NS780TB3

Desktop 16-Bay (3.5" / 2.5") Thunderbolt 3 RAID Storage

User Manual

First edition, Aug. 2020

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1. Overview

The NS780TB3 is a desktop 16-bay Thunderbolt 3 RAID storage enclosure with high-speed 40Gbps data transfer rate and available for large storage capacity. Providing RAID data protection solution, the 16-bay storage fully applies to the video editing fields of 4K (4096×2304), Full HD (1920×1080), 3D animation, and so on. Featuring easy setup of the enclosure, the NS780TB3 can be easily connected to Thunderbolt 3 host computer through only one data cable connectivity.

2. Package Checklist

Before installing this unit, verify the package contains the following items.

A. NS780TB3 Enclosure × 1

B. HDD tray (installed in NS780TB3; compatible with 3.5” and 2.5” HDDs) × 16

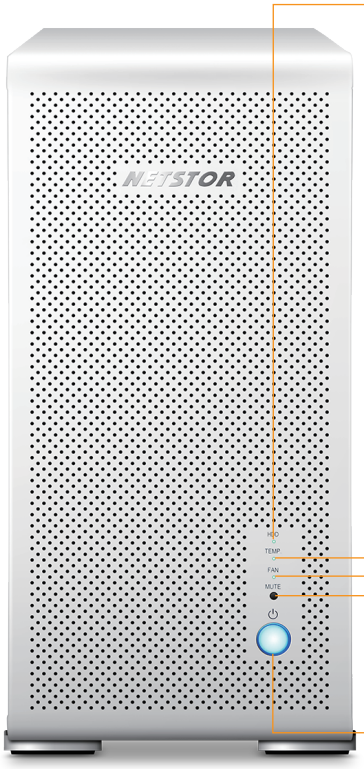
C. HDD mounting screws

D. Thunderbolt 3 cable (2 meters) × 1

E. Internal mini-SAS to mini-SAS data cable × 4

F. Power cord × 1

3. Panel Layout



5. Global HDD LED

- Reading/writing – blue
  Periodic access – flashing blue
  HDD failure – red (go to page 19. for the detail)
  Rebuilding – interlacing of flashing blue and flashing red

4. Temperature LED

- Green – temperature normal
  Red – Over-temperature (higher than 50°C)

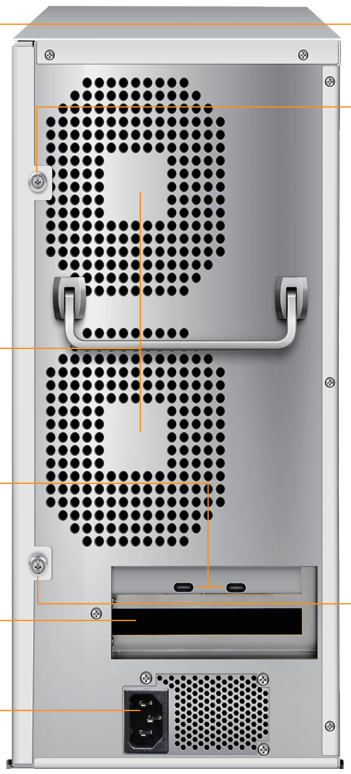
3. Fan LED

- Green – fan normal
  Red – fan failure (low frequency of RPM or stop)
  (go to page 18. for the detail)

2. Buzzer mute button

1. Power on/off button (display)

- Blue – power on
  No light – power off



10. Thumbscrews to loosen/tighten the side door

9. 120x120x25 mm hot-swappable cooling fans

8. Thunderbolt 3 card for host connection

7. Slot for RAID controller card

6. Power receptacle

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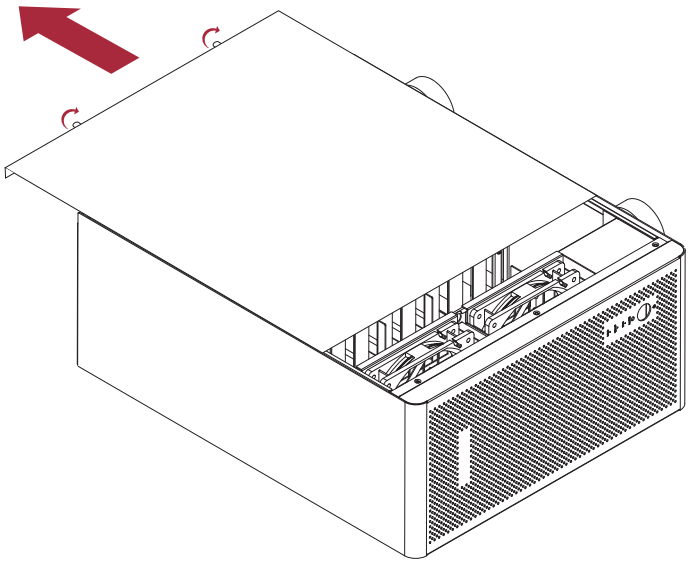
4. Enclosure Setup

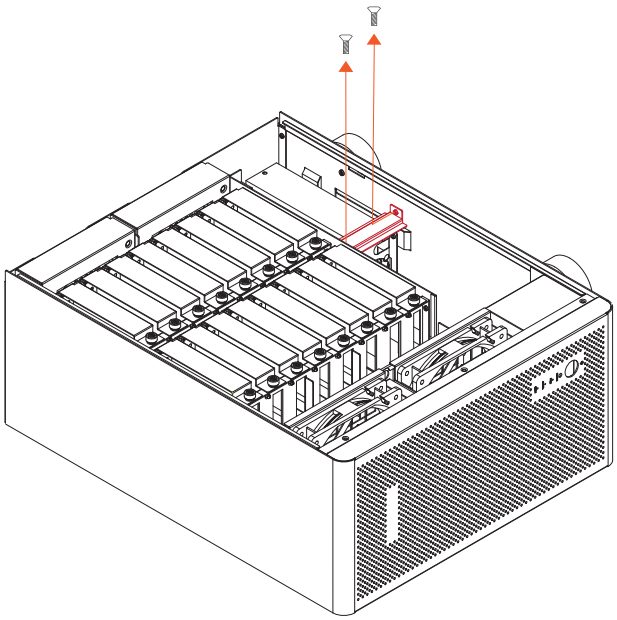
1. Remove the NS780TB3 from its packaging, and place the enclosure on the even surface close to the Thunderbolt 3 host computer.

2. Loosen the two thumbscrews and remove the side door from NS780TB3.

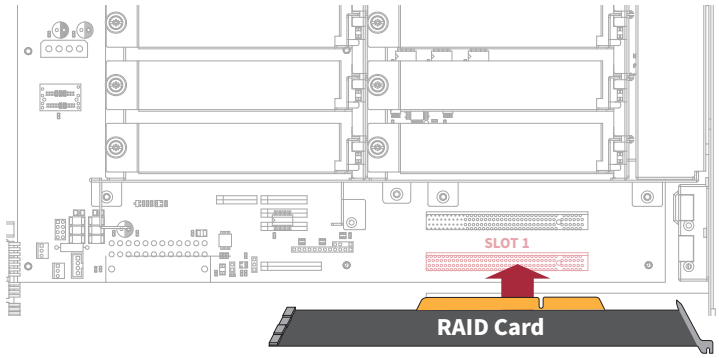


· RAID Card/HBA Card Installation

3. Detach the pillar under the sixteen drive trays by unscrewing the two screws at top and at the bottom side of the pillar.



4. Install one SAS/SATA RAID card into the PCIe ×16 slot [labeled SLOT 1 (RAID Card)] on the backplane of NS780TB3, and tighten the RAID card with the screw on RAID card's bracket.



5. Connect the four internal mini-SAS to mini-SAS data cables between RAID card and NS780TB3 backplane. Connect the topmost mini-SAS connector (labeled SAS Port 1) on backplane to Channel 1~4 mini-SAS connector on RAID card, the second connector (labeled SAS Port 2) to Channel 5~8 mini-SAS connector on RAID card, the third (SAS Port 3) to Channel 9~12 mini-SAS connector on RAID card, and the fourth (SAS Port 4) to Channel 13~16 mini-SAS connector on RAID card.

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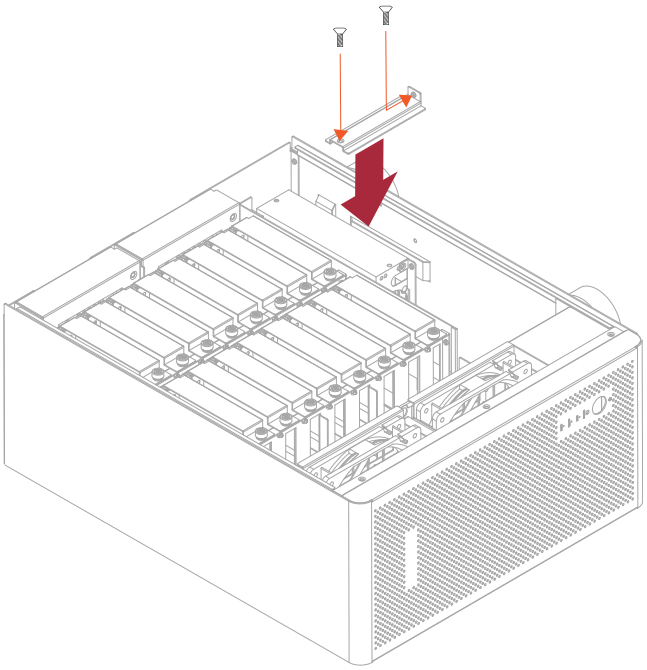
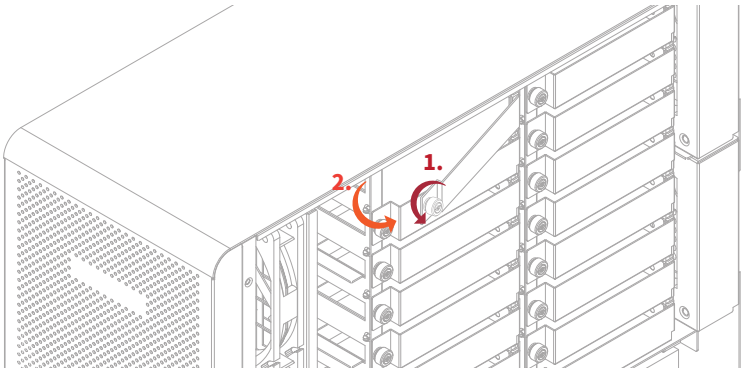
6. Restore the pillar back to the original state by tightening the two screws at top and at the bottom side of the pillar.

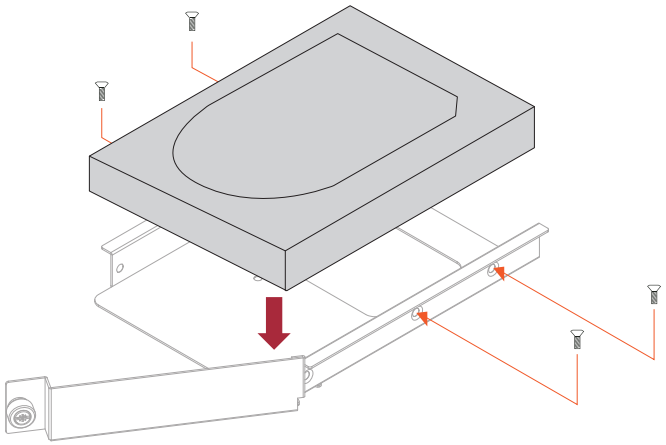


· Hard Drive Installation

7. Loosen the thumbscrew on the drive tray, and then pull the tray out of the enclosure.



8. Place the drive tray on a flat surface, and then attach the hard drive into the tray.



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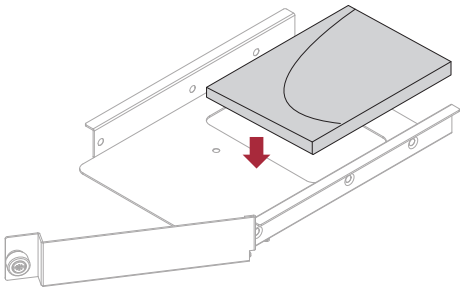
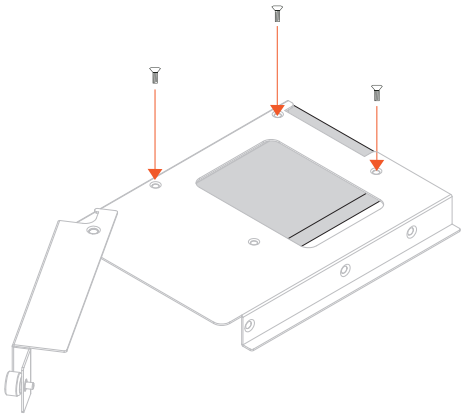
9. Adopt four of the screws provided, and then fasten the HDD on the drive tray. Tighten each screw to fasten the tray snugly to the hard drive. Do not tighten the screws overly. For 3.5” HDDs, tighten the four screws on the sides of the tray; for 2.5” HDDs, tighten the three screws on the bottom of the tray as shown in the picture below.

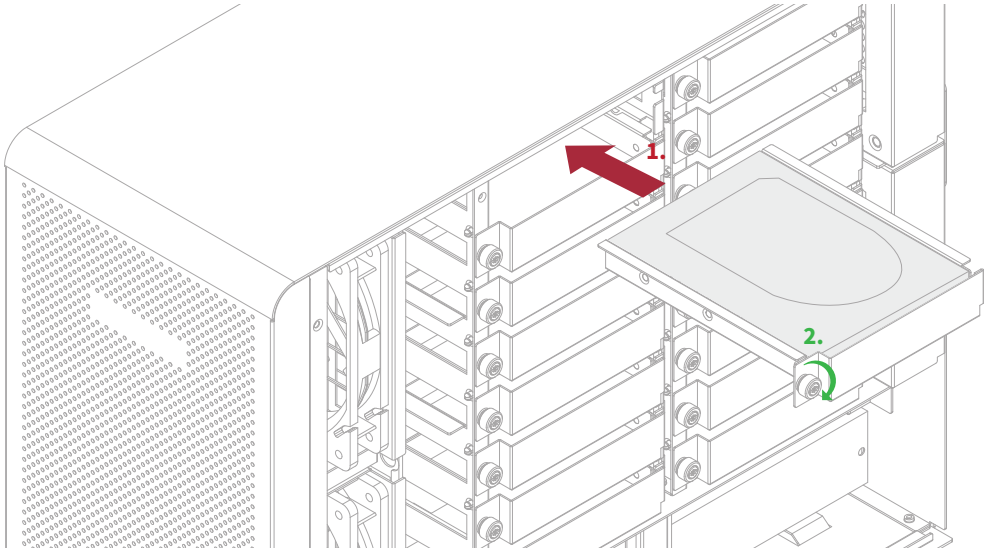




WARNING:

You must verify the heads of the four screws are level with the side (for 3.5” HDD) or the bottom (for 2.5” HDD) of the drive tray while the HDDs are attached to the trays; otherwise, a screw may take hold of the tray from the side and prevent pulling the tray out of the array.

10. Insert the drive tray containing the HDD into the NS780TB3 storage enclosure correctly, and then tighten the thumbscrew on the tray.



11. Go over steps 7 to 10 again for further drives.

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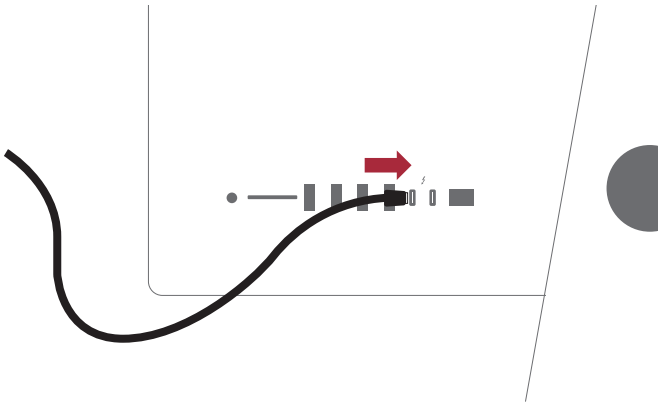
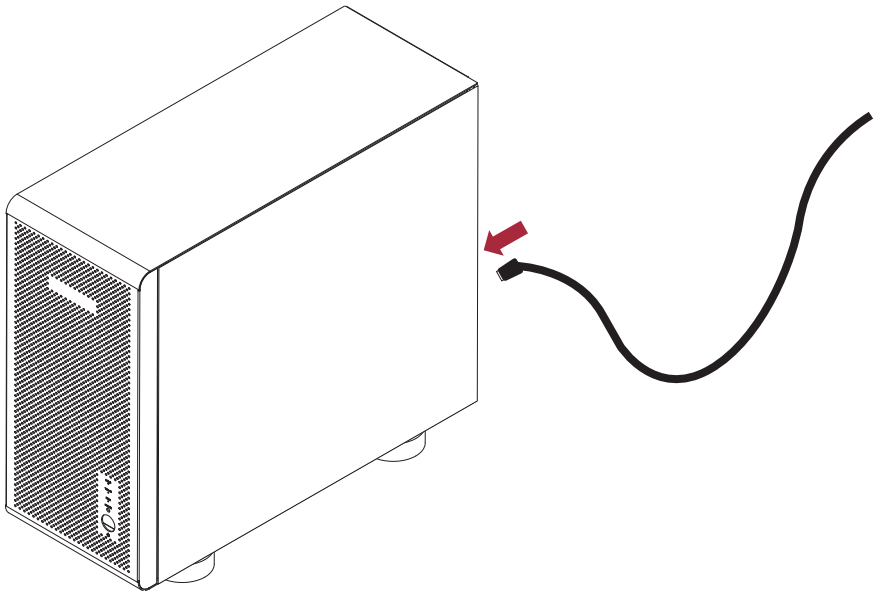
5. Host Computer Connection

1. Connect one end of the Thunderbolt 3 cable to host computer's Thunderbolt 3 port.



2. Connect the other end of the Thunderbolt 3 cable to NS780TB3 storage's Thunderbolt 3 port.

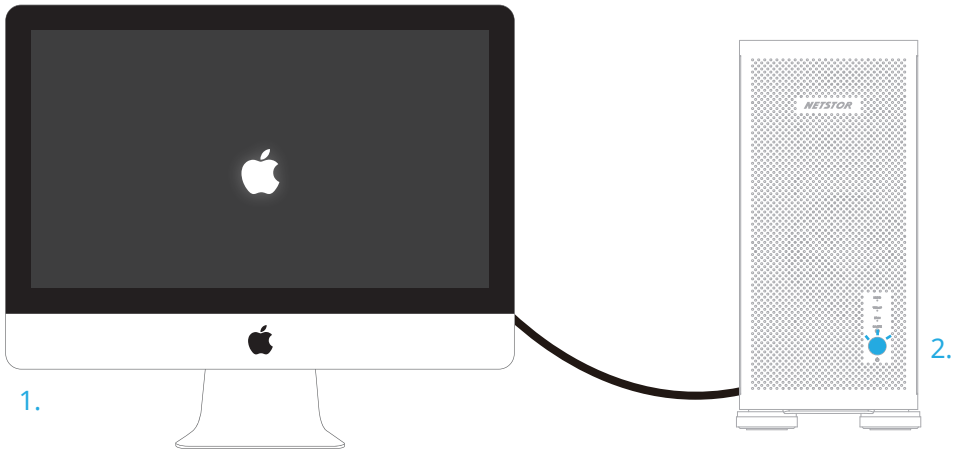


6. Power On/Off

NS780TB3 is designed to be powered on/off by the Thunderbolt 3 host computer.

1. Connect one end of power cord to the power cord receptacle at rear of NS780TB3 enclosure, and the other end of power cord to the power outlet.

2. Power on the Thunderbolt 3 host computer, and then the NS780TB3 storage will be powered on along automatically.



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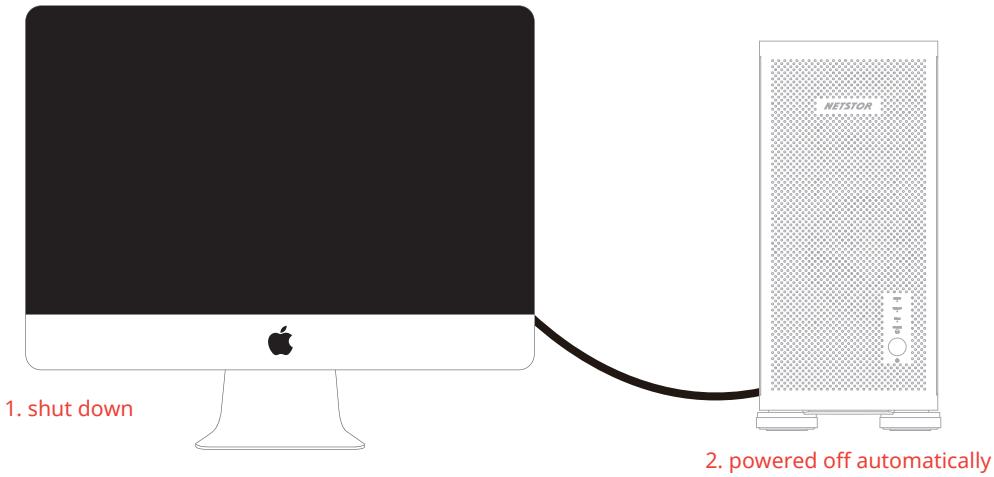
3. When the Thunderbolt 3 host computer is shut down, the Netstor storage will be powered off automatically as well.



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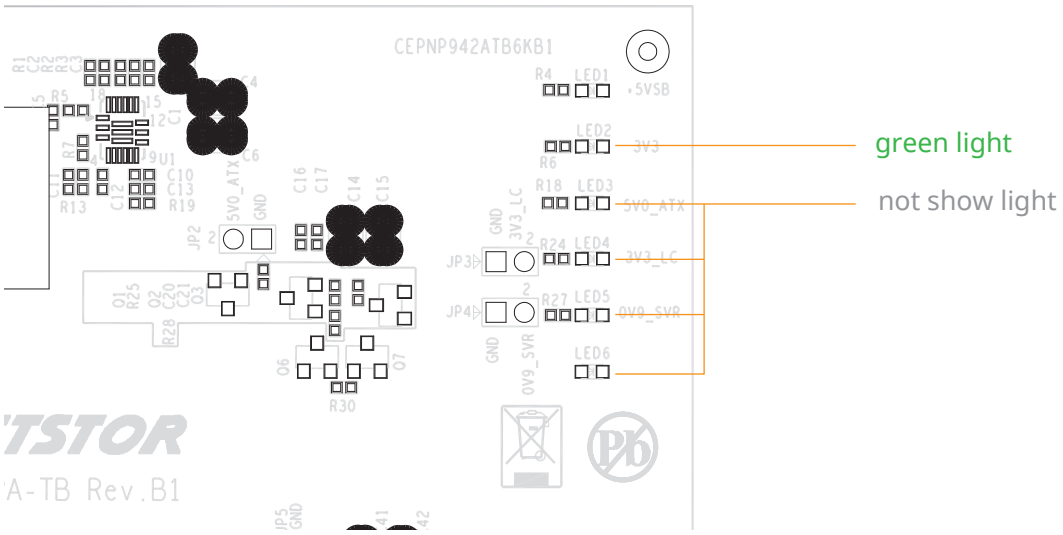
7. Operation

· Thunderbolt 3 Card LEDs Status

On the Thunderbolt 3 card within the NS780TB3 storage, there are totally five LEDs. From top to bottom, they are: LED 2 (for 3V3), LED 3 (for 5V0_ATX), LED 4 (for 3V3_LC), LED 5 (for 0V9_SVR), and LED 6 (for 0V9_USB). The following information describes what the LEDs lighting status will be before NS780TB3 is powered on and after the Netstor unit is powered on.

Power-off:

Before NS780TB3 is powered on, only LED 2 will show green light, and the rest LED 3 through LED 6 will not show light.



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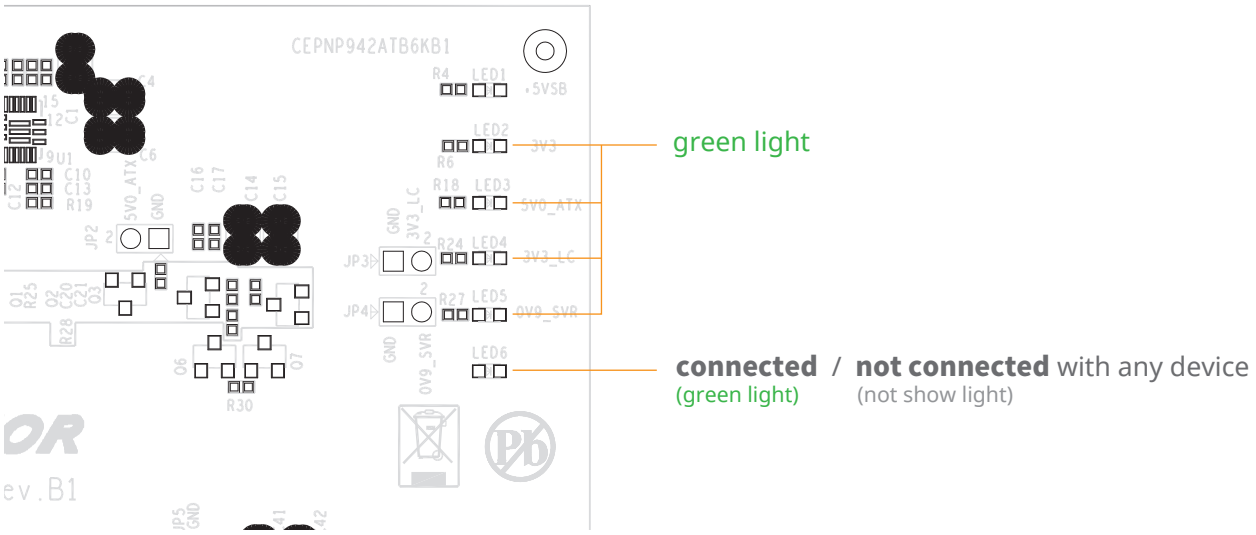
Power-on:

After NS780TB3 is powered on, LED 2 through LED 5 will show green light. At this time, if a USB device or a monitor is daisy chained to the second Thunderbolt 3 port on the Netstor Thunderbolt 3 card, then LED 6 will show green light. On the other hand, provided the second Thunderbolt 3 port is not connected with any device/monitor, LED 6 will not show light.



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· macOS operating system

Firstly, verify Netstor Thunderbolt 3 card in NS780TB3 is recognized by Thunderbolt 3 Mac computer. Click Apple icon at the top menu bar, select **About This Mac**, and click **System Report** button. Click **Thunderbolt** in the left column, as the model name NS780TB3 appears in the information area, it means Netstor storage's Thunderbolt 3 card is recognized by Thunderbolt 3 Mac computer.

Secondly, verify the RAID card in NS780TB3 is recognized by Thunderbolt 3 Mac computer. Click Apple icon at the top menu bar, select **About This Mac**, and click **System Report** button. Click **PCI** in the left column, as the RAID card info appears in the information area, it means Netstor storage's RAID controller card is recognized by Thunderbolt 3 Mac computer.

· Windows operating system

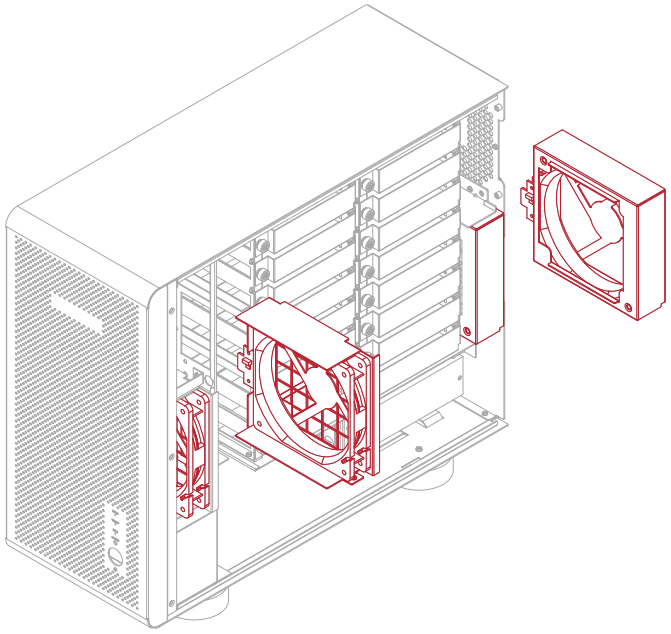
Firstly, verify Netstor Thunderbolt 3 card in NS780TB3 is recognized by Thunderbolt 3 host computer. At Windows 10's desktop, right click on the Thunderbolt icon at the bottom right of the desktop screen, and select 'View Attached Devices'. And then the window of view attached devices will pop up; as it shows the model name NS780TB3, it means Netstor storage's Thunderbolt 3 card is recognized by Thunderbolt 3 host computer.

Secondly, verify the RAID card in NS780TB3 is recognized by Thunderbolt 3 host computer. Right click **This PC**, and select **Manage**. As window of Computer Management pops up, click **Device Manager** in the left column, click **View** at the top menu bar, and select **Devices by connection**.
Click **ACPI x64-based PC**, select **Microsoft ACPI-Compliant System**, and click **PCI Express Root Complex**. Open the PCI Express Root Port, and the RAID card in NS780TB3 will be shown, meaning the storage's RAID card is recognized by the Thunderbolt 3 host computer.

To configure the RAID setting for the storage, please refer to the user's manual of the RAID card that is installed in NS780TB3.

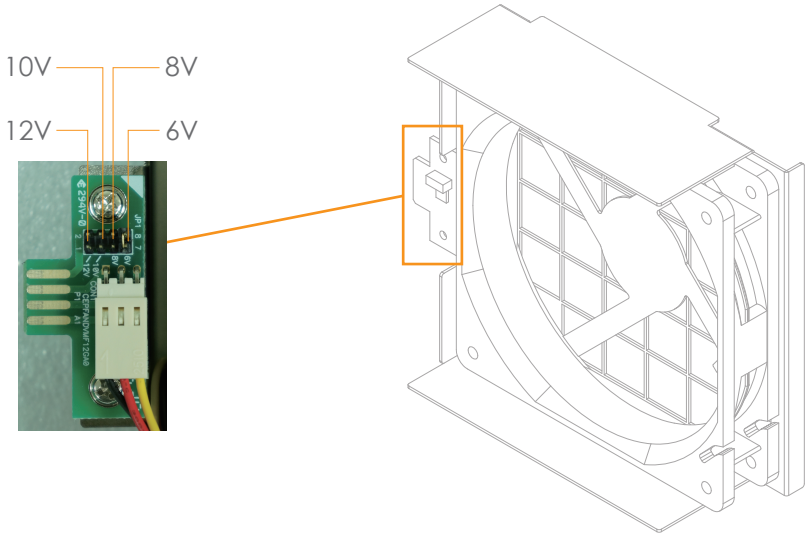
8. Fan Speed Adjustment

There are four hot-swappable 120×120×25 mm cooling fans in the front and in the rear of the NS780TB3 enclosure for ventilation. The cooling fan can simply be drawn out of the enclosure by pulling the L type metal handle on the fan module.



· The front two fans

The front 120×120×25 mm cooling fan speed can be adjusted. Pull out the fan module, there are four sets of jumpers labeled with 6V, 8V, 10V, 12V from top to bottom on the fan connector board. The default setting is the jumper being placed over pin 7 and 8 for label 6V for slowest speed. The speed increases from label 8V to label 12V. As jumper is not placed over pins, the fan will spin at 12V full speed.



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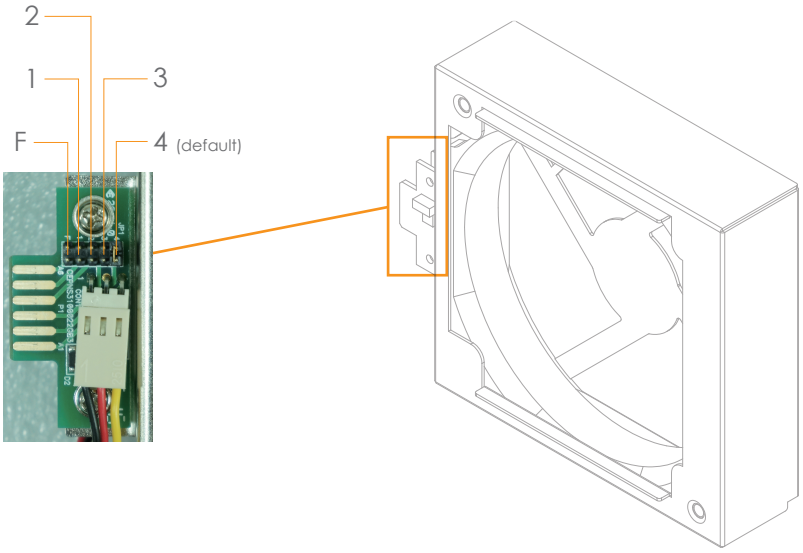
· The rear two fans

To adjust the fan speeds, pull the rear fan module out of the enclosure. There are five sets of jumpers labeled with 4, 3, 2, 1, F sequentially from top to bottom on the fan connector board.

The default setting is the jumper being placed over pin 9 and pin 10 for label 4, meaning the slowest speed of fan. The fan speeds increase from label 3 to label 1. When the jumper is placed over pin 1 and pin 2 for label F, the fan spins at full speed. If all the pins are open (no jumper being placed over the pins), the fan will not spin.



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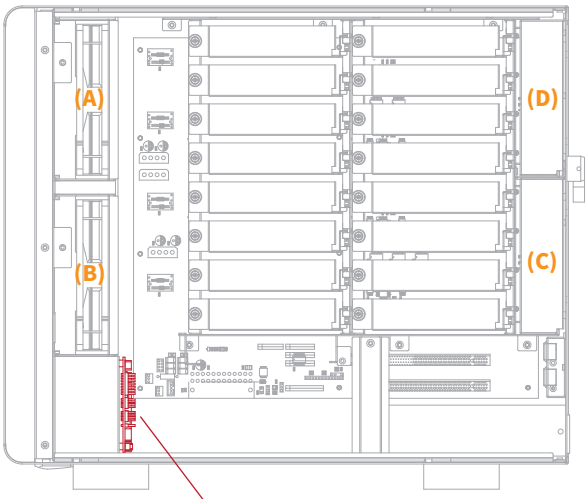
9. Troubleshooting

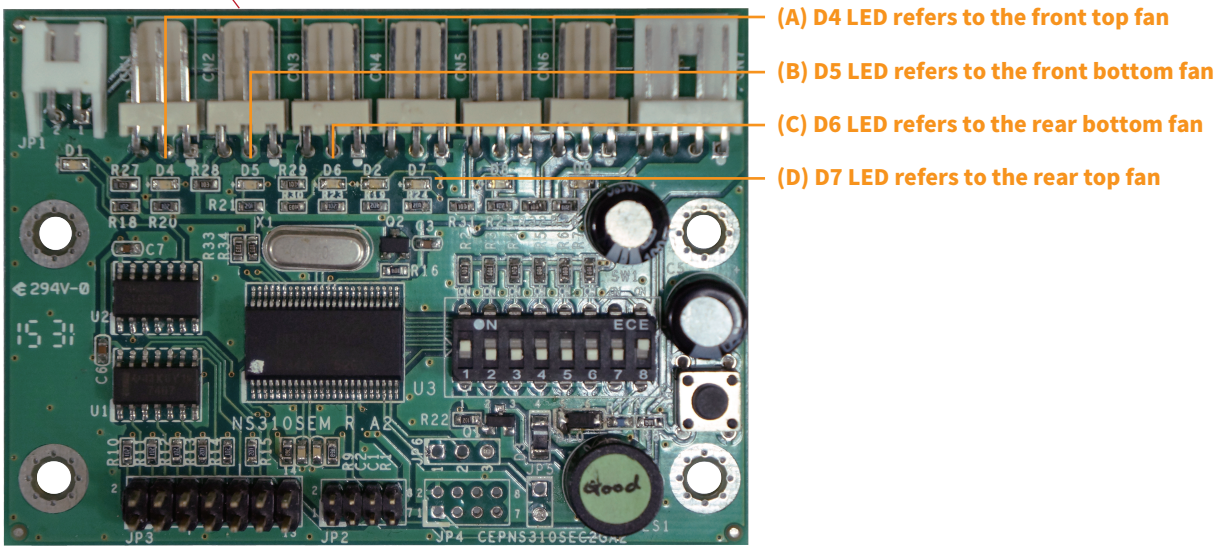
9.1 Fan LED showing red light

When one of the cooling fans within Netstor unit fails, the fan LED in front of NS780TB3 enclosure will show red light. The approach to distinguish which cooling fan in the Netstor unit has the issue is given as follows.

1. Inside the Netstor storage enclosure, the front bottom part, there is an environmental control board; locate this board.

2. On the environmental control board, there are four LEDs indicating the four 12x12 cm cooling fans inside the Netstor unit.





As either of the above four LEDs shows red light, the corresponding cooling fan fails.

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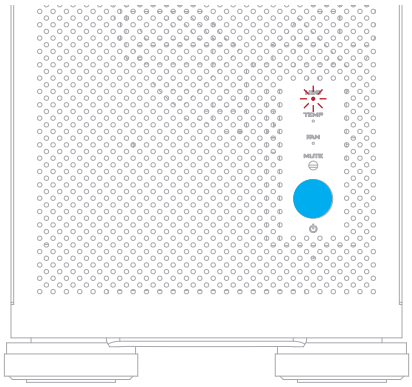
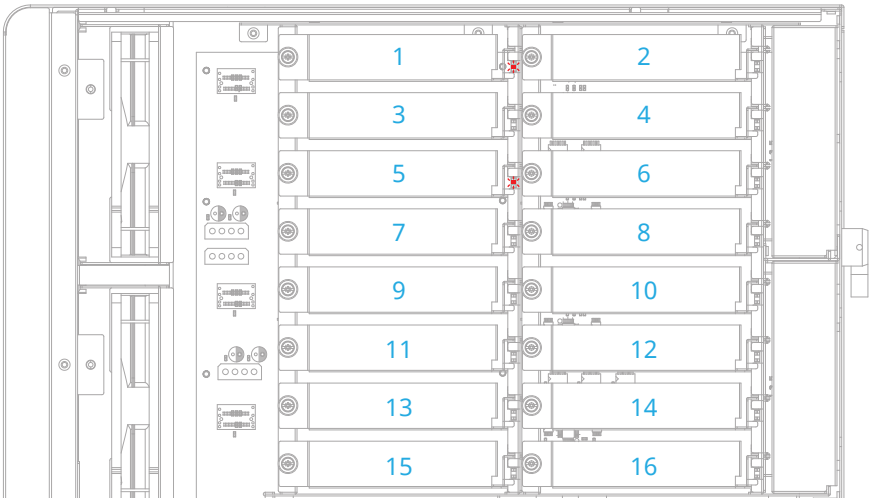
9.2 Global HDD LED showing red light

When one of the HDDs within Netstor unit fails, the Global HDD LED in front of NS780TB3 enclosure will show red light. At this time, here is the method to distinguish which HDD in the Netstor unit has the issue supposing that all the sixteen bays are populated with drives.



1. When both computer and Netstor unit are at the powered on status, enter NS780TB3 RAID controller card's web GUI. (here take Areca RAID card's GUI for example) Click on 'Information' in the left column, and then click on 'RAID Set Hierarchy'. At this moment, in the GUI it will show, among all the sixteen drives, which number of HDD fails. Remember the number of the failure HDD.

2. Open Netstor unit's side door. All the sixteen drive bays are labeled with numbers from 1 through 16. As you have known the number of HDD that fails in the web GUI from the last step, locate the number of drive bay in the Netstor unit, and you will see, with the number of the failure drive, it will show red light.



※ Note for the Global HDD LED to be effective, the SAS/SATA RAID controller card to be utilized in the Netstor unit must support SGPIO function.
If the RAID card doesn't support SGPIO function, then the Global HDD LED won't work.

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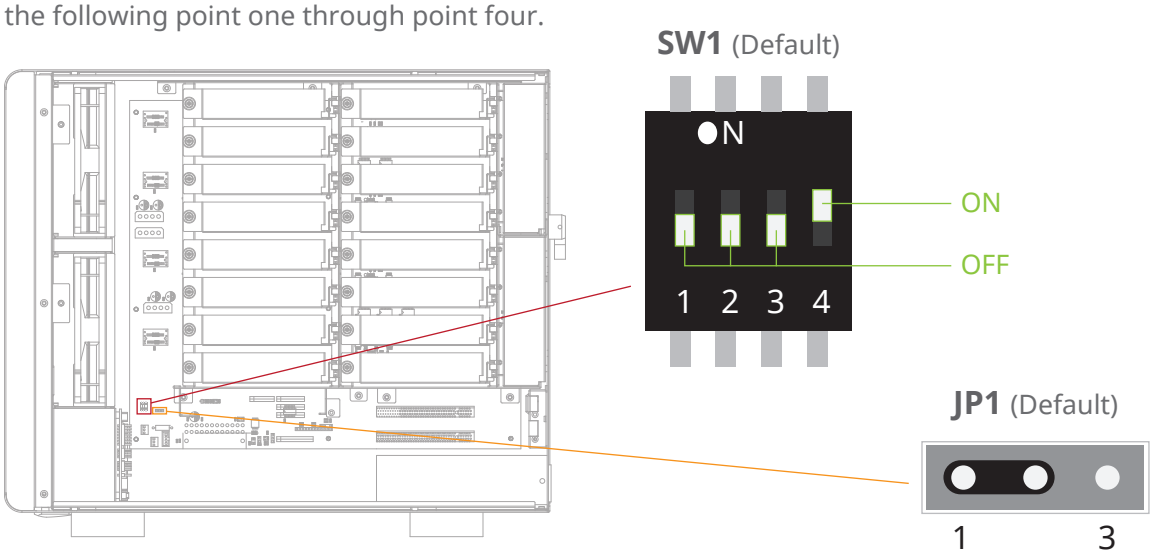
Appendix: The Functions on Backplane

There is one switch module on the backplane of NS780TB3 providing four functions on SW1-1, SW1-2, SW1-3, and SW1-4. The description for each function is given in the following point one through point four.



1. Function of Backplane Drive Fault LED (SW1-1)

There are sixteen drive fault LEDs beside each HDD connector on the backplane inside the Netstor unit.

This switch determines whether the drive fault LED on the backplane appears to be permanent red light or flashing red light when the HDD fails. The default setting is set to be drive fault LED showing flashing red light.

The situation of the drive fault LED appearing varies according to different RAID card employed.

2. Function of SAS HDD act state LED on Backplane (SW1-2)

There are sixteen HDD act state LEDs beside each HDD connector on the backplane inside the Netstor unit.

This switch determines whether the HDD act state LED on the backplane appears to show blue light or no light when the SAS HDD is inserted into the NS780TB3. The default setting is set to be SAS HDD act state LED showing no light.

3. Function of LED act source (SW1-3)

This switch determines whether the source of the HDD access indicator of the Global HDD LED in front of NS780TB3 comes from RAID card's SGPIO or the HDD itself. The default setting is set to be the source coming from the HDD itself.

4. Function of Power on/off by Host or Manually (SW1-4)

This switch is created for the other model of Netstor NS780S-G3, not for NS780TB3. The NS780TB3 storage will always be powered on/off by the Thunderbolt 3 host computer.

5. Global HDD LED fault indicator jumper

This jumper determines whether the Global HDD LED in front of the NS780TB3 storage appears to show red light or no light when the HDD fails.

The default setting is the jumper being placed over pin 1 and pin 2, meaning the Global HDD LED in front of the NS780TB3 storage showing red light when the HDD fails.

If you have any further questions, please contact your regional distributor, or Netstor Technology, Taiwan.

Netstor Technology Co. Ltd.

6F, No. 1, Alley 16, Lane 235, Baoqiao Rd., Xindian District,
New Taipei City 231-45, Taiwan, R.O.C.

www.netstor.com.tw

sales@netstor.com.tw

+886 2 2917 1500