AMD’s Ryzen 3000XT CPU refresh is here—benchmarks inside

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Today, AMD released three new Ryzen 3000 desktop processors—the Ryzen 3000XT line. These new CPU models—the Ryzen 9 3900XT, Ryzen 7 3800XT, and Ryzen 5 3600XT—are minor refreshes of the existing Ryzen 9 3900X, Ryzen 7 3800X, and Ryzen 5 3600X models and add a couple hundred MHz extra boost clock speed to the original versions.

We’ll go ahead and spoiler this one for you right away—if you’ve already got a Ryzen 3000 X-series desktop CPU, you don’t need to rush out to buy a new one. These updates should be seen largely as a way to keep pressure on Intel while AMD is ahead rather than something revolutionary.

If you’re already in the market for a new CPU and want the top performer in your bracket, you probably want the XT model. PC builders looking for a better value per dollar may want to watch for the X-series CPUs to drop a few dollars, instead—none of the performance improvements brought in XT are overwhelming.

You may also want to skip the XT line if you’re looking for the absolute top-dog CPU. That’s generally going to be the Ryzen 9 3950X, which didn’t get an XT upgrade and outperforms

the Ryzen 9 3900XT in most respects.

Before we get to the benchmarks, we want to make one disclaimer clear—we don't have in-house results for the older X-series CPUs, the Intel i7-10700K, or the Intel i5-10600K. Passmark, Cinebench R20, and Geekbench 5 results for those CPUs are sourced from publicly available composite scores at cpubenchmark.net, cgidirector.com, and geekbench.com; Time Spy CPU results for those CPUs come from benchmarks performed by guru3d.com.

All test scores for Ryzen 3000 XT series CPUs and the Intel i9-10900K CPU were generated directly at Ars Technica.

Ryzen 3000XT vs. Ryzen 3000X

- Unsurprisingly, Ryzen 9 3950X is faster than Ryzen 9 3900XT. But the older Ryzen 5 3600X dominating its newer 3600XT sibling is an unexpected upset.
  Jim Salter
- The newer XT models are 5-10% faster than their older X siblings in every single-threaded test—including the 3950X vs. 3900XT, and 3600X vs. 3600XT. No upsets here.
  Jim Salter
- Raw passmark results for XT series CPUs, as tested at Ars this week.
  Jim Salter
- Raw single-threaded Passmark results, as tested at Ars this week.
  Jim Salter
- Raw Cinebench R20 results, as tested at Ars this week.
  Jim Salter
- Raw Cinebench R20 single-threaded results, as tested at Ars this week.
  Jim Salter
- Raw Geekbench 5 results, as tested by Ars this week.
  Jim Salter

- Raw Geekbench 5 single-threaded results, as tested by Ars this week.
  Jim Salter
- Raw 3DMark Time Spy CPU results, as tested by Ars this week.
  Jim Salter

We don’t expect you to take our word for it on the performance difference of Ryzen 3000 X-series versus Ryzen 3000 XT-series—above, you’ll find the numbers that make that case. The first two charts compare the older X series processors to their closest XT series equivalent—so, Ryzen 9 3950X and 3900X versus Ryzen 9 3900XT; Ryzen 7 3800X versus 3800XT; and Ryzen 5 3600X versus 3600XT.

Unsurprisingly, the Ryzen 9 3950X still rules the roost in multithreaded tests—paraphrasing AMD’s comments when the company first announced the line, it didn’t have any real room to improve there. In single-threaded testing, however, all Ryzen 3000 XT models outpaced their closest Ryzen 3000 X-series equivalent by a solid 5 percent to 10 percent.

The big upset here was the Ryzen 5 3600X versus Ryzen 5 3600XT. We’re not sure if its results are truly representative or we got a poor bin on our specific CPU—but our multithreaded results with the 3600XT are significantly worse than equivalent results for the older 3600X, across the board. The single-threaded results do still favor the newer 3600XT by the expected 5 percent to 10 percent margin.

Bracket racing, AMD vs. Intel

- If you’re not sure which general bracket you should shop in—Ryzen 9/Core i9, Ryzen 7/Core i7, or Ryzen 5/Core i5—this multithreaded performance comparison might help.
  Jim Salter
- If you’re not sure which general bracket you should shop

in—Ryzen 9/Core i9, Ryzen 7/Core i7, or Ryzen 5/Core i5—this single-threaded performance comparison might help.
Jim Salter

It's a good idea to keep abreast of the differences in performance between each general "bracket" of CPU—Ryzen 9/Core i9, Ryzen 7/Core i7, and Ryzen 5/Core i5. To that end, we took multithreaded and single-threaded benchmark scores for the top AMD and Intel SKUs in each bracket, and we expressed them all as a percentage of the Ryzen 9 3900XT's performance.

Within the Ryzen 9 / Core i9 bracket, the Ryzen 9 3950X still dominates multithreaded tests handily—with the exception of Time Spy CPU, which does not scale beyond 10 threads. That scale limitation in Time Spy allows the Intel i9-10900K to pull a consistent win there, despite losing to both the 3950X and 3900XT in every other multithreaded test.

Dropping to the Ryzen 7 / Core i7 and Ryzen 5 / Core i5 brackets, the AMD and 10th-gen Intel parts generally run neck and neck in Cinebench R20 and Geekbench 5, with relatively small differences that can go either way. In Passmark testing, the Ryzen parts dominate their Intel counterparts handily—but Time Spy still significantly favors the Intel CPUs in each bracket. If Time Spy is your preferred metric, Intel's i9-10900K and AMD's Ryzen 9 3950X are neck and neck for the top slot, with everything else falling increasingly farther behind.

In terms of the brackets themselves—9 versus 7 versus 5—we see a roughly 20 percent performance drop at each bracket. Loosely speaking, the top Core i7 or Ryzen 7 SKU is about 75 percent as fast as the Ryzen 9 3900XT, and the top Core i5 or Ryzen 5 SKU is about half as fast as the 3900XT. Unfortunately, careful shoppers will still need to look more closely than these "brackets"—both sides tend to have multiple CPUs within each one, and we're only comparing the top performing model in

each.

Moving onto the single-threaded performance chart, there frankly isn't much to see. We're still expressing results as a percentage of the Ryzen 9 3900XT so that we can fit all the scores on a single chart with one scale—and no CPU falls much below 95 percent on the low end. On the high end, all three Intel CPUs slightly outperform the 3900XT on single-threaded Passmark testing, with the i9-10900K taking top honors at 111.2 percent.

Conclusions

The new Ryzen 3000XT CPUs aren't particularly exciting buys in and of themselves. They're debuting at the same prices set for their original Ryzen 3000X counterparts—but unlike the first Ryzen 3000 series launch, they don't represent a groundbreaking performance improvement in any aspect, and they don't really change AMD desktop CPUs' relationships to their Intel counterparts.

Intel's 10th generation of desktop CPUs has proven more performant than most of the industry originally expected, given Intel's lackluster promotion. On that score, we believe AMD has shot itself in the foot slightly—Intel's i9-10900K compares more favorably to the 3900XT than it does to the older 3950X. We suspect quite a few shoppers won't realize that, leading them to believe Intel is closer to AMD in the top slot than they really are.

Unfortunately for Intel, the 10th-generation Core CPUs still consume significantly more electricity and generate more heat than their Ryzen counterparts—a careful shopper willing to tolerate a 5-10 percent drop in Cinebench or Geekbench scores might still balk at the increase in power consumption.

- Despite a PCIe 4.0 motherboard and an RTX 2060 Super

GPU, our 3900XT system ran much more efficiently than its iGPU-only, PCIe 3.0 only i9-10900K competition.
Jim Salter

- Despite a PCI Express 4.0 motherboard and a Geforce RTX 2060 Super discrete GPU, our Ryzen 9 3900XT system desktop idled around 55W.
  Jim Salter
- Our 3900XT system's peak wall-power consumption during Cinebench R20 testing was steady at 210W.
  Jim Salter
- When we tested the i9-10900K in May, its peak power consumption was more than 50% higher than the 3900XT's—despite running on an integrated GPU, and with no PCIe 4.0 on the motherboard.
  Jim Salter

When we tested Intel's i9-10900K, the entire system desktop-idled at 70W and ran full-out at 336W during Cinebench R20 tests. The Ryzen 9 3900XT idles at 55W, and it peaked at 210W—a much larger difference than comparing Intel's 125W to AMD's 105W TDP would lead one to expect.

This nearly 50 percent increase in power consumption for Intel versus AMD comes despite the fact that our Intel test system ran on integrated graphics only, while our Ryzen system is running on a Geforce RTX 2060 Super—and a PCI Express 4.0-capable motherboard.

Determined gamers who believe devoutly in the Time Spy CPU metric may conclude that Intel's moderate wins there make it the best choice for them. But when taking performance, initial cost, and power consumption into account, we believe most people will prefer AMD's desktop CPUs across the board.

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