

Storage Configurator

Lenovo ThinkStation P5



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Overview

The following document will provide detailed guidance for users to add in the M.2 and SATA drives in order to optimally configure their system storage options in the ThinkStation P5 platform. The ThinkStation P5 workstation offers both M.2 SSD support as well as support for the traditional SATA HDDs. The P5 workstation provides two standard M.2 slots directly on the motherboard as well as the ability to utilize an optional FLEX bay that can hold one externally accessible hot swappable M.2 drive. There is also an optional quad M.2 PCIe Add In Card (AIC). There are two internal SATA bays located at the bottom of the system with an optional internal HDD kit to add one SATA drive to the top front section of the chassis.

Here is a high-level overview of the types of storage devices supported in the ThinkStation P5 platform:

Table 1 - General overview of support storage devices in the ThinkStation P5

Drive Type and Speed	ThinkStation P5 Drive Capacities
3.5" SATA Gen3 Hard Disk Drive	Up to 2TB each
3.5" SATA Gen3 Enterprise HDD	Up to 12TB each
M.2 PCIe SSD Gen4 x4	Up to 4TB each

Table 2 – Quantity and capacity by drive type

Drive Type	Number of Drives Available	Total Storage
3.5" SATA Drives	3	Up to 36TB
M.2 PCIe Drive	7	Up to 20TB

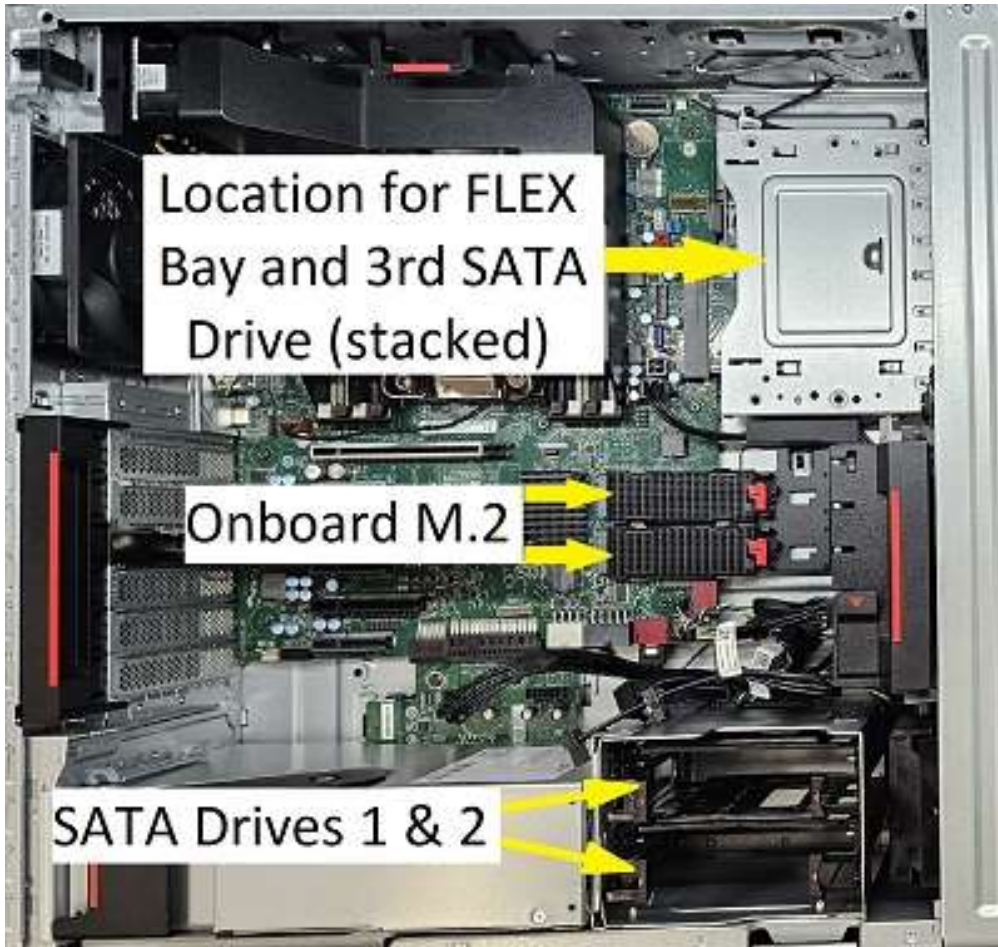
Section 1 – P5 Storage Summary

The below Table 3 shows a high-level summary of what storage options are available in the ThinkStation P5 platform.

Table 3 - Storage Summary

Storage Location	Drive Type Support
Internal onboard M.2 slots	2 x M.2 SSD Gen5
FLEX bay M.2 Kit	1 x M.2 SSD Gen4
ThinkStation Quad AIC M.2 SSD Gen3 Adapter	4 x M.2 SSD Gen3
Internal 3.5" bays	2 x 3.5" SATA Gen3
3rd HDD bay kit	1 x 3.5" SATA Gen3

Figure 1 – Location of storage devices within the P5



Section 2 – P5 M.2 SSD Drives

The Lenovo ThinkStation P5 platform supports a variety of different storage devices. Table 4 shows the available features for M.2 SSD drives utilizing the CPU-based controller. Table 5 highlights the compatibility and requirements for M.2 SSD drives utilizing the CPU-based controller.

Table 4 - Features for M.2 SSD drives on CPU-based controllers

Feature	Onboard M.2 Slots	FLEX Bay M.2 SSD enclosure	Quad M.2 PCIe Card Gen3
Drive Count (System max = 7)	2	1	4
Maximum PCIe speed	Gen5	Gen4	Gen3
Availability	Standard	Optional	Optional
Location	Motherboard	Front access bay 2	PCIe Slot
Controller	CPU	CPU	Follows slot connection
Supported M.2 dimensions (mm)	2280 or 22110	2280	2242, 2260, 2280, 22110
Double side support	Yes	Yes	No
Maximum power per drive	8W	8W	8W
Front accessible	No	Yes	No
Toolless	Yes	Partial ¹	No
Hot swappable	No	Yes	No
Individual activity/status LEDs	No	Activity Only ²	No
Combined in system activity LED	Yes	Yes	Yes
Max Drive Size	4TB	4TB	2TB

1: A screwdriver is needed during the initial installation of an M.2 drive into the FLEX bay carrier. Insertion and removal of the carrier is then toolless.

2: See Figure 2 for location of the storage drive activity light.

Figure 2 – Location of storage drive activity light



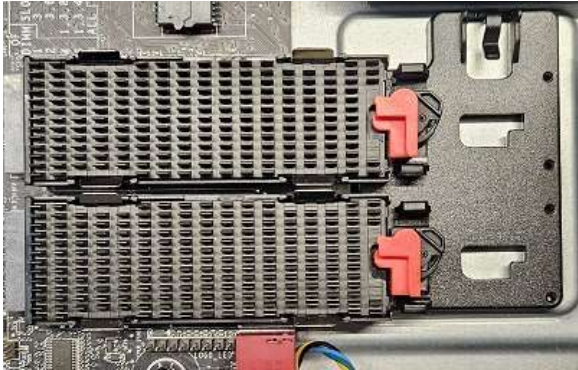
Table 5 - Compatibility and parts requirements for M.2 SSD drives on CPU-based controller

Location	Requirements and Parts
Onboard	<ul style="list-style-type: none"> • Dual M.2 Carriers and heat sink kits standard on motherboard
FLEX bay M.2 kit	<ul style="list-style-type: none"> • Front storage tray • M.2 storage access box for front storage bay • FLEX bay fan
Quad M.2 Gen3 PCIe	<ul style="list-style-type: none"> • Requires available x16 slot • Quad M.2 Adapter

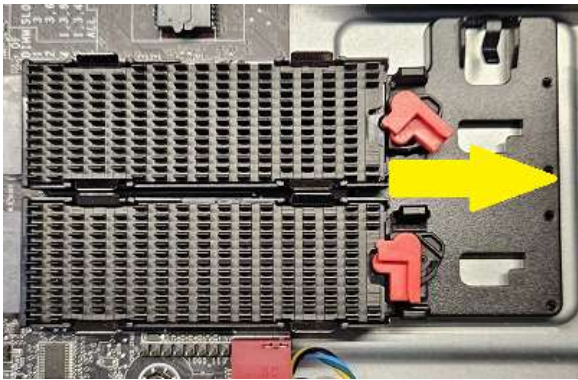
See [Appendix](#) for additional information and images of parts.

Onboard M.2 SSD drive installation

1. Open the side cover on the P5 and remove any PCIe adapters that may interfere with accessing the onboard M.2 slots.

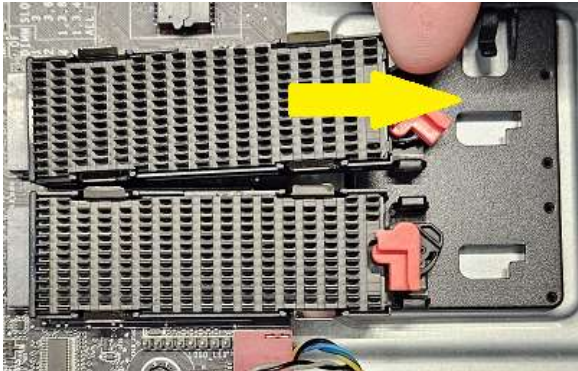


2. Push on the outside edge of red locking mechanism to rotate it counterclockwise.



3. Slightly lift the carrier up to about a 15-degree angle and pull it straight out of the slot.

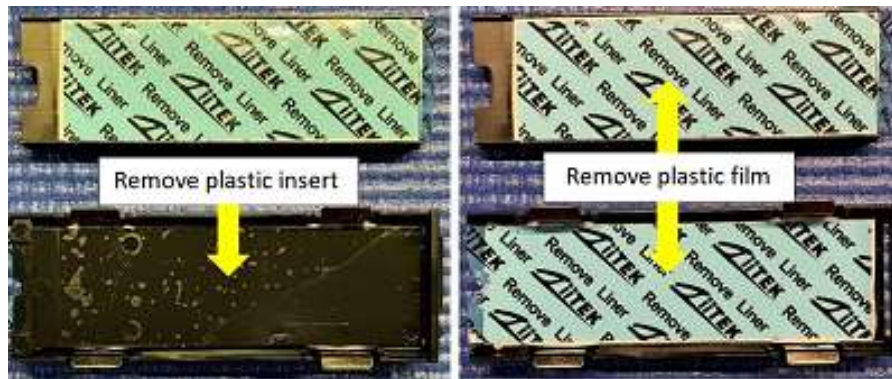
Caution: Be careful not to raise the carrier up too far before pulling it out as this risks breaking the M.2 slot.



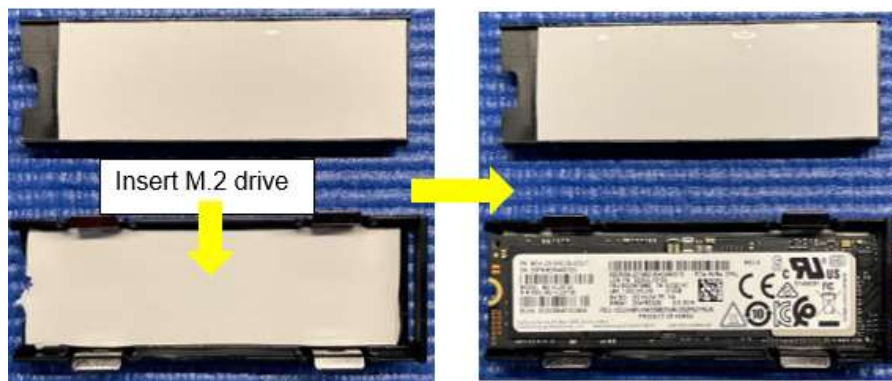
4. Lay the M.2 carrier flat on a desk and carefully separate the heat sink from the carrier by gently pushing two of the tabs on one side away from the heat sink.



5. Remove the plastic insert, then remove the thermal pad plastic film from both sides.



6. Insert the M.2 drive carefully in the M.2 bracket as shown below, align the notch in the end of the drive with the notch in the heatsink.

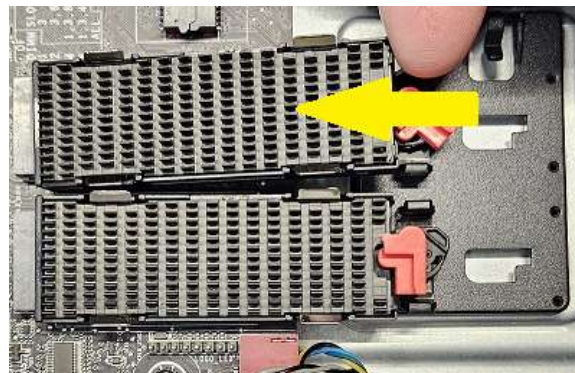


7. Reinstall the heatsink on top of the M.2 drive within the carrier by inserting the feet on one side of the heat sink into the openings of two of the tabs on one side of the carrier. Then press down on the other side of the heat sink until the feet engage the tabs on the heatsink.

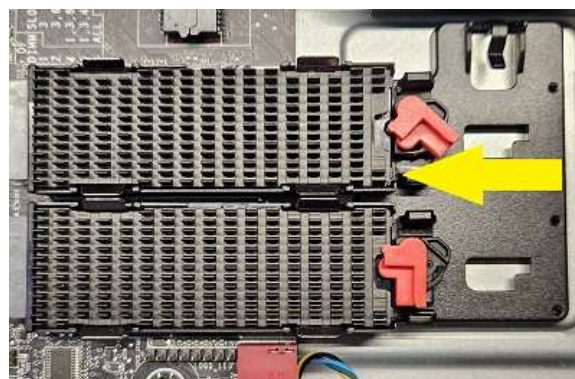


8. Insert the M.2 bracket back into the onboard M.2 slot at a slight 15-degree angle.

Caution: Be careful not to use excessive force as this risks breaking the M.2 slot.



9. Gently lower the carrier and push on the edge of the red latch to rotate the latch clockwise and secure the M.2 carrier in the system.



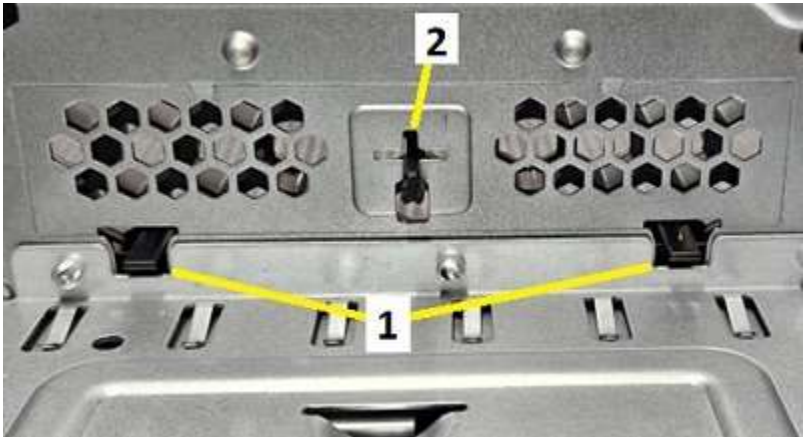
Installing The FLEX Bay M.2 Enclosure

The FLEX Bay enclosure is an optional kit that will need to be purchased separately if it was not ordered when the original system was built. See [Appendix](#) for additional information and images of parts.

1. Locate the area in the chassis where the FLEX bay kit will be installed.



2. If it has not already been removed, remove the FLEX Bay bezel cover and metal insert. From inside the system (1) lift the two tabs to release the bezel cover and then (2) push on the center post to pop the bezel cover out.



3. Once the front cover is removed the metal insert will be exposed on the front of the chassis.



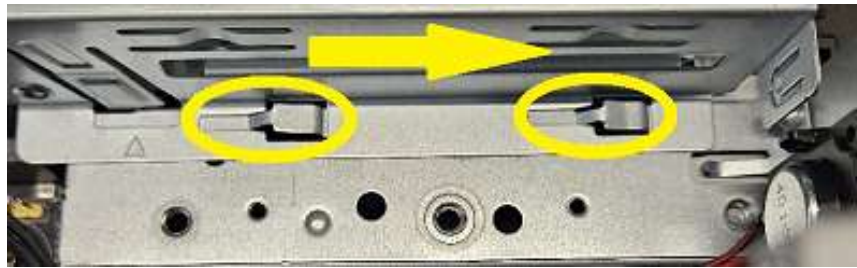
4. Remove the metal insert by fully inserting a large Philips head #2 screwdriver into the center “+” opening in the cover and slowly lift the screwdriver out of the system. It may be necessary to rock the tool up and down and side to side to fully free the cover from the chassis. Do not exert excessive force and be careful of the new opening as there may be sharp edges.



5. Install the FLEX bay cable to the FLEX bay frame with the included screws.



6. Locate the four mounting points and align the openings in the FLEX bay frame base over all of the points and slide the frame forward towards the front of the chassis until it clicks into place.



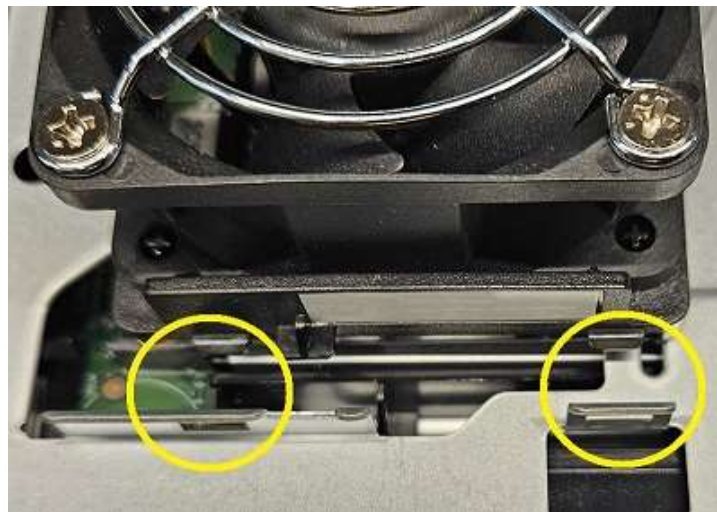
7. When installed properly, all four points should look like this.



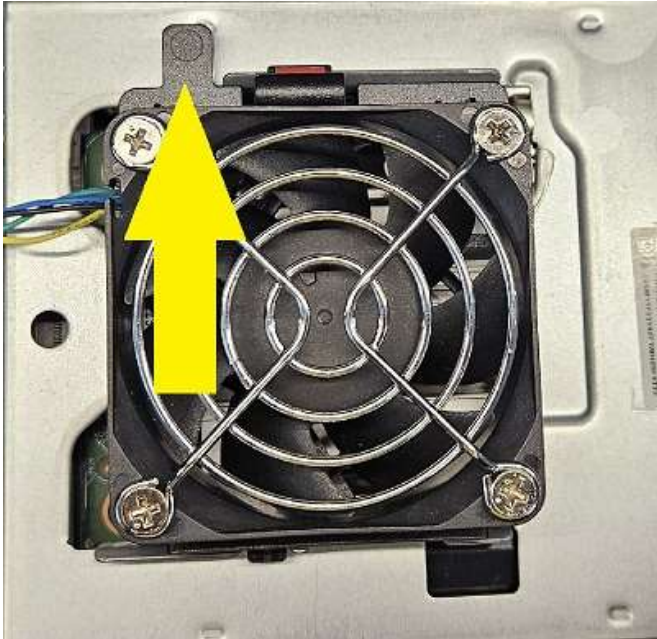
8. Plug the FLEX bay cable into the motherboard.



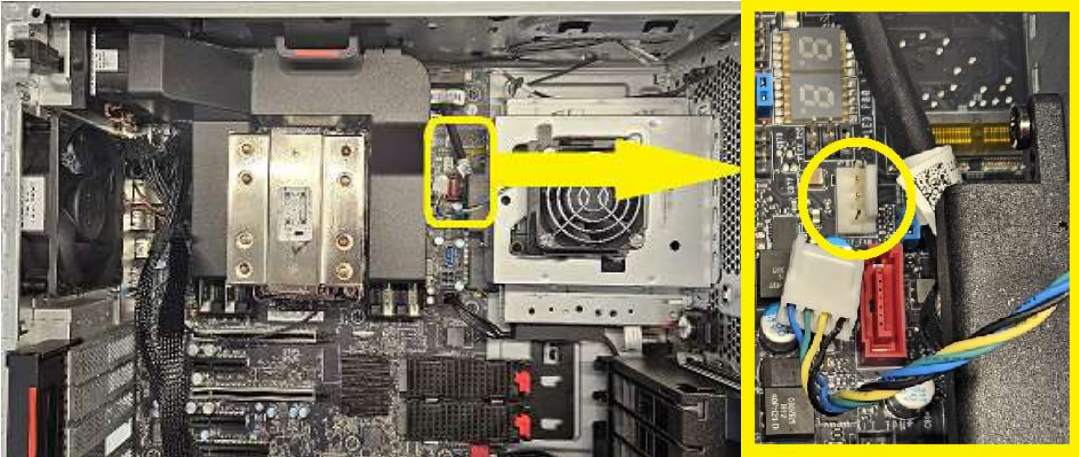
9. Install the fan to the top of the FLEX bay frame by inserting the tabs on the fan into the notches on the top of the FLEX bay frame.



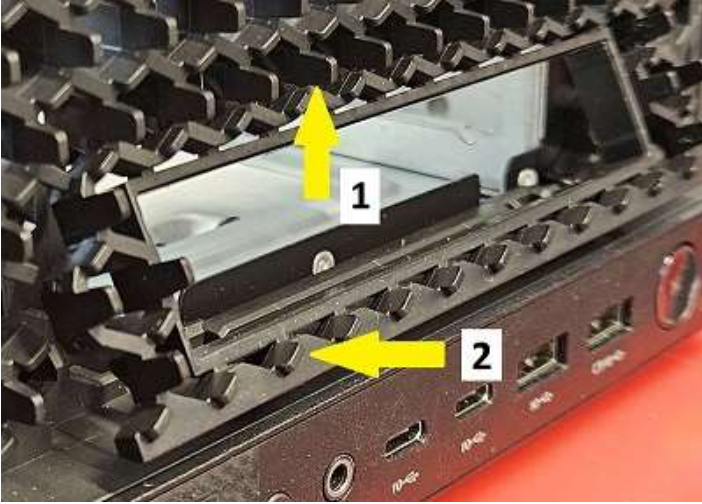
10. Press gently on the extended tab on the other side of the fan. The fan will noticeably click into place.



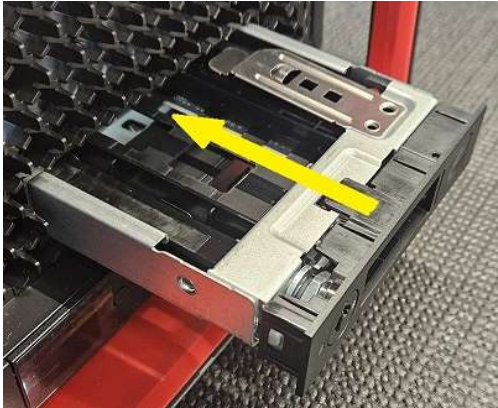
11. Locate the FLEX_BAY_FAN power connector on the motherboard between the CPU and the FLEX bay and plug in the fan.



12. Before installing the FLEX bay into the front of the system, install the bezel adapter. The flat edge should be on the bottom. Insert the top of the bezel adapter into the bezel opening (1) and then push gently on the bottom of the bezel adapter until it clicks into place (2). If it does not easily click into place, remove the bezel adapter fully, reposition the top in the opening, and try to complete the installation again.



13. Install the FLEX bay into the FLEX bay frame through the bezel. Push the bay until the retention tab locks the bay into place in the frame.



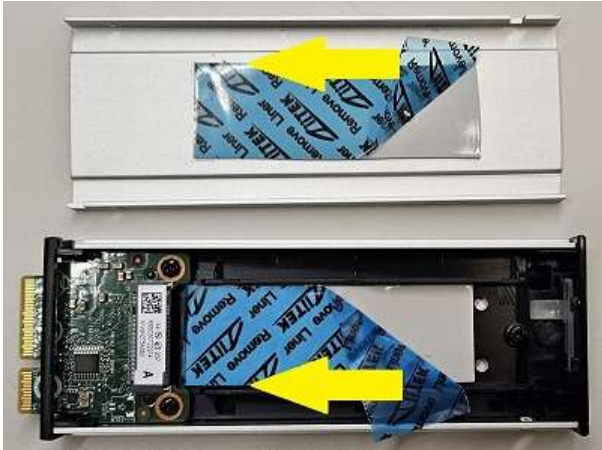
14. To install the M.2 SSD into the FLEX Bay M.2 carrier, remove the screws from each side of the end of the carrier.



15. Lift up on the lid on the end of the carrier slightly (1) and slide the lid out from under the tabs on the front of the carrier base (2).



16. Peel back and remove the protective plastic film from the heat sink pads on the lid and base.



17. Remove the M.2 retention screw from the carrier base.



18. Insert the M.2 SSD into the M.2 slot in the carrier base at a slight 15-degree angle (1). Gently lower the M.2 into place with the round notch lining up with the screw hole in the carrier base (2). Reinstall the screw to secure the M.2 drive in the carrier.



Caution: Be careful not to use excessive force as this risks breaking the M.2 slot or drive.

19. Holding the lid at a slight angle, slide the lid under the tabs on the front of the carrier base (1) and lower the lid into place (2) with the holes on the lids aligning with the screw holes on the base. Reinstall the screws to secure the carrier lid in place.



20. Insert the M.2 carrier into the FLEX bay through the front opening. Push firmly until the front of the carrier is fully inserted into the FLEX bay and clicks into place.



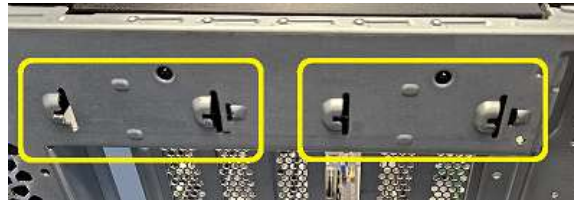
21. To remove the carrier, push the button on the side of the FLEX bay. The carrier will eject for removal.



22. The FLEX bay also includes 2 keys in a mountable key carrier. These keys can be used to lock the M.2 carrier into place once it has been inserted.



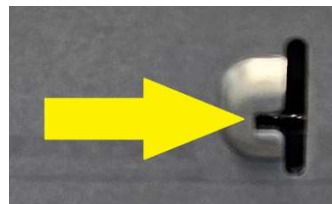
23. On the back of the system chassis there are two locations to mount key carriers for both the side door keys and the FLEX bay keys, as needed. If there is no lock for the side door, both of these locations will be available. Both locations are identical and either can be used.



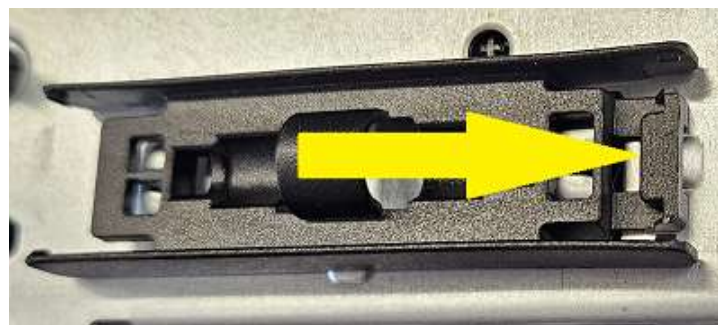
24. On the bottom of the key carrier, locate the two mounting tabs. Note the open end with the center guide on each tab.



25. Position the carrier to insert the open end of the tabs into the notches on one of the key carrier mount locations. Line up the center guides on the carrier with the openings in the center of the notches.



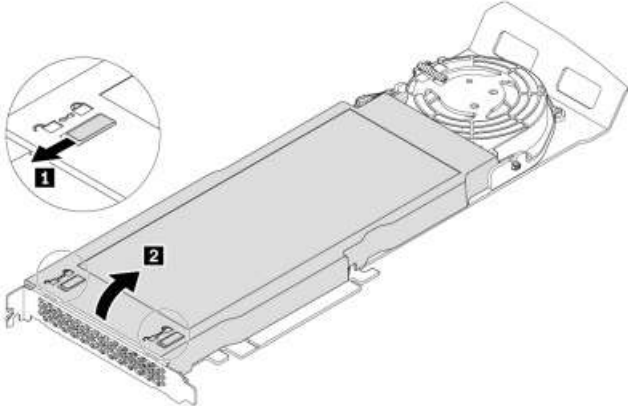
26. Slide the carrier into the notches until the catch on the end of the carrier, seen below, locks into place. If it does not slide into place easily, it may be necessary to put pressure on the carrier, directly over each tab.



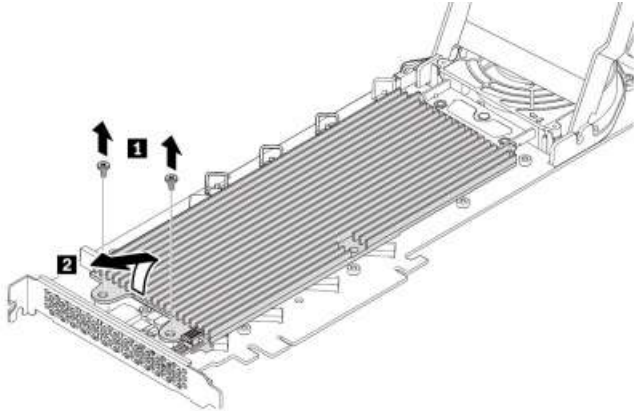
Installing the Quad M.2 Gen3 PCIe Add-In-Card (AIC)

On ThinkStation P5 models with only one GPU installed, it is possible to add up to four (4) additional M.2 drives using an optional PCIe based Quad M.2 adapter card. See [Appendix](#) for additional information and images of parts.

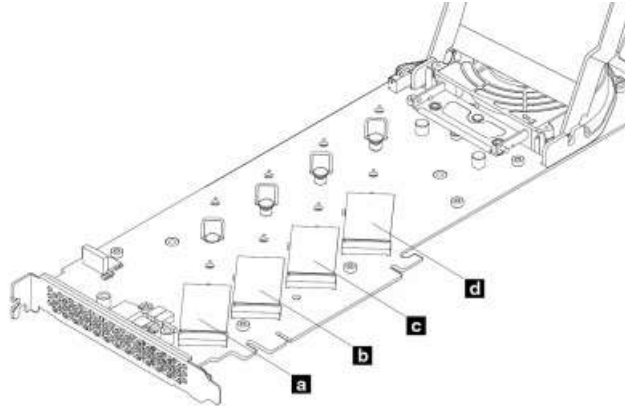
1. Slide the cover latches of the quad drive PCIe adapter to the open position. Then, pivot the cover as shown until it stops.



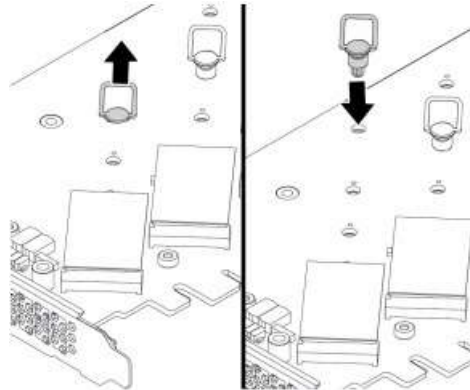
2. Loosen the screws that secure the M.2 NVMe drive heat sink. Then, remove the heat sink as shown.



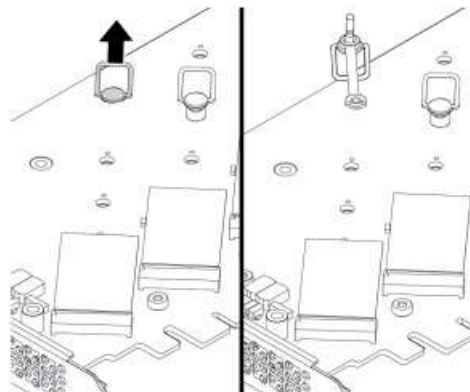
3. Install M.2 solid-state drives in the alphabetic order as shown.



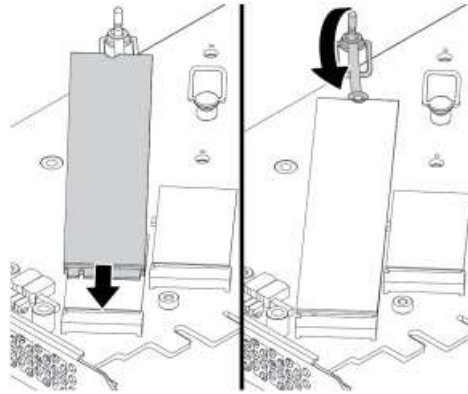
4. If necessary, move the retention latch to an appropriate location to suit the length of the new M.2 NVMe drive and remove any film on the thermal pads on which you want to install the M.2 NVMe drive.



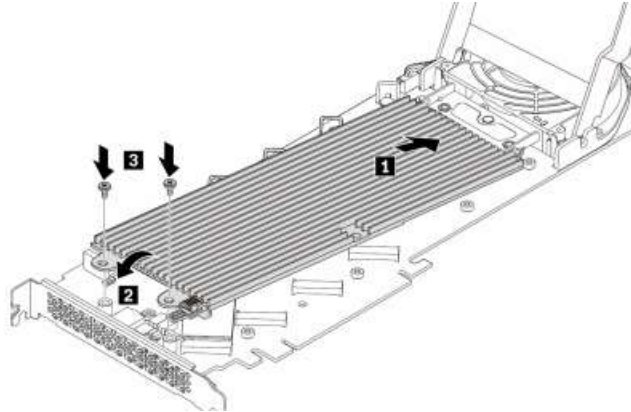
5. Pull the handle of the retention latch outward to the open position.



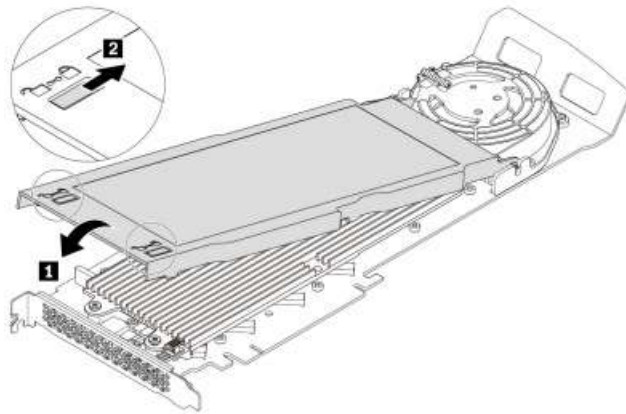
6. Hold the new drive by its edges so as not to touch the circuit board and ensure that the circuit board side is facing upward. Align the notch in the new M.2 NVMe drive with the slot key in the M.2 slot. Insert the drive into the corresponding slot on the PCIe adapter until it is firmly seated. Then, insert the plug of the retention latch into the hole to secure the new drive.



7. Install the heat sink as shown. Then tighten the screws to secure the heat sink.



8. Install the cover as shown. Then, slide the cover latches to the locked position.



9. Install the M.2 NVMe drive PCIe adapter in a PCIe x16 card slot on the system board.

Note: Although the Quad Adapter supports multiple M.2 sizes, all of the Lenovo qualified drives are 2280 M.2 drives.

Section 3 – P5 SATA Drives

The Lenovo ThinkStation P5 platform supports up to three (3) SATA drives. Table 6 shows the available features for SATA drives utilizing the chipset-based controller. Table 7 highlights the compatibility and requirements for SATA drives utilizing the chipset-based controller.

Table 6 - Features for SATA drives on Chipset-based controller

Feature	Internal Bays 1 & 2	Optional Internal Bay 3
Drive Count (System max = 3)	1 each	1
Drive Size	3.5" only ¹	3.5" only
Maximum SATA Speed	6Gb/s SATA3	6Gb/s SATA3
Availability	Standard	Optional
Location	Internal Bay 1 & 2	Optional Internal Bay 3
Controller	PCH	PCH
Front accessible	No	No
Toolless	Yes	Yes ²
Hot swappable	No	No
Individual activity/status LEDs	No	No
Combined in system activity LED³	Yes	Yes
Max Drive Size	12TB each	12TB

1: The drive trays for the internal bays each have the ability to convert, without any additional parts, and hold a 2.5" drive. However, at the time of writing, only 3.5" drives have been certified by Lenovo on the P5.

2: The Optional 3rd SATA drive bay kit requires a screwdriver for initial installation of the kit. Access and use of the drive after installation of the kit is toolless.

3: See Figure 3 for location of the storage drive activity light.

Figure 3 - Location of storage drive activity light



Table 7 - Compatibility and parts requirements for SATA drives on Chipset-based controller

Location	Compatibility	Requirements and Parts
Internal Bay 1 Internal Bay 2	3 x SATA drives can be utilized simultaneously	<ul style="list-style-type: none"> • 2 drive carriers are included standard • SATA 2-drop power cable included standard (supports both bays) • Standard SATA signal cable count <ul style="list-style-type: none"> · 0 drives configured: one cable · 1-2 drives configured: two cables
Optional Internal Bay 3		Optional HDD kit (includes SATA power and signal cables)

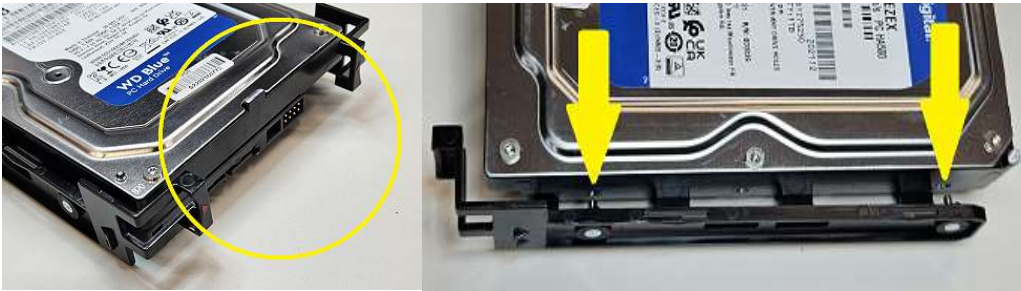
Installing 3.5" SATA Drives in the Internal Bays

All ThinkStation P5 models include two internal SATA drive bays standard. These bays are located in the bottom of the system between the PSU and the front of the chassis. The side cover of the system must be removed to access the internal drive bays. See [Figure 1 in Section 1](#) for reference. When adding SATA drives to a system with a 1000W PSU, where no SATA drives were previously installed, it will be necessary to install a Front HDD Bay Fan Kit. A system that shipped with a 750W PSU will have this fan kit by default. The fan kit consists of a fan in a fan holder.

1. Pinch the arrowed tabs and pull the drive tray out of the system.



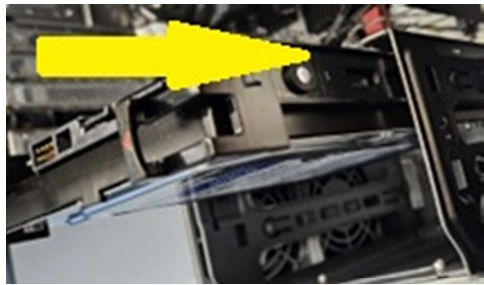
2. Insert the drive, bottom down into the tray with the signal and power connections on the same end as the arrowed tabs. Angle the side of the drive down into the tray and line up the holes on the side of the drive with the posts on the inside of the tray then insert the posts.



3. Gently twist the open side of the tray downward, until the posts on the tray can clear the side of the drive and insert the posts into the holes on the side of the drive.



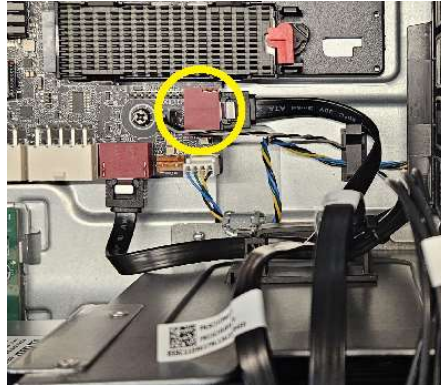
4. Insert the tray into the internal bay, with the bottom up, by lining up the guide on the tray with the tracks in the bay.



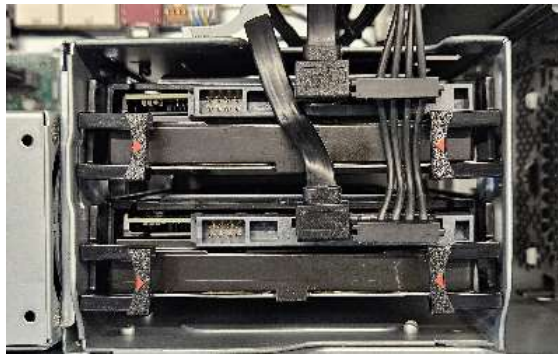
5. Push down on the tray until the tabs on the tray are fully inserted and catch into the notches in the bay tracks.



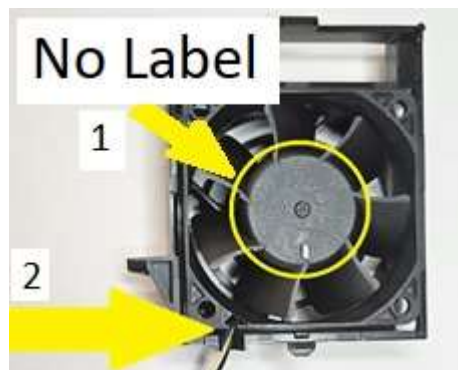
6. If there is a 2nd SATA drive to be installed, repeat the steps above for the 2nd drive to be installed in the internal bay. An additional SATA signal cable will need to be obtained and plugged into the open SATA2 port on the motherboard. The SATA 1 port is always populated, even if there was no drive in the system. See the [Appendix](#) for additional parts information.



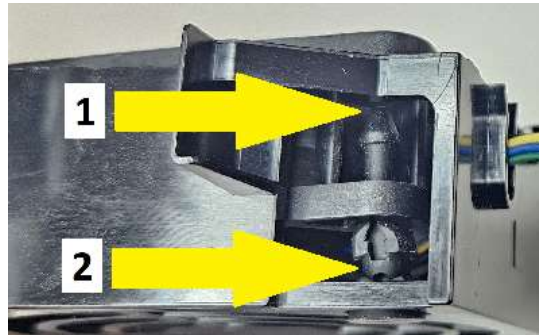
7. Plug in the SATA power and signal cables into both drives.



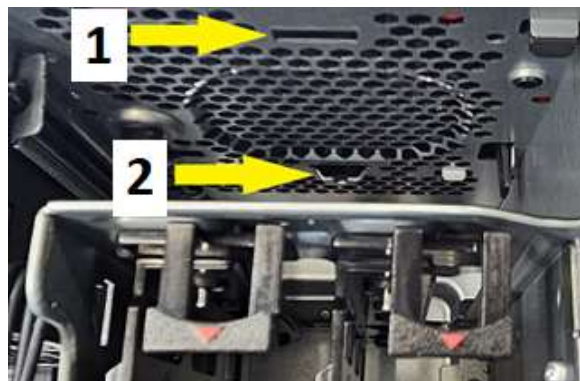
8. If the fan and fan holder did not come together as a set it will be necessary to insert the fan into the fan holder. Standard installation will be with the label on the fan to the inside of the holder. When installed properly the center of the fan should have no label visible (1). Rotate the fan in the holder, as needed, so that the power cable can easily be inserted into the power cable slot on the fan holder (2).



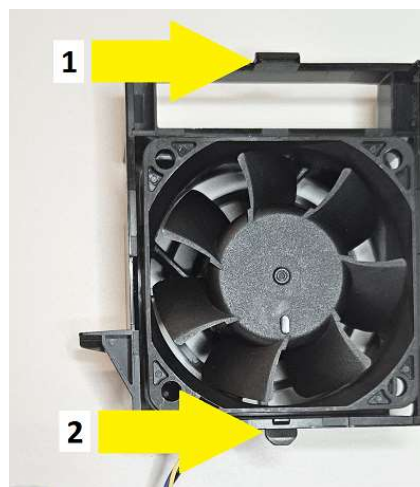
9. The fan will insert into the four rubber posts in each corner. Pull on each post to stretch it out (1) until it stretches enough that the fan base will rest in the notch (2) at the base of each rubber post.



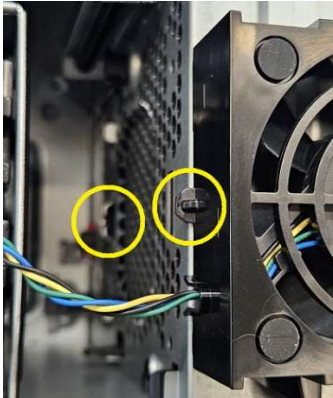
10. To install the Front HDD Bay Fan Kit, locate the lower notch (1) and upper notch (2) in the front wall of the chassis near the internal SATA bays.



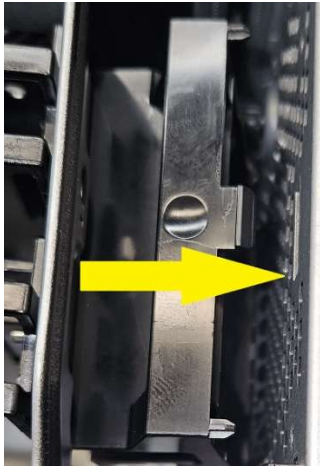
11. Identify the tab on the top of the fan holder (1) and the other tab on the bottom of the fan holder (2).



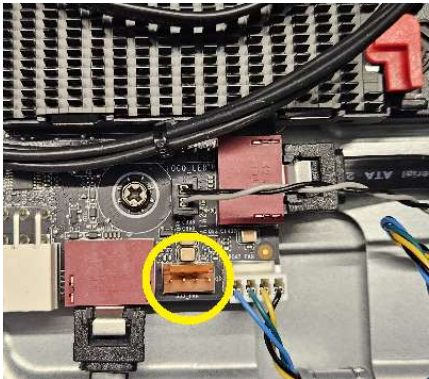
12. Lower the fan assembly into the chassis and insert the tab on the bottom of the fan holder into the lower notch on the front wall of the chassis.



13. When the lower tab is properly inserted into the lower notch, the tab on the top of the fan holder will easily insert into the upper notch on the front chassis wall.



14. Locate the HDD_FAN power connector on the motherboard between the SATA1 port and the FRONT_FAN connector and plug in the fan.



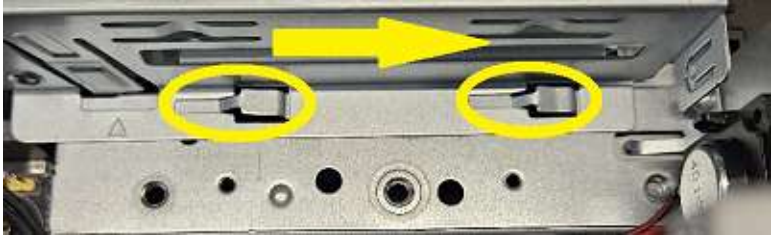
Installing the 3rd SATA Drive Bay Kit

The P5 provides the ability to install an additional drive bay to hold a 3rd SATA drive. This bay is installed in the same area as the FLEX bay and requires the FLEX bay frame and fan to complete the installation. See the [Appendix](#) for additional parts information.

1. Locate the area in the chassis where the FLEX bay kit will be installed.



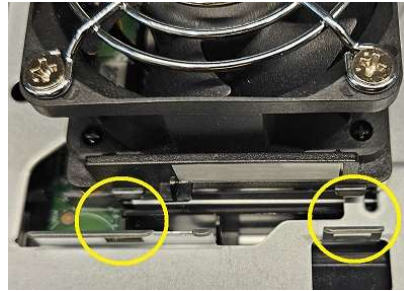
27. Locate the four mounting points and align the openings in the FLEX bay frame base over all of the points and slide the frame forward towards the front of the chassis until it clicks into place.



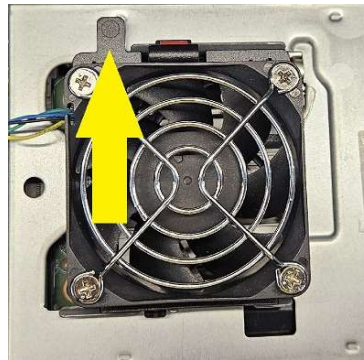
28. When installed properly, all four points should look like this.



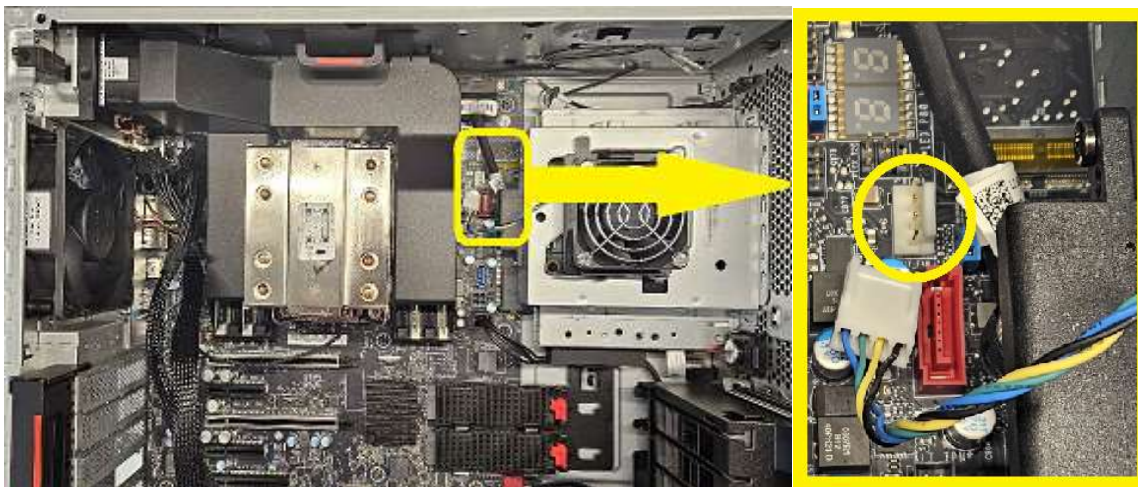
2. Install the fan to the top of the FLEX bay frame by inserting the tabs on the fan into the notches on the top of the FLEX bay frame.



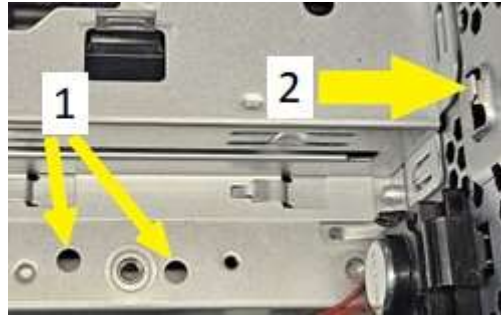
3. Press gently on the extended tab on the other side of the fan. The fan will noticeably click into place.



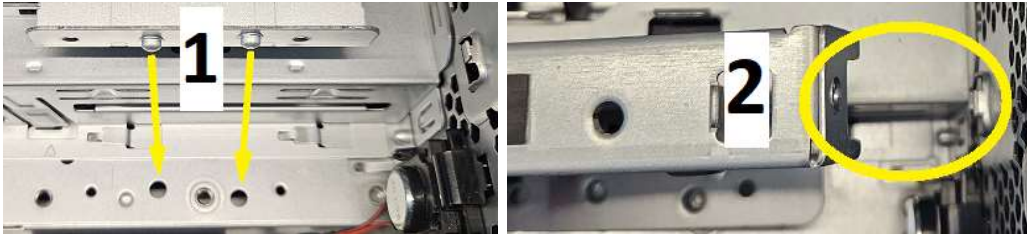
4. Locate the FLEX_BAY_FAN power connector on the motherboard between the CPU and the FLEX bay and plug in the fan.



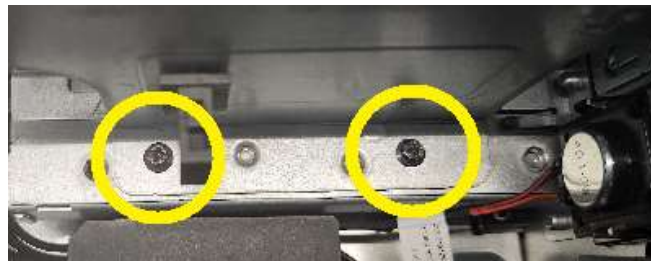
5. Install the 3rd Drive bay mount next to the FLEX bay base. Locate the offset mount holes (1) next to the FLEX bay base and the mounting point (2) on the front of the chassis wall.



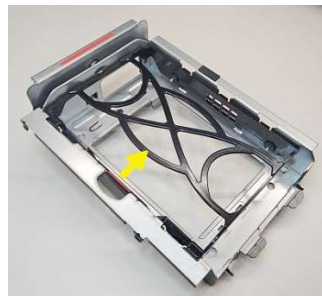
6. Align the bumps on the bottom of the 3rd Drive bay mount with the offset mount holes (1) and insure that the notch on the mount rests in the mounting point on the front of the chassis wall (2).



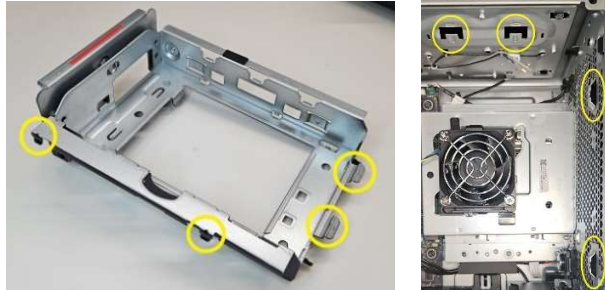
7. When the drive mount is seated properly install the two screws into the mount base, on either side of the indents, securing it to the chassis.



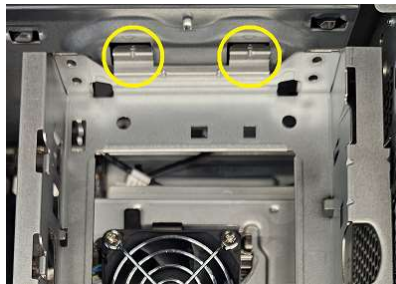
8. Remove the drive carrier from the 3rd Drive Bay tray by pulling in on the red handle and lifting the tray up out of the tray.



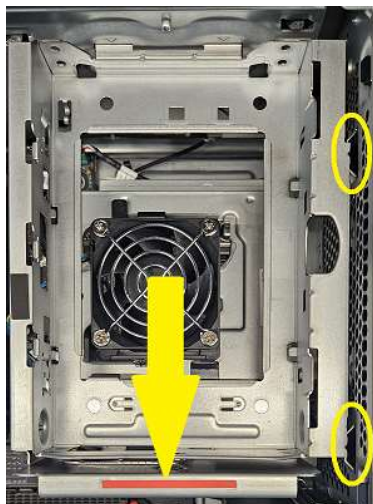
9. Identify the tabs on side and end of the tray. Identify the matching notches in the wall of the top of the chassis and the side of the chassis.



10. Holding the tray with the red handle end up at a slight angle, fully insert the tabs into the top wall of the chassis.



11. When the tray has been inserted properly, the other end will easily lower down onto the top of the 3rd Drive bay mount. Be sure the side tabs insert into the notches on the front wall of the chassis. The tray should lower easily to the top of the mount. Push slightly on the red handle on the end of the drive tray and the tray will click into place.



12. Set the drive carrier on a flat surface, upside down, as seen in the below image. Note the position of the red handle.



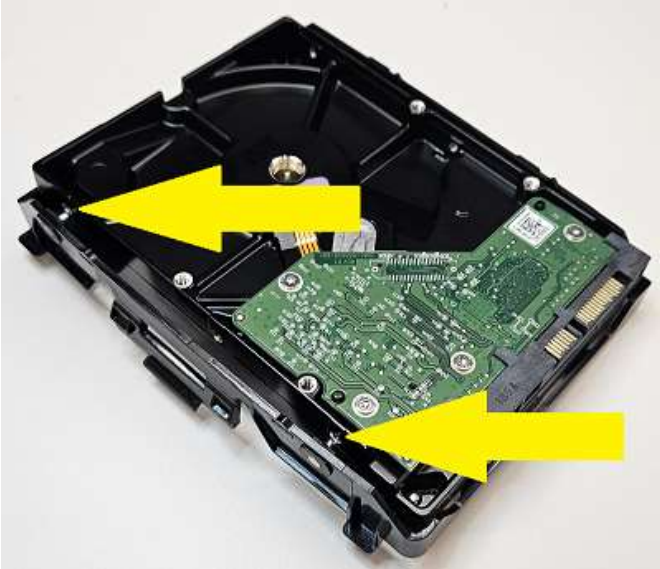
13. Align the drive, upside down, so that the signal and power plugs are on the end of the carrier as seen in the below image.



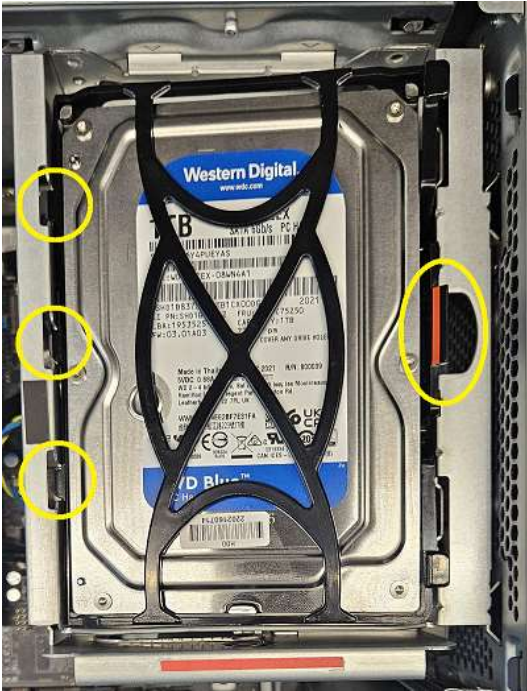
14. Line up the holes on the side of the drive with the posts on the inside of the carrier and insert the posts into the holes.



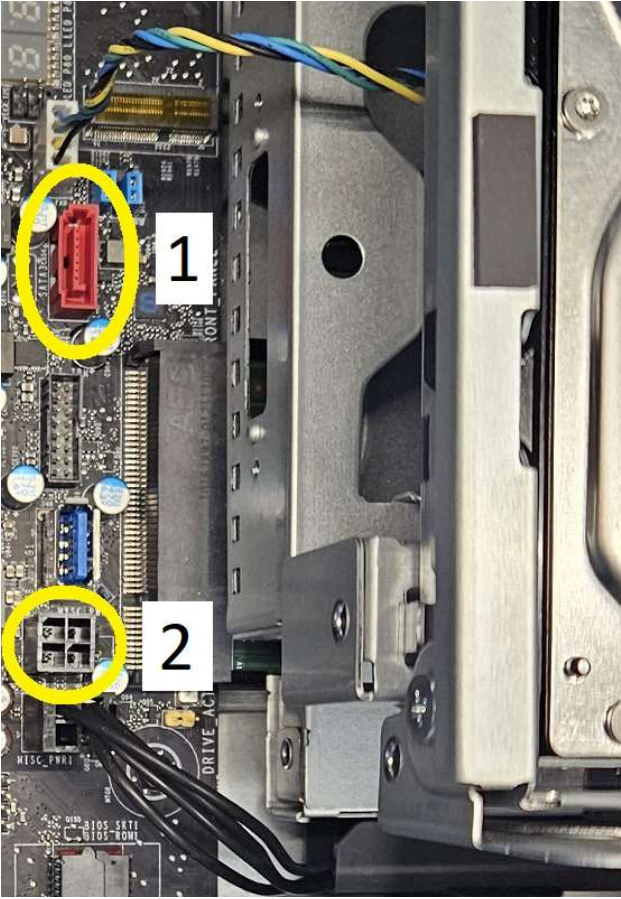
15. Gently bend the open side of the carrier outward, until the posts on the carrier can clear the side of the drive and insert the posts into the holes on the side of the drive.



16. Align the tabs on the side of the drive carrier with the notches on the inside of the tray and insert the tabs. Lower the carrier side with the red handle down into the tray and press on the red handle until it clicks into place.



17. Locate the SATA3 signal (1) and MISC_PWR2 power (2) ports on the motherboard, between the CPU and the 3rd Drive Bay and plug in the SATA signal cable and SATA 1-drop power cable into the motherboard.

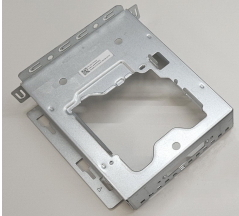


18. Plug the SATA signal and power plugs into the drive.

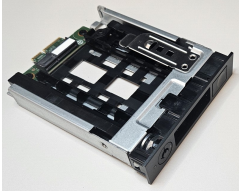


FLEX Bay Parts

FLEX Bay Frame
FRU: 5M11H28588



FLEX Bay Tray
FRU: 5C51H31595



FLEX Bay Bezel Adapter
FRU: 5M11H28587



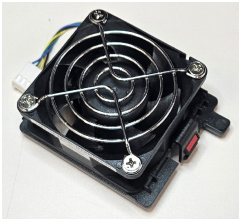
FLEX Bay Carrier
FRU: 5M11C16902



FLEX Bay Cable 105mm
FRU: 5C10U58624



FLEX Bay Fan
FRU: 5M11C16911

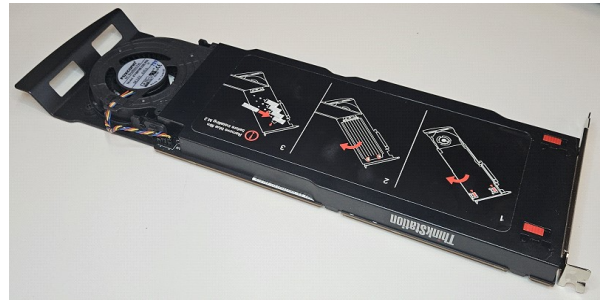


FLEX Bay Tray Keys and Key Carrier
(Included with FLEX Bay Tray)



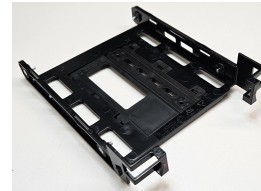
Quad M.2 Gen 3 Add-In-Card

PN: 4XH0V09766



Internal SATA Bay Parts

SATA Drive Tray
(Two included with system)



SATA Signal Cable Straight to Angle,
250MM
FRU: 5C10U58479



Front HDD Bay Fan Parts

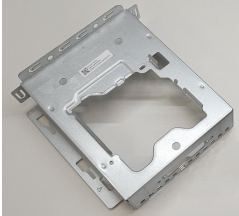
Storage Bay Fan
FRU: 5F10U94085

Storage Bay Fan Holder
FRU: 5M11H28595

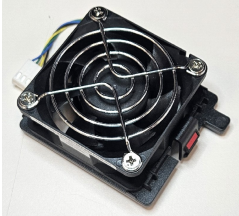


3rd HDD Bay Parts

FLEX Bay Frame
FRU: 5M11H28588



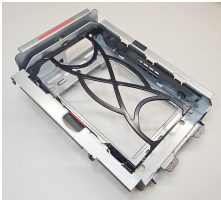
FLEX Bay Fan
FRU: 5M11C16911



3rd Drive Bay Mount
FRU: 5M11H28591



3rd Drive Tray with Carrier
FRU: 5M11H28590



SATA Signal Cable Straight to Angle,
350MM
FRU: 5C10U58385



SATA 1-Drop Power Cable, 300mm
FRU: 5C10U58388





Revision History

Version	Date	Author	Changes/Updates
1.0	5/26/23	Scott C	Initial Draft