

Lenovo ThinkStation Boot Block Recovery

Lenovo ThinkStations



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Overview

The purpose of this document is to provide details on how to perform a Boot Block Recovery (BBR) of the BIOS on most of the modern ThinkStation workstations in the event of an unrecoverable BIOS failure. If the system is believed to have a corrupted BIOS, and other options such as clearing the CMOS have been attempted, the BBR process can be used as a last resort to attempt to rewrite the BIOS at a base level to restore system functionality.

This is a last resort option and should never be performed on a properly functioning system. When opting to perform a BBR users should proceed with caution as this is done at users own risk for systems that are already considered non-bootable.

Section 1 – Boot Block Recovery

The typical BBR process will involve a number of steps that will be detailed in Section 4. At a high level, across all of the systems, the steps will involve downloading the current BIOS version, extracting a specific file or files to a USB memory key, moving the CMOS jumper to the clear position, and powering on the computer with the USB memory key inserted for the system to complete the process. Depending on the system the behavior during this process may vary and this document will identify the differences between the systems.

There is an existing YouTube tutorial demonstrating the process on a ThinkStation P620 that can be found [here](#). This document is meant to provide additional information with system specific details on the BBR process.

Things to note about a BBR:

- As part of the debugging process, it is expected that a system would have all hardware removed except for only those parts necessary for the system to boot. If that has not been done, it is recommended to remove any unnecessary hardware before attempting the BBR process.
- Best practices recommendations are to only attempt to recover to a more recent BIOS version. Of special note, users should never attempt a BBR to any BIOS older than the BIOS that was on the system when it shipped. Users should also take precautions if the CPU has been upgraded to a newer generation. Attempting to downgrade the BIOS in either of these scenarios, even if the BBR initially appears successful in repairing the BIOS, could result in the system no longer booting.
- During this process the CMOS is reset. Most customer BIOS settings will be reset to defaults. However, certain settings, such as BIOS RAID configurations, will persist through a CMOS reset and BBR.

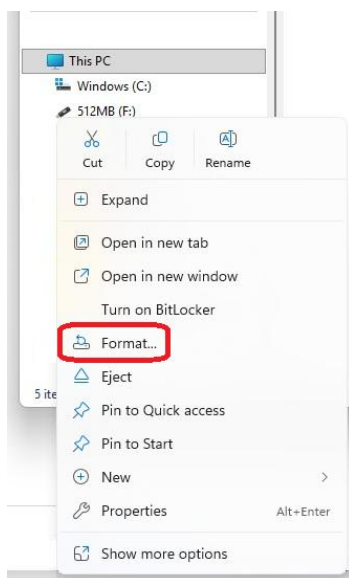
Section 2 – Preparing a USB Memory Key

It is recommended to start with a clean USB memory key formatted with a FAT file system. This can be a FAT, FAT32, or exFAT file system. The size of the memory key should not matter as long as there is enough space for the BIOS files needed, but the size of the key will determine which file systems are available by default as Windows format options. See the table below for sizing information.

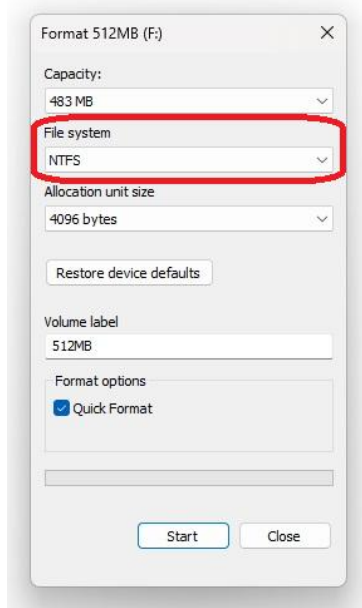
File System	Memory Key Size
FAT	All sizes up to 4GB
FAT32	All sizes up to 32GB
exFAT	All Sizes

Note: Certain memory keys, regardless of stated size, may exceed the Windows threshold changing the format options.

In Windows, insert a USB memory key into an open USB port. Browse to Windows Explorer and locate the memory key under “This PC”. Right click the entry for the memory key and select “Format...”

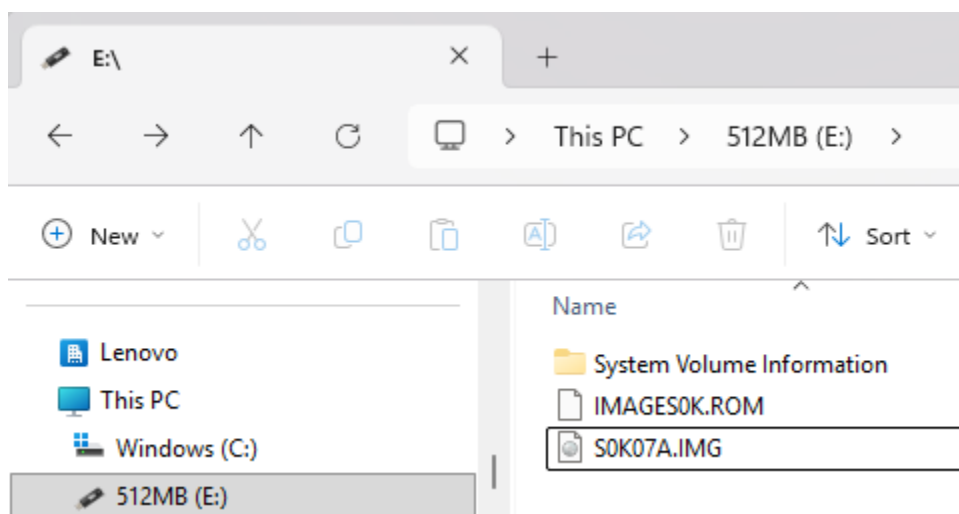


The Format window will pop up. As shown below, if any option other than FAT, FAT32, or exFAT is shown under “File system” select the drop-down arrow and select any of those options from the list.



Then select “Start” and “OK” at the warning to proceed. Once the format process has completed close out the Format window.

The formatted key with the files should look something like this. Files for a P5 Gen 2 were used in this example.



Section 3 – Downloading and Extracting the BIOS Files

It is necessary to extract the BIOS update files from the CD/ISO update package from the Lenovo support site. Here are the steps to complete this.

- 1 Go to the Lenovo support site for the specific system needing a BBR. Browse to the Drivers and Software section. Under BIOS/UEFI locate and download the “BIOS Update (CD ISO Image Version)” (or similarly named) software package. It is recommended to use the latest version from the Lenovo support site. Attempting to use older versions could lead to system issues such as processor incompatibility.
- 2 After downloading the package, the ISO must be “mounted” as a virtual drive to access the files within the image.
- 3 Right click the ISO file and select the option “Mount” and click the prompt to “open”.
- 4 The system will then mount the ISO image, assign it a drive letter, and open the drive to show the contents.
- 5 Depending on the system, the ISO will, at a minimum, have an S0XXX.IMG file and then either an IMAGEXXX.CAP or IMAGEXXX.ROM file.
- 6 The general recommendation is to copy all of the files from the mounted ISO image into the root of a USB memory key. To work properly either the IMAGEXXX.CAP or IMAGEXXX.ROM must be copied to the key. See Section 2 for instructions on preparing a USB memory key.

NOTE: The same IMAGEXXX.CAP and IMAGEXXX.ROM files found in the ISO image are also available in the zipped “USB Drive Package (UEFI Shell)” found in the same BIOS/UEFI section as the ISO image.

Section 4 – Steps to Perform a Boot Block Recovery

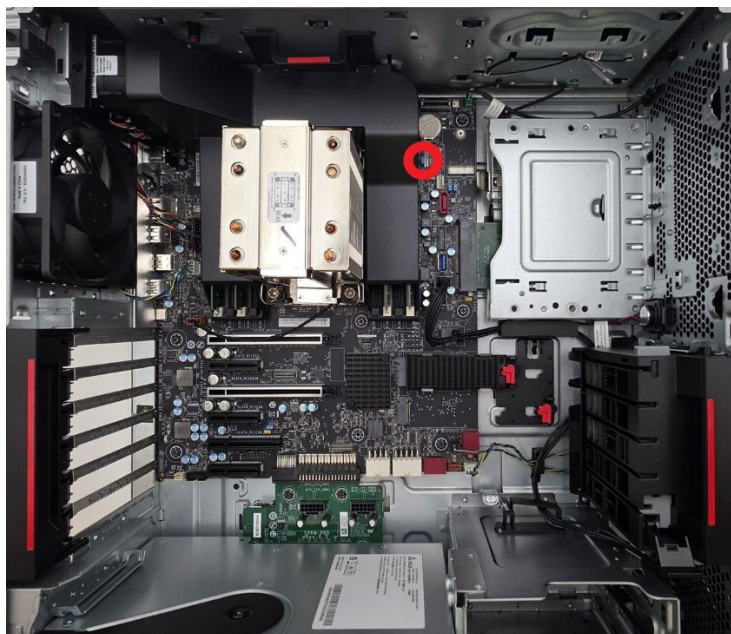
These systems all share the same basic process for how to perform a BBR with some noted differences.

- 1 See Sections 2 & 3 for instructions on preparing a USB memory key and extracting the proper files.
- 2 Power off the system and remove AC power.
- 3 Remove the system cover or lid in order to access the Clear CMOS Hardware Jumper. If necessary, remove any remaining hardware necessary to access the CMOS jumper. System specific information on CMOS jumper locations, as well as the Standard and Clear jumper positions, are shown later in this document. Do NOT alter any other jumpers in the system during this process.
- 4 Move the CMOS jumper from the Standard position to the Clear CMOS position using the system specific images provided later in this document as a reference. Verify that there is a GPU in the system, reinstalling a GPU if it was necessary to remove it to access the CMOS jumper.
- 5 Restore AC power and the system will boot or need to be booted and will automatically initiate the recovery process. There will typically be a delay before two beeps indicate the start of the process which should be followed by an on-screen BIOS update progress bar. As with a regular BIOS update, DO NOT POWER OFF THE SYSTEM DURING THIS UPDATE.
- 6 The system will automatically shut down once the recovery process has completed successfully.
- 7 Remove AC power. If necessary, remove any hardware to access the CMOS jumper and return the Clear CMOS Hardware Jumper to the Standard position, remove the USB memory key, verify there is a GPU in the system and replace the system cover or lid.
- 8 Restore AC power and the system should boot or need to be booted and will boot to a CMOS reset BIOS error "Setup data integrity error". Press F1 to enter BIOS. It is then recommended to select F9 to reset BIOS to defaults, and then F10 to save and reboot the system.
- 9 The system should boot and function properly.
- 10 After verifying functionality, reinstall any hardware that was previously removed and replace the cover or lid.

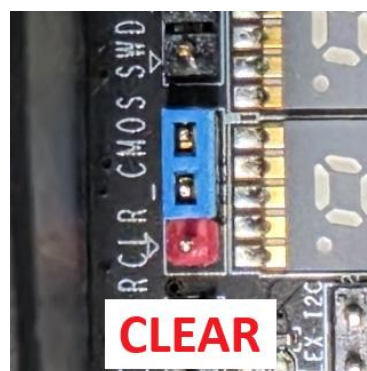
Section 5 – System Specific Clear CMOS Jumper Locations and Positions

Section 5.1 - P5 Gen 1

Location of the Clear CMOS jumper in the P5 Gen 1 chassis circled in red. The front of the system is on the right.

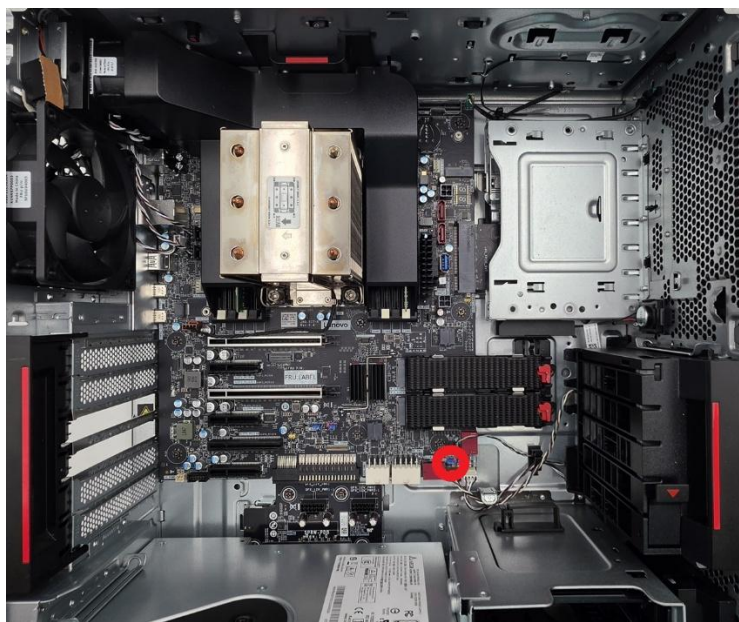


Positions for CMOS jumper. Standard position is shown on the left and Clear CMOS position is shown on the right. Jumper colors found inside individual systems may vary from below images.

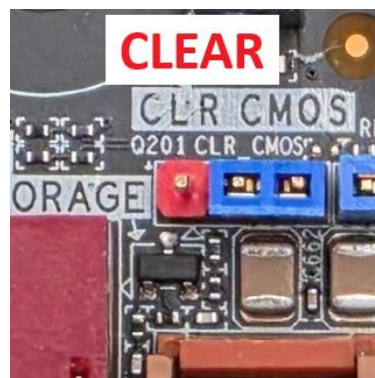
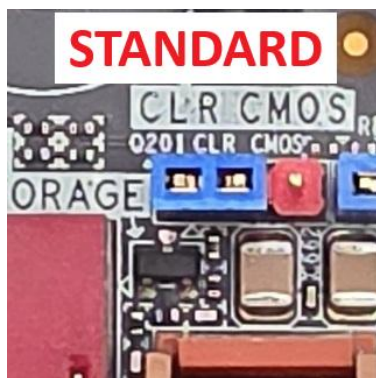


Section 5.2 - P5 Gen 2

Location of the Clear CMOS jumper in the P5 Gen 2 chassis circled in red. The front of the system is on the right.



Positions for CMOS jumper. Standard position is shown on the left and Clear CMOS position is shown on the right. Jumper colors found inside individual systems may vary from below images.

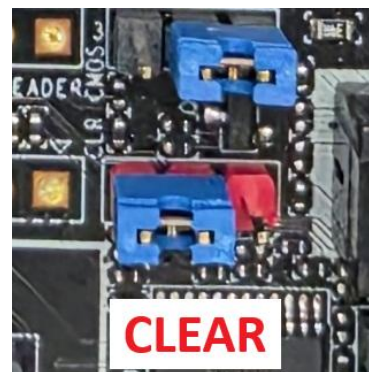
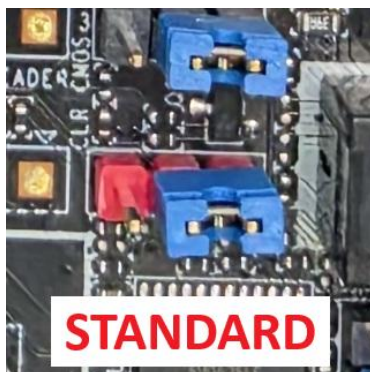


Section 5.3 - P7

Location of the Clear CMOS jumper in the P7 chassis circled in red. The front of the system is on the right.



Positions for CMOS jumper. Standard position is shown on the left and Clear CMOS position is shown on the right. Jumper colors found inside individual systems may vary from below images.

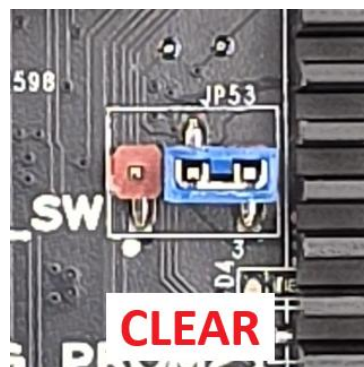
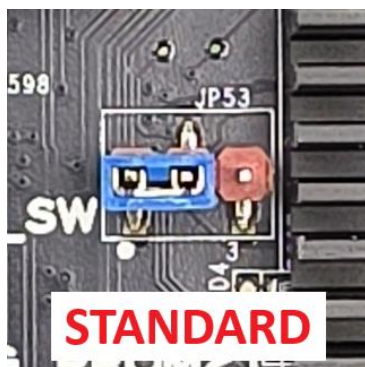


Section 5.4 - P8

Location of the Clear CMOS jumper in the P8 chassis circled in red. The front of the system is on the right.

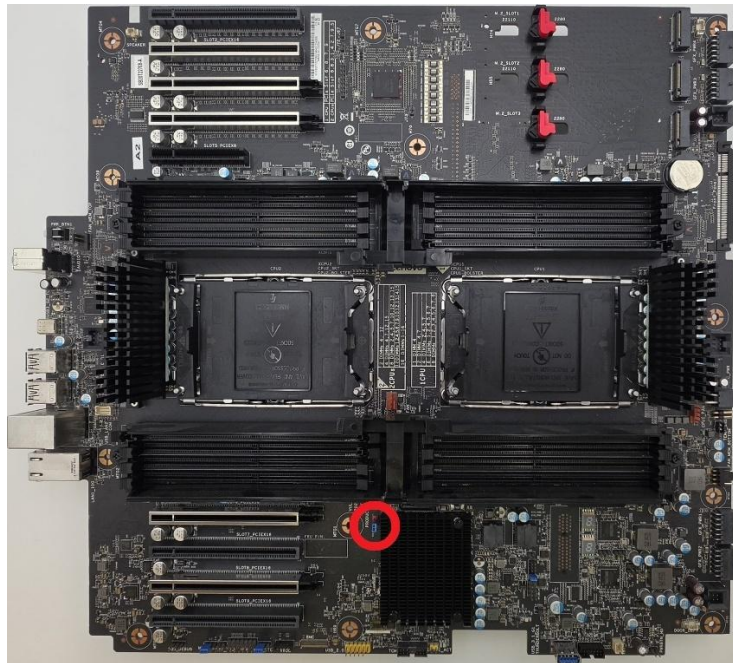


Positions for CMOS jumper. Standard position is shown on the left and Clear CMOS position is shown on the right. Jumper colors found inside individual systems may vary from below images.

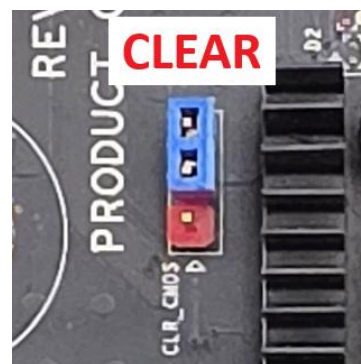
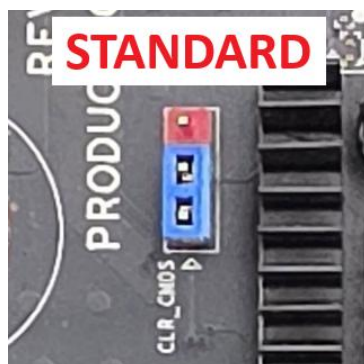


Section 5.5 - PX

Location of the Clear CMOS jumper on the PX motherboard circled in red. The front of the system is on the right.



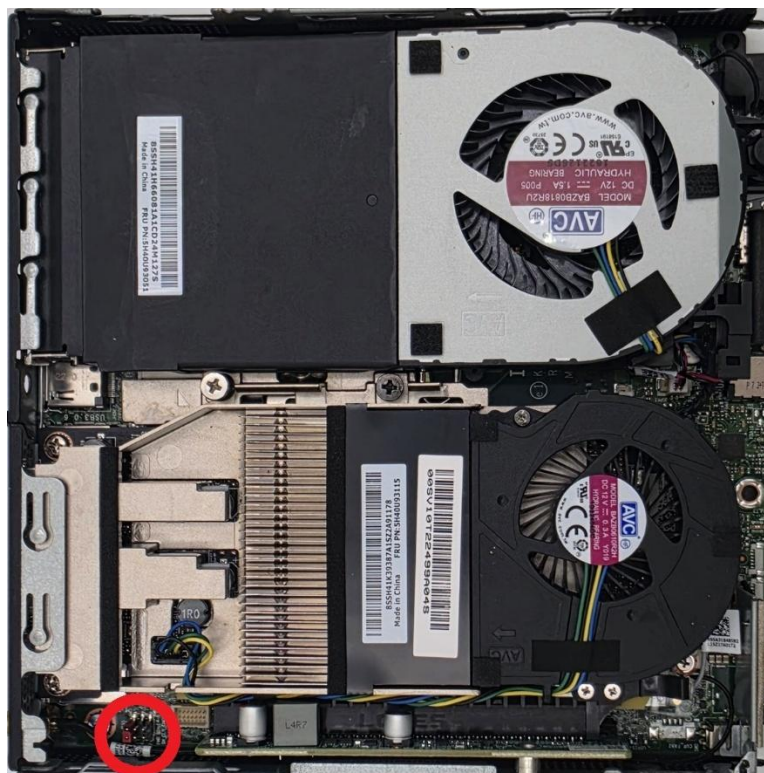
Positions for CMOS jumper. Standard position is shown on the left and Clear CMOS position is shown on the right. Jumper colors found inside individual systems may vary from below images.



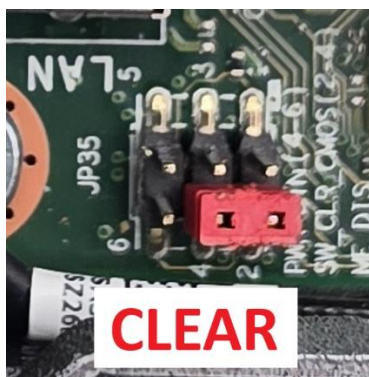
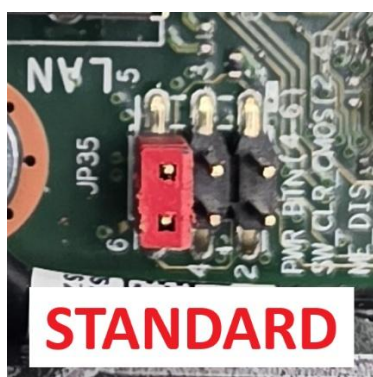
Section 5.6 - P3 Tiny Gen 1

Location of the Clear CMOS jumper in the P3 Tiny Gen 1 chassis circled in red. The front of the system is on the right.

NOTE: The jumpers for the Tiny and Ultra systems are very small. Take care when removing or installing them and handle them carefully so as not to drop them.



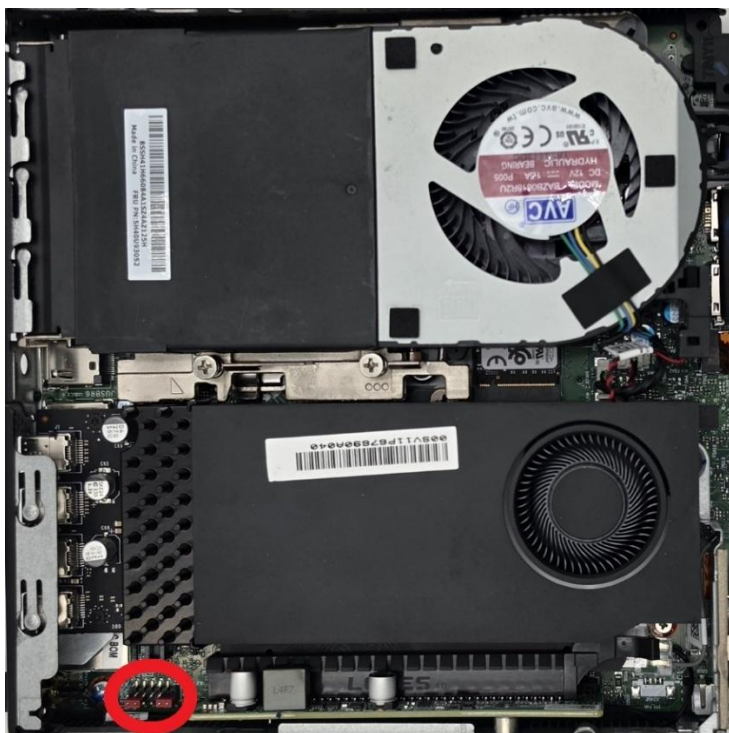
Positions for CMOS jumper. Standard position is shown on the left and Clear CMOS position is shown on the right. Jumper colors found inside individual systems may vary from below images.



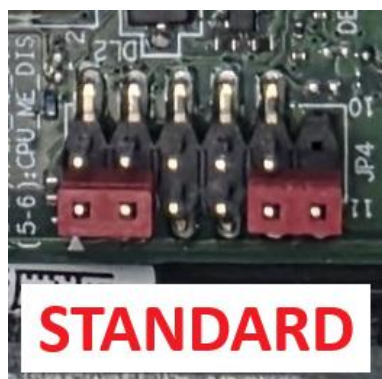
Section 5.7 - P3 Tiny Gen 2

Location of the Clear CMOS jumper in the P3 Tiny Gen 2 chassis circled in red. The front of the system is on the right.

NOTE: The jumpers for the Tiny and Ultra systems are very small. Take care when removing or installing them and handle them carefully so as not to drop them.



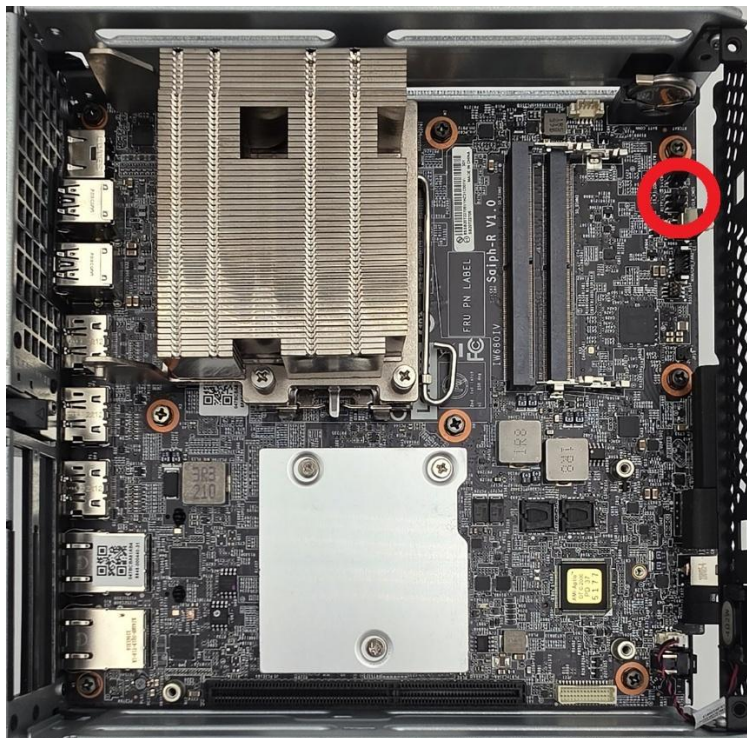
Positions for CMOS jumper. The P3 Tiny Gen 2 Clear CMOS jumper sits within a larger pin set than previous generations and there is an additional jumper that should not be moved. Only move the Clear CMOS jumper as shown in the images. Standard position is shown on the left and Clear CMOS position is shown on the right. Jumper colors found inside individual systems may vary from below images.



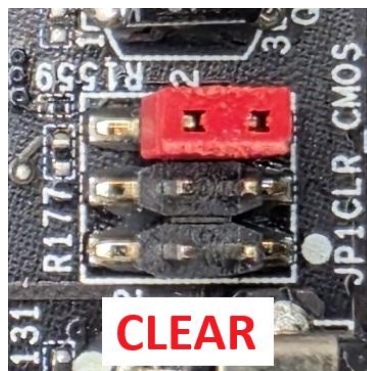
Section 5.8 - P3 Ultra Gen 1

Location of the Clear CMOS jumper in the P3 Ultra Gen 1 chassis circled in red. The front of the system is on the right.

NOTE: The jumpers for the Tiny and Ultra systems are very small. Take care when removing or installing them and handle them carefully so as not to drop them.



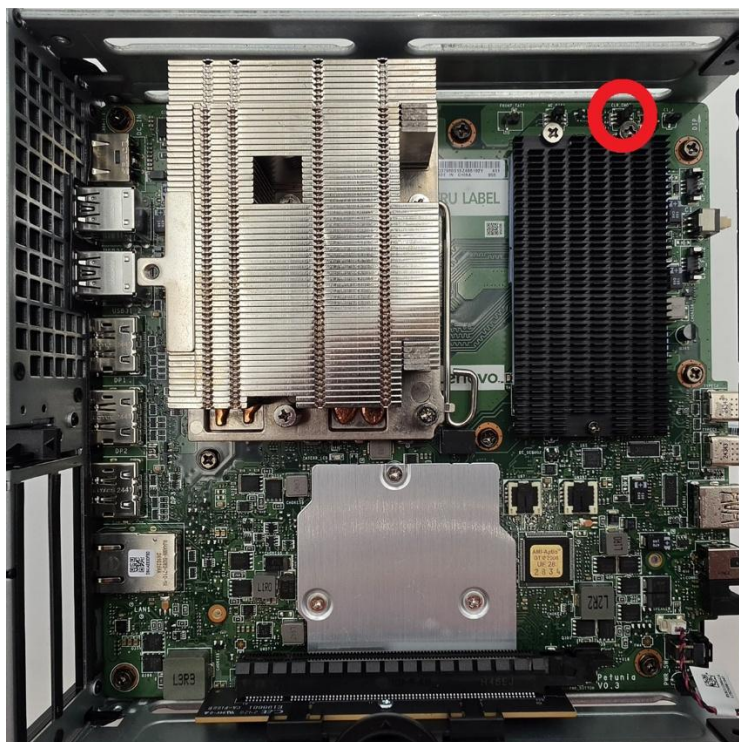
Positions for CMOS jumper. Standard position is shown on the left and Clear CMOS position is shown on the right. Jumper colors found inside individual systems may vary from below images.



Section 5.9 - P3 Ultra Gen 2

Location of the Clear CMOS jumper in the P3 Ultra Gen 2 chassis circled in red. The front of the system is on the right.

NOTE: The jumpers for the Tiny and Ultra systems are very small. Take care when removing or installing them and handle them carefully so as not to drop or damage them.



Positions for CMOS jumper. Standard position is shown on the left and Clear CMOS position is shown on the right. Jumper colors found inside individual systems may vary from below images.

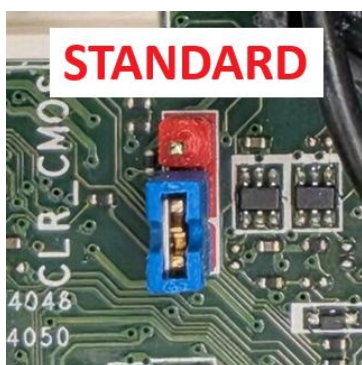


Section 5.10 - P2/3 Tower Gen 1

Location of the Clear CMOS jumper on the P2/3 Tower Gen 1 motherboard circled in red. The chassis shown below is the P3 Tower. The front of the system is on the right.

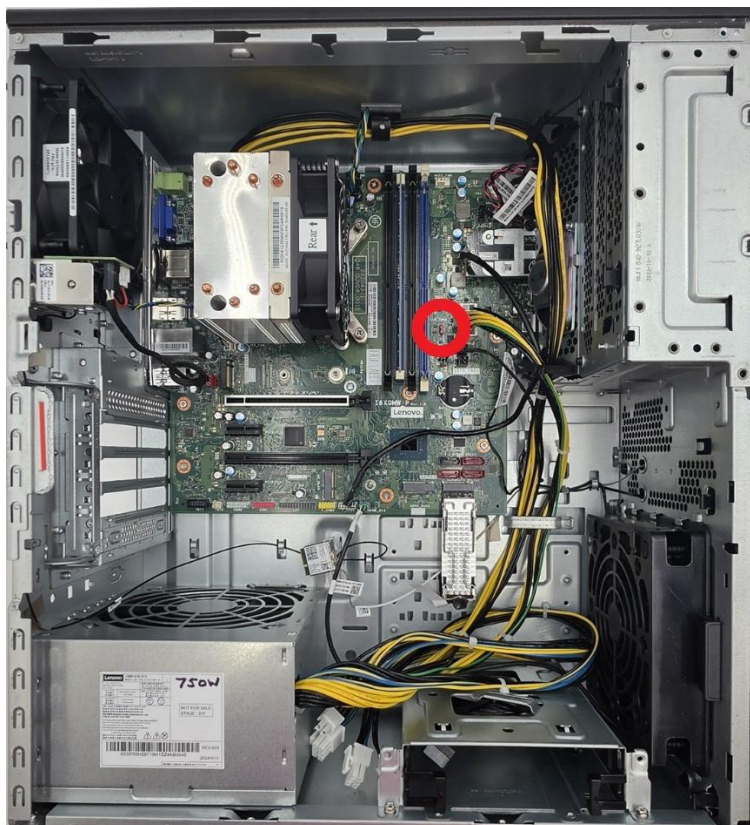


Positions for CMOS jumper. Standard position is shown on the left and Clear CMOS position is shown on the right. Jumper colors found inside individual systems may vary from below images.



Section 5.11 - P2/3 Tower Gen 2

Location of the Clear CMOS jumper on the P2/3 Tower Gen 1 motherboard circled in red. The chassis shown below is the P3 Tower. The front of the system is on the right.



Positions for CMOS jumper. Standard position is shown on the left and Clear CMOS position is shown on the right. Jumper colors found inside individual systems may vary from below images.



Section 5.12 - P4

Location of the Clear CMOS jumper in the P4 chassis circled in red. The front of the system is on the right.



Positions for CMOS jumper. Standard position is shown on the left and Clear CMOS position is shown on the right. Jumper colors found inside individual systems may vary from below images.



Section 6 – Considerations

If any part of the processes in the previous sections fail, there are still options to try.

- Create a CD/DVD disc using the ISO image that was downloaded and following the same steps in Section 4, use a USB CD/DVD player attached to the system in place of a USB memory key.
- Redownload the BIOS update package or try the previous version that is usually still available from the Lenovo Support website.
- Change the USB memory key being used. Attempt to use a different size, model, or even a different brand than was previously used.
- If all attempts still fail, users can post in the Lenovo ThinkStation [forums](#) or contact Lenovo [support](#) for further information or assistance.

Revision History

Version	Date	Author	Changes/Updates
1.0	7/22/2026	Scott C	Initial Release