

	1	2	3	4	5	6	7	8																																																																
A	THIS DRAWING AND SPECIFICATIONS, HEREIN, ARE THE PROPERTY OF INVENTEC CORPORATION AND SHALL NOT BE REPRODUCED, COPIED, OR USED IN WHOLE OR IN PART AS THE BASIS FOR THE MANUFACTURE OR SALE OF ITEMS WITHOUT WRITTEN PERMISSION, INVENTEC CORPORATION 2010 ALL RIGHT RESERVED								A																																																															
	HSF Property : <b>Halogen-Free</b>																																																																							
B	<div>ROMEO DISCRETE PV2 BUILD</div> <div>2010/04/01</div>								B																																																															
C									C																																																															
D									D																																																															
E									E																																																															
F									<table><tr><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td></tr><tr><td>DATE</td><td>CHANGE NO.</td><td>REV</td></tr></table>																													DATE	CHANGE NO.	REV	<table><tr><td>DRAWER</td><td>EE</td><td>DATE</td><td>POWER</td><td>DATE</td></tr><tr><td>DESIGN</td><td></td><td></td><td></td><td></td></tr><tr><td>CHECK</td><td></td><td></td><td></td><td></td></tr><tr><td>RESPONSIBLE</td><td></td><td></td><td></td><td></td></tr></table>		DRAWER	EE	DATE	POWER	DATE	DESIGN					CHECK					RESPONSIBLE					<table><tr><td colspan="3">INVENTEC</td></tr><tr><td colspan="3">TITLE ROMEO</td></tr><tr><td>SIZE A3</td><td>CODE CS</td><td>DOC. NUMBER 1310A23166-0-MTR</td></tr><tr><td>FILE NAME XXXX-XXXXXX-XX</td><td>VER 3</td><td>REV A01</td></tr><tr><td>P/N XXXXXXXXXXXX</td><td>SHEET 1</td><td>OF 66</td></tr></table>		INVENTEC			TITLE ROMEO			SIZE A3	CODE CS
DATE	CHANGE NO.	REV																																																																						
DRAWER	EE	DATE	POWER	DATE																																																																				
DESIGN																																																																								
CHECK																																																																								
RESPONSIBLE																																																																								
INVENTEC																																																																								
TITLE ROMEO																																																																								
SIZE A3	CODE CS	DOC. NUMBER 1310A23166-0-MTR																																																																						
FILE NAME XXXX-XXXXXX-XX	VER 3	REV A01																																																																						
P/N XXXXXXXXXXXX	SHEET 1	OF 66																																																																						
	1	2	3	4	5	6	7	8																																																																

## Index

### PAGE

01. PROJECT NAME
02. INDEX
03. Block Diagram
04. POWER Procedure
05. +V3A & +V5A
06. +V1.5 & +V0.75
07. +V1.8S & +V1.05S
08. +VTT & +VDDC\_GPU
09. +VGFX\_CORE
10. +VCC\_CORE
11. +V5S & +V3S & +V1.5S
12. CLK GEN
13. CPU-1
14. CPU-2
15. CPU-3
16. CPU-4
17. CPU-5
18. CPU-6
19. Thermal & Fan
20. DDR3-1
21. DDR3-2
22. PCH-1
23. PCH-2
24. PCH-3
25. PCH-4
26. PCH-5
27. PCH-6
28. PCH-7

### PAGE

29. PCH-8
30. PCH-9
31. KBC
32. Keyboard & TouchPad
33. eSATA & USB COMBO
34. LCM switch & CONN
35. LCM switch
36. HDMI CONN
37. Mini DISPLAY PORT CONN
38. LAN
39. RJ-45
40. EMI CAP. & SCREW
41. Audio, PWB, ODD Board & HDD CONN
42. CHG BOARD & WWAN BOARD CONN
43. WLAN & HDD PROTECTION
44. CARD READER
45. GPU-1
46. GPU-2
47. GPU-3
48. GPU-4
49. GPU-5
50. GPU-6
51. GPU-7
52. VRAM-1
53. VRAM-2
54. VRAM-3
55. VRAM-4

### PAGE

56. AUDIO BOARD-1 & USB CONN
57. AUDIO BOARD-2
58. AUDIO BOARD-3
59. ODD EXT BOARD
60. POWER BUTTON BOARD
61. WC BOARD-1 & BT
62. WC BOARD-2
63. CHG BOARD-1
64. CHG BOARD-2
65. CHG BOARD-3

**INVENTEC**

TITLE <b>Romeo</b> <i>Index</i>			
SIZE <b>A3</b>	CODE <b>CS</b>	DOC. NUMBER <b>1310A23166-0-MTR</b>	REV <b>A01</b>
SHEET <b>2</b>		OF <b>66</b>	

CHANGE by *Evan Shih* 5-Feb-2010

Inventec Confidential

Arrandale/  
Clarksfield  
(Socket-rPGA989)

DDR3 SO-DIMM 1  
800/1066/1333 MHz , 8GB maximum memory P20

DDR3 SO-DIMM 2  
800/1066/1333 MHz , 8GB maximum memory P21

PCH  
HM-55

USB 0  
ESATA+USB  
P33

USB 1  
Card Reader  
P44

USB 2  
WLAN+BT  
P42/P60

USB 3  
WWAN  
P60

USB 4  
Touchscreen  
P42

USB 5  
Webcam  
P34

USB 8  
USB CONN01  
P46

USB 9  
USB CONN02  
P41

USB 10  
Bluetooth  
P39

USB 11  
FingerPrint  
P39

MAIN BATT  
P06

System Charger  
DC / DC System Power  
P05

SPI ROM  
EC FW  
(BIOS)  
P31

SPI ROM  
BIOS  
P24

IDT 92HD80  
AudioCodec  
P42

ITE IT8502E  
KBC  
P31

Keyboard  
P32

Touchpad  
P32

Accelerometer  
ST Micro HP302DLTR8-MBD  
P42

P55 SPKR

P56 HP JACK

P56 COMBOL JACK

P34 int DMIC

WLAN + BT  
MiniCard  
P60

RTL8111DL  
GLAN  
P37

RJ-45  
P38

ESATA  
P44

SATA ODD  
P40

SATA HDD  
P40

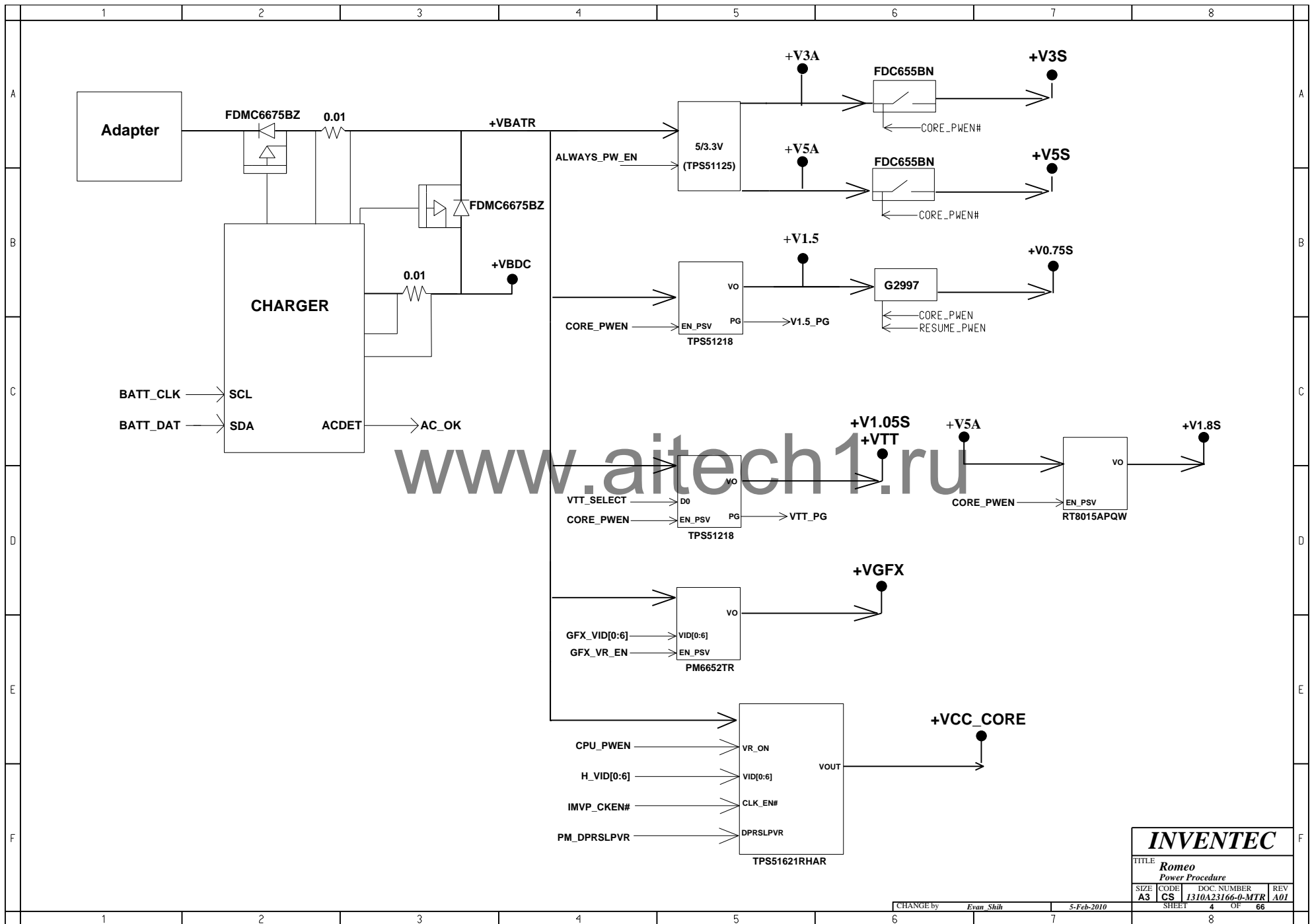
CLK GEN  
SLG 8SP585  
P12

Thermal meter  
TI TMP431A  
P46

INVENTEC

TITLE Romeo Block Diagram			
SIZE A3	CODE CS	DOC NUMBER 1310A23166-0-MTR	REV A01
SHEET 3		OF 66	

CHANGE by Evan Shih 5-Feb-2010

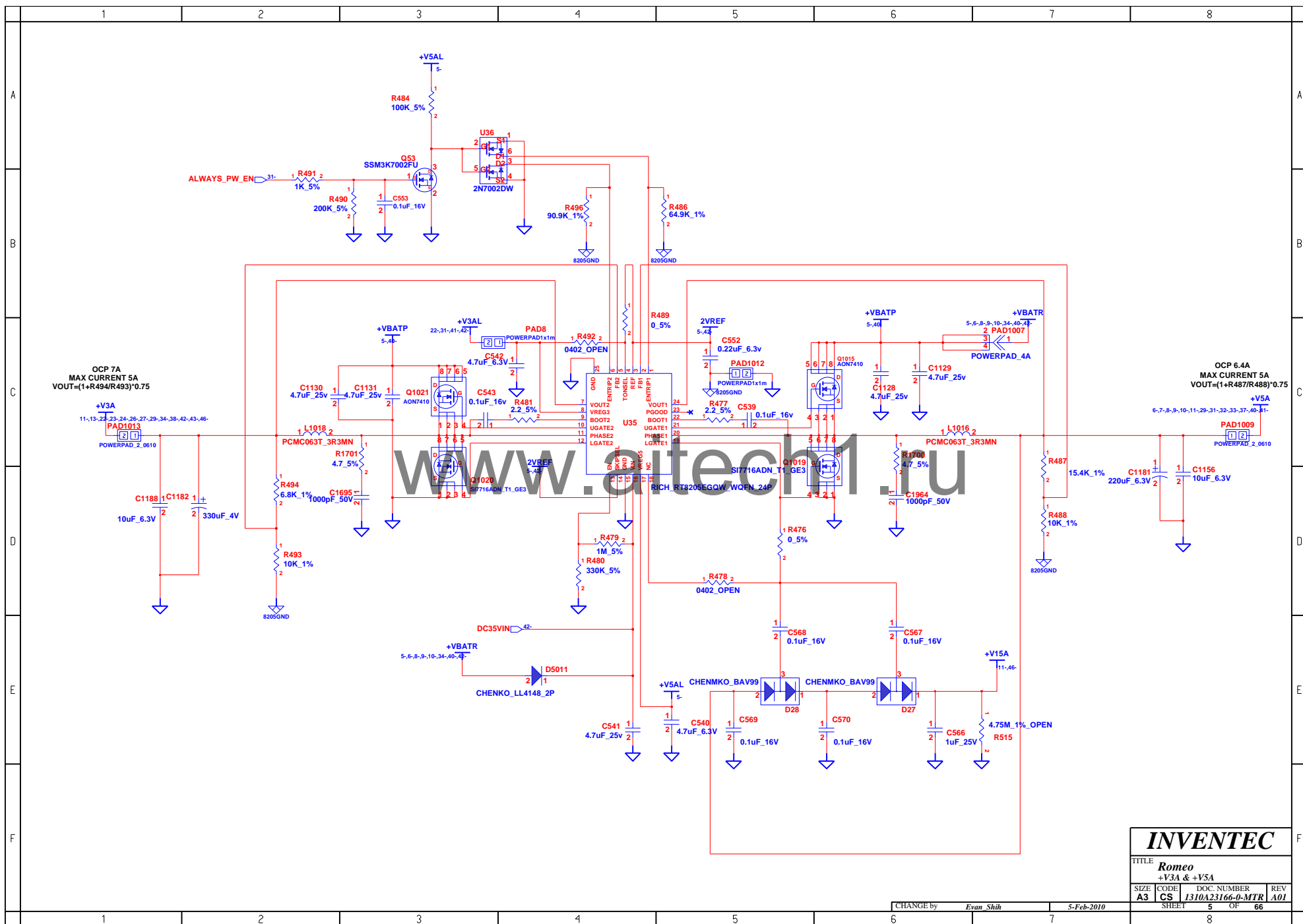


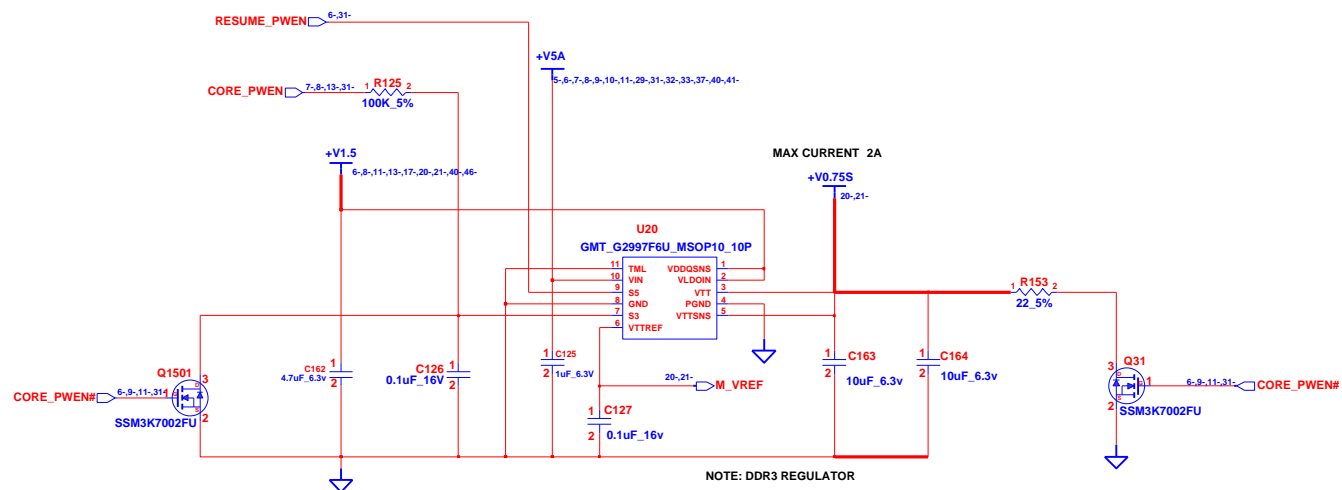
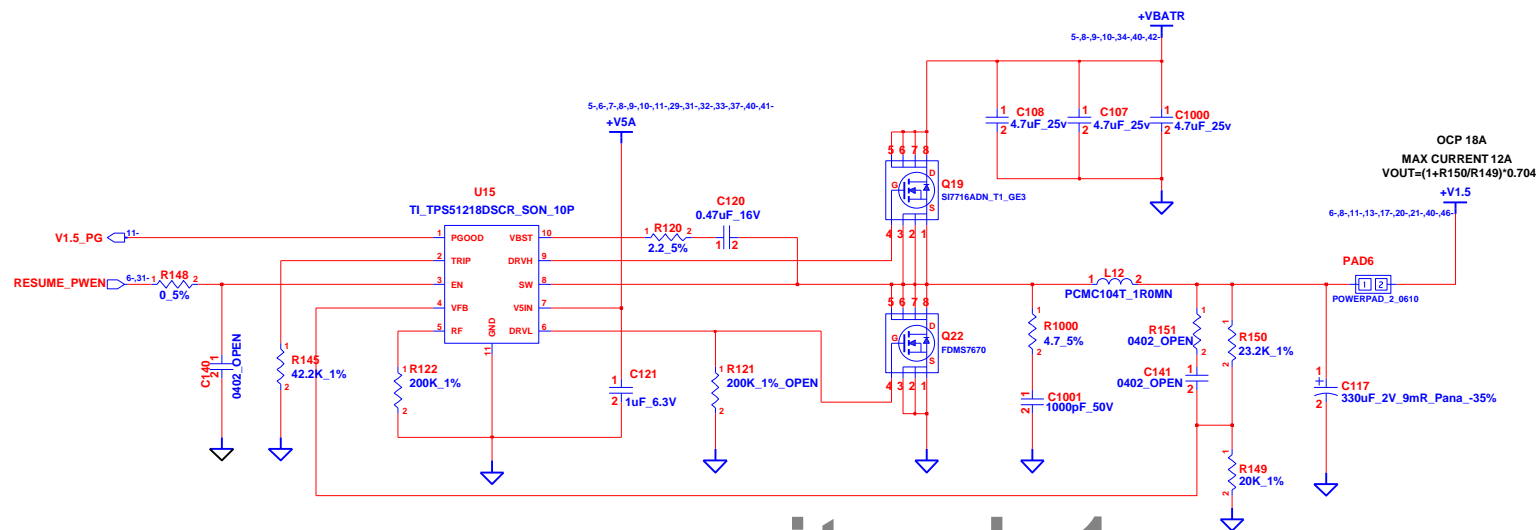
**INVENTEC**

TITLE			
Romeo			
Power Procedure			
SIZE	CODE	DOC. NUMBER	REV
A3	CS	1310A23166-0-MTR	A01
SHEET		4	OF 66

CHANGE by *Evan Shih* 5-Feb-2010

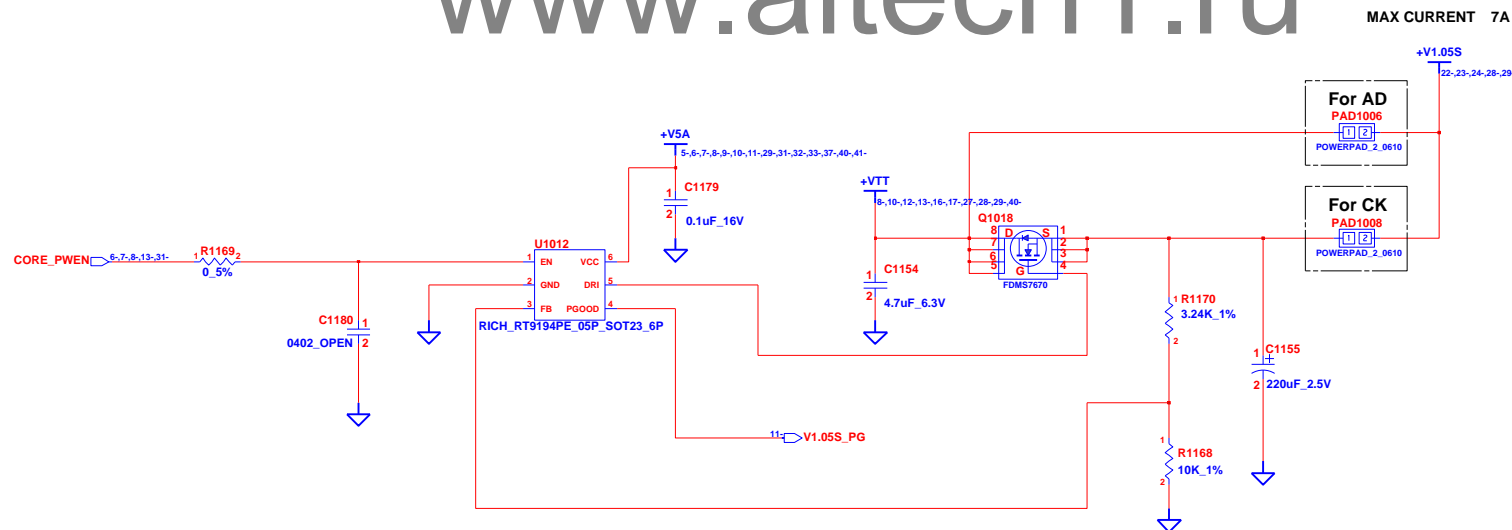
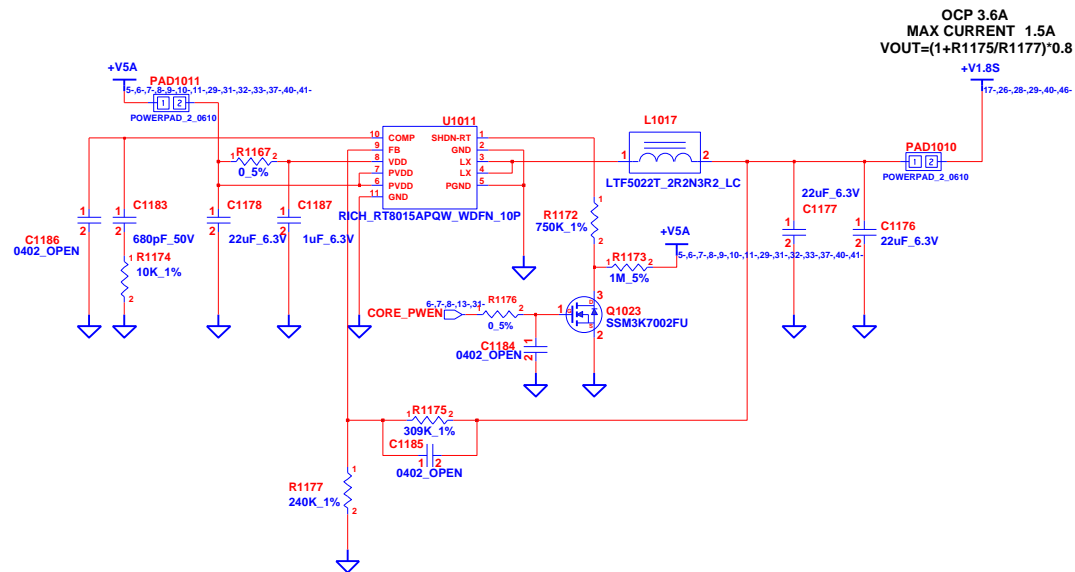






INVENTEC			
TITLE			
Romeo			
+V1.5 & +V0.75			
SIZE	CODE	DOC. NUMBER	REV
A3	CS	1310A23166-0-MTR	A01
SHEET		6	OF 66

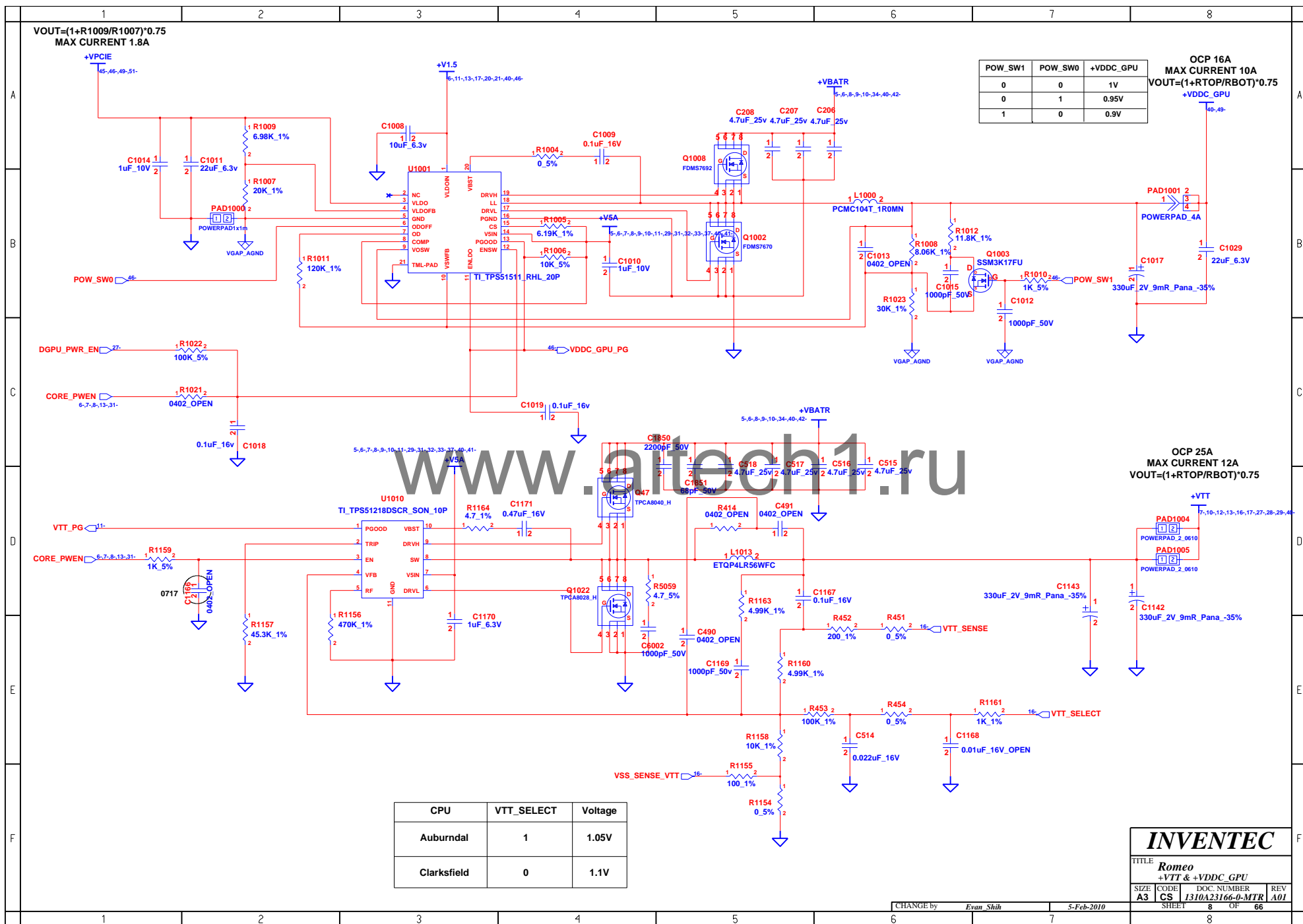
CHANGE by Evan Shih 5-Feb-2010

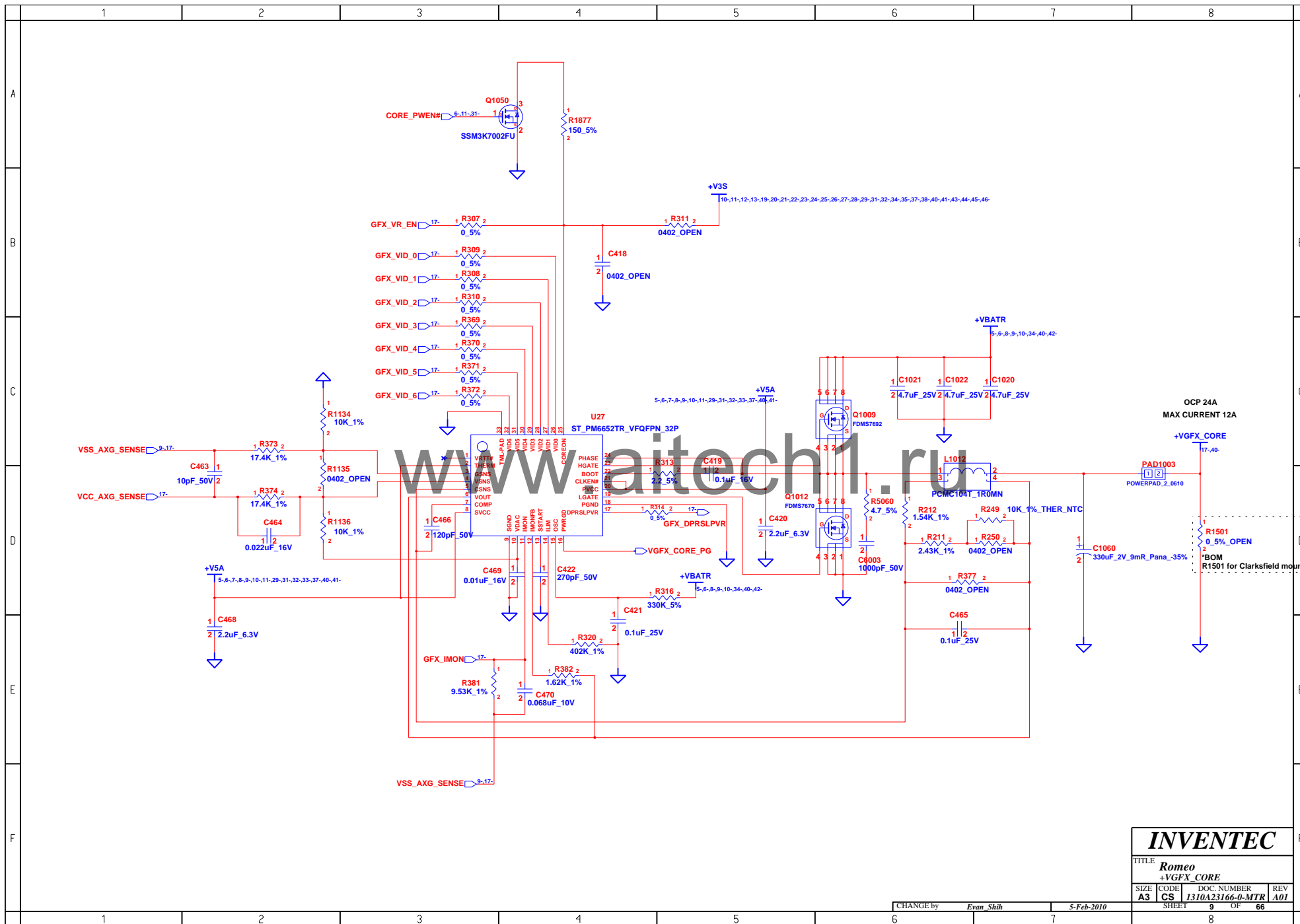


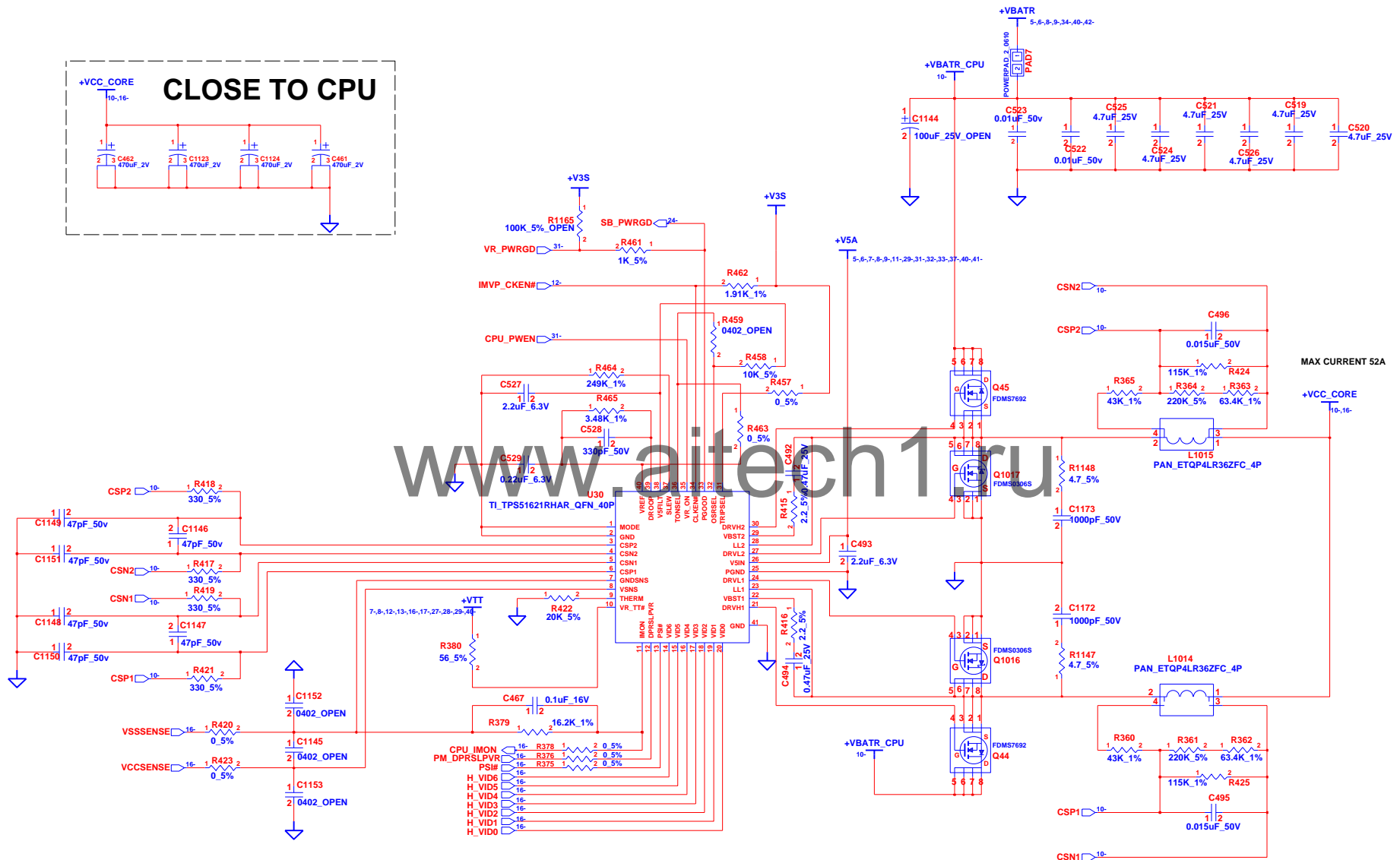
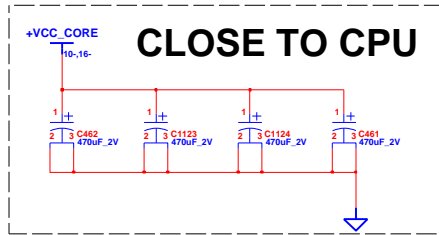
**INVENTEC**

TITLE			
Romeo			
+V1.8S & +V1.05S			
SIZE	CODE	DOC. NUMBER	REV
A3	CS	1310A23166-0-MTR	A01
SHEET		7	OF 66

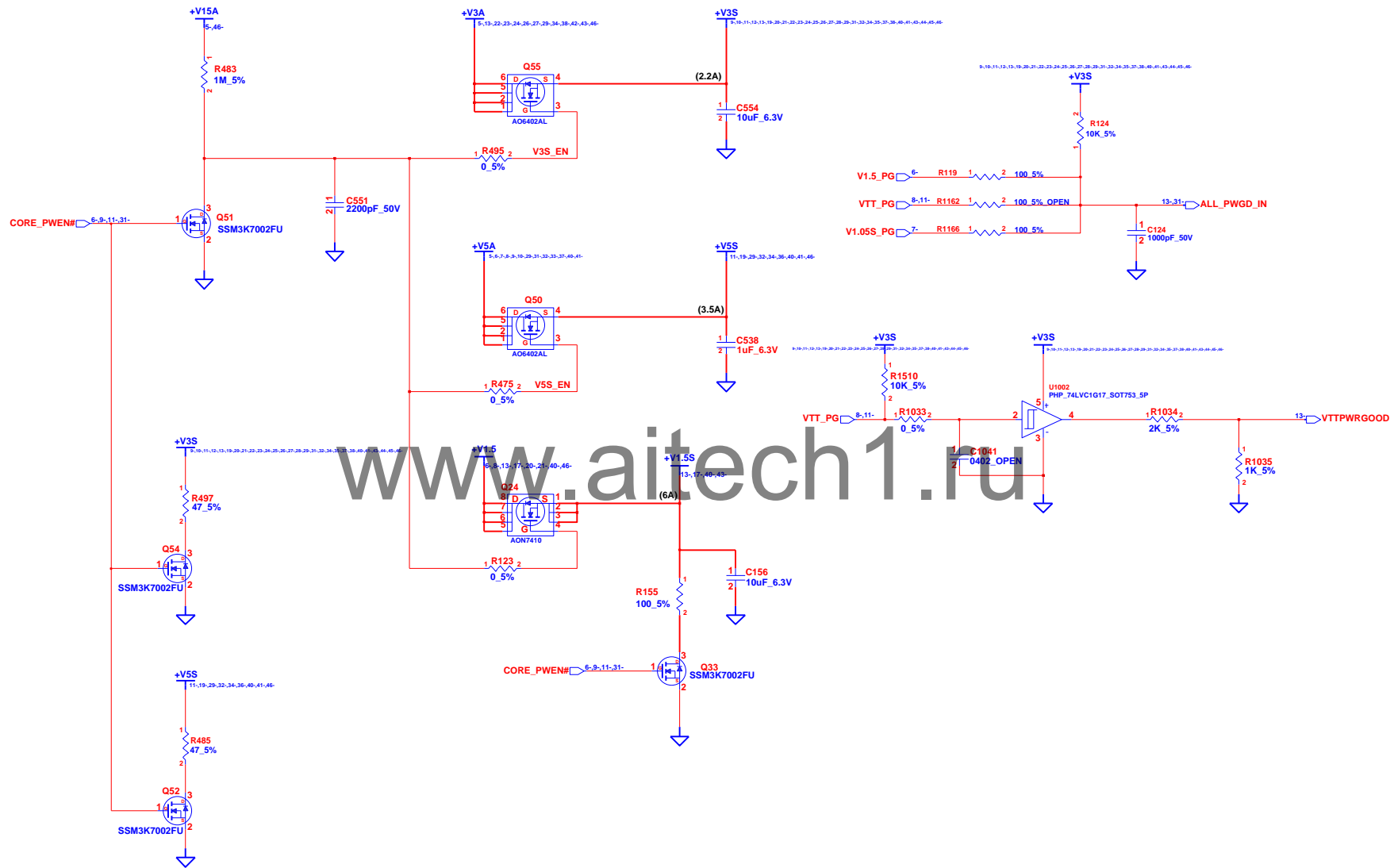
CHANGE by *Evan Shih* 5-Feb-2010







INVENTEC			
TITLE Romeo +VCC_CORE			
SIZE A3	CODE CS	DOC. NUMBER 1310A23166-0-MTR	REV A01
CHANGE by Evan Shih		5-Feb-2010	
SHEET 10		OF 66	

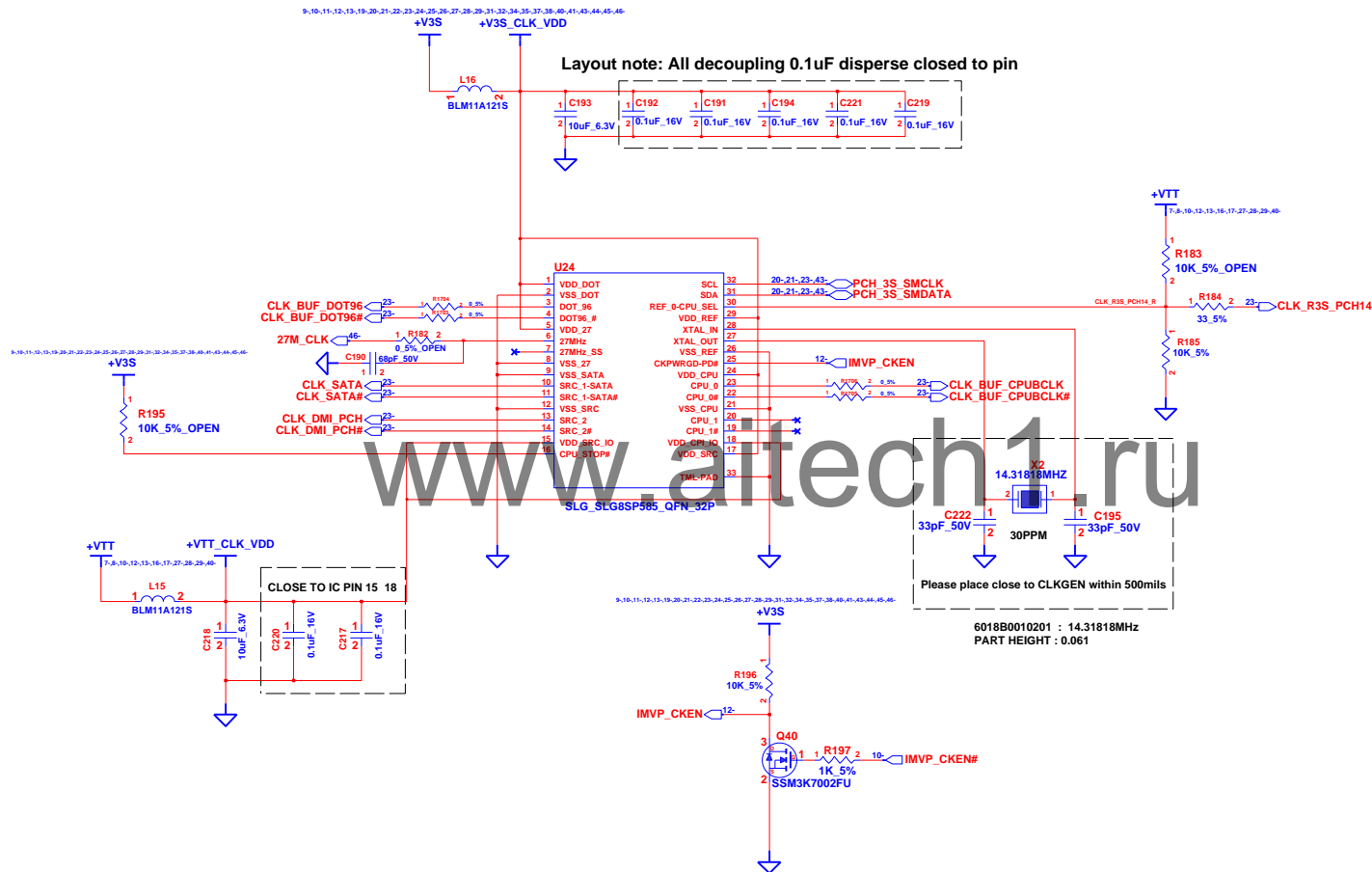


www.aitech1.ru

**INVENTEC**

TITLE			
Romeo			
+V5S & +V3S			
SIZE	CODE	DOC. NUMBER	REV
A3	CS	1310A23166-0-MTR	A01
SHEET		11	OF 66

CHANGE by *Evan Shih* 5-Feb-2010

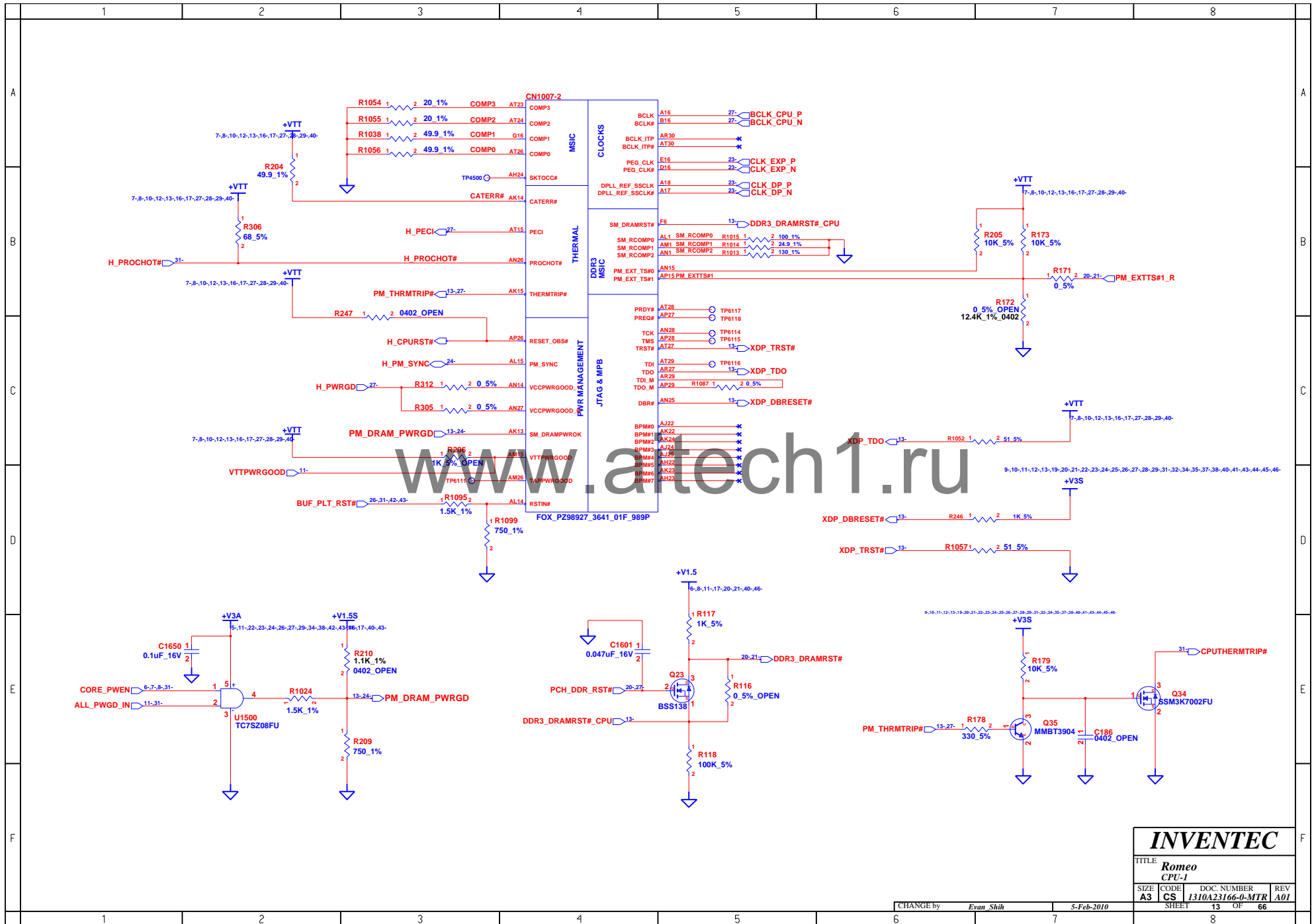


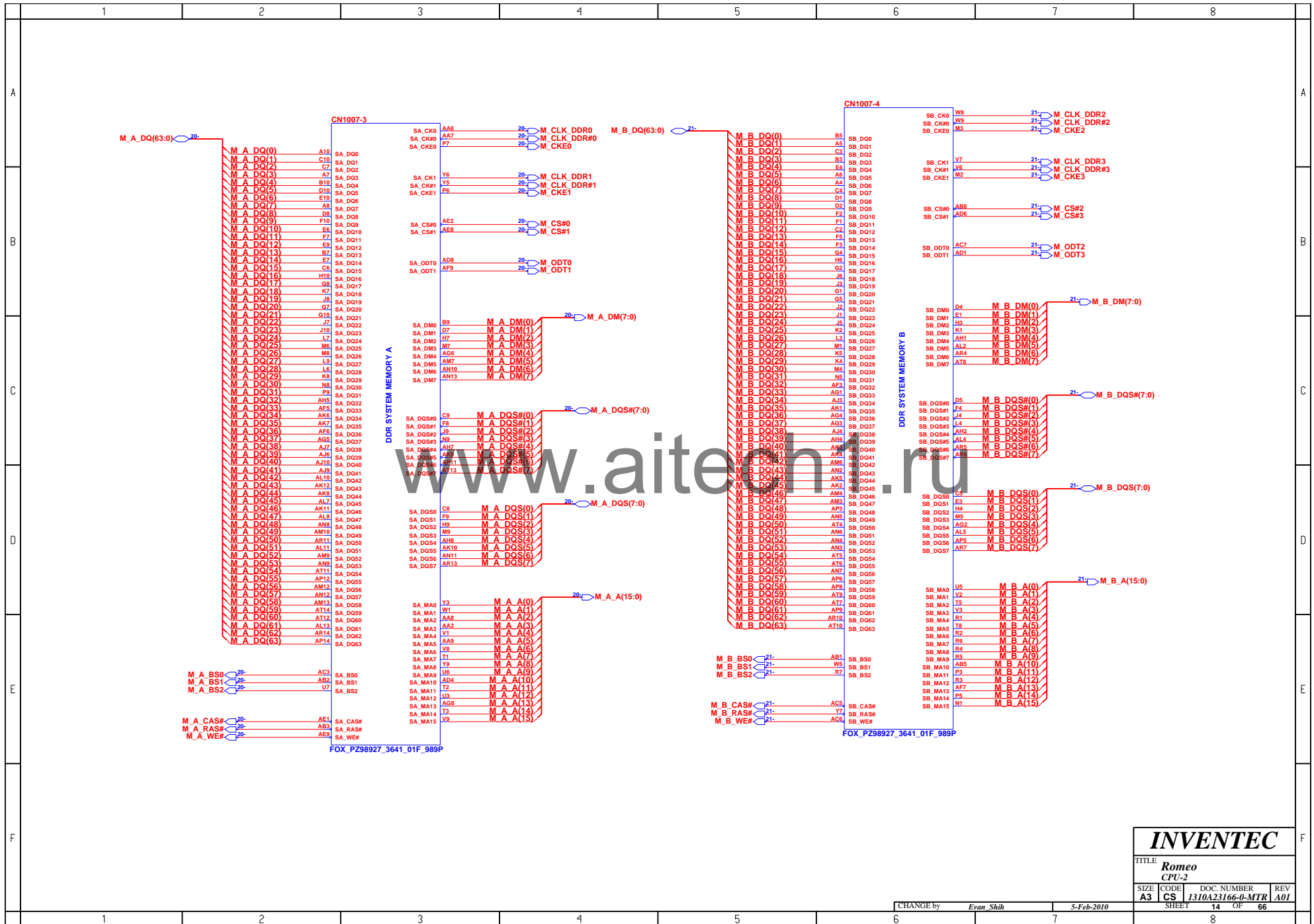
**INVENTEC**

TITLE <b>Romeo CLK GEN</b>			
SIZE <b>A3</b>	CODE <b>CS</b>	DOC. NUMBER <b>I310A23166-0-MTR</b>	REV <b>A01</b>
SHEET <b>12</b>		OF <b>66</b>	

CHANGE by *Evan Shih* 5-Feb-2010





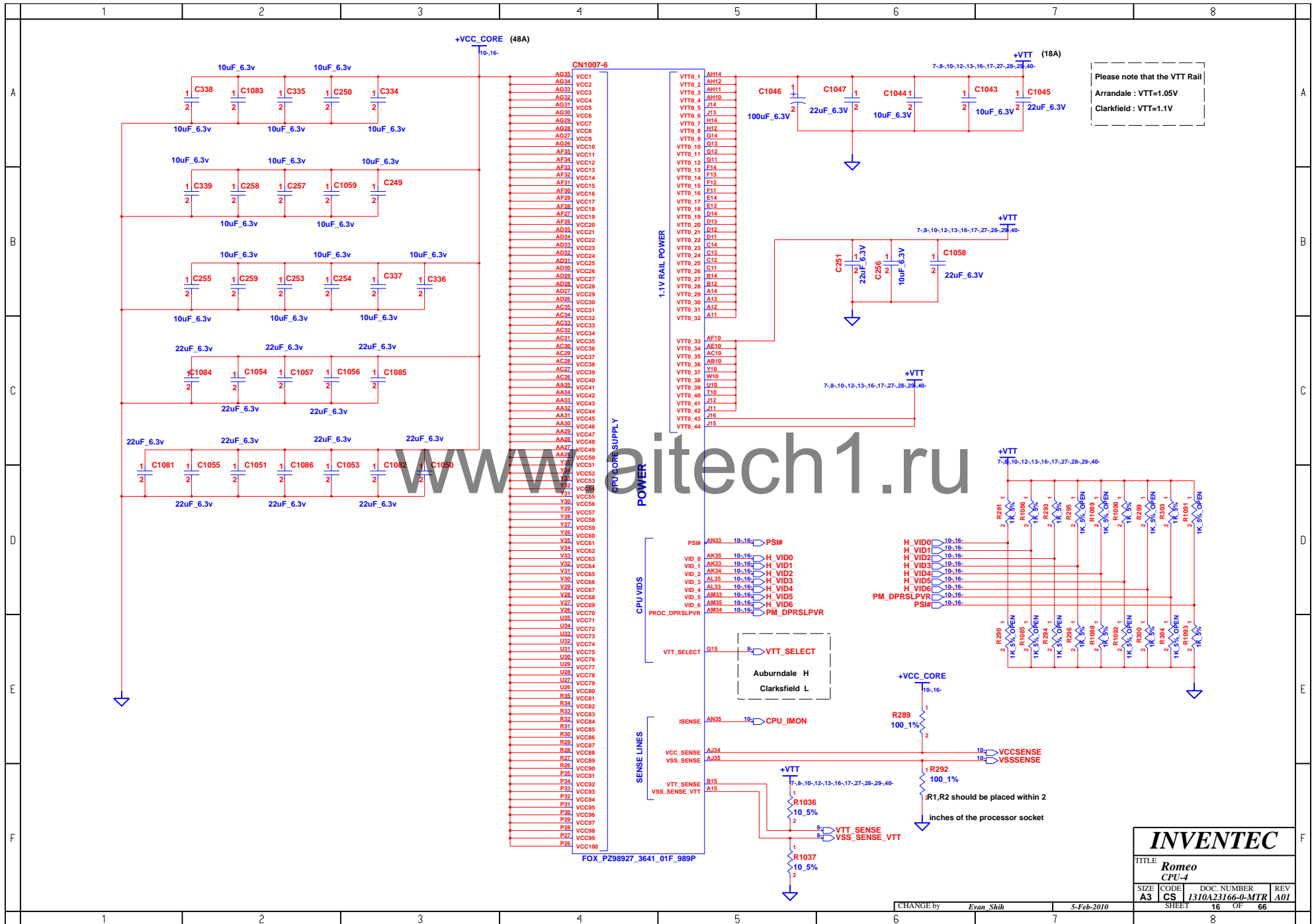


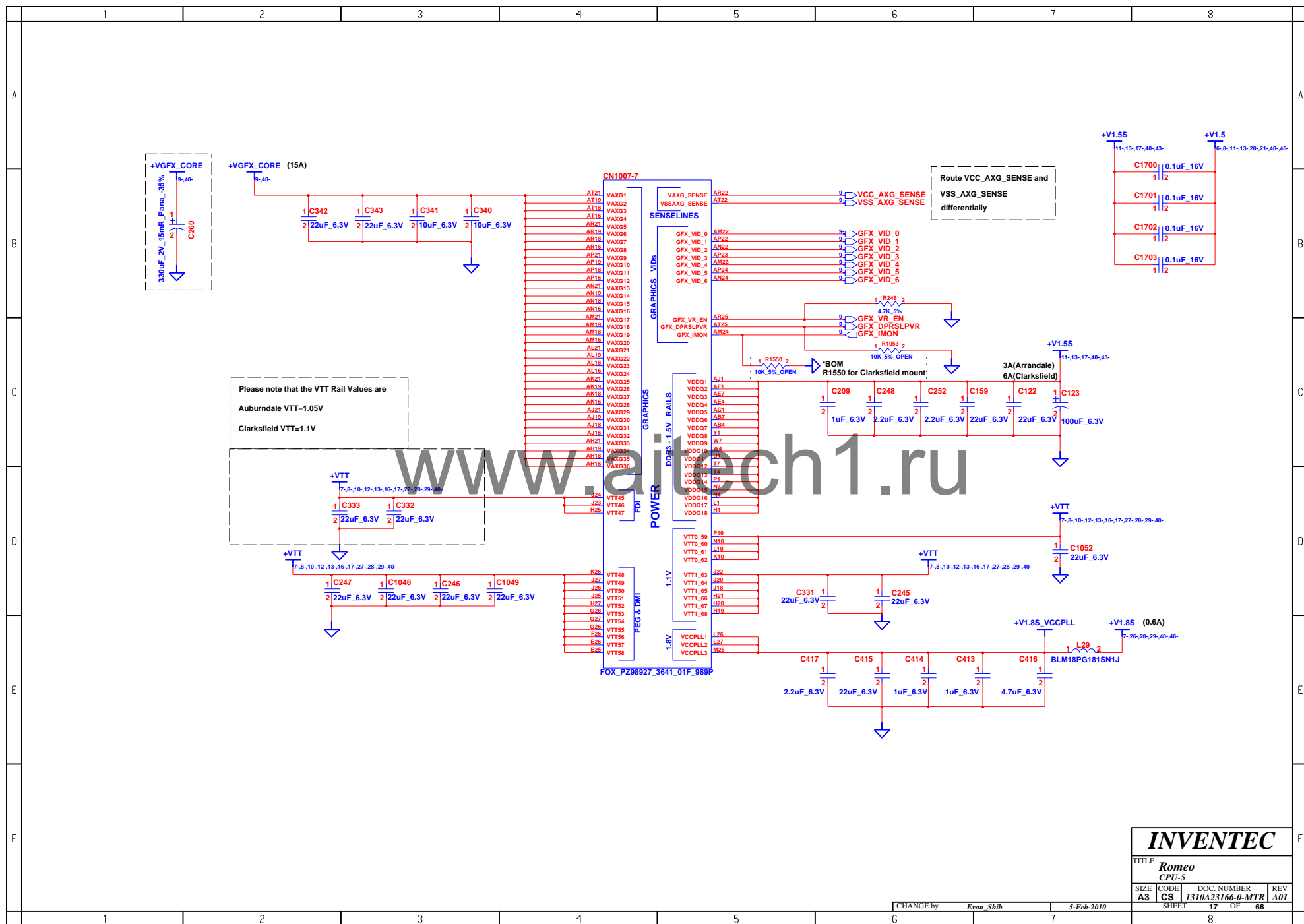
**INVENTEC**

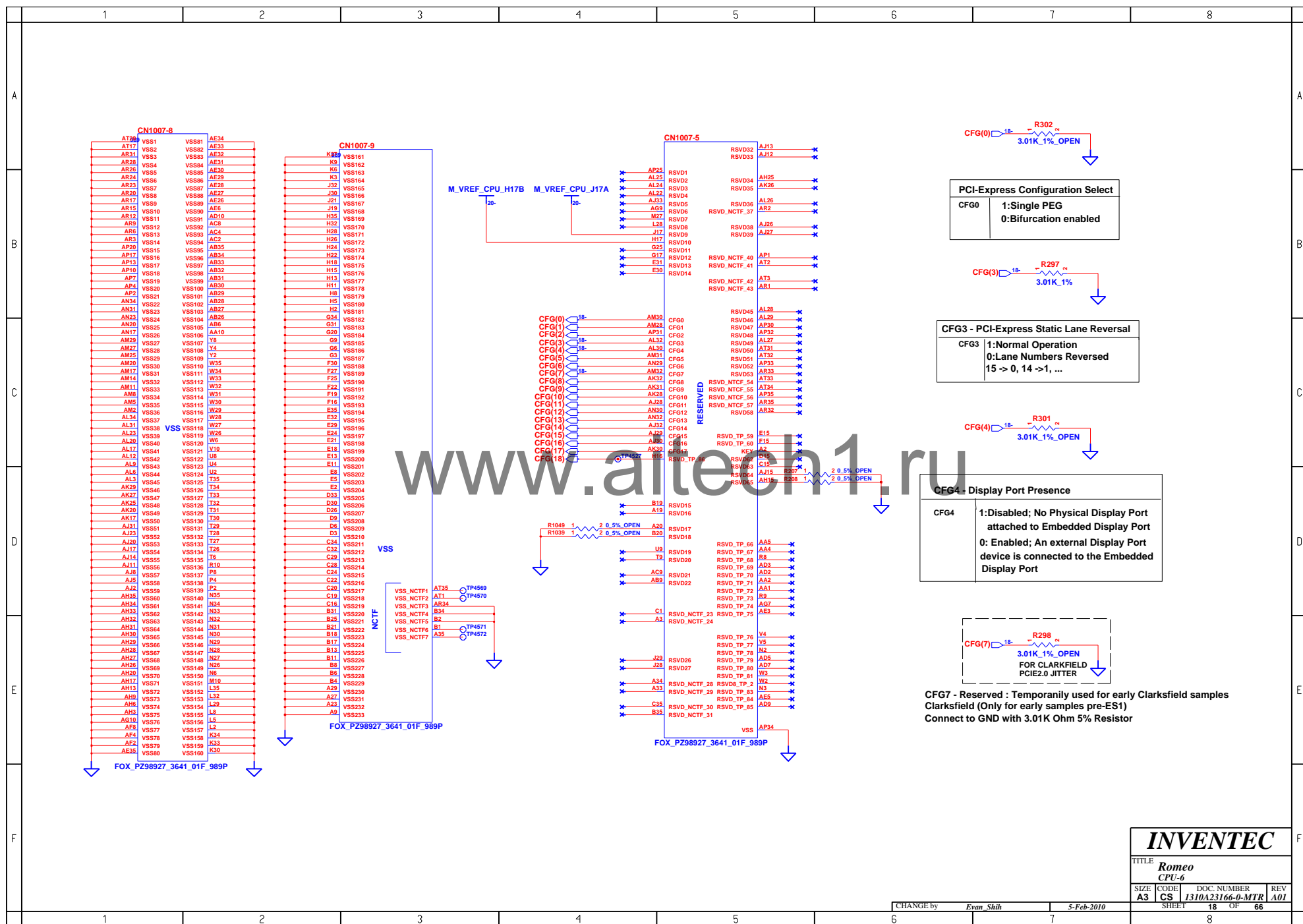
TITLE <b>Romeo CPU-2</b>			
SIZE <b>A3</b>	CODE <b>CS</b>	DOC. NUMBER <b>1310A23166-0-MTR</b>	REV <b>A01</b>
SHEET 14 OF 66			

CHANGE by *Evan Shih* 5-Feb-2010

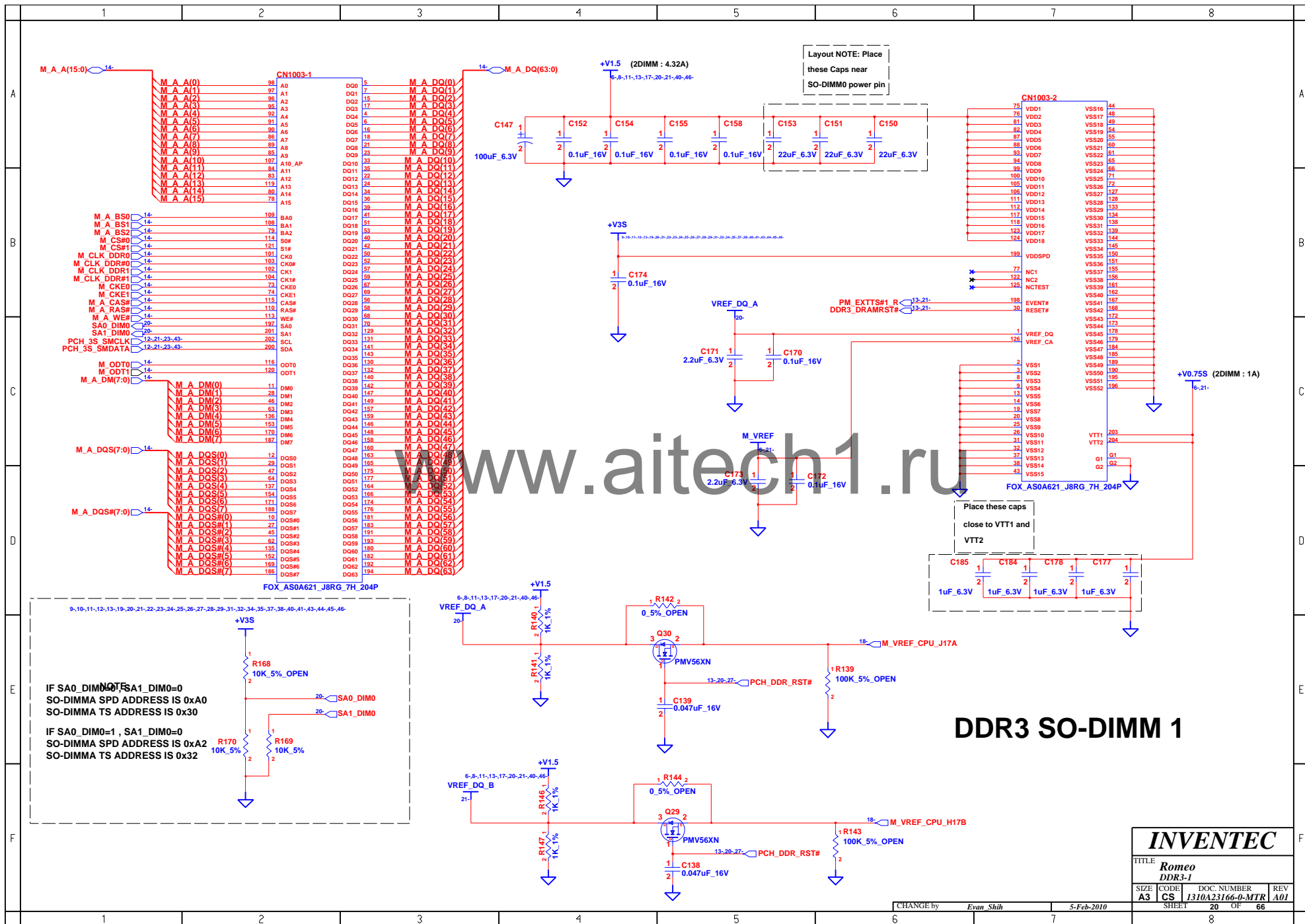






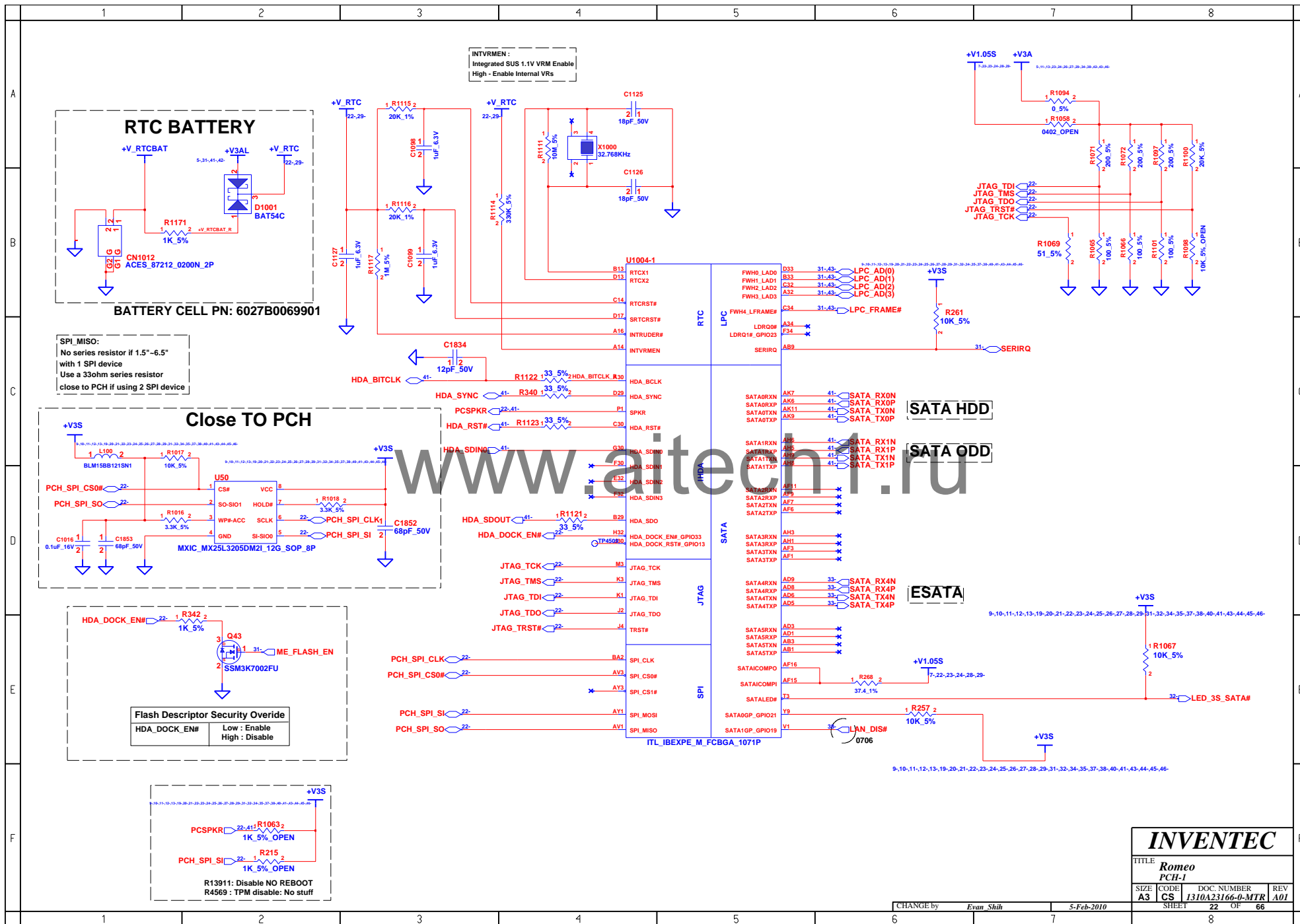












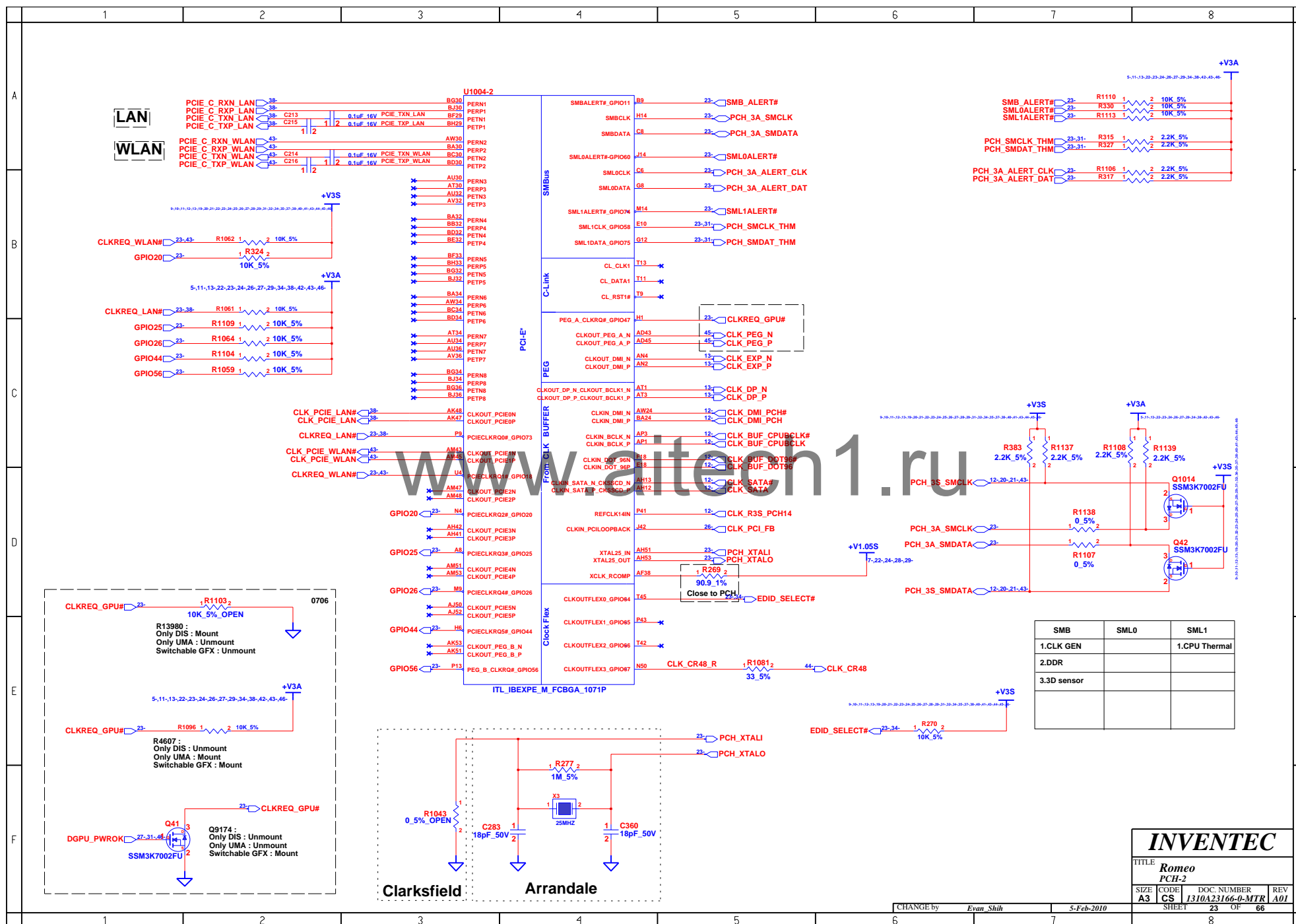
**INVENTEC**

TITLE  
**Romeo  
PCH-1**

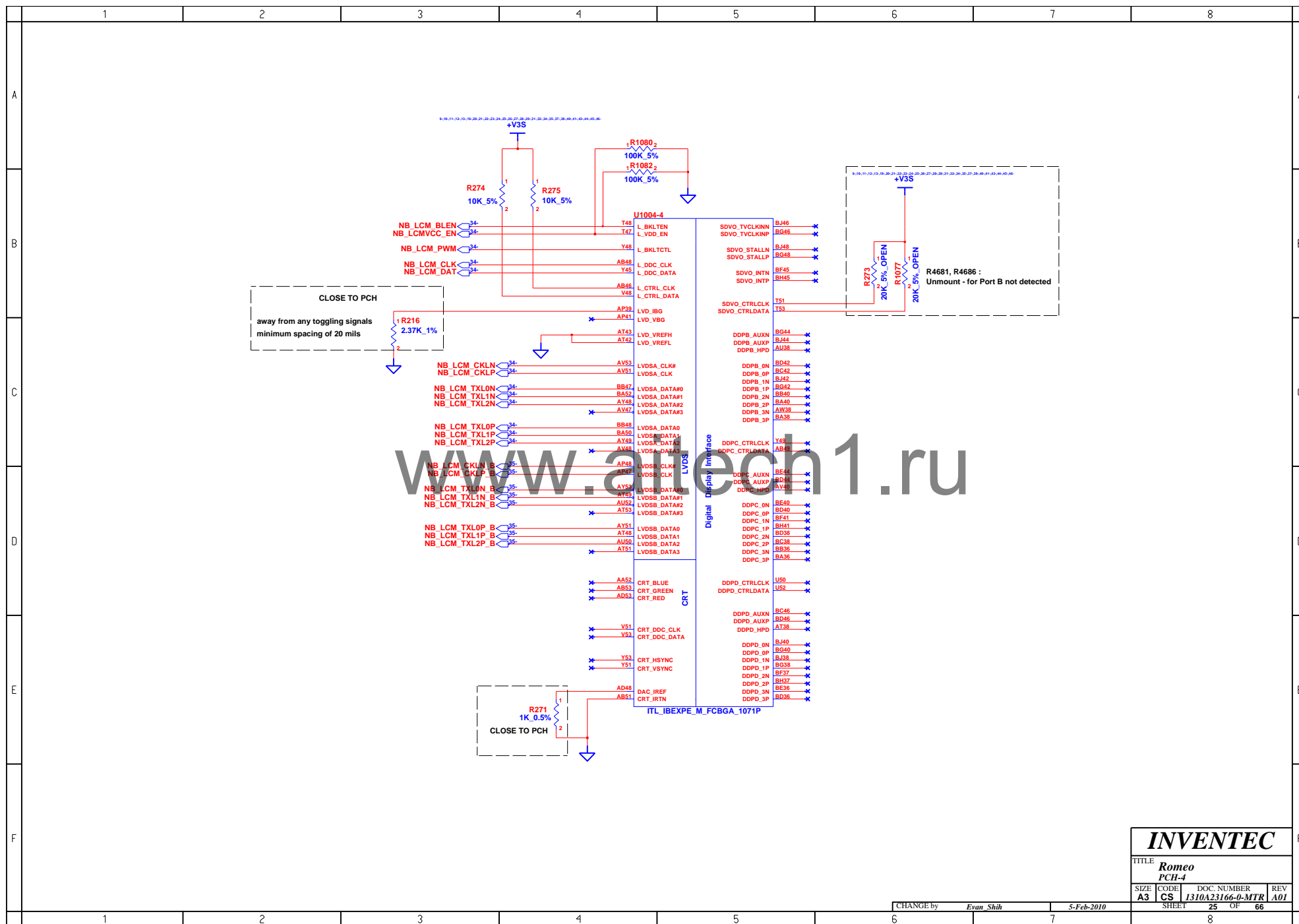
SIZE CODE CS 1310A23166-0-MTR REV A01

SHEET 22 OF 66

CHANGE by Evan Shih 5-Feb-2010

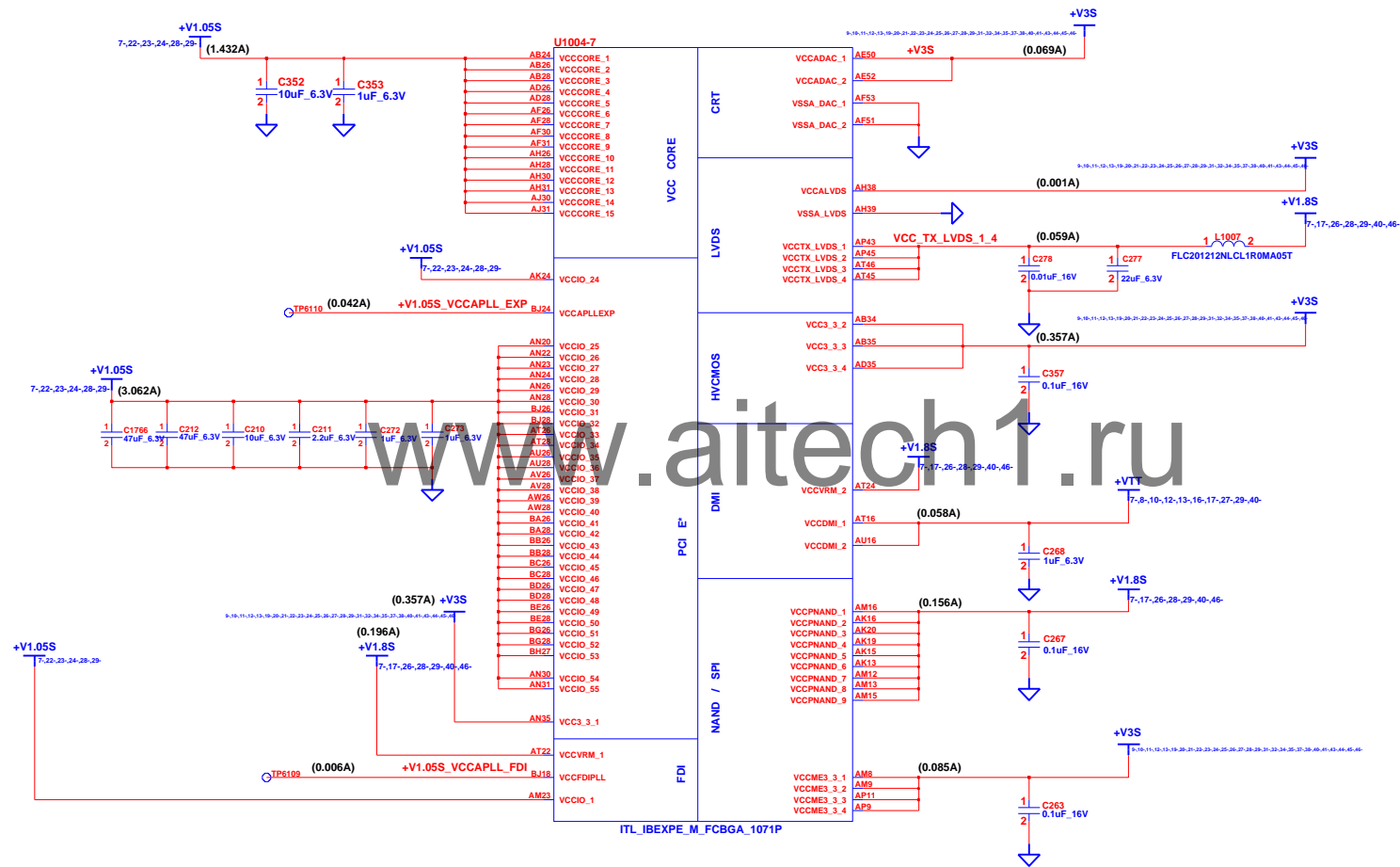






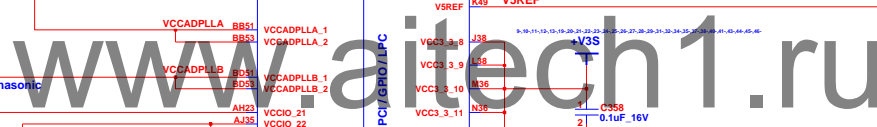




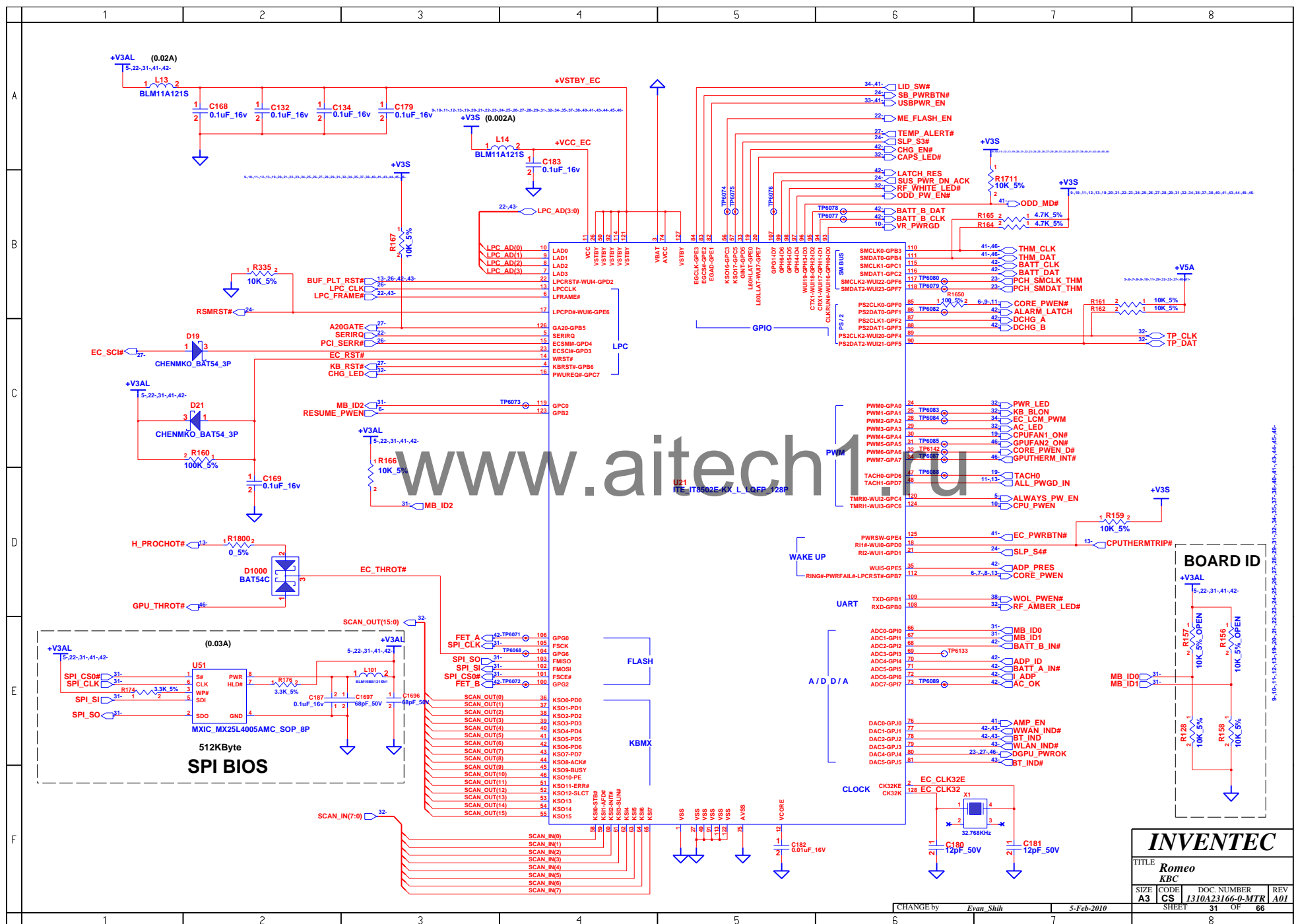


INVENTEC			
TITLE Romeo PCH-7			
SIZE A3	CODE CS	DOC. NUMBER 1310A23166-0-MTR	REV A01
CHANGE by Evan Shih		5-Feb-2010	
SHEET 28		OF 66	

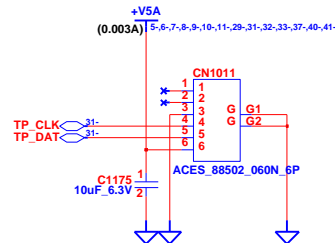




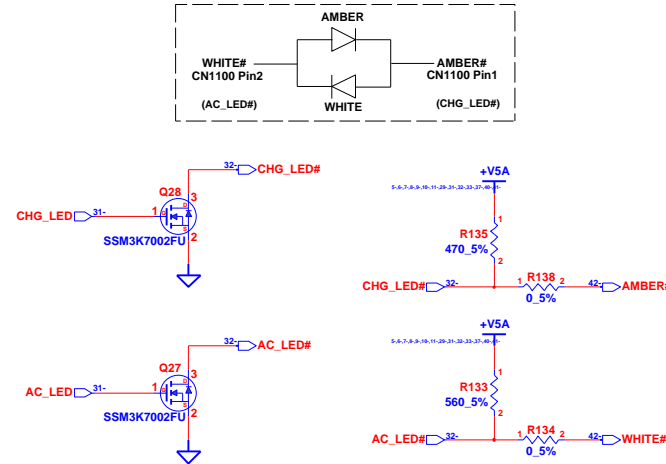




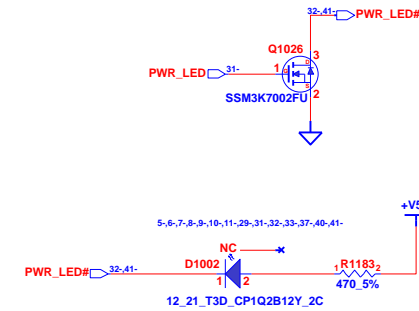
## TouchPad Module CONN



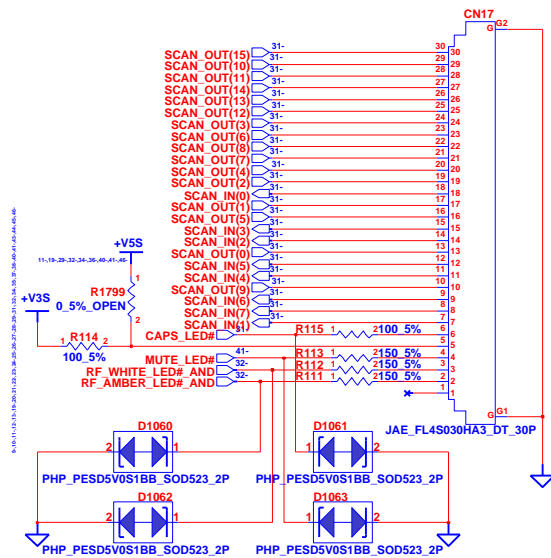
## DC-JACK LED



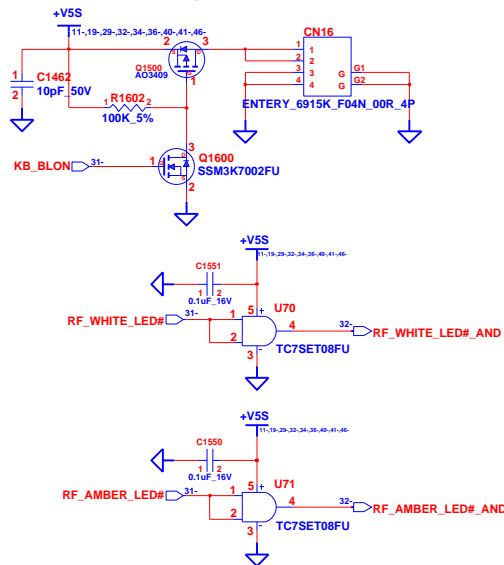
## POWER LED



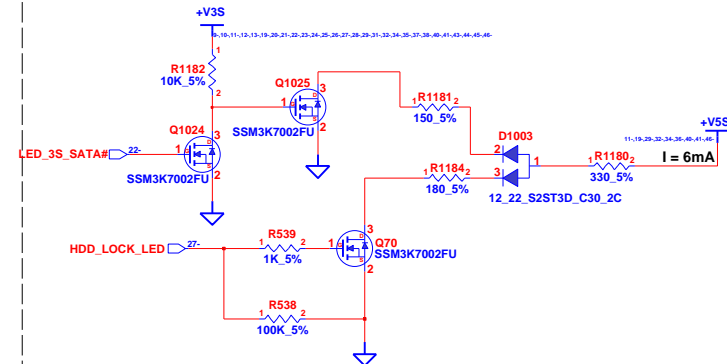
## KeyBoard CONN (30 pin)



## Backlight connector



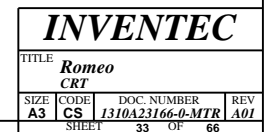
## SATA LED & HDD-HALTED LED

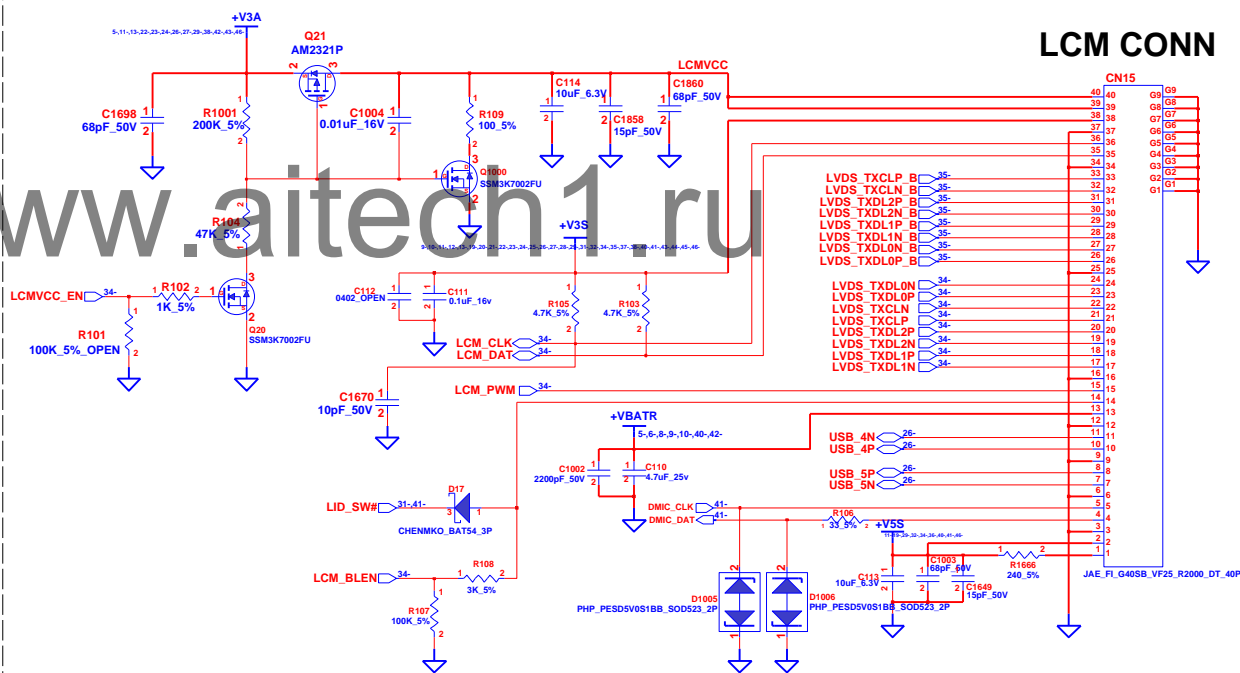


**INVENTEC**

TITLE			
Romeo			
Keyboard & Touchpad			
SIZE	CODE	DOC NUMBER	REV
A3	CS	1310A23166-0-MTR	A01
SHEET		32	OF 66

CHANGE by Evan Shih 5-Feb-2010

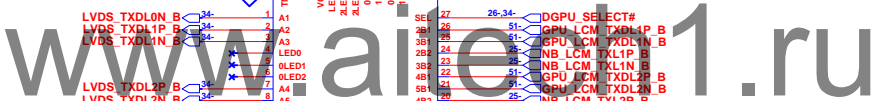




**INVENTEC**

TITLE *Romeo*  
*LCM*

SIZE	CODE	DOC. NUMBER	R
A3	CS	1310A23166-0-MTR	A
SHEET		34	OF 66

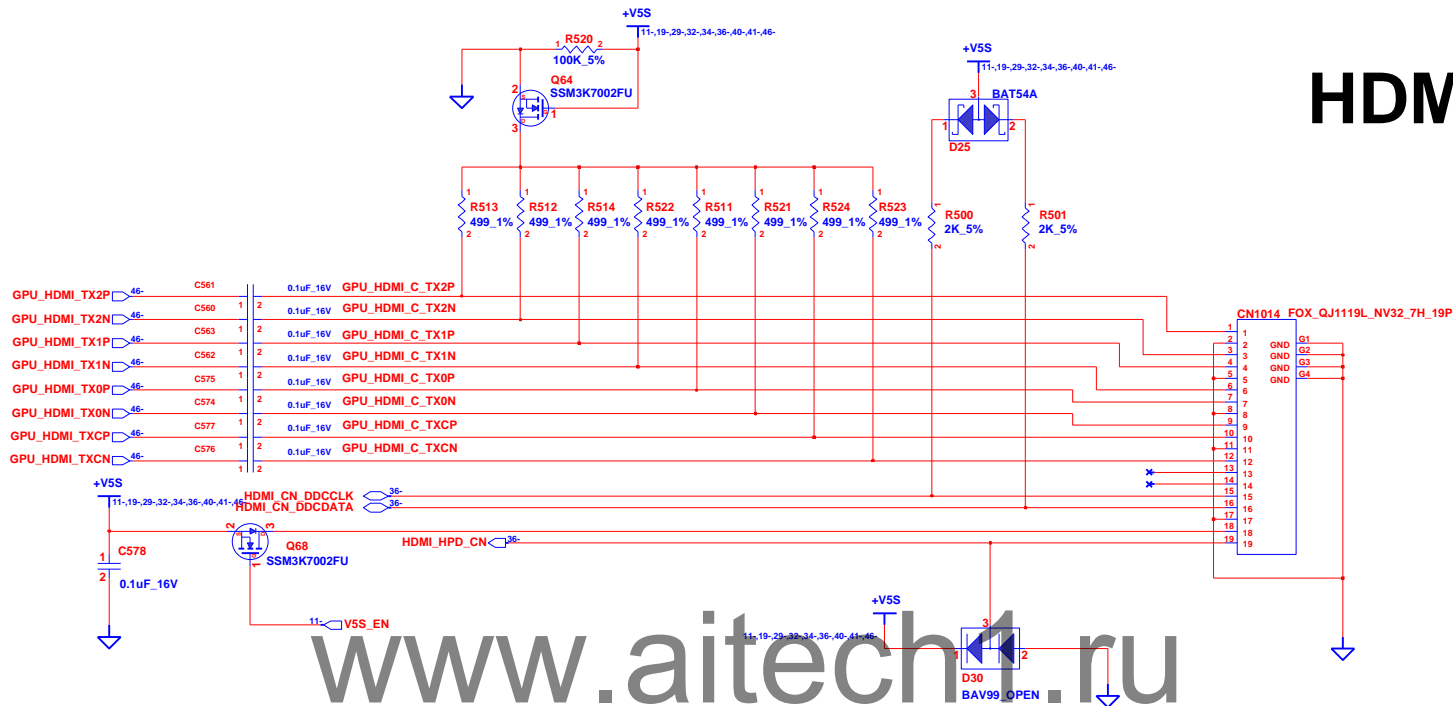


***INVENTEC***

SIZE <b>A3</b>	CODE <b>CS</b>	DOC. NUMBER <b>1310A23166-0-MTR</b>	REV <b>A01</b>
SHEET		35	OF 66

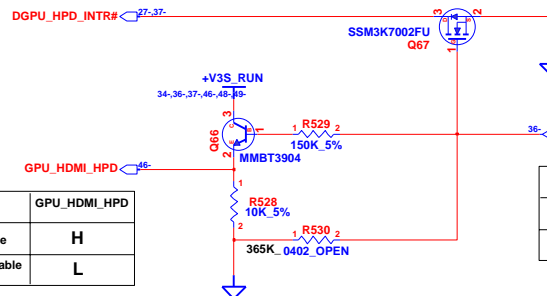
CHANGE by	<i>Evan Shih</i>	<i>5-Feb-2010</i>
-----------	------------------	-------------------

# HDMI



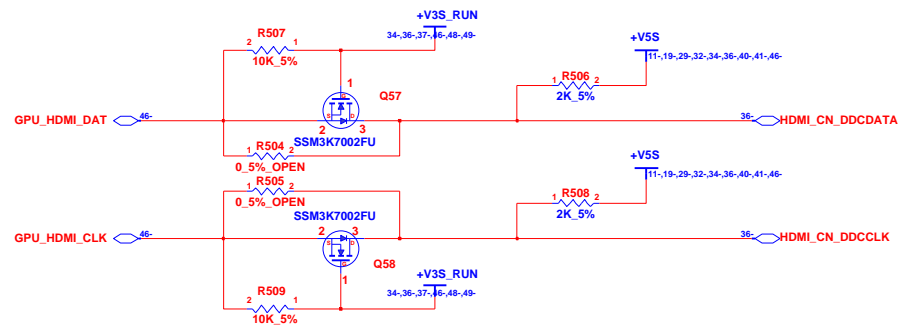
www.aitech1.ru

	DGPU_HPD_INTR#
Plug Cable	L
Unplug Cable	H



	GPU_HDMI_HPD
Plug Cable	H
Unplug Cable	L

	HDMI_HPD_CN
Plug Cable	H
Unplug Cable	L



**INVENTEC**

TITLE <b>Romeo HDMI</b>			
SIZE <b>A3</b>	CODE <b>CS</b>	DOC. NUMBER <b>1310A23166-0-MTR</b>	REV <b>A01</b>

CHANGE by *Evan Shih* 5-Feb-2010

SHEET 36 OF 66



# Mini Display Port

The schematic diagram illustrates the internal circuitry of a Mini Display Port. Key components and their connections include:

- Power and Ground:** The circuit is powered by +V3S\_RUN\_DP, +V3S\_RUN, +V5A, and +V3S. Ground connections are shown throughout the diagram.
- Transistors:** Q59, Q65, Q60, and Q63 are MOSFETs used for signal processing and switching. Q59 and Q65 are connected to the DP\_AUXN\_CN and DP\_AUXP\_CN pins. Q60 and Q63 are connected to the DP\_HPD\_CN pin.
- Capacitors:** Various capacitors (C571, C572, C548, C549, C1197, C1198, C1199, C550, C564) are used for decoupling and timing. C571 and C572 are connected to the DP\_AUXN\_CN and DP\_AUXP\_CN pins. C548 and C549 are connected to the DP\_HPD\_CN pin. C1197, C1198, and C1199 are connected to the DP\_AUXN\_CN, DP\_AUXP\_CN, and DP\_HPD\_CN pins. C550 and C564 are connected to the DP\_HPD\_CN pin.
- Resistors:** Resistors (R526, R527, R525, R516, R517, R510, R1179) are used for current limiting and signal conditioning. R526 and R527 are connected to the DP\_AUXN\_CN and DP\_AUXP\_CN pins. R525 is connected to the DP\_HPD\_CN pin. R516 and R517 are connected to the DP\_HPD\_CN pin. R510 and R1179 are connected to the DP\_HPD\_CN pin.
- Diodes:** Diodes D26, D28, and D31 are used for signal protection and rectification. D26 and D28 are connected to the DP\_AUXN\_CN and DP\_AUXP\_CN pins. D31 is connected to the DP\_HPD\_CN pin.
- Connectors:** The circuit is connected to a DP connector (CN1013) and a DP cable (FOX\_3V112M3\_RH3HH7\_7H\_20P).

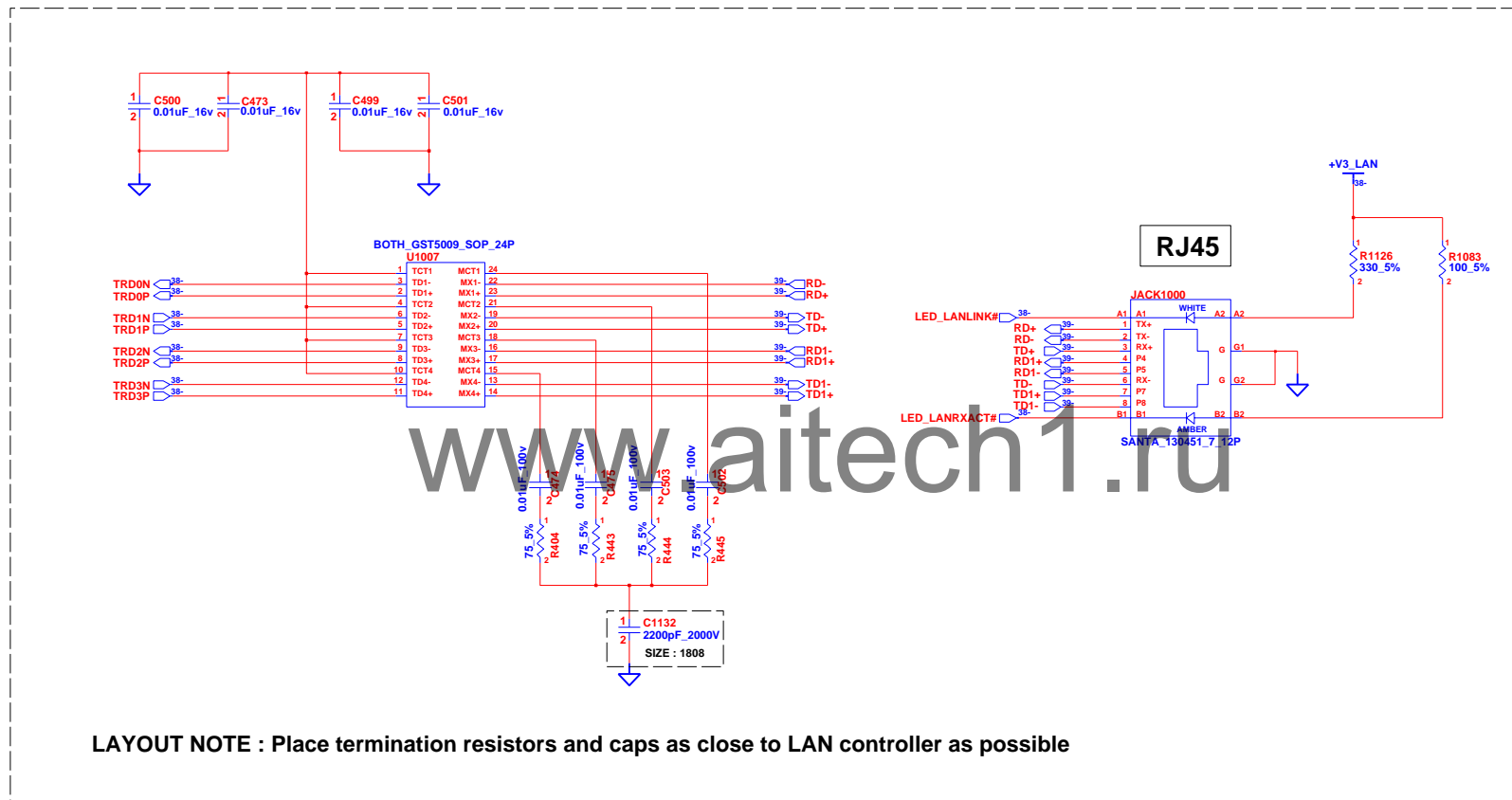
www.aitech1.ru

INVENTEC			
TITLE: Romeo DisplayPort			
SIZE	CODE	DOC. NUMBER	REV
A3	CS	I310A23166-0-MTR	A01
CHANGE by: Evan Shih		5-Feb-2010	
SHEET 37		OF 66	

[illegible]

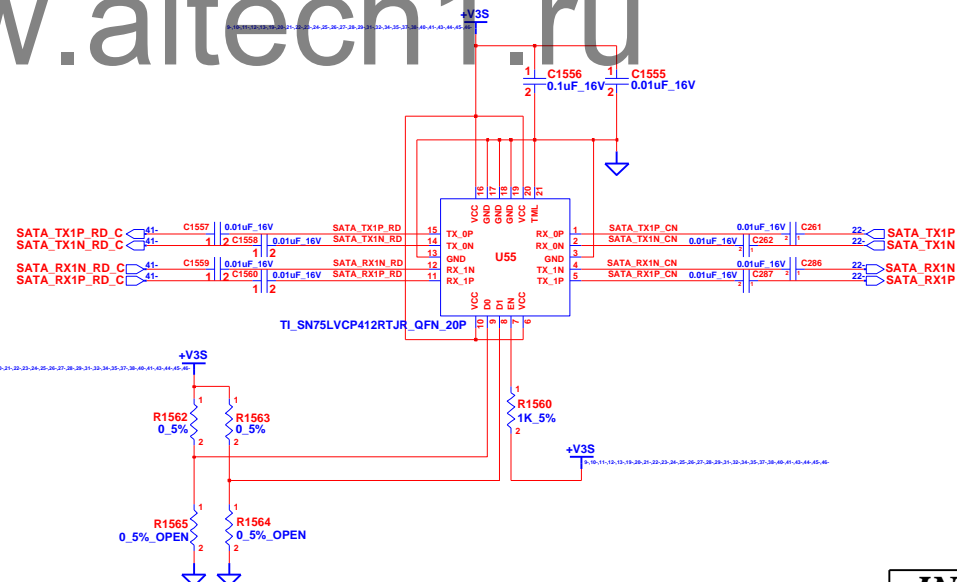
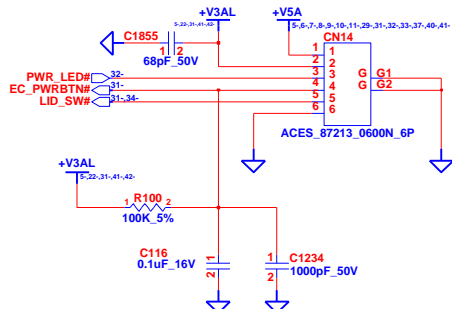
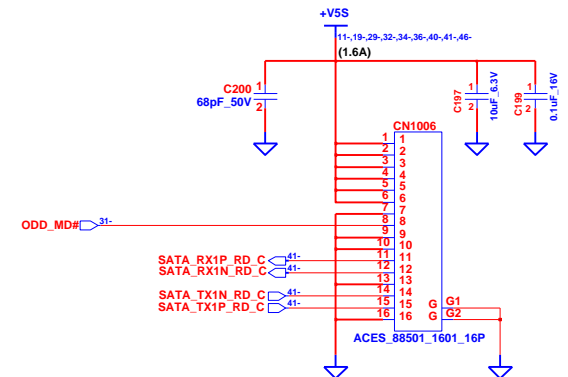
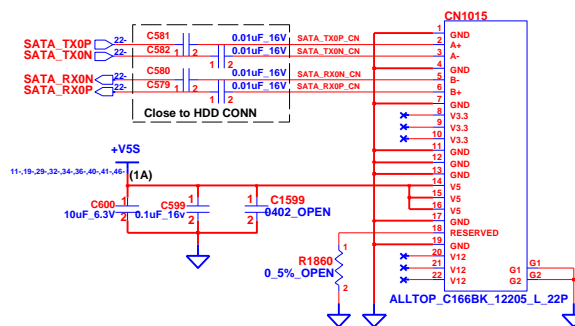
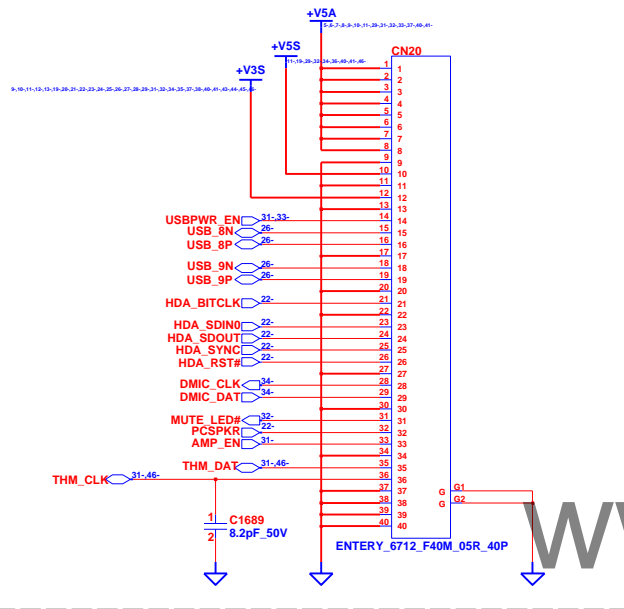
<b>INVENTEC</b>			
TITLE <b>Romeo DisplayPort</b>			
SIZE <b>A3</b>	CODE <b>CS</b>	DOC. NUMBER <b>I310A23166-0-MTR</b>	REV <b>A01</b>
SHEET		37 OF	66





INVENTEC			
TITLE			
Romeo			
RJ-45			
SIZE	CODE	DOC. NUMBER	REV
A3	CS	1310A23166-0-MTR	A01
CHANGE by		5-Feb-2010	
Evan Shih			
SHEET		39	OF 66





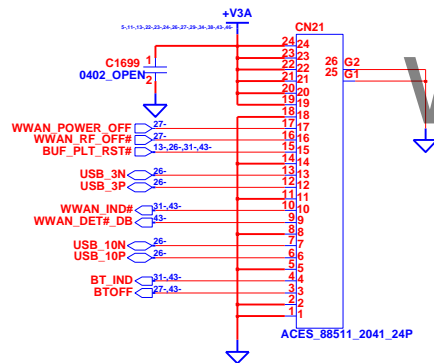
TITLE			
<b>Romeo</b> <b>Connector-1</b>			
SIZE	CODE	DOC. NUMBER	REV
<b>A3</b>	<b>CS</b>	<b>1310A23166-0-MTR</b>	<b>A01</b>
SHEET		41	OF 66

CHANGE by	<i>Evan Shih</i>	<i>5-Feb-2010</i>
-----------	------------------	-------------------

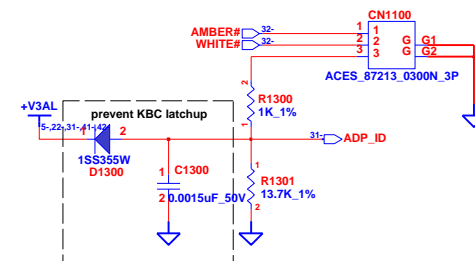
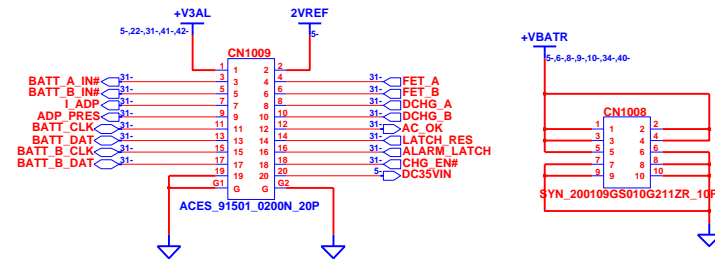
41 OF 66

## WC Board CN on MB

### WWAN & BT



## CHG Board CN on MB

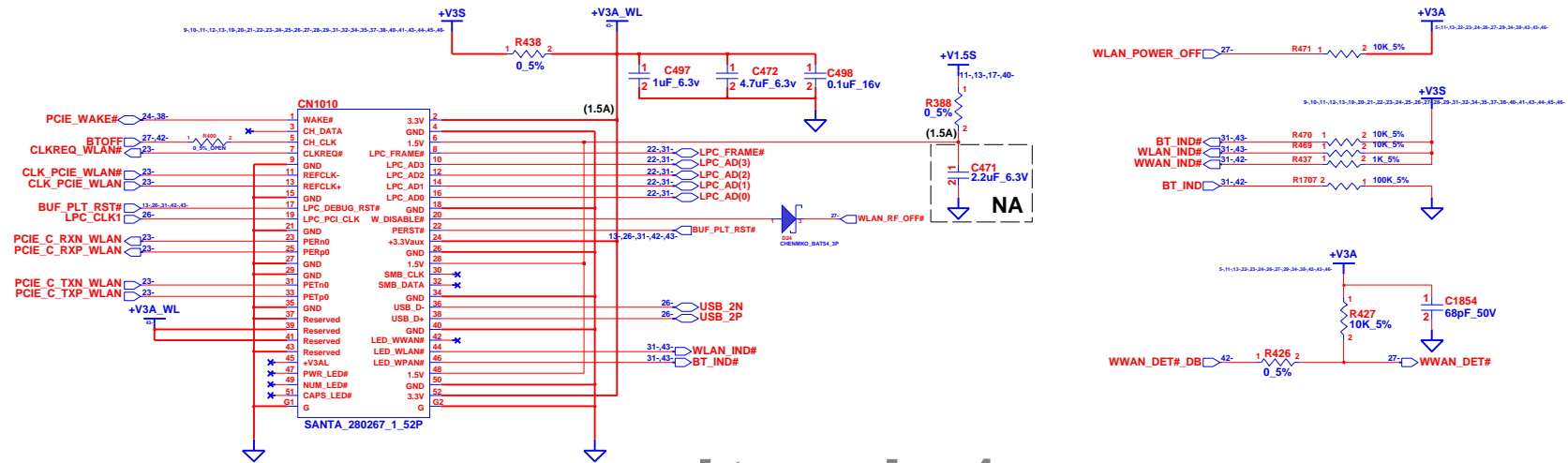


**INVENTEC**

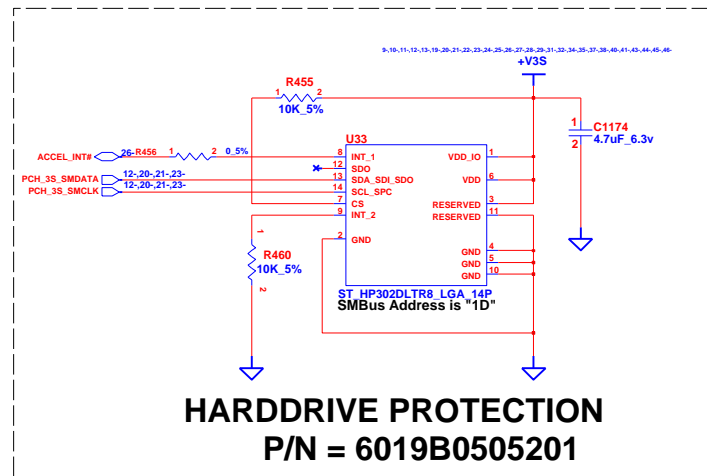
TITLE			
Romeo Connector-2			
SIZE	CODE	DOC. NUMBER	REV
A3	CS	1310A23166-0-MTR	A01
SHEET		42	OF 66

CHANGE by Evan Shih 5-Feb-2010

# WLAN CONN (MINICARD)



www.aitech1.ru



**HARDDRIVE PROTECTION**  
P/N = 6019B0505201

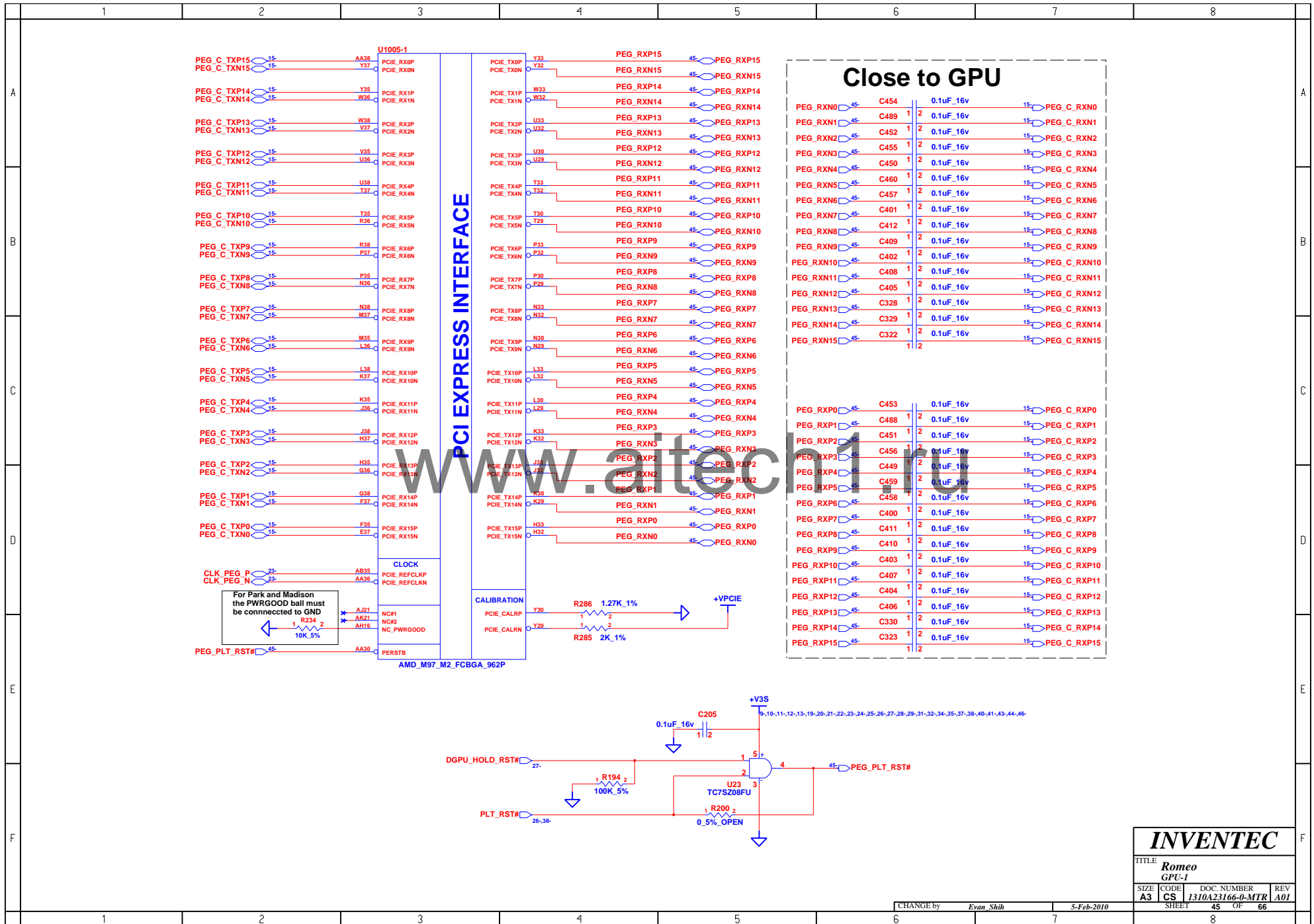
**INVENTEC**

TITLE <b>Romeo</b> WLAN & HDD Lock			
SIZE <b>A3</b>	CODE <b>CS</b>	DOC. NUMBER <b>1310A23166-0-MTR</b>	REV <b>A01</b>
SHEET <b>43</b>		OF <b>66</b>	

CHANGE by *Evan Shih* 5-Feb-2010

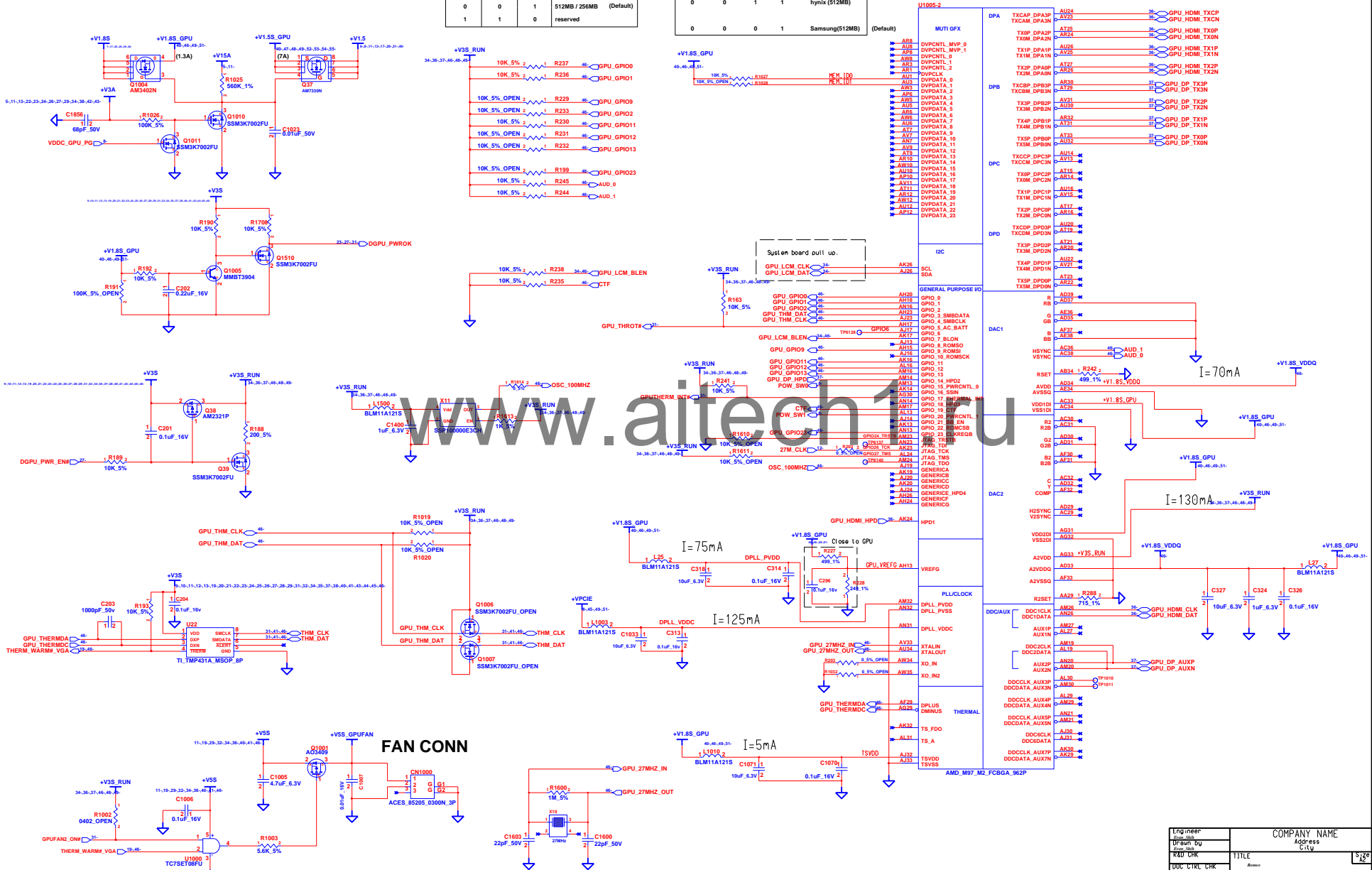






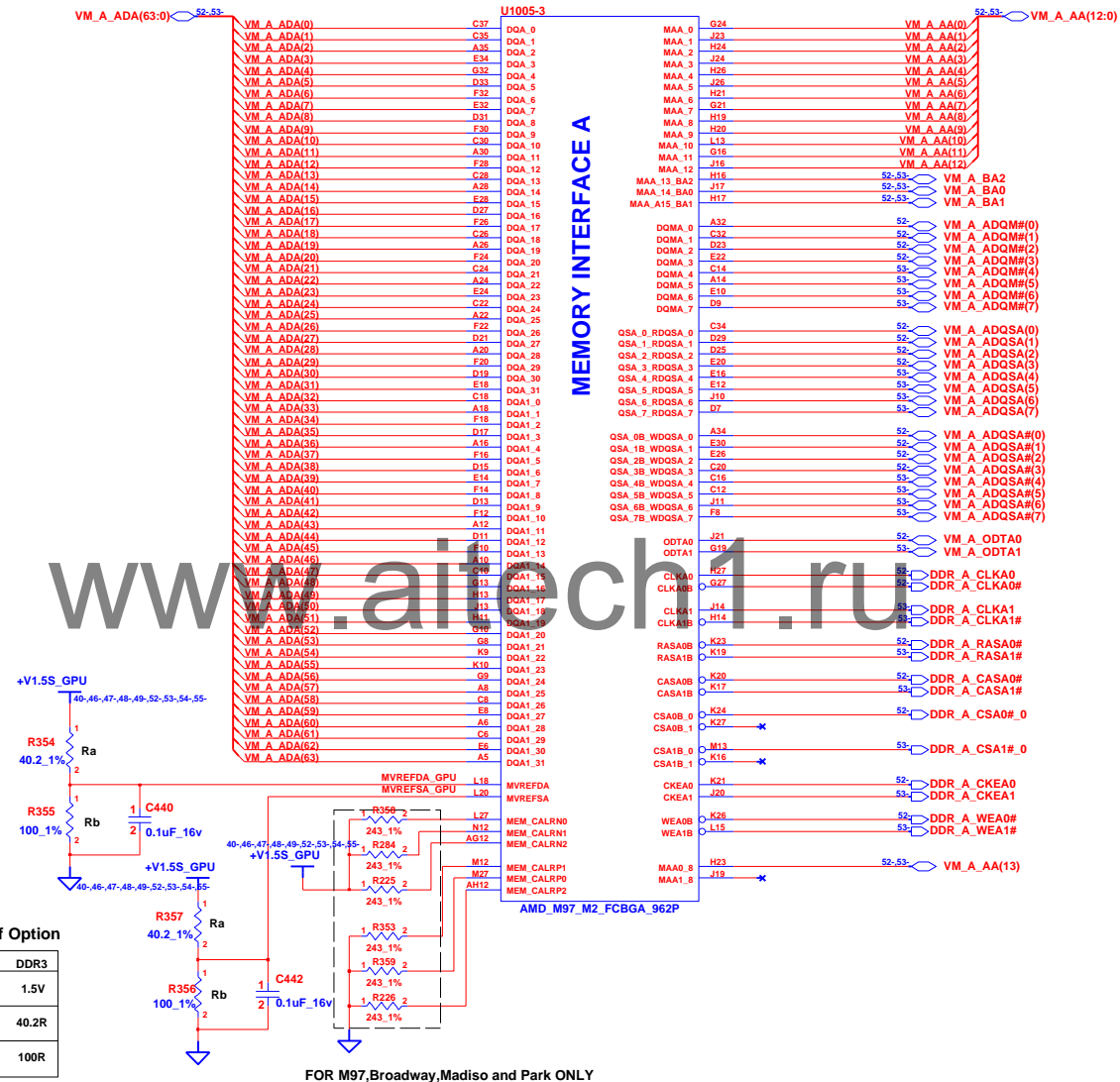
If GPIO_22_EN = 0, then GPIO(13:11) defines the primary memory aperture size.			
GPIO_13	GPIO_12	GPIO_11	Memory aperture size
0	0	1	512MB / 256MB (Default)
1	1	0	reserved

MEM_ID3	MEM_ID2	MEM_ID1	MEM_ID0	vendor
0	0	1	1	hynix (512MB)
0	0	0	1	Samsung(512MB) (Default)



Engineer	COMPANY NAME
Drawn by	City
Rev. Ctrl. Chk	TITLE
Rev. Eng. Chk	Rev. GPU-2

# Channel A

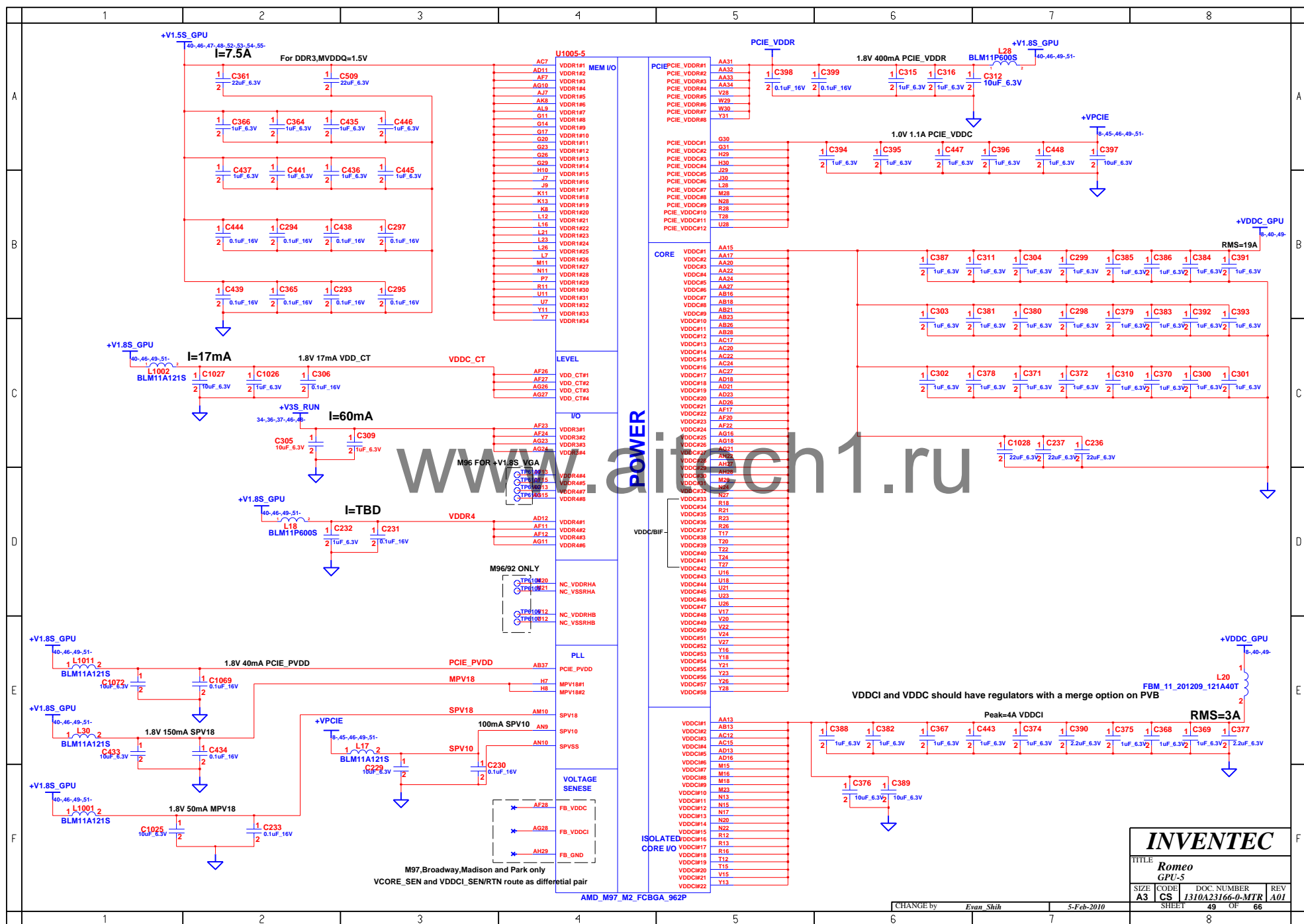


**INVENTEC**

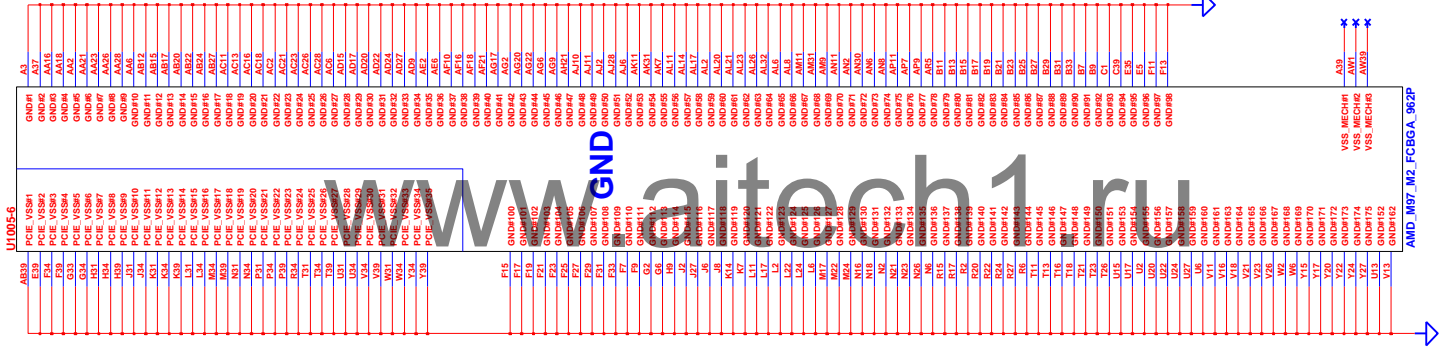
TITLE <b>Romeo GPU-3</b>			
SIZE <b>A3</b>	CODE <b>CS</b>	DOC. NUMBER <b>1310A23166-0-MTR</b>	REV <b>A01</b>
SHEET <b>47</b>		OF <b>66</b>	

CHANGE by *Evan Shih* 5-Feb-2010

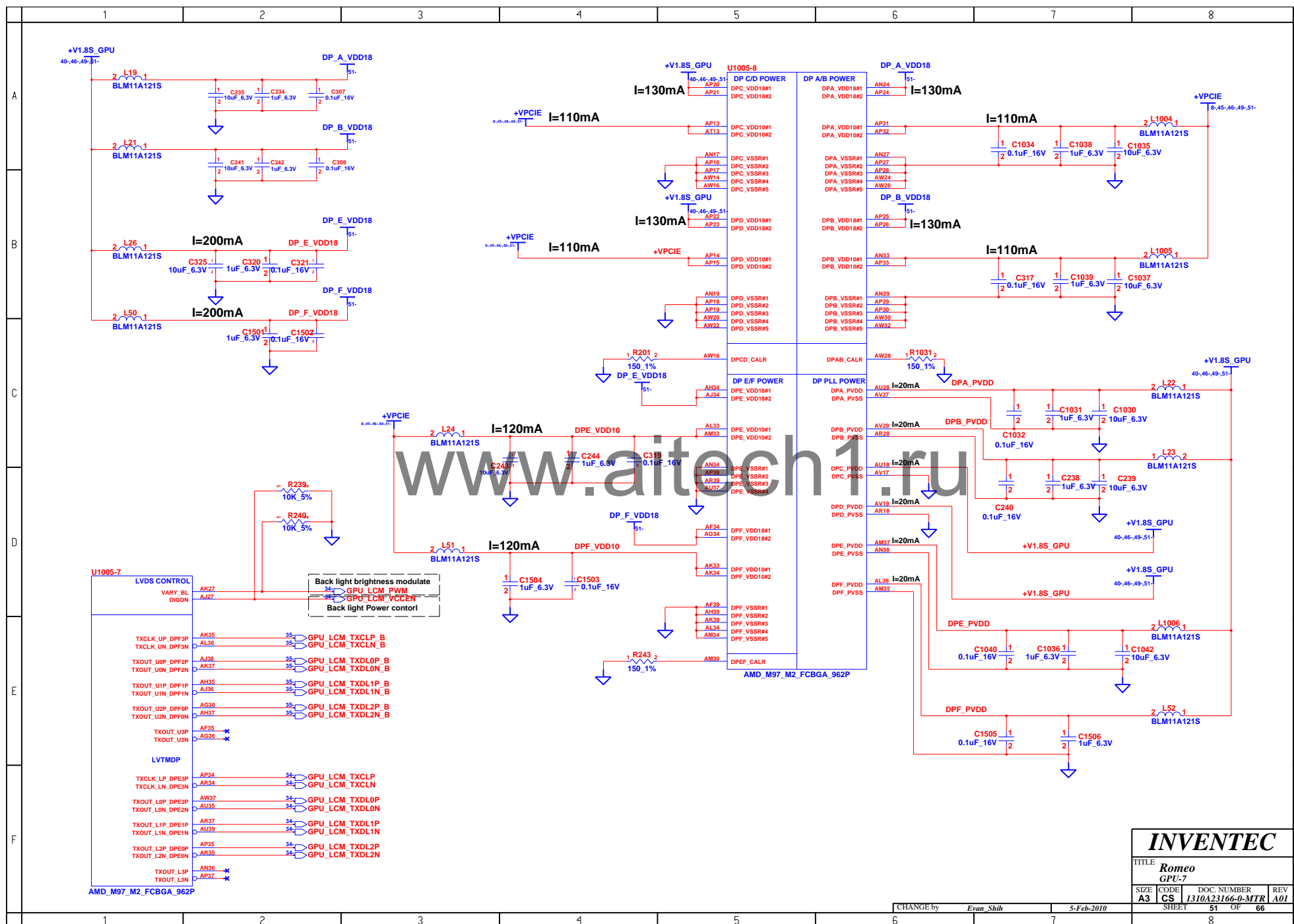




	1	2	3	4	5	6	7	8	
A									A
B									B
C									C
D									D
E									E
F									F
	1	2	3	4	5	6	7	8	

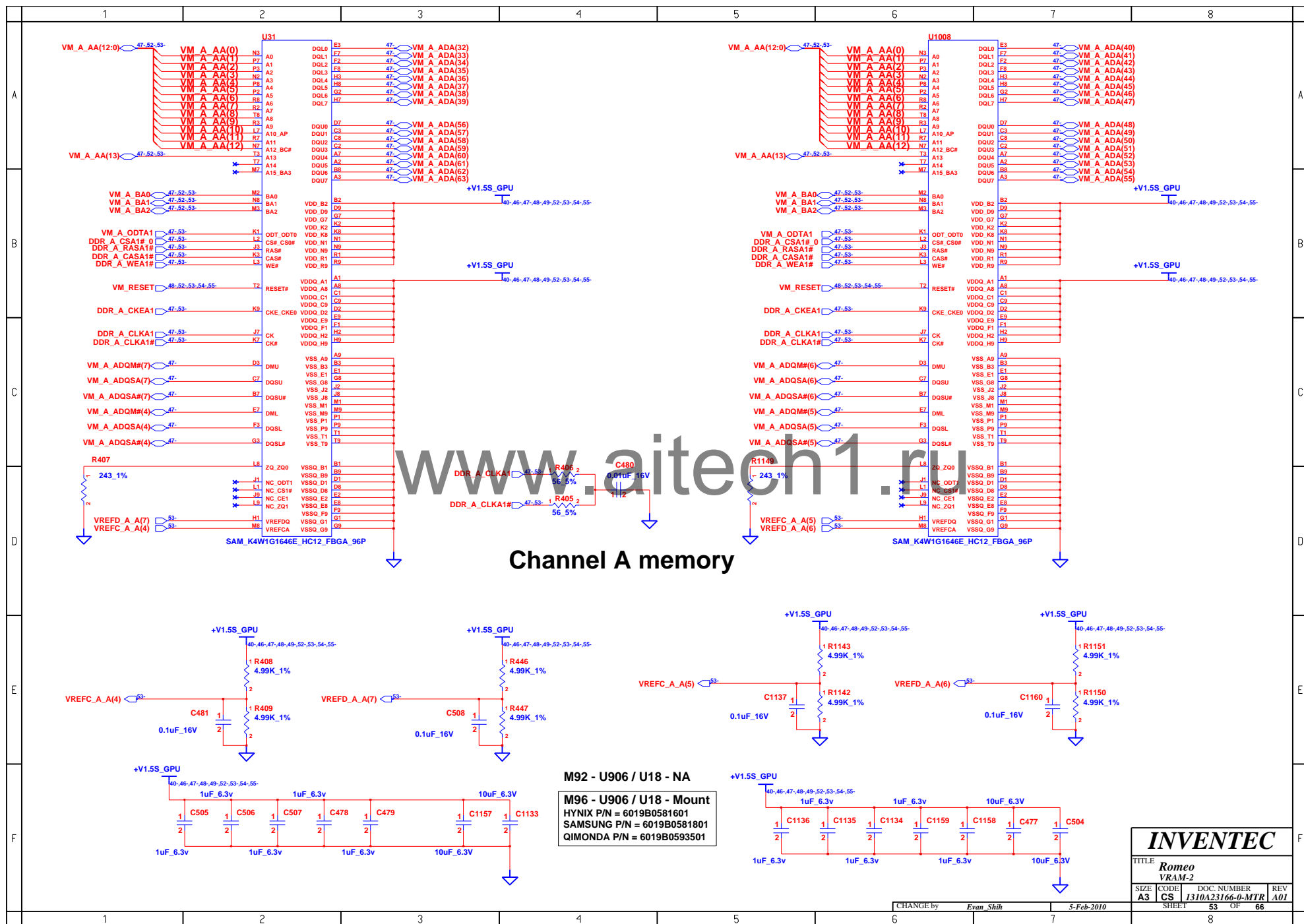


<b>INVENTEC</b>			
TITLE <b>Romeo GPU-6</b>			
SIZE <b>A3</b>	CODE <b>CS</b>	DOC. NUMBER <b>1310A23166-0-MTR</b>	REV <b>A01</b>
CHANGE by <i>Evan Shih</i>		5-Feb-2010	
SHEET		50 OF	66







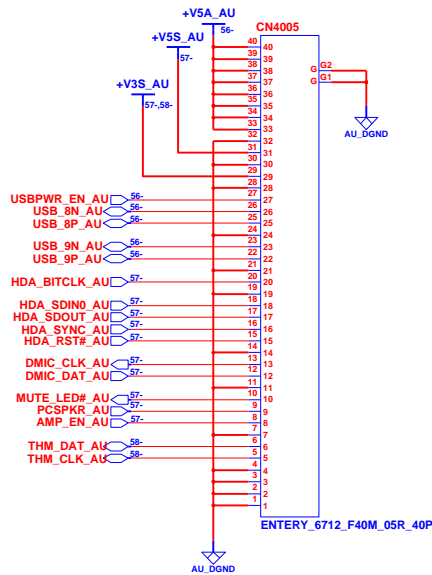




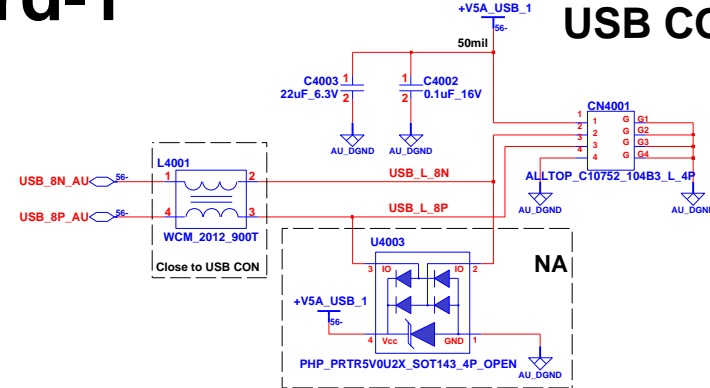


# AU Board-1

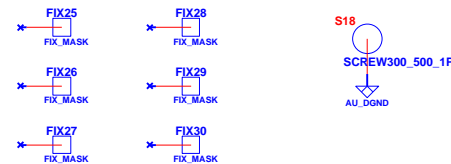
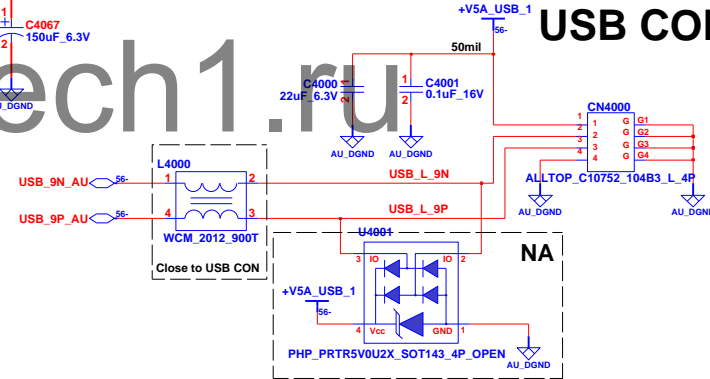
## AU Board CN on DB



## USB CONN01



## USB CONN02



**INVENTEC**

TITLE			
Romeo			
AUDIO & USB Board			
SIZE	CODE	DOC. NUMBER	REV
A3	CS	1310A23165-0-MTR	A01
SHEET		56	OF 66

CHANGE by Evan Shih 5-Feb-2010

# AU Board-2

**Close to Pin3**

**Close to Pin9**

**Close to Pin1**

**Close to Audio Codec**

**INT-SPEAKER CONN**

PORT	Discription	Sense
A	Microphone	SENSE_A
B	Headphone	SENSE_A
C	NO USE	
D	SPKR	
E	NO USE	
F	NO USE	

**INVENTEC**

TITLE: **Romeo**  
AUDIO & USB Board

SIZE: **A3** CODE: **CS** DOC. NUMBER: **1310A23165-0-MTR** REV: **A01**

SHEET: **57** OF: **66**

CHANGE by: **Evan Shih** 10-Feb-2010

PORT	Discription	Sense
A	Microphone	SENSE_A
B	Headphone	SENSE_A
C	NO USE	
D	SPKR	
E	NO USE	
F	NO USE	

## INVENTEC

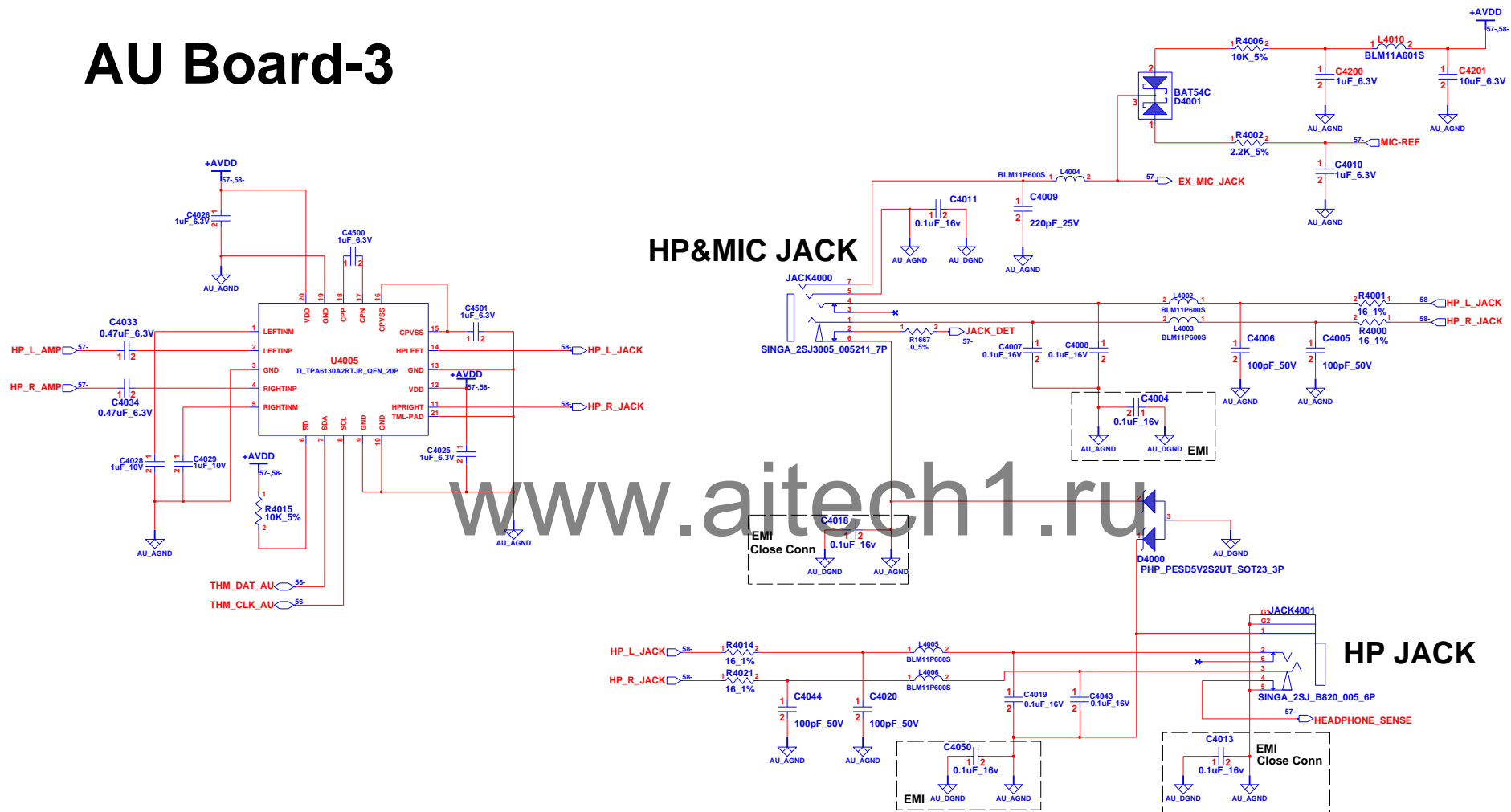
TITLE				
<b><i>Romeo</i></b> <b><i>AUDIO &amp; USB Board</i></b>				
SIZE	CODE	DOC. NUMBER		REV
<b>A3</b>	<b>CS</b>	<b>1310A23165-0-MTR</b>		<b>A0</b>
SHEET		57	OF	66

CHANGE by	<i>Evan Shih</i>	<i>10-Feb-2016</i>
-----------	------------------	--------------------

# AU Board-3

## HP&MIC JACK

## HP JACK



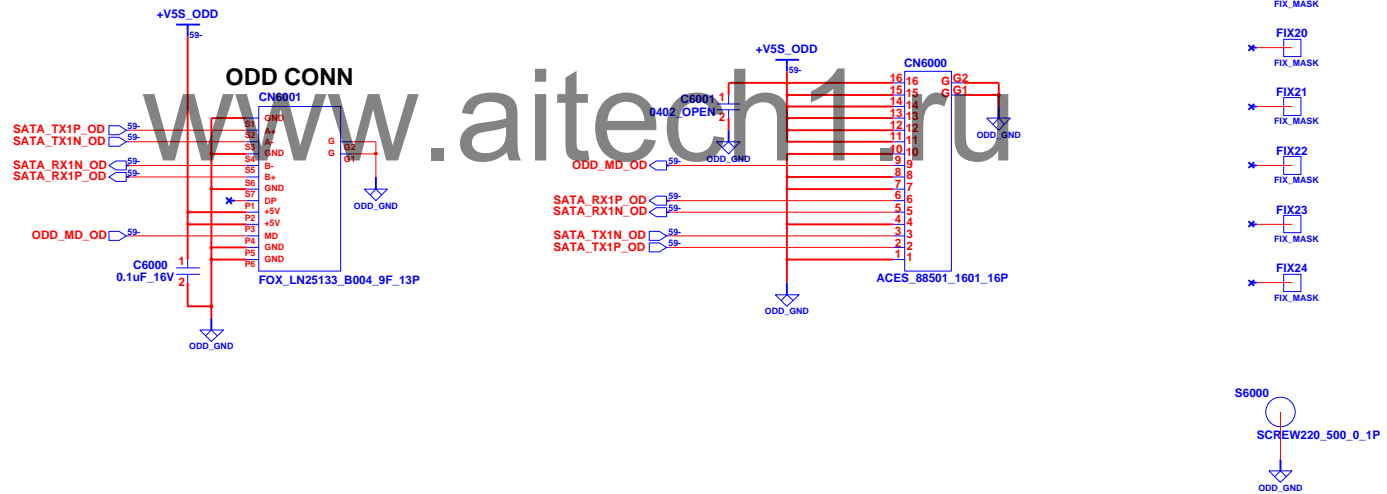
**INVENTEC**

TITLE			
Romeo			
AUDIO & USB Board			
SIZE	CODE	DOC. NUMBER	REV
A3	CS	1310A23165-0-MTR	A01
SHEET		58	OF 66

CHANGE by *Evan Shih* 5-Feb-2010

# SATA ODD

## ODD Board



**INVENTEC**

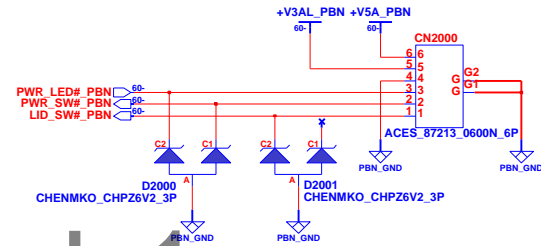
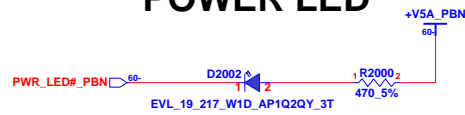
TITLE			
Romeo			
ODD EXT BOARD			
SIZE	CODE	DOC. NUMBER	REV
A3	CS	1310A23162-0-MTR	A01
SHEET		59	OF 66

CHANGE by: *Evan Shih* 5-Feb-2010

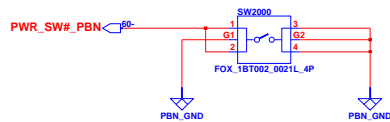
8

# Power Button

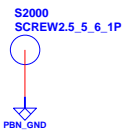
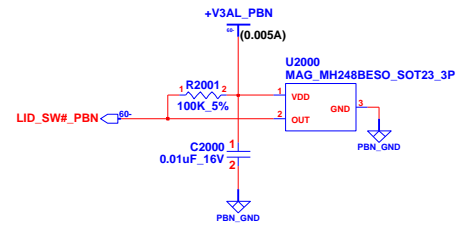
## POWER LED



## POWER BUTTON



## LID SWITCH



**INVENTEC**

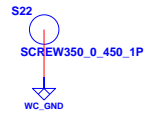
TITLE			
Romeo Power SW Board			
SIZE	CODE	DOC. NUMBER	REV
A3	CS	1310A23174-0-MTR	A01
SHEET		60	OF 66

CHANGE by Evan Shih 5-Feb-2010

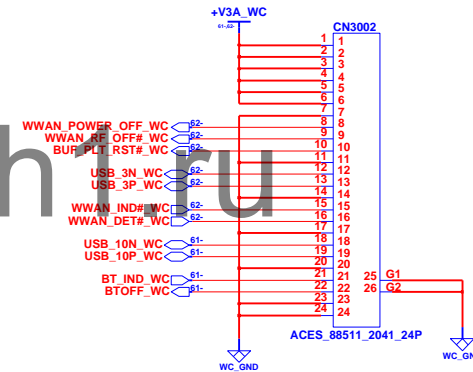
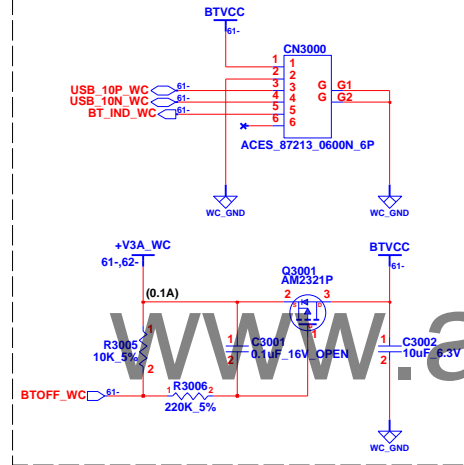
8



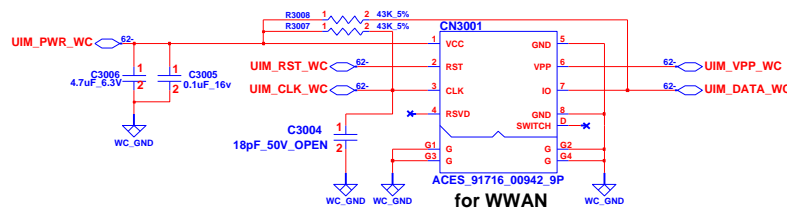
# WC Board-1



## BLUETOOTH CONN (Softbreeze)



## SIM CARD CONN



**INVENTEC**

TITLE			
Romeo WIRELESS Board			
SIZE	CODE	DOC. NUMBER	REV
A3	CS	1310A23164-0-MTR	A01
SHEET		61	OF 66

CHANGE by: Evan Shih 5-Feb-2010

## A

## B



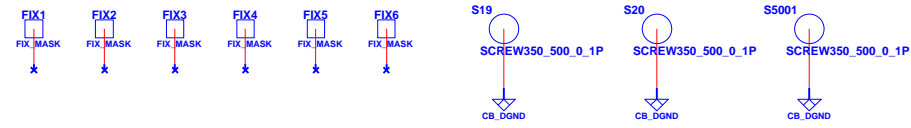
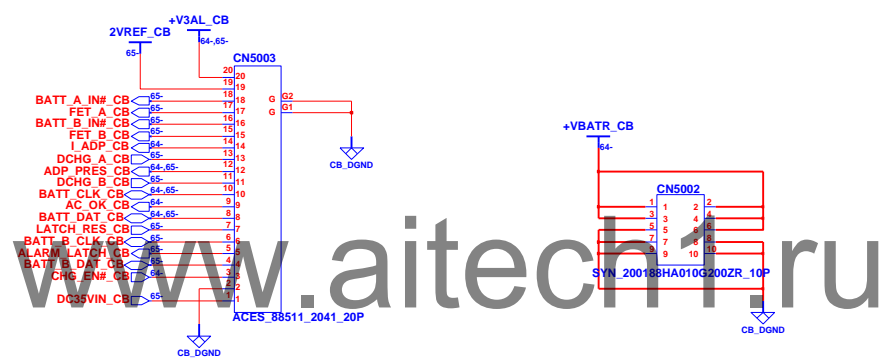
D



F

CHANGE by	<i>Evan Shih</i>	<i>5-Feb-2010</i>
-----------	------------------	-------------------

CHG Board-1

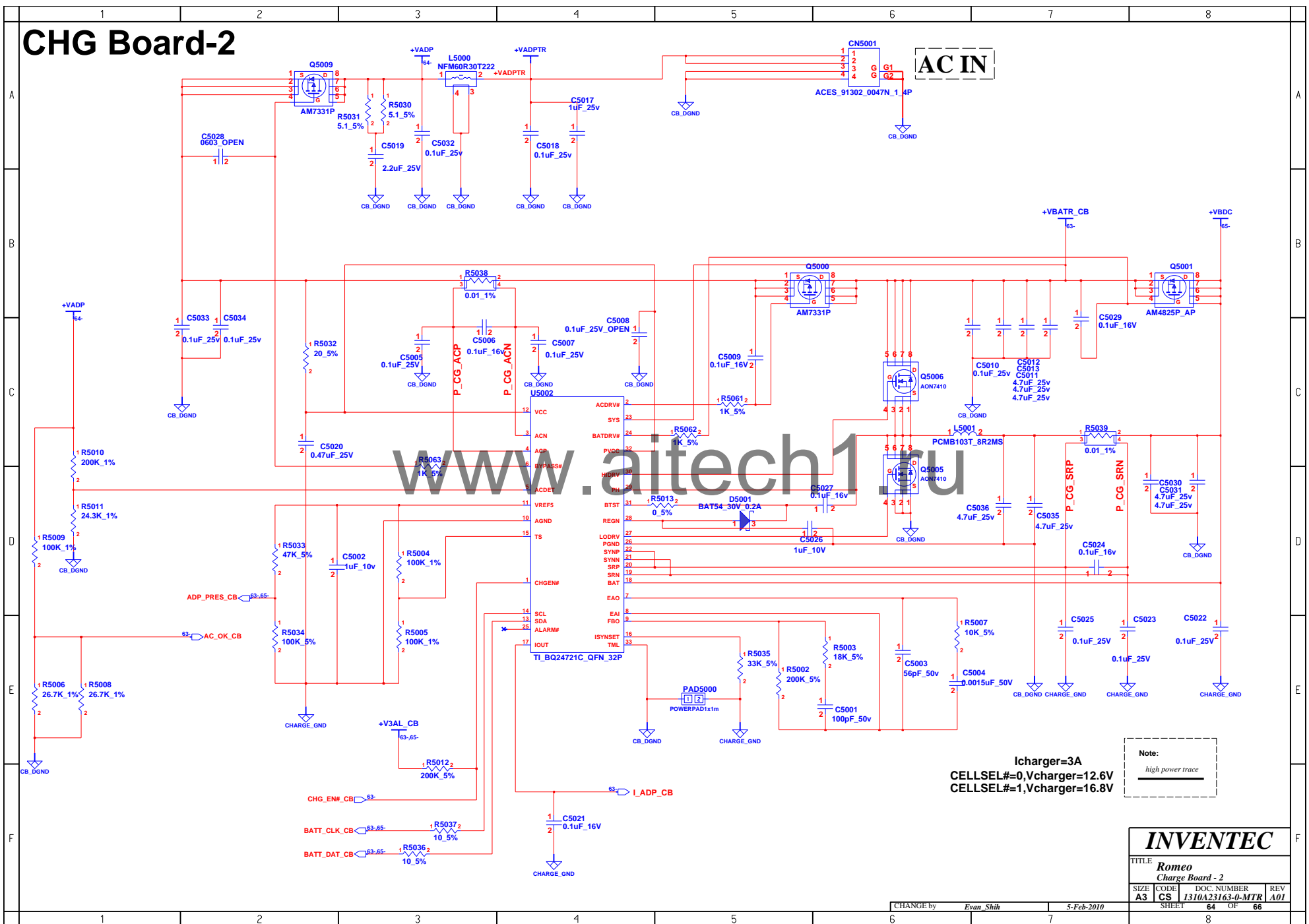


INVENTEC

TITLE			
Romeo			
Charge Board - 1			
SIZE	CODE	DOC. NUMBER	REV
A3	CS	1310A23163-0-MTR	A01
SHEET		63	OF 66

CHANGE by Evan Shih 5-Feb-2010

# CHG Board-2



**Note:**  
*high power trace*

**INVENTEC**

TITLE			
<b><i>Romeo</i></b> <b><i>Charge Board - 2</i></b>			
SIZE	CODE	DOC. NUMBER	REV
<b>A3</b>	<b>CS</b>	<b>1310A23163-0-MTR</b>	<b>A01</b>
SHEET		64 OF	66

CHANGE by	<i>Evan Shih</i>	<i>5-Feb-2010</i>
-----------	------------------	-------------------

64 OF 66

# CHG Board-3

BATT_A_ID_CB	HI	LOW
SERIES	3	4
VOLTAGE	12.6V	16.8V

**INVENTEC**

TITLE	<b><i>Romeo</i></b> <b><i>Charge Board - 3</i></b>
-------	---

SIZE <b>A3</b>	CODE <b>CS</b>	DOC. NUMBER <b>1310A23163-0-MTR</b>	R <b>A</b>
SHEET		65 OF	66

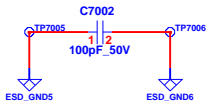
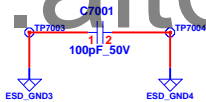
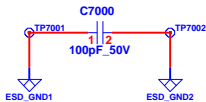
CHANGE by *Evan Shil*

3-Feb-2016

Q

# EMC Board

www.aitech1.ru



INVENTEC			
TITLE <i>Romeo</i> EMC			
SIZE A3	CODE CS	DOC. NUMBER 1310A23671-0-MTR	REV A01
CHANGE by EV145I		5-Feb-2010	
SHEET 66		OF 66	