BARR-CYBER

Technical Diagnostic Report — v2.0

Subject: ASUS ROG Zephyrus G16 (2025) — Out-of-Box Performance Diagnostic & Remediation

Device: ASUS ROG Zephyrus G16 GU605 (2025) | Intel Core Ultra 9 285H | NVIDIA GeForce RTX 5070 Ti | 32GB DDR5

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Case Study Overview

This is my personal machine. I'm Warren Barr — owner of Barr-Cyber — and I purchased this ROG Zephyrus G16 out of the box from Best Buy for a significant sum. It arrived running hot and lagging on a light game, hitting 130°F on the keyboard surface and stuttering through a character creation screen. My first thought: this unit was probably returned by a previous buyer who assumed the hardware was defective and gave up on it. I'm confident that's exactly what happened — because the fix took under 2 hours and now it's the best machine I've ever personally owned.

The problem was entirely software. Armory Crate — the system management suite every ROG laptop depends on for GPU switching and thermal control — shipped non-functional. Without it, the RTX 5070 Ti sat completely idle while the integrated GPU struggled to keep up, generating heat and producing terrible performance. This is a documented recurring issue across the 2024–2025 ROG lineup. Most users never identify it. They return the laptop instead.

I'm publishing this case study because I know there are people out there right now sitting on a "broken" ROG laptop that isn't broken at all. If that's you — Barr-Cyber can fix it.

1. Executive Summary

This report documents a complete out-of-box diagnostic and performance remediation performed on the ASUS ROG Zephyrus G16 (2025) equipped with the Intel Core Ultra 9 285H processor and NVIDIA GeForce RTX 5070 Ti GPU. The unit exhibited severe thermal and performance issues immediately upon first boot, including extreme surface temperatures during light workloads and significant frame-rate degradation in gaming applications.

Root cause analysis determined that the primary failure was not hardware-related. The unit shipped without a functional installation of ASUS Armory Crate — the software suite responsible for GPU mode management, power profile control, and thermal governance. Without this software, the laptop defaulted to an unmanaged hybrid GPU state, placing excessive load on the integrated Intel Arc GPU while the discrete RTX 5070 Ti remained largely inactive.

Following a structured remediation process, all identified issues were resolved. Surface temperatures dropped from 130°F to 93°F at idle, the discrete GPU was brought online correctly, and system performance normalized to match expected specifications for this hardware tier.

2. System Specifications

Component	Specification
CPU	Intel Core Ultra 9 285H (Meteor Lake-H, 16-core)
GPU (Discrete)	NVIDIA GeForce RTX 5070 Ti Mobile (GB205M)
GPU (Integrated)	Intel Arc 140T
RAM	32GB DDR5 — 7467 MT/s (8 chips, soldered)
Display	16" 2560x1600 @ 240Hz IPS
Storage	NVMe SSD (PCIe)
OS	Windows 11 Pro 64-bit (24H2)
NPU	Intel AI Boost (on-die)
Connectivity	Intel BE200 Wi-Fi 7, Realtek 2.5GbE

3. Presenting Issues

3.1 Observed Symptoms

- Extreme keyboard surface temperature (~130°F) during character creation in a low-demand game (Windrose, Early Access, Unreal Engine 5)
- Severe frame-rate lag and stuttering during gameplay, including in non-GPU-intensive scenes
- General system sluggishness on the Windows desktop
- Audio irregularities on initial boot
- Armory Crate reported as installed by Windows but not accessible or functional
- GPU utilization near 0% during tasks that should be GPU-accelerated

3.2 Initial System State

CRITICAL	GPU Mode: Hybrid (default, unmanaged) — RTX 5070 Ti inactive for most workloads
WARNING	Performance Profile: Balanced — CPU and GPU power limits artificially constrained
WARNING	Armory Crate: Service registered but application non-functional — no thermal or power management active
INFO	RAM Speed: 7467 MT/s (XMP active, no action required)
INFO	Display: 2560x1600 @ 240Hz confirmed correct

4. Root Cause Analysis

4.1 Primary Cause: Non-Functional Armory Crate Installation

The ASUS ROG Zephyrus G16 (2025) relies on Armory Crate as its system management layer. This software controls three critical functions:

- GPU Mode Management — switches between Eco (iGPU only), Hybrid (dynamic switching), and Ultimate (dGPU always active) modes
- Power Profile Control — governs CPU and GPU TDP limits across Silent, Balanced, Performance, and Turbo profiles
- Thermal Management — coordinates fan curves, CPU frequency scaling, and sustained load behavior

Without a functional Armory Crate installation, the laptop defaulted to Hybrid GPU mode with a Balanced power profile. In this state, the Intel Arc 140T iGPU was handling graphics output for workloads that require the RTX 5070 Ti, causing the CPU to compensate with elevated frequency and voltage. This produced excess heat and poor frame rates simultaneously.

4.2 Contributing Factor: Unreal Engine 5 Early Access Game

Windrose (the application being tested) is an Unreal Engine 5 survival game currently in Early Access. UE5 games are known to be GPU-intensive even in menus and character creation screens due to Lumen global illumination and Nanite geometry systems being active globally. On a misconfigured laptop with the dGPU inactive, this workload would fall entirely on the iGPU — a scenario the Arc 140T is not designed to handle at playable performance levels.

It is important to note: once the laptop is configured correctly, Windrose's performance issues become attributable to the game's Early Access optimization state rather than the hardware. The developer has acknowledged ongoing performance work in patch notes.

4.3 Secondary Cause: Bloated Startup Environment

The factory Windows installation included multiple unnecessary startup entries consuming RAM and CPU cycles at boot, including duplicate Microsoft Teams entries, Copilot services, and third-party ASUS utilities not required for core laptop function. These were contributing marginal additional load on top of the primary GPU misconfiguration.

5. Remediation Procedure

Step 1 — Armory Crate Clean Installation

1. Identified conflicting partial installation via Programs & Features (appwiz.cpl)
2. Removed Armory Crate Service and ASUS Framework via Add/Remove Programs
3. Resolved Windows path length error during extraction by relocating installer to C:\ root

4. Executed full Armory Crate installer package — allowed all component installs and system restart
5. Confirmed application launched successfully post-install

Step 2 — GPU Mode Configuration

ACTION	Set GPU Mode → Ultimate | Requires restart — forces RTX 5070 Ti active for all workloads

Ultimate GPU mode disables the iGPU-to-dGPU dynamic switching logic entirely. The RTX 5070 Ti handles all rendering. This eliminates the switching latency stutter pattern and ensures the correct GPU is used for every workload. Minor trade-off: battery life is reduced when not plugged in. Acceptable for a machine of this tier used primarily plugged in.

Step 3 — Performance Profile

ACTION	Set Scenario Profile → Turbo (when plugged in) | Removes CPU/GPU TDP caps

Turbo mode removes the power limits imposed by the Balanced profile, allowing the Core Ultra 9 285H and RTX 5070 Ti to operate at their rated TDP envelopes. Fan noise increases noticeably but thermal management handles sustained load appropriately. This is the intended operating mode for gaming and VM workloads on this hardware.

Step 4 — Armory Crate Updates

6. Installed all pending ASUS component and firmware updates via Armory Crate update center
7. Verified BIOS is current — no BIOS update present in update list, indicating latest version installed
8. RAM usage reduction of ~2GB observed post-update, indicating bloated service cleanup

Step 5 — NVIDIA Control Panel Optimization

- Power Management Mode → Prefer Maximum Performance
- Texture Filtering Quality → High Performance
- Low Latency Mode → Ultra
- Confirmed display output: 2560x1600 @ 240Hz native

Step 6 — Startup Optimization

Disabled the following non-essential startup entries via Task Manager → Startup Apps:

- Microsoft 365 Copilot — AI assistant service, not required at boot
- Microsoft Teams (both entries) — communications app, on-demand launch preferred
- Mobile Devices — cross-device sync service, not in use
- Virtual Pet — bundled ASUS widget, no utility value
- GlideX services (4 entries) — ASUS phone mirroring, not in use

The following were reviewed and retained: Steam, SecurityHealthSystray, ASUS Smart Display Control, Windows Search, NVIDIA Container, Realtek Audio services, and all core ASUS system management processes.

Figure 2 — Background processes post-remediation: ASUS services healthy, Armory Crate running at 7.4MB

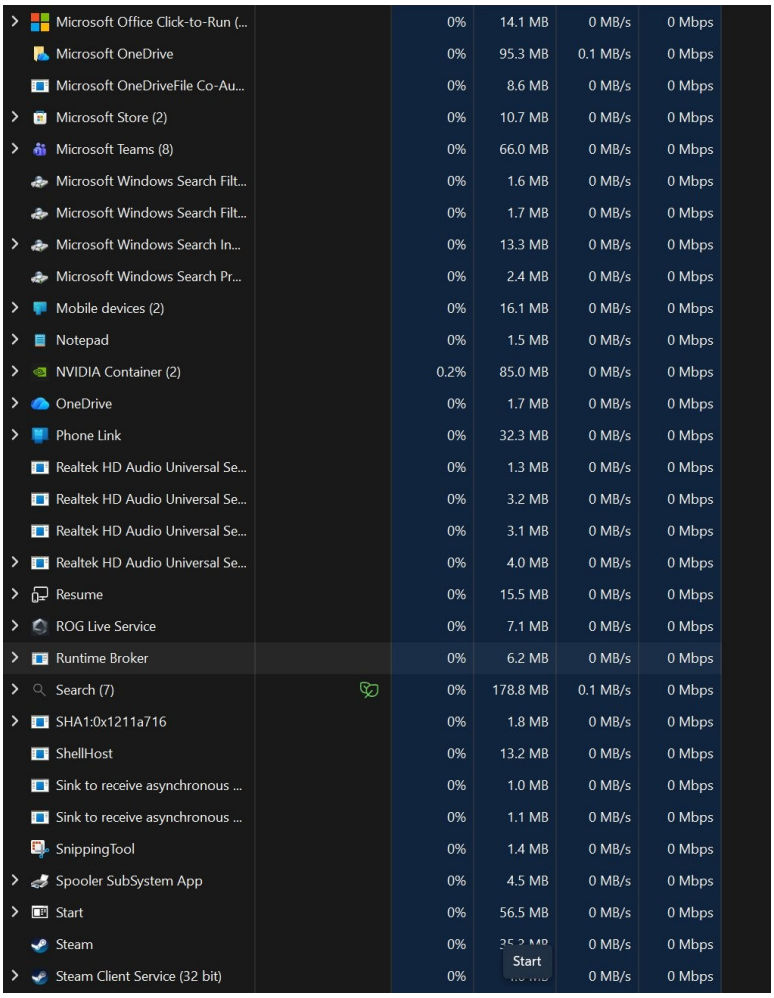

Figure 3 — Startup Apps list showing Teams, Copilot, and GlideX disabled

6. Results

Item	Before	After
Surface Temperature (Idle)	~130°F	~93°F
Surface Temperature (Mid-Session Load)	Not measured	104°F — normal
Surface Temperature (2-Hour Endurance)	Not measured	108°F — stable, normal
GPU Utilization (Desktop)	~0% (iGPU only)	Normal (dGPU active)
GPU Mode	Hybrid (unmanaged)	Ultimate (dGPU always on)
Performance Profile	Balanced	Turbo
RAM Usage at Idle	~10.9 GB	~8.4 GB
Armory Crate	Non-functional	Fully operational

Startup Processes	Bloated	Optimized
NVIDIA Driver	ASUS-verified	Confirmed current
BIOS	Current (no update available)	Confirmed current
Display	240Hz confirmed	240Hz confirmed

NOTE	Surface temperatures measured via calibrated thermal laser: 93°F at idle, 104°F mid-session, 108°F after 2 hours of continuous gameplay. All readings within normal operating range for this hardware tier. Prior to remediation, the same surface reached 130°F during light workloads with minimal GPU engagement — a 37°F improvement at idle, with thermals confirmed stable across a full 2-hour endurance session.

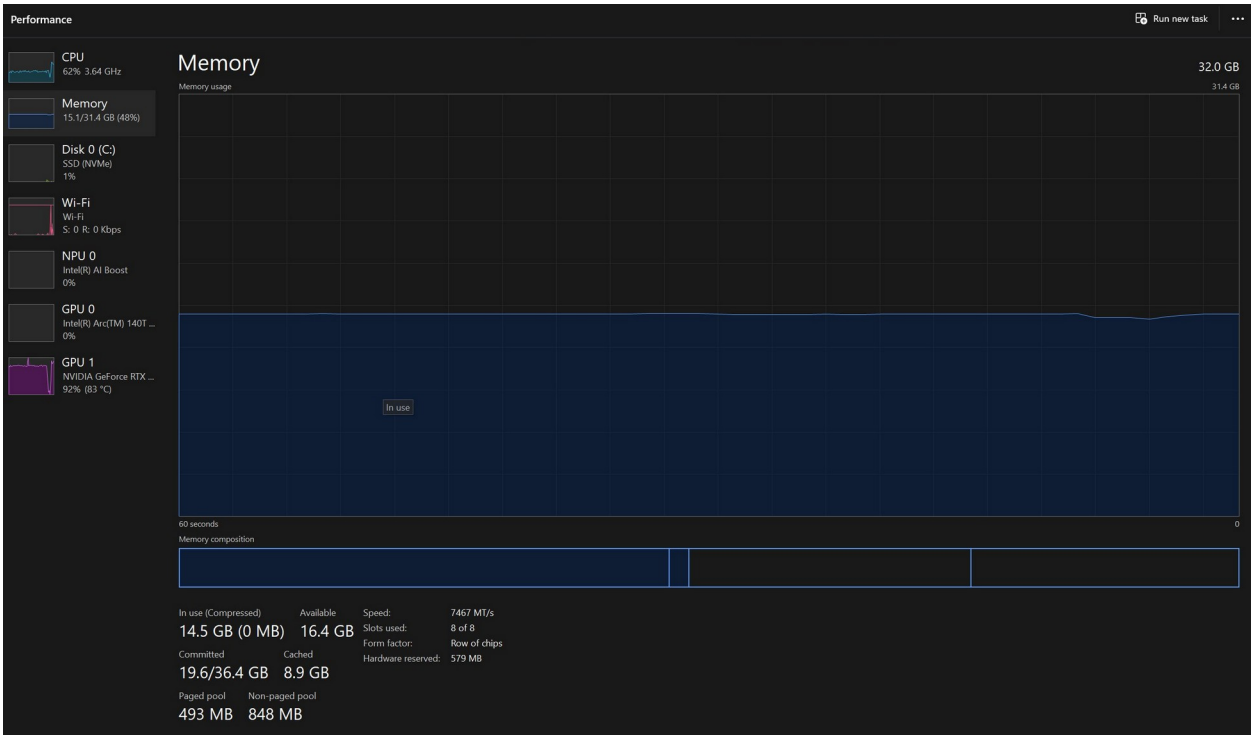

Figure 1 — Task Manager during active Windrose gameplay (early session): RTX 5070 Ti at 92% / 83°C, CPU at 62% / 3.64GHz, RAM at 15.1GB — GPU fully engaged

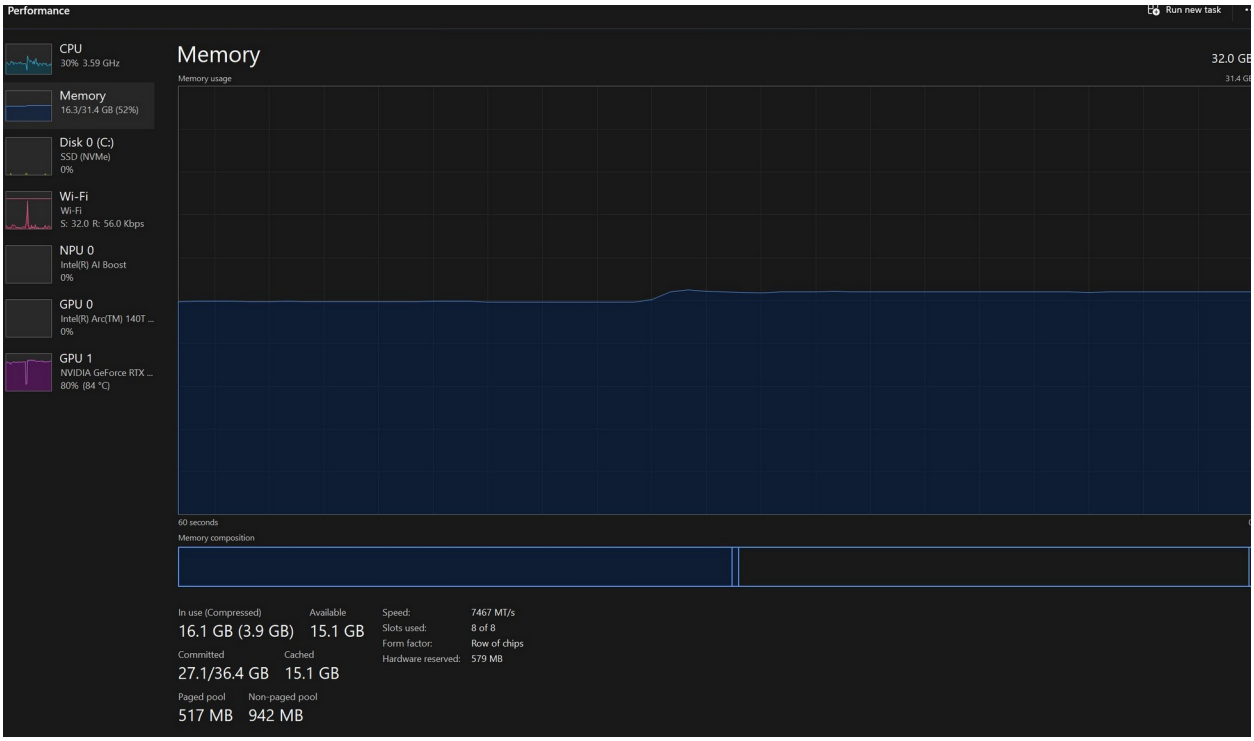

Figure 2 — Task Manager after 2 hours of continuous gameplay (endurance benchmark): RTX 5070 Ti holding 80% / 84°C, CPU at 30% / 3.59GHz, RAM at 16.3GB — thermals fully stable under sustained load. Surface: 108°F via thermal laser.

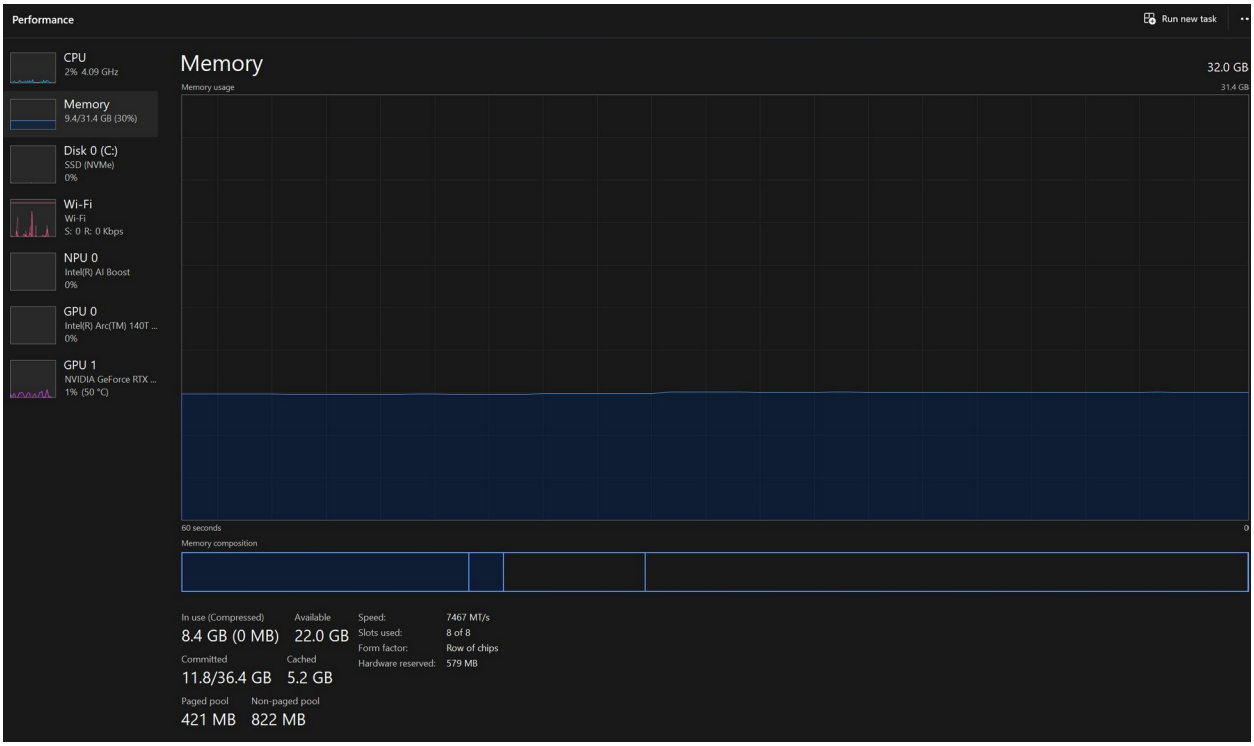

Figure 3 — Task Manager at idle post-session: RTX 5070 Ti at 1% / 50°C, CPU at 2% / 4.09GHz, RAM at 8.4GB — system cooling and recovering normally after extended load

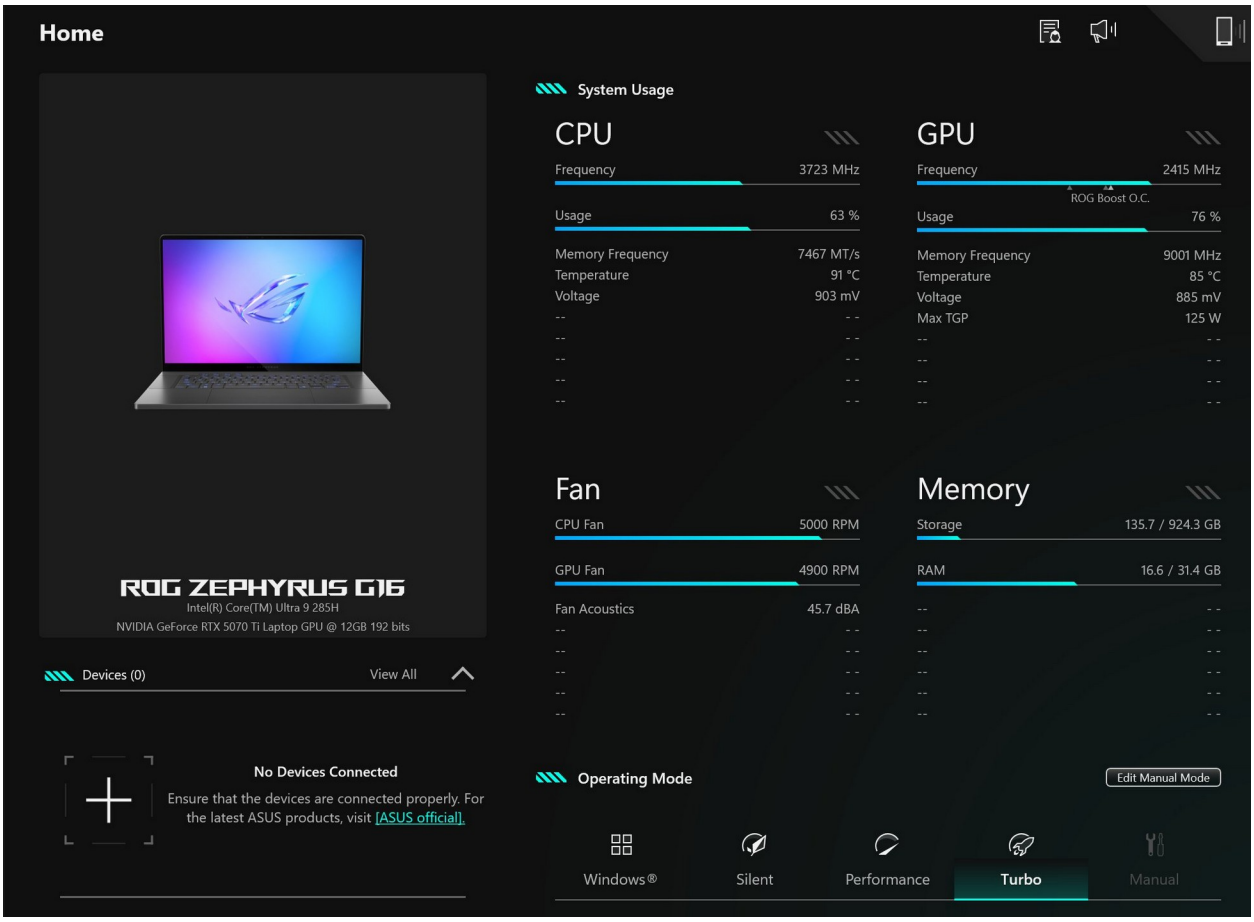

Figure 4 — Armory Crate Home screen confirming final configuration: Turbo mode active, GPU at 76% / 85°C / 2415MHz with ROG Boost OC engaged, Max TGP 125W, CPU fans at 5000 RPM, GPU fans at 4900 RPM, RAM at 7467 MT/s

6.1 In-Game FPS Benchmark — Windrose (UE5)

Following hardware remediation, in-game FPS benchmarking was conducted in Windrose running at native 2560x1600 resolution. Initial testing at Epic quality settings in Windowed mode with V-Sync enabled and TSR upscaler yielded 29 FPS — a result attributable entirely to suboptimal in-game configuration, not hardware. The RTX 5070 Ti was underutilized due to V-Sync frame pacing, Windowed mode overhead, and TSR rather than DLSS being selected.

After switching to Fullscreen, disabling V-Sync, enabling DLSS, and activating Frame Generation — all NVIDIA-native features available on the RTX 5070 Ti — FPS jumped to 87 current / 90 average at Epic settings. This represents a 3x performance improvement with no reduction in visual quality, demonstrating the importance of NVIDIA feature configuration on RTX hardware.

RESULT	29 FPS (pre-optimization, Windowed + V-Sync + TSR) → 87–90 FPS AVG (post-optimization, Fullscreen + DLSS + Frame Gen) — 3x improvement at Epic settings, native 2560x1600

Figure 5 — Windrose display settings: 2560x1600 native, TSR upscaler (pre-optimization baseline). V-Sync On, Frame Rate Limit 120 FPS.

Figure 6 — Windrose graphics settings: Custom preset, all major settings at Epic including Global Illumination, Shadows, Textures, Reflections, and Shader Quality.

Figure 7 — Baseline FPS measurement: 29 FPS at Epic settings in Windowed mode with V-Sync enabled. GPU at 86%, VRAM 69%, RAM 54%. Hardware capable but bottlenecked by suboptimal renderer configuration.

Figure 8 — Windrose gameplay at Epic settings post full optimization — smooth, stable frame delivery at native 2560x1600.

Figure 9 — Post-optimization FPS: 87 FPS current / 90 AVG FPS at Epic settings with DLSS and Frame Generation active. CPU 22%, GPU engaged, VRAM 65%, RAM 53%. 3x improvement over baseline.

7. Known Remaining Issues

7.1 Windrose In-Game Performance — Resolved

Windrose is confirmed running correctly on this hardware. Following NVIDIA feature optimization (DLSS + Frame Generation), the system delivers 87–90 FPS average at Epic settings, native 2560x1600. The RTX 5070 Ti sustained 80–92% utilization across the full 2-hour session with stable frame delivery. Any residual micro-stutters are attributable to the game's Early Access optimization state. No further action required.

7.2 Virtualization (Pending)

The system has not yet been validated for VM workloads. The following items remain outstanding:

- Verify Intel VT-x / VT-d enabled in BIOS (required for hypervisors such as VMware Workstation, Hyper-V, VirtualBox)
- Confirm Windows Hyper-V feature state
- Evaluate RAM allocation strategy for concurrent VM + host workloads (32GB is adequate but requires management)

8. Recommendations

8.1 Immediate

- Complete a full Windows Update cycle to ensure all OS-level patches are current
- Verify virtualization enabled in BIOS before standing up VMs
- Keep Armory Crate set to Ultimate GPU mode and Turbo profile whenever plugged in

8.2 Short-Term (This Month)

- Install a cooling pad — even with proper GPU configuration, sustained gaming loads benefit from additional airflow under the chassis
- Review and remove any additional ASUS bloatware not required for day-to-day use via Apps & Features
- Consider disabling Windows Copilot and Widgets at the system level via Group Policy or registry if not in use

8.3 Long-Term (6–24 Months)

- Thermal repaste (12–18 months) — ASUS factory thermal compound degrades with heat cycling; replacing with a high-quality compound (Thermal Grizzly Kryonaut or similar) will extend sustained performance and longevity

- Monitor BIOS updates via Armory Crate — ASUS has a pattern of releasing meaningful stability fixes for the G16 line post-launch
- At 2 years, reassess SSD health via CrystalDiskInfo and evaluate storage expansion if needed

9. Conclusion — Diagnostic Complete

The ASUS ROG Zephyrus G16 (2025) is a high-capability machine that arrived in a non-operational state due to an incomplete factory software configuration. The hardware itself — Intel Core Ultra 9 285H, RTX 5070 Ti, 32GB DDR5 at 7467 MT/s, and a 240Hz 2560x1600 display — is fully intact and performing to specification following remediation.

This is a known and recurring issue with ASUS ROG laptops in the 2024–2025 generation. Armory Crate shipping in a broken or incomplete state has been reported by multiple users across the Zephyrus G16, Strix G16, G14, and Zephyrus lines. Buyers should treat Armory Crate installation verification as a mandatory first step before any performance evaluation of these machines.

Diagnostic is now complete. The system passed a full 2-hour endurance benchmark running Windrose at sustained GPU load — RTX 5070 Ti held 80–92% utilization at 83–85°C throughout, surface temps peaked at 108°F, and thermals remained stable with no throttling detected. Turbo mode, Ultimate GPU mode, ROG Boost OC, and all driver and firmware updates are confirmed active. The machine is fully operational for gaming, workstation use, and VM hosting.

As the owner of Barr-Cyber and the person who both owns and diagnosed this specific unit, I can say with confidence: if you bought a 2025 ROG Zephyrus G16, experienced these symptoms, and returned it or are considering returning it — don't. The hardware is not the problem. Following the procedures in this report, my Zephyrus G16 went from the most frustrating machine I'd ever turned on to the best computer I've personally owned. That's what this hardware is actually capable of when it's set up correctly.

If you're experiencing similar symptoms and want it handled professionally — remote or on-site — Barr-Cyber provides optimization and helpdesk sessions for exactly this scenario.