SPECTRE 4 | SPECTRE 4
AEVUM
LIMITED EDITION

Assembly Manual

Revision 1.2

SINGULARITYCOMPUTERS

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Introduction

Spectre 4

Spectre 4 is the ultimate extreme water-cooling case with more water-cooling features than any case on the market. It continues the famous Singularity Computers water-cooling integration via a distribution plate which makes up the rear wall of the case. It has a PowerBoard which removes the need for cable management while integrating many features.

Spectre 4 introduces a new distribution plate design with two thicker 10mm layers and countersunk fasteners which enhances durability, quality, and aesthetics. The design for the 6061 CNC machined frame is completely new with greatly improved strength and updated aesthetics. The PowerBoard comes with a vast range of new features including improved lighting, temperature-based RPM control, separate PWM zones, dedicated PWM pump headers, PSU jump start for running the pumps, pump power headers, temperature sensor inputs and more.

Spectre 4 fits x2 360mm or 420mm radiators, it has a 140mm fan mount behind the motherboard to cool the rear of the CPU socket, two 2.5" drive mounts integrated on the PowerBoard (one is also compatible with 3.5" drives) and a touch activated power button. It also comes with dust filters on all fans positions and protective layers on the feet to protect your desk.

Spectre 4 Aevum Limited Edition

Aevum is a Time and Space themed limited edition (time being the 4th dimension). It is a heavily upgraded version of Spectre 4 with a new graphite anodizing color. The distribution plate is far more detailed and has a completely different design with more intricate machining particularly in the reservoir area. The rear covers and PSU shroud panels also have a more detailed design with extra glowing LED sections. Additionally, it comes included with an Aevum version of the front distribution plate and a 1920⁄480 60Hz IPS screen mounted on the PSU Shroud.

Features

- New frame design with greatly improved strength and updated aesthetics.
- 420mm or 360 radiators x2.
- 100mm thickness for radiators and fans.
- Much larger PSU shroud for long PSUs and cables.
- PSU shroud covers the pump.
- New distribution plate design with two 10mm layers and countersunk bolts.
- 140mm fan to cool the rear of the CPU socket.
- Dust filters on all fan positions.
- Glowing top and front panel layers.
- Multi layered top and front panels.
- Multi zone PWM hubs.
- Temperature based RPM control.
- RPM curve adjustment.
- Dedicated pump RPM and power headers.

- Temperature sensor inputs.
- 12pin header for addon devices.
- Improved ARGB and UV lighting.
- Standby lighting.
- Integrated PowerBoard 2.5" mount plus a 2.5"/3.5" mount.
- PSU jump-start for powering pumps only.
- Temperature sensor port.
- Internal drain port.

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. We then build ideas around this function and the aesthetics and everything else follows. The original idea for Spectre came from our 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. Development moves quickly and much of our focus is on Spectre, it is a constant process of improvement.

The aesthetics of Spectre originate from its function with one of the main aesthetic features (the distribution plate lighting) being something only made possible by the integration. We wanted the case to look skeletal and transparent enough to (in a way) disappear around the components. The metal components have been designed to enhance this with an extreme focus on detailed and complex multi sided CNC machining.

Manufacturing & Quality

Every component of Spectre is CNC machined from a solid block of material. With the level of transparency and being an open case, we wanted it to be a celebration of the raw materials. 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.

Specifications

|	
Water-cooling Integration	Reservoir, Pump Top, Pump Cover, Fill Port, Drain Port, Parts of water-cooling loop. Front distribution plate. Ports: x8 G1/4" BSPP. 1x Fill Port. 2x Drain Ports. Pump:(Not included): Compatible with all D5 pumps.
Electronics Integration	Connectors: 24pin x1. PCIE 8pin x4. 12VHPWR x2. 8pin EPS x4. PCIE 6pin Supplementary x1. (Equal inputs and outputs must be used). Hubs: PWM Fan Hubs x2 each with x1 input and x3 outputs. With coolant temperature-based RPM control or motherboard control Pump inputs and outputs x2. Each fan hub and pump output have coolant temperature-based RPM control or can be switched to motherboard RPM control. The built-in RPM control on the PowerBoard is independent of the motherboard and no software is needed. Dedicated PWM header for 140mm fan which can be mounted behind the motherboard (controlled by PWM fan hub 1). PWM Control: 4x potentiometers to set the minimum PWM speed. ARGB: x13 with one input. Temperature sensor inputs: x2 for up to two loops. Compatible any water-cooling brand plug temperature sensor or inline sensor if it is a 10K NTC thermistor. LEDs: x28 Integrated ARGB 90-degree LEDs and x28 UV 90-degree LEDs around the external perimeter of the PowerBoard. There are dip switches to turn the ARGB and UV LEDs on or off separately and stand-by UV lighting can be disabled. Power and Reset Buttons. PowerBoard direct mount 1 x 2.5" and 1 x 2.5"/3.5" SATA 3.0 6Gb/s accessible from the back of the distribution plate. 4pin ATX header to power up to two pumps with custom cables from the PowerBoard. 12pin header for future controller addon. PSU jump-start switch to run the pump/s without booting so that you can run only the pump for filling the loop. Screen: 1920⁄480 60Hz IPS. (Aevum only)
Cables	PowerBoard Linking Cables Standard Set: 24pin x1. 8pin EPS x2. 8pin PCIE x3 or 12VHPWR (Based on selected option). 18AWG Black Headshrinkless Sleeve. PWM Female to Female 50cm Black Sleeved x1. ARGB Female to Female 50cm Black Sleeved x1. Touch Power Button Cables: Power, Reset, Black 20cm. PowerBoard to Horten Touch Module 60cm Black. Screen cables: Black 1m Mini HDMI to HDMI, USB-A to USB Micro-B. (Aevum only)
LED strips	ARGB 5V 50cm x5(x6 Aevum only) pre-installed.
Motherboard Form Factor	XL-ATX (Up to: 285mm Wide & 350mm High; Aevum: 290mm Wide & 350mm High). E-ATX, ATX, M-ATX, Mini-DTX, Mini-ITX.
Expansion Slots	x8.
Case Form Factor	Full Tower Water-cooling Case.
Package Dimensions & Weight	L: 640mm W: 620mm H: 110mm (Case is flat packed)	15kg (Aevum 22.5kg)
Case Dimensions & Weight	L: 610mm x W: 245mm x H: 560mm	12kg (Aevum 19kg)

Storage	x5 2.5"	x2 are on top of the PSU shroud and cannot be used when the GPUs are vertically mounted. X1 are inside of the PSU Shroud. X2 are on the rear side of the PowerBoard, x1 is optional 2.5" or 3.5".
Radiators	420mm/360mm X2 with 100mm of thickness for radiators and fans.
Maximum GPU Length	445mm with 60mm front radiator and 25mm fans.
Maximum GPU Height	170mm in standard orientation, unlimited in vertical orientation.
Maximum CPU Cooler Height	170mm.
Maximum PSU Length	240mm with a large amount of space for cables.
Front Panel I/O	No Front I/O.
Vertical GPU Mount	Vertical GPU mounting brackets with PCIE 4.0 Riser Cable. 2nd Vertical GPU Mount is available separately.
Materials	6061 Aluminum Anodized. Cast Acrylic. Stainless Steel. PCB.
Manufacturing Process	Manufacturing Process: CNC Mill, CNC Lathe, CNC Router, PCB.
Assembly	Distribution Plate Assembled by Hand. The case is flat packed, and the metal components need to be assembled by the customer.
Testing/Validation	All Distribution Plates are factory pressure tested and precise fastener tension is applied.

Table of Fasteners & Panels

Panels
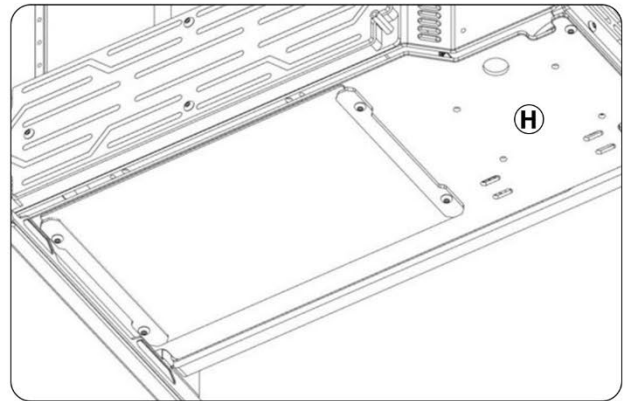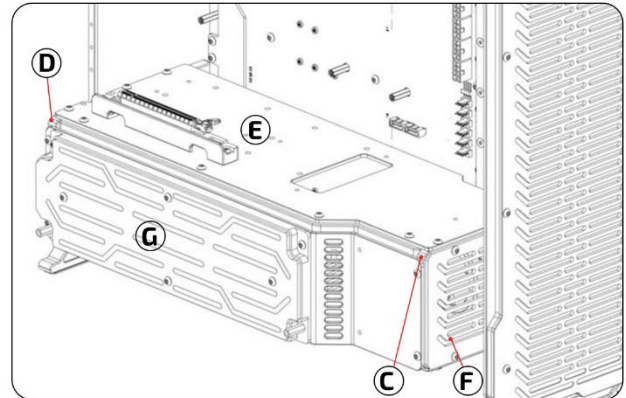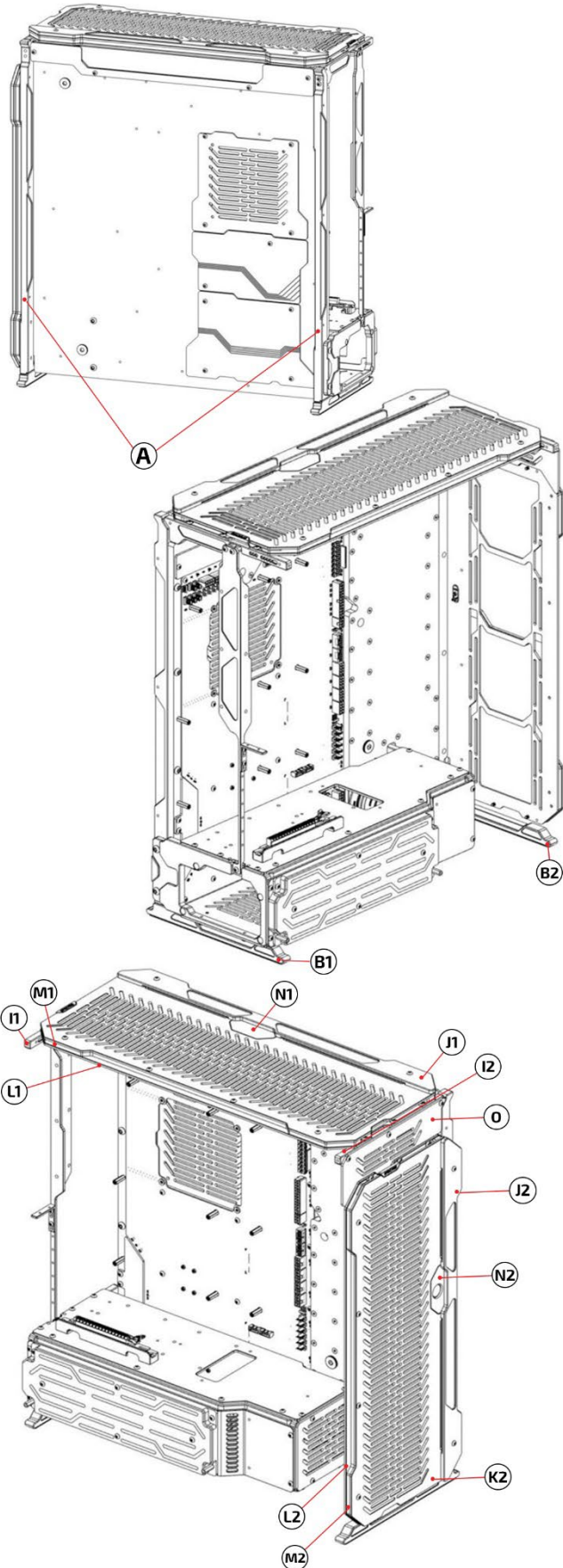
	Name
A	Legs
B1 B2	Feet
C	PSU Front Mount
D	PSU Rear Mount
E	PSU Top Shroud
F	PSU Front Shroud
G	PSU Side Shroud
H	PSU Bottom Shroud
I1 I2	Top Supports
J1 J2	Corner Panels
K1 K2	Radiator Panels
L1 L2	Radiator Mounts
M1 M2	Radiator Spacer
N1 N2	Button Cover Top & Front
O	Front Panel Top Cover

Fasteners

Panel	Fastener	Quantity
Feet	M6 x 20mm	4
Legs	M6 x 20mm	8
PSU Shroud to Case	M6 x 20mm	4
I/O Panel to Case	M4 x 8mm	3
	Stand Off M4 x 13mm	2
Side Panel Window	M4 x 12mm	4
	Stand Off 18.5mm M4	2
Top Supports	M4 x 25mm	4
PSU Shroud Assembly	M4 x 10mm	10
	M4 x 14mm (Aevum)	2
Motherboard	Stand Off M4 x 18mm	9
	M3 x 6mm	9
Vertical GPU	M4 x 12mm	2
	M4 x 16mm (Aevum)	2
Top Panel	M4 x 6mm	6
Front Panel	M4 x 12mm	4
Front Panel Cover	M4 x 8mm	3
	M4 x 14mm (Aevum)	3
PowerBoard Fan	M4 x 35mm	4
Drives	M3 x 8mm	2
	M3 x 6mm	8
	6-32	2
	SSD Mount	1

Warranty

Spectre 4 & Aevum Limited Edition 2-Year Limited Warranty:

1: The Integrated Water-cooling system is pressure tested at the factory, there is no need to adjust the fasteners on the distribution plate. Take care not to over tighten any of the fasteners particularly on the acrylic, stop as soon as you feel feedback or tension on the fastener. 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 will not be covered under our warranty. All threads are pre-tested. We use stainless steel fasteners which are extremely durable.

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 5 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.

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.

Assembly Manual

ⓘ Assembly Note

Spectre is built from thick and strong CNC Machined aluminum components with tight tolerances. There is no flex in the metal parts like there is on other cases. Due to this we have had to build tolerances into all the mounting holes on Spectre Integra. If something does not align then loosen all related fasteners on the surrounding panels to let the component settle in, then tighten the fasteners again.

Step 1: Install Legs onto Distribution Plate.

Attach the main case Distribution Plate to the Legs **(A)** using x8 M6 20mm Fasteners. The fastener locations are marked in the diagram below. The easiest way is to lay the Legs down horizontally and put the Distribution Plate on top of them and the align the legs so the holes line up. Do not over tighten fasteners on acrylic.


⬇ **x8 M6 x 20MM**
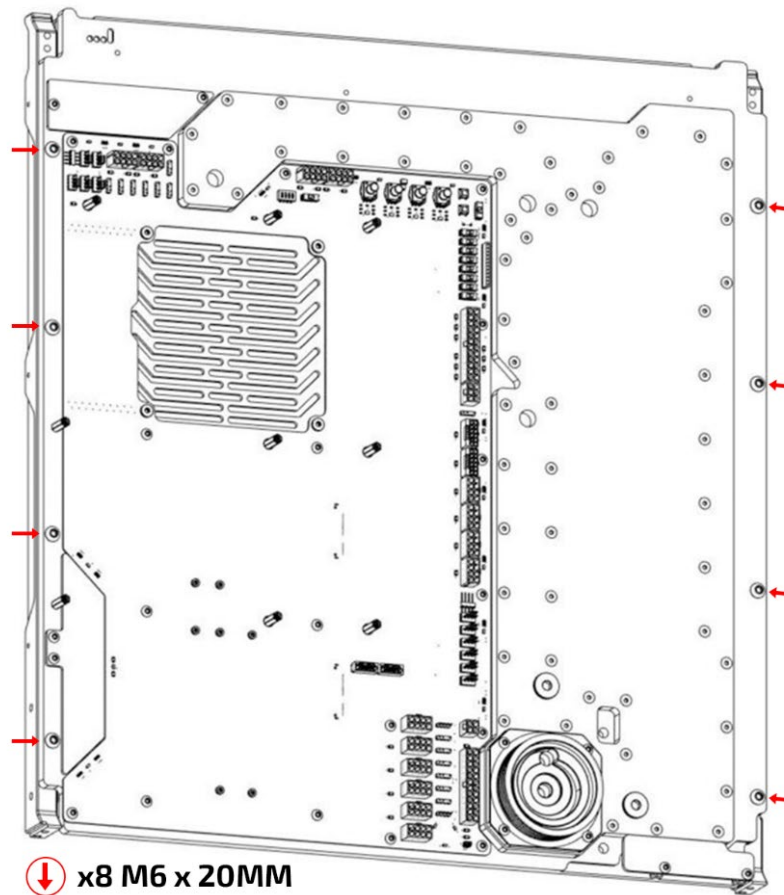
Step 2: Attach Feet to Bottom Legs.

Attach the Feet **(B1) (B2)** to the bottom of the Legs using x2 M6 20mm Fasteners. Fastener locations are marked in the diagram below. Before installing the fasteners, you will need to remove the protective covers from the feet, these can be pulled off by hand and they will need to be replaced again afterwards. After this the case can be put upright on the feet.

x2 M6 x 20MM (EACH FOOT)
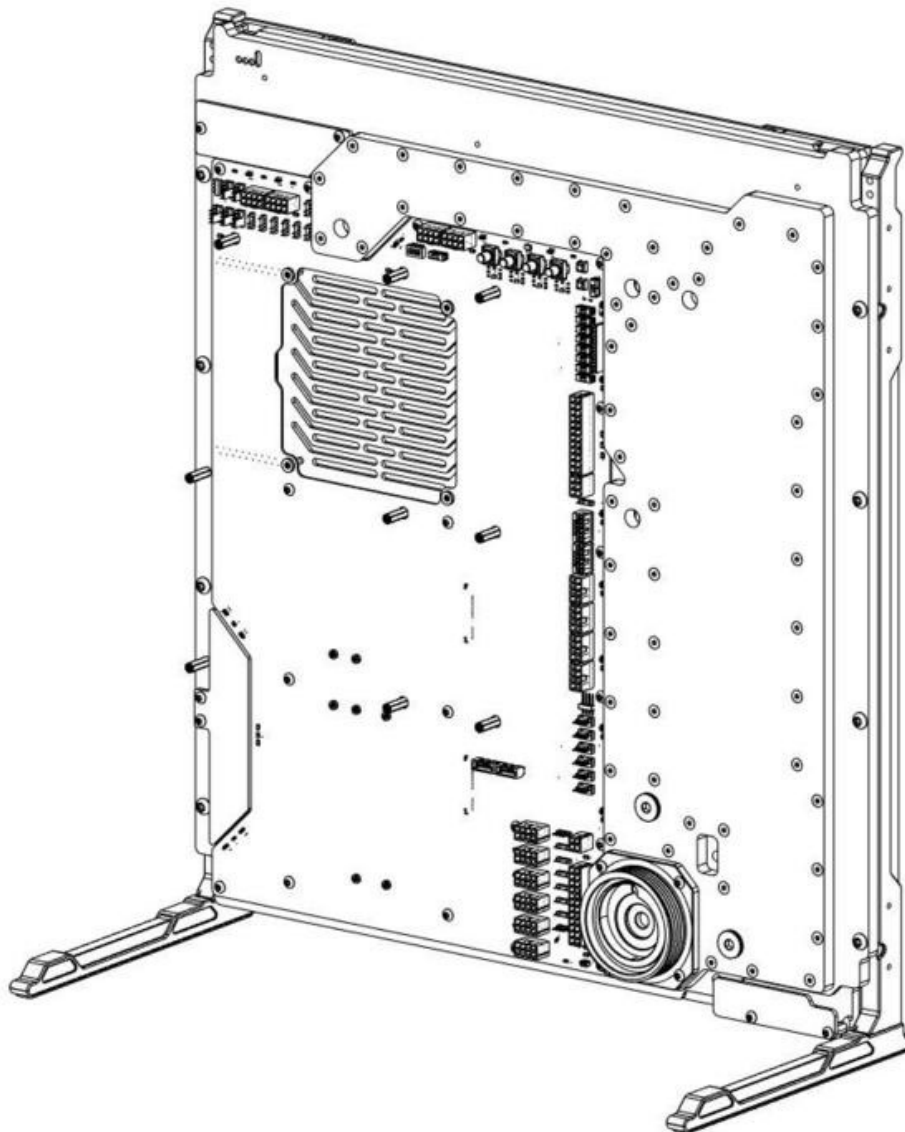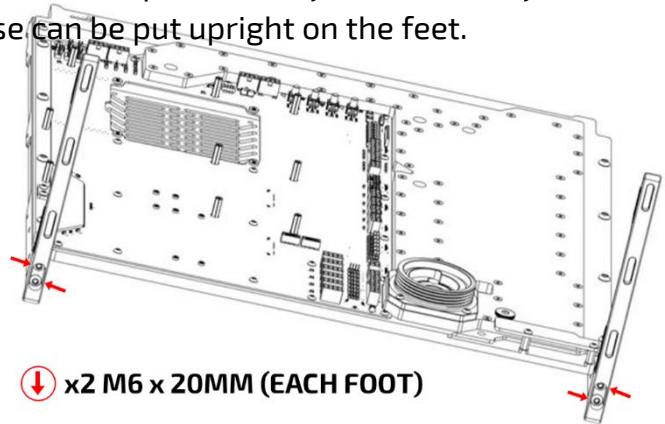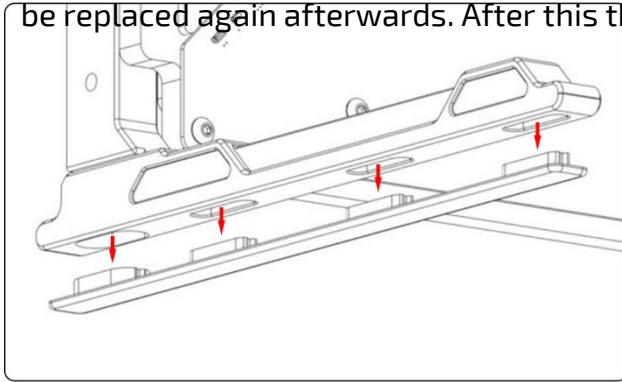
Step 3: PSU Shroud Assembly.

*Note:* For Aevum the PSU shroud looks different and there is a screen mounted onto the side but the assembly process is similar.
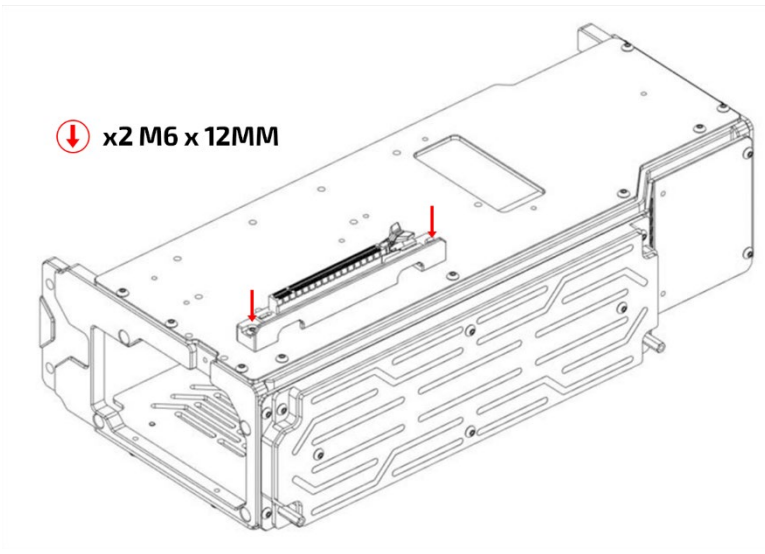
Attach the Vertical GPU Mount with Riser Cable to the PSU Top Shroud**(E)** using 2x M4 12mm Fasteners.

Assemble the PSU Front Mount **(C)**, PSU Rear Mount **(D)**, PSU Top Shroud **(E)**, PSU Front Shroud **(F)** and PSU Side Shroud **(G)** using 13x M4 10mm Fasteners. 2x M4 18.5mm Stand Offs will need to be used in the locations marked 'SO' in the diagram below.

For Aevum 2x M4 14mm will need to be used in the locations marked 'AV' in the diagram below instead of 2x M4 10mm.
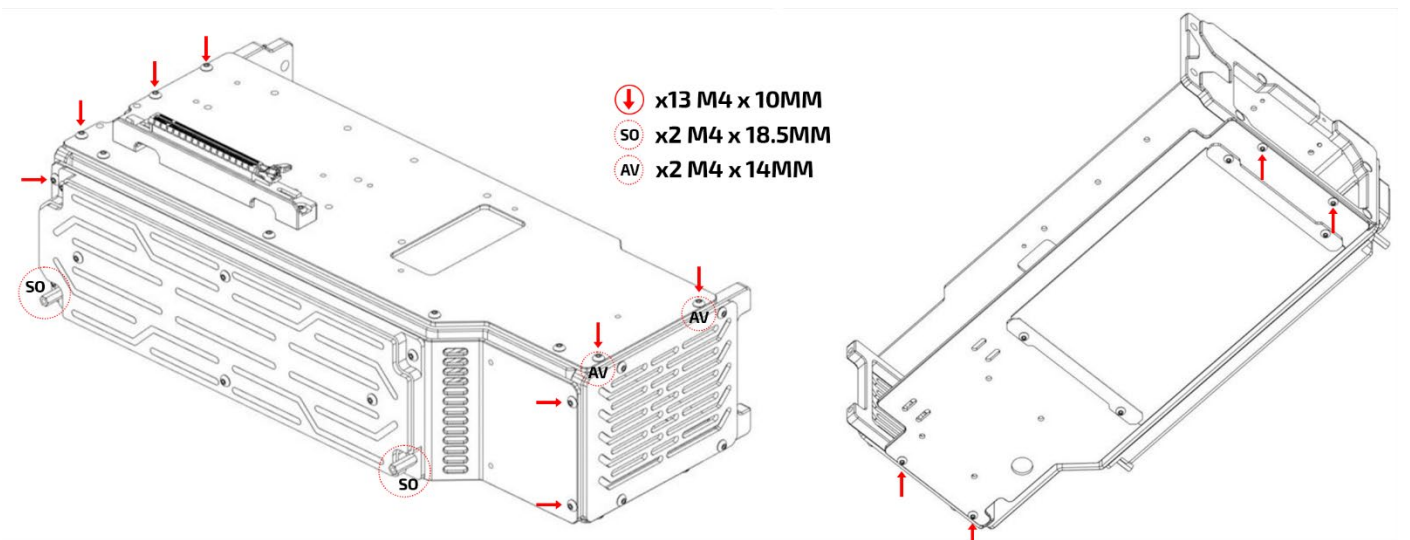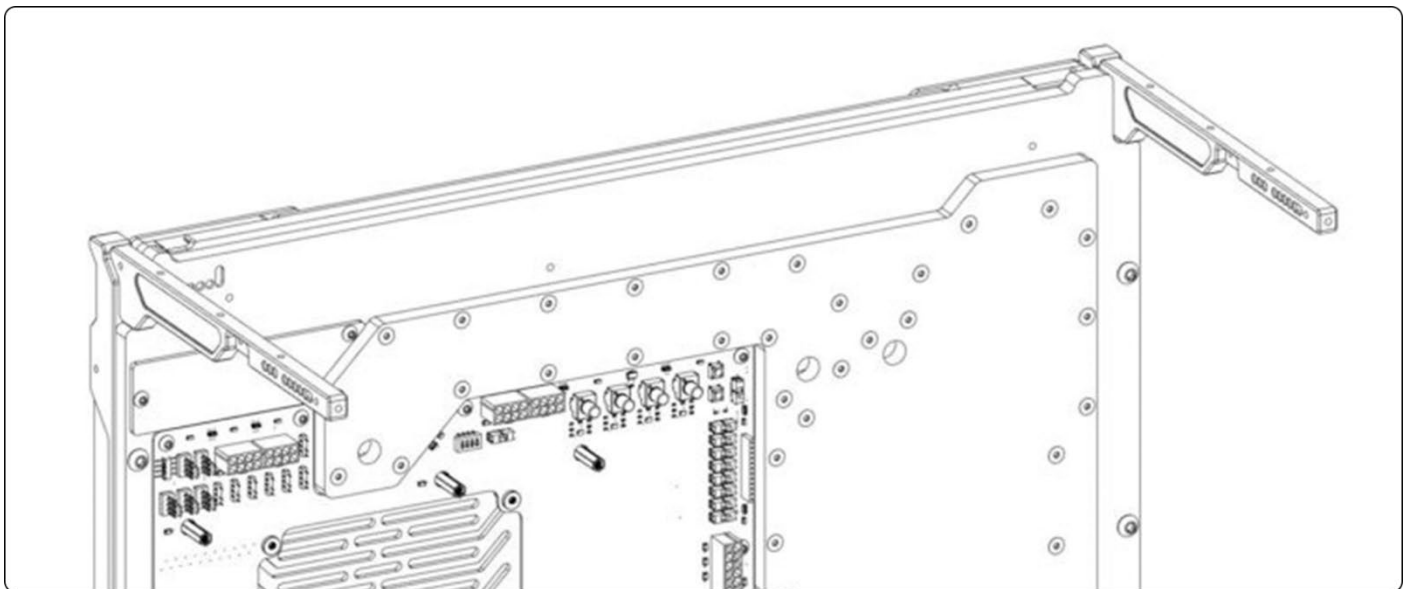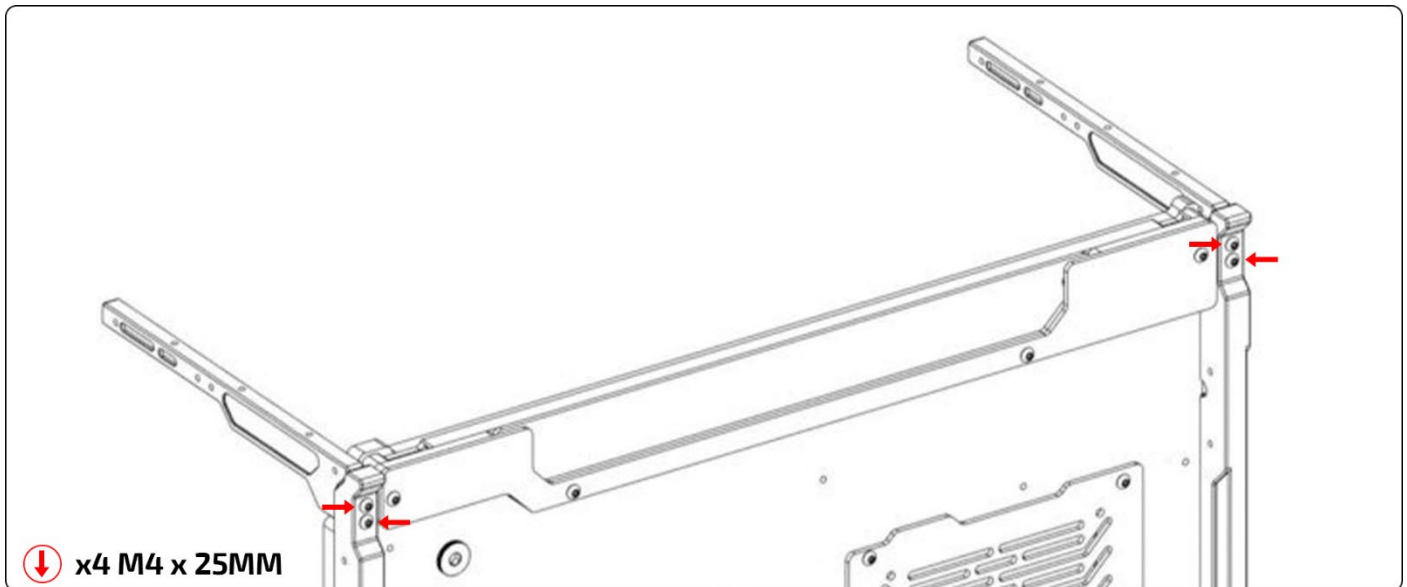
Step 4: Attach PSU Shroud to Distribution Plate.

Attach the assembled PSU Shroud to the Distribution Plate using 4x M6 20mm Fasteners. Do not over tighten fasteners on acrylic.

x2 M6 x 20MM

x2 M6 x 20MM
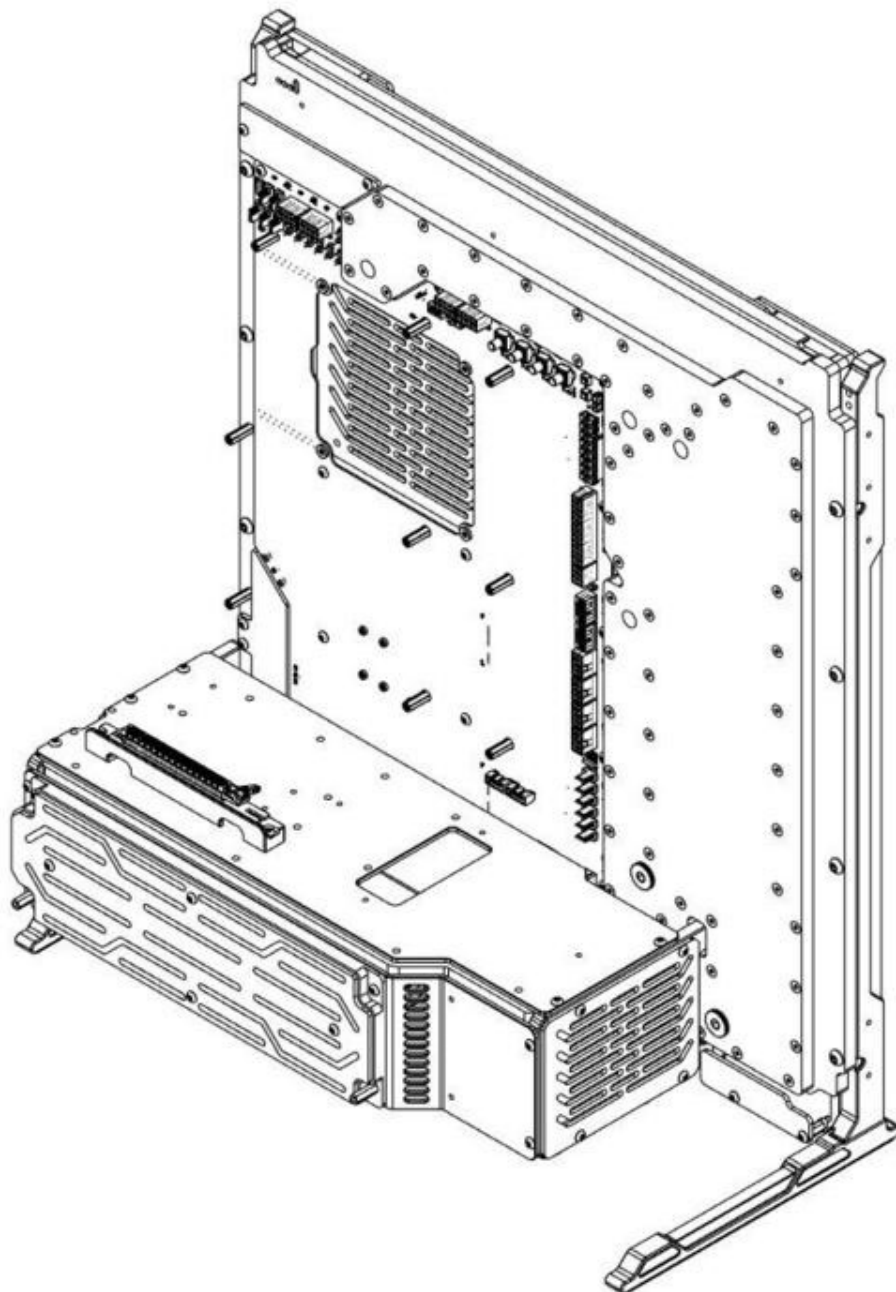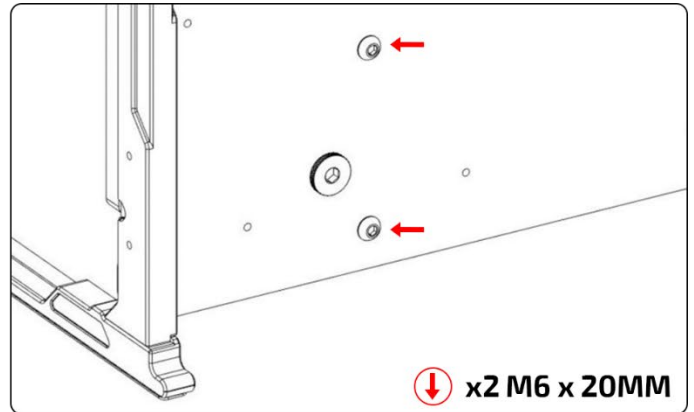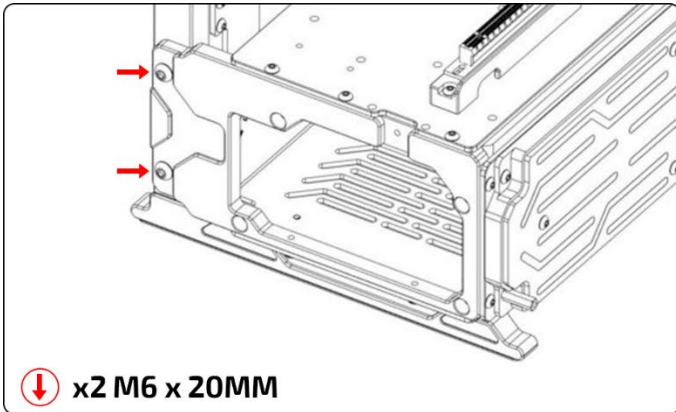
Step 5: Attach Top Supports to Legs.

Attach the Top Supports (I1) (I2) to the top of the Legs using 4x M4 25mm Fasteners.

x4 M4 x 25MM

Step 6: Attach the Top Panel.

The Top Panel comes pre-assembled so first you will need to completely disassemble it by removing all fasteners.

1

Attach the Top Radiator Panel **(L1)** to the Top Supports **(I1)** and **(I2)** using 6x M4 6mm Fasteners.

2

Then attach the Top Radiator Panel **(K1)** and the Top Button Cover **(N1)** using 8x M4 12mm fasteners.

3

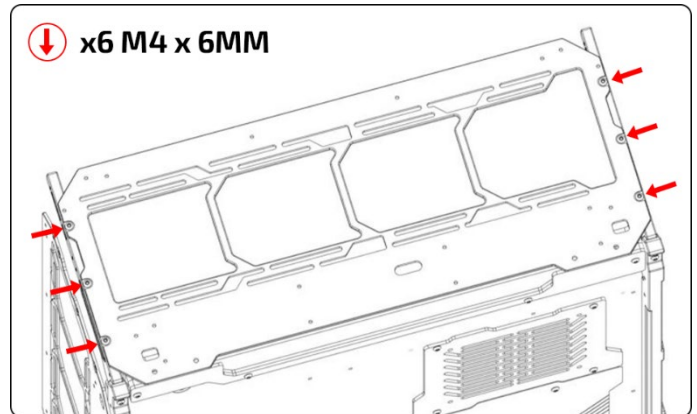Then attach the Top Corner Panel **(J1)** using 2x M4 16mm Fasteners.

Step 7: Attach the Front Panel.

The Front Panel comes pre-assembled so first you will need to completely disassemble it by removing all fasteners.
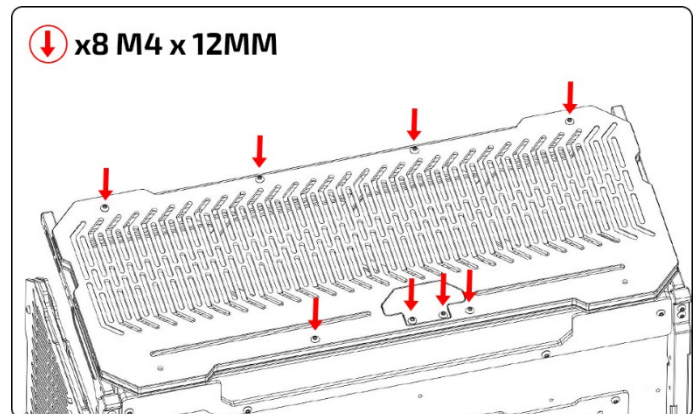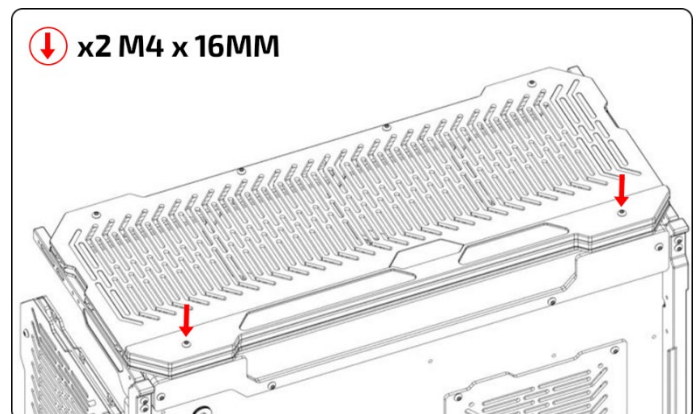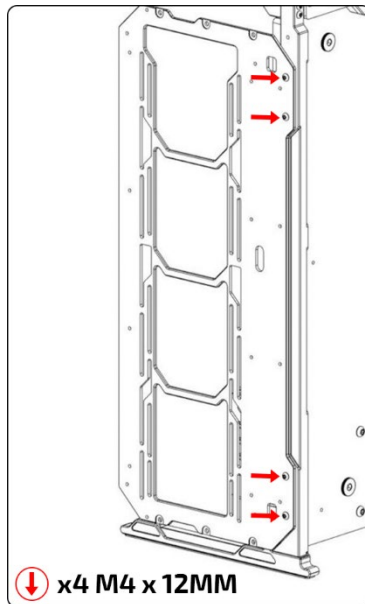
❶

Then attach the Front Radiator Mount **(K2)** to the case using 4x M4 12mm fasteners.

⬇ **x4 M4 x 12MM**

❷

Then attach the Front Radiator Spacer **(M2)** using 4x M4 8mm fasteners.

⬇ **x4 M4 x 8MM**

❸
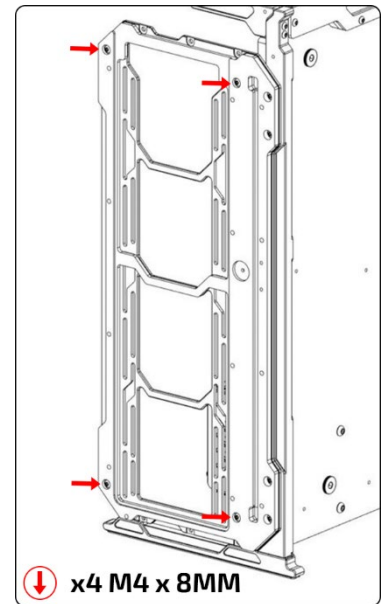
Then attach the Front Radiator Panel **(K2)** and Front Button Cover **(N2)** using 8x M4 12mm fasteners.

⬇ **x8 M4 x 12MM**

❹
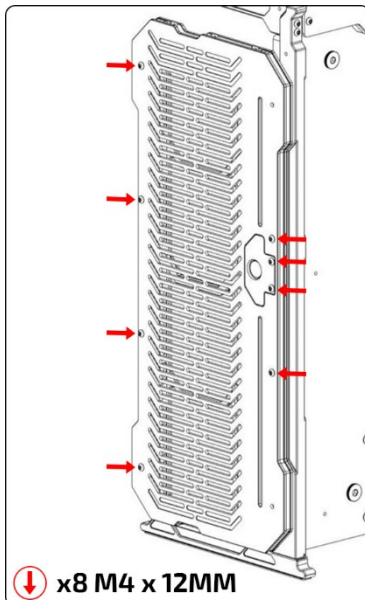
Then attach the Top Corner Panel **(J2)** using 2x M4 16mm fasteners.

⬇ **x2 M4 x 16MM**

❺
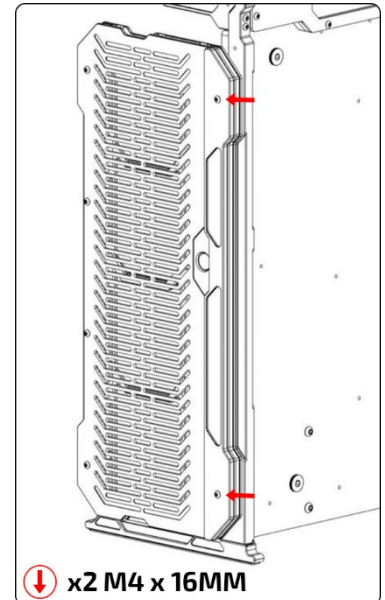
Attach the Front Panel Cover **(O)** using M4 6mm x3 for Spectre 4 or M4 14mm x3 for Spectre 4 Aevum.

⬇ **x2 M4 x 16MM**

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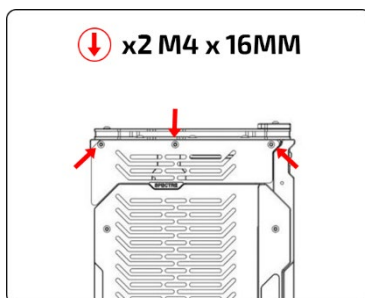
Spectre 4 Aevum Elite (Spectre 4 Aevum only)

Spectre 4 Aevum Elite comes fully assembled, to install it and to install radiators you will need to separate the distribution plate from the Radiator Mounting Panel by undoing the fasteners marked in the diagrams beside.
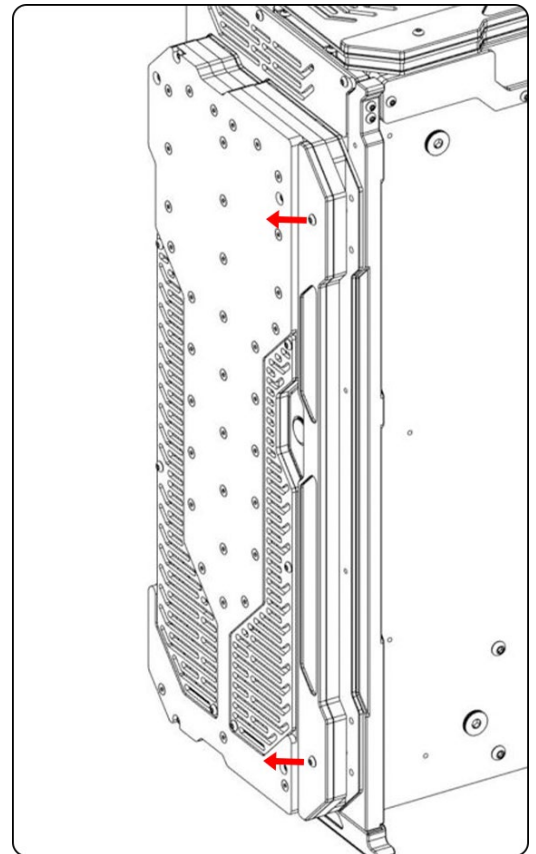
The radiator needs to be installed before the distribution plate. The distribution plate can be reinstalled using the x5 M4 30mm fasteners.

x5 M4 x 30MM
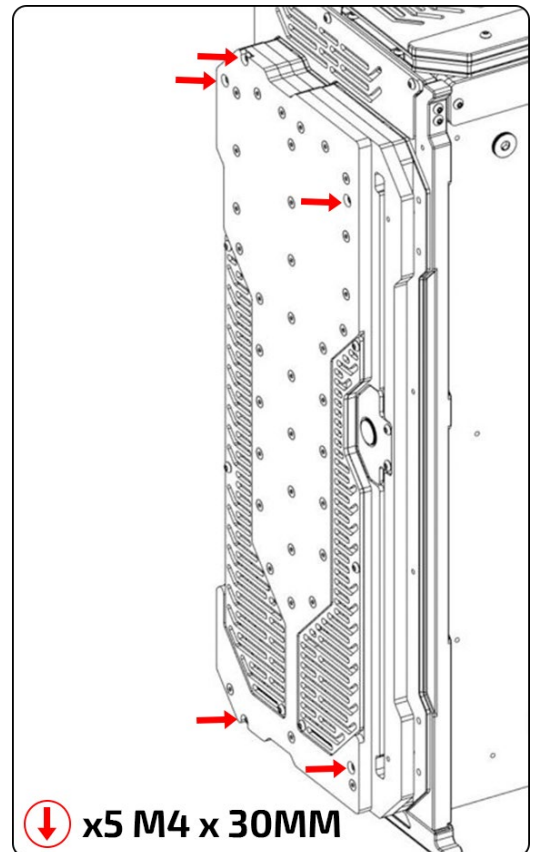
Power Button

The Power Button comes pre-installed with the cable attached but the cable will need to be plugged into the PowerBoard.
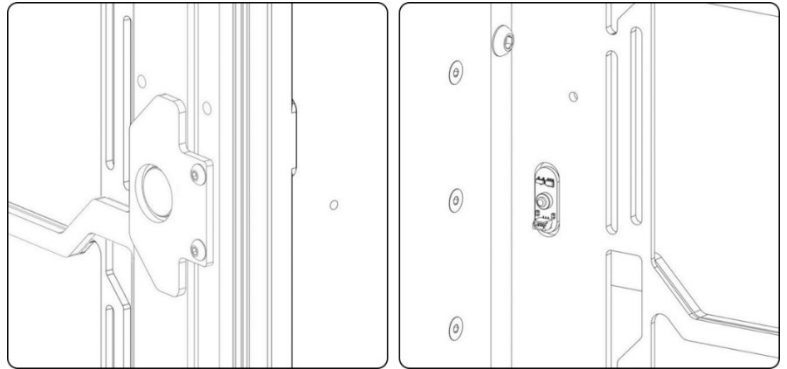
Step 8: Attach Rear I/O & Vertical GPU Bracket.

Attach the rear IO to the case using 3x M4 8mm Fasteners and 2x M4 13mm Stand Offs. Also attach the Vertical GPU Angle Bracket using 2x 6-32 0.25".

SO
SO
x2 M4 x 13mm Stand Off
x2 M4 x 8mm
x2 6-32 x 0.25"
x1 M4 x 8mm
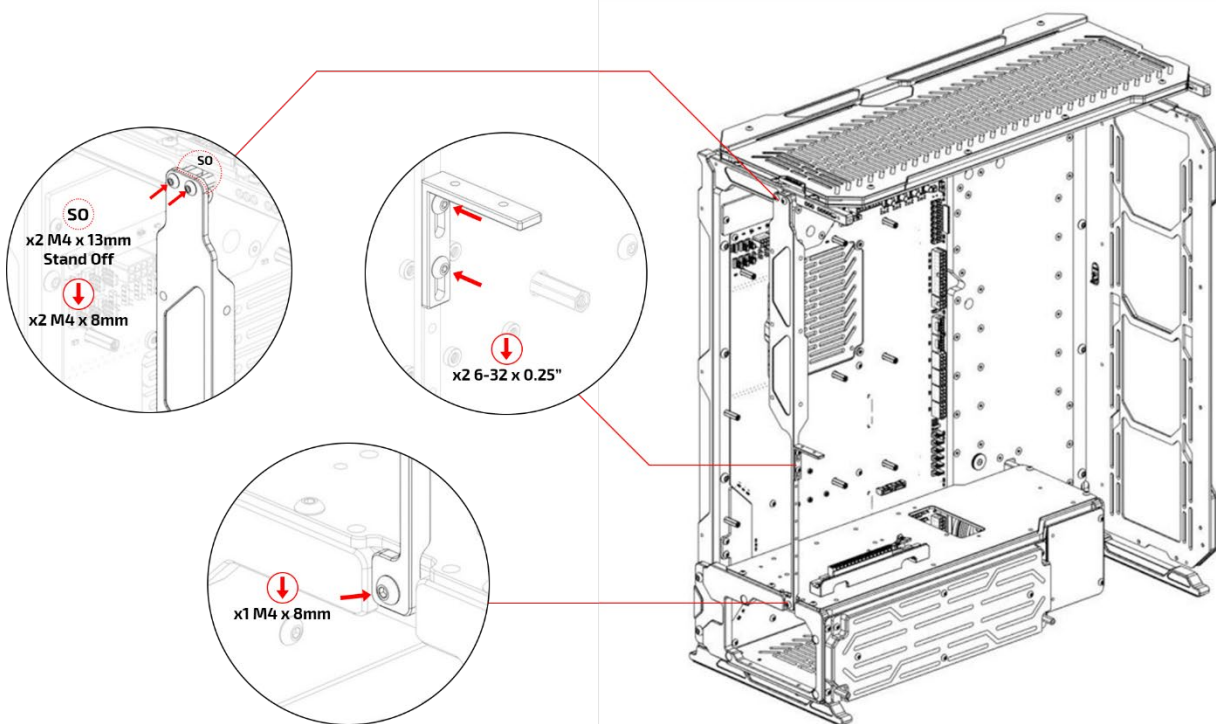
Step 9: Install Cable Cover Panel.

❶ x2 M4 x 13MM STAND OFFS
❷ x2 M4 x 6MM
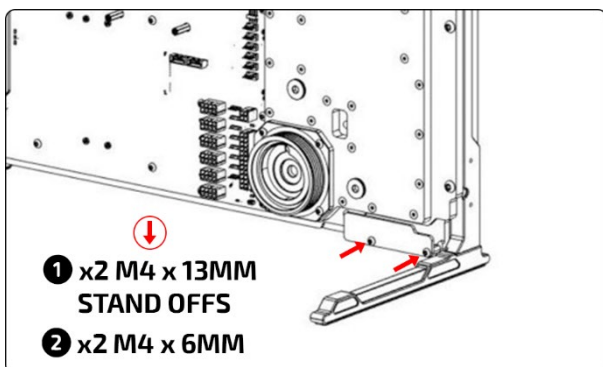
Install the Cable Cover Panel under the pump. First install the x2 M4 13mm Stand Offs from the fasteners labelled 'Cable Cover'. Then install the Cable Cover Panel using the x2 M4 6mm fasteners. Do not over tighten fasteners on acrylic.

Drives & Rear Fans Installation

The drives and rear fan can be installed after removing the rear covers from the distribution plate. The Fan Cover and HDD Cover are shipped separately from the distribution plate and will need to be installed with the fasteners labelled 'Fan & 2.5"/3.5" Covers'. First install the Stand Off M4 13mm x8 and then the covers can be secured with the M4 6mm x8 fasteners.
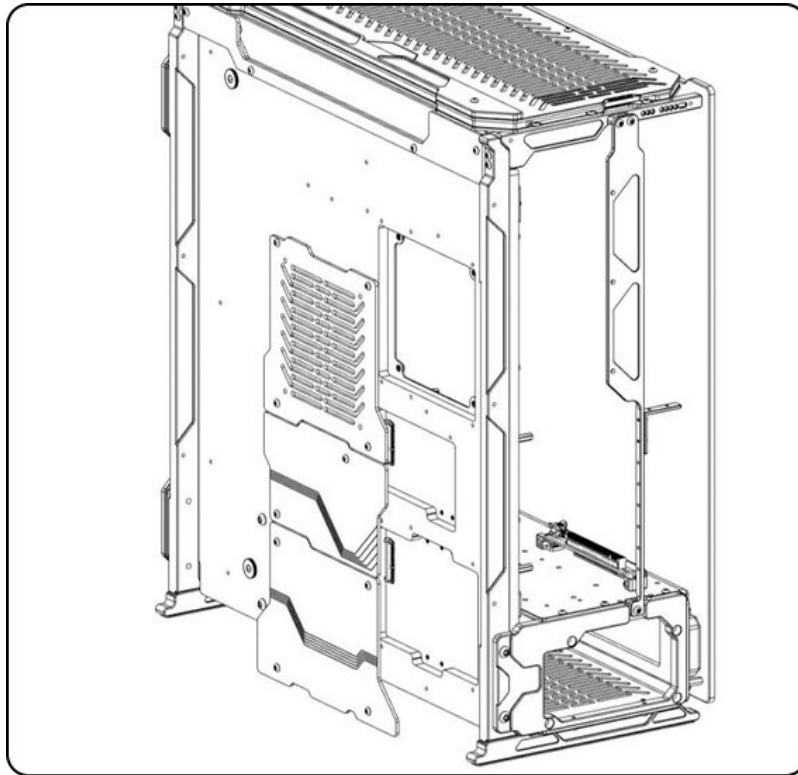
Rear 140mm Fan Mounting
Mount the rear 140mm fan using 4x 35mm M4 x4, the cover and dust filter need to be mounted at the same time and the stand offs which came installed on the distribution plate can be removed.

Drive Mounting
The drive mounting components come pre-installed on the PowerBoard except for one extra 2.5" drive mount which you can find in the fasteners. Mount the drive mounts to the drives, then slide the drives onto the connectors and replace the fasteners which were holding the drive mounts.

⊕ x4 M3 x 6MM

The drive mounts are attached with 6-32 0.25" fasteners.

To attach the drive mounts to the drives, use 2x 6-32 0.375" (one on each side) for the 3.5" drive, and 1x 8mm M3 for each 2.5" drive.

Two 2.5" drives can be installed onto the PSU top shroud using the mounts marked in the image below. Use 4x M3 6mm fasteners to mount each drive.
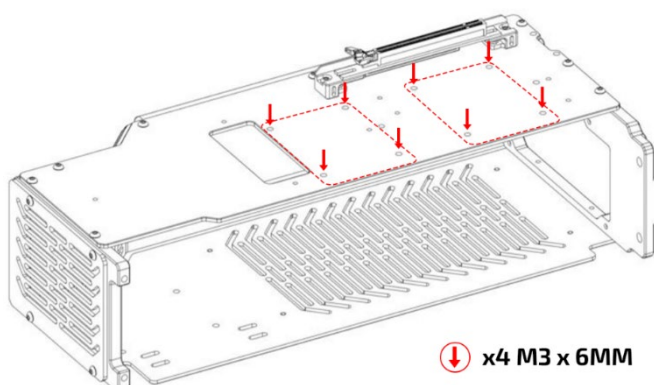
Side Panel Window Installation
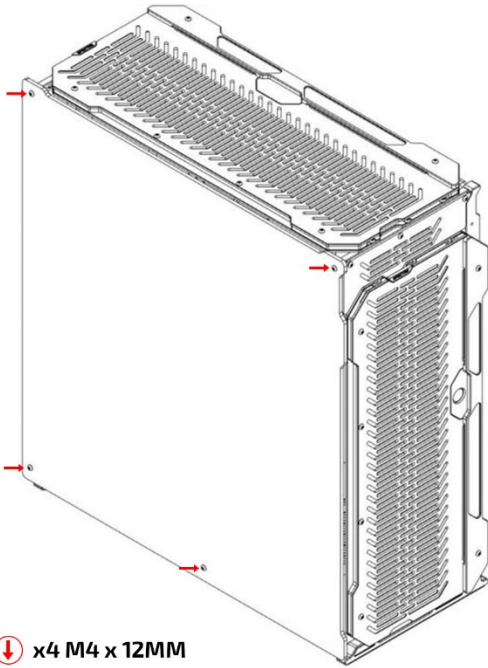
x4 M4 x 12MM

Install the Side Panel Window using 4x M4 12mm Fasteners.

Dust Filters

There are dust filters on all fan locations.
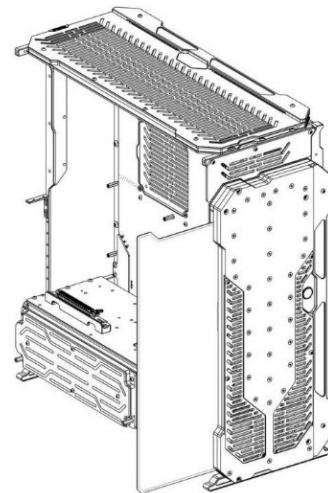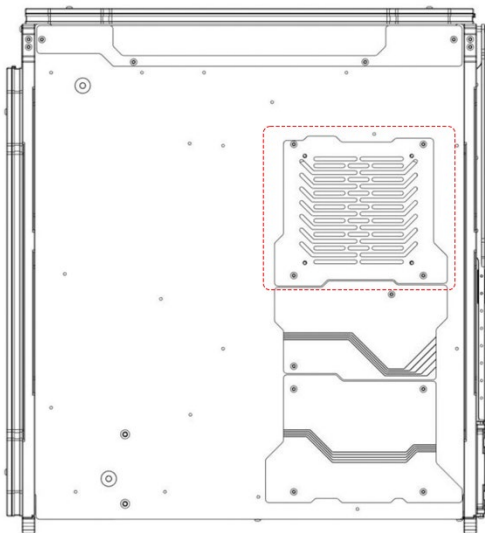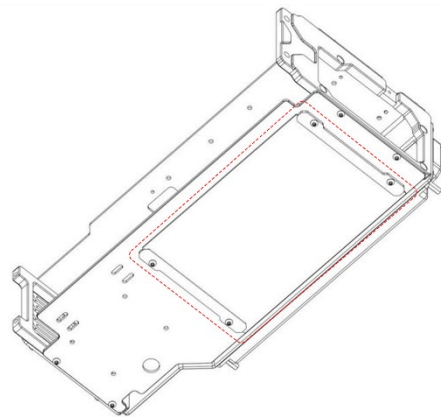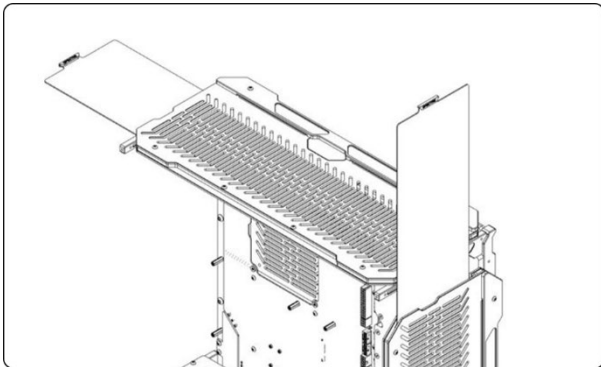
Spectre 4 Aevum Elite Dust Filter

Filling & Draining the Loop

Filling the Loop

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. Spectre Builds will usually take 1.2-1.5L of fluid but allow 2L.

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

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.
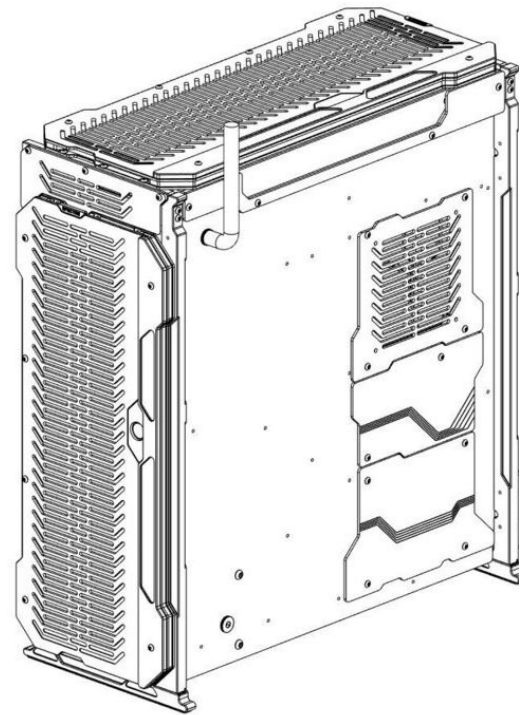
Draining the Loop

There are various options for drain valves. For Spectre 4 & Aevum Limited Edition, it is in quite a visible location around the back of the case, so we suggest something visually appealing. We like to use no spill quick disconnects but any high-quality drain valve will work. 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.

Installing Radiators

The radiator panels have sliding adjustment. Use this to position your radiators so that the ports are optimally aligned with the ports on the Distribution Plate.

Liquid Cooling System Layout

PowerBoard

FAN 1 OUTPUT x3

EPS OUTPUT x4

ARGB INPUT

SPEED CONTROL
PUMP 1   FAN 2
PUMP 2   FAN 1

POWER BUTTON
RESET POWER

PSU JUMPSTART

MB FAN OUTPUT
FAN 1 INPUT
FAN 2 INPUT

ARGB
OUTPUT 6x

LIGHT SWITCHES
RGB SOURCE SWITCH

FAN 1 SOURCE
FAN 2 SOURCE
PUMP 1 SOURCE
PUMP 2 SOURCE

12PIN IO HEADER

14CM FAN MOUNT M4 x4

MB 24PIN OUTPUT

PCIE 6PIN SUP

ARGB OUTPUT

POWERBOARD MOUNT x18

12VHPWR
OUTPUT x2

PICE 8PIN
OUTPUT x4

ARGB LED x28
UV LED x28

FAN 2 OUTPUT x3

SATA DATA INPUT x2

PUMP 2 INPUT
PUMP 2 OUTPUT
PUMP 1 INPUT
PUMP 1 OUTPUT

POWER AND RESET BUTTON HEADER

PUMP POWER

EPS 8PIN INPUT x2

ARGB OUTPUT x6

PICE 8PIN INPUT x4

MB 24PIN INPUT

HORTEN HEADER

STANDBY UV LED LIGHT x3

T-SENSOR HEADER x2

⚠ *All PowerBoards need PowerBoard Linking Cables.*

Features

The PowerBoard is a PCB integrating 24pin, EPS, 12VHPWR, PCIE, PWM and ARGB hubs, SATA, Power and Reset Buttons and built-in analogue coolant-temperature based speed control for the fans and pumps. The PowerBoard has x28 ARGB and x28 UV LEDs positioned around the external perimeter to optimally light up the distribution plate and the build, the LEDs can be switched on or off. Essentially the PowerBoard is a distribution plate for cables also integrating other features and functions. It is a new method for cables allowing standardisation of cable lengths and making cable management almost unnecessary. The PowerBoard also comes included with a standard set of black sleeved linking cables including 24pin x1, 8pin EPS x2, 8pin PCIE x3 or 1x 12VHPWR and unsleeved 50cm ARGB and sleeved PWM cables.

Specifications

Included Items	Spectre 4.0 PowerBoard
Cables	PowerBoard Linking Cables: 18AWG wire black sleeved: 24pin x1. 8pin EPS x2. 8pin PCIE x3 or 12VHPWR x1. PWM Fan Linking Cable Black Sleeved 50cm. ARGB Linking Cable Black 50cm..
Electronics Integration	Inputs: 24pin x1. 8pin EPS x2. 8pin PCIE x4. PWM x4. ARGB x1. SATA x2. Outputs: 24pin x1. 8pin EPS x4. 8pin PCIE x4. 12VHPWR x2. SATA Direct Mount x2. PWM x8 (FANS x6 and PUMPS x2). ARGB x12. ARGB built-in LEDs x28 and UV built-in LEDs x28 with ON/OFF switch. Power and Reset Buttons built-in. Horten Module header for the touch button integration

PowerBoard PSU Cables

The stock cables that come with every power supply can be used, plug in as many cables as input connectors are available. Do not use components that have more connectors than Your power supply has cables for. For example, if Your power supply comes with a single 8pin EPS (4+4) plug and Your motherboard has 2X 8pin EPS connectors, than a better power supply needs to be used. Singularity Computers offers custom sleeved and shorter PSU cable kits that better fit in the PSU shroud area than stock cables.

PowerBoard Linking Cables

The Spectre 4.0 PowerBoard comes with a standard kit of PowerBoard Linking Cables which include 24pin MB x1, 8pin EPS x2 and 8pin PCIE x3 or 12VHPWR x1. The pinout of these Linking cables is mirrored and the lengths are custom to achieve an arch. The connectors are also female on both sides (refers to the pin and not to the connector housing). PWM and ARGB linking cables are also included to connect from your motherboard or controller to the PowerBoard PWM and ARGB inputs. Use our Cable setup guide if making custom Linking cables.

Power Connectors

The input and output power connectors are not wired directly together but they are shared, so if EPS-1-IN is plugged in then any of the EPS outputs can be used, it is not limited to EPS-1-OUT. The same applies to the 8pin PCIE inputs, they can be mixed and matched. The 12VHPWR outputs draw power from the 8pin PCIE inputs and is set to provide 600W of power, so even if the power supply doesn't have a 12VHPWR output a GPU with that connector can still be used as the PowerBoard

does the conversion. There is a 6pin PCIE connector located next to the 24pin MB connector for motherboards that have a supplementary 6pin PCIE connector for additional power.

ARGB Connectors:

The PowerBoard has built-in ARGB lighting and acts as an ARGB hub. An ARGB source, like a motherboard ARGB header, must be connected to the ARGB-IN header on the PowerBoard. The input header is marked with a white rectangle around it for easier identification. The PowerBoard uses this ARGB signal to light up the built-in LEDs and shares this signal to all ARGB outputs. What signal goes into the input will be displayed on the built-in LEDs and all LED strips attached to the ARGB outputs, in parallel. The PowerBoard does not show up as an individual component in ARGB controlling software, but it can be controlled by controlling the motherboard ARGB header, which will show up in software. The PowerBoard LEDs and headers are powered by the power supply 24pin connection, so they will only light up when the system is turned on but not when the system is turned off or is in stand-by mode. The ARGB headers are conveniently located where they are expected to be used, next to radiator mounts, GPU, and CPU waterblocks. Do not plug a 4pin/12V RGB device into the PowerBoard, only 3pin/5V ARGB/DRGB (addressable/digital RGB) devices are compatible.

PB ARGB Dip Switch

This switch connects/disconnects the ARGB control signal from the built-in LEDs on the perimeter of the PowerBoard. When turned ON, the LEDs will immediately light up. When turned OFF, the LEDs will not light up from the next time the system is turned ON from a cold boot. After turning the switch OFF, turn OFF the system, wait 5 seconds and turn the system ON again. This switch does not control ARGB headers, only the built-in LEDs on the PowerBoard.

PB UV Dip Switch

This switch enables/disables the built-in UV LEDs around the perimeter of the PowerBoard.

FAN/PUMP Connectors

The PowerBoard acts as a powered PWM hub. A PWM source, like a motherboard CPU Fan header, can be connected to the FAN-IN header on the PowerBoard. The PowerBoard shares this PWM signal to all related PWM outputs. What signal goes into the inputs will be the same control signal sent to fans connected to the PowerBoard. The PowerBoard does not show up as an individual component in fan controlling software, but it can be controlled by controlling the motherboard CPU FAN header, which will show up in software/BIOS. The PowerBoard PWM headers are powered by the power supply so there is no strain on the motherboard. Only the *-RPM designated headers monitor the speed of a connected fan which is reported back to the motherboard. If no fan is connected to this header, the motherboard will see zero RPM even if all other headers have fans connected to them, so populate FAN-*-OUT-RPM first with a fan that You would like to monitor the RPM of. The PWM headers are conveniently located where they are expected to be used, close to radiator mounts.

The PowerBoard also has newly developed, built-in analogue 4-channel fan speed control technology. There are 2 independent channels for the 2 sets of fans aimed for the top and the front radiators and also 2 independent channels for the 2 pumps in the main and dual-loop side panel distros. The speed curve is based on the coolant temperature and up to 2 temperature sensors can be used for a dual loop setup and each can have its own speed curve. All channels can be controlled by a motherboard signal or a temperature signal, and all channels can choose which temperature sensor to use. This way a CPU loop can have a 100% independent fan and pump speed from the GPU loop. Another reason to use the coolant temperature sensors to define fan and pump speeds is to finally be able to use the GPU's heat output to define fan speeds without using any software.

The base functionality is based on this specification:
The minimum speed for the FAN channels is 30% and for the PUMP channels it is 50%. The reason for these minimum values is that there is no reason to go below 30% for the fans since in this range most fans are inaudible already and lower speeds might stop some fans, while for pumps below 50% there is an increasing risk for not moving the coolant with sufficient flow.

The speed of the fans and pumps are kept at the set minimum speed below 25°C coolant temperature and it is linearly increased to 100% above 45°C. With this control structure the fans and pumps will slowly and gradually increase their speed so there will be no sudden ramp up and ramp downs when the CPU or GPU gets only momentarily loaded. The aim of this built-in speed controller was to simplify and compartmentalise the cooling functionality of Spectre 4.0 from software and to eliminate guess-work from setting up the ideal noise-to-performance ratio. The fan curve can be adjusted live so if the system is running too hot or too loud it can instantly be corrected.

SATA Connectors
Connect the SATA inputs into the SATA outputs on the motherboard and install 2.5"/3.5" drives onto the PowerBoard. There is no need to connect a SATA power cable to the drives, they are powered directly from the PowerBoard. The drives attach to the PowerBoard with the included 3D-printed brackets, M3 8mm and #6-32 ¼" fasteners.

Power buttons and switches
The Spectre 4.0 PowerBoard has built in POWER and RESET buttons in the top right corner and also a PSU JUMPSTART switch to power the connected fans and pumps without the need to turn on the motherboard and boot the system. Disconnect the MB 24pin Linking Cable to prevent powering the motherboard while using the PSU JUMPSTART switch. As long as the switch is in the ON position the power supply will enable all of its power rails, but the motherboard will not turn on automatically. The fans and pumps will turn on and if the speed control source is set to the PowerBoard then the PWM signal can be controlled during the filling, bleeding and initial testing process. Controlling the speed of the pumps while filling the loop makes it possible to fill the loop in one try, since the pump can be set to a low-speed operation. This way there is no need to repeatedly turn the system ON and OFF to fully fill the loop with coolant.

12PIN I/O Header

The PowerBoard exposes the voltages of the power rails and other basic information through this header for monitoring. These voltages can be measured manually or with a custom microcontroller as a DIY project. The pinout is as follows from top to bottom:

1. GND
2. 12V
3. 5V
4. 3V3
5. ARGB (2nd control signal input)
6. T1 (temperature readout of the T1 sensor as voltage)
7. T2 (temperature readout of the T2 sensor as voltage)
8. F1R (RPM readout of FAN-1-OUT-1-RPM header)
9. F2R (RPM readout of FAN-2-OUT-1-RPM header)
10. P1R (RPM readout of PUMP-1-OUT header)
11. P2R (RPM readout of PUMP-2-OUT header)
12. GND

Pins 1, 2, 3, 4 and 12 can be used to power the microcontroller or other circuits. Pin 5 is an additional ARGB control signal input that can be selected using the ARGB SOURCE switch in the "PB" position.

POWER and RESET button header (JP1)

Connect the included PWR_BTN and RST_BTN linking cables to this header and to the motherboard's front panel headers.

T-SENSOR header (JP2)

Connect standard 10K NTC Thermistor-based temperature sensors to this header, up to 2. The widely available temperature sensors in stop-fittings are compatible.

HORTEN header

Connect the included HRTN cable here and to the Horten Module to enable the front panel's touch button functionality.

Stand-by UV logo

UV21, UV22 and UV23 LEDs are part of the built-in stand-by lighting effect that's visible on the rear side of Spectre 4.0 as the Singularity Computers triangular logo. This logo lights up as a greenish blue colour while the system is in stand-by mode or is turned on. Can be disabled via the "SB UV" dip switch.

PUMP-PWR

Dedicated power header for connecting up to 2 pumps. Pins 1 and 2 are GND, 3 and 4 are +12V. With this header the pump is directly connected to the PowerBoard so the PSU can be swapped to another brand without having to change the pinout or redo the custom sleeve and crimps.

A breakout cable will be available for purchase with 2x 4pin MOLEX and 2x SATA power connectors.

14cm fan cutout

Mount a 14cm class fan using 4x M4 30mm fasteners for a 25cm thick fan or 4x 35mm fasteners for a 30cm thick fan. Route the fan cable through the cutout before installing the fan to hide it. Connect the cable to the FAN-1-OUT-BACK header and its speed is controlled by the FAN-1 hub.