www.DataSheet4U.com

Socket A
AMD Processor
Installation Guide

**Thank you for purchasing a Socket A AMD processor.
Before installing the new AMD processor in a system,
please review this installation guide in its entirety.**

Note: The product(s) received may vary in appearance from the products illustrated.
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> Failure to install the AMD Athlon™ or the AMD Duron™ processor properly
> may adversely affect operation and may void your warranty coverage.
> DO NOT install the processor if it has been damaged!

Recommended Configuration

The AMD Athlon™ and AMD Duron™ processors are leading-edge processors that require high-performance components to operate at maximum overall efficiency.

Do not attempt to install these AMD processors with an inadequate power supply, memory, or other supporting components.

For the latest information on the components that have been tested by AMD and are recommended for best performance, always check the AMD web site. For successful operation of the AMD Socket A processors, AMD strongly recommends selecting a recommended motherboard and heatsink from our website at the following URLs:

http://www1.amd.com/athlon/config

http://www1.amd.com/duron/config

Beware of Static Electricity

The AMD Athlon and AMD Duron processors and all computer motherboards have sensitive electronic components that can be easily damaged by static electricity. We recommend that you leave the processor and motherboard in their original packaging until you are ready to install them. The installer should only touch the edges of the processor, and never touch the processor pins.

IMPORTANT

Never touch a processor without wearing a functioning grounded antistatic strap. We recommend that all unpacking and installation be done on a grounded antistatic mat. Both the antistatic wristband and the antistatic mat must be grounded at the same point. After removing the processor from its package, place it directly on the antistatic mat.

Installation Procedure

You must adhere to the step-by-step procedures listed on the following pages to successfully install the AMD Athlon and AMD Duron processors in a personal computer system motherboard. Any deviation from this procedure may result in a processor failure.

You can installl the processor in the motherboard either before or after installing the motherboard in the system chassis. It is usually easier to install the processor onto the motherboard before installing the completed assembly into the case.

Normally it is better to install the processor and heatsink before installing any memory modules.

It is recommended that you trial-fit the heatsink on the processor socket to verify that the fan power cable can easily reach a designated connector. If there are any problems, go to step 20 and follow the instructions.

> **Caution:** Never start the processor unless the heatsink is properly and firmly attached. THERMAL FAILURE WILL RESULT—THE PROCESSOR WILL BE PERMANENTLY DAMAGED.

> ***Note:*** *In this guide, the AMD Athlon or AMD Duron processor is installed in Socket A of the motherboard before installing the motherboard and processor assembly into the system chassis. This is usually the easiest way to install the processor and heatsink.*

1. Figure 1 shows the processor socket on a motherboard. Note that the release lever on the side of the socket is down. This position is used to lock the processor in place. Before installing the processor, this lever must be raised by first pushing the lever sideways to unlatch it and then raising it all the way up (approximately 90°).
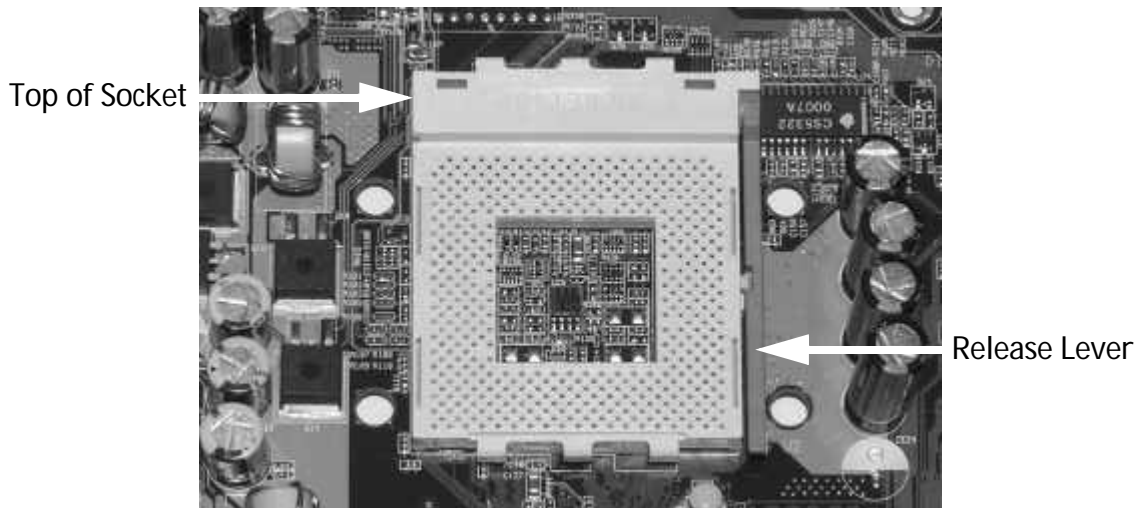
Top of Socket

Release Lever

Figure 1.   Processor Socket with Lever Down.

2. Figure 2 shows the release lever raised completely. The lever must be in a fully raised position before the processor can be installed.

   Note: In this guide, the phrase "top of the socket" refers to the end of the socket that reads `"Socket 462"`.
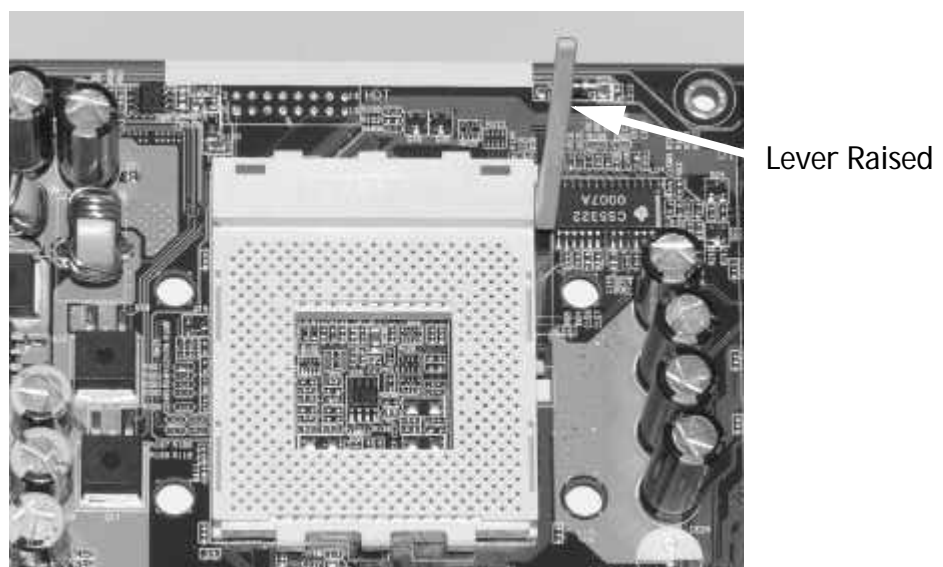
Lever Raised

Figure 2.   Processor Socket with Lever Raised

3. Figure 3 shows the underside (pin side) of the processor. Notice how the pin array at the two upper corners in the picture are angled and there are no pins in either top corner. Notice also that there are no pin positions in the top corners of the socket (near where it is labeled "Socket 462"). The processor must be positioned so the processor and socket pin patterns match. When positioned properly, the 45° cut corner of the processor will be next to the release pivot.
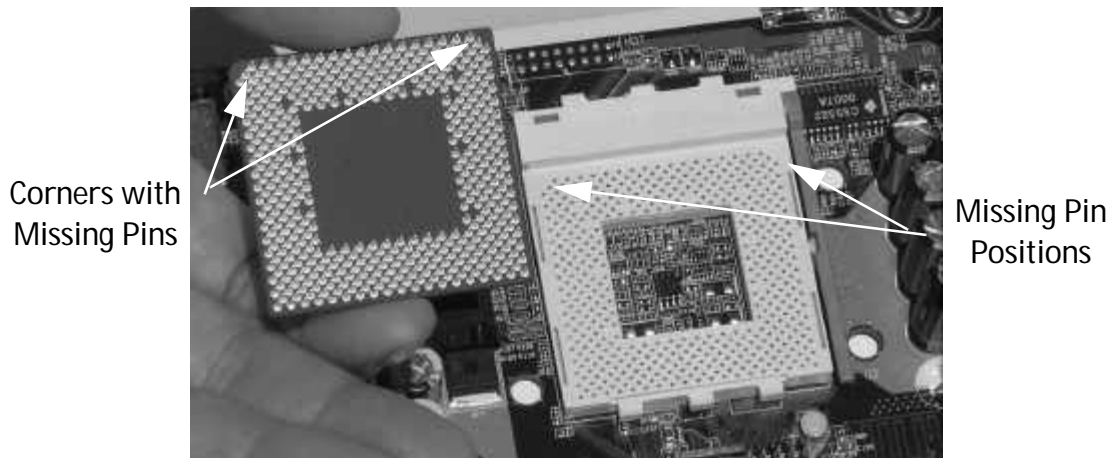
www.DataSheet4U.com

Corners with
Missing Pins

Missing Pin
Positions

Figure 3.   Underside of the Processor Showing Pin Corner Keys

4. Figure 4 shows the processor dropping into the socket. Notice how the corner located near the release lever pivot is the 45° cut corner. This is verification that the processor has been installed properly.

It should take no significant force to install the processor. This is a zero insertion force socket (often referred to as a ZIF socket). If the processor does not fall into the socket, check the pin alignment and make sure that the release lever is raised up completely. If the installation of the processor requires any significant amount of force, then something is wrong. (Check the pins, and lever position.)
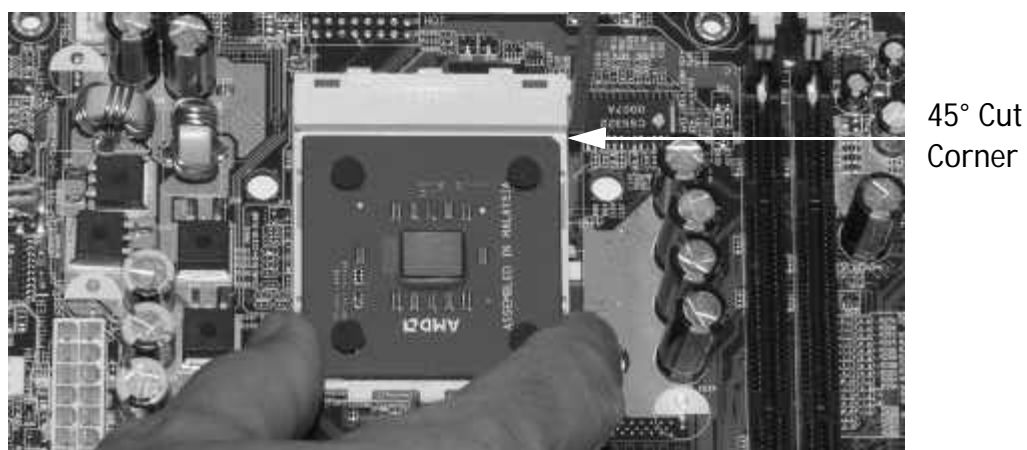
45° Cut
Corner

Figure 4.   Placing the Processor in the Socket

5. Figure 5 shows the processor installed and the release lever lowered to lock the processor in place. With the processor now properly installed, the heatsink and fan assembly can be attached.

    WARNING: *Do not power up the processor without the heatsink properly and firmly attached. THE PROCESSOR WILL SUFFER THERMAL FAILURE and PERMANENT DAMAGE WILL RESULT!*

    Notice the rubber pads on each corner of the processor. These pads are required to ensure the proper installation of the heatsink. They should never be removed. There must be four pads. If a pad is missing, please return the processor to your supplier. Do not use it—die damage may result.

    Also notice the lugs on the socket. In later steps, the center lugs will be used for the heatsink isntallation.
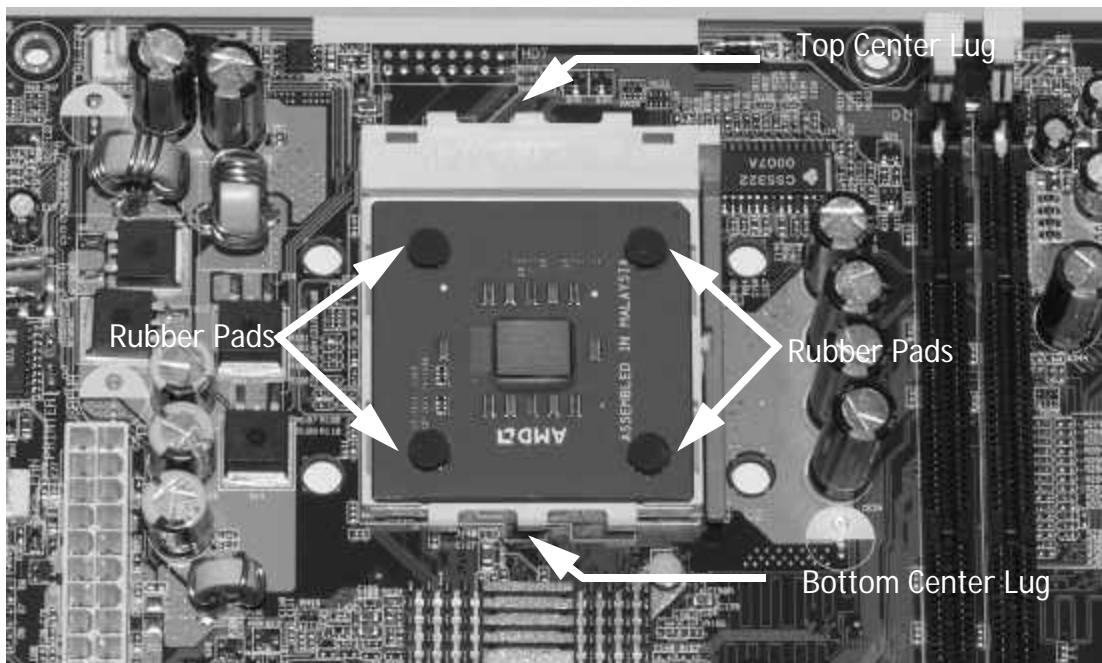

Figure 5.   Processor Installed and the Lever Lowered

6. Figure 6 shows a sampling of the typical heatsink assemblies that are commonly used on the AMD socketed processors. Notice that the assemblies vary in size, fin density, and clip design. The appropriate heatsink to use will be determined by:

• The list of approved thermal solutions on the AMD website.

• Availability of the approved thermal solution in your area.

Log onto the www. amd.com website for a listing of tested heatsink/fans that AMD recommends. *Only use a heatsink/fan assembly that has been AMD tested and recommended for your AMD processor speed and model.* The proper heatsink is essential.

Notice the two different types of heatsink retaining clips shown in Figure 6. The style with the slight hook is designed to be installed with the open end of a nut-driver (looks like a screwdriver with a socket attached). The style of clip with the slotted end is designed to be pushed down with a screwdriver inserted into the slot.

Caution: When engaging the heatsink clip with either installation tool, use extreme care when pressing down on the clip. If the tool slips off the clip, the system motherboard can be damaged.
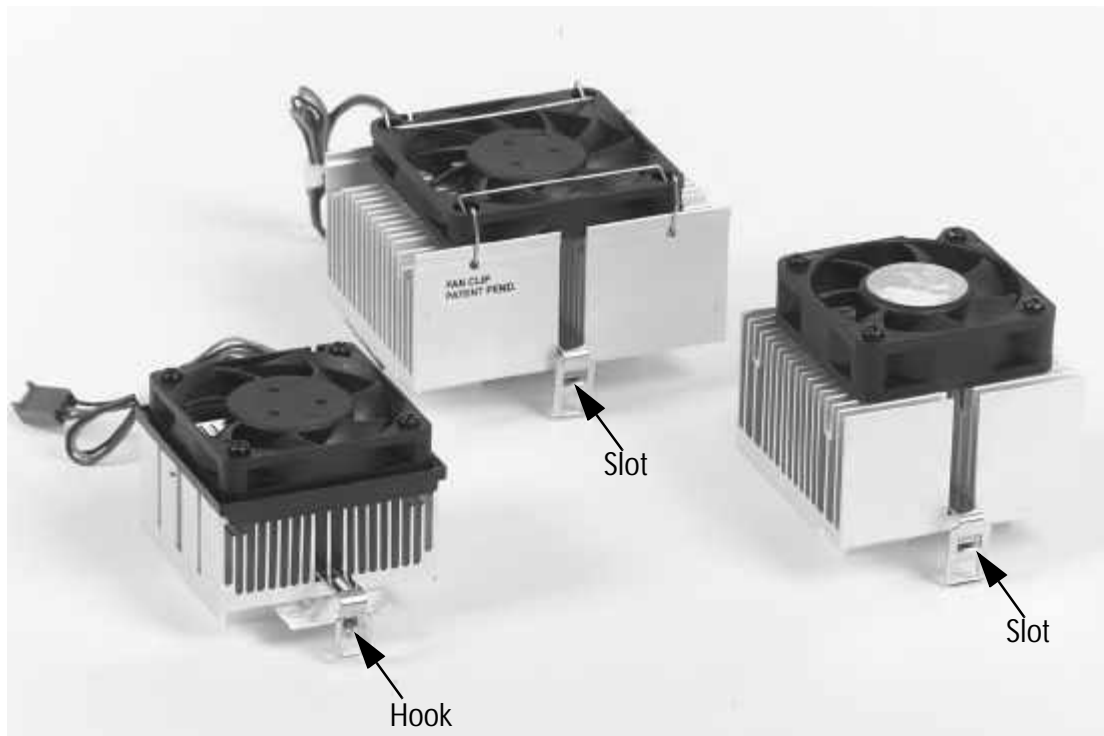

Figure 6.   Typical Heatsinks Suitable for Use with Socket A AMD Processors

7. Figure 7 shows the bottom of a heatsink with a step. The stepped portion fits over the top of the socket, where the legend "Socket 462" is molded into the plastic. When the heatsink is correctly installed, the heatsink base will not touch any portion of the socket.

Caution: The processor will overheat and fail if the heatsink is not installed so that it sits parallel to the top of the processor, or if the heatsink touches any part of the socket itself. This may result in permanent damage to the processor.
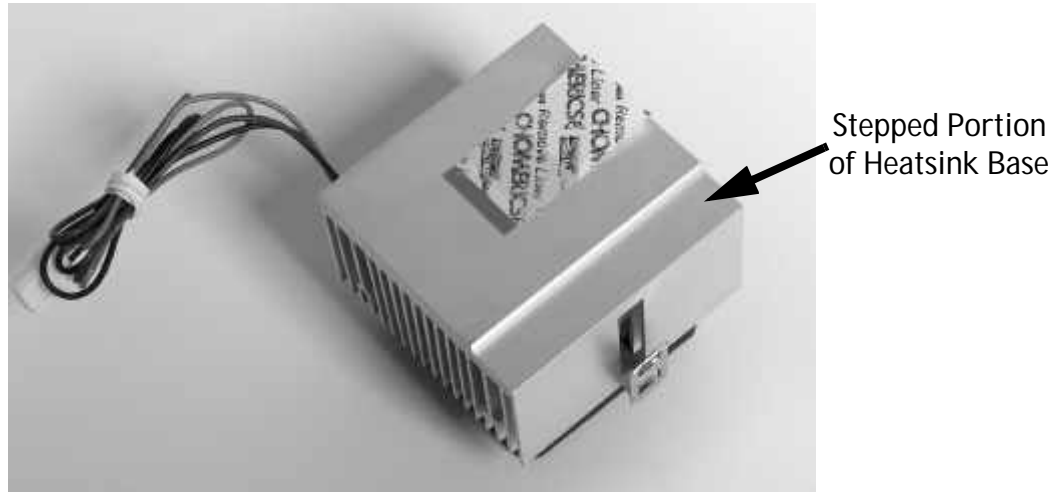

Stepped Portion of Heatsink Base

Figure 7.   Underside of Heatsink with Stepped Bottom Surface

8. Figure 8 shows the bottom of the smallest heatsink from the previous page. This heatsink has a flat bottom and its placement on the processor is determined by the asymmetrical retaining clip used to hold the heat sink to the processor (Figure 13 shows an example of an asymetrical clip).
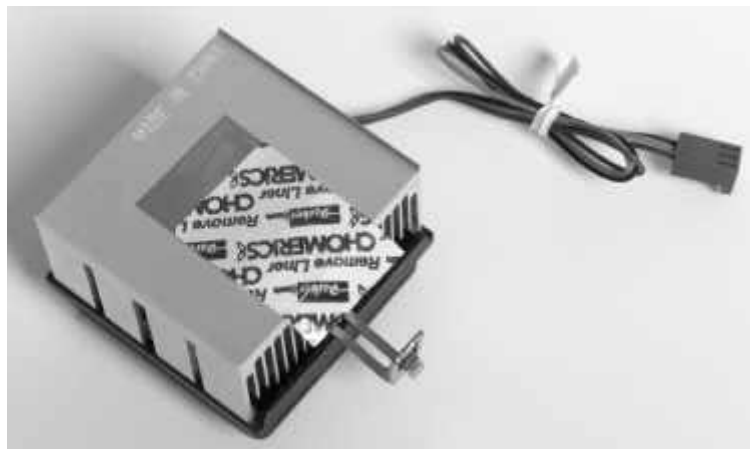

Figure 8.   Underside of Small-sized Heatsink with Flat Bottom Surface

9. Figure 9 shows the proper way to remove the plastic film from the phase-change thermally conductive compound.

Note: The phase-change thermal compound is very important to the efficiency and success of the heatsink. The compound must be applied evenly to the surface of the heatsink so it can (basically) melt and fill any microscopic voids in the surfaces of the processor and heatsink with a thermally conductive material.

Caution: If you have never installed a heat sink with this type of phase-change thermal material, we suggest that you not remove this film until after you have practiced installing the heatsink and mounting the clips on the socket. It may take a few trials until you are familiar with the procedure. If you want to become familiar with the process, skip the tape removal step for now and proceed to repeat Step 10 through Step 19.

Notice in Figure 9 that the film is removed by pulling rapidly at a right angle to the base. A quick lifting motion is the best way to remove this film. Be aware that:

• Once the film is removed, immediately install the heatsink.
• The thermal compound must not come in contact with any foreign material.

Caution: Do not remove the heatsink from the processor, once it has been permanently installed. The phase-change thermal adhesive material cannot be reused. **Remove the plastic film completely from the heatsink during the installation to avoid causing the processor to overheat and be damaged when power is applied.** *Pay strict attention to the procedures outlined in this document to avoid missing a crucial step.*

Figure 9.   Pull Tape from Thermal Material with a Quick Motion

10. Figure 10 shows the **WRONG** way to install the heatsink. Do not tilt and push the heatsink onto the processor because doing so increases the chances of cracking the processor die. Instead, install the heatsink carefully with the bottom of the heatsink nearly parallel to the top surface of the processor. When properly installed, the heatsink will rest on the four rubber pads. The heatsink will come in contact with the processor die only when the retaining clip is fully installed.

Caution: Never push down on the heatsink. This can cause irreparable damage to the processor die. All force should be applied only to the clip .
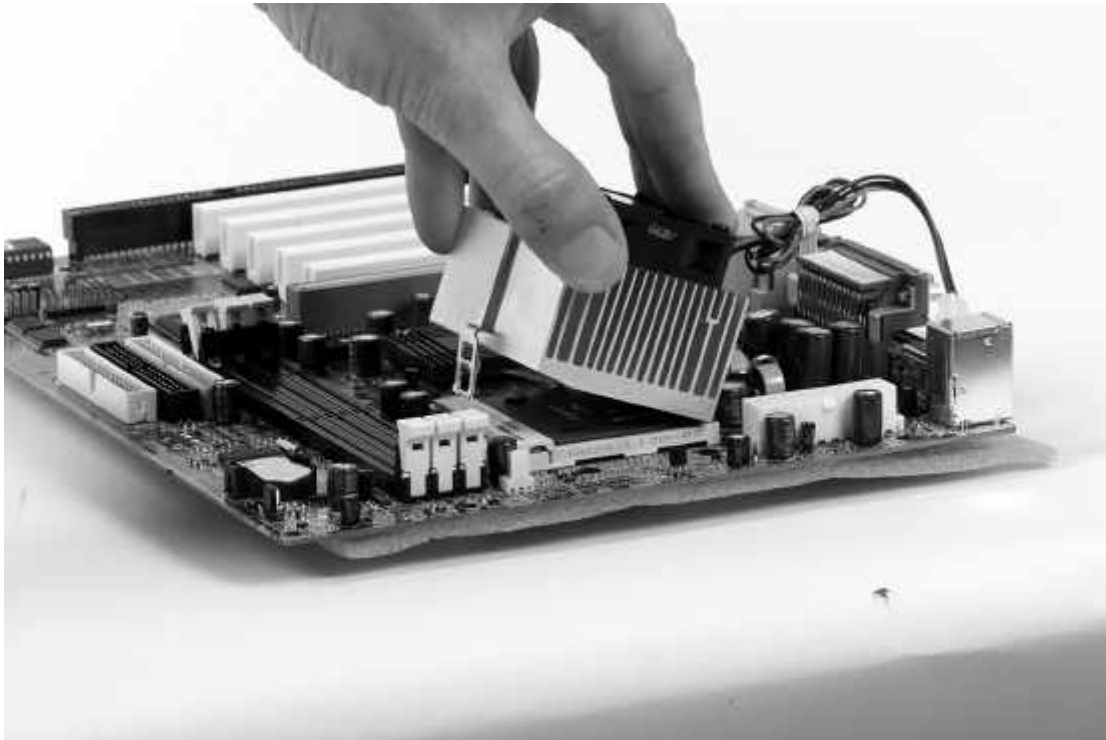
THIS IS WRONG!

Figure 10.   The *WRONG WAY* to Install a Socket A AMD Processor Heatsink

11. Figure 11 shows a side view of the heatsink with the retaining clip at the bottom of the heatsink. Make sure that the retaining clip is in this position before trying to install the heatsink. Notice that the clip is *not* symmetrical. The long end always attaches to the top of the socket (the end that reads "Socket 462"), while the short end engages the bottom of the socket. No matter which heatsink is used, the clip is always installed in the same manner.

For best results, always install the processor and its heatsink before installing any memory modules.

Also notice how the heatsink sits on the rubber pads. These pads are important to the proper installation of the heatsink, because they prevent the heatsink from rocking and cracking the processor die. **THE PADS ARE ESSENTIAL. DO NOT REMOVE THEM!**
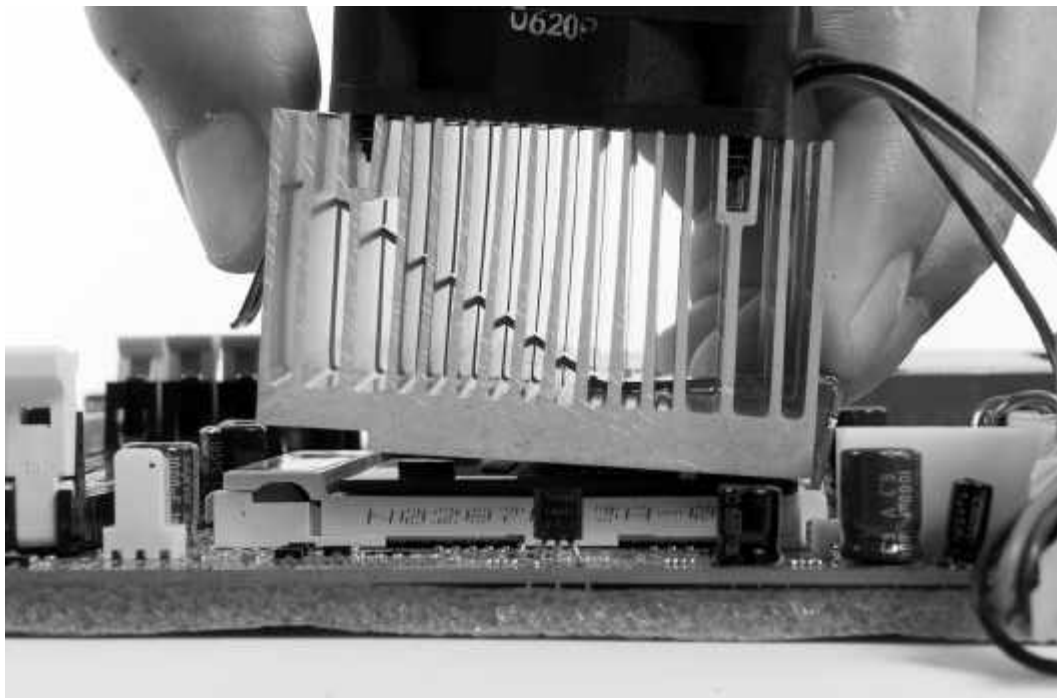

Figure 11.   Side View of Heatsink and Clip on an Socket A AMD Processor

12. Figure 12 shows the first step in the installation of the heatsink. The heatsink must be placed on the processor with the short end of the clip attached to the center lug at the bottom of the socket. It should fit onto this lug with finger pressure alone.

    Note: *The bottom of the heatsink is almost parallel with the top of the processor. This is the only proper way to install the heatsink.*

    Caution: Never push down on the heatsink. Doing so can cause irreparable damage to the processor die. All force should be applied to the clip only.
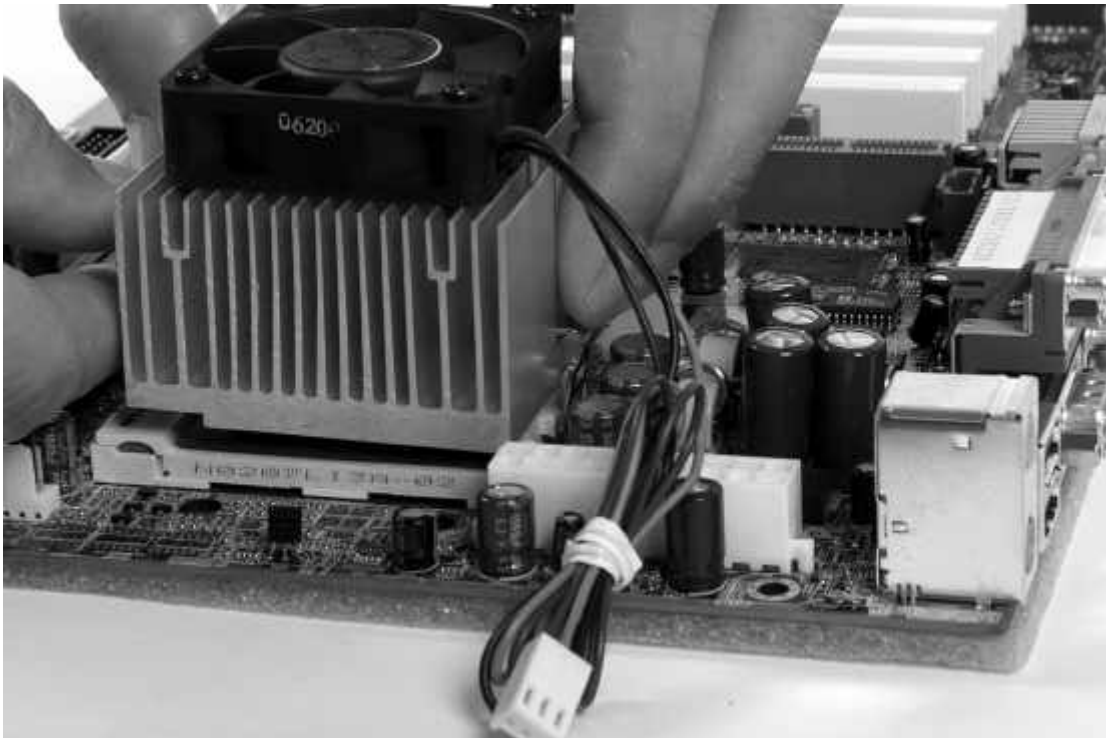

Figure 12.   The Proper Way to Install the Heatsink on the Processor

13. Figure 13 shows a side view of the heatsink with the clip installed on the center socket lug at the bottom of the socket. Notice how the heatsink rests on the rubber pads and not on the processor itself. When the retention clip is fully installed, the rubber pads are compressed and the heatsink will then touch the surface of the processor die.

Note: Figure 13 illustrates the end of the clip, which goes over the top of the socket (the portion of the socket that reads "Socket 462"), is much longer than the other end. The clip is formed asymmetrically so that the pressure point is directly over the processor die. Although in the photo it seems like the clip is too far to one side, when the other side is installed, the clip contact point is centered over the processor die.
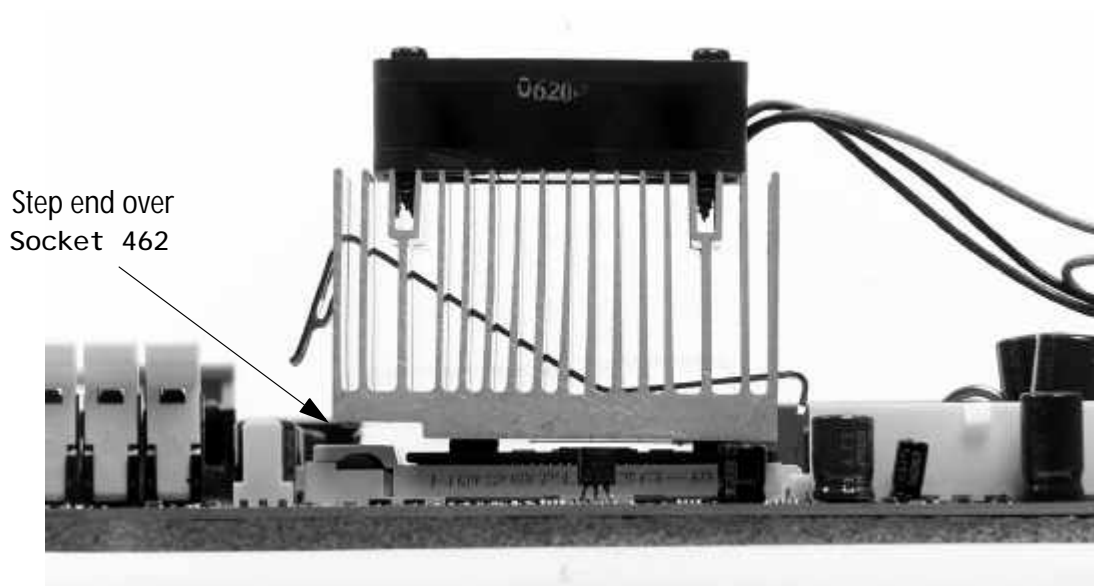

Step end over
Socket 462

Figure 13.   The Heatsink Partially Installed and Resting on the Rubber Pads

14. Figure 14 shows a WRONG WAY to position the heatsink. Notice how the lower area of the stepped portion of the aluminum heatsink is resting on the higher end of the socket rather than flat on the processor die. If the heatsink is not contacting the complete surface of the processor die, the heatsink is non-functional. This will cause **THE PROCESSOR TO OVERHEAT AND FAIL!** Always make sure the heatsink surface is not contacting any part of the socket.

This problem can be caused by installing the retaining clip improperly. Always install the clip only on the center lugs. The outer lugs have no function at this time. The step on the heatsink must be installed so that it does not rest on the portion of the socket labeled `Socket 462`.

Caution: Do not reuse the heatsink if it has be improperly installed. Once the phase-change thermal compound has come in contact with the processor surface, the heatsink must be replaced, since the phase change material cannot be reused.
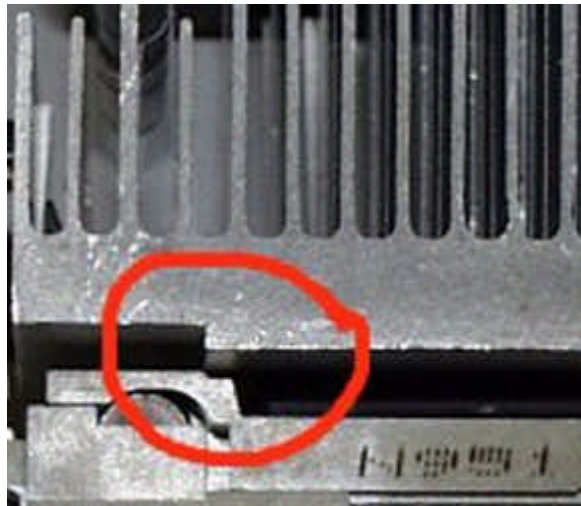
THIS IS WRONG!

Figure 14.   Make sure the Heatsink is Seated Properly on the Processor!

15. Figure 15 shows the heatsink clip being installed on the center lug at the top of the processor socket. To install this clip, push firmly only on the end of the clip. To install the clip, typically requires 12 to 24 pounds of force.

    Note: *Using a screwdriver with a fairly large handle and small blade will distribute the load over a greater portion of the installer's hands. Using the proper tool will make this procedure easier to accomplish. Screwdrivers like this are commonly available at most better hardware stores.*

    Figure 15 shows the heatsink clip being pushed down with a screwdriver inserted into the slot at the end of the clip. This is basically downward force on the clip.

Push downward.

Use caution!

Figure 15.   Pushing the Heatsink Clip Down

16. Figure 16 shows the clip being pushed past the lug. Push downward with a slight outward motion so that the clip goes over the lug on the socket.
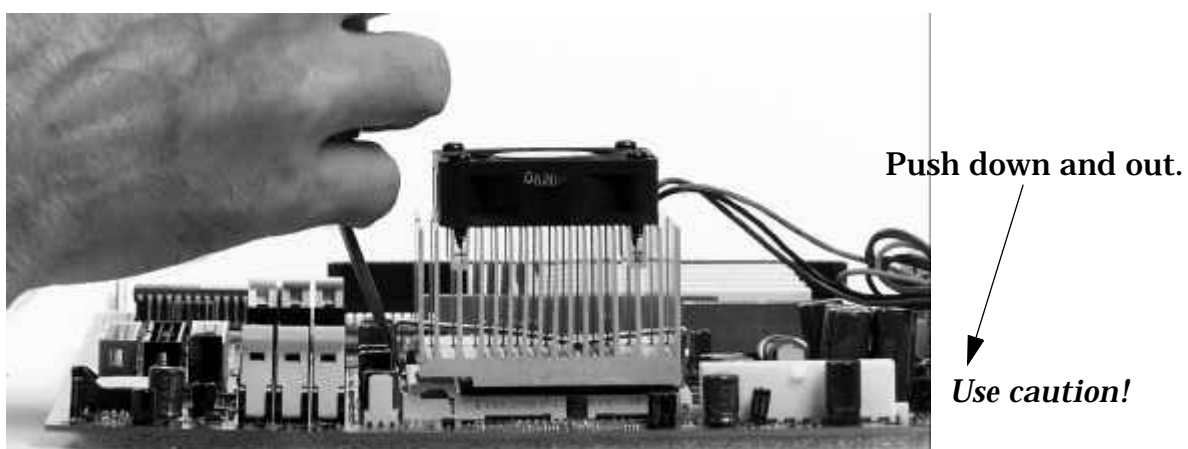

Push down and out.

Use caution!

Figure 16.   Pushing the Clip Past the Socket Lug

17. Figure 17 shows the clip being locked securely on the center lug. Keep the clip at the same level as the lug and press slightly inward so that the clip is hooked onto the center lug on the top end of the socket.
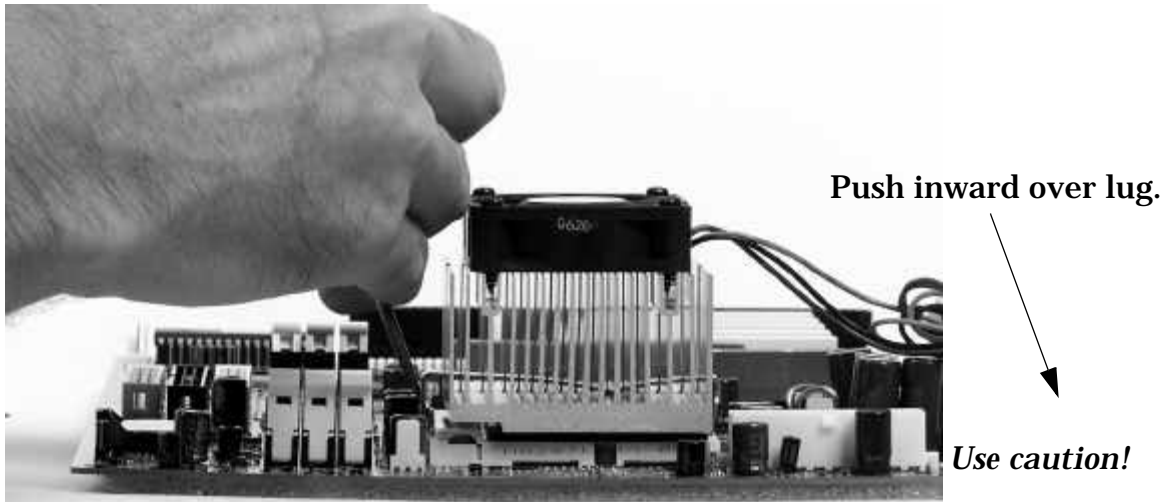

Figure 17.   Locking the Clip on the Socket Lug

18. Figure 18 shows one of the installation steps using a nutdriver instead of the screwdriver. All the steps and operations are identical except for the choice of tool used. *Always install the processor before installing the memory modules.*
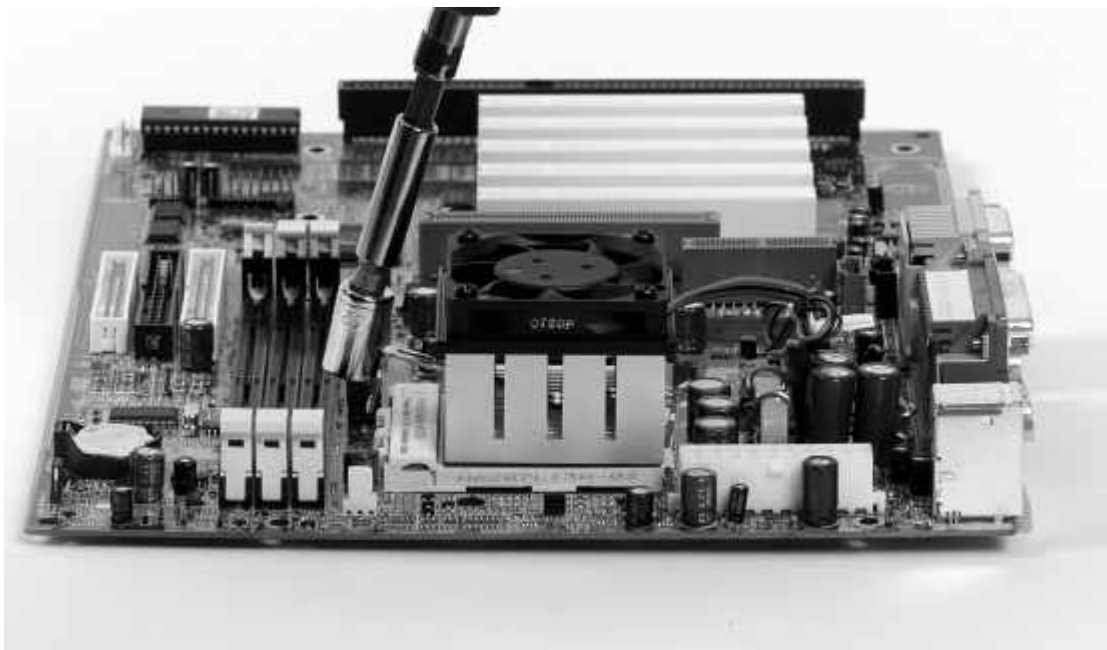

Figure 18.   Installing the Clip with a Nutdriver

19. No matter which tool is used, the clip must be aligned with the center socket lugs for the clip to fit. Figure 19 shows the clip aligned with the lug. This alignment is essential for the clip to lock. Otherwise, the clip may only be held in place by one side of the lug and the clip will eventually come loose.

Caution: Make sure that the clip has been lifted over the tab so that it is fully engaged and not simply resting on the edge of the center socket tab. Improper installation can cause the socket tab to break.

Note: Inspect the socket and the clip from both the side (profile) view and top view (from above) to verify the proper installation.

If this is a test-fit operation, to remove the heatsink simply push the clip down and it will (normally) spring off the lug. If it does not, use the insertion tool and reverse the installation procedure.
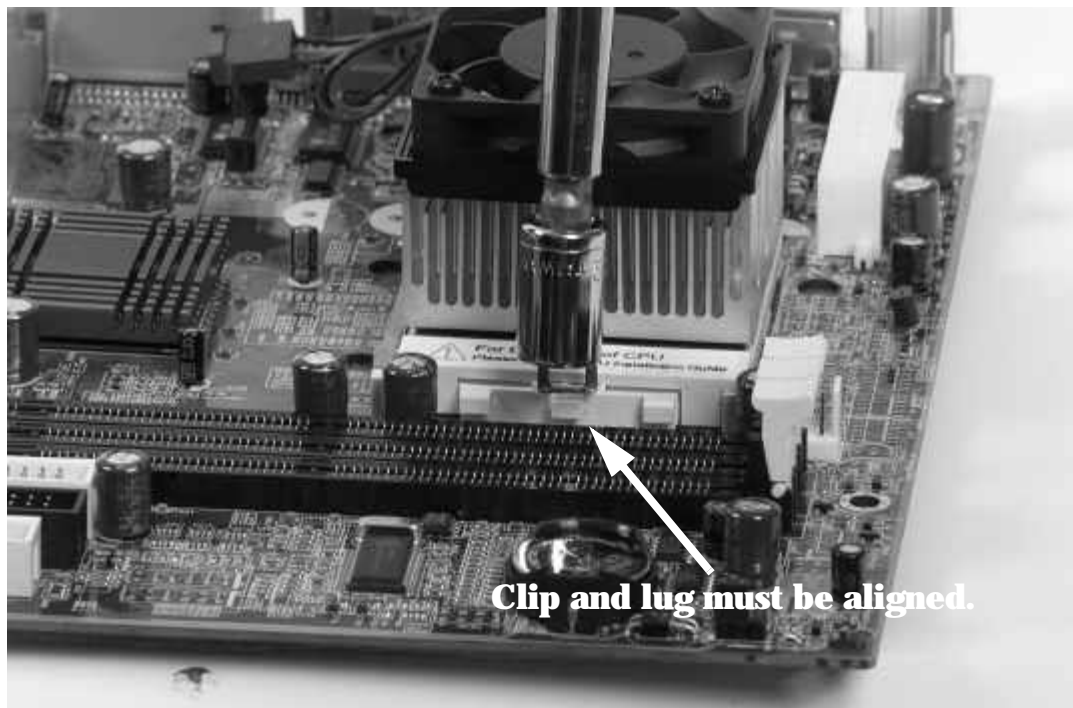

Clip and lug must be aligned.

Figure 19.   Make Sure that the Clip is Aligned With the Lug

20. After installing the heatsink, the next step is to connect the fan. Figure 20 shows the wire from the heatsink fan being plugged into the motherboard connector marked "CPU FAN". This connector is keyed so the power lead can only be installed one way. If a connector marked "CPU FAN" is not apparent on the board, read the motherboard manual to learn where the fan is to be connected.

In Figure 20, also notice how the excess wires are neatly bundled and out of the way of the airflow required by the fan. If the flow of fresh air is blocked, the fan will not function properly.

Note: *Never allow the power cable to come into contact with the fan blades nor allow the cable to block the airflow to the fan. At a minimum, there must be one inch of clearance above the fan to ensure good airflow.*
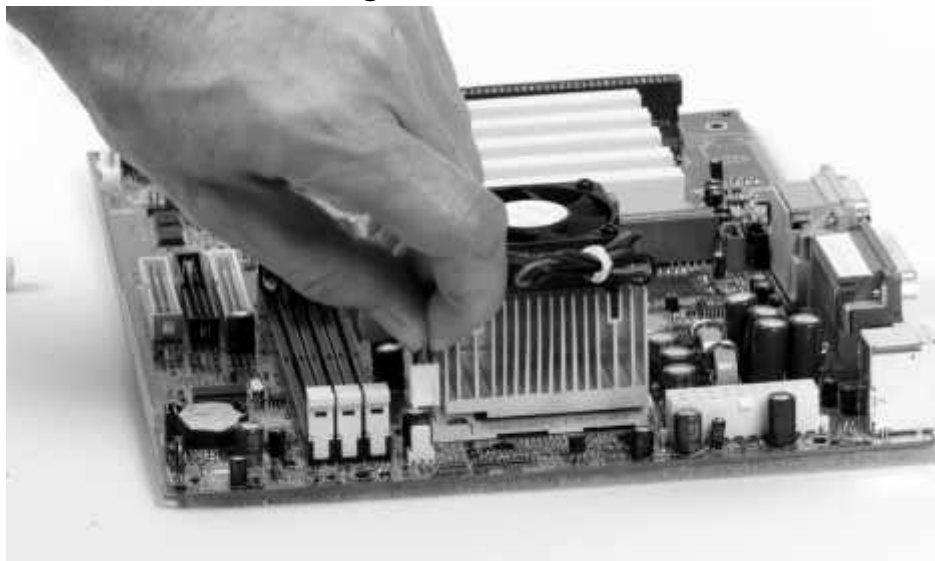
Figure 20.   Plugging the Fan Power Lead into the Motherboard Connector

If the wires are too short, or if they are stretched too tightly, the fan can usually be remounted to allow less tension in the wire. If test-fitting the heatsink to the processor, remove the heatsink and perform the following steps. If the protective film on the heatsink has been removed and the heatsink has been installed on the processor, *carefully* follow the following instructions with the processor still mounted on the board.

a. Mark the top of the fan housing, so that it is not reinstalled upside down.
b. Loosen and remove the screws holding the fan.
c. Trial-mount the fan in a more suitable orientation.
d. Verify that the new mounting will solve the problem.
e. Tighten the screws and verify that the fan blades will rotate freely with finger pressure alone.
f. After verifying that everything can be assembled properly, reinstall the heatsink, and proceed.

21. The heatsink and fan are now fully installed. Figure 21 shows the installation.
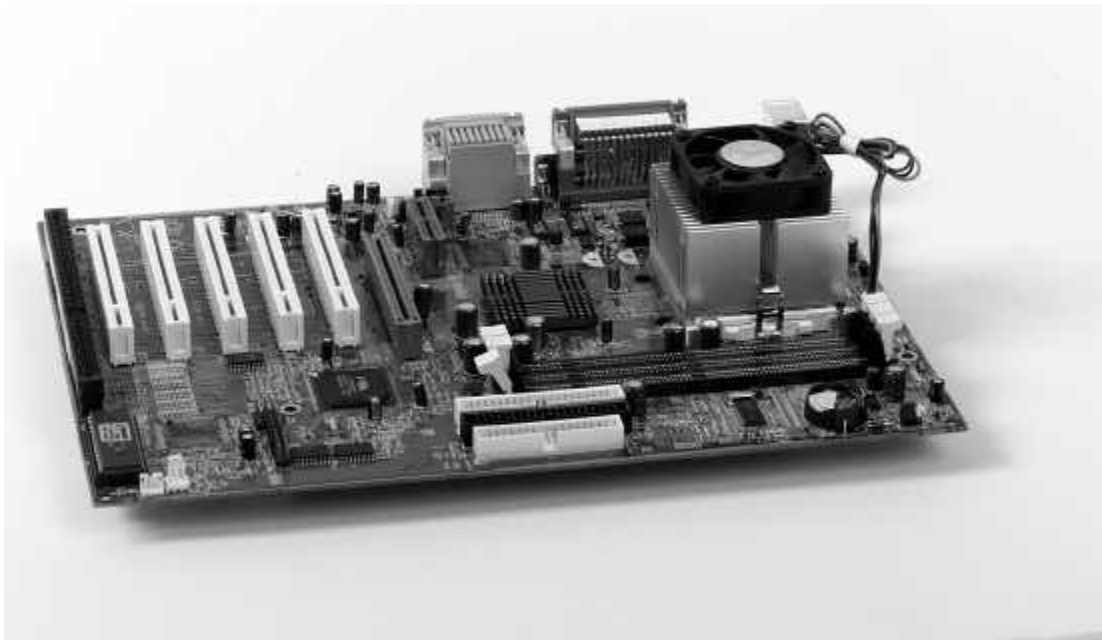

Figure 21.   The Heat sink is Installed, the Installation is Ready to be Double-checked

Before starting the system, be sure to check the following:

■   The surface of the heatsink is not contacting any portion of the socket.

■   The protective liner for the thermal material has actually been removed.

■   The *long* end of the clip is properly attached to the *top* of the socket.

■   Verify that the heatsink retaining clip is completely seated on both center socket lugs.

■   The heatsink fan is plugged into the proper connector.

When the system is first powered-on, verify that the heatsink fan is turning at a relatively fast speed. It is very easy to have installed the screws too tightly, causing the fan housing to bind. If the fan is not turning properly, check to see that all the screws are tightened correctly.

Completing System Assembly

Follow the instructions for mounting the motherboard with processor into the case, as outlined in the case literature. On the AMD website, there are general instructions on how to build a system. To review these instructions go to:

http://www.amd.com/products/cpg/athlon-duron/howtobuild/howtobuild.html

For system cooling guidelines (case characteristics to look for, airflow patterns, where cooling fans should be installed, etc.), go to:

http://www.amd.com/products/cpg/athlon-duron/pdf/cooling_guide.pdf

If You Need Help

For technical assistance with the installation of your new processor, or for technical questions about its operation, the E-mail addresses and technical support phone numbers can be found on our support website at the following URL:

http://www.amd.com/support/support.html

Returns

Whenever possible, please return both the failed processor and attached heatsink to your vender. Having both components allows the AMD engineers to more fully diagnose any problems.