



The science behind the report:

# A pint-sized workstation that can power your demanding engineering and design applications

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 [A pint-sized workstation that can power your demanding engineering and design applications](#).

We concluded our hands-on testing on June 16, 2022. 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 1, 2022 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 <https://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

Application name	Version	Application installs	Application completes simple task	Application closes
Adobe® InDesign® CC	v17.2.1	Pass	Pass	Pass
Adobe Lightroom® Classic	v11.3.1	Pass	Pass	Pass
Adobe Photoshop® CC	v23.3.2	Pass	Pass	Pass
Adobe Premiere® Pro CC	v22.4	Pass	Pass	Pass
Adobe After Effects® CC	v22.4	Pass	Pass	Pass
ANSYS® Discovery™	2022 R1	Pass	Pass	Pass
Autodesk® 3ds Max® 2023	v25.0.0.997	Pass	Pass	Pass
Autodesk AutoCAD® 2023	vT.53.0.0	Pass	Pass	Pass

Application name	Version	Application installs	Application completes simple task	Application closes
Autodesk Inventor® Pro 2023	Build 158	Pass	Pass	Pass
Autodesk Maya® 2023	v2023	Pass	Pass	Pass
Revit® 2023	v23.0.11.19	Pass	Pass	Pass
Avid® Media Composer® Ultimate	v22.4.0	Pass	Pass	Pass
Bentley Microstation Connect Update16	v10.16.03.11	Pass	Pass	Pass
Blackmagic Design DaVinci Resolve 18	v18.0B Build 14	Pass	Pass	Pass
Dassault Systèmes SOLIDWORKS® 2022	vSP2.0	Pass	Pass	Pass
Siemens NX™ Core Designer	v1926 Build 1700	Pass	Pass	Pass
Siemens Solid Edge® 2022	v222.00.00.132 x64	Pass	Pass	Pass
Siemens Tecnomatix® Plant Simulaton	v16	Pass	Pass	Pass
VMware Horizon® View	v8.5.0-19584195	Pass	N/A	N/A

## System configuration information

Table 2: Detailed information on the system we tested.

System configuration information	Intel® NUC 12 Extreme Kit
BIOS name and version	Intel EDADLMIV.0052.2022.0425.2256
Processor	
Number of processors	1
Vendor and model	Intel Core™ i9-12900 with Intel vPro®
Core count (per processor)	16
Core frequency (GHz)	2.40–5.10
Cache	30MB SmartCache
Memory	
Amount (GB)	64
Type	DDR4-3200
Speed (MHz)	3,200
Graphics #1	
Vendor	Intel
Model number	UHD Graphics 770
Graphics #2	
Vendor	NVIDIA®
Model number	Quadro® P2200
Storage	
Model	Samsung® 980 Pro
Amount	500 GB
Connectivity/expansion	
Wired internet	Intel I225-LM Marvel AQtion 10Gbit
Wireless internet	Intel Wi-Fi 6E AX211
Bluetooth	Yes
USB	6x rear USB 3.2g2, 2x Thunderbolt 4 (USB 3.2g2), 2x front USB 3.2g2, 1x USB 2.0 via internal header
On-board video	1 x HDMI, 4 x DisplayPort
Operating system	
Vendor	Microsoft
Name	Windows 11 Pro
Build number or version	10.0.22000

## How we tested

### Adobe InDesign CC v17.2.1

#### Creating, editing, saving, and exporting a new document

1. Download Adobe InDesign, and using the default options, install the application.
2. Launch Adobe InDesign.
3. Click Create New.
4. Choose the Print layout option, and select Tabloid.
5. Under Preset Details, name the project.
6. For units, choose inches.
7. Change the orientation to landscape, and uncheck Facing Pages.
8. Click Create.
9. Click File→Place.
10. Select the Stock Sample image file, and click Open.
11. Adjust the image file to the desired position for the layout.
12. Using the Text tool, add text to the design.
13. Click File→Save, and save the project file.
14. Click File→Export, and click Save to export the InDesign project to an Adobe PDF.
15. Accept the default export options, and click Export.
16. Close Adobe InDesign.

### Adobe Lightroom Classic v11.3.1

#### Importing RAW .NEF files, creating a Panorama image, and exporting the file

1. Download Adobe Lightroom Classic, and using the default options, install the application.
2. Launch Adobe Lightroom Classic.
3. Click File [Symbol] Import Photos and Video.
4. Select the test file directory, and click Import.
5. To select all the imported photos, press Ctrl + A.
6. Click Photo→Photo Merge→Panorama.
7. When the Panorama picture appears, click Merge.
8. Select File→Export.
9. Select JPEG with 100% Quality.
10. Click Export.
11. Close Adobe Lightroom Classic.

### Adobe Photoshop CC v23.3.2

#### Importing RAW .NEF files, creating an HDR image, and exporting the file

1. Download Adobe Photoshop, and using the default options, install the application.
2. Launch Adobe Photoshop.
3. Select File→Automate→Merge to HDR Pro.
4. Select the five high dynamic range (HDR) test files, and click OK.
5. To begin the HDR merge process, click OK.
6. When the HDR picture appears, select File→Export→Export As.
7. Select JPG from the Format dropdown menu, and select 100% Quality.
8. Click Export.
9. Close Adobe Photoshop CC.

## Adobe Premiere Pro CC v22.4

### Importing a RED 4K file and exporting the file to H.264

1. Download Adobe Premiere Pro, and using the default options, install the application.
2. Launch Adobe Premiere Pro.
3. Select New Project, and enter a name for the project.
4. To Import the RED 4K video file, press Ctrl + I, and select the timeline box.
5. To bring up the Export Media dialog, press Ctrl + M.
6. From the Format dropdown menu, choose H.264.
7. Click Export.
8. Close Adobe Premiere Pro.

## Adobe After Effects CC v22.4

### Importing a RED 4K file, adding a special effect, and exporting the file

1. Download Adobe After Effects, and using the default options, install the application.
2. Launch Adobe After Effects.
3. Select New Project, and enter a name for the project.
4. Click Composition→New Composition, and enter a name.
5. To import the RED 4K video file, press Ctrl + I, and select the timeline box.
6. To add a position keyframe, click the stopwatch in the bottom left corner.
7. Move down the timeline two seconds, and change the X-value coordinates to -500.
8. To play the video, press the spacebar.
9. Click Effect→Generate→CC Threads.
10. Click File→Export→Add to Render Queue.
11. Specify the Export destination, and click Save.
12. Click Render.
13. Close Adobe After Effects.

## ANSYS Discovery 2022 R1

### Performing Heat Sink temperature simulation

1. Download Ansys Discovery Live, and using the default options, install the application.
2. Launch Ansys Discovery Live.
3. Click Sample Heat sink.
4. Click Solve and verify that the simulation begins.
5. Close Ansys Discovery Live

## Autodesk 3ds Max 2023 v25.0.0.997

### Creating an object and saving the project

1. Download Autodesk 3ds Max, and using the default options, install the application.
2. Launch Autodesk 3ds Max.
3. From the top menu, click Customize→Unit Setup, and select Generic Units.
4. Select Standard Primitives, and click the Cylinder object.
5. Click and drag the mouse on the grid workspace, and create a cylinder.
6. Click File→Save, and save the project.
7. Close Autodesk 3ds Max.

## Autodesk AutoCAD 2023 vT.53.0.0

### Creating a basic 2D drawing, rotating the drawing, and saving the project file

1. Download AutoCAD, and using the default options, install the application.
2. Launch AutoCAD.
3. At the bottom of the screen, select Create.
4. Click Start Drawing.
5. Select the Polyline tool, and draw four connecting lines.
6. Select the Circle tool, and draw a circle.
7. Select the Arc tool, and draw an arc.
8. Select the Rectangle tool, and draw a rectangle.
9. Using the arrows in the top right-hand corner, rotate the project.
10. Click AutoCAD, and select Save As Drawing.
11. Enter a project name, and click Save.
12. Close AutoCAD.

## Autodesk Inventor Pro 2023 Build 158

### Creating a basic 3d rectangle, rotating the rectangle, and saving the project file

1. Download Inventor Pro, and using the default options, install the application.
2. Launch Inventor Pro.
3. Click New→Templates→en-US→Metric choose Standard (mm).ipt, and click Create.
4. Click Start 2D Sketch.
5. Select the XY plane.
6. Click the Rectangle tool, and select the Rectangle Two Point Center option.
7. For the y-axis, use 96, and for the x-axis, use 64.
8. Right-click the workspace area, and select OK.
9. Click Finish Sketch.
10. Click Extrude. For Distance, type 20, and click OK.
11. In the upper right-hand corner, click the cube, and rotate the shape so the front face is facing up.
12. Click File→Save as.
13. Enter a project name, and click Save.
14. Close Inventor Pro.

## Autodesk Maya 2019 v2023

### Creating a ring with a hole

1. Download Maya, and using the default options, install the application.
2. Launch Maya.
3. Click New Project.
4. Click New, enter a name for the project, and click Accept.
5. Click Create→Polygon Primitives→Torus.
6. Change Radius to 25, Section Radius to 7, Axis divisions to 130, and Height divisions to 50. Click Apply, and Close.
7. To duplicate in the Outliner box, press Ctrl+D.
8. To hide the Outliner box, press Shift+H.
9. Select the Torus.
10. In the top right-hand corner, open the modeling toolkit.
11. Select the Vertex.
12. To select all the vertices, draw a box around the Torus shape.
13. Click Edit-Mesh, and select Chamfer Vertices.
14. Click Edit, and select Reset the Settings.
15. Change the width to 0.5. Click Apply and Close.
16. To select all the vertices, draw a box around the Torus shape.
17. Click Edit-Mesh, and select Merge.
18. Click Object Mood.
19. Select one face, and on the next face, press Shift + double-click.
20. Repeat the process so there is a crisscross effect occurring around the shape.
21. Click Select→Inverse.
22. Click the shape, and delete the Face.
23. Click Vertex Selection.
24. To select all the vertices, draw a box around the Torus shape.
25. Click Mesh Display, and select Average.
26. Click Object Mood.
27. Click Edit-Mesh, and select Extrude.
28. Change Local Translate Z to 0.7.
29. In the Outliner box, select the hidden pTorus2, and press - - - h
30. Click the workspace area, and to show a solid shape, drag down.
31. Press Alt+B.
32. Close Maya.

## Autodesk Revit 2023 v23.0.11.19

### Opening a sample project file, changing the 2<sup>nd</sup> floor single door to a double door, rotating the 3D view image, and saving the project

1. Download Revit, and using the default options, install the application.
2. Launch Revit.
3. Click Sample Architectural Project.
4. Select the rac\_basic\_sample\_project.rvt file.
5. In the left-hand column, expand the Floor Plans option, and select the 2<sup>nd</sup> floor.
6. Click View, and select Tile Views.
7. In the Level 2 panel, select the door, and change the Properties from a single door to a Curtain Wall Dbl Glass.
8. In the 3D panel, click Full Navigation Wheel, and move the mouse to rotate the 3D image.
9. Close Revit.

## Avid Media Composer Ultimate v22.4.0

### Importing RED 4K file, adding Color Correction effect, and exporting to H.264

1. Download Media Composer | Ultimate, and using the default options, install the application.
2. Launch Media Composer | Ultimate.
3. Select Private, and click New Project.
4. Under format, select 4K→4K DCI Full 4096x2160 24P.
5. Enter a name for the project, and click OK.
6. Select the newly created project, and to open the project, click OK.
7. Click File→Import, and select the big\_buck\_bunny\_1080p\_h264.mov video file.
8. Drag the file to the timeline.
9. Click Filters, and select the Green bias.
10. Drag that filter onto the video clip.
11. Export the video as an Avid File Exchange File.
12. Close Media Composer | Ultimate.

## Bentley MicroStation Connect Update 16 v10.16.03.11

### Opening a sample project file, adding a rectangular addition to the structure, and saving the project file

1. Download MicroStation Connect, and using the default options, install the application.
2. Launch MicroStation Connect.
3. To start a work session, on the right-hand portion of the screen, click the half circle with an arrow.
4. Click New File.
5. Enter a file name, and click Save.
6. Select the Place SmartLine tool, and draw four connecting lines.
7. Select the Arc tool, and draw an arc.
8. Select the Elipse tool, and draw a circle.
9. To rotate the view, click Rotate View, and click and drag the workspace.
10. Save the project.
11. Close MicroStation Connect.

## Blackmagic Design DaVinci Resolve 18

### Importing RED 4K video, speeding up the video, and rendering it to H.264

1. Download Resolve, and with the default options, install the application.
2. Launch Resolve.
3. Click New Project.
4. At the bottom of the page, click the Media icon, and import the RED 4K video.
5. Drag the video onto the project timeline.
6. Right-click the clip, and select Change Clip Speed.
7. Change the Speed to 289.00%, and click Change.
8. On the bottom, click Deliver Workspace .
9. Click Render Settings, select H.264, name the file, and select the save location.
10. Click Add to Render Queue.
11. Select the job, and click Start Render.
12. Close Resolve.



## Dassault Systèmes SOLIDWORKS 2022 vSP2.0

### Creating an Aluminum rectangle extruded base, and saving the project

1. Download SOLIDWORKS, and using the default options, install the application.
2. Launch SOLIDWORKS.
3. Click File→New.
4. Select Part, and click OK.
5. Right-click Material, and select Edit Material.
6. Select Aluminum Alloys→1060 Alloy.
7. For the Units, select SI – N/mm<sup>2</sup> (MPa), and click Apply and Close.
8. From the left column, select the Front Plane option, and click Sketch.
9. Select the Corner Rectangle tool.
10. Move the mouse cursor to the center point.
11. Left click the mouse, move the cursor to the upper right, and to make a rectangle, left click the mouse.
12. Click the Smart Dimension tool.
13. Click the right side of the rectangle, move the cursor to the right, and left click the mouse.
14. Into the Modify box, type 5.
15. Click the bottom side of the rectangle, move the cursor down, and left click the mouse.
16. Into the Modify box, type 3.
17. Press Escape.
18. Click Features.
19. Select Extruded Boss/Base.
20. In the left column, type 0.5 inches, and click the green check mark.
21. Press the left and right arrow keys, and rotate the image.
22. Save the project.
23. Close SOLIDWORKS.

## Siemens NX Core Designer

### Creating an extruded rectangular sketch, and saving the project

1. Sign into Siemens.
2. Launch NX.
3. Click New→Model, and click OK.
4. Click the Extrude tool, and select the horizontal plane.
5. Click the Rectangle tool.
6. Drag the mouse cursor, and create a rectangle.
7. Make the width 96 and the height 64, and click the workspace area.
8. Click Finish.
9. For Distance in the Extrude dialog box, type 16, and click Apply.
10. Using the mouse cursor, rotate the shape.
11. Save the project.
12. Close NX.

## Siemens Solid Edge 2022

### Creating an extruded rectangular sketch, and saving the project

1. Download Solid Edge, and with the default options, install the application.
2. Launch Solid Edge.
3. Click New.
4. Click ISO Metric→ISO Metric Part.
5. Right-click Synchronous, and select Transition to Ordered.
6. Click Extrude, and click the horizontal plane.
7. Click the Rectangle tool, and to create a rectangle, drag the mouse cursor.
8. Click the Smart Dimension tool.
9. Click the right side of the rectangle, move the cursor to the right, and left click.
10. Type 100.
11. Click the bottom side of the rectangle, move the cursor down, and left click.
12. In Modify, type 150.
13. To close Sketch, click the Green check mark.
14. Make the distance 20, and click finish.
15. Rotate the image.
16. Save the project.
17. Close Solid Edge.

## Siemens Tecnomatix Plant Simulation v16

### Creating a production line model

1. Download Tecnomatix, and with the default options, install the application.
2. Launch Tecnomatix.
3. Click Create New Model.
4. Select 3D.
5. Click View, and select Planning View.
6. Maximize the window, and right-click and drag the workspace area so that the stopwatch is in the top left corner.
7. Click the Source icon, place the source in the frame, and click the left mouse button.
8. Select the Station single process, and to place it in the frame two grid boxes away from the Source, left click.
9. Hold the Ctrl key, and add two station single process points.
10. Select the drain, and place it at the end of the production line.
11. Select the Connector, and hold the Ctrl key while connecting the source, 3 process points, and drain together. Once you have selected everything, press Escape.
12. Click Planning View.
13. Click Home. To reset the simulation, click the red back button.
14. To start the simulation, click the green play button.
15. Close Tecnomatix.

## VMware Horizon View v8.5.0

### Installing the VMware Horizon client

Note: This scenario requires an existing VMware Horizon 7 Infrastructure, installation media, and that the Intel NUC runs a Microsoft Windows operating system.

1. Log into Windows, browse to the VMware Horizon View 7 media, and run the VMware-Horizon-Client-4.10.0-11021086.exe file.
2. At the Welcome screen, click Agree & Install.
3. Click Finish.
4. Click restart Now.
5. Log into Windows.
6. Click VMware Horizon client.
7. Click add server.
8. Enter the VMware Horizon connection server address, and click connect.
9. To authenticate to the VMware Horizon environment, enter the username and password, and click Login.
10. To launch a virtual desktop in the Horizon client, click the virtual desktop.

Read the report at <https://facts.pt/z5BEL2x> ►

This project was commissioned by Intel.



**Facts matter.®**

Principled Technologies is a registered trademark of Principled Technologies, Inc.  
All other product names are the trademarks of their respective owners.

#### DISCLAIMER OF WARRANTIES; LIMITATION OF LIABILITY:

Principled Technologies, Inc. has made reasonable efforts to ensure the accuracy and validity of its testing, however, Principled Technologies, Inc. specifically disclaims any warranty, expressed or implied, relating to the test results and analysis, their accuracy, completeness or quality, including any implied warranty of fitness for any particular purpose. All persons or entities relying on the results of any testing do so at their own risk, and agree that Principled Technologies, Inc., its employees and its subcontractors shall have no liability whatsoever from any claim of loss or damage on account of any alleged error or defect in any testing procedure or result.

In no event shall Principled Technologies, Inc. be liable for indirect, special, incidental, or consequential damages in connection with its testing, even if advised of the possibility of such damages. In no event shall Principled Technologies, Inc.'s liability, including for direct damages, exceed the amounts paid in connection with Principled Technologies, Inc.'s testing. Customer's sole and exclusive remedies are as set forth herein.