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16 February 2010

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To: Mark 5 Development Group

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Subject: How to replace a CPU fan (and how not to)

Recently we have had a few CPU fan failures in some of our Mark 5 systems.

What should be an easy procedure can turn out to be quite difficult.

The difficulty arises from these facts:

- 1) To get a fan, you need to buy a heat sink with it.
Apparently, fans are not available separately.
- 2) Intel uses multiple manufacturers to supply their boxed fan-plus-heatsink assemblies to ensure consistent supply. Unfortunately, the fan-to-heatsink mechanical interface is different for each manufacturer.
- 3) Fan-plus-heatsink assemblies from all manufacturers have the same Intel part number.

So to get a replacement fan that will fit your heatsink, you need to buy an Intel heat sink assembly with a fan that has the same manufacturer as the original fan.

Fortunately, fan markings do differ for each fan manufacturer.

See <http://www.intel.com/support/processors/sb/CS-030330.htm>

Well, if you can't get a fan that fits your heat sink, why not replace the whole heatsink assembly?

Because the heat sink is attached to the CPU and you can't remove the heat sink without removing the CPU from the main board. Also, you can't re-install the CPU with the heat sink attached.

If for some reason you are forced to replace the whole thing, here's how to do it.

- 1) Wear a grounded wrist strap.
- 2) When handling the CPU, hold it only by the edges to avoid touching the pins.
- 3) Remove the CPU/heatsink/fan assembly from the main board.
- 4) Gently twist the CPU back and forth several times until it breaks free of the heat sink. Be careful not to bend any of the pins on the CPU. Or use a razor blade to separate the CPU assembly from the heat sink assembly.
- 5) Use a razor blade to remove the adhesive from the CPU after the heat sink is removed.
- 6) Use isopropyl alcohol to completely remove all remaining adhesive from the CPU.
- 7) Let the CPU dry for 15 minutes.
- 8) Check that all the CPU pins are straight and carefully straighten any bent pins.
- 9) Open the socket lever on the main board all the way.
- 10) Orient the CPU with the socket on the main board so that the cutout or corner mark on the CPU matches the notch or corner mark on the socket.
- 11) The main board has "zero-insertion force" sockets. If the CPU does not drop easily into the socket holes, make sure that the socket lever is in the full-open position and that no bent pins are present on the CPU.
- 12) Carefully drop the CPU into the socket holes
- 13) Close the socket lever.
- 14) CAUTION: The heat sink has thermal interface material (TIM) on the underside of it. Use caution so that you do not damage the thermal interface material.
- 15) If a protective film covers the TIM on the underside of the heat sink, remove the protective film.
- 16) Align the heat-sink fins to the front and back of the chassis for correct air flow. Air flow goes from the front to the back of the chassis.
- 17) The heat sink has four captive fasteners and should be tightened as follows:
 - a. Use a #2 Phillips screwdriver to finger-tighten diagonally each fastener.
 - b. Securely re-tighten each fastener again in the same order as performed in Step a.
 - c. Do not over tighten the fasteners.
 - d. Attach the fan power cable to the socket on the main board.
- 18) Refer to the Quick Start Guide for your main board for detailed and illustrated instructions on installing the CPU and the Heat Sink:

Intel® Server Board SE7520BD2 Quick start guide

<http://www.intel.com/support/motherboards/server/sb/cs-013535.htm>

Intel® Server Board S5000VSA Quick start guide

<http://www.intel.com/support/motherboards/server/S5000VSA/sb/CS-022691.htm>