Assembling Intel Reference Components for the Intel® Pentium® 4 Processor in 478-Pin Package

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Thermal Mechanical Solutions for the Intel® Pentium® 4 Processor in the 478-Pin Package

- Intel has developed a reference design for OEM solutions.
  - This reference design provides a baseline for OEM thermal solutions.
  - OEMs are responsible for all design, sourcing, and validation of components in their system configuration.
  - Reference designs for other variations of the Intel® Pentium® 4 Processor in the 478-pin package form factor may differ.
- Intel delivers ready-to-use fan heatsink assembly and clip with the boxed processor.
  - Heatsinks delivered with boxed Intel processors are designed for use only with the clip included with this solution.

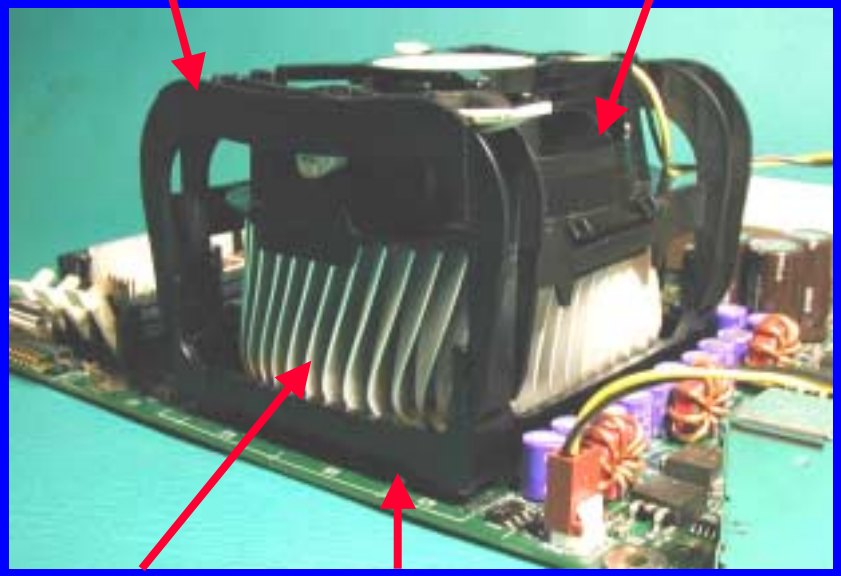
mPGA478 Platforms Mechanical Reference Solution Benefits

- This solution provides structural robustness to assure mechanical and electrical integrity of the motherboard during shock and vibration events(**) described in the *Intel® Pentium® 4 Processor in the 478-Pin Package Thermal Design Guidelines* available on http://www.developer.intel.com/design/pentium4 website .
  - Motherboard stiffening to protect socket and chipset solder joints during manufacturing and shipment
  - Prevention of package pullout during shipment
  - Assurance of thermal interface material performance
- This mechanism can be mounted entirely from the top side of the board, and has no specific tool requirements
  - Easier assembly on the manufacturing line (no need to work on the back on the board, and/or on the chassis)
  - Increased motherboard design flexibility also enabling chassis independent solutions.

(**): Shock :50g, trapezoidal, 11ms duration

Vibration: 5Hz-350Hz, 3.13g RMS power spectral density, 10 minute duration

Intel Thermal Mechanical Solutions for the Intel® Pentium® 4 Processor in the 478-Pin Package



Intel Reference heatsink assembly

Uses reference RM and clip

Boxed Intel processor heatsink assembly

Changes in enabled components of the Reference Design or Boxed Processor assembly must be qualified by the system vendor. Intel reference designs were tested in conjunction with the reference MCH heatsink assembly.

Assembly Steps Overview

Intel Reference Design Example

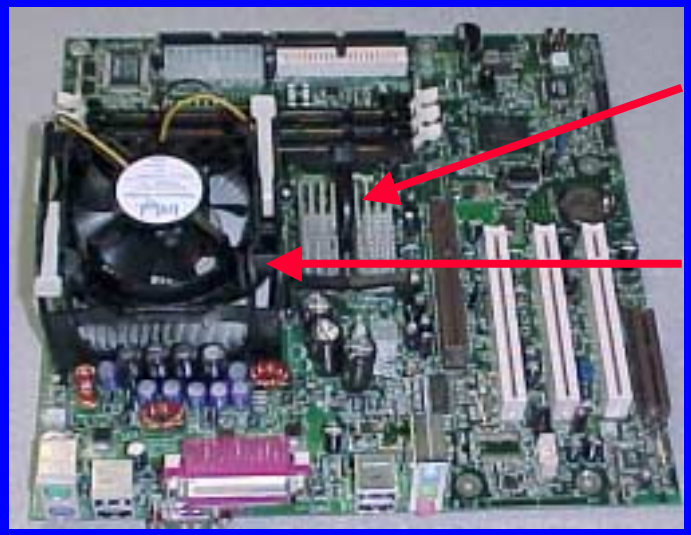
Whenever possible, it is recommended to attach the board to the chassis before installing the heatsink.

- The clip, heatsink, fan, and shroud should arrive from the supplier as an assembly.
  - Different heatsinks may use different clips
  - This assembly process is valid for the Intel Reference components only.
- The heatsink should have TIM (thermal interface material) pre-applied to its base.
- Ensure that clip levers are in open position prior to installation on the motherboard.
- The assembly should be placed over the processor and pushed down to engage the clip hooks with the RM windows.
- The clip hooks should snap into place. Use visual or tactile inspection to ensure that all four hooks have fully engaged.
- Actuate clip levers (2 places) by rotating the lever into its closed position. Levers should be rotated until encountering hard stop.
- Levers can be actuated sequentially or simultaneously. Note that the preload is applied through engagement of the two clip levers described above. No special instruction is required.
- Ensure processor heat spreader contacts heatsink base.
- Refer to your board documentation to locate the CPU fan header, and connect the fan power cable to it.

Board Bow after Assembly

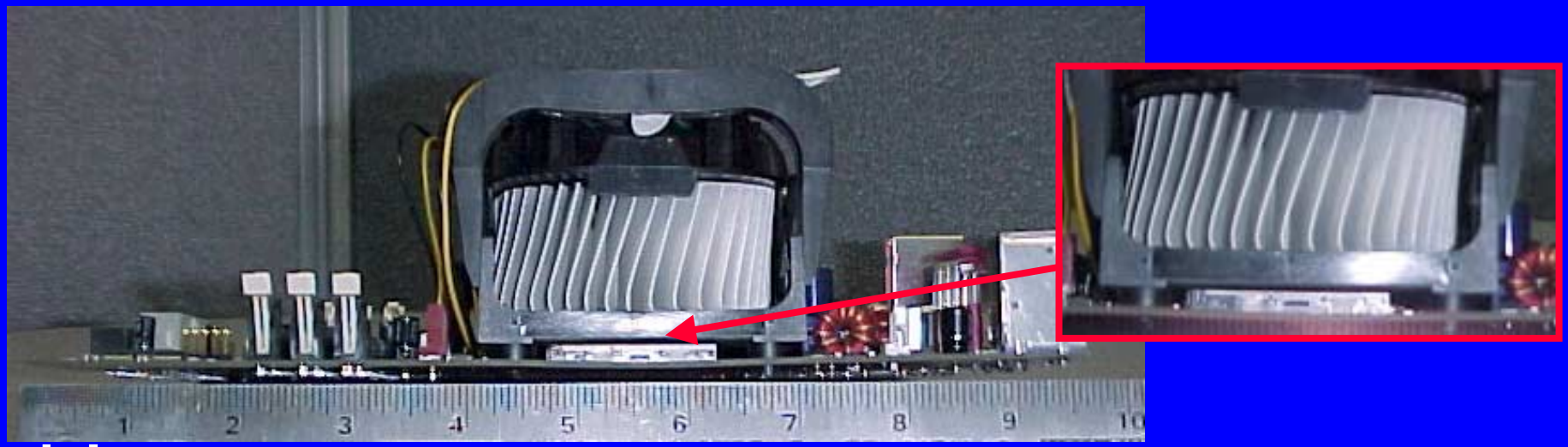
Intel µATX Board and Intel Reference Design

- The reference mechanical design for mPGA478 platforms is designed to place a compressive load on the CPU package and socket. It is normal to observe a bow to the board as shown below in the case of an Intel board and the Intel reference design. The level of bow depends on the motherboard material properties and component layout.



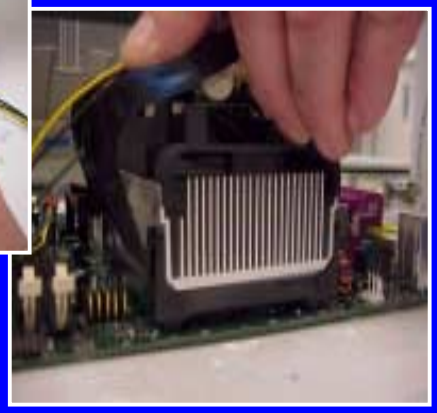
Intel® 845 Chipset Reference Solution

Intel® Pentium® 4 Processor in the 478-Pin Package Reference Solution



Assembly Steps Overview

Boxed Intel® Processor Example



Whenever possible, it is recommended to attach the board to the chassis before installing the heatsink.

- The clip, heatsink, fan, and shroud arrive as an assembly.
  - This assembly process is valid for the Boxed Intel® Processor components only.
- The heatsink has TIM (thermal interface material) pre-applied to its base.
- Ensure that clip levers are in open position prior to installation on the motherboard.
- The assembly should be placed over the processor and pushed down to engage the clip hooks with the RM windows.
- The clip hooks should snap into place. Use visual or tactile inspection to ensure that all four hooks have fully engaged.
- Actuate clip levers (2 places) by rotating the lever into its closed position. Levers should be rotated until encountering hard stop.
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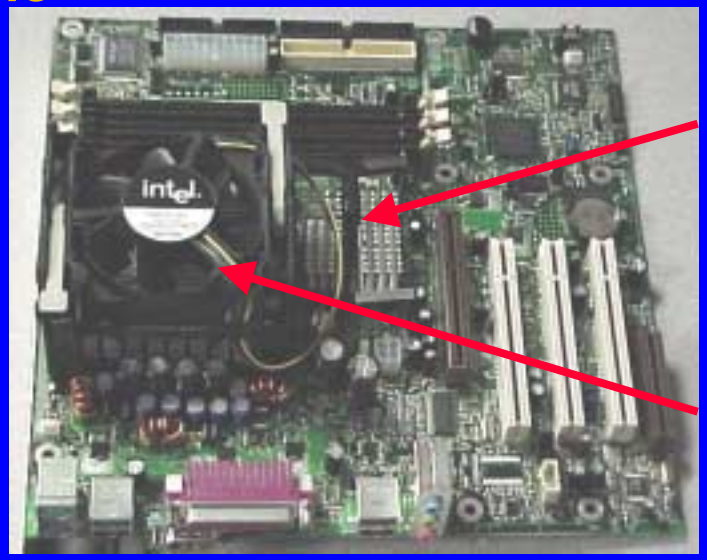
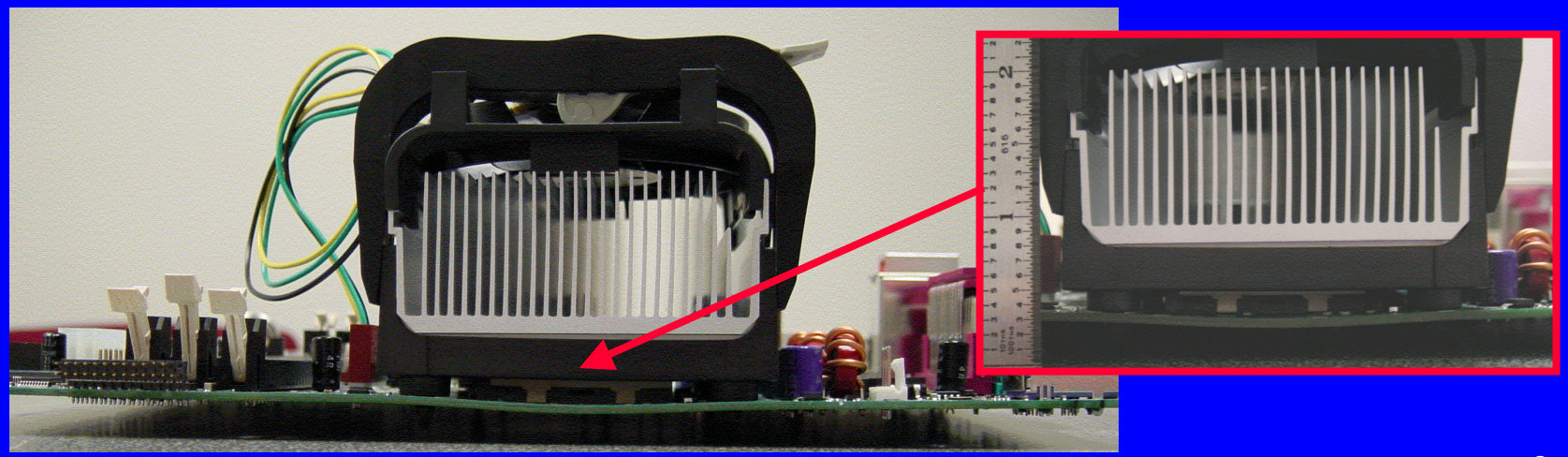
- Ensure processor heat spreader contacts heatsink base.
- Refer to your board documentation to locate the CPU fan header, and connect the fan power cable to it.

Board Bow after Assembly

Boxed Intel® Processor Example

- The boxed Intel® processor mechanical design for mPGA478 platforms is designed to place a compressive load on the CPU package and socket. It is normal to observe a bow to the board as shown below in the case of an Intel board and boxed Intel processor solution. The level of bow depends on the motherboard material properties and component layout.





Intel Enabled Vendor Information for Thermal Mechanical Enabling Components

Motherboard Vendors

Vendor	Contact	Phone	Vendor Part Number	Intel Part Number
Processor Retention Mechanism				
Foxconn*	Julia Jiang	408 919-6178 juliaj@foxconn.com	With push-pins: PT41050-1102 Without push-pins: 012-1000-064	A65428-001 Rev C A65064-001
Chipset Heat Sink and Clip Assembly				
Foxconn*	Julia Jiang	408 919-6178 juliaj@foxconn.com	PHC029C02012	A67625-001
Solder Down Anchor				
Foxconn*	Julia Jiang	408 919-6178 juliaj@foxconn.com	HB96030-DW	A13494-005

System Integrators

Processor Heat Sink				
AVC*	Felicia Lee	886-2-22996930 x144 felicia@avc.com.tw	Without TIM: 217140 With TIM: 12714000001	Without TIM: A59300-001 With TIM: A59876-001
Processor Fan/Shroud Assembly				
Nidec*	Karl Mattson	360 666-2445 karl.mattson@nidec.com	F07A-12B1S1-01C1	A60301-001 Rev B
Processor Heat Sink Clip Assembly				
Foxconn*	Julia Jiang	408 919-6178 juliaj@foxconn.com	PW34552-002	A64880-001 Rev B

Part numbers may change. Make sure you are using the latest revision available.

*Other names and brands may be claimed as the property of others.

Boxed Intel® Processor Enabling Information

- The fan heatsink assembly for the boxed Intel® Pentium® 4 processor in the 478-pin package currently comes in two different versions:
  - Sanyo* A38001-001
  - Nidec* A42816-001
  - The clip is delivered within the box, and should be used exclusively with these assemblies.

*Other names and brands may be claimed as the property of others.

Conclusion

- This presentation provides basic information on how to manufacture with the Intel reference thermal mechanical design and the boxed Intel® processor solution available for the Intel® Pentium® 4 processor in the 478-pin package.

- Contact your local Intel representative for any further information.