DATACOM

DM-SV01 Server

Product Manual

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1 Introduction

The DM-SV01 is a dual processor server compatible with the AMD EPYC Series processors family. With options scaling from 8 up to 64 cores per device, the AMD EPYC chips are the most advanced processors on the market. They are manufactured using 7nm process technology, which provides outstanding results in terms of processing capacity and energy efficiency.

The DM-SV01 server is based on the OCP (Open Compute Project) concept, which is explained in more detail in section “1.1 OCP (Open Compute Project) Concept Fundamentals”.

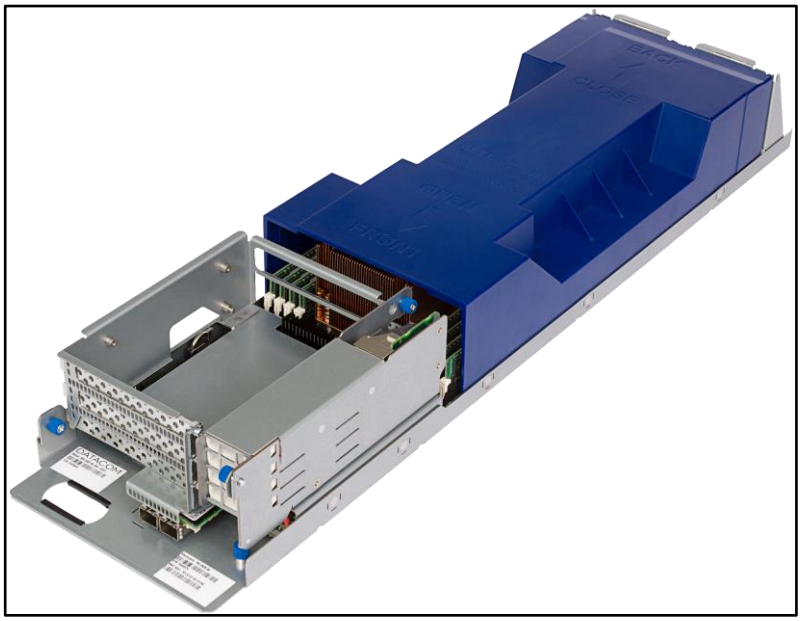

Figure 1: DM-SV01 Server Sled

The DM-SV01 sleds can be installed in the DM1904 sub-rack chassis, allowing up to four servers to be allocated in a 4.5U height structure.

Figure 2: DM1904 Chassis with 4 DM-SV01 servers

1.1 OCP (Open Compute Project) Concept Fundamentals

In 2009, Facebook started a project to redesign their data centers in order to control cost and energy consumption. A small team of engineers spent the next two years designing a new generation of data centers, which resulted in a solution 38% more energy efficient to build and 24% less expensive to run than the company's previous facilities.

In 2011, Facebook made its design public alongside the launch of the Open Compute Project (OCP) Foundation. The five founding members of the initiative expected to create a movement in the hardware atmosphere that would lead to the same kind of creativity and collaboration seen in open source software. Nowadays, OCP concepts are well established among cloud datacenters.

During the initial OCP development the engineers had freedom to change many established concepts, with focus on reducing power usage and operating costs. These changes resulted in the definition of some characteristics of the OCP concept, such as those described below.

- **Rack with centralized power supplies**

OCP racks have one or two centralized power shelves on the rack instead of multiple power supply units in each server chassis. The power is distributed at 12.5Vdc by means of a busbar on the back of the rack to all servers and storage systems.

The centralized power concept allows power modules in the shelf to operate at the optimum point of the efficiency-vs-load curve, thus optimizing energy consumption.

There is no need for a redundant power supply connected on each server anymore, since the power modules in the rack operate in parallel. The customer may define the amount of redundant power to be reserved in an m+n scheme.

- **Front access design and maintenance**

The concept of power distribution located on the backside of the rack via a 12Vdc busbar eliminates a bunch of AC cables and PDUs (Power Distribution Units), reducing rack cabling and maintenance efforts.

Compared to traditional 19" servers, the OCP approach regarding server access is different, once all connections are performed on the front side only. This solution makes the rack cabling and maintenance processes easier, once the server handling is done only on the cold aisle.

- **Disaggregation and system lifecycle**

The servers are designed in such a way to improve serviceability and to be handled without the need of tools. The parts can be easily replaced, minimizing the time spent with service and improving the availability.

Traditional servers combine many components with different life cycles. Separating power and storage nodes from computing allows the upgrading of each component at the optimal point of the life cycle, resulting in increased lifetime cost efficiency.

Modular components such as enclosures, fans, CPUs, heatsinks, memory, disks or even the central power shelf can be reused and replaced easily, lowering migration costs and leading to a lower impact on our planet's environment.

Datacom's policy is to give customers the choice of selecting their own components, even if they are not supplied by the company. This way the customer is free to purchase parts at the most convenient time and at the lowest cost. The only recommendation for the customer regarding this matter is to ask Datacom about compatibility issues, once some components may not be fully compatible with the DM-SV01 solution or with the operating system used by the customer implementation.

- **Space and cooling optimization**

A standard OCP rack has the same outer width dimension as a traditional 19” rack, although it is organized in such a way as to make the most effective use of the horizontal space for the equipment. The Cabling is accommodated in the sidewalls that also protect the front of the servers. As a result, three servers can be installed side by side occupying 2 OU (96mm) of height.

The increased height in servers allows larger heatsinks and fans. While heatsinks with a higher heat dissipation capacity allow lower airflow, larger diameter fans rotating at lower speeds move the same amount of air with less power and noise. All in all, the streamlined design optimizes cooling efficiency and power consumption.

2 System Description

This section provides a detailed description of the DM-SV01 server, showing an overview of the main system characteristics and also describing the interfaces available for the user.

2.1 System Overview

The DM-SV01 can have up to two processors and each of them has support for 8 DIMMs slots. Using 256GB DDR3 memories for all the slots, the maximum DRAM capacity is 4TB per server. The system supports DDR3 memories with speeds up to 3200MT/s. Each DIMM slot has its own memory channel controller. Processor P0 also supports NVDIMM modules on four DIMM slots. Modules from 32GB up to 128GB are available. For modules of 16GB and 256GB, please consult the Datacom sales team for checking the availability.

The system is hot-pluggable and front side serviceable, avoiding work on the hot aisle. The form factor is based on the Open Compute Project (OCP), allowing three nodes in 2OU height of OCP racks. As an option for 19” racks, Datacom offers the DM1904 Chassis, which is able to accommodate up to 4 servers at a height of 4.5U.

Figure 3: DM1904 Chassis for 19” rack

2.1.1 Expansion cards and PCIe slots

The DM-SV01 has an expansion slot in the left side of the front panel, which provides two assembling options, depending on the customer requirements:

- Riser card with one PCIe x16 FHHL (Full Height Half Length) slot and one PCIe x8 FHHL slot.
- Riser card with three PCIe x8 FHHL slots. The lower slot accepts only Datacom PCIe x8 cards for two E1.S NVMe SSDs.

Please refer to section “2.2.11.3 X24 Expansion Slot” for details about the expansion slot.

2.1.2 Storage

The DM-SV01 has a high storage capacity, once it provides many ways of connecting high speed NVMe drives using the available PCIe channels. The options available for connecting storage devices in the DM-SV01 server are listed below.

- One M.2 (up to 4TB) NVMe disk on board.
- One module that supports up to 4 hot swappable E1.S NVMe SSDs situated on the right side of the server front panel. E1.S NVMe SSDs with storage capacity of 4TB are available, while the 8TB E1.S disks are on the roadmap.
- PCIe x8 card supporting two hot swappable E1.S NVMe SSDs. Up to 3 cards can be installed on the server using a riser card with three x8 FHHL slots.
- PCIe x16 card with four M.2 sockets. The M.2 NVMe SSDs (up to 2TB) are not hot swappable.

2.1.3 Network

The DM-SV01 has a specific PCIe x16 slot for connecting one OCP 2.0 Mezzanine NIC (Network Interface Controller) card. The system accepts network interface cards with up to 100Gbit/s QSFP ports.

Another possibility regarding network connectivity is to connect standard NICs at the PCIe slots available in the platform. For details regarding the available PCIe slots configurations, please refer to section 2.2.11.3 X24 Expansion Slot.

SFP+ and QSFP ports can also be connected inside the rack by means of DAC (Direct Attach Copper) cables, thus eliminating the need of optical modules. This approach reduces cost and avoids the power consumption of the optical modules.

Please refer to section 2.2.11.2 Mezzanine Card for details about the network connections.

2.1.4 System Management

The DM-SV01 server is managed by a Baseboard Management Controller (BMC). The connection to the data center management network can be accomplished in two ways:

- Using a dedicated Gigabit Ethernet port available on the DM-SV01 front panel (out-of-band management).
- Using NC-SI (Network Connectivity - Status Indicator) via the Ethernet port of the OCP Mezzanine NIC card (in-band management).

The BMC software used in the system is the OpenBMC with auditable and modifiable code and Redfish support.

2.1.5 TPM

The DM-SV01 server has a slot for a TPM module. The TPM device is an optional module provided by Datacom and can be connected to the server in order to bring enhanced hardware-based security features. The TPM module is compatible with TPM 2.0 specification and supports all cryptographic functions and key administration for a guaranteed security operation of the system.

The TPM module is shown in the image below.

Figure 4: DM-SV01 TPM module

2.1.6 Connectivity and User Interfaces

The DM-SV01 server supports several connectivity channels to comply with the most common interconnection needs of the datacenter environment. Additionally, the system provides several control and monitoring interfaces that allows an effortless system administration whilst improving the serviceability. The connectivity options and control/monitoring interfaces available in the DM-SV01 server include:

- Connection to an external shelf of GPUs via PCIe retimer cards.
- Connection to an external JBOD storage via PCIe SAS HBA cards.
- Connection to an external JBOF via PCIe retimer cards.
- Two general purpose USB 3.1 ports connected to the host processor.
- Gigabit Ethernet management port.
- VGA port for access to the operating system video output.
- OCP 2.0 Mezzanine NIC.
- Debug port.
- Monitoring Leds.
- Power, Reset and UID buttons.

Please refer to the section “2.2 System Interfaces Description” for detailed information about all the interfaces available.

2.1.7 Power Supply

The DM-SV01 is powered with 12Vdc supplied by OCP rack or by DM1904 Chassis (Datacom shelf for 19” racks installation). The power consumption can reach up to 750W, depending on processors and peripherals installed.

Please refer to the section “2.2.8 Power Supply” for detailed information about the power supply specifications.

2.1.8 Temperature

The use of high dissipation heat sinks and two efficient 80mm fans allows operation in the ambient temperature range from 0°C up to 35°C (sea level) without throttling the processors.

2.1.9 Mechanics

Dimensions of the sled: 89 x 174 x 724mm.

2.1.10 Certifications

The DM-SV01 complies with the CE Mark directives and regulations. The Server COMMISSION REGULATION (EU) 2019/424 of 15 March 2019 (hereafter called CELEX32019R0424) defines ecodesign requirements for servers and data storage products pursuant to Directive 2009/125/EC of the European Parliament and of the Council and amending Commission Regulation (EU) No 617/2013. The DM-SV01 server is compliant with the Ecodesign Directive 2009/125/EC.

- For details regarding the DM-SV01 low-end and high-end performance configuration, please refer to 8 Annex A - DM-SV01 Ecodesign Specifications.
- For details regarding the procedure for performing secure data deletion on storage devices connected to the server, please refer to 9 Annex B - SSD Secure Data Deletion

For additional details regarding the DM-SV01 CE Mark certification, please refer to “DM-SV01 - Technical File CE Marking” (3).

2.2 System Interfaces Description

The diagram below shows an overview of the DM-SV01 interfaces and their respective connections.

Please, refer to 10 Annex C - Buttons and LEDs for a list of the buttons and LEDs present in the DM-SV01 server and its respective functions. Additionally, the sections “2.2.2 Buttons” and “2.2.3 LEDs” have a more detailed explanation of each button and LED available in the server.

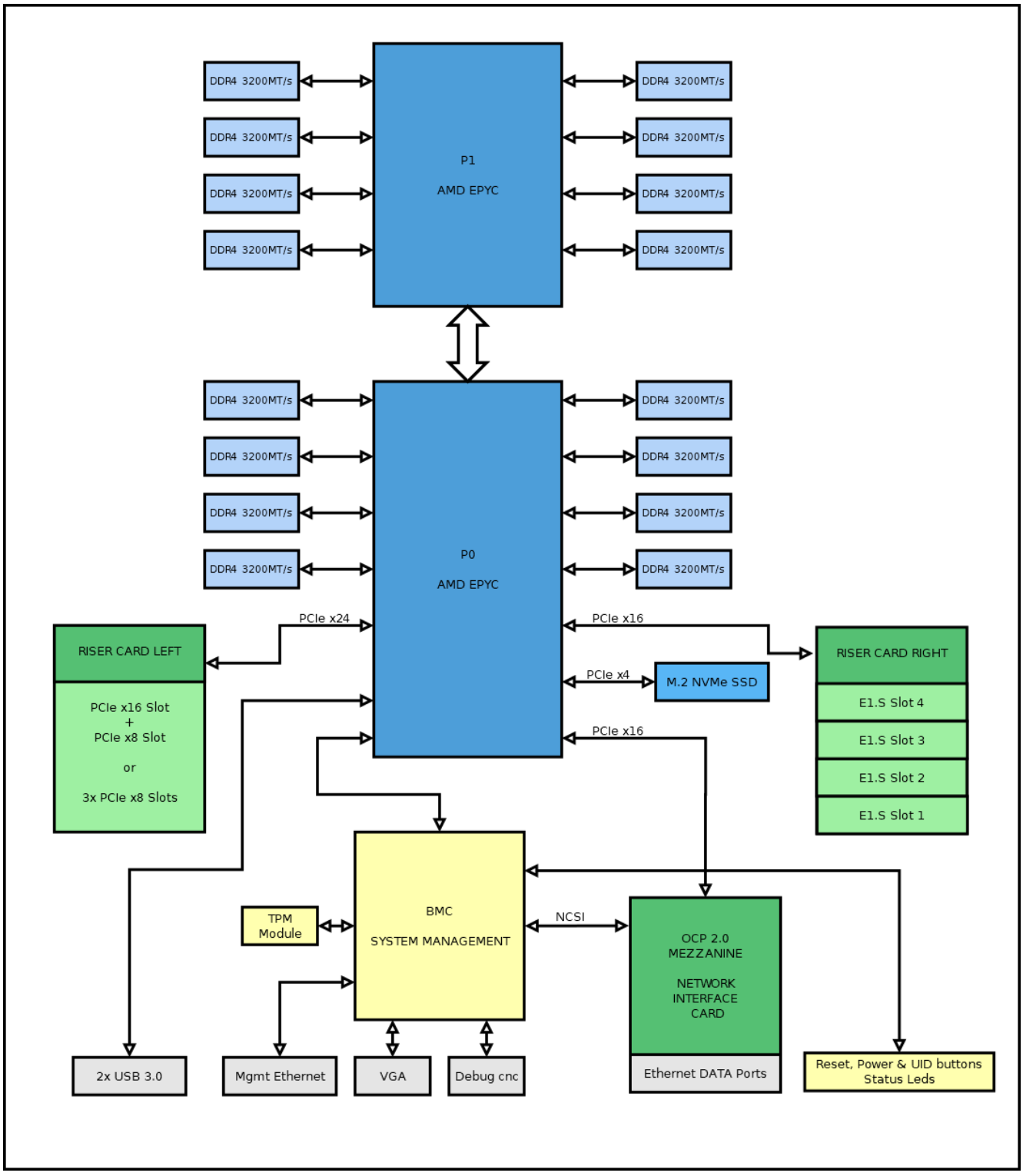

Figure 5: DM-SV01 Server Block Diagram

2.2.1 Mainboard Jumpers

The DM-SV01 server features two essential jumpers on the mainboard. The jumpers on your server's mainboard serve as hardware configuration settings that determine crucial aspects of your server's operation. The location and correct positioning of both jumpers can be seen in the images below.

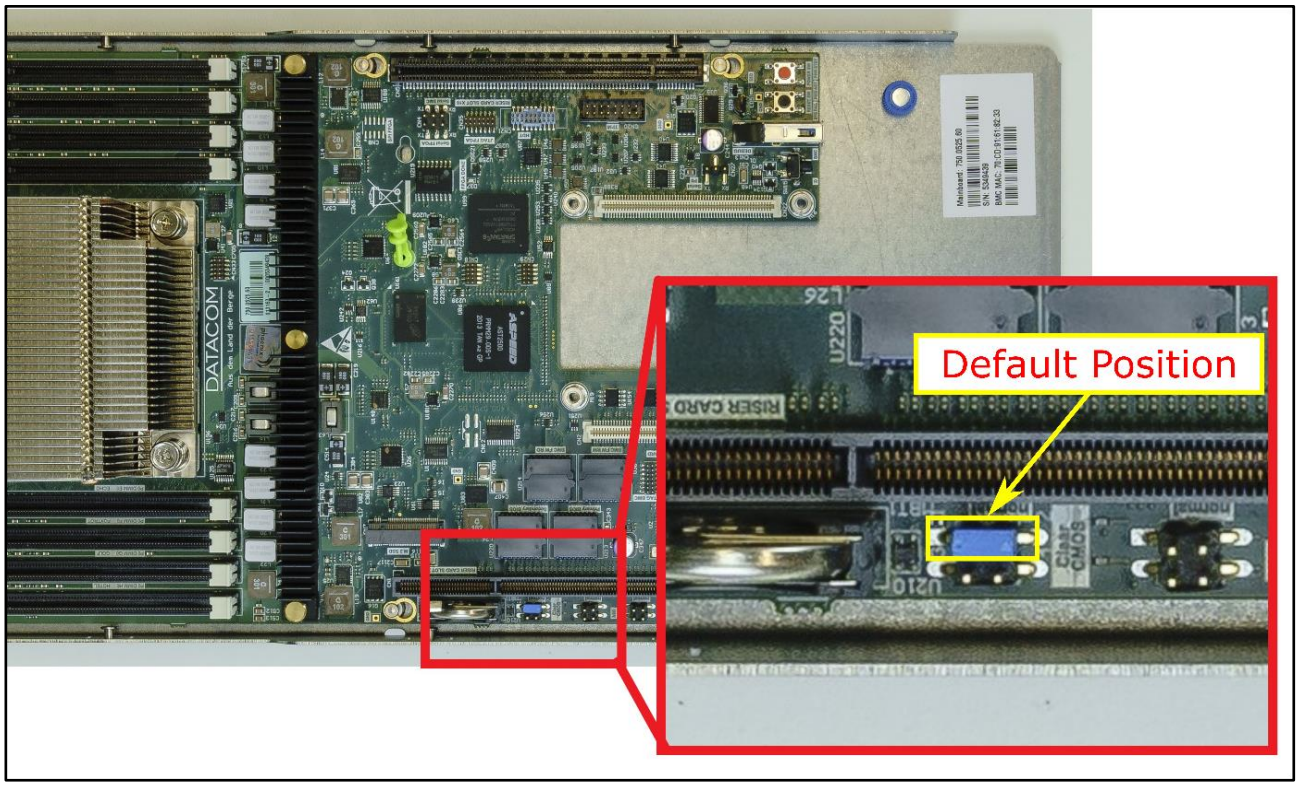

Figure 6: Jumper 1 position

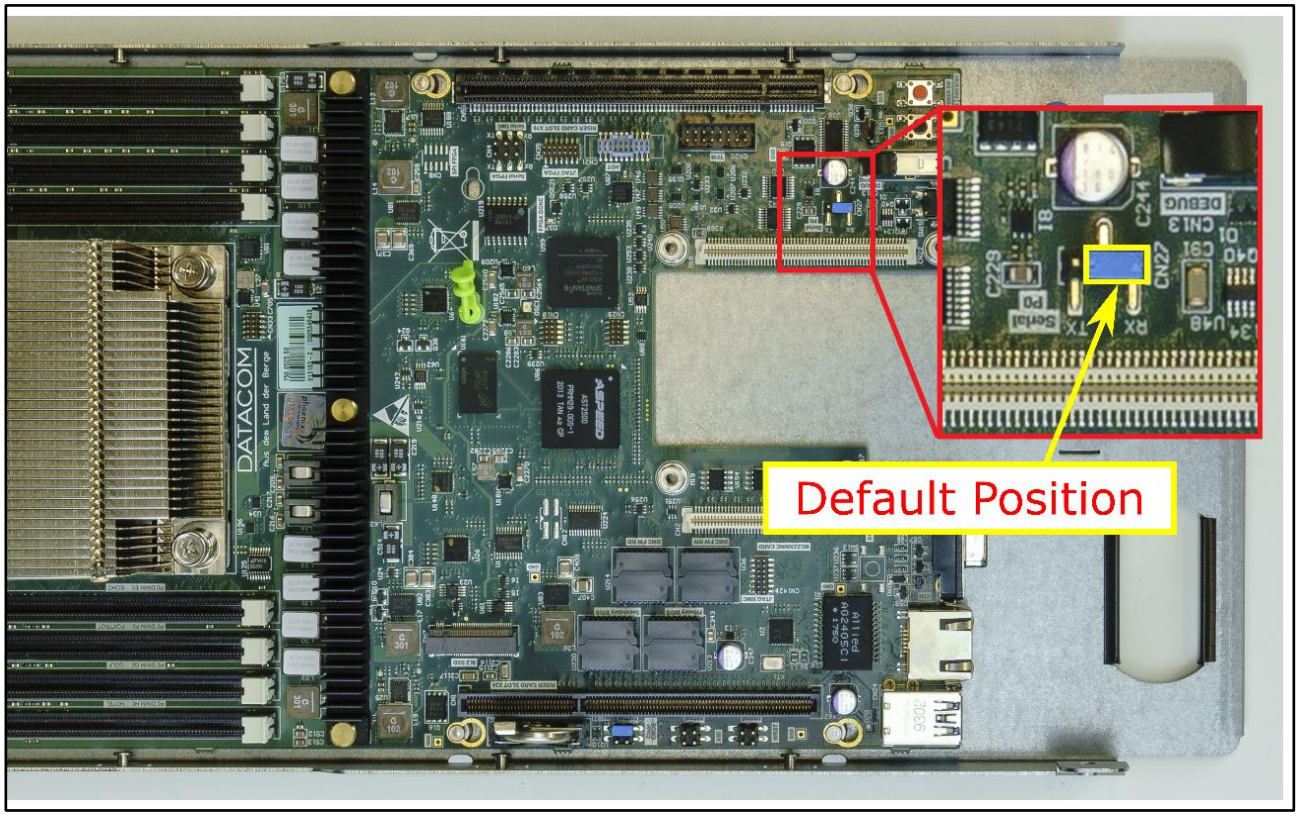

Figure 7: Jumper 2 position

The presence and correct configuration of these jumpers are of utmost importance. Without them, your server may not operate as intended, and you risk encountering issues related to hardware and performance.

The jumper 1 is used for clear CMOS. For additional details regarding specifically the clear CMOS jumper, please refer to section “5.8.1 Clear CMOS procedure”.

The jumper 2 is for hardware debug purpose only and shall not be removed from its default position, otherwise the server may not operate as expected.

2.2.2 Buttons

The DM-SV01 buttons are located in the motherboard as shown in the pictures below.

Figure 8: DM-SV01 buttons location

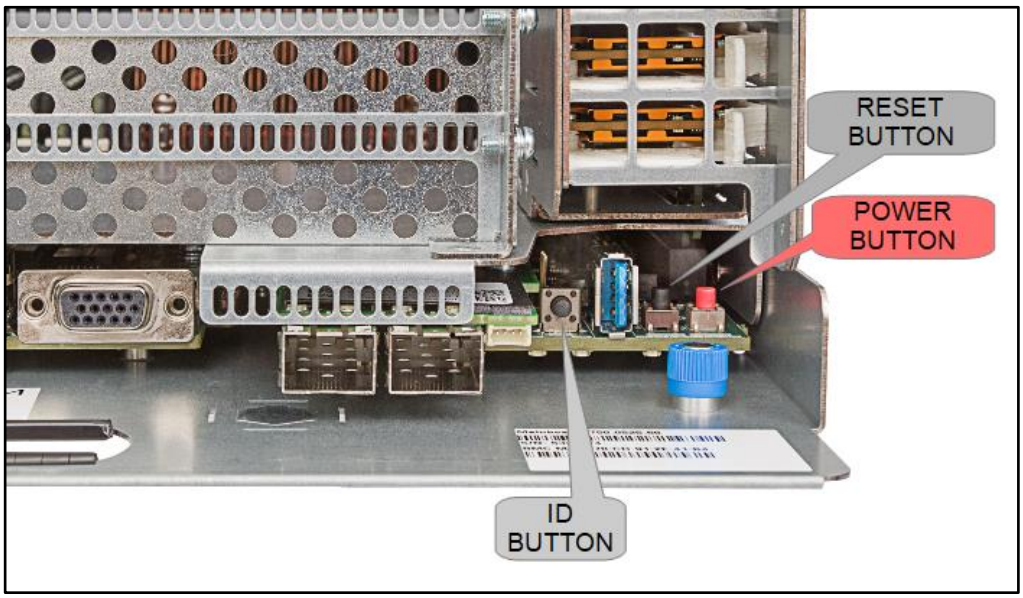

Figure 9: DM-SV01 buttons

2.2.2.1 Power button - POWER SW

In red color, the power button is used to power the host processors on or off. This button does not control the BMC power, so the BMC keeps powered on and active whenever the power button is used to control the host processors power. The table below shows the possible operations using the power button.

Operation	Prerequisites	Action required	Server response
Power the host processors ON (Standby to Active mode).	Host processors are powered down.	Press the power button shortly.	The PWR_ACT LED will turn on in GREEN color, indicating that the host processor completed the power on process.
Power the host processors OFF Orderly Mode (Active to Standby mode).	Host processors are powered up.	Press the power button shortly.	The OS will trigger a controlled shutdown process. After the shutdown is complete, the PWR_ACT LED will turn off, indicating that the host processor is in Standby mode.
Power the host processors OFF Immediate Mode (Active to Standby mode).	Host processors are powered up.	Press the power button and hold it pressed for more than 4 seconds.	The host processor is forced to shutdown independent of the OS control. After the shutdown is complete, the PWR_ACT LED will turn off, indicating that the host processor is in Standby mode.

Table 1: Power button functions

The host processors can also be powered on/off via BMC WEB management interface. Please refer to the BMC User Manual (1) for details of the power on/off operation via management interface.

2.2.2.2 Reset button - RESET SW

In black color, the reset button is used to reset the host processor. This button does not reset the BMC, so the BMC keeps active and running whenever the reset button is used to reset the host processors. The table below shows the possible operations using the reset button.

Operation	Prerequisites	Action required	Server response
Reset the host processors.	Host processors are powered up.	Press the reset button shortly.	The PWR_ACT LED will turn RED while pressing the RESET button and after releasing the button, the PWR_ACT LED turns GREEN.

Table 2: Reset button functions

The host processor can also be reset via BMC WEB management interface. Please refer to the BMC User Manual (1) for details of the reset operation via management interface.

2.2.2.3 Unit ID button - ID

In black color, 90º angle, the ID button is used to identify the DM-SV01 inside a datacenter. The table below shows the possible operations using the reset button.

Operation	Prerequisites	Action required	Server response
Turn on the ID feature.	The ID feature is disabled.	Press the ID button shortly.	The ID LED will start blinking (GREEN). A Redfish event will be triggered to the management system to indicate that the ID flag is ON.
Turn off the ID feature.	The ID feature is enabled.	Press the ID button shortly.	The ID LED will turn OFF. A Redfish event will be triggered to the management system to indicate that the ID flag is OFF.

Table 3: Unit ID Button functions

The ID LED can be controlled via the ID button and also via BMC WEB management interface. Using the BMC WEB management interface to turn the ID LED on allows the user to visually identify a specific server unit in the datacenter facilities.

2.2.3 LEDs

The DM-SV01 LEDs are located in the motherboard as shown in the pictures below.

Figure 10: DM-SV01 LEDs location

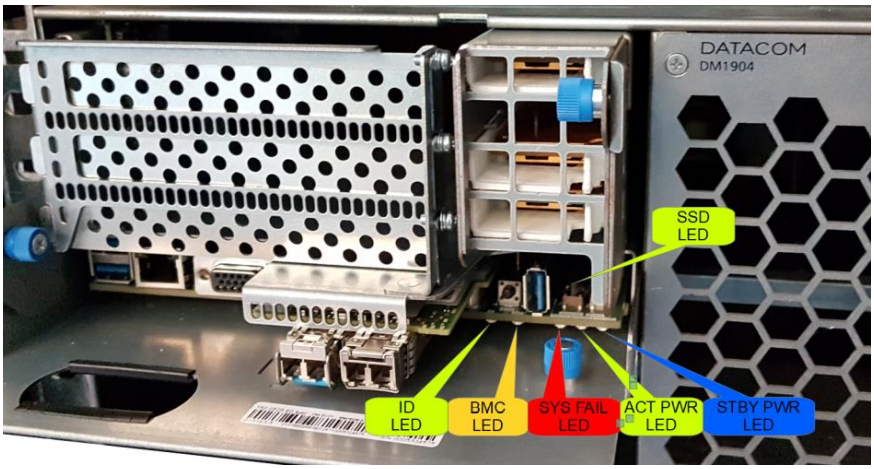

Figure 11: DM-SV01 LEDs

2.2.3.1 Power Standby LED - PWR STBY

The Power Standby LED provides information about the status of the DM-SV01 standby power rails.

Power Standby LED	
LED Color	**Information**
OFF	There is no power (12V) at the rear power input connector.
Solid RED	System failure.
Blinking BLUE	System is initializing and waiting for BMC boot to complete.
Solid BLUE	BMC has booted and Standby power rails are ok. The system is ready to turn the processors on.

Table 4: STBY PWR LED

2.2.3.2 Power Active LED - PWR ACT

The Power Active LED provides information whether the host processor is Powered ON (Active) or OFF (Standby). The Power Active LED information is only valid when Power Standby LED (2.2.3.1 Power Standby LED - PWR STBY) is solid BLUE.

Power Active LED	
LED Color	**Information**
OFF	Server is powered OFF (Standby mode).
Solid GREEN	Server is Powered ON (Active mode).
Solid RED	Failure on the Active power rails or the reset button is being pressed.

Table 5: ACT PWR LED

2.2.3.3 System Fail LED - SYS FAIL

The SYS FAIL LED indicates that there is a failure on the server (please refer to the BMC User Manual (1) for additional information) which requires system servicing. Further details about the failure cause can be retrieved from the BMC WEB management interface, by checking the Event Logs.

System Fail LED	
LED Color	**Information**
OFF	No failure
Solid RED	System failure (requires system servicing)

Table 6: SYS FAIL LED

2.2.3.4 User ID LED - ID

The ID LED, together with the ID button, is used to identify the DM-SV01 inside a datacenter. For further details about the ID Function and how to enable it, please refer to section “2.2.2.3 Unit ID button - ID”.

User ID LED	
LED Color	**Information**
OFF	Unit ID function is turned OFF.
Blinking GREEN	Unit ID function is turned ON.

Table 7: ID LED

2.2.3.5 BMC LED - BMC

The BMC LED is used to provide heartbeat information, indicating the BMC operational status.

BMC LED	
LED Color	**Information**
Fast Blinking YELLOW	BMC initialization.
Normal Blinking YELLOW (2Hz)	BMC in normal operation.

Table 8: BMC LED

2.2.3.6 SSD LED - SSD

The SSD LED shows the activity of the onboard M.2 SSD.

SSD LED	
LED Color	**Information**
Solid GREEN	No activity in the M.2 SSD.
Blinking GREEN	Read/Write activity in the M.2 SSD.

Table 9: SSD LED

2.2.4 VGA

The server provides an onboard VGA port (VGA D-Sub connector) for connecting an external display. The VGA port is used to access the video output of the operating system running on the host processors. The images below show the positioning of the VGA port in the DM-SV01 motherboard.

Figure 12: DM-SV01 VGA location

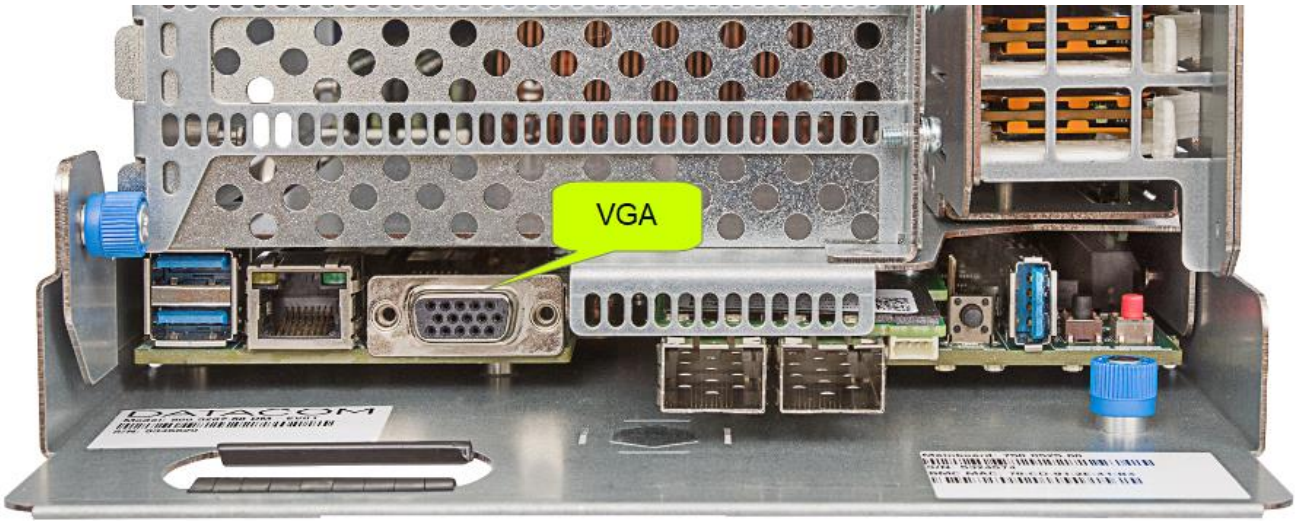

Figure 13: VGA connector

2.2.5 USB 3.1

The server provides two standard USB 3.1 ports (USB 1 and USB 2) on the front panel. These USB interfaces are attached to the host processor and they are intended for generic use (mouse, keyboard, USB storage, etc). The images below show the positioning of the USB ports in the DM-SV01 motherboard.

Figure 14: DM-SV01 USB 3.1 ports location

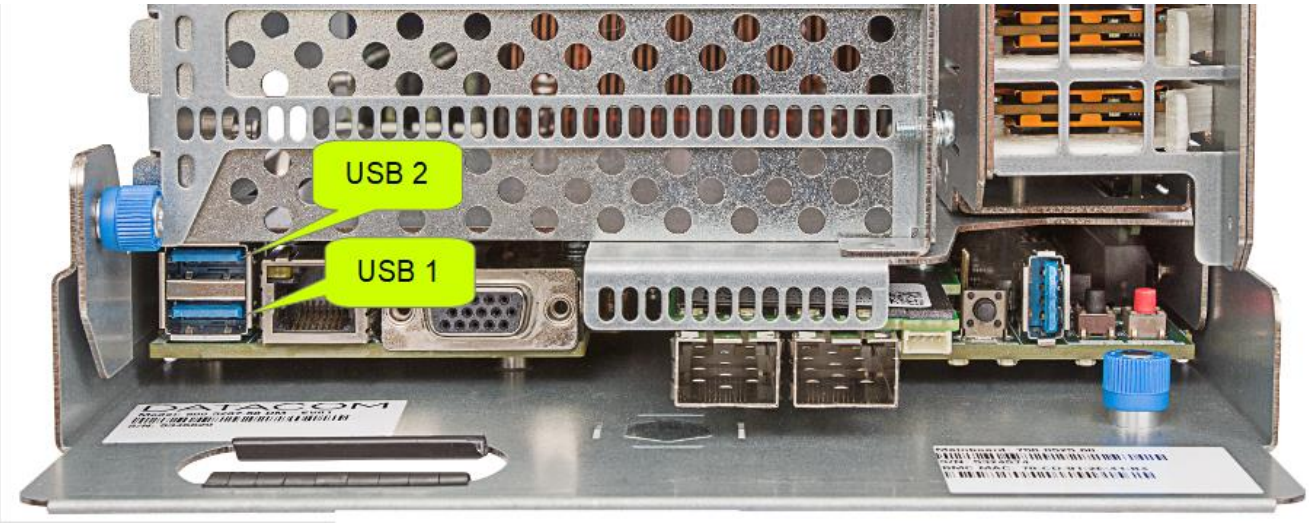

Figure 15: USB 3.1 ports

2.2.6 LAN

The DM-SV01 server provides a Gigabit Ethernet port which is used as an OOB (Out of Band) management interface for accessing the BMC. The images below show the positioning of the LAN port in the DM-SV01 motherboard.

Figure 16: DM-SV01 LAN Connector location

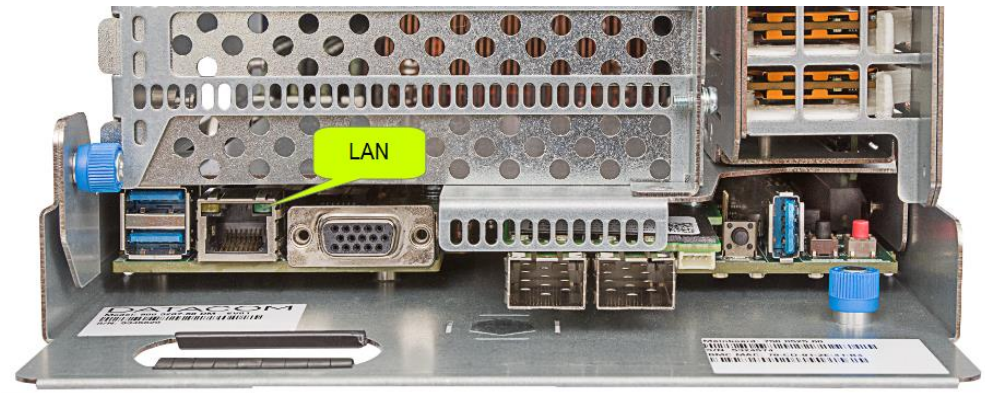

Figure 17: LAN Connector

2.2.7 Debug Connector

The DM-SV01 mainboard has a customized pinout USB 3.0 connector located on the right side of the front panel. This connector is not a general purpose USB 3.0 connector. It is a special connector, with a proprietary pinout and it is intended only to connect the external DM-SV01 Debug Card. The image below shows the positioning of the Debug USB 3.0 connector in the DM-SV01 motherboard.

Caution: it is not allowed to connect general USB devices to this connector.

Figure 18: Debug Connector Location

2.2.8 Power Supply

The DM-SV01 power is supplied through a connector located on the rear end of the SLED. The power supply connector type and board location are shown in the following pictures.

Figure 19: Power connector location

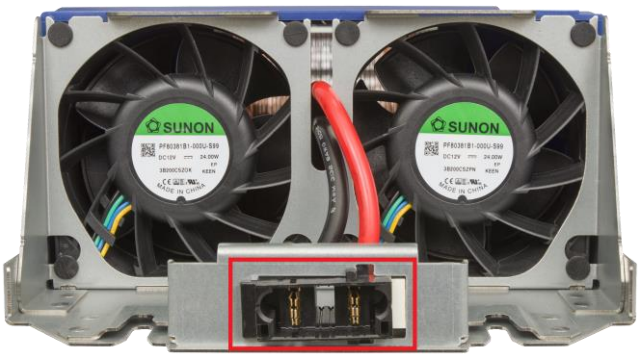

Figure 20: DM-SV01 power connector

The signals of the power connector are defined as below:

- RED wire : +12V DC
- BLACK wire: Ground

The DM-SV01 power demand depends on the system configuration, such as CPU types and quantity, memory speed and quantity, E1.S SSDs quantity, additional PCIe cards, etc. The maximum power that can be delivered is shown in the table below.

Power Requirements	Minimum	Nominal	Maximum
DC Input Voltage (V)	10.4	**12**	13.9
Current (A)	--	*	**60**

* Depends on system configuration

Table 10: DM-SV01 Power

If the power demanded by the system exceeds a predefined safety threshold, a throttling mechanism will be triggered, forcing the CPUs to lower their operating frequency in order to decrease overall system power.

Additionally, if the system power exceeds a predefined critical threshold (e.g. a board short circuit), a protection mechanism will shutdown the DM-SV01 power in order to avoid board damage. If this situation happens, Datacom support must be contacted.

2.2.9 DM-SV01 Sensors

The DM-SV01 server has a set of sensors which are responsible for monitoring the voltage, current and temperature at several relevant spots of the system. The sensors information is used for controlling the FANs speed and generating alarms or emergency shutdown in case of reaching a critical threshold.

The figure below shows the location of the temperature sensors, which can have its values visualized by means of the BMC web management interface.

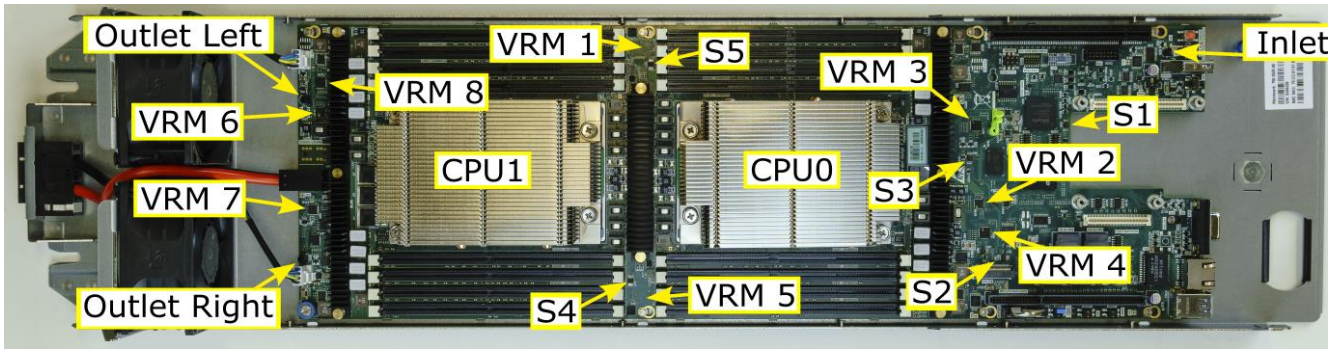

Figure 21: DM-SV01 temperature sensors location

The table below shows the description of each sensor and its respective alias in the BMC web management interface.

Sensor name	Sensor name in the BMC web GUI	Sensor positioning
CPU 0	Temperature CPU 0	Processor P0
CPU 1	Temperature CPU 1	Processor P1
Inlet	Temperature INLET	Airflow Input
Outlet Left	Temperature OUTLET LEFT	Airflow Output - Left
Outlet Right	Temperature OUTLET RIGHT	Airflow Output - Right
VRM1	Temperature VRM P0 VDD CORE RUN	Voltage Regulator Module 1 - CPU P0 Core Power
VRM2	Temperature VRM P0 VDD SOC RUN	Voltage Regulator Module 1 - CPU P0 SoC Power
VRM3	Temperature VRM P0 VDD MEM ABCD SUS	Voltage Regulator Module 1 - CPU P0 ABCD DIMMs Power
VRM4	Temperature VRM P0 VDD MEM EFGH SUS	Voltage Regulator Module 1 - CPU P0 EFGH DIMMs Power
VRM5	Temperature VRM P1 VDD CORE RUN	Voltage Regulator Module 1 - CPU P1 Core Power
VRM6	Temperature VRM P1 VDD SOC RUN	Voltage Regulator Module 1 - CPU P1 SoC Power
VRM7	Temperature VRM P1 VDD MEM ABCD SUS	Voltage Regulator Module 1 - CPU P1 ABCD DIMMs Power
VRM8	Temperature VRM P1 VDD MEM EFGH SUS	Voltage Regulator Module 1 - CPU P1 EFGH DIMMs Power
S1	Temperature LM75 MEZZ	Sensor 1 - near the mezzanine card
S2	Temperature LM75 LEFT IN	Sensor 2 - near the airflow input on left side
S3	Temperature LM75 C IN	Sensor 3 - near the airflow input on center
S4	Temperature LM75 DIMM ML	Sensor 4 - near DIMMs on left side
S5	Temperature LM75 DIMM MR	Sensor 5 - near DIMMs on right side
-	Temperature Nvme[x]	Temperature of the nvme module. Each nvme module is monitored and the temperature

		is shown in the BMC web GUI as nvme0, nvme1, etc.
-	Temperature MEZZANINE CARD	Temperature of the mezzanine card, when connected.
-	Temperature PCIE CARD SLOT3	Temperature of the PCIe card from riser card slot 3, when connected.

Table 11: DM-SV01 temperature sensors description

Additionally, the DM-SV01 is also capable of monitoring the system input power, the FANs speed and some primary voltages. The table below shows the additional monitoring outputs of the DM-SV01.

Sensor name in the BMC web GUI	Sensor description
Fan Tach FAN LEFT	Left fan speed
Fan Tach FAN RIGHT	Right fan speed
Voltage POWER SUPPLY IN	12V Power supply input (before the input power controller)
Voltage POWER SUPPLY OUT	12V Power supply output (after the intput power controller)
Voltage VDD 5 DUAL	5V Power supply
Voltage VDD 33 DUAL	3.3V Standby Power Supply
Voltage VDD 33 RUN	3.3V Active Power Supply
Current POWER SUPPLY	DM-SV01 server total input current
Power Total Power	DM-SV01 server total input power

Table 12: DM-SV01 additional sensors description

For additional information regarding the DM-SV01 sensors behavior in the BMC web management interface, please refer to the BMC User Manual (1).

2.2.10 TPM module

The DM-SV01 motherboard has a slot for connecting a proprietary TPM (Trusted Plaftorm Module) card. This card is sold separately, so the user may ask the commercial team for this module when acquiring the server. The location of the TPM module is shown in the image below.

Figure 22: TPM module location

Figure 23: DM-SV01 TPM

The TPM module is compatible with TCG specification for TPM 2.0. The BIOS/UEFI FW provides all configurations for handling the TPM keys and setting Secure Boot options. For additional information about these configurations, please refer to the DM-SV01 BIOS User manual (2).

2.2.11 PCIe slots

2.2.11.1 M.2 NVMe slot

The DM-SV01 board has one internal slot for M.2 NVMe with the following characteristics:

- M.2 Interface: PCIe 4.0 (Gen 4) x4 (please check the requirements for using PCIe 4.0 in section “2.2.11.5 PCIe Configuration and restrictions”).
- M.2 Form Factor options: 2280, 22110
- M.2 Key: M-key

The M.2 NVMe is attached to the host processor and its usual application is to host the operating system, although it can be used for other purposes, according to the user's needs. The image below shows the positioning of the M.2 NVMe card in the DM-SV01 motherboard.

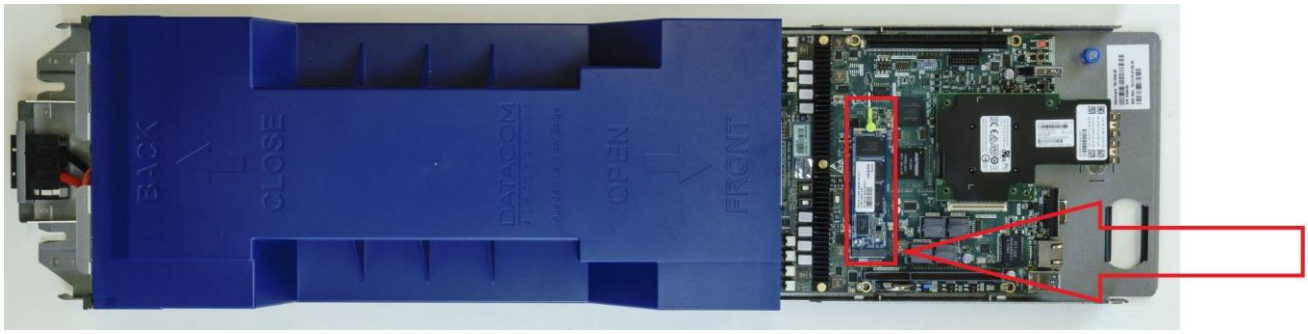

Figure 24: M.2 NVMe slot location

2.2.11.2 Mezzanine Card

The DM-SV01 server is compatible with OCP Mezzanine Card 2.0 Design Specification. The mezzanine card is a network interface card (NIC) which is installed on two connectors on the top of the motherboard, near the front panel. The image below shows the positioning of the mezzanine card in the DM-SV01 motherboard.

Figure 25: Mezzanine slot location

The DM-SV01 mezzanine card slot is compatible with PCIe 4.0 (Gen 4) x16 (please check the requirements for using PCIe 4.0 in section “2.2.11.5 PCIe Specifications”). Lower PCIe bus speeds and widths are also acceptable, due to the intrinsic capacity of the PCIe bus of automatic switching down its speed and lane width to comply with the endpoint device capability.

The mezzanine card is seen by the operating system as a standard network PCIe device. The mezzanine card also provides the NCSI (Network Controller Sideband Interface), which is used as an inband management interface to access the BMC.

The image below shows an example of a mezzanine card that can be used in the DM-SV01 server.

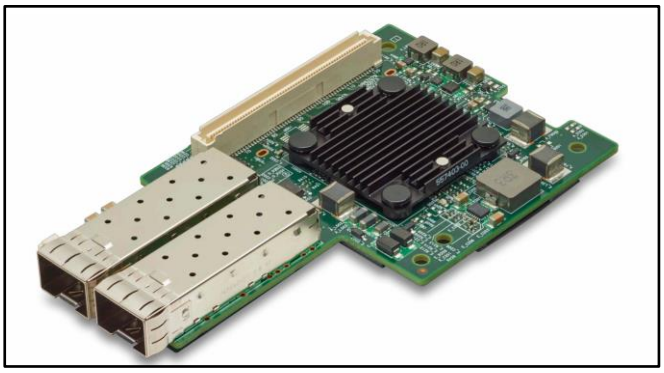

Figure 26: Broadcom 2x25Gbit/s Mezzanine Card

2.2.11.3 X24 Expansion Slot

The DM-SV01 server has a proprietary connector with 24 PCIe lanes, used for equipping an expansion riser card.

Figure 27: Expansion slot x24 location

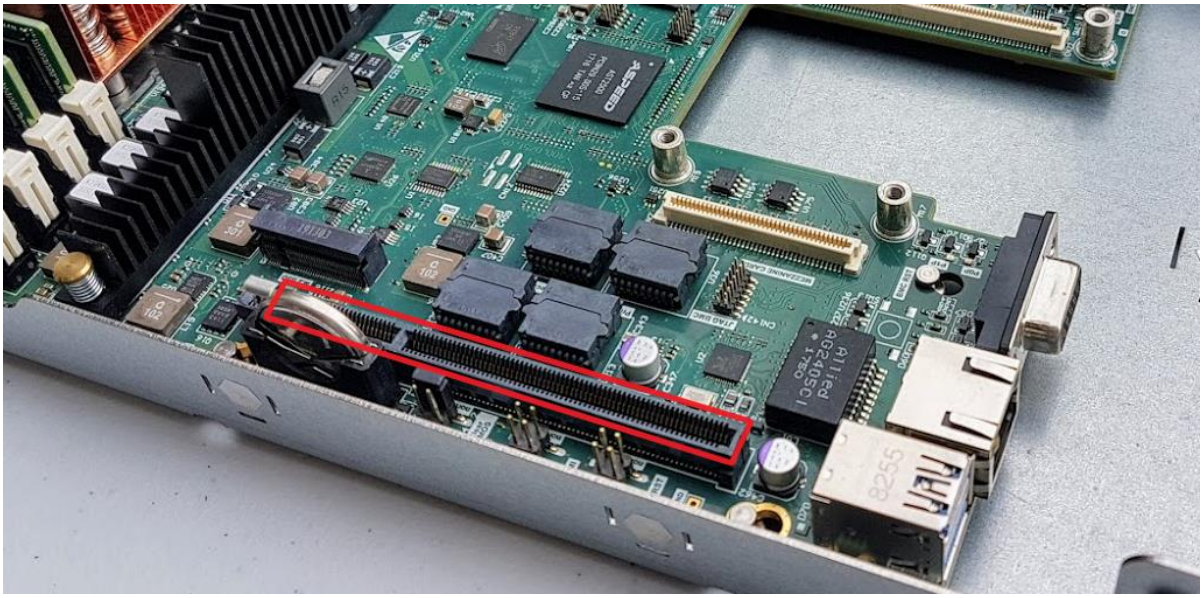

Figure 28: expansion slot X24

The DM-SV01 server can be equipped with two different expansion riser cards on this slot: “Risercard PCIe x16+x8” and “Risercard PCIe 3x8”.

2.2.11.3.1 Risercard PCIe x16+x8

The Risercard PCIe x16+x8 is mounted on the x24 slot. This card provides two standard PCIe slots: one PCIe 4.0 (Gen 4) x16 and one PCIe 4.0 (Gen 4) x8 (please check the requirements for using PCIe 4.0 in section “2.2.11.5 PCIe Specifications").

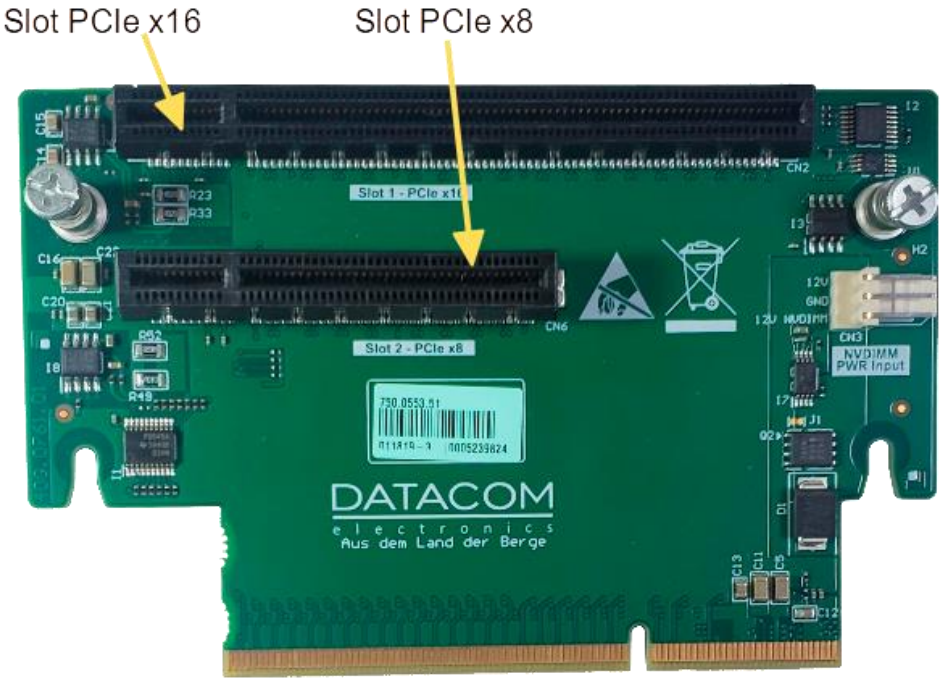

Figure 29: Risercard PCIe x16+x8

- **Slot 1:** this slot is not available when using the Risercard PCIe x16+x8.
- **Slot 2 - PCIe x8:** used to plug in a standard, non hot pluggable, PCIe 4.0 (Gen 4) x8 or below cards (please check the requirements for using PCIe 4.0 in section “2.2.11.5 PCIe Specifications”). This slot can have the PCIe lanes bifurcated on BIOS to the following options:
  - 1x PCIe x8
  - 2x PCIe x4
- **Slot 3 - PCIe x16:** used to plug in standard, non hot pluggable, PCIe 4.0 (Gen 4) x16 or below cards (please check the requirements for using PCIe 4.0 in section “2.2.11.5 PCIe Specifications”). This slot can have the PCIe lanes bifurcated on BIOS to the following options:
  - 1x PCIe x16
  - 2x PCIe x8
  - 4x PCIe x4

The image below shows a diagram of the system nomenclatures and slot positioning when using the Risercard PCIe x16+x8.

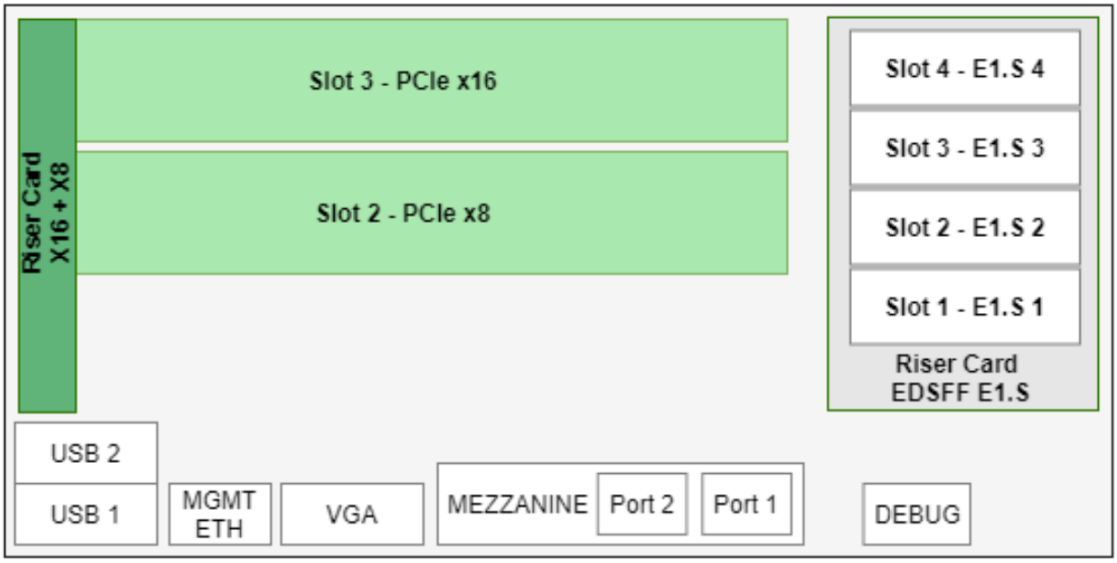

Figure 30: Risercard PCIe x16+x8 equipped with standard PCIe cards

2.2.11.3.1.1 Risercard PCIe x16+x8 Power Specifications

The Risercard PCIe x16+x8 slots can be normal power (both x8 and x16 slots) or high power (only x16 slot) slot type.

The table below shows the power specifications for PCIe normal power slots:

PCIe x8/x16 normal power	V(V)	I(A)	P(W)	Total (W)
3.3V (Aux)	3,3	0,375	1,2375	
3.3V	3,30	3	9,9	**36,34**
12V (x4, x8, x16)	12,00	2,1	25,2	

Table 13: PCIe Normal Power slots

The table below shows the power specifications for PCIe high power slots (valid only for PCIe x16 slot):

PCIe x16 high power	V(V)	I(A)	P(W)	Total (W)
3.3V (Aux)	3,3	0,375	1,2375	
3.3V	3,30	3	9,9	**77,14**
12V (x16)	12,00	5,5	66	

Table 14: PCIe High Power slot

The Risercard PCIe x16+x8 does not support PCIe cards that require an extra external power

connector.

2.2.11.3.2 Risercard PCIe 3x8

The Risercard PCIe 3x8 is mounted on the x24 slot. This card provides three standard PCIe 4.0 (Gen 4) x8 slots.

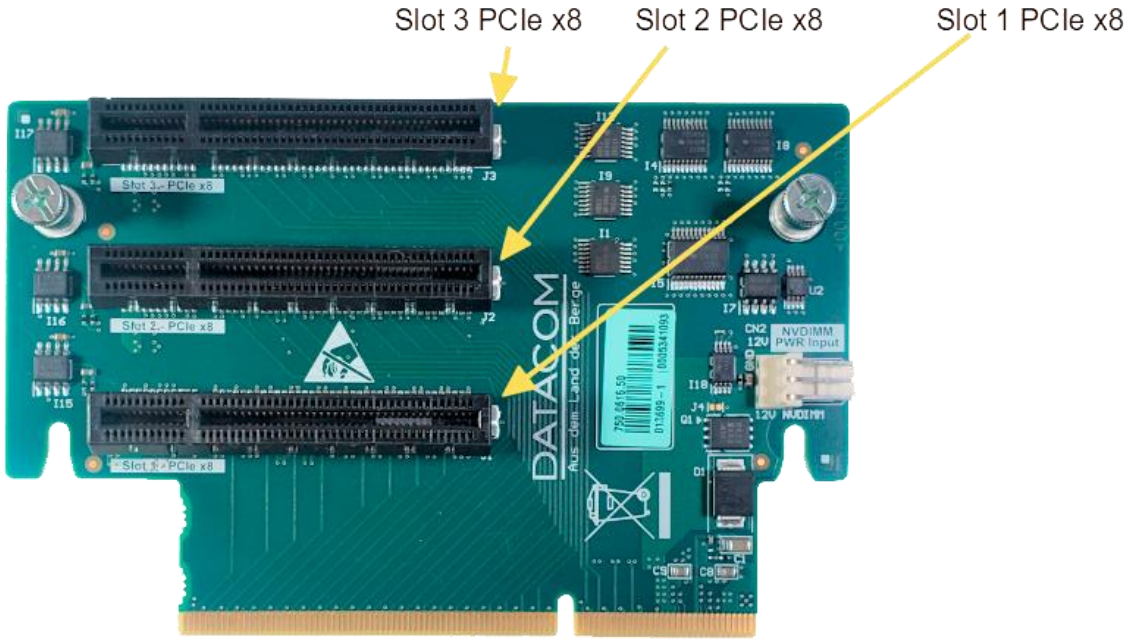

Figure 31: Risercard PCIe 3x8

- **Slot 1 - PCIe x8:** used to plug in a standard, non hot pluggable, PCIe 4.0 (Gen 4) x8 or below cards (please check the requirements for using PCIe 4.0 in section “2.2.11.5 PCIe Specifications”). This slot can have the PCIe lanes bifurcated on BIOS to the following options:
  - 1x PCIe x8
  - 2x PCIe x4
- **Slot 2 - PCIe x8:** used to plug in a standard, non hot pluggable, PCIe 4.0 (Gen 4) x8 or below cards (please check the requirements for using PCIe 4.0 in section “2.2.11.5 PCIe Specifications”). This slot can have the PCIe lanes bifurcated on BIOS to the following options:
  - 1x PCIe x8
  - 2x PCIe x4
- **Slot 3 - PCIe x8:** used to plug in a standard, non hot pluggable, PCIe 4.0 (Gen 4) x8 or below cards (please check the requirements for using PCIe 4.0 in section “2.2.11.5 PCIe Specifications”). This slot can have the PCIe lanes bifurcated on BIOS to the following options:
  - 1x PCIe x8
  - 2x PCIe x4

The image below shows a diagram of the system nomenclatures and slot positioning when using the Risercard PCIe 3x8.

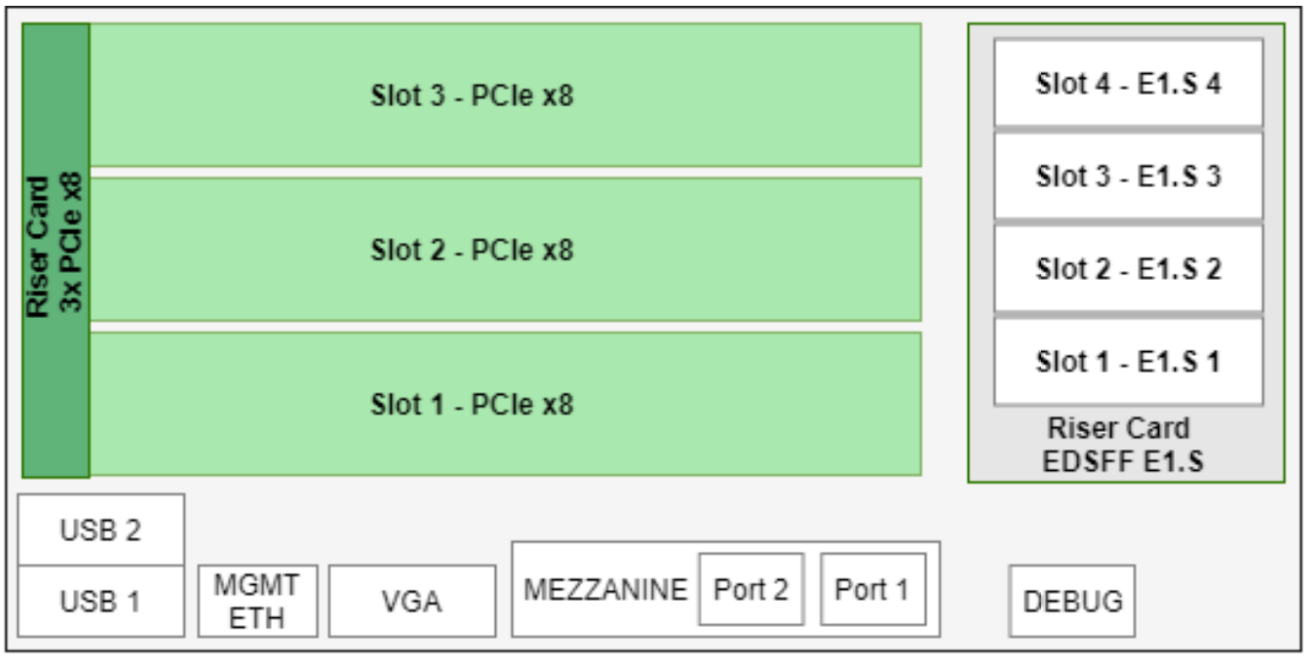

Figure 32: Risercard PCIe 3x8 equipped with standard PCIe cards

2.2.11.3.2.1 Risercard PCIe 3x8 Power Specifications

The Risercard PCIe 3x8 slots are all normal power slot types.

The table below shows the power specifications for PCIe normal power x8 slots.

PCIe x8 normal power	V(V)	I(A)	P(W)	Total (W)
3.3V (Aux)	3,3	0,375	1,2375	
3.3V	3,30	3	9,9	**36,34**
12V (x4, x8, x16)	12,00	2,1	25,2	

Table 15: PCIe Normal Power slot

The Risercard PCIe 3x8 does not support PCIe cards that require an extra external power connector.

2.2.11.3.3 2x E1.S PCIe Adapter Card

The 2x E1.S PCIe Adapter Card is a PCIe 3.0 (Gen 3) x8 card that provides two E1.S SSD slots. Despite using standard PCIe x8 connector, its pinout is proprietary and it cannot be used in systems other than DM-SV01.

The two SSD slots follow Intel's EDSFF standard and are electrically and mechanically compatible with the EDSFF E1.S SSD form factor.

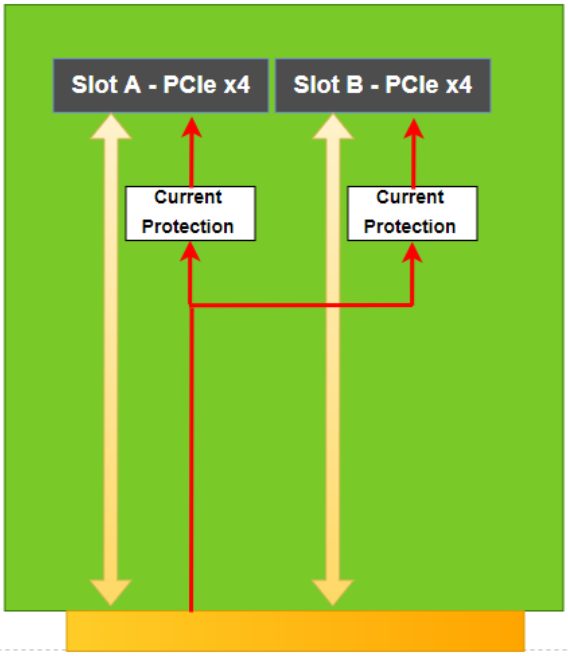

Figure 33: 2x E1.S PCIe Adapter Card - Block Diagram

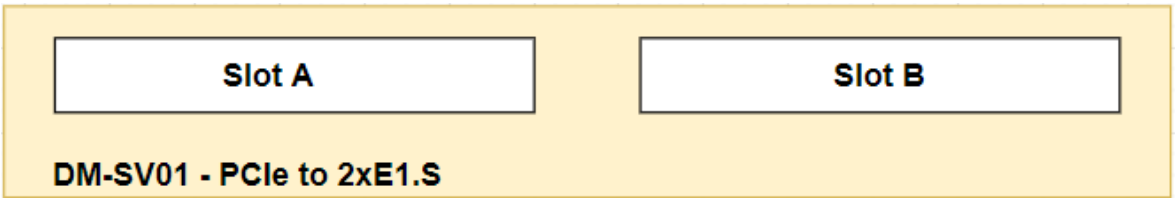

Figure 34: 2x E1.S PCIe Adapter Card - SSD slots

The 2x E1.S PCIe Adapter Card provides full hotplug capability for each SSD slot so they can be freely inserted or removed without the need to previously configure the server or inform the operating system.

There are two types of 2xE1.S adapter card:

- Type I: The first type of 2xE1.S adapter card is intended for use with 5.9mm thickness E1.S disks. The picture below shows the mechanics of the Type I 2xE1.S adapter card.

Figure 35: 2xE1.S adapter card Type I

- Type II: The second type of 2xE1.S adapter card is intended for use with 9.5mm thickness E1.S disks. The picture below shows the mechanics of the Type II 2xE1.S adapter card.

Figure 36: E1.S 2xE1.S adapter card Type II

Both 2xE1.S adapter card options provide the same electrical connections and disk features. The only difference is the mechanics, which is adapted to accommodate the different disk thicknesses available in the market. Please consult Datacom sales team or support team for acquiring the correct 2xE1.S adapter card model according to your SSD requirements.

The 2x E1.S PCIe Adapter Card can be plugged in the following PCIe slots of the DM-SV01 server.

- **Risercard PCIe 3x8:** up to three 2x E1.S PCIe Adapter Cards can be plugged into the riser card, providing support for up to 6 E1.S SSDs.
  - Slot 1 (PCIe x8 slot) => One “2x E1.S PCIe Adapter Card”.
  - Slot 2 (PCIe x8 slot) => One “2x E1.S PCIe Adapter Card”.
  - Slot 3 (PCIe x8 slot) => One “2x E1.S PCIe Adapter Card”.

- **Risercard PCIe x16+x8:** up to two 2x E1.S PCIe Adapter Cards can be plugged into the riser card, providing support for up to 4 E1.S SSDs.
  - Slot 2 (PCIe x8 slot) => One “2x E1.S PCIe Adapter Card”.
  - Slot 3 (PCIe x16 slot) => One “2x E1.S PCIe Adapter Card”.

When equipping the PCIe slot with the proprietary 2x E1.S PCIe Adapter Card, the BIOS/UEFI FW automatically bifurcates the slot to 2x PCIe x4.

The SSDs nomenclature when using the 2x E1.S Adapter Card is shown in the diagram below.

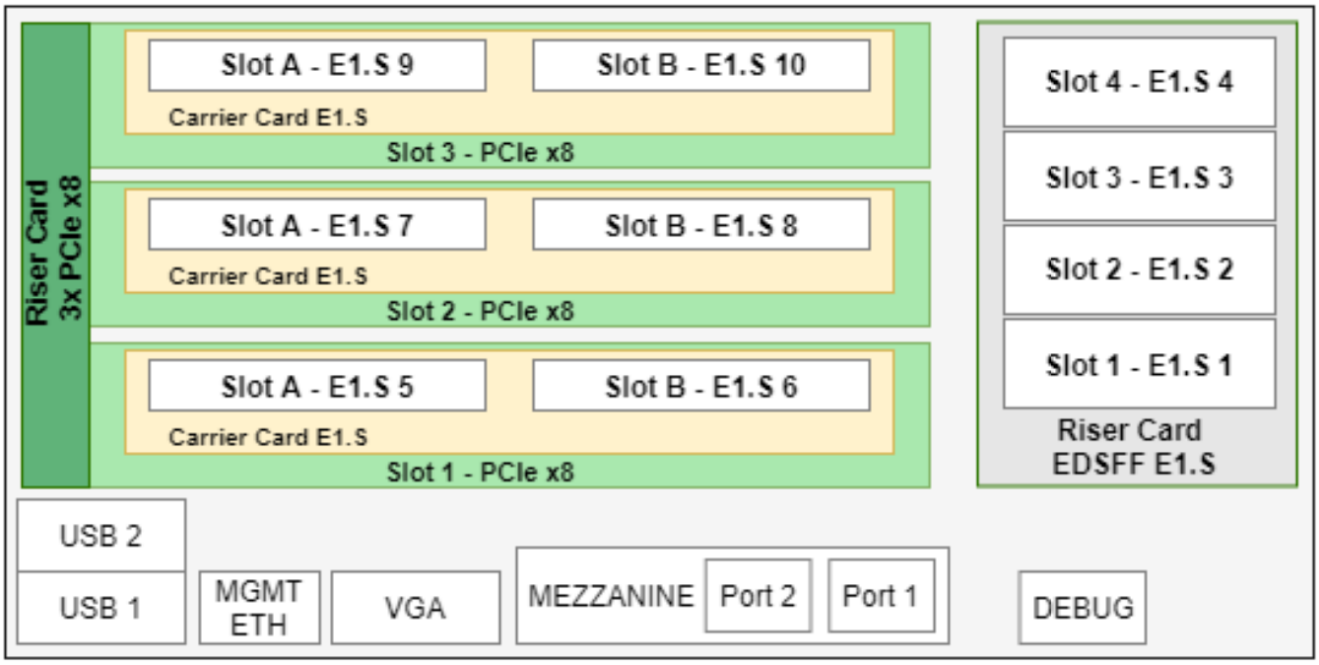

Figure 37: Risercard PCIe 3x8 equipped with 2x E1.S PCIe Adapter Card

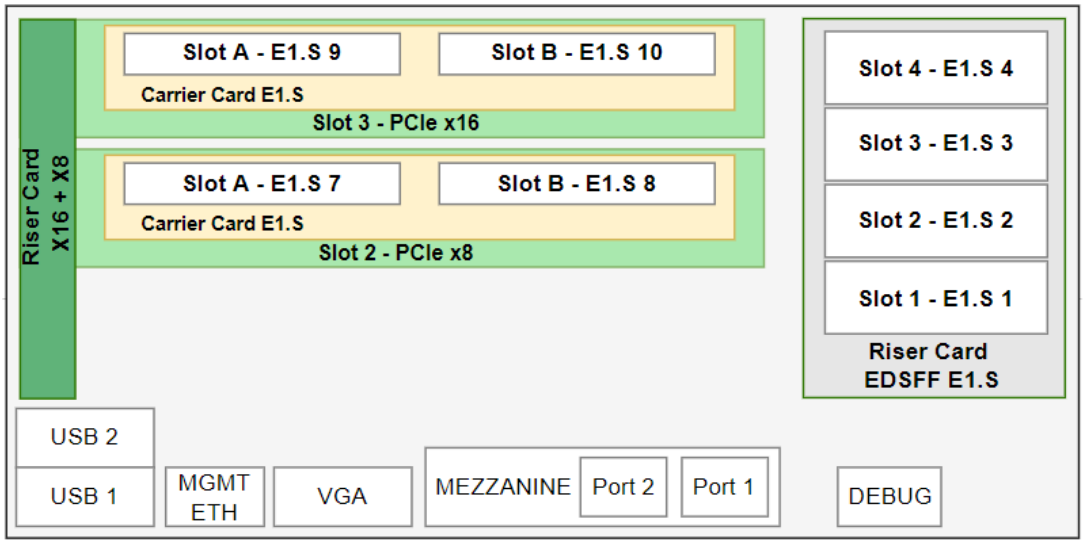

Figure 38: Risercard PCIe x16+x8 equipped with 2x E1.S PCIe Adapter Card

2.2.11.3.3.1 2xE1.S Adapter Power Specifications

Each E1.S slot can deliver up to 12W to the SSD. The table below shows the power specifications for each E1.S SSD slot of the 2xE1.S PCIe Adapter Card.

2x E1.S PCIe Adapter Card slot	V(V)	I(A)	P(W)	Total (W)
Slot A	12	1	12	**24**
Slot B	12	1	12	

Table 16: 2x E1.S PCIe Adapter Card - power specifications

2.2.11.4 X16 Expansion Slot

The DM-SV01 server has a proprietary connector with 16 PCIe lanes, used for connecting an expansion Riser Card.

Figure 39: expansion slot x16 location

Figure 40: expansion slot X16

The DM-SV01 server can be equipped with the “E1.S Cage” on this slot.

2.2.11.4.1 Cage E1.S

The Cage E1.S is a riser card that is equipped in the x16 expansion slot and that provides four E1.S SSD slots supporting PCIe 4.0 (please check the requirements for using PCIe 4.0 in section “2.2.11.5 PCIe Specifications”). The Cage E1.S pinout is proprietary and it can not be used in systems other than DM-SV01.

The four SSD slots follow Intel’s EDSFF standard and are electrically and mechanically compatible with the EDSFF E1.S SSD form factor.

There are two types of Cage E1.S:

- Type I: The first type of cage E1.S is intended for use with 5.9mm thickness E1.S disks. The picture below shows the mechanics of the Type I cage E1.S.

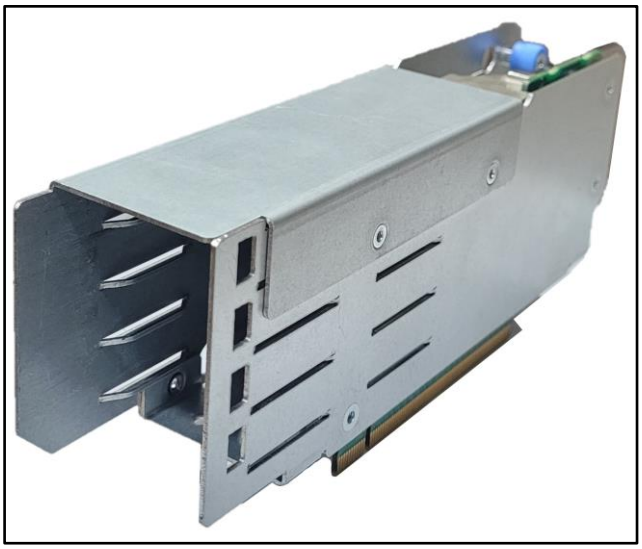

Figure 41: Cage E1.S Type I

- Type II: The second type of cage E1.S is intended for use with 9.5mm thickness E1.S disks. The picture below shows the mechanics of the Type II cage E1.S.

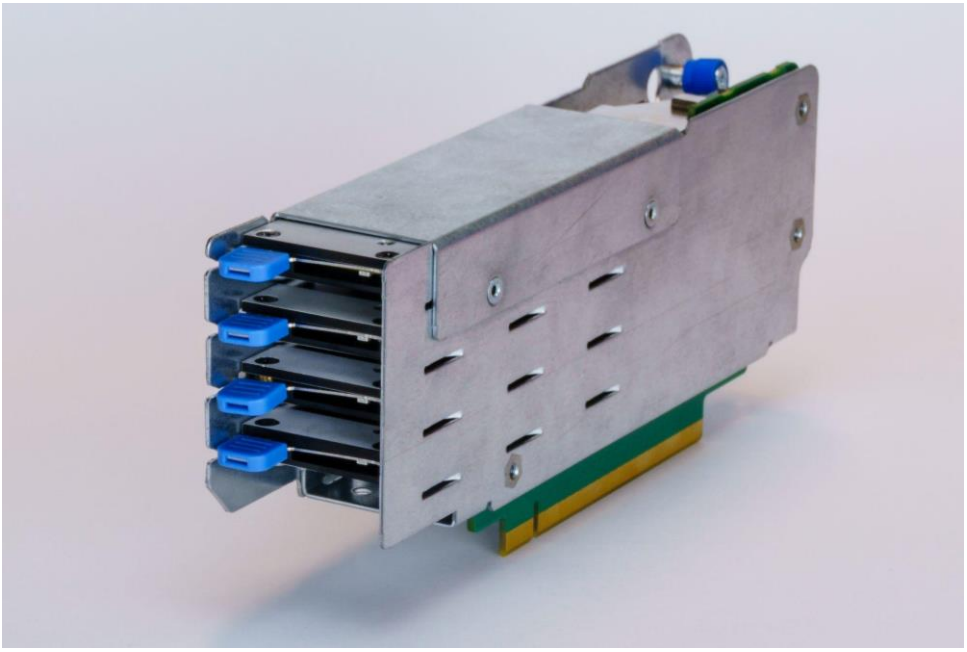

Figure 42: Cage E1.S Type II

Both Cage E1.S options provide the same electrical connections and disk features. The only difference is the mechanics, which is adapted to accommodate the different disk thicknesses available in the market. Please consult Datacom sales team or support team for acquiring the correct Cage E1.S model according to your SSD requirements.

The diagram below shows a brief overview of the electrical connections of the Cage E1.S.

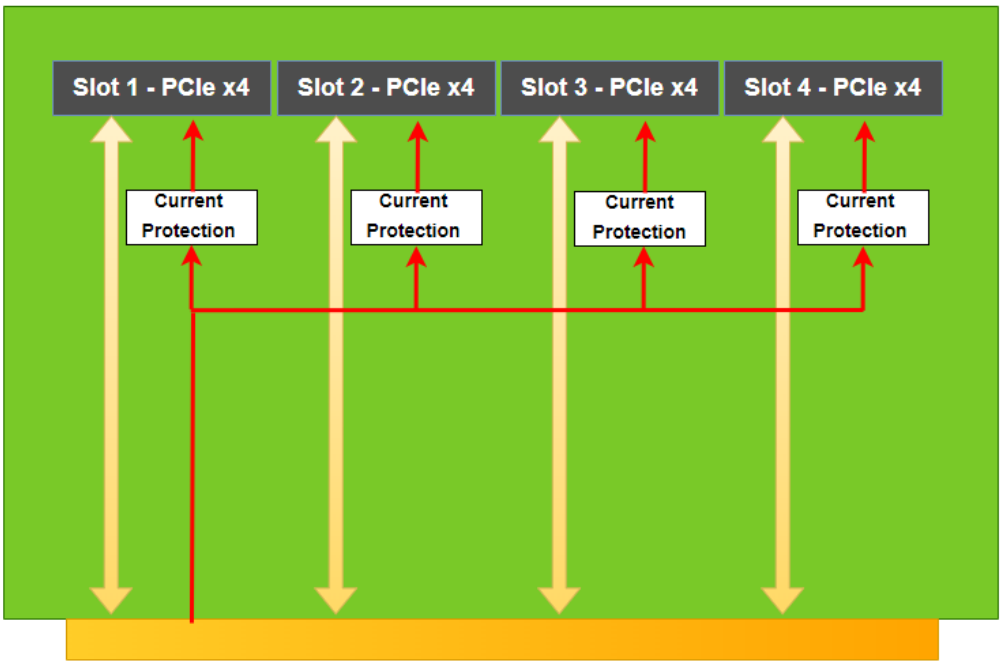

Figure 43: E1.S Cage - Block Diagram

The Cage E1.S provides full hotplug capability for each SSD slot so they can be freely inserted or removed without the need to previously configure the server or inform the operating system.

The SSDs nomenclature when using the Cage E1.S is shown in the diagram below.

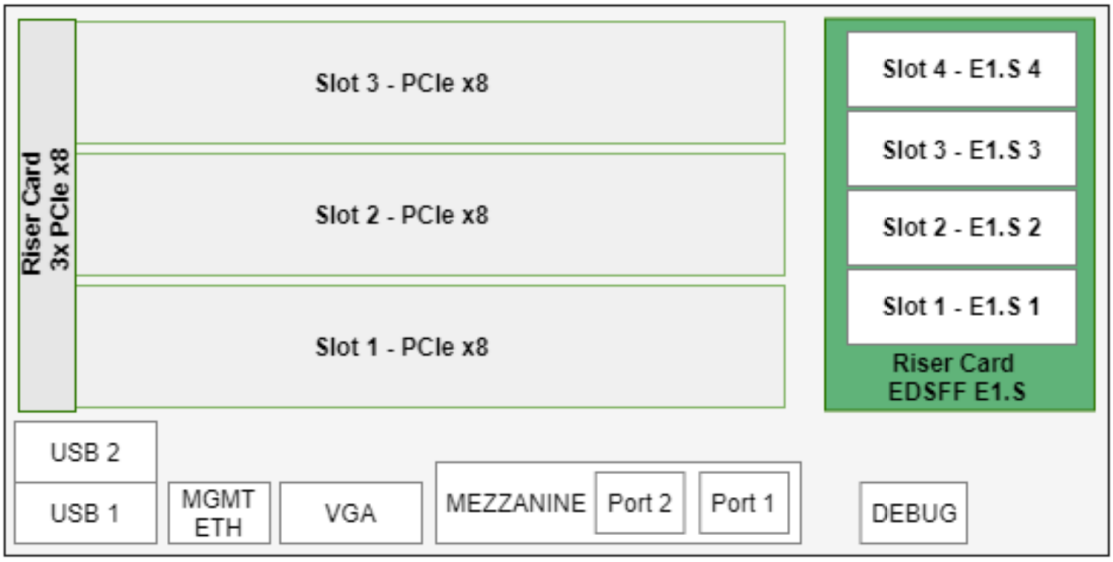

Figure 44: Cage E1.S SSD slots

2.2.11.4.1.1 Cage E1.S Power Specifications

Each E1.S slot can deliver up to 12W to the SSD. The table below shows the power specifications for each E1.S SSD slot of the Cage E1.S.

PCIe E1.S Riser Card	V(V)	I(A)	P(W)	Total (W)
SSD Slot 1	12	1	12	48
SSD Slot 2	12	1	12	
SSD Slot 3	12	1	12	
SSD Slot 4	12	1	12	

Table 17: E1.S Cage - Power

2.2.11.5 PCIe Configuration and restrictions

The DM-SV01 server is equipped with PCIe slots that allow you to connect various expansion cards as explained in section “2.2.11 PCIe slots”. It's important to understand the supported PCIe generations and how certain adapter cards may affect their operation.

2.2.11.5.1 PCIe Slots Capabilities

The PCIe specifications for the slots of the DM-SV01 server are listed in the table below.

PCIe slot	Capability
M.2 onboard	PCIe 4.0 (Gen 4) x4
Mezzanine card	PCIe 4.0 (Gen 4) x16
Risercard x16+x8 - slot 2	PCIe 4.0 (Gen 4) x8
Risercard x16+x8 - slot 3	PCIe 4.0 (Gen 4) x16
Risercard 3x8 - slot 1	PCIe 4.0 (Gen 4) x8
Risercard 3x8 - slot 2	PCIe 4.0 (Gen 4) x8
Risercard 3x8 - slot 3	PCIe 4.0 (Gen 4) x8
2xE1.S Adapter Card - slot A	PCIe 3.0 (Gen 3) x4
2xE1.S Adapter Card - slot B	PCIe 3.0 (Gen 3) x4

Table 18: DM-SV01 PCIe slots capabilities

Using the BIOS menu, it is possible to configure the PCIe capability for all slots of the DM-SV01 server (Gen 3 or Gen 4). This setting is applicable to all PCIe slots at once. Therefore, it is not possible to configure each slot separately, (as an example, it is not possible to have some slots configured as Gen 3 and others as Gen 4 at the same time). For details regarding the configuration of the PCIe slots of the DM-SV01 server, please refer to the BIOS user manual (2).

For most cases it is recommended to configure the PCIe capability as Gen 4. **However, if the 2x E1.S Adapter Card is equipped, the PCIe capability shall be configured as Gen 3.** Attempting to operate this card at Gen 4 speed may lead to instability or performance issues for the E1.S devices connected to the slots.

3 DM-SV01 Installation

This chapter describes the installation and maintenance procedures for the DM1904 sub-rack and for the DM-SV01 server.

3.1 ESD Precautions

Electrostatic Discharge (ESD) can potentially damage electronic components. To prevent damage to the server electronic parts, it is important to handle it very carefully. The following measures are generally sufficient to protect your equipment against ESD.

- Use an antistatic wrist strap to prevent static damage whenever you are handling the server. Attach the appropriate end of the strap to a known ground and attach the other end of the strap to your wrist.
- When performing any installation or service procedure, place static-sensitive parts such as expansion cards, riser cards and memory modules on an antistatic surface.
- Touch a grounded metal object before removing the board from the antistatic bag.
- Handle electronic boards by its edges only; do not touch its components, peripheral chips, memory modules or gold contacts.
- When handling chips or modules, avoid touching their pins.
- Put the mainboard and peripherals back into their antistatic bags when not in use.
- Never work on the system with the power plugged in. Turning the host processor off is not sufficient to completely power down the system. The only way to make sure that the system is off is unplugging it from the power connector.

3.2 DM1904 Sub-Rack installation and maintenance

The DM1904 sub-rack can be installed in standard 19” racks. It occupies 4.5U of height and enables the plugging of up to four DM-SV01 servers.

Figure 45: DM1904 Sub-Rack

The DM1904 sub-rack has the following dimensions:

- Height = 200mm
- Width = 451mm
- Depth = 754mm

3.2.1 DM1904 Power Supply

The DM1904 Chassis has four power supply slots. All power sources feed a single internal bus, which is responsible for powering all the four sleds. The power supplies are hot swappable, so they can be freely inserted and removed even if the system is powered up.

The power demanded by the sleds is equally divided between all the available power supplies. The number of power supplies and its respective power specification must be sufficient to meet the power demand of the available sleds. For redundancy purposes, an extra power supply may be added to the set. The power supply cables are individually connected to each of the PSUs available in the system.

The figure below shows one of the power supply units available for using within the DM1904 chassis.

Figure 46: DM1904 800W Power Supply

3.2.1.1 PSU 800W specifications

The DM1904 800W PSU has the following specifications regarding power factor and efficiency.

Input Voltage	20% loading	50% loading	100% loading
115VAC/60Hz	> 0.8	> 0.95	> 0.98
230VAC/50Hz	>0.8	>0.90	>0.95

Table 19: Power Factor for PSU 800W

Efficiency Std.	20% load 12V = 13.00A 12Vsb = 0.42A	50% load 12V = 32.50A 12Vsb = 1.05A	100% load 12V = 65A 12Vsb = 2.1A
Platinum	90%	94%	91%

Table 20: Efficiency for PSU 800W

3.2.2 DM1904 Supervisory Board (SB)

The DM1904 chassis has a module called “Supervisory Board” (SB) that is responsible for providing remote monitoring functions to the power supplies present on the sub-rack. The Supervisory Board functions are controlled by a BMC (Baseboard Management Controller), which provides an user interface similar to the web GUI from DM-SV01 server. The Supervisory Board provides the following functionalities:

- Connectivity through Gigabit Ethernet interface, providing remote access to the DM1904 chassis management system.
- Inventory information management for the DM1904 chassis and power supplies.
- Real time monitoring of power consumption and voltage sensors.
- Management of the power supplies connected to the DM1904 chassis, providing health status information and alarms monitoring.

- Web management GUI for user friendly BMC management and access to the chassis monitoring functions.

The Figure 47 below shows the supervisory board.

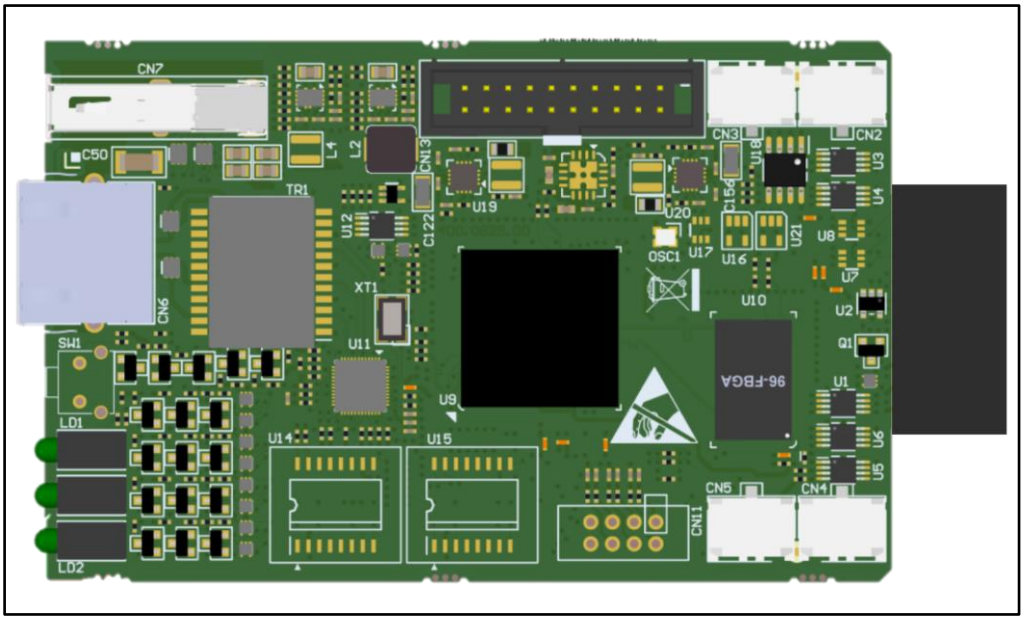

Figure 47: Supervisory Board

3.2.2.1 Supervisory Board interface

The supervisory Board is located in the center bottom of the DM1904 chassis, as can be seen in Figure 48.

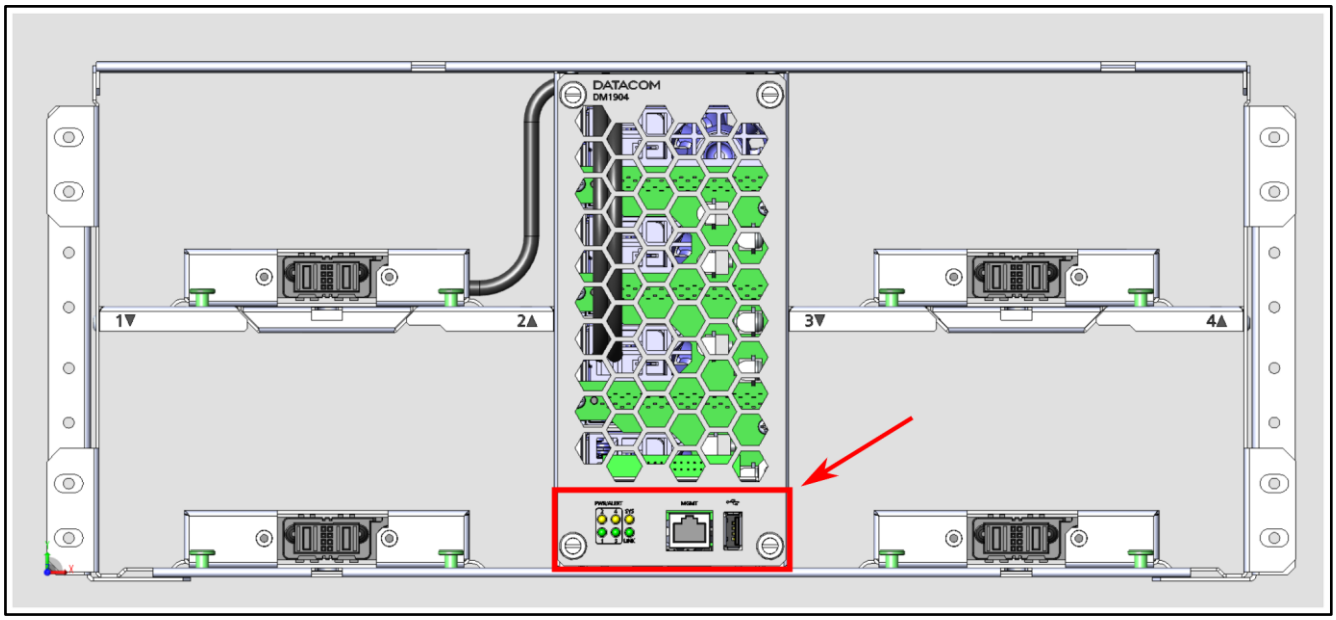

Figure 48: Supervisory Board location on DM1904 chassis

The Supervisory Board front panel is shown in Figure 49.

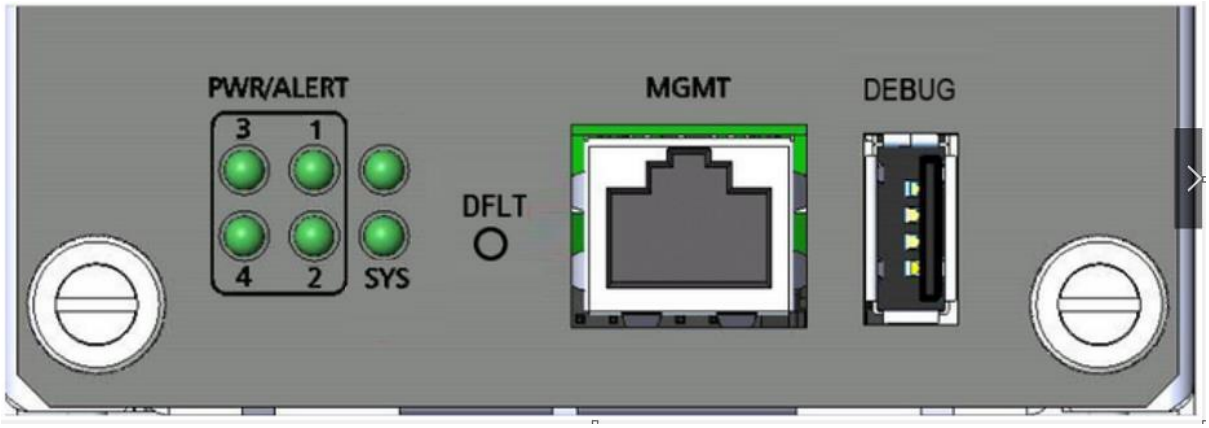

Figure 49: Supervisory Board front panel

The Supervisory Board interface on the front panel is composed by the following components:

- **PWR/ALERT LEDs:** these LEDs are used to indicate the status of the DM1904 power supplies.
- **SYS LED:** used to indicate the status of the supervisory board BMC.
- **DFLT button:** used to reset the supervisory board BMC. Additionally, this button can be long pressed during the early boot of the BMC in order to force the BMC to boot the recovery read only FW. For details regarding this functionality, please refer to (1) “DM-SV01 Server - BMC User Manual”.
- **MGMT interface:** the Ethernet management interface is used to provide remote access to the supervisory board BMC user interface.
- **DEBUG port:** used to connect the Datacom debug card for access to the serial interface.

3.2.2.1.1 LEDs

The DM1904 Supervisory Board has 5 LEDs used to indicate power supply status and BMC SW operating condition.

The PWR/ALERT LEDs of the supervisory board front panel correspond to the PSU slots numbering of the DM1904 chassis, as shown in Figure 50 below.

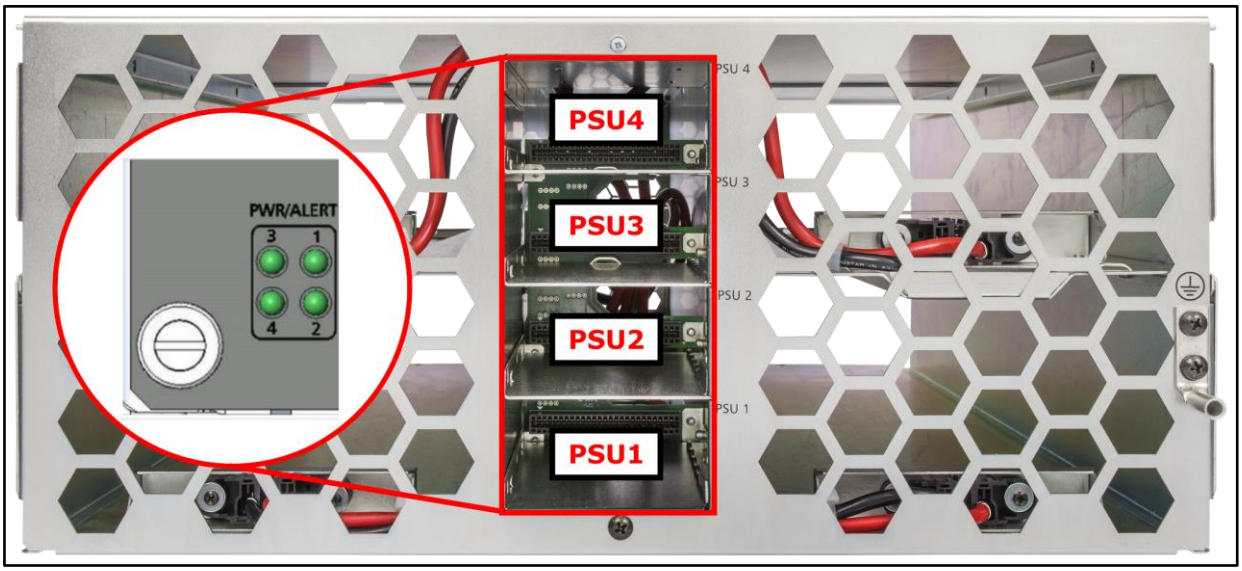

Figure 50: DM1904 back view - PSU slots numbering

The table below shows the description of the LEDs, as well as their available states.

LED	Color	Function	LED state	Status
PWR/ALERT (1,2,3,4)	GREEN/YELLOW	PSU status	OFF	PSU not detected.
PWR/ALERT (1,2,3,4)	GREEN/YELLOW	PSU status	Solid GREEN	PSU OK.
PWR/ALERT (1,2,3,4)	GREEN/YELLOW	PSU status	Solid YELLOW	PSU failure.
SYS	GREEN/YELLOW	BMC status	OFF	Power off or power failure.
SYS	GREEN/YELLOW	BMC status	Blinking YELLOW	BMC booting.
SYS	GREEN/YELLOW	BMC status	Solid GREEN	BMC up and running.

Table 21: Supervisory Board LEDs description

3.2.2.1.2 Management (MGMT) Interface

The DM1904 Supervisory Board can be accessed by means of an Ethernet gigabit interface present on the front panel. This port provides remote access to the management functions of the SB by means of the BMC web management interface.
By default, the MGMT interface is configured as DHCP, so the user can perform a first access to the BMC by using a DHCP server on the host.

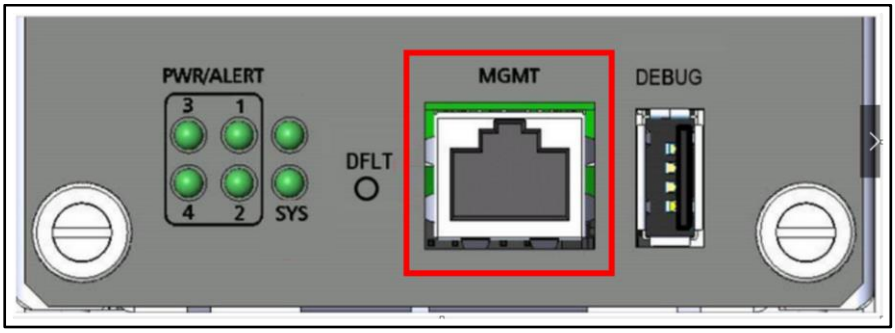

Figure 51: Supervisory Board Ethernet management interface

Details regarding the BMC web management interface and its functionalities can be found in the BMC user manual (1).

3.2.2.1.3 Debug Port

The Supervisory Board has a customized pinout USB 3.0 connector located on the right side of the front panel. This connector is not a general purpose USB 3.0 connector. It is a special connector, with a proprietary pinout and it is intended only for connecting the external DM-SV01 Debug Card. The image below shows the positioning of the Debug USB 3.0 connector in the DM1904 Supervisory Board.

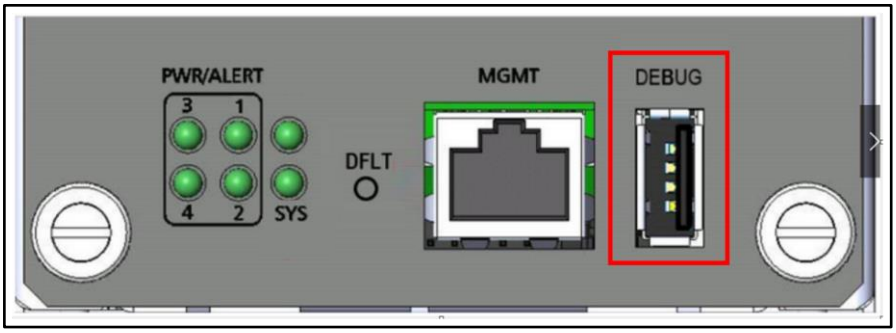

Figure 52: Supervisory Board Ethernet management interface

Caution: it is not allowed to connect general USB devices to this connector.

3.2.3 DM1904 Installation

3.2.3.1 Installation facilities

The installation rules below must be followed when choosing the location where the equipment will be installed.

- Choose a location with easy access to the equipment and where its LEDs can be viewed;
- The ambient temperature must be kept between 0 and 35ºC and the relative humidity between 10% and 90% non-condensing;
- Install the equipment close to its power source;
- 4.5RUs of free rack space are required for the installation of the chassis;

- The 19” Rack for installation must have side fixing beams at the front and also at the rear. Simple racks, with fixing beams only at the front side or only at the rear side do not provide enough mechanical support for the equipment.

3.2.3.2 Fixing the DM1904 chassis on 19" Racks

Follow the instructions below to correctly install the DM1904 chassis to the 19” rack.

1. Start the installation by mounting the fixing brackets in the front and rear beams of the rack. The four brackets must be placed on the same height level in the rack and all of them must face the inside of the rack. Use M5 type screws.

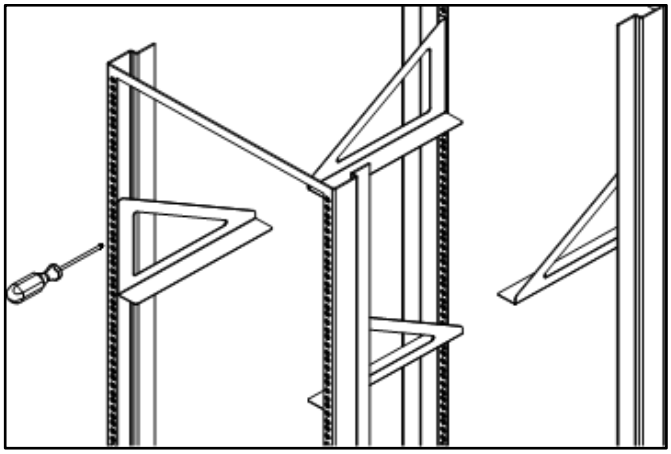

Figure 53: DM1904 fixing brackets mount

2. Position the DM1904 Chassis so that it settles on the supports fixed as explained in step 1. Insert the chassis by sliding it all the way to the end.
3. Fix the DM1904 side lugs in the rack beams also using M5 type screws.

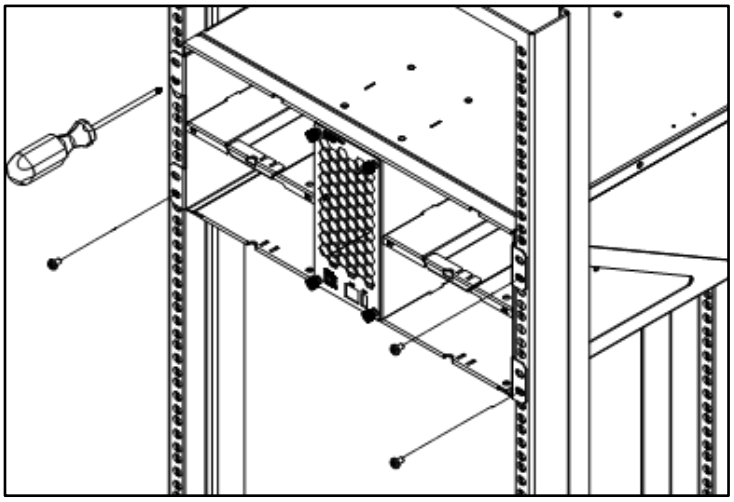

Figure 54: DM1904 rack installation

3.2.3.3 DM1904 Ventilation

The airflow of the DM1904 Chassis flows from the front to the back. The servers that are inserted in the front side and the power supplies that are inserted in the rear side of the DM1904 Chassis provide their own cooling system, with cold air being drawn in the front side and hot air blowing out of the rear side. It is essential for the correct functioning of the whole cooling system that all ventilation inlets and outlets are unobstructed and that free space of at least 10cm on the front and rear panels are respected.

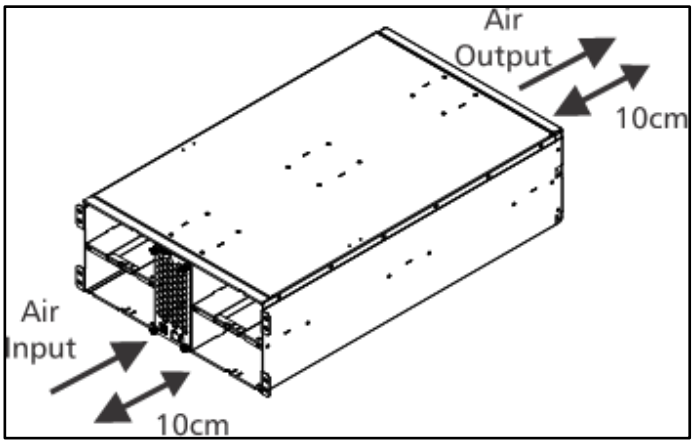

Figure 55: DM1904 ventilation diagram

3.2.3.4 Installing the Supervisory Board in the DM1904

3.2.3.4.1 Mechanical structure for the supervisory board

In order to allow the Supervisory Board to be installed into the DM1904 subrack, the DM1904 mechanics provides the structure shown in Figure 56 and Figure 57. The following mechanical components must be available in the chassis:

- Backplane connector, to plug the supervisory board in.
- Mechanical cover, to protect the supervisory board.
- Slide plastic rails, which guide the supervisory board connection.
- Flat cable provided by Datacom, responsible for connecting the supervisory board to the DM1904 backplane.

Note: if you need to install a Supervisory Board but your DM1904 does not provide the structure below, please contact Datacom support team.

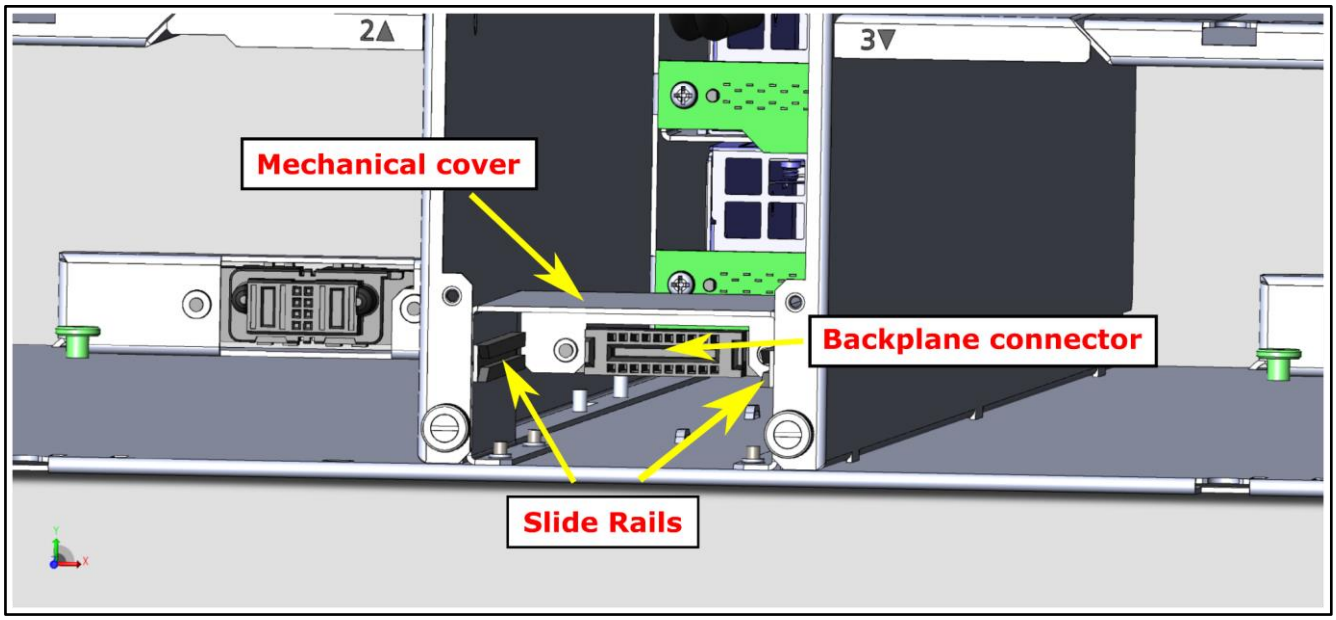

Figure 56: Required mechanics for installing SB

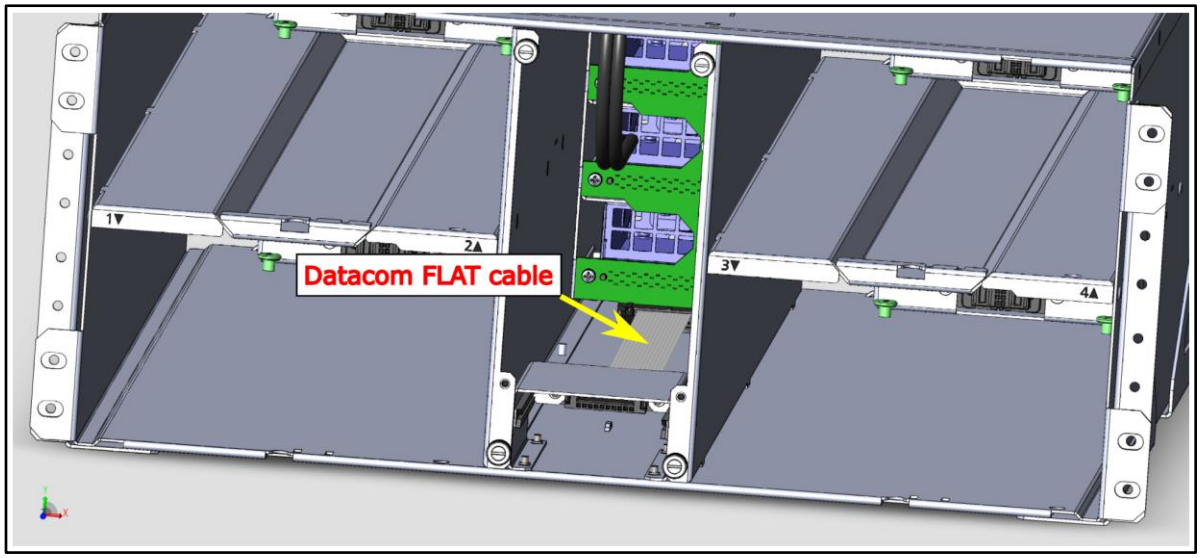

Figure 57: Supervisory Board flat cable

3.2.3.4.2 Supervisory Board installation

In order to install the Supervisory Board, first check if the DM1904 chassis meets the requirements shown in section 3.2.3.4.1 Mechanical structure for the supervisory board.

Then, the procedure below can be followed for installing the Supervisory Board.

1) Loosen the four screws from the chassis front panel using a screwdriver.
2) Move the front panel frontwards to complete the removal process.

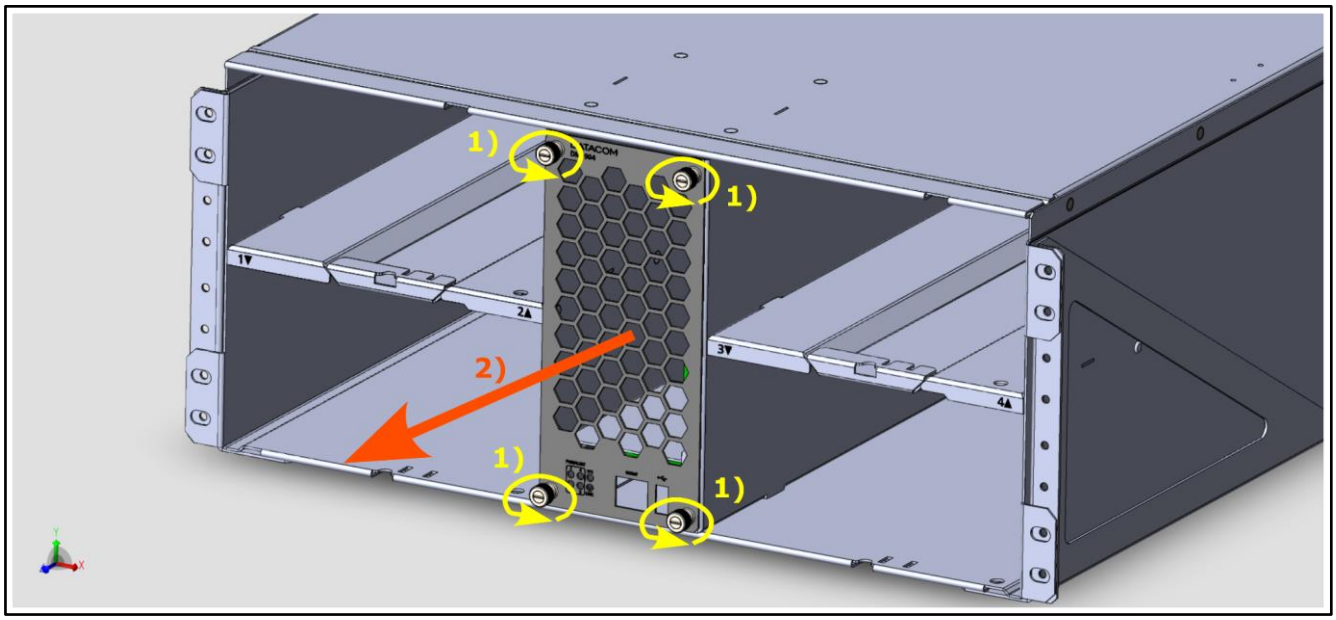

Figure 58: SB installation - removing the DM1904 front panel

Note: Check if the flat cable is installed between the DM1904 backplane and the Supervisory Board interface backplane. If not present, please contact Datacom support team for additional assistance.

3) Position the Supervisory Board as shown in Figure 59, and insert it aligning the board edges with the slide rails. Then move it backwards until it completely attaches to the backplane connector.

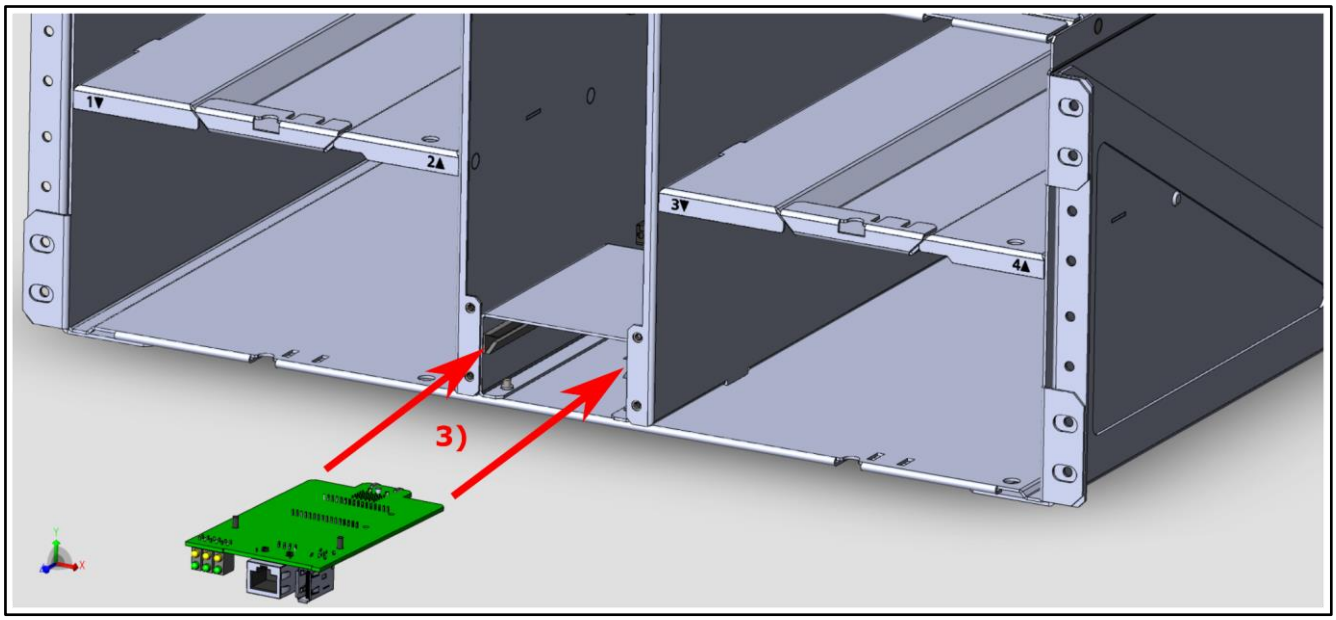

Figure 59: SB installation - inserting the Supervisory Board

4) Position the front panel as shown in Figure 60, aligning the four screws with the fixation holes.
5) Tighten the four screws completely using a screwdriver.

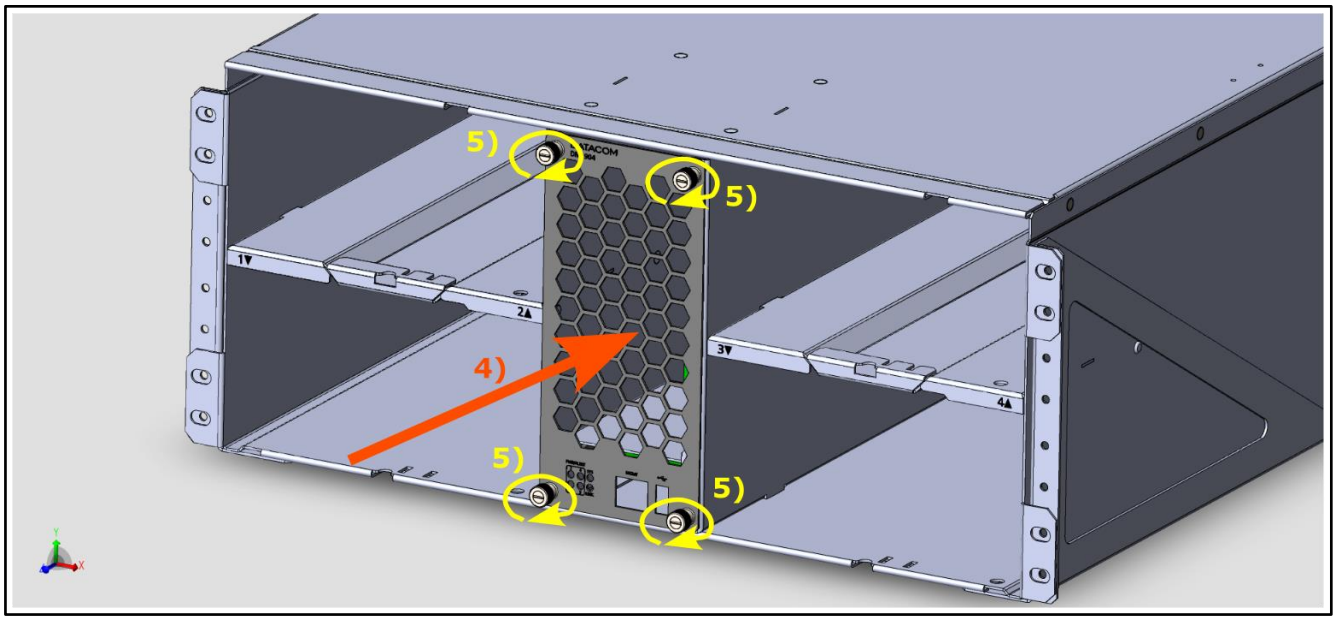

Figure 60: SB installation - inserting the DM1904 front panel

3.2.3.5 Installing Power Supplies in the DM1904

The installation of the PSUs in the DM1904 is pretty straightforward. Follow the steps below to connect and power up the units.

1. Position the PSU in the slot available on the rear side of the chassis and slide it until it gets well attached to the power connector of the DM1904 chassis.
2. Connect the power cables individually to each of the PSUs available in the system.

For additional information regarding the DM1904 PSUs specifications and features, please refer to section “3.2.1 DM1904 Power Supply”.

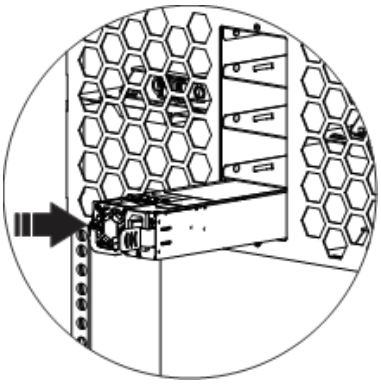

Figure 61: DM1904 PSU installation

3.2.3.6 Grounding

The grounding point of the DM1904 Chassis is located on the right side of the back of the chassis and must always be installed.

The grounding point location is shown in the figures below.

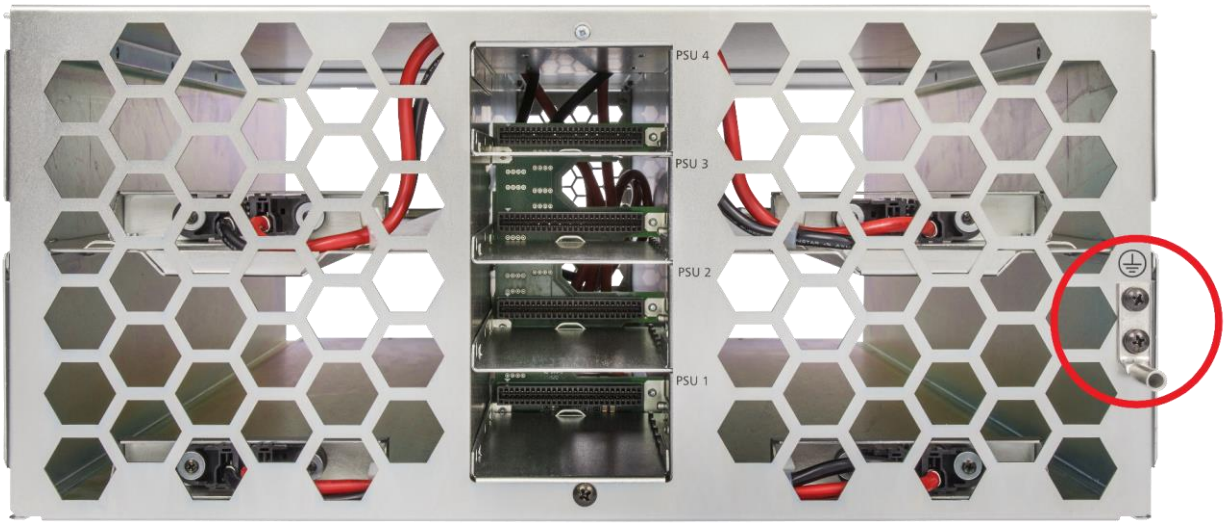

Figure 62: DM1904 grounding point location

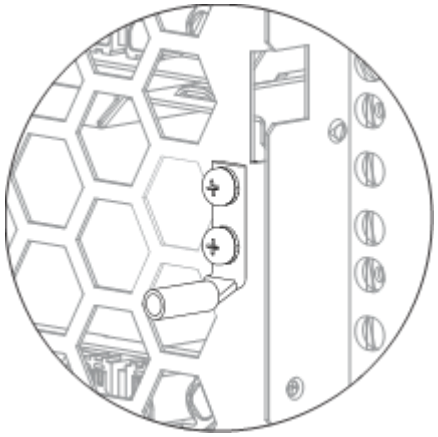

Figure 63: DM1904 grounding point

3.3 Installing the DM-SV01 server into the DM1904 Sub-Rack

This section describes the procedure to install the DM-SV01 server in the DM1904 chassis.

3.3.1 Inserting the DM-SV01 server into the DM1904

Follow the instructions below in order to install the DM-SV01 server in the DM1904 chassis.

1. Position the DM-SV01 server in the DM1904 slot that will be used for the installation. The four DM1904 slots are identical, so the process is the same for installing the product at any slot.
2. Before finishing the complete insertion, pull the lock pin up (step 1) and then insert DM-SV01 completely (step 2).

   CAUTION: the DM-SV01 server sled must be inserted SLOWLY into the DM1904 slot. Inserting it very fast or roughly plugging the power connector may cause damage to the mechanics, connectors or other structures of the set.

Figure 64: Inserting the DM-SV01 into the DM1904

3. Release the lock pin. The DM-SV01 server will be mechanically locked to the shelf.
4. As soon as the insertion is complete, the DM-SV01 server will be automatically powered up by the DM1904 power rail. For additional details about the power topology of the DM1904 chassis, please refer to the section “3.2.1 DM1904 Power Supply”.

3.3.2 Removing the DM-SV01 server from the DM1904

1. Before removing the DM-SV01 from the DM1904 sub-rack, shut the host processor down as described in section “4.5 Host Processor Power Off”.
2. Pull the front fixing pin up for releasing the mechanical lock (step 1) and then pull DM-SV01 out of the shelf (step 2). The DM-SV01 mechanics has a rounded opening in the left side of the base plate that can be used to hold the server when removing it from the chassis. This opening can be seen near the red arrow in Figure 65.

When the DM-SV01 system is disconnected from the DM1904, the power is completely removed from the server.

Figure 65: Removing DM-SV01 from the DM1904

4 Powering up the System - Quick Start Guide

This section explains the basics of powering up the system and connecting to the management interface. For further details, please refer to the BIOS user manual (2) and the BMC user manual (1).

4.1 Powering up the DM-SV01

1. Insert the DM-SV01 server into the DM1904 sub-rack (refer to section “3.3.1 Inserting the DM-SV01 server into the DM1904” for details). As soon as the server is plugged in the DM1904 chassis, power is applied and the startup sequence takes place.
2. BMC SW startup: once the system is powered, the BMC SW starts booting. The CPUs P0 and P1 will remain unpowered during this initial phase. The BMC boot process takes some minutes and it is indicated by:
    a. The BMC LED (Yellow) will flash slowly (2Hz) indicating that the BMC is operational.
    b. PWR_STBY LED will blink in blue color, which indicates that the 12V standby voltage is present and the BMC firmware is booting.
3. When the BMC boot process has finished, the system reaches the state known as STANDBY MODE. In this state, the BMC is completely initialized and the system is ready to turn the CPUs on, as explained in section 4.3 Host Processors Power On. This condition is indicated by:
    a. BMC LED (Yellow) keeps flashing slowly, indicating the BMC is running.
    b. PWR_STBY LED stops blinking and turns blue permanently, indicating STANDBY STATE.
    c. PWR_ACT LED (Green) remains OFF, indicating that the CPUs are still powered off.

4.2 Connecting to the BMC

By factory default, the BMC firmware boots with its network configuration set to DHCP. This means that in order to access the BMC for the first time, it is necessary to have an Ethernet connection to the BMC and a DHCP server configured in the network infrastructure. Both Inband and Out Of Band BMC network interfaces share this same behavior regarding the network default configuration.

Once the BMC receives a valid IP address from the DHCP server, it can be accessed by:

- Using SSH to connect to the CLI.
- Via HTTPS to access the web interface.

For example, if the given IP address to the BMC is 192.168.15.15, you can connect to the BMC web interface by typing “https://192.168.15.15/” in the web browser.

The default administrator username is “root” and the password is “0penBmc” (Note that the “0” is the number zero, not the letter ‘O’).

For more details about the BMC web management, please refer to the BMC User manual (1).

4.2.1 BMC management Interfaces

There are two interfaces that can be used to access the BMC, including the web interface.

1. Using the frontal RJ45 connector for out of band management. This port is connected directly to BMC. The RJ45 connector is located at the front panel of the motherboard, as shown below.

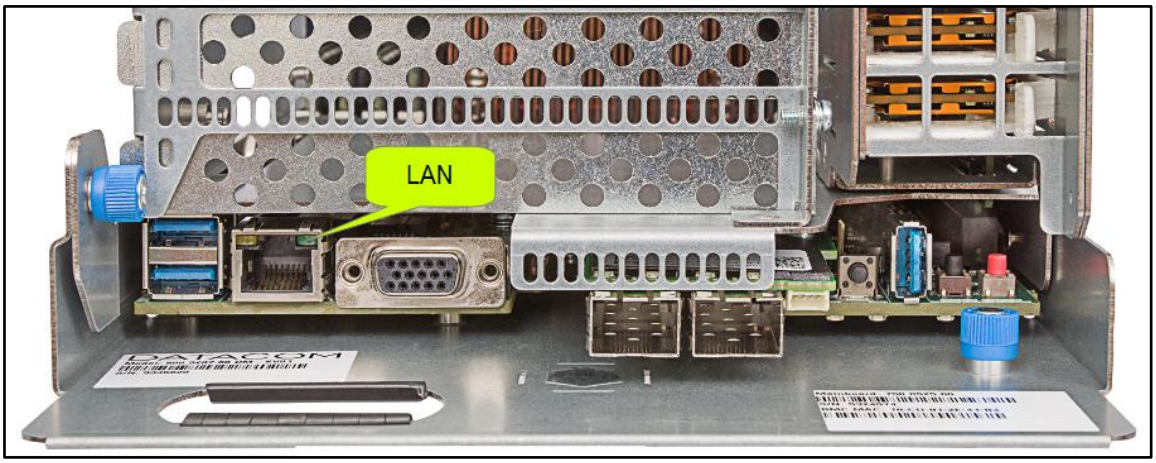

Figure 66: LAN Connector

2. Through the Mezzanine Card, using the NC-SI interface. The NC-SI or “network controller sideband interface”, is an electrical interface and protocol that allows the BMC to share the network connection of the NIC port for management traffic purposes, in addition to the regular host traffic. When the NIC has two ports available, The NC-SI interface is available at the port on the right side of the Mezzanine card (Mezzanine port 0).

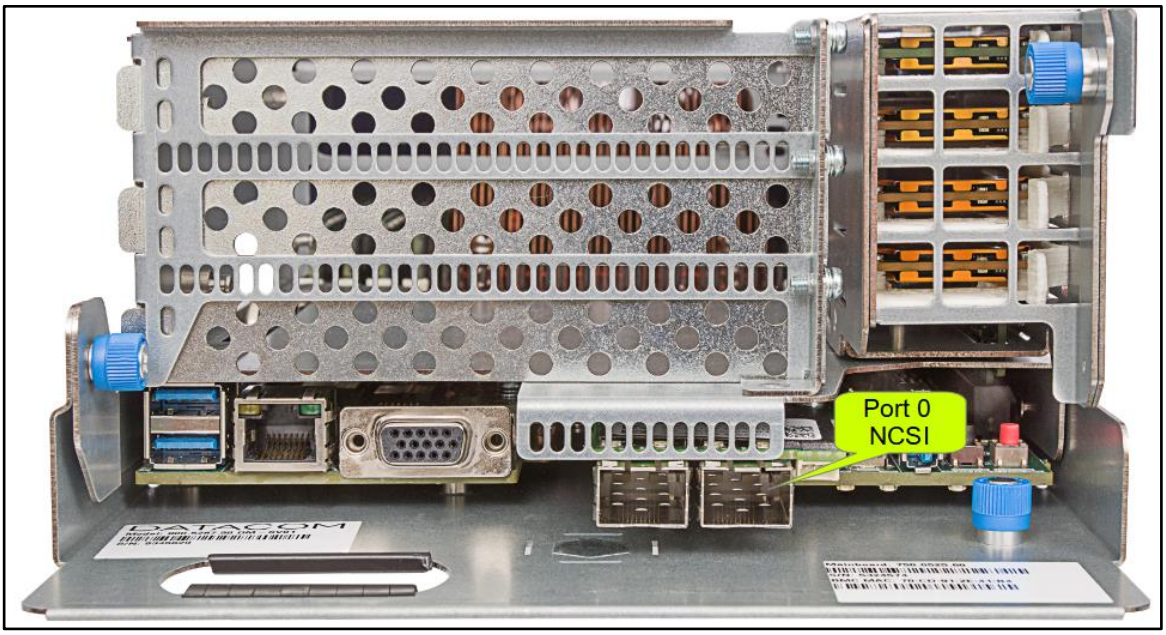

Figure 67: NC-SI mezzanine port

4.2.2 BMC Redfish API

The Redfish API interface can be accessed through the IP address configured at the BMC, as explained in section “4.2 Connecting to the BMC”. You can send requests or view the redfish API information through the web address path “/redfish/v1”. As an example, you can access the redfish API of the BMC with IP address “192.168.15.15” by entering the following URL into your web browser:

- *https://192.168.15.15/redfish/v1”*

4.3 Host Processors Power On

1. After the DM-SV01 is powered and the BMC has finished booting, the host processors are ready to be turned on. This can be done in two ways:
    a. **Power Button:** turn on the processors by shortly pressing the PWR Button (in red color).
    b. **BMC web management interface:** on the BMC web management interface, under the “Control > Server > Power Operations” menu, click on the “Power On” option (please refer to the BMC user manual (1) for additional details).
2. After the processors have been turned on as explained on item 1, the server reaches the ACTIVE MODE: CPUs P0 and P1 are fully powered and the host processor starts booting. This condition is indicated by the following behaviors:
    a. The BMC LED (yellow) keeps flashing slowly (2Hz) indicating that the BMC is operational.
    b. PWR_STBY LED remains on, in blue color, indicating that the STANDBY power supplies are up and running.
    c. PWR_ACT LED (Green) will turn on in GREEN color, indicating that the ACTIVE power supplies are ok and the CPUs are able to start booting. **Note: if the PWR_ACT LED turns on in RED color, this indicates a failure in the ACTIVE power supplies of the CPUs. In this case, contact the Datacom support team.**
3. Wait for the system boot and access the host interface by one of the methods explained in section 4.4 Graphical Interface.

4.4 Graphical Interface

Once the host processor successfully boots, there are two ways to view and interact with the graphics interface to access the BIOS menu, UEFI shell and operating system interface.

1. Using KVM through the BMC WEB management interface. This menu can be accessed by navigating to the “Control > KVM” option, as shown in the image below. The KVM is a screen that displays directly in the web browser the video output of the host. The user can also interact with the host by using the keyboard and mouse inside the KVM screen. For additional details regarding this feature, please refer to the BMC User Manual (1).

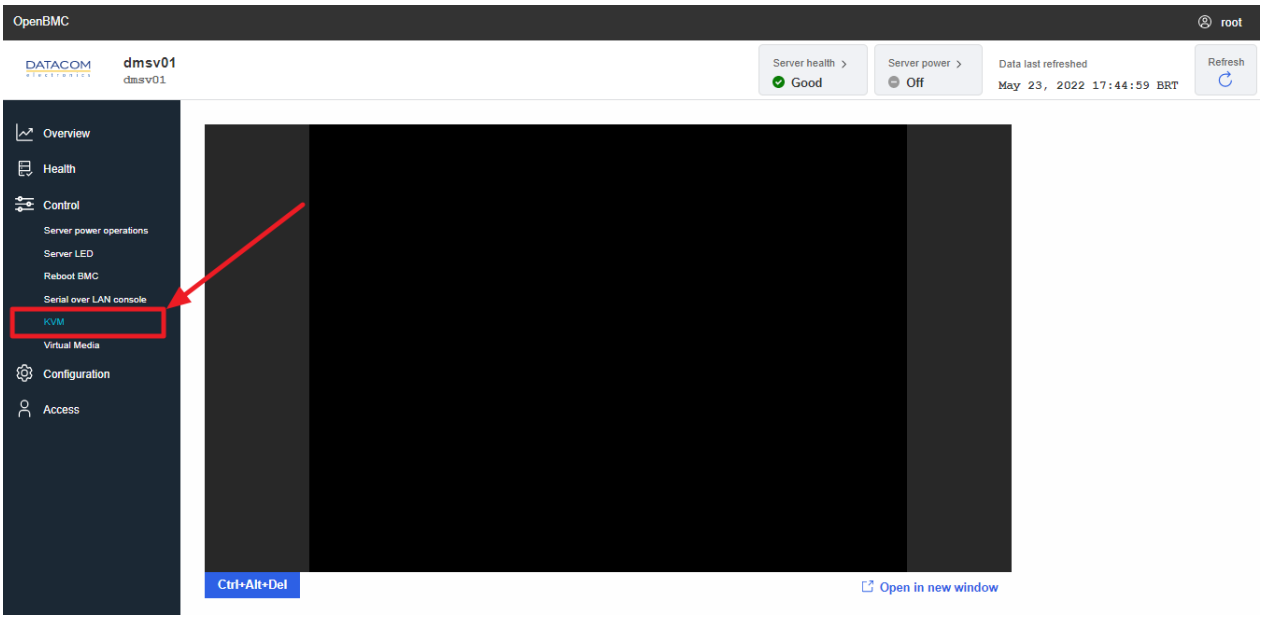

Figure 68: KVM location on the BMC WEB interface

2. Using VGA and USB mouse and keyboard: another option to access the host interface is to use the front panel interfaces to connect a standard VGA monitor and typical USB mouse and keyboard devices. Details of these interfaces can be found in sections “2.2.4 VGA” and “2.2.5 USB 3.1”.

If desired, press F2 during the boot process to access the BIOS setup screen. For more information regarding the BIOS menu, please refer to the BIOS user manual (2).

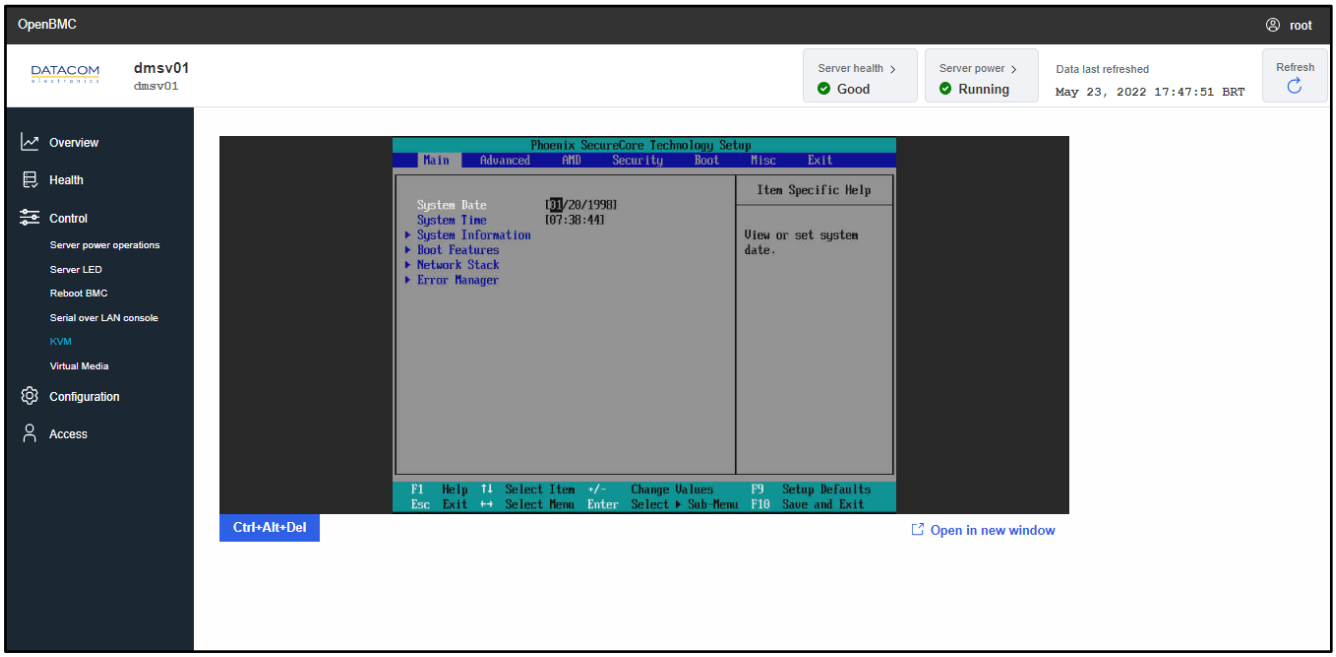

Figure 69: BIOS screen

4.5 Host Processor Power Off

There are two methods of powering the server OFF: orderly shutdown or immediate shutdown.

1. **Orderly shutdown:** the power off process can be started by pressing the POWER button, by means of an OS command or via BMC WEB management interface.
    a. **POWER button:** press the POWER button shortly.
    b. **OS command:** access the OS interface and perform the shutdown command (this process varies depending on the OS being used).
    c. **BMC WEB management interface:** in the BMC WEB management interface, access the Control > Server Power Operations menu, mark the “Orderly” option and then click on “SHUTDOWN”.

    Using any of the options above causes the OS shutdown process to be triggered. After the shutdown procedure has been completed, the server will switch to the STANDBY Mode.

2. **Immediate shutdown:** the power off process can be performed by pressing POWER button or via BMC WEB management interface:
    a. **POWER button:** press the POWER button for at least 4s.
    b. **BMC WEB management interface:** in the BMC WEB management interface, access the Control > Server Power Operations menu, mark the “Immediately” option and then click on “SHUTDOWN”.

    Using any of the options above causes the CPU to be abruptly shut down, without previous warning to the OS. After the shutdown procedure has been completed, the server will switch to the STANDBY Mode.

4.6 Host Processors RESET

1. There are three methods of performing the server reset: using the RESET button, via OS command and through BMC WEB management interface.
    a. **RESET button:** press the RESET button shortly (LED PWR_ACT will be RED while the RESET button is pressed). The server will immediately restart without previous warning to the OS.
    b. **OS command:** access the OS interface and perform the restart command (this process varies depending on the OS being used). The OS will start the shutdown process and, after finished, it will start the boot process again.
    c. **BMC WEB management interface:** in the BMC WEB management interface, access the Control > Server Power Operations menu, mark the “Immediately” option and then click on “REBOOT”. The OS will immediately restart without previous warning to the OS.

5 DM-SV01 Maintenance

This section describes the procedures and guidelines to install the server and also to provide basic maintenance, such as the assembling or replacement of sub-modules and mechanical components.

5.1 Air Duct

The DM-SV01 server is covered by a plastic air duct. The air duct protects the processors and DDR memories and it is designed for efficiently guiding the airflow in order to refrigerate such components. The insertion and removal of the air duct can be accomplished by following the procedures below.

- To remove the air duct, slide it to the front until it is mechanically released (step 1) and then pull it up (step 2).

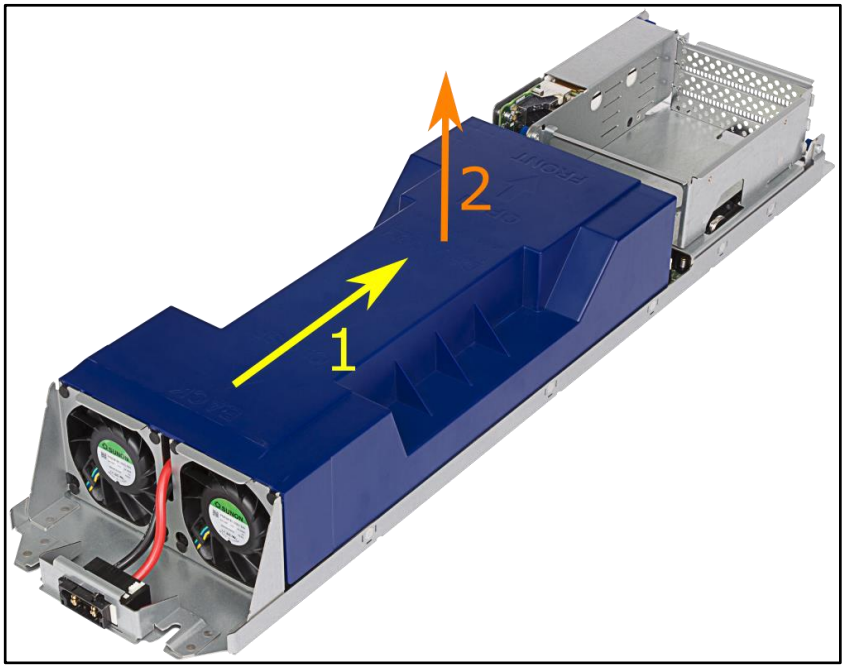

Figure 70: Air Duct removal

- To insert the air duct, pull it down with the metal guiding pins aligned to the plastic openings (step 1 and detail in Figure 71) and then move it backwards until it locks and attaches to the mechanics (step 2).

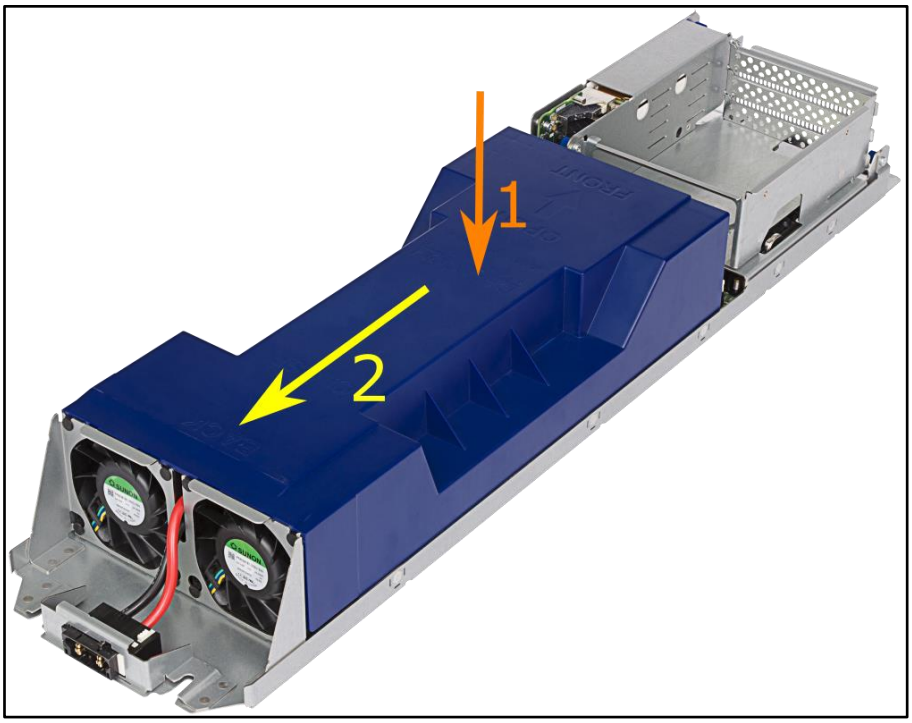

Figure 71: Inserting the air duct

5.2 DIMMs

5.2.1 General guidelines for DIMMs installation

The DM-SV01 server has 16 DIMM slots (8 per processor) which can be populated with up to 4 TB of ECC DDR4. The maximum memory speed is 3200 MT/s. The supported memory types are RDIMM, LRDIMM, 3DS and NVDIMM ECC DDR4. The system supports all available configurations for single, dual and quad rank RDIMMs, according to the AMD guidelines. The DIMM capacities are 8GB, 16GB, 32GB, 64GB, 128GB and 256GB per module. The table below lists the available options of DIMMs that can be used in the server.

DIMM Type	Ranks	Capacity	Frequency (MT/s)
RDIMM	1 (Single Rank)	8GB, 16GB or 32GB	3200
RDIMM	2 (Dual Rank)	16GB, 32GB, 64GB or 128GB	3200
LRDIMM	4 (Quad Rank)	64GB or 128GB	3200
LRDIMM	8 (Octal Rank)	128GB or 256GB	3200
3DS	4 (Quad Rank)	64GB or 128GB	3200
3DS	8 (Octal Rank)	128GB or 256GB	3200

Table 22: DIMM Types

Supported DIMM types:

- 1R and 2R RDIMM, built with x4 and x8 DDR4 devices.
- 4R and 8R LRDIMM, built with x4 DDR4 devices (4DR, 2S2R, 2S4R devices).
- 2S2R (= 4R) and 2S4R (= 8R) 3DS built with x4 DDR4 devices.

Each processor has eight memory channels, which are designated A, B, C, D, E, F, G, and H. The figure below depicts the physical memory channels distribution in the motherboard.

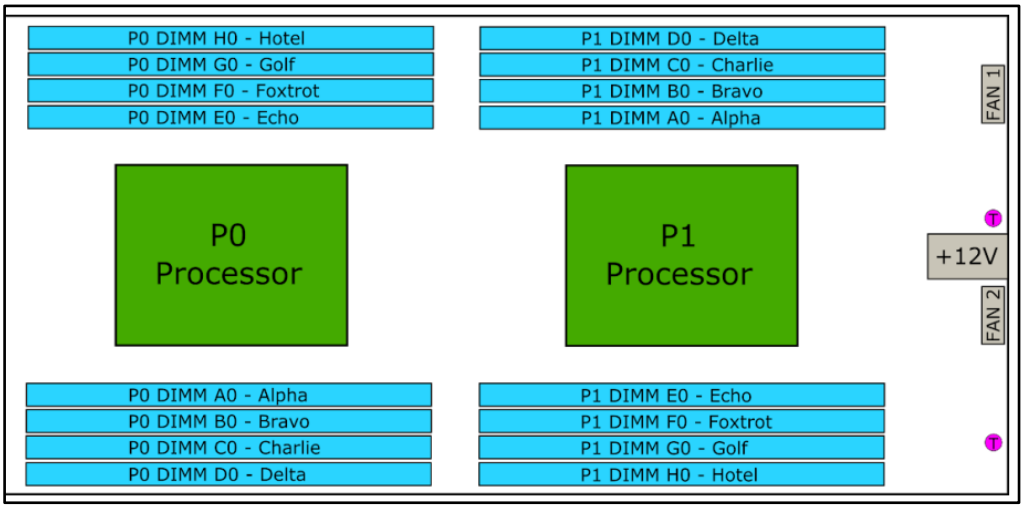

Figure 72: DIMMs location

The following DIMM population guidelines must be followed as per AMD recommendation, in order to guarantee the best performance results from the CPUs:

- Each CPU should have all the eight DIMM slots (A, B, C, D, E, F, G and H) populated.
- All DDR4 modules must have the same capacity.

If it is not possible to populate all the eight slots per processor, the user has still the following option:

- If the processors have up to 32 cores each, the user may install four DIMM modules on slots C, D, G and H. The server performance may be reduced when compared to the recommended full DIMM population condition.

Other DIMM configurations are not allowed, once they result in considerable loss of performance.

5.2.2 DIMMs installation procedure

CAUTION: care should be taken when inserting or removing DIMM modules to prevent any damage. Please refer to section “3.1 ESD Precautions” for details regarding the safe handling of DM-SV01 sub-modules.

The insertion of DIMM modules must be done by following the procedure below.

1. Holding the DDR4 module by its edges, position the module over the DIMM slot. In order to know the correct orientation of the module, refer to the central chamfer of the DDR4 module: it should be aligned with the plastic partition of the DIMM slot, as shown in the figure below.

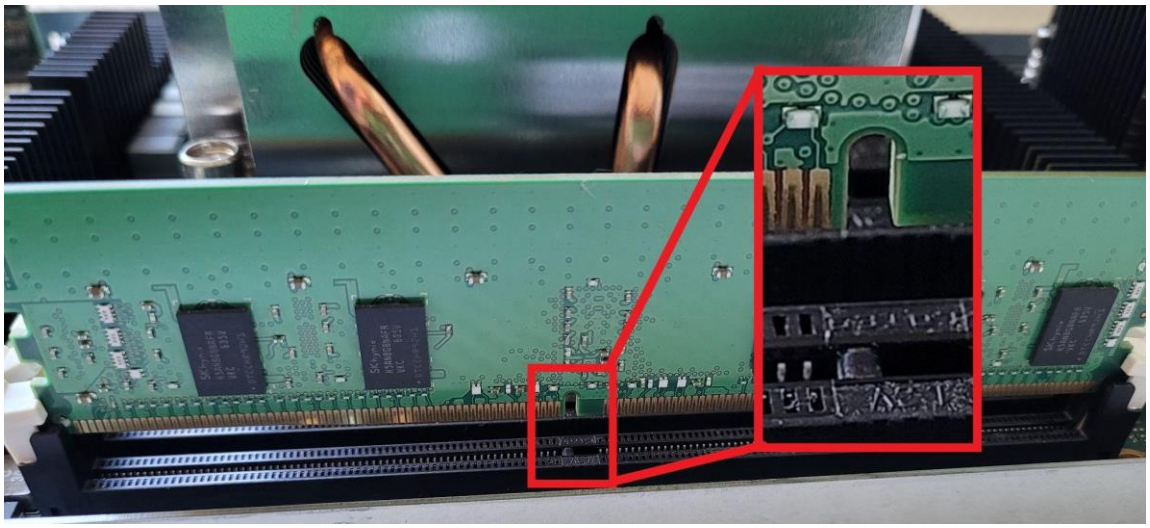

Figure 73: DDR4 positioning

2. Push the module down, pressing equally both sides until the levers of the connector move up and attach to the module's side chamfer.

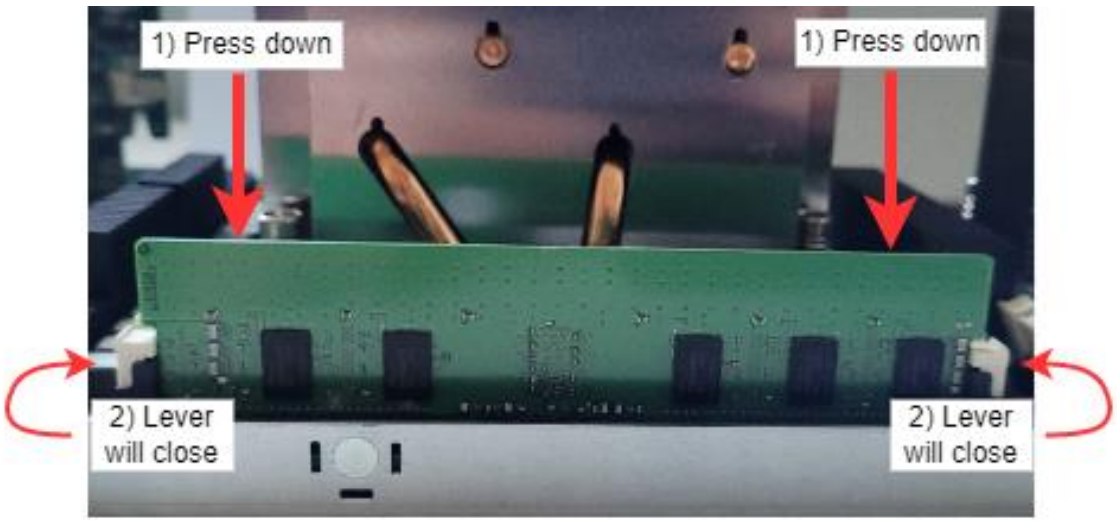

Figure 74: DIMM installation procedure

In order to remove a DDR4 module from the DIMM slot, please follow the instructions below.

1. Using your fingers, press both ejector levers in the direction away from the DIMM connector.

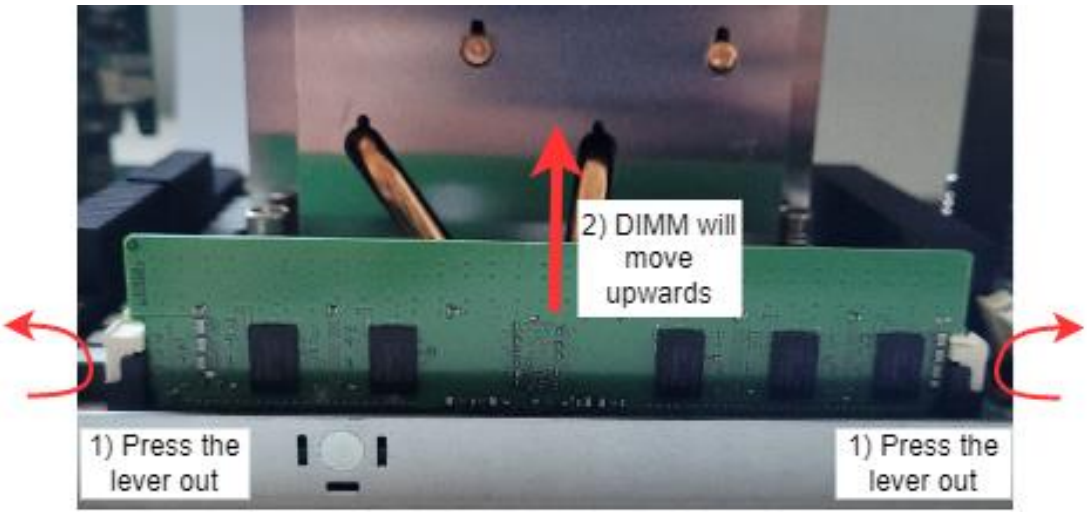

Figure 75: DIMM removal procedure

2. The DDR4 module will be automatically released and will move upwards.
3. Now, simply hold the DDR4 module by its edges and pull it away from the connector.

5.3 M.2 SSD Installation

The installation procedure for the M.2 SSD is described below.

1. insert the M.2 card into the connector using a 30° angle.

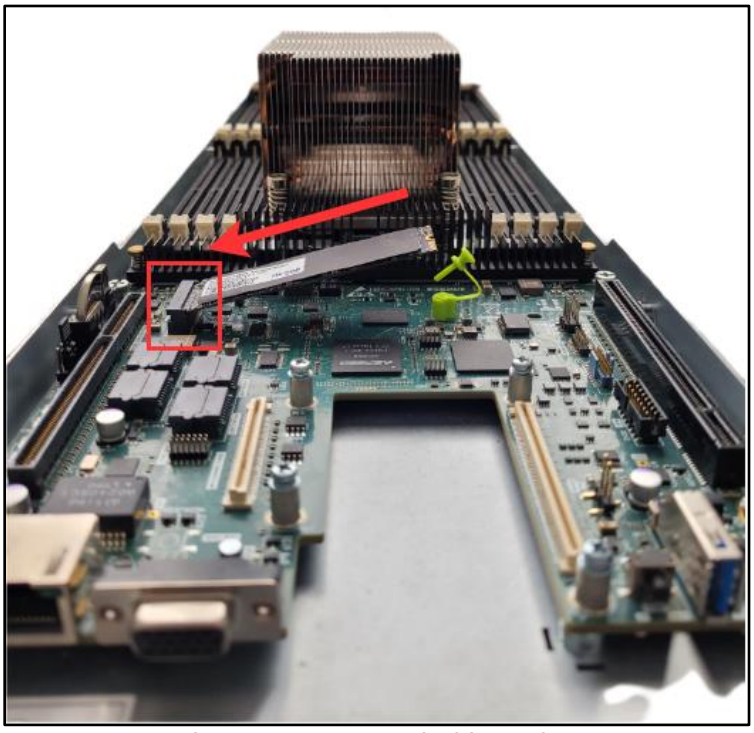

Figure 76: M.2 angled insertion

2. After the insertion, push the far end of the M.2 card down until it touches the plastic standoff and then close it.

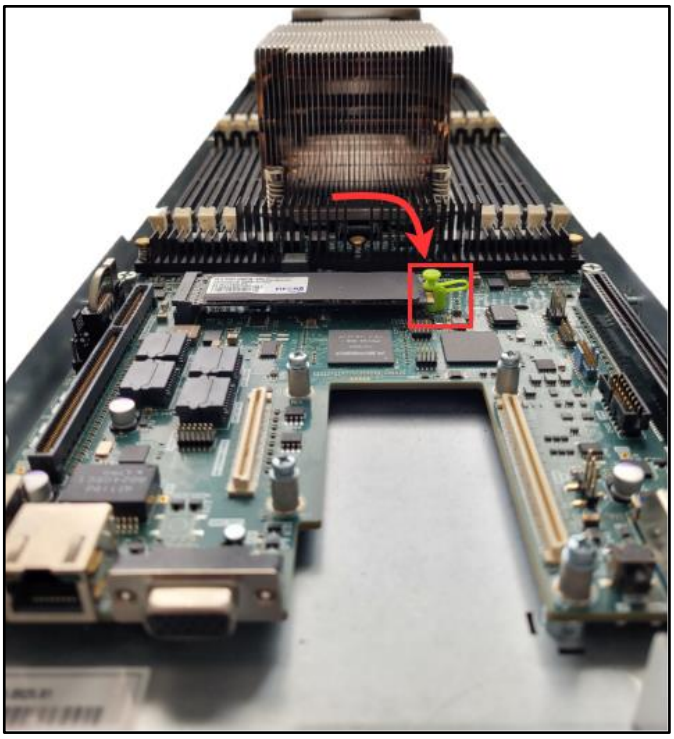

Figure 77: M.2 standoff fixing

The plastic standoff that holds the far end of the M.2 card may have its position changed in order to adapt the connection to the 2280 or 22110 form factor, as needed by the user.

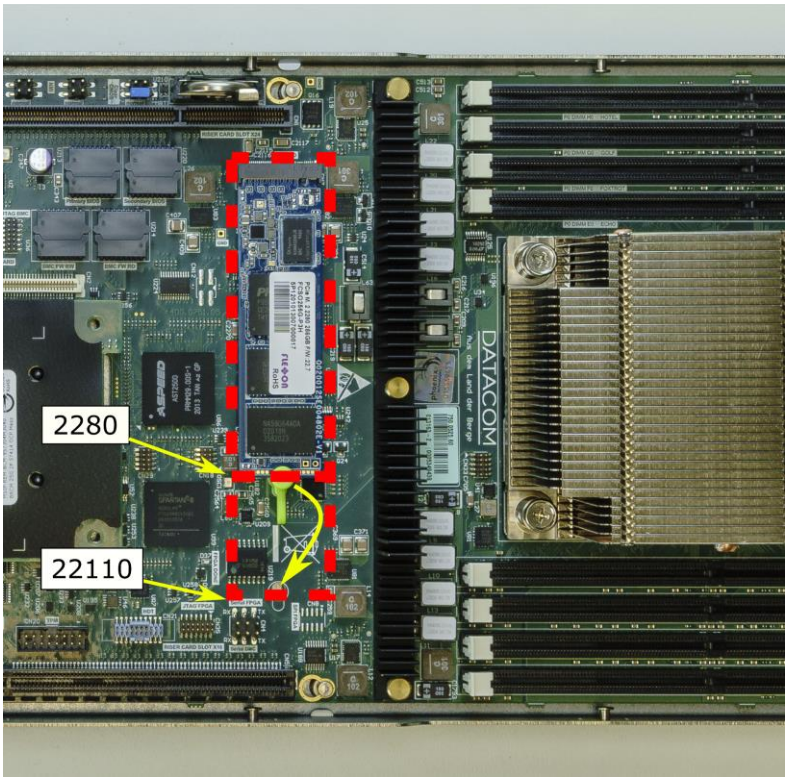

Figure 78: M.2 connector

5.4 Mezzanine Installation

The mezzanine card installation can be accomplished by following the steps below.

1. Position the Mezzanine Card according to the image below, aligning the connectors A and B and the four fixing holes.

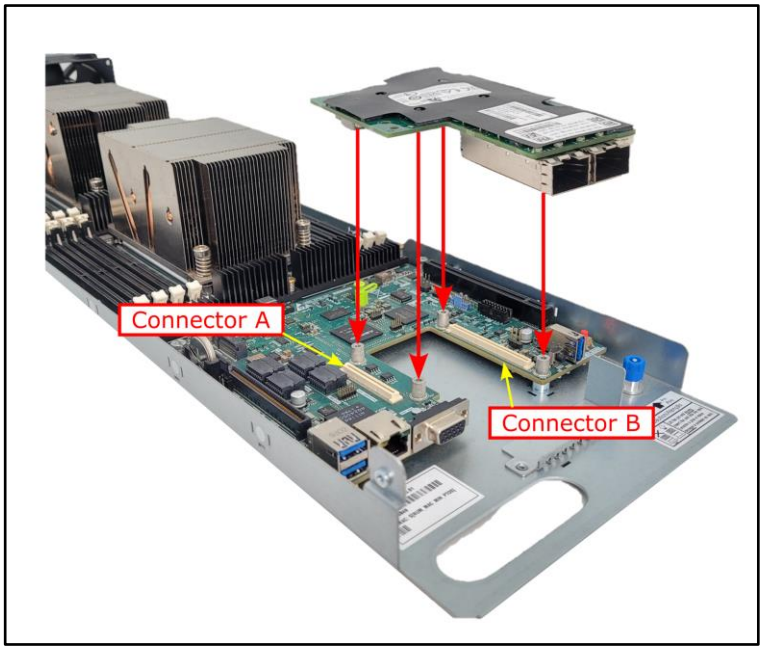

Figure 79: Mezzanine card installation

2. Press the Mezzanine Card down to attach both connectors. Some mezzanine card models may have just one connector on side B. The connection procedure is the same for this model, with the difference that only the connector B will be plugged in the motherboard.
3. Screw the four fixing screws using a screwdriver.

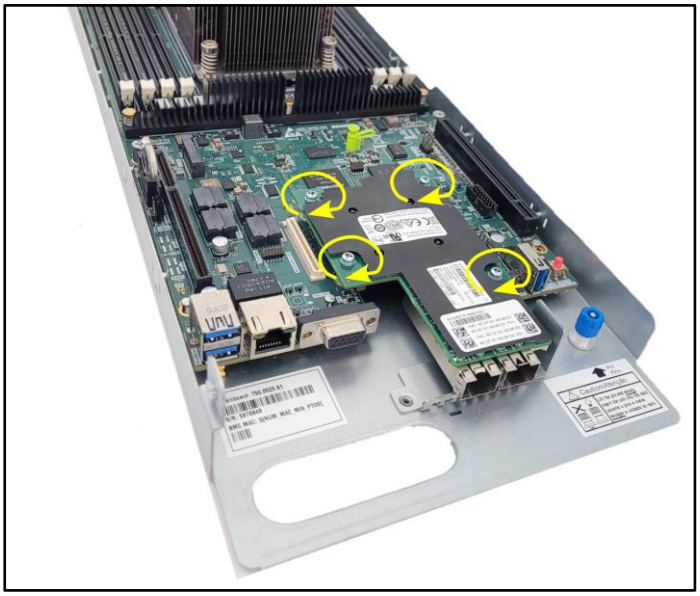

Figure 80: Mezzanine card installation - screws

5.5 Riser Cards Installation

5.5.1 Riser Cards mechanics

The procedure below must be followed for inserting the mechanics for the riser cards.

1. Position the mechanics over the motherboard as shown in the Figure 81, aligning the chamfers with the guiding pins of the baseplate (Figure 82 and Figure 83) and move it down until it fits completely.

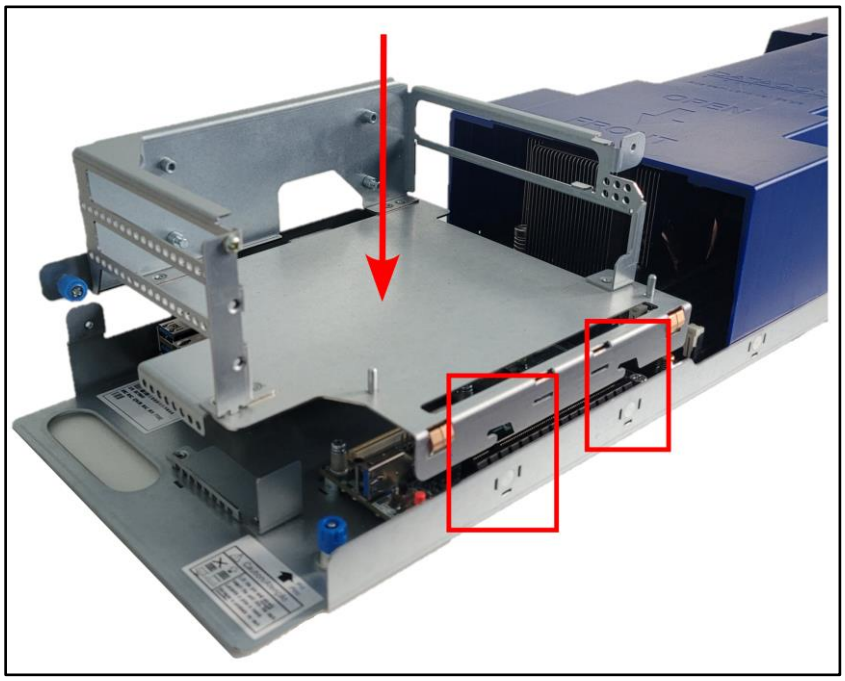

Figure 81: Positioning of the mechanics for riser cards

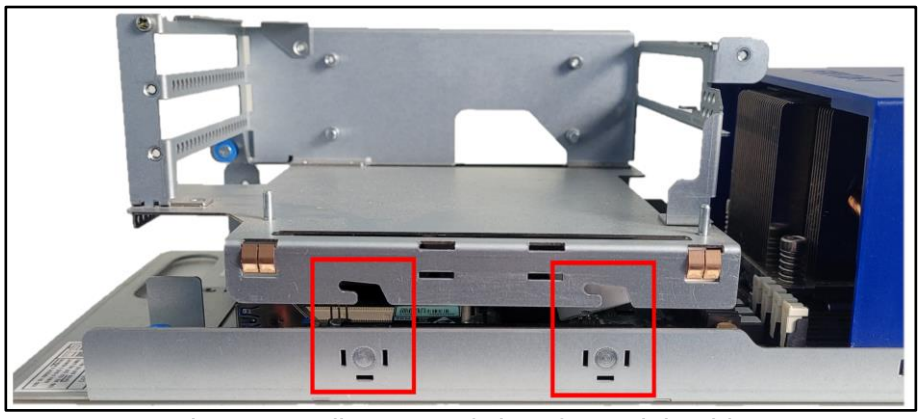

Figure 82: Alignment of chamfers - right side

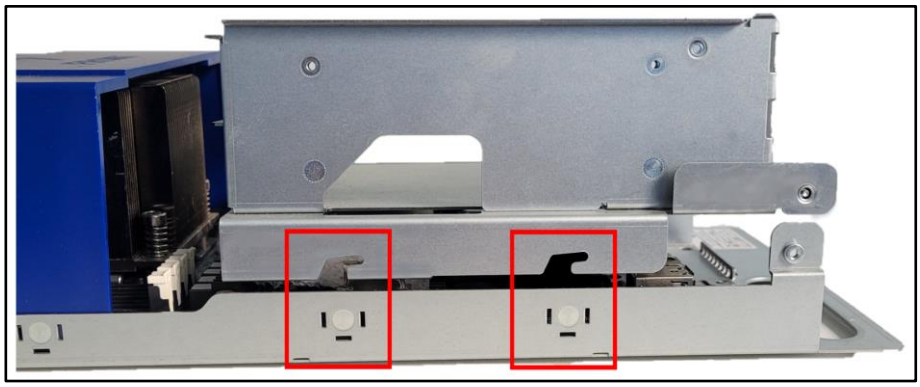

Figure 83: Alignment of chamfers - left side

2. Move the mechanics backwards to complete the fixing process and then tighten the screw manually or using a screwdriver.

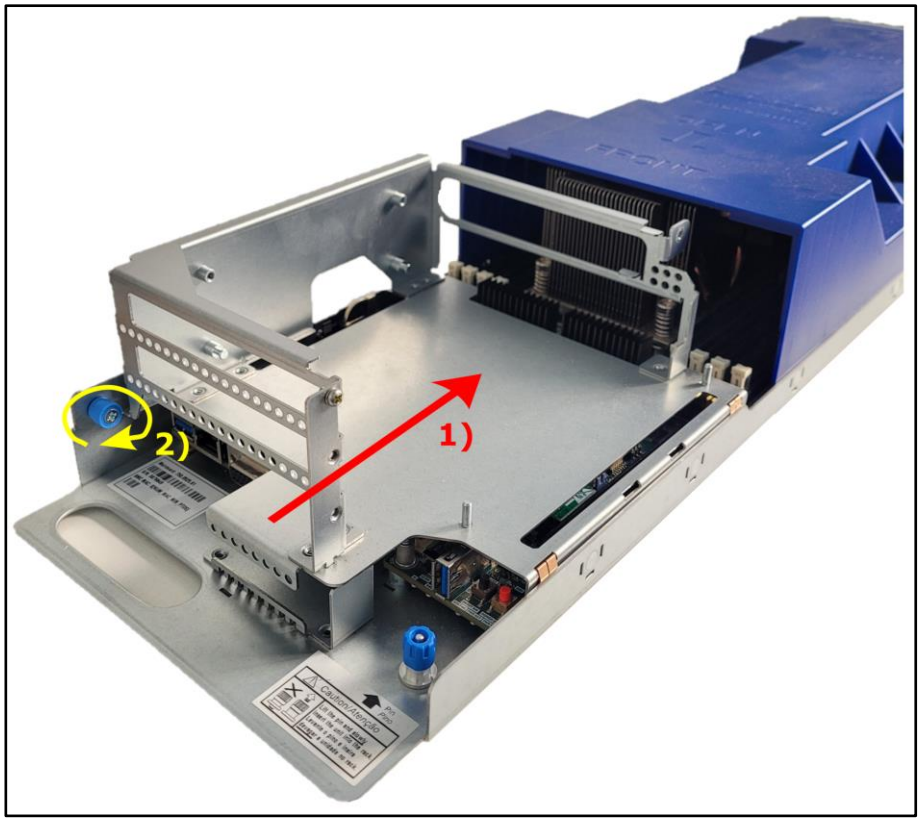

Figure 84: Riser cards mechanics installation

In order to remove the mechanics for the riser cards from the baseplate, please follow the procedure below.

1. Loosen the screw completely using a screwdriver.
2. Move the mechanics frontwards to complete the disconnecting process.
3. Pull the mechanics up to remove it completely from the baseplate.

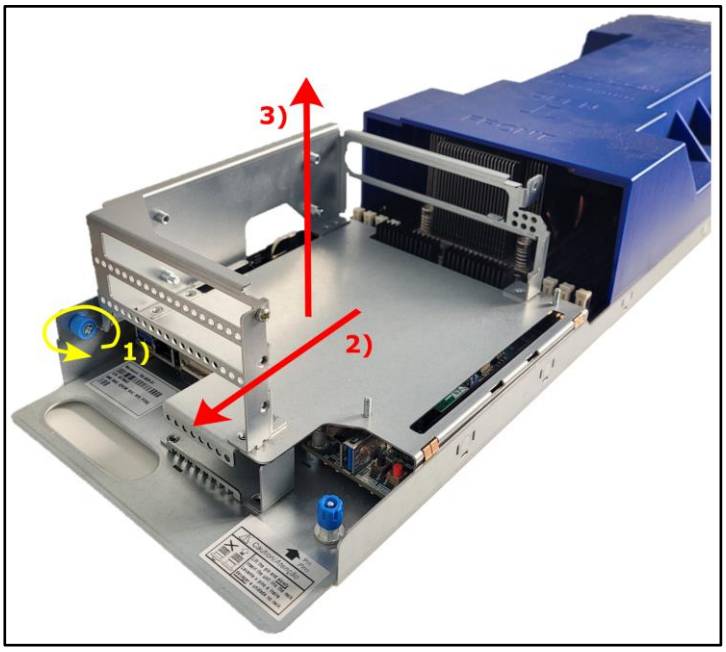

Figure 85: Riser cards mechanics removal

5.5.2 Riser Card PCIe x16+x8 or Riser Card PCIe 3x8

Follow the sequence below for installing the riser card x16+x8 or the riser card 3x8 in the DM-SV01 server. The installation process for both riser card options is identical.

Note: in order to install a riser card in the DM-SV01 server, the mechanics for the riser cards must be previously installed. Please refer to section “5.5.1 Riser Cards mechanics” for details regarding the installation of the mechanics for supporting the riser cards.

1. Completely remove power from the system (remove the DM-SV01 server from the shelf).
2. Position the riser card over the DM-SV01 server according to Figure 86.

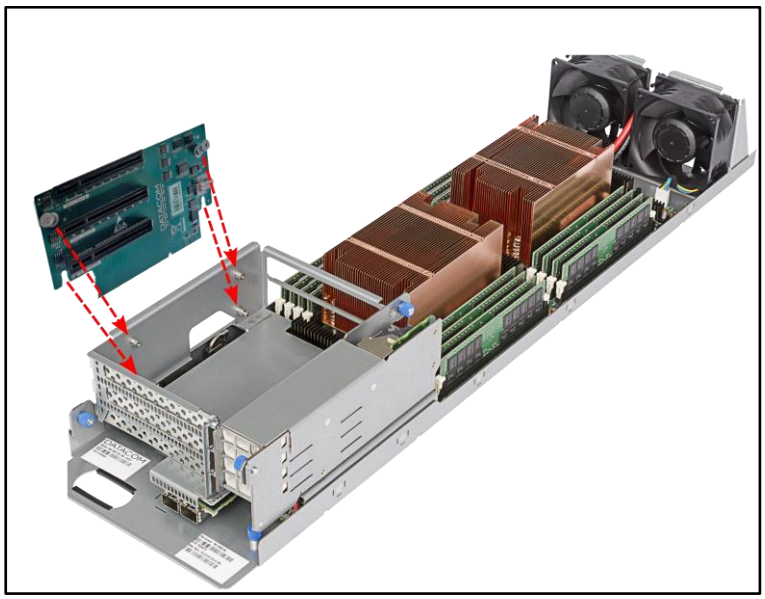

Figure 86: Riser card installation

3. Move the riser card down towards the mainboard slot connector until the riser card guiding holes are completely positioned on the fixing guide pins. Make sure that the riser card is vertically aligned when moving it down.

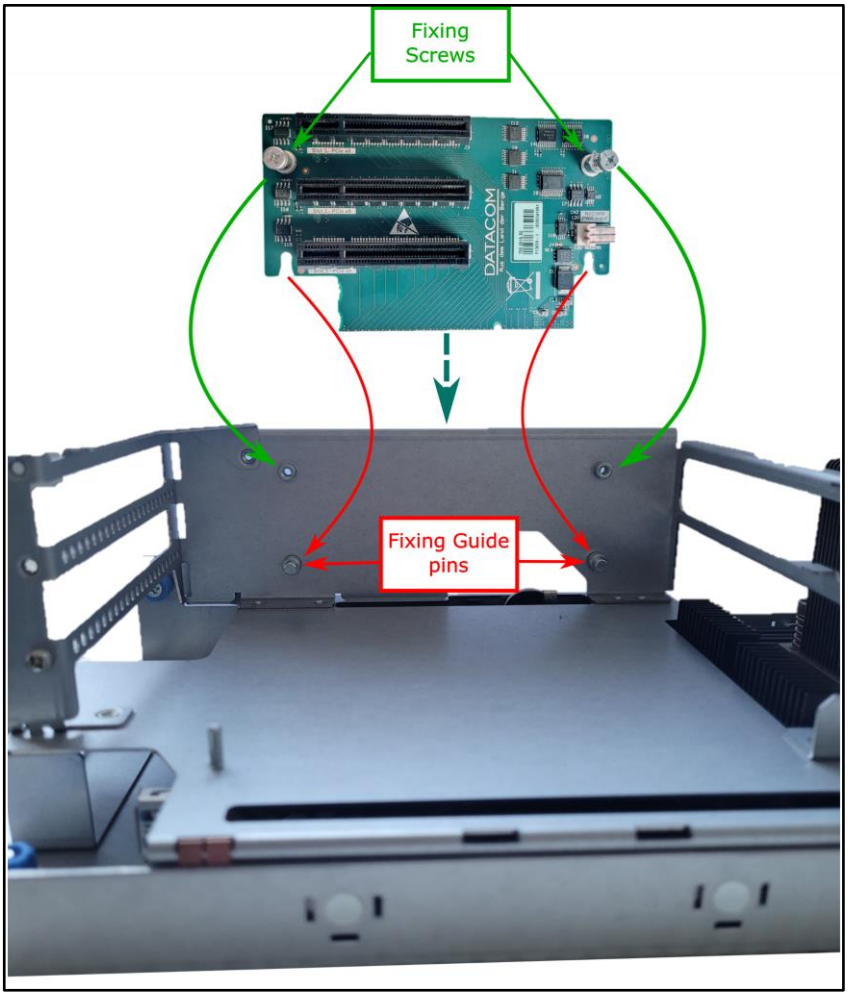

Figure 87: Riser card installation detail

4. Screw the two fixing screws using a screwdriver.

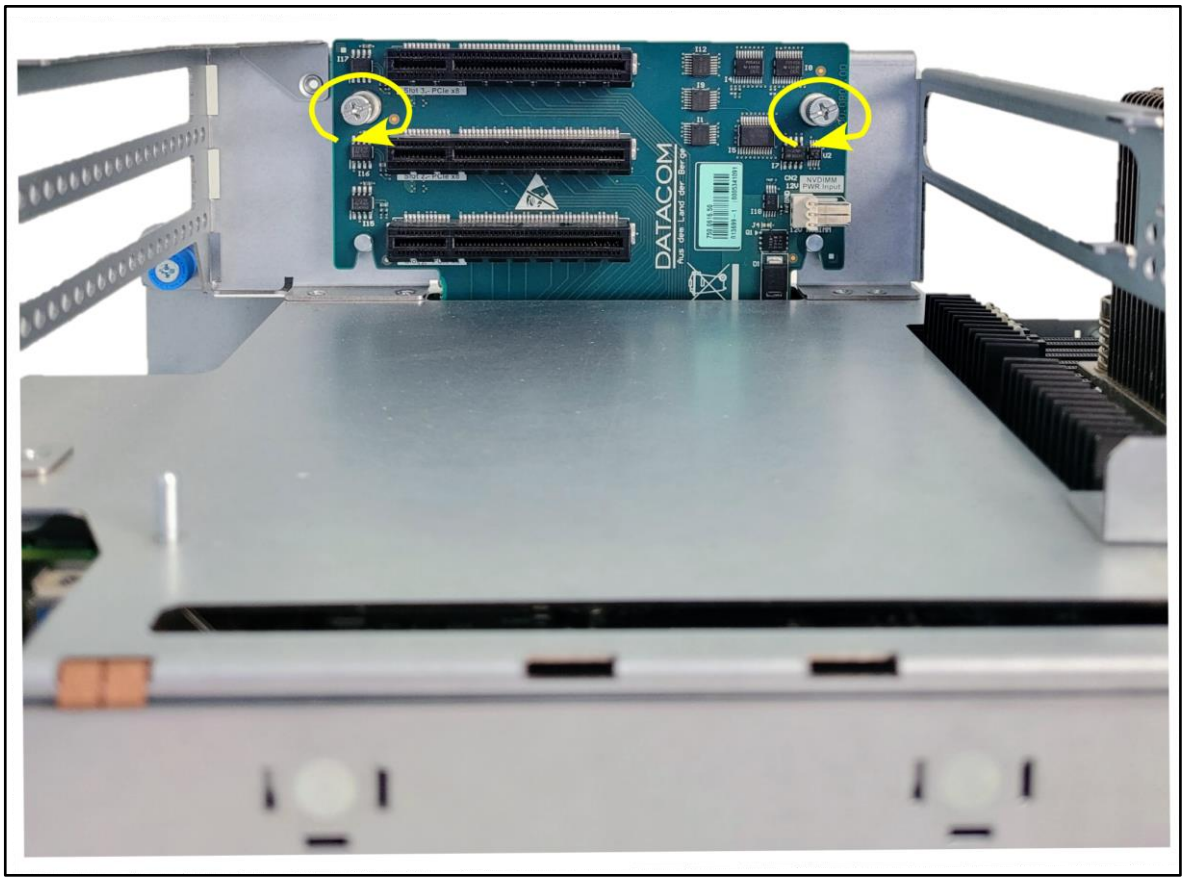

Figure 88: Riser Card Screws fixing

The procedure for removing the riser card from the slot is described below.

1. Completely remove power from the system (remove the DM-SV01 server from the shelf).
2. Unscrew the two fixing screws using a screwdriver.
3. Hold the riser card with both hands and pull it up vertically until it is completely removed from the connector.

5.5.2.1 PCIe cards installation

The following procedure must be followed for installing a standard PCIe card at any of the PCIe slots present in the Riser Card PCIe x16+x8 or in the Riser Card PCIe 3x8.

1. Insert the PCIe card in the mechanics as shown on step “1” from the Figure 89, connecting the PCIe connector in the desired riser card slot.
2. Use a screw to fix the front panel of the PCIe card to the riser cards mechanics.

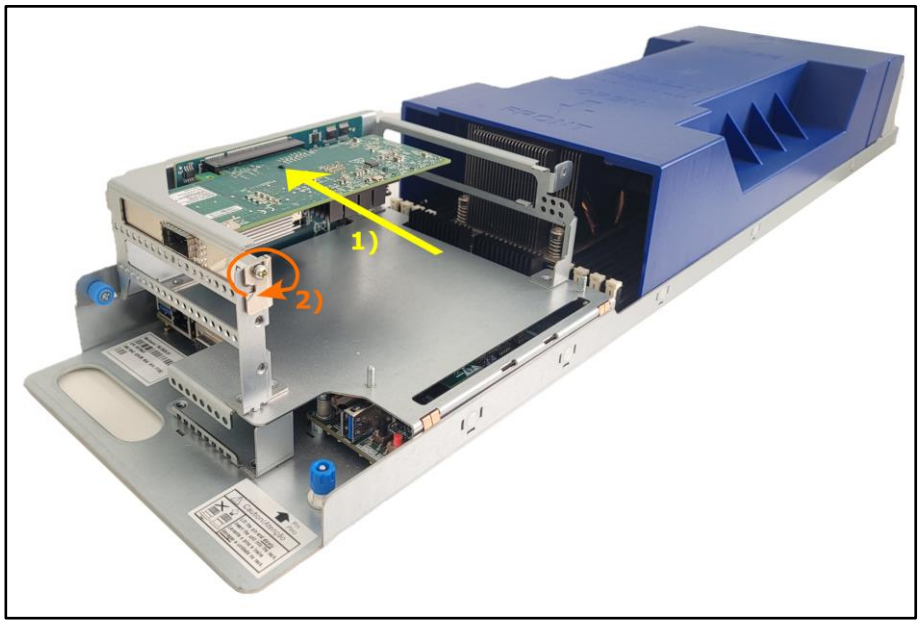

Figure 89: PCIe card installation

In order to remove a standard PCIe card from the PCIe slot of the Riser Card PCIe x16+x8 or from the Riser Card PCIe 3x8, please follow the procedure below.

1. Remove the screw that fixes the front panel of the PCIe card to the riser cards mechanics
2. Manually disconnect the PCIe connector from the riser card slot, as shown on step “2” from the Figure 90.

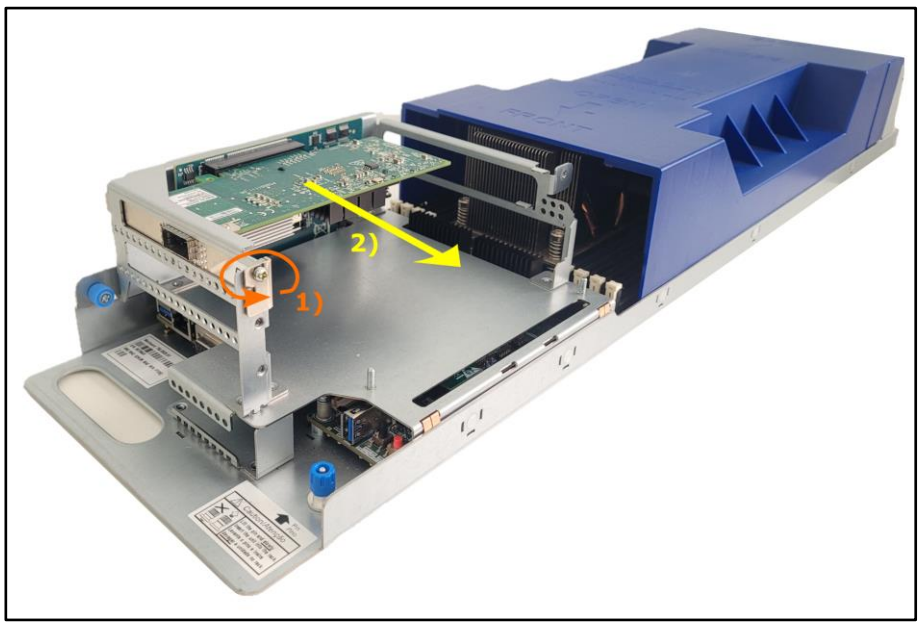

Figure 90: PCIe card removal

5.5.3 Cage E1.S installation

Follow the sequence below for installing the cage E1.S in the DM-SV01 server.

1. Completely remove power from the system (remove the DM-SV01 server from the shelf).
2. Position the cage E1.S over the DM-SV01 server according to Figure 91.
3. Move the cage E1.S down towards the mainboard slot connector until the connection is accomplished. Make sure that the cage E1.S is vertically aligned when moving it down.

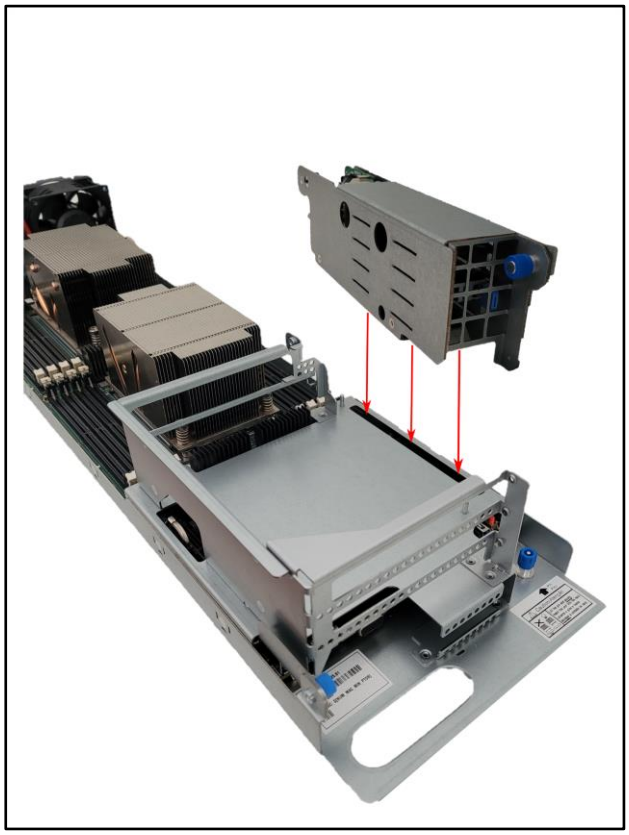

Figure 91: E1.S Cage installation

4. Screw the fixing screw as shown in Figure 92.

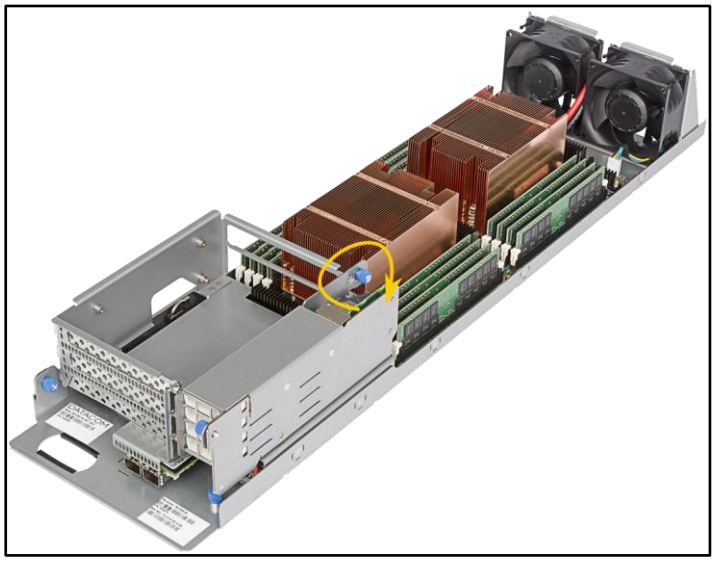

Figure 92 :E1.S Cage installation screw

The procedure for removing the cage E1.S from the slot is described below.

1. Completely remove power from the system (remove the DM-SV01 server from the shelf).
2. Unscrew the fixing screw.
3. Hold the cage E1.S and pull it up vertically until it is completely removed from the connector.

5.6 E1.S disks installation

The DM-SV01 is compatible with 5.9mm or 9.5mm thickness E1.S disks, as explained in section 2.2.12.1. The E1.S disks are fully hotplug compatible, so they can be inserted in or removed from the system whenever necessary, even if the server is powered and the OS is running.

The procedure for inserting or removing the E1.S disk is very simple and it is described hereafter. The procedure is the same for inserting an E1.S disk into both the Cage E1.S and the 2xE1.S PCIe adapter card.

For inserting an E1.S disk in the server, please refer to the procedure below.

1. Position the E1.S disk in the slot you would like to insert it.
2. Slide it all the way to the end and then push it slightly until you notice that the connection has been established.

For removing an E1.S disk in the server, please refer to the procedures below.

For disks connected to the E1.S cage Type I or to the 2xE1.S adapter card Type I:

1. Press the blue pin to the left side and hold it while pulling the disk away from the connector, in order to disconnect it from the mechanics.

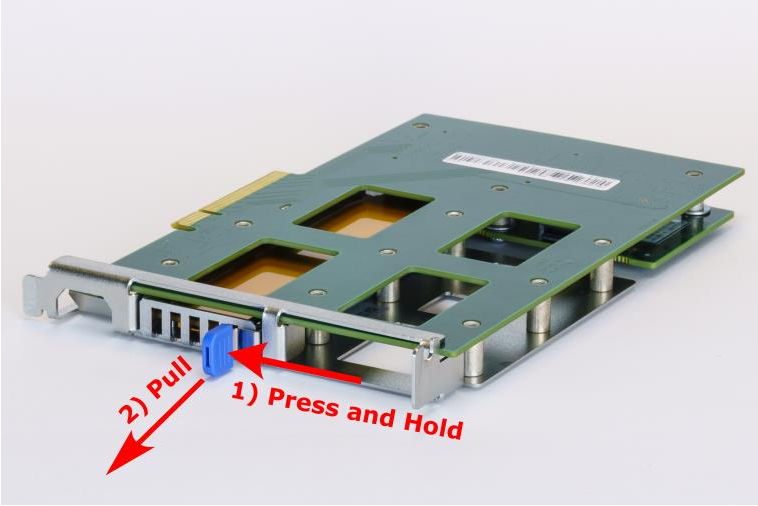

Figure 93: removing the E1.S disk from 2xE1.S adapter Type I

2. Slide the disk off the slot until it is completely removed.

For disks connected to the E1.S cage Type II or to the 2xE1.S adapter card Type II:

1. Press the blue pin down and hold it while pulling the disk away from the connector, in order to disconnect it from the mechanics.

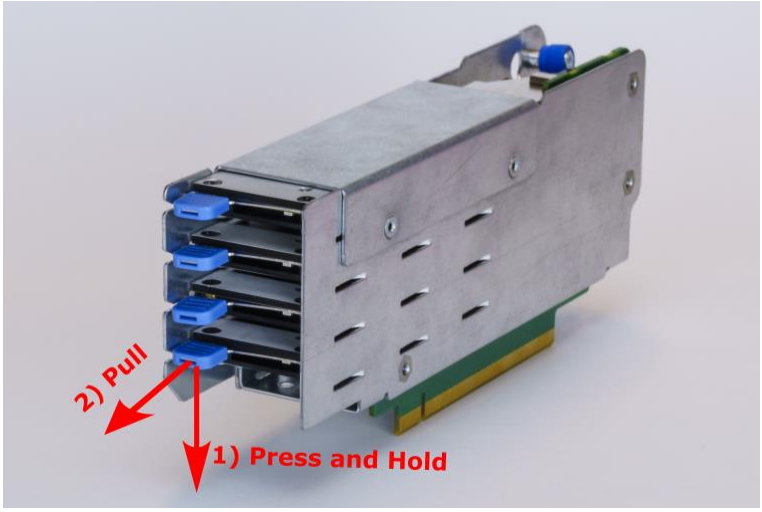

Figure 94: removing the E1.S disk from 2xE1.S adapter Type II

2. Slide the disk off the slot until it is completely removed.

5.7 Fans installation

Follow the sequence below for replacing the fans of the DM-SV01 server.

- Completely remove power from the system (remove the DM-SV01 server from the shelf).
- Remove the air duct as explained in section “5.1 Air Duct”.
- Disconnect the fan connector by pulling it up (caution: disconnect the fan by holding the white connector; do not remove the fan by holding the connector wires as it may cause damage to the fan cable).

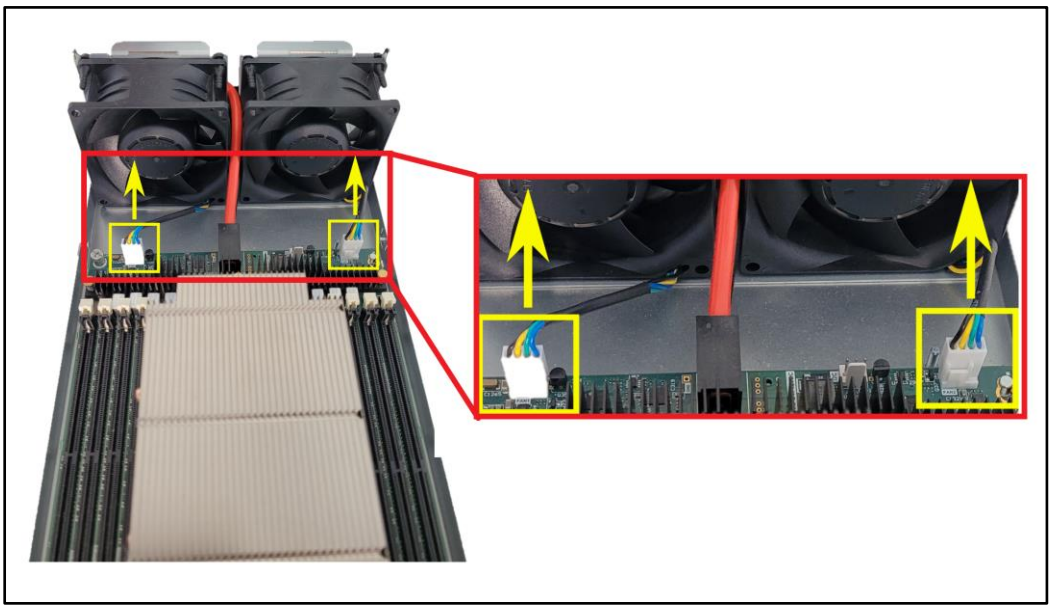

Figure 95: Disconnection of fan connector

- Hold the fan and pull it up until the fixing rubbers are released from the mechanics (step 1) and then move it back until it is completely removed (step 2).

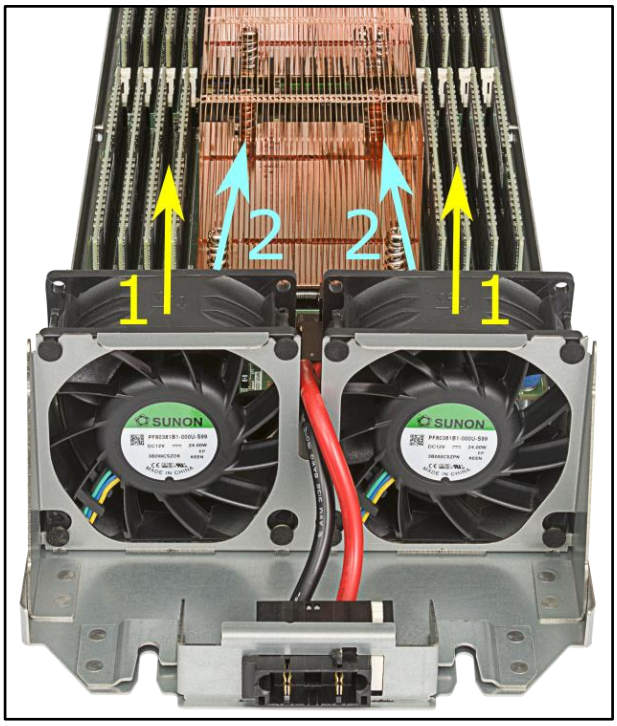

Figure 96: fan removal

- Insert the replacing fan into the mechanics, aligning the four fixing rubbers to the respective holes (step 1) and then move the fan down until the fixing rubbers are well attached (step 2).

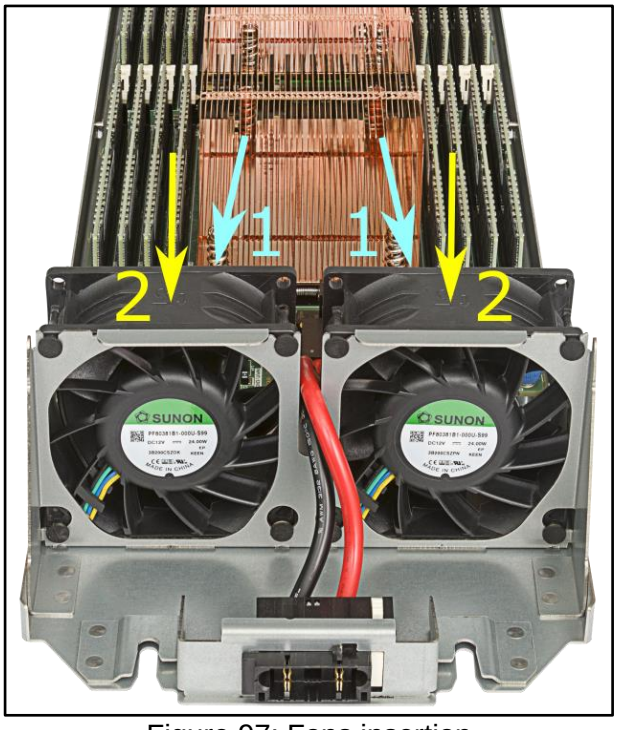

Figure 97: Fans insertion

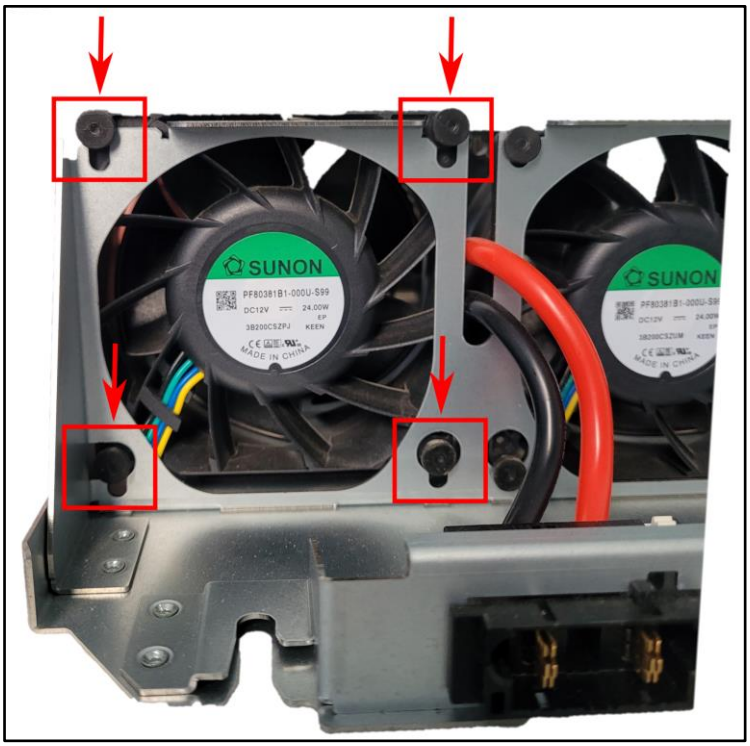

Figure 98: Fans rubbers alignment detail

- Insert the fan connector into the motherboard. Please pay attention to the mechanical polarization of the connector, which defines the right side of the connection.

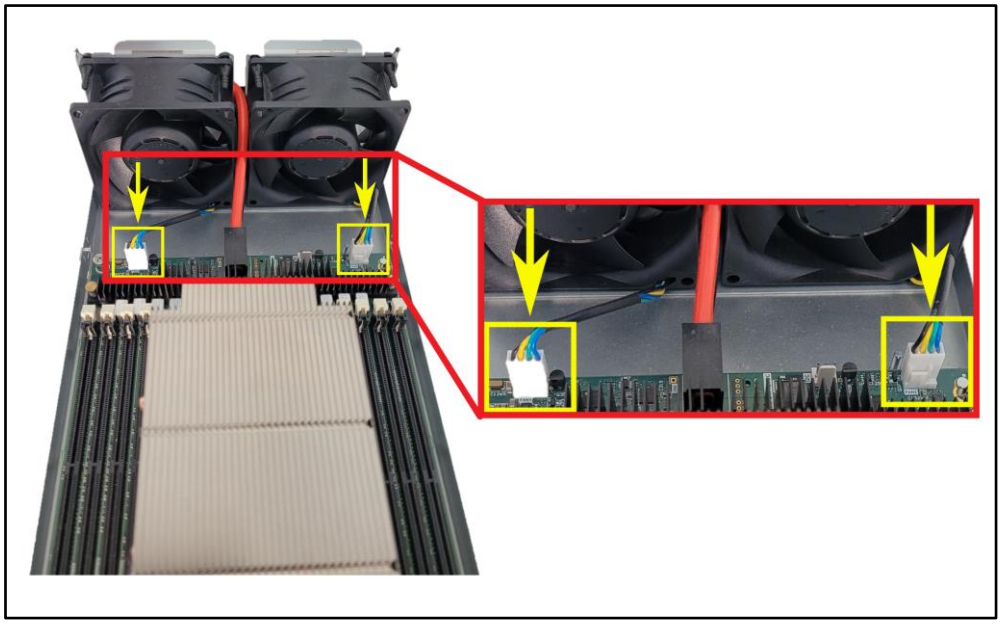

Figure 99: Inserting the fan connector

- Insert the air duct as explained in section 5.1 Air Duct.
- Insert DM-SV01 back into the shelf so it is powered on again.

5.8 Battery and Clear CMOS

The DM-SV01 server uses a non-volatile memory for keeping system configuration (CMOS data) when power is removed. This memory is powered by an onboard lithium CR2032 battery.

The CMOS data can be cleared when necessary (clear CMOS process), causing the FW settings to go back to its default state.

5.8.1 Clear CMOS procedure

1. Completely remove power from the system (remove the DM-SV01 server from the shelf).
2. Remove the mechanics from riser cards and cage E1.S in order to have access to the CMOS jumper.
3. Remove the jumper from the “Normal” position and place it in the “CLEAR CMOS” position (please see Figure 100). Wait for approximately 10 seconds.
4. Remove the jumper from the “CLEAR CMOS” position and place it back in the “Normal” position (please see Figure 100). **Warning: The non completion of this step will cause the host processor to hang at the boot phase.**
5. Assembly back the mechanics of the riser cards and cage E1.S.
6. Insert the DM-SV01 server back into the shelf so it is powered on again.

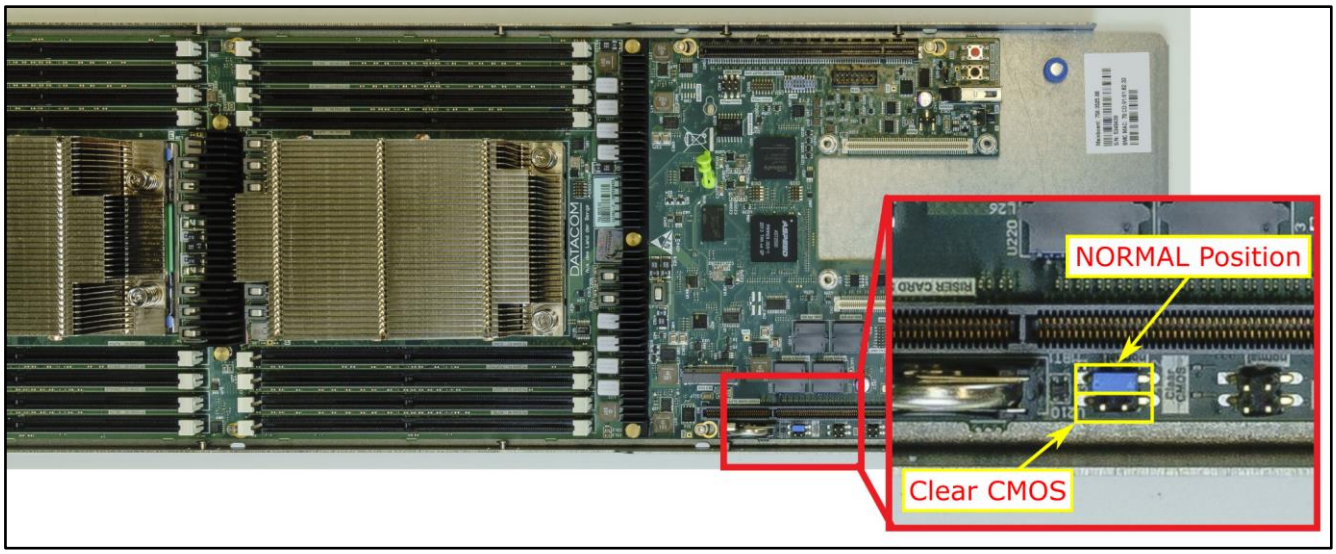

Figure 100: Clear CMOS

CMOS Jumper position	
Normal	Default Setting: CMOS data is unchanged.
Clear CMOS	Clears CMOS data.

Table 23: Clear CMOS

5.8.2 Replacing the CMOS Battery

The procedure below must be followed to remove the CMOS battery.

1. Completely remove power from the system (removing the DM-SV01 server from the shelf).

2. Remove the mechanics from riser cards and cage E1.S in order to have access to the CMOS jumper.
3. Push aside the small clamp that keeps the battery in the holder (step 1).
4. Completely remove the battery from the holder (step 2).

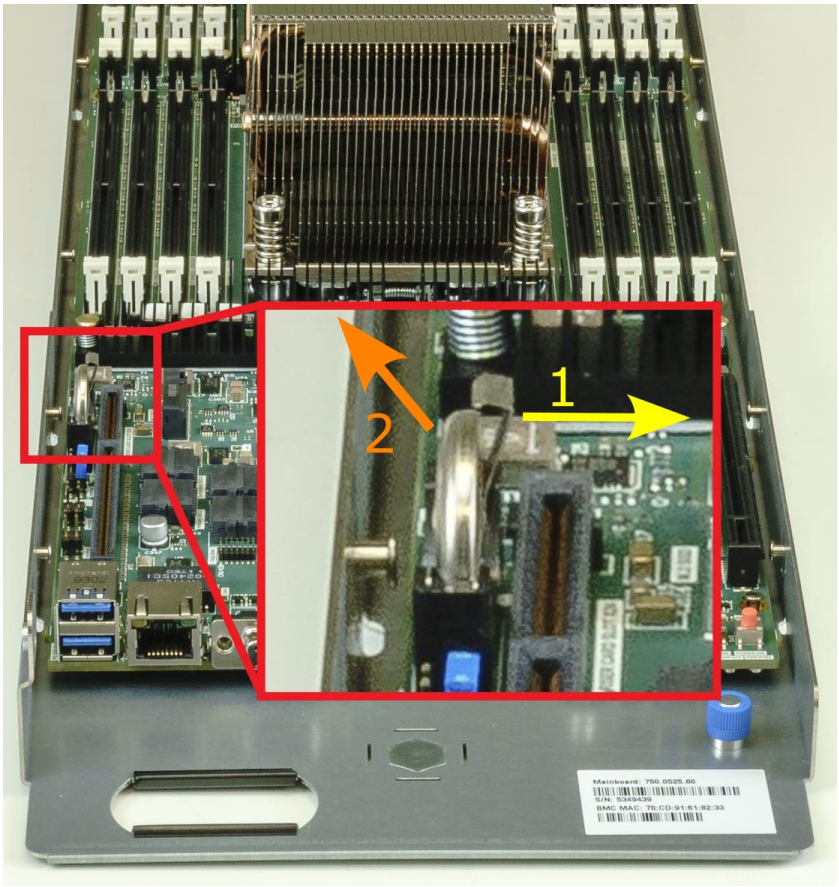

Figure 101: Battery removal

In order to insert the CMOS battery, please follow the instructions below.

1. Insert the CR2032 battery in the holder, with the positive (+) terminal facing the inner side of the server, until it is locked inside the holder.
2. Assembly back the mechanics of the riser cards and cage E1.S.
3. Insert the DM-SV01 server back into the shelf so it is powered on again.

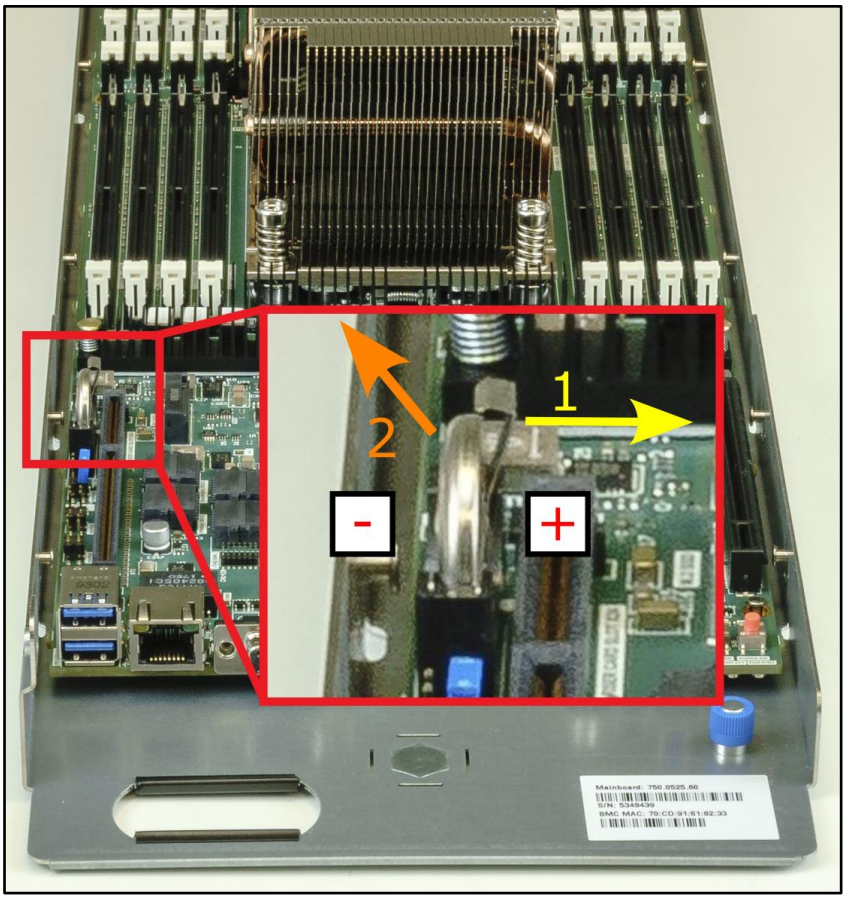

Figure 102: Battery insertion

Note: Do not discard any battery in the common garbage. Please comply with the regulations defined by your local hazardous waste management agency to properly dispose your battery.

Warning: **There is a danger of explosion if the onboard battery is installed with reversed polarity.**

This battery must be replaced only by an equivalent type (CR2032). Please consult the Datacom support team if you have any doubt about the battery specifications.

5.9 TPM installation

The procedure to insert and remove the TPM module is pretty straightforward. The user just needs to locate the TPM connector in the motherboard (as shown in the Figure 103), align the connectors and manually insert or remove the TPM module as shown in the Figure 104.

Figure 103: TPM module location

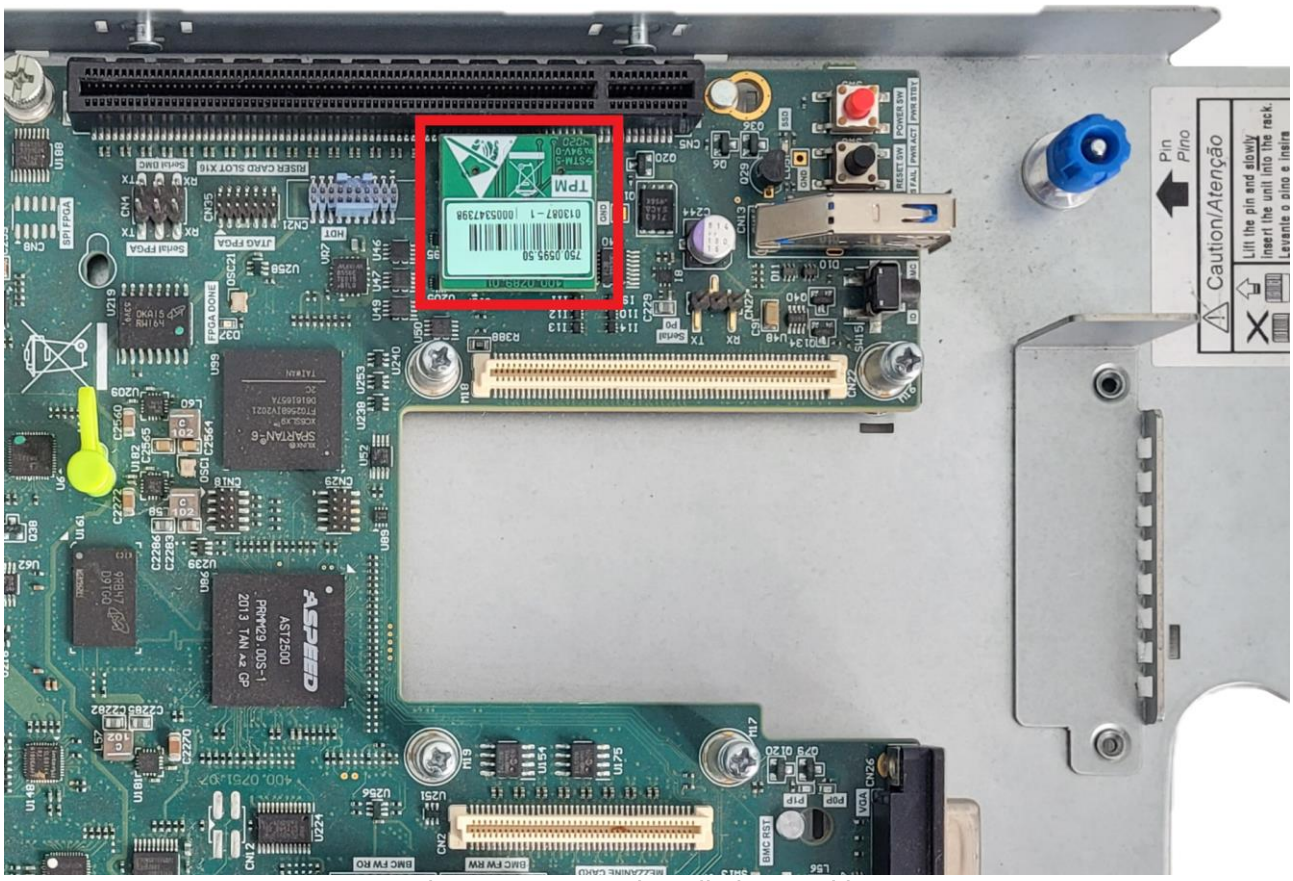

Figure 104: TPM installation position

5.10 Motherboard installation

The DM-SV01 motherboard can be inserted or removed from the baseplate if needed. The procedure for inserting the motherboard in the baseplate is described below.

1. Position the motherboard over the baseplate, aligning the holes present in the border of the board with the guiding pins of the baseplate, and move it down until it fits completely (step 1 on Figure 105).

2. Move the motherboard frontwards to complete the fixing process (step 2 on Figure 105) and then tighten the three screws completely using a screwdriver (step 3 on Figure 105).
3. Insert the FANs using the procedure described in section “5.7 Fans installation”.

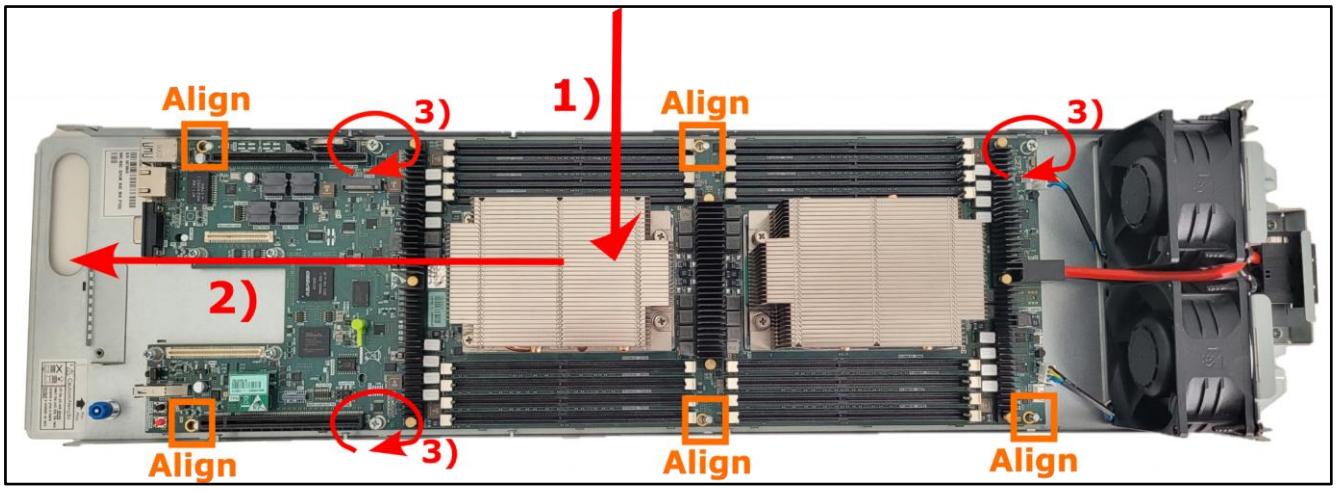

Figure 105: Motherboard installation

In order to remove the motherboard from the baseplate, the procedure below must be followed.

1. Loosen the screws completely using a screwdriver.
2. Move the motherboard backwards to complete the disconnecting process.
3. Pull the motherboard up to remove it completely from the baseplate.

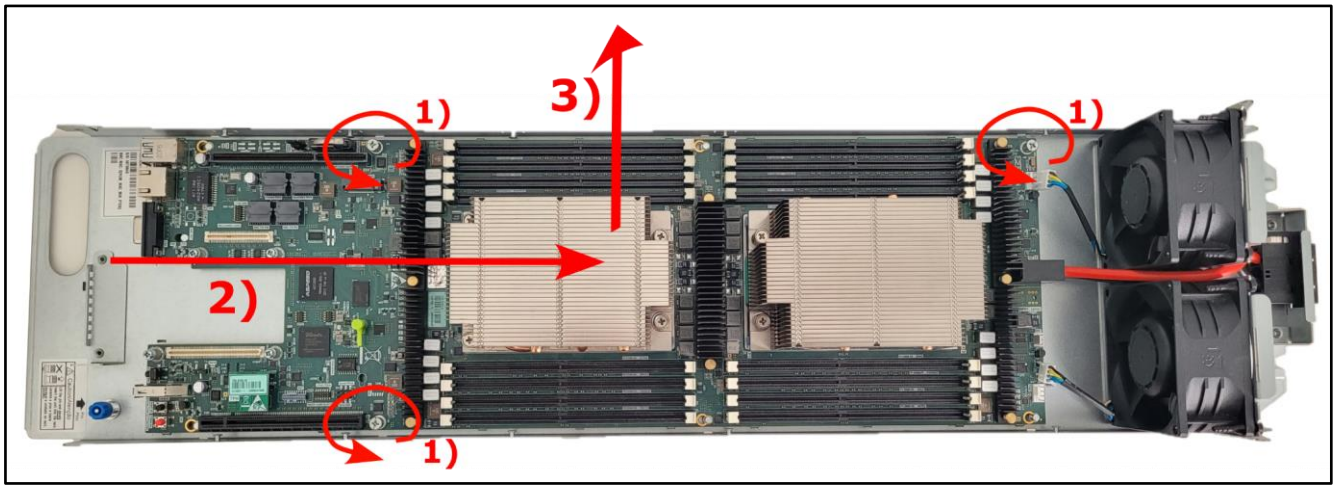

Figure 106: Motherboard removal

6 External disaggregated systems

6.1 Storage solutions - JBOD + HBA card

For applications requiring massive amounts of storage, a common approach is to use external disk units known as JBODs (Just a Bunch Of Disks). They are enclosures with SAS interfaces and expanders that allow the connection of external disks to one or more servers. On the DM-SV01 an HBA PCIe card is required and the connection to JBODs is made via mini SAS cables (SFF-8644).

For 19” racks, there are options of JBODs from 24 to 108 disks. For OCP racks, the JBODs offer room for 72 disks.

With this kind of solution, the life cycle of storage solutions is not tied to server upgrades. JBODs are a mature and stable technology that does not advance at the same pace as servers. Unlike equipment where storage is located inside servers, your investment in JBODs will not be discarded in the next server evolution cycle.

The usual configuration for JBODs and servers is to connect each JBOD to two or more servers and the head end servers to two or more JBODs, illustrated in the diagram below.

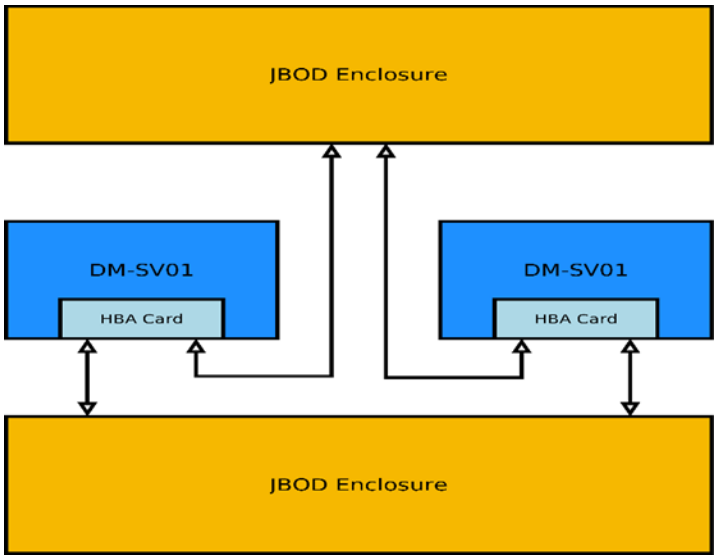

Figure 107: JBOD Configuration using DM-SV01 server

6.2 JBOF + PCIe retimer card + cables

A solution very similar to JBODs is a JBOF (Just a Bunch Of Flashes), which uses Flash based NVMe SSDs. In this case, the connection between DM-SV01 and the JBOFs is done with PCIe interface extenders and coaxial copper cables, the same ones used for external SAS connections for JBODs. On the DM-SV01 side, a PCIe retimer card is required.

There are JBOFs for installation in OCP racks or in 19” racks.

6.3 GPU units

For HPC, deep learning or inference applications where a high number of GPU cards is required, an external unit for GPU cards offers all the advantages of a disaggregated solution.

Those units are connected to the DM-SV01 through PCIe interface extenders and coaxial copper cables, the same used for external SAS connections for JBODs. On the DM-SV01 side, a PCIe retimer card is required.

They are available for installation in OCP racks or in 19” racks.

7 References

(1) “DM-SV01 Server - BMC User Manual”

(2) “DM-SV01 Server - BIOS User Manual”

(3) “DM-SV01 - Technical File CE Marking”

8 Annex A - DM-SV01 Ecodesign Specifications

8.1 A.1. Low-End Configuration

The DM-SV01 low-end configuration model P1x7282-R2x32-N2VS-256-RC3-NA-NA-HBA-NA ecodesign specifications are defined in the table below.

Specification	Value
Idle State Power	78,5W
Idle State Power at Maximum Temperature	108W
Maximum power	163,92W
Efficiency Score	43,8
Performance Score	9,83

Table 24: DM-SV01 low-end configuration specification

Item	Quantity	Description	Power (W)
Base value	-	Motherboard base value	+40W
CPU additional power	7,627	# of transactions per unit of time	+76,27W
PSU additional power	1	# of redundant PSU in DM1904	+10W
SSD additional power	1	# of installed SSDs	+5W
Memory additional power	124	# of GB of memory installed greater than 4GB	+22,32W
Additional I/O devices	0	# additional I/O devices	+0W
		Total	**153,59W**

Table 25: DM-SV01 low-end configuration additional idle power allowances

8.2 A.2. High-End Configuration

The DM-SV01 high-end configuration model 2x7542-R16x64-N1CX-256-RC3-S1CB-S2CB-S3CB-10xE1.S4T ecodesign specifications defined in the table below.

Specification	Value
Idle State Power	152,0
Idle State Power at Maximum Temperature	183,1W
Maximum power	675W
Efficiency Score	62,2
Performance Score	50,53

Table 26: DM-SV01 high-end configuration specification

Item	Quantity	Description	Power (W)
Base value	-	Motherboard base value	+40W
CPU additional power	33,096	# of transactions per unit of time	+231,67W
PSU additional power	1	# of redundant PSU in DM1904	+10W
SSD additional power	3	# of installed SSDs	+15W
Memory additional power	1020	# of GB of memory installed greater than 4GB	+183,6W
Additional I/O devices	0	# additional I/O devices	+0W
		Total	**480,27W**

Table 27: DM-SV01 high-end configuration additional idle power allowances

8.3 A.3. Operating Condition Classification

The operating condition of DM-SV01 is classified as an A3 type, as shown in the figure below.

Operating condition classes

	Dry bulb temp °C		Humidity range, non-condensing			
Operating condition class	Allowable range	Recom-mended range	Allowable range	Recommended range	Max dew point (°C)	Maximum rate of change (°C/hr)
A1	15- 32	18-27	– 12 °C Dew Point (DP) and 8 % relative humidity (RH) to 17 °C DP and 80 % RH	– 9 °C DP to 15 °C DP and 60 % RH	17	5/20
A2	10-35	18-27	– 12 °C DP and 8 % RH to 21 °C DP and 80 % RH	Same as A1	21	5/20
A3	5-40	18-27	– 12 °C DP and 8 % RH to 24 °C DP and 85 % RH	Same as A1	24	5/20
A4	5-45	18-27	– 12 °C DP and 8 % RH to 24 °C DP and 90 % RH	Same as A1	24	5/20

Figure 108: DM-SV01 operating condition classification

9 Annex B - SSD Secure Data Deletion

This section describes the usage of the nvme-cli (NVMe management command line interface) tool to erase the data from SSDs installed on the DM-SV01.

There are two operations that can be performed to securely delete data from an NVMe SSD, which are format and sanitize.

The sanitize option is more robust for ensuring the data was properly wiped out, since it also deletes the cache and also ensures that the process will continue even after an interruption such as a reboot operation. Sanitize also supports a pattern overwrite for a secure erase operation, which is harmful for NAND endurance but can be used with other types of storage and memory classes, or for ensuring that user data cannot be recovered.

The format option, on the other hand, is good for everyday use and testing and it is usually much faster than sanitize operation.

9.1 B.1. Format

The nvme format can be achieved by the following command on the operating system with nvme-cli installed:

```
nvme format <device> --ses=[option]
```

Where the ses parameter is defined as follows:

Value	Definition
0	No secure erase operation requested
1	User Data Erase: All user data shall be erased, contents of the user data after the erase is indeterminate (e.g., the user data may be zero filled, one filled, etc). The controller may perform a cryptographic erase when a User Data Erase is requested if all user data is encrypted.
2	Cryptographic Erase: All user data shall be erased cryptographically. This is accomplished by deleting the encryption key.
3–7	Reserved

Table 28: nvme format command options

As an example, “nvme format /dev/nvme0 --ses=2” would erase the disk labeled as “nvme0” with cryptographic erase. In order to use the Cryptographic Erase option, the drive must support cryptographic erase.

9.2 B.2. Sanitize

The nvme sanitize can be achieved by means of the following command on the operating system with nvme-cli installed:

```
nvme sanitize -a [option] <device>
```

Where the a parameter is defined as follows:

-a <action>::
Sanitize Action:
0 - Reserved
1 - Exit Failure Mode
2- Start a Block Erase sanitize operation
3 - Start an Overwrite sanitize operation
4 - Start a Crypto Erase sanitize operation

As an example, “nvme sanitize /dev/nvme0n1 -a 2” would sanitize the disk labeled as “nvme0n1”.

10 Annex C - Buttons and LEDs

This section describes the functions and behaviors of the DM-SV01 buttons and LEDs.

The buttons present in the DM-SV01 server are shown in the images below.

Figure 109: DM-SV01 buttons location - top view

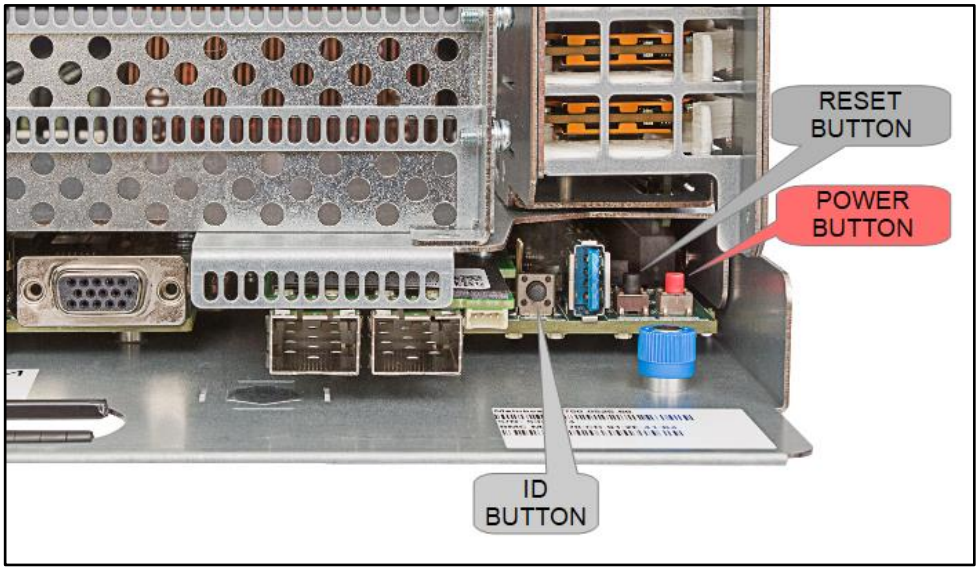

Figure 110: DM-SV01 buttons - front view

The buttons of the DM-SV01 server are listed in the table below.

Button	Function	Prerequisites	Action required	Server response
Power Button	Power the host processors ON (Standby to Active mode).	Host processors are powered down.	Press the power button shortly.	The PWR_ACT LED will turn on in GREEN color, indicating that the host

				processor completed the power on process.
	Power the host processors OFF Orderly Mode (Active to Standby mode).	Host processors are powered up.	Press the power button shortly.	The OS will trigger a controlled shutdown process. After the shutdown is complete, the PWR_ACT LED will turn off, indicating that the host processor is in Standby mode.
	Power the host processors OFF Immediate Mode (Active to Standby mode).	Host processors are powered up.	Press the power button and hold it pressed for more than 4 seconds.	The host processor is forced to shutdown independent of the OS control. After the shutdown is complete, the PWR_ACT LED will turn off, indicating that the host processor is in Standby mode.
Reset Button	Reset the host processors.	Host processors are powered up.	Press the reset button shortly.	The PWR_ACT LED will turn RED while pressing the RESET button and after releasing the button, the PWR_ACT LED turns GREEN.
Unit ID Button	Turn on the ID feature.	The ID feature is disabled.	Press the ID button shortly.	The ID LED will start blinking (GREEN). A Redfish event will be triggered to the management system to indicate that the ID flag is ON.
	Turn off the ID feature.	The ID feature is enabled.	Press the ID button shortly.	The ID LED will turn OFF. A Redfish event will be triggered to the management system to indicate that the ID flag is OFF.

Table 29: DM-SV01 buttons

The LEDs present in the DM-SV01 server are shown in the images below.

Figure 111: DM-SV01 LEDs location - top view

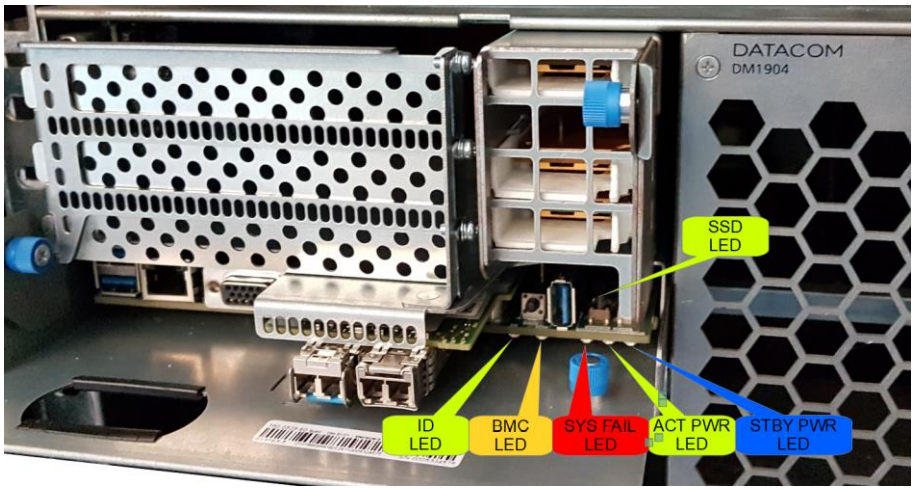

Figure 112: DM-SV01 LEDs - front view

The LEDs in the DM-SV01 server are listed in the table below.

LED	LED Color	Information
Power Standby	OFF	There is no power (12V) at the rear power input connector.
	Solid RED	System failure.
	Blinking BLUE	System is initializing and waiting for BMC boot to complete.
	Solid BLUE	BMC has booted and Standby power rails are ok. The system is ready to turn the processors on.
Power Active	OFF	Server is powered OFF (Standby mode).

	Solid GREEN	Server is Powered ON (Active mode).
	Solid RED	Failure on the Active power rails or the reset button is being pressed.
System Fail	OFF	No failure
	Solid RED	System failure (requires system servicing)
User ID	OFF	Unit ID function is turned OFF.
	Blinking GREEN	Unit ID function is turned ON.
BMC	Fast Blinking YELLOW	BMC initialization.
	Normal Blinking YELLOW (2Hz)	BMC in normal operation.
SSD	Solid GREEN	No activity in the M.2 SSD.
	Blinking GREEN	Read/Write activity in the M.2 SSD.

Table 30: DM-SV01 LEDs

This document comprises 97 pages.

Revision History:

Date	Description
05/08/2022	- Release 1.0
25/11/2022	- Release 1.1 ● Section “5.8 Battery and Clear CMOS”: corrected CMOS battery polarity indication.
05/05/2023	- Release 2.0 ● Section “3.2.2 DM1904 Supervisory Board (SB)”: added information about the Supervisory Board for DM1904 chassis. ● Section “3.2.3.4 Installing the Supervisory Board in the DM1904”: included instructions for mounting the Supervisory Board into the DM1904 chassis.
21/11/2023	- Release 2.1 ● Section “2.2.1 Mainboard Jumpers”: added information about the jumpers of the mainboard. ● Section “2.2.11.5 PCIe Configuration and restrictions”: added details regarding PCIe Gen 3 and Gen 4 configurations and limitations.