The science behind the report:

HP Spectre x360 14: A snappier way to interact with the world

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 HP Spectre x360 14: A snappier way to interact with the world.

We concluded our hands-on testing on October 19, 2020. 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 September 15, 2020 or earlier. Unavoidably, these configurations may not represent the latest versions available when this report appears.

Our test results

Table 1: Results of our testing

	HP Spectre x360 14	2020 Apple® MacBook Pro® 13-inch
Time to boot (seconds)	11.1	21.3
WebXPRT 3 overall scores (Chrome)	265	211
Time to open and export an 4K video project while listening to Spotify® (seconds)		
Launch Adobe® Premiere® Pro	9.2	9.1
Open Adobe Premiere Pro project file	4.0	3.8
Export video sequence	56.7	69.9
Total	**69.9**	**82.8**
Time to open and export an 8K video project while listening to Spotify (seconds)		
Launch Adobe Premiere Pro	9.4	8.6
Open Adobe Premiere Pro project file	7.9	8.2
Export video sequence	116.6	201.5
Total	**133.9**	**218.3**

	HP Spectre x360 14	2020 Apple® MacBook Pro® 13-inch
Time to finish a complex Microsoft Excel task while watching a YouTube® video (seconds)		
Launch Microsoft Excel	1.5	2.0
Open a 92MB spreadsheet	13.4	21.6
Open a 650KB, 10K-row spreadsheet	1.0	1.4
Insert 100% stacked column 3D chart	24.1	42.2
Total	**40.0**	**67.2**
Time to open and export an Adobe Premiere Pro video project (seconds)		
Launch Adobe Premiere Pro	9.5	7.7
Open Adobe Premiere Pro project file	6.2	8.1
Export video sequence	99.0	199.7
Total	**114.7**	**215.5**
PugetBench for Adobe Creative Cloud® benchmark scores		
PugetBench for Adobe Photoshop	702	635
PugetBench for Adobe Premiere Pro	271	255
Battery life		
Battery life during local video playback (hh:mm)	11:45	10:33

System configuration information

Table 2: Detailed information on the systems we tested.

System configuration information	HP Spectre x360 14	2020 Apple MacBook Pro 13-inch
Processor		
Vendor	Intel®	Intel
Name	Core™ i7-1165G7	Core i7-1068NG7
Core frequency (GHz)	2.80 – 4.70	2.30 – 4.10
Number of cores	4	4
Memory		
Amount (GB)	16	16
Type	LPDDR4X	LPDDR4X
Graphics		
Vendor	Intel	Intel
Model number	Intel Iris® Xe® Graphics	Iris Plus Graphics
Storage		
Amount	1 TB + 32GB Intel Optane™ Memory	1 TB
Type	SSD	SSD
Connectivity/expansion		
Wireless internet	Wi-Fi 6 802.11ax	Wi-Fi 5 802.11ac
Bluetooth	5.1	5.0
Ports	1 x USB-A 2 x USB-C®	4 x USB-C
Battery		
Type	Integrated Lithium-polymer	Integrated Lithium-polymer
Rated capacity (Whr)	64.7	58.0
Display		
Size (in.)	13.5	13.3
Resolution	3,000 x 2,000 with OLED	2,560 x 1,600
Operating system		
Vendor	Microsoft	Apple
Name	Windows 10 Home 64	macOS® Catalina
Build number or version	10.0.19041	10.15.6
BIOS		
BIOS name and version	AMI B.22	N/A

System configuration information	HP Spectre x360 14	2020 Apple MacBook Pro 13-inch
Dimensions		
Height (in)	11.75	11.97
Width (in)	8.69	8.36
Depth (in)	0.75	0.61
Weight (lbs.)	2.8	3.1

How we tested

Measuring boot times

Setting up the HP Spectre x360 14:
1. To open the Windows Run Dialog, simultaneously press Windows + R.
2. In the Windows run dialog box, type `control userpasswords2`, and click Enter.
3. To use this computer, highlight the User Name, uncheck the box next to Users must enter a user name and password, and click Apply.
4. Enter and confirm the password, and click Ok.
5. To confirm that automatic login is enabled, restart the system.

Setting up the 2020 Apple MacBook Pro:
1. Click the Apple logo icon, and select System Preferences.
2. Click Users & Groups.
3. In the bottom left corner, click the lock icon, and enter the account password.
4. From the drop-down menu, click Login Options, and select Automatic login.
5. Select the user account for automatic login, and enter its password.
6. To confirm that automatic login is enabled, restart the system.

Running the test on both systems:
1. Simultaneously start the timer and boot the system.
2. When the desktop user interface appears, stop the timer, and record the time.
3. Record the result.
4. Repeat steps 1 through 3 two more times.
5. Record the median result.

Measuring web browsing capabilities with the WebXPRT benchmark

Running the benchmark on both systems:
1. Open the Web browser under test, and go to https://www.principledtechnologies.com/benchmarkxprt/webxprt/.
2. Click Run WebXPRT 3.
3. At the Ready to test your browser screen, click Continue.
4. Click Start.
5. When the test completes, record the results.
6. Click Run Again and click Start to rerun WebXPRT.
7. Record the results.
8. Repeat step 7 one more time.
9. Record the median result.

Measuring hand-timed multitasking capabilities

Completing an Adobe Premiere Pro video project while listening to Spotify scenarios

Before we started timing, we opened the Spotify app, launched the Outlook and Excel applications, and loaded the native web browser window with 10 open tabs. After we started music playback in Spotify, we timed and recorded how long each system took to launch Adobe Premiere Pro. Then, we opened either a 4K 700MB or 8K 1.5GB Adobe Premiere Pro project, and exported that video sequence.

We used the following applications:
- Spotify
- Microsoft Outlook
- Native web browser with 10 tabs open
  - (Windows: Edge Chromium; macOS: Safari®)
- Microsoft Excel
- Adobe Premiere Pro

Running the tests on the HP Spectre x360 14:

1. Launch the Spotify app, and start listening to a music stream.
2. Launch Outlook.
3. Launch Edge browser, and open 10 tabs, one set to each of the following sites: Google, YouTube, Amazon, Yahoo, Facebook, Reddit, Zoom, Wikipedia, Shopify, and eBay.
4. Launch Excel, and open the test Excel file.
5. Simultaneously start the timer and launch Adobe Premiere Pro.
6. When Adobe Premiere Pro has loaded, stop the timer, and record the time.
7. Select Open Project, and select the test Premiere project file.
8. Simultaneously start the timer and click Open.
9. When the Premiere project file has opened, stop the timer, and record the time.
10. To bring up the Export Media dialog, press Ctrl+M.
11. From the Format drop-down menu, choose H.264.
12. Simultaneously start the timer and click Export.
13. When the export has finished, stop the timer, and record the time.
14. Before performing the next run, close Premiere and wait 5 minutes.
15. Repeat steps 1 through 14 twice more.
16. Record the median time.

Running the tests on the 2020 Apple MacBook Pro:

1. Launch the Spotify app, and start listening to a music stream.
2. Launch Outlook.
3. Launch Safari browser, and open 10 tabs, one set to each of the following sites: Google, YouTube, Amazon, Yahoo, Facebook, Reddit, Zoom, Wikipedia, Shopify, and eBay.
4. Launch Excel, and open the test Excel file.
5. Simultaneously start the timer and launch Adobe Premiere Pro.
6. When Adobe Premiere Pro has loaded, stop the timer, and record the time.
7. Select Open Project, and select the test Premiere project file.
8. Simultaneously start the timer and click Open.
9. When the Premiere project file has opened, stop the timer, and record the time.
10. To bring up the Export Media dialog, press CMD+M.
11. From the Format drop-down menu, choose H.264.
12. Simultaneously start the timer and click Export.
13. When the export has finished, stop the timer, and record the time.
14. Before performing the next run, close Premiere and wait 5 minutes.
15. Repeat steps 1 through 14 twice more.
16. Record the median time.

Completing a complex Microsoft Excel task while watching a YouTube video scenario

Before we started timing, we launched Outlook and PowerPoint. We also loaded a native web browser window with 10 open tabs. After we started watching a picture-in-picture video on YouTube, we timed and recorded how long each system took to launch Excel, open two XLSX test files, and insert a 100% stacked column 3D chart.

We used the following applications:

- YouTube PiP player
- Microsoft Outlook
- Microsoft PowerPoint
- Native web browser with 10 tabs open
    - (Windows: Edge Chromium; macOS: Safari)
- Microsoft Excel

Running the test on the HP Spectre x360 14:

1. Launch Edge browser, and open 10 tabs, one set to each of the following sites: Google, YouTube, Amazon, Yahoo, Facebook, Reddit, Zoom, Wikipedia, Shopify, and eBay.
2. Start watching a YouTube video.
3. To bring up PIP mode, right-click the YouTube video, and right-click again.
4. Launch Outlook.
5. Launch PowerPoint, and open the test PowerPoint file.
6. Simultaneously start the timer and launch Excel.
7. When Excel has loaded, stop the timer, and record the subtest time.
8. Select the test Excel macro file.
9. Simultaneously start the timer and open the test Excel macro file.
10. When the Excel file has loaded, stop the timer, and record the subtest time.
11. Close the macro test file.
12. Select the test Excel 10K-row file.
13. Simultaneously start the timer and open the test 10K-row file.
14. When the test Excel file has loaded, stop the timer, and record the subtest time.
15. Click Insert.
16. Next to the Insert Column or Bar Chart icon, select the drop-down menu.
17. At the bottom of the drop-down menu, select More Column Charts.
18. Under the Column section, choose 3D-100% Stacked Column.
19. Simultaneously start the timer and click Ok.
20. When the 3D-100% Stacked Column Chart appears, stop the timer, and record the subtest time.
21. Before performing the next run, close all the open applications and wait 5 minutes.
22. Repeat steps 1 through 21 twice more.
23. Record the median total time.

Running the test on the 2020 Apple MacBook Pro:

1. Launch Safari browser, and open 10 tabs, one set to each of the following sites: Google, YouTube, Amazon, Yahoo, Facebook, Reddit, Zoom, Wikipedia, Shopify, and eBay.
2. Start watching a YouTube video.
3. To bring up PIP mode, right-click the YouTube video, and right-click again.
4. Launch Outlook.
5. Launch PowerPoint, and open the test PowerPoint file.
6. Simultaneously start the timer and launch Excel.
7. When Excel has loaded, stop the timer, and record the subtest time.
8. Select the test Excel macro file.
9. Simultaneously start the timer and open the test Excel macro file.
10. When the Excel file has loaded, stop the timer, and record the subtest time.
11. Close the macro test file.
12. Select the test Excel 10K-row file.
13. Simultaneously start the timer and open the test 10K-row file.
14. When the test Excel file has loaded, stop the timer, and record the subtest time.
15. Click Insert.
16. Next to the Insert Column or Bar Chart icon, select the drop-down menu.
17. At the bottom of the drop-down menu, select More Column Charts.
18. Under the Column section, choose 3D-100% Stacked Column.
19. Simultaneously start the timer and click Ok.
20. When the 3D-100% Stacked Column Chart appears, stop the timer, and record the subtest time.
21. Before performing the next run, close all the open applications and wait 5 minutes.
22. Repeat steps 1 through 21 twice more.
23. Record the median total time.

Measuring content creation capabilities with PugetBench benchmarks

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 Photoshop

We used the following application:

- Adobe Photoshop

Setting up the tests on both systems:

1. Purchase, and download the PugetBench for Photoshop license from https://www.pugetsystems.com/labs/articles/PugetBench-for-Adobe-Creative-Cloud-1642/.
2. Extract the PugetBench for Photoshop zip file to the desktop.
3. Download, and install aescripts ZXP installer from https://aescripts.com/learn/zxp-installer/.
4. To install the Adobe plug-in necessary to run the benchmark, open the extracted PugetBench for Photoshop directory, and click the PugetBench_PS.zxp.
5. Open Adobe Photoshop.
6. Click Window→Extensions→PugetBench for Photoshop.
7. Under Test locations, click Change, and select the extracted PugetBench for Photoshop directory.
8. Next to License Key, click Change, enter your license key, and click Save.

Running the test on both systems:

1. Open Adobe Photoshop.
2. Click Window→Extensions→PugetBench for Photoshop.
3. Click Run Benchmark.
4. When the benchmark finishes, record the overall score.
5. Close Adobe Photoshop, and restart the system.
6. Before performing the next run, wait 15 minutes.
7. Repeat steps 1 through 6 twice more.
8. Record the median score.

PugetBench for Premiere Pro

We used the following application:

- Adobe Premiere Pro

Setting up the test on the HP Spectre x360 14:

1. Purchase, and download the PugetBench for Premiere Pro license from https://www.pugetsystems.com/labs/articles/PugetBench-for-Adobe-Creative-Cloud-1642/.
2. Extract the PugetBench for Premiere Pro zip file to the desktop.
3. Download, and install aescripts ZXP installer from https://aescripts.com/learn/zxp-installer/.
4. To install the Adobe plug-in necessary to run the benchmark, open the extracted PugetBench for Premiere Pro directory and click the PugetBench_PR.zxp.
5. Open Adobe Premiere Pro.
6. Click Window→Extensions→PugetBench for Premiere Pro.
7. Next to License Key, click Change, enter your license key, and click Save.

Setting up the test on the 2020 Apple MacBook Pro:

1. Purchase and download the PugetBench for Premiere Pro license from https://www.pugetsystems.com/labs/articles/PugetBench-for-Adobe-C,reative-Cloud-1642/.
2. Extract the PugetBench for Premiere Pro zip file to the desktop.
3. Download, and install aescripts ZXP installer from https://aescripts.com/learn/zxp-installer/.
4. To install the Adobe plug-in necessary to run the benchmark, open the extracted PugetBench for Premiere Pro directory, and click the PugetBench_PR.zxp.
5. Click System Preferences→Security & Privacy.
6. Click the Privacy tab.
7. To add Adobe Premiere Pro, select Accessibility, and click +.
8. Close the Security & Privacy dialog box.
9. Open Adobe Premiere Pro.
10. Click Window→Extensions→PugetBench for Premiere Pro.
11. Next to License Key, click Change, enter your license key, and click Save.

Running the test on the HP Spectre x360 14:

1. Open Adobe Premiere Pro.
2. Open the Benchmark_Project.prproj file.
3. Click Window→Extensions→PugetBench for Premiere Pro.
4. Click Run Benchmark.
5. When the benchmark finishes, record the overall score.
6. Close Adobe Premiere Pro, and restart the system.
7. Before performing the next run, wait 15 minutes.
8. Repeat steps 1 through 7 twice more.
9. Record the median score.

Running the test on the 2020 Apple MacBook Pro:

1. Open Adobe Premiere Pro.
2. Open the Benchmark_Project.prproj file.
3. Click Window→Extensions→PugetBench for Premiere Pro.
4. Click Run Benchmark.
    a. To allow Premiere Pro to control System events, the first time the benchmark runs, click OK on the popup.
5. When the benchmark finishes, record the overall score.
6. Close Adobe Premiere Pro, and restart the system.
7. Before performing the next run, wait 15 minutes.
8. Repeat steps 1 through 7 twice more.
9. Record the median score.

Measuring hand-timed content creation capabilities

Creating an Adobe Premiere Pro video

We recorded how long it took to launch Adobe Premiere Pro, open a Premiere project file, and export a 4K RED video file to H.264. We used the following application:

- Adobe Premiere Pro

Running the test on the HP Spectre x360 14:

1. Simultaneously start the timer and launch Adobe Premiere Pro.
2. When Premiere has loaded, stop the timer, and record the subtest time.
3. Select Open Project, and select the test Premiere project file.
4. Simultaneously start the timer and click Open.
5. When the Premiere project file has opened, stop the timer, and record the subtest time.
6. To bring up the Export Media dialog, press Ctrl+M.
7. From the Format drop-down menu, choose H.264.
8. Simultaneously start the timer and click Export.
9. When the export has finished, stop the timer, and record the subtest time.
10. Close Premiere and wait 5 minutes before performing the next run.
11. Repeat steps 1 through 10 twice more.
12. Record the median total time.

Running the test on the 2020 Apple MacBook Pro:

1. Simultaneously start the timer and launch Adobe Premiere Pro.
2. When Premiere has loaded, stop the timer, and record the subtest time.
3. Select Open Project, and select the test Premiere project file.
4. Simultaneously start the timer and click Open.
5. When the Premiere project file has opened, stop the timer, and record the subtest time.
6. To bring up the Export Media dialog, press CMD+M.
7. From the Format drop-down menu, choose H.264.
8. Simultaneously start the timer and click Export.
9. When the export has finished, stop the timer, and record the subtest time.
10. Close Premiere and wait 5 minutes before performing the next run.
11. Repeat steps 1 through 10 twice more.
12. Record the median total time.

Measuring battery life during video playback

Performing this test requires the following items:

- A Gossen Mavolux 5032C USB luminance meter
- A 5-minute 1080p .MP4 (329 MB) test video
- An external timer for noting the passage of time
- A video camera for capturing the runs

Setting up both systems:

1. Turn on the systems.
2. Copy the .MP4 file to each system, and verify that the video player is set to loop the video.
3. Verify that the displays will remain on, and disable power saving options.

Setting up the HP Spectre x360 14:

1. Right-click the desktop, and select Display settings.
2. Uncheck the box next to Change brightness automatically when lighting changes.
3. Select Power & sleep.
4. Select Additional power settings.
5. Select Change plan settings.
6. Select Change advanced power settings, and make the following changes:

   - Display: Turn off Display = Never
   - Display: Dimmed display brightness = 0
   - Display: Enable adaptive brightness = Off
   - Battery: Critical battery action = Shutdown
   - Battery: Critical battery level = 2% (Note: If system doesn't allow 2%, select the next lowest value.)
   - Battery: Low battery notification = Off
   - To save the above changes, click Apply.

7. To bring up a white screen, open a web browser, and type `about:blank` into the address bar.
8. Unplug the system.
9. Allow the screens to warm up for 30 minutes.
10. Use the luminance meter to adjust each screen to a brightness as close to 200 nits as possible without going lower.
11. Right-click the desktop, and select Display settings.
12. Adjust the slider bar until the luminance meter reads 200 nits.

Setting up the 2020 Apple MacBook Pro:

1. Select System Preferences.
2. Select Desktop & Screensaver.
3. Set Start Screensaver to Never.
4. Return to System Preferences, and select Energy Saver.
5. Select Battery, and move the slider bar to Never.
6. Uncheck Slightly dim the display while on battery power.
7. Go back to System Preferences, and select Displays.
8. Uncheck the boxes next to Automatically adjust brightness and True Tone.
9. To bring up a white screen, open a web browser, and type `about:blank` into the address bar.
10. Unplug the system.
11. Allow the screens to warm up for 30 minutes.
12. Use the luminance meter to adjust each screen to a brightness as close to 200 nits as possible without going lower.
    a. Select System Preferences
    b. Select Displays.
    c. Adjust the slider bar until the luminance meter reads 200 nits.

Running the test on both systems

1. Verify that the system's battery is fully charged.
2. Launch the test .MP4 video in full-screen mode.
3. Simultaneously start the video camera and the external timer.
4. Note the time, and unplug the system.
5. When all the systems have finished, stop the video camera.
6. Review the video camera footage, and report the battery life result.
7. Repeat steps 1 through 6 two times.
8. Report the median result.

Read the report at http://facts.pt/LajA7md ▶

This project was commissioned by HP.