

## Computer Requirements for Gen5 Imaging Apps

If a user does not buy Agilent's required computer controller for their imaging system, it is their responsibility to ensure an alternate computer meets Agilent's recommended configuration. Computers not bought from Agilent cannot be guaranteed to operate the imaging system properly. In these situations, Agilent will troubleshoot within the normal time and scope of an imaging installation. If a computer still does not work, a customer may consult their IT department or buy a computer from Agilent.

Here are some important guidelines for preparing the host computer to support imaging applications. Ask your organization's Information Technology (IT) providers to assist with the installation, if necessary.

### A) Essential Information

Two software drivers must be installed on the controller to support Agilent imagers:

#### 1) Instrument Driver

A USB Driver shipped with the Gen5 software on a USB flash drive: for connecting the Agilent imager to the controller.

#### 2) Camera Driver

- All imagers except Cytation C10 models: C10PHC2 and C10MPHC2. A USB3 Camera Driver copied to the controller when Gen5 is installed and used to communicate with the cameras.
- All Cytation C10 C10PHC2 and C10MPHC2 models. A Hamamatsu Camera Driver copied to the controller when Gen5 is installed and used to communicate with the Hamamatsu camera.

### B) Recommended Computer Configuration for Gen5 Imaging Applications

For the Cytation C10, see the High-End Controller option.

#### IMPORTANT

Windows "N" and "KN" Editions require installing the "Media Features Package" from Microsoft Corporation.

#### 1) Standard Controller option

- Desktop-style computer rather than a laptop. (Problems with USB 3.0 connections have been experienced in some commercially available laptops.)
- Intel® 9500 Core i5-6Core (6 Core, 6 Threads, 3.1 GHz, 12MB Cache) or higher
- Intel® 8 USB Chipset or higher
- 8 GB RAM or greater
- 512 GB Hard Drive space or greater

Each image is at least 2MB in size; WFOV and confocal images are almost 8MB. Image file management is the user's responsibility. For best performance, use an RJ-45 Lan connector for network use.

- Monitor resolution of 1680 x 1050

Gen5 is not designed for use on high-resolution monitors, such as 4K or 5K monitors.

- Software:
  - **64-bit version** of Windows 10 Professional

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- Gen5 Image+, Gen5 Secure Image+, Gen5 IVD Image+, Gen5 Image Prime, or Gen5 Secure Image Prime.
- Web browser of your choice (for online help)
- Microsoft Excel for Quick Export and PowerExport:
- Gen5 v. 3.00 and higher: Excel 2010 - 2019 (64-bit editions) or Office 365 (64-bit edition).  
Your instrument model may need a higher version of Gen5.
- Keyboard and mouse
- Connectivity:
  - USB 3 ports for camera
  - USB 2 or USB 3 port for instrument
  - USB ports as needed for Keyboard, mouse, etc.
  - USB 3 or USB-C port is needed for external drive.

### 2) High-End Controller option

Use a high-end controller with all Cytation C10 models.

- Desktop-style computer rather than a laptop. (Problems with USB 3.0 connections have been experienced in some commercially available laptops.)
- Intel® 9500 Core i9 (12 Core, 6 Threads, 2.9 GHz, 16.5MB Cache) or higher
- 32 GB RAM or greater
- Turbo Drive M.2 (1TB) SSD Hard Drive space or greater

Each image is at least 2MB in size; WFOV and confocal images are almost 8MB. Image file management is the user's responsibility. For best performance, use an RJ-45 Lan connector for network use.

Do not connect to a WiFi network.

- Monitor resolution of 1680 x 1050  
Gen5 is not designed for use on high-resolution monitors, such as 4K or 5K monitors.
- Software:
  - **64-bit version** of Windows 10 Professional
  - Gen5 Image+, Gen5 Secure Image+, Gen5 IVD Image+, Gen5 Image Prime, or Gen5 Secure Image Prime. Except:
    - Microsoft Internet Explorer v 9.0 or later (for online Help)
    - Microsoft Excel for Quick Export and PowerExport:
    - Gen5 v. 3.00 and higher: Excel 2010 - 2019 (64-bit editions) or Office 365 (64-bit edition).  
Your instrument model may need a higher version of Gen5.
- Keyboard and mouse
- Connectivity:
  - USB 3 port for the camera

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- USB 2 or 3 port for the instrument
- USB ports as needed for keyboard, mouse, etc.
- USB 3 or USB-C port is required for external drive.

### C) Recommended Installation Sequence

Following the detailed installation instructions provided in the operator's manual, perform steps in this order for the best experience:

1. Set up the hardware components as applicable, including:
  - removing the shipping hardware from reader/imager
  - connecting the gas controller, dispenser, and joystick
2. Install Gen5 on the host computer.
3. Install the USB Driver software shipped with the Gen5 software on USB flash drive. This is the instrument driver.
4. Connect the instrument to the host computer with the USB cable.
5. Connect the USB 3 camera cable to a USB 3 port, and power on instrument.
6. Install the USB 3 Driver (below).

#### IMPORTANT

**Imaging instruments (except Cytation C10 C2 Models):** Use the USB3 cable provided by Agilent (PN 02078). Longer cables (>3 meters) reduce the power delivered to the camera and do not function properly.

**Cytation C10 C2 models:** Use the cable provided (PN 03033).

### D) Install the USB3/Hamamatsu Camera Driver

Install the Gen5 software and connect the instrument to the controller with the USB cable and USB3 camera cable before beginning this procedure.

#### 1) All Imagers Except Cytation C10 Models with Hamamatsu Camera

Follow these steps to install the USB3 camera driver:

- a) Find the Gen5 program files on your computer (C:\Program Files\BioTek\Gen5 <version>).
- b) Open the USB3 Drivers folder, the Windows\_64 folder, and the PGRUSBCam folder.
- c) Right-click **InstallPGRDriver.bat** and select **Run as Administrator** to run the driver installer.

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```
C:\Windows\System32\cmd.exe
INFO: Option "/i"
INFO: Input file "C:\Program Files\BioTek\Gen5 3.00\
SBCam\PGRUSBCAM.inf"
INFO: Flags 0x14 <20>
LOG Event: 1, Installing devices with Id "USB\UID_1E
using INF "C:\Windows\System32\DriverStore\FileReposi
utral_cc3948416e204ca4\PGRUSBCAM.inf".
LOG Event: 1, ENTER UpdateDriverForPlugAndPlayDevices
LOG Event: 0, RETURN UpdateDriverForPlugAndPlayDevices
LOG Event: 1, Installation was successful
LOG Event: 0, Install completed
LOG Event: 1, RETURN: DriverPackageInstallW <0x0>
LOG Event: 1, RETURN: DriverPackageInstallA <0x0>
SUCCESS: Installed package C:\Program Files\BioTek\Ge
s_54\PGRUSBCam\PGRUSBCAM.inf.
Press any key to continue . . .
```

### 2) Cytation C10 with Hamamatsu Camera: C10PHC2 and C10MPHC2 Models

- Find the Gen5 program files on your computer (C:\Program Files\BioTek\Gen5 <version>).
- Open the HamamatsuDrivers folder.
- Right-click **setup.exe** and select **Run as Administrator** to run the driver installer.

When finished, the install wizard displays a success message. If you do not see this message, contact [Agilent support](#).

- Restart the controller after installing the camera driver.

## E) Establish Communication with the Camera

- From the Gen5 main screen, select **System > Instrument Configuration**.
- Select the Agilent imager, and then click **View/Modify**.
- Click **Test Communication**.
- Click **Camera Information**. If communication is successful, Gen5 displays information about the camera.

For all cameras except the Hamamatsu: Check the "Bus Speed," which should say 5000 Mbits. If a lower bus speed is reported, review the Troubleshooting info below.

```
Camera Information:
Model: Chameleon3 CM3-U3-50S5M ←
Firmware: 1.12.3.0
Serial Number: 19160798
Sensor: Sony IMX264 (2/3" Mono CMOS)
Driver: USB Camera Driver (PGRUsbCam.sys) - 2.3.3.59
Bus Speed: 5000 Mbits/sec
```

### FLIR Camera

```
Camera Information:
Model: C11440-42U
Firmware: 3.20.A
Serial Number: 102005
Driver: 1.2.6.6051
Module: 20.7.642.6051
API: 4.00
BUS: USB3
```

### Hamamatsu Camera

### F) Troubleshooting Software Drivers

If you have problems communicating with the camera or if the bus speed is significantly lower than 5000 Mbits/sec. (Hamamatsu cameras do not display bus speed).

1. Reboot the controller/host computer.
2. Disconnect and reconnect the USB3 cable from/to the controller/host computer. Make sure the USB3 cable is connected to a USB3 port.
3. Re-run the camera driver installation, as described above under Install Gen5.
4. If Agilent's controller is not in use, make sure the computer meets the recommended requirements, including an Intel 8 USB Chipset or higher.

If problems persist, ask your IT group for support or contact [Agilent support](#).

### G) Storing Gen5 Files on an External Hard Drive

External hard drives are popular tools for expanding computer storage. Agilent recommends buying the highest quality device you can afford as problems have been reported with poor quality devices and cables.

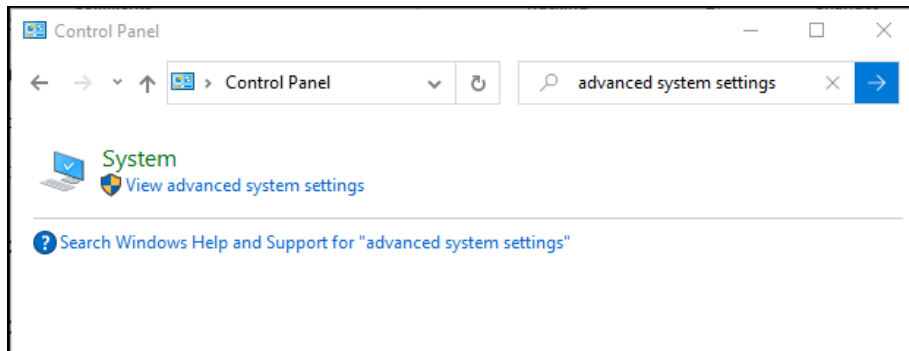
- Use a USB 3.0 drive for faster transfer rates.
- Close the live session or experiment in Gen5 before ejecting the device.
- Always use the eject utility instead of just pulling it out when disconnecting the drive. This prevents disk caching errors. Follow instructions for your device.



### H) Expand Virtual Memory

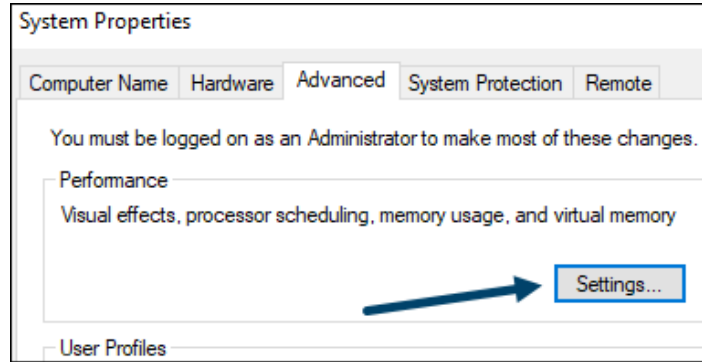
To improve computer performance for imaging:

1. Open the Control Panel.
2. Type "advanced system settings" in the search field and press Enter.

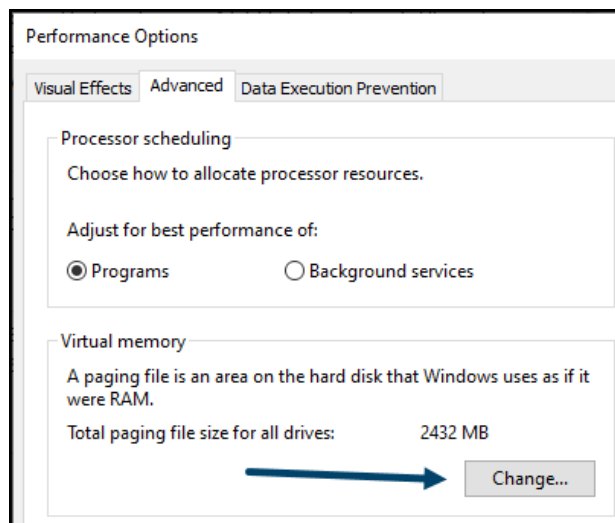


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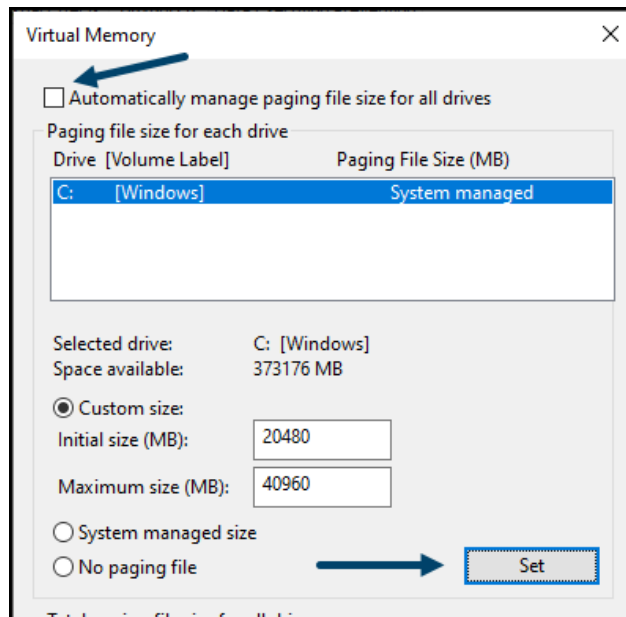
3. Click **View advanced system settings**. The System Properties window appears.



4. Click **Settings** from the Advanced tab under Performance. The Performance Options window appears.
5. Select the **Advanced** tab.



6. Click **Change**. The Virtual Memory window appears.



7. Un-check the **Automatically manage paging file size for all drives** box.

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8. Select **Custom size**.

- Initial size: 20480
- Maximum size: 40960

9. Close the windows and restart the computer.

This is meant for basic imaging assays which do not require maximum computing power and memory. If your host computer supports it, you can increase its virtual memory to support more demanding imaging assays.

Assays consuming lots of memory include:

- Large montages with image stitching;
- Fast or burst-mode kinetics, e.g. <300 ms and >15,000 images;
- Intensive data reduction and image processing on a large batch of images.

Double the paging size if your computer supports it and your assays demand it.

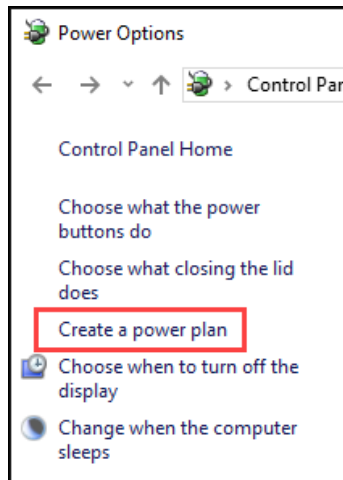
### I) Set the power and USB management settings

Set power and USB management settings in Windows for imagers or long kinetic reads.

Depending on your operating system and computer not all windows shown below maybe representative of your system. Instructions built from a Windows 10 version with full administrative rights.

1. In the Windows search box, enter **Control Panel**.
2. On the Control Panel, select Small icons for View by.
3. Select **Power Options**.
4. Click **Create a power plan** from the left panel.

The latest Windows 10 update does not allow the user to easily change the power plan to a high-performance plan. Create a custom plan for high performance.



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5. Select **High performance** and type a name for the custom plan. Click **Next**.

**Create a power plan**  
Start with an existing plan and give it a name.

**Balanced (recommended)**  
Automatically balances performance with energy consumption on capable hardware.

Power saver  
Saves energy by reducing your computer's performance where possible.

**High performance**  
Favors performance, but may use more energy.

Plan name:  
My Custom Plan High performance

Next Cancel

6. Select **Never** for all power settings. Click **Create**.

**Change settings for the plan: My Custom Plan High performance**  
Choose the sleep and display settings that you want your computer to use.

On battery Plugged in

Turn off the display: Never Never

Put the computer to sleep: Never Never

Create Cancel

7. Click **Change plan settings** for your custom plan.

**Choose or customize a power plan**  
A power plan is a collection of hardware and system settings (like display brightness, sleep, etc.) that manages how your computer uses power. [Tell me more about power plans](#)

Plans shown on the battery meter

**Balanced (recommended)** [Change plan settings](#)  
Automatically balances performance with energy consumption on capable hardware.

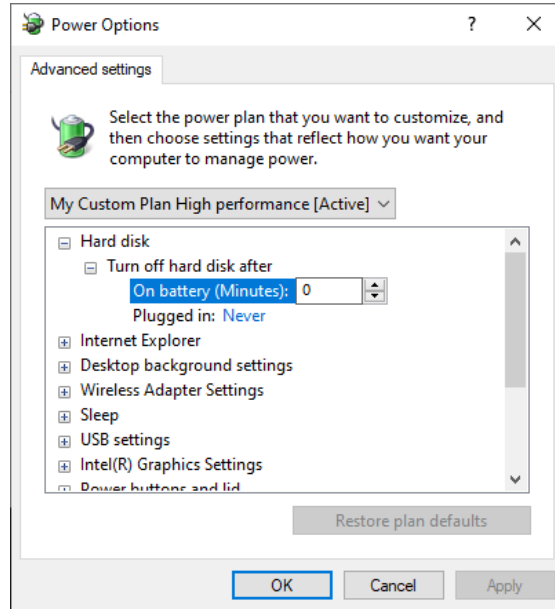
My Custom Plan 1 [Change plan settings](#)

8. Click **Change advanced power settings**.

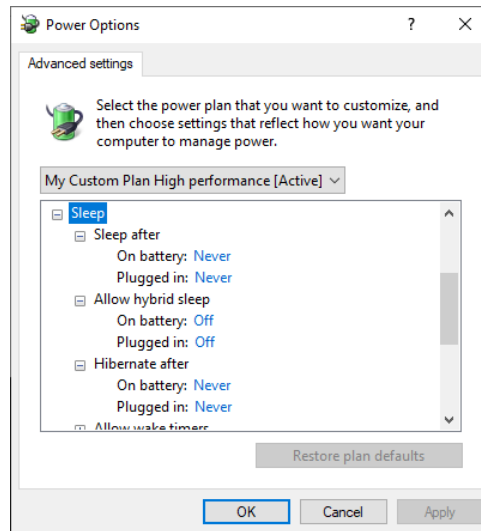


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- In Power Options, set:
  - On battery (Minutes): Never
  - Plugged in: Never

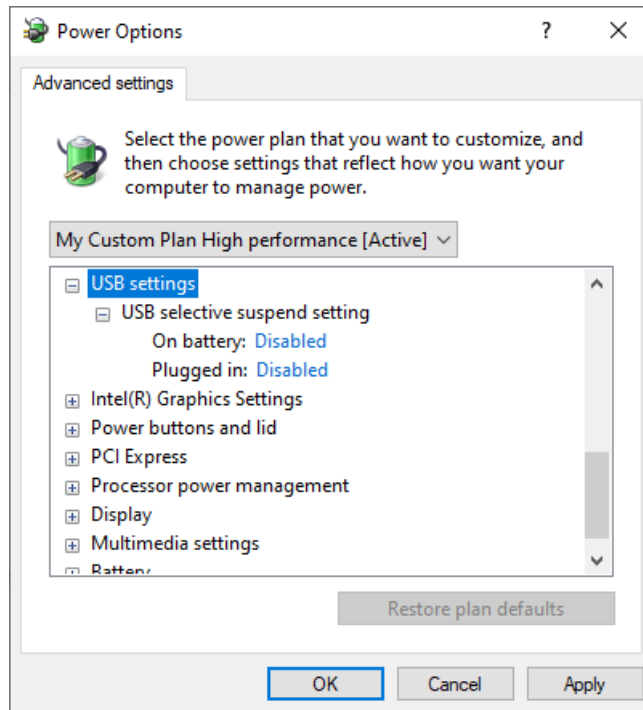


- Set Sleep options to **Never**.



- Set USB settings to Disabled.

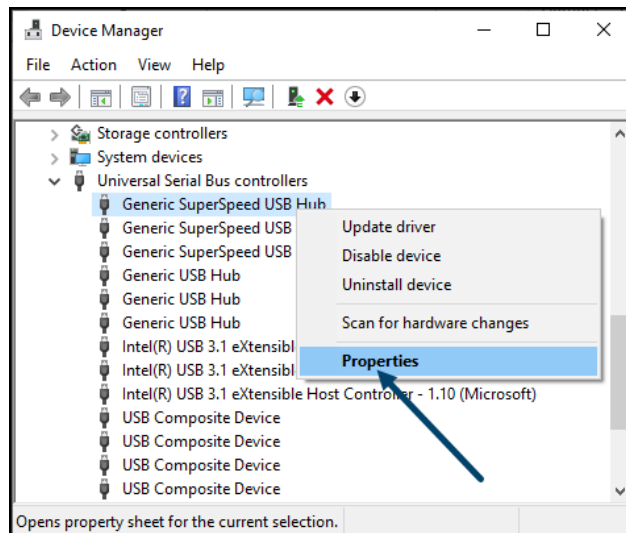
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12. Click **OK**.

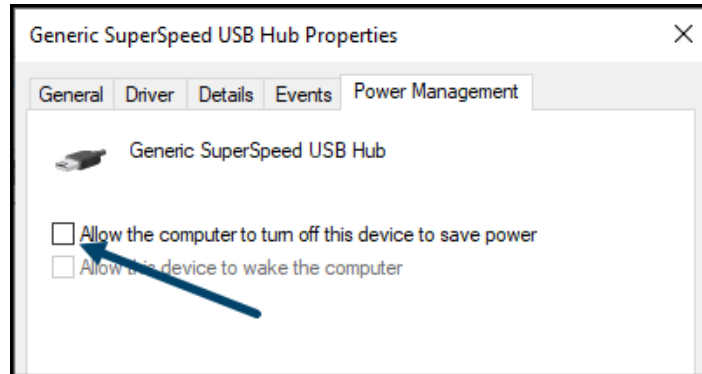
### J) Set the property for the USB port

1. Confirm the camera is connected and communicating with the controller/PC.
2. From Control Panel, select Device Manager, and then expand Universal Serial Bus Controllers.
3. Select the hub/device port identified to support the camera.
4. The camera must be connected and communicating with the PC for the USB port to appear.
5. Right-click on the USB port and select Properties.



6. Select the Power Management tab and un-check the Allow the computer to turn off the device to save power checkbox.

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7. Click OK to save properties and close this window.
8. Repeat this process for any other camera ports.
9. Another option is to set the power management properties for all USB Hubs and the eXtensible Host Controller, if present. USB Composite Devices do not have a Power Management tab in the Properties window.

### NOTE

When you add an external hub, recheck **Device Manager** to be sure the Power Management property is set correctly.

10. Close Device Manager.
11. Return to Power Options and verify the custom power plan is selected.
12. Exit Power Options.

## K) Turn Off Automatic Updates

If possible, turn off the computer's auto-update routines, power-saving options, and virus scans that can interrupt a Gen5 experiment or disable previously installed drivers.