

KOOLANCE[®]

Superior Liquid Cooling Systems



ICM-510

User's Manual

English v1.00

Protected by U.S. Patents 6,664,627; 6,313,990; 6,234,240; 5,731,954
Other Technology Pending U.S. & World-Wide Patents

This User Manual is updated regularly. Please be sure to check our support page for a newer version of this guide: www.koolance.com/support

GENERAL PRECAUTION

Please read this manual carefully before beginning the installation of your Koolance system. This manual assumes the user has basic experience in building and configuring computer systems. Information referring to traditional hardware assembly is intentionally brief.

ABOUT SIGNS

Throughout this document, critical information is highlighted in gray-colored boxes. The following symbols are intended to prevent you from any situation which may cause personal injury and/or damage to equipment:



WARNING: Indicates a potentially hazardous situation which, if not avoided, could result in personal injury or be life-threatening.



CAUTION: Indicates a potentially hazardous situation which, if not avoided, may result in damage to equipment.



PROHIBITED: Indicates a prohibited action.

PROHIBITED USE

This product is designed, developed and manufactured as contemplated for general use, including without limitation: general office use, personal use and household use, but is not designed, developed and manufactured as contemplated for use accompanying fatal risks or dangers that, unless extremely high safety is secured, could lead directly to death, personal injury, severe physical damage or other loss, including without limitation: nuclear power core control, airplane control, air traffic control, mass transport operation control, life support, or weapon launching control. If these products are used in such hazardous environments, Koolance Incorporated does not warrant them.

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WARNING: The Koolance liquid & coolant pack contain chemicals which may be harmful or fatal if swallowed. KEEP THIS AND ALL DANGEROUS CHEMICALS OUT OF THE REACH OF CHILDREN. If ingestion has occurred, seek medical attention immediately. Give two glasses of water. Do not induce vomiting. In the case of eye contact, flush eyes immediately with water for 15 minutes. Remove contact lenses. Call a physician if irritation persists. Some individuals may have an allergic skin reaction with the solution, although generally mild. Avoid contact as much as possible, and wash exposed area with soap and water for at least 15 minutes. If irritation persists, or if contact has been prolonged, get medical help. For further information, please visit our website at: www.koolance.com



CAUTION: Koolance Incorporated can not be held responsible for any damage to your system due to misconfiguration or incorrect installation. If there is any point of installation that you do not understand, please contact our Technical Support Staff at: tech@koolance.com, or visit our website at: www.koolance.com/support



CAUTION: Liquid cooling systems are not yet universally supported by hardware manufacturers. In some situations, adding liquid coolers and other components to computer hardware might void the manufacturer's original warranty. Installation of the device is ultimately done at the user's own risk. If you have any specific questions on warranty coverage, please contact your component or computer manufacturer.

KOOLANCE CONTACT INFORMATION

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Included Hardware

ICM-510 Series Systems:

- CPU Cooler
- ATX power jumper wire
- refill funnel
- liquid coolant mixture
- liquid tubing
- user manual

Required Tools

During installation, you may need the following tools:



flat-head screw driver



phillips-head screw driver



pliers



long-nose pliers



scissors



CHAPTER 1

Introduction

Congratulations on your purchase of a Koolance system!

As the most sophisticated product of its kind, Koolance offers many unique features found nowhere else in the realm of computer cooling. In addition, you can expect to enjoy all of the advantages that water-cooling technology brings with it.

Advantages of Water Cooling

Water transfers 30 times faster, and holds over 4 times more heat than air.

With this thermal conductivity and specific heat capacity, it's easy to see why liquid cooling is getting a lot of attention from hardware manufacturers.

Heat-producing devices in a typical computer are cooled by air. Generally, this involves mounting a heat sink and fan to each component. For example, heat generated from your CPU (or other heat source) is transferred into a metal heat sink, where a fan blows air across its wide surface area.

While altering a heat sink's size and makeup can improve the effectiveness, it is still limited because air absorbs and transfers heat very slowly. To help compensate for this, the fan is often run at a higher speed. Many people have therefore come to equate high performance with high noise. As systems continued to be upgraded, the required heat sinks simply got larger and louder.

Liquid cooling greatly reduces the noise issue. A larger amount of heat is withdrawn from the components more quickly, and less airflow is required to cool them.

The heat exchanger is also located remotely from heat-producing devices, so airflow can be controlled. This considerably reduces dust accumulation on sensitive hardware and can result in a **cleaner overall system**.

Advantages of Koolance Systems

Koolance was the first company to offer fully-integrated, consumer-level PC liquid cooling systems to the world-wide market. Our products are designed and **built to look and operate professionally**. You will not need power tools or a tape measure to install your Koolance system, and it should even be less difficult than assembling your own computer.

Koolance offers liquid coolers for every major hardware device. Providing enormous flexibility, you can customize your system to fit your specific needs—cool dual processors in a server, multiple hard drives in a RAID configuration, or add video cooling to a gaming rig.

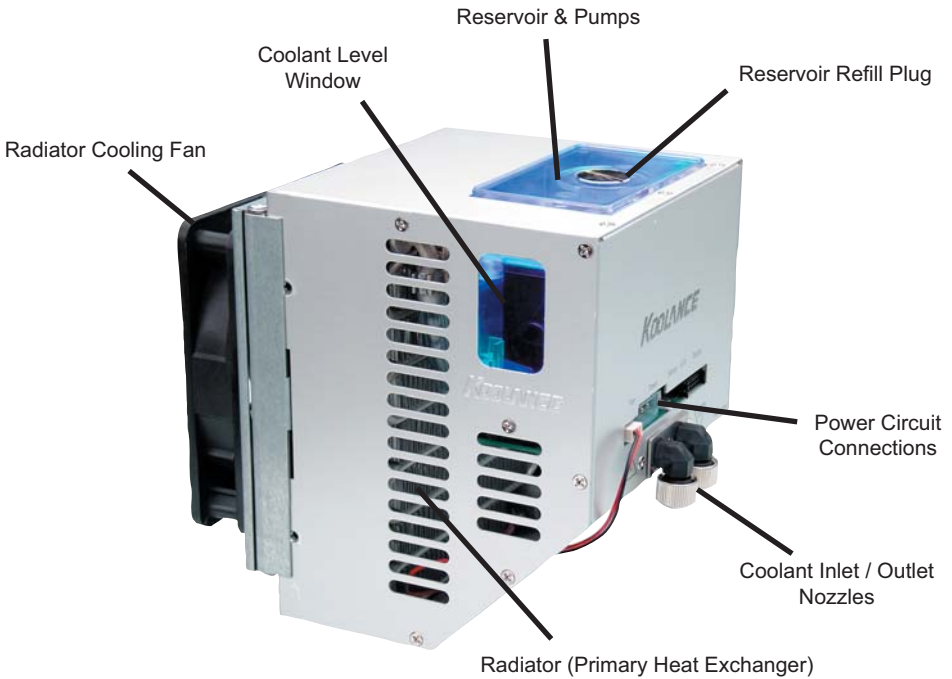
The heart of a liquid cooling system is the pump. This device pushes liquid through each cooler and into the heat exchanger. Koolance systems use **dual pumps to increase reliability and liquid pressure**. If one pump should fail, the second can help prevent potential damage caused by heat increase.

Every Koolance system **includes built-in hardware safety features**. Our proprietary power control board constantly monitors liquid temperature, sounding an alarm if it should get too high, and even turning-off your computer if you are not there to do so.

But Koolance's innovations extend beyond just cooling features. Our **safe, patent-pending CPU Retention Clip** places even pressure across the CPU, protecting the chip and simplifying installation. There's even a ratcheting tension screw for precise contact pressure.

Finally, Koolance systems allow coolers to be **easily exchanged and upgraded** to address future hardware compatibility.

ICM-510 Overview



Reservoir & Pumps - The coolant tank is translucent for easy liquid-level monitoring. Dual pumps help to provide higher system reliability; if one pump should fail, the other can maintain flow, gradually bringing the system to shut itself down (see *LED Display Panel*).

Power Circuit Board - The Power Circuit is responsible for a number of tasks, including: powering the pumps, LED display (sold separately), heat exchanger fans, and operating the audio alarm and shutdown modes.

Radiator - The primary heat exchanger is located behind the cooling fan. This is the main cooling element, and provides high thermal dissipation in a relatively small area. Inside, an aluminum mesh (Louver fin) is webbed between a looping liquid path.

System Settings

By default, the ICM-510 automatically adjusts fan speeds based on the liquid temperature at the CPU (see *CPU Cooler* for sensor placement). For actual CPU temperatures, please refer to your motherboard's BIOS, or 3rd-party software.

The Koolance system alarm will sound if the sensor gets too high (55°C / 131°F). At that point, the radiator fans will increase to 100% power. Should the system continue heating (to 58°C / 136°F), the computer will automatically shutdown. At this level, the processor may be nearing critical temperatures.



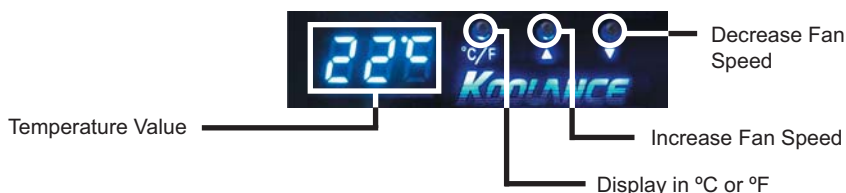
CAUTION: If activated, the shutdown feature of your Koolance system will automatically turn off power to the entire computer. Unsaved files and documents may be lost. Always make regular backups of your files to an external device or medium.

LED Display Panel

The ICM-510 features an expansion connection for an optional LED Display Panel. The display mounts in a 3.5" drive bay, or a 5.25" drive bay with 3rd-party adapter.



The LED Display allows visual monitoring of the Koolance sensor temperature, adjustment of the alarm and shutdown mode, and adds 10 manual fan speeds to the default automatic setting.



LED Display - Fan Speed

This option adjusts the radiator fan speed. Higher speeds can improve performance, but will produce more noise. There is 1 automatic and 10 manual fan settings (1-10). Press the ▲ or ▼ buttons to cycle through these settings, or hold down an arrow to skip to the highest or lowest mode directly.

Automatic mode will adjust the fans for you based on temperature values from the primary sensor. This is the only mode available when using the ICM-510 without the LED Display Panel. With the display, automatic mode is reached by lowering the fan setting to "0" (**Aut / A1** will be displayed).

Details on ICM-510 fan modes are as follows:

Auto Mode	Manual Mode	Fan Power %	Total CFM	Fan RPM
0 - 35°C (32 - 95°F)	1	30	28	720
36 - 37°C (97 - 99°F)	2	35	33	840
38 - 39°C (100 - 102°F)	3	40	38	960
40 - 41°C (104 - 106°F)	4	45	43	1080
42 - 43°C (108 - 109°F)	5	50	47	1200
44 - 45°C (111 - 113°F)	6	60	57	1440
46 - 47°C (115 - 117°F)	7	70	66	1680
48 - 49°C (118 - 120°F)	8	80	75	1920
50 - 51°C (122 - 124°F)	9	90	85	2160
52 - 99°C (126 - 210°F)	10	100	94	2400

LED Display - Alarm Settings

By default, the Koolance audio alarm will sound if the primary sensor reaches 55°C (131°F). When the system alarm sounds, the LED temperature will flash in the display and the radiator fans will increase to 100% power.

To change this setting with the LED Display, press and hold ▲ + ▼ together for 3 seconds. The alarm temperature will begin flashing. You may change this value from 0°C (32°F) up to 99°C (210°F). The normal temperature reading will resume if you do not press any buttons for 4 seconds.

To reset the temperature alarm to the default (55°C / 131°F) setting, press and hold the °C/F button until “dEF” flashes in the display. NOTE: This will also reset the fan speed mode to “auto”.

LED Display - Safety Shutdown

If the temperature value of the primary sensor reaches 3°C (5°F) above the alarm temperature, the system will shutdown power to the computer. With default alarm settings, this means the system will shutdown if the sensor reaches 58°C (136°F).



CAUTION: The Koolance system shutdown mode is linked to the alarm setting. If the alarm temperature is set too high above default (55°C / 131°F), the system may lose its ability to help prevent hardware damage in the event of cooling system failure. Remember, the LED displays the *liquid temperature*; actual CPU temperatures will be higher.

CHAPTER 2

Installing the ICM-510

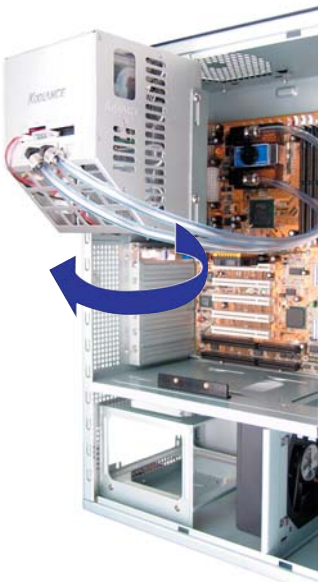
Mounting the ICM-510



The ICM-510 mounts via a rear 120mm fan grill. If you already have a 120mm fan installed in your computer, Koolance recommends removing the fan and utilizing the one included with the ICM-510 to ensure variable voltage compatibility.

The fan mounting bracket is adjustable up to 2.5cm (1 in.) vertically with two side screws. This allows the ICM-510 to adapt to different grill locations, and to help avoid conflict with video cards.

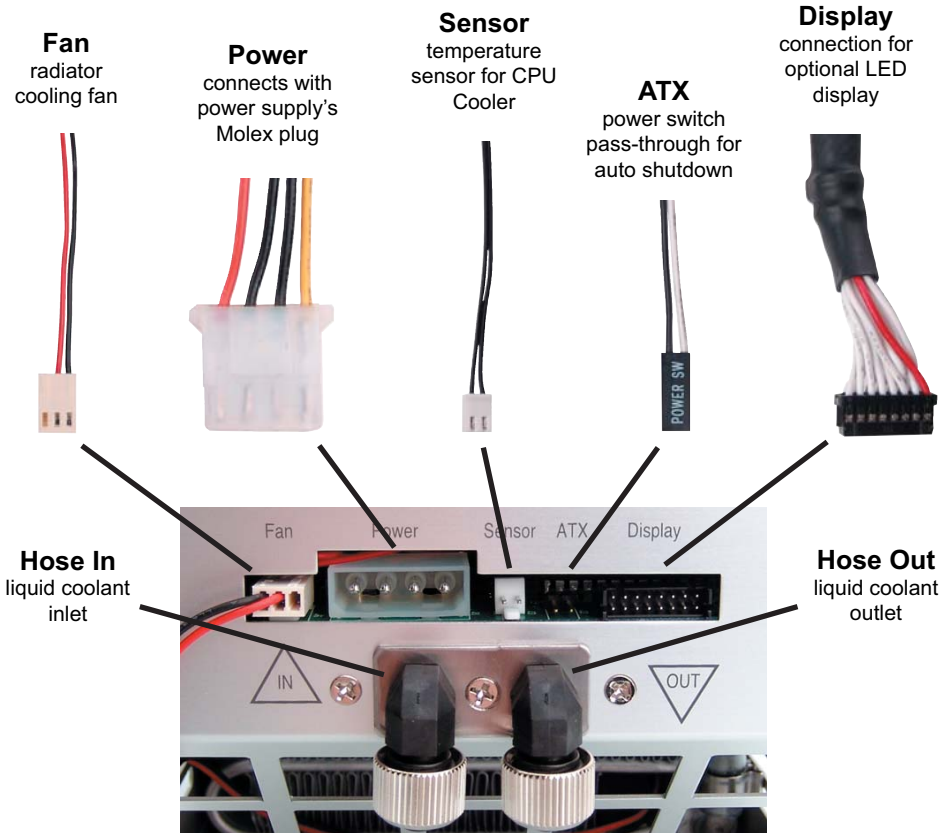
Depending on the installed direction of the ICM-510, it may be necessary to adjust these screws before mounting the cooling unit.



The ICM-510 is hinged to allow access to components behind it, and to simplify maintenance (see *Filling & Maintenance*).

Wire Connections

During installation, there are a number of connections on the ICM-510 that need to be made. Each is labeled below:



Fan - The ICM-510 includes a Koolance dual ball-bearing, variable speed 120mm cooling fan. If not already connected, this lead should be inserted into the plug marked “Fan” on the ICM-510.

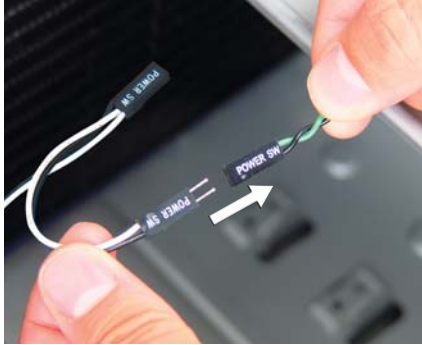
Power - An available Molex plug from your computer’s power supply should be inserted here. Without this important connection, the cooling system will NOT operate.



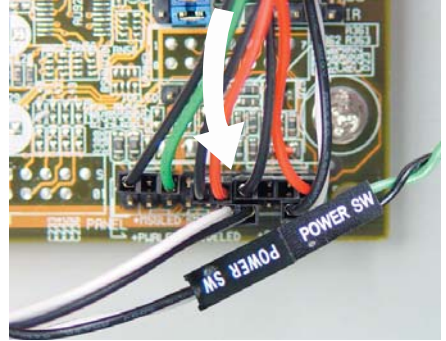
CAUTION: The “Power” connection is vital to system operation. A 12V 4-pin plug from the power supply must remain connected to the cooling system at all times while the computer is in use.

Sensor - The Koolance temperature probe is connected here. The sensor end will be taped to the bottom of the CPU Cooler during installation later (see *CPU Cooler* for more information).

ATX - The “pass-through” ATX lead simulates the chassis’ power button in the event that automatic shutdown becomes necessary. Connect the single end to the ICM-510. The dual ends connect with the chassis main power switch, and to the motherboard. In all instances, direction or polarity of the ATX wire does not matter.



Plug your computer’s main power switch to the male ATX power lead from the ICM-510.



Plug the remaining female ATX power lead from the ICM-510 to the motherboard’s power switch connection. (This is often marked “PWRSW”, “PWSW”, or “PWBT”).



CAUTION: The auto shutdown safety features of your ICM-510 will not function without properly connecting the ATX power switch lead.

Display - The optional LED temperature display (sold separately) is plugged to the connection marked “Display” (see *LED Display Panel* for more information).

Connecting Hoses

Each tubing connection uses a threaded compression fitting (“hose screw”) to keep it secure. To connect these components:



Thread a hose screw onto the tube end.



Squeeze the tube while pushing it firmly over the nozzle. Tubing should completely cover the nozzle.



Tighten the connection by sliding the compression fitting down over the nozzle and screwing securely.

Nozzles are designed to attach tightly. If you need to remove a hose for any reason, it may not pull off easily, even after unscrewing the compression fitting.

Usually, a connection will come free by squeezing the hose *on top* of the nozzle and pulling away. If this fails, cutting a small incision lengthwise (parallel) along the nozzle should free it.



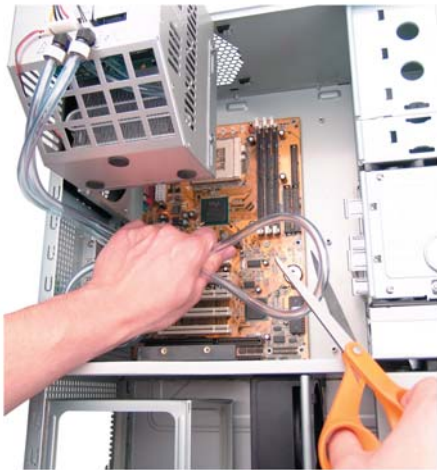
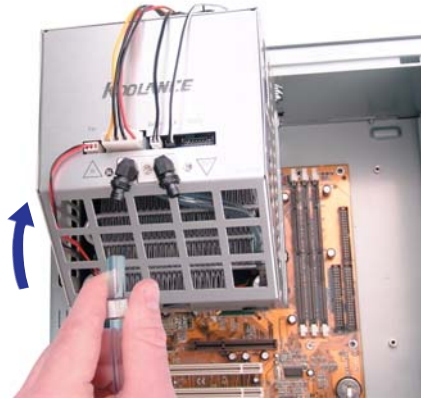
When a hose screw has been removed, it may have distorted the tubing beneath it. This last portion (about 1cm, 7/16”) should be trimmed to ensure a perfect fit with the next connection. The tip should *always* be re-cut if you needed to remove the hose with an incision.



Hose Lengths

Before installing your liquid coolers, appropriate lengths of tubing must be cut to connect each device. If not already installed, it may be easier to temporarily lay your motherboard and video card inside the chassis to better estimate the required amounts.

Connect both ends of the included 6mm (1/4") hose to the ICM-510 inlet and outlet nozzles. The tubing should now form a simple loop without any attached coolers.



Roughly estimate the length you will need from the ICM-510 to your first cooler, and cut tubing from the nozzle marked "Out".

Cut the hose from the "In" nozzle with enough length to connect with the last cooler that will be in your system.

Using the leftover tubing, cut shorter pieces to link between each individual cooler.

Continue connecting all of your coolers in the system until there are no longer any open tubing ends.

Remember to leave enough tubing for the ICM-510 to open easily on its hinge once the coolers are mounted.



CHAPTER 3

**Installing the CPU Cooler*

*NOTE: Images of the CPU Cooler in this chapter may differ from your specific model. However, the actual installation process is the same.

Temperature Sensor



CAUTION: Be sure to attach the Koolance temperature probe to the CPU cooler during installation. The safety features of your system may not function properly without the correct placement of this probe, and hardware damage can result.

Remove the protective film from the bottom of the CPU cooler.

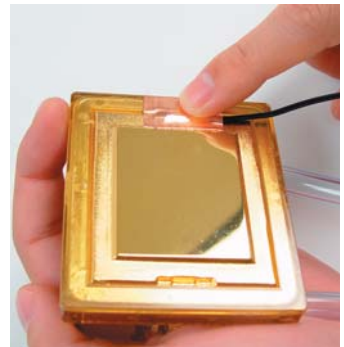


Insert the temperature sensor into *either* bottom groove on the CPU cooler. The sensor is required for proper fan speed control and system safety features.

DO NOT attempt to install the temperature probe *in between* the processor and cooler. Despite its thin size, it will interfere with CPU contact or burn-out the sensor.

Apply metal tape to keep the temperature probe in place. **DO NOT** stick metal tape or the temperature probe to the the raised (polished) portion of the CPU cold plate.

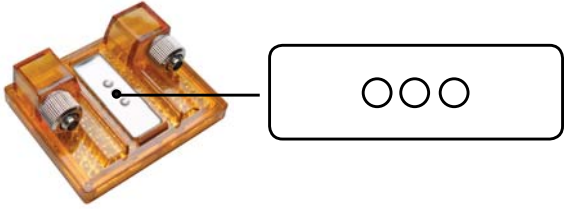
You can use a zip-tie to further secure the temperature probe wire to the CPU tubing.



Tension Screw

There are 3 metal center receptacles on the CPU-305 cooler:

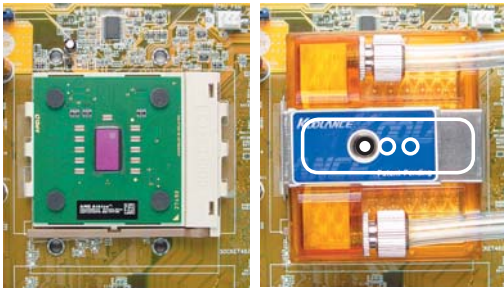
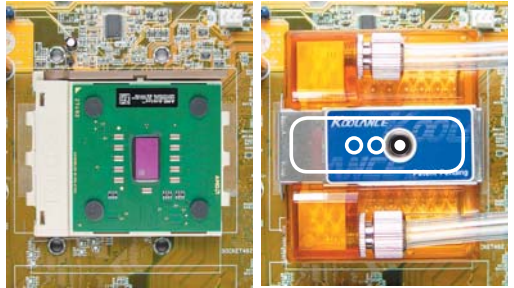
3 center holes correspond with different CPU socket positions



CAUTION: Installing the tension screw into the wrong cooler receptacle can cause insufficient cooler contact, and may result in hardware damage.

For AMD Athlon/XP processors, the left or right receptacles will be used, depending on which direction the CPU socket faces in relation to the cooler:

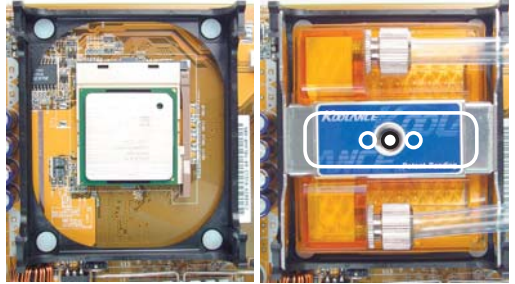
Screw alignment for right-side AMD Athlon/XP processors



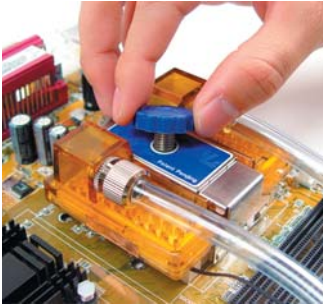
Screw alignment for left-side AMD Athlon/XP processors

For Intel P-4 (478 & 775), Xeon, AMD Athlon 64, FX, or Opteron processors, use the center hole:

*Screw alignment
for P-4, Xeon,
Athlon 64, FX,
and Opteron
processors*



Due to different contact pressure requirements, two tension screws are included with the CPU-305. Use the **BLUE** screw for “open die” processors, such as: AMD Athlon/XP or Intel P-III. Use the **BLACK** screw for processors with metal heat spreaders, such as: Intel Pentium-4, Xeon, AMD Athlon 64, FX, and Opteron chips.



AMD Athlon/XP Blue Screw



*Intel P-4/Xeon & AMD 64/
Opteron Black Screw*



CAUTION: Installing the tension screw into the wrong cooler receptacle can cause insufficient cooler contact, and may result in hardware damage.

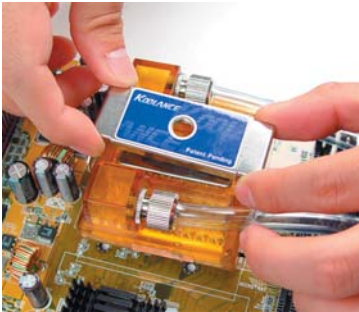
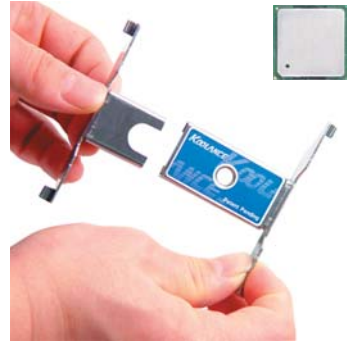
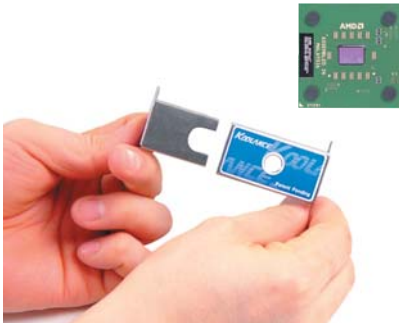
With the bracket properly aligned, insert and slowly twist the tension screw until it can no longer be tightened. Over-tightening is prevented by a ratcheting action.

AMD Socket 462 (“A”), Intel Socket 478 Processors

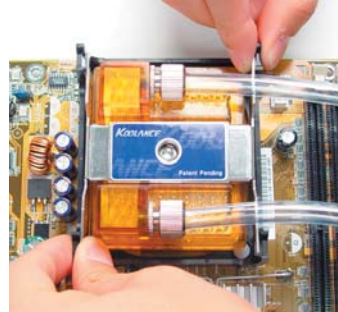
Apply thermal interface compound directly to the CPU die. Do not add more than is necessary to cover it with a very thin layer.



Assemble the CPU mounting bracket using the appropriate clips. The longer pair are for Intel Pentium-4 processors; the shorter are for AMD Athlon/XP and Intel P-III processors.



*Clips for AMD socket 472
& Intel P-III socket 370*



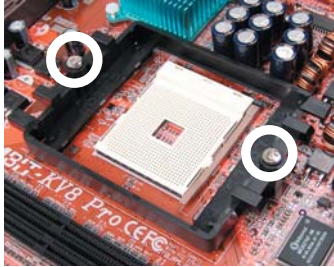
Clips for Intel P-4 socket 478

Fit the cooler and mounting brackets onto the CPU socket. The bracket clips slide inward and outward in order to hook to the socket tabs. Check that the bracket clips are aligned before installing the tension screw.

The tension screw must be aligned over the center of the CPU (particularly for AMD Athlon/XP processors). Otherwise, insufficient contact could result in poor performance, or even damage. (Please see *Tension Screw* for more details.)

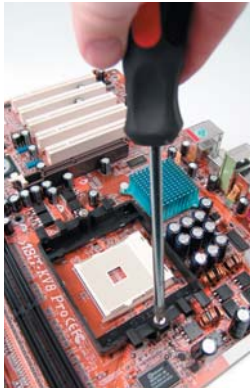
AMD Socket 939, 754, & 940 Processors

The AMD 64 Adapter is designed for **AMD Athlon 64, FX, and Opteron** processors in socket 754, 940, and 939 formats. The motherboard may need to be removed from the chassis in order to install this device.



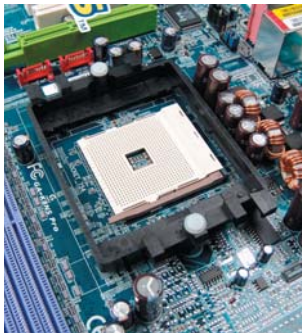
Various hardware comes with the Koolance AMD 64 Kit, and depending on your particular motherboard, some of it may not be required.

AMD 64-bit boards have 2 primary mounting holes which the Adapter will use.

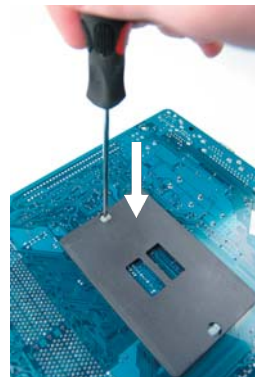


Remove the black plastic retention frame from the motherboard. Generally, this is held in place with 2 metal screws.

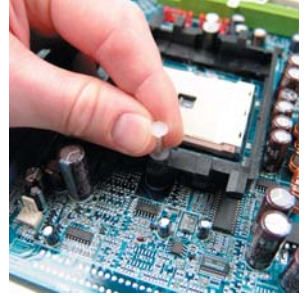
(If there are plastic tabs instead of screws, please skip to the next paragraph.)



For motherboards with plastic tabs instead of metal screws, turn the motherboard over and push the center locking bolt inward with a small flat screw driver.



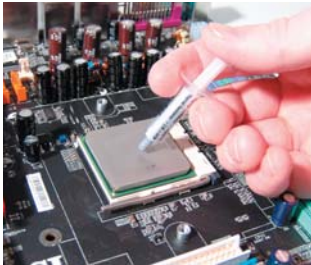
From the top side, pull up both plastic center locking bolts.



Finally, squeeze the remaining tabs together beneath the board, and gently push them through with long-nose pliers.

This should allow you to remove the CPU socket's plastic retention frame from the motherboard.

The included bracket clips are used to mount the Cooler. Assemble the bracket by inserting these clips into the center slider of the CPU Cooler.



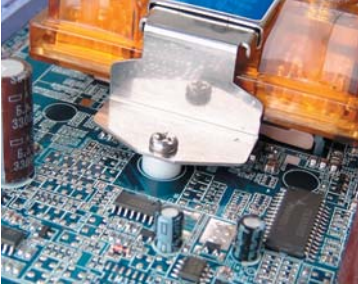
Apply thermal paste to the CPU directly. Spread the paste so that it evenly covers the CPU. A piece of thick paper (such as a business card) works well for this.

Ideally, the short screws with the Koolance AMD 64 Adapter kit are all that will be required to mount the bracket. (These are standard ATX chassis screws.)

However, if the socket's backplate is a different design, the longer screws, plastic spacers, and nuts may be needed to hold the bracket.



Short Metal Screws



Plastic Washer (with Long Screw)



Bottom Metal Nut (with Long Screw)

Despite the final method of attachment, the Koolance AMD 64 Adapter should utilize the original motherboard backplate. This is a necessary component to avoid physical damage of the motherboard or CPU.

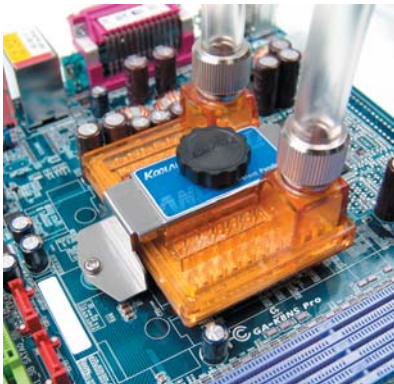


CAUTION: Always use the motherboard's original CPU socket backplate with the Koolance AMD 64 Adapter. This component is designed to avoid damage to your hardware from over-extension.



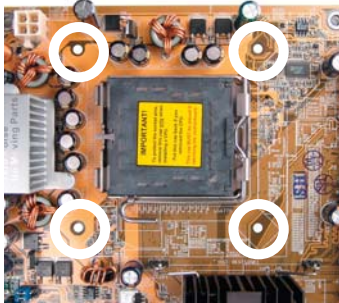
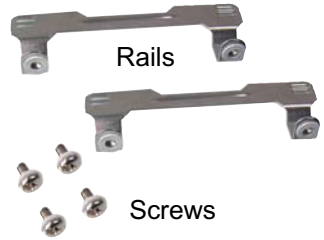
Be sure to install the temperature sensor before mounting the CPU Cooler.

The CPU Cooler will use the black tension screw and the center hole for AMD 64, Opteron, or FX processors. (Please see *Tension Screw* for more details.)



Intel Socket LGA-775 (“T”) Processors

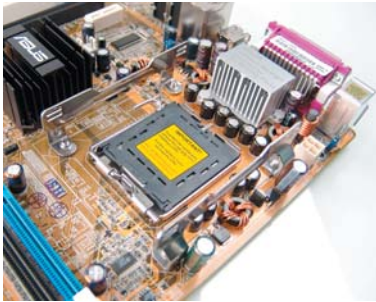
The LGA 775 Adapter is designed for **Intel LGA 775 (“Socket T”)** processors. The motherboard should be removed from the chassis in order to install this device.



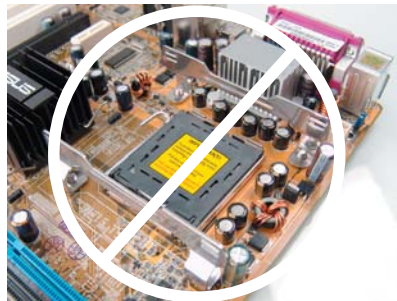
LGA 775 boards have 4 mounting holes which the adapter will use.

The adapter can be mounted in any direction, but it will be easier to install the CPU if the metal rails are mounted parallel to the socket locking arm.

CORRECT: rails parallel to socket locking arm



INCORRECT: rails perpendicular to socket locking arm



Both rails are mounted with two screws from the back side of the motherboard.



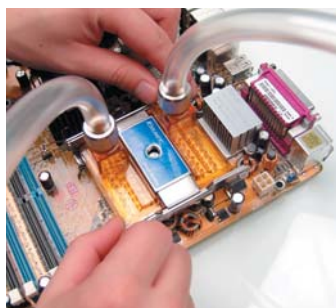


Apply thermal paste to the CPU directly.

Spread the paste so that it evenly covers the processor. A piece of thick paper (such as a business card) works well for this.



The P-4 socket 478 bracket clips are also used with the LGA-775 Adapter. Assemble the bracket by inserting these clips into the center slider.



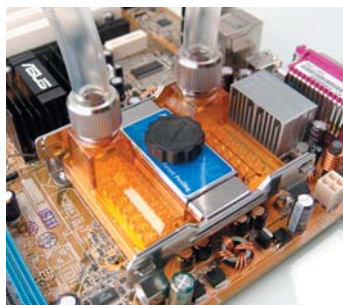
The temperature sensor should already be installed into the CPU Cooler.

Fit the cooler and mounting bracket onto the CPU socket. The bracket clips slide inward and outward in order to hook to the rail holes.

The CPU-305 uses the top rail holes of the LGA-775 Adapter. DO NOT use the bottom holes.



Use the top holes on the LGA-775 Rails



Check that the bracket clips are aligned in all 4 rail holes before installing the tension screw.

The CPU-305 Cooler will use the black tension screw, and the center hole for LGA-775 processors. (Please see *Tension Screw* for more details.)

CHAPTER 4

Filling & Maintenance



WARNING: KEEP KOOLANCE LIQUID COOLANT AND ALL CHEMICALS OUT OF THE REACH OF CHILDREN. KOOLANCE LIQUID COOLANT MAY BE HARMFUL OR FATAL IF SWALLOWED. Koolance liquid coolant contains Monoethylene Glycol. If ingestion has occurred, seek medical attention immediately. Give two glasses of water. Do not induce vomiting. In the case of eye contact, flush eyes immediately with water for 15 minutes. Remove contact lenses. Call a physician if irritation persists. Some individuals may have an allergic reaction with this solution. Avoid contact as much as possible, and wash exposed area with soap and water for at least 15 minutes. If irritation persists, or if contact has been prolonged, get medical help. For further information, please visit our website at: www.koolance.com

Testing & Filling

Once all of the coolers have been connected, the system can be filled with coolant. Swing open the ICM-510, and remove the large slot-headed screw on top of the reservoir (with a screwdriver or large coin). Insert the refill funnel.

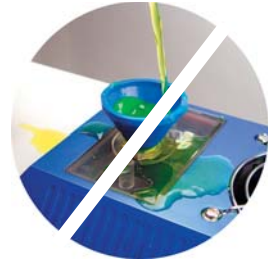


WARNING: The liquid coolant is electrically conductive. Use caution when filling the system, and keep all liquids away from computer hardware and power cables. In case of emergency during installation, immediately unplug the computer's rear power cable. Dry the system thoroughly before proceeding.

Cut a very small corner in the coolant pack, and slowly fill the reservoir. You may not require the whole pack of liquid.



The liquid coolant should be filled up to about 1.5 cm (1/2") from the reservoir's top. This small gap will catch air as it circulates through the system. **Do not overfill.** It is recommended to keep paper towels on hand just in case.



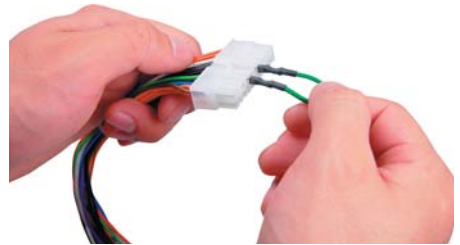
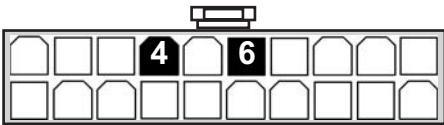
Replace the refill tap screw.

The cooling system can be "jump-started" to assist in the circulation process without booting-up the computer. This will also allow you to check your hose connections and make sure there are no folds in the tubing.



CAUTION: Jumping the incorrect ATX power supply pins can cause permanent damage to the power supply.

Make sure the AC power cord is attached to the power supply. If the power supply has a rear switch, it must be in the ON (-) position. Using the ATX Jumper Wire, insert the metal prongs into pin numbers **4 and 6** on the 20-pin motherboard ATX power supply connector (green and a black ground wire-- See *diagram*).



Allow the pumps to run for about 1-5 minutes. When filtration has ended, the liquid rushing noise should stop. If the reservoir level becomes significantly lower during this "bleeding" process, add more liquid coolant. (The continuous sound of liquid rushing through the reservoir indicates that it was overfilled, or that it needs more coolant.)

That's it! Replace the ATX motherboard connection and boot-up the computer.

Draining & Maintenance

The coolant in your system should be emptied for any of the below reasons:

- 1. To Keep it Clean** - Koolance recommends replacing the liquid coolant about every 2 years. The coolant should also be replaced if it becomes contaminated or significantly changes color.
- 2. Upgrading Coolers** - Whether you are adding or removing liquid coolers, upgrades can be performed more easily with a dry system.
- 3. Shipping** - For safety, Koolance recommends draining the liquid coolant if the system is to be shipped or transported in any method other than by hand.



Before draining the system, it should be placed upside-down on a table with the ICM-510 rotated open. Hold a wide 2 liter container below the reservoir to capture liquid. Unscrew the refill plug to begin draining the system.

In some configurations, air may not be able to enter the system and will prohibit coolant from draining. If this occurs, you can remove tubing from the farthest cooler from the reservoir within the chassis to release the liquid.



CAUTION: Because of the possibility of leakage, computer hardware should first be removed before draining your system if done so by hose disconnection.

Radiator Performance

Over time, dust will accumulate on the radiator. While the cooling system may continue to operate in this condition, performance can decrease. To keep the system clean, check the radiator periodically (through the fan grill) and keep it clean with a can of electronics air cleaner.

Troubleshooting

Your Koolance system is designed to provide you with years of reliable cooling performance if maintained properly. To help avoid unnecessary RMA issues, we have prepared this list of possible operational problems, and their most common solutions.

1. How do I tell if the pumps are working?...

After initial air-filtering, the pumps may not create enough noise to tell if they're working properly. During normal operation, some air bubbles may even remain attached to the insides of the hoses and will not appear to move when the tubing is "flicked".

The easiest way to test pump operations is to simply monitor liquid inside the reservoir. If the pumps are operating, liquid movement should be visible.

2. My temperatures seem too high...

Unless your processor is capable of reading temperatures within the die, BIOS temperatures may not provide reliable readings for liquid cooling systems. This is due to the absence of air flow beneath the CPU socket. If the system exhibits signs of high temperature (reboots, shut-downs, etc.), there may be a problem with your system. These same symptoms can also be attributed to a faulty power supply, and other internal hardware.

Verify that the liquid coolers are making sufficient contact with each component. Make sure the CPU tension screw is placed in the correct cooler receptacle (see the CPU Cooler's Instructions). If the thermal interface material has become over-used, or if the protective film on a liquid cooler has not been removed, the system can exhibit higher temperatures or malfunction.

Also check that there are no blocks, twists, or crimps in the tubing system. If a nozzle has been attached incorrectly, it should be reconnected.

Finally, a dusty Radiator can also result in higher temperatures. Please see *Draining and Maintenance* for more information.

3. When I adjust the temperature alarm settings, it skips number increments...

This is normal if your LED is set to display in Fahrenheit, because the temperature program is based on whole centigrade units. Some °C values convert to decimal temperatures in °F, or skip over them. These can not be set by the program.

4. After the system has been on for awhile, the temperature alarm sounds...

Make sure the LED temperature is at or above your preset alarm temperature (default is 55°C, 131°F). If not, the audio alarm may in fact be your motherboard's BIOS alarm. If the system is not exhibiting signs of overheating (see #2 in *Troubleshooting*), this temperature monitor may need to be disabled to ignore false readings by BIOS. The Koolance LED temperature display (sold separately) will flash whenever the cooling system alarm sounds, and fans will be run at 100% power.

If the alarm sounds within a few seconds after a cold boot-up, or the LED temperature does not reach the alarm preset, the control board/pumps may be malfunctioning. Please visit our support web page for more information.

Verify that the pumps are operating (see *Troubleshooting #1*), and that liquid flow is present in the reservoir. Note that if the reservoir was over-filled during system assembly, this procedure is not possible since there will be no necessary air gap.

5. My system has boot-up problems, or does not turn on...

The majority of these problems are not related to the Koolance system, but hardware or configuration issues. In a new system, a problem with the RAM, motherboard, power supply, video card, processor, or monitor can cause the system to appear not to boot-up properly.

If the cooling fan does not spin, or if no LED's light-up, check to see if your motherboard has a power indicator LED on the board. This is usually a green light next to the ATX power connector. If unlit, power is not getting to the motherboard.

The power circuit should be checked to make sure all connections are plugged-in, especially the 12V 4-pin power supply connection. If your power supply has a rear power switch, make sure that it is in the ON ("-") position, and switched to the appropriate regional current (115VAC or 220VAC).

Another possibility is that the motherboard is shorting-out electrically on the chassis. Remove the motherboard, and verify that the stand-offs are properly installed. Lastly, check that the IO shield (the thin aluminum rear motherboard ATX port plate) is not bent backwards around the motherboard, possibly shorting a component.

If further problems persist, you are likely having a separate hardware issue.

6. My system appears to be leaking fluid...

Since users are allowed to configure their own coolers and clamps, it is possible a connection was not properly sealed (however unlikely). If you can see liquid somewhere on the tubing, or at the bottom of the chassis, computer components may need to be removed for a system test (see *Flow Testing*).

If liquid should get onto another computer component, shut down the system, and remove the component. In many cases, the hardware will be fine after allowing it to dry. However, the system should not be operated until you have discovered where the leak is coming from and can repaired the problem. Should the leak be situated somewhere it can not be easily repaired, please contact our Technical Department for further diagnostic information.

7. My computer's BIOS gives me errors that there are no cooling fans attached...

Some motherboards will not boot, or may generate an error or alarm if no cooling fans are attached to the CPU or motherboard chipset power connectors. There is sometimes an option to disable these fan connections in BIOS, but you may have to boot-up with a fan attached initially to disable this setting. If the system is not booting due to this problem, clear the CMOS and reconfigure the BIOS.

8. The LED Display Panel (sold separately) shows "S - 0" or "S - S"...

Your Koolance LED display may specify if there is a problem with the cooling unit. Please use the following guide in determining the cause of a problem:

S - 0 : Sensor open. This indicates that a temperature sensor may be disconnected or faulty.

S - S : Sensor short. This indicates that a sensor may be faulty or electrically bypassed. If the sensor channel is listed with an "S-S" status, the cooling system alarm will sound.

9. The LED Display Panel (sold separately) does not light up...

A defective display circuit is extremely rare. Usually, this is due to a misaligned or disconnected plug on the power circuit. Verify that all appropriate plugins are attached, particularly the 12V 4-pin power supply connection.

Limited Warranty

Koolance Incorporated (“Koolance”) warrants each new Koolance liquid-cooled system (“the system”), against defects in materials or workmanship for a period of one year from the date of purchase, and agrees to repair or replace any defective Koolance system without charge.

This warranty is non-transferable. All warranty claims must be accompanied by the original proof of purchase.

THIS WARRANTY DOES NOT COVER DAMAGE RESULTING FROM ACCIDENT, MISUSE OR ABUSE, LACK OF REASONABLE CARE, SHIPPING DAMAGE, MODIFICATIONS, THE AFFIXING OF ANY ATTACHMENT NOT PROVIDED WITH THE PRODUCT, LOSS OF PARTS, OR OPERATING COMPONENTS AT SPEEDS OR FUNCTIONS OTHER THAN THOSE SPECIFIED BY THEIR MANUFACTURERS.

Use of unauthorized replacement parts or liquid additives will void this warranty. Koolance Incorporated will not pay for warranty service performed by entities other than Koolance, and will not reimburse the consumer for damage resulting from warranty service performed by an entity other than Koolance. No responsibility is assumed for any special incidental or consequential damages due to a defective Koolance product.

In order to obtain warranty service, contact our RMA department for information. The product must be shipped postage prepaid to an authorized Koolance service location. It is suggested that, for your protection, you return shipments of product by insured mail, insurance prepaid. Damage occurring during shipment is not covered by this warranty. Shipping costs are non-refundable. No other warranty, written or oral, is authorized by Koolance Incorporated.

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