

H2O-220-T
Thermoelectric Cooling kit

TUTORIAL & INSTALLATION GUIDE

Water
cooling
Swifttech

manufacturer of the world's best active coolers

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

Packing List

Included components check-marked per applicable model:
H20-220-PT H20-220-775T H20-220-64T H20-220-AT

Description	Product Code	Description	Product Code
Intel® Pentium® 4 (socket 478)	PT	AMD®Athlon® 64 (SOCKET 754, 939, 940)	64T
Intel® Pentium® 4 (LGA775)	775T	AMD®Athlon® MP, XP (socket 462)	AT

Product Code	Qty	Item	Product Code	Qty	Item
PT	1	MCW5002-PT thermoelectric water-block, with (2) # 6 worm drive hose clamps & gaskets	ALL	1	MCP655™ 12 Volts DC industrial pump with retention screws and hose clamps
775T	1	MCW5002-775T thermoelectric water-block with (2) # 6 worm drive hose clamps & gaskets	ALL	1	MCRES-MICRO Reservoir with retention screws , Velcro strips and hose clamps
64T	1	MCW5002-64T thermoelectric water-block with (2) # 6 worm drive hose clamps & gaskets	ALL	1	40" length smatcoils™ clear coils
AT	1	MCW5002-AT thermoelectric water-block with (2) # 6 worm drive hose clamps & gaskets	ALL	1	10 Feet 7/16" ID High quality vinyl tubing
ALL	1	MCR220-QPK Radiator with 120x25mm fan and Radbox	ALL	1	2 oz bottle HydrX™ specially formulated coolant
			ALL	1	Luberex Dielectric grease
ALL	1	S320-12 Kit, 25 Amps auxiliary power supply with relay switch harness	ALL	1	MG chemicals conformal coating spray
			ALL	1	Céramique™ thermal grease

TABLE OF CONTENTS

I. Motherboard preparation & water-block mechanical installation	6
1. MCW5002-775T™ Thermoelectric Water-block Installation Guide for Intel® Pentium® 4 (LGA775).....	7
A. Preparing the motherboard.....	7
B. Condensation control measures.....	7
C. Motherboard preparation.....	8
D. CPU preparation and water-block installation.....	8
E. Hydraulic Installation.....	9
2. MCW5002-PT™ Thermoelectric Water-block Installation Guide for Intel® Pentium® 4 (socket 478).....	10
A. Preparing the Motherboard.....	10
B. Condensation control measures.....	11
C. Motherboard preparation.....	11
D. CPU and water-block installation.....	12
E. Hydraulic Installation.....	12
3. MCW5002-AT™ Thermoelectric Waterblock Installation Guide for AMD Athlon MP, XP, Sempron (socket 462 motherboards with mounting holes exclusively).....	13
A. Condensation control measures: Motherboard preparation.....	13
B. CPU and water-block installation.....	14
C. Hydraulic Installation.....	15
4. MCW5002-64T™ Thermoelectric Water-block Installation Guide for AMD Athlon 64, Opteron (socket 754, 939, 940).....	16
A. Condensation prevention measures: Motherboard preparation.....	16
B. CPU and cooler installation.....	17
C. Hydraulic Installation.....	18
II. Components (other than water-block) installation	19
1. S320-12 power supply kit installation guide.....	19
A. S320-12 Power supply installation.....	19
B. Relay Switch Installation.....	20
C. Power Supply ventilation.....	21
2. MCR220 Radiator installation.....	23
A. Radiator installation, general considerations.....	23
B. Installation with the Radbox.....	23
C. Securing the base plate at the desired location.....	24
D. Fastening the radiator/Radbox assembly to the computer back-panel.....	24
3. Re-installing the motherboard/water-block assembly into the chassis.....	26
4. MCP655 Pump Installation.....	27
A. General Use.....	27
B. Installation.....	27
C. Precautions.....	27
5. MCRES-Micro reservoir Installation.....	29
A. Installation.....	29
B. Fastening the device to the case.....	29
6. Tubing installation.....	30
A. Preamble: difficult installation of the tubing with the MCP655 pump.....	30
B. Preparing the coolant.....	30
C. Precautions of use with the MCRES-Micro reservoir.....	30
D. Pre-cutting the tubing to length and tube routing.....	30
E. Re-installing your computer power-supply.....	31
F. Filling-up the circuit.....	31
G. Post-installation note: Draining the system.....	31
7. Electrical connection: TEC to S320-12 power-supply.....	31

III. Periodic maintenance	32
A. Keeping your system clean	32
B. Fluid Level.....	32
C. Draining the system	32

Preamble

Congratulations on your purchase of a Swiftech liquid cooling system!

This kit has been designed to facilitate the installation of the components with as few and simple modifications to the chassis as possible. It is nonetheless intended for technically advanced users, well versed in installing computer components.

General guidelines

Never work with electricity connected to the computer while work is in progress.

The reservoir should preferably be at the highest point of the cooling circuit. This will allow air to accumulate there over time.

It is strongly recommended that you install this kit in a bare chassis, removing first all typical PC components such as motherboard, power supply, hard drives, as well as side panels, front bezel, and top panel.

Plan your installation ahead. Observe the relative position of the components for possible interference with other components. Examples: will the pump interfere with a hard drive? Will the radiator interfere with the installation of the CPU cooler?

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.

IMPORTANT DISCLOSURES

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.

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.

Installation Overview

The following is a typical sequence of components installation. Step 1 is always first. Steps 2 to 6 may be performed out of sequence depending on the chassis configuration. Placement of the cooling components may also vary depending on your chassis and motherboard configurations. A mock-up installation is thus necessary to estimate the length of the different sections of tubing that will be required between each component.

STEP 1 Motherboard preparation, and Water-block(s) Installation: Chapter 1

This part of the installation is by and large the most crucial and should be done first. Please refer to your specific water-block model in the water-block installation chapters below. It is suggested that you complete steps 2 and 3 prior to re-installing the motherboard/water-block assembly in the chassis.

STEP 3 Radiator installation: Chapter 2.2

The H20-220T kit is supplied with a dual 120mm radiator. The radiator is equipped with our MCB120 “Radbox” and should be installed externally at the back of chassis. Because this step may require case modifications, such as drilling holes into the computer panels, please carefully clean-up the case for metal shavings

STEP 4 Reinstall the motherboard/water-block assembly into the case: Chapter 2.3

STEP 5 MCP655 Pump installation: Chapter 2.4

Preferable position of the pump is at the bottom of the chassis. However, the pump can operate in any position. For optimum safety, the pump can be bolted to the chassis. **TIP!** Do not peel-off the protective sticker until you are satisfied with the position of the pump, as subsequent removal is destructive to the foam gasket.

STEP 7 and forward refer to hydraulic and electrical connections and finishing of the installation: Chapter 2.6 to end

STEP 2 Power Supply Installation: Chapter 2.1

The S320-12 auxiliary power supply supplied with your kit fits in a 5 ¼” bay with the provided rails. Because it generates a significant amount of heat, we recommend that it be installed in the uppermost drive bay. To prevent it from overheating, a blowhole in the upper panel located in the general vicinity of the power supply exhaust vent is highly desirable. Guidelines are also provided on how to make a blow hole. Because this step may require case modifications, such as drilling holes into the computer panels, please carefully clean-up the case for metal shavings.

STEP 6 MCRES-MICRO reservoir installation: Chapter 2.5

This reservoir being the simplest to install, it is suggested that you install it last.

TIP! Positioning the reservoir at the highest point of the liquid cooling circuit is preferred but not mandatory. If one of the components, the radiator for example, is higher than the reservoir, you may want to fill-up the reservoir outside of the chassis, holding it above the radiator, and once done close the fill-cap, and secure the reservoir in the desired bay.

I. MOTHERBOARD PREPARATION & WATER-BLOCK MECHANICAL INSTALLATION

Please refer to the following chapters relevant to your model:

- MCW5502-775T for Intel Pentium 4 socket LGA775
- MCW5002-PT for Intel Pentium 4 socket 478
- MCW5002-AT for AMD socket 462
- MCW5002-64T for AMD socket 754, 939, 940

It is assumed below that you have removed the motherboard from the case.

1. MCW5002-775T™ THERMOELECTRIC WATER-BLOCK INSTALLATION GUIDE FOR INTEL® PENTIUM® 4 (LGA775)

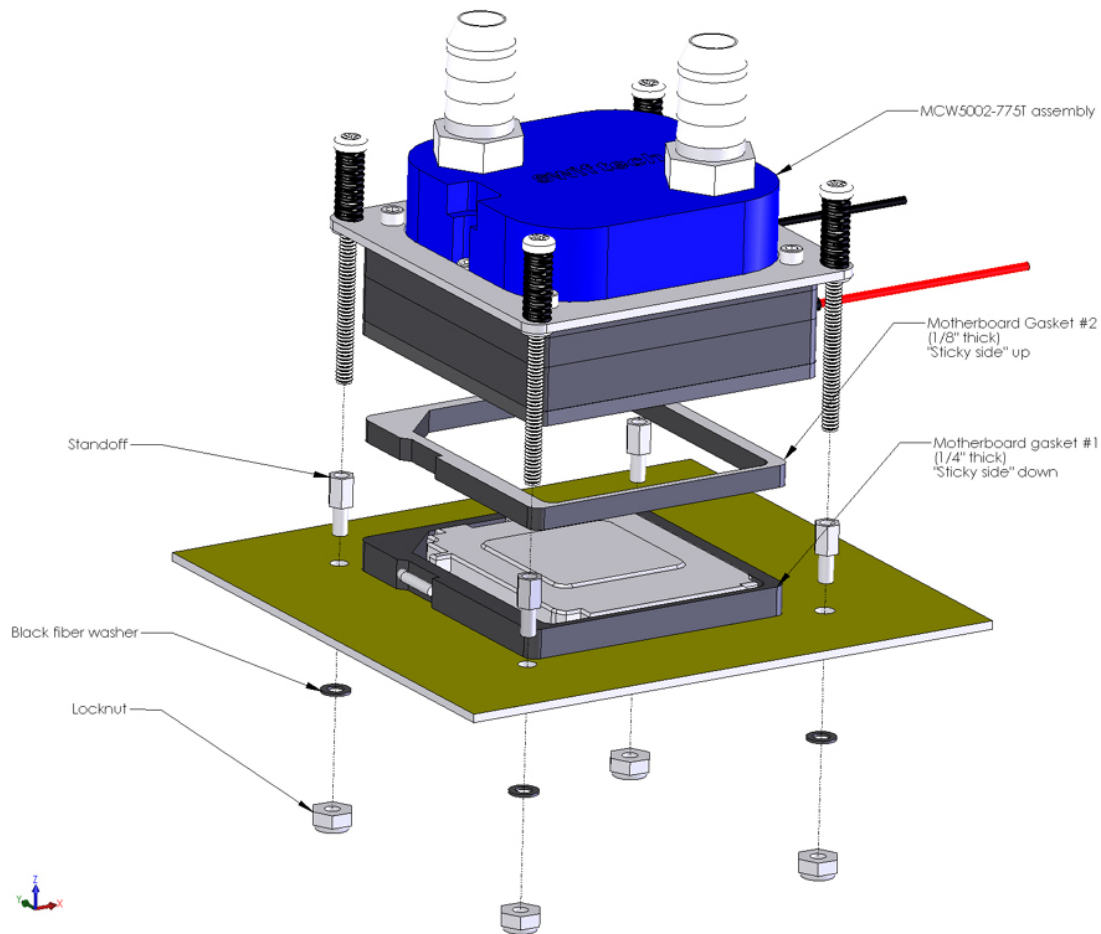


Figure 1

A. Preparing the motherboard

Remove the stock heatsink retention mechanism to reveal the four-motherboard mounting holes.

Install a standoff in each one of the holes. As the diameter of the mounting holes is usually larger than the diameter of the standoff stem, be careful to keep the standoff approximately centered in the MB holes. Secure the standoffs with the provided hex locknuts, and a fiber washer on the backside of the MB as shown on fig. 1, using the tools described fig. 2

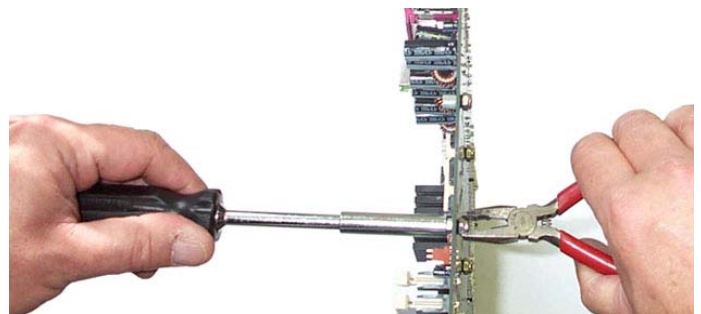


Figure 2

Use a 1/4" socket tool to drive the standoff, and a small pair of pliers to prevent the locknut from spinning. Torque value should not to exceed 16 in. lbs. In other words **JUST FIRM AND TIGHT, BUT WITHOUT EXCESSIVE TORQUE.**

B. Condensation control measures

The following instructions are crucial to long lasting & reliable operations. Do not skip these steps, and do not take shortcuts. Permanent damage to your components is likely to occur otherwise.

C. Motherboard preparation

Conformal coating application: This step will positively ensure that any micro condensation occurring on small surface mount components will not corrode or short-circuit the motherboard. Please use the enclosed conformal coating spray.



Figure 3 - Back of the motherboard:



Figure 4 - Front of the motherboard

Spray the back of the motherboard, concentrating on the area immediately behind the CPU. Also spray all the way down, in a vertical path directly under the CPU area. Allow time to dry, per manufacturer specs.

Use masking tape to protect the CPU socket, and any connector sockets in the immediate vicinity of the processor. A double layer of tape is recommended for all sockets, as the spray may soak a single layer of tape and contaminate the contacts.

Spray the area immediately surrounding the socket. It is not recommended to spray further than the area circled in the above picture. Allow the coating to be “dry to the touch” (20 minutes approximately), and remove the masking tape. Then let the board dry completely per manufacturer specs.

D. CPU preparation and water-block installation

Dielectric grease application: The following steps will ensure that condensation does not form inside of the CPU socket. Please use the Lubrex dielectric grease provided with your kit.



Step 1

- 1/ Install the motherboard gasket #1 (1/4" thick)
- 2/ Squirt a generous amount of dielectric grease inside the socket center section.



Step 2

- 3/ Place your CPU in the socket, and gently push it down to pack the grease inside the socket center section.
- 4/ squeeze more dielectric grease all around, between the gasket and the CPU socket



Step 3

- 5/ Close the socket lever
- 6/ Clean off all the excess grease, particularly on the CPU itself. The surface of the CPU needs to be clean for the next step which is application of the thermal grease.



Step 4

7/ Squeeze a small amount of Céramique thermal compound on the CPU.

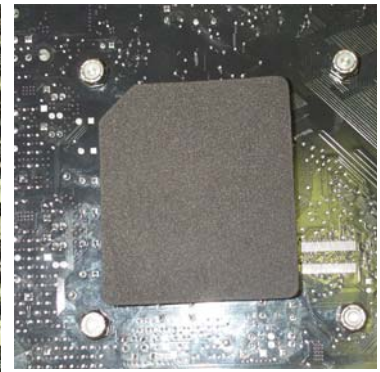
8/ Peel-off the protective paper from motherboard gasket #2 (1/8" thick) and carefully align the gasket over motherboard gasket #1, with the sticky side up



Step 5

9/ Align the water-block mounting posts with the motherboard standoffs, and tighten the screws in a cross pattern. Do not over-tighten the screws or they could jam into the standoffs, making further removal difficult.

The water-block is now installed



Step 6

10/ There will be grease squeezing off from the holes behind the motherboard. Wipe it out clean.

11/ Stick the neoprene gasket directly behind the CPU (use the center section of motherboard gasket #1). This will prevent condensation to form here over time.

IMPORTANT WARNING: Solder joints of the wires to the thermoelectric module are extremely fragile. Bending the wires at their root will break the solder joint, with no possible repair. Swiftech will not honor the warranty for broken wires.

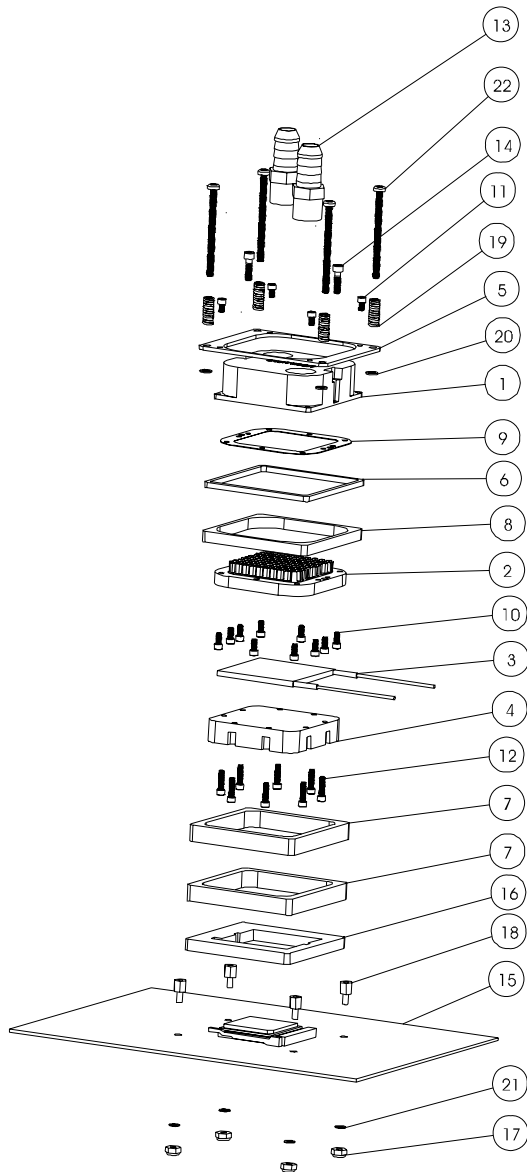
E. Hydraulic Installation

- ❑ The MCW5002-T is shipped with 1/2" barb to 3/8" NPT nylon fittings. These fittings should be installed using Teflon tape or plumbers "goop". If fittings need to be replaced for a difference tubing size, do not use brass fittings, because of the galvanic corrosion that will take place between copper or brass and the MCW5002-T aluminum housing. Always use nylon fittings.
- ❑ Inlet and outlet are interchangeable.
- ❑ Type of Coolant:
 - For best performance, use 5 to 10% of Swiftech brand "HydrX" corrosion inhibitor mixed with distilled water only .
 - Regular automotive anti-freeze is also acceptable. Automotive manufacturers recommend that not less than 25% is used.
 - **NEVER use tap water, even for a short-term test.**

Not following the above instructions constitutes misuse (*) of the product, and will void your warranty.

Now that the water-block installation is complete, please proceed with the rest of the components installation as described in Chapter II.

2. MCW5002-PT™ THERMOELECTRIC WATER-BLOCK INSTALLATION GUIDE FOR INTEL® PENTIUM® 4 (SOCKET 478)



ITEM NO.	QTY.	PART NO.	DESCRIPTION
1	1	MCW5002-T	Aluminum housing 3/8" NPT - TEC version
2	1	MCW5000-BPT	Base plate - Flat
3	1	50mm	226w THERMOELECTRIC MODULE
4	1	MCW5000-CP	Cold Plate
5	1	MCW5000-P_bracket	
6	1	MCW5000-BGST1	Neosponge 1/8"
7	2	MCW5000-BGST2	Neosponge 3/8"
8	1	MCW5000-BGST3	Neosponge 1/4"
9	1	MCW5000-HGSKT	Velbuna housing gasket
10	10	92196A106	4-40 x 1/4" S/S socket screw
11	4	4-40SOCKET3-16	4-40 X 3/16" SOCKET SCREW STAINLESS 18-8
12	8	92196A109	4-40 x 7/16" S/S socket screw
13	2	3-8NPT-to-1-2barb	1/2" ID Hose barb plastic fitting
14	2	6-32x1-2socket	6-32 x 1/2" S/S socket screw
15	1	s478-notframe	Intel Pentium 4 socket 478 motherboard and processor
16	1	MCW5000-MBGSKT	
17	4	6-32-LOCKNUT	6-32 LOCKNUT
18	4	STANDOFF	stainless steel hexagonal 1/4" standoff
19	4	7C75C	0.042 diam Heavy Duty spring (black for identification)
20	4	4-40 nylon retaining washer	4-40 nylon retaining washer
21	4	4-40 fiberwasher	
22	4	90272A159-6-32X200-PHILIPS	6-32 X 2.00 Phillips s crews

Figure 1

A. Preparing the Motherboard

Remove the stock heatsink retention frame (the black plastic frame that clips down to your motherboard). This will reveal the four mounting holes used to install the MCW5000-PT™ retention standoffs.

Install a standoff in each one of the holes. As the diameter of the mounting holes is much larger than the diameter of the standoff stem, be careful to keep the standoff approximately centered in the MB holes. Secure standoffs with hex locknuts, and a fiber washer on backside of the MB as shown on fig. 1, using the tools described fig. 2

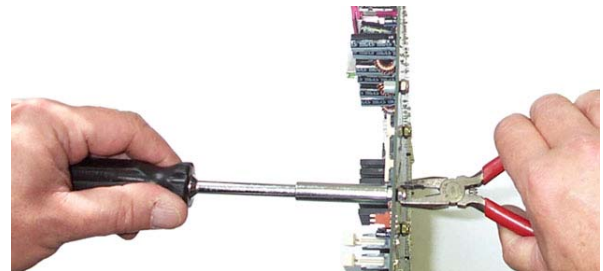


Figure 2

Use a ¼” socket tool to drive the standoff, and a small pair of pliers to prevent the locknut from spinning. Torque value should not to exceed 16 in. lbs. In other words JUST TIGHT, WITHOUT EXCESSIVE TORQUE.

B. Condensation control measures

The following instructions are crucial to long lasting & reliable operations. Do not skip these steps, and do not take shortcuts. Permanent damage to your components is likely to occur otherwise.

C. Motherboard preparation

Conformal coating application: This step will positively ensure that any micro condensation occurring on small surface mount components will not corrode or short-circuit the motherboard. Please use the conformal coating spray included with the kit.



Figure 3

Spray the back of the motherboard, concentrating on the area immediately behind the CPU. Also spray all the way down, in a vertical path directly under the CPU area. Allow time to dry, per manufacturer specs.



Figure 4

Use masking tape to protect the CPU socket, and any connector sockets in the immediate vicinity of the processor. A double layer of tape is recommended for all sockets, as the spray may soak a single layer of tape and contaminate the contacts.

Spray the area immediately surrounding the socket. It is not recommended to spray further than the area circled in the above picture. Allow the coating to be “dry to the touch” (20 minutes approximately), and remove the masking tape. Then let the board dry completely per manufacturer specs.

Dielectric grease application: This step will ensure that condensation does not form inside of the CPU socket. Please use the included Lubrex dielectric grease as follows.

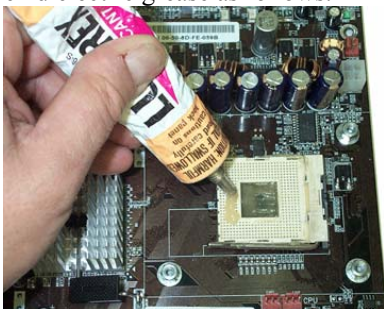


Figure 5

Squirt a generous amount of grease onto the socket.

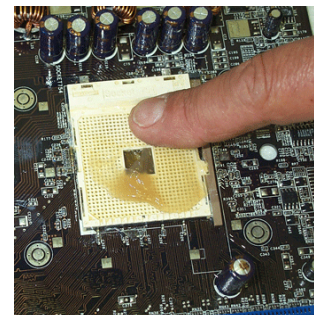


Figure 6

Force the grease inside of the pin-holes with your finger. Make sure that the central area of the socket is completely filled with grease.

To complete the condensation prevention measures, simply apply the neoprene sticker provided with your MCW5002-PT™ accessories to the back of the motherboard, directly behind the processor.

D. CPU and water-block installation

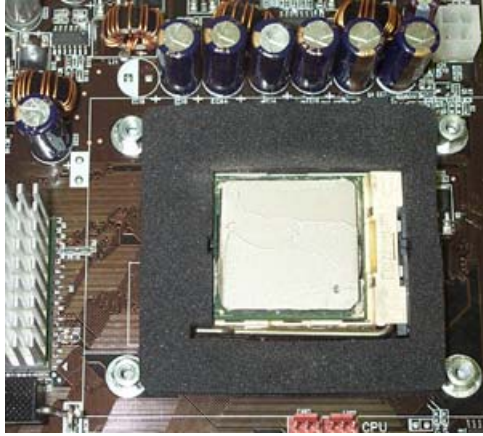


Figure 7

Remove the peel-off paper back from the motherboard gasket, and install it as shown above. The sticky side should be towards the motherboard.

Insert the processor into the socket. Since you have grease inside the socket, some hydraulic pressure lift may occur: for this reason, make sure that the processor sits perfectly flat, and is inserted all the way into the socket. Then, drop a small amount of high quality thermal compound onto the center of the processor core.

Installation of the cooler to the motherboard is now complete!

IMPORTANT WARNING: Solder joints of the wires to the thermoelectric module are extremely fragile. Bending the wires at their root will break the solder joint, with no possible repair. Swiftech will not honor the warranty for broken wires.

E. Hydraulic Installation

- ❑ The MCW5002-T is shipped with 1/2" barb to 3/8" NPT nylon fittings. These fittings should be installed using Teflon tape or plumbers "goop". If fittings need to be replaced for a difference tubing size, do not use brass fittings, because of the galvanic corrosion that will take place between copper or brass and the MCW5002-T aluminum housing. Always use nylon fittings.
- ❑ Inlet and outlet are interchangeable.
- ❑ Type of Coolant:
 - For best performance, use 5 to 10% of Swiftech brand "HydrX" corrosion inhibitor mixed with distilled water only .
 - Regular automotive anti-freeze is also acceptable. Automotive manufacturers recommend that not less than 25% is used.
 - **NEVER use tap water, even for a short-term test.**

Not following the above instructions constitutes misuse (*) of the product, and will void your warranty.

Now that the water-block installation is complete, please proceed with the rest of the components installation as described in Chapter II.

Securing the MCW5002-PT cooler to the motherboard:

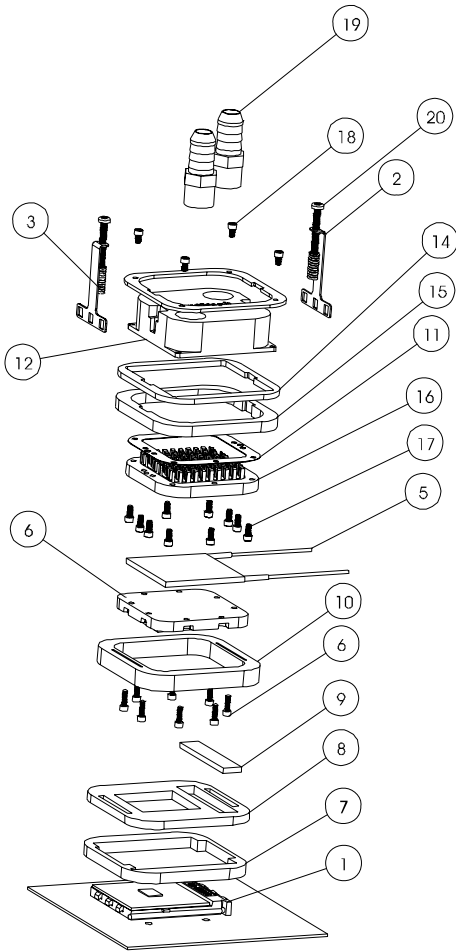
Install the MCW5002-PT™ assembly onto your processor, as shown in figure 8.

Gradually tighten the screws in a cross pattern until you feel that they reach the bottom of the standoff. A "finger-tight" lock is sufficient.



Figure 8 - (showing an MCW5000-PT)

3. MCW5002-AT™ THERMOELECTRIC WATERBLOCK INSTALLATION GUIDE FOR AMD ATHLON MP, XP, SEMPRON (SOCKET 462 MOTHERBOARDS WITH MOUNTING HOLES EXCLUSIVELY)



ITEM NO.	QTY.	PART NO.	DESCRIPTION
1	1	socket462	
2	2	3T CLIP-long	1.945" long 3T clip
3	1	70750	0.042 diam Heavy Duty spring (black for identification)
4	1	70709	0.038" diam light duty spring
5	1	TEC1-12724T125	226w THERMOELECTRIC MODULE
6	1	MCW5002-AT-CP-and screws	C110 cold plate assembly
	1	MCW5002-AT-CP	C110 Copper cold plate
8	4	4-40SOCKET3-8	4-40 x 3/8" S/S Socket screw
7	1	MCW5002-AI-MB-GSKT	Soft 1/4" neo sponge AMD motherboard gasket
8	1	MCW5002-AT-CPU-GSKT	soft 3/16" neo sponge AMD socket 462 insulation gasket
9	1	MCW5002-AT-CPU-GSKT2	Soft 1/8" neo sponge AMD socket 462 insulation gasket insert
10	1	MCW5002-AT-TC-GSKT2	Soft 3/8" neo sponge TEC insulation gasket 2
11	1	MCW5000-HGSKT	Velbuna housing gasket
12	1	MCW5002	Housing
13	1	MCW5002-AT-BRACKET	14 gage S/S bracket
14	1	MCW5002-AI-BGST1	Soft 1/8" neo sponge bracket spacer gasket
15	1	MCW5002-AT-BGST2	Soft 1/4" neo sponge base plate insulator gasket
16	1	MCW5002-AT-BP	C110 copper base plate
17	10	92196A106	
18	4	4-40SOCKET3-16	4-40 X 3/16" SOCKET SCREW STAINLESS 18-8
19	2	3-8NPT-to-1-2barb	1/2" ID Hose barb plastic fitting
20	2	90272A155-6-32x1-250	6-32 x 1 1/4" Phillips screw

Figure 1

Preamble

The following instructions are crucial to long lasting & reliable operations. Do not skip these steps, and do not take shortcuts. Permanent damage to your components is likely to occur otherwise.

A. Condensation control measures: Motherboard preparation

Conformal coating application: This step will positively ensure that any micro condensation occurring on small surface mount components will not corrode or short-circuit the motherboard. Please use the conformal coating spray included with the kit.



Figure 2

Spray the back of the motherboard, concentrating on the area immediately behind the CPU. Also spray all the way down, in a vertical path directly under the CPU area. Allow time to dry, per manufacturer specs.



Figure 3

Use masking tape to protect the CPU socket, and any connector sockets in the immediate vicinity of the processor. A double layer of tape is recommended for all sockets, as the spray may soak a single layer of tape and contaminate the contacts.

Spray the area immediately surrounding the socket. It is not recommended to spray further than the area circled in the above picture. Allow the coating to be “dry to the touch” (20 minutes approximately), and remove the masking tape. Then let the board dry completely per manufacturer specs.

Dielectric grease application: This step will ensure that condensation does not form inside of the CPU socket.

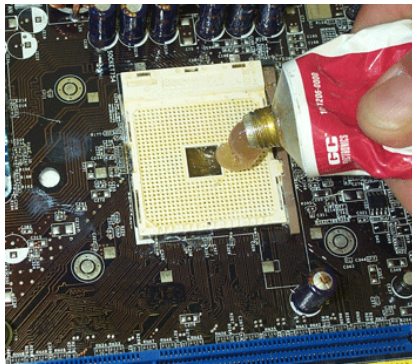


Figure 4

Squirt a generous amount of grease onto the socket.

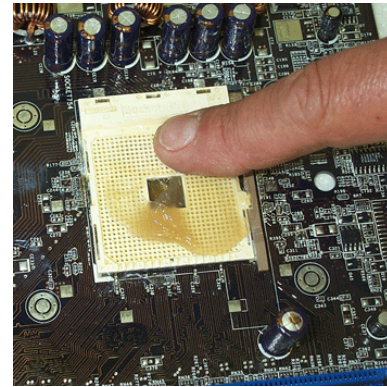


Figure 5

Force the grease inside of the pin-holes with your finger. Make sure that the central area of the socket is completely filled with grease.

B. CPU and water-block installation



Securing the MCW5002-AT cooler to the motherboard:

Initial check: make sure that the retention clips are at their lowest position by tightening the 2 spring loaded Philips screws until the springs are fully compressed (do not over-tighten)

Engage one side of the clip under the CPU socket retention lugs

Gently pull the water-block in the opposite direction and push it down to catch the opposite set of socket lugs. The clip will snap underneath the socket lugs.

Firmly press the base of the clips (through the gaskets) between middle finger and thumb as shown in Figure 7 to compress them against the socket (this will prevent the clips for disengaging themselves from

Figure 6

Remove the peel-off paper back from the motherboard gasket, and install it as shown above. The sticky side should be towards the motherboard.

Insert the processor into the socket. Since you have grease inside the socket, some hydraulic pressure lift may occur: for this reason, make sure that the processor sits perfectly flat, and is inserted all the way into the socket.

Then, drop a small amount of high quality thermal compound into the center of the processor core.

underneath the tabs at start-up) then gradually and alternatively loosen the two spring loaded Philips screws to secure the water-block. Continue backing off the screws until the head of each screw completely clears the top of the bracket by about the thickness of a credit card.



Figure 7

IMPORTANT WARNING: Solder joints of the wires to the thermoelectric module are extremely fragile. Bending the wires at their root will break the solder joint, with no possible repair. Swiftech will not honor the warranty for broken wires.

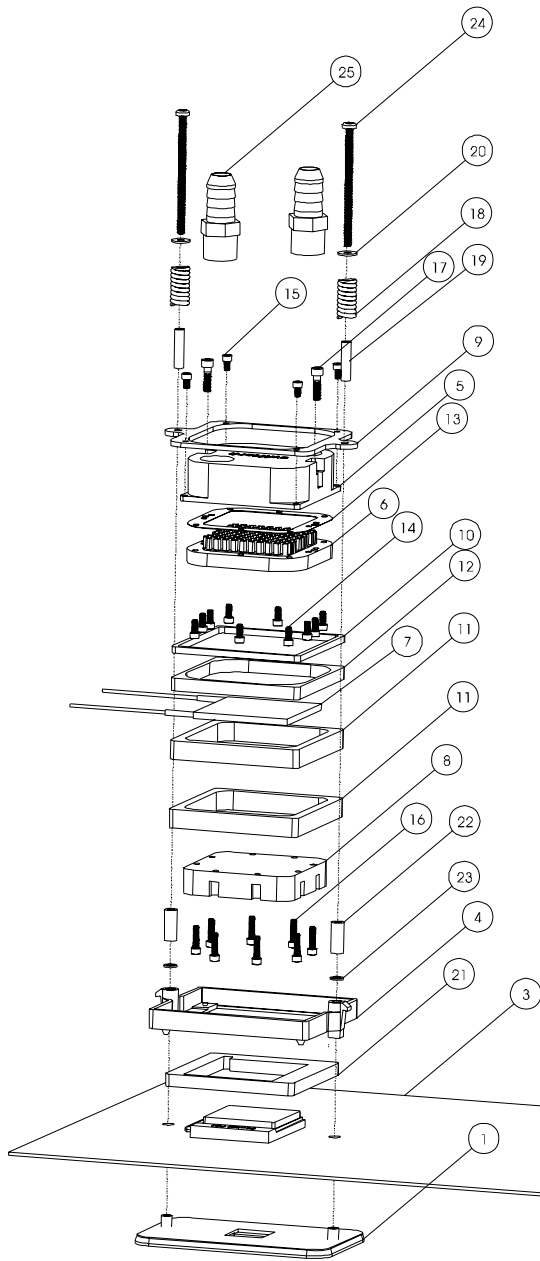
C. Hydraulic Installation

- ❑ The MCW5002-T is shipped with 1/2" barb to 3/8" NPT nylon fittings. These fittings should be installed using Teflon tape or plumbers "goop". If fittings need to be replaced for a difference tubing size, do not use brass fittings, because of the galvanic corrosion that will take place between copper or brass and the MCW5002-T aluminum housing. Always use nylon fittings.
- ❑ Inlet and outlet are interchangeable.
- ❑ Type of Coolant:
 - For best performance, use 5 to 10% of Swiftech brand "HydrX" corrosion inhibitor mixed with distilled water only .
 - Regular automotive anti-freeze is also acceptable. Automotive manufacturers recommend that not less than 25% is used.
 - **NEVER use tap water, even for a short-term test.**

Not following the above instructions constitutes misuse (*) of the product, and will void your warranty.

Now that the water-block installation is complete, please proceed with the rest of the components installation as described in Chapter II.

4. MCW5002-64T™ THERMOELECTRIC WATER-BLOCK INSTALLATION GUIDE FOR AMD ATHLON 64, OPTERON (SOCKET 754, 939, 940)



ITEM NO.	QTY.	PART NO.	DESCRIPTION
1	1	counter-plate	Back plate AJ00264
3	1	motherboard	
4	1	retention-frame	Retention frame AJ00172
5	1	MCW5002	Housing
6	1	MCW5000-BPT	Base plate - Flat
7	1	50mm	226w THERMOELECTRIC MODULE
8	1	MCW5000-CP	Cold Plate
9	1	opteron_bracket	13 gage s/s bracket
10	1	MCW5000-BGST1	Neospunge 1/8"
11	2	MCW5000-BGST2	Neospunge 3/8"
12	1	MCW5000-BGST3	Neospunge 1/4"
13	1	MCW5000-HGSKT	Velbuna housing gasket
14	10	92196A106	
15	4	4-40SOCKET3-16	4-40 X 3/16" SOCKET SCREW STAINLESS 18-8
16	8	92196A109	
17	2	6-32x1-2socket	6-32 x 1/2" S/S socket screw
18	2	885	spring
19	2	spacer-205x140x773	tension limiter
20	2	washer-93286A041	.375 OD x .140 ID X .032 THICKNESS WASHER
21	1	MCW5000-64-MBGASKET	Neospunge 0.250"
22	2	13R8025055250	Nylon spacer 250X610
23	2	4-40 nylon retaining washer	4-40 nylon retaining washer
24	2	6-32X2.375	6-32 x 2 3/8" Phillips screw
25	2	3-8NPTH-1-2barb	1/2" ID Hose barb plastic fitting

Figure 1

Preamble

The following instructions are crucial to long lasting & reliable operations. Do not skip these steps, and do not take shortcuts. Permanent damage to your components is likely to occur otherwise.

A. Condensation prevention measures: Motherboard preparation

Conformal coating application: This step will positively ensure that any micro condensation occurring on small surface mount components will not corrode or short-circuit the motherboard. Please use the included conformal coating spray.



Figure 2

Spray the back of the motherboard, concentrating on the area immediately behind the CPU. Also spray all the way down, in a vertical path directly under the CPU area. Allow time to dry, per manufacturer specs.



Figure 3

Use masking tape to protect the CPU socket, and any connector sockets in the immediate vicinity of the processor. A double layer of tape is recommended for all sockets, as the spray may soak a single layer of tape and contaminate the contacts.

Spray the area immediately surrounding the socket. It is not recommended to spray further than the area circled in the above picture. Allow the coating to be “dry to the touch” (20 minutes approximately), and remove the masking tape. Then let the board dry completely per manufacturer specs.

Dielectric grease application: This step will ensure that condensation does not form inside of the CPU socket. Please use the provided Lubrex grease.

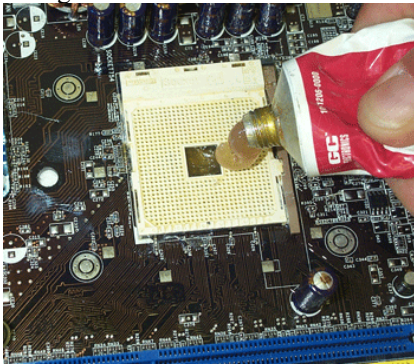


Figure 4

Squirt a generous amount of grease onto the socket.

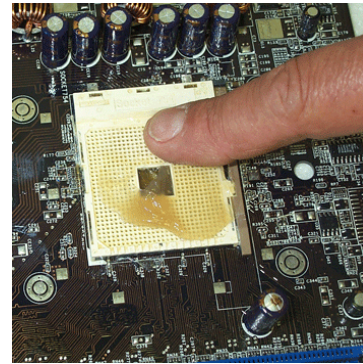


Figure 5

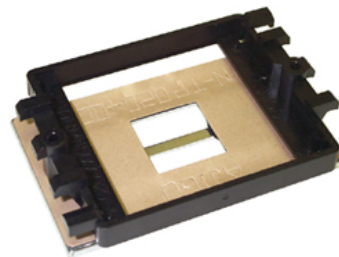
Force the grease inside of the pin holes with your finger. Make sure that the central area of the socket is completely filled with grease.

B. CPU and cooler installation

Preamble: The MCW5002-64T requires the AMD recommended motherboard backing plates (made out of metal) for its installation. Some motherboard manufacturers use plastic back plates and snap-rivets to attach the CPU holding frame to the back-plate, which cannot be used with the MCW5002-64T. AMD recommended backing plates and retention frames are available online on our site at: <http://www.swiftnets.com/store/category.asp?CatID=1>



Part # AJ00264 backing plate alone



Part # AJ00172 complete retention frame & backing plate

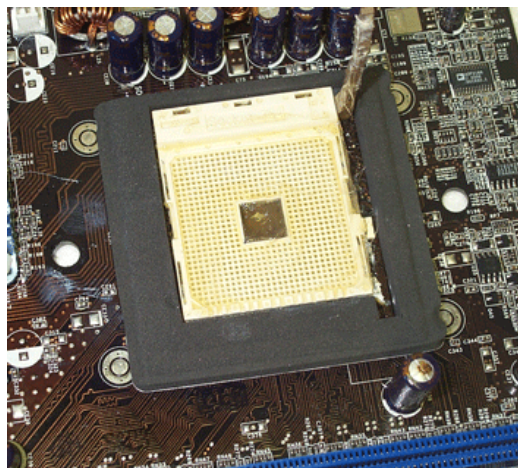


Figure 6

Remove the peel-off paper back from the motherboard gasket, and install it as shown above. The sticky side should be towards the motherboard.

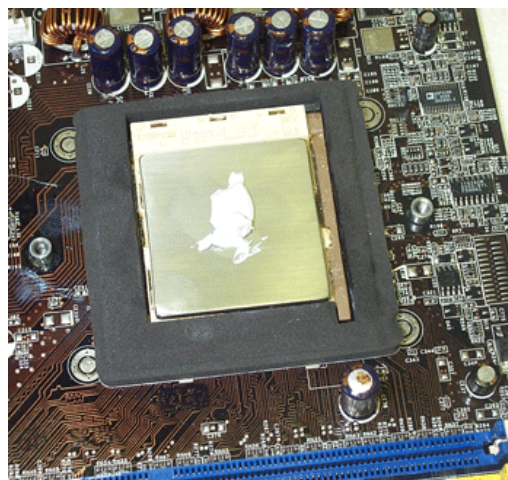


Figure 7

Insert the processor into the socket. Since you have grease inside the socket, some hydraulic pressure lift may occur: for this reason, make sure that the processor sits perfectly flat, and is inserted all the way into the socket. Then, drop a small amount of high quality thermal compound into the center of the processor core.

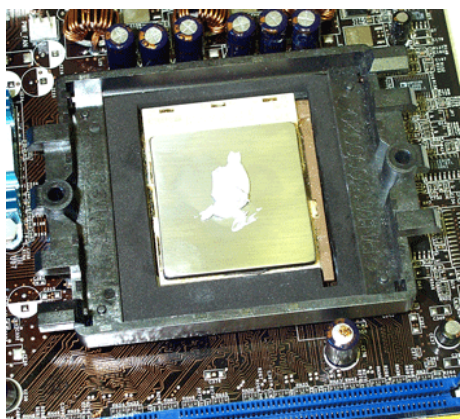


Figure 8

Place the stock plastic retention over the gasket as shown above

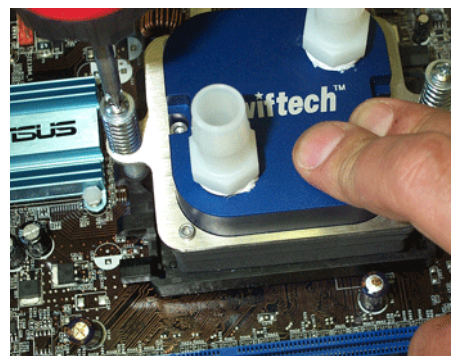


Figure 9

Secure the MCW5002-64T cooler to the motherboard by alternatively and gradually tightening the 2 retention screws.

IMPORTANT WARNING: Solder joints of the wires to the thermoelectric module are extremely fragile. Bending the wires at their root will break the solder joint, with no possible repair. Swifttech will not honor the warranty for broken

C. Hydraulic Installation

- ❑ The MCW5002-T is shipped with 1/2" barb to 3/8" NPT nylon fittings. These fittings should be installed using Teflon tape or plumbers "goop". If fittings need to be replaced for a difference tubing size, do not use brass fittings, because of the galvanic corrosion that will take place between copper or brass and the MCW5002-T aluminum housing. Always use nylon fittings.
- ❑ Inlet and outlet are interchangeable.

- ❑ Type of Coolant:
 - For best performance, use 5 to 10% of Swiftech brand “HydrX” corrosion inhibitor mixed with distilled water only .
 - Regular automotive anti-freeze is also acceptable. Automotive manufacturers recommend that not less than 25% is used.
 - **NEVER use tap water, even for a short-term test.**

Not following the above instructions constitutes misuse (*) of the product, and will void your warranty. wires.

Now that the water-block installation is complete, please proceed with the rest of the components installation as described in Chapter 2.

II. COMPONENTS (OTHER THAN WATER-BLOCK) INSTALLATION

Set aside your motherboard/water-block assembly in a safe place, and start working on your chassis. There is no critical order in the suggestions below, other than good common sense. Choices will depend on the layout of your own chassis.

1. S320-12 POWER SUPPLY KIT INSTALLATION GUIDE

Qty	Item
1	S320-12 power supply installed in 5 ¼” adapter tray, screws
1	Electrical harness
1	Relay Switch
1	A/C socket adapter, stainless steel cover plate, screws
1	A/C cord
1	80mm fan guard with (4) snap rivets

Preamble

This kit has been designed to facilitate installation with as little modifications to the case as possible. It is however meant for advanced users, well versed in installing computer components.



Specific tools needed to complete the installation:
 Power drill
 1 ¼” (32mm) Bi-Metal hole saw to drill hole for A/C socket
 1/8” (3.17mm) Drill bit for A/C socket cover mounting holes
 Optionally: 3 ¼” Bi-Metal hole saw to drill an 80mm blow hole above the power supply fan exhaust

General Rules:

Always work on a “naked” case, removing side panels, front bezel, and top panel, with no power supply installed.

Never work with electricity connected to the computer while work is in progress.

Strip the case “naked”: Since you will be making holes in the case, metal debris could be flying off into your components, and a “naked” chassis will be easier to clean-up.

A. S320-12 Power supply installation

Install the power supply in a 5 ¼” bay, preferably in the uppermost slot as shown in figure 1. Use the provided screws to secure tray to the chassis.



Figure 1

B. Relay Switch Installation

Find a suitable placement to drill a hole for the A/C socket adapter. Leave sufficient room under or above the hole to install the relay switch circuit board. A 1/4" minimum clearance will be required between the circuit board and the edge of the hole.

Make a 1.25" (32mm) diameter hole in the case, using a 1 1/4" Bi-Metal hole saw. De-burr the edges of the hole with sand paper. Position and center the mounting plate over the hole as a template to mark the locations of the plate's mounting screws. Drill 2 holes of .125" diameter for the mounting screws.

Install the mounting plate using the screws provided with your kit. Insert the A/C socket inside the mounting plate.

Proceed with electrical connections as described in fig.3:

- Black L wire from A/C socket to N\O (normally opened) position on switch
- Black L wire from S320-12 power supply to N\O position on switch
- White N wire from S320-12 power supply to N position on A/C socket
- Green Ground wire from S320-12 power supply to Ground on A/C socket
- The 4 pins Molex connector will then connect to the computer power supply.

Note that connection of the TEC wires to the S320-12 power supply will take place at the very end of the installation, once your hydraulic circuit has been leak proofed (chapter 2.7)

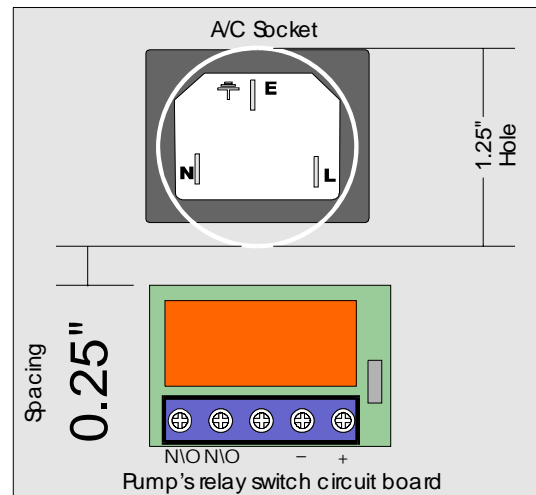
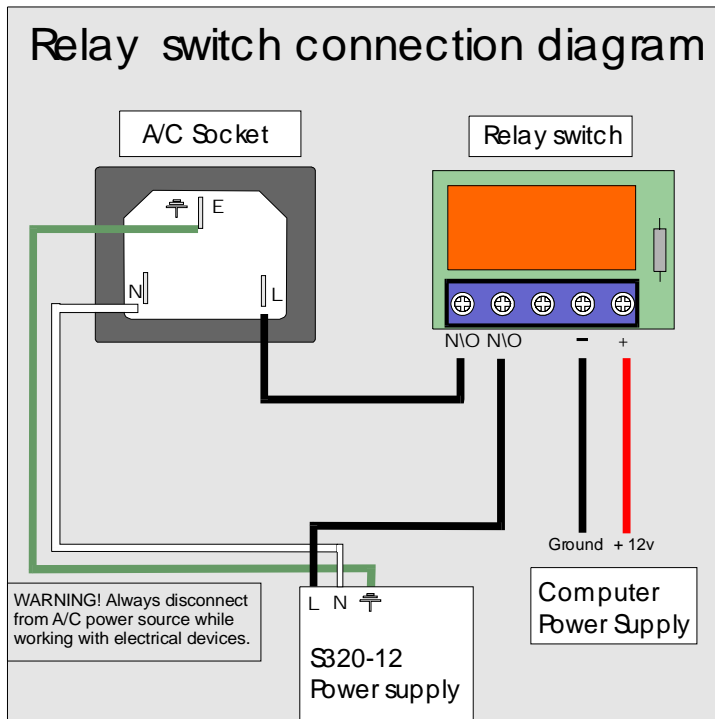


Figure 2



The relay switch and A/C socket adapter installed



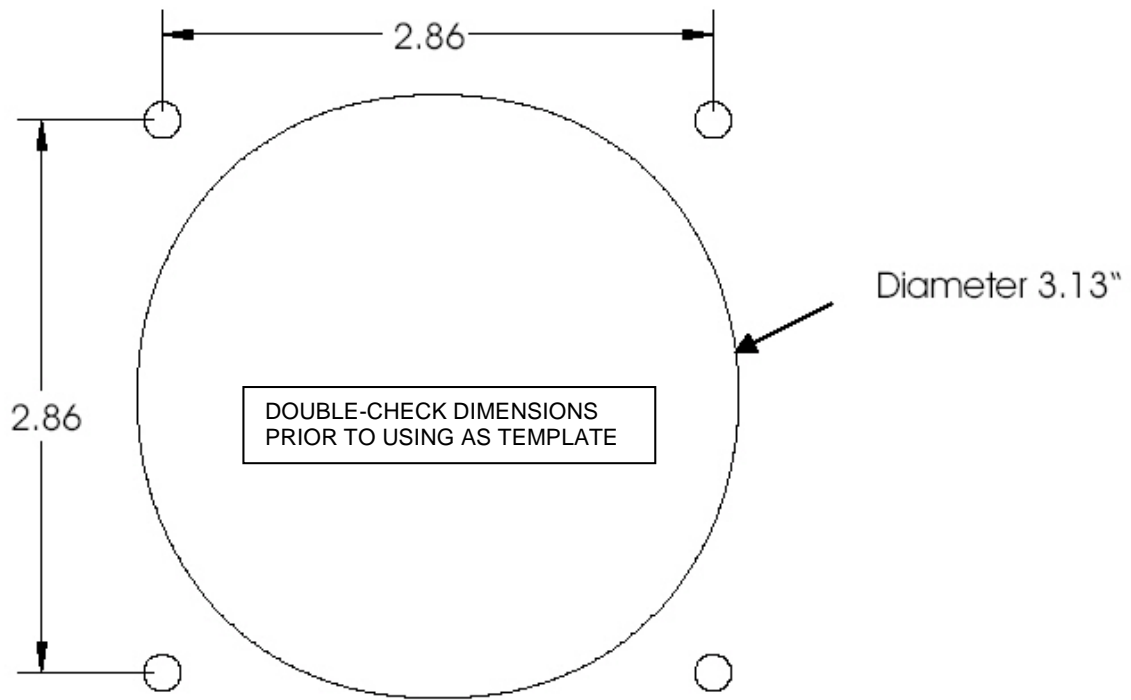
Figure 4

C. Power Supply ventilation

The following information is optional, and subject to existing ventilation in your particular chassis. Please disregard if your computer chassis already features a blowhole, with or without fan.

The S320-12 power supply features a built-in temperature controlled fan, which activates as needed. Since the power supply is being installed in a confined area, and in order to reduce a heat build-up inside the chassis, it is essential to optimize exhaust of the hot air generated by the power supply. A blowhole will accomplish just this, and should be located as close to, or preferably directly above the power supply exhaust vent. Ideally, a low CFM 80mm fan should be added, if space permits. Such solution will greatly reduce the activity of the power supply built-in cooling fan, resulting in quieter operations, and lower temperatures both inside the computer and in the power supply. If such fan is installed, it should be extracting air from the case (blowing towards the outside).

The template below provides holes dimensions for installation of such 80mm fan blowhole. A fan guard and snap rivets are provided with the kit to complete such installation.



Blowhole template (schematic above is on scale, and may be used to mark the hole locations)

Example of installation with a 80mm fan mounted externally





Another example of “blow-hole” installation

Now that your power supply is physically in place, let’s move on to the installation of the next component.

Note that connection of the TEC wires to the power supply will take place at the very end of the installation, once your hydraulic circuit has been leak proofed (chapter 2.7)

2. MCR220 RADIATOR INSTALLATION

Preamble

The MCR220™ dual 120mm radiator ships with the fans and the Radbox chassis already pre-assembled to the radiator. It is assumed in effect that users will take advantage of our Radbox concept (external radiator installation) due to the benefits it provides and ease of installation. In such context, the following installation guide describes this type of installation. We also recognize that due to various considerations (cosmetics, space, or simply user preference) a number of users will wish to install the MR220 radiator internally. Because of the large size of the radiator, it is most likely that an internal installation will require extensive modifications in most computer cases. Because these modifications depend on the structure and dimensions of each individual chassis, we simply cannot provide precise installation instructions to this effect. Here are some general guidelines that advanced “case-modders” should take into consideration:

A. Radiator installation, general considerations

For optimum performance radiators require an unobstructed source of cool air. This dictates either an external mounting or one on/in the case where the radiator will draw cool air from the exterior. The second consideration is the placement of the inlet and outlet connections; at least one connection should be at the ‘top’ of the radiator to make it self-purging.

An external mounting can be effectuated by means of the RadBox affixed to the backside of the case and the tubing routed through holes drilled in the case underneath the power-supply. This places the connections at the top of the radiator and it will preclude the accumulation of air in the radiator.

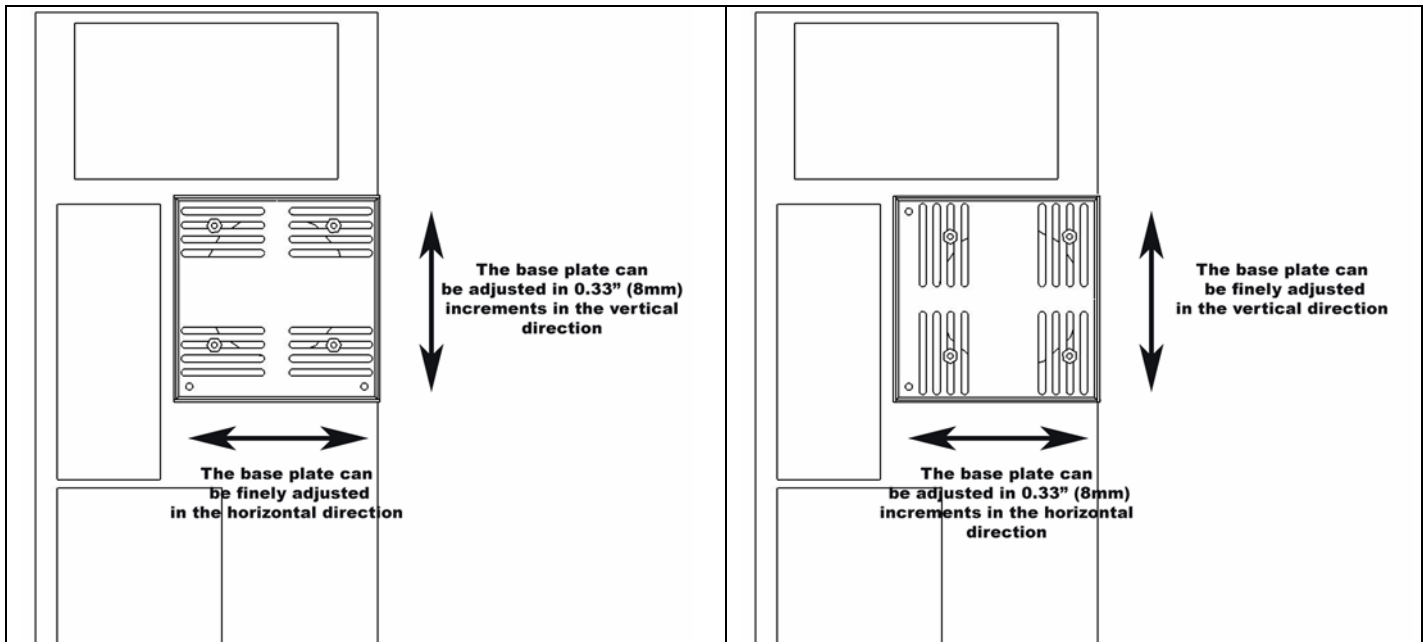
Single 120mm fan radiators can be mounted over appropriately sized openings in a variety of cases; conversely, mounting a dual 120mm radiator is considerably more difficult and generally results in placing the radiator ‘inverted’ at the top, or ‘right side up’ at the bottom. Note that the ‘inverted’ mounting places the inlet and outlet facing down; this mounting will accumulate air over time. Placing the radiator ‘right side up’ in the case bottom will make the radiator self-purging, but it will gather dust VERY quickly if adjacent to the floor. In any case, mounting a dual 120mm radiator inside a case will require some extensive case modifications for the air inlet.

B. Installation with the Radbox

- 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:

- 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.
- 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.
- 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 our installation for the purpose of positioning the radiator. In that case, it will become necessary to drill (4) mounting holes of 0.150" (~3.5mm) in diameter to install the base plate at the desired location.

C. Securing the base plate at the desired location



D. Fastening the radiator/Radbox assembly to the computer back-panel

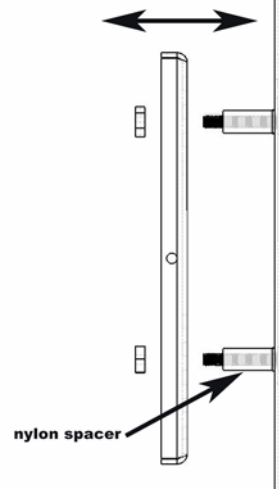
TIP: In the package of assorted hardware coming with your Radbox, locate the 4 little nylon retaining washers looking like this:

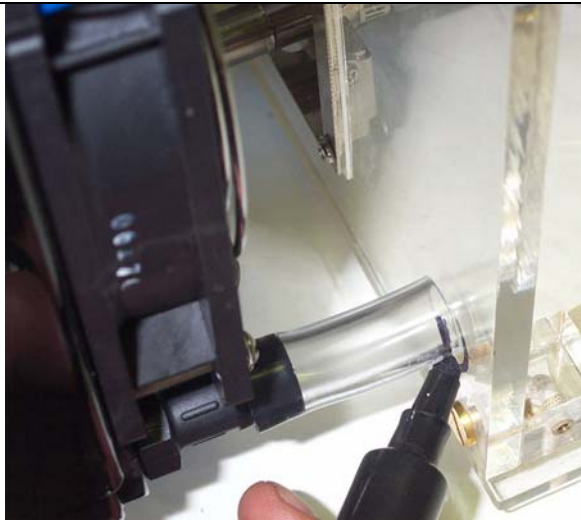


Use these to secure the screws and nylon spacers to the computer back-panel. This will hold the screws in place while you adjust the Radbox back-plate.

Once satisfied with the position, bolt down the Radbox back-plate with the provided nylon nuts.
 Next, you will need to mark the location of the holes that must be drilled to allow routing of the tubes through the computer back-panel. You can cut two small pieces of the provided PVC tubing and install these to the radiator hose barbs, then temporarily mount the radiator assembly onto the back-plate. The tubing will provide a convenient way to mark the position of the holes as shown below:

The base plate separation from the back-panel can be adjusted using various nylon spacers





Remove the radiator assembly from the back-plate and mark the center of the circle.

Two rubber grommets are provided with your kit so that you can route the tube through the case without damaging the tubing with the sharp edges of the hole. The required hole diameter for the grommet is 7/8" (23mm).

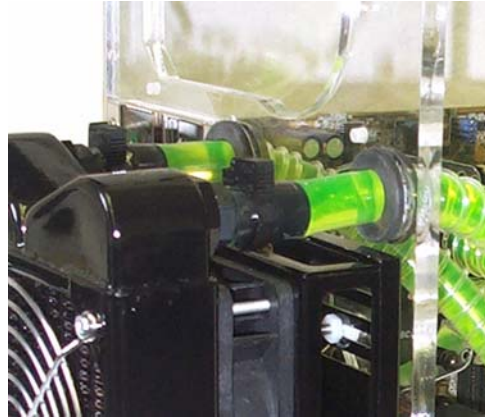
To cut the holes, use a heavy-duty Bimetal hole saw of 7/8" in diameter:



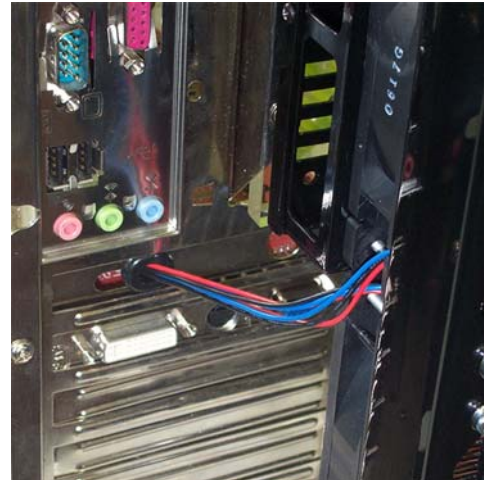
Once the two holes are cut, de-burr the edges, and install the grommets.

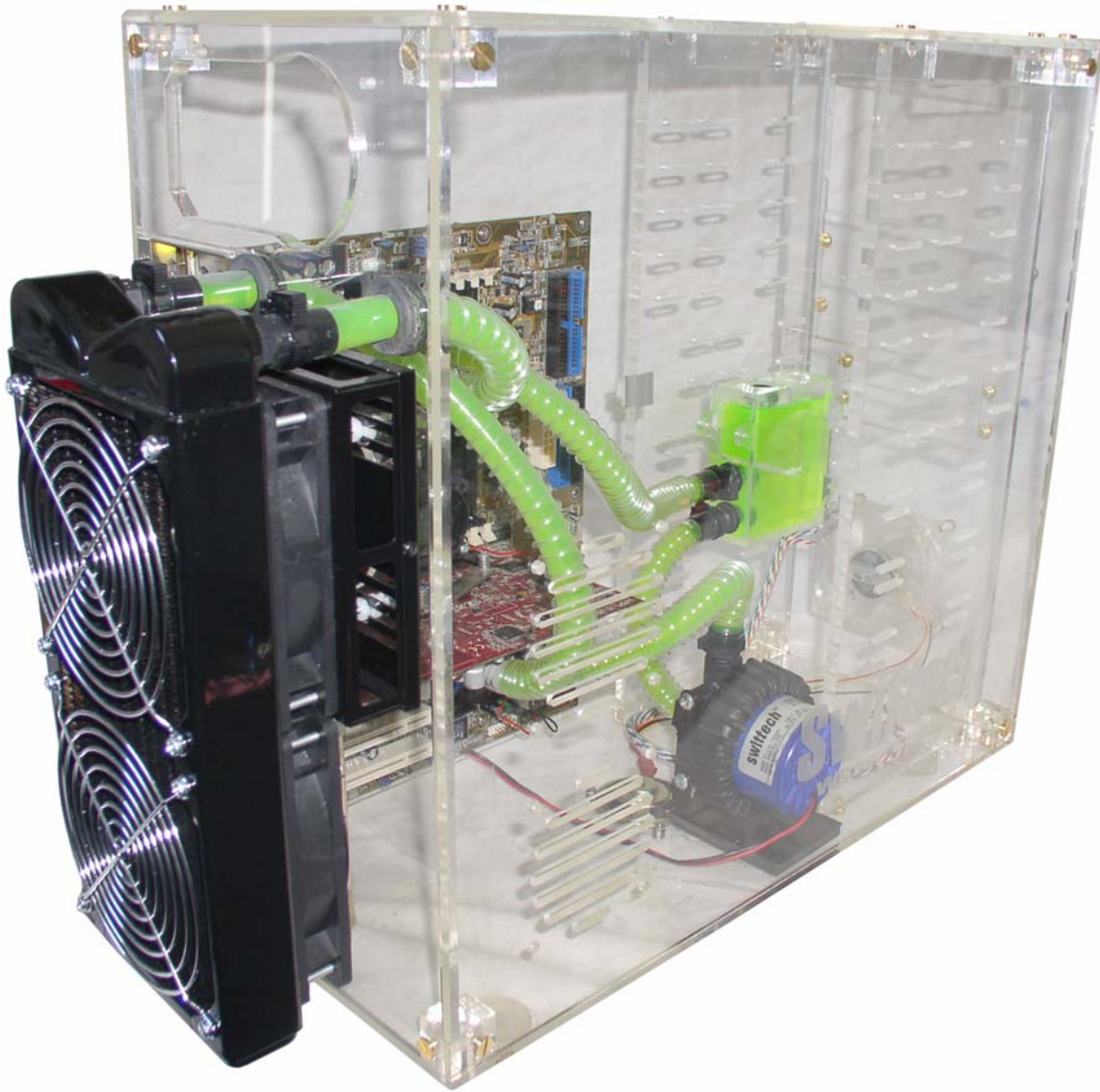
Install your radiator assembly onto the back plate.

Once the tubes are connected to the radiator, the final results will look like so:



Finally, you need to route the fan wires through the back-panel. This can be done easily with the provided PCI adapter plate featuring a hole and grommet for protection of the wire.





Example of Installation of the MCR220-QP radiator with Radbox

3. RE-INSTALLING THE MOTHERBOARD/WATER-BLOCK ASSEMBLY INTO THE CHASSIS

Once your radiator and S320-12 power supply are in place, make sure to clean-off any metal shavings left inside the case, then go ahead and reinstall the motherboard/water-block assembly into the computer.

- Intentionally left blank -

4. MCP655 PUMP INSTALLATION

A. General Use

The MCP655 pump is a magnetically driven centrifugal pump featuring a 12 V DC motor. It requires no maintenance when used with de-mineralized water and the appropriate anti-fungal additives. We recommend using 5 to 10% of 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.

The MCP655 pump is neither submersible, nor self-priming. The inlet needs to be continuously supplied with fluid for the pump to operate properly.

B. Installation

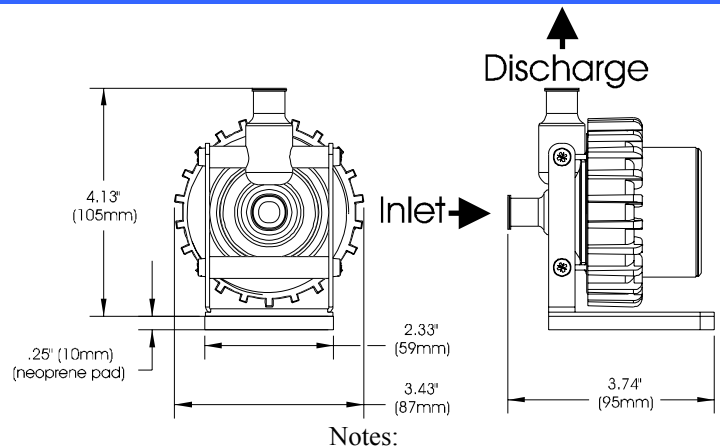
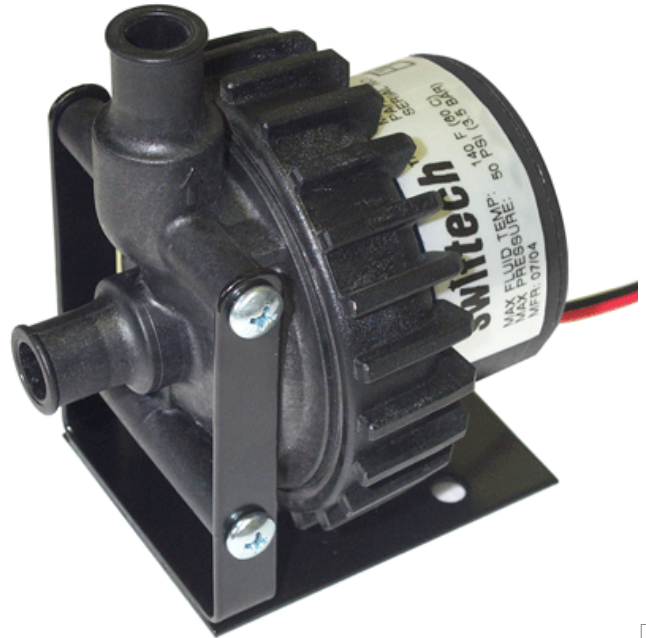
- Determine the best location for your pump by observing how the tubing will be routed to the rest of the circuit. Sharp bends in the tubing should always be avoided to prevent kinks, which will reduce or completely prevent flow of the cooling fluid.
- In general, we recommend installation of the pump at the bottom of the chassis.
- The base of the pump features a soft neoprene pad coated with **strong** adhesive material. Only once the final location for the pump has been determined, go ahead and peel-off the pad's protective paper, and press the pump against the chassis surface. The surface should be clean, and non greasy. Thru-bolts are also provided for permanent installation, and require drilling holes in the chassis.
- The back of the pump features a potentiometer to allow users to vary the pump speed from 1800 to 4800 rpm. Full speed is suggested for maximum performance. When reducing the pump speed, the operating noise will also decrease proportionally, but so will the performance. A flow rate chart is provided below

C. Precautions

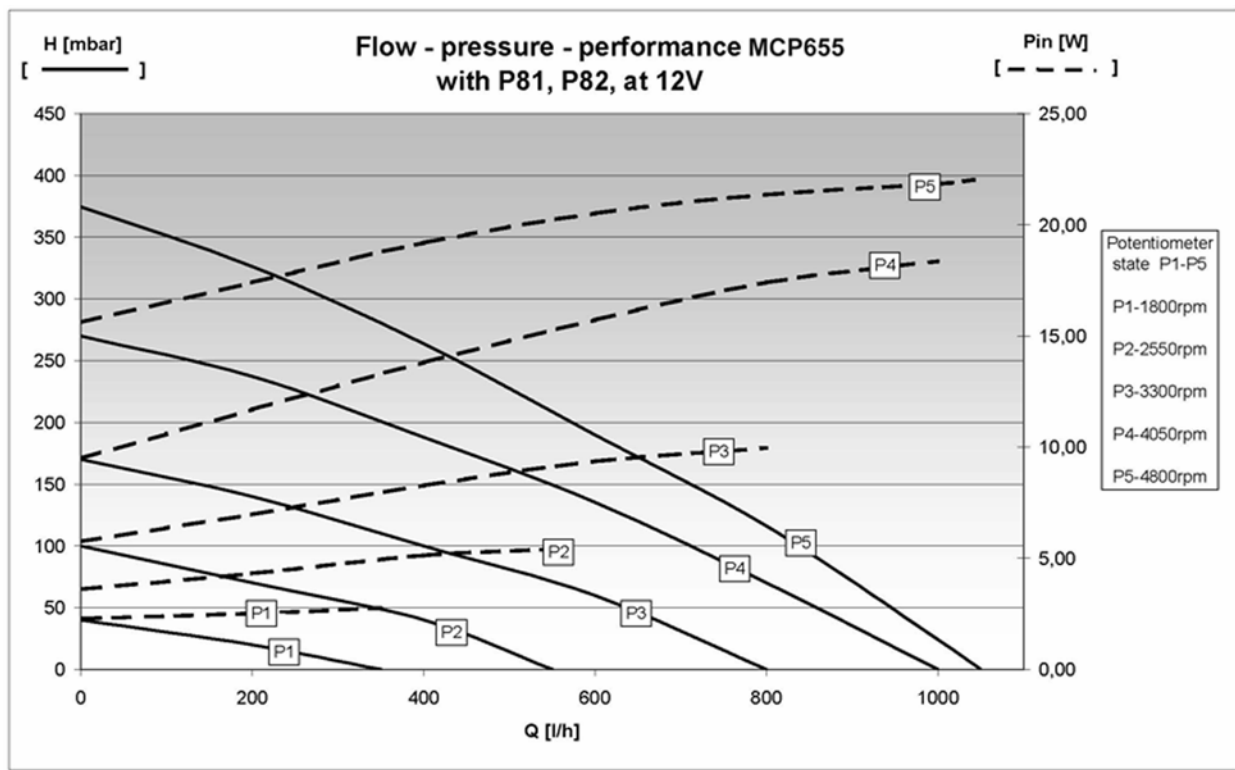
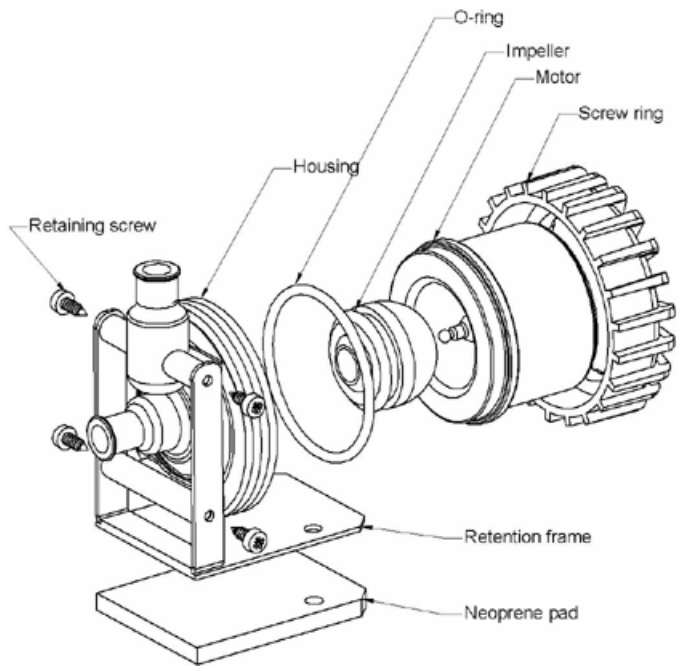
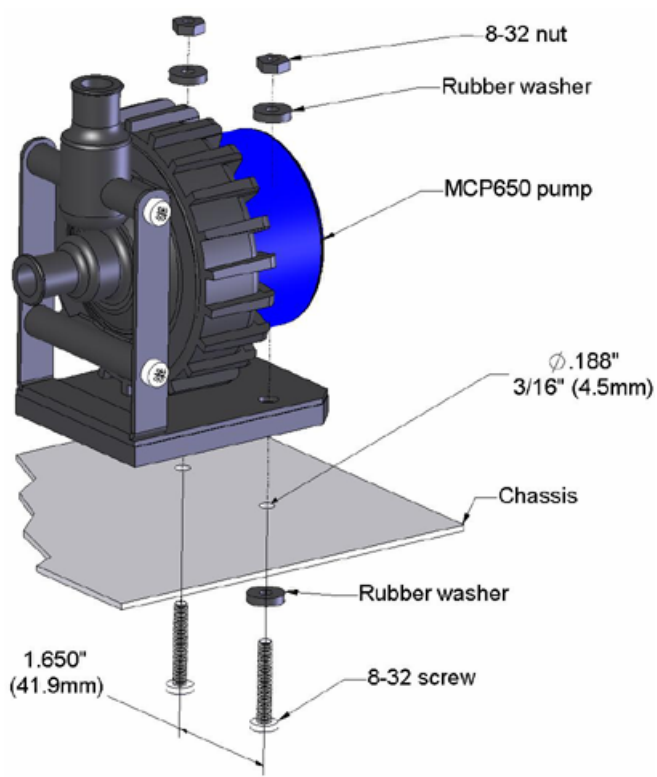
The MCP655 pump should never be run dry, even for a quick test. You should always prime the pump with fluid before you start operating it (see warranty note *).

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

Error!



- Always make sure to directly connect the RESERVOIR DISCHARGE to the PUMP INLET.
- Please refer to paragraph 2.6 for an important note concerning connection of the tubing to the pump.



5. 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

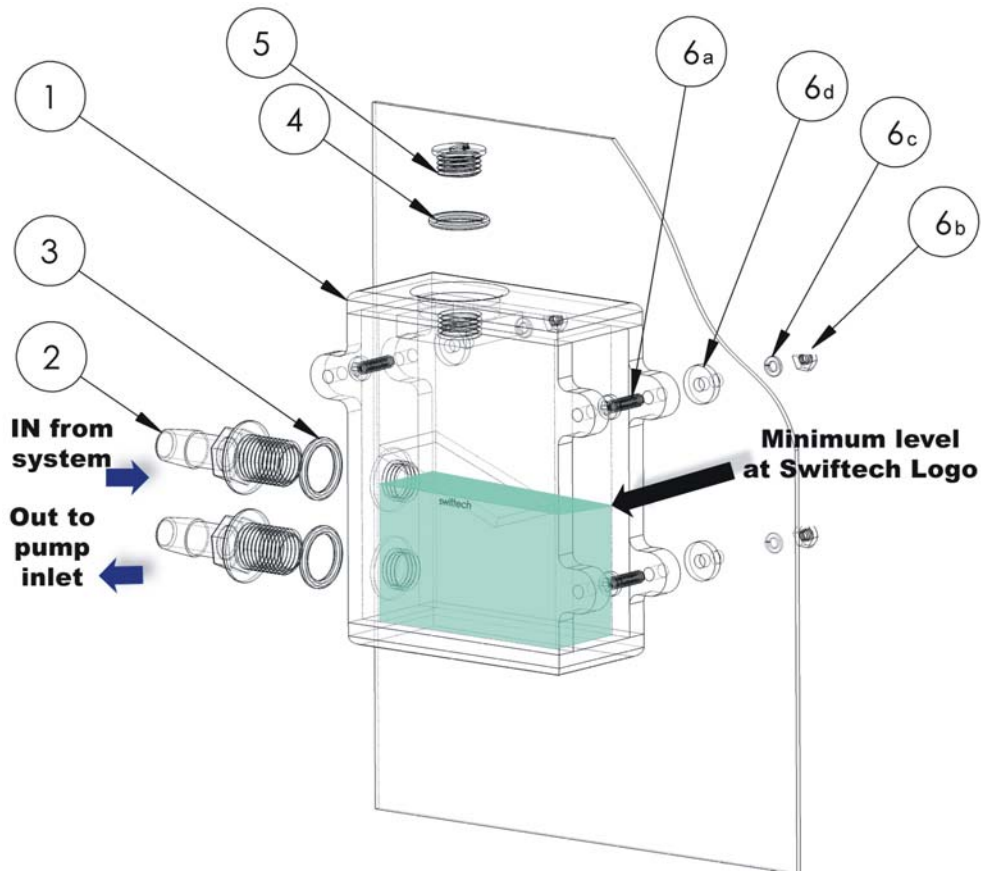


Figure 1

A. Installation

The MCRES-MICRO can be installed in any suitable location meeting its form factor requirements. For filling and bleeding purposes, it is preferable to hold or to install the MCRES-MICRO at the highest point of the liquid cooling loop. However, once filled and hermetically closed, the reservoir can be installed practically anywhere as long as it is kept upright as shown in figure 1. Also, to facilitate the filling and bleeding operations, you might want to wait until the circuit has been filled-up before you fasten the reservoir permanently to the chassis.

B. Fastening the device to the case

- Two mounting methods can be used
 - Permanent mount with the provided mounting hardware as shown in figure 1. Three holes will need to be drilled for a permanent mount. Simply use the reservoir as a template to mark the hole locations, and use a 0.150” (4mm) drill bit to drill the holes. Make sure to clean up any metal shavings from the case once you are done.
 - Easy mount, with the provided Velcro strips. This is a fairly secure mount, as we use extra strong Velcro. However, if your computer is to travel often (LAN parties for example), a permanent mount remains more suited for a more reliable fastening of the device.
- The only critical precaution to take when installing the reservoir is to make sure that the discharge line (“Out to pump inlet” in figure 1) is 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.

6. TUBING INSTALLATION

A. Preamble: difficult installation of the tubing with the MCP655 pump

Once your radiator, pump and reservoir are in place, it is now time to connect all the elements of the circuit together. Your kit comes with 7/16” ID (5/8” OD) tubing. This type of tubing was specifically selected following suggestions made by our enthusiast users because it offers very low flow restriction, similar to that of true 1/2” ID tubing, without the bulk of true 1/2” (which is 3/4” OD and therefore hard to work with). This tubing will fit easily onto standard 1/2” barbs EXCEPT for the MCP655 pump. In effect, the design of the hose barbs on this pump makes it quite difficult to install this slightly smaller tubing. Two things can be done to ease this process:

- Rub the pump barbs with liquid soap to make them slippery
- Soften-up the extremity of the tubes by dipping them in a glass of boiling water for about 20 to 30 seconds (boil some water in a microwave oven, then dip the extremity of the tube).

Then work the tube around the pump hose barbs by pushing it firmly. Be patient, it is not easy but it does work.

B. 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, and mixing the content of the bottle to 1/2 l of distilled water only. 1/2” a liter is normally sufficient to fill-up a typical cooling loop.

C. Precautions of use with the MCRES-Micro reservoir

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. 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.

D. Pre-cutting the tubing to length and tube routing

With all the components in place, it will be easy to estimate the length of tubing segments necessary between each component.

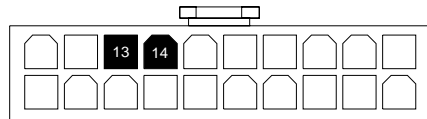
The following table shows a typical tube routing. This setup may change depending on the relative position of the components inside your chassis. The only strict requirement is that the reservoir discharge be always connected directly to the pump inlet (“directly” should be understood as “with no other components in between the reservoir and the pump”)

Reservoir discharge to pump inlet	Pump discharge to Radiator inlet	Radiator discharge to CPU Water-block inlet	CPU Water-block discharge to reservoir inlet	Loop completed
-----------------------------------	----------------------------------	---	--	----------------

Connect the tube segments to the components, and secure them with the provided hose-clamps.

E. Re-installing your computer power-supply

Prior to fill-up the circuit, you will need to re-install your power-supply in order to start-up the pump during the fill procedure. You must be able to start the PSU without it being connected to the motherboard. While the Internet contains numerous references on how to use a paper-clip to short-out pin 13 and 14 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, www.Directron.com, www.newegg.com, etc.).



F. 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.
- **Allow the fluid to fill-up the tubes by gravity AT LEAST past the pump. In effect, the pump inlet and outlet must be full of fluid in order for the pump to operate properly.**
- Once the reservoir is full, seal the fill port back with its cap in order to avoid any spills, and start-up the pump: the reservoir will quickly (within 1 second) empty itself. **Immediately turn off the pump** as you do not want the pump to run dry (without fluid) which will damage it rapidly;
- Top-off the fluid in the reservoir to the maximum level, and restart the pump. You need to repeat this operation 3 to 4 times, until the circuit is finally full of coolant.
- Then, allow the system to run 20 to 30 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, and you may permanently install the reservoir.
- **Allow the system to run for 3 to 6 hours and frequently inspect all your connections for possible leaks before you electrically reconnect your PC components (motherboard, hard drives, etc.)**

G. Post-installation note: Draining the system

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.

Do not forget to open up the fill-cap from the MCRES-MICRO to allow the fluid to completely escape.

7. ELECTRICAL CONNECTION: TEC TO S320-12 POWER-SUPPLY

Now that your liquid cooling circuit has been leak proofed, you can safely proceed with the connection of the TEC device to the S320-12 meanwell power supply.

- ❑ Your TEC module has been measured to draw 18 amps at 12 volts, whereas the S320-12 is rated for 25 amps. If you need to, you can thus connect other devices to this power supply, drawing up to 6 amps (~70 Watts at 12 volts). Note that the more current you draw on this unit, the more heat it will develop. Proper ventilation is therefore of the utmost importance to guarantee a long life to your component.

- ❑ The TEC module is provided with “bare wires” to facilitate installation with screw type terminals such as featured in the S320-12 power supply
- ❑ Connect red wire from TEC module to the +V terminal, and black wire to the –V terminal as shown in figure 10 below



Figure 10

A euro-style connector is provided with your kit in case you needed to extend the wires of the TEC to the power supply. Please only use 16 gage stranded wire. Note another method to connect the extensions to the existing wires is to use terminal splices, or solder the butts, and insulate them with shrink tubing.

CRITICAL RECOMMENDATIONS MUST READ!!!

Never run a thermoelectric module without coolant flowing in the circuit. This will result in catastrophic failure of the cooling element, and may cause any/all of the following:

- *Tubing to burst open due to coolant overheating*
- *Permanent failure of the Peltier module*
- *Permanent damage to the CPU and/or motherboard due to excess heat*

If you run your computer unattended for extended periods of time, it is also a good practice to setup an alarm temperature, which will shut down the computer in case the CPU overheats. Such alarm/shut down process must be tested and fully functional.

WARNING! Wires from the thermoelectric module **do get hot** (this is normal). Make sure that the wires do not touch devices that are heat sensitive, such as vinyl tubes for example. Heat from the wires may cause the vinyl to deform, and/or to burst.

III. PERIODIC MAINTENANCE

A. Keeping your system clean

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.

B. Fluid Level

Inspect the level of liquid inside the circuit, and refill if necessary. Evaporation in this closed circuit is extremely limited, but still present due to permeability in the vinyl lines.

Every 12 to 18 months or as necessary: top-off the fluid with a mix of distilled water and 5 to 10% Hydrx fluid.

C. Draining the system

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. Do not forget to open up the fill-cap from the MCRES-MICRO to allow the fluid to completely escape.