Mac Studio (2022) - Technical Specifications





Finish

- Silver

Chip
Apple M1 Max chip

- 10-core CPU with 8 performance cores and 2 efficiency cores
- 24-core GPU
- 16-core Neural Engine
- 400GB/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
- Configurable to:
  - M1 Max with 10-core CPU, 32-core GPU, and 16-core Neural Engine

Apple M1 Ultra chip

- 20-core CPU with 16 performance cores and 4 efficiency cores
- 48-core GPU
- 32-core Neural Engine
- 800GB/s memory bandwidth
- Media engine
  - Hardware-accelerated H.264, HEVC, ProRes, and ProRes RAW
  - Two video decode engines
  - Four video encode engines
  - Four ProRes encode and decode engines
- Configurable to:
  - M1 Ultra with 20-core CPU, 64-core GPU, and 32-core Neural Engine

Memory
Apple M1 Max chip

- 32GB unified memory
  Configurable to 64GB

Apple M1 Ultra chip

- 64GB unified memory
  Configurable to 128GB

Storage[1]
Apple M1 Max chip

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

Apple M1 Ultra chip

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

Video Support
Simultaneously supports up to five displays:

- Support for up to four Pro Display XDRs (6K resolution at 60Hz and over a billion colors) over USB-C and one 4K display (4K resolution at 60Hz and over a billion colors) over HDMI

Thunderbolt 4 digital video output supports

- Native DisplayPort output over USB-C
- Thunderbolt 2, DVI, and VGA output supported using adapters (sold separately)

HDMI display video output

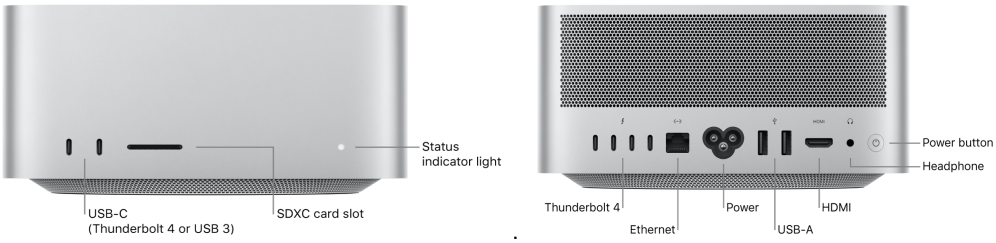
- Support for one display with up to 4K resolution at 60Hz
- DVI output using HDMI to DVI Adapter (sold separately)

Audio

- Built-in speaker
- 3.5 mm headphone jack with advanced support for high-impedance headphones
- HDMI port supports multichannel audio output

Connections and Expansion

- Four Thunderbolt 4 ports with support for:
  - Thunderbolt 4 (up to 40Gb/s)
  - DisplayPort
  - USB 4 (up to 40Gb/s)
  - USB 3.1 Gen 2 (up to 10Gb/s)
  - Two USB-A ports (up to 5Gb/s)
  - HDMI port
  - 10Gb Ethernet
  - 3.5 mm headphone jack
- On front (M1 Max):
  - Two USB-C ports (up to 10Gb/s)
  - SDXC card slot (UHS-II)
- On front (M1 Ultra):
  - Two Thunderbolt 4 ports (up to 40Gb/s)
  - SDXC card slot (UHS-II)



Communications
Wi-Fi

- 802.11ax Wi-Fi 6 wireless networking
- IEEE 802.11a/b/g/n/ac compatible

Bluetooth

- Bluetooth 5.0 wireless technology

Ethernet

- 10Gb Ethernet (Nbase-T Ethernet with support for 1Gb, 2.5Gb, 5Gb, and 10Gb Ethernet using RJ-45 connector)

Size and Weight

- Height: 3.7 inches (9.5 cm)
- Width: 7.7 inches (19.7 cm)
- Depth: 7.7 inches (19.7 cm)
- Weight (M1 Max): 5.9 pounds (2.7 kg)[2]
- Weight (M1 Ultra): 7.9 pounds (3.6 kg)[2]

Electrical and Operating Requirements

- Line voltage: 100–240V AC
- Frequency: 50Hz to 60Hz, single phase
- Maximum continuous power: 370W
- Operating temperature: 50° to 95° F (10° to 35° C)
- Storage temperature: -40° to 116° F (-40° to 47° C)
- Relative humidity: 5% to 90% noncondensing

- Operating altitude: tested up to 16,400 feet (5000 meters)

In the Box

- Mac Studio
- Power cord

Operating System
macOS
macOS is the most advanced desktop operating system in the world. macOS Ventura makes the things you do most on Mac even better, so you can work smarter, play harder, and go further.
Learn more about latest operating system
macOS User Guide

Accessibility
Accessibility features help people with disabilities get the most out of their new Mac Studio. 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
- VoiceOver
- Zoom
- Increase Contrast
- Reduce Motion
- Siri and Dictation
- Switch Control
- Live Captions

Built-in Apps[3]

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

Configure to Order

- Configure your Mac Studio with these options at apple.com:
  - M1 Max with 10-core CPU, 32-core GPU, and 16-core Neural Engine
  - M1 Ultra with 20-core CPU, 48-core GPU, and 32-core Neural Engine
  - M1 Ultra with 20-core CPU, 64-core GPU, and 32-core Neural Engine
  - 64GB unified memory (M1 Max)
  - 128GB unified memory (M1 Ultra)
  - 1TB, 2TB, 4TB, or 8TB SSD

Mac Studio and the Environment
Mac Studio is designed with the following features to reduce its environmental impact:[4]
See the Mac Studio Product Environmental Report

Made with better materials

- 100% recycled rare earth elements in all magnets, representing 98% of the rare earth elements in the device
- 80% recycled aluminum in the enclosure
- 100% recycled tin in the solder of the main logic board
- 25% or more recycled plastic in multiple components

Energy efficient

- ENERGY STAR® certified[5]

Smarter chemistry[6]

- Mercury-, BFR-, PVC-, and beryllium-free

Green manufacturing

- Apple's Zero Waste Program helps suppliers eliminate waste sent to landfill
- All final assembly supplier sites are transitioning to 100% renewable energy for Apple production

Responsible packaging

- 100% of virgin wood fiber comes from responsibly managed forests
- 90% or more fiber-based packaging

Apple and the Environment

We're committed to making our products without taking from the earth, and to become carbon neutral across our entire business, including products, by 2030.
See Apple's commitment

Acoustic Performance
Declared noise emission values in accordance with ECMA-109

	Sound Power Level $L_{WA,m}$ **(B)**	**Sound Pressure Level Operator Position** $L_{pA,m}$ **(dB)**
Idle	2.5 (K_V = 0.3)	15
Wireless web	2.5 (K_V = 0.3)	15

1. $L_{WA,m}$ is the mean A-weighted sound power level, rounded to the nearest 0.1 B.
2. $L_{pA,m}$ is the mean A-weighted sound pressure level measured at operator position (rounded to the nearest 1 dB).
3. 1 B (bel) = 10 dB (decibel)
4. K_V is the statistical adder for computing upper-limit of A-weighted sound power level.
5. The quantity, $L_{WA,c}$ (formerly called L_{WAd}) may be computed from the sum of $L_{WA,m}$ and K_V.
6. The wireless web test browses 6 tabs with a mix of content including media.
7. Configuration tested: Apple M1 Ultra, 20-core CPU / 48-core GPU, 64GB memory, 1TB storage.

1. 1GB = 1 billion bytes and 1TB = 1 trillion bytes; actual formatted capacity less.
2. Weight varies by configuration and manufacturing process.
3. iMovie, GarageBand, Pages, Numbers, and Keynote are available on the Mac App Store. Downloading apps requires an Apple ID and a device that is compatible with the OS version required for each app.
4. Data accurate as of product launch.
5. ENERGY STAR and the ENERGY STAR mark are registered trademarks owned by the U.S. Environmental Protection Agency.
6. Apple defines its restrictions on harmful substances, including definitions for what Apple considers to be "free of," in the Apple Regulated Substances Specification. Every Apple product is free of PVC and phthalates with the exception of AC power cords in India, Thailand (for two-prong AC power cords), and South Korea, where we continue to seek government approval for our PVC and phthalates replacement.

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