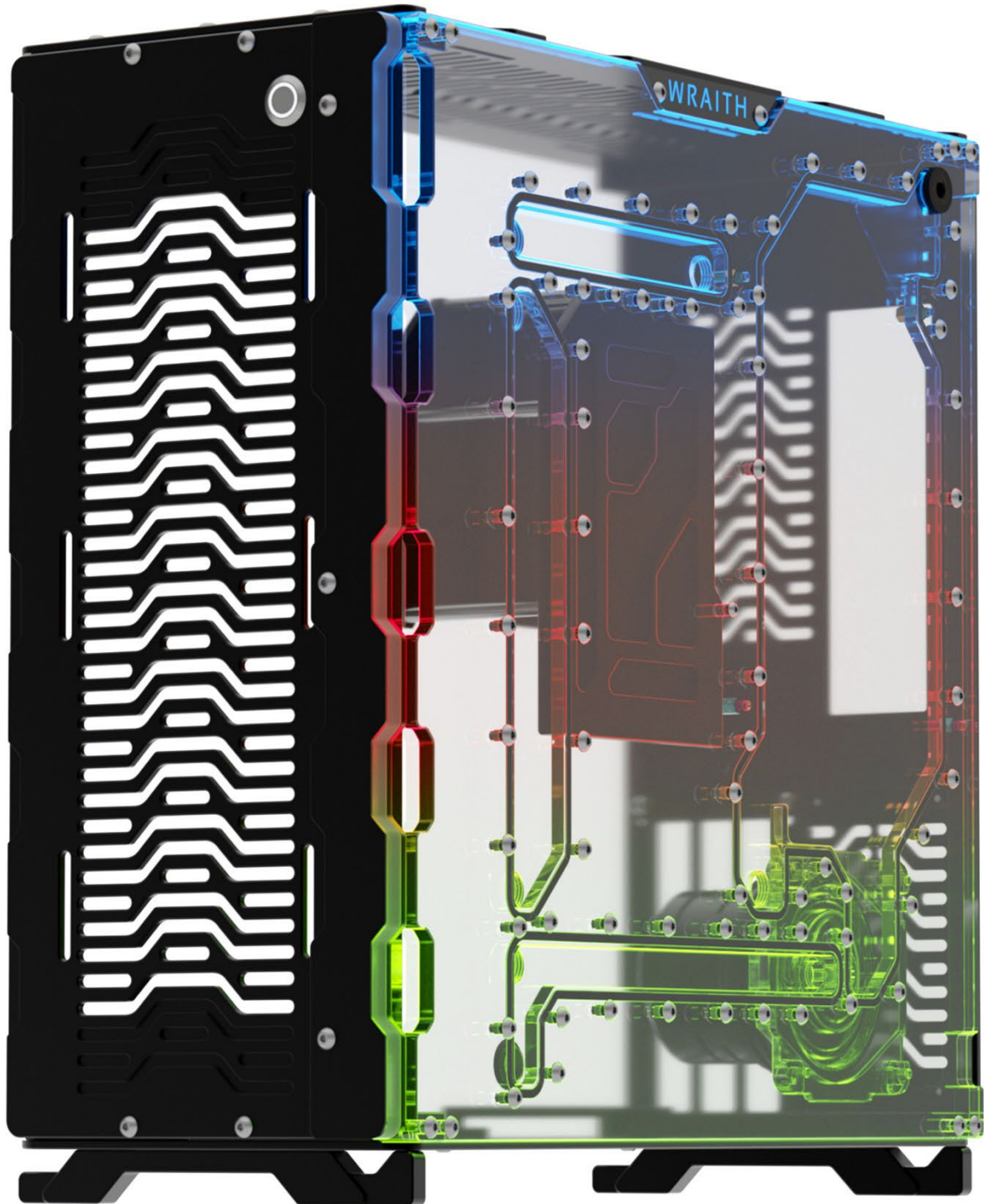


# WRAITH 2.0



# MANUAL

Revision 1.00

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## IMPORTANT: Wraith 2.0 Warranty

### Wraith 2.0 has a limited 2-year warranty.

Welcome to Singularity Computers and your new Wraith 2.0! We look forward to seeing what you create.

1: The Integrated Liquid Cooling System is pressure tested at the factory, so there is no need to adjust the fasteners on the manifold. Take care not to over tighten any fasteners on the acrylic. As soon as you feel any significant feedback or tension go no more than 1/4th of a turn past it. On the metal parts you can tighten normally. We are not responsible for damage caused by over-tightening the fasteners.

2: Any thread stripping, cross threading or thread damage of any kind will not be covered under our warranty. All threads are pre-tested. We use stainless steel fasteners which are extremely tough.

3: All acrylic is carefully checked for scratches, marks or particles as the manifold is assembled. We are not responsible for mistreatment of the acrylic. Only clean with a microfiber cloth and use nothing except distilled or deionized water for cleaning, or Novus Plastic Cleaner. Damage caused by cleaning agents (particularly alcohols or solvents) is not covered under warranty.

4: Acrylic Surface Guarantee: Marks on acrylic which cannot be wiped away with a microfiber cloth will only be covered under warranty under the following conditions: That they did not occur after the item was shipped from the Singularity Computers Factory or Retailer. If there are more than 10 marks which are beyond 5mm in length and visible when facing perpendicular to the surface. Evidence of this must be photographed in detail and photographs must be taken perpendicular to the surface. Marks must be easily visible in photographs; subtle marks will not be covered.

5: For the latest coolant recommendations please visit <http://bit.ly/sc-important-info>. We are not responsible for staining of the acrylic, but it has never been an issue with our products. Most staining will be easy to remove by flushing out the loop with distilled water for 24hrs or using Mayhems Blitz. If you are concerned about staining then we suggest Mayhems Non-Stain Dyes.

6: Any damage which occurs after the item leaves the Singularity Computers Factory or our Retailers is not covered under warranty. We are not responsible for shipping damage or mishandling.

## Introducing Wraith 2.0

Singularity Computers Wraith 2.0 is a compact case capable of housing a high-end liquid cooled system. Since Wraith was originally launched, we have been developing Wraith 2.0 with the features customers have requested. Every part of the case has been redesigned with updated aesthetics. Wraith 2.0 has three expansion slots, more space for SFX-L PSUs, a PCIe 4.0 Vertical GPU Riser, increased ventilation and many design tweaks to improve performance and component compatibility.

The Distribution Plate has been redesigned including updates to the reservoir for improved filling and bleeding of the loop. All metal components have been redesigned. Wraith 2.0 has two PSU locations, the one on the rear panel is for a future Wraith 2.0 version and addon which is coming for the case but cannot be used with the distribution plate.

## Design & Engineering

We are all experienced system builders at Singularity Computers having built high end water-cooled systems for over 15 years. Our approach to product development begins with a need for our own builds and so the origin is always function. From there we start to build ideas around this function and the aesthetics and everything else follows. The original ideas for our products came from years of building highly customized, high end water-cooled systems and trying to reduce the exceptionally long build times and complexity. Our approach to development is hands on, we are using our own products every day.

## Manufacturing & Quality

Almost all components of Wraith 2.0 are CNC machined from a solid block of material. There is no hidden or back side, and this also goes for the components being installed. Due to this we selected the most high-end materials manufacturing process. The Distribution Plate is machined on a CNC router built from thick sheets of cast acrylic. It is hand assembled with silicone gaskets and stainless-steel fasteners, and pressure tested. The metal components are machined with Extreme Precision from solid blocks of 6061 aluminum on a CNC mill then sand blasted and anodized.

## Lighting

Wraith 2.0 has the best lighting features of any case in the industry. There are two integrated 30cm (11.81") LED Strip positions. Even one LED strip will make the entire case glow. With UV lighting and UV reactive coolant you can make your coolant glow. There are endless lighting possibilities to experiment with.

## Features

### Integrated Liquid Cooling Features

Reservoir, D5 Pump Top, D5 Pump Cover, Fill Port, Drain Port, parts of the cooling loop.

### Reduced build time due to integration

With the pump, reservoir, fill and drain ports and half of the water-cooling loop integrated there is less assembly to be done. Also, less fittings and tube are needed.

### Integration Cost Component

A large portion of the case cost is due to the integration; these are components you do not have to purchase for your build. The pump top, pump cover, reservoir, less fittings, and tube.

### Compatibility

Theoretically the more integration the less compatibility. For Wraith 2.0's integration each port was positioned based on an average of a vast range of components and build designs.

### Integration & Optimization

With the integration we did not just develop a case, we also developed all the integrated components. This meant that we could focus more on optimization than would normally be possible. The integrated loop routes in Wraith 2.0 allow for more flow than 16mm tubes. The pump top was designed for the D5 pump, maximizing flow to and from the distribution plate. The reservoir was designed to remove air as quickly as possible making the loop easier to fill. The fill port is at the highest point on the back for the case and the drain point at the lowest point.

### High End Components

Despite its compact size Wraith 2.0 is designed to fit a high-end liquid cooled build. It can fit the largest high-end GPUs and the largest SFX-L PSUs. For the water-cooling system it can fit 2x 240mm radiators 30mm thick with a single set of fans and the D5 pump.

### Radiator Adjustment

The radiator mounting panels have a large range of adjustment to help with port alignment to the distribution plate.

### Storage

Wraith 2.0 has 9x 2.5" drive positions and 1x 3.5".

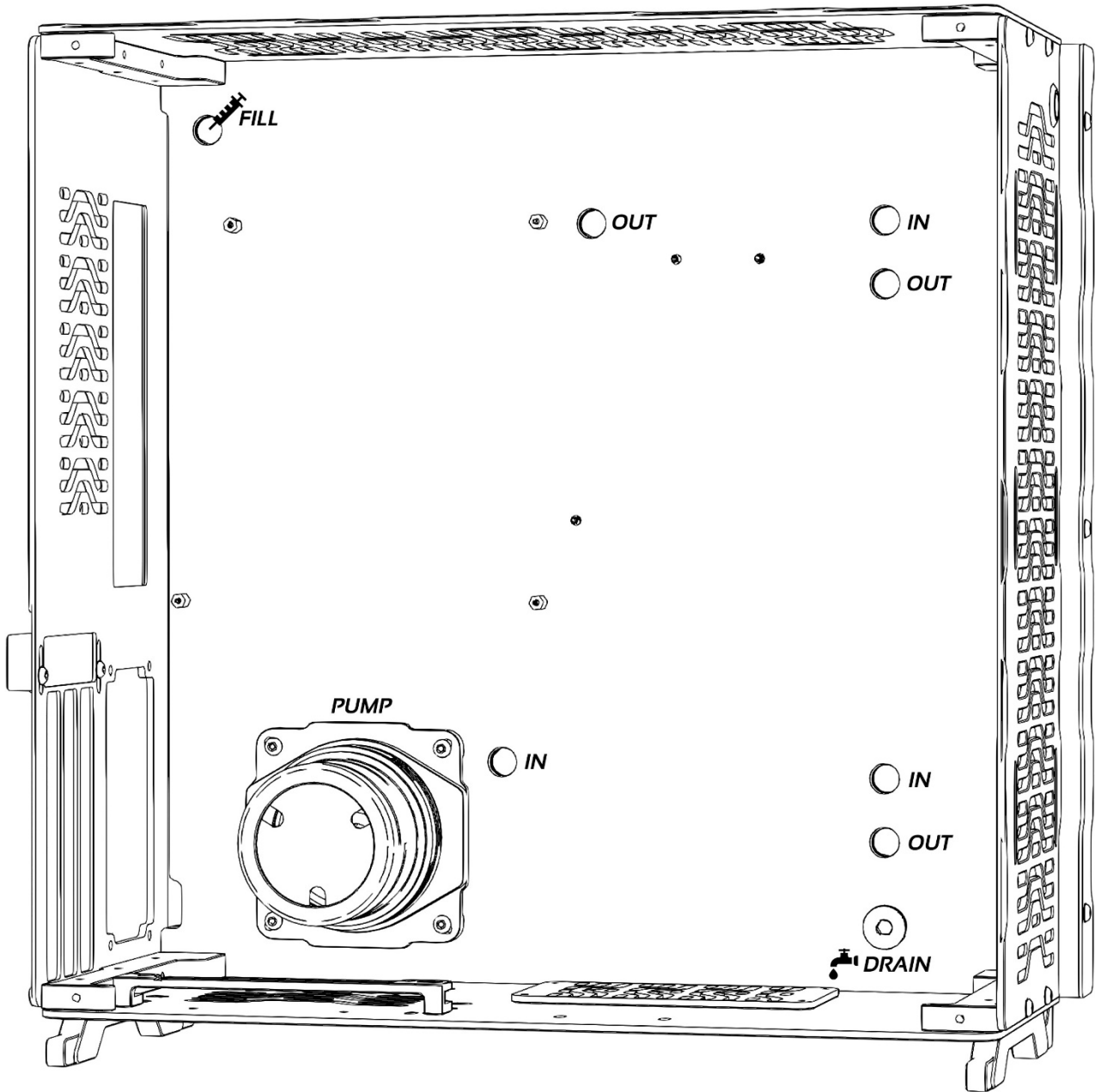
### Two PSU Mounting Locations

There is a PSU mounting location toward the front of the case on the bottom panel and at the back of the case on the rear panel. The front PSU location is more for Wraith 2.0 allowing space for the integrated pump, the rear PSU location is more for Wraith 2.0 Volta allowing space for pump/reservoir combos mounted onto the inside of the front radiator. Only the front PSU location can be used with Wraith 2.0 to make room for the pump but on Wraith 2.0 Volta either PSU location can be used. The benefit of the front PSU location is you can fit an extra 3.5" HDD, and the benefit of the rear one is that you can fit larger pump/reservoir combos. It also depends on your build layout and how you want it to look.

## Specifications

<b>Motherboard Form Factor</b>	Mini-ITX, Mini-DTX
<b>Case Dimensions</b>	407mm x 407mm x 170mm (Including legs)
<b>Package Dimensions</b>	450mm x 500mm x 120mm
<b>Case Weight</b>	7 kg
<b>Case Packaged Weight</b>	8 kg
<b>Expansion Slots</b>	3x
<b>Storage</b>	2.5" x9   3.5" x1
<b>PSU Compatibility</b>	SFX, SFX-L
<b>Maximum PSU Length</b>	Up to 170mm long   Without Top Cable Shroud any SFX-L PSU size can be used with no limitation.
<b>Radiator Top</b>	240mm x 30mm
<b>Radiator Front</b>	240mm x 30mm
<b>Maximum GPU Length</b>	300mm
<b>Maximum GPU Thickness</b>	3 slots
<b>Maximum GPU Width</b>	Fits any available wide GPUs
<b>Maximum CPU Cooler Height</b>	130mm
<b>Front Panel I/O</b>	Vandal Switch 16mm
<b>Fittings Compatibility</b>	G1/4" BSPP Standard
<b>Fittings</b>	Click <a href="#">here</a> for more details
<b>Pump Compatibility</b>	All D5 pumps (Pump not included)
<b>Vertical GPU Mount</b>	1x Singularity Computers PCIe 4.0 Bracket & Riser Cable
<b>Materials</b>	6061 Anodized Aluminum, Cast Acrylic, Stainless Steel
<b>Manufacturing Process</b>	CNC Router, CNC Mill, CNC Lathe

# Wraith 2.0 Liquid Cooling System Layout



## Table of Panels, Accessories & Fasteners

### Panels

	Name	Quantity	Page Reference
<b>A</b>	Top Panel	1	9
<b>B</b>	Bottom Panel	1	9
<b>C</b>	Front Panel	1	10
<b>D</b>	Rear Panel	1	11, 15
<b>E</b>	Corner Pieces	4	9
<b>F</b>	Feet	2	9
<b>G</b>	LED Diffusor	1	10
<b>H</b>	LED Shroud	1	10
<b>I</b>	Manifold	1	12
<b>J</b>	Drive Mount	1	13
<b>K</b>	Cable Shroud	1	13
<b>L</b>	Side Panel Window	1	15
	Rear I/O Block	1	11
	Struts	5	13

### Accessories

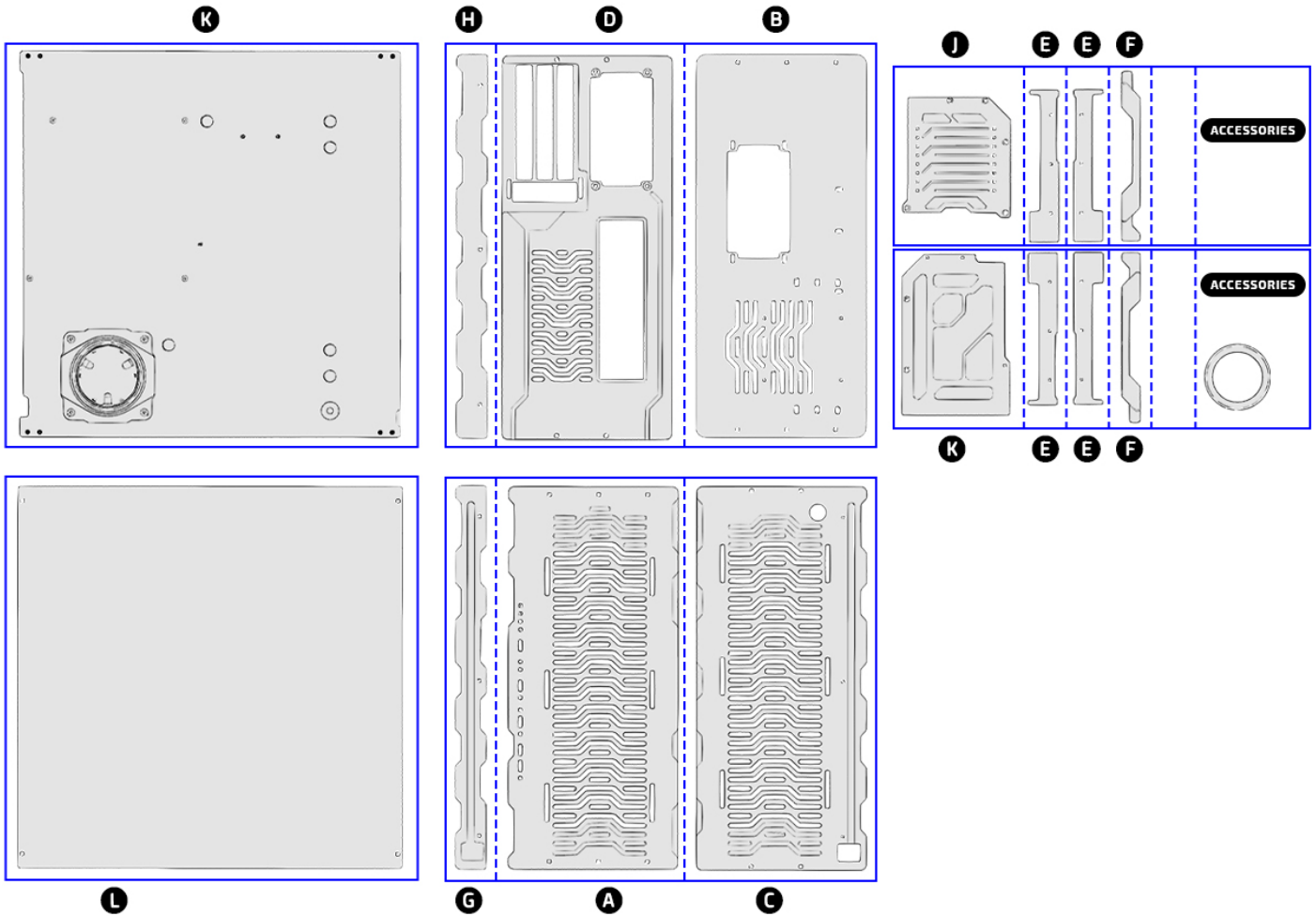
Name	Quantity
Vertical GPU Mount	1
30cm DRGB LED Strips	2
D5 O-Ring	1
Power Button	1
Power Cable	1

### Fasteners

Type	Quantity
M3 x 6mm	24
M3 x 8mm	5
M3 x 25mm	5
M4 x 6mm	2
M4 x 10mm	24
M4 x 14mm	3
M4 x 25mm	8
6-32 x 0.25"	10

Turn to next page for **Panels Layout Diagram**.





### Assembly Tolerances & Alignment

Wraith 2.0 uses CNC machining and very thick materials. This means it is manufactured with extreme precision and there is no flex or play in any of the materials. Due to this we have built in tolerances to most mounting holes to allow for the looser tolerances on the components being installed. If a component does not align then loosen the related fasteners and you will be able to align it. All of the outer panels have a tolerance built in so that they can be used for alignment also.

### Tools Required

- M4 Allen Key
- M3 Allen Key
- 6-32 Hex Key
- Fill & Drain Tubes

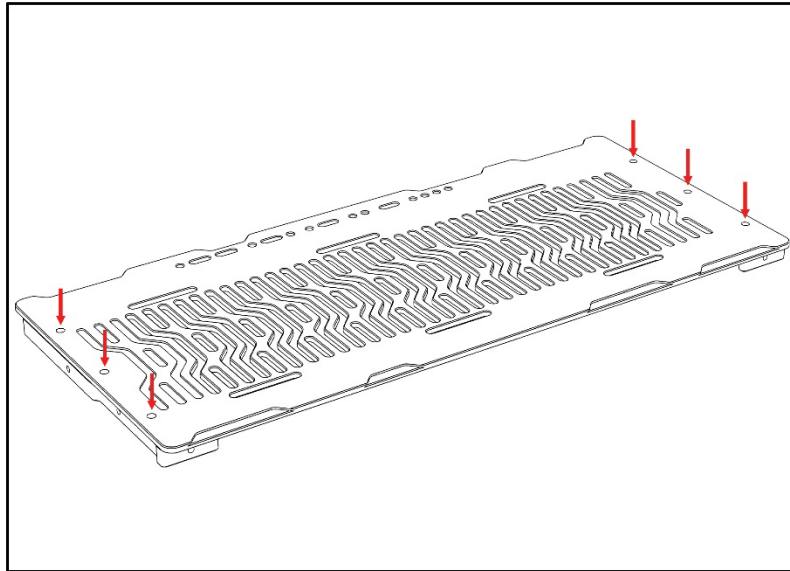
**Note:** Tools listed are not included, unless otherwise specified.

## Step 1 - Attach Corner Pieces to Top Panel

### Parts Involved

- **A** Top Panel x1
- **E** Corner Pieces x2
- M4 x 10mm Button Head Fasteners x6

Attach the corner pieces to the top panel using x6 M4 10mm Button Head Fasteners.

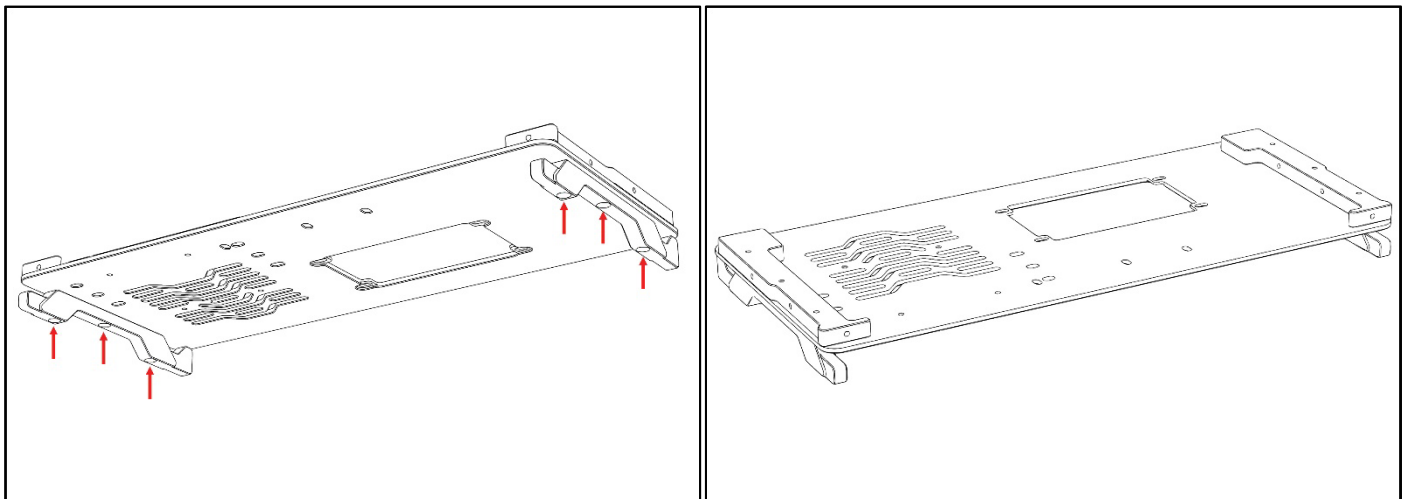


## Step 2 - Attach Corner Pieces and Feet to Bottom Panel

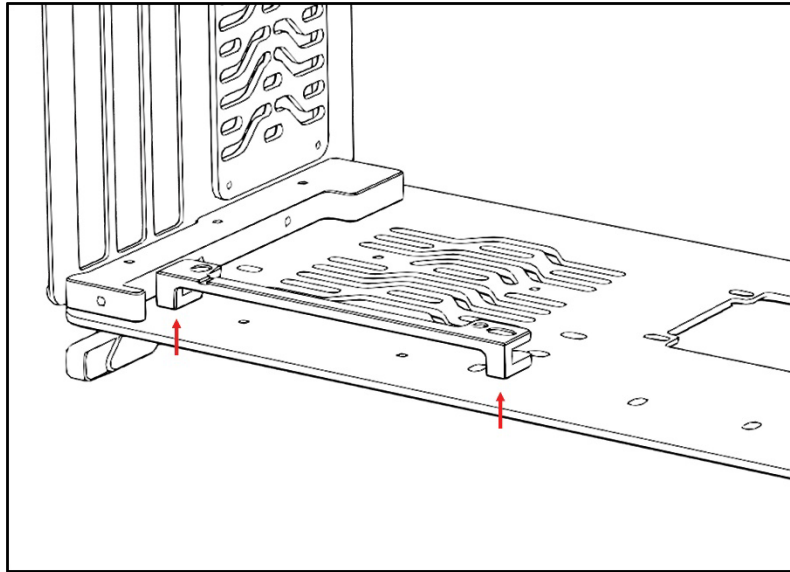
### Parts Involved

- **B** Bottom Panel x1
- **E** Corner Pieces x2
- **F** Feet x2
- Vertical GPU Mount
- M4 x 10mm Fasteners x6
- M4 x 6mm Fasteners x2

Attach the Corner Pieces to the Bottom Panel using x6 M4 10mm Fasteners in the marked holes below.



Attach Vertical GPU Mount to bottom panel in the position marked in the diagram below using x2 M4 6mm fasteners.



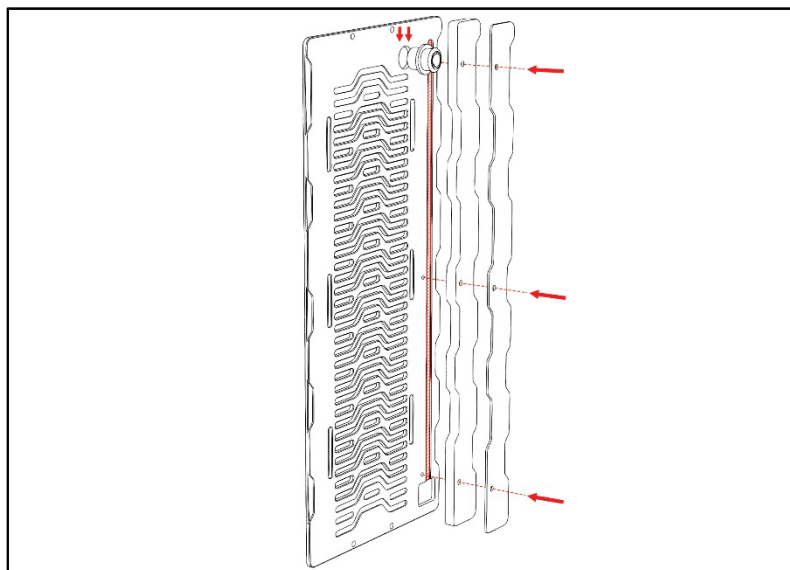
### Step 3 - Attach LED Diffusor and LED Shroud to Front Panel

#### Parts Involved

- **C** Front Panel x1
- **G** LED Diffusor x1
- **H** LED Shroud x1
- 30cm LED Strip x1
- Power Button x1
- M4 x 14mm Fasteners x3

Remove the adhesive backing from the LED strip and attach it to the LED strip position highlighted in the diagram below. Route the cable through the cable routing hole at the bottom of the front panel. Attach the LED Diffusor and LED Shroud at the same time using x3 M4 14mm Fasteners. Do not over tighten fasteners on acrylic.

Install the Power Button into hole as shown in the diagram. Use the included O-ring on the inside of the panel and tighten the retention ring onto it.

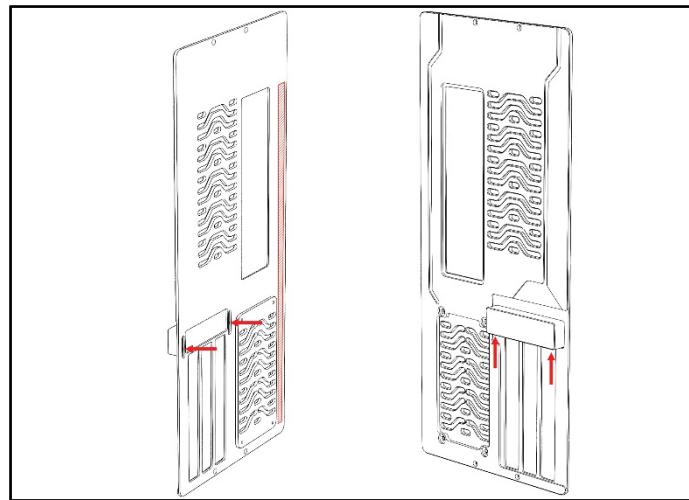


## Step 4 - Attach Rear I/O Block to Rear Panel

### Parts Involved

- Rear I/O Block x1
- **D** Rear Panel x1
- 30cm LED Strip x1
- M4 x 6mm Fasteners x2
- 6-32 x 0.25" x3

Attach the Rear I/O Block to the Rear Panel using x2 M4 6mm Fasteners. The Rear I/O Block is adjustable so that you can fit your GPU into position. Use x3 6-32 x 0.25" Fasteners to attach your GPU to the Rear I/O Block during building the system. Remove the adhesive backing from the LED strip and attach it to the LED strip position highlighted in the diagram below.

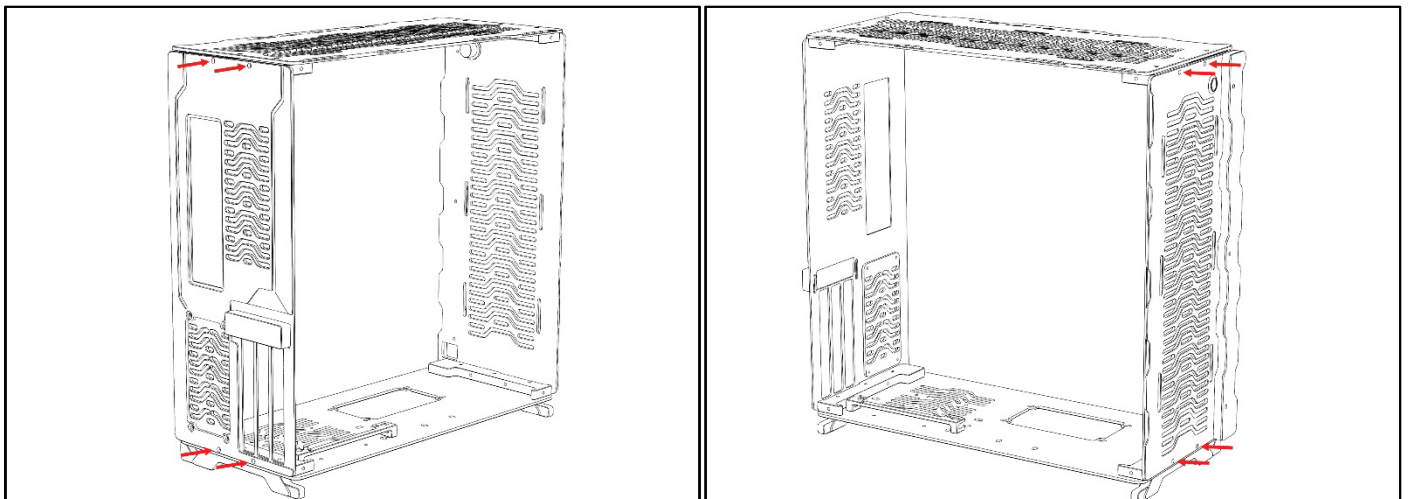


## Step 5 - Assemble Wraith 2.0 Outer Panels

### Parts Involved

- Front Panel Assembly x1
- Top Panel Assembly x1
- Bottom Panel Assembly x1
- Rear Panel Assembly x1
- M4 x 10mm Fasteners x8

Attach Front, Rear, Bottom and Top Panel assemblies to each other via the Corner pieces (which should already be installed) using x8 M4 10mm Fasteners.

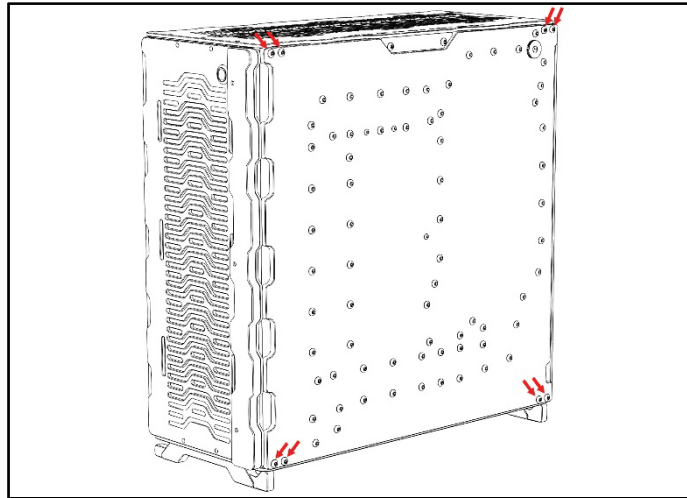


## Step 6 - Install Wraith 2.0 Manifold

### Parts Involved

- Wraith 2.0 Metal Parts Assembly x1
- M4 x 25mm Fasteners x8
- **1** Wraith 2.0 Manifold x1

Put the Wraith 2.0 Metal Parts Assembly onto its side so that it is horizontal with the Corner Pieces facing so that the side with the two holes is facing upwards. Install the Wraith 2.0 Manifold into the Wraith 2.0 Metal Parts Assembly. If the Manifold does not fit then loosen off some of the fasteners holding the outer panels onto the Corner Pieces. Use x8 25mm M4 Fasteners to attach the Wraith 2.0 Manifold to the Corner Pieces. Do not over tighten fasteners on acrylic.



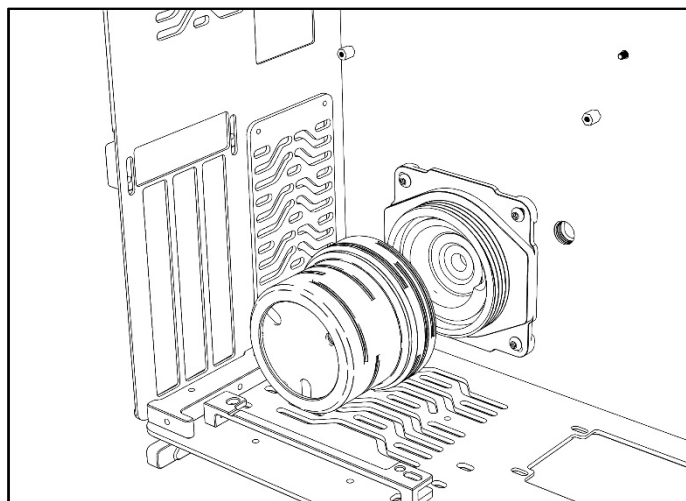
### D5 Pump Installation

Install your D5 Pump into the included pump cover (D5 pump not included). Make sure to fit the included O-Ring into the Wraith 2.0 D5 Pump Top before installing the pump. Check that the O-Ring is properly placed inside of the O-Ring groove, it may be best to do this while the case is laying on the manifold side so that the pump top is horizontal. Then tighten the pump cover onto the pump firmly.

### Pressure Testing

We strongly recommend pressure testing with an air pressure tester prior to filling your loop.

For pressure testing we recommend up to 8.7 PSI (0.6 bar).

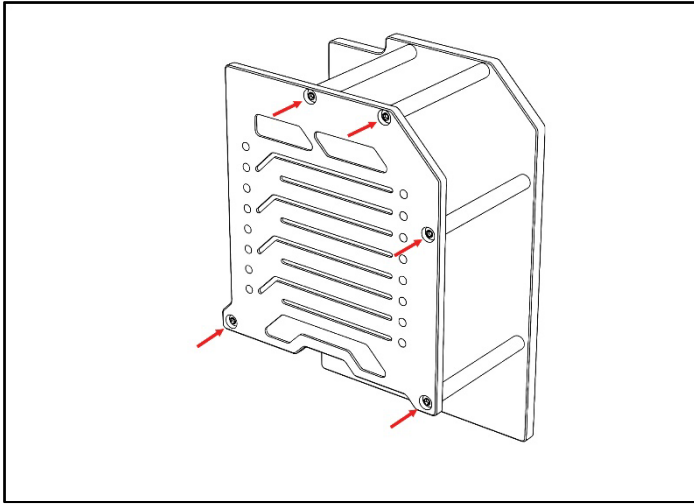


## Step 7 - Assemble Cable Shroud/Drive Cage and attach it to the case

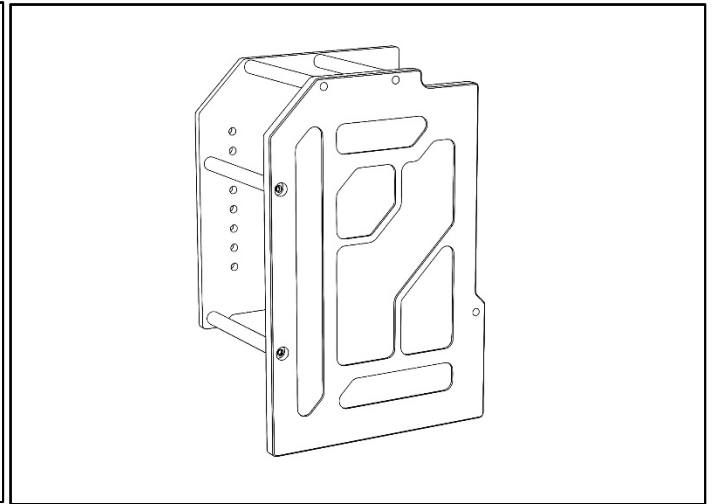
### Parts Involved

- Struts x5
- **J** Drive Mount x1
- **K** Cable Shroud x1
- M3 x 25mm Fasteners x3
- M3 x 8mm Fasteners x5
- M3 Thread Insert x4

Attach the x5 Struts to the Drive Mount using the x5 M3 8mm fasteners with arrows in diagram 1.

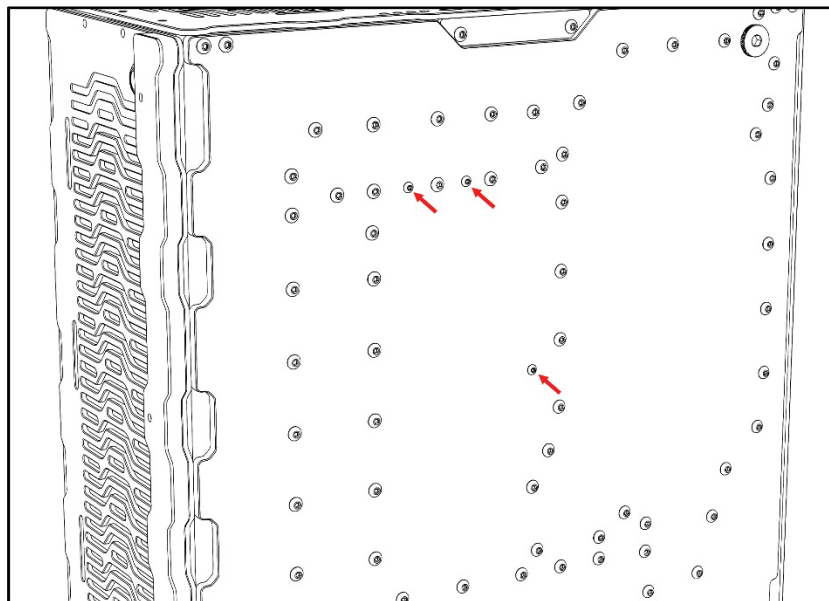


**Diagram 1**



**Diagram 2**

Push the 3x M3 x 25mm fasteners through the distribution plate and then push the Cable Shroud onto the end of the fasteners. Then attach the Drive Mount (which should now have the Struts attached to it) to the 3x M3 x 25mm fasteners sandwiching the Cable Shroud in between.

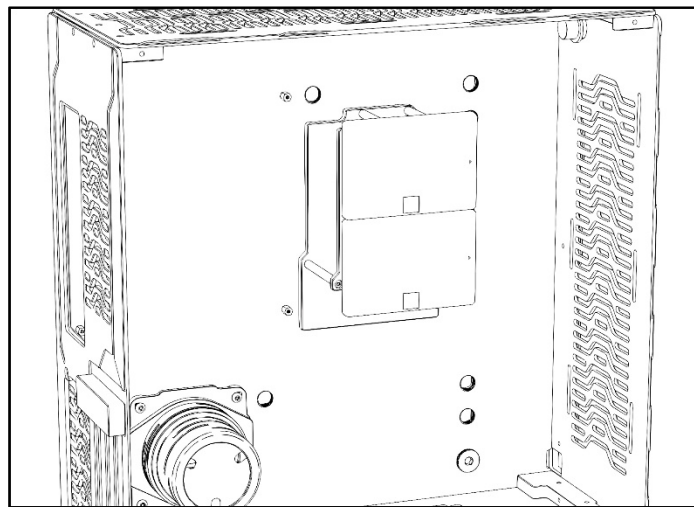


**Diagram 3**

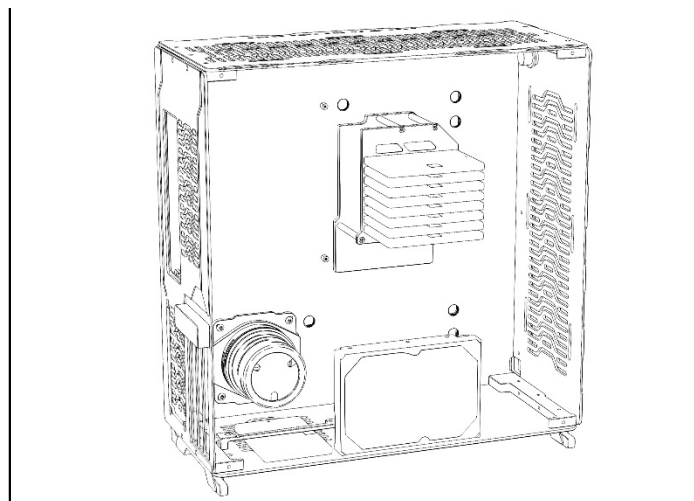
## Drive Installation

There are 9 mounting positions for 2.5" drives, 8 on the Front Cable Cover and one more on the Bottom Panel under the Vertical GPU Mount. To install drives onto the Front Cable Cover you may not need to remove it because you can reach around the back. If you need to remove it then you will need to undo it from the manifold not from the front. Undo the 5 fasteners from the back of the manifold and remove the entire Cable Cover assembly together with the Stand Offs. Then you can easily access the rear of the Front Cable Cover to install your drives. There are two mounting orientations for 2.5" drives on the Front Cable Cover, one is for aesthetics and the other is for maximum drive capacity. For the aesthetics configuration you can lay two drives flat. For the maximum capacity configuration install the drives on their edge.

Wraith 2.0 also has one 3.5" drive position in-front of the GPU for a side mounted 3.5" drive.



**Drive Configuration 1**



**Drive Configuration 2**

## Step 8 - Side Panel Window Installation

### Parts Involved

-  Side Panel Window x1
- M4 x 10mm Button Head Fasteners x4

Attach the Side Panel Window to the Corner Pieces using the x4 M4 12mm Fasteners.

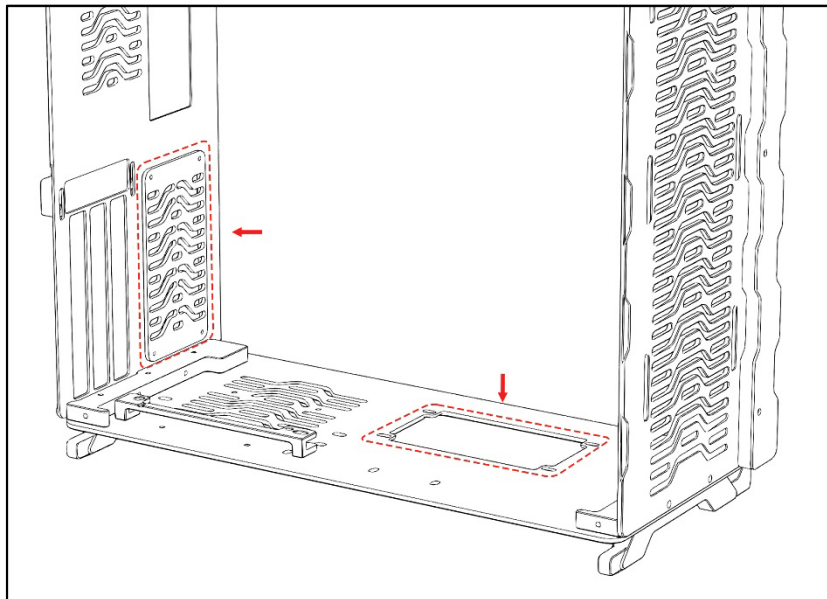
## Step 9 – Install PSU

### Parts Involved

- PSU Cover
- Wraith 2.0 90° Power Cable
- 6-32 x 0.25" Fasteners x4
- M4 x 6mm Fasteners x4

There are two PSU mounting locations on Wraith 2.0. The rear panel PSU mounting location is for Wraith Volta so you will need to install the PSU cover in this location using x4 6mm M4 Fasteners.

Mount the PSU onto the bottom panel PSU Mounting location using x4 6-32 x 0.25" fasteners. Alternatively, you can use the fasteners included with your PSU. Any SFX or SFX-L PSU will fit. You will need to use the included power cable which has a 90° connector to fit under the case.





## Filling & Draining The Loop



### Recommended Items

- Air Pressure Tester
- Long Fill Tube
- External Power Supply for D5 Pump

### Filling the Loop

We recommend air pressure testing before filling any loop. Air pressure should not surpass 0.6 bar.

To fill the loop, we strongly recommend a long fill tube. We use a 90-degree fitting with a barb fitting and a 200mm length of soft tube. This prevents spilling and helps to remove the air faster. Use an external PSU for your pump or jump start your PSU. Do not boot your system to fill the loop.

Fill the reservoir 100% and run the pump until the reservoir is almost empty (do not run the pump dry). Keep repeating until you have full circulation. Give some time for the final air to come out, it can take 30min to 48hrs depending on your build. Keep the fill tube on until all the air is out and then seal up the reservoir with a stop fitting.

### Draining the Loop

There are various options for drain valves. No drainage system will ever drain a loop 100%. The only way trapped coolant can be removed is the hard way in any build, dismantling the loop and individually draining each section.

For more information about Singularity Computers and our products, please visit/scan the following links:

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