

Apple Service Diagnostic Test Results Guide

August, 2006

For failed test results, use this guide to help determine corrective action.

Mass Storage-Hard Drive

- a) Reseat drive cables and retest.
- b) Replace the drive.

Mass Storage-Optical

- a) Reseat drive cables and retest.
- b) Replace the drive.

Memory

Replace memory module or replace logic board if memory is solder to logic board.

Processor

Rerun tests. Replace logic board if appropriate.

FireWire

Disconnect any FireWire cable connected to the unit under test and retest.

For FireWire server tests be sure that the server-FireWire setup is correct and working properly.

If error persists, replace the Logic Board.

USB

Disconnect any USB cable connected to the unit under test and retest.

If error persists, replace the Logic Board.

Bluetooth

Check servers for proper configuration and connectivity then retest.

If error persists, replace the Logic Board.

Airport

Check servers for proper configuration and connectivity then retest.

If error persists, replace the Airport device or logic board if Airport is on logic board.

Video

Replace the Logic Board (MacBook Pro, MacBook, iMac, Mac mini).

Replace Video Card (Others).

Ethernet Controller

Disconnect any network/crossover cable connected to the unit under test and retest.

If error persists, replace the Logic Board.

Fans/Motors

Check fan electrical connection, if applicable.

Replace fan module or fan sensor.

Sensors

Check that sensor is connected, where appropriate.

Replace or repair sensor connector. If sensor is on logic board replace logic board.

SENSOR DESCRIPTIONS

iMac (early 2006 20-inch) Sensors

iMac (early 2006 17-inch) Sensors

iMac (Mid 2006 17-inch) Sensors

Name		Location
IC0C	Current	CPU0 I-Sense
ID0R	Current	DC I-Sense
IG0C	Current	GPU0 I-Sense
PC0C	Power	CPU Core Power
PD0R	Power	DC-In Rail Power
PG0C	Power	GPU Core Power
TA0P	Temperature	Ambient air Temperature sensor (on front panel board)
TC0D	Temperature	CPU0 Die Temperature
TC0P	Temperature	CPU VR area
TG0D	Temperature	GPU0 Die temperature
TH0P	Temperature	Hard disk drive 1 body temperature
TO0P	Temperature	ODD temperature
Tm0P	Temperature	Misc Temperature (clock chip) Proximity
VC0C	Voltage	CPU0 V-Sense
VD0R	Voltage	DC V-Sense
VG0C	Voltage	GPU0 V-Sense

MacBook Pro Sensors

Name		Location
IC0C	Current	CPU0 I-Sense
ID0R	Current	DC I-Sense
IF0R	Current	FWire I-Sense
IG0C	Current	GPU0 I-Sense
IM0R	Current	Memory I-Sense
IN0R	Current	NorthBridge I-Sense
IP0R	Current	PBus I-Sense
PC0C	Power	CPU Core Power
PD0R	Power	DC-In Rail Power
PF0R	Power	1394 Rail Power
PG0C	Power	GPU Core Power
PM0R	Power	Memory Rail Power
PN0R	Power	NorthBridge Rail Power
PP0R	Power	PBus Rail Power
TA0P	Temperature	Ambient air Temperature sensor (on front panel board)
TB0T	Temperature	Battery Temperature
TC0D	Temperature	CPU0 Die Temperature
TC0P	Temperature	CPU VR area
TG0H	Temperature	GPU0 Heatsync
TG0P	Temperature	GPU0 Proximity
TG0T	Temperature	GPU0 Discrete Thermal Diode
Th0H	Temperature	NB/CPU/GPU HeatPipe 0 Proximity
Th1H	Temperature	NB/CPU/GPU HeatPipe 1 Proximity
TM0P	Temperature	FBDIMM Riser A incoming air Temp
Tm0P	Temperature	Misc Temperature (clock chip) Proximity
Ts0P	Temperature	Palm rest L
Ts1P	Temperature	Palm rest R
VC0C	Voltage	CPU0 V-Sense
VG0C	Voltage	GPU0 V-Sense
VP0R	Voltage	PBus V-Sense

Mac mini (Early 2006) Sensors

Name	Location		
IC0C	Current	CPU0	I-Sense
IM0R	Current	Memory	I-Sense
IN0R	Current	NorthBridge	I-Sense
PC0C	Power	CPU Core	Power
PM0R	Power	Memory Rail	Power
PN0R	Power	NorthBridge Rail	Power
TA0P	Temperature	Ambient air Temperature sensor (on front panel board)	
TC0D	Temperature	CPU	Die Temperature
TC0H	Temperature	CPU	Heat-sync
TC0P	Temperature	CPU	VR area
TC1P	Temperature	CPU0	Temp Proximity
TN0P	Temperature	GPU0	Die temperature
TN1P	Temperature	GPU0	Die temperature
VC0C	Voltage	CPU0	V-Sense

MacBook Pro

MacBook Pro (17-inch) Sensors

Name	Location		
IC0C	Current	CPU0	I-Sense
ID0R	Current	DC	I-Sense
IF0R	Current	FWire	I-Sense
IG0C	Current	GPU0	I-Sense
IM0R	Current	Memory	I-Sense
IN0R	Current	NorthBridge	I-Sense
IP0R	Current	PBus	I-Sense
PC0C	Power	CPU Core	Power
PD0R	Power	DC-In Rail	Power
PF0R	Power	1394 Rail	Power
PG0C	Power	GPU Core	Power
PM0R	Power	Memory Rail	Power
PN0R	Power	NorthBridge Rail	Power
PP0R	Power	P Buss Rail	Power
TB0T	Temperature	Battery	Temperature
TC0D	Temperature	CPU0	Die Temperature
TC0P	Temperature	CPU	VR area
TG0H	Temperature	GPU0	Heatsync
TG0P	Temperature	GPU0	Proximity
TG0T	Temperature	GPU0	Discrete Thermal Diode
Th0H	Temperature	NB/CPU/GPU	HeatPipe 0 Proximity
Th1H	Temperature	NB/CPU/GPU	HeatPipe 1 Proximity
Tm0P	Temperature	Misc	Temperature (clock chip Proximity)
Ts0P	Temperature	Palm rest	L
Ts1P	Temperature	Palm rest	R
VC0C	Voltage	CPU0	V-Sense
VG0C	Voltage	GPU0	V-Sense

VP0R Voltage PBus V-Sense

MacBook (13-inch) Sensors

Name	Location
IC0C	Current CPU0 I-Sense
ID0R	Current DC I-Sense
IN0R	Current NorthBridge I-Sense
IN1R	Current NorthBridge I-Sense
IP0R	Current PBus I-Sense
PC0C	Power CPU Core Power
PD0R	Power DC-In Rail Power
PN0R	Power NorthBridge Rail Power
PP0R	Power PBus Rail Power
TB0T	Temperature Battery Temperature
TC0D	Temperature CPU0 Die Temperature
TC0P	Temperature CPU VR area
TM0P	Temperature FBDIMM Riser A incoming air Temp
TN0P	Temperature NB Proximity
TN1P	Temperature NB Proximity
Th0H	Temperature NB/CPU/GPU HeatPipe 0 Proximity
Th1H	Temperature NB/CPU/GPU HeatPipe 1 Proximity
Ts0P	Temperature Palm rest L
VC0C	Voltage CPU0 V-Sense
VP0R	Voltage PBus V-Sense

Mac Pro Sensors

Name	Location
ICAC	Current CPU-A core current
ICBC	Current CPU-B core current
IMAS	Current FBDIMM Riser A 12V supply current
IMBS	Current FBDIMM Riser B 12V supply current
IN0C	Current MCH core current - Supply input
Ie1S	Current PCIe Slot 1 +12V Current
Ie2S	Current PCIe Slot 2 +12V Current
Ie3S	Current PCIe Slot 3 +12V Current
Ie4S	Current PCIe Slot 4 +12V Current
IeAS	Current PCIe Slot Boost 1 +12V Current
IeBS	Current PCIe Slot Boost 2 +12V Current
Ip0C	Current PSMI supply AC/DC total output current, +12V rail
TA0P	Temperature Ambient air temperature sensor (on front panel board)
TC0C	Temperature CPU-A Die 1 Temp offset
TC0P	Temperature Temperature of CPU VR area
TC2C	Temperature CPU-B Die 1 Temp offset
TCAH	Temperature CPU-A heatsink temperature
TCBH	Temperature CPU-B heatsink temperature
TH0P	Temperature Hard disk drive 1 body temperature
TH1P	Temperature Hard disk drive 2 body temperature
TH2P	Temperature Hard disk drive 3 body temperature
TH3P	Temperature Hard disk drive 4 body temperature
TM0P	Temperature FBDIMM Riser A incoming air temperature
TM0S	Temperature Temperatures of AMB IC on FBDIMM in Riser A Slot 1
TM1P	Temperature FBDIMM Riser A outgoing air temperature

TM1S Temperature Temperatures of AMB IC on FBDIMM in Riser A Slot 2
TM2P Temperature FBDIMM Riser A voltage regulator area temperature
TM8P Temperature FBDIMM Riser B incoming air temperature
TM9P Temperature FBDIMM Riser B outgoing air temperature
TMAP Temperature FBDIMM Riser B voltage regulator area temperature
TN0H Temperature Temperature of MCH heatsink
TS0C Temperature Temperature of LM94, between CPU-A and CPU-A's VR
Tp0C Temperature PSMI supply AC/DC Supply Temperature 1
Tp1C Temperature PSMI supply AC/DC Supply Temperature 2

VCAC Voltage CPU-A core voltage
VCBC Voltage CPU-B core voltage
VMAS Voltage FBDIMM Riser A +12V rail at VRs
VMBS Voltage FBDIMM Riser B +12V rail at VRs
VN0C Voltage MCH core voltage
VeES Voltage PCIe Slots +12V rail voltage
Vp0C Voltage PSMI supply AC/DC output voltage, +12V rail

Audio

This is an audible test, the Mac listens to itself via speakers and microphone.

User should hear tones during this test. If no tones are heard investigate speaker settings.

Speakers and microphone should be set to internal.

THIS TEST NOT AVAILABLE ON UNITS REQUIRING EXTERNAL SPEAKERS OR MICROPHONE.