



The science behind the report:

Optimize creative and design workflows and enjoy a better user experience with the Dell Precision 5680

This document describes what we tested, how we tested, and what we found. To learn how these facts translate into real-world benefits, read the report [Optimize creative and design workflows and enjoy a better user experience with the Dell Precision 5680](#).

We concluded our hands-on testing on July 17, 2023. During testing, we determined the appropriate hardware and software configurations and applied updates as they became available. The results in this report reflect configurations that we finalized on June 13, 2023 or earlier. Unavoidably, these configurations may not represent the latest versions available when this report appears.

Our results

To learn more about how we have calculated the wins in this report, go to <http://facts.pt/calculating-and-highlighting-wins>. Unless we state otherwise, we have followed the rules and principles we outline in that document.

Table 1: Results of our testing.

	Dell Precision 5680	Apple MacBook Pro 16"
Video AI testing (median score)		
Topaz Video AI benchmark Chronos 1080p	12.40	3.74
Topaz Video AI benchmark Chronos 4K	2.70	0.81
Performance benchmark testing		
Blender (samples per minute)		
Monster render	3,191.8	953.2
Junkshop render	1,590.7	512.3
Classroom render	1,546.3	464.5
Geekbench 6 Compute OpenCL (median score)		
Geekbench Compute performance	165,722	85,354

	Dell Precision 5680	Apple MacBook Pro 16"
HandBrake (median)		
HandBrake hardware 4K H.265 video encoding (time to encode [m:ss])	1:00	1:11
HandBrake hardware 4K H.265 video encoding (frames per second)	130.3	106.1
Cinebench R23 (median score)		
Single-core	2,005	1,719
Multi-core	20,040	14,877
Collaboration workflow testing		
Collaboration workflow using Zoom (Outlook, PowerPoint, Google Chrome™, Excel)		
Median time to perform workflow (seconds)	205	211
Thermal testing		
Thermal performance under a sustained Cinebench workload		
Change from room temperature (degrees in Fahrenheit)	24.6	37.4

System configuration information

Table 2: Detailed information on the systems we tested.

System configuration information	Dell Precision 5680	Apple MacBook Pro 16"
MSRP	\$7,920.92	\$3,899.00
Processor		
Vendor	Intel®	Apple
Model number	Core® i9-13900H	M2 Max
Core frequency (GHz)	2.6 – 5.4	3.68
Number of cores	14	12
Logical processors	20	
Memory		
Amount (GB)	64	64
Type	LPDDR5	Unified
Graphics 1		
Vendor	Intel	Apple
Model number	Intel Iris Xe Graphics	M2 Max 38-core GPU
Graphics 2		
Vendor	NVIDIA	NA
Model number	RTX A5000 Ada Gen	NA
Driver	NVIDIA 31.0.15.3625 (6/10/2023)	NA
Storage		
Amount (TB)	4	4
Type	SSD	SSD
Connectivity/expansion		
Wireless internet	Intel Wi-Fi 6E AX211	Wi-Fi 6E (802.11ax)
Bluetooth	5.3	5.3
USB	1 x MicroSD card reader 3 x Thunderbolt 4 ports	1 x SDXC card 3 x Thunderbolt 4 ports
Battery		
Type	Integrated Lithium-ion	Integrated Lithium-polymer
Rated capacity (mAh)	100 Whr	100 Whr
Display		
Size (in.)	16"	16.2"
Resolution	3,840 x 2,400	3,456 x 2,234

System configuration information	Dell Precision 5680	Apple MacBook Pro 16"
Operating system		
Vendor	Microsoft	Apple
Name	Windows 11 Pro	macOS Ventura
Build number or version	22H2 Build 22621.1848	13.3.1 (a)
BIOS		
BIOS name and version	Dell Inc. 1.1.3	8422.100.650
Dimensions		
Height (in)	0.80	0.66
Width (in)	13.92	14.01
Depth (in)	9.46	9.77
Weight (lbs.)	4.2	4.8

How we tested

Setting up the system (Windows)

Setting up and updating the OEM image

1. Boot the system.
2. Follow the on-screen instructions to complete installation, using the default selections when appropriate.
3. Set the Windows (plugged in) Power Mode to Best Performance.
4. Set Screen and Sleep options to Never:
 - Right-click the desktop and select Display settings.
 - Select System from the left-hand column.
 - Click Power & Battery.
 - For all power options listed under Screen and Sleep, select Never.
5. Disable User Account Control notifications.
 - Select Windows Start, type UAC, and press the Enter key.
 - Move the slider control to Never notify, and click OK.
6. Run Windows Update, and install all updates available.
7. Verify the date and time are correct, and synchronize the system clock with the time server.
8. Pause Automatic Windows Updates:
 - Click the Windows Start button.
 - Type Windows Update settings, and press the Enter key.
 - From the Pause updates drop-down menu, select Pause for 5 weeks.

Setting up the system (macOS)

Setting up and updating the OEM image

1. Boot the system.
2. Follow the on-screen instructions to complete installation, using the default selections when appropriate.
3. Set Screen and Sleep options to Never:
 - a. Select System Settings.
 - b. Select Screensaver.
 - c. Set Lock Screen Settings to Never.
 - d. Return to System Settings, and select Battery.
 - e. Set On power adapter setting to High Power.
4. Disable automatically adjust brightness:
 - a. Select System Settings.
 - b. Select Display.
 - c. Disable Automatically adjust brightness.
5. Run Software Update, and install all updates available.
6. Verify the date and time are correct.
7. Enable Automatic log in:
 - a. Select System Settings.
 - b. Click Users & Groups.
 - c. Select the drop down menu next to the Automatically log in as setting, and select the User account.
8. Disable Automatic Mac Updates:
 - a. Select System Settings.
 - b. Click General.
 - c. Click Software Update.
 - d. Click the information icon next to Automatic updates.
 - e. Disable Check for updates.

Video AI testing

Topaz Video AI testing

Setting up the test (Windows & macOS)

1. Purchase a Pro license and download and install Topaz Video AI 3.3.4 from <https://www.topazlabs.com/downloads>.

Running the test in 1920x1080 (FHD) (Windows & macOS)

1. Launch Topaz AI.
2. Close the activation window.
3. Select Process Benchmark.
4. Select 1920x1080 (FHD) from the Input Resolution drop-down menu.
5. Click Benchmark.
6. When the test completes, record the results.
7. Wait 15 minutes before retesting.
8. Repeat steps 1 through 7 two more times.

Running the test in 3480x2160 (4K) (Windows & macOS)

1. Launch Topaz AI.
2. Close the activation window.
3. Select Process Benchmark.
4. Select 3840x2160 (4K) from the Input Resolution drop-down menu.
5. Click Benchmark.
6. When the test completes, record the results.
7. Wait 15 minutes before retesting.
8. Repeat steps 1 through 7 two more times.

Performance testing

Blender Benchmark testing

Setting up the test (Windows & macOS)

1. Download the Blender Benchmark from <https://opendata.blender.org/>.

Running the test (Windows & macOS)

1. Launch the Blender Benchmark.
2. At the Welcome screen, click Next.
3. Select Blender version 3.5.0, and click Next.
4. Click Next at the Benchmark Scenes screen.
5. At the Benchmark Device screen, select the GPU option, and click Start Benchmark.
6. Record the results.
7. Wait 15 minutes before performing the next run.
8. Repeat steps 1 through 7 two more times.

Geekbench 6 Pro testing

Setting up the test (Windows & macOS)

1. Purchase a Pro license and download and install Geekbench 6 Pro from <https://www.geekbench.com/download/>.

Running the test (Windows & macOS)

1. Launch Geekbench.
2. Click Run CPU Benchmark.
3. Record the result.
4. Wait 5 minutes before re-running.
5. Repeat steps 1 through 4 two more times.

Geekbench 6 Pro GPU OpenCL testing

Setting up the test (Windows & macOS)

1. Purchase a Pro license and download and install Geekbench 6 Pro from <https://www.geekbench.com/download/>.

Running the test (Windows & macOS)

1. Launch Geekbench.
2. Click Run Compute Benchmark.
3. Record the result.
4. Wait 5 minutes before re-running.
5. Repeat steps 1 through 4 two more times.

HandBrake

Setting up the test

1. Download HandBrake from <https://handbrake.fr/downloads.php>.
2. Install HandBrake with default options.
3. Copy the 4K file to be transcoded to the test system.
4. Launch HandBrake.
5. Browse to the 4K source file, click Open.

Fast 1080p30 preset test

Running the test (all platforms)

1. Click the Chapters tab, uncheck the Create chapter markers box.
2. Click Start Encode.
3. When complete, click the Show Queue menu item to view the encoding statistics.
4. Repeat steps 1 through 3 two more times.

Hardware 4K H.265 encoder test

We tested the Dell with NVENC due to the NVIDIA graphics chip. We tested the Mac with QSV encoder since NVENC is a NVIDIA only encoder.

Windows

1. Click the Preset dropdown, and select H.265 NVENC 2160p 4K.
2. On the Video tab, change the Framerate (FPS) to 60.
3. Set the preset to Fast.
4. On the Chapters tab, uncheck the Create chapter markers box.
5. Click Start.
6. When complete, click the Show Queue menu item to view the encoding statistics.
7. Repeat steps 1 through 6 two more times.

MacOS

1. Click the Preset dropdown, and select H.265 MKV 2160p 60.
2. Change the Format to MP4.
3. On the Filters tab, set all to Off.
4. On the Video tab, change the Video Encoder to H.265 (VideoToolbox).
5. Set the preset to Speed.
6. On the Chapters tab, uncheck the Create chapter markers box.
7. Click Start.
8. When complete, click the Show Queue menu item to view the encoding statistics.
9. Repeat steps 1 through 7 two more times

Cinebench R23 benchmark testing

Setting up the Cinebench R23 test (Windows & macOS)

1. Download and install Cinebench from <https://www.maxon.net/en/downloads/cinebench-r23-downloads>.

Running the Cinebench R23 benchmark (Windows & macOS)

1. Launch Cinebench.
2. Select File Advanced benchmark.
3. Set the Minimum Test Duration to Off.
4. Select either CPU (Multi Core) or CPU (Single Core), and click Start.
5. Record the result.
6. Wait 15 minutes before re-running.
7. Repeat steps 1 through 6 two more times.

Collaboration workflow testing

We recorded how long it took to complete a multi-tasking scenario using multiple applications and tasks. Once we opened an application, we kept it open for the duration of the testing. A stopwatch is required for this test.

We used the following applications:

- Zoom
- Outlook
- PowerPoint
- Google Chrome web browser with 10 tabs open
- Excel

Setting up the test (Windows & macOS)

1. Open the Google Chrome web browser, and set the homepage to <https://www.dell.com/en-us/shop/scc/sr/workstations/precision-laptops>.
2. In the top-right corner of the Chrome web browser, click the three-dot menu to customize and control Google Chrome.
3. Select Settings.
4. In the left column, select On startup.
5. Select Open a specific page or set of pages and click Use current pages.
6. Close Google Chrome and re-open to verify that the web page that opens is <https://www.dell.com/en-us/shop/scc/sr/workstations/precision-laptops>.

Running the test (Windows & macOS)

1. Simultaneously start the timer and launch Zoom.
2. Click New Meeting.
3. Click Join with Computer Audio and stop the timer once the meeting has started.
4. Simultaneously start the timer and launch Outlook.
5. Click New Email.
6. Input the email address of the recipient of the email in the To section.
7. Click Attach File and select Browse This PC...
8. Navigate to the ~10mb test video file and select it.
9. Click Send.
10. Stop the timer once the Outlook sends the message.
11. Simultaneously start the timer and launch the test PowerPoint file.
12. Launch a slideshow in presenter mode and scroll through the slides.
13. Once the slideshow is complete, stop the timer.
14. Simultaneously start the timer and launch Google Chrome.
15. Browse to <https://www.dell.com/en-us/shop/scc/sr/workstations/precision-laptops>.
16. Right-click the tab and select duplicate.
17. Once the web page fully loads, as indicated by the spinning Dell icon becoming solid, right-click the tab and select duplicate to duplicate the web page again in a new tab.
18. Repeat step 17 until there are 10 tabs open.

19. Stop the timer when the web page on the 10th tab fully loads.
20. Simultaneously start the timer and launch Excel.
21. Browse to where the test Excel macro file is located, and open the Excel macro file.
22. Browse to where the test Excel 10K row file is located, and open the 10K row file.
23. Click Insert, and select the drop-down menu next to the Insert Column or Bar Chart icon.
24. Select More Column Charts at the bottom of the drop-down menu.
25. Under the Column section choose 3D-100% Stacked Column.
26. Click Ok.
27. Stop the timer when the Column Chart appears.
28. Repeat steps 1 through 27 two more times.

Thermal testing: Cinebench R23

Setting up the environmental heatmap test (Windows & macOS)

1. Download and install Cinebench from <https://www.maxon.net/en/downloads/cinebench-r23-downloads>. Note: A FLIR E6xt Infrared Camera is necessary for taking top and bottom skin temperatures.

Running the environmental heatmap test (Windows & macOS)

1. Launch Cinebench.
2. Select File Advanced benchmark.
3. Verify that the Minimum Test Duration is set to the default 10 minutes (Test Throttling).
4. Select CPU (Multi Core) and click Start.
5. Record the performance results for the next five back-to-back 10-minute iterations and at the end of each run note the ambient room temperature and take a skin temperature photo with the FLIR E6xt infrared Camera of the top and bottom and report the hottest spots.

Boot and shut down testing

Note: A stopwatch is necessary for timing purposes.

Running the test (Windows & macOS)

1. Simultaneously start the timer and boot the system.
2. Stop the timer when the Windows Taskbar or macOS Dock appears.
3. Record the result as the Boot time.
4. Allow the system to remain booted for 15 minutes.
5. Simultaneously start the timer and shut down the system.
6. Stop the timer when the power LED turns off.
7. Record the result as the shutdown time.
8. Repeat steps 1 through 7 two more times, and report the median of the three runs.

PugetBench Adobe Content Creation Benchmark

Puget Systems Adobe CC benchmarks are designed to thoroughly test many of Adobe's most popular software packages using real world projects and workflows.

PugetBench for Premiere Pro

We used the following application:

- Adobe Premiere Pro

Setting up the test (Windows)

1. Launch Adobe Premiere Pro.
2. Click through the Tutorial pop-up tips.
3. Close Adobe Premiere Pro.
4. Purchase a PugetBench for Premiere Pro license from <https://www.pugetsystems.com/labs/articles/PugetBench-for-Adobe-Creative-Cloud-1642/>.
5. Click on Get on Adobe Marketplace and log into your Adobe account.
6. Click on the PugetBench Premiere Pro Plug-in to install it.

7. Open Adobe Premiere Pro.
8. Click on Create New Project>Create.
9. Click on WindowàExtensionsàPugetBench for Premiere Pro.
10. Next to License Key click Change and enter your license key. Click Save.
11. Click on Download Project Files, and download the test assets.
12. Extract the PugetBench for Premiere Pro 0.95.7 test assets found in Downloads.

Setting up the test (macOS)

1. Click System Setting, and select Security & Privacy.
2. Click Accessibility, and add Premiere Pro.
3. Launch Adobe Premiere Pro.
4. Click through the Tutorial pop-up tips.
5. Close Adobe Premiere Pro.
6. Purchase a PugetBench for Premiere Pro license from <https://www.pugetsystems.com/labs/articles/PugetBench-for-Adobe-Creative-Cloud-1642/>.
7. Click Get on Adobe Marketplace and log into your Adobe account.
8. Click the PugetBench Premiere Pro Plug-in to install it.
9. Open Adobe Premiere Pro.
10. Click Create New Project Create.
11. Click Window Extensions PugetBench for Premiere Pro.
12. Next to License Key click Change, and enter your license key. Click Save.
13. Click Download Project Files, and download the test assets.
14. Extract the PugetBench for Premiere Pro 0.95.7 test assets found in Downloads.

Running the test (Windows)

1. Boot the system.
2. Open Adobe Premiere Pro.
3. Open the Benchmark_Project_23.pproj file found in Downloads PugetBench for Premiere Pro.
4. Click on Window Extensions PugetBench for Premiere Pro.
5. Click Run Benchmark.
6. Record the overall score when the benchmark finishes.
7. Close Adobe Premiere Pro and restart the system under test.
8. Wait 30 minutes before performing the next run.
9. Repeat steps 1 through 8 twice more and record the median result.

Running the test (macOS)

1. Boot the system.
2. Open Adobe Premiere Pro.
3. Open the Benchmark_Project_23.pproj file found in DownloadsàPugetBench for Premiere Pro.
4. Click on WindowàExtensionsàPugetBench for Premiere Pro.
5. Click Run Benchmark.
6. On the initial benchmark run, click OK at the Allow Access Warning.
7. Record the overall score when the benchmark finishes.
8. Close Adobe Premiere Pro and restart the system under test.
9. Wait 30 minutes before performing the next run.
10. Repeat steps 1 through 9 twice more and record the median result.

PugetBench for Photoshop

We used the following application:

- Adobe Photoshop

Setting up the test (Windows & macOS)

1. Launch Adobe Photoshop.
2. Click through the Tutorial pop-up tips.
3. Close Adobe Photoshop.
4. Purchase and download the PugetBench for Photoshop license from <https://www.pugetsystems.com/labs/articles/PugetBench-for-Adobe-Creative-Cloud-1642/>.
5. Click Get on Adobe Marketplace, and log into your Adobe account.
6. Click the PugetBench Photoshop Plug-in to install it.
7. Open Adobe Photoshop.
8. Click Window Extensions PugetBench for Photoshop.
9. Next to License Key, click Change, and enter your license key. Click Save.

Running the test (Windows & macOS)

1. Boot the system.
2. Open Adobe Photoshop.
3. Click Window Extensions PugetBench for Photoshop.
4. Click Run Benchmark.
5. Record the overall score when the benchmark finishes.
6. Close Adobe Photoshop, and restart the system under test.
7. Wait 15 minutes before performing the next run.
8. Repeat steps 1 through 7 twice more, and record the median result.

PugetBench for After Effects

We used the following application:

- Adobe After Effects

Setting up the test (Windows & macOS)

1. Launch Adobe After Effects.
2. Click through the Tutorial pop-up tips.
3. Close Adobe After Effects.
4. Purchase and download the PugetBench for After Effects license from <https://www.pugetsystems.com/labs/articles/PugetBench-for-Adobe-Creative-Cloud-1642/>.
5. Click Get on Adobe Marketplace and log into your Adobe account.
6. Click the PugetBench After Effects Plug-in to install it.
7. Open Adobe After Effects.
8. Click Edit Preferences Scripting & Expressions.
9. Select Allow Scripts to Write Files and Access Network and click OK.
10. Click Edit Preferences Memory & Performance.
11. The benchmark requires After Effects to have 12 GB of RAM space. Adjust the RAM reserved for other applications to get to 12 GB RAM reserved for After Effects, and click OK.
12. Click Composition New Composition.
13. Accept the default Composition Settings, and click Ok.
14. Click Composition Preview, and uncheck Cache Frames When Idle.
15. Click Window Extensions PugetBench for After Effects.
16. Next to License Key, click Change, and enter your license key. Click Save.

Running the test (Windows & macOS)

1. Boot the system.
2. Open Adobe After Effects.
3. Click Window Extensions PugetBench for After Effects.
4. Click Run Benchmark.
5. Record the overall score when the benchmark finishes.
6. Close Adobe Photoshop, and restart the system under test.
7. Wait 30 minutes before performing the next run.
8. Repeat steps 1 through 7 twice more, and record the median result.

Custom workflow testing and multi-tasking scenarios

Creative workflow using Adobe Creative Cloud (Photoshop, Premiere Pro, & After Effects)

We recorded how long it took to complete a multi-tasking scenario using multiple applications and tasks. Once an application is opened, it is kept open for the duration of the testing. A stopwatch is required for this test.

Setting up the Adobe Creative Cloud test (Windows & macOS)

1. Download and install the Adobe Creative Cloud application from <https://creativecloud.adobe.com/>.
2. Launch the Creative Cloud application, and log in to download Adobe Photoshop, Adobe Premiere Pro, and Adobe After Effects.
3. Launch each application, and click through the Tutorial pop-up tips. Afterwards, close each application.
4. A stopwatch is necessary for timing purposes.

Running the Adobe Creative Cloud workflow (Windows & macOS)

1. Simultaneously start the timer and launch Photoshop.
2. Select File Scripts Image Processor.
3. Click the Select Folder button and select the test file directory of RAW images.
4. Select 10 as the JPEG Quality.
5. Click Run.
6. When all the RAW images have been converted into JPEG's as indicated by spinning circle disappearing, move to the next step.
7. Select File Automate Photomerge.
8. Browse to the directory where the images are located, select them, and click OK.
9. Simultaneously start the timer and click OK.
10. When the panoramic picture appears.
11. Close the panoramic picture file, and click Yes to save the image.
12. In the Format drop down, select Large Document Format, and click Save.
13. Select File Automate Merge to HDR Pro.
14. Browse to the directory where the five HDR images are located, select them and click Ok.
15. Click OK.
16. When the preview merged file appears, click Ok.
17. Stop the timer when the HDR image has been created, and record the results.
18. Simultaneously start the timer and launch Adobe Premiere Pro.
19. Select Open Project, and select the test Premiere project file, and click Open.
20. To bring up the Export Media dialog, press Ctrl+M.
21. From the Format drop-down menu, choose HEVC (H.265).
22. Click Export.
23. When the export has finished, stop the timer, and record the time.
24. Simultaneously start the timer and launch Adobe After Effects.
25. Select New Project.
26. Click Composition New Composition, and enter a name.
27. To import the 4K video file, press Ctrl + I.
28. Drag the newly imported 4K file from the top left hand corner box down to the bottom "timeline box", and select the timeline box.
29. Click Effect Generate CC Threads.
30. Click File Export Add to Render Queue.
31. In the bottom area where it says Output to: Not specified, click to add a save directory.
32. Select a save location and click Save.
33. Click Render.
34. When the export has finished, stop the timer, and record the time.
35. Close all the Adobe applications.
36. Wait 30 minutes before re-running.
37. Repeat steps 1 through 36 two more times.

Measuring acoustics

These tests requires the following items:

- Extech SDL600 Sound Level Meter/Datalogger with SD card
- Cinebench R23

Setting up the test

1. Place the laptop under test in a sound-proofed professional sound booth.
2. Set the Extech SDL600 on a tripod so that it is 30 centimeters in front of, and 40 centimeters above the laptop under test.

Measuring acoustics while idle

Running the test

1. Boot the laptop.
2. Wait five minutes before running the test.
3. Start the Extech SDL600 Sound Level Meter/Datalogger, and allow the laptop to run at idle for 20 minutes.
4. At the end of the 20 minutes, stop the Extech SDL600, and record the average Idle (dB).
5. Shut down the laptop.
6. Repeat steps 1 through 5 two more times.

Measuring acoustics while running Cinebench R23

Setting up the test

1. Purchase and download the Cinebench R23 benchmark from <https://www.maxon.net/en/downloads/cinebench-r23-downloads>.
2. Launch Cinebench R23.
3. Select File→Advanced benchmark.
4. Select File→Preferences and change the Custom Minimum Test Duration to 20 minutes, and click OK.
5. Exit Cinebench.

Running the test

1. Boot the laptop.
2. Wait five minutes before running the test.
3. Launch Cinebench R 23.
4. In the Minimum Test Duration field, select Custome (20 minutes).
5. In Cinebench R23, simultaneously start the Extech SDL600 Sound Level Meter/Datalogger and click CPU (Multi Core) Start.
6. At the end of the Cinebench R23run, stop the Extech SDL600, and record the average sound level (dB) while running Cinebench R23.
7. Shut down the laptop for 40 minutes, and let it return to room temperature.
8. Repeat steps 1 through 7 two more times.

Read the report at <https://facts.pt/GBus6Nt>

This project was commissioned by Dell Technologies.



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