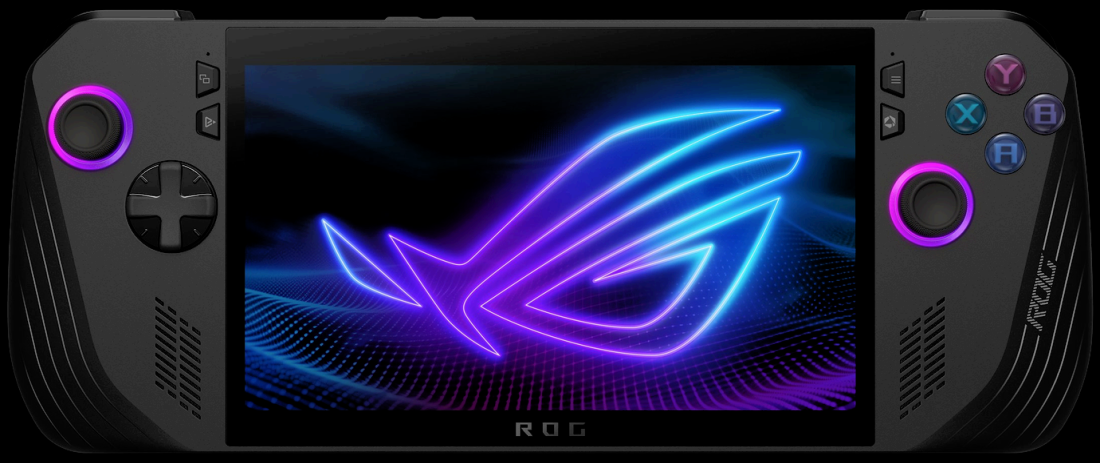
CONSUMER REFERENCE

ROG Ally X

The Windows handheld built for the long haul.



RYZEN Z1 EXTREME // 24GB LPDDR5X // 1–2TB NVME // 80WH

PROCESSOR	MEMORY	BATTERY	STORAGE
Z1 Extreme	**24** GB	**80** Wh	**1–2** TB
Zen 4 // RDNA 3	LPDDR5X	2× the original Ally	M.2 2280 NVMe
8 cores / 16 threads	7,500 MT/s	Largest in class	User-replaceable

EXECUTIVE SUMMARY

What the Ally X is and why it matters

The ROG Ally X is ASUS's mid-cycle hardware refresh of the original 2023 Ally, and it fixes almost every complaint the first-gen device earned. The core chassis, the 7-inch 120Hz FHD display, and the AMD Ryzen Z1 Extreme APU carry over. Everything else got bigger, faster, or more comfortable: the battery doubled to 80Wh, RAM jumped from 16GB to 24GB of faster LPDDR5X-7500, storage moved to a standard M.2 2280 slot with 1TB or 2TB options out of the box, and the ergonomics got a real pass — deeper grips, reshaped triggers, offset sticks, and a third exhaust vent for cooler, quieter play.

For a hardcore PC gamer deciding between handhelds, the Ally X sits in a specific lane. It's not the cheapest option — the Steam Deck OLED owns that at $549. It's not the biggest screen — the Lenovo Legion Go 2 wins there with an 8.8" QHD+ panel. What the Ally X offers is the best Windows-native handheld experience at its price, with the largest battery in its size class, a standard user-replaceable SSD, a high-refresh FreeSync Premium display, and a first-party software layer (Armoury Crate SE) that's genuinely built for a gamepad rather than retrofitted onto a desktop OS.

> POSITIONING IN ONE LINE
>
> The handheld that plays every PC game you own, for twice as long as the original Ally, on hardware you can actually upgrade yourself.

Who this brief is for

This is a reference doc for hardcore PC gamers evaluating a portable gaming purchase. It goes deeper than a spec sheet and is structured so you can skim the section you care about — performance, battery, upgradeability, or Windows software fit — and get a defensible, number-backed answer. A one-page companion summary ships alongside this document for quick reference.

Four things that matter most

30W	80Wh	M.2 2280	Win 11
PEAK TDP ON AC	BATTERY CAPACITY	STANDARD SSD SLOT	FULL PC OS

POSITIONING

Four message pillars

These are the four stories the product tells, ordered by what a buyer actually cares about. Each has a headline claim and the specific numbers that back it up. Use these as the skeleton for any campaign, reviewer pitch, or retail conversation.

PILLAR 01 // PERFORMANCE

Desktop-class gaming in a 678g chassis

Ryzen Z1 Extreme at up to 30W on AC

The Z1 Extreme is an 8-core / 16-thread Zen 4 APU on TSMC's 4nm process, paired with a 12-CU RDNA 3 integrated GPU rated at 8.6 TFLOPs. Turbo Mode pushes 25W on battery and 30W plugged into AC. The real step up on the Ally X is the memory: 24GB of LPDDR5X-7500 means the integrated GPU is no longer fighting the rest of the system for a shared 16GB pool. Reviewers consistently flag 1–3 fps gains over the original Ally in CPU-bound scenarios and much healthier frame-time consistency in memory-hungry titles like Cyberpunk 2077 and Starfield.

PILLAR 02 // BATTERY LIFE

Game for a transatlantic flight, not just a takeoff

80Wh is the headline upgrade

On the original 40Wh Ally, a AAA title at Turbo settings would last roughly 90 minutes; the Ally X in the same scenario routinely runs past three hours, and lighter indie or older titles in Silent Mode (10W) push past six. The Verge described the battery as making the Ally X "the king of handheld battery packs," and that framing has held up across a year of reviews. For a buyer whose pain point with the first Ally was "I can't take it on a flight," this is the single biggest reason to upgrade.

PILLAR 03 // UPGRADEABILITY

A PC handheld that's actually a PC

Standard M.2 2280 NVMe PCIe 4.0 slot

Swapping in a 4TB drive is a five-screw job with the official upgrade guide (ASUS document E23506). The original Ally used the smaller 2230 form factor, which limits the market of replacement drives to a handful of SKUs at a premium. This matters because modern AAA installs are 100–200GB each; a 2TB drive holds maybe ten of them. RAM is soldered (LPDDR5X speeds require it), but the SSD is the component most buyers will actually want to upgrade.

PILLAR 04 // WINDOWS-NATIVE SOFTWARE

Every launcher, every game, no workarounds

Windows 11 Home + Armoury Crate SE

Windows 11 Home is the full desktop OS, not a restricted console shell. That means Steam, Epic, GOG, Xbox Game Pass (3 months included), EA App, Battle.net, Ubisoft Connect, and any emulator install and run the way they would on a gaming laptop. The tradeoff is that Windows on a 7-inch touchscreen is still clumsy without a dock and keyboard; Armoury Crate SE mitigates this with a gamepad-first launcher, per-game profiles, TDP sliders, and a Command Center overlay.

DEEP-DIVE // PERFORMANCE

The silicon and the software that drive it

AMD Ryzen Z1 Extreme — the APU

The Z1 Extreme is a handheld-specific variant of AMD's Phoenix silicon. It runs the Zen 4 CPU architecture (same generation as the Ryzen 7040-series laptop chips) on TSMC's 4nm process, with 8 cores, 16 threads, 24MB of total cache, and a 5.10 GHz boost clock. The integrated GPU uses AMD's RDNA 3 architecture with 12 compute units clocked up to 2.7 GHz, yielding roughly 8.6 TFLOPs of FP32 throughput — similar in class to a mobile RTX 3050 under ideal thermal conditions. Configurable TDP runs from 9W in battery-conscious silent modes up to 30W when plugged in.

OPERATING MODE	TDP	BEST FOR
Silent	10W	Indies, retro, 2D, emulation; quietest fans
Performance	15W	Most AAA at medium settings; best battery balance
Turbo (battery)	25W	Demanding AAA at 720p–900p; short sessions
Turbo (AC)	30W	Max frame rates, docked play, benchmark runs

Memory — where the Ally X actually pulls ahead

The 24GB of LPDDR5X-7500 is the single spec that changes the Ally X's gaming character most compared to the first-gen Ally's 16GB of LPDDR5-6400. On integrated graphics, system RAM is also VRAM — every gigabyte the OS and background apps consume is a gigabyte the GPU can't use for textures. Modern titles are increasingly allocating 10–14GB of memory at higher texture settings, which means the 16GB original Ally was swapping to SSD more often than it should have been. The Ally X's extra 8GB plus faster memory speed translates to measurably fewer stutters in open-world titles and supports running a game alongside Discord, a browser, or a second launcher without a performance cliff.

Upscaling and frame generation

The Ally X benefits from AMD's full software stack: FSR (in-game super resolution), RSR (driver-level super resolution for any game), AMD Fluid Motion Frames (AFMF for frame generation on supported titles), and Radeon Anti-Lag. Armoury Crate exposes these as per-game toggles. In practice, AFMF is the most impactful for handheld use — it can take a 40fps target up to a smoother 60+ fps perceived rate at a modest latency cost, which is often a worthwhile tradeoff on a 120Hz panel.

DEEP-DIVE // THERMALS

Why the Ally X runs quieter than its predecessor

The thermal architecture is called ASUS Zero Gravity, and the marketing name is backed by actual engineering. The heat pipes use a capillary wick structure that increases capillary pressure by more than 15% over conventional heat pipes, so thermal transfer holds up regardless of which way the device is tilted — a non-trivial problem for a handheld that gets held sideways, upside down, or docked. Both fans use fluid bearings rated for long life under off-axis use.

The geometry changes that matter

The Ally X's fans are 0.15mm thick — slimmer than the first-gen Ally's — which freed up internal volume for the larger battery while still increasing total airflow by roughly 10%. A third exhaust vent on the top chassis routes a small amount of air between the motherboard and the display panel, which keeps the screen's touch surface cooler during long Turbo sessions. The heatsinks use 0.1mm ultra-thin aluminum fins (up to 102 of them) for roughly 12,173 square millimeters of dissipation surface. Dust filters cover both intakes.

Reviewer consensus on acoustics

The original Ally had a "hot and loud at Turbo" reputation. Every major reviewer who retested the Ally X flagged lower peak fan noise at the same TDP and noticeably cooler grip temperatures. This is the thermal story worth telling: the Ally X runs the same silicon more quietly and more comfortably than the device it replaces, not hotter despite the bigger battery.

DEEP-DIVE // BATTERY

80Wh and what it actually buys you

80Wh is the largest battery in any mainstream gaming handheld under 700g. For reference: the Steam Deck OLED has 50Wh at 640g, the Lenovo Legion Go S has 55.5Wh, and the original Ally had 40Wh at 608g. The Ally X adds 70g over the original to deliver exactly twice the capacity, and the ergonomic rework absorbs most of the perceived weight difference through deeper grips.

SCENARIO	TDP	APPROX. RUNTIME ON 80WH
Light indie / 2D / retro emulation	10W (Silent)	5.5 – 7 hours
Mainstream 3D at medium settings	15W (Performance)	3 – 4 hours
AAA at Turbo on battery	25W (Turbo)	1.5 – 2.5 hours
Cloud gaming (Xbox, GeForce Now)	Low idle + Wi-Fi	7 – 9 hours
Video playback	Minimal	9 – 11 hours

Ranges reflect reviewer testing and community reports across multiple sources. Actual runtime varies with title, settings, screen brightness, and refresh rate. The included 65W USB-C GaN charger fast-charges via USB Power Delivery 3.0 — roughly 30 minutes to reach 50% from empty, about two hours for a full charge. Both USB-C ports support Power Delivery, so any standard laptop charger works in a pinch.

DEEP-DIVE // DISPLAY + AUDIO + CONTROLS

The stuff you touch, see, and hear

Display

The panel is a 7-inch 1920×1080 IPS-class LCD at 120Hz with a 7ms response time. It covers 100% sRGB and hits 500 nits of peak brightness — double the 200–300 nits most low-cost LCD handhelds ship with. AMD FreeSync Premium is supported, meaning variable refresh rate tear-free gameplay from roughly 48fps upward. The surface is protected by Corning Gorilla Glass Victus with a DXC anti-reflective coating that drops specular reflection from roughly 4% to under 0.6% — the main reason the Ally X is usable outdoors on a sunny day when the Steam Deck OLED (which is a better panel indoors) can struggle.

Display context vs competitors

The Ally X does not have an OLED panel. The Steam Deck OLED does, and on direct side-by-sides in dark rooms, the OLED wins on contrast, HDR, and black levels. What the Ally X's panel gives you that the Deck OLED does not: 1080p native resolution, 120Hz refresh, FreeSync VRR, and 500 nits of brightness for outdoor use. For competitive shooters or fast-paced action games at 60–120fps, the 120Hz VRR panel is the stronger choice; for story-driven AAA in a dim room, the OLED wins.

Audio

Dual front-firing Smart Amp speakers with Dolby Atmos support and Hi-Res Audio certification. Front-firing is the key detail — many handhelds ship with bottom-firing speakers that get muffled the moment you hold the device. Two-way AI Noise Cancelation processes both microphone input (so your party chat is clean) and speaker output (so background noise gets filtered out of game audio). The 3.5mm combo jack supports standard headsets. Bluetooth 5.2 and Wi-Fi 6E round out wireless.

Controls and ergonomics

The redesigned grips are 4.5mm taller with a 2° and 14° slant tailored to hand position. Joysticks are Hall-effect adjacent in durability terms — rated for 5 million rotation cycles, twice the 2.5 million on the original Ally — with RGB halos and slight offset for ergonomics. The D-pad has been reworked to reduce stickiness on circular inputs, which matters for fighting games and retro play. Two rear macro buttons (M1, M2) combine with face buttons or directional inputs for shortcuts like screenshot, task manager, and desktop. A fingerprint reader built into the power button handles Windows Hello sign-in.

DEEP-DIVE // UPGRADEABILITY + CONNECTIVITY

The PC part of "handheld PC"

The Ally X is the most upgradeable mainstream handheld on the market, and ASUS publishes an official upgrade guide (document E23506) for the SSD and battery. The bottom cover comes off with six screws, and system power automatically cuts when the cover is removed. The user-replaceable components are the M.2 2280 PCIe 4.0 SSD and the 80Wh battery itself.

REAR CHASSIS — SIX SCREWS UNDER THE BOTTOM COVER REVEAL THE USER-SERVICEABLE SSD AND BATTERY

01
M.2 2280 SSD
PCIe 4.0 // 1–2TB out of the box, user-replaceable, standard desktop form factor

02
80Wh Battery
2× the original Ally, largest in class, officially serviceable

03
Cooling
Dual 0.15mm fans + 15% higher capillary heatpipe pressure

04
Six-screw access
Upgrade guide E23506, self-service path published by ASUS

Why M.2 2280 matters

The original Ally used the shorter M.2 2230 form factor, which is used mostly in ultraportable laptops and has a thin aftermarket. A 2TB 2230 drive typically costs 40–60% more than an equivalent 2280. By moving to 2280, the Ally X opens up the entire consumer SSD market — any Samsung 990 Pro, WD Black SN850X, Crucial T500, or value option in 2TB / 4TB / 8TB capacities works. The performance ceiling is PCIe 4.0 x4, so there's no benefit to PCIe 5.0 drives, but there's also no compatibility penalty.

CONNECTIVITY

Ports, radios, and the dock story

PORT / RADIO	SPEC	WHAT IT'S FOR
USB-C (top, port 1)	USB4 / TB4-compatible, DP 1.4, PD 3.0	Fastest dock, external GPU, charging
USB-C (top, port 2)	USB 3.2 Gen 2, DP 1.4, PD 3.0	Second display, standard dock, charging
microSD	UHS-II	Overflow storage for games or media
3.5mm combo	Standard TRRS	Headset with mic
Wi-Fi	Wi-Fi 6E (2×2)	Tri-band, 6GHz support, low congestion
Bluetooth	5.2	Controllers, headphones, keyboards

Thunderbolt 4 — the dock story

The move from the original Ally's proprietary XG Mobile connector to a standard Thunderbolt 4 port on the Ally X is the quieter-but-bigger upgrade. XG Mobile locked you into ASUS's own external GPU at premium pricing; Thunderbolt 4 works with any TB4 dock, eGPU enclosure (Razer Core X, ASUS XG Station, custom builds with a Radeon or GeForce card), or dual 4K monitor setup. For buyers who want to use the Ally X as a desktop replacement at home, this is a meaningful flexibility gain.

COMPETITIVE // HANDHELD GAMING PCS

Where the Ally X wins, where it doesn't

The handheld PC category got crowded in 2024–2025. Below is a spec and positioning comparison against the three devices most buyers cross-shop. Prices reflect MSRP at launch; street pricing has drifted down for older models.

	ROG ALLY X	STEAM DECK OLED	LEGION GO (GEN 1)	LEGION GO S
APU	Z1 Extreme (Zen 4)	Van Gogh (Zen 2)	Z1 Extreme (Zen 4)	Ryzen Z2 Go
RAM	24GB LPDDR5X-7500	16GB LPDDR5-6400	16GB LPDDR5X-7500	16GB
Display	7" 1080p 120Hz	7.4" 1280×800 OLED 90Hz	8.8" 2560×1600 144Hz	8" 1920×1200 120Hz
Battery	80Wh	50Wh	49Wh	55.5Wh
Weight	678g	640g	854g (w/ ctrl)	~720g
Storage	M.2 2280	M.2 2230	M.2 2242	M.2 2280
OS	Windows 11	SteamOS 3	Windows 11	SteamOS 3
MSRP	$799	$549 / $649	$699 / $749	$649+

WHERE IT WINS, WHERE IT LOSES

Where the Ally X wins

Battery capacity (80Wh beats everything in class), RAM (24GB is the most of any sub-$1000 handheld), storage expandability (M.2 2280 is the standard desktop form factor), connectivity (USB4 / Thunderbolt 4), and Windows compatibility breadth when you specifically need Windows-only launchers or anti-cheat support. In head-to-head benchmark coverage, one reviewer tested the Ally X running SteamOS via a community port and found it roughly 20% faster than a Steam Deck OLED in the same titles.

Where it loses

The Steam Deck OLED is $250 cheaper, has a noticeably better panel for indoor story games, and offers the most frictionless handheld experience on the market thanks to SteamOS's instant suspend-resume and zero-config tuning. The Legion Go 2 has a larger and higher-resolution screen with detachable controllers. The upcoming ROG Xbox Ally X (2025, Z2 Extreme, $999) is ASUS's own newer flagship — pricier, with the newer silicon and an Xbox-branded launcher shell, but also less upgradeable on the SSD path.

AUDIENCE // WHO BUYS THIS

Three buyer archetypes

The PC gamer without a living-room TV

Apartment-dweller, often single or in a shared household, main gaming PC is either a desktop in a small office or a laptop. Wants a second-screen gaming device for the couch, the bedroom, and travel. Cares that their Steam library, Game Pass subscription, and the one or two Epic exclusives all work without fuss. Values the 120Hz panel for the kinds of games they play (shooters, action, fighters). This is the Ally X's core customer.

The frequent traveler / commuter

Flies or rides transit regularly. Played the original Ally and found the battery painful. Upgrade case here is almost entirely the 80Wh battery — "I can play Baldur's Gate 3 for the whole flight" is a real pitch. The 7-inch form factor fits a tray table better than the Legion Go's 8.8-inch, and the third exhaust vent keeps the screen comfortable in cramped seats.

The PC enthusiast who tinkers

Already swaps NVMe drives in their desktop. The M.2 2280 slot, Thunderbolt 4 for eGPU experiments, the ability to dual-boot Windows and a community SteamOS port, and the per-game Armoury Crate TDP profiles all land. This buyer is going to mod, and the Ally X is the most mod-friendly handheld in its class. Treat them as a community ambassador.

USE CASES // SCENARIO FIT

What it actually does well

SCENARIO	FIT	WHY
AAA handheld at 30–60fps	**Strong**	Z1 Extreme + 24GB + 120Hz VRR panel handles most modern AAA at 720p–900p
Competitive shooters (Apex, CS2)	**Strong**	120Hz refresh, low response time, stable frame pacing in Turbo mode
Indie / retro / emulation	**Strong**	Silent mode delivers 6+ hour sessions; full Windows means every emulator available
Cloud gaming (Xbox, GFN, Luna)	**Strong**	Wi-Fi 6E + 7-inch panel + 9-hour cloud runtime
Docked 4K gaming	**Moderate**	Thunderbolt 4 docking works; 4K on integrated graphics demands heavy FSR
eGPU desktop replacement	**Moderate**	TB4 + eGPU enclosure works but costs more than a dedicated mini-PC
Pure productivity / work laptop	**Weak**	Windows on a 7-inch touchscreen is clumsy; buy a ThinkPad instead

REFERENCE // FULL SPEC SHEET

MODEL NUMBER	RC72LA
OPERATING SYSTEM	Windows 11 Home (64-bit)
PROCESSOR	AMD Ryzen Z1 Extreme — Zen 4, 4nm, 8 cores / 16 threads, 24MB cache, up to 5.10 GHz boost
GRAPHICS	AMD Radeon (RDNA 3), 12 CUs, up to 2.7 GHz, 8.6 TFLOPs
CONFIGURABLE TDP	9W – 30W (Silent 10W / Performance 15W / Turbo 25W battery / Turbo 30W AC)
MEMORY	24GB LPDDR5X-7500 (on-board, not user-upgradeable)
STORAGE	1TB or 2TB PCIe 4.0 NVMe M.2 2280 SSD (user-replaceable)
DISPLAY	7" IPS, 1920×1080, 120Hz, 7ms, 500 nits, 100% sRGB, FreeSync Premium, Gorilla Glass Victus + DXC, touch
BATTERY	80Wh lithium-polymer, non-removable (serviceable)
POWER ADAPTER	65W USB-C GaN (bundled), USB PD 3.0
PORTS	1× USB-C USB4/TB4 (DP 1.4, PD 3.0), 1× USB-C 3.2 Gen 2 (DP 1.4, PD 3.0), microSD UHS-II, 3.5mm combo
WIRELESS	Wi-Fi 6E (2×2), Bluetooth 5.2
DIMENSIONS	280.6 × 111.3 × 24.7–36.9mm
WEIGHT	678g (1.49 lbs)
BUNDLED SOFTWARE	Armoury Crate SE 1.5, MyASUS, 3 months Xbox Game Pass Ultimate
MSRP	$799.99 (1TB); 2TB SKU available at a premium

ENABLEMENT // TALKING POINTS

How to talk about the Ally X

Lead with the upgrade story, not the spec sheet

The Ally X is easiest to sell as "the first Ally done right." If the buyer owned the original or read the first-gen reviews, they already know the complaints — battery life, SSD form factor, grip comfort. The Ally X addresses each of those by name. A tight elevator pitch: "Twice the battery, twice the storage ceiling, faster RAM, comfier grips, quieter thermals — same chip, same price."

Anchor every claim to a number

80Wh is specific. "Better battery life" is not. 24GB of LPDDR5X-7500 is specific. "Fast memory" is not. M.2 2280 is specific. "Upgradeable" is not. The number is the proof; the adjective is marketing. Always lead with the number.

Be honest about what it isn't

The Ally X is not a Steam Deck replacement for Steam-first buyers, and it's not an OLED device. Pretending otherwise loses credibility with the audience that reads reviews before buying. The honest framing: if you want plug-and-play Steam, get the Deck OLED. If you want the most capable Windows handheld for the price, with room to grow, get the Ally X.

DO

- Lead with the 80Wh battery in any battery-adjacent conversation
- Use specific TDP numbers (10W / 15W / 25W / 30W) when talking performance modes
- Mention M.2 2280 by name — it's the detail that signals "real PC" to enthusiasts
- Position 24GB as "shared with the GPU" to explain why it matters vs 16GB competitors
- Reference the 3-month Game Pass bundle when the buyer mentions cloud or subscription gaming
- Use Thunderbolt 4 / USB4 as the dock / eGPU story, not the proprietary-XG story

DON'T

- Oversell the panel. It's a good 120Hz IPS, but it's not OLED, and enthusiasts know
- Claim desktop-RTX performance. The 8.6 TFLOP figure is real but thermally constrained
- Skip the weight. 678g is a real increase over the Steam Deck OLED's 640g
- Use "console-killer" framing. The audience buying this already has a PC
- Promise native 4K. Integrated graphics need heavy upscaling at 4K in most titles
- Forget the Armoury Crate SE demo. The software layer is a differentiator; show it working

Brief prepared for consumer marketing reference. Numbers sourced from ASUS ROG product page, ROG Ally X user manual (Revised Edition V2 / October 2024, document E25272), upgrade guide (E23506), and reviewer consensus across Tom's Guide, PC Gamer, Windows Central, The Verge, Tom's Hardware, and Trusted Reviews. Competitive specs from manufacturer pages.