



# H2O-120 PREMIUM LIQUID COOLING KIT

## TUTORIAL & INSTALLATION GUIDE

# Water cooling Swiftech

*manufacturer of the world's best active coolers*



These instructions are updated on a regular basis. Please visit our web site at <http://www.swiftech.com>

## Packing List

QTY	ITEM
1	APOGEE GT water-block, including hold-down plates (multi sockets and AM2), various processors mounting systems, 3/8" barbs and hose clamps
1	MCRES-Micro reservoir assembly, including mounting hardware 3/8" barbs and hose clamps
1	MCP350 Pump, including mounting hardware, gaskets and (2) hose clamps
1	MCR120 Radiator assembly, including pre-installed 120mm fan without fan guards, mounting hardware, (1) 12v to 7v adapters, (1) 12v to 5v 3-pin to 4-pin Molex adapters, (2) hose clamps, and MCB-120 Radbox, with mounting hardware
8	Feet 3/8" (tube ID) industrial grade PVC tubing
1	Length (40") Smartcoils 500
1	2 Oz. Bottle of HydrX concentrated coolant
1	Syringe of Arctic Céramique thermal compound

### Processor & Motherboard Compatibility

#### Intel®

Pentium® 4, D, Celeron, Core 2 Duo, Core 2 Quad, Core 2 Extreme  
Socket 478  
Socket 775  
Xeon™ (socket 603, 604, 771)  
400 & 533 MHz FSB Processors: hardware included  
800 MHz FSB Processors: See Note 1

#### AMD®

Athlon XP, MP, Duron, Sempron, socket 462 (see Note 2)  
Athlon 64, Sempron, Socket 754  
Opteron, socket 939, 940, Socket AM2

Note 1 to dual "Nocona" processor users: since the H20-120 Premium is provided with one Waterblock only, you will need to procure another Apogee Waterblock separately for your second. Please note that the mounting hardware for 800 MHz FSB processors is not included with the Apogee Waterblock and needs to be procured separately under part number: AP-NC604

Note 2: This product is exclusively compatible with socket A (socket 462) motherboards featuring (4) mounting holes around the socket.

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## INTRODUCTION

Congratulations on your purchase of a Swiftech™ H2O-120 PREMIUM Liquid Cooling System!

This kit has been designed to facilitate the installation of the components without having to make any modifications to the chassis. While all attempts have been made to make the installation of this system user friendly, please note that this system is intended for users that are well versed in installing computer components.

## GENERAL GUIDELINES

Please read this guide carefully and entirely before you start this installation. Plan your installation ahead. Observe the relative position of the components for possible interference with other components.

- ❖ Never work with electricity connected to the computer while work is in progress.
- ❖ While it is possible to install the kit in a chassis already populated with all typical components, such as hard drive, CD Rom, power supply, Video Card, etc, it is recommended that these components be removed from the case prior to installing the water cooling system. If there is no need to remove the motherboard for installation of the water-block mounting posts, it may remain in the chassis, and will be useful to estimate the length of tubing necessary to connect the different components. But note that AC power must be disconnected from the Power supply, and that the motherboard must be disconnected from the power-supply during the entire installation. In case of a spill or leak on the motherboard, do not panic! As long as the motherboard is not electrically connected, no harm is done. You must however thoroughly dry the exposed area, using a hair dryer for example, and wait a minimum of 6 to 8 hours prior to re-connecting the motherboard to its power source.
- ❖ The reservoir should preferably be at the highest point of the cooling circuit, it helps for the filling procedure.
- ❖ Think about the airflow inside your chassis. In liquid-cooling environments, it is always better to draw fresh air from the outside through the radiator, as opposed to using the warm air from inside the computer.
- ❖ Make sure to dry-fit all components before making final connections and filling the water-cooling system.

## DISCLAIMER

While all efforts have been made to provide the most comprehensive tutorial possible, Swiftech assumes no liability expressed or implied for any damage(s) occurring to your components as a result of using Swiftech cooling products, either due to mistake or omission on our part in the above instructions, or due to failure or defect in the Swiftech™ cooling products.

In addition, Swiftech assumes no liability, expressed or implied, for the use of this product, and more specifically for any, and all damages caused by the use of this product to any other device in a personal computer, whether due to product failure, leak, electrical short, and or electro-magnetic emissions.

## WARRANTY

Our products are guaranteed for 12 months from the date of delivery to the final user against defects in materials or workmanship. During this period, they will be repaired or have parts replaced provided that: (I) the product is returned to the agent from which it was purchased; (II) the product has been purchased by the end user and not used for hire purposes; (III) the product has not been misused, handled carelessly, or other than in accordance with any instructions provided with respect to its use. This guarantee does not confer rights other than those expressly set out above and does not cover any claims for consequential loss or damage. This guarantee is offered as an extra benefit and does not affect your statutory rights as a consumer.

## I. TUBE ROUTING

The tubing for the water-cooling system must be routed to form a complete loop that includes all elements of the system. When daisy-chaining components, the simplest and most natural route is usually the best. Always avoid sharp bends that would kink the tubing!

The following table contains examples on how to establish connections between the different elements of a cooling circuit based on multiple possible configurations. These are guidelines only, and may change depending on the relative position of the components inside your chassis.

From a performance standpoint there is very little performance to be gained from strictly controlling the component sequence: the maximum delta T (difference in temperature) between any two points of the liquid cooling circuit does not exceed 1°C. Whenever possible, performance oriented users will typically want to route the radiator discharge(s) tube(s) to the inlet of the CPU cooler, since the fluid exiting the radiators is always the coolest.

### Devices: (1) CPU cooler + (1) Radiator + Pump + Reservoir

- Connect:
- Reservoir discharge (lower barb) to pump inlet
  - Pump discharge (arrow pointing out) to radiator inlet (either barb)
  - Radiator discharge to CPU cooler inlet (either barb)
  - CPU cooler discharge to reservoir inlet (upper barb)

Alternatively,

- Connect
- Reservoir discharge (lower barb) to pump inlet
  - Pump discharge (arrow pointing out) to CPU cooler inlet (any barb of two)
  - CPU cooler discharge to Radiator inlet (either barb)
  - Radiator discharge to reservoir inlet (upper barb)

### Devices (1) CPU cooler + (1) VGA cooler + (1) Radiator + Pump + Reservoir

- Connect:
- Reservoir discharge (lower barb) to pump inlet
  - Pump discharge (arrow pointing out) to VGA Cooler inlet (any barb of two)
  - VGA cooler discharge to radiator inlet (either barb)
  - Radiator discharge to CPU cooler inlet (either barb)
  - CPU cooler discharge to reservoir inlet (upper barb)

Alternatively,

- Connect:
- Reservoir discharge (lower barb) to pump inlet
  - Pump discharge (arrow pointing out) to radiator inlet (either barb)
  - Radiator discharge to CPU cooler inlet (either barb)
  - CPU cooler discharge to VGA cooler inlet (either barb)
  - VGA cooler discharge to reservoir inlet (upper barb)

### Devices: (1) CPU cooler + (1) VGA Cooler + (1) chipset Cooler + (1) Radiator + Pump + Reservoir

- Connect:
- Reservoir discharge (lower barb) to pump inlet
  - Pump discharge (arrow pointing out) to VGA Cooler inlet (any barb of two)
  - VGA cooler discharge to Chipset cooler inlet (either barb)
  - Chipset cooler discharge to radiator inlet (either barb)
  - Radiator discharge to CPU cooler inlet (either barb)
  - CPU cooler discharge to reservoir inlet (upper barb)

Alternatively,

- Connect:
- Reservoir discharge (lower barb) to pump inlet
  - Pump discharge (arrow pointing out) to VGA Cooler inlet (any barb of two)
  - VGA cooler discharge to Chipset cooler inlet (either barb)
  - Chipset cooler discharge to CPU cooler inlet (either barb)
  - CPU Cooler discharge to Radiator inlet (either barb)
  - Radiator Discharge to reservoir inlet (upper barb)

### Devices: Dual CPU cooler and VGA cooler (SLI) configurations

- Connect:
- CPU coolers in series: CPU cooler (1) discharge to CPU cooler (2) inlet
  - VGA coolers in series: VGA cooler (1) discharge to VGA cooler (2) inlet

### Devices: Dual Radiators: A second radiator can be added anywhere in the loop in series with the other components, For example

- Connect
- Pump discharge to radiator (1) inlet
  - Radiator (1) discharge to VGA cooler inlet



- ❑ VGA Cooler discharge to chipset cooler inlet
- ❑ Chipset cooler discharge to radiator (2) inlet
- ❑ Radiator (2) discharge to CPU cooler inlet
- ❑ CPU cooler discharge to reservoir inlet

## II. INSTALLATION OF THE COOLING COMPONENTS

Placement of the cooling components may vary depending on your chassis and motherboard configurations.

The following is the recommended sequence of components installation.

1: Radiator & fan; 2: Water-block(s); 3: Pump; 4: Reservoir; 5: Tubing; 6: Filling-up the system

### 1 MCR120-F RADIATOR INSTALLATION

Your first choice is to decide whether you will be installing the radiator INSIDE of the computer, or use the included "Radbox" to hang the radiator OUTSIDE at the back of the computer chassis.

There are four considerations that will dictate such choice:

**Performance:** From a pure performance standpoint, using the Radbox will always be a superior solution to an installation *inside* of the computer because the temperature of the ambient air outside of the computer – which is used to cool the radiator, will always be cooler than that of the inside even in the best ventilated case. Additional benefits are also discussed in the Radbox installation section below.

**Space constraints:** If your PC has no room inside to install a 120mm radiator, and if you are not inclined to modify the case to "make it fit", the Radbox will allow you to hang the radiator to any standard fan opening at the back of the chassis, without any modifications; using the Radbox then also becomes an obvious choice. Conversely, if you have enough room inside of the PC to install the radiator, *BUT* your PC is located in a space constrained area, then adding the Radbox to the back of the chassis will lengthen the PC, which could prevent its use.

**Noise:** Having the radiator/fan assembly operating outside of the chassis may slightly increase the audible noise compared to an internal installation, because the chassis no longer muffles the noise emitted by the fan. A mitigating factor to this is the fact that the Radbox assembly is at the back of the computer, and usually hidden away amidst the various cables. If the PC is underneath a desk, chances are that there will be no audible difference between an internal installation and an external one. However, there are situations where the PC is located in an open area, close to the user ears. In such case, users in search of the lowest possible audible noise will prefer to install the radiator inside of the computer.

#### ❖ Back of the case radiator installation:

If CPU cooling is a priority, we suggest that the fan be installed in intake mode in contradiction to the "classic" airflow scheme, which is intake at the front, and exhaust at the back. In effect, if the fan flow direction were reversed, it would use heated air from inside of the chassis, which is usually 3°C (at best) and up to 10°C hotter than that of the ambient air outside of the chassis. Conversely, users with excellent ventilation in their case may opt to install the fan in exhaust mode with the understanding of the above stated temperature handicap.

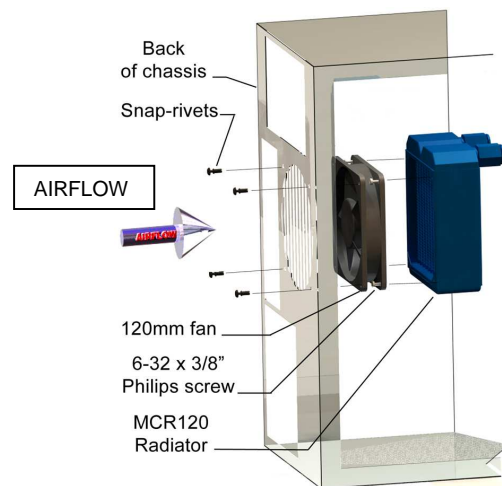


Figure 1

#### ❖ Front of the case Radiator installation:

This is an ideal location, as the radiator draws fresh air, and the "classic" airflow scheme is respected.

**Cosmetics:** This is the last and probably most difficult choice. Swiftech cannot presume of the user's tastes, and therefore cannot make a recommendation here.

Swiftech pre-assembles the fan and Radbox components to the radiator.

#### ❑ Internal radiator installation

Strictly from a CPU cooling performance standpoint it is always preferable to install the fan so that it will either draw or push fresh air from outside of the chassis into the radiator. There are two possible cases as shown to the right:

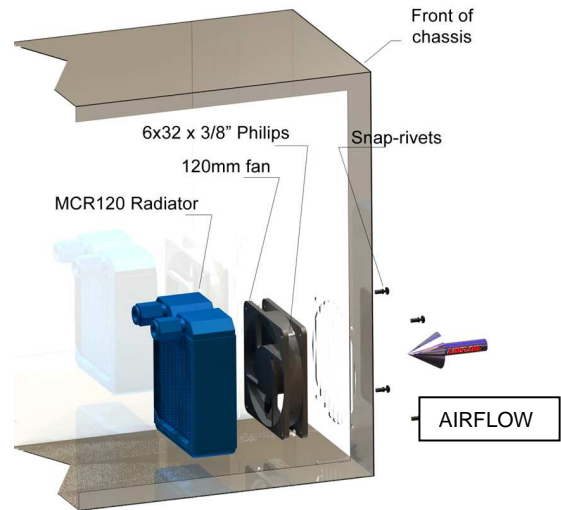


Figure 2

#### ❑ External radiator installation using the "Radbox"

##### ❖ PCI pass-thru Installation

Make sure to insert your fan electrical connector through the slotted hole of the PCI bracket before you install the tubing. Only 3-pin connectors (the type that connect to the motherboard) are small enough to pass through the slotted hole. 4-pin Molex connectors (the type that connect to your power supply) will require that the terminals be removed from the Molex housing first.

##### ❖ Radbox Installation

Place the radiator assembly on the back of the computer to roughly estimate where it will fit best. You need to consider the following clearance issues:

**1. Exit cables and connectors from various PCI devices:** the Radbox base plate can be moved in both vertical and horizontal directions to allow clearance for the cables.

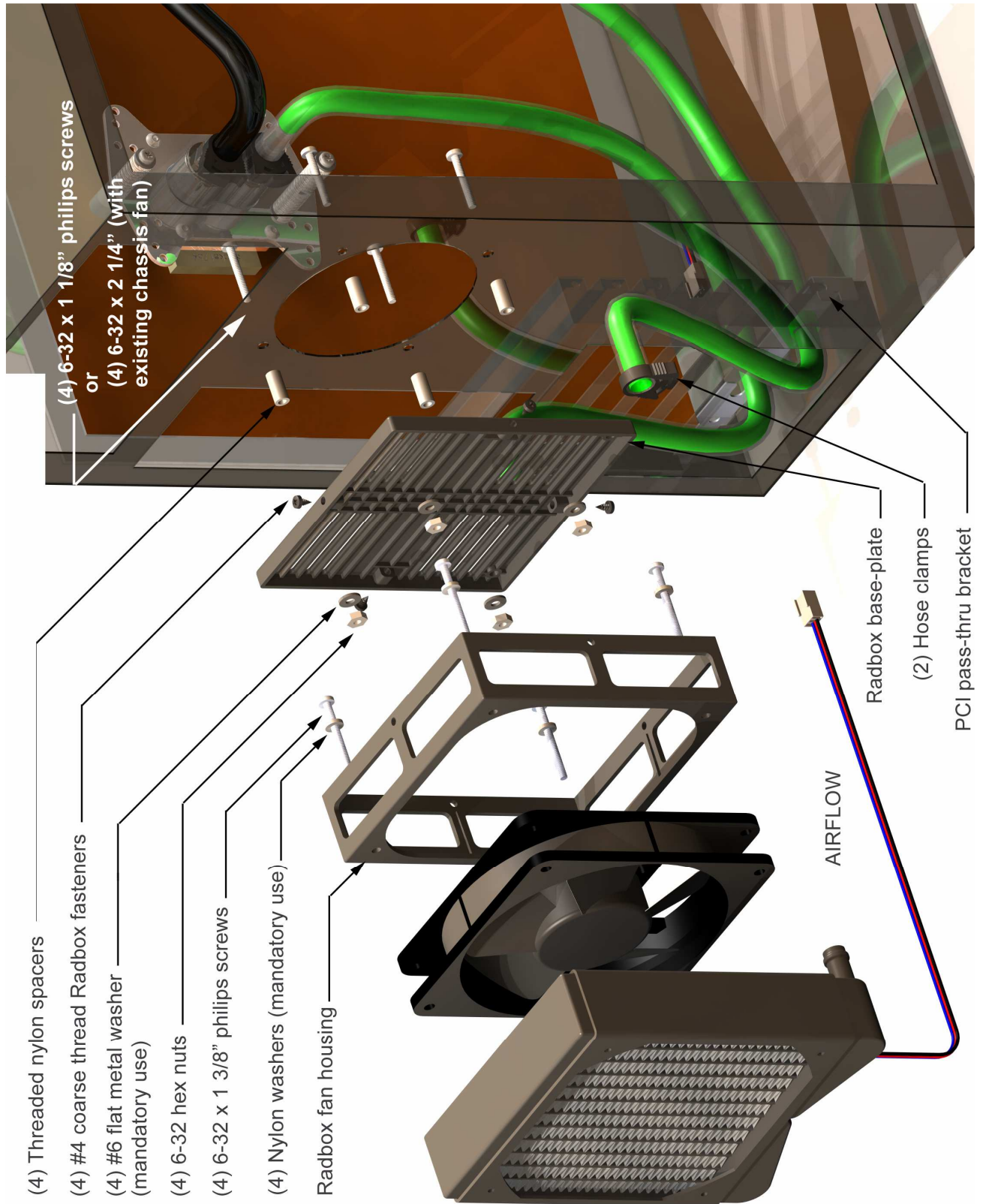
**2. Opening the side panel once the Radbox is installed:** the Radbox is supplied with various nylon spacers to separate the base plate from the surface of the back-panel and to provide clearance for opening of the side-panel (see Fig.3)

Note that a chassis with 80mm fan opening(s) is likely to provide a very good range of adjustments. Conversely, a chassis featuring a single 120mm fan opening the base-plate is a direct bolt on, but offers no adjustments, which may or may not suit your installation for the purpose of positioning the radiator. In that case, it will be become necessary to drill (4) mounting holes of 0.150" (~3.5mm) in diameter to install the base plate at the desired location.

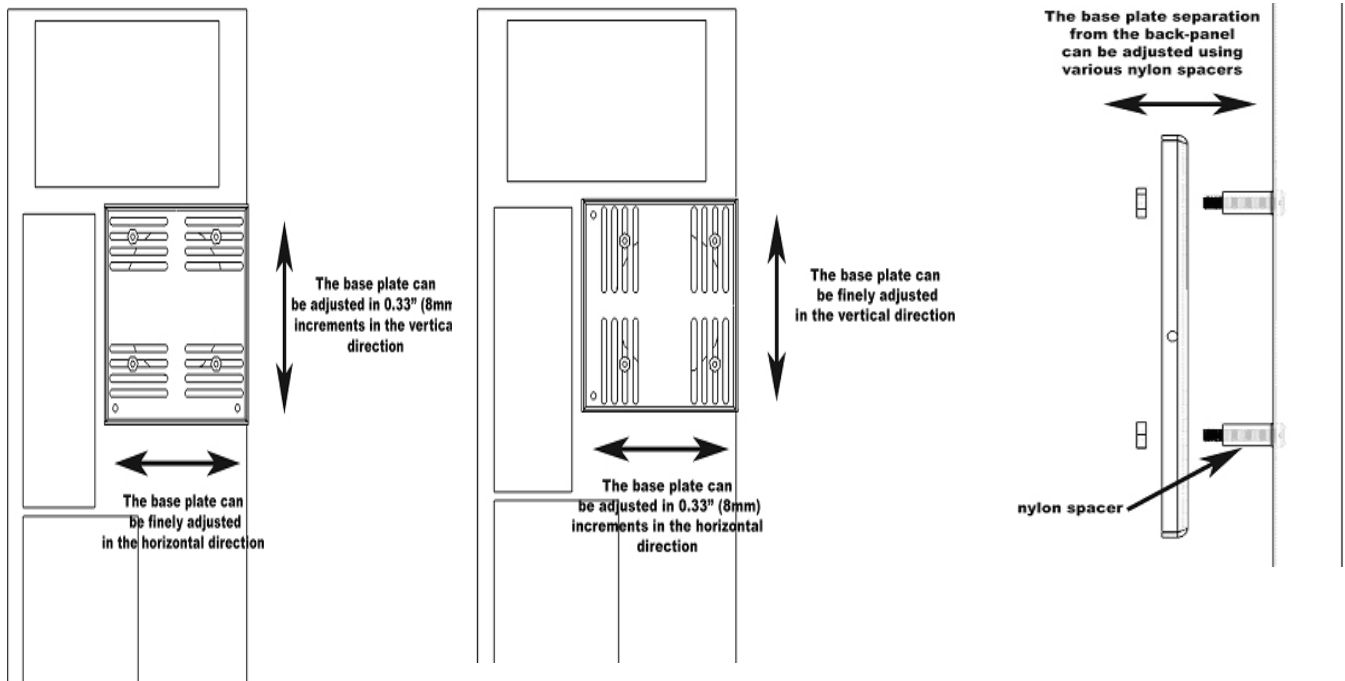
The following page shows an exploded view of a typical installation:

#### Exploded view of an installation

##### A. Securing the base plate at the desired location:







## B. Housing/Fan/Radiator installation

Once you have found a satisfactory position for the Radbox base plate, secure the housing and fan to the radiator using the provided (4) M3.5 x 30mm Philips screws. Ensure that the exit of the fan wire is positioned towards the bottom of the PC and to its left (towards the motherboard) to facilitate further routing of the wire through the PCI pass-thru.

## C. Finalizing the installation

Secure the housing/fan/radiator assembly to the base plate with the provided #4 screws. With the radiator in its final place, you can now cut two pieces of tubing of sufficient length to connect inlet and outlet of the radiator to the PCI pass-thru nipples. The tubes will form some sharp bends here, and you must wrap them with the provided Smartcoils by forming tight loops in order to prevent the tubes from kinking. Please refer to the Smartcoils installation in the following chapter for further details on how to use Smartcoils. Once done slip the tubes over their respective fittings, and secure them with the provided hose clamps.

## D. Electrical connection

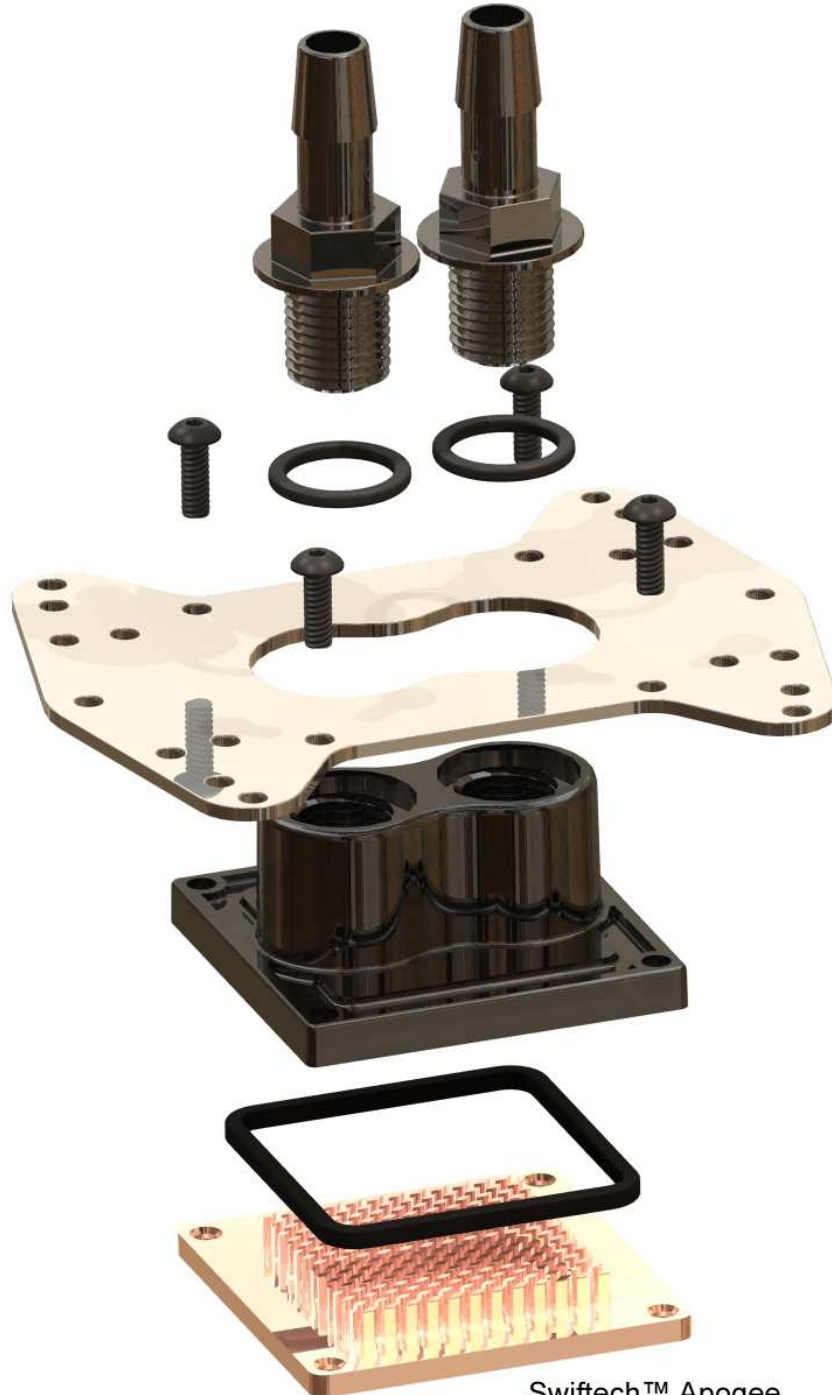
The fan shipped with the MCR120 uses a 3-pin connector. For 12volt operations, this connector can be safely installed on one of the motherboard headers. Use any free header **other than** the CPU fan header, since the pump RPM sensor will be connected to the CPU fan header in order to monitor the pump.

For low noise operations, 2 additional fan connector adapters are supplied with the kit, and should be connected to the power supply instead of a motherboard fan header:

- ❑ 12v to 7v adapter: this setting provides a good balance for performance, at whisper quiet operations
- ❑ 12v to 5v adapter: this setting is for silent operations, and will result in higher processor temperatures.
- ❑ Please consult the product page ([www.swiftech.com/products/h20-120-premium.asp](http://www.swiftech.com/products/h20-120-premium.asp)) on our web site for specific data with respect to CPU temperatures when using the 12 to 7V or 12 to 5V adapters.

**Your radiator installation is complete, and we can now move on to the water-block installation.**

One or more Patents pending



Swiftch™ Apogee  
One or more Patents Pending

Figure 1 – Exploded View

## Packing List

COMPONENT ID	COMPONENT DESCRIPTION	QTY	USAGE
BHSC006C0-007SS	6-32 X 7/16 BUT HD CAP SS	4.00	WATER-BLOCK ASSEMBLY
O-RING 3/32	B1000-133 O-RING 3/32 X 1 13/1	1.00	WATER-BLOCK ASSEMBLY
APOGEE-H	APOGEE WATERBLOCK HOUSING	1.00	WATER-BLOCK ASSEMBLY
APOGEE-BRKT	APOGEE HOLD-DOWN PLATE	1.00	WATER-BLOCK ASSEMBLY
APOGEE-BP	APOGEE BASE PLATE	1.00	WATER-BLOCK ASSEMBLY
B1000-2.5X50	BUNA-N 70D BLACK O-RING	2.00	FITTINGS
PM4S-6BN	1/4" - 1/8 NPSM TO 3/8" ID	2.00	FITTINGS
PM4S-8BN	1/4" - 1/8 NPSM TO 1/2 ID	2.00	FITTINGS
22HC04688	15/32" HOSE CLAMP	2.00	FITTINGS
22HC0672B	43/64" PREMIUM HOSE CLAMP	2.00	FITTINGS
SPRING6	SPRING FOR MCW6000-775	4.00	COMMON HARDWARE
6-32 HEX CAP	6-32 ACRON NUT	4.00	COMMON HARDWARE
12SWS0444	NYLON SHOULDER WASHER	8.00	COMMON HARDWARE
LOCKWASHER6	LOCK WASHER #6	6.00	COMMON HARDWARE
FW140X250X0215FB BLK	BLACK FIBER WASHER .140X.250X.	10.00	COMMON HARDWARE
632.112PHPMS	6X32 X 1 1/2 PHILIPS PAN HEAD	4.00	COMMON HARDWARE
6-32 NUT	6-32 NUT	4.00	COMMON HARDWARE
6-32 X 1 5/8	6-32 X 1 5/8	4.00	XEON SCREWS
WASHER-0148X0266X0040-91007A619	LOCK WASHER #6 X 0.040	4.00	AMD SOCKET 754/939/940,AM2 HARDWARE
90272A153-6-32X1.00-PHILIPS SCREW	6-32 X 1" PHILIPS SCREW	4.00	AMD SOCKET 754/939/940, AM2 HARDWARE
13RS040637	ROUND SPACER	4.00	AMD SOCKET 754/939/940,AM2 HARDWARE
APOGEE-AM2-BP	APOGEE AM2 BASE PLATE	1.00	AMD SOCKET AM2 HARDWARE
ARCTIC CÉRAMIQUE	ARCTIC CÉRAMIQUE	1.00	THERMAL COMPOUND

### ❑ Common installation guidelines

Removal of the motherboard is necessary to install the mounting posts in all cases, except for AMD® socket 754, 939, 940 and AM2.

The Apogee water-block may be installed in any direction. Simply rotate the water-block in your hand prior to fasten it to the processor when you are filling up the circuit. This will purge it from any air bubbles.

The inlet and outlet are interchangeable with respect to flow direction.

Coolant: use of distilled water is mandatory. Swiftech's HydrX coolant is recommended as an antifungal, and corrosion inhibitor.

### ❑ Step-by step summary

- ❖ Install the fittings with their o-rings into the water block. **Tighten each fitting until the flange of the fitting mates with the edge of the water-block, then lock it by adding ¼ to ½ turn. This is important to prevent leaks in the future. These fittings need to be tight.**
- ❖ Remove the existing heatsink from your motherboard.
- ❖ Apply the provided Arctic Céramique thermal compound to the CPU following the comprehensive installation instructions provided here: [http://www.arcticsilver.com/ceramique\\_instructions.htm](http://www.arcticsilver.com/ceramique_instructions.htm).
- ❖ Install the Apogee water-block following the individual installation schematics for each type of CPU socket provided hereafter.
- ❖ Connect the tubing to the water-block hose-barbs. Use the provided hose-clamps to secure the tubing to the barbs.

### ❑ Individual installation schematics

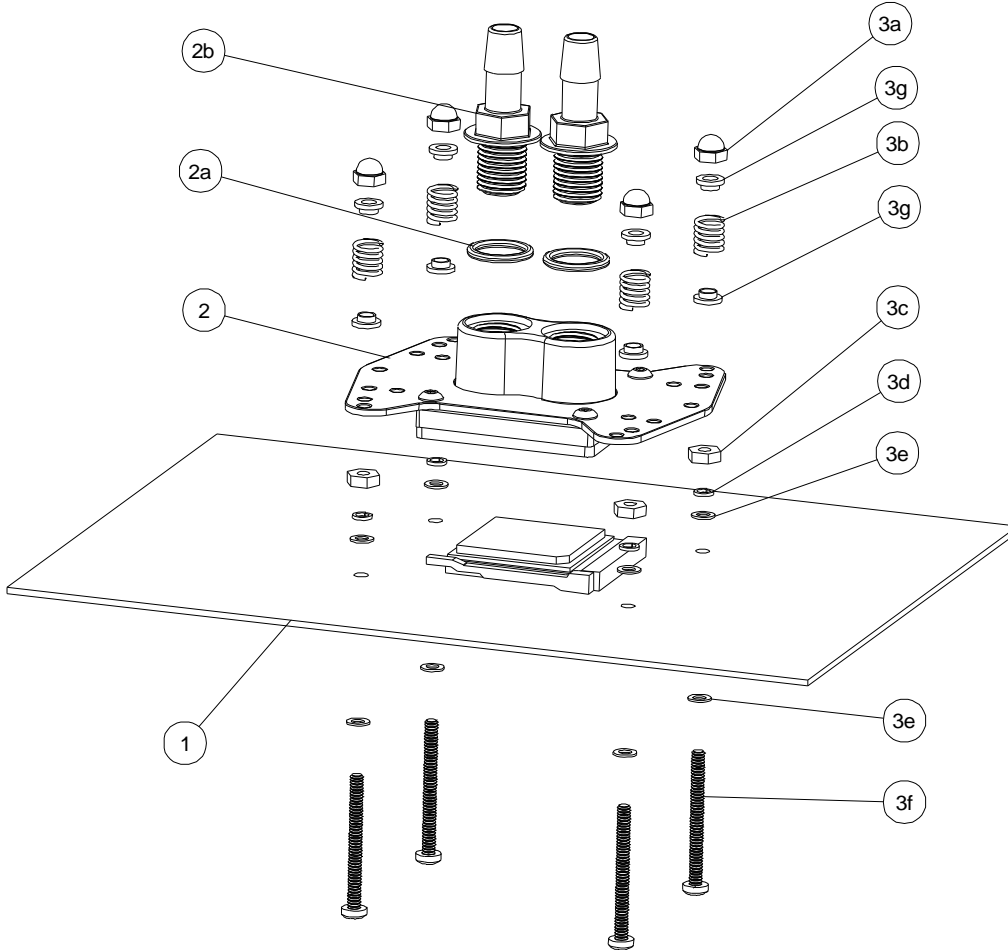
The provided mounting hardware is common to Intel® Pentium® 4 socket 478, socket LGA775, and AMD® socket 462. AMD® socket 754, 939, 940 & AM2 mounting hardware are identified in separate packs, as well as Intel® Xeon hardware.

**Please flip thru the following pages to find the type of processor & socket that you will be installing your water-block onto. Once installation is done, set aside the motherboard with the installed water-block, and proceed with the installation of the reservoir.**

# Intel® Pentium® 4 Socket 478

**Use hardware from the “common pack”**

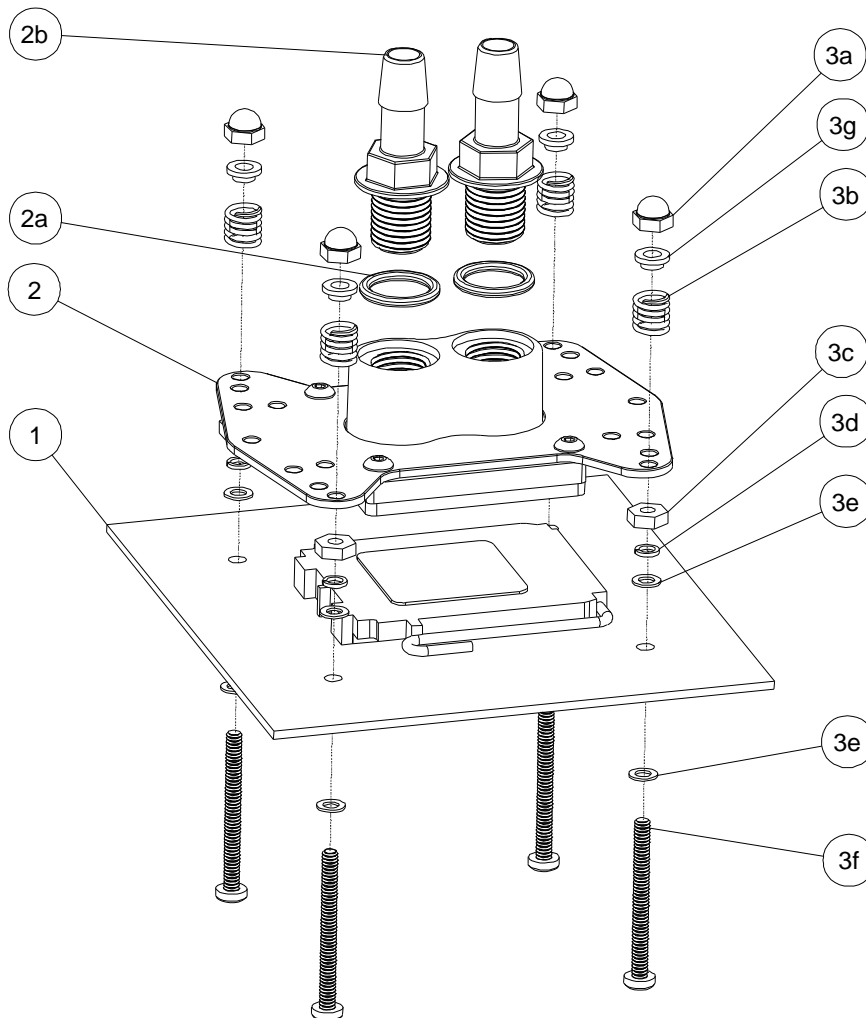
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	S478	Intel Pentium 4 socket 478 motherboard and processor	1
2	apogee-assy		1
	APOGEE-H	Housing	1
	APOGEE-BP	Base Plate	1
	APOGEE-BRCKT	Universal hold-down plate	1
2a	O-RING-9557K473	1-4" NPSM barb fitting O-Ring	2
2b	1-4-straightx3-8-barb	1/4" NPSM X 3/8" Barb fitting	2
3	APOGEE-P4S478--HARDWARE		4 x
3a	6-32-Acorn-nut	6-32 Acorn nut	1
3b	70927-368	Spring	1
3c	6-32-nut	6-32 nut	1
3d	LOCK-WASHER#6	#6 lock washer	1
3e	FW140X250X0215FB BLK	black fiber washer	2
3f	91772A157-6-32x1.5	6-32 x 1 1/2" philips screw	1
3g	12SWS0444	NYLON SHOULDER WASHER	2



## Intel® Pentium® 4 and Pentium® D Socket LGA 775

**Use hardware from the “common pack”**

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	LPGA 775	Motherboard	1
2	apogee-assy 92949A149		1
	O-RING-9557K473	1-4" NPSM barb fitting O-Ring	2
2a	1-4-straightx3-8-barb	1/4" NPSM X 3/8" Barb fitting	2
2b	O-RING_3-32	B1000-133 O-RING 3/32 X 1 13/1	1
	APOGEE-H	Housing	1
	APOGEE-BP	Base Plate	1
	APOGEE-BRCKT	Universal hold-down plate	1
3	APOGEE-775-HARDWARE		4 x
3a	6-32-Acorn-nut	Acorn nut	1
3b	SPRING6	spring	1
3c	6-32-nut	6-32 nut	1
3d	LOCK-WASHER#6	Lock washer	1
3e	FW140X250X0215FB BLK	black fiber washer	2
3f	91772A157-6-32x1.5	Philips screw 6-32 x 1 1/2	1
3g	12SWS0444	NYLON SHOULDER WASHER	1

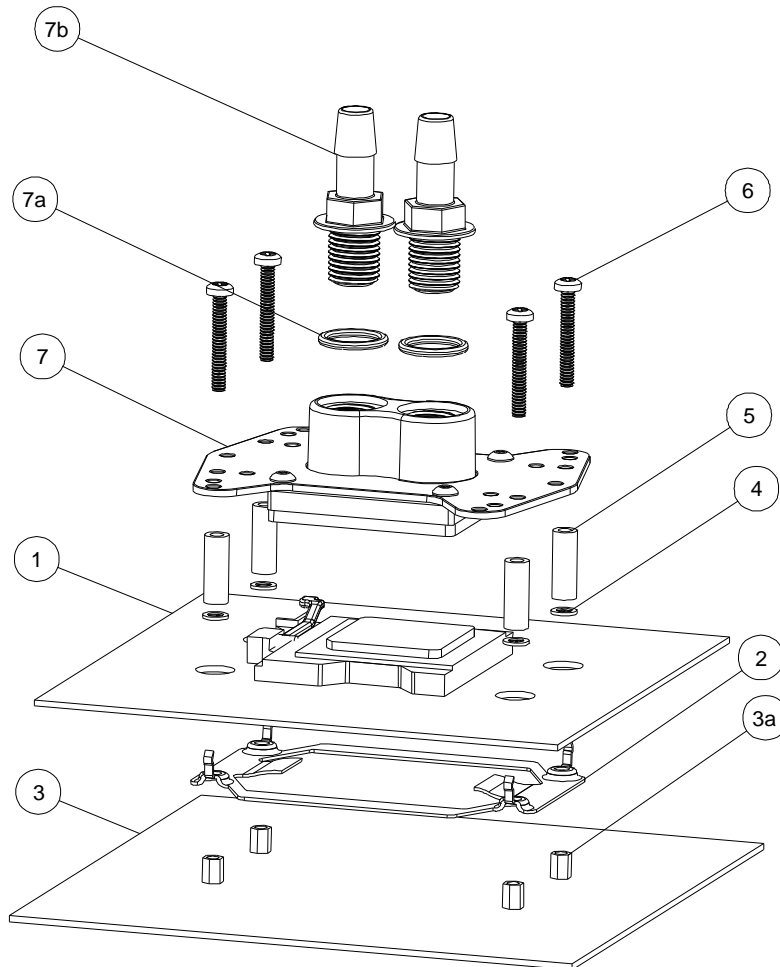




## Intel® Xeon™ Socket 604 & 771 800 MHz FSB motherboards

**Use Intel Xeon “Nocona” separate hardware.**

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	Nocona board mockup	Motherboard	1
2	spring-backplate	retention spring (provided by motherboard vendors)	1
3	chassis		1
3a	STANDOFF-0.187		4
4	4-40 nylon retaining washer	4-40 nylon retaining washer	4
5	SPACER-13LTS2501400697	Apogee - Nocona nylon spacer	4
6	90272A153-6-32x1-philips	6-32 x 1" Philips zinc plated screw	4
7	apogee-assy		1
	APOGEE-H	Housing	1
	APOGEE-BP	Base Plate	1
	APOGEE-BRCKT	Universal hold-down plate	1
7a	O-RING-9557K473	1-4" NPSM barb fitting O-Ring	2
7b	1-4-straightx3-8-barb	1/4" NPSM X 3/8" Barb fitting	2

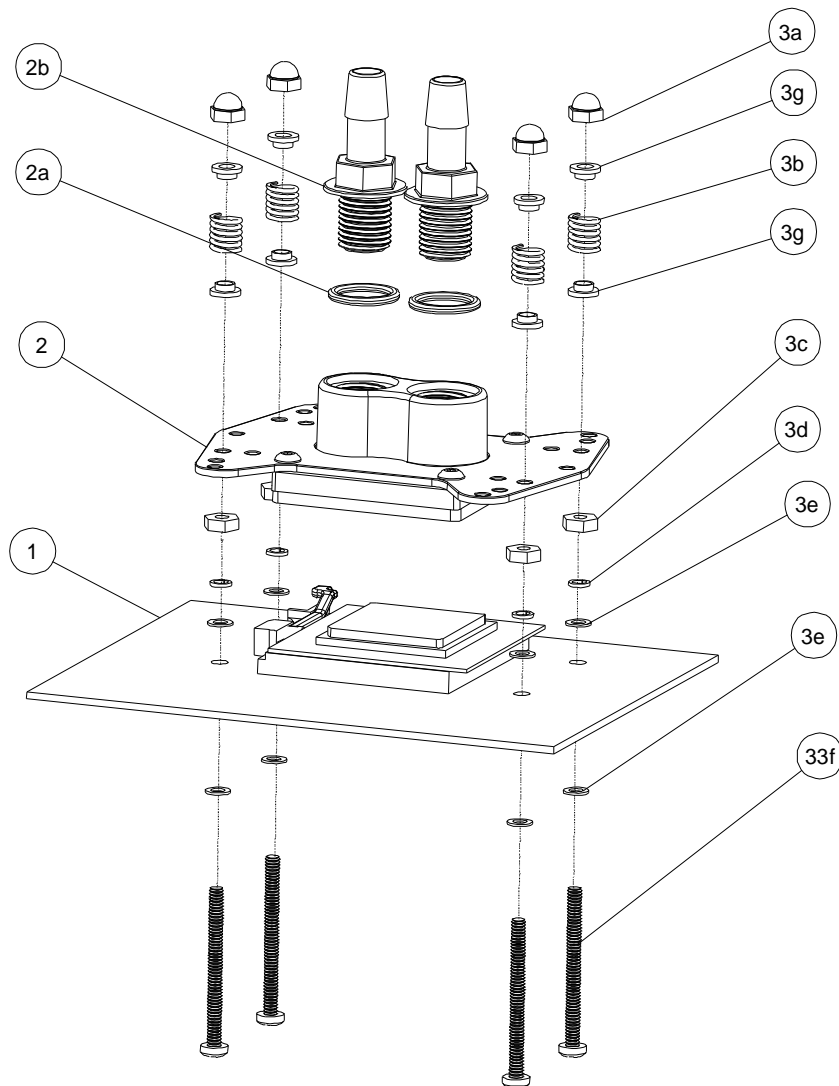


Note to dual processor users: since the Apex Ultra is provided with one Waterblock only, you will need to procure another Apogee Waterblock separately for your second processor. Please note that the “Nocona” hardware is not included with the Apogee Waterblock and also needs to be procured separately under part number: AP-NC604 (\$3.00)

## Intel® Xeon™ Socket 603/604 400 and 533 MHz FSB motherboards

**Use all parts from “common parts pack” except Philips screws: replace with the enclosed 6-32 1 5/8” long screws, instead of the 1 1/2” long screws supplied in the common parts pack.**

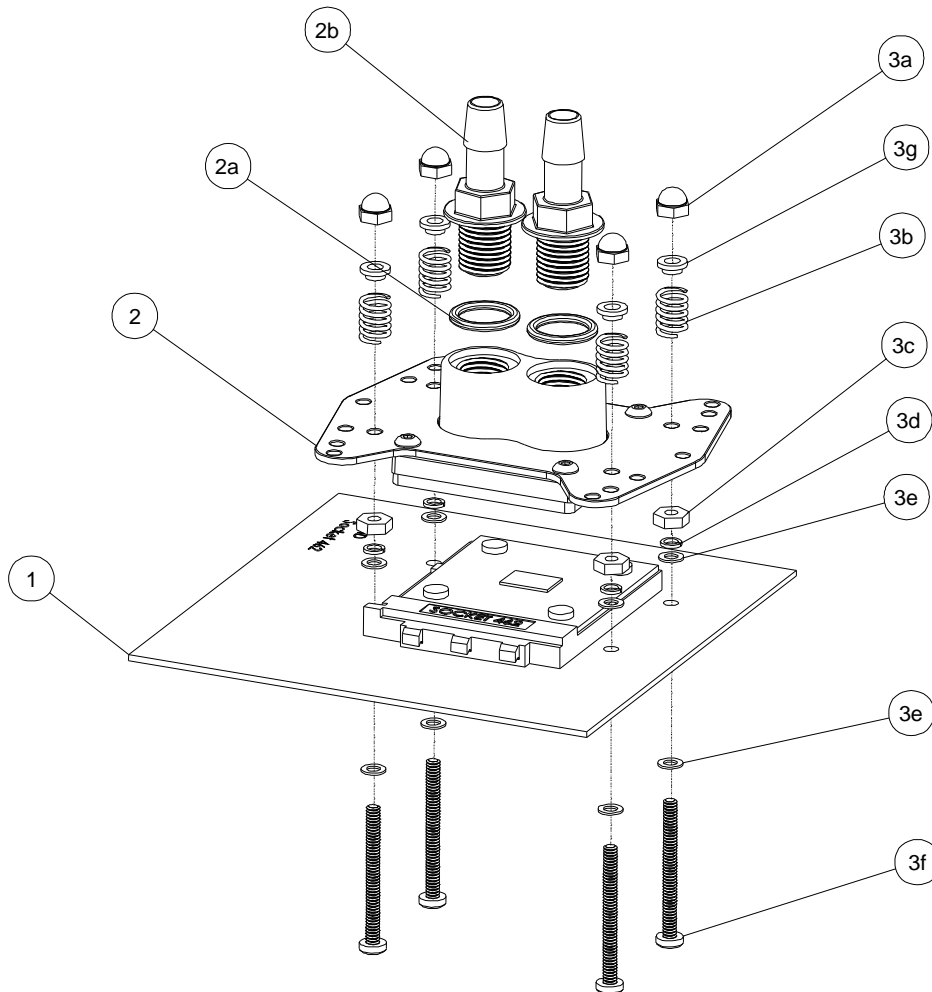
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	Socket-603-604	Motherboard	1
2	apogee-assy		1
	APOGEE-H	Housing	1
	APOGEE-BP	Base Plate	1
	APOGEE-BRCKT	Universal hold-down plate	1
2a	O-RING-9557K473	1-4" NPSM barb fitting O-Ring	2
2b	1-4-straightx3-8-barb	1/4" NPSM X 3/8" Barb fitting	2
3	APOGEE-XEON-HARDWARE		4 x
3a	6-32-Acorn-nut	6-32 Acorn nut	1
3b	SPRING6	Spring	1
3c	6-32-nut	6-32 nut	1
3d	LOCK-WASHER#6	#6 lock washer	1
3e	FW140X250X0215FB BLK	black fiber washer	2
3f	6-32X1.5-8	6-32 x 1 5/8" philips screw	1
3g	12SWS0444	NYLON SHOULDER WASHER	2



# AMD® Athlon®, Duron®, MP, XP, Sempron® Socket 462

**Use common hardware pack.**  
**Compatibility: Exclusively compatible with motherboards featuring mounting holes around the socket.**

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	socket462	Motherboard and CPU assy.	1
2	apogee-assy	Waterblock	1
	92949A149	6-32 X 3/8" PHILIPS	4
2a	O-RING-9557K473	1-4" NPSM barb fitting O-Ring	2
2b	1-4-straightx3-8-barb	1/4" NPSM X 3/8" Barb fitting	2
	APOGEE-H	Housing	1
	APOGEE-BP	Base Plate	1
	APOGEE-BRCKT	Universal hold-down plate	1
3	APOGEE-462-HARDWARE		4 x
3a	6-32-Acorn-nut	Acorn nut	1
3b	SPRING6	Spring	1
3c	6-32-nut	Hex Nut	1
3d	LOCK-WASHER#6	Lock washer	1
3e	FW140X250X0215FB BLK	Ffiber washer	2
3f	91772A157-6-32x1.5	6-32 x 1 1/2 philips screw	1
3g	12SWS0444	Nylon shoulder washer	1

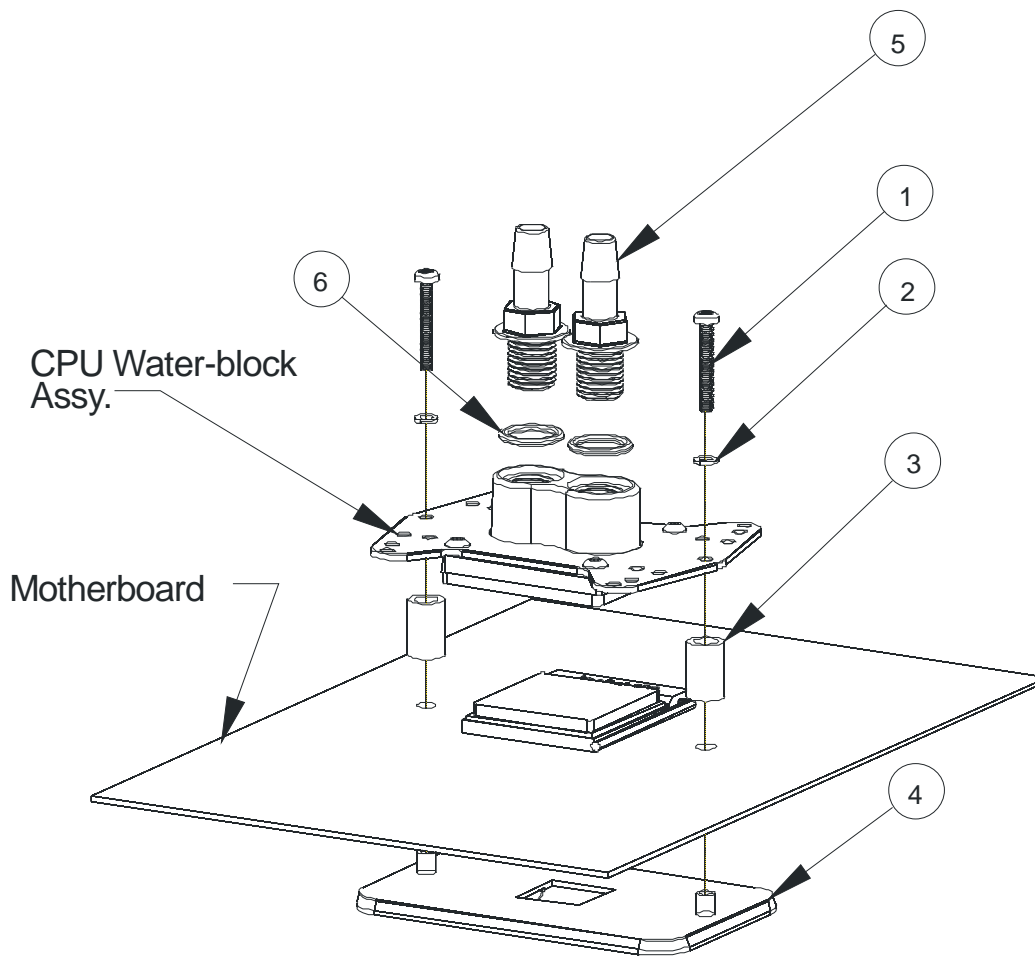


“An additional part is available in order to work with motherboards with high density of capacitors around the socket”.  
 Article # AP-S462-R

**AMD® 64, Sempron®, Opteron®  
Socket 754, 939, 940**

**Use separate AMD 754/939/940 hardware pack**

ITEM NO.	PART NUMBER	DESCRIPTION	QTY
1	90272A153-6-32x1.00-philips	6-32 x 1" Philips screw	2
2	washer-0148x0266x0040-91007A619	Lock Washer #6 x 0.040	2
3	13RS040637	Nylon spacer for Apogee K8 assy	2
4	AJ00264	Motherboard Back plate (not provided)	1
5	1-4-NPSMx3-8-barb	1/4" NPSM X 3/8" Barb fitting	2
6	O-RING-9557K473	1-4" NPSM barb fitting O-Ring	2



## AMD® 64, FX, X2, Sempron®, Socket AM2

The Apogee water-block ships pre-installed with the multi-socket hold-down plate. In order to install your Apogee with AMD's AM2 socket, you will need to remove the existing hold-down plate first and replace it with the AM2 model as follows:



Step 1: loosen all 4 screws using the included hex key, and set aside the standard hold-down plate.

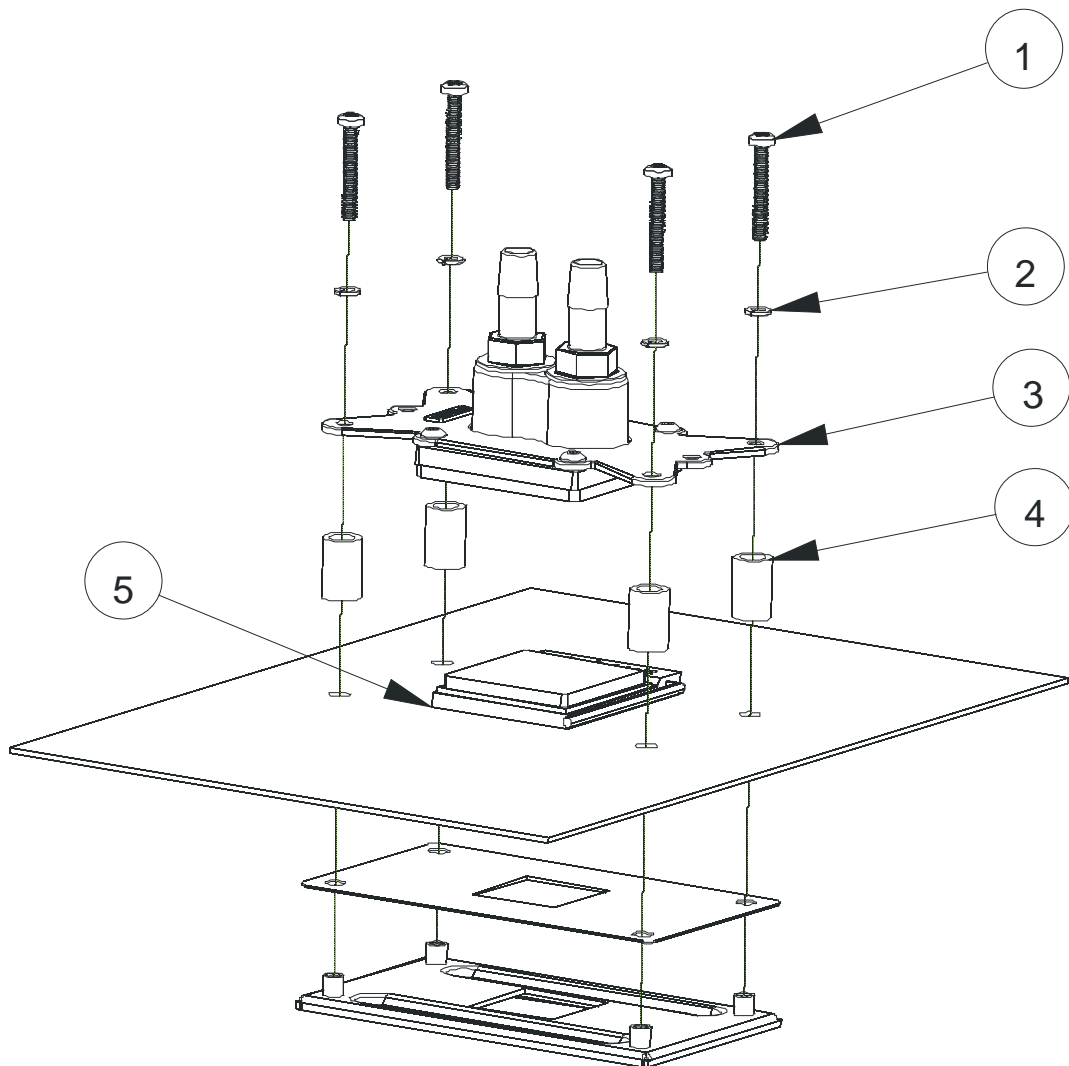


Step 2: place the AM2 hold-down plate on the Apogee body, and fasten all four screws in cross pattern.

You can now use your Apogee with AM2 socket motherboards. Please read the common, and step by step installation guidelines on page 11, then continue the installation as shown in the schematic hereafter.



ITEM	PART NUMBER	DESCRIPTION	QTY
1	90272A153-6-32x1.00-philips	Philips screw	4
2	washer-0148x0266x0040-91007A619	Lock Washer #6 x 0.040	4
3	apogee-assy-AM2		1
4	13RS040637	Nylon spacer for Apogee K8 assy	4
5	SOCKET AM2		1



### 3 MCRES-MICRO RESERVOIR INSTALLATION

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	MCRES-MICRO	Reservoir	1
2	1-4" NPSM x 3-8" and 1-2" barb	Barb fitting	2 pairs each
3	O-RING-9557K473	Barb fitting O-Ring	2
4	pg7-o-ring	Fill-cap o-ring	1
5	pg7-plug	Pg7 Fill-cap	1
6	MOUNTING HARDWARE		3
6a	90272A152-6-32x0500philips	6-32 x 7/8" (22mm) Philips screw	1
6b	90760A007	6-32 Nut	1
6c	washer-91007A614	Lock Washer	1
6d	WASHER-RUBBER-437X150X092	Rubber Washer	1
7	panel		1

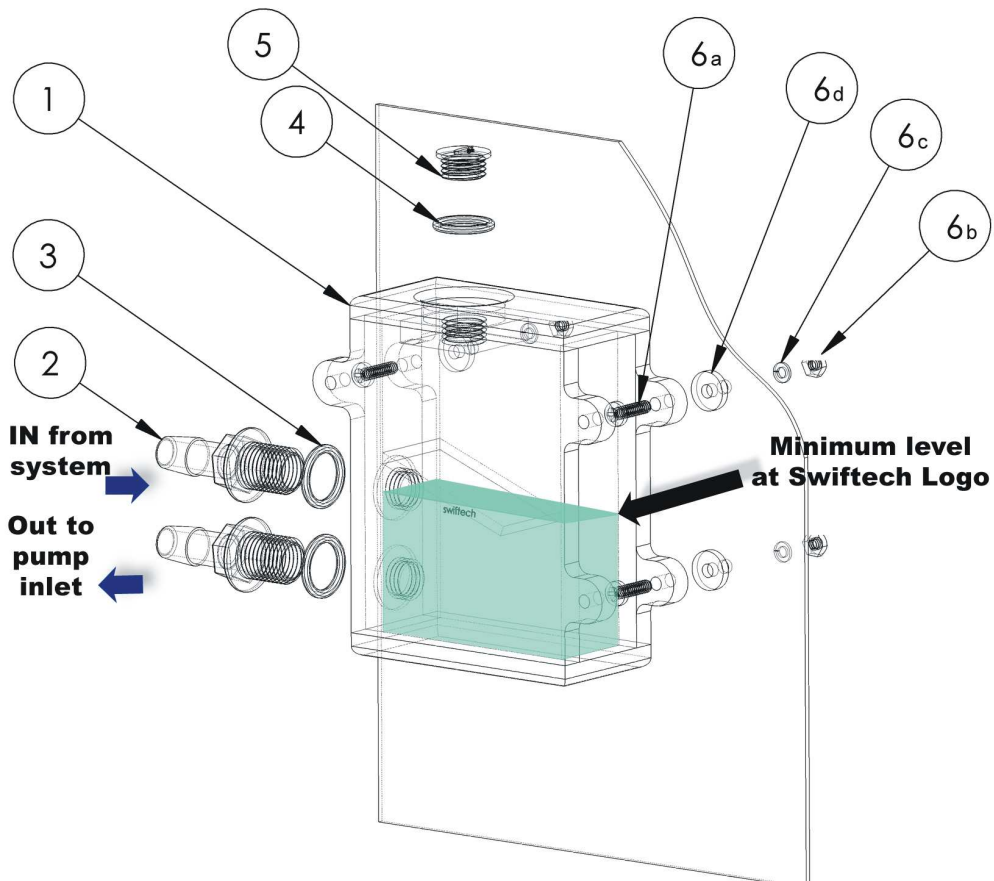


Figure 1

## Product Description

The MCRES-MICRO is a small form factor reservoir designed for liquid-cooled personal computers.

The device features two 1/4" NPSM threaded ports and a Pg7 fill-port

The port usage is defined as follows:

- ❑ Upper port: "In from system" shown in figure 1 is the return line from the system
- ❑ Lower port: "Out to pump inlet" shown in figure 1 should be connected to the pump inlet.
- ❑ The fill-port located on top of the unit is used to fill it up with coolant, and sealed with a Pg7 plug.

### ❑ Installation

The MCRES-MICRO can be installed in any suitable location meeting its form factor requirements. For filling purposes, it is preferable to install the MCRES-MICRO at the highest point of the liquid cooling loop.

Fastening the device to the case: two mounting methods can be used

- ❑ Permanent mount with the provided mounting hardware as shown in figure 1 page 1, and various examples on page 3.
- ❑ Easy mount, with the provided Velcro strips. Please note that a permanent mount is recommended for a reliable fastening of the device over time.

### ❑ Recommended coolant, and prohibited fluids

We recommend using distilled water with a 5% (or up to 10%) of Swiftech's HydrX coolant.

**Use of alcohols (Alcohol Allyl, Amyl, Benzyl, Ethyl (Ethanol), Isopropyl, Methyl (Methanol), n-Butyl) or antifreeze products containing the listed alcohols is prohibited as it will result in deterioration of the product over-time, and will void your warranty.** Resistance to Ethylene and Methylene glycol used in antifreeze products is excellent.

**Minimum Operating Level** is situated at the Swiftech Logo (approximately 1/2" of the reservoir). The reservoir should not be operated below this level, which could result in degradation of the system cooling.

### ❑ Bracketry

A set of brackets is included with the reservoir in order to facilitate installation. Please refer to the next page for various configurations.

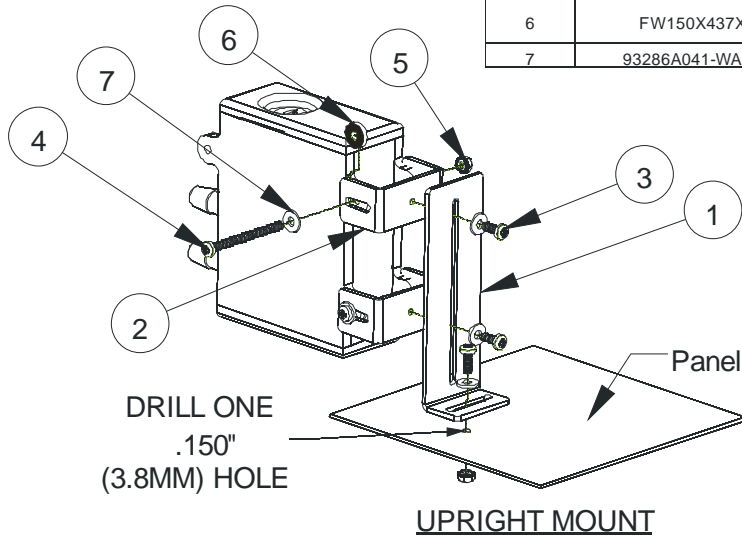
### ❑ Installation precautions

**CRITICAL: make sure that the discharge line (called "Out to pump inlet" in the schematic) will be directly connected to the INLET of the pump.** In other words, the pump (inlet) should be the first device connected to the reservoir discharge. Using a different routing will make the filling and bleeding of the circuit difficult, and may prevent the pump to prime properly.

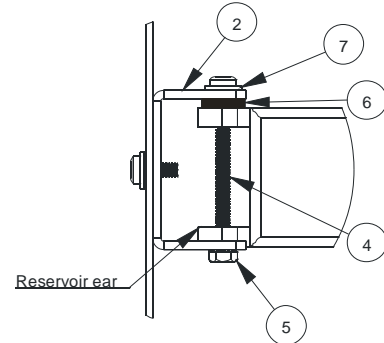
**CRITICAL: Tighten each fitting until the flange of the fitting mates with the flat of the reservoir, then lock it by adding 1/4 to 1/2 turn. This is important to prevent leaks in the future. These fittings need to be tight!**

# MCRes Micro Bracketry installation and examples

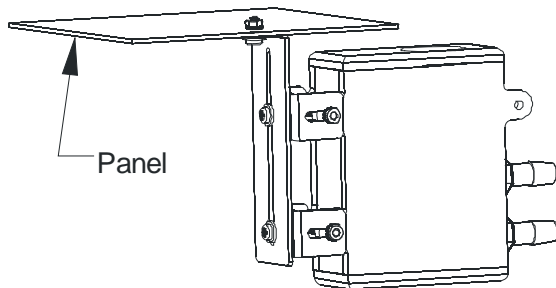
ITEM NO.	PART NUMBER	DESCRIPTION	QTY
1	BCKT1	"L" bracket	1
2	BCKT2	"U" bracket	2
3	90272A146-6-32x3-8-philips	6-32 x 3/8" Philips screw	3
4	91772A158-6-32X1.75	6-32 x 1 3/4" Philips screw	2
5	90760A007	6-32 Nut w/teeth washer	3
6	FW150X437X092	Rubber Washer 437X150X092	2
7	93286A041-WASHER	zinc plated washer	5



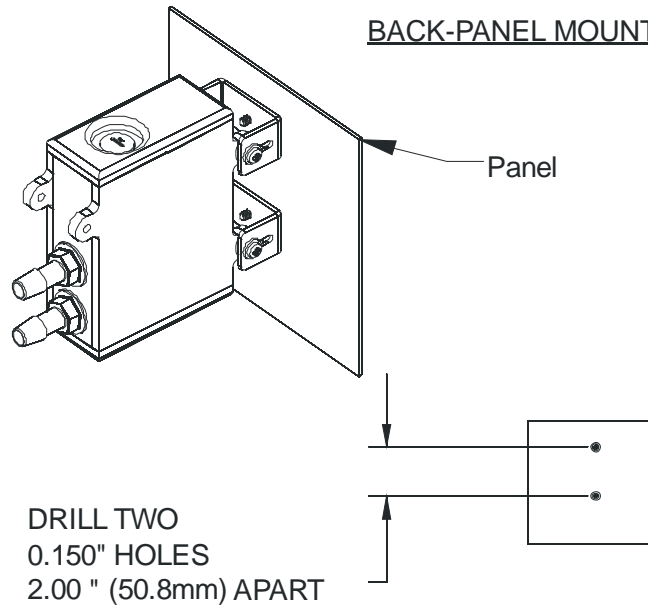
Note 1: rubber washer 6 should be inserted between either side of the reservoir ear and the U bracket 2.



## HANGING MOUNT



## BACK-PANEL MOUNT



Note 2: the 6-32 x 1 3/4" screw #4 & nut #5 assembly is designed to protrude as little as possible in order to reduce overall clearance necessary for the Micro Res assembly. It is thus necessary to slightly push the nut in order to engage it on the screw thread.

#### □ General Use

The MCP350™ pump is a magnetically driven centrifugal pump featuring a 12 V DC brushless motor. It requires no maintenance when used with de-mineralized water and the appropriate anti-fungal additives. We recommend using 5 to 10% Swiftech's HydrX™ as an additive. The pump is designed to be connected to your computer power supply using the standard Molex 4 pin connectors, and also features a second wire equipped with a 3-pin connector designed to connect to a motherboard fan header, and to report the impeller rotational speed (RPM sensor).

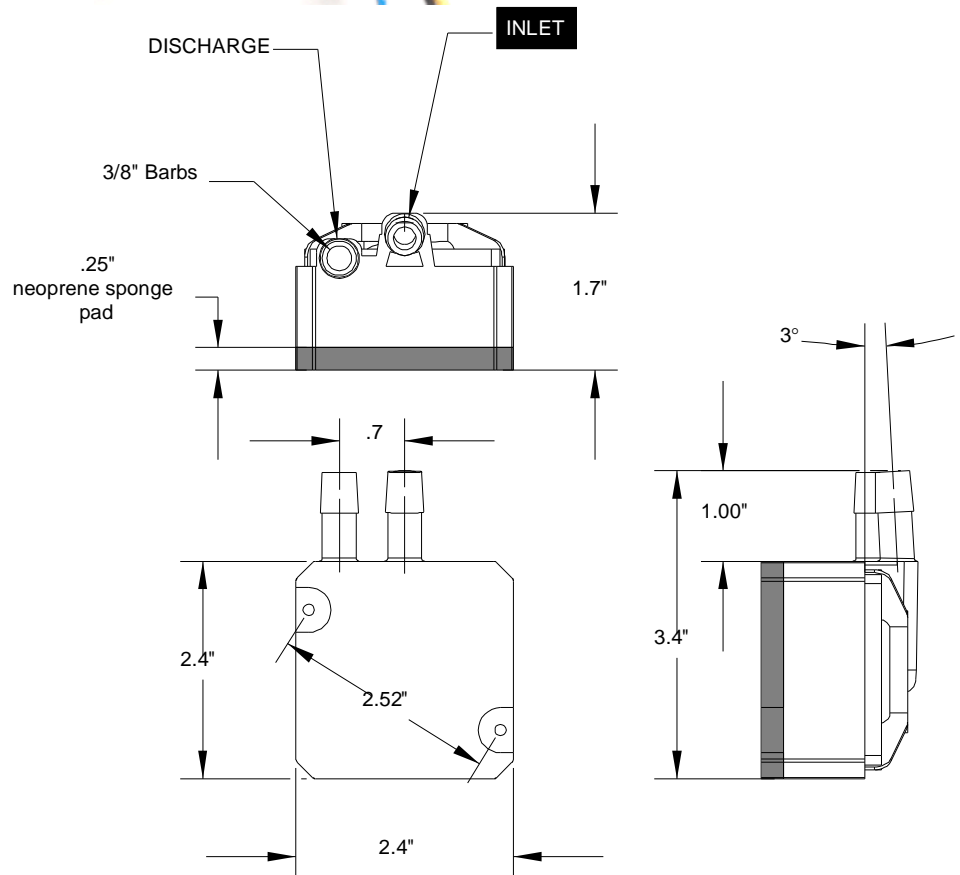
#### □ Physical installation

Determine the best location for your pump by observing how the tubing will be routed to the rest of the circuit: sharp bends in the tubing should always be avoided to prevent kinks, which will reduce or completely prevent flow of the cooling fluid. In general, we recommend installation of the pump at the bottom of the chassis. The base of the pump features a soft neoprene pad coated with strong adhesive material. Once an appropriate location for the pump has been determined, simply peel-off the pad's protective paper, and press the pump against the chassis surface. The surface should be clean, and non greasy. Screws & grommets are also provided for permanent installation, and require drilling holes in the chassis (see permanent installation in the following page).

#### □ Pump installation & operating precautions:

**The MCP350™ pump should never be run dry, even for a quick test.** You should always prime the pump with fluid before you start operating it. **With filled lines, turn the inlet/outlets upward to ensure there is no air bubble in the impeller.**

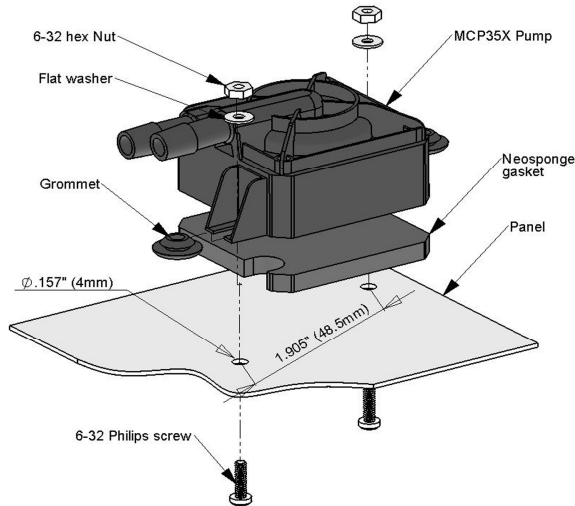
**Use of coloring die or fluorescent additives** containing particulate fillers will cause excessive wear to the pump's impeller bearing.



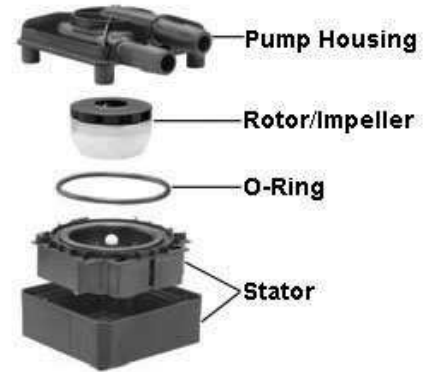


**❑ Permanent Installation**

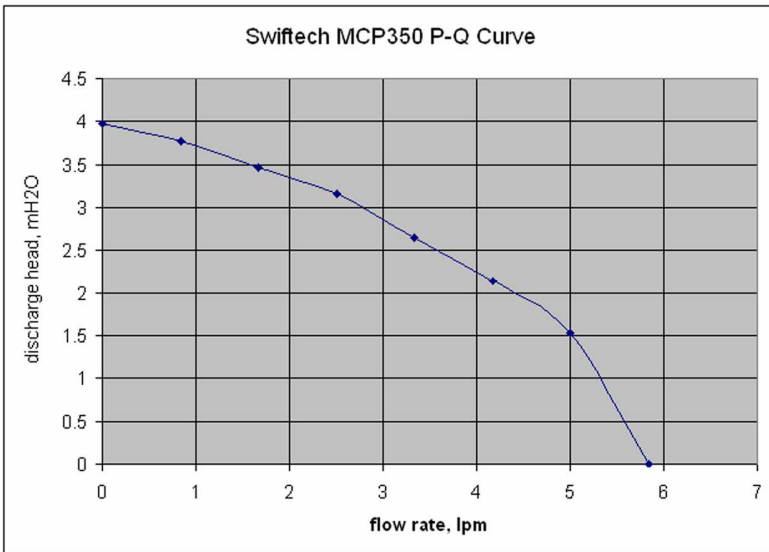
Drill two 0.312" (8mm) holes into panel, 2.52" (64mm) apart. Snap grommet into each hole. Tighten the provided screws until the pump neoprene pad is slightly and evenly compressed by approximately 1/8" (2~3mm) or less.



Exploded view



**❑ Performance & Specifications**



Nominal voltage	12 V DC
Operating voltage range	9 to 13.2 VDC
Nominal power (@ 12 V)	8.3 W
Nominal current (@ 12 V)	.69 amps
Motor type	Electronically commutated, brushless DC, spherical motor
Nominal hWith the ead (@ 12 V)	13.05 ft (4 m)
Nominal discharge (@ 12 V)	~ 92.4 GPH (350 LPH)
Connection size	3/8" barbs (10mm)
Maximum pressure	22 PSI (1.5 BAR)
Temperature range	Up to 140°F (60°C)
Electrical connector	Molex 4 pin
Weight	7.3 oz (207 gr.)
Our noise measurement (non lab environment)	24 ~ 26 dBA in a quiet room @ 2'
MTBF (Mean Time Between Failures)	50,000 Hours
RPM sensor	3-pin connector

**5 RE-INSTALLING THE MOTHERBOARD**

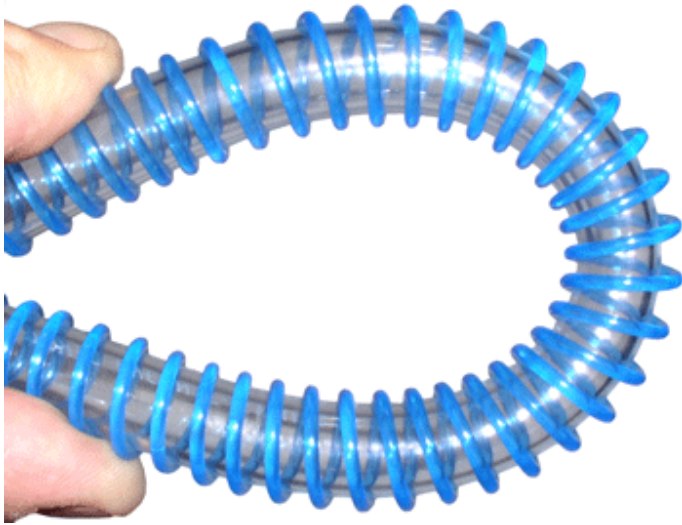
With your radiator, pump and reservoir installed, it is now time to re-install the motherboard into your case. Please follow the motherboard manufacturer instructions to this effect. **DO NOT CONNECT THE POWER TO THE MOTHERBOARD AT THIS TIME!** Power to the motherboard should ONLY be connected once the system has been fully tested for leaks.

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 Rouchon Industries, Inc., dba Swiftech – 3400 Industry ave., suite 104, Lakewood, CA 90712 – Tel. 562-595-8009 – Fax 562-595-8769 - E Mail: help@swiftnets.com

## 6 PREPARING THE TUBING

Now that your radiator, water-block, pump and reservoir are ready, it is time to cut segments of tubing and connect the elements of the cooling system together.

In addition to the supplied high quality vinyl tubing, your kit also comes with a 40" length of Smartcoils which, when extended provides a sufficient length to wrap 6 feet of tubing. Use of these coils is **mandatory** in order to prevent kinking and flattening of the tube over time.



*Example of wrapping for a tight bend. (shown with the blue version for picture clarity – The kit actually comes with clear coils).*

Tight radii sections require that coils be close to each other (1/8" spacing coil to coil). In straight sections, coils can be spaced up to 1/4" or more, coil-to-coil.

Gather the Smartcoils towards the center of the tubing, and then pull on the ends of the tubing. This will allow the coils to expand to their natural pitch.

Another technique to evenly spread the coils along the tubing consists in pushing one of the extremities of the coil clockwise. This will loosen the coils from around the tube, and allow you to spread them easily.

Then, with one end of a tube connected to a startup component such as the water-block for example, roughly estimate the length that you will need to the next component, and cut the tube and coil squarely with a pair of scissors. Work your way through the entire circuit in the same fashion, until you are satisfied with the tube routing.

- ❑ Once everything is connected, you should then adjust the Smartcoils coil spacing: adjust to a wide space between each coil (up to 1/4" or more if needed) when the tube is straight, and very close to each other in tight bends (approximately 1/8<sup>th</sup> of an inch or less).
- ❑ With everything in place, carefully double-check each connection. If it all looks tight and secure proceed to the next step.

**TIP!** Verify that each cooler will 'hang' naturally in very close to its mounted position. If the stiffness of the tubing, or the tight radius of the necessary bend, will not permit such, then it may be necessary to externally support the tubing: typically some strategically placed cable ties will facilitate this restraint. This precaution is particularly important with AMD® K7 class processors, but less so with Intel® Pentium® 4, Xeon, or AMD® K8 class processors.

## 7 PREPARING THE COOLANT

Your kit comes with a 2 Oz (60ml) bottle of Swiftech's specially formulated HydrX™ concentrated coolant. The product should be mixed with distilled water only. Simply empty the concentrated coolant into a 33 fl oz (1 liter) plastic bottle, and complete filling with distilled water. Your coolant is now ready. Note: a 5% mix might still allow some algae formation over prolonged usage if your system is continuously exposed to daylight (such as a clear acrylic case for example). Under such circumstances, we would suggest using a 10% mix (1 bottle for ½ liter)

**Use of alcohols (Alcohol Allyl, Amyl, Benzyl, Ethyl (Ethanol), Isopropyl, Methyl (Methanol), n-Butyl) or antifreeze products containing the listed alcohols is prohibited as it will result in deterioration of the reservoir over-time, and will void your warranty.** Resistance to Ethylene and Methylene glycol used in antifreeze products is excellent.

## 8 FILLING-UP THE CIRCUIT

Simply pour the coolant that you prepared into the reservoir – **carefully to avoid spills**, allowing the circuit to fill-up by simple gravity. Note: for the gravity to take effect the reservoir should be placed or held at the highest point of the cooling circuit. Once the reservoir is full, seal the fill port back with its cap in order to avoid any spills, and start-up the pump (see Note in chapter 9 below on how to startup the pump). The reservoir will quickly (within 1 second) empty itself. Immediately turn off the pump, top-off the fluid to the maximum level, and restart the pump. You need to repeat this operation 2 to 3 times, until the circuit is finally full of coolant. Then, allow the system to run 10 minutes uninterrupted to clear all the micro-bubbles and foam, and finally top-off the level one last time. Your liquid cooling circuit is now ready.

Allow the system to run for (3) hours and frequently inspect all your connections for possible leaks before you reconnect and re-install all your components (motherboard, hard drives, etc.)

**The Minimum Operating Level** is situated at the Swiftech Logo (approximately ½” of the reservoir). The reservoir should not be operated below this level, which could result in degradation of the system cooling.

## 9 NOTES AND TROUBLESHOOTING

**While filling up the reservoir, the pump discharge tube does not fill-up with fluid:** this will prevent the pump from priming and circulate the liquid thru the circuit. It means that there is a significant pocket of air trapped in the circuit, preventing the fluid to rise up to the pump discharge spigot. Make sure that your reservoir inlet and outlet barbs are oriented upwards. If your installation required that the reservoir be mounted upside-down, temporarily dismount it from the chassis, this will allow the air to escape and travel up to the reservoir. If you are using Swiftech's "Radbox" simply remove the 4 screws from the half shell and rotate the reservoir until the filling procedure is complete, then re-attach the radiator/fan/half shell assembly to the Radbox base.

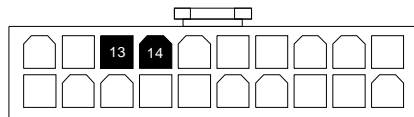
### **Air keeps circulating into the circuit, long after the pump has primed:**

There is a significant pocket of air trapped into the circuit, check the radiator as indicated above, and/or the water-block. The fluid level is too low: top-off the reservoir to the appropriate level.

One of the components connections is loose, or improperly tightened: Inspect each connection for traces of moisture, and tighten all worm-drive clamps, and various connections in the circuit.

### **Note - Starting the Power Supply when the motherboard is not connected**

While the Internet contains numerous references on how to use a paper-clip to short-out pin 13 (GND - BLACK) and 14 (PS-ON – GREEN) of the 20 pin ATX connector as shown below, we nonetheless recommend instead using a power-supply tester. A wide variety of these common devices are available on the Internet (**Google** key word: "PSU tester"), and among Swiftech resellers ([www.frozencpu.com](http://www.frozencpu.com), [www.Directron.com](http://www.Directron.com), [www.newegg.com](http://www.newegg.com), etc.).



## 10 COMPLETING THE INSTALLATION

Once your system has been fully tested for leaks, you may complete all the electrical and data connections to the motherboard, Hard Drives, CD Roms, etc..

# INSTALLATION COMPLETE!

## III. DRAINING THE SYSTEM

- Disconnect the PC from AC power
- You will need to disconnect a line from one of the lowermost components. Procure a bucket large enough to receive approximately 1 liter of fluid, and place the bucket underneath the connection that you intend to "break". Disconnect the line, and place both ends into the bucket.
- Open up the fill-cap from the MCRES-1000P. This will allow most of the fluid to escape.
- A cleaner and much more convenient method consists in incorporating a drain assembly into the circuit during initial installation. See [TV500](#) drain assembly below.

## IV. PERIODIC MAINTENANCE

- Every 6 months: dust off the radiator fins and fan. You can use a can of compressed air for example, available in most electronic supply stores. If you live in a very dusty area, you should perform this task at closer intervals. It is essential to maintain the optimum performance of your cooling system.
- Inspect the level of liquid inside the circuit, and refill if necessary. Evaporation in this closed circuit is limited, but still present due to permeability in the vinyl lines. Typical time between refills varies from 12 to 18 months.

## V. ADD-ON COMPONENTS

Improve performance with a second radiator:  
MCR120-FK Radiator assembly



Part # MCR120-FK, includes radiator, 120mm fan and mounting screws

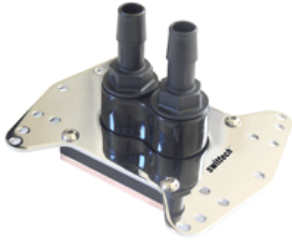


Cool your graphics card with the MCW60 VGA water-block.

Go to: <http://www.swiftnets.com/products/mcw60.asp> for specifications

Part # MCW60

Add a second [Apogee](#) water block for multiprocessor applications, such as dual AMD®, dual Xeon™, or dual Opteron™



Cool the chipset with the [MCW30](#) chipset cooler

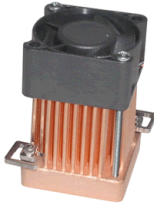


For Dual Xeon “Nocona” users do not forget to add the optional Nocona hardware (part AP-NC604) when you purchase your second Apogee water-block. In effect, while this hardware is included in this kit, it is not included when the Apogee water-block is sold separately.



Cool the VGA memory with the [MCW-Ramcool](#)  
Go to: <http://www.swiftech.com/products/mcwrcool.asp>

When heat loads are not “out of control” air-cooling does the job just fine. Check out the heavy-duty air-cooled solutions below for your chipset and graphics memory.



Cool your chipset with the MCX159-CU whisper-quiet heatsink.  
Go to <http://www.swiftnets.com/products/mcx159-CU.asp> for specifications

Cool your graphics memory chips with the MC14 BGA heatsinks  
Go to: <http://www.swiftnets.com/products/MC14.asp>  
Part # MC14

Part # MCX159-CU

#### TV500 Drain assembly

1/2" (Tube OD) Flush Assembly, including 1/2" Tube quick-connect T, and 1/2" quick-connect ball valve. A useful accessory for users who empty their system often. Can also be used as a fill T (without reservoir).

