Building Your Own Desktop PC

CUCUG
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Why Build Your Own?

- Get exactly what you want
  - And don’t pay for things you don’t want!
- Can be a *lot* cheaper
  - My recent one was about half the cost of a comparable pre-built one
- Makes it easier to plan what to upgrade later

Skills Needed

- Basic knowledge of computer pieces and parts
- Basic screwdriver skills
- Mechanical and spatial awareness
- Understanding that static electricity is bad
- And most importantly - Patience!

What to Consider First

- What is my budget?
- What do I need the system to do or run?
  - AAA gaming, A/V editing, browsing the web
- Any parts I can scavenge or buy used?
  - Monitors, keyboard/mouse, hard drives/SSDs
  - Even motherboards, processors, graphics cards, memory, anything
- What form factor(s)/physical size will work?

Budget Considerations

- Where am I willing to cut?
- What am I unwilling to compromise on?
  - Certain features, manufacturers
- Can I buy used or refurb?
- What can I put off to a later upgrade?

What It Does

- Look at all the software you'll run
  - See what other people use for that software:
    - Processor speed, CPU count, cache size
    - Graphics horsepower
    - Memory and storage
    - Any peripherals?

Scavenged and Used Parts

- My previous desktop build from 2020 had:
  - Case scavenged from an ancient 2005 build
  - Used, refurb motherboard from Ebay
  - Used DIMMs from Ebay
  - Used graphics card from Amazon reseller
- No regrets or problems from those parts

Form Factors

- Decides case, motherboard, expansion slots, and power supply

Case Size	ATX	Micro-ATX (mATX)	Mini-ITX	E-ATX	XL-ATX	FlexATX	Nano-ITX	Pico-ITX	HPTX	Mini-STX	Thin Mini-ITX
Full Tower	✔	✔	✔	✔	✔	✔	✘	✘	✔	✘	✔
Mid Tower	✔	✔	✔	✘	✘	✔	✘	✘	✘	✘	✔
Mini Tower	✘	✔	✔	✘	✘	✔	✘	✘	✘	✘	✔
Small Form Factor	✘	✘	✔	✘	✘	✘	✔	✔	✘	✔	✔
Ultra Compact	✘	✘	✘	✘	✘	✘	✔	✔	✘	✔	✘

Other Considerations

- Number and type of USB ports
- WiFi, Bluetooth, Ethernet ports and speed
- How many monitors
  - At what resolution and refresh, with what cabling
- Power consumption
- What future-proofing concerns might you have?

Helpful Resources

- PC Part Picker
- ChatGPT
- Reddit

PC Part Picker

- pcpartpicker.com helps you with:
  - Sourcing
  - Pricing
  - Compatibility
  - Tracks power consumption

ChatGPT

- From your prompts will offer suggestions
  - Keep in mind, ChatGPT info can lag
- One of my sessions:

Reddit

- Check out and ask questions in:
  - r/buildapc
    - And check out its Resources and Wiki
  - r/mffpc, r/sffpc

Cautionary Notes

- Shoot for a balanced system
  - Don’t try to stick a V8 in a VW Beetle!
    - Make sure processor, graphics, cooling system, and PSU are balanced
- Be aware of “analysis paralysis”

My Goals

- Beefy processor, fast memory and storage
  - E.g.: Doing parallel builds of Linux kernels
- Drives two 4K monitors at 60 Hz or higher
  - Light gaming, so no hardy 3D graphics needed
- Fast wired Ethernet
- Smaller than a full-size desktop

Additional Goals

- AMD Zen 5 processor
- ASRock, Gigabyte, ASUS, or MSI motherboard
  - Wanted a tweakable, hack-friendly BIOS
- Buy nowish because of possible future tech tariffs

What I Went With

- Got some screaming Cyber Monday deals
- Lian Li A3 mATX case
- ASRock B650M Pro RS WiFi motherboard
- AMD Ryzen 9 9900X 12-core processor
- Full build: 

Goal Met!

- Kernel build time dropped from 3:36:44 to 32:16
  - Going from a Ryzen 5 3400G (July 2019)
  - A 6.7X improvement!
  - (Full kernel and tools package build with 38 rpms)

Questions?