



The science behind the report:

HP ZBook Firefly 14 G11 Mobile Workstation PC: Improve productivity, battery life, and power efficiency

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 ZBook Firefly 14 G11 Mobile Workstation PC: Improve productivity, battery life, and power efficiency.](#)

We concluded our hands-on testing on October 28, 2024. 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 October 7, 2024 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.](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 industry-standard benchmark and AI tool testing. Higher benchmark scores and lower Stable Diffusion times are better.

	HP ZBook Firefly 14 G11 Mobile Workstation PC	HP ZBook Firefly 14 G10 Mobile Workstation PC	Win percentage
Cinebench 2024 benchmark			
CPU multi-core score	664	517	28.43
3DMark® benchmark			
Fire Strike Extreme overall score	3,874	3,118	24.24
Time Spy Extreme overall score	1,622	1,219	33.05
Geekbench AI benchmark (CPU, OpenVINO™)			
Single Precision score	2,789	2,363	18.02
Half Precision score	2,811	2,377	18.25
Quantized score	6,987	4,821	44.92
Stable Diffusion (time in seconds, lower is better)			
Time to generate an image from a text prompt	379.70	403.70	5.94

	HP ZBook Firefly 14 G11 Mobile Workstation PC	HP ZBook Firefly 14 G10 Mobile Workstation PC	Win percentage
ResNet-50 inferencing benchmark			
Samples per second	2,852.19	2,126.51	34.12
SPECworkstation® 3.1 benchmark			
Media and Entertainment overall score	2.16	1.91	13.08
Product Development overall score	3.28	2.52	30.15
Graphics overall score	3.03	2.16	40.27
Financial Services overall score	2.74	1.58	73.41
Energy overall score	3.23	2.28	41.66
GPU Compute overall score	1.77	1.60	10.62
SPECapc® for Creo 9 benchmark			
CPU Composite score	1.76	1.59	10.69
GPU Composite score	1.74	1.53	13.72

Table 2: Results of our battery life testing. More time and higher MobileMark 30 scores are better.

	HP ZBook Firefly 14 G11 Mobile Workstation PC	HP ZBook Firefly 14 G10 Mobile Workstation PC	Win percentage
MobileMark 30 v1.0.0.17 - Best Power Efficiency Mode			
Battery life (h:mm)	7:18	5:52	24.43
Power efficiency (minutes per WHr)	7.8	6.9	13.32
DC performance score	927	726	27.68
MobileMark 30 Index score	406	255	59.21

System configuration information

Table 3: Detailed information on the systems we tested.

System configuration information	HP ZBook Firefly 14 G11 Mobile Workstation PC	HP ZBook Firefly 14 G10 Mobile Workstation PC
Processor		
Vendor	Intel®	Intel
Model number	vPro® with Intel Core™ Ultra 7 processor 165H	Core i7-1355U
Core frequency (GHz)	3.8 – 5.0	3.7 – 5.0
Number of cores	16	10
Logical processors	22	12
Cache (MB)	24	12
AI technology	Intel DL Boost on CPU Intel DL Boost on GPU Intel AI Boost on NPU	Intel DL Boost on CPU
Memory		
Amount (GB)	32 (2 x 16)	32 (2 x 16)
Type	DDR-5600	DDR-5200
Integrated graphics		
Vendor	Intel	Intel
Model number	Arc™ Pro Graphics	Iris® Xe Graphics
Driver	Intel 32.0.101.5763	Intel 31.0.101.5388
Discrete graphics		
Vendor	NVIDIA®	NVIDIA
Model number	RTX™ A500 Graphics	RTX A500 Graphics
Driver	NVIDIA 32.0.15.5612	NVIDIA 32.0.15.5612
Storage		
Model	Samsung MZVL21T0HCLR-00BH1	Samsung MZVL21T0HCLR-00BH1
Amount (TB)	1	1
Type	PCIe® Gen4 x4 NVMe M.2 2280	PCIe Gen4 x4 NVMe M.2 2280
Display		
Specifications	14" diagonal, WUXGA LED UWVA, anti-glare for IR webcam, touchscreen (1920 x 1200) 300 nits	14" diagonal, WUXGA, anti-glare, IPS, touchscreen (1920 x 1200) 250 nits

System configuration information	HP ZBook Firefly 14 G11 Mobile Workstation PC	HP ZBook Firefly 14 G10 Mobile Workstation PC
Connectivity/expansion		
Wired internet	N/A	N/A
Wireless internet	Intel Wi-Fi 6E AX211	Intel Wi-Fi 6E AX211
Bluetooth	5.3	5.3
Number of USB Type A	2	2
Number of USB Type C	2	2
Video outputs	1 x HDMI	1 x HDMI
OS		
Vendor	Microsoft	Microsoft
Name	Windows 11 Pro	Windows 11 Pro
Build number or version	23H2 Build 22631.4317	23H2 Build 22631.4317
BIOS		
BIOS name and version	HP W70 Ver.01.03.05 (09/12/2024)	HP V70 Ver.01.06.03 (08/12/2024)
Battery		
Type (WHr)	56 (3-cell)	51 (3-cell)
Dimensions		
Height (in.)	0.76	0.78
Width (in.)	12.42	12.42
Depth (in.)	8.80	8.80
Weight (lb.)	3.53	3.56

How we tested

Setting up the systems

When running the tests, we used a factory-provided image. To prevent software from corrupting the test image, we reset the system image between tests.

Setting up and updating the OEM image

1. Boot the system.
2. To complete installation, follow the on-screen instructions, using the default selections when appropriate.
3. Set the Windows Power Plan to Best Performance.
4. Set Screen and Sleep options to Never:
 - a. Right-click the desktop, and select Display settings.
 - b. From the left-hand column, select System.
 - c. Click Power.
 - d. For all power options listed under Screen and Sleep, select Never.
5. Disable User Account Control notifications:
 - a. Select Windows Start, type UAC, and press Enter.
 - b. Move the slider control to Never notify, and click OK.
6. Run Windows Update, and install all updates available.
7. Check for updates using the HP Support Assistant Application, and run updates.
8. In application settings, disable automatic software updates.
9. For both integrated and discrete graphics cards, we used the latest graphics drivers available from HP.
10. Verify the date and time are correct, and synchronize the system clock with the time server.
11. Pause Automatic Windows Updates:
 - a. Click Windows Start.
 - b. Type Windows Update settings, and press Enter.
 - c. From the Pause updates drop-down menu, select Pause for 5 weeks.

Capturing an image

1. Connect an external HDD to the system.
2. Click the Windows Menu button.
3. In the search bar, type Control Panel.
4. Click Control Panel→System and Security→Backup and Restore (Windows 7)→Create a system image.
5. Verify that the external HDD is selected as the save drive, and click Next.
6. Verify that all drives are selected to back up, and click Next.
7. Click Start backup.
8. When the system asks if you want to create a system repair disc, select No, and close the dialogs.

Restoring an image

1. Connect an external HDD to the system.
2. While restarting the system, press and hold the Shift key.
3. Select Troubleshoot.
4. Select Advanced options.
5. Select See more recovery options.
6. Select System image recovery.
7. Select the User account.
8. Enter the system password, and click Continue.
9. At the Restore system files and settings screen, select Next.
10. Verify that the external HDD is selected, and click Next.
11. Once the recovery has completed, click Finish.

Running virus scan and processing idle tasks

Once every 24-hour period, before testing, we rebooted the system and ran a full virus scan followed by the ProcessIdleTasks command. This forces idle processes to complete, minimizing the chance of background tasks affecting test runs.

1. Restart the system.
2. Open the HP Wolf Security application.
3. Click Start Full Scan.
4. After the virus scan finishes, select Windows Start.
5. Type `cmd`, and press Ctrl+Shift+Enter.
6. Type `Rundll32.exe advapi32.dll, ProcessIdleTasks`. Do not interact with the system until the command completes.
7. After the command completes, wait 5 minutes before running the test.

Measuring performance with benchmarks and AI tools

Testing with 3DMark

Setting up 3DMark

1. Download the 3DMark benchmark from <http://www.futuremark.com/benchmarks/3dmark/all>.
2. To install 3DMark with the default options, double-click the 3DMark installer.exe file.
3. To launch 3DMark, double-click the 3DMark desktop icon, enter the registration code, and click Register.
4. Exit 3DMark.

Running 3DMark

1. To launch the benchmark, double-click the 3DMark desktop icon.
2. At the top of the 3DMark Home screen, click the Benchmarks tab.
3. Select the desired benchmark to run (Time Spy Extreme or Fire Strike Extreme).
4. To turn off the Include Demo feature, move the slider button.
5. Click Run.
6. When the benchmark run completes, record the results.
7. Wait 10 minutes.
8. Perform steps 3 through 7 two more times for each benchmark.
9. Record the median result.

Testing with Cinebench 2024

Setting up the test

1. Download and install Cinebench 2024 from <https://www.maxon.net/en/downloads/cinebench-2024-downloads>.
2. Launch Cinebench 2024.
3. Select File→Advanced benchmark.
4. From the Minimum Test Duration drop-down menu, select Off.

Running the test

1. Launch Cinebench 2024.
2. Click File→Run All tests.
3. Record the result.
4. Wait 10 minutes before re-running.
5. Repeat steps 1 through 4 two more times.
6. Record the median result.

Testing with Geekbench AI

Setting up the test

1. Purchase and download a Geekbench AI Pro license from <https://www.geekbench.com/ai/download/>.
2. Using all the defaults, run the installer, and install the benchmark.

Running the test

1. Launch Geekbench AI.
2. Enter the license key.
3. For CPU/NPU testing, select:
 - AI Framework: OpenVINO™
 - AI Backend: CPU
 - AI Device: processor
4. For GPU testing, select:
 - AI Framework: ONNX
 - AI Backend: DirectML
 - AI Device: discrete NVIDIA graphics card
5. Click Run AI Benchmark.
6. Wait 5 minutes, repeat steps 3 through 5, and capture the median of 3 runs.

Testing with the ResNet-50 inferencing benchmark

Here we set up an MLPerf container in Ubuntu 22.04 on WSL2. We used the MLPerf container to run a TensorRT supported workload focused on edge systems. This workload targets the GPU exclusively. For more information about this workload, see the following URL: https://docs.mlccommons.org/inference/benchmarks/image_classification/resnet50/.

We performed this section on 10/20/2024 and updated files at that time. At the time of testing, NVIDIA Studio driver release 565.90 was required for GPU functionality in the WSL2 environment.

1. On the target system, Enable Microsoft Hyper-V and WSL:

```
Enable-WindowsOptionalFeature -online -featurename Microsoft-Hyper-V-All,VirtualMachinePlatform,Microsoft-Windows-Subsystem-Linux -a
```

2. Reboot the system.
3. After rebooting, update WSL:

```
wsl --update
```

4. Install Ubuntu 22.04:

```
wsl --install Ubuntu-22.04
```

5. Once installed, enter the following for username, and create a password:

```
username: ptuser
```

6. Use `sudo nano /etc/profile`, and add the following to the end of `/etc/profile`:

```
export PATH="/home/ptuser/.local/bin:$PATH"
```

7. Run updates, and exit:

```
sudo apt update && sudo apt upgrade -y  
exit
```

8. Close the terminal window, start a new one using Ubuntu, and install dependencies:

```
sudo apt install python3 python3-pip python3-venv git wget curl zlib1g unzip -y
```

9. Create and activate a Python virtual environment for CM:

```
python3 -m venv cm
source cm/bin/activate
```

10. Install the CM4MLOPS Python packages:

```
pip install cm4mlops
```

11. Verify cmind functionality:

```
cm test core
```

12. Build and initialize the test container environment:

```
cm run script --tags=run-mlperf,inference,_find-performance,_full,_r4.1-dev \
--model=resnet50 \
--implementation=nvidia \
--framework=tensorrt \
--category=edge \
--scenario=Offline \
--execution_mode=test \
--device=cuda \
--gpu_name=rtx_4090 \
--docker --quiet \
--test_query_count=5000
```

If Docker wasn't installed on the system, you may need to exit the terminal and run the command again to initialize environment variables that were changed during the first run of the script. When successful, the prompt will be inside the built container.

Running the test

1. After the initialization script completes, run the benchmark in the container context:

```
cm run script --tags=run-mlperf,inference,_r4.1-dev \
--model=resnet50 \
--implementation=nvidia \
--framework=tensorrt \
--category=edge \
--scenario=Offline \
--execution_mode=valid \
--device=cuda \
--quiet \
--gpu_name=rtx_4090 \
--test_query_count=1000000 \
--rerun
```

2. Record the resulting throughput result.
3. Wait 15 minutes, and repeat steps 1 and 2 two more times.
4. Record the median result.

Testing with SPECapc for Creo 9

Setting up the test

1. Purchase a license for Creo 9.
2. To log into your PTC account, use the Welcome email, and designate a site administrator. (Note: For valid SPECapc for Creo 9 results to be submitted, Creo 9 v9.0.4.0 must be used for testing. Download the Win64 Creo 9.0.4.0 installer from here <https://support.ptc.com/appserver/auth/it/esd/product.jsp?prodFamily=ENG>.)
3. Extract the Creo 9.0.4.0 zip file.
4. Inside the extracted file, copy the install_license_server.exe onto a separate Windows system.

5. On a separate Windows system, run `install_license_server.exe`.
6. In the Creo Installation Assistant – Creo 9.0.4.0 Window, select Install License Server, and click Next.
7. Accept the Software License Agreement, and click Next.
8. On the License Identification screen, select Simple license entry, and click Next.
9. Next to License Generation for Server Install, expand the drop-down menu, and select Simple License entry.
10. Enter the sales order number located on your purchase order, and click Install License.
11. In the new window, log into PTC.com with your credentials.
12. Click Finish.
13. To verify that the license server is running, browse to the server IP and port 8090 or `[server_ip]:8090`.
14. Log in with the default credentials, `admin/admin`, enter a new password, and verify that the license server is running with available licenses.
15. On the system under test, copy the Creo Installation folder above to the target system.
16. Run `Setup.exe`.
17. At the Introduction screen, click Next.
18. At the Software License Agreement screen, accept the agreement, export the agreement, and click Next.
19. Add the license server using `7788@[ip_of_license_server]`. Select the License server, and click Next.
20. At the Application Selection screen, accept the Defaults, and click Next.
21. At the Customize Application screen, confirm that Creo Render Studio is selected, and click Install.
22. Once the installation completes, click Finish.
23. Launch Creo Parametric, and close any prompts.
24. Download SPECapc for Creo 9 from <https://gwpkg.spec.org/benchmarks/benchmark/specapc-ptc-creo-9/>.
25. To extract and complete the installation, use all default options.

Running the test

1. Open SPECapc for Creo 9.
2. Click Run.
3. Repeat steps 1 and 2 two more times.
4. Record the median result.

Testing with SPECworkstation 3.1

Setting up the test

1. Go to <https://www.spec.org/gwpg/wpc.static/workstation3-info.html>, and purchase and download the vendor license of the benchmark.
2. Unzip the `SPECworkstation_304.zip` file to `C:\`.
3. To install, navigate to the extracted `SPECworkstation_304` directory, and click the `SPECworkstation_304.exe`.
4. Turn off Windows Defender Firewall.
5. Click Windows Menu button.
6. In the search bar, type `Firewall`.
7. Select Windows Defender Firewall.
8. In the column on the left, select Turn Windows Defender Firewall on or off.
9. Under both Private and Public network settings, choose Turn off Windows Defender Firewall, and click OK.

Running the test

1. Launch SPECworkstation.
2. Next to Official Run, check the box.
3. Click the OpenCL Configuration button, and select the discrete graphics card option.
4. Click Run Benchmark.
5. Repeat steps 1 through 4 two more times.
6. Record the median result.

Testing with Stable Diffusion

We installed Stable Diffusion AUTOMATIC111 with the V1-5-pruned-emaonly model.

Installing Stable Diffusion

1. Download Python from <https://www.python.org/ftp/python/3.10.6/python-3.10.6-amd64.exe>.
2. Double-click the installer.
3. Check the box for Add Python 3.10 to PATH, and click Install Now.
4. To end the installer wizard, click Close.
5. Download git from <https://github.com/git-for-windows/git/releases/download/v2.45.2.windows.1/Git-2.45.2-64-bit.exe>.
6. Double-click the installer.
7. Click Next through the default options, and click Install.
8. To end the installer wizard, click Finish.
9. Reboot the system.
10. Open a command prompt, navigate to c:\Users\[your username], and enter the following command:

```
git clone https://github.com/AUTOMATIC1111/stable-diffusion-webui.git
```

11. On completion, open file explorer, and browse to C:\Users\[your username]\stable-diffusion-webui\models\.
12. Open a web browser, and download a checkpoint file from <https://huggingface.co/runwayml/stable-diffusion-v1-5/resolve/main/v1-5-pruned-emaonly.ckpt>.
13. Copy that downloaded checkpoint file into the C:\Users\[your username]\stable-diffusion-webui\models\Stable-diffusions folder.
14. Browse up two levels to C:\Users\[your username]\stable-diffusion-webui\, and execute the webui-user.bat file. The batch file will take about 5 minutes to complete and will launch a browser with <http://127.0.0.1:7860> as the address. Use this browser window to execute testing.
15. Close the command session, and repeat step 14 for each subsequent test.

Using Stable Diffusion

For testing, we used default settings, except for the following modifications:

1. Set width to 640 and height to 360.
2. Check the box for Hires, fix, expand the panel, and change the upscale to 2 for 720p image quality.
3. Change sampling steps from 20 to 100.
4. Enter a prompt into the txt2image text box. We used, `A monster truck rally but the spectators are dinosaurs.`
5. To start the image creation, click Generate.
6. Repeat steps 1 through 5 two more times.
7. Record median result.

Measuring battery life

Testing with MobileMark 30

This test requires an X-Rite - i1Display Plus colorimeter.

Avoiding antivirus software conflicts

MobileMark 30 is not compatible with any virus-scanning software, so we uninstalled any such software present on the systems before we installed the benchmark.

Avoiding pre-installed software conflicts

MobileMark 30 installs the following applications, which its test scripts employ:

Productivity

- Corel WinZip 26.0 Enterprise
- Microsoft Excel 2021 Professional Plus
- Microsoft Outlook 2021 Professional Plus
- Microsoft PowerPoint 2021 Professional Plus
- Microsoft Word 2021 Professional Plus

Creativity

- Adobe® Photoshop® CC

If any of these applications already exist on the system under test, they could cause problems with the benchmark due to software conflicts. To avoid any such issues, we uninstalled all conflicting pre-installed software applications—including different versions of any of the programs MobileMark 30 uses—before we installed the benchmark.

Using the MobileMark built-in configuration tool

This tool supports three levels of configuration:

1. Only makes changes that are **REQUIRED** for the benchmark to run.
2. Additionally, makes changes that are **RECOMMENDED** for repeatable results.
3. Additionally, makes **OPTIONAL** changes that help ensure best results.

The configuration tool makes the following configuration changes at each of the three levels:

Level 1 - Required

- Disables User Account Control (UAC)
- Set DPI Scaling to 100%
- Disables Low Battery Actions
- Disables Network Proxies
- Disables System Sleep and Hibernate
- Disables Windows Update
- Enables Windows Search
- Disables WinSAT

Level 2 - Recommended

- Create BAPCo power scheme
- Set Power Plan Type to Balanced
- Set CPU Adaptive Mode
- Disables Battery Saver Dimming
- Verifies Battery Saver Threshold
- Disables Disk Defrag
- Disables Windows Error Reporting
- Disables Windows Lock Screen
- Disables Screen Saver and Monitor Timeout
- Set Font Smoothing

Level 3 - Optional

- Disables Battery Saver
- Disables Hard Disk Timeout
- Disables System Restore
- Ignores Laptop Lid Close
- Enables Dark Mode

For the Best power efficiency runs we disabled the recommended options for “Set Power Plan Type to balanced” and “Verify Battery Saver Threshold” options.

Setting up the performance-qualified battery life test

1. On a separate PC, install the i1Profiler software from <https://www.xrite.com/categories/formulation-and-quality-assurance-software/i1profiler> and connect the X-Rite - i1Display Plus colorimeter to that PC.
2. On the system under test, verify that the wireless adapter is disabled.
3. For the Best power efficiency battery life runs:
4. Select Windows Start, type `Power, sleep, and battery settings`, and press Enter.
5. From the Power mode drop-down menu, select Best power efficiency.
6. Select Windows Start, type `Battery saver`, and press Enter.

7. From the Battery saver drop-down menu, select Turns on at Always (100%), click the down arrow. Next to Lower screen brightness when using battery saver, toggle the button to Off.
8. On the system under test, verify that the volume is set to 50%.
9. Disable Intel DPST to prevent the screen from dynamically changing the screen brightness based on content:
 - a. Open the Intel Graphics Command Center, press on the keyboard Windows key, type `Intel`, and choose Intel Graphics Command Center.
 - b. Select System→Power.
 - c. In On Battery, set Display Power Savings to Off.
10. Verify the system is no less than 250 nits.
11. On the system under test, install MobileMark 30 with the default options.

Running the performance-qualified battery life test

1. Boot the system.
2. Launch MobileMark 30.
3. Click Run Benchmark.
4. Click the Brightness Profiler button.
5. Allow the white screen to warm up for 30 minutes. After 30 minutes, click Skip.
6. To use the value that is queried from the display, at the Panel Dark Luminance pop-up, select Yes.
7. Place the X-Rite - i1Display Plus colorimeter in the outlined spot on the screen.
8. To turn off the test overlay, on the test PC, toggle the F1 button.
9. On the colorimeter PC, start i1Profiler program, and select Advanced.
10. Click Display, and click Profiling.
11. Next to Luminance, click the drop-down menu, and select Measure.
12. In the drop-down menu that appears below, select Paper in booth.
13. In the box with the image that says Place your paper in the light booth, scroll down so that you can click the Measure button.
14. On the test PC, adjust the slider until the Target White luminance is met on the colorimeter PC.
15. Once the correct Target White luminance is met on the test PC, click Done.
16. The test will begin immediately. When prompted, unplug the AC power adapter.

The benchmark is complete when the system has fully depleted its battery and is no longer operational when running on battery power.

We executed the MobileMark 30 benchmark three times on the system and took the median battery life score run as the representative performance score result for that test.

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

This project was commissioned by HP.



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