

[Game Master] Gaming Performance Optimization & Troubleshooting for NVIDIA Graphics Notebooks

This document supplies you with useful solutions if you're encountering the problems below in games. Please follow the instruction for troubleshooting.

- Low performance, FPS drop, stutter
- Timeout Detection and Recovery (TDR), Blue Screen of Death (BSOD)
- Game/System freeze, crash
- Flicker, black screen, garbage screen, or other graphics artifacts
- Audio problem, like sound stutter/delay, distorted sound, or microphone related
- Connection problem, like ping spikes

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1. Before Starting

If your game doesn't work properly on the notebook, there are several possible reasons why. Before starting the troubleshooting, please check the notebook's hardware configuration is the same with original, your notebook meets or exceeds the system requirements, you have the proper system environment, and the notebook's performance is normal.

Besides, please keep your game updated to prevent the problem from out-of-date or corrupted files.

1.1. Check if the hardware configuration is the same as the original

If you upgraded the memory or SSD, we suggest you return to the original condition since the notebook was shipped without a problem, and we should check if your problem exists with the condition.

Unplug any non-required external devices

You may have other devices plugged into your notebook (such as a webcam, external hard drive, or USB drives like gaming mouse or keyboard). Some device driver or their software might conflict with your system. MSI suggests you remove these external devices for troubleshooting.

1.2. Check the system requirements of the game

To play a game without problems, all game needs certain hardware components or other software resources to be present on a computer. These prerequisites are known as system requirements and are often used as a guideline. The most game defines two sets of system requirements: **minimum and recommended**. With the increasing demand for higher processing power and resources in newer versions of the game, system requirements tend to increase over time.

Make sure your notebook meets the game's recommended system requirements.

1.3. Check the system environment

The system environment includes the BIOS/EC firmware, Windows Update, and the proper driver and utility. Please check your system environment by following the instruction below.

➤ BIOS and EC firmware

Since the new BIOS and EC firmware fix some potential issues and improve the system stability, MSI suggests you try to update the latest BIOS and EC firmware from the download webpage of your notebook.

❶ FAQ [\[How To\] BIOS, EC Update and EC Reset](#)

➤ Windows Update

After applying the latest Windows Update (e.g. Windows 10 Anniversary/Redstone 1 Update “build 14393”), some device functions or software might not work properly.

MSI suggests you keep running Windows Update to download the important or critical hotfix.

❶ FAQ [\[How To\] Get and Install the Latest Windows 10 Build](#)

❶ Tutorial [MSI® HOW-TO get the latest Windows Update](#)

➤ Install the proper driver and utility

MSI suggests you install the latest MSI approved driver and utility from the MSI website. It helps you to get the most stable system environment.

- NVIDIA and Intel graphics driver

MSI suggests you try the graphics driver on the MSI website at the beginning but we also recommend you try the generic graphics driver on the Nvidia website since the generic version supports the latest feature and includes patches for known issues.

- Realtek audio driver and audio effect software (Nahimic)

- Network driver (LAN/Wireless LAN)

- Dragon Gaming Center (For notebook with NVIDIA GTX 900M series graphics or older generation)

- Dragon Center/Creator Center (Win32)

- MSI Dragon Center/Creator Center (UWP)

- ❗ FAQ [\[How To\] Driver/Software Install and Update](#)
- ❗ FAQ [\[How To\] Intel graphics driver Clean Install & Update](#)
- ❗ FAQ [\[How To\] NVIDIA graphics driver Clean Install & Update](#)
- ❗ Tutorial (Go to the support of your notebook and check if there is MSI Driver & App Center or only MSI Dragon Center/Creator Center)
 - [Install driver by using Live Update in MSI Dragon Center/Creator Center](#) (Intel 10th gen or later CPU notebook)
 - [Install driver by using MSI Driver & App Center](#) (Intel 9th gen or older CPU model notebook)

1.4. Check the graphics performance

If the graphics score in 3DMARK Fire Strike and the FPS in other games are normal, please refer to [the Basic Troubleshooting](#) for more information.

A. Perform the 3DMARK Fire Strike benchmark.

[Download 3DMARK Basic Edition \(FREE\) from the Futuremark website.](#)

B. Compare the graphics score below.

Graphics	GTX 980 SLI	GTX 980	GTX 980M SLI	GTX 980M
Graphics Score	237XX	126XX	186XX	96XX
Graphics	GTX 970M	GTX 965M	GTX 960M	GTX 950M
Graphics Score	73XX	60XX	41XX	30XX

(3DMark Basic Edition v2.0.2067)

Graphics	GTX 1080 SLI	GTX 1080	GTX 1070 SLI	GTX 1070	GTX 1060
Graphics Score	390XX	215XX	322XX	167XX	113XX

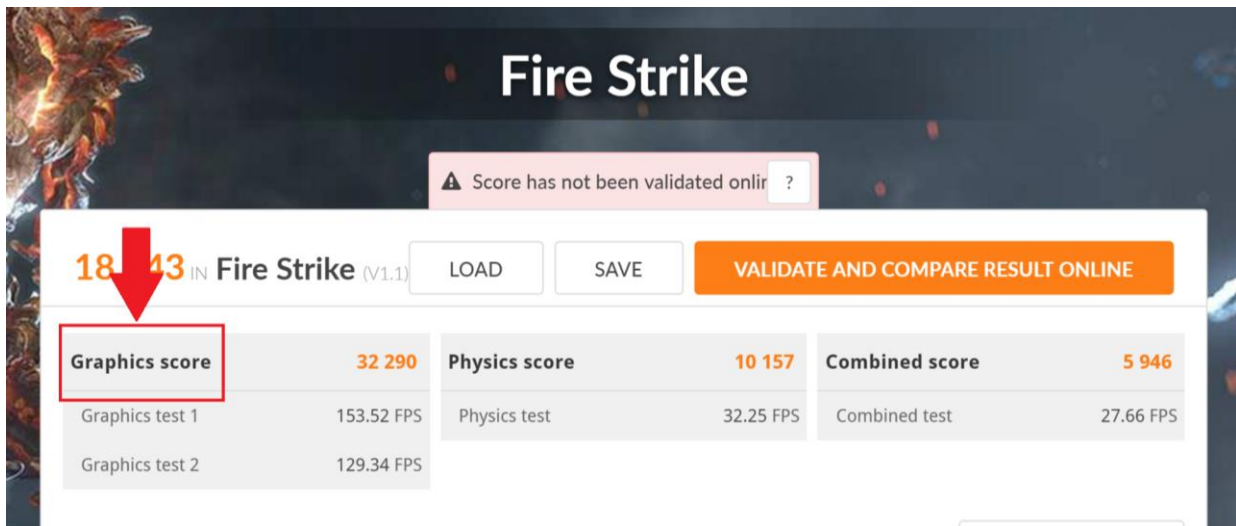
(3DMark Basic Edition v2.1.2973)

Graphics	RTX 2080	RTX 2070	RTX 2060	GTX 1660Ti	GTX 1650
Graphics Score	254XX	200XX	154XX	144XX	91XX

(3DMark Basic Edition v2.8.6546)

Graphics	RTX 2080 Super	RTX 2080 Super Max-Q	RTX 2070 Super	RTX 2070 Super Max-Q
Graphics Score	252XX	202XX	220XX	194XX

(3DMark Basic Edition v2.10.6799)



- i Most users have incorrect expect on the graphics performance, they expect high FPS with the highest in-game setting. (In fact the default video setting in some game like LOL is only medium for GTX 960M graphics card.)

1.5. Update the game

Some FPS drop or low-performance problem might relate to the game patch is installed incorrectly, MSI suggest you remove and install the game

Reinstalling from the most recent version of the setup files ensures that any problems you experience with the game are not caused by out-of-date or corrupted files.

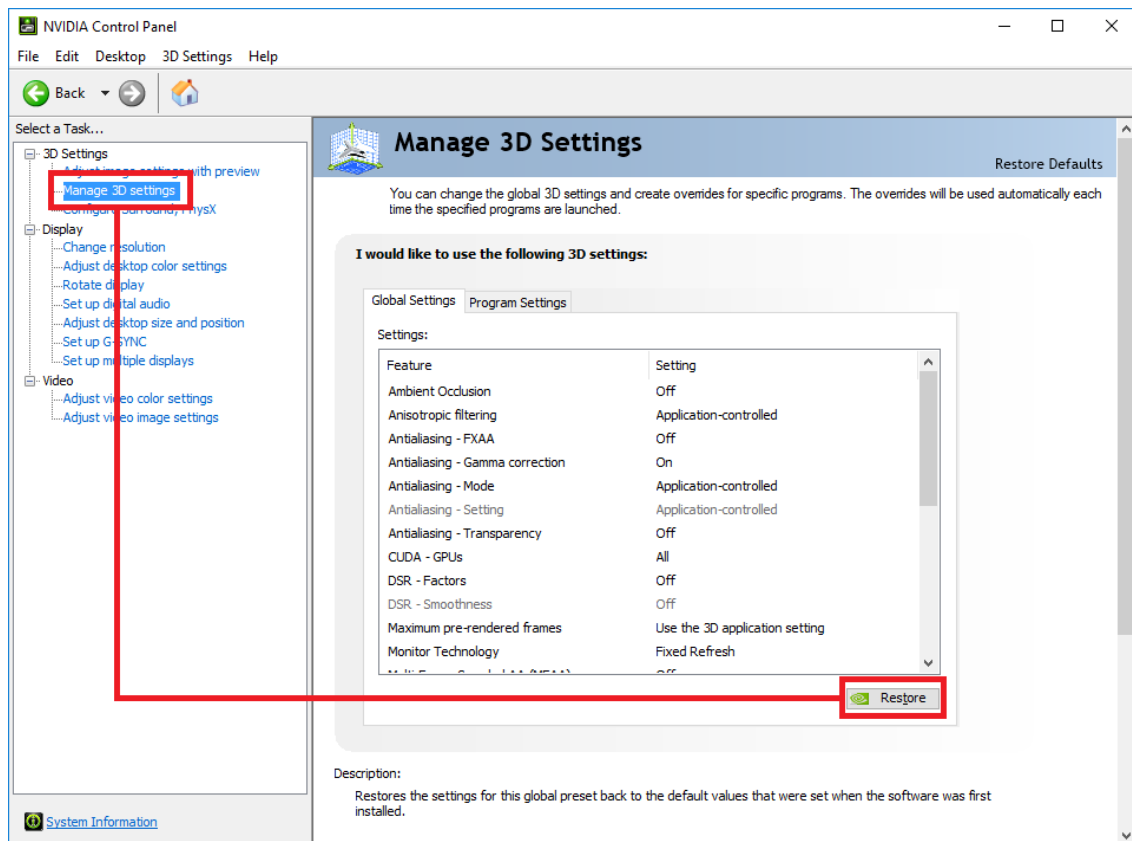
2. Basic Troubleshooting

2.1. Graphics card setting

➤ Restore NVIDIA graphics setting

Click on “Restore” to restore display related settings, and check whether the application or game controls the settings.

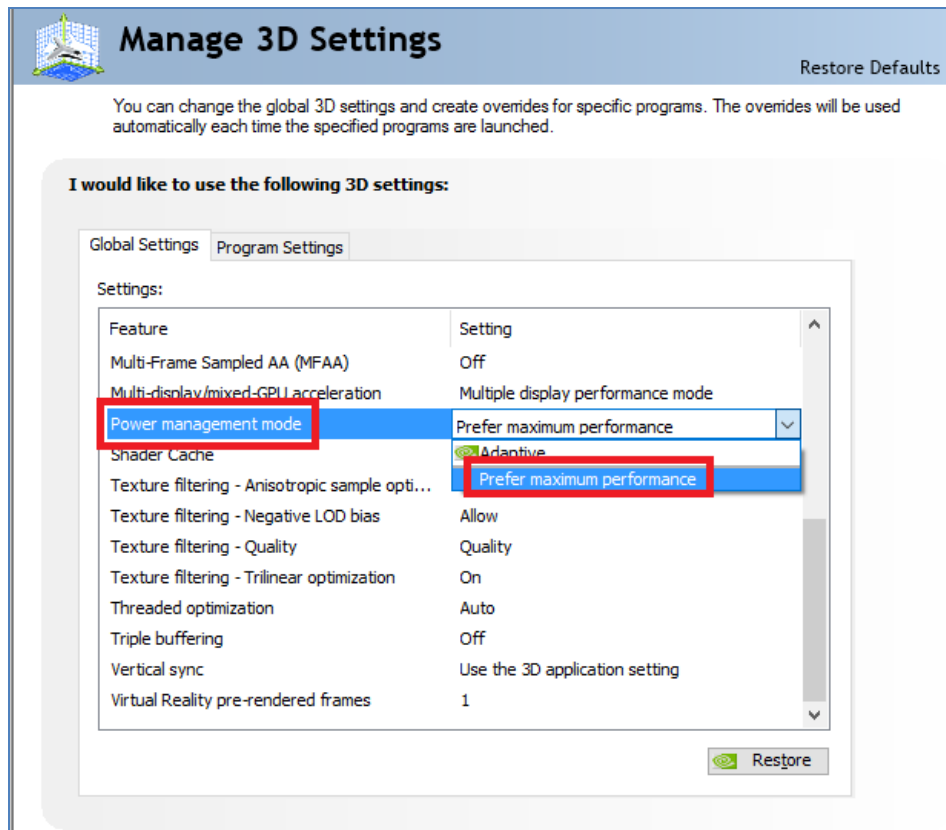
This step avoids unstable performance caused by interfered settings.



➤ Power management mode

Setting this item helps to improve the performance in some games and applications.

3D settings → Power management mode → Prefer maximum performance

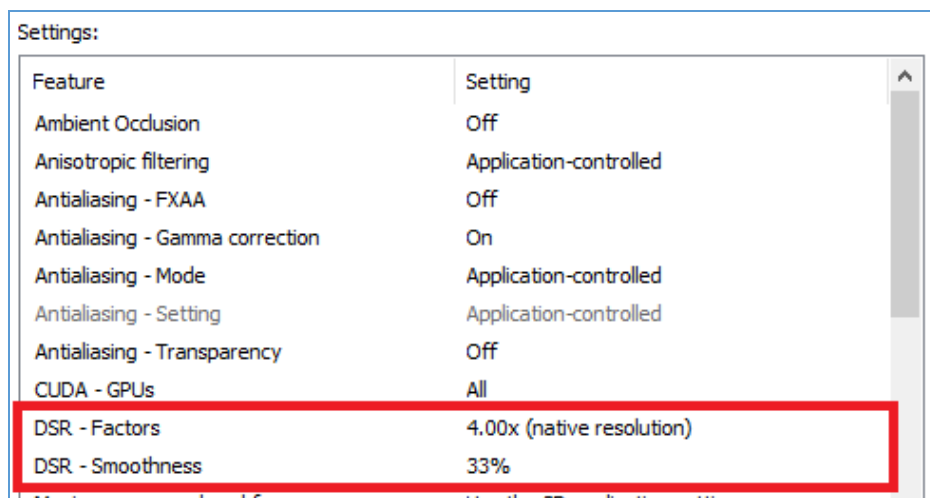
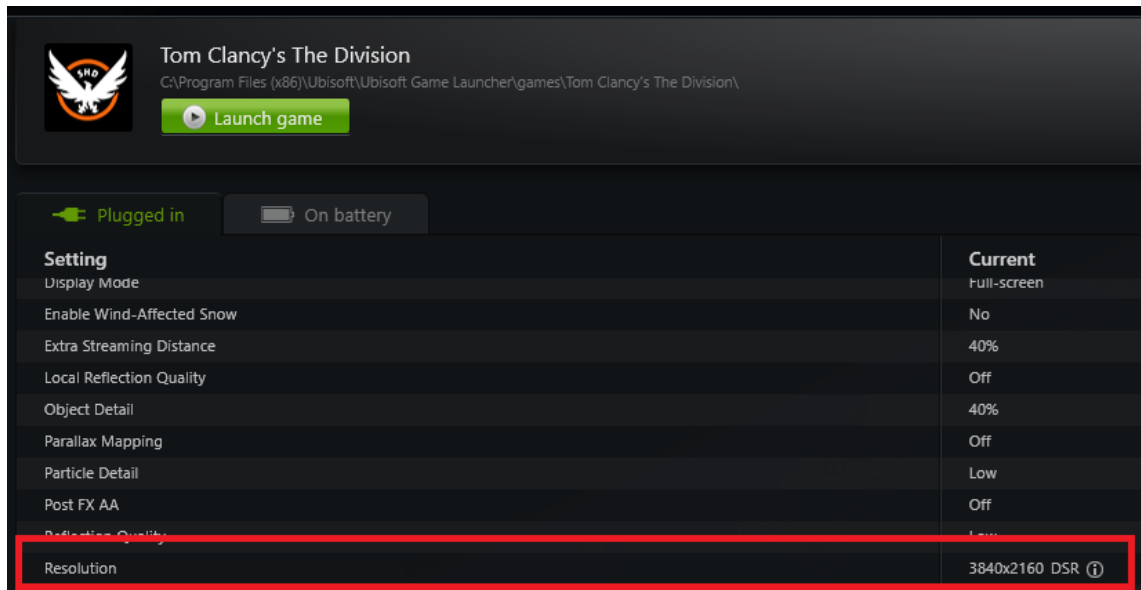


➤ NVIDIA DSR

If the user performs “Optimize” in NVIDIA GeForce Experience, the DSR could be turned on automatically in the NVIDIA control panel, and then it will affect the game performance and cause low fps. MSI suggests you disable this item manually in the NVIDIA control panel.

Besides, the in-game setting “Resolution” might be enabled by DSR and override the native resolution of the internal panel. MSI suggests you disable DSR and adjust the resolution back to native resolution.

If you cannot find this option, please skip this step because Nvidia might have removed this option from the graphics driver.



➤ NVIDIA V-SYNC

V-Sync matches the frame rate to screen refresh rate, and usually, the screen refresh rate is 60 Hz. If you enable V-Sync, it can increase image stability but it will keep 60 FPS and then you might feel low performance; if you disable V-Sync, FPS will be not limited but you might encounter screen tears. (Adjust this item based on your FPS)

You can adjust the V-SYNC function in the NVIDIA control panel or in-game settings

Manage 3D Settings

You can change the global 3D settings and create overrides for specific programs. The overrides will be used automatically when the specified programs are launched.

I would like to use the following 3D settings:

Global Settings | Program Settings

Settings:

Feature	Setting
DSR - Smoothness	Off
Maximum pre-rendered frames	Use the 3D application setting
Monitor Technology	Fixed Refresh
Multi-display/mixed-GPU acceleration	Multiple display performance mode
Power management mode	Optimal power
SLI rendering mode	NVIDIA recommended
Shader Cache	On
Texture filtering - Anisotropic sample optimi...	Off
Texture filtering - Negative LOD bias	Allow
Texture filtering - Quality	Quality
Texture filtering - Trilinear optimization	On
Threaded optimization	Auto
Triple buffering	Off
Vertical sync	Use the 3D application setting
Virtual Reality pre-rendered frames	1

Restore

Description:
This listbox contains all of the features you can adjust on your NVIDIA GPU-based graphics card. You can change the setting of a feature using the dropdown listbox beside the feature name.

➤ NVIDIA G-SYNC

Certain games might have a compatibility issue with NVIDIA G-SYNC and it would cause stuttering, flashing black screen in games.

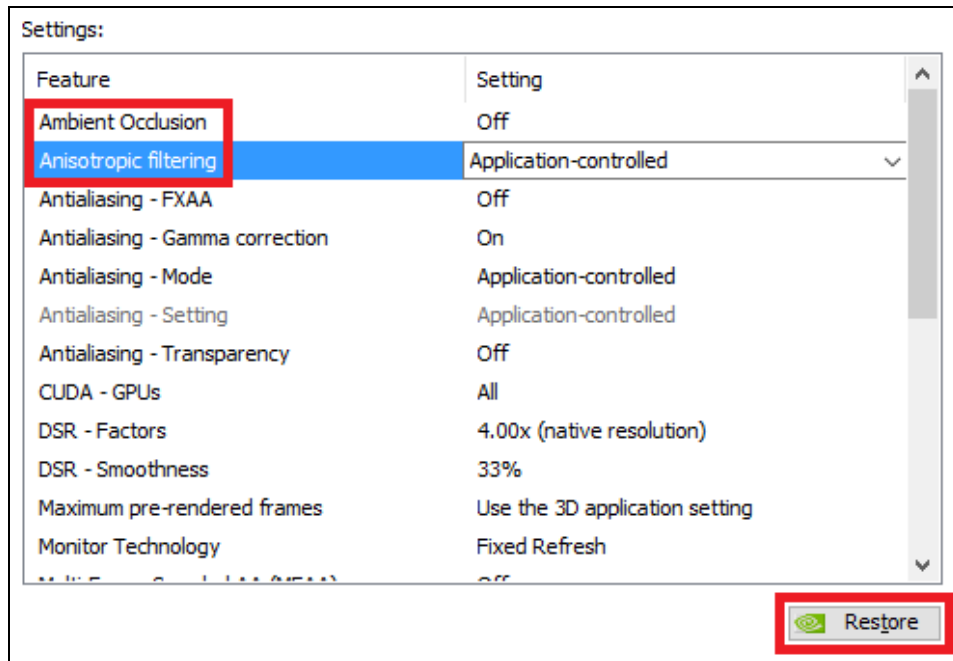
If your notebook supports G-SYNC and you encounter stuttering in games, we suggest trying to disable in the NVIDIA control panel.

i FAQ [\[How To\] Enable/Disable NVIDIA G-SYNC](#)

i FAQ [\[Product Information\] Whether the notebook supports NVIDIA G-SYNC or not](#)

➤ Other display settings

Ambient Occlusion, Anisotropic Filtering, Anti-Aliasing could cause negative effects on FPS or display stability.



2.2. Streaming service

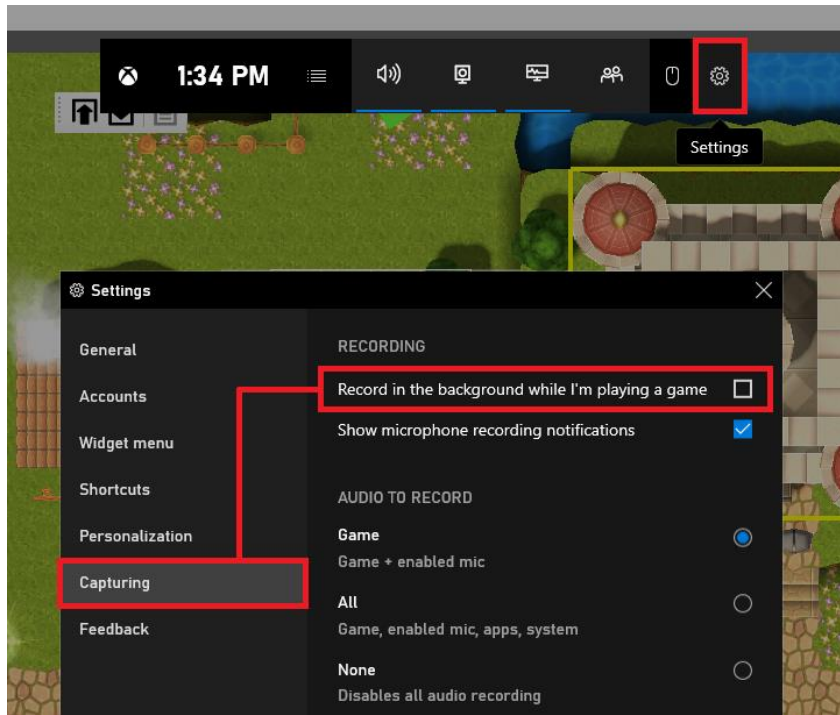
Streaming service would put additional CPU loading in the background and cause low performance, FPS drop, audio stutter, or sound delay in games. Please refer to the instructions below.

➤ Windows background recording (Xbox Game DVR)

Since Windows 10 Anniversary Update, it auto-enabled Microsoft built-in recording function. While the feature is useful if you plan on sharing clips quite regularly, it could be causing some major stutter (Refer to the [Microsoft webpage](#) or [DOTA2 forum](#)).

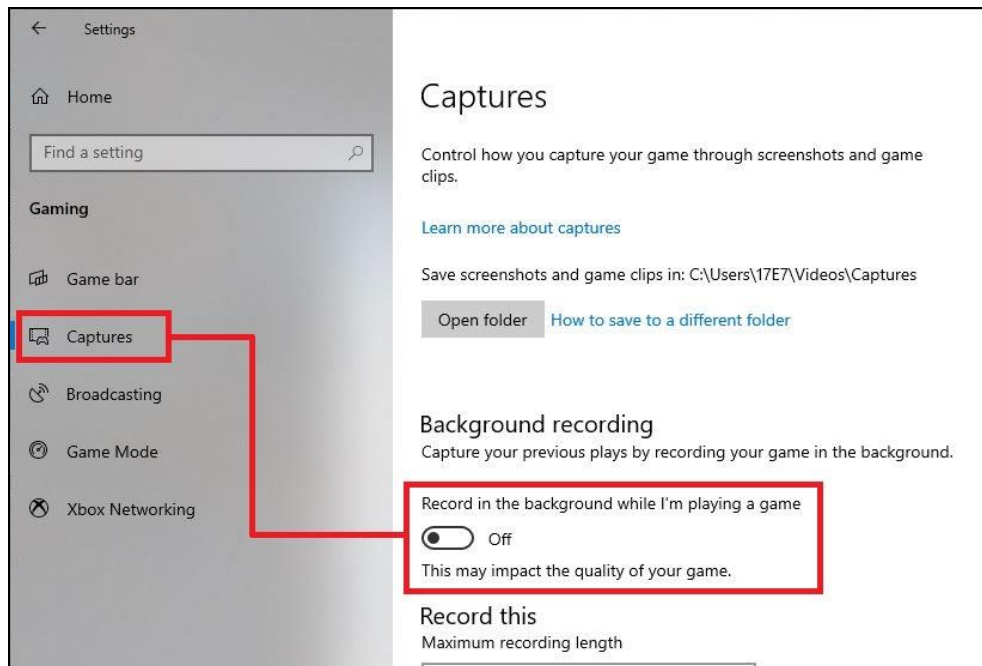
MSI suggests you disable the background recording by the methods below. (It's also recommended by [Steam](#) & [Blizzard](#) to improve FPS in games)

- Turn off background recording in a game
 - a. Run a game
 - b. Press the “Windows logo” + “G” key to open the game bar
 - c. Select “Settings”
 - d. In the “Capturing” tab, uncheck the “Record in the background while I’m playing a game” checkbox.



- Access the location below

Start > Settings > Gaming > Captures > turn off **Record in the background while I'm playing a game**



- Blizzard Battle.net streaming

Please refer to the steps below to turn off Battle.net streaming for Blizzard games

- Click on the Battle.net application icon to open it
- Select "Settings"

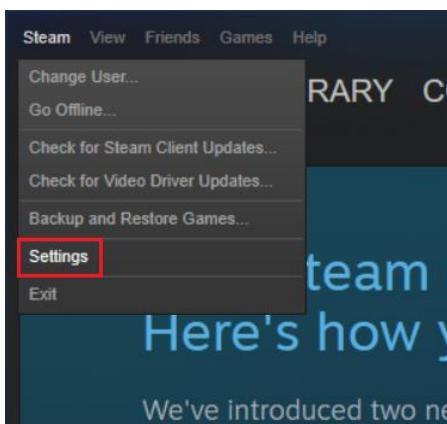
- c. Click the “Streaming” icon on the left side of the Battle.net Settings window
- d. Uncheck “Enable Streaming” to turn off the streaming feature.
(Blizzard has removed “Streaming” in the current version)

➤ Steam overlay and streaming

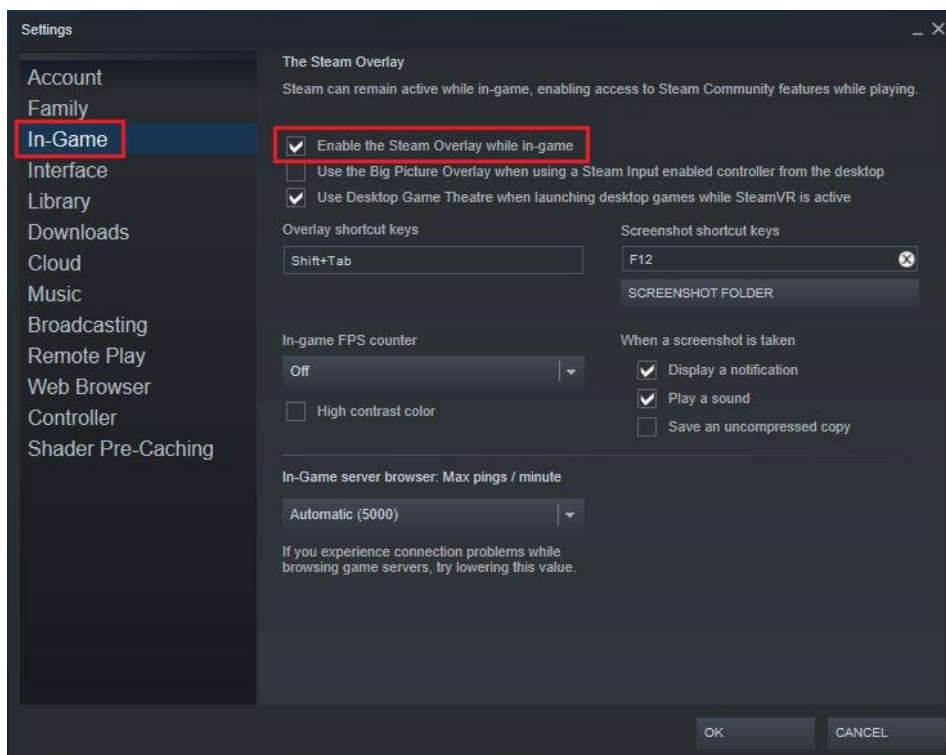
The Steam overlay allows the user to surf the web and message friends while in-game, but can also cause performance issues with some games.

Please refer to the steps below to turn off Steam overlay and streaming for Steam games.

- a. Click on the Steam application icon to open it
- b. Select “Settings”



- c. Click the “In-Game” icon on the left side of the Steam Settings window
- d. Uncheck “Enable the Steam Overlay while in-game” to turn off the Steam Overlay.



- e. Click the “In-Home Streaming” icon on the left side of the Steam Settings window
- f. Uncheck “Enable streaming” to turn off the streaming.
(Steam has removed “In-Home Streaming” in the current version)

2.3. Reinstall operation system and driver

Many reasons are causing low performance or freezing, and you cannot be able to find the root cause even if you try to troubleshoot one by one.

MSI suggests you reinstall the Windows and check the problem if you have tried to reinstall the game and graphics driver but the problem still exists.

Kindly follow the instructions below to reinstall the operation system and driver, and then you will have a clean system environment.

- Notebook with Pre-installed system :
 - a. Use the *F3 recovery* function or *the recovery media created by BurnRecovery* to restore the system to the factory setting.
[\(FAQ\) How to use F3 Recovery on MSI Windows 10 preloaded system?](#)
[\(FAQ\) How to use MSI BurnRecovery on Windows 10 preloaded system?](#)
 - b. After the system restore has been completed, kindly perform Windows Update and make sure the latest Windows 10 update is installed if the system is Windows 10.
 - c. Reinstall the game.
 - d. After the steps above have finished, kindly do not install any third-party software (such as anti-virus software, game plugins, or system optimized tool) and check whether the performance is normal in this environment.

- Notebook with Free DOS :
 - a. Install the original or MSDN version of Windows operation system.
 - i. [\[How To\] Get and Install the Latest Windows 10 Build](#)
 - ii. [MSI® HOW-TO clean install pure OS](#)
 - b. After the system installing finished, download and install MSI approve driver and utility from the MSI website or the “ONE TOUCH INSTALL” came with your notebook.
 - i. [MSI® HOW-TO use ONE TOUCH INSTALL to install driver if the notebook doesn't have a pre-installed system](#)

- c. Kindly perform Windows Update and make sure the latest Windows 10 update is installed.
- d. Reinstall the game.
- e. After the steps above have finished, kindly do not install any third-party software (such as anti-virus software, 3rd-party game plugins, or system optimized tool) and check whether the performance is normal in this environment.

2.4. Connection problem

A connection issue affects the connection between your system and the game server. It might cause lag, ping spike, or screen delay during champion select, at the login screen, or even during the gameplay. Below you can find a list of common symptoms that are associated with connection issues and a useful wireless troubleshooting guide.

➤ Current server status

Before performing any troubleshooting steps, it's worth checking the current status of the game server that you are trying to connect to.
(Find out the server status on the game official website)

➤ Switching to a wired connection

Wireless connections tend to be difficult to troubleshoot due to potential interference from the environment and other radio signals. This often causes lag spikes and/or packet loss in the game. To eliminate this factor from your troubleshooting, we recommend switching to a wired (Ethernet) connection whenever it is possible.

If you have only a wireless connection, please refer to the FAQ below to troubleshoot wireless connection problems.

[\[Troubleshooting\] Wireless connection problem \(wireless signal can't be detected, connection lost, unstable, or stop working\)](#)

3. Advanced Troubleshooting for particular games

3.1. League of Legends (LOL)

The common reasons for low performance or FPS drop are, LOL patch installed incorrectly, graphics card settings have been changed, some programs or processes are consuming system resource, or using third-party game plugins/optimization tools.

Go through all the steps in the FAQ below to troubleshoot low performance or FPS drop problems in LOL.

[\[Game Master\] League of Legends \(LOL\) Troubleshooting Guide](#)

3.2. Overwatch

Overwatch is a heavily threaded game with fairly complex rendering features. It will use as much CPU and GPU resources as they can. In the worst case, it would cause the game unstable (black screen, the game close automatically, game crash, or TDR error).

To avoid these problems in Overwatch, please follow the instructions of the FAQ below and try to lower CPU/GPU usage run by Overwatch.

[\[Game Master\] Overwatch Troubleshooting Guide](#)