



S E S A M E

Discovery V1.0 Specifications

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2. Revision History

| Date | Name | Decription |
|------------|-----------|------------|
| 10/14/2019 | JJ Chanut | Creation |
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| | | |



3. Scope

This document provides the technical specifications for the design of the discovery chassis.

4. Overview

Discovery is a fully integrated mini mobile rack compatible with OCP Openrack V1 and V2 servers. This rack supports 5 slots 2 Open U and is powered by a standard electrical outlet (110-230v 16A).



Figure 1 & 2 Discovery rack

Discovery rack is divided into three zones as shown in Figure 3:

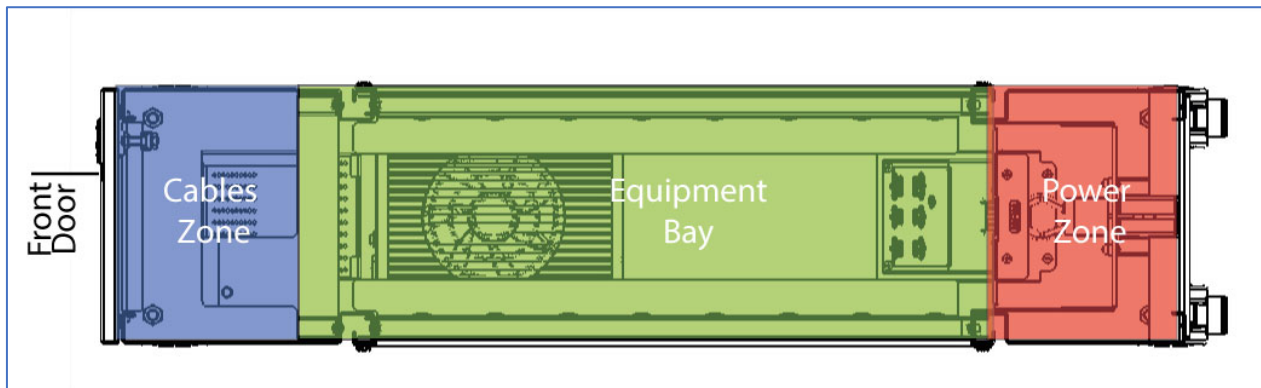


Figure 3



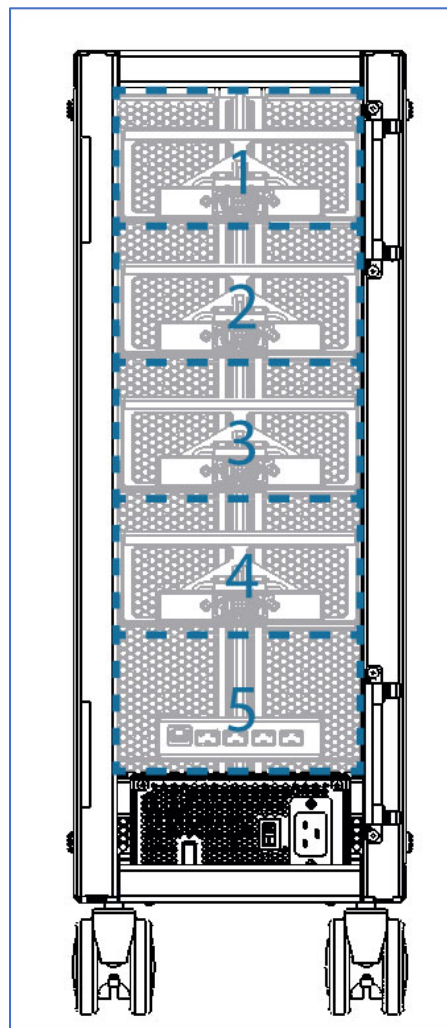
- A Cable zone in front
- An Equipment Bay in the middle for all of the equipment
- A Power zone on at the back

The Cable zone, located at the front of the rack, manages and protects the data cables connected to the IT equipment.

During installation, the equipment slides past the cable zone and rests on a series of horizontal supports within the rack. Once on the support, a DC connector in the equipment blind-mates into the bus bars in the Power zone.

The Power zone in the rack consists of a pair of bus bars that transmit power from a rack level power shelf to the equipment. The vertical bus bars connect the equipment with the PSU located below the Equipment Bay. The system is designed so that equipment in the Equipment Bay can attach to the bus bar continuously along its entire length to accommodate chassis of different sizes over multiple generations.

The discovery has 5x2 openU slots to integrate 5 servers or 4 servers and a network switch.





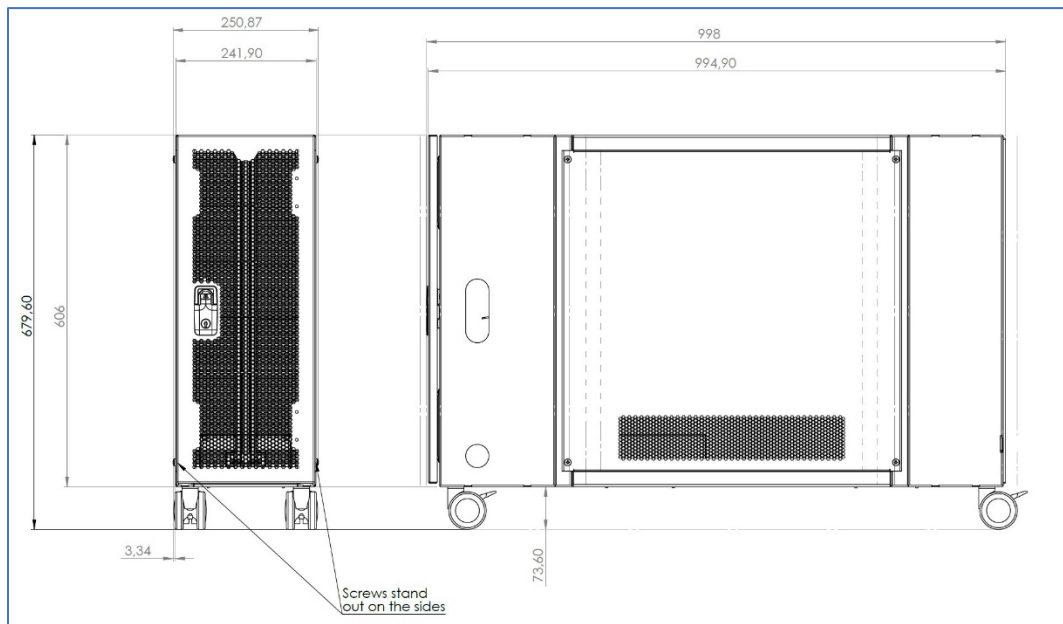
5. Chassis specifications

The following sections describe the chassis.

The chassis is an assembly of interlocking components designed to be individually mounted to the rack. It provides structure and airflow to the servers and other electrical subsystems.

a. Dimensional

Figure5 detail mechanical dimension of the discovery



b. Decommissioned parts

Following parts are recovered from decommissioned material:

- Bus bar
- Bus bar lug cover
- Server support left
- Server support right
- Power bars screws
- Busbar lug cover screw
- Server supports screws

c. Casters

The discovery rack has 4 wheels to move it easily. The 2 wheels at the front are lockable while the two wheels at the back are not.

| Specification | requirement |
|------------------|-------------|
| Wheel diameter | 65 cm |
| Charge per wheel | 25kg min |



| | |
|-------|--------------------|
| Mount | threaded shaft M10 |
|-------|--------------------|

d. Electrical grounding

Rack shall provide an electrically conductive path from the IT equipment in the rack to PSU ground.

This path shall not pass through any surfaces that are not protected from rust and corrosion such as un-plated surfaces.

All rack ground paths shall pass rust grade 6 per ASTM D610-01 after 48 hours of salt spray per ASTM B117-07.

The bus bar SHALL NOT:

- Be electrically connected to the rack system metal frame (chassis ground)
- Have the positive bus bar connected to the chassis ground

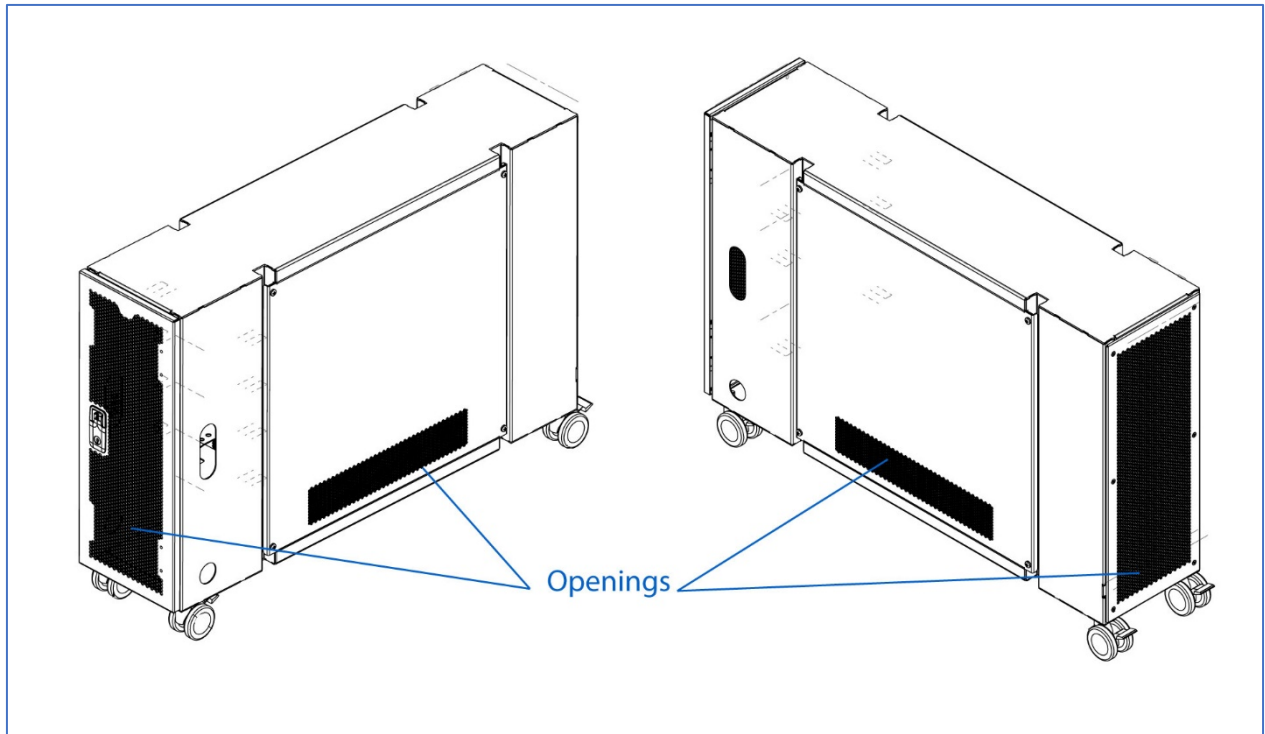
Power board and other electrical component must be connected to the chassis ground.

e. Cooling requirement

Ventilation is provided by the server and PSU fans, so there is no active cooling system on the discovery chassis itself.

Discovery is designed to minimize disruption of airflow in servers; Thus, the front door and the back panel are perforated up to 65%.

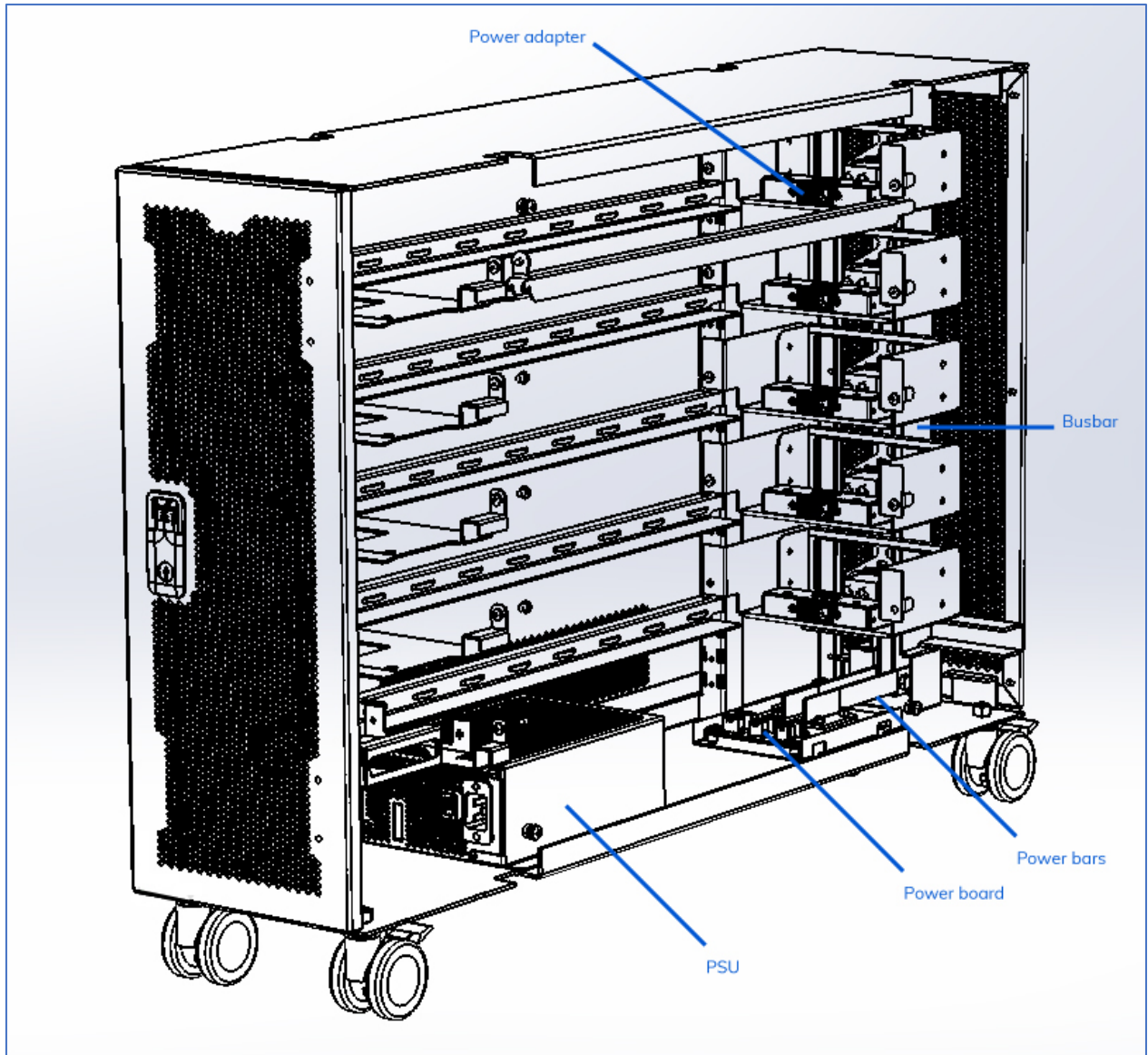
The side panels are also perforated with the same rate to provide enough air to cool the PSU.



6. Discovery power management

Within the rack, power limits are determined by the power-supply power limits under worst-case failure conditions. The power supplies cannot be run at more than 95 percent of maximum output capacity for long periods of time. The total blade power of a deployment therefore cannot exceed these values.

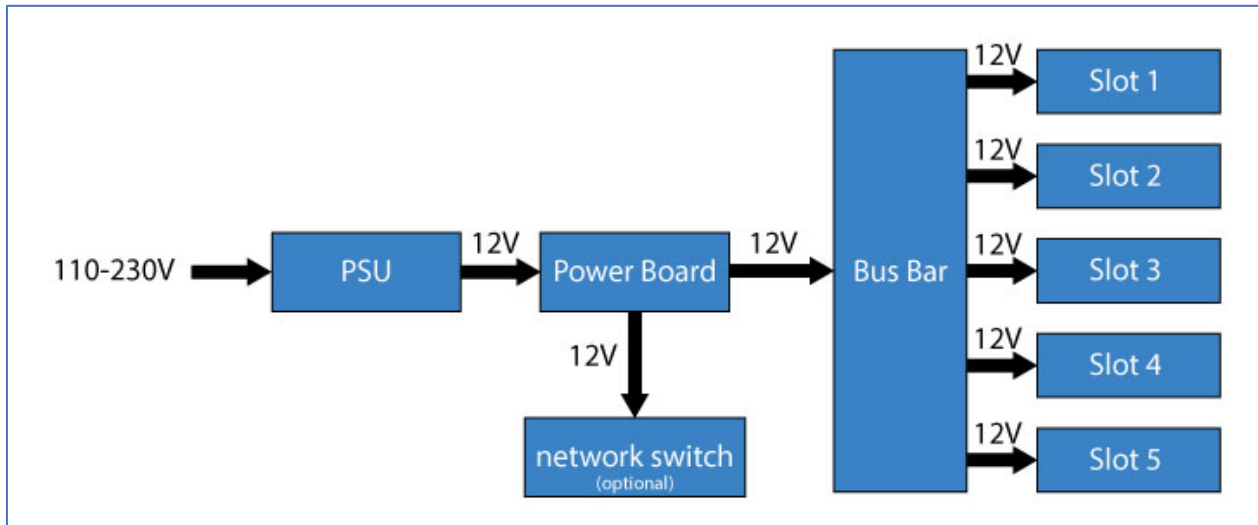
The electric power available to power the discovery is limited by the maximum capacities of the domestic electrical network, ie 1600W for a network delivering 110-130 V for 16A, or 3600W for a network delivering 210-230 V 16A.



Figure# Electrical management parts in the discovery



f. Electrical diagram



g. Power supply requirement

Due to power grid limitations in countries using 110-130V, we chose to use a 1600W PSU.

Designed for being used in an office environment, the Discovery rack uses a standard ATX power supply because it can be connected to a standard power outlet and the noise it produces is suitable.

Table below describes all PSU requirements:

| Specification | Requirement |
|------------------------------|---|
| Form factor | ATX |
| Power | 1600W |
| Modular | Fully |
| Dynamic control of fan speed | yes |
| EPS12V 8 pins connector | 2 |
| PCIe 6 pins connector | 4 |
| Operating temperature | 50°C min at sea level |
| Protection Circuits | OVP (Over Voltage) UVP (Under Voltage) SCP (Short Circuit) OTP (Over Temp) OPP (Over Power) |
| Noise | 35 db max |

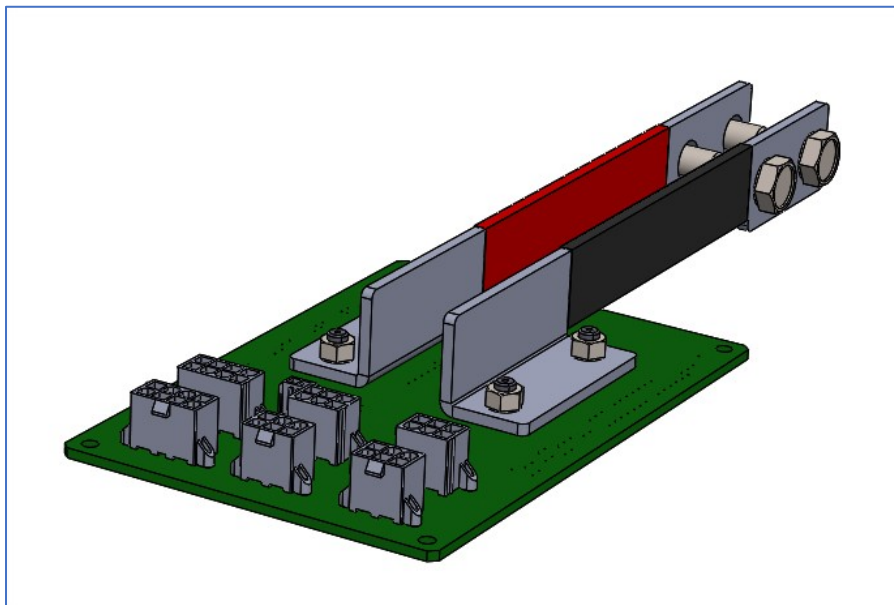


Figure # Standard modular 1600W PSU

h. Power board requirement

Power board receive the 12V current from the PSU and transmits it to the power bars. It also powers the optional network switch.

Power board support 4x 8 pins connectors, 2x6 pins connectors, a 2 pins connector for switch power cable.



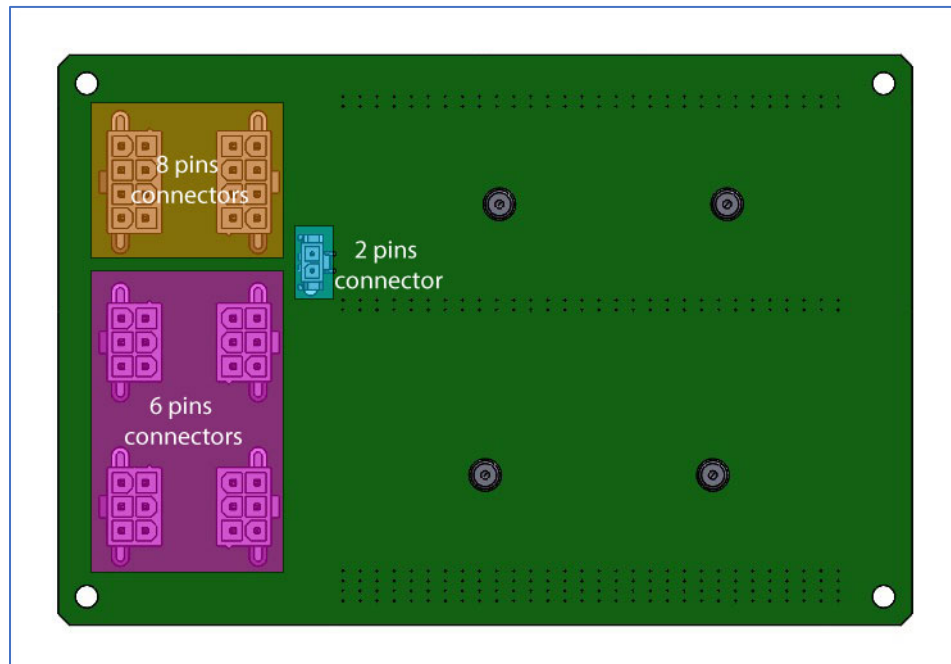
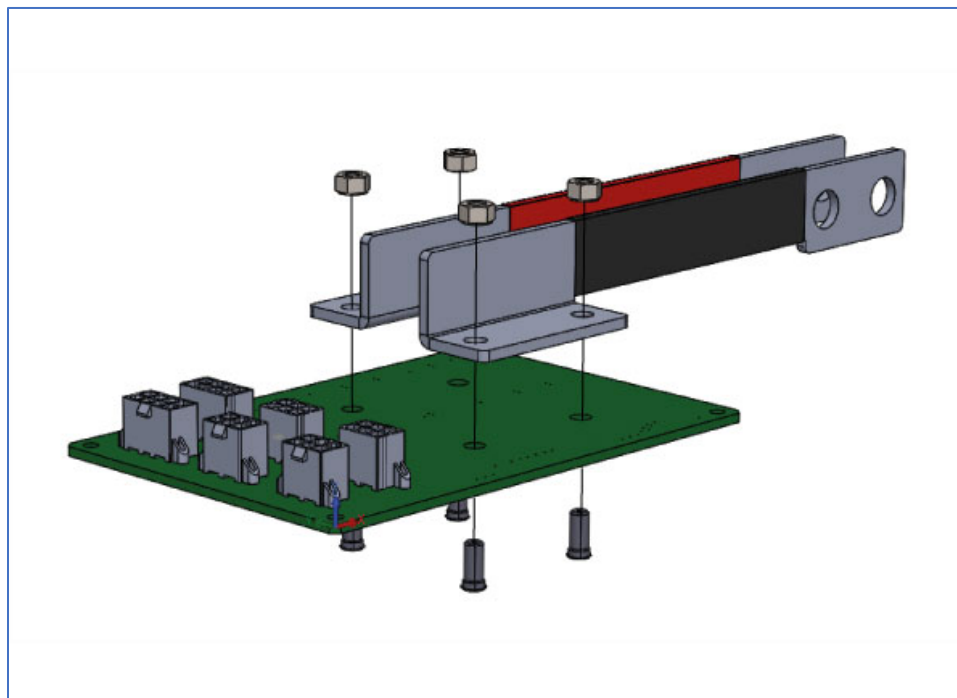


Figure 5

4 threaded broaching studs are mounted on the PCB to assemble the power bars with nuts



i. Power bars requirement

Power bars material is tin plated copper, they provide 12V current from the power board to the busbar.

Material and dimensions are detailed on mechanical drawings.



For safety reasons the bars are sheathed with a heat-shrinkable sheath and is covered with a cap to avoid a direct contact.

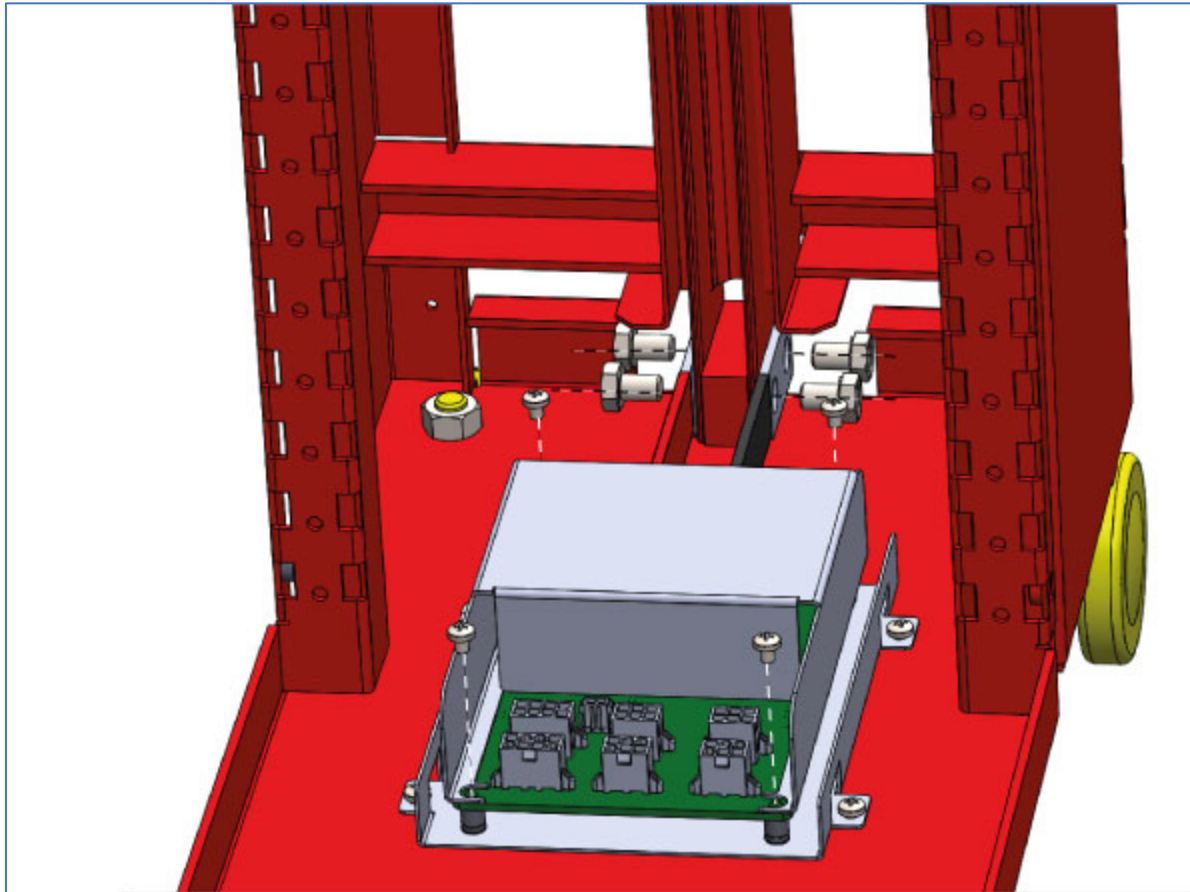


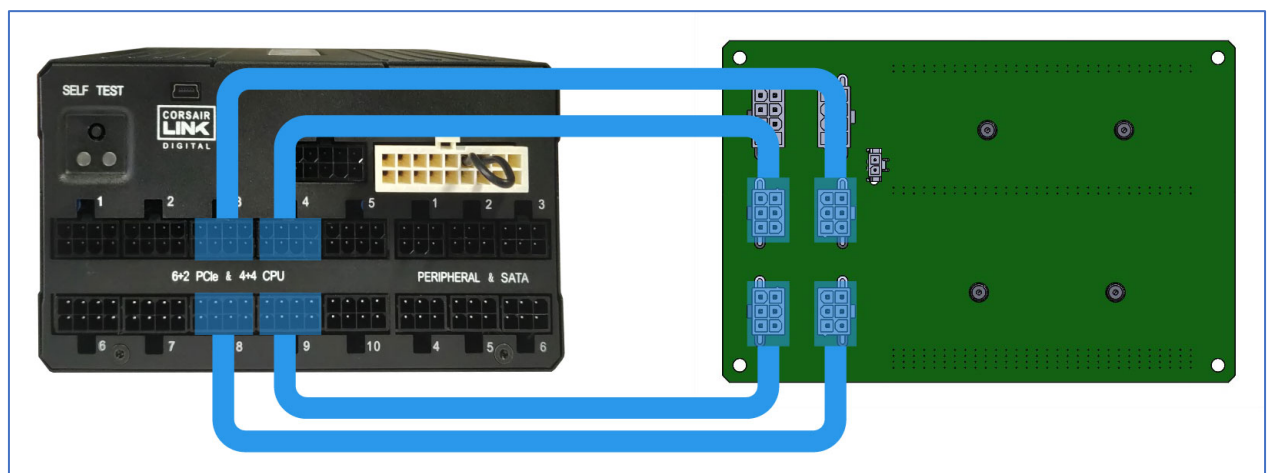
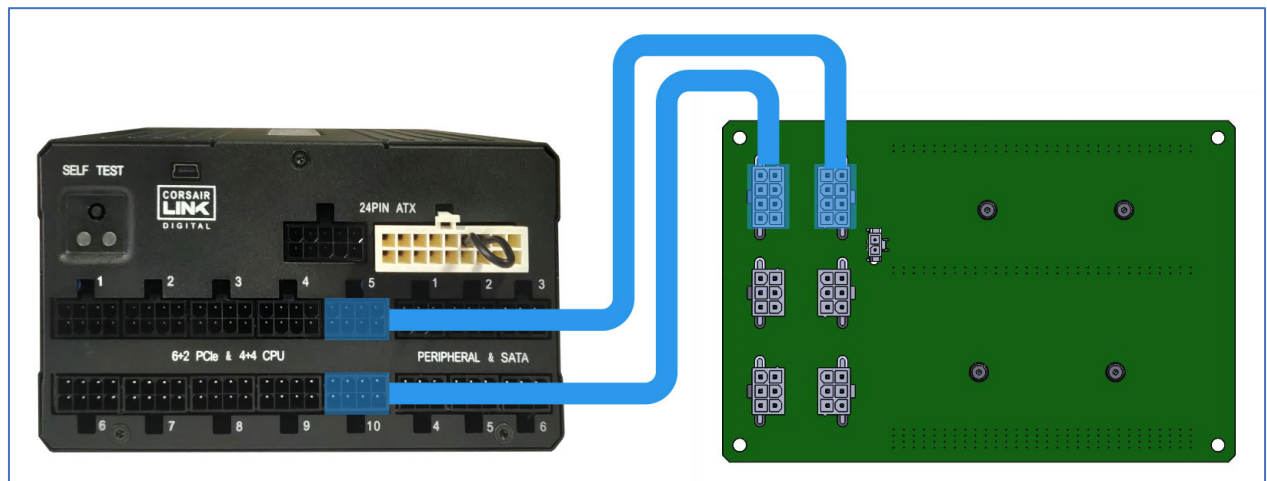
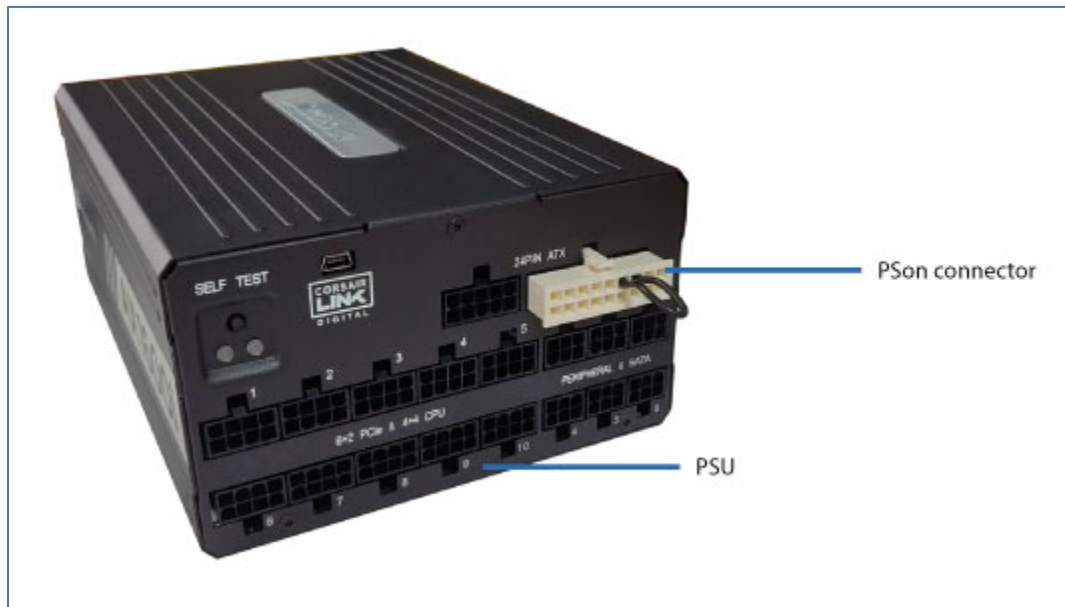
Table below describes heat-shrinkable sheath requirement:

| Specification | Requirement |
|------------------------------|------------------------------------|
| Standard | UL 224 |
| Shrink temperature | 110°C |
| Operating temperature | -20°C to 70°C |
| Dielectric voltage withstand | 2500V, 60sec no breakdown (UL 224) |
| Dielectric strength | 19.7KV/mm min. |
| Volume resistivity | 10 ¹⁴ Ω·cm min. |
| Flammability | VW-1 test |

j. Cabling

The PSU provide 12V to the power board, given the power required for server power, 2 EPS cables and 4 PCIe cables are required.

A PSON connector is also required to be able to start the PSU as the ATX connector is unused.





7. Operating environment

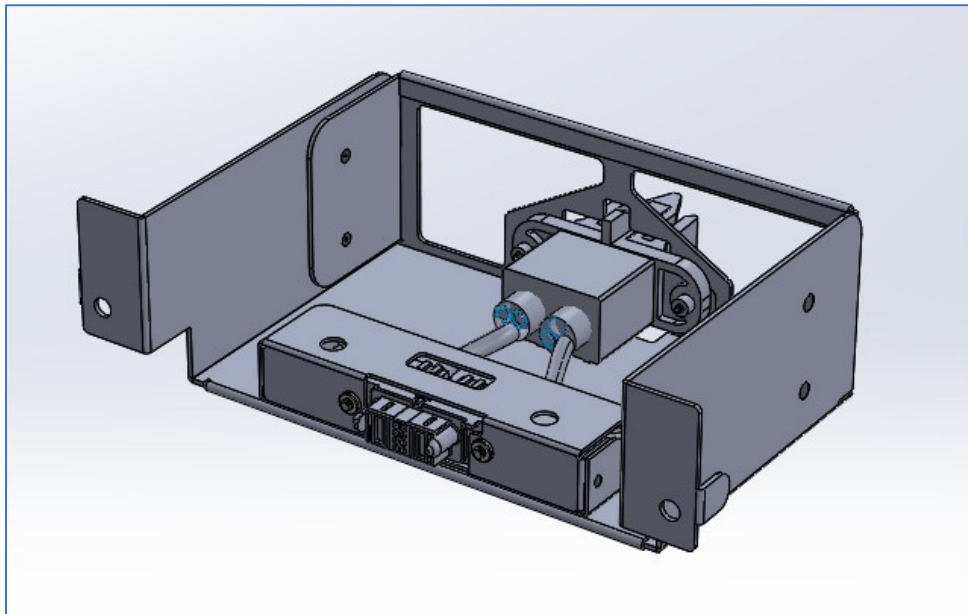
The discovery must fit to office environment, table below describes environmental conditions limits.

| Specification | | Requirement |
|---------------------|---------------|----------------------------|
| Ambient temperature | Operating | 10°C to 35°C at sea level |
| | Non-Operating | -40°C to 60°C at sea level |
| Humidity | Operating | 10% to 80% non-condensing |
| | Non-Operating | 5% to 95% non-condensing |
| Altitude | Operating | 3050m maximum |
| | Non-Operating | 9144m maximum |

8. Hardware compatibility

a. Openrack V1 servers

Openrack V1 servers can be used in a discovery chassis by removing the Openrack V2 adaptor. This includes **Winterfell** and **Leopard Haswell** servers.



b. Openrack V2

Openrack V2 servers can be used in a discovery chassis by adding the Openrack V2 adaptor. This includes **Leopard Broadwell**, **Tioga pass** and **Yosemite V1** servers.



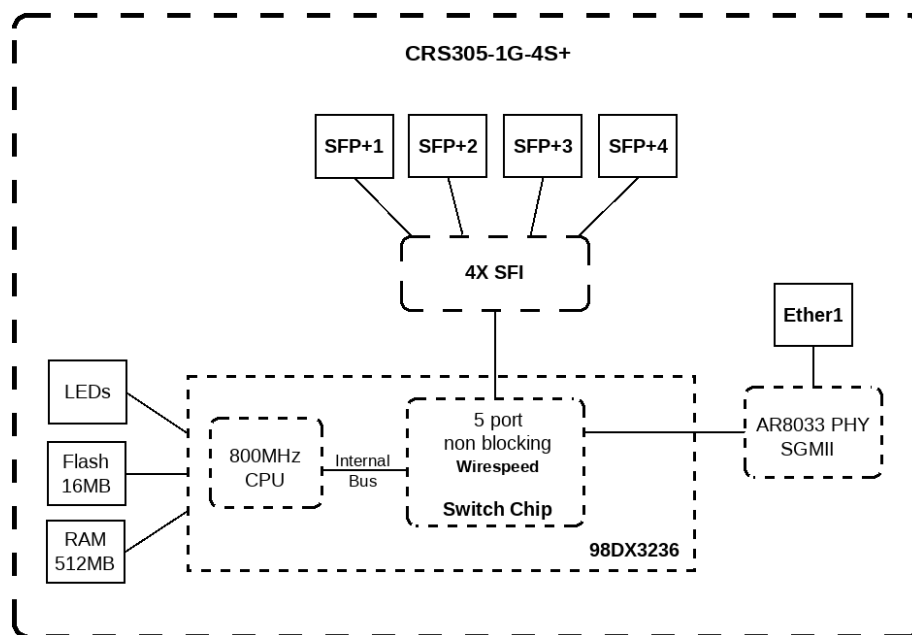
c. Network switch

Discovery supports a 4 SFP+ switch for network connection.

Qualified reference is CRS305-1G-4S+IN from Mikotik, this switch provides a RJ45 1Gb management port and 4 10Gb SFP+ ports.



Figure# 1 Mikrotik CRS305-1G-4S+IN



Figure# switch bloc diagram

A switch support must be installed on the 5th slot in order to assemble the switch.

Picture

9. EMC requirements



6dB margin from the Class A limit is required for all emission test, both radiated emission and conducted emission. When the EUT is DC powered, DC line conducted emission test is required.

Primary EMC Standards apply to emission test include, but not limited to

- FCC Part 15, Subpart B
- EN 55022: 2010 / CISPR 22: 2008 (Modified)
- EN 55032: 2012 / CISPR 32: 2012 (Modified) - Effective 05/03/2017
- EN61000-3-2: 2006/A1 : 2009/A2 : 2009
- EN61000-3-3: 2008

10. Safety Standards

Discovery racks is designed to comply with the latest edition, revision, and amendment of the following standards:

- [USA] UL 60950-1, Information Technology Equipment - Safety - Part 1: General Requirements
- [CAN] CAN/CSA C22.2 No. 60950-1, Information Technology Equipment - Safety - Part 1: General Requirements
- [INT'L] IEC 60950-1, Information Technology Equipment - Safety - Part 1: General Requirements, including all national deviations as specified in the most current CB Bulletin; CB Certificate and report MUST include all countries participating in the CB Scheme; US and Canada national deviations may be excluded since the power supply will have third party certifications for these 2 countries
- [EU] EN 60950-1, Information Technology Equipment - Safety - Part 1: General Requirements
- IEC 62368-1, Audio/video, information and communication technology equipment – Part 1: Safety requirements (applicable to meet anticipated effective date of June 20, 2019 for North America and Europe.)

11. Materials requirements

All materials shall be UL94V0 rate.

Connectors shall be UL1977 recognized

Acceptable payload materials include zinc plated CRS steel. Any plastic material used shall meet the appropriate flame rating specifications as note below:

- Fasteners - made of material with flammability V-0.
- Connectors - material flammability V-0, min 80C. Certified connectors preferred.
- Wiring - Wires are to be certified, rated VW-1, voltage, current, temperature rating suitable for application.



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- Wiring Mechanical protection - e.g. Heat shrink tubing, braided mesh, etc. are to be certified, rated VW-1, voltage and temperature rating suitable for application.
 - Printed Wiring Boards - Printed circuit board shall be UL Recognized Component, Printed Wiring Board (ZPMV2), rated V-0 and minimum 130C. Additionally it shall comply with direct support of current-carrying parts performance level requirements of ANSI/UL 796.