SHODDYTECHGARAGE
Learning

Solo At-Home Build Guide

X79 / X99 / Dual-Socket Xeon-Style PCs

Build it. Boot it. Understand it.

What This Guide Is

A casual, at-home, step-by-step build manual for someone building one of these budget Xeon-style PCs alone. It assumes you may not have a teacher next to you, so the important checks are written into the steps.

What This Guide Is Not

This is not an endorsement from MACHINIST, JUXIESHI, AMD, Microsoft, Epic, Mojang/Microsoft, Roblox, Ubuntu, Bazzite, Proxmox, or any other brand. All mentions of specific brands are not endorsed. Brand names are used only to help you select compatible parts and find official reference pages.

Learning Inspiration

This guide was built out with a shoutout to GamersNexus for helping inspire the practical, test-it-yourself mindset behind it. For tech information in general, GamersNexus is one of the first places I look, followed closely by Level1Techs. They are useful reference points when you want to understand hardware, testing, troubleshooting, servers, and the wider PC ecosystem.

> **No affiliation:** This is a personal shoutout and learning recommendation, not sponsorship, endorsement, or permission to treat any one source as a replacement for checking your exact parts.

Start Here - Read This First

This guide is written like you are building at a desk, kitchen table, garage bench, or spare room. Go slowly. Do not rush the first boot. A clean, boring build beats a fast build every time.

> **The one rule that prevents most mistakes:** If a part does not slide in with reasonable pressure, stop. PC parts are keyed. Most of them only fit one way. Forcing parts is how sockets, RAM slots, PCIe slots, and power connectors get damaged.

The hardware in this guide is usually not brand-new retail hardware. These systems are commonly built from imported budget X79/X99-style motherboards, refurbished/surplus Xeon CPUs, ECC/REG memory, used or refurbished graphics cards, and ordinary new parts such as SSDs, power supplies, and cases.

That is the whole point: retired industrial, server, and workstation parts are often cheap, easy to source, and useful for learning because they expose you to real compatibility, BIOS, cooling, and troubleshooting tradeoffs. The goal is an affordable machine that can still be useful, not an expensive mistake if a lesson goes sideways.

Set expectations honestly: this kind of build can become a basic desktop, a low-entry budget gaming PC with the right GPU, or a light-to-mid workstation. It is not a promise of high-end gaming performance or a modern professional workstation.

Quick Buying Rule

Price the whole platform, not just the CPU. Compare the motherboard, CPU, RAM, cooler, storage, power supply, graphics card, shipping, and seller return risk before you buy.

Option	Choose It When	Watch For
AMD AM4 or comparable Intel consumer build	The total cost is close, gaming matters more, you want a simpler first build, or you want easier future replacement parts. Examples include used AM4 systems or Intel Core platforms such as LGA 1151, LGA 1200, or newer when the board/CPU/RAM bundle price makes sense.	Price the whole setup. A cheap CPU is not a deal if the board, cooler, RAM, storage, PSU, GPU, or shipping makes the total higher.
Retired workstation/server X79/X99 build	The bundle is clearly cheaper, includes more RAM or cores, is easy to source, and the goal is learning, Linux, virtualization, home-lab work, or troubleshooting practice.	Seller return path, exact board model, BIOS support, RAM type, cooler fit, and GPU/PSU compatibility matter more than the listing headline.

Your Build Goal

- Build a working PC from parts.
- Get display output through a dedicated graphics card such as an AMD RX 580/RX 590-class card, Nvidia equivalent, or a carefully chosen Intel Arc option.
- Enter BIOS/UEFI and confirm the CPU, RAM, storage, and temperatures look right.
- Install Bazzite by default, or Ubuntu Desktop if Bazzite gives you trouble.
- Understand the Windows path without confusing the Windows installer with a Windows license.
- End with a computer that can handle basic desktop use, Steam/Linux gaming experiments, Minecraft Java, and Windows gaming if you install Windows with your own license.

Quick Table of Contents

1. Choose the Right Build

Do not start by buying random parts. Start by choosing the build level you want. The part list changes depending on whether you are building X79, X99, or dual-socket.

Recommended first build: Most first-time builders should start with a single-socket X99 build or a price-checked AM4/comparable Intel consumer build. Avoid dual-socket as a first PC unless your goal is home-lab learning and you are ready for extra heat, case space, BIOS, and RAM-placement troubleshooting.

Mobile note: Wide comparison tables may scroll sideways on phones.

Build	Best For	RAM Target	PSU Target*	Notes
X79 Budget	Lowest-cost learning PC, Bazzite/Ubuntu, Minecraft Java, basic Windows gaming with license	16GB minimum, 32GB better	550W minimum* with real PCIe power	Usually LGA 2011, DDR3 ECC/REG, Xeon E5 v1/v2
X99 Workstation	Better daily-use PC, Docker, light virtualization, more comfortable multitasking	32GB minimum, 64GB better	650W preferred*	Usually LGA 2011-3, DDR4 ECC/REG, Xeon E5 v3/v4
Dual X79	Weird home-lab box, Minecraft server, lots of cores, learning dual CPU hardware	64GB minimum	750-850W minimum*	Needs big case, two coolers, careful RAM placement
Dual X99	Home-lab monster, Proxmox, many VMs, server-style learning	64GB minimum, 128GB better	850-1000W preferred*	Advanced build; not the best first PC if you are nervous

***PSU note:** These targets assume a modest GPU like an RX 500-series card. A higher-power graphics card can dramatically change the PSU requirement, especially if it needs multiple PCIe power connectors.

Modern consumer alternative: If an AMD AM4 build or comparable Intel Core consumer platform, such as LGA 1151, LGA 1200, or newer, is available for roughly the same total price, consider it before committing to X79/X99. The newer platform may be easier to live with, while retired workstation/server parts remain the preferred learning value when they are cheap, plentiful, and easy to source.

Gaming reality check: The GPU matters more than dual CPUs for games. Dual-socket builds are cool for servers, VMs, and learning, but they are not automatically better Fortnite or Minecraft client machines.

Budget RAM: Why 16GB Is Okay

For the X79 budget build, 16GB is a reasonable floor. It is enough for Bazzite/Ubuntu, basic desktop work, Minecraft Java, and many light games. 32GB is nicer, especially for modded Minecraft, multitasking, Docker, and general long-term comfort.

- Use 16GB when keeping the price low matters most. Best layout: 4 x 4GB matching sticks.
- Use 32GB when you want the build to feel more useful long-term. Best layout: 4 x 8GB matching sticks.
- Avoid weird 24GB or 28GB mixes unless you already own the RAM. Matching sticks are easier to explain, easier to troubleshoot, and cleaner for these platforms.

Preferred Budget Board/Bundles

Based on prior hands-on Shoddy Tech Garage-style budget builds, MACHINIST has been the most successful practical target, but that is not a guarantee. JUXIESHI is the second target I would check. They are not endorsed brands; they are just known budget-platform candidates in the AliExpress/eBay X79/X99 Xeon-bundle world.

- MACHINIST: first place I would look for common X79/X99 single-socket bundles and dual-socket options.
- JUXIESHI: second practical target for common X79/X99 single-socket and dual-socket options.
- Exact model matters more than brand. Buy by socket, CPU support, RAM type, slot layout, power connectors, and return policy.
- Nonbranded or mystery boards are the highest-risk lane. They might work, but they often have unclear BIOS support, weak documentation, and issues that show up later. If the seller cannot identify the exact board, walk away unless you knowingly want a troubleshooting project.
- Treat these as X79/X99-style Xeon platforms, not guaranteed full retail Intel-chipset enthusiast boards.

> **Brand disclaimer:** All mentions of specific brands are not endorsed. Names are included for transparency, parts selection, and official-reference convenience only.

2. Parts Selection - No Guessing

Use this section before you buy. The easiest way to ruin the build is mixing incompatible CPU, RAM, board, cooler, case, or power parts.

A. Motherboard Bundle

- [ ] The listing shows real photos of the exact motherboard or a clearly identified model.
- [ ] Socket matches your CPU: X79-style = LGA 2011 for Xeon E5 v1/v2; X99-style = LGA 2011-3 for Xeon E5 v3/v4.
- [ ] RAM type is clear: DDR3 ECC/REG for most X79; DDR4 ECC/REG for most X99.
- [ ] Board has at least one PCIe x16 slot for the graphics card.
- [ ] Board uses standard 24-pin ATX motherboard power and 8-pin CPU power, or the listing clearly shows any extra CPU power connectors.
- [ ] Seller lists the CPU model and RAM amount clearly. Avoid vague "random CPU" or "random RAM" bundles for a planned build.
- [ ] Seller has a return path. DOA risk and delayed weirdness are real with refurbished/surplus boards.

B. CPU

- X79 budget example: Xeon E5-2670 v2 or similar.
- X99 power example: Xeon E5-2680 v4, E5-2690 v4, or similar.
- Dual builds need two matching compatible CPUs. Matching CPUs reduces BIOS and memory-training weirdness.
- Do not assume the motherboard BIOS supports every CPU in the socket family. Check the seller notes and buy a bundle with the CPU already paired when possible.

C. RAM

Platform	Minimum	Better	Clean Layout
X79	16GB	32GB	4 x 4GB or 4 x 8GB DDR3 ECC/REG
X99	32GB	64GB	4 x 8GB or 4 x 16GB DDR4 ECC/REG

Platform	Minimum	Better	Clean Layout
Dual X79	64GB	96GB+	ECC/REG sticks spread across both CPUs; matching sets preferred
Dual X99	64GB	128GB+	ECC/REG sticks balanced across both CPUs/channels

Default RAM recommendation: use matching ECC/REG memory. These Intel Xeon server/workstation platforms are usually happiest with ECC registered sticks, especially on dual-socket boards. Mixed RAM can work, but it gives you more things to troubleshoot when the board refuses to POST.

D. GPU - Required, Not Optional

> **Important:** These Xeon E5 systems do not have useful integrated graphics. Even if the motherboard has a port-looking cutout or confusing listing photos, assume you need a dedicated PCIe graphics card. Plug the monitor into the graphics card, not the motherboard.

- Recommended AMD target: RX 580 or RX 590, preferably 8GB. These are the RX 500-series cards I would treat as the reasonably viable target for this build style.
- Lower RX 500-series cards, RX 570, and RX 580 2048SP can still work for display and light gaming if the price is right, but they are a step down from a full RX 580/RX 590.
- NVIDIA equivalents to consider: GTX 1060 6GB as the closest older budget match, or GTX 1650 Super / GTX 1660 if the total price is similar. Avoid treating GTX 1050 Ti-class cards as RX 580/RX 590 equivalents.
- Intel option for a single-GPU build: Arc A580 8GB is the more reasonable Intel alternative in this budget class. Arc A380 6GB is better treated as a display/light-gaming card, not a true RX 580/RX 590 equivalent.
- Intel Arc warning: older X79/X99 boards can be less predictable with newer Intel GPU drivers and platform features. If you want the simplest first build, AMD or NVIDIA is usually the safer path.
- Check whether the GPU needs 6-pin or 8-pin PCIe power. Your PSU must have the correct cable natively.
- Avoid SATA-to-PCIe and Molex-to-PCIe adapters. They are not worth the risk.

E. Power Supply

Build	Minimum	Better Target	Must Have
X79 single CPU + RX 500 GPU	550W*	650W*	Real 6-pin/8-pin PCIe GPU cable
X99 single CPU + RX 500 GPU	650W*	750W*	Real 6-pin/8-pin PCIe GPU cable
Dual X79	750W*	850W*	Enough CPU power and GPU PCIe power
Dual X99	850W*	1000W*	Quality unit, enough EPS/CPU connectors, GPU PCIe power

> ***GPU power changes the PSU math:** The wattage targets above are starting points for modest GPUs. If you choose a higher-power card, check the GPU's recommended PSU, PCIe cable count, and total system power before buying.

Always buy a new name-brand PSU. Do not cheap out on the power supply. Unknown, no-name, or questionable used power supplies may not be honestly rated, properly tested, or safe under real load. The PSU is one of the few parts that can take other parts with it when it fails.

F. Storage

I recommend buying storage new. Used HDDs, SSDs, and NVMe drives can have unknown hours, unknown write wear, old data, malware risk, or hidden health problems. Storage is cheap enough that a new drive is usually worth it for reliability and peace of mind.

- SATA SSD is the safest default for X79/X99 budget boards.
- 500GB is the minimum I would use for a budget build.
- 1TB is a better target if you want games, Windows, or dual-boot space.
- NVMe is nice, but only use it as your boot drive if that exact board is confirmed to boot from NVMe. Keep a SATA SSD fallback.

G. Case and Cooling

Case rule: You can always go bigger, but you cannot make a small case fit a motherboard that is physically too large. Pick the case around the motherboard size first, then worry about looks.

Board / Build	Case Direction	Watch For
mATX single-socket	mATX or larger ATX case	GPU length, cooler height, front-panel cable reach
ATX single-socket	Standard ATX mid-tower or larger	Full ATX support, enough airflow, easy cable routing
Large X99 or odd-layout board	ATX case only if the listing confirms fit	Some budget boards have unusual slot, standoff, or connector placement
Dual X79 / Dual X99	Large E-ATX, SSI-EEB, workstation, or server-style case	Board size, two coolers, airflow path, PSU clearance, RAM access

- Single-socket boards usually fit normal ATX or mATX cases, but verify the exact board size before ordering.
- Dual-socket boards may need E-ATX, SSI-EEB, or a large server/workstation case. Do not guess from photos.
- You need a cooler that fits the socket, clears the RAM, and fits inside the case side panel.
- Dual CPU builds need two coolers and airflow over the VRM area. More cores mean more heat.
- For a first build, a slightly bigger plain case is usually better than a tight flashy case that makes every cable and cooler fight you.

Cooling and functionality beat LEDs every time. Yes, LEDs look cool, but airflow, fan mounts, dust filters, cable space, and room to work matter more.

Quick case check: Before buying, confirm motherboard size support, CPU cooler height, GPU length, PSU size, front intake fan space, rear/top exhaust fan space, and enough drive mounts for your SSDs.

3. At-Home Prep

Give yourself room. This is much easier if you are not balancing parts on a couch or carpet.

Clear Your Space

- [ ] Use a clean table or bench with enough space for the case, motherboard box, tools, and monitor.
- [ ] Keep drinks away from the work area.
- [ ] Keep pets, kids, and loose clutter away while the board is exposed.
- [ ] Use a small bowl, magnetic tray, or cup for screws.
- [ ] Have your phone nearby for official links, photos, and troubleshooting notes.

Tools

- [ ] #2 Phillips screwdriver.
- [ ] Thermal paste, unless the cooler is pre-pasted.
- [ ] Isopropyl alcohol and lint-free cloth/paper towel for cleaning paste if needed.
- [ ] USB flash drive, 16GB minimum, 32GB preferred.
- [ ] Monitor, keyboard, mouse, and display cable that matches your GPU output.
- [ ] Ethernet cable if possible. Wired internet is easier than Wi-Fi during first setup.
- [ ] Flashlight or phone light.
- [ ] Zip ties or Velcro straps for cable management after the PC is working.

Static and Handling

- Build on a table, not carpet.
- Before touching parts, touch the bare metal of the case or PSU housing to discharge yourself.
- Hold the motherboard by the edges.
- Do not touch CPU socket pins.
- Do not open the power supply. Ever.
- Do not work inside the PC while it is plugged into the wall.

Make the USB Installer

Use official pages. Do not download operating system images from random mirror sites, file-sharing links, or forum posts.

Need	Use This Page	Why
Default OS	Bazzite Image Picker	SteamOS-like desktop/gaming-focused Linux choice
Bazzite help	Bazzite Desktop Install Guide	Use the correct image for desktop hardware and GPU type
Fallback OS	Ubuntu Desktop Download	Good general-purpose Linux fallback if Bazzite gives you trouble
Windows option	Windows 10 or Windows 11 Download Page	Windows 10 is often easier on X79/X99; Windows license is separate

Need	Use This Page	Why
Home-lab advanced	Proxmox VE Downloads	For virtualization/server learning, not a normal desktop
USB writer	Rufus or balenaEtcher	Turns the OS image into a bootable USB

> **Windows note:** I prefer Windows 10 for many X79/X99 learning builds because it avoids the Windows 11 TPM 2.0 requirement that older boards may not support. The tradeoff is important: Windows 10 reached end of support on October 14, 2025, so treat it as a compatibility choice for a budget lab, learning box, or offline/low-risk setup, not the best long-term internet-facing daily-driver OS.

Bazzite tip: Use the official Bazzite image picker. For these builds, you are normally selecting a desktop PC image, not a handheld-specific image. Pick the option that matches your GPU vendor and desktop preference. Since this guide assumes AMD RX 500-series graphics, choose the AMD/desktop path unless your actual GPU is different.

4. Inspect Before You Build

This is boring, and that is why it works. Inspecting first saves you from chasing ghosts later.

Unbox and Sort

- [ ] Motherboard is present and not visibly cracked.
- [ ] CPU socket cover/protection was used during shipping, or socket looks undamaged.
- [ ] CPU is installed or ready to install, depending on how the bundle arrived.
- [ ] RAM sticks are present and match what you ordered.
- [ ] Cooler mounting hardware is present.
- [ ] GPU is present and has no missing fan blades or badly bent bracket.
- [ ] SSD/NVMe is present.
- [ ] PSU has the correct CPU and GPU power cables.
- [ ] Case includes screws and motherboard standoffs.

Take photos now: Before building, take clear photos of the motherboard, CPU socket, RAM labels, GPU power connector, and PSU cables. If something is DOA, photos help with returns. Photos also help you remember where cables were connected.

> **Socket warning:** LGA sockets have tiny pins in the motherboard socket. Bent pins can kill a board. If you have never installed an LGA CPU before and the CPU is already installed in the bundle, leave it installed. There is no prize for removing it.

If you must install the CPU yourself: open the latch slowly, align the notches, lower the CPU flat into place, and close the latch without sliding the CPU around.

5. Bench-Test First

Why bench-test? A bench test means you power the motherboard outside the case before full installation. It proves the core parts work before case screws, front-panel wires, and cable routing make troubleshooting harder.

Use the motherboard box as the work surface. Do not put the board on the anti-static bag as a powered work surface. The outside of some anti-static bags can be conductive enough to cause weird problems. Cardboard is safer.

Bench-Test Parts Needed

- [ ] Motherboard with CPU installed.
- [ ] CPU cooler installed and connected to CPU_FAN.
- [ ] One clean RAM layout installed, preferably matching sticks in the recommended slots.
- [ ] GPU installed in the main PCIe x16 slot.
- [ ] SSD connected, optional for first POST but useful.
- [ ] 24-pin motherboard power connected.
- [ ] 8-pin CPU power connected. Dual boards may need more CPU power connectors.
- [ ] GPU PCIe power connected if the GPU requires it.
- [ ] Monitor connected to the GPU.
- [ ] Keyboard connected.
- [ ] PSU plugged in and switched on only when ready.

Bench-Test Steps

- [ ] Place the motherboard on its cardboard box.
- [ ] Install RAM. Press evenly until the latches click or the stick is fully seated.
- [ ] Install the cooler. Tighten gradually in a cross pattern if using screws.
- [ ] Connect the CPU fan to CPU_FAN.
- [ ] Install the GPU in the PCIe x16 slot.
- [ ] Connect the monitor cable to the GPU, not the motherboard.
- [ ] Connect 24-pin motherboard power.
- [ ] Connect 8-pin CPU power.
- [ ] Connect GPU PCIe power if needed.
- [ ] Connect keyboard.
- [ ] Turn on PSU switch.
- [ ] Press the motherboard power button if it has one, or briefly touch the two front-panel power-switch pins with a screwdriver tip.

What you should see: Fans spin, the GPU outputs video, and the screen eventually shows a logo, POST text, or BIOS. The first boot on these boards may take longer than a modern retail PC. Give it a minute before assuming failure.

If nothing shows up: Do not panic. Turn the PSU off, unplug power, and use the troubleshooting section later in this guide. The most common causes are monitor plugged into the wrong port, RAM not fully seated, GPU not seated, missing GPU power, or missing 8-pin CPU power.

First BIOS Check

- [ ] CPU model appears and looks close to what you bought.
- [ ] RAM amount appears. If you installed 32GB and BIOS shows 16GB, stop and troubleshoot before installing the OS.
- [ ] Storage appears, if connected.

- [ ] CPU temperature is reasonable. Idle BIOS temperature under roughly 40-60C is usually okay depending on cooler and room temperature. If it climbs rapidly toward 80-90C, shut down and recheck cooler mount.
- [ ] Keyboard works in BIOS.
- [ ] USB installer appears in boot menu later.

6. Install in the Case

Once the bench test works, move into the case. This is where people accidentally create new problems, usually with standoffs or front-panel wiring.

Case Prep

- [ ] Remove both side panels.
- [ ] Lay the case flat if that makes it easier.
- [ ] Find the motherboard standoffs. These are small brass or metal posts the motherboard screws into.
- [ ] Move standoffs so they match your motherboard screw holes exactly.
- [ ] Remove any extra standoff that does not line up with a motherboard screw hole.
- [ ] Install the I/O shield if your board uses a separate one. Some boards have none or have integrated I/O.

> **Standoff warning:** An extra standoff under the board can short the motherboard. Before screwing the board down, look underneath and confirm every standoff matches a hole.

Motherboard and PSU

- [ ] Lower the motherboard into the case carefully.
- [ ] Line up rear ports and screw holes.
- [ ] Install screws snug, not gorilla-tight.
- [ ] Install the PSU with its fan facing the correct direction for your case.
- [ ] Route 24-pin motherboard power toward the main connector.
- [ ] Route 8-pin CPU power before the case gets crowded.
- [ ] Route GPU PCIe power but do not force it.

GPU, Storage, and Front Panel

- [ ] Install the GPU in the top/main PCIe x16 slot if possible.
- [ ] Screw the GPU bracket to the case.
- [ ] Connect the GPU 6-pin or 8-pin PCIe power cable if required.
- [ ] Mount SATA SSD and connect SATA data cable to motherboard.
- [ ] Connect SATA power from PSU to SSD.
- [ ] Connect front-panel power switch. This is the tiny connector that lets the case power button work.
- [ ] Connect front USB if desired.
- [ ] Connect front audio if desired.
- [ ] Connect case fans to motherboard fan headers or fan hub.

Front-panel tip: The front-panel header is the fiddly part. You only need the power switch to boot. Power LED, reset switch, HDD LED, and front audio can wait. If the case button does nothing, the power-switch connector is probably on the wrong pins.

7. First Full Boot in the Case

- [ ] Monitor connected to GPU.
- [ ] Keyboard and mouse connected.
- [ ] PSU switch on.
- [ ] Press case power button.
- [ ] Confirm fans spin.
- [ ] Enter BIOS with Delete, F2, or the key shown on screen.
- [ ] Confirm CPU, RAM, storage, and temperatures again.
- [ ] Set USB installer first in boot order, or use boot menu key.
- [ ] Save settings and reboot.

BIOS Settings to Check

Setting	Recommended At-Home Choice	Why
Load defaults	Yes	Starts from a known baseline.
Boot mode	UEFI first when available	Modern OS installs are usually easier with UEFI. Legacy mode can be fallback.
Virtualization	Enable VT-x/VT-d if present	Useful for VMs, Proxmox, and home-lab learning.
Fan control	Normal/standard curve	Keeps noise reasonable without overheating.
Storage mode	AHCI for SATA	Good default for SSDs.
Secure Boot	Usually off for old boards/Bazzite troubleshooting	Chinese X79/X99 boards may implement this oddly or not at all.

> **Do not update BIOS casually:** Only update BIOS if you have a clear reason and a known-correct file for your exact board model/revision. A wrong BIOS can brick the board.

8. Install Bazzite

Bazzite is the default choice in this guide because it is a SteamOS-like Linux experience for desktop/gaming use. It is still Linux, so some Windows-only games will not work. That is normal.

Before Installing

- [ ] You used the Bazzite image picker, not a random ISO link.
- [ ] You selected the correct desktop/hardware/GPU path for your system.
- [ ] You flashed the USB with Rufus or balenaEtcher.
- [ ] The SSD you are installing to has no important data, because installing can erase it.

- [ ] Ethernet is connected if available.

Install Steps

- [ ] Boot from the Bazzite USB.
- [ ] Choose the normal install option unless the screen gives you a clear safer option.
- [ ] Wait for the live environment or installer to load. First load can be slow.
- [ ] Choose your language, keyboard, and time zone.
- [ ] Choose the target SSD carefully. If there is only one SSD, this is easier.
- [ ] For a first build, choose the simple erase/install path unless you are intentionally dual-booting.
- [ ] Create your user account and password.
- [ ] Start installation.
- [ ] When done, remove the USB when prompted and reboot.

After Bazzite Boots

- [ ] Log in.
- [ ] Connect to internet.
- [ ] Open system settings and confirm display resolution.
- [ ] Open Steam and let it update if you plan to use Steam.
- [ ] Open terminal and run the manual update command below if you want to force updates now.
- [ ] Reboot after updates if prompted or if system components update.

```
ujust update
```

Bazzite desktop images also handle updates automatically, but knowing the command is useful when you are setting up a new build.

If Bazzite Gives You Trouble

- Try another USB port, preferably a rear motherboard USB port.
- Re-flash the USB using another tool: Rufus if you used Etcher, or Etcher if you used Rufus.
- Use the Bazzite install guide and image picker again to make sure you chose the right image.
- Try Ubuntu Desktop as a fallback. Ubuntu is not as SteamOS-like, but it is a strong general-purpose Linux option.
- If both Bazzite and Ubuntu fail, suspect USB media, RAM stability, storage, BIOS mode, or a hardware problem.

9. Optional Windows Path

> **Windows is not included:** Downloading Windows installation media is not the same as owning a Windows license. If you install Windows, use Microsoft official pages and your own valid digital license or product key.

Do not use pre-activated ISOs, activation scripts, random keys, KMS cracks, or mystery Windows images. Besides the legal/ethical problem, those are a great way to install malware on your fresh PC.

Windows 11 vs Windows 10 on Old Xeon Boards

- Windows 11 may complain about CPU support, TPM, Secure Boot, or firmware requirements on older X79/X99-style platforms.
- Windows 10 is my preferred Windows compatibility path for many X79/X99 builds because it avoids the Windows 11 TPM 2.0 roadblock, but Microsoft ended Windows 10 support on October 14, 2025. Treat it as an EOL-aware budget lab or offline/low-risk choice.
- Fortnite, Roblox, and many popular Windows games should be treated as Windows paths, not Bazzite/Linux paths.
- If gaming is the main goal, consider a dedicated Windows SSD so you do not risk breaking your Bazzite install while experimenting.

Clean Windows Install Checklist

- [ ] Download installation media from Microsoft official Windows download page.
- [ ] Use your own valid license/digital entitlement/product key.
- [ ] Disconnect extra drives if you are worried about installing to the wrong disk.
- [ ] Install AMD GPU drivers from AMD official support page after Windows is installed.
- [ ] Run Windows Update.
- [ ] Install game launchers only from official sources.
- [ ] Keep your Bazzite USB around in case you want to reinstall Linux later.

10. Gaming Expectations

This build can be gaming-capable, but it is not a magic high-end gaming PC. The RX 500-series GPU is what makes the gaming side practical. The Xeon CPU and RAM make the build useful and interesting, but many games still care about single-thread performance and GPU power more than core count.

Game / Use	Best OS Path	Expectation
Minecraft Java	Bazzite/Linux or Windows	Good fit. Vanilla should be fine. Modded Minecraft benefits from 32GB+ RAM.
Fortnite	Windows	Use low/performance settings. Compatibility depends on current Epic requirements and anti-cheat.
Roblox	Windows	Roblox does not officially support Linux. Use Windows for the normal path.
Steam games	Bazzite or Windows	Many games work well through Steam/Proton. Check each title.
Local AI	Not the main target	RX 500 cards are not ideal for modern local AI. Treat AI as a separate upgrade path.
Minecraft server	Linux/Bazzite/Ubuntu/Proxmox	Great learning project, especially on X99 or dual-socket builds.
AMP game servers	Linux/Ubuntu/Proxmox or Windows	Strong practical use for X99/Machinist-style builds. I actively use AMP to host game servers on an X99 Machinist build.

AMP note: CubeCoders AMP is a self-hosted game-server control panel. It is a good reason to keep one of these retired workstation/server builds around, especially when you want to learn server hosting, backups, updates, ports, and remote management without buying expensive new hardware.

11. Troubleshooting - Start Here When It Acts Weird

Troubleshooting rule: Change one thing at a time. If you reseat RAM, swap GPU, change BIOS settings, and move the SSD all at once, you will not know which thing fixed or broke it.

No Power at All

- [ ] Wall outlet works.
- [ ] Power cable is fully seated.
- [ ] PSU switch is on.
- [ ] 24-pin motherboard power is fully seated.
- [ ] 8-pin CPU power is fully seated.
- [ ] Front-panel power-switch connector is on the correct pins.
- [ ] Try briefly shorting the power-switch pins with a screwdriver tip to bypass the case button.
- [ ] Test with a known-good PSU if available.

Fans Spin, No Display

- [ ] Monitor is on and correct input is selected.
- [ ] Display cable is plugged into the GPU, not the motherboard.
- [ ] GPU is fully seated in PCIe slot.
- [ ] GPU power cable is connected if required.
- [ ] Try a different display cable or port.
- [ ] Reseat RAM.
- [ ] Try one RAM stick in the slot recommended by the board/seller.
- [ ] Reset CMOS by removing the coin-cell battery for a few minutes with power unplugged, or use clear-CMOS pins if documented.
- [ ] Try a known-good cheap GPU if available.

Turns On, Then Reboots Over and Over

- [ ] Let the first memory training attempt run for a minute or two.
- [ ] Power off and reseat RAM.
- [ ] Try fewer RAM sticks.
- [ ] Use matching RAM only.
- [ ] Reset CMOS.
- [ ] Check CPU cooler pressure. Uneven cooler mounting can cause boot issues.

- [ ] Confirm CPU is compatible with the board BIOS.

BIOS Shows Wrong RAM Amount

- [ ] Power off and unplug.
- [ ] Reseat all RAM sticks.
- [ ] Use the recommended slots from the board manual/seller image.
- [ ] Test one stick at a time.
- [ ] Test one slot at a time only if you are comfortable and patient.
- [ ] Look for bent socket pins if one memory channel never appears.
- [ ] Avoid mixed capacity/speed RAM until the system is proven stable.

CPU Temperature Too High

- [ ] Shut down if BIOS temperature climbs rapidly toward 80-90C.
- [ ] Confirm the cooler fan is plugged into CPU_FAN.
- [ ] Confirm plastic film was removed from cooler cold plate.
- [ ] Remove cooler, clean paste, reapply paste, reinstall evenly.
- [ ] Confirm cooler mounting bracket is correct for the socket.
- [ ] Improve case airflow before gaming or stress testing.

SSD Not Detected

- [ ] For SATA SSD: check SATA data cable at both ends.
- [ ] For SATA SSD: check SATA power cable.
- [ ] Try another SATA port.
- [ ] Try another SATA cable.
- [ ] For NVMe: confirm the board actually supports booting from NVMe.
- [ ] Use a SATA SSD fallback if NVMe boot support is unclear.

USB Installer Will Not Boot

- [ ] Use a rear USB port directly on the motherboard.
- [ ] Try another USB drive.
- [ ] Re-flash the installer from the official page.
- [ ] Try Rufus instead of Etcher, or Etcher instead of Rufus.
- [ ] Try UEFI boot mode first. If it fails, try Legacy/CSM only as a fallback.
- [ ] Reset BIOS defaults and set boot order again.

12. Final Setup Checklist

Do this before you call the build done.

- [ ] Side panels are still off for final visual check.

- [ ] All fans spin freely and no cable touches a fan blade.
- [ ] CPU cooler is firmly mounted.
- [ ] GPU is screwed into the case and power cable is connected.
- [ ] 24-pin and CPU 8-pin power are fully seated.
- [ ] SSD is mounted or secured.
- [ ] Bazzite or Ubuntu boots without the USB installer.
- [ ] Internet works.
- [ ] Display resolution is correct.
- [ ] Updates have run or are scheduled.
- [ ] System has been rebooted after updates.
- [ ] Case side panels fit without pressing hard against cables.
- [ ] You wrote down the board model, CPU model, RAM amount, GPU model, SSD size, and PSU model.

Friendly Battery Test

This is the simple post-build test I like to do after every build. It is not about chasing a perfect benchmark score. It is about proving the PC can handle heat, load, fans, storage, and graphics without immediately acting weird.

- [ ] Install HWiNFO from the official site and open the sensor view.
- [ ] Write down idle CPU temperature, GPU temperature, fan behavior, and any obvious warning signs.
- [ ] Run 3DMark or a similar graphics stress test from an official source.
- [ ] Watch HWiNFO while the test runs. Look for runaway CPU/GPU temperatures, fans not spinning, sudden shutdowns, crashes, or heavy throttling.
- [ ] Let the PC cool back down, then check whether it still boots, opens apps, and behaves normally.
- [ ] If anything fails, do not keep stress testing. Fix cooling, power, RAM seating, GPU power, drivers, or airflow first.

> **Friendly pass:** If it boots cleanly, idles normally, survives a basic graphics stress test, and does not crash or cook itself, that is enough for a budget learning build. Write down the results so you know what changed after future upgrades.

Write Your Build Specs Here

Motherboard brand/model/revision	
CPU	
RAM amount and stick layout	
GPU	
Storage	
Power supply	
Case	
Operating system installed	
Install date	

Motherboard brand/model/revision	
[illegible]	

Keep These

- Your OS USB installer.
- Motherboard seller page or manual PDF saved/bookmarked.
- Receipts and order details.
- Photos of the build before and after cable management.
- Extra screws and cables in a labeled bag.

13. Upgrade Paths

Do not upgrade everything at once. Upgrade based on what actually bothers you after using the PC for a week or two. The goal is self-reliance: learn what the machine is doing, change one thing, test it, and keep notes.

> **Self-reliance rule:** A cheap learning build is valuable because you can afford to experiment. If a used part fails, you learned without wrecking your main computer or creating a financial hardship. Upgrade only when the problem is real, repeatable, and worth the money.

The Upgrade Decision Loop

1. **Use it first:** Run the PC for real tasks before buying more parts.
2. **Name the problem:** Write down what is actually annoying you.
3. **Measure something:** Check temperatures, RAM use, storage space, CPU load, GPU load, or network stability.
4. **Change one thing:** Upgrade or adjust only one part of the setup at a time.
5. **Retest the same task:** Use the same game, server, workload, or boot process so the result means something.
6. **Keep notes:** Future-you will forget which RAM slots, BIOS setting, cable, or driver actually fixed the issue.

Problem	Upgrade First	Why
Games stutter or run low FPS	GPU, then settings	Most games care heavily about GPU. Lower settings first, then price a better card.
Modded Minecraft runs out of memory	RAM to 32GB or 64GB	Java/mod packs can eat RAM. Matching ECC/REG sticks keep troubleshooting simpler.
System feels full	1TB or 2TB new SSD	Games, server files, backups, and dual-boot installs need space.
PC is loud/hot	Cooler, case fans, airflow case	Old Xeons and RX cards produce heat. Airflow is often cheaper than replacing core parts.
Want AMP or game servers	More RAM, more SSD space, wired network	Game servers care about memory, storage, uptime, and stable networking more than flashy parts.

Problem	Upgrade First	Why
Want multiple servers/VMs	X99 or dual-socket, more RAM	Virtualization loves cores and RAM. This is where retired workstation/server parts make sense.
Boots fine but feels sluggish	SSD health, clean OS, startup apps	Do not blame the CPU first. A tired drive or messy install can make any PC feel bad.
Want serious AI	Different GPU/platform plan	RX 500-series is not a modern AI target. Treat AI as a separate build plan.

Do Not Upgrade Yet If...

Situation	Do This First	Why
Only one game runs badly	Check game settings, drivers, Proton/Windows path, and current requirements	One bad title does not prove the whole PC needs parts.
Crashes started after a change	Undo the last BIOS, driver, RAM, GPU, or OS change	The newest change is usually the first suspect.
Temps are unknown	Check CPU and GPU temperature before buying hardware	Heat can look like a bad CPU, GPU, RAM, or power problem.
Storage is used or unknown	Install a known-new SSD and keep backups	Old drives can cause slow boots, crashes, and weird file problems.
Power supply is unknown	Use a brand-name PSU with the correct native PCIe cables	A questionable PSU can make every other part look broken.

Before You Buy Another Part

- [ ] Write down the symptom in plain language: low FPS, crashing, heat, noise, full storage, or slow boot.
- [ ] Check whether the problem happens every time or only with one game, mod pack, server, or operating system.
- [ ] Look at temperatures, RAM usage, storage free space, and GPU usage before spending money.
- [ ] Change one thing at a time so you know what actually helped.
- [ ] Keep the working old part as a spare until the upgraded build proves stable.

Useful First Upgrades

- **New SSD:** Best quality-of-life upgrade and safer than trusting unknown used storage.
- **Matching ECC/REG RAM:** Makes server, VM, Minecraft, and AMP experiments easier to live with.
- **Better cooling:** A quiet cooler and simple case airflow can make an old Xeon box feel much less sketchy.
- **UPS or backup plan:** If the box hosts game servers, protect saves and config files before chasing more performance.

> **Keep the lesson:** The best upgrade is not always the fastest part. Sometimes it is a clean backup, a labeled cable, a known-good spare PSU, or a notebook page that explains what fixed the last problem.

If This Becomes a Server Box

- [ ] Use wired Ethernet if you are hosting AMP, Minecraft, VMs, or other always-on services.
- [ ] Back up game worlds, AMP configs, VM disks, and important server files before experimenting.

- [ ] Write down ports, usernames, install paths, and where backups live.
- [ ] Prefer stability over maximum overclocking, aggressive fan curves, or mystery BIOS tweaks.
- [ ] Keep a spare known-good SSD or USB installer nearby so you can recover without starting over.

> **Good server mindset:** The box does not need to be impressive. It needs to boot, stay cool, stay online, and teach you something every time you fix it.

Dual-Boot Advice

- The safest dual-boot method is separate drives: one for Bazzite/Linux, one for Windows.
- Install Windows with the Linux drive disconnected if you want to avoid accidental bootloader changes.
- Reconnect both drives after installation and use BIOS boot menu to choose OS.
- Back up important files before changing partitions.

14. Official Hotlinks

These links go to official or reference pages, not direct ISO files. Use them from this page or the PDF while building on another machine.

> **Link policy:** ShoddyTechGarage should link to official pages and should not host Windows ISOs, Linux ISOs, drivers, or third-party installers. Official pages are safer, easier to verify, and more likely to stay updated.

Bazzite Image Picker	Bazzite Desktop Install Guide
Bazzite Updating Guide	Ubuntu Desktop Download
Windows 11 Download Page	Windows 10 Download Page
Windows Activation Help	Proxmox VE Downloads
Rufus	balenaEtcher
AMD Drivers and Support	CubeCoders AMP
HWiNFO	3DMark
GamersNexus YouTube	Level1Techs YouTube
Fortnite PC Requirements	Minecraft Java Requirements
Roblox Requirements	MACHINIST Reference
JUXIESHI Reference	

15. Build Notes

Use this page for weird things you learned during your build: BIOS keys, which RAM slots worked, which USB port booted, fan direction, or anything that would help future-you fix the PC.

Found an Issue?

Need clarification, found a mistake, or want to suggest a cleanup for this guide? Email me at shoddytechgarage@gmail.com.

> **Small-shop note:** ShoddyTechGarage is a one-person show, so it might take me some time to respond. I still want the feedback, especially if it helps make the guide clearer for the next person building one of these machines.