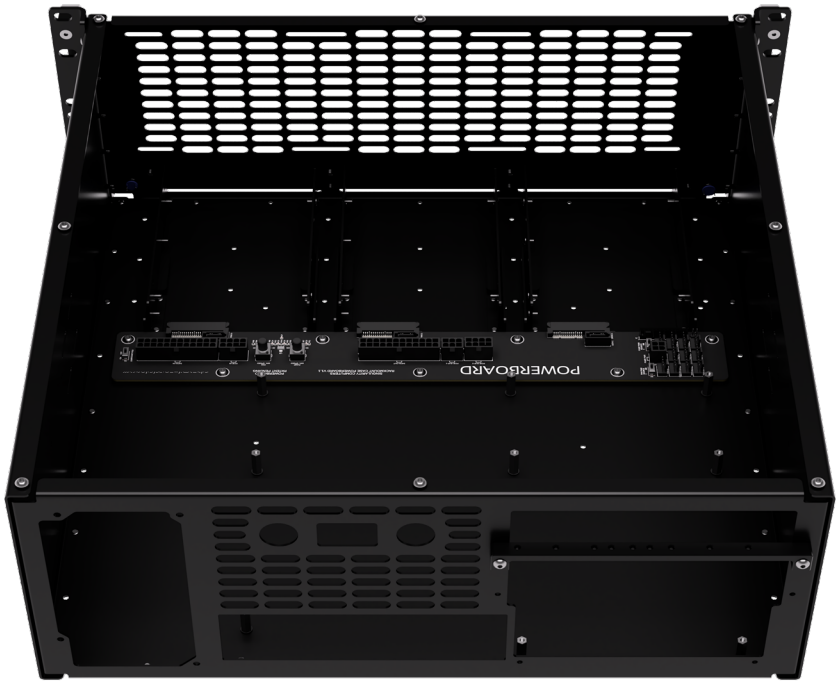
SINGULARITYCOMPUTERS

4U RACKMOUNT CASE

Assembly Manual

Revision 1.1

Table of Contents



Introduction

Possibly the most requested product line by our customers is finally here, we introduce the Singularity Computers Rack Case and Rack-mount Water-box which were designed to work together in pairs but they can also be used as standalone products. The SC Rackmount Case fits 1x 360mm radiator on the front, motherboards up to the SSI-EEB form factor, ATX power supplies, 3x SATA drives, 7x PCIe expansion slots, and has a PowerBoard option with features like a PSU jump-start switch and temperature-based fan and pump speed control and the 12pin header to connect a FanGuardian PowerBoard Controller. The Rack Case uses 4U space.

Features

- **PowerBoard Integration**
  The PowerBoard is a PCB integrating 24pin, supplementary 6/8pin PCIe with PWM hubs and direct-attach SATA connections. Essentially, the PowerBoard is a distribution plate for cables while integrating other features and functions as well.

- **High End Components**
  It is designed to fit high-end GPUs, large power supplies and thick radiators.

- **Radiator Adjustment**
  The radiator has +/-10mm horizontal adjustability on the front panel.

- **Storage**
  The case has 3x drive positions.

4U Rackmount Case Specifications

Case Components	Steel panels, stainless steel fasteners and stand offs. Magnetic dust filter.
PowerBoard Electronics Integration	24pin x1, PWM FAN x6, PWM PUMP x2 headers. PSU jumpstart switch, FanGuardian 12pin header and Temperature sensor header x1 (10K NTC standard).
Cables	PowerBoard Linking Cables and PowerBoard PSU Cables available here. Custom Cables available here.
Motherboard Form Factor	ATX/mini-ITX/EATX, SSIE-CEB/SSI-EEB.
Expansion Slots	x7 Vertical / x3 Horizontal.
Case Form Factor	4U Rack.
Package Dimensions	480mm(L) x 620mm(W) x 100mm(H) Case is flat packed and requires assembly.
Package Weight	10 kg.
Case Dimensions	450mm(L) / 492mm(L) with handles x 441mm(W) x 177mm(H)
Case Weight	8 kg.
Radiators	1x 360mm radiator up to 85mm thickness with up to 30mm thick fans on the front panel.
Max. GPU Length	• 419mm with 25mm thick front fans • 389mm with a 30mm radiator with 25mm fans • 374mm with a 45mm radiator with 25mm fans • 354mm with a 60mm radiator with 30mm fans • 329mm with an 85mm radiator and 30mm thick fans
Max. GPU Width (Horizontal)	3-5 Slots.
Max. GPU Height (Vertical)	143mm.
Max. CPU Cooler Height	144mm.
Max. PSU Length	220mm.
Storage	3x 2.5" or 3x 3.5" with slide rails accessible from the front. These drive bays only work with ATX motherboards and with the PowerBoard in position "1" due to space constraints.
Ports	2x 20mm diameter G1/4" pass thru ports for external water-cooling.
Front Panel I/O	Power and Reset buttons.
Horizontal GPU Mount	Yes, purchasable as an add-on.
Materials	Steel, stainless steel, aluminium and PCB.
Manufacturing Process	Metal folding & CNC machining.
Assembly	Flat packed and needs to be assembled by the customer.
Accessories	M3 Hex Key x1 & M4 hex key x1.

Parts List

	Item		Quantity
4U Rackmount Case	PCIe Mount		1
	Rear Panel		1
	Front Panel		1
	Bottom Panel		1
	Top Panel		1
	Handles		2
	Rack Mounts		2
	Drive Cover		3
	Drive Bracket		6
	Drive Rail Left		3
	Drive Rail Right		3
	Radiator Filter		1
	12mm Power Switch		1
	12mm Reset Switch		1
	M4 4mm BH		49
	M4 8mm BH		16
	M4 14mm BH		2
	M4 12mm CS		4
	#6-32 0.25" BH		23
	M4 7mm Plastic Washer		19
	M3 6mm BH		25
	M3-M4 18mm Standoff		19
	M3 & M4 Hex Key		1
Horizontal GPU Mount	PCIe Riser Cable		1
	PCIe IO Cover		1
	M4 4mm BH		2
	M3 7mm washer		3
	M3 22mm BH		3
	VGPU 3mm Acryl		2
	VGPU 10mm Acryl		1
	VGPU 90 Degree Bracket		1
PowerBoard	Rackmount Case PowerBoard		1
	PowerBoard Spacer		1
	24pin 15cm Linking Cable		1
	PWM Linking Cable		1
	M4 8mm BH		7

Assembly Manual

Step 1: Assembling the Mainframe

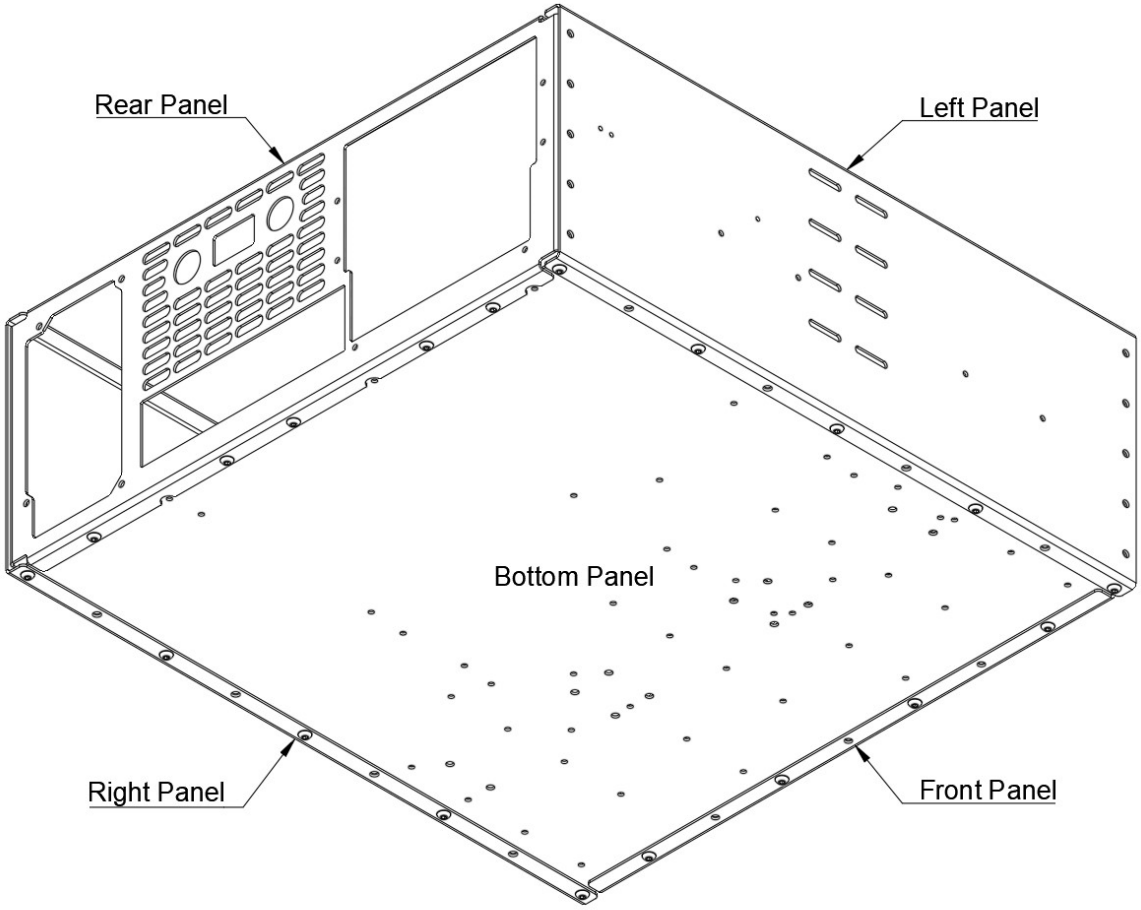


Figure 1A

- Step 1: Install the Left Panel, Right Panel, Front Panel and Rear Panel to the Bottom Panel with M4 4mm BH x19.

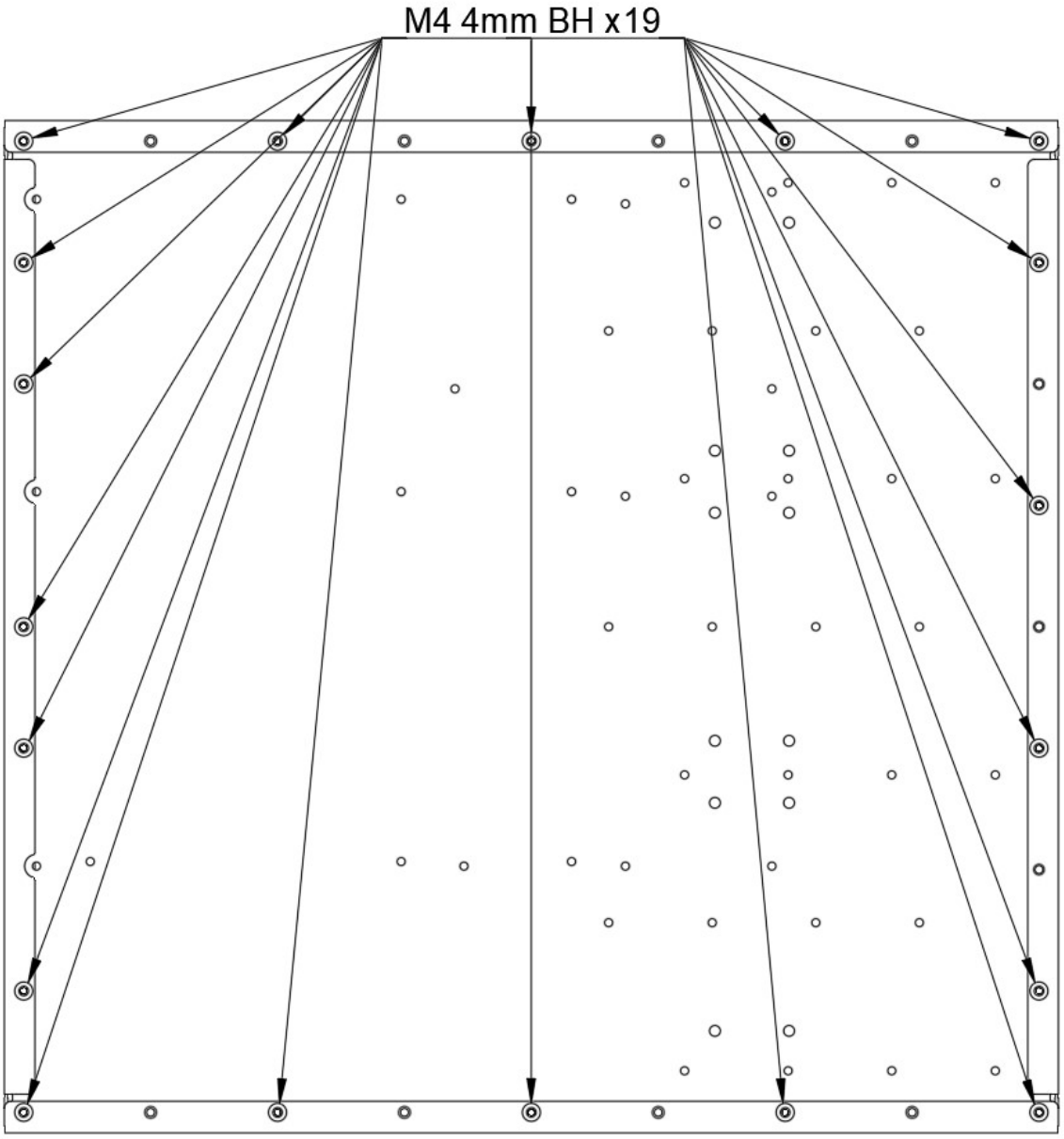


Figure 1B

Step 2: Securing the Rear Panel

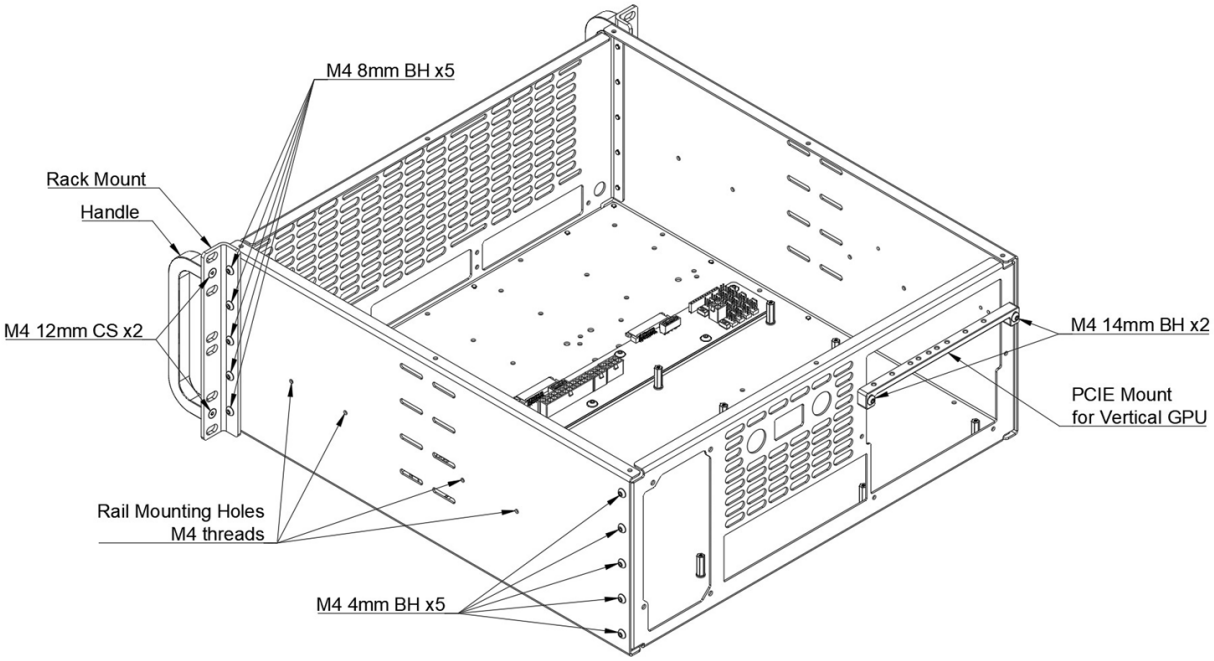


Figure 2

- Step 2: Secure the Left and Right Panels to the Rear Panel with M4 4mm BH x5 on both sides.

Step 3: Installing Rack Mounts & Handles

- Step 3A: Install the Rack Mounts to the Left and Right Panels with M4 8mm BH x5 on each side.
- Step 3B (Optional): Install the Handles to the Rack Mounts using M4 12mm CS x2.
- Step 3C (Optional): Install a sliding rail to each side using the M4 threaded holes on the Left and Right Panels.

Step 4: Installing the PCIe Mount for Vertical GPU

- Step 4: Install the PCIe Mount in the top position on the rear panel and secure it with M4 14mm BH x2 according to *Figure 2*, or if a Horizontal GPU Mounting kit is used with a riser cable, then go to Step 5 instead.

Step 5: Installing the PCIe Mount for Horizontal GPU

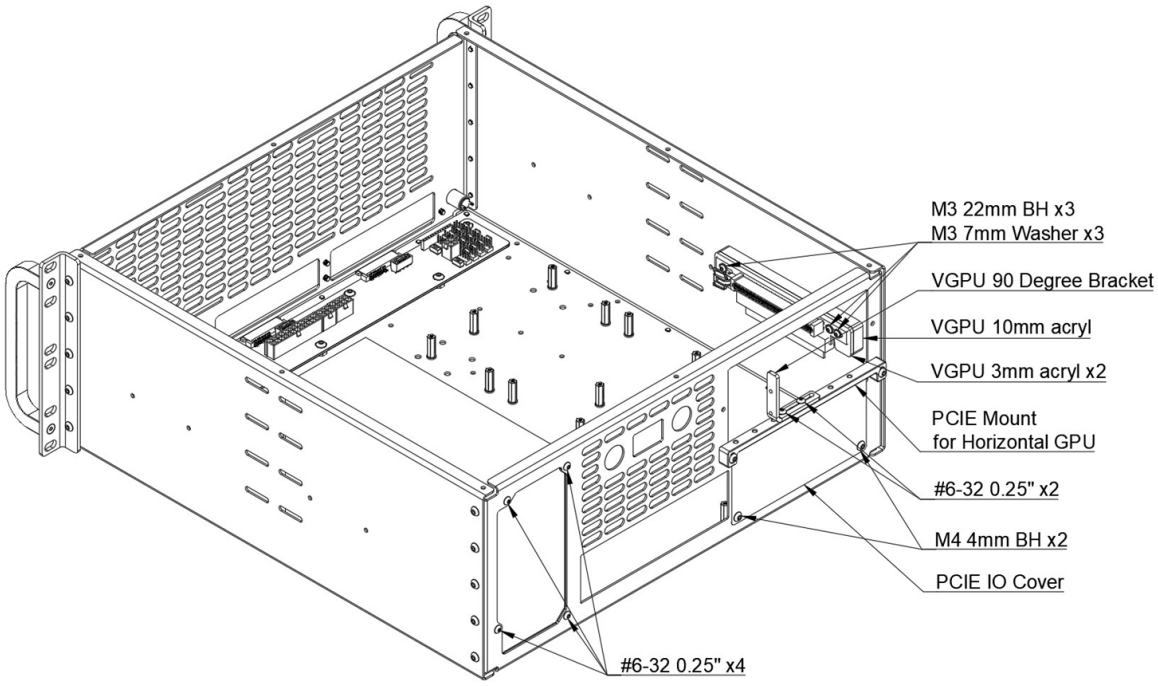


Figure 3

- Step 5A: If a horizontal GPU mounting kit is used with a riser cable, then install the PCIe Mount in the bottom position on the rear panel and secure it with M4 14mm BH x2 according to *Figure 3*. Then install the VGPU 90 Degree Bracket with #6-32 0.25" x2 in the position shown. This can be adjusted horizontally.
- Step 5B: Install the PCIe Riser Cable to the Left Panel using the VGPU 10mm Acryl and VGPU 3mm Acryl x2 as spacers and secure this assembly with M3 22mm BH x3 fasteners with M3 7mm Washer x3.
- Step 5C: Install the PCIe IO Cover to the Rear Panel with M4 4mm BH x2.

Step 6: Power Supply

- Step 1: Install an ATX power supply to the Rear Panel with #6-32 0.25" BH x4.

Step 7: ATX Motherboard & PowerBoard

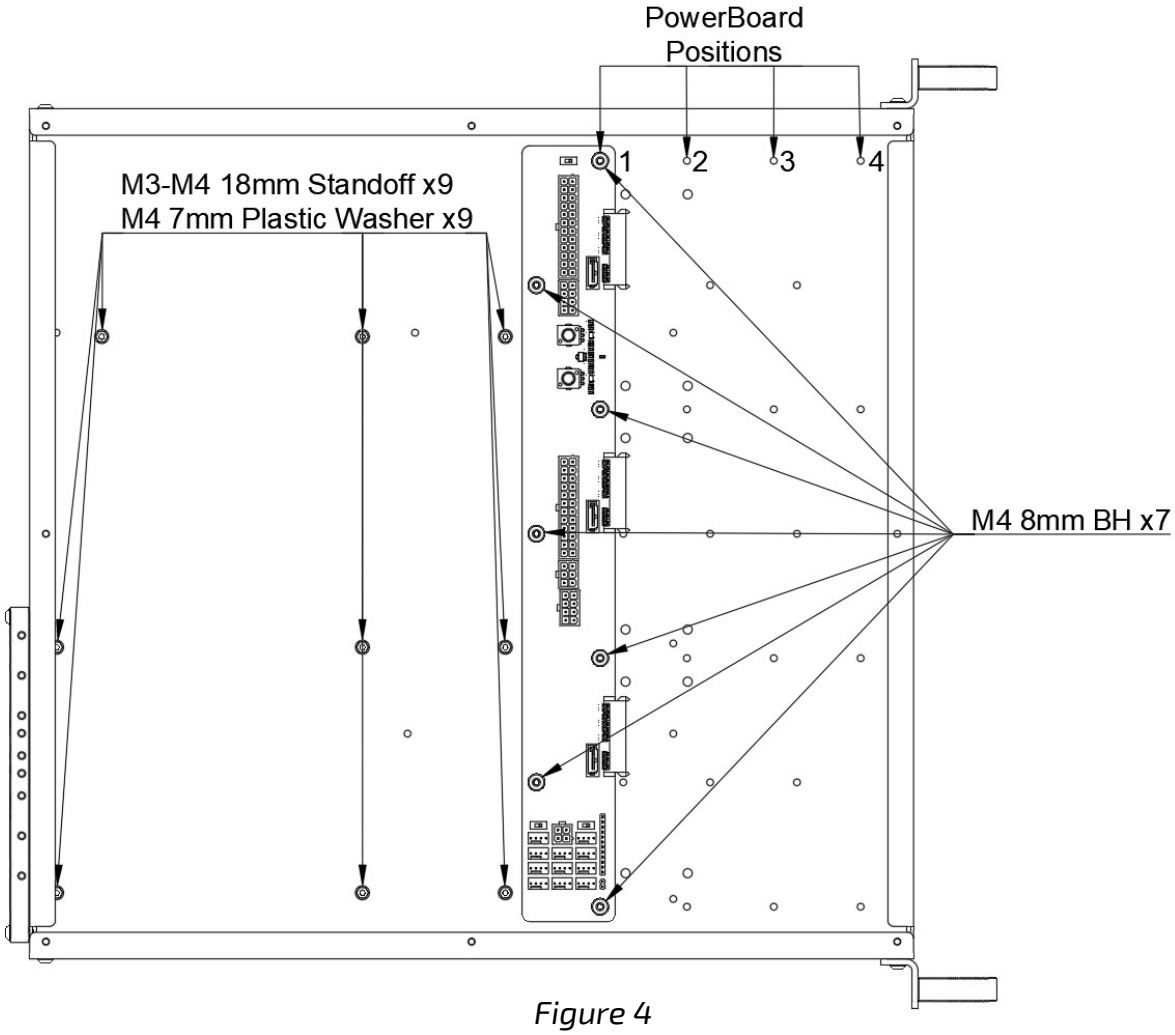


Figure 4

- Step 7A: If an ATX/EATX motherboard is used, then install M3-M4 18mm Standoff x9 with M4 7mm Plastic Washer x9 in the marked locations. Otherwise go to Step 9.
- Step 7B (Optional): If an ATX motherboard is used then install the Rackmount Case PowerBoard to position "1" using the PowerBoard Spacer and M4 8mm BH x7.

The 2.5" and 3.5" drive bays only work when the PowerBoard is in position "1".

The PowerBoard connectors block the radiator in position "4" so only fans can be installed to the Front Panel.

- Step 7C (Optional): If an EATX motherboard is used with right-angled connectors, then install the Rackmount Case PowerBoard in position "2" or "3" depending on how wide the motherboard is using the PowerBoard Spacer and M4 8mm BH x7.

For right-angled 24pin and PCIe supplementary connectors a Shift 90-degree adaptor will be needed to rotate the connectors back to vertical position.

Step 8: Installing Drive Rails

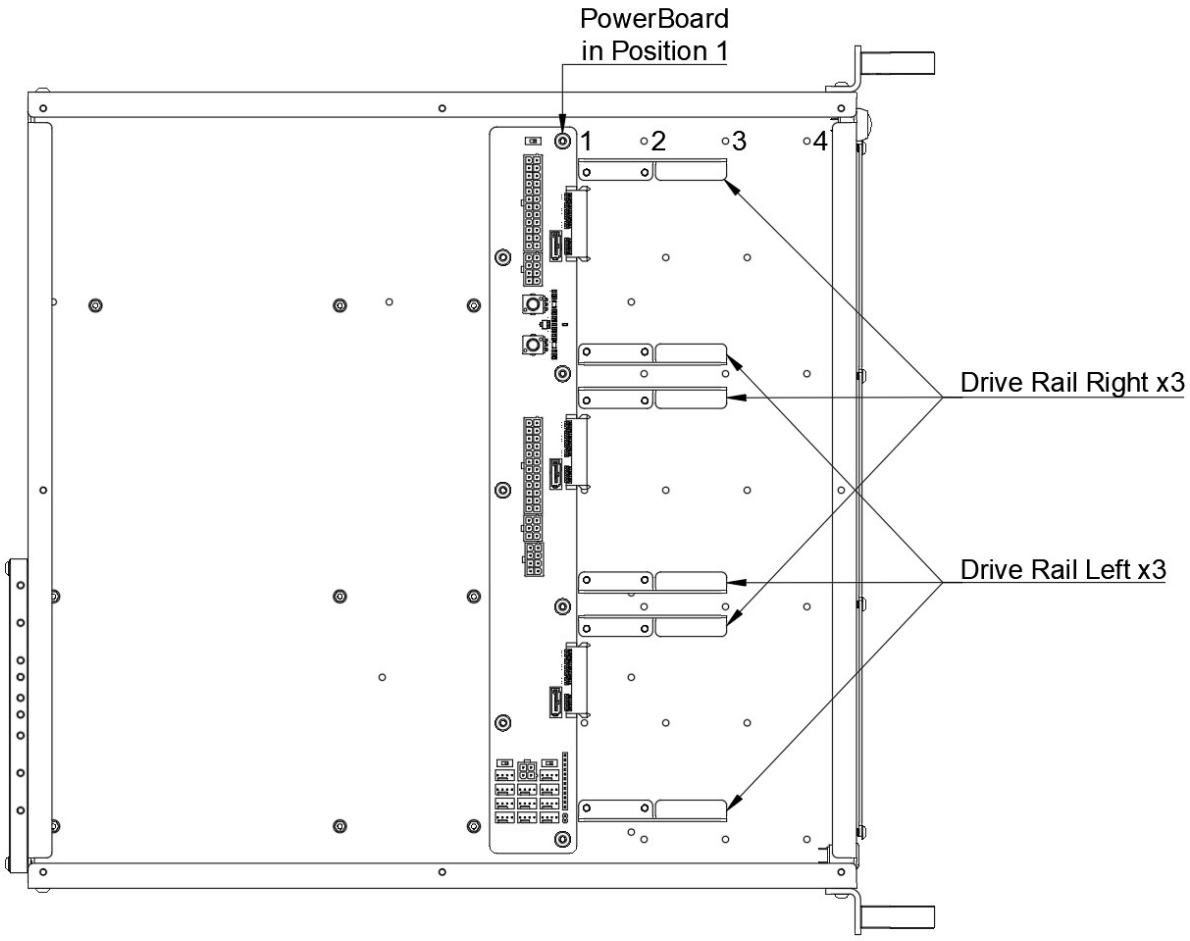
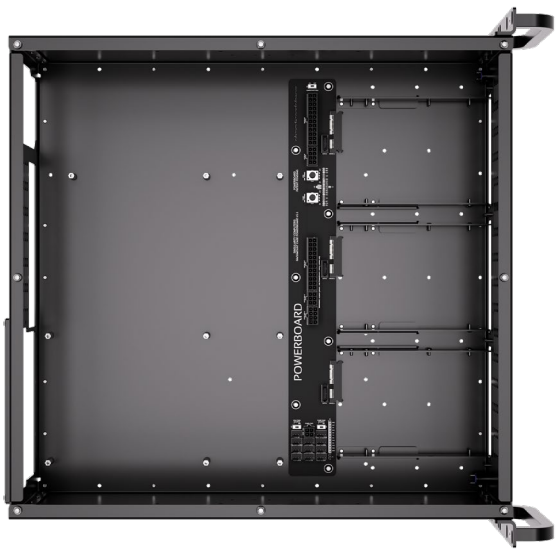


Figure 5A

- Step 8A: If an ATX motherboard is used then drive rails can be installed in the above locations. *The Rackmount Case PowerBoard is recommended but not necessarily needed for installing drives. The drives can be connected to the power supply and to the motherboard the regular way with cables.*



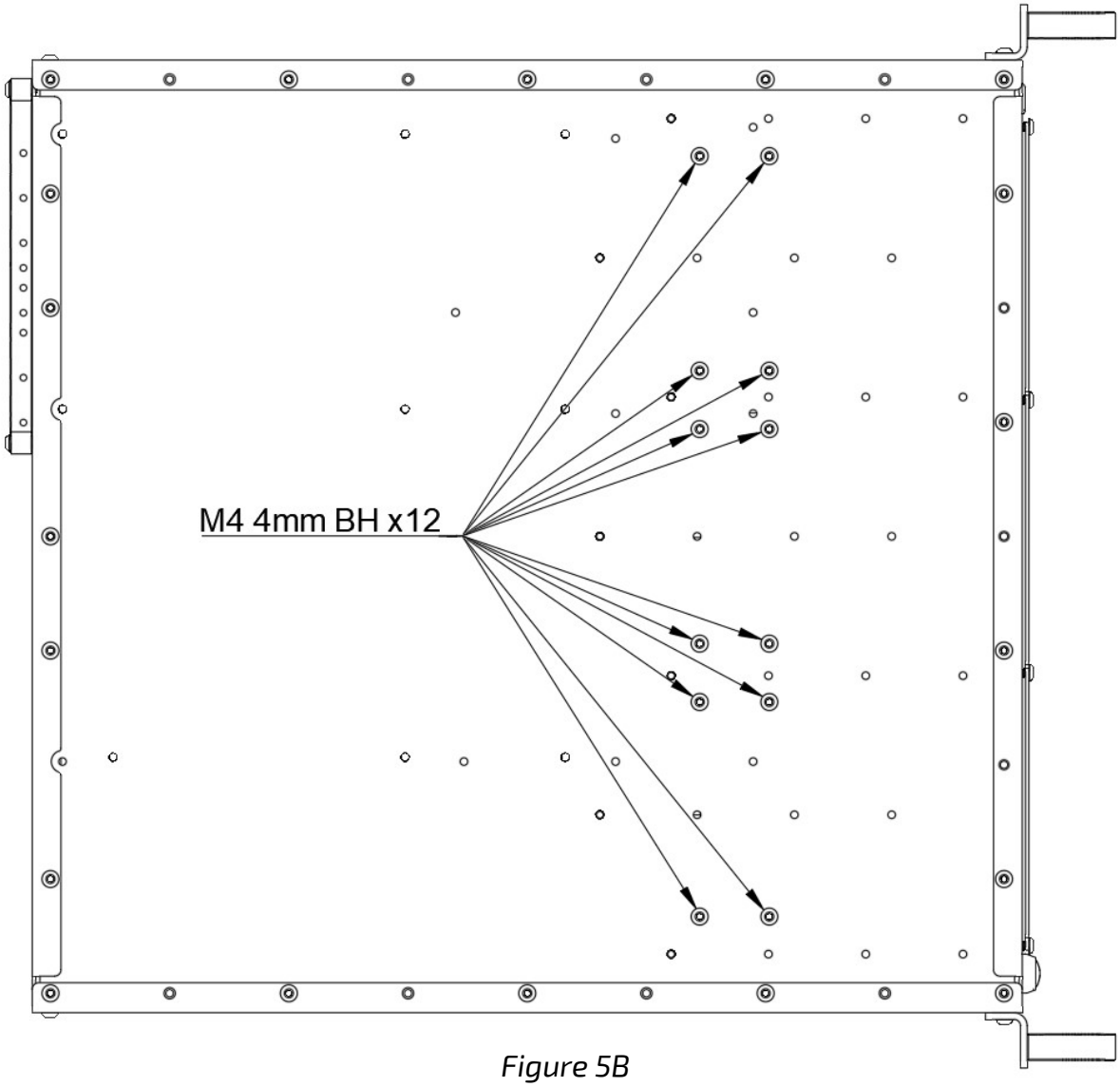


Figure 5B

- Step 8B: Secure the drive rails to the Bottom Panel with M4 4mm BH x12 total.

Step 9: Installing Drives

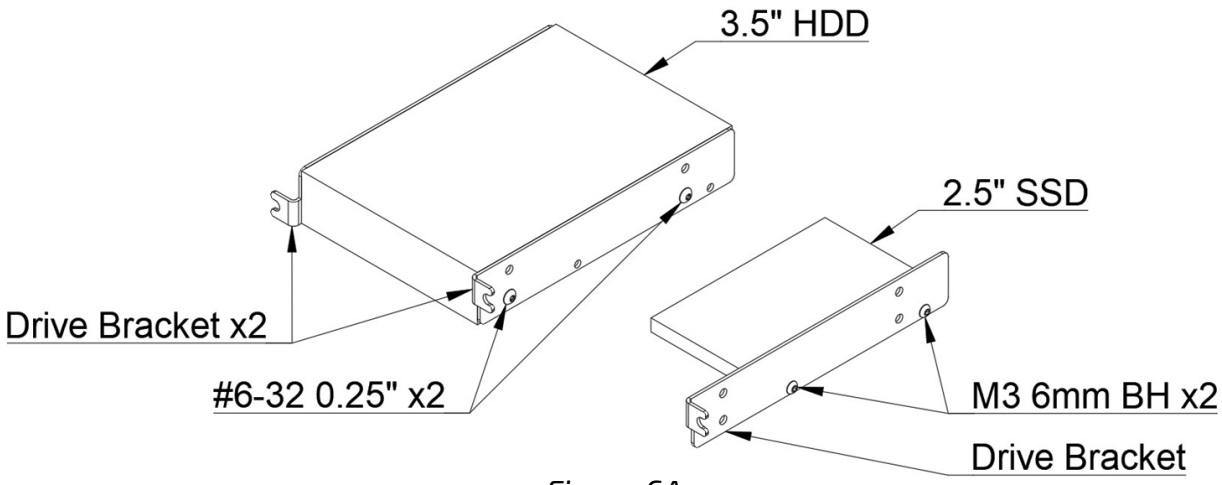


Figure 6A

- Step 9A: Install the Drive Bracket x1 to the side of the 2.5" drive using M3 6mm BH x2.
- Step 9B: Install the Drive Bracket x2 to each side of the 3.5" drive using #6-32 0.25" x2 on each side.

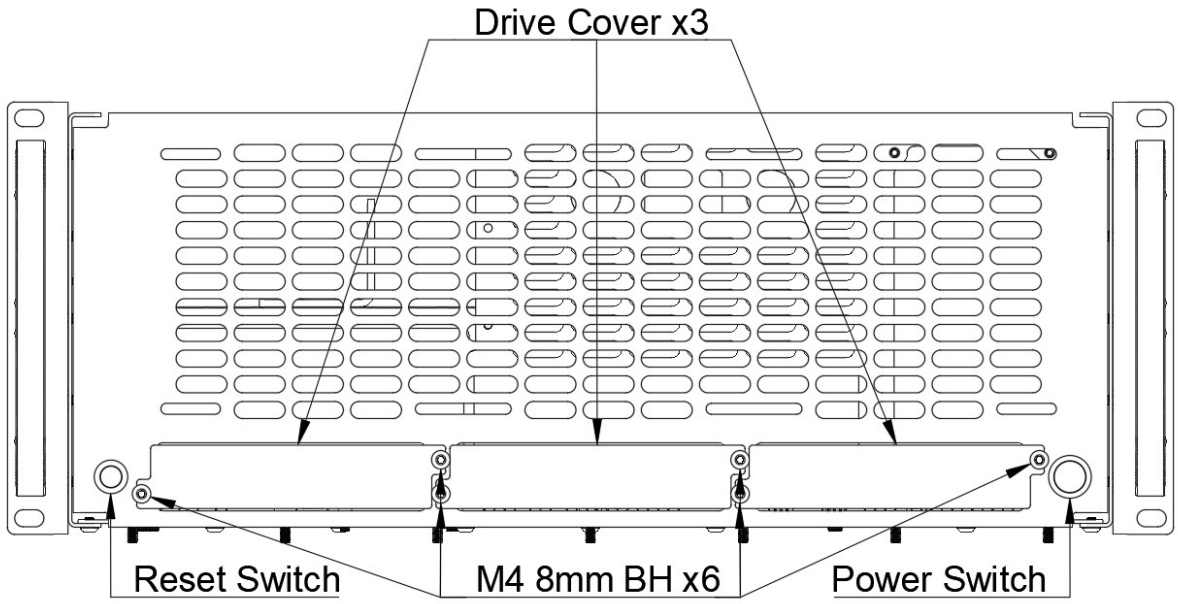


Figure 6B

- Step 9C: After the 2.5" or 3.5" drives are installed then install Drive Covers x3 on the Front Panel using M4 8mm BH x6 total.

Step 10: Power & Reset Switches

- Step 10: Install the 12mm Power and Reset Switches to the front panel, their positions are interchangeable.

Step 11: SSI-CEB, SSI-EEB Motherboard & PowerBoard

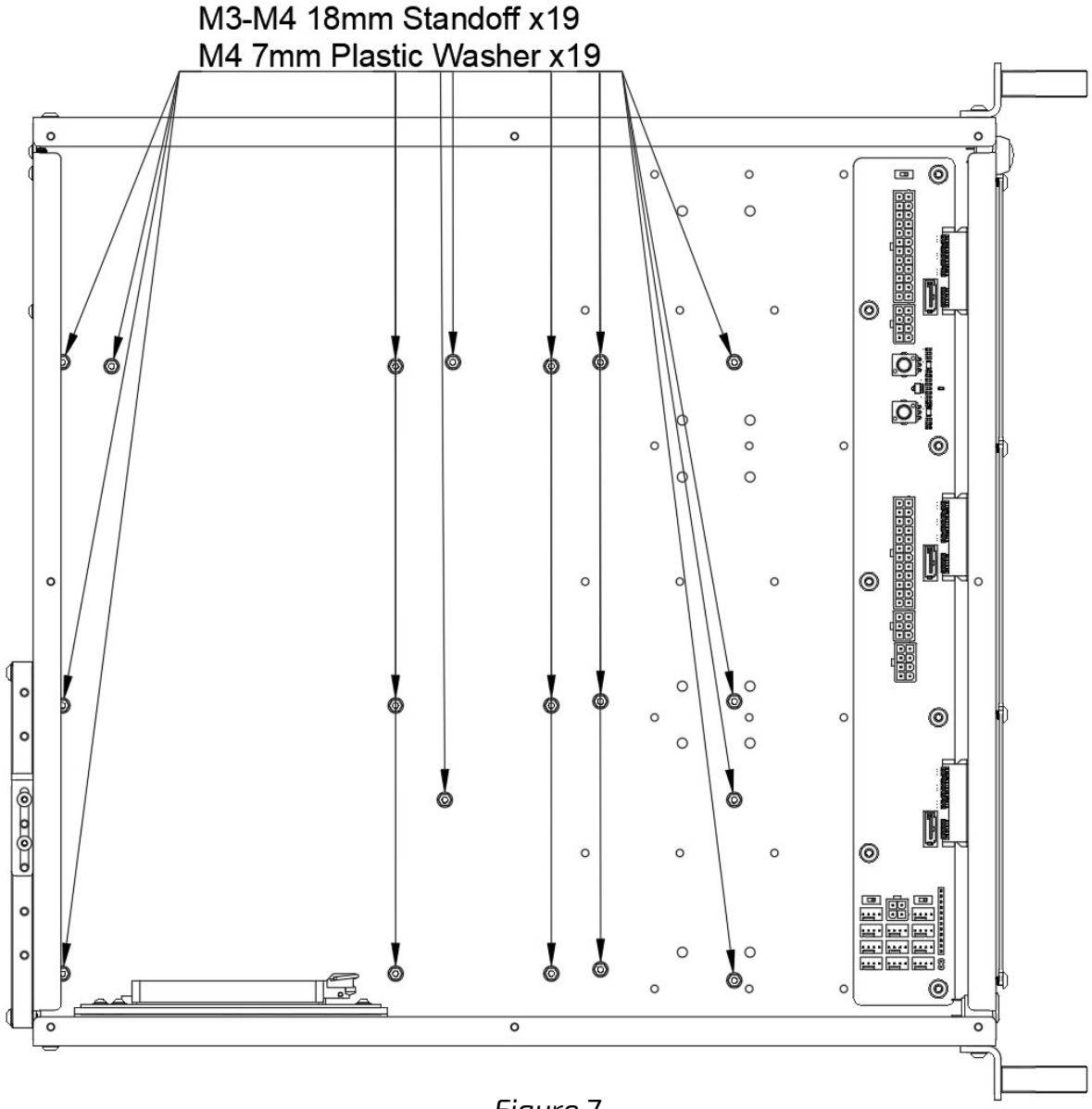


Figure 7

- Step 11A: If an SSI-CEB or SSI-EEB motherboard is used, then install M3-M4 18mm Standoffs with M4 7mm Plastic Washers in the marked locations depending on which mounting holes are present in the motherboard. *Always check which mounting holes are used on the motherboard and only install standoffs in the corresponding threaded holes on the Bottom Panel. Installing standoffs where they are not needed can cause physical and electrical damage to the motherboard.*
- Step 11B (Optional): Install the Rackmount Case PowerBoard to any of the remaining positions using the PowerBoard Spacer and M4 8mm BH x7. *SATA drives can't be installed unless the Rackmount Case PowerBoard is in position "1" which is in conflict with SSI-CEB/SSI-EEB motherboards.*

Step 12: Installing the Top Panel

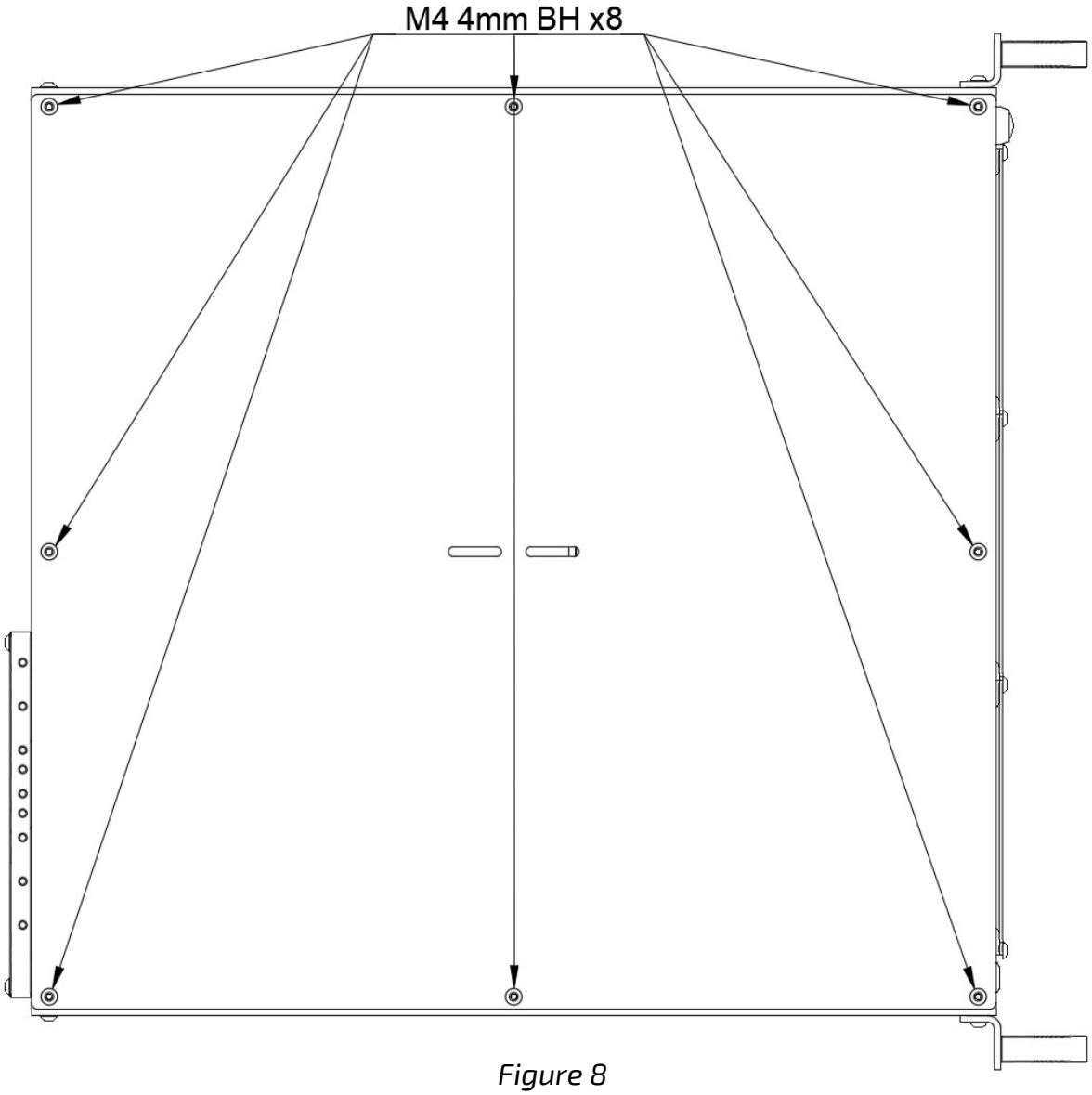


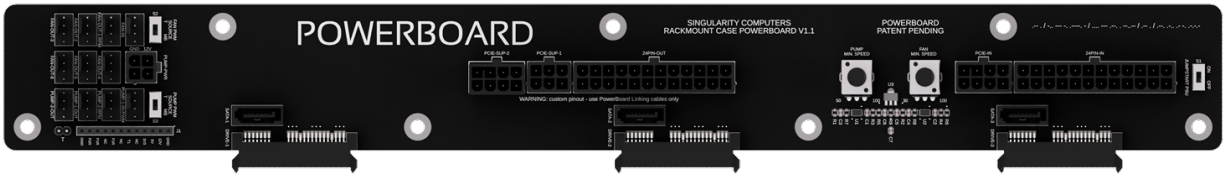
Figure 8

- Step 12: Install the Top Panel using M4 4mm BH x8.

Rackmount Case PowerBoard

Input Connections	• MB 24pin Input x1 • PCIe 8pin Input x1 • PWM FAN Input x1 • PWM PUMP Input x1 • Temperature Sensor x1 • SATA Data x3
Output Connections	• MB 24pin Output x1 • PCIe 8pin Supplementary Output x1 • PCIe 6pin Supplementary Output x1 • 4pin ATX PUMP Power x1 • PWM FAN Output x6 • PWM PUMP Output x2 • FanGuardian 12-pin x1 • SATA Drive x3

One of the Rackmount Case PowerBoard's extra features is a PSU jumpstart switch that is able to power on the system without booting which simplifies filling and bleeding the loop. Other features are temperature-based PWM speed control for the fans and pumps and a 12-pin header to connect a FanGuardian for monitoring the system.



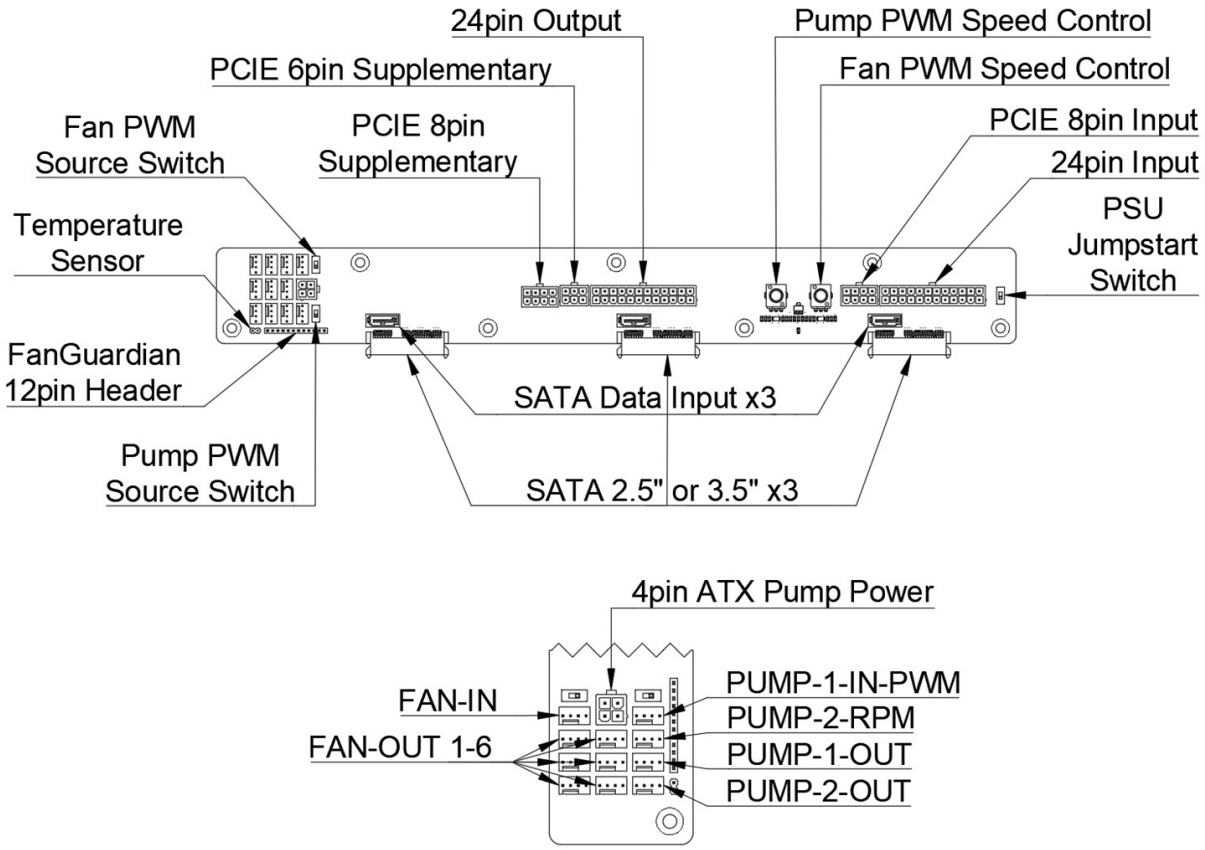


Figure 9

⚠ All PowerBoards need PowerBoard Linking Cables.

- The Rackmount Case PowerBoard has extensive fan and pump PWM speed control features. The PowerBoard can be connected to the motherboard with PWM Linking Cables to have the motherboard BIOS control the fan and pump speed. If a standard 10K NTC temperature sensor is installed in the loop then the PowerBoard can control the PWM speed based on that temperature reading. The speed control potentiometers set the starting point of the fan curve. If there is no temperature sensor connected then these provide fix speed PWM control.

- The PWM source can be set with the switches: "T" stands for temperature-based control with a temperature sensor connected to the PowerBoard, while "MB" stands for motherboard control in which case a motherboard needs to be connected to the PWM inputs or the speed defaults to 100%.

- To read the RPM and provide a PWM signal to the fans and pumps connect a PWM Linking Cable to the FAN-IN and PUMP-1-IN-PWM headers. PUMP-1 and PUMP-2 operate with the same PWM signal.
  To read the RPM of the second pump connect a PWM Linking Cable to the PUMP-2-RPM header.

- The 24pin, 8pin and 6pin supplementary outputs are mirrored, only use Singularity Computers Linking Cables.