

# MacBook Pro (16-inch, 2023) – Technical Specifications

Year introduced : 2023

## Finish

- Silver
- Space Gray

## Chip

Apple M2 Pro chip

- 12-core CPU with 8 performance cores and 4 efficiency cores
- 19-core GPU
- 16-core Neural Engine
- 200GB/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
- Configurable to:
  - M2 Max with 12-core CPU and 30-core GPU or M2 Max with 12-core CPU and 38-core GPU

Apple M2 Max chip

- 12-core CPU with 8 performance cores and 4 efficiency cores
- 38-core GPU
- 16-core Neural Engine

- Hardware-accelerated H.264, HEVC, ProRes and ProRes RAW
- Video decode engine
- Two Video encode engines
- Two ProRes encode and decode engines

## Display

Liquid Retina XDR display

- 16.2-inch (diagonal) Liquid Retina XDR display;<sup>1</sup> 3456-by-2234 native resolution at 254 pixels per inch

XDR (Extreme Dynamic Range)

- 1,000,000:1 contrast ratio
- XDR brightness: 1000 nits sustained full-screen, 1600 nits peak<sup>2</sup> (HDR content only)
- SDR brightness: 500 nits

Color

- 1 billion colors
- Wide color (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

## Memory

Apple M2 Pro chip

- 16GB unified memory  
*Configurable to: 32GB (M2 Pro or M2 Max), 64GB (M2 Max), or 96GB (M2 Max with 38-core GPU)*

Apple M2 Max chip

- 32GB unified memory  
*Configurable to: 64GB (M2 Max) or 96GB (M2 Max with 38-core GPU)*

## Battery and Power<sup>3</sup>

- Up to 22 hours Apple TV app movie playback

- 100-watt-hour lithium-polymer battery<sup>3</sup>
- 140W USB-C Power Adapter
- USB-C to MagSafe 3 Cable
- Fast-charge capable with included 140W USB-C Power Adapter

#### Storage<sup>4</sup>

Apple M2 Pro chip

- 512GB SSD  
*Configurable to: 1TB, 2TB, 4TB, or 8TB*

Apple M2 Max chip

- 1TB SSD  
*Configurable to: 2TB, 4TB, or 8TB*

#### Charging and Expansion

- SDXC card slot
- HDMI port
- 3.5 mm headphone jack
- MagSafe 3 port
- Three Thunderbolt 4 (USB-C) ports with support for:
  - Charging
  - DisplayPort
  - Thunderbolt 4 (up to 40Gb/s)
  - USB 4 (up to 40Gb/s)

#### Display Support

M2 Pro

Simultaneously supports full native resolution on the built-in display at 1 billion colors 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 60Hz over HDMI
- One external display supported at 8K resolution at 60Hz or one external display at 4K resolution at 120Hz over HDMI

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

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

Thunderbolt 4 digital video output

- Support for native DisplayPort 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, and ProRes
- HDR with Dolby Vision, 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 (U.S.) 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 Touch gestures, accelerators, pressure-sensitive drawing, and Multi-Touch gestures

### Wireless

Wi-Fi

- Wi-Fi 6E (802.11ax)<sup>5</sup>

- Bluetooth 5.3

### Camera

- 1080p FaceTime HD camera
- 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 Pro, and AirPods Max
- Studio-quality three-mic array with high signal-to-noise ratio and directional beamforming
- 3.5 mm headphone jack with advanced support for high-impedance headphones
- HDMI port supports multichannel audio output

### Operating Requirements

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

### Size and Weight

- Height: 0.66 inch (1.68 cm)
- Width: 14.01 inches (35.57 cm)
- Depth: 9.77 inches (24.81 cm)
- Weight (M2 Pro): 4.7 pounds (2.15 kg)<sup>6</sup>
- Weight (M2 Max): 4.8 pounds (2.16 kg)<sup>6</sup>

### Operating System

#### macOS

macOS is the most advanced desktop operating system in the world. macOS Ventura makes the things you can do most on Mac even better, so you can work smarter, play harder, and go further.

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