Voltage

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GRMA
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Advanced Configuration and Power Interface

Advanced Configuration and Power Interface

S0: All Power

S3: Standby and Dual

S5: Only Standby

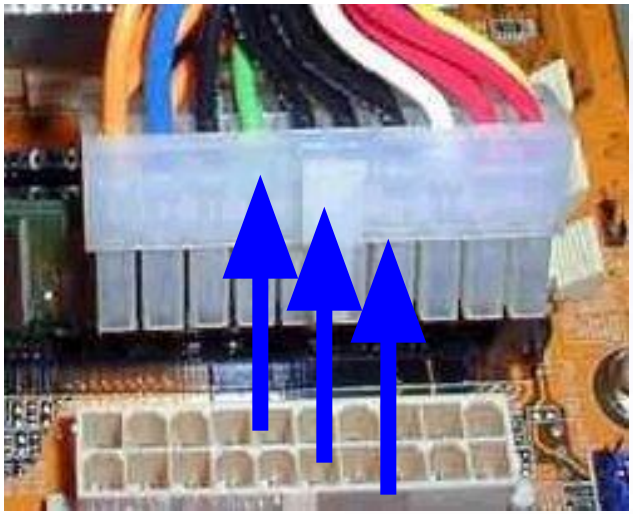
Mode Operation Status

Edit By : Ricky Huang

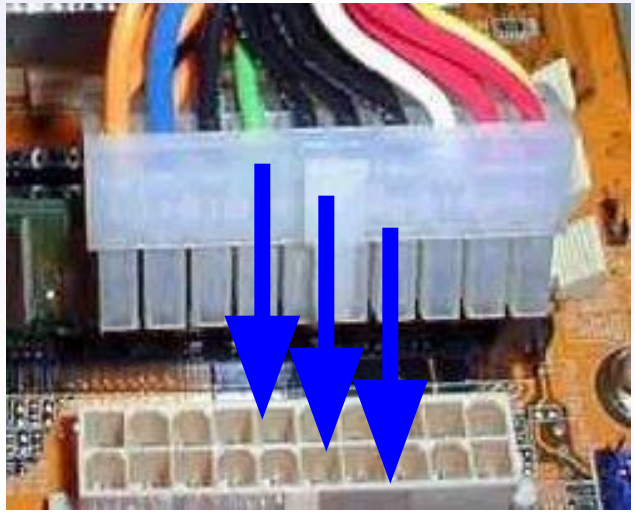
Mode Description		Standby Power	Dual Power	Main Power	Note
S0	Working State	◎	◎	◎	
S1	Suspend	◎	◎	◎	No Display O/P include all of power rail
S2	---	---	---	---	
S3	Suspend to RAM (recoverable)	◎	◎	---	
S4	Suspend to Disc (recoverable)	◎	---	---	
S5	Soft off	◎	---	---	
power rail		5VSB, 3VSB, 1.8VSB, 1.5VSB, 1.2VSB, 1.0VSB	5V_DUAL, 3V_DUAL, 2.5V_DUAL, 1.8V_DUAL	12V, 5V, 3V, 2.5V, 1.8V, 1.5V, 1.2V, 1.25V, 1.0V, 0.9V	power rail depend on difference chipset

Before Power On
Voltage and Signal

Before Power On-Power Supply and Stand By Voltage

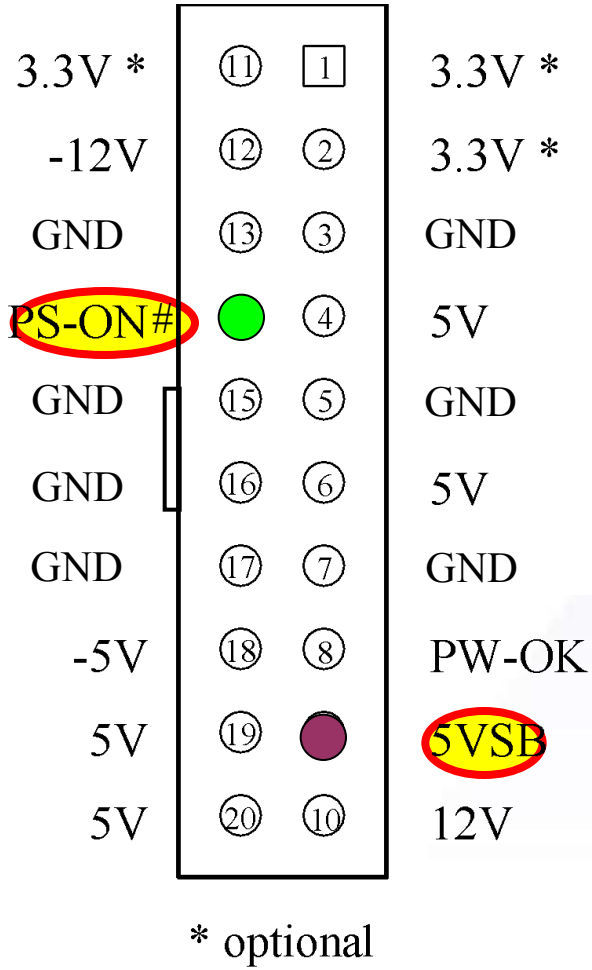


Unplug ATX Power Supply



Plug-in ATX Power Supply

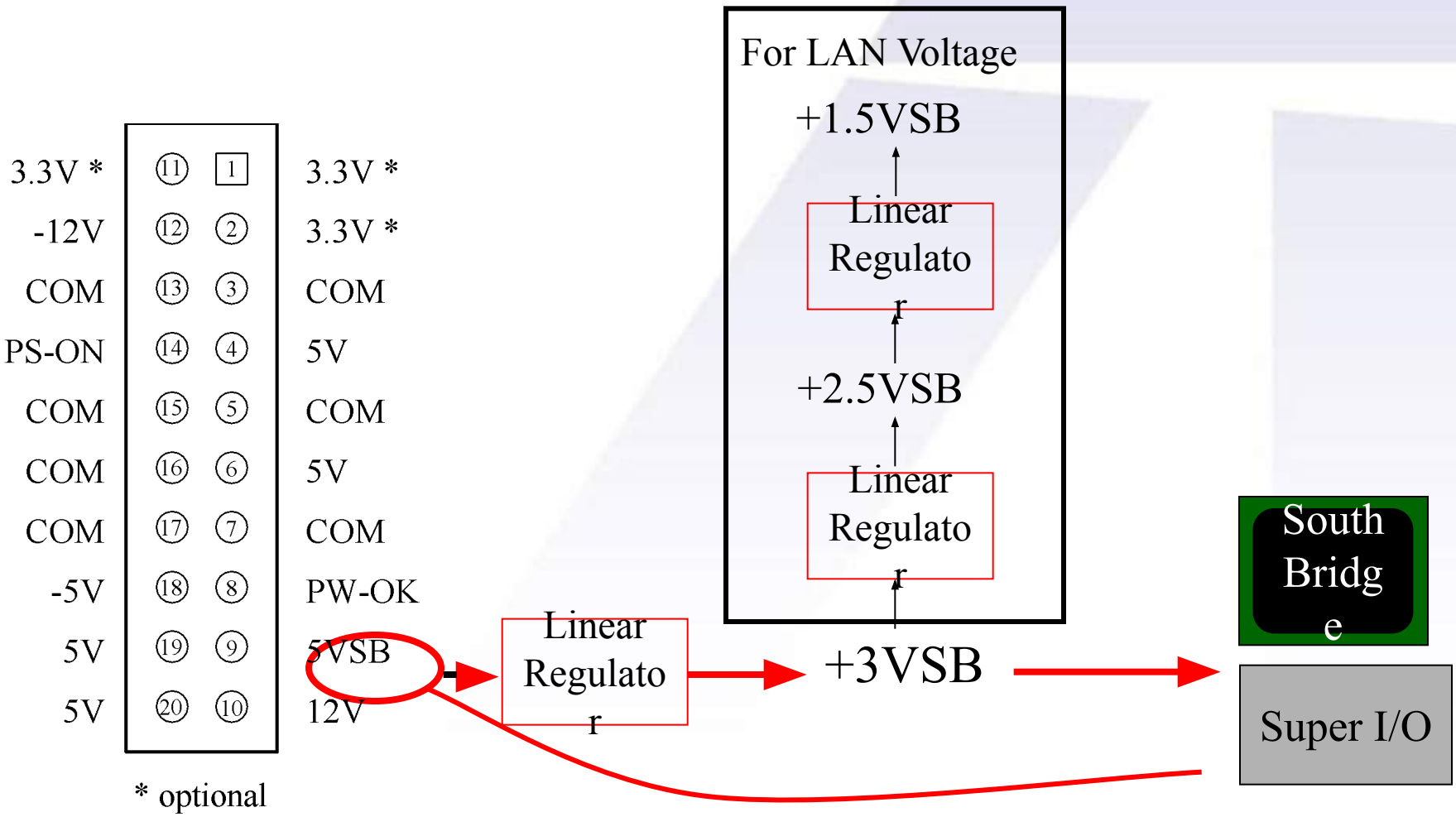
Before Power On-Power Supply and Stand By Voltage



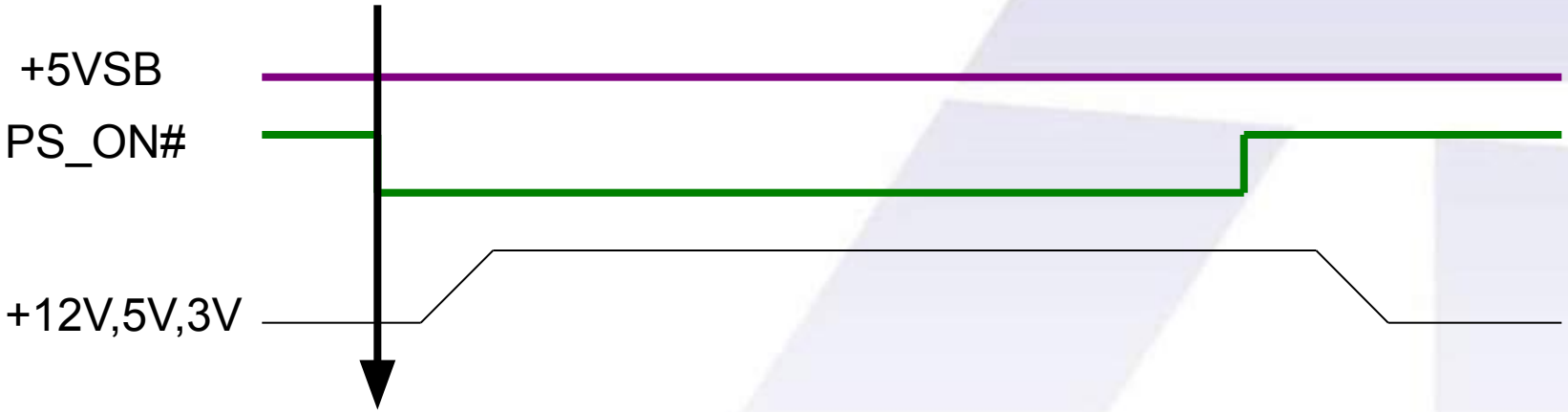
5VSB is a standby voltage that may be used to power circuits that require power input during the powered down state of the power rails.

PS-ON# is an active low signal that turns on all of the main power rails including 3.3V, 5V, -5V, 12V, and -12V power rails.

Before Power On-Power Supply and Stand By Voltage



Before Power On-Power Supply and Stand By Voltage

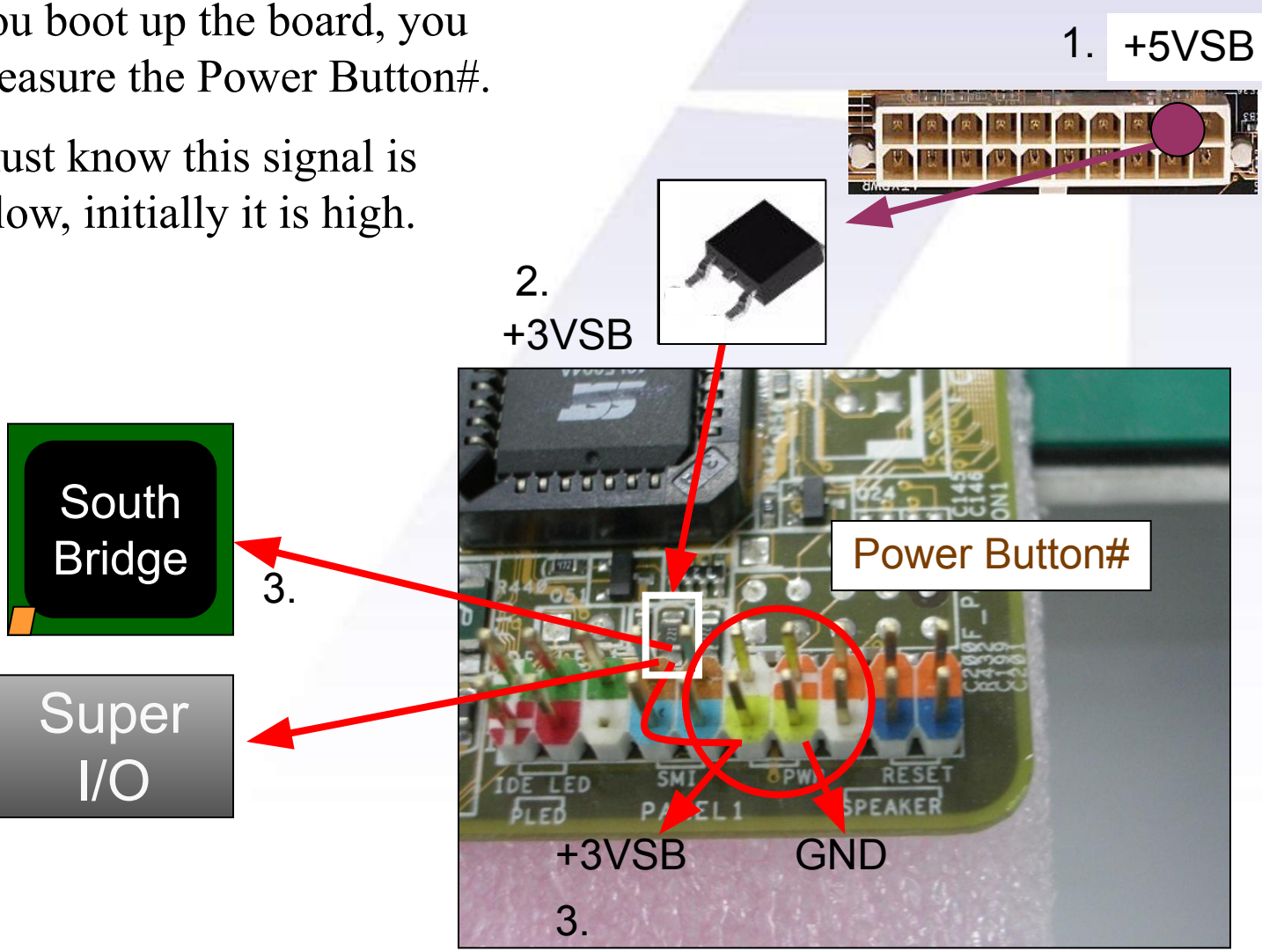


1. Before you turn on power 5VSB is always high! while you plug in the power supply which offers the standby voltage to some chipsets that can boot MB up!
2. PS_ON# must be touched off low to turn MB on !
3. If PS_ON# were low, every voltages from power supply will operate!

Before Power On-PWRBTN#, RSTCON#, RSMRST#,PS_ON#

Before you boot up the board, you should measure the Power Button#.

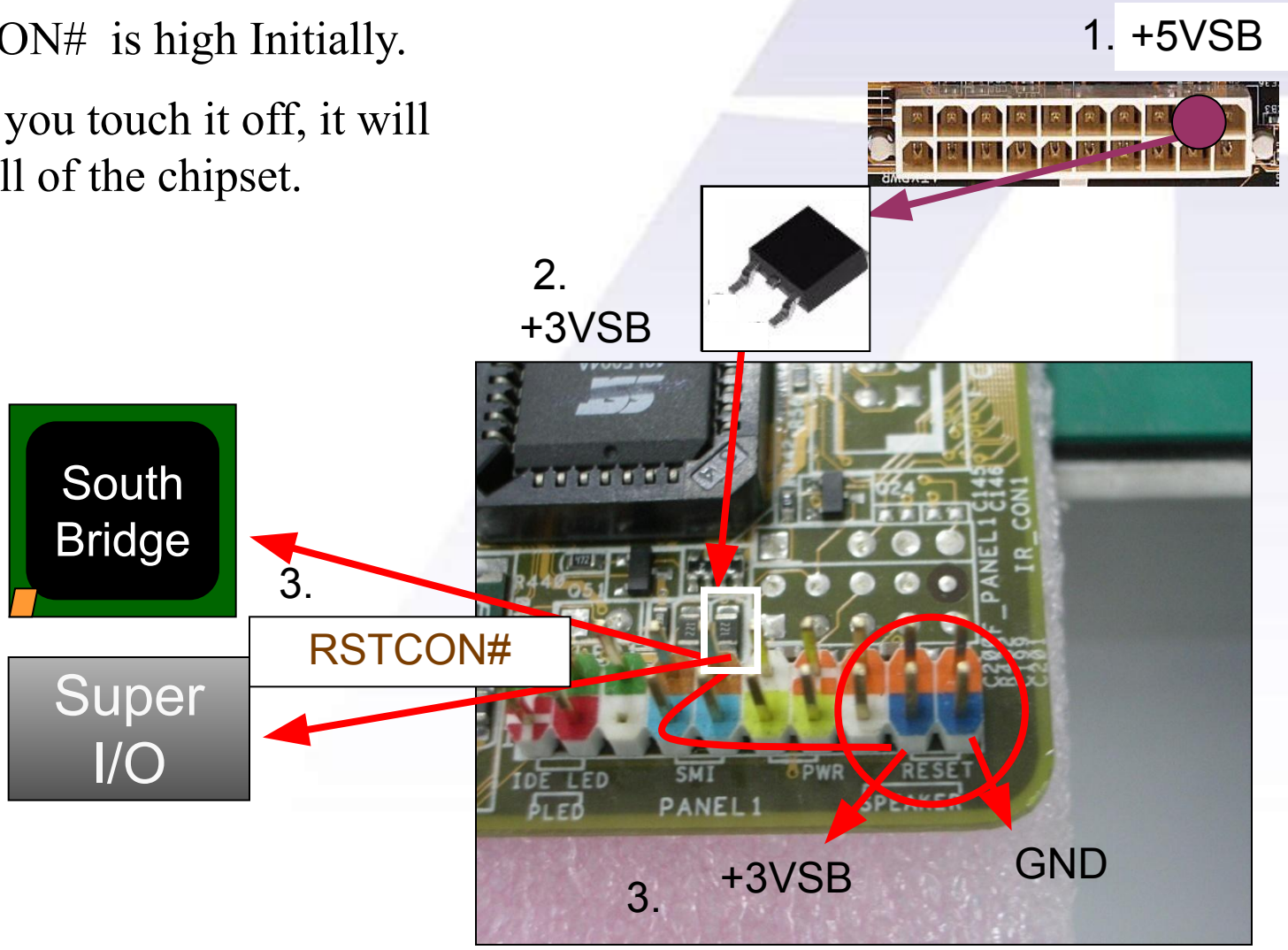
#, you must know this signal is acted by low, initially it is high.



Before Power On-PWRBTN#, RSTCON#, RSMRST#,PS_ON#

RSTCON# is high Initially.

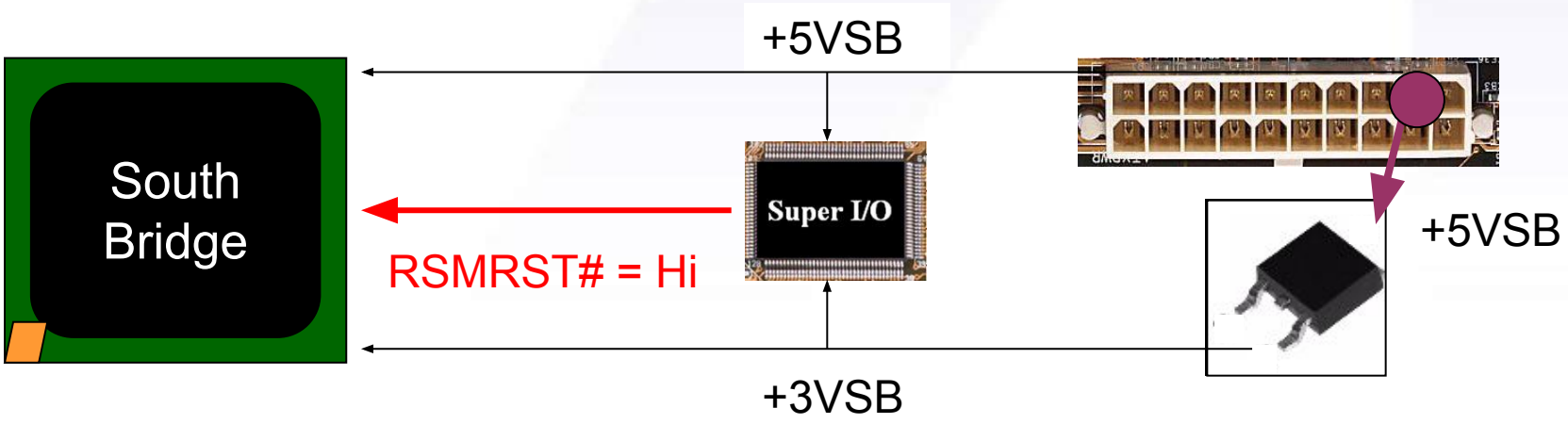
While you touch it off, it will reset all of the chipset.



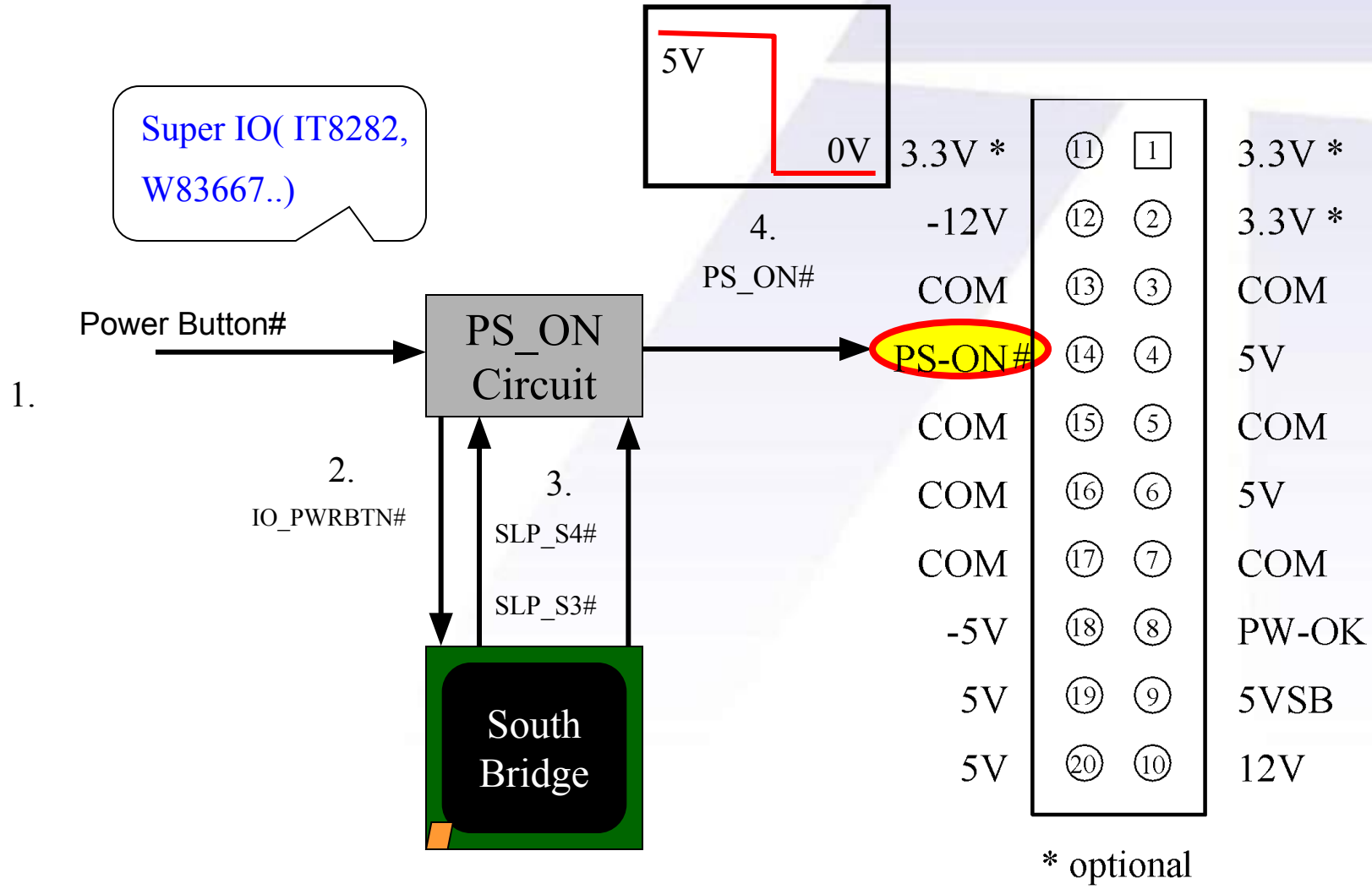
Before Power On-PWRBTN#, RSTCON#, RSMRST#,PS_ON#

- When 5VSB and 3VSB send to SIO and SB
- SIO will send this signal ‘’RSMRST# ’’ to SB’s boot up circuit to notice the MB is ready to boot up! If this signal is Lo, you can’t boot up MB.

- Do you know when RSMRST# is Lo?
- The answer is unplug the ATX connector!



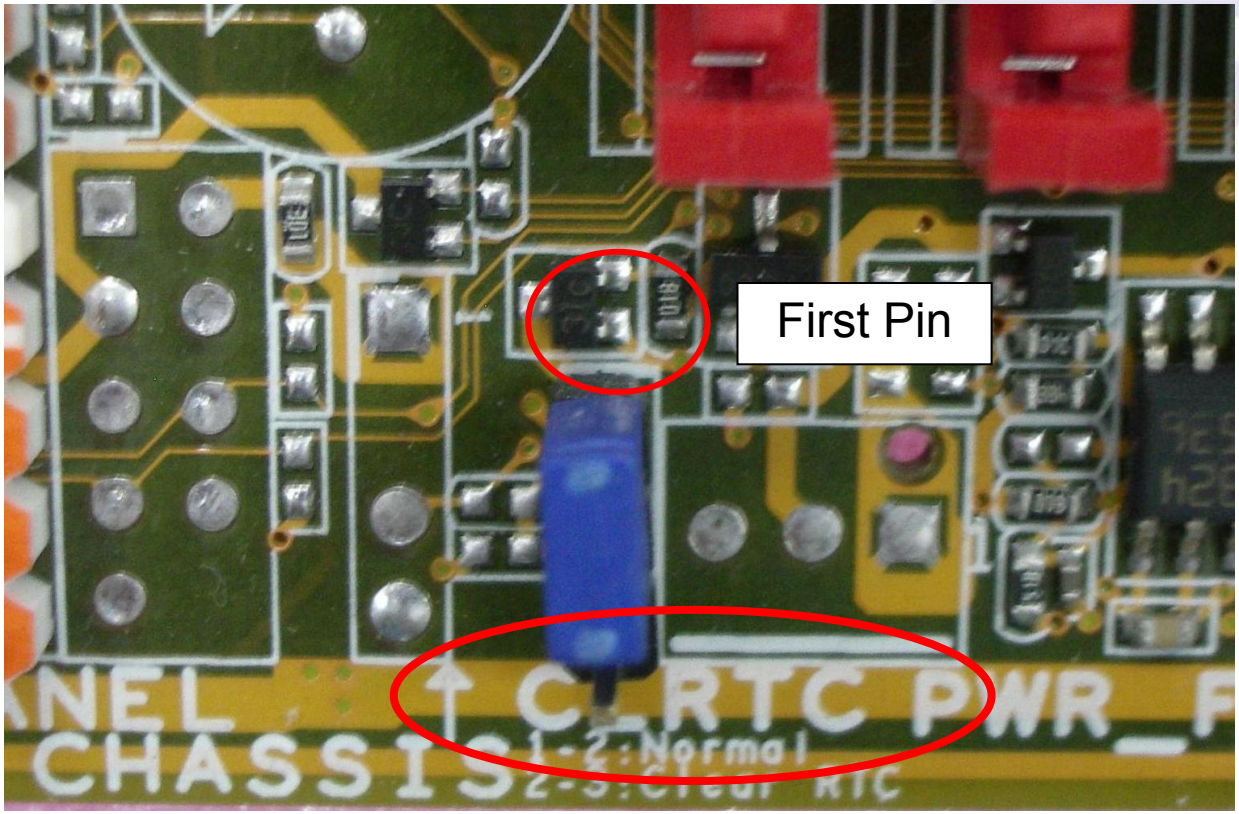
Before Power On-PWRBTN#, RSTCON#, RSMRST#,PS_ON#

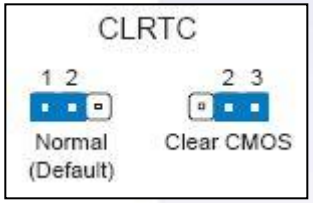


Before Power On-Battery Voltage

- Function of Battery Power are:
  - CMOS SRAM
  - Real Time Clock

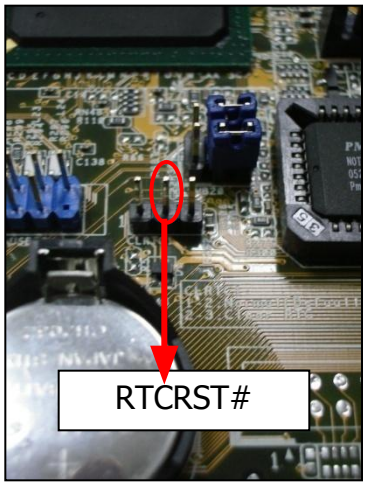
Before Power On-Battery Voltage

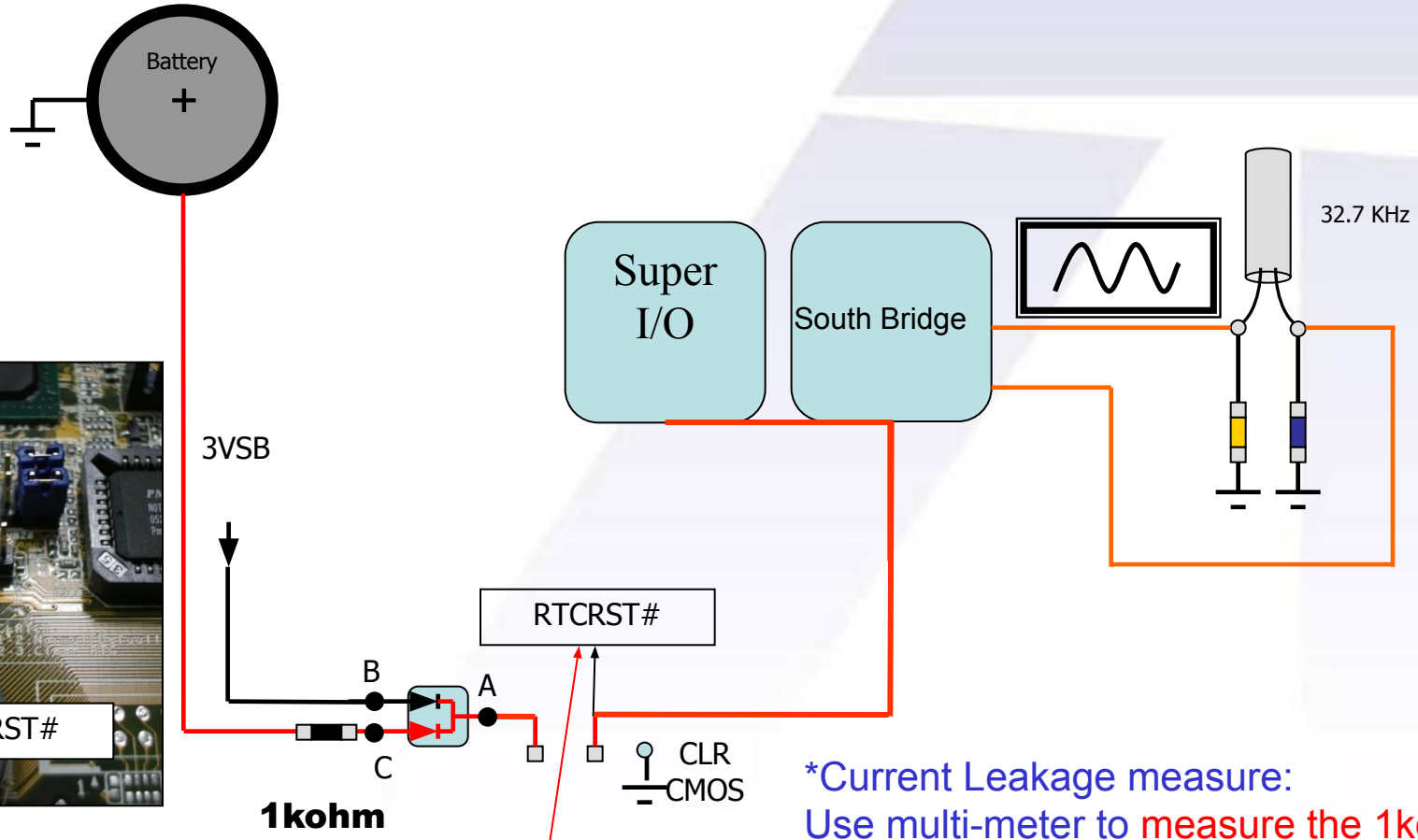




Before boot up the board, please check the jumper in normal status.

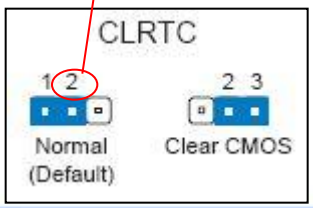
Before Power On-Battery Voltage





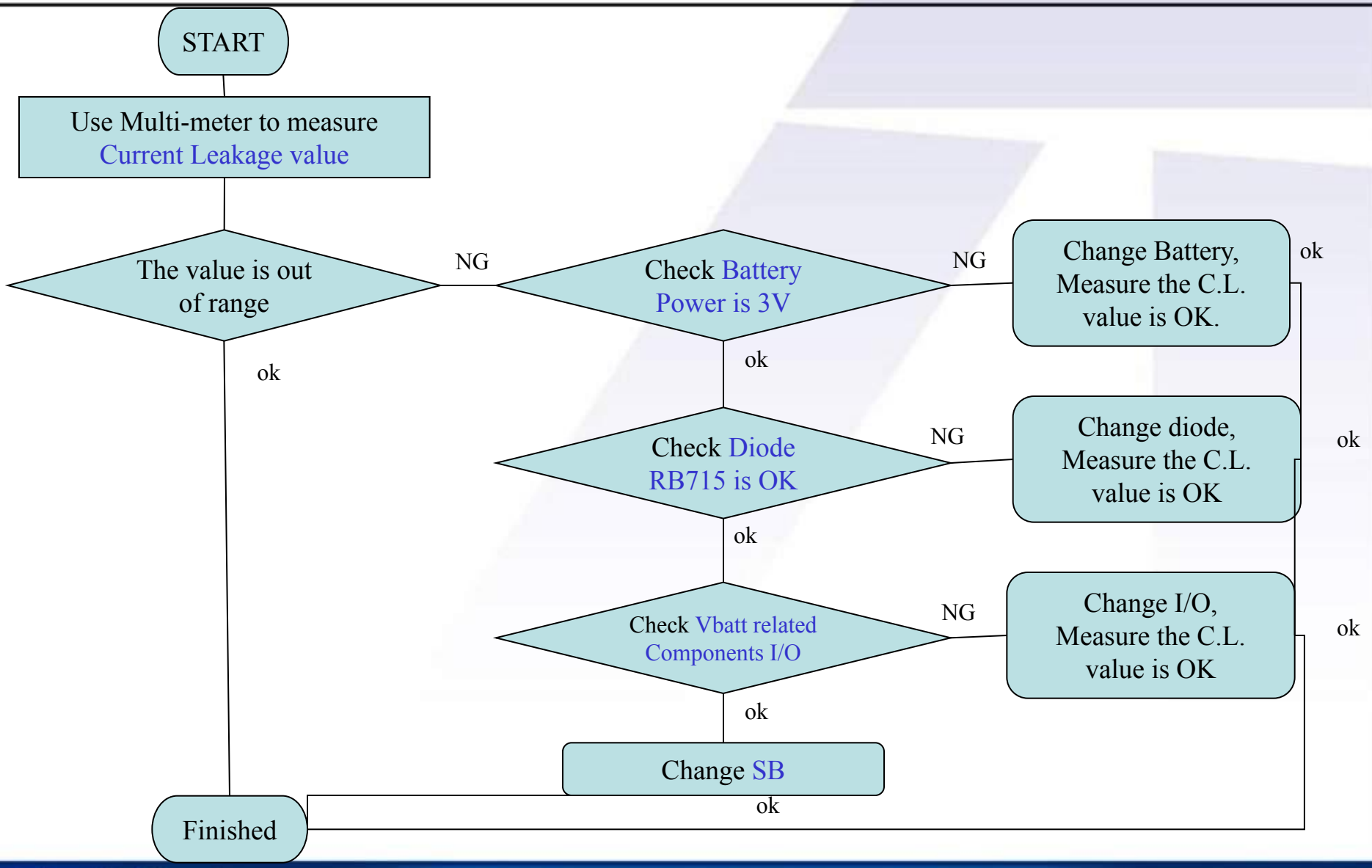
When you plug in power supply, A=B

When you unplug power supply, A=C

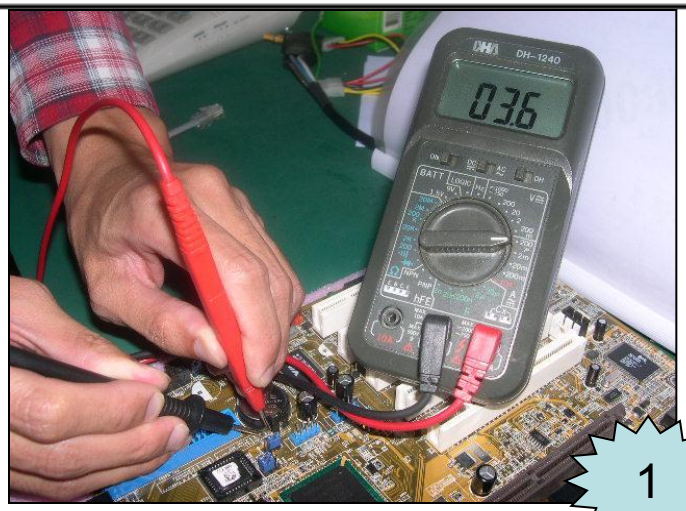


*Current Leakage measure:
Use multi-meter to measure the 1kohm, the voltage value between 1mV~15mV is ok, out of this range is NG.
According to Ohm theory: I=U/R, the Current leakage should be 1uA~10uA.

Before Power On-Battery Voltage



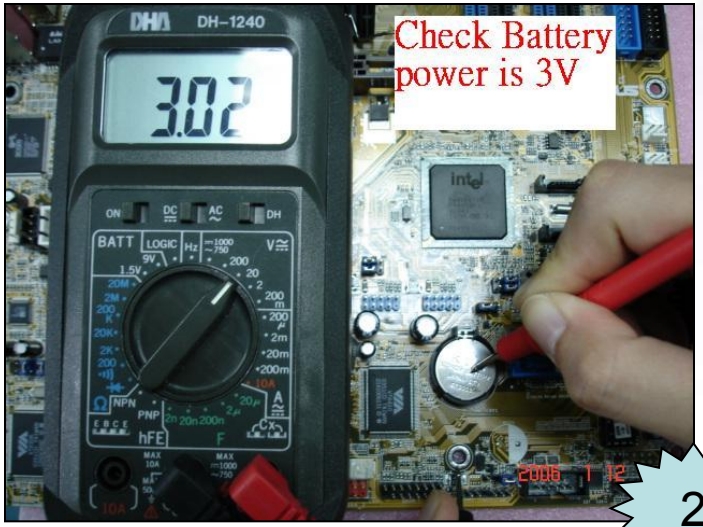
Before Power On-Battery Voltage



1

1. Use multi-meter to measure 1k ohm near the battery circuit, the value between 1mV~10mV is ok, out Of this range is NG.

(According to Ohm theory: I=V/R, the Current leakage should be 1uA~10uA.)



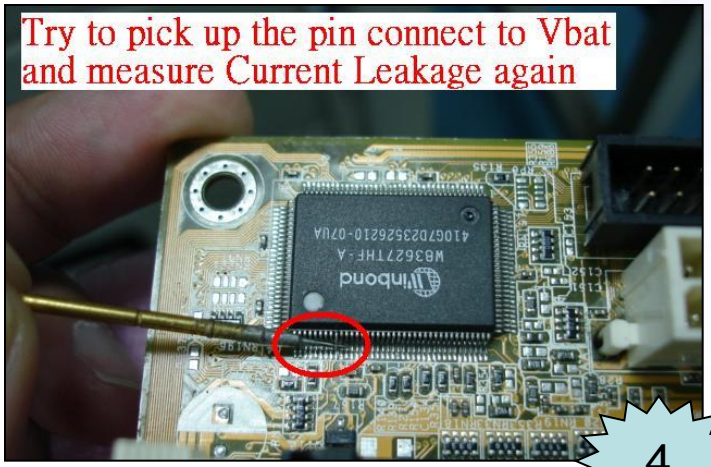
2

2. If the value is NG, check the battery voltage is 3V. If not, change battery and measure the leakage current again.

Before Power On-Battery Voltage

3

3. If the value is still NG, check the diode (RB715F) near battery is ok. If NG, please try to change it and measure again.



4

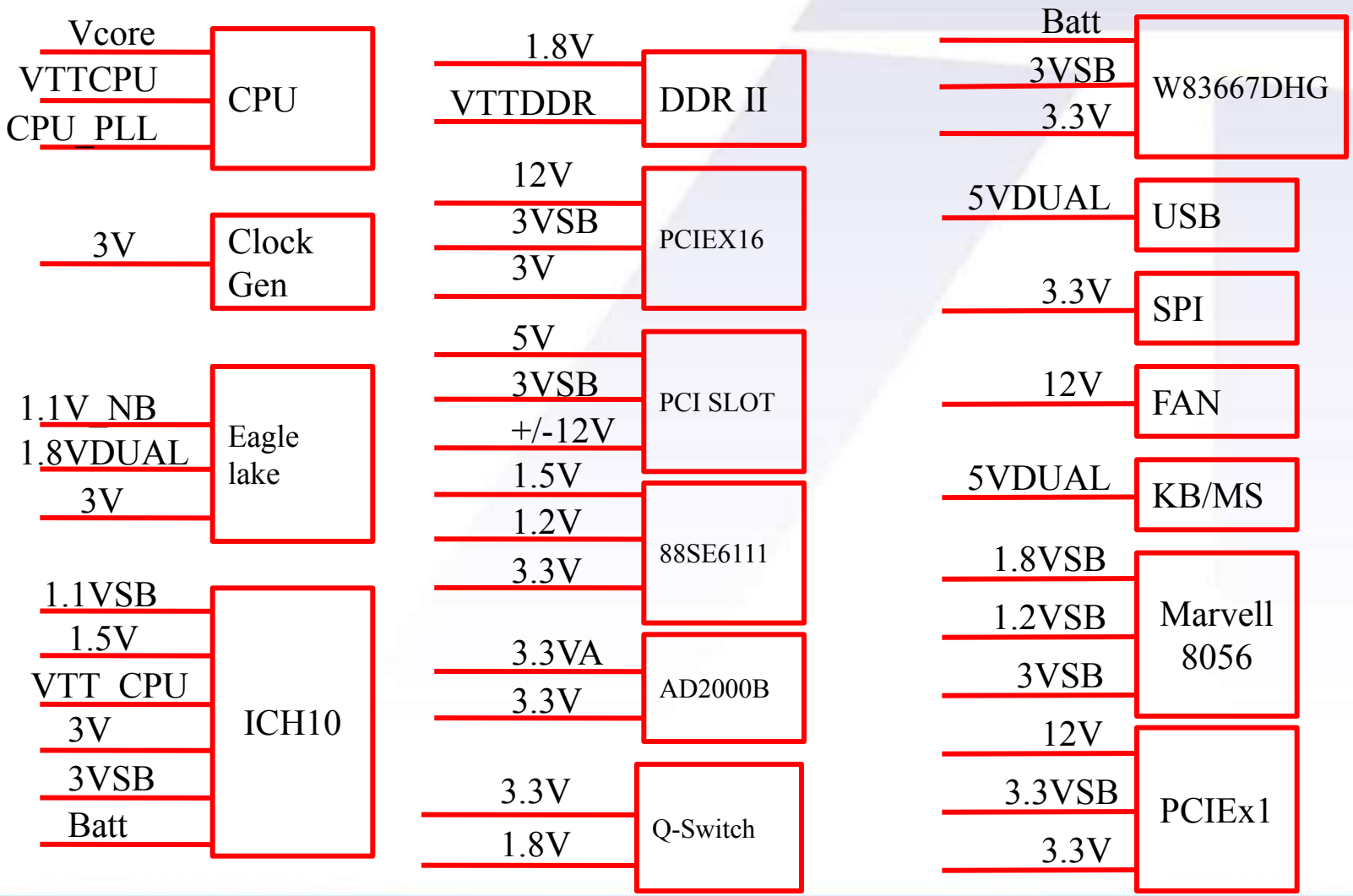
4. If the value is still NG, check which component use Vbatt. Most MB Vbatt connect to SB, I/O and ASUS ASIC. We can strip up the Vbatt pin of I/O and ASIC to confirm which component is .

5. If it's not I/O or ASIC problem finally please try to change SB.

AFTER POWER ON VOLTAGE

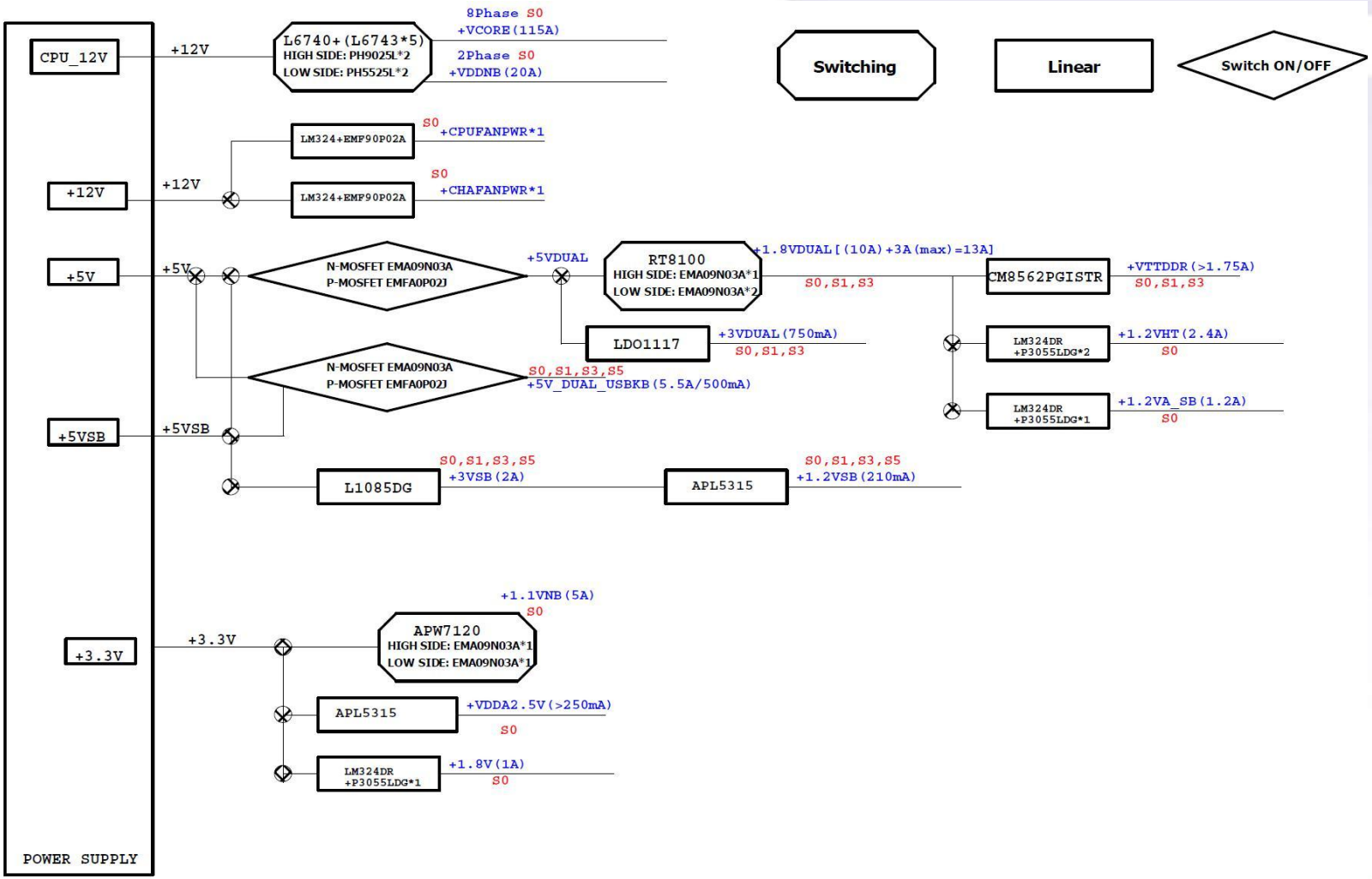
After Power On-Voltage Distribution

P5Q Deluxe



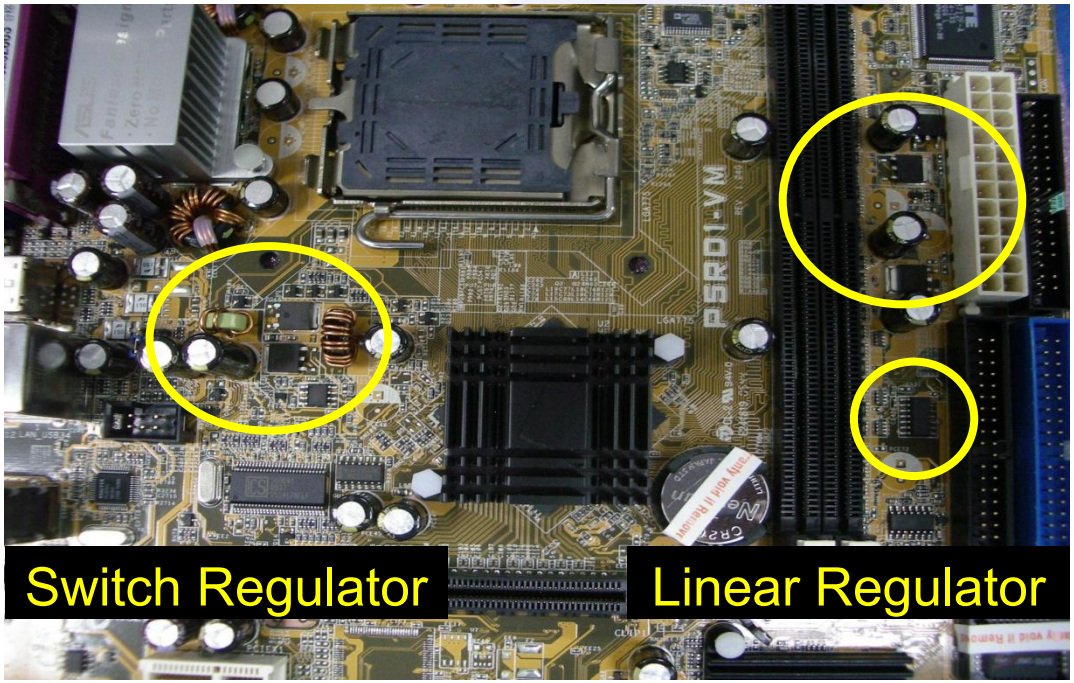
After Power On-Voltage Distribution

M4A79T DELUXE



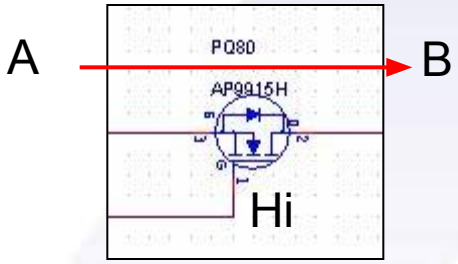
After Power On-Linear & Switch Regulator introduction

1. Linear Regulator – Lower Cost and Higher heat.
   e.g. LAN voltage, FAN.
2. Switch Regulator – Higher Cost and Lower heat.
   e.g. VCORE, Memory voltage.

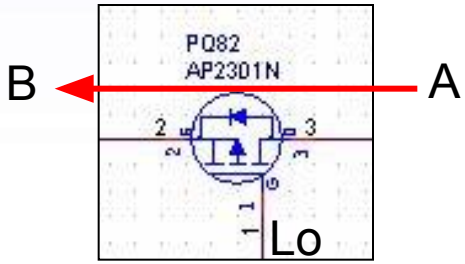


After Power On-Linear & Switch Regulator introduction

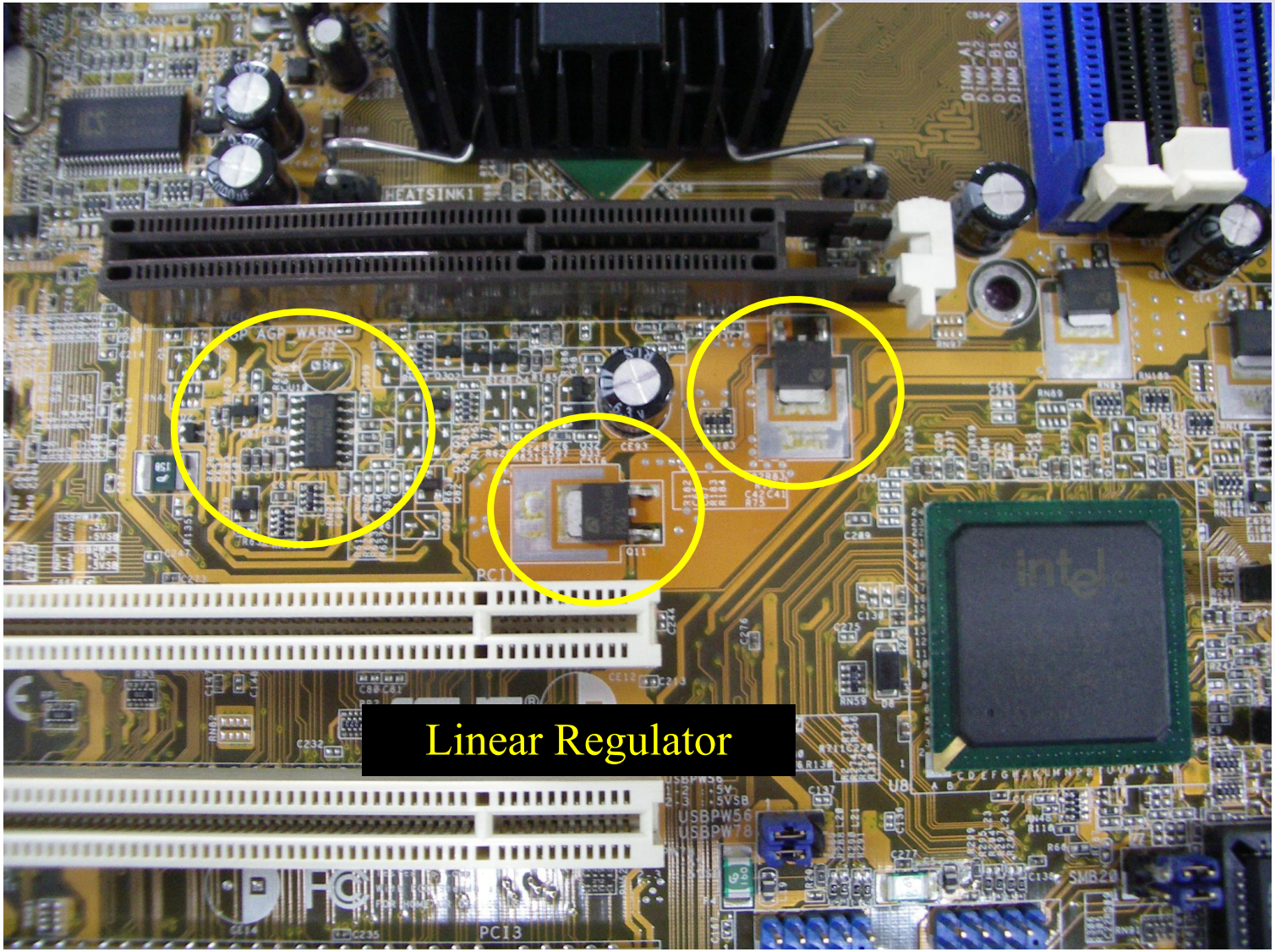
- **MOSFET**
  - N channel, Current high
  - If G is hi, the voltage in D should transfer to S.



  - P channel, Current low.
  - If G is lo, the voltage in S should transfer to D.

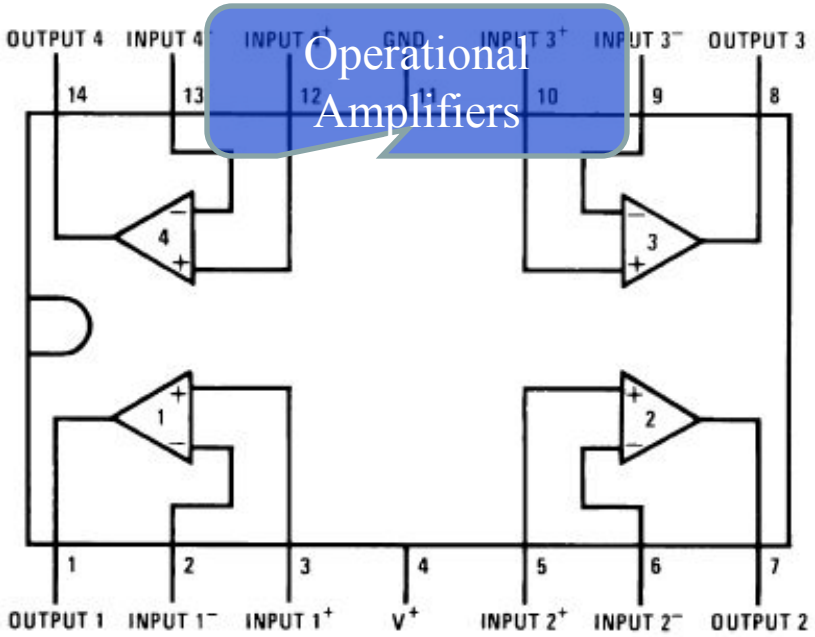


After Power On-Typical Linear Regulator



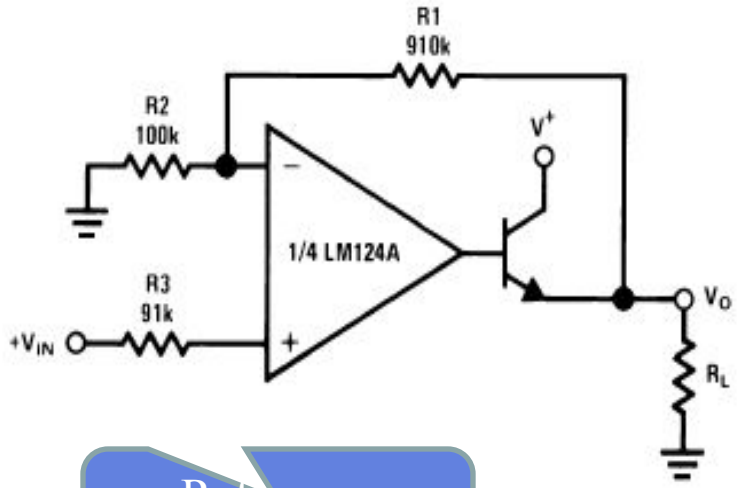
After Power On-Typical Linear Regulator

LM324 Diagrams



Operational Amplifiers

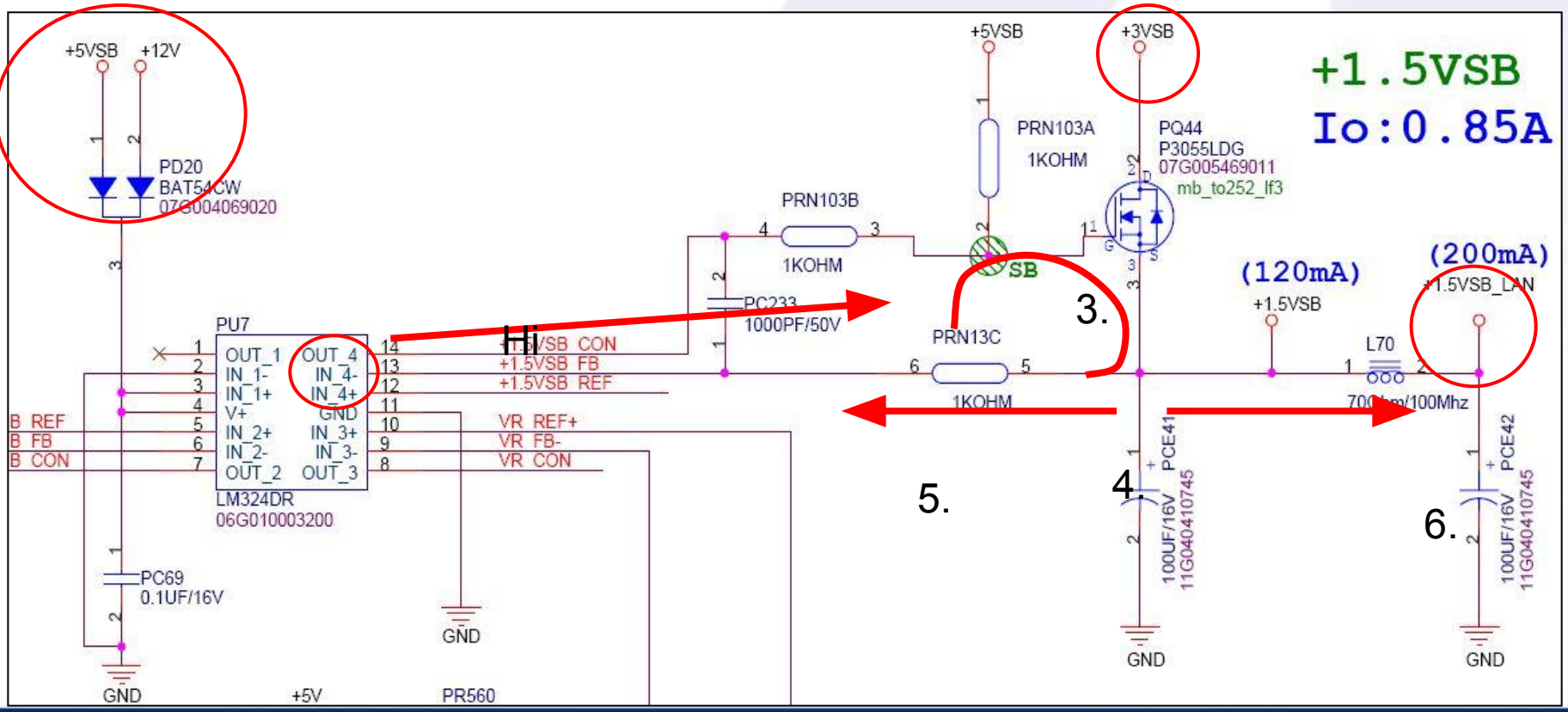
Power Amplifier



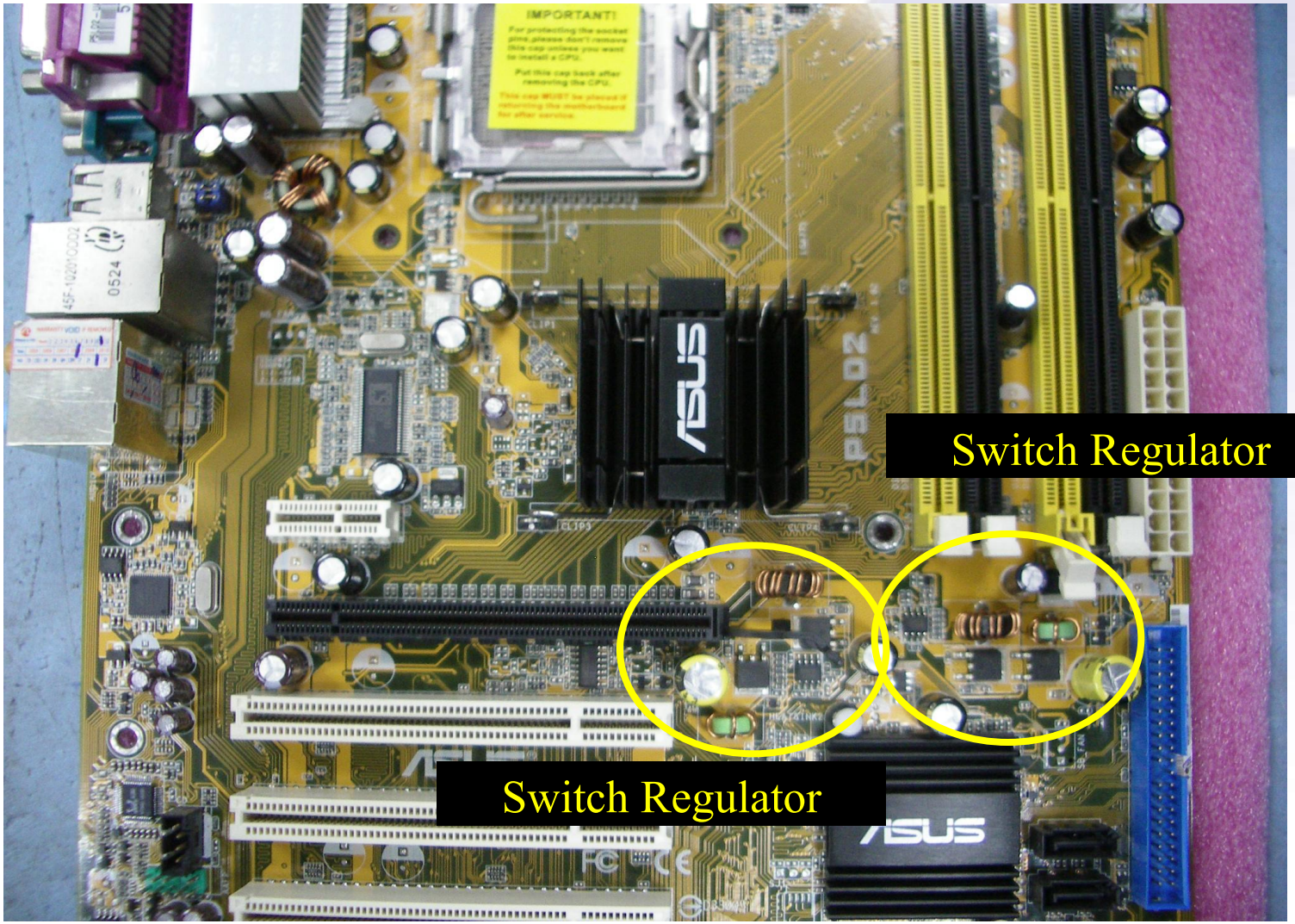
Reference voltage

After Power On-Typical Linear Regulator

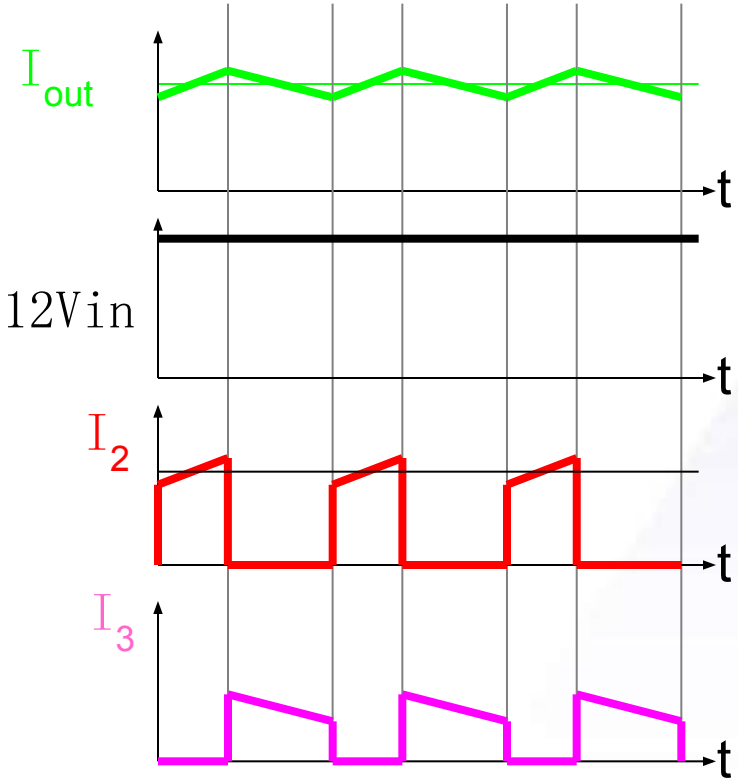
- **IN+ = IN-**, +1.5VSB REF (12th pin)= +1.5VSB FB (13th pin)
- If 13th pin (Feedback) were lower than 12th pin (Reference), the 14th pin will make VG hi, meanwhile MOSFET is working till IN 4 - = IN4 +.

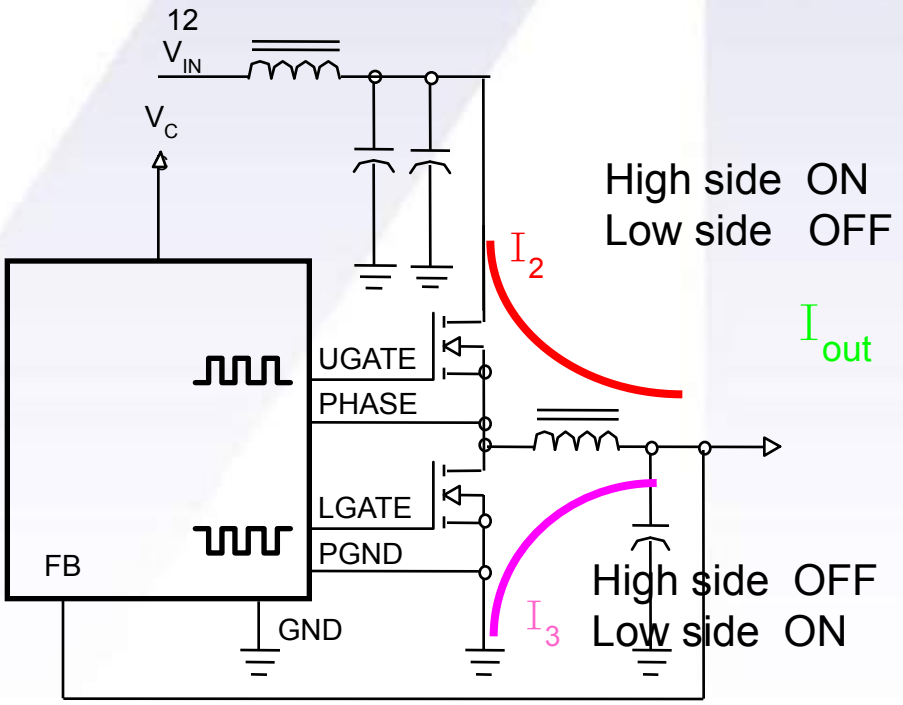


After Power On-Typical Switch Regulator

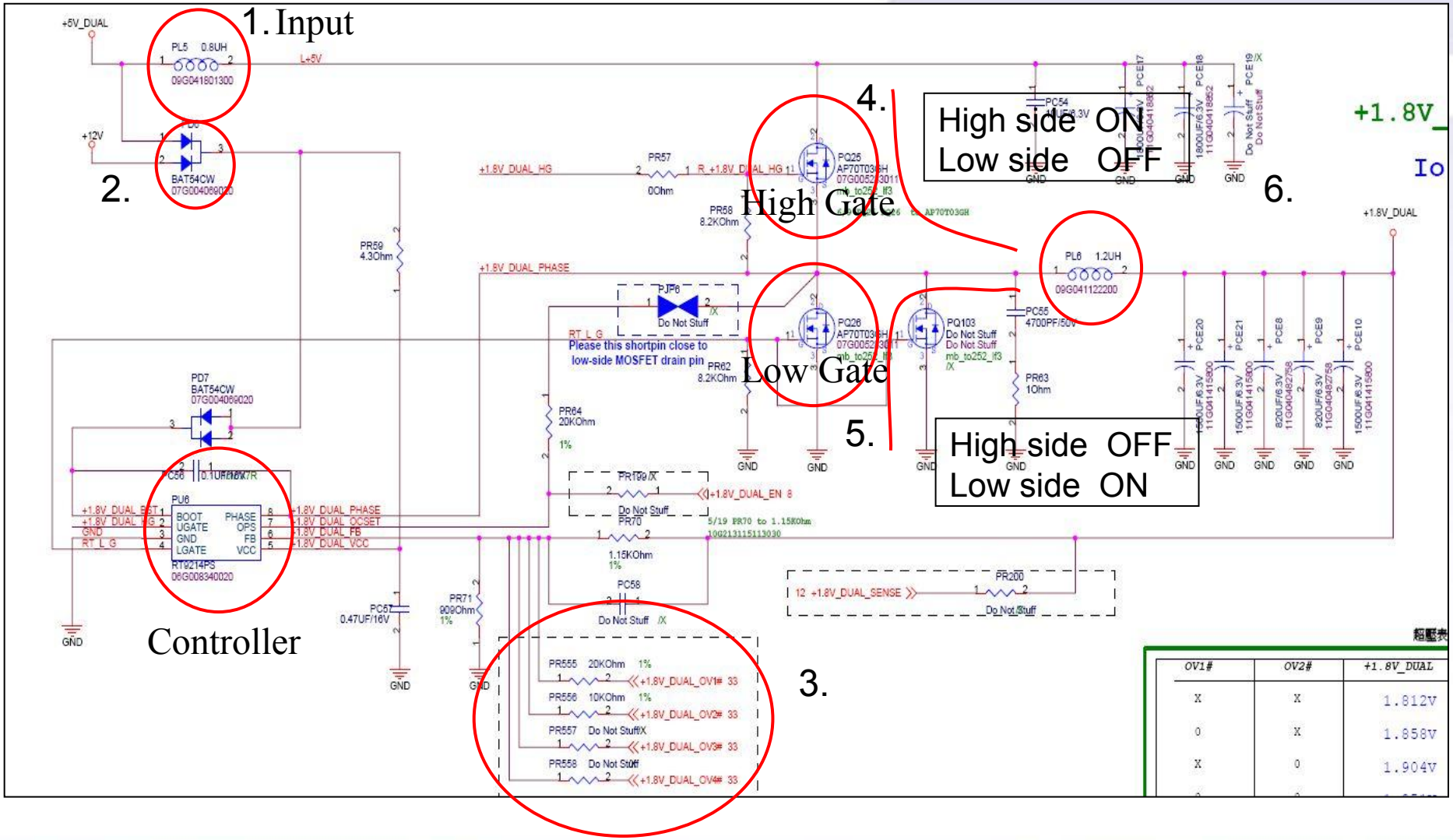


After Power On-Typical Switch Regulator



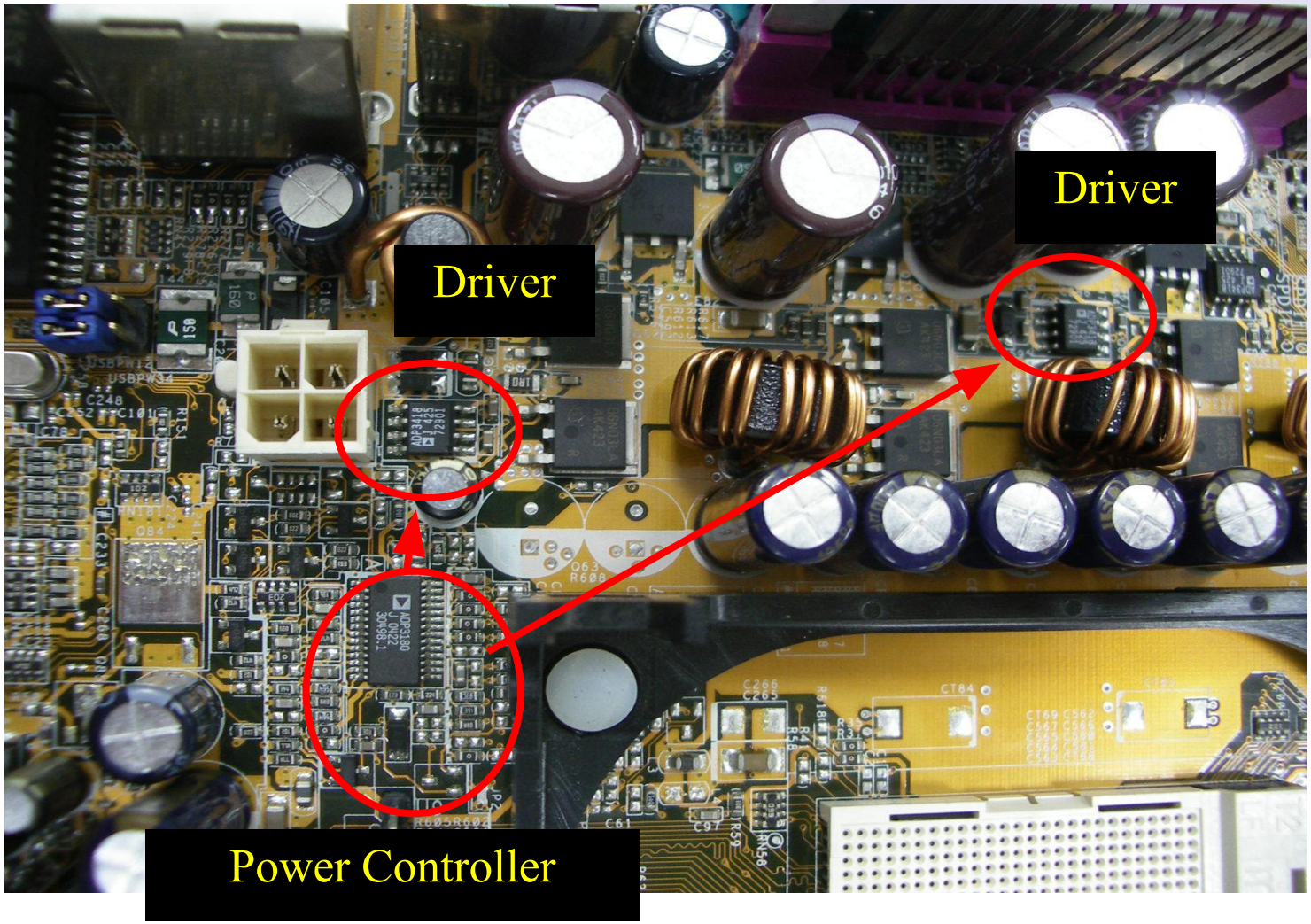


After Power On-Typical Switch Regulator

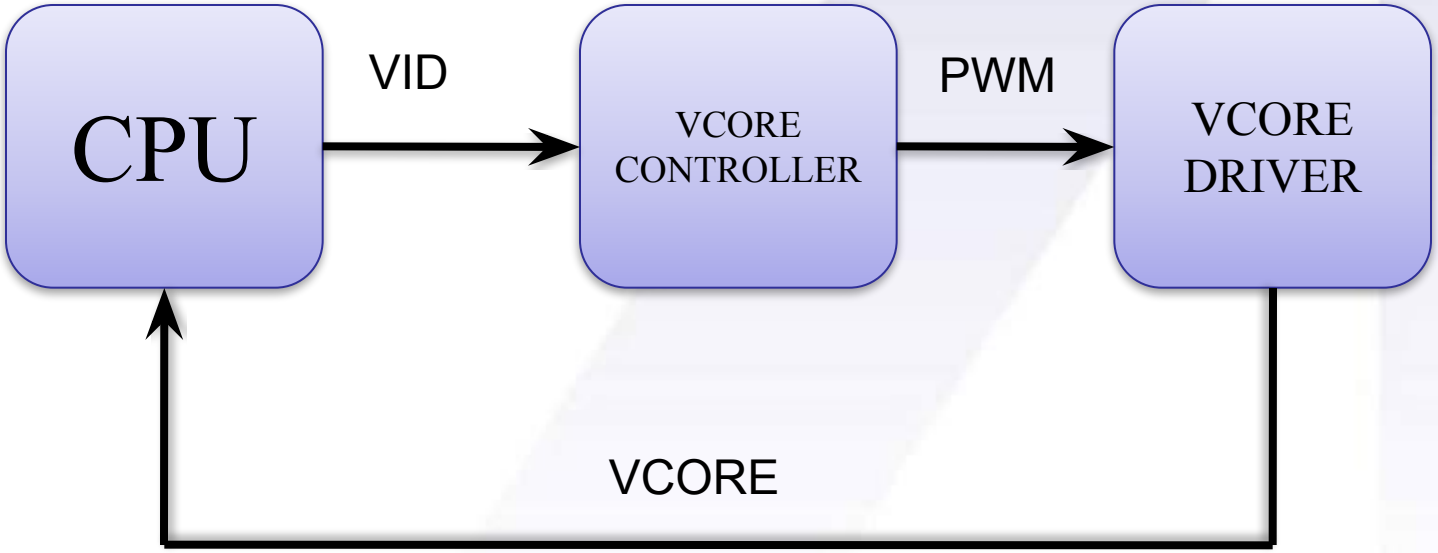


VCORE

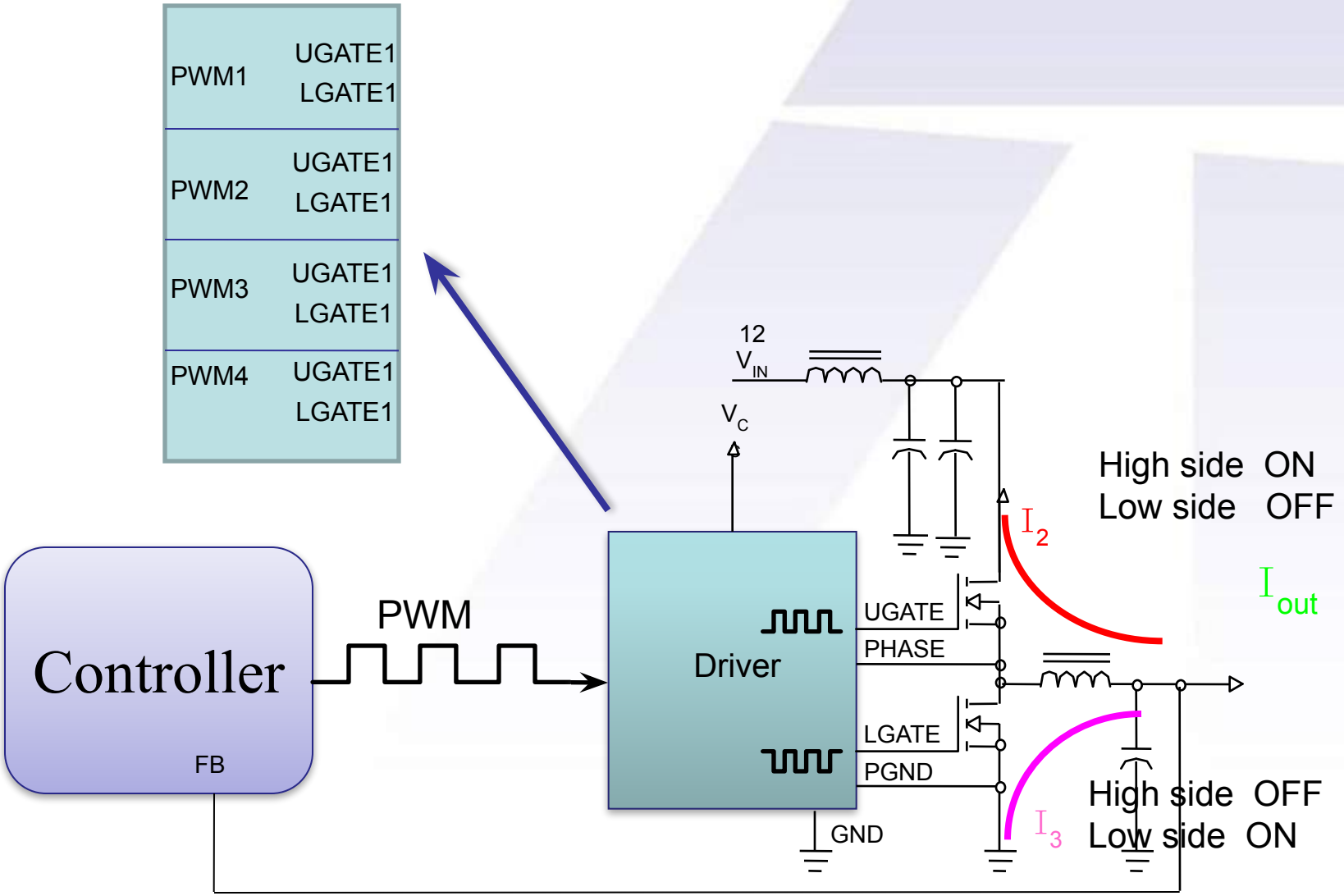
After Power On-VCORE architecture & circuit



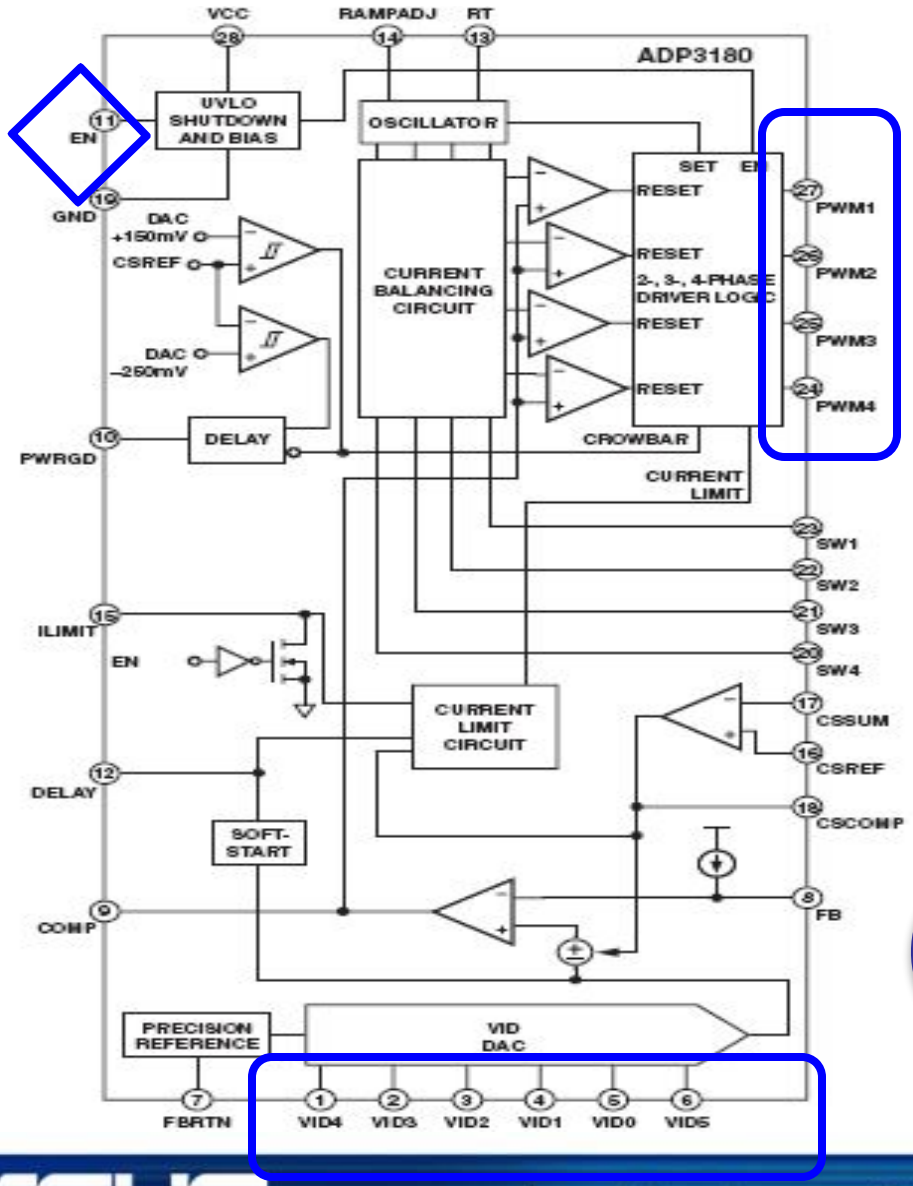
After Power On-VCORE architecture & circuit



After Power On-VCORE architecture & circuit



After Power On-VCORE architecture & circuit

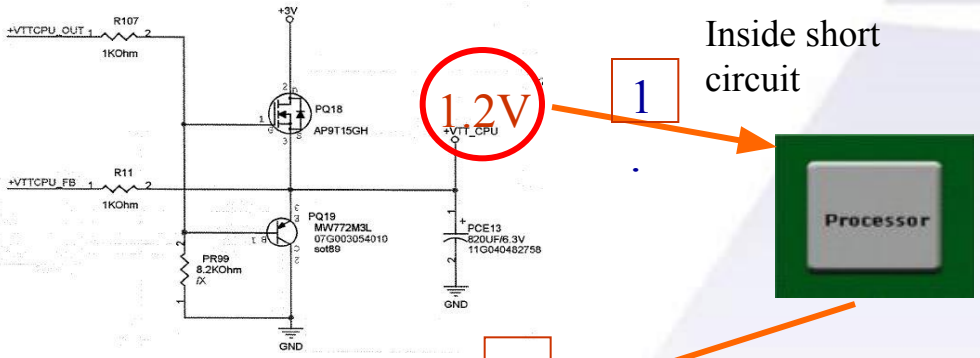


PWM

VCORE Control IC—ADP3180

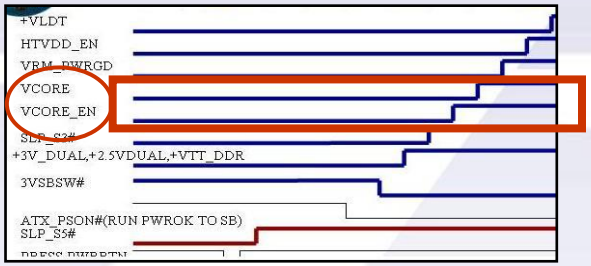
VID

After Power On-VCORE architecture & circuit



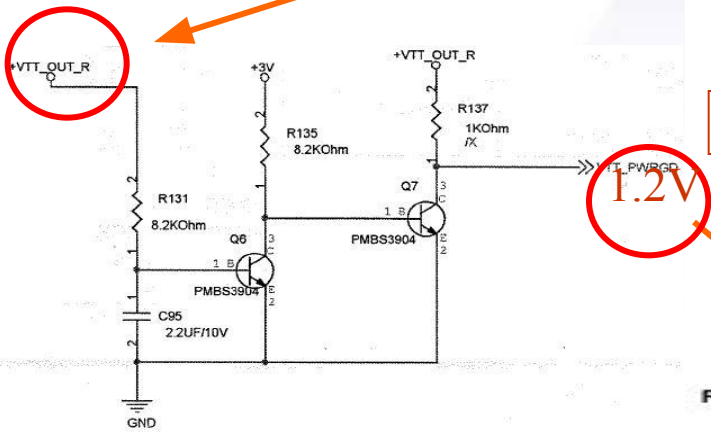
1

Inside short circuit



We should measure the Controller EN pin 1.2V in 11th at first time, if VCORE no work!

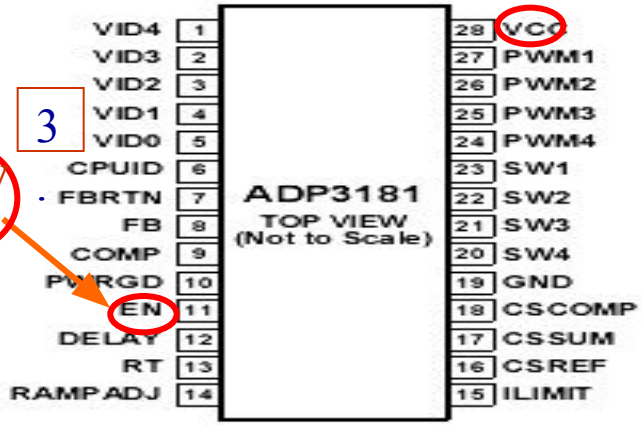
2



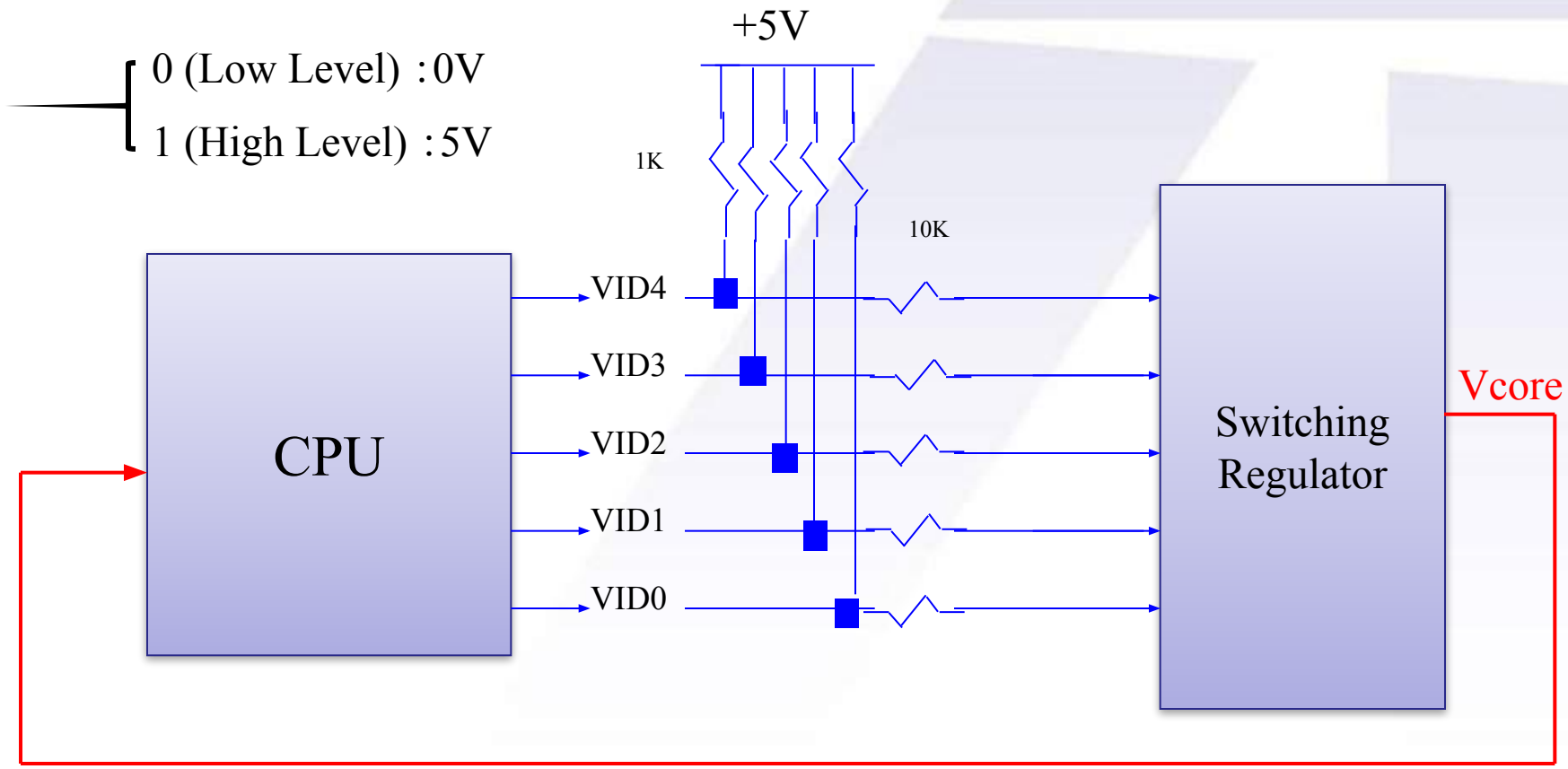
1.2V

3

12V



After Power On-VCORE architecture & circuit



After Power On-VCORE architecture & circuit

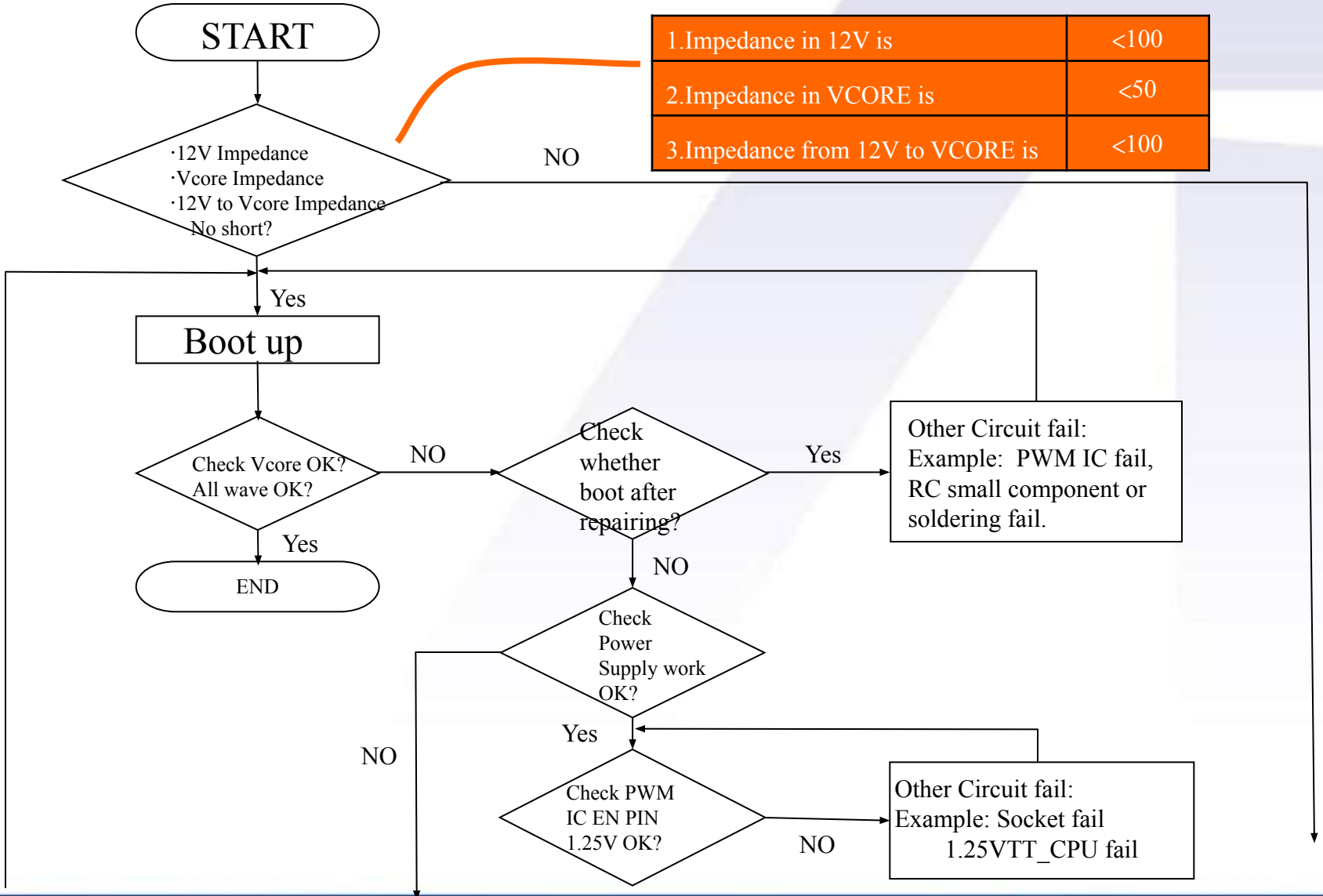
ADP3180 Output Voltage V.S. VID code

VID4	VID3	VID2	VID1	VID0	VID5	$V_{OUT(NOM)}$
1	1	1	1	1	X	No CPU
0	1	0	1	0	0	0.8375 V
0	1	0	0	1	1	0.850 V
0	1	0	0	1	0	0.8625 V
0	1	0	0	0	1	0.875 V
0	1	0	0	0	0	0.8875 V
0	0	1	1	1	1	0.900 V
0	0	1	1	1	0	0.9125 V
0	0	1	1	0	1	0.925 V
0	0	1	1	0	0	0.9375 V
0	0	1	0	1	1	0.950 V
0	0	1	0	1	0	0.9625 V
0	0	1	0	0	1	0.975 V
0	0	1	0	0	0	0.9875 V
0	0	0	1	1	1	1.000 V
0	0	0	1	1	0	1.0125 V
0	0	0	1	0	1	1.025 V
0	0	0	1	0	0	1.0375 V
0	0	0	0	1	1	1.050 V
0	0	0	0	1	0	1.0625 V
0	0	0	0	0	1	1.075 V
0	0	0	0	0	0	1.0875 V
1	1	1	1	0	1	1.100 V
1	1	1	1	0	0	1.1125 V
1	1	1	0	1	1	1.125 V
1	1	1	0	1	0	1.1375 V
1	1	1	0	0	1	1.150 V
1	1	1	0	0	0	1.1625 V
1	1	0	1	1	1	1.175 V
1	1	0	1	1	0	1.1875 V
1	1	0	1	0	1	1.200 V
1	1	0	1	0	0	1.2125 V

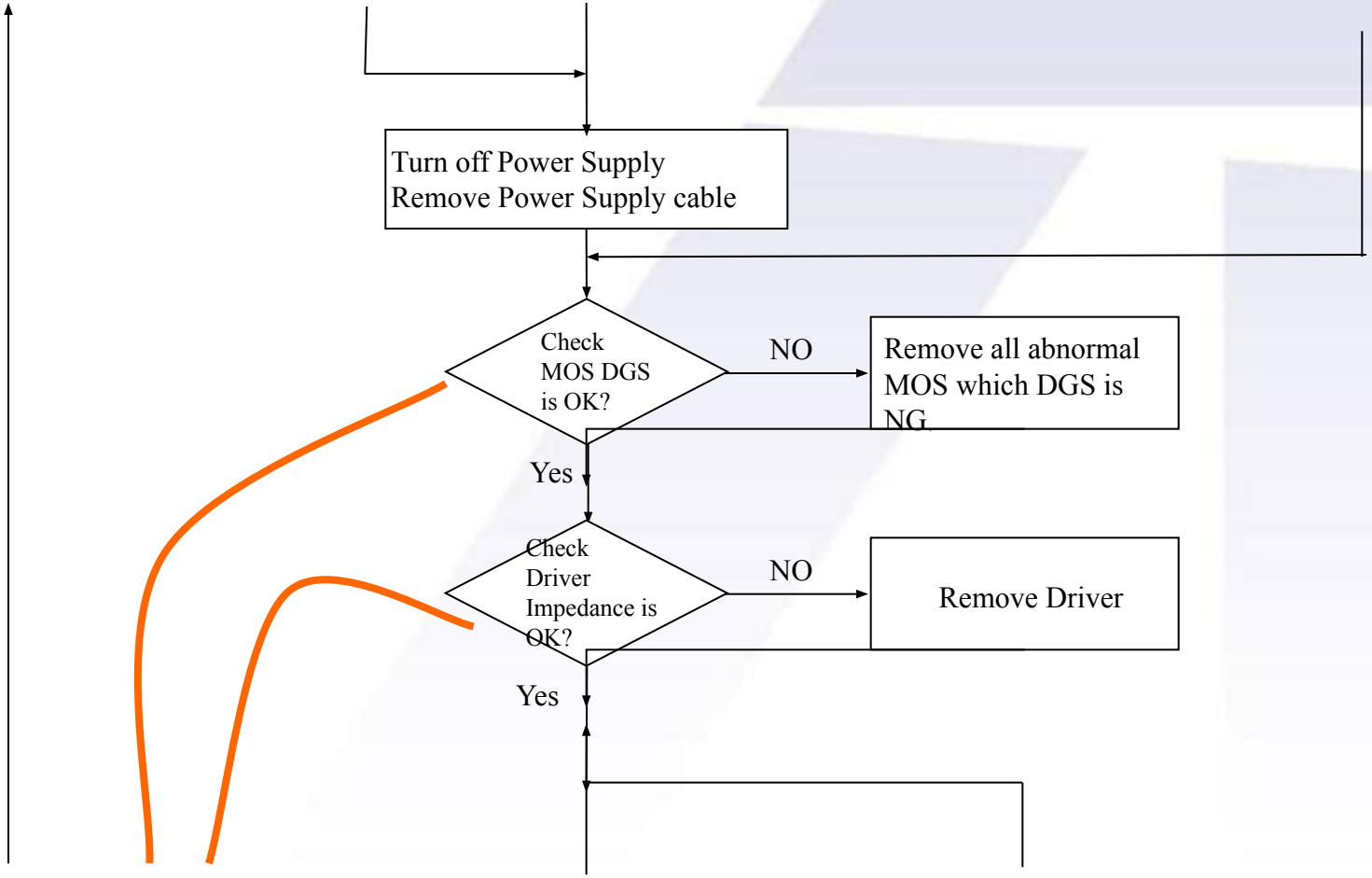
VID4	VID3	VID2	VID1	VID0	VID5	$V_{OUT(NOM)}$
1	1	0	0	1	1	1.225 V
1	1	0	0	1	0	1.2375 V
1	1	0	0	0	1	1.250 V
1	1	0	0	0	0	1.2625 V
1	0	1	1	1	1	1.275 V
1	0	1	1	1	0	1.2875 V
1	0	1	1	0	1	1.300 V
1	0	1	1	0	0	1.3125 V
1	0	1	0	1	1	1.325 V
1	0	1	0	1	0	1.3375 V
1	0	1	0	0	1	1.350 V
1	0	1	0	0	0	1.3625 V
1	0	0	1	1	1	1.375 V
1	0	0	1	1	0	1.3875 V
1	0	0	1	0	1	1.400 V
1	0	0	1	0	0	1.4125 V
1	0	0	0	1	1	1.425 V
1	0	0	0	1	0	1.4375 V
1	0	0	0	0	1	1.450 V
1	0	0	0	0	0	1.4625 V
0	1	1	1	1	1	1.475 V
0	1	1	1	1	0	1.4875 V
0	1	1	1	0	1	1.500 V
0	1	1	1	0	0	1.5125 V
0	1	1	0	1	1	1.525 V
0	1	1	0	1	0	1.5375 V
0	1	1	0	0	1	1.550 V
0	1	1	0	0	0	1.5625 V
0	1	0	1	1	1	1.575 V
0	1	0	1	1	0	1.5875 V
0	1	0	1	0	1	1.600 V

X = Don't Care

After Power On-VCORE Voltage repair Flow Chart 1

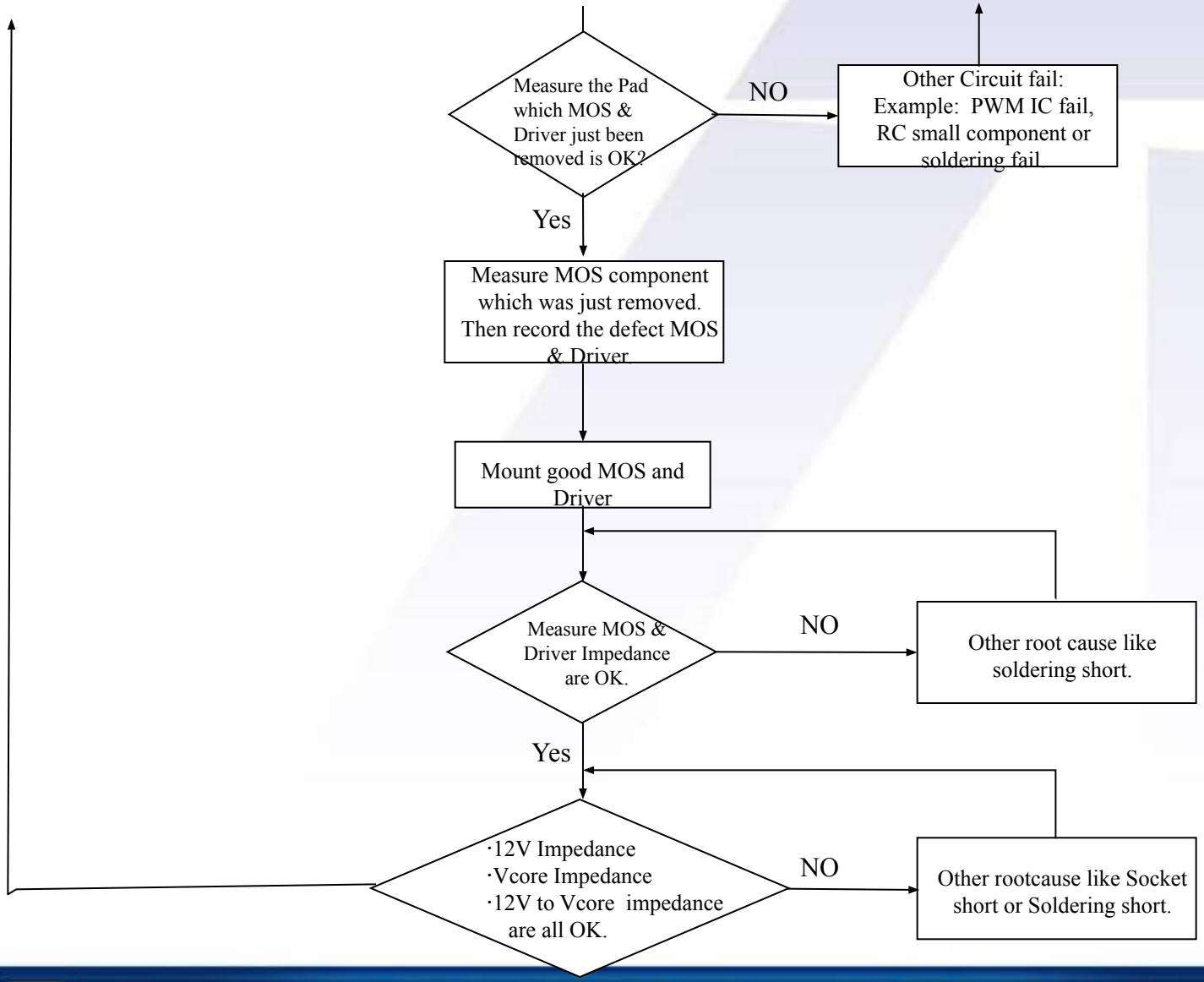


After Power On-VCORE Voltage repair Flow Chart 12



+ Point: Red Line	PIN1(BST)	PIN8(DRVH)	PIN4(VCC)	PIN5(DRVL)	PIN2(DRVL)	PIN3(DRVL)
- Point: Black Line	PIN8(DRVH)	PIN7(SW)	PIN5(DRVL)	PIN6(PGND)	PIN6(PGND)	PIN6(PGND)
Impedance	>1M	8.2K(10%)	> 300K	8.2K(10%)	> 100K	> 50K

After Power On-VCORE Voltage repair Flow Chart 12



After Power On-VCORE Problem Debug Procedure (1)

- **If no Output**
  - Check if both 5V and 12V are OK
  - Check if POWER MOSFET (both UGATE/ LGATE) are not short
  - Check all VIDs of Power Regulator are not high
  - Check EN/FS of Power Regulator is not zero Volt

After Power On-VCORE Problem Debug Procedure (2)

- **If the output voltage wrong**
  - Check if VIDs of Power Regulator are wrong setting
  - Check if the feedback resistor divider is wrong
  - Check if UGATE and LGATE of Power Regulator with wrong voltage level
  - Check if POWER MOSFET failure

Thank You!