



**AP-902**

**APPLICATION  
NOTE**

**S.E.C.C. 2 Heat Sink  
Installation and  
Removal Process**

December 1998

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## 1. INTRODUCTION

The Single Edge Contact Cartridge 2(S.E.C.C. 2) package for the Pentium® II processor presents unique problems for the Personal Computer Original Equipment Manufacturer (PC OEM) when installing or removing a heat sink. Unlike the S.E.C.C. package, the S.E.C.C.2 package does not have a thermal plate, which exposes the processor core making it vulnerable to damage.

The heat sink assembly and removal process can not induce excessive stress on the substrate or core. To mitigate the risk of damage to the processor core two tools have been developed to assist in the assembly or removal of the heat sink. Both tools have been designed to be compatible with the S.E.C.C. 2 package that have either the Plastic Land Grid Array(PLGA) or Organic Land Grid Array (OLGA) processor core.

The heat sink attach tool is designed to install passive heat sinks on the S.E.C.C.2 package. Alignment posts position the heat sink relative to the S.E.C.C.2 package. A cam provides the mechanical advantage needed to seat the heat sink retention clips. The base of the tool is spring loaded to limit the maximum load applied to the processor core.

The heat sink removal jig is designed to remove a passive heat sink from the S.E.C.C.2 package. The tool aligns the Pentium II processor while drilling out the heat sink retention clips. This jig can be used with any drill press.

## 2. References

The reader of this specification should also be familiar with material and concepts presented in the following documents:

- Pentium® II processor data sheet (Order Number 243657)

Intel website <http://developer.intel.com/design/PentiumII/> or <http://www.intel.com>

### 3. Introduction to Heatsink Attach Fixture

The Napco Heat Sink Attach Fixture, NAP 026, is designed to install passive heat sinks on S.E.C.C. 2 package that have either the PLGA or OLGA processor core. The alignment posts position the SECC2 package relative to the heat sink. A latch holds the top down so that the press plate can apply pressure to the heat sink retention clips. A cam provides the mechanical advantage needed to seat the heat sink retention clips. The nest is spring loaded to limit the maximum load applied to the microprocessor package.



#### CAUTION

The nest portion of the fixture is not fastened to the base. It is positioned with the two locating pins and can fall off of the base if the fixture is tipped over. Hold the fixture upright while carrying it.

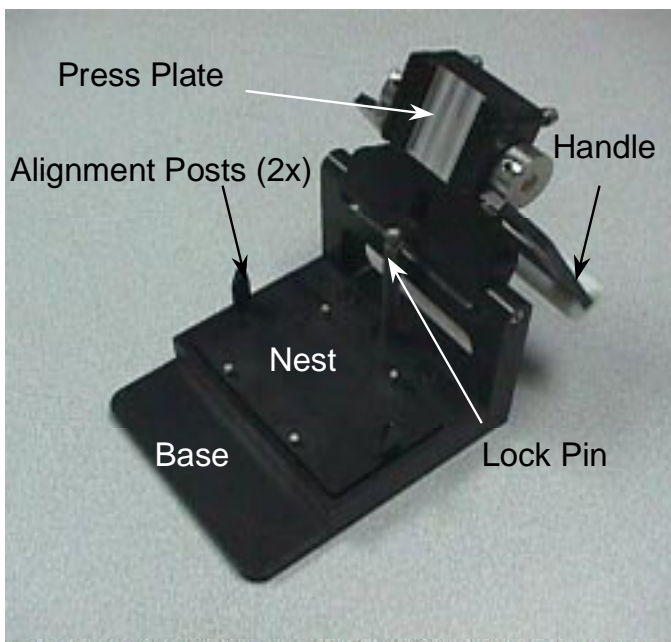


Figure 1, Heat sink Attach Fixture, open

#### 4. S.E.C.C. 2 Heat Sink Attach Instructions



**Figure 2, Position the processor on the tool**

1. Place the S.E.C.C.2 package in nest between locating pins. The gold fingers face toward the operator and the processor core is flat on the nest.

#### ⇒ NOTE

If the processor is positioned backward on the jig, fingers away from the operator, the heat sink retention clips can not be installed.

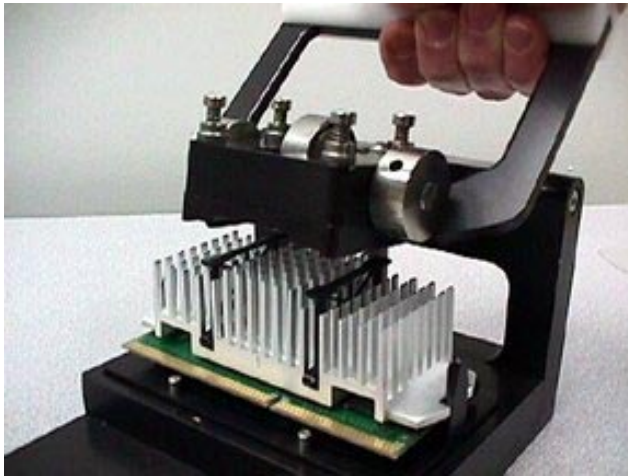


**Figure 3, Heat sink and heat sink retention clip placement**

2. Prepare heat sink for installation. Remove the backing from thermal interface material on the heat sink. Verify the thermal interface material on the heat sink is continuous; no through holes or debris in the material.
3. Place heat sink carefully on the microprocessor die. Notches in heat sink tabs engage alignment posts on the fixture. Insert heat-sink retention clips through heat sink. The tips should just engage the cover bosses.

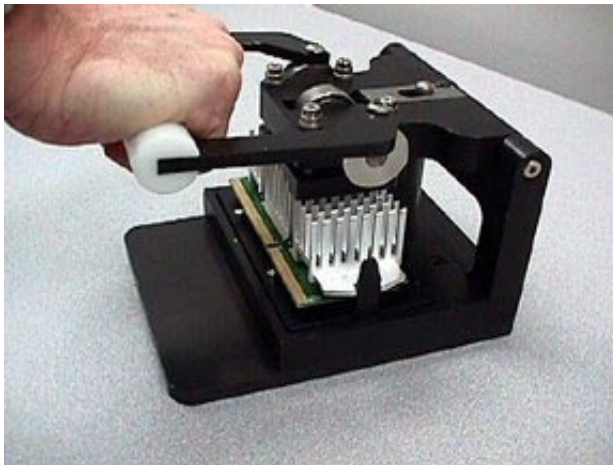
#### ⇒ NOTE

Do not try to seat the retention clips by hand.



**Figure 4, Closing the tool**

4. Close tool by pulling the handle forward. The top of the fixture rotates forward and stops with the press plate in position over the retention clips.

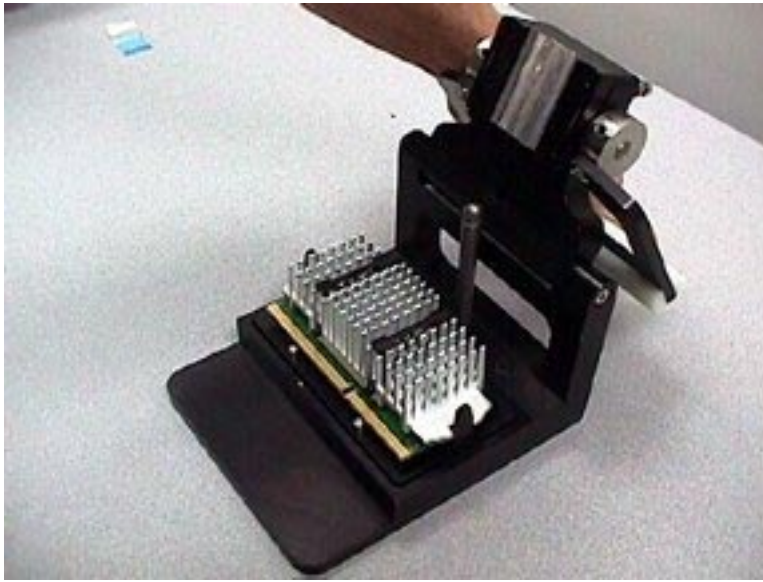


**Figure 5, Pressing the retention clips into the cover**

5. Rotate the handle forward and down until it stops. The cover latch engages the lock pin to hold the top down. The cam rolls forward, applying pressure to the press plate. The press plate pushes the clips into the S.E.C.C. 2 cover and seats the retention clip springs on the heat sink.

#### ➡ **NOTE**

The nest in the base will depress slightly as the retention clips are seated. This limits the load that can be applied by the tool to the processor core and the substrate.



**Figure 6, Opening the tool**

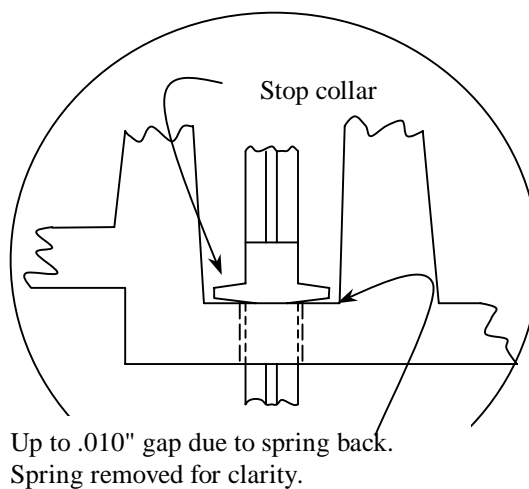
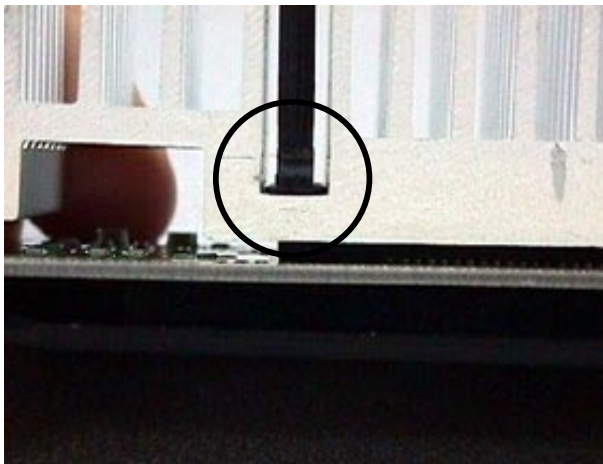
6. Push the handle all the way back. Top rotates back just beyond vertical. Remove the processor and heat sink assembly from fixture.



**Figure 7, Assembled processor and heat sink**



## 5. Assembled Part Quality

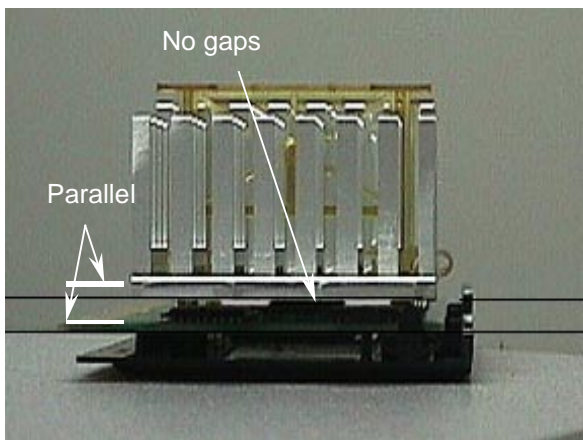


**Figure 8, Attached clips seated in heat sink.**

Verify stop collars of the retention clips sit on the heat sink.

### ➡ NOTE

The retention clips can spring back after the collars contact the heat sink. There may be as much as .010" gap between the collars and the heat sink.



**Figure 9, Heat sink installed.**

### ➡ NOTE

Visually verify that no gap exists between microprocessor die and heat sink.

Visually verify heat sink is parallel to substrate.

## 6. Introduction to Heat Sink Removal Jig

The Napco Heat Sink Removal Jig, NAP 027, can be used with any standard drill press. The Drill Jig kit consists of Disassembly Jig Base, the Disassembly Jig cover and two Carbide Drill Bits with stop collars installed.

The Disassembly jig base secures the processor and aligns the S.E.C.C. 2 cover holes with bushings in the Disassembly jig cover. The bit drills out the heat sink retention clip allowing the heat sink to be removed. Drilling out the heat sink clips reduces the forces put on the processor core, substrate and cover.

The press shown in Figure 10, is a compact, 3-speed model builder's drill press. To be compatible with the process described in this document the drill press must be adjustable to 4500-rpm +/- 500 rpm.

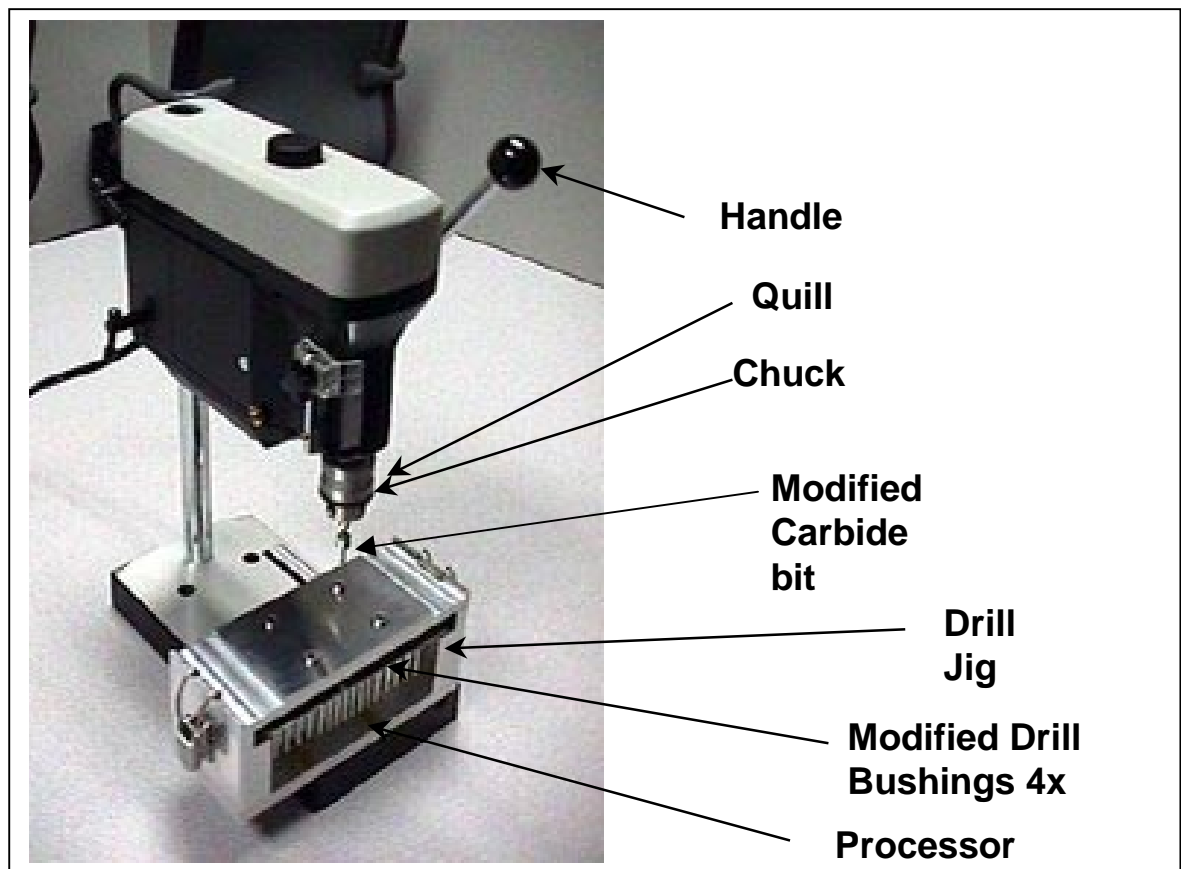
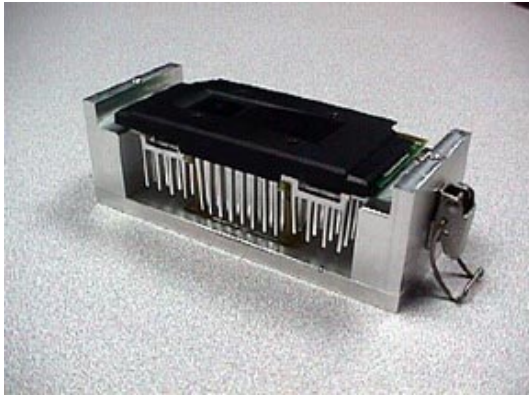


Figure 10, Overview of Drill Jig

## 7. S.E.C.C. 2 Heat Sink Removal Instructions

1. Install drill bit in the drill chuck. Finger tighten only.  
(Replacement Drill Bits - 3/32 inch diameter carbide drill bit)
2. Verify drill press is set to run at 4500 +/-500 RPM. Adjust speed if necessary.



**Figure 11, S.E.C.C.2 in jig base**

3. Put S.E.C.C. 2 assembly in the drill jig as shown in, Figure 11. The heat sink tabs rest on the base of the jig. The plastic cover with hologram is facing you.



**Figure 12, Placing jig cover on base**

4. Put the top of jig on the S.E.C.C. 2 cover and the base of the jig as shown in Figure 12. The Drill bushings should fit into S.E.C.C. 2 cover holes. Secure the top of jig by snapping the two clips into place on the top.
5. Place the jig with the processor on the drill press base.
6. Set the bit height to provide clearance over the jig. Tighten the drill chuck with the chuck key.
7. Turn on the drill press. Hold the jig loosely on the press base. Pull the handle down, adjusting the position of the first bushing to receive the drill bit.



### **WARNING**

Use Eye Protection and firmly grasp the jig while drilling out the



**Figure 13, Cleaning out the drill bit**



**Figure 14, Stop collar at maximum insertion**

8. Advance the bit into the clip approx. 1 mm (.040") and then retract it completely from the bushing as shown in Figure 13. This allows plastic chips to clear from the bit. Repeat this process 6-8 times until the stop collar reaches the drill bushing as shown in Figure 14.

#### ⇒ **NOTE**

The heat sink retention clip will usually come loose from the cover just before the collar contacts the bushing. Do not push the stop collar against the bushing.

The actual depth drilled each time the bit goes in will vary depending on the bit sharpness and the operator's skill. The bit should be pushed easily into the material. Do not run the bit hard into the plastic. Hitting the plastic hard dulls the bit faster and may break the carbide drill bit.

#### ⚠ **CAUTION**

It is important to retract the bit completely from the bushing each time to clear chips. If it is not retracted completely or if the operator attempts to drill too deep, plastic chips will jam the bit in the bushing. When the bit jams, the fixture will lift off the press as the operator retracts the bit. Also, the drill bushings may spin loose in the fixture or the drill bit may break.

9. Repeat step 8 for the other pins.
10. When all four pins are drilled out, turn off the drill, remove the jig from the drill press. Release the latches. Remove the top of the jig while holding onto the S.E.C.C. 2 package.

#### ⇒ **NOTE**

If the top is lifted without holding the S.E.C.C. 2 package, the cover may stick to the jig top and the S.E.C.C. 2 may be dropped as the top is removed.



**Figure 15, Cleaning out boss**

11. Push the pieces left in the cover bosses out of the bosses with the shank of another drill bit as shown in Figure 15. Push from the substrate side so chips do not get between the substrate and the cover. Use care not to hit components or traces on the substrate.

⇒ **NOTE**

Any solid tool that has a diameter of .093 - .108 inch can be substituted for the drill bit.

## **8. Suppliers**

Please see the Intel Developer Web page at: <http://developer.intel.com/design/PentiumII/components/>  
For supplier information