

Hardware Monitor

Sephiroth Kwon

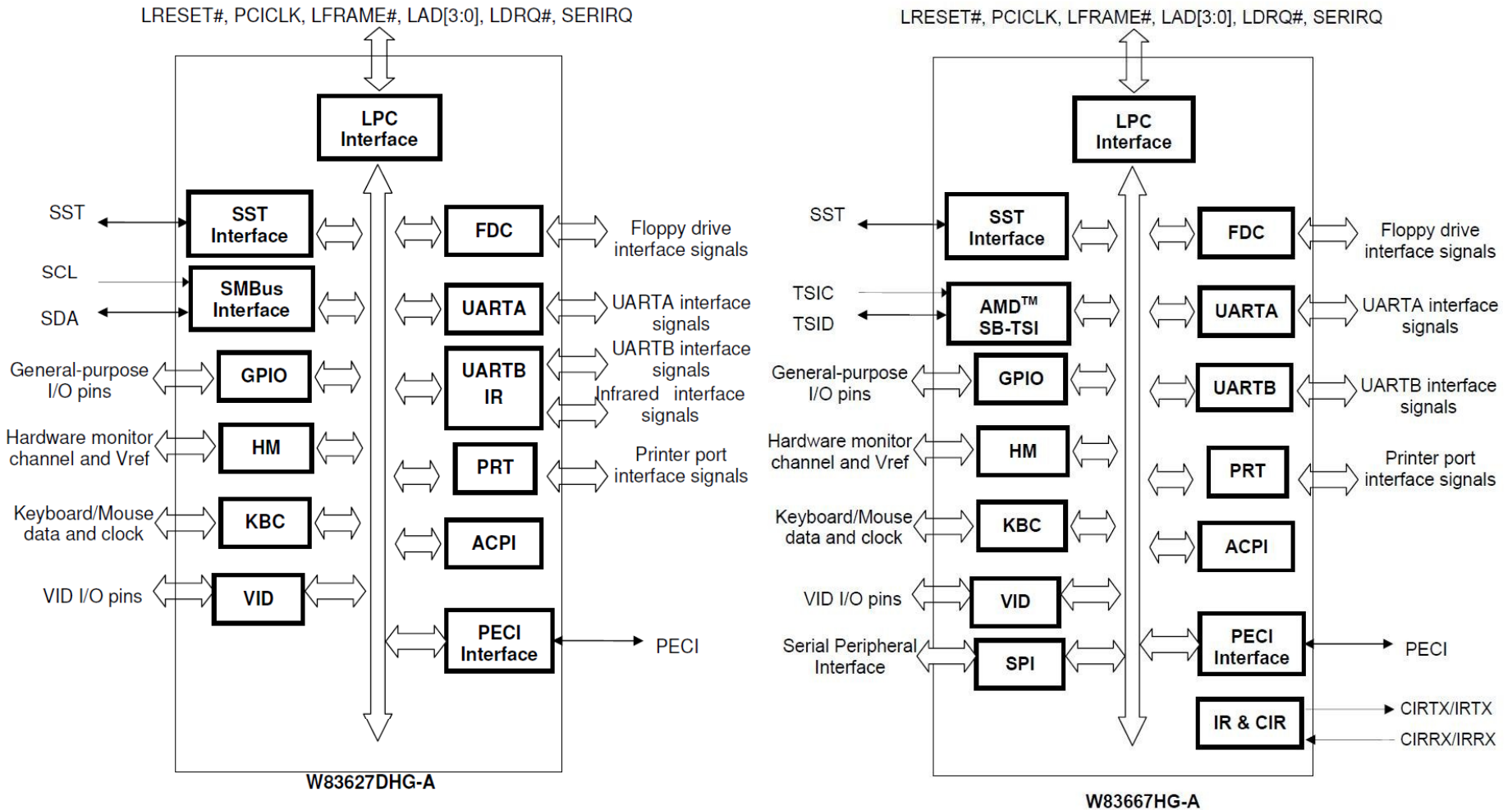
GRMA

26-05-2009

OUTLINE

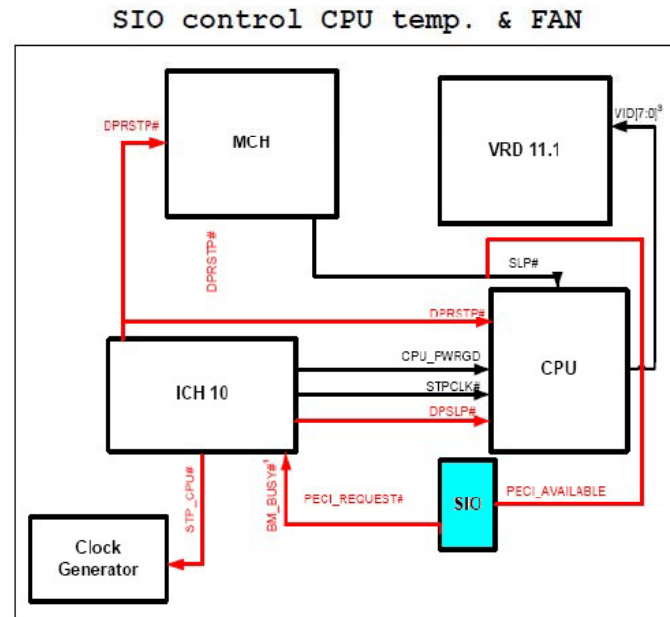
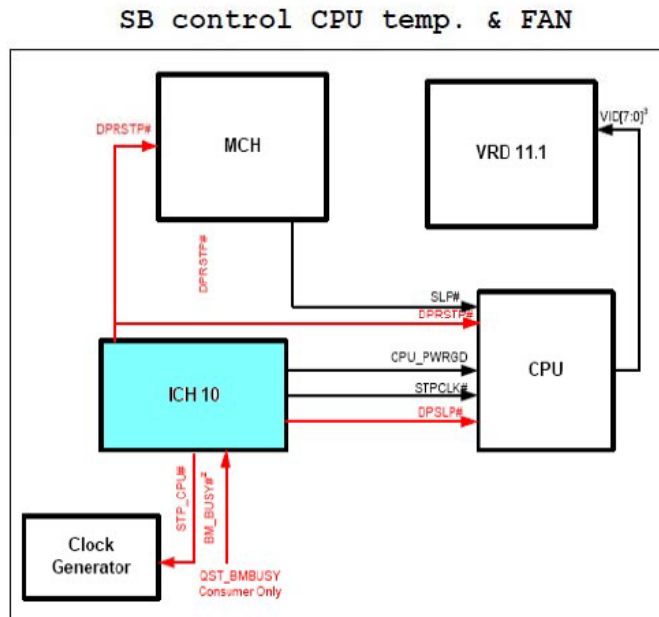
- **Diagram**
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 - Theorem
 - Repair Flow Chart
 - Repair Technique
- **Fan Sense**
 - Theorem
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 - Repair Technique
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 - Repair Flow Chart
 - Repair Technique

Super I/O Diagram



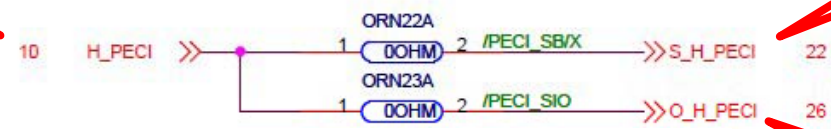
PECE (Platform Environment Control Interface) is a new digital interface that enables communication of the temperature reading of a CPU to the PECE host controller, enabling more efficient platform thermal control than previous methods

Select PECI control



Connect to CPU

SIO or SB control



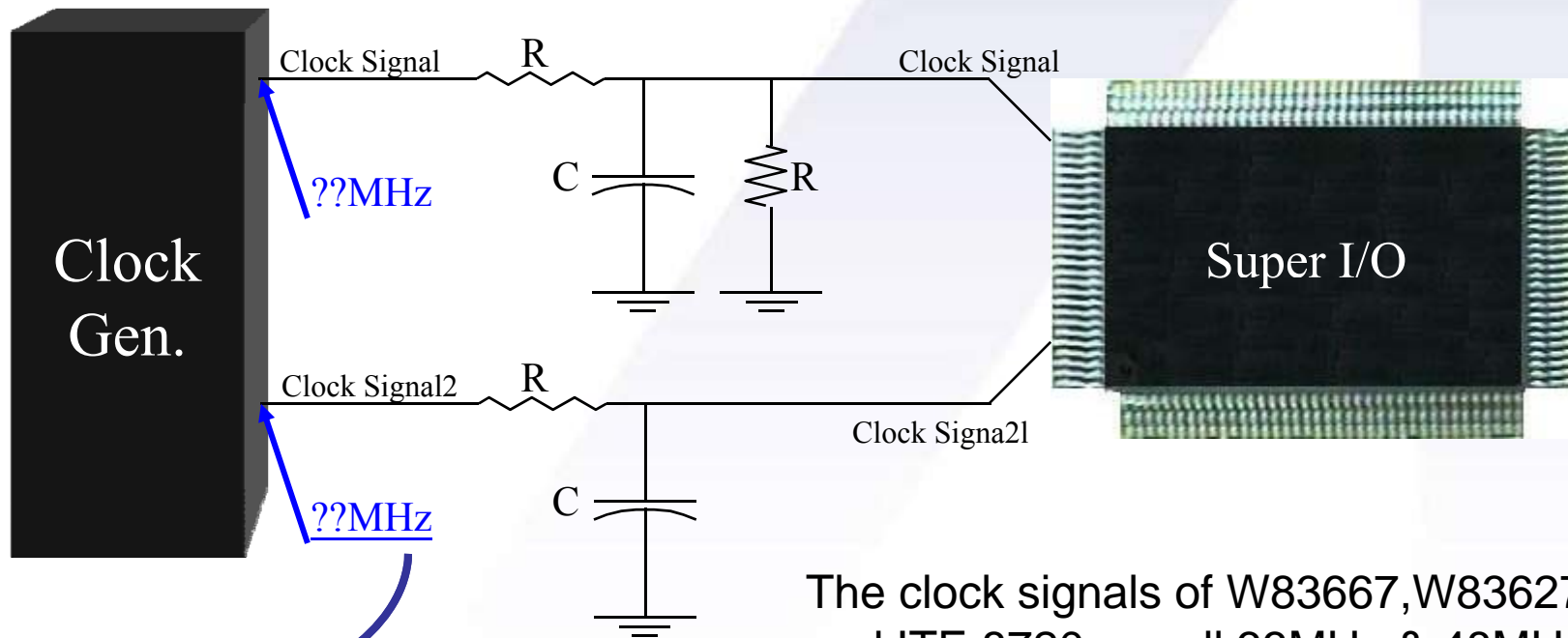
Connect to SB

PECI control BOM Option

	SB control	SIO control
ORN22	V	X
ORN23	X	V

Connect to SIO

Clock Diagram (for super I/O)

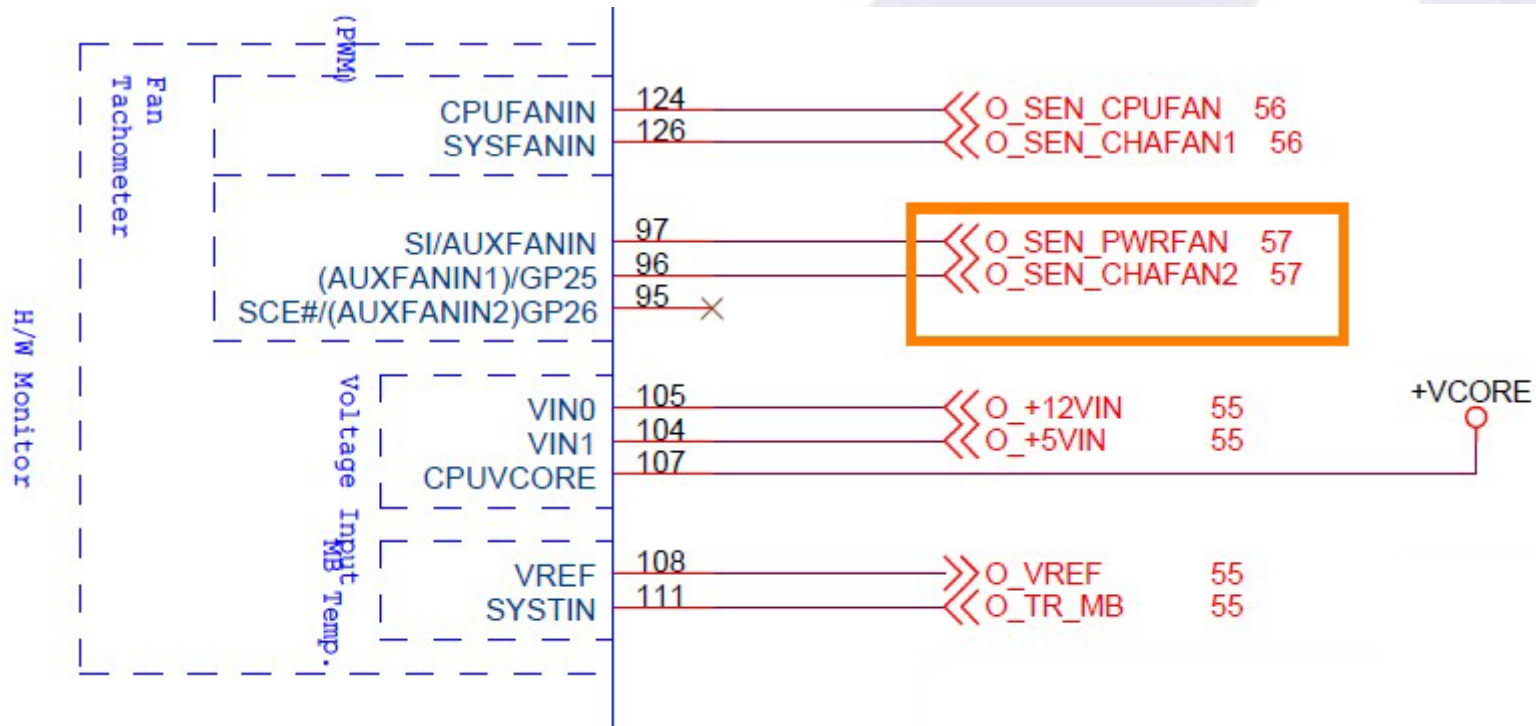


Depends on difference chip

The clock signals of W83667, W83627 and ITE 8720 are all 33MHz & 48MHz.

But the ITE 8712's are 33MHz & 24MHz.

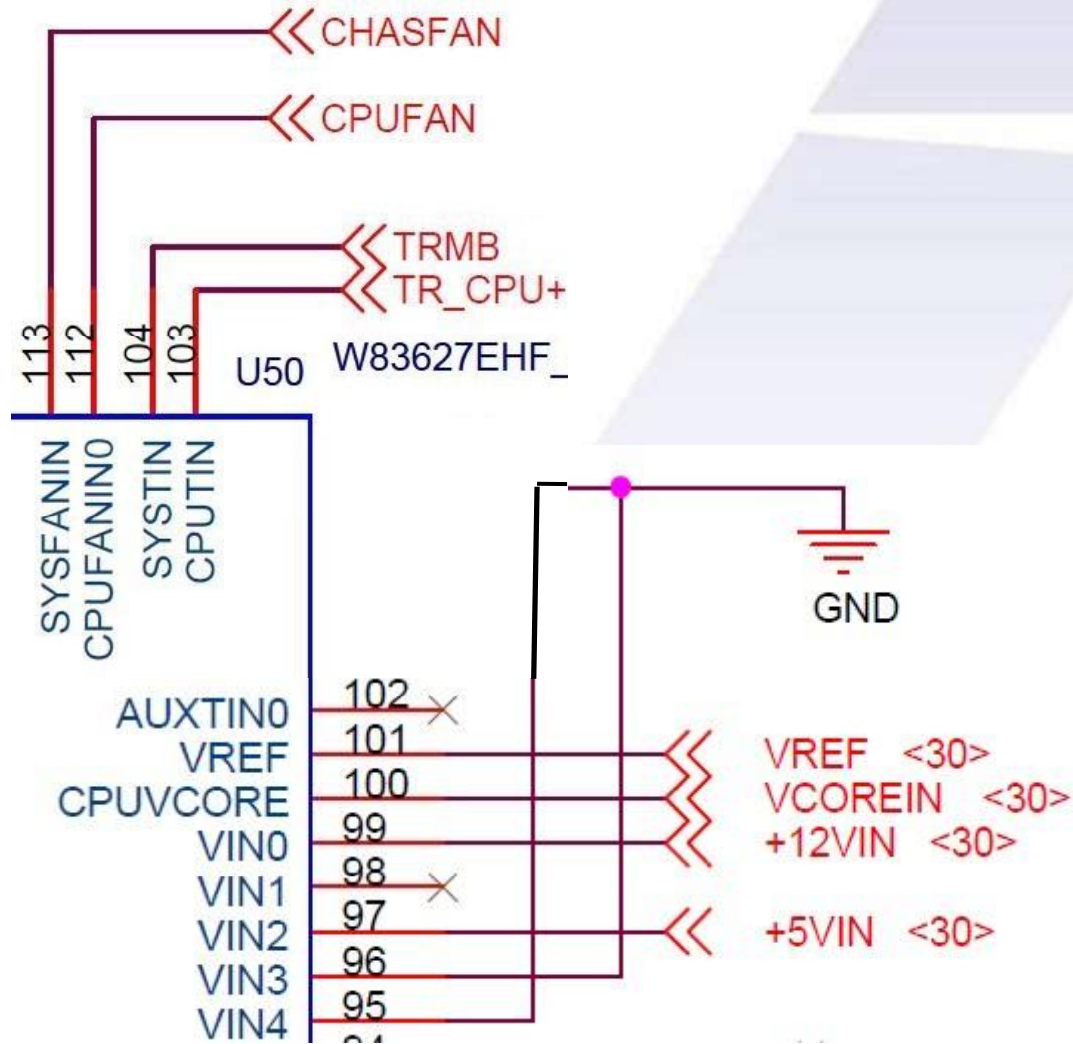
Signal Description(W83667HG H/W partial pins)



Signal Description(W83667HG H/W partial pins)

SYMBOL	PIN	I/O	DESCRIPTION
SI	97	IN _{ts}	Receive data from Serial Flash. This pin is connected to Serial Flash SO.
AUXFANIN		I/O _{12ts}	0 to +3 V amplitude fan tachometer input.
SO	98	O ₈	Transfer commands, address or data to Serial Flash. This pin is connected to Serial Flash SI.
AUXFANOUT		AOUT O ₁₂ OD ₁₂	DC / PWM fan output control.
CASEOPEN#	100	IN _i	CASE OPEN. An active-low input from an external device when the case is open. This signal can be latched if pin VBAT is disconnected to the battery, even if the W83667HG-A is turned off. Pulling up a 2-MΩ resistor to VBAT is recommended if not in use.
SLOT0CC#	102	IN _i	To detect CPU present or not.
GP56		I/OD _{12t}	General-purpose I/O port 5 bit 6.
VIN1	104	AIN	Analog Inputs for voltage measurement (Range: 0 to 2.948 V)
VIN0	105	AIN	Analog Inputs for voltage measurement (Range: 0 to 2.048 V)
CPUVCORE	107	AIN	Analog Inputs for voltage measurement (Range: 0 to 2.048 V)
VREF	108	AOUT	Reference Voltage (2.048 V).
VIN2	109	AIN	Analog Inputs for voltage measurement (Range: 0 to 2.048 V)
AUXTIN		AIN	The input of temperature sensor 3. It is used for temperature sensing.
CPUTIN	110	AIN	The input of temperature sensor 2. It is used for CPU temperature sensing.
SYSTIN	111	AIN	The input of temperature sensor 1. It is used for system temperature sensing.
CPUFANIN	124	I/O _{12ts}	0 to +3 V amplitude fan tachometer input.
CPUFANOUT	125	AOUT O ₁₂ OD ₁₂	DC / PWM fan output control.
SYSFANIN	126	I/O _{12ts}	0 to +3 V amplitude fan tachometer input.
SYSFANOUT	127	AOUT O ₁₂ OD ₁₂	DC / PWM fan output control.
SMI#	128	OD ₁₂	System Management Interrupt channel output.
OVT#		OD ₁₂	The output of over temperature Shutdown. This pin indicates the temperature is over the temperature limit. (Default after PCIRST)

Signal Description(W83627DHG H/W partial pins)



Signal Description(W83627DHG H/W partial pins)

SYMBOL	PIN	I/O	DESCRIPTION
BEEP	118	OD8	Beep function for hardware monitor. This pin is low after system reset.
SO		O8	Transfer commands, address or data to serial flash. This pin is connected to SI of serial flash.
CASEOPEN#	76	INt	CASE OPEN detection. An active-low input from an external device when the case is open. This signal can be latched if pin VBAT is connected to the battery, even if the W83627DHG-A is turned off. Pulling up a 2-MW resistor to VBAT is recommended if not in use.
VIN3	96	AIN	Analog Inputs for voltage measurement (Range: 0 to 2.048 V)
VIN2	97	AIN	Analog Inputs for voltage measurement (Range: 0 to 2.048 V)
VIN1	98	AIN	Analog Inputs for voltage measurement (Range: 0 to 2.948 V)
VIN0	99	AIN	Analog Inputs for voltage measurement (Range: 0 to 2.048 V)
CPUVCORE	100	AIN	Analog Inputs for voltage measurement (Range: 0 to 2.048 V)
VREF	101	AOUT	Reference Voltage (2.048 V).
AUXTIN	102	AIN	The input of temperature sensor 3. It is used for temperature sensing.
CPUTIN	103	AIN	The input of temperature sensor 2. It is used for CPU temperature sensing.
SYSTIN	104	AIN	The input of temperature sensor 1. It is used for system temperature sensing.
OVT#	5	OD12	The output of over temperature Shutdown. This pin indicates the temperature is over the temperature limit. (Default after LRESET#)
SMI#		OD12	System Management Interrupt channel output.
VID7 VID6 VID5 VID4 VID3 VID2 VID1 VID0	121 122 123 124 125 126 127 128	I/O12	VID input detection, also with output control.

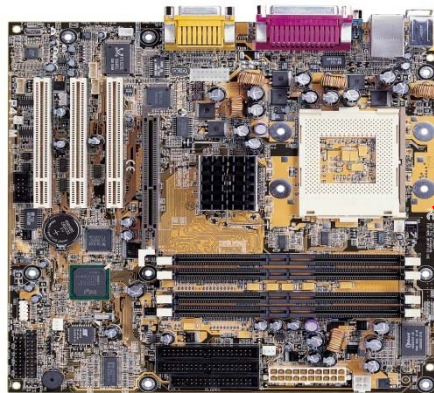
Signal Description(W83627DHG H/W partial pins)

SYMBOL	PIN	I/O	DESCRIPTION
AUXFANIN1	58	I/O _{12ts}	0 to +3 V amplitude fan tachometer input.
SI		IN _{ts}	Receive data from serial flash. This pin is connected to SO of serial flash.
AUXFANIN0 CPUFANIN0 SYSFANIN	111 112 113	I/O _{12ts}	0 to +3 V amplitude fan tachometer input.
CPUFANIN1	119	I/O _{12ts}	0 to +3 V amplitude fan tachometer input. (Default)
GP21		I/OD _{12t}	General-purpose I/O port 2 bit 1.
AUXFANOUT CPUFANOUT0 SYSFANOUT	7 115 116	AOUT/ OD ₁₂ / O ₁₂	DC/PWM fan output control. CPUFANOUT0 and AUXFANOUT are default PWM mode, CPUFANOUT1 and SYSFANOUT are default DC mode.
CPUFANOUT1	120	AOUT/ OD ₁₂ / O ₁₂	DC/PWM fan output control. (Default) CPUFANOUT0 and AUXFANOUT are default PWM mode, CPUFANOUT1 and SYSFANOUT are default DC mode.
GP20		I/OD _{12t}	General-purpose I/O port 2 bit 0.
FAN_SET	117	IN _{td}	Determines the initial FAN speed. Power on configuration for 2 fan speeds, 50% or 100%. During power-on reset, this pin is pulled down internally and the fan speed is 50%. Only CPUFANOUT0 is supported.
PLED		O ₁₂	Power LED output. Drive high 3.3 V after strapping.

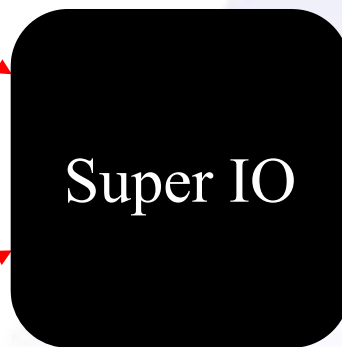
Theorem (Temp. Sense)



CPU Temperature



Motherboard Temperature



Super I/O

Power	
HardWare Monitor	
MB Temperature	33°C/91°F
CPU Temperature	61°C/141°F
JTPWR Temperature	[Ignore]
CPU Fan Speed	7500RPM
Power Fan Speed	7670RPM
Chassis Fan Speed	N/A
VCORE Voltage	1.52V
+3.3V Voltage	3.33V
+5V Voltage	5.00V
+12V Voltage	12.00V

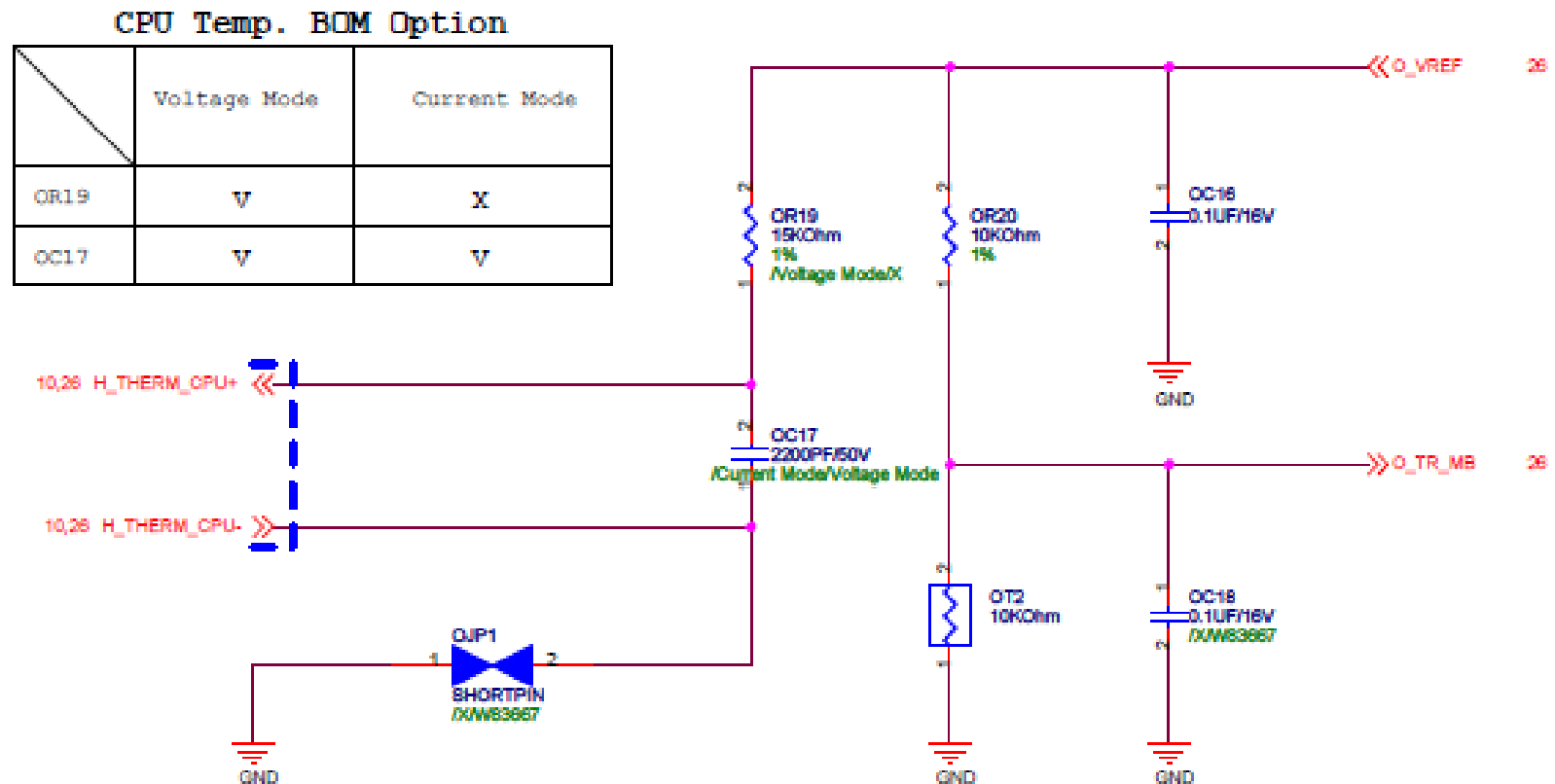
BIOS Menu

監測項目	感測值	狀態
<input checked="" type="checkbox"/> CPU溫度	48 C / 118 F	正常
<input checked="" type="checkbox"/> 主機板溫度	28 C / 82 F	正常
<input checked="" type="checkbox"/> CPU 風扇	4720	正常
<input type="checkbox"/> 電源風扇	0	暫停監測
<input type="checkbox"/> 機殼風扇	0	暫停監測
<input checked="" type="checkbox"/> +12V 電壓	12.524	正常
<input checked="" type="checkbox"/> +5V 電壓	4.999	正常
<input checked="" type="checkbox"/> +3.3V 電壓	3.408	正常
<input checked="" type="checkbox"/> VCore 電壓	1.624	正常

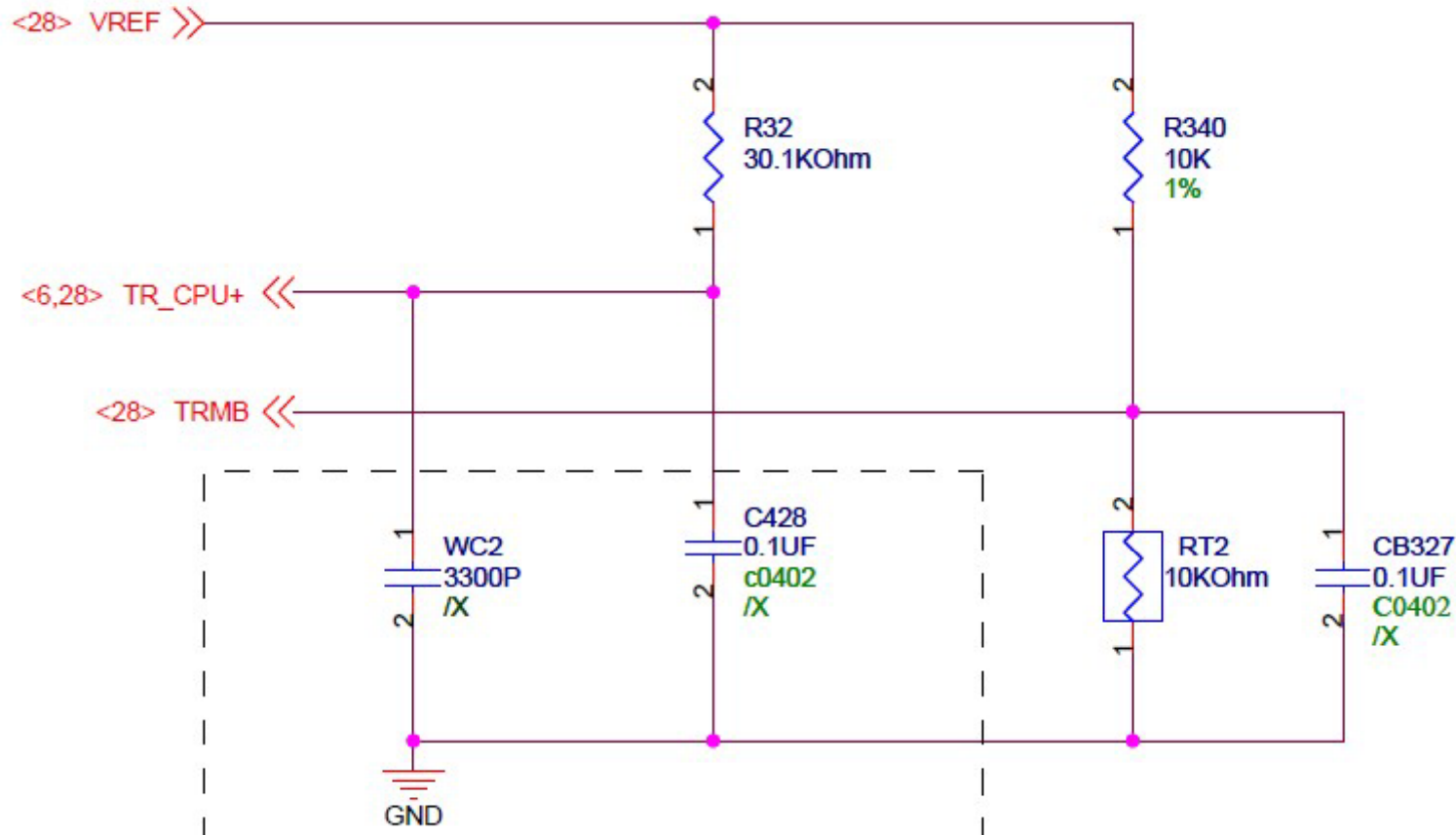
ASUS PC Probe

Theorem (Temp. Sense-W83667)

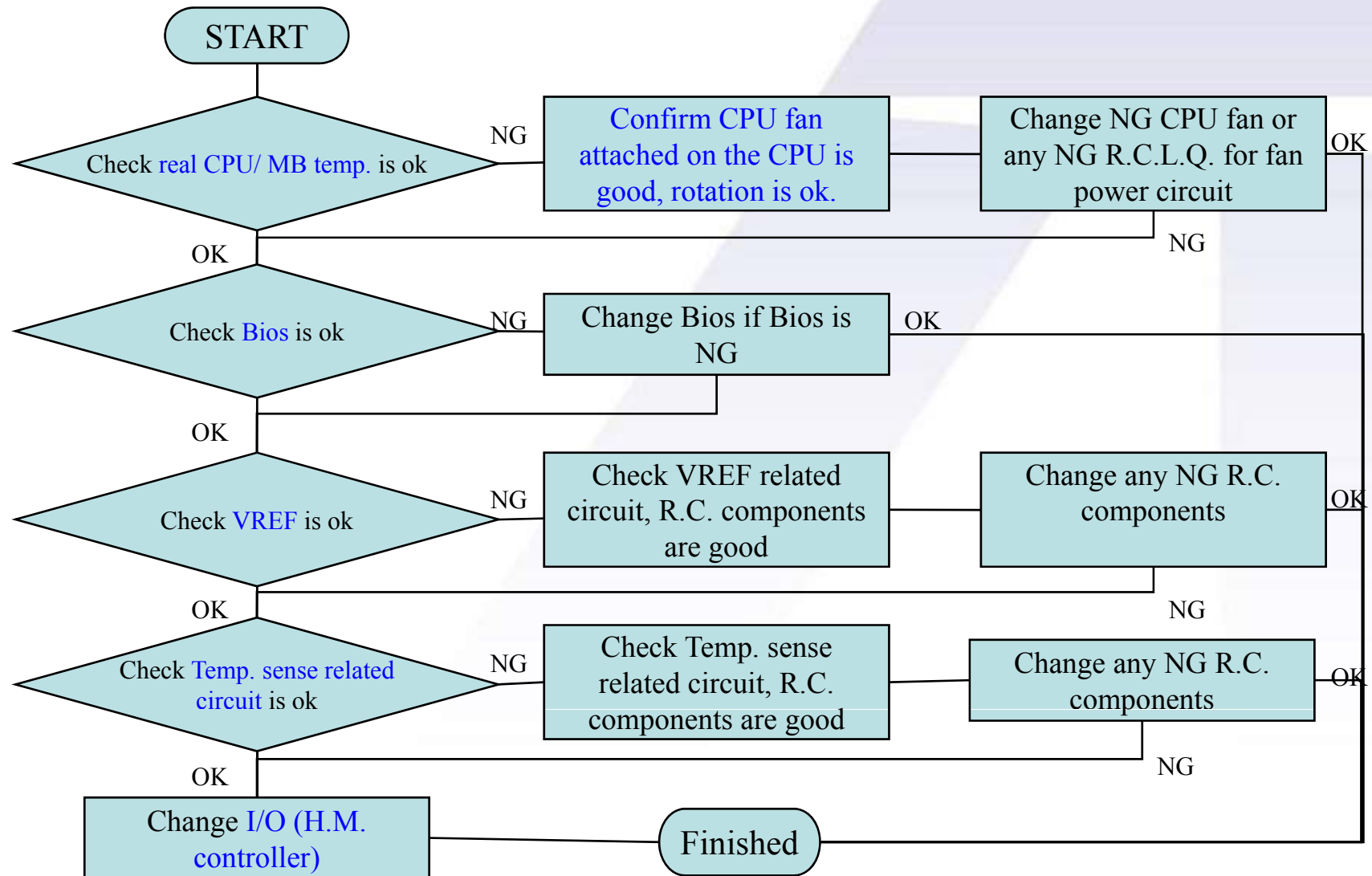
Hardware Monitor for Temperature



Theorem (Temp. Sense-W83627)



Repair Flow Chart (Temp. Sense)



Repair Technique (Temp. Sense)

1. Check **real CPU or MB temperature** is ok or not, if ok **change bios** first. If NG check **CPU fan rotation and contact is good**.
2. Check **VREF (Reference Voltage)**. If NG check **VREF related resistor & capacitor**.
3. Check **Temp. Sense signal** (TR CPU or TR MB). If NG check related resistor & capacitor.
4. If check above signals there's nothing abnormal, please try to change **super I/O (Hardware Monitor controller)**.

Theorem (Fan Sense)



Super IO

Super I/O

Power

Hardware Monitor

MB Temperature	33°C/91°F
CPU Temperature	61°C/141°F
JTPWR Temperature	[Ignore]
CPU Fan Speed	7500RPM
Power Fan Speed	7670RPM
Chassis Fan Speed	N/A
VCore Voltage	1.52V
+3.3V Voltage	3.33V
+5V Voltage	5.00V
+12V Voltage	12.00V

BIOS Menu

华硕系统诊断家

ASUS PC Probe

硬體監測 | 系統資訊 | 工具程式

摘要列表 | 溫度監測 | 風扇監測 | 電壓監測 | 設定 | 歷程紀錄

監測項目	感測值	狀態
<input checked="" type="checkbox"/> CPU 溫度	48 C / 118 F	正常
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<input checked="" type="checkbox"/> CPU 風扇	4720	正常
<input type="checkbox"/> 電源風扇	0	暫停監測
<input type="checkbox"/> 機殼風扇	0	暫停監測
<input checked="" type="checkbox"/> +12V 電壓	12.524	正常
<input checked="" type="checkbox"/> +5V 電壓	4.999	正常
<input checked="" type="checkbox"/> +3.3V 電壓	3.408	正常
<input checked="" type="checkbox"/> VCore 電壓	1.824	正常

ASUS PC Probe

Diagram Sample (Fan Sense)

Connect to SIO.
So, the SIO can sense
the speed of FAN

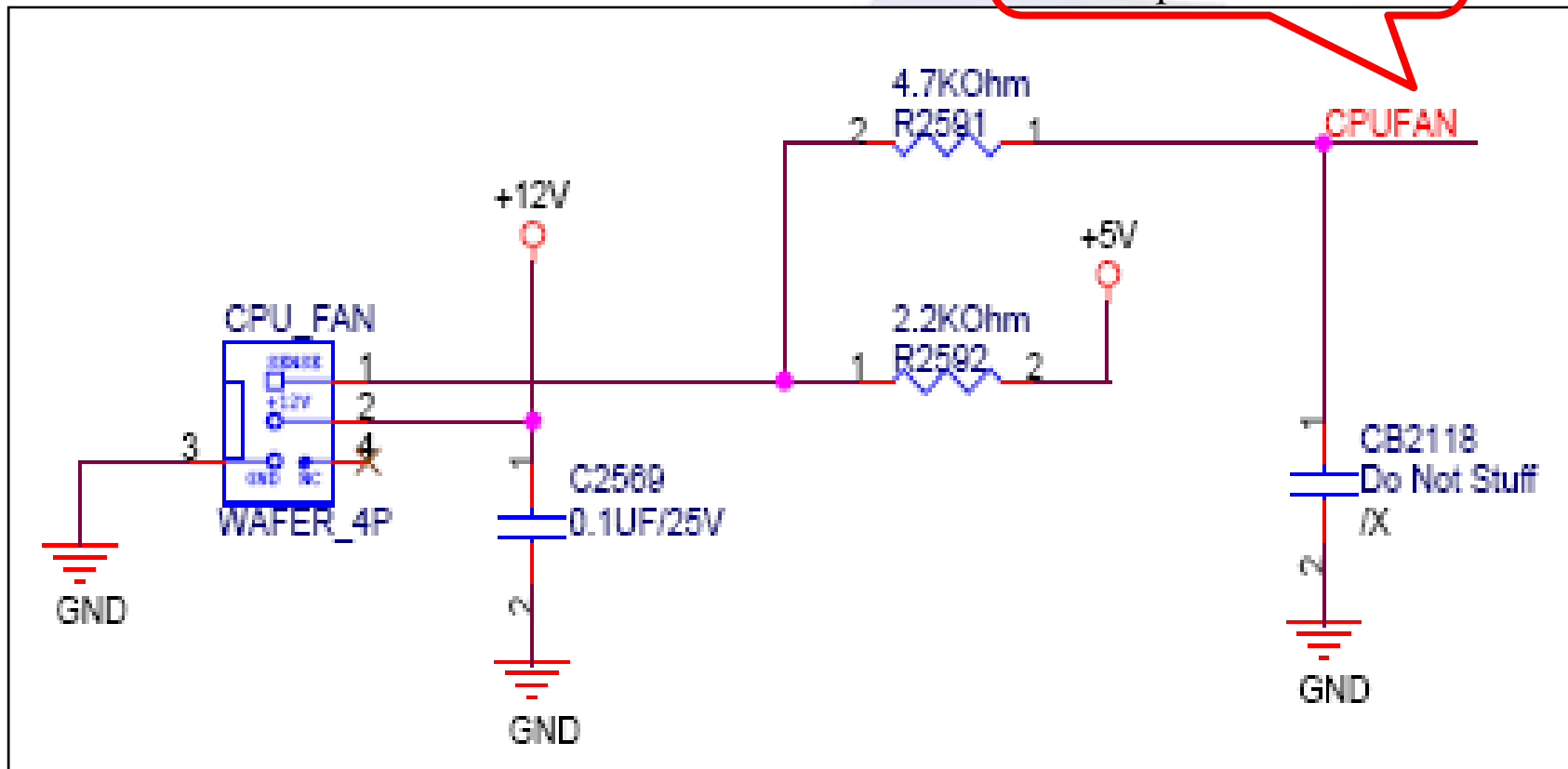
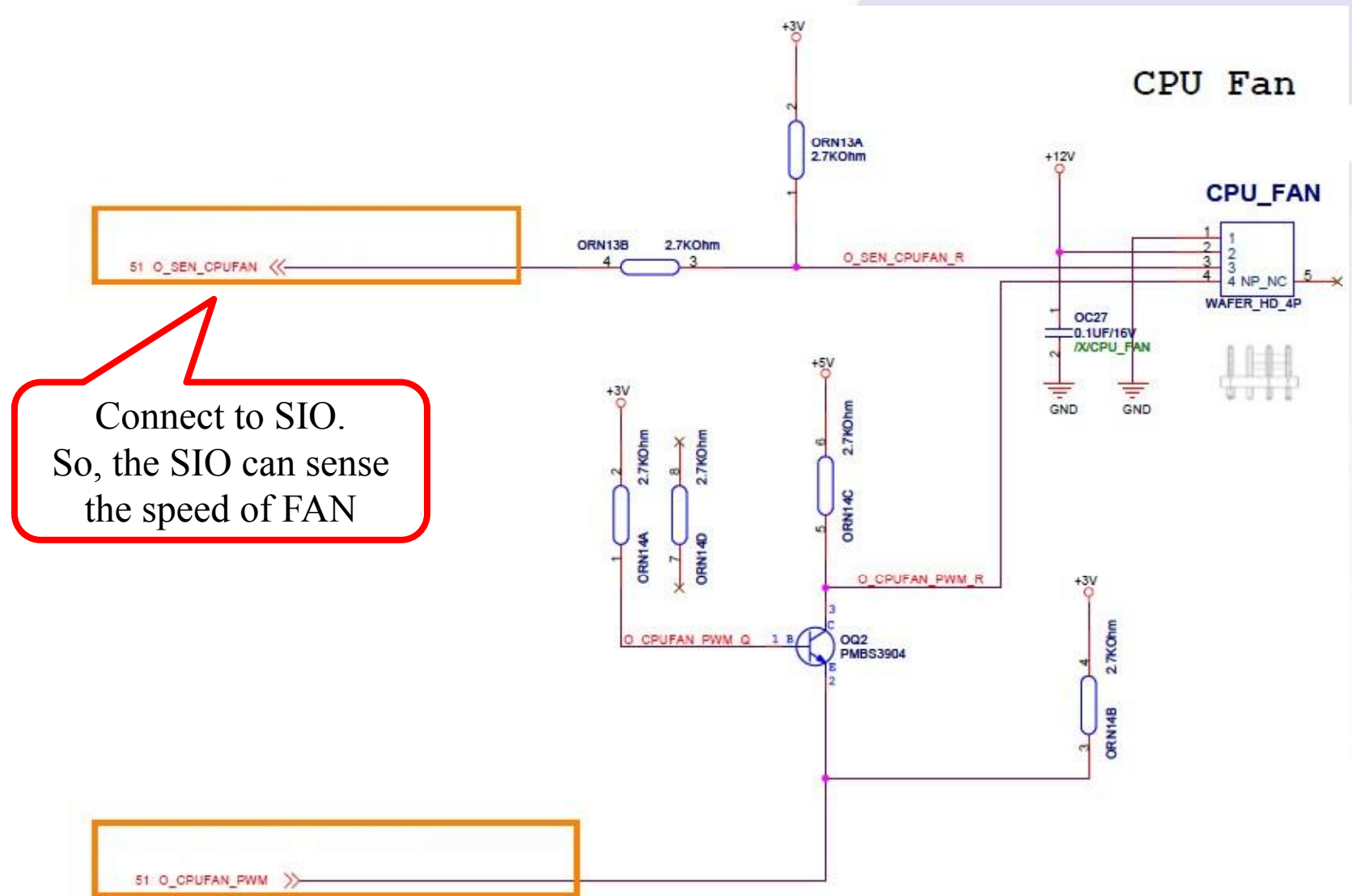
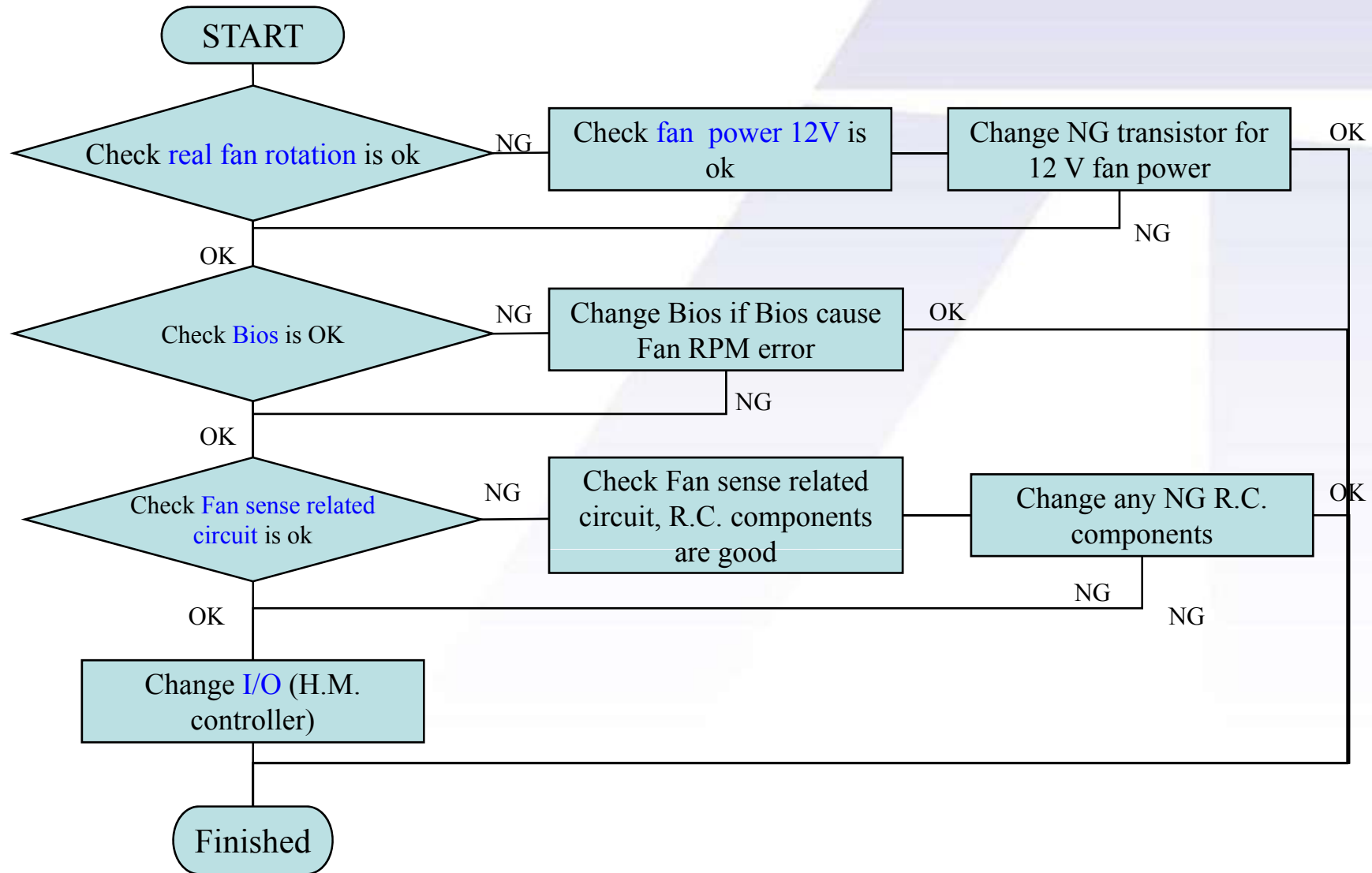


Diagram Sample(Fan Sense)



Repair Flow Chart (Fan Sense)



Repair Technique (Fan Sense)

1. Check **real fan rotation** is ok or not, if NG check **fan 12V related circuit**. Especially check fan **transistor** which provides fan 12V.
2. Check **Bios** is ok or not.
3. Check **Fan Sense signal (CPU Fan, Chassis Fan, Power Fan)**. If NG check related resistor & capacitor.
4. If check above signals there's nothing abnormal, please try to change **super I/O** (Hardware Monitor controller).

Theorem (Voltage Sense)



Power Supply

5V、12V、3.3V



Super I/O

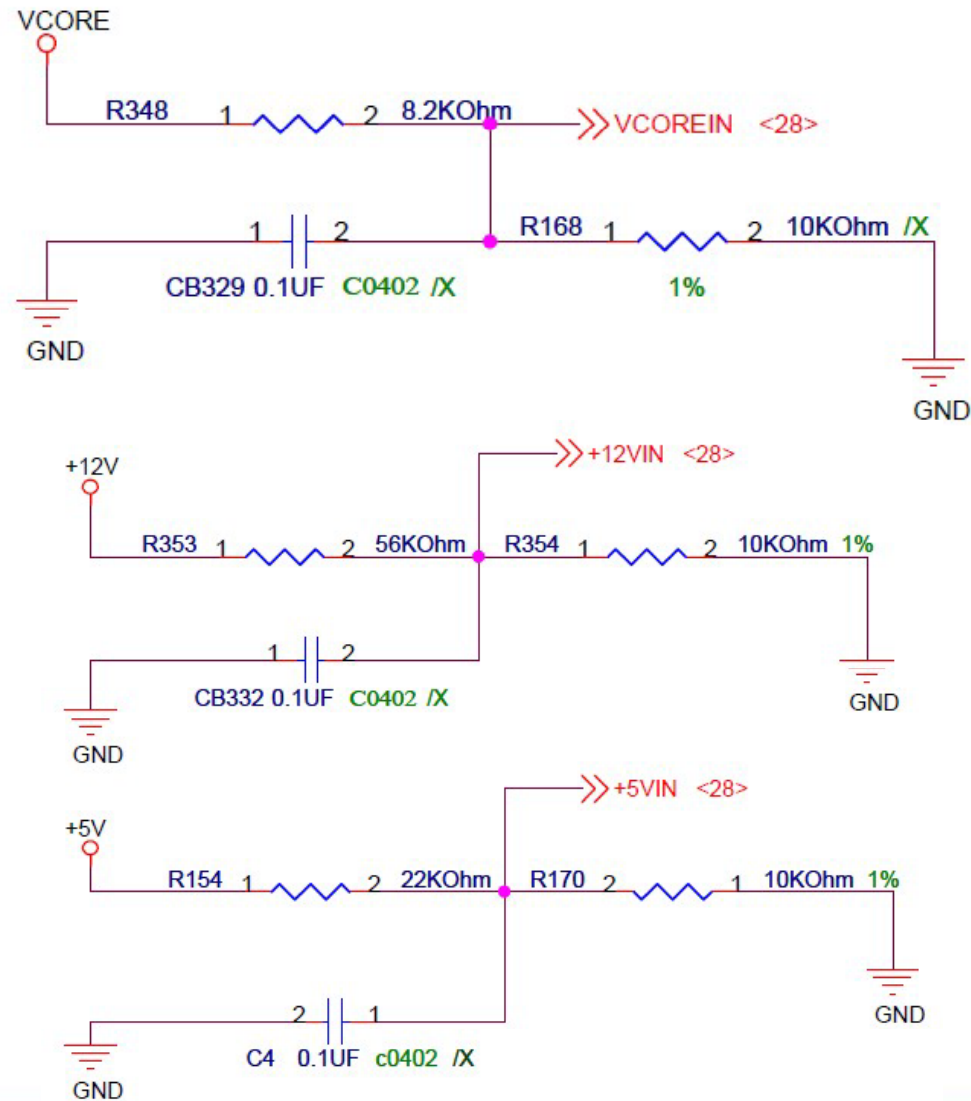
Power	
HardWare Monitor	
MB Temperature	33°C/91°F
CPU Temperature	61°C/141°F
JTPWR Temperature	[Ignore]
CPU Fan Speed	7500RPM
Power Fan Speed	7670RPM
Chassis Fan Speed	N/A
VCore Voltage	1.52V
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+5V Voltage	5.00V
+12V Voltage	12.00V

BIOS Menu

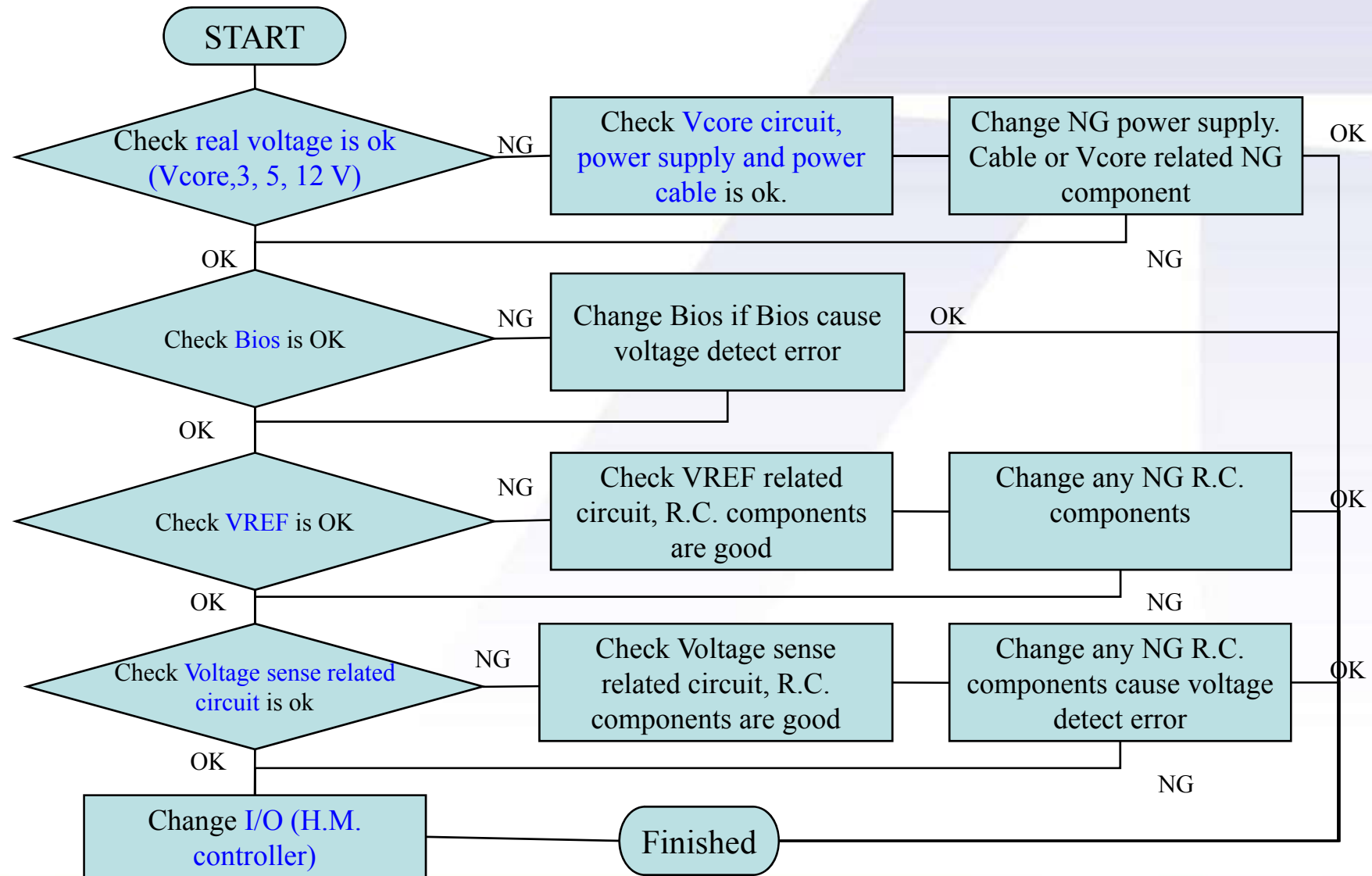
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<input type="checkbox"/> 電源風扇	0	暫停監測
<input type="checkbox"/> 機殼風扇	U	暫停監測
<input checked="" type="checkbox"/> +12V 電壓	12.524	正常
<input checked="" type="checkbox"/> +5V 電壓	4.999	正常
<input checked="" type="checkbox"/> +3.3V 電壓	3.408	正常
<input checked="" type="checkbox"/> VCore 電壓	1.824	正常

ASUS PC Probe

Theorem (Voltage Sense-W83627)



Repair Flow Chart (Voltage Sense)



Repair Technique (Voltage Sense)

1. Check **real voltage (Vcore, 3.3V, 5V ,12V)** is ok or not, if ok **change bios** first; if NG check **Vcore related circuit or check power supply (power supply cable also included)** is good.
2. Check **VREF (Reference Voltage)**. If NG check VREF related **resistor & capacitor(104P)**.
3. Check **Voltage Sense signal (12Vin, 5Vin, 3Vin..)**. If NG check related resistor & capacitor.
4. If check above signals there's nothing abnormal, please try to change **super I/O (Hardware Monitor controller)**.

Thank You!
