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ABBREVIATIONS

<table>
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<th>Abbreviation</th>
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<tr>
<td>GPU</td>
<td>Graphics Processing Unit</td>
</tr>
<tr>
<td>eGPU</td>
<td>External Graphics Processing Unit (connected via Thunderbolt)</td>
</tr>
<tr>
<td>dGPU</td>
<td>Discrete Graphics Processing Unit (inside laptop)</td>
</tr>
<tr>
<td>iGPU</td>
<td>Integrated Graphics Processing unit (part of the processor)</td>
</tr>
<tr>
<td>USB</td>
<td>Universal Serial Bus</td>
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<tr>
<td>BIOS</td>
<td>Basic Input Output System</td>
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<td>PC</td>
<td>Personal Computer</td>
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<td>NVM</td>
<td>Non-Volatile Memory</td>
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<tr>
<td>PCIe</td>
<td>Peripheral Component Interconnect Express</td>
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<tr>
<td>App</td>
<td>Application (Computer Program)</td>
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GENERAL INFORMATION

External graphics using AMD® or NVIDIA® graphics chips is supported on most Thunderbolt™ 3 enabled machines. Only Thunderbolt 3 machines running the latest version of 64-bit Windows 10 support external graphics. If you are not sure if your system can support external graphics then follow the guidelines in step: “Software/Firmware Check”.

Most Thunderbolt 3 Windows PCs with an 8th or 7th generation Intel-Core processor support external graphics, as long as they have current OS, BIOS, firmware and drivers. Systems based on a 6th generation Intel-Core processor may support external graphics with usage errata, depending on whether recent BIOS and firmware are available.

Please make sure that your machine has a Thunderbolt 3 port and not a regular USB-C port. Thunderbolt 3 (USB-C connector type) ports on a Windows PC and all Thunderbolt 3 cables must be marked with the Intel® Thunderbolt trademark logo, Figure 1. Only a Thunderbolt 3 port connected with a Thunderbolt 3 cable supports external graphics. The number “3” on a Thunderbolt 3 cable indicates that the cable is rated for 40Gb/s. (A Thunderbolt cable without the 3 is generally rated at only 20Gb/s.)

If the port has the lightning bolt logo below (see Figure 2), it means that this is a USB-C Charging Port and not a Thunderbolt port.

![Figure 1: 40Gb/s Thunderbolt 3 cable and port with Thunderbolt logo.](image1)

![Figure 2: Icon for USB-C Charging Port. A port marked with this icon is not a Thunderbolt Port.](image2)
SOFTWARE/ FIRMWARE CHECK (PRE-PURCHASE CHECK)

In order to find out if your Thunderbolt 3 enabled Windows 10 system may work with external graphics please check the following:

1. **Computer BIOS**: Make sure your machine has the latest BIOS installed. Go to your computer manufacturers website and find your system model under support. Check for updates. Many PCs also have support assistance software installed that allows you to check for software updates (HP Support Assistant, Dell Support Assist, Lenovo ThinkVantage System Update).

   1.1 Find your computers BIOS version by entering “msinfo32.exe” in the search bar of your Windows 10 desktop. BIOS release dates after June 2017 are best. See Figure 3.

![Figure 3: Windows 10 BIOS information.](image-url)
2. **Windows Version**: Install all Windows 10 updates and check which version of Windows you have.

   2.1 Install Windows 10 updates by going to Settings → Update & Security → Check for updates. See Figure 4.

![Figure 4: Windows 10 update.](image)
2.2 Make sure your Windows 10 installation is at least at version 1709 by entering “winver.exe” in the search bar in the lower left-hand corner of your Windows 10 desktop. See Figure 5.

![Figure 5: Windows 10 version check.](image-url)
3. **Thunderbolt Firmware Version**: Check the Thunderbolt firmware version of your computer. Check for updates.

3.1 Check your Thunderbolt firmware version by entering “Thunderbolt” in the search bar on your Windows 10 desktop. In the lower right-hand corner of your desktop, a Thunderbolt icon should pop up. Right click on it and select “Settings” or “About”, depending on your Thunderbolt software (driver). Click on “Details” and check your NVM Firmware version as well as external GPU support. For computers manufactured in 2016 and 2017, NVM version 23 or higher is best. See Figure 6.

**Note for 2016 and 2017 Windows computers**: If your system has a Thunderbolt NVM Firmware version that is lower than 23, it may support external graphics, even if it says “External GPUs supported: No”. However, you may experience some limitations (for example, you may not be able to disconnect the eGPU while system is running).

4. **Thunderbolt Driver Version**: Check the Thunderbolt driver version of your computer. Go to your computer manufacturers website and find your system model under support. Check for updates.

4.1 Follow step number 3 and look for “Software package version: xx.x.xx.xxx”. See Figure 6. Version 16.3.61.275 and above is best. Previous versions may work with limitations.

![Figure 6: Thunderbolt firmware check.](image-url)
SETTING UP EXTERNAL GRAPHICS (EGPU)

1. Choose a compatible graphics card and Sonnet eGFX Breakaway Box. Take a look at our Graphics Card Compatibility Chart to find the right card and Box.

2. Install your **AMD or NVIDIA card** in the Breakaway Box. Plug the auxiliary power connectors into the top or rear of the card. Close the Box. Plug in the Box and turn on the power switch (if it has one). Connect the Box to your computer with the included Thunderbolt 3 cable. (The blue light on the Box will not come on until you connect it to a live computer.) You should get a message asking whether you want to connect this Thunderbolt device. Select “always connect” and click “OK”, see Figure 7. If a message pops up saying external graphics is not supported, continue anyway.

Figure 7: Approving connected Thunderbolt device.
3. If you double click on the Thunderbolt icon in the lower right-hand corner of your desktop, you should now see the eGFX device in “Attached Thunderbolt Devices”. See Figure 8.

Figure 8: Attached Thunderbolt devices.
4. Go to the [AMD](https://www.amd.com) or [Nvidia](https://www.nvidia.com) website to find the right driver for your eGPU. Download and install the desktop driver. Follow the instructions of the installation assistant. 

**Note:** If you have a discrete Quadro GPU, you must first uninstall the NVIDIA Quadro driver. Then you can install the Nvidia GeForce desktop driver which will support both your discrete Quadro and external GeForce GPUs.

5. Check that your eGPU is being detected by your computer. Enter “Device Manager” in the search bar of your Windows desktop. Open the tab “Display adapters”. Your eGPU should appear without any caution signs, see Figure 9.

![Device Manager with external AMD Radeon® Pro WX 9100.](image)
6. One more thing and you are ready to go!

**Please note:** When you disconnect your external graphics card, use the safe eject feature (Icons: AMD, Nvidia), see Figure 10 and Figure 12. With Nvidia, when you reconnect the eGPU, you have to click “Connect GPU” to reactivate your external graphics card, see Figure 11.

![Figure 10: AMD eject external graphics.](image)

![Figure 12: Nvidia disconnect GPU.](image)

![Figure 11: Nvidia connect GPU.](image)
TROUBLESHOOTING

If your external graphics card isn’t working correctly, please check the following:

- Make sure the Thunderbolt interface of your eGFX product is being detected. See “Setting up External Graphics (eGPU)” (Step 4, Figure 8).
  
  If you don’t see your Sonnet product under “Attached Thunderbolt devices”, check the following:
  
  ◦ Is the power cable connected, the power switch on (Breakaway Box 650 does not have one), the Thunderbolt 3 cable connected, and computer on? If not all of the above, the Breakaway Box will not turn on.
  ◦ Are you using a Thunderbolt cable? Check for the Thunderbolt logo on the connectors (see Figure 1).
  ◦ Could the cable be defective? Try a different Thunderbolt 3 cable.
  ◦ Do other Thunderbolt devices work with your PC? If not, your Thunderbolt port may be defective or your Thunderbolt driver may be corrupted. Reach out to your computer manufacturer to get assistance.
  ◦ If only the Sonnet eGFX product doesn’t work, please reach out to the Sonnet Technical support.

- If your Sonnet eGFX product appears under “Attached Thunderbolt devices” (see step above), try to find your external GPU in the Device Manager under “Display adapters”. See “Setting up External Graphics (eGPU)” (Step 6, Figure 9).
  
  ◦ If you don’t find your eGPU under “Display adapters” but you see a “Microsoft Basic Display Adapter”, install the correct graphics driver.
  ◦ If neither your eGPU nor a “Microsoft Basic Display Adapter” appear under “Display adapters”, make sure your eGPU is correctly seated in the PCIe slot. Also, make sure that the auxiliary power cable is fully seated and connected to your eGPU. It is also possible that your card is defective.

- If you are a professional user, make sure that your application has detected the external GPU. You may have to select the external graphics card in the system preferences of your application.
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