



MacBook Pro (16-inch, 2024) - Tech Specs

Year introduced: 2024

Finish	Space Black Silver
Chip	Apple M4 Pro chip 14-core CPU with 10 performance cores and 4 efficiency cores 20-core GPU Hardware-accelerated ray tracing 16-core Neural Engine 273GB/s memory bandwidth Media Engine Hardware-accelerated H.264, HEVC, ProRes and ProRes RAW

Video decode engine
Video encode engine
ProRes encode and decode engine
AV1 decode

Configurable to:

M4 Max with 14-core CPU and 32-core GPU (410GB/s memory bandwidth) or M4 Max with 16-core CPU and 40-core GPU (546GB/s memory bandwidth)

Apple M4 Max chip

14-core CPU with 10 performance cores and 4 efficiency cores, 16-core CPU with 12 performance cores and 4 efficiency cores

32-core GPU, 40-core GPU

Hardware-accelerated ray tracing

16-core Neural Engine

410GB/s memory bandwidth, 546GB/s memory bandwidth

Media Engine

Hardware-accelerated H.264, HEVC, ProRes and ProRes RAW

Video decode engine

Two video encode engines

Two ProRes encode and decode engines

AV1 decode

Configurable to:

M4 Max with 16-core CPU and 40-core GPU (546GB/s memory bandwidth)

Apple Intelligence¹

Apple Intelligence is the personal intelligence system that helps you write, express yourself and get things done effortlessly. With groundbreaking privacy protections, it gives you peace of mind that no one else can access your data — not even Apple.

[Learn more about Apple Intelligence](#)

Display

Liquid Retina XDR display

16.2-inch (diagonal) Liquid Retina XDR display;² 3456x2234 native resolution at 254 pixels per inch

XDR (Extreme Dynamic Range)

1,000,000:1 contrast ratio

XDR brightness: 1,000 nits sustained full-screen, 1,600 nits peak³ (HDR content only)

SDR brightness: up to 1,000 nits (outdoor)

Colour

1 billion colours

Wide colour (P3)

True Tone technology

Refresh rates

ProMotion technology for adaptive refresh rates up to 120Hz

Fixed refresh rates: 47.95Hz, 48.00Hz, 50.00Hz, 59.94Hz, 60.00Hz

Configurable with:

Nano-texture display

Memory

Apple M4 Pro chip

24GB unified memory

Configurable to:

36GB (M4 Max with 14-core CPU) or 48GB (M4 Pro and M4 Max with 16-core CPU) or 64GB or 128GB (M4 Max with 16-core CPU)

Apple M4 Max chip

36GB unified memory

Configurable to:

48GB, 64GB or 128GB (M4 Max with 16-core CPU)

Battery and Power¹⁸

M4 Pro

Up to 24 hours video streaming

Up to 17 hours wireless web

100-watt-hour lithium-polymer battery¹⁸

140W USB-C Power Adapter

USB-C to MagSafe 3 Cable

Fast-charge capable with included 140W USB-C Power Adapter

M4 Max

Up to 21 hours video streaming

Up to 14 hours wireless web

100-watt-hour lithium-polymer battery¹⁸

140W USB-C Power Adapter

USB-C to MagSafe 3 Cable

Fast-charge capable with included 140W USB-C Power Adapter

Storage⁶

Apple M4 Pro chip

512GB SSD

Configurable to:

1TB, 2TB or 4TB

Apple M4 Max chip

1TB SSD

Configurable to:

2TB, 4TB or 8TB

Charging and Expansion

SDXC card slot

HDMI port

3.5mm headphone jack

MagSafe 3 port

Three Thunderbolt 5 (USB-C) ports with support for:

Charging

DisplayPort

Thunderbolt 5 (up to 120Gb/s)

Thunderbolt 4 (up to 40Gb/s)

USB 4 (up to 40Gb/s)

Display Support

M4 Pro

Simultaneously supports full native resolution on the built-in display at 1 billion colours and:

Up to two external displays with up to 6K resolution at 60Hz over Thunderbolt, or one external display with up to 6K resolution at 60Hz over Thunderbolt and one external display with up to 4K resolution at 144Hz over HDMI

One external display supported at 8K resolution at 60Hz or one external display at 4K resolution at 240Hz over HDMI

M4 Max

Simultaneously supports full native resolution on the built-in display at 1 billion colours and:

Up to four external displays: up to three external displays with 6K resolution at 60Hz over Thunderbolt and one external display with up to 4K resolution at 144Hz over HDMI

Up to three external displays: up to two external displays with 6K resolution at 60Hz over Thunderbolt and one external display with up to 8K resolution at 60Hz or one external display with 4K resolution at 240Hz over HDMI

Thunderbolt 5 digital video output

Support for native DisplayPort 2.1 output over USB-C

HDMI digital video output

Support for one display with up to 8K resolution at 60Hz or 4K resolution at 240Hz

Video Playback

Supported formats include HEVC, H.264, AV1 and ProRes

HDR with Dolby Vision, HDR10+/HDR10 and HLG

Audio Playback

Supported formats include AAC, MP3, Apple Lossless, FLAC, Dolby Digital, Dolby Digital Plus and Dolby Atmos

Keyboard and Trackpad

Backlit Magic Keyboard with:

78 (US) or 79 (ISO) keys including 12 full-height function keys and 4 arrow keys in an inverted “T” arrangement

Touch ID

Ambient light sensor

Force Touch trackpad for precise cursor control and pressure-sensing capabilities; enables Force clicks, accelerators, pressure-sensitive drawing and Multi-Touch gestures

Wireless

Wi-Fi

Wi-Fi 6E (802.11ax)⁸

Bluetooth

Bluetooth 5.3

Camera

12MP Center Stage camera with support for Desk View
1080p HD video recording
Advanced image signal processor with computational video

Audio

High-fidelity six-speaker sound system with force-cancelling woofers
Wide stereo sound
Support for Spatial Audio when playing music or video with Dolby Atmos on built-in speakers
Spatial Audio with dynamic head tracking when using AirPods (3rd generation), AirPods 4, AirPods Pro, AirPods Pro 2 and AirPods Max
Studio-quality three-mic array with high signal-to-noise ratio and directional beamforming
3.5mm headphone jack with advanced support for high-impedance headphones
HDMI port supports multi-channel audio output

Operating Requirements

Line voltage: 100V to 240V AC
Frequency: 50Hz to 60Hz
Operating temperature: 10° to 35° C (50° to 95° F)
Storage temperature: -25° to 45° C (-13° to 113° F)
Relative humidity: 0% to 90% non-condensing
Operating altitude: tested up to 3,000 metres (10,000 feet)
Maximum storage altitude: 4,500 metres (15,000 feet)
Maximum shipping altitude: 10,500 metres (35,000 feet)

Size and Weight

Height: 1.68 cm (0.66 inches)
Width: 35.57 cm (14.01 inches)
Depth: 24.81 cm (9.77 inches)
Weight (M4 Pro): 2.14 kg (4.7 pounds)⁹
Weight (M4 Max): 2.15 kg (4.7 pounds)⁹

Operating System

macOS

macOS is the most advanced desktop operating system in the world. macOS Sequoia helps you be productive and creative in new ways — with Apple Intelligence,¹ iPhone Mirroring, window tiling, major updates to Safari and more.

[Learn more about latest operating system](#)

Accessibility

Accessibility features help people with disabilities get the most out of their new MacBook Pro. With built-in support for vision, hearing, mobility and learning, you can create and do amazing things.

[Learn more about Accessibility](#)

Features include:

Voice Control	Siri and Dictation
VoiceOver	Switch Control
Zoom	Closed Captions
Increase Contrast	Text to Speech
Reduce Motion	

Built-in Apps¹⁰

App Store	Keynote	Podcasts
Books	Mail	Preview
Calendar	Maps	QuickTime Player
Contacts	Messages	Reminders
FaceTime	Music	Safari
Find My	News	Shortcuts
Freeform	Notes	Stocks
GarageBand	Numbers	Time Machine
Home	Pages	TV
iMovie	Photo Booth	Voice Memos
iPhone Mirroring	Photos	Weather

In the Box

16-inch MacBook Pro
140W USB-C Power Adapter
USB-C to MagSafe 3 Cable (2m)
Polishing cloth (only with nano-texture display option)

Configure to Order

Configure your MacBook Pro with these options at apple.com:

- M4 Max with 14-core CPU, 32-core GPU and 16-core Neural Engine
- M4 Max with 16-core CPU, 40-core GPU and 16-core Neural Engine
- 36GB unified memory (M4 Max with 14-core CPU)
- 48GB unified memory (M4 Pro and M4 Max with 16-core CPU)
- 64GB unified memory (M4 Max with 16-core CPU)
- 128GB unified memory (M4 Max with 16-core CPU)
- 1TB, 2TB or 4TB SSD (M4 Pro and M4 Max)
- 8TB SSD (M4 Max)
- Nano-texture display

MacBook Pro and the Environment

Environmental impact

The 16-inch MacBook Pro is designed to reduce environmental impact:¹¹

[See the 16-inch MacBook Pro Product Environmental Report \(PDF\).](#)

Progress towards Apple 2030

40% recycled content¹²

Over 45% of manufacturing electricity sourced from low-carbon electricity¹³

45% emissions reduction against business-as-usual scenario as modelled by Apple¹⁴

[See Apple's commitment](#)

Materials

100% recycled aluminium in the enclosure

- 100% recycled rare earth elements in all magnets
- 100% recycled tin in the solder of multiple printed circuit boards
- 100% recycled copper in multiple printed circuit boards and in multiple thermal module components
- 100% recycled gold in the plating of multiple printed circuit boards
- 90% recycled steel in the keyboard feature plate
- 35% or more recycled plastic in 11 components

Energy

- Over 45% of manufacturing electricity for the 16-inch MacBook Pro is sourced from low-carbon electricity¹³
- ENERGY STAR® certified¹⁵

Packaging

- 100% fibre-based packaging¹⁶
- 50% recycled content in fibre packaging

Waste

No established final assembly sites generate waste sent to landfill as part of Apple's Zero Waste Programme

Smarter chemistry¹⁷

- Arsenic-free glass
- Mercury-, BFR- and PVC-free

Declared noise emission values in accordance with ECMA-109

Acoustic Performance

	Sound Power Level $L_{WA,m}$ (B)	Sound Pressure Level Operator Position $L_{pA,m}$ (dB)
Idle	1.3 ($K_v = 0.3$)	4
Wireless web	1.3 ($K_v = 0.3$)	4

- $L_{WA,m}$ is the mean A-weighted sound power level, rounded to the nearest 0.1 B.
- $L_{pA,m}$ is the mean A-weighted sound pressure level measured at operator position (rounded to the nearest 1 dB).
- 1 B (bel) = 10 dB (decibel).
- K_v is the statistical adder for computing upper-limit of A-weighted sound power level.
- The quantity, $L_{WA,c}$ (formerly called L_{WAd}) may be computed from the sum of $L_{WA,m}$ and K_v .
- The wireless web test browses 6 tabs with a mix of content including media.
- Configuration tested: M4 Max, 16-core CPU / 40-core GPU, 48GB unified memory, 2TB storage.

- Apple Intelligence is available in beta on all Mac models with M1 and later, with Siri and device language set to US English, as a macOS Sequoia update. English (Australia, Canada, Ireland, New Zealand, South Africa, UK) language support available this December. Some features and support for additional languages, like Chinese, English (India, Singapore), French, German, Italian, Japanese, Korean, Portuguese, Spanish, Vietnamese and others, will be coming over the course of the next year.
- The displays on the 14-inch and 16-inch MacBook Pro have rounded corners at the top. When measured as a standard rectangular shape, the screens are 14.2 inches and 16.2 inches diagonally (actual viewable area is less).
- In temperatures less than 25° C.

4. Testing conducted by Apple August to October 2024 using pre-production 14-inch MacBook Pro systems with Apple M4, 10-core CPU, 10-core GPU, 24GB of RAM and 1TB SSD. Wireless web battery life tested by browsing 25 popular websites while connected to Wi-Fi. Video streaming battery life tested with 1080p content in Safari while connected to Wi-Fi. Display brightness set to 8 clicks from the bottom and keyboard backlight was off. Battery life varies by use and configuration. See apple.com/uk/batteries for more information.
5. Testing conducted by Apple August to October 2024 using pre-production 14-inch MacBook Pro systems with Apple M4 Pro, 14-core CPU, 20-core GPU, 24GB of RAM and 1TB SSD; and pre-production 14-inch MacBook Pro systems with Apple M4 Max, 14-core CPU, 32-core GPU, 36GB of RAM and 2TB SSD. Wireless web battery life tested by browsing 25 popular websites while connected to Wi-Fi. Video streaming battery life tested with 1080p content in Safari while connected to Wi-Fi. Display brightness set to 8 clicks from the bottom and keyboard backlight was off. Battery life varies by use and configuration. See apple.com/uk/batteries for more information.
6. 1GB = 1 billion bytes and 1TB = 1 trillion bytes; actual formatted capacity less.
7. Price varies depending on storage capacity.
8. Wi-Fi 6E available in countries and regions where supported.
9. Weight varies by configuration and manufacturing process.
10. iMovie, GarageBand, Pages, Numbers and Keynote are available on the Mac App Store. Downloading apps requires an Apple Account and a device that is compatible with the OS version required for each app. iPhone Mirroring is not available in all countries and regions. Some iPhone features (e.g., camera and microphone) are not compatible with iPhone Mirroring.
11. Data accurate as of product launch.
12. Product recycled or renewable content is the mass of certified recycled material relative to the overall mass of the device, not including packaging or in-box accessories.
13. We estimate the percentage of electricity-related emissions in our manufacturing that is sourced from low-carbon electricity by attributing to our carbon model low-carbon energy procured by our suppliers in the prior fiscal year, based on the supplier manufacturing allocations at time of product launch. Included in this number is only low-carbon electricity that Apple or its suppliers have procured as part of Apple's Supplier Clean Energy Programme.
14. Carbon reductions are calculated against a business-as-usual scenario as modelled by Apple: 1) No use of clean electricity for manufacturing or product use, beyond what is already available on the latest modelled grid (based on regional emissions factors). 2) Apple's carbon intensity of key materials as of 2015 (our baseline year for our 2030 product carbon-neutrality goal). Carbon intensity of materials reflects use of recycled content and production technology. 3) Apple's average mix of transport modes (air, rail, sea, land) by product line across three years (fiscal years 2017 to 2019) to best capture the baseline transport emissions of our products.
15. ENERGY STAR and the ENERGY STAR mark are registered trademarks owned by the US Environmental Protection Agency.
16. Based on retail packaging as shipped by Apple. Breakdown of US retail packaging by weight. Adhesives, inks and coatings are excluded from our calculations of plastic content and packaging weight.
17. Apple's Regulated Substances Specification describes Apple's restrictions on the use of certain chemical substances in materials in Apple products, accessories, manufacturing processes, and packaging used for shipping products to Apple's end customers. Restrictions are derived from international laws or directives, regulatory agencies, eco-label requirements, environmental standards and Apple policies. Every Apple product is free of PVC and phthalates except for AC power leads in India, Thailand (for two-pin AC power leads) and the Republic of Korea, where we continue to seek government approval for our PVC and phthalates replacement. Apple products comply with the European Union Directive 2011/65/EU and its amendments, including exemptions for the use of lead such as high-temperature solder. Apple is working to phase out the use of these exempted substances for new products where technically possible.
18. Actual rating of 99.6 watt-hours. Testing conducted by Apple August to October 2024 using pre-production 16-inch MacBook Pro systems with Apple M4 Pro, 14-core CPU, 20-core GPU, 48GB of RAM and 512GB SSD; and pre-production 16-inch MacBook Pro systems with Apple M4 Max, 14-core CPU, 32-core GPU, 36GB of RAM and 2TB SSD. Wireless web battery life tested by browsing 25 popular websites while connected to Wi-Fi. Video streaming battery life tested with 1080p content in Safari while connected to Wi-Fi. Display brightness set to 8 clicks from the bottom and keyboard backlight was off. Battery life varies by use and configuration. See apple.com/uk/batteries for more information.

Helpful?

Yes

No

Support

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