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Intel Core i5-12400, Core i3-12300, Core i3-12100 Early Review Leaks Out: Alder Lake Quad Cores Destroy Zen 3 Quad Cores, 12400 Faster, Cooler & More Efficient Than 5600X

By Hassan Mujtaba

Dec 26, 2021 01:05 EST

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NVIDIA Lovela

3. Elden Ring Cro
Are No Rings
Says The Gam

4. Final Fantasy
Tweaks Impro
TAA, Ambient

5. AMD Ryzen AF
Performance
To 28% Impro

Intel Core i5-12400, Core i3-12300 & Core i3-12100 Alder Lake Desktop CPU reviews have been published online ahead of launch. (Image Credits: Chiphell Forums)

Early performance reviews of Intel's mainstream & entry-level 12th Gen Alder Lake Desktop CPUs including the Core i5-12400, Core i3-12300 & Core i3-12100 have been published over at Chiphell Forums by Enthusiast Citizen.

Intel Alder Lake Core i3-12300 & Core i3-12100 Quad-Core CPUs Destroy AMD Zen 3 Quad Cores, Core i5-12400 Wins In Perf/$ Against 5600X While Running Efficiently and Cooler

The Intel Non-K lineup is more intended for standard and more cost-effective gaming setups. They don't necessarily offer the higher overclocking capabilities or the higher clocks (and higher TDP) as the unlocked SKUs but they do offer lower TDPs and are a perfect fit for OEMs and their pre-built options. As such, Intel is expected to launch at least 19 non-K variants of its 12th Gen Alder Lake-S Desktop CPU family. We have already covered the detailed specs of the lineup in this post.

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The Intel Core i5-12400 will feature a 6 core and 12 thread design and will comprise only of Golden Cove (P-Cores). The chip will feature 18 MB of L3 cache & clocks will be rated at 3.00 GHz base and 4.6 GHz boost. The CPU will come with 65W TDP and it will be very interesting to see how these chips fare against AMD's Ryzen 5 5600X as they are aiming at the same segment. The Intel Core i5-12400 for $210 US while the F variant of the 12400 will hit store shelves for $180 US.

Intel Non-K Alder Lake-S Core i3 CPUs

Lastly, we have the Core i3 lineup which includes the Intel Core i3-12300 and i3-12100. Both CPUs come with 4 cores and 8 threads (4 Golden Cove cores). The clocks are maintained at 4.4 GHz and 4.3 GHz boost for the chips respectively. They also pack 12 MB of L3 cache and every chip below the i5-12600 features the UHD730 graphics while the higher-end chips feature the UHD770 iGPU. The Core i3-12100 will retail for $140 US for the standard and $110 US for the F variant while the 12300 will retail for $150 US.
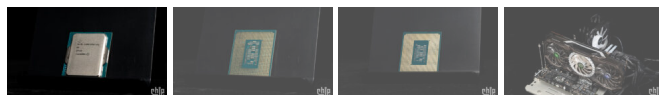
For testing, the Intel Alder Lake Core i5 and Core i3 CPUs were tested on an ASRock Z690 Phantom Gaming 4 motherboard along with Apacer NOX DDR4-4266 (8 GB x 2) memory. The AMD platform used for comparison only had the motherboard changed to ASRock X570 Taichi while the rest of the specs such as graphics card (RX 6800 XT Taichi) and cooling remained the same.

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Intel Alder Lake Non-K Core i5 & Core i3 Synthetic CPU Performance Benchmarks

First of all, we have to talk about synthetic benchmarks starting with the Intel Core i5-12400. The i5 chip comfortably sits above or on par with the Ryzen 5 5600X with PBO enabled. The average perf gain is about 5% which isn't a lot but considering that this chip is around 50-55% lower in price ($180 vs $299) than the AMD part, that alone is a huge win in the synthetic performance segment.

The Intel Core i3 parts are compared to the Ryzen 3 5350G which is the only 4 core and 8 thread Zen 3 part it can be compared to and here, the Core i3 CPUs totally outclass Zen 3, even with the

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Intel Alder Lake Non-K Core i5 & Core i3 Gaming CPU Performance Benchmarks

Moving over to gaming benchmarks, the Intel Core i5-12400 and the AMD Ryzen 5 5600X trade blows with one another. AMD wins 3 tests and Intel wins 3 tests but we also have to remember AMD's chip is using PBO and costs much more. On the Core i3 front, these entry-level chips outclass every other CPU designated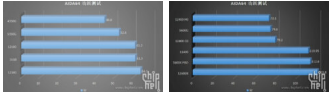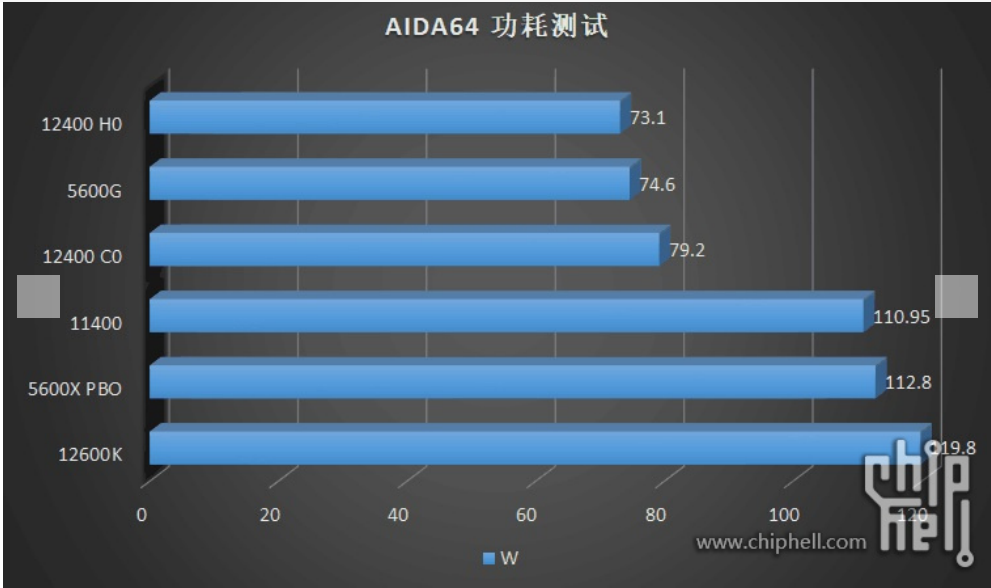 at the segment. Once again, the gains are up to 50% and that's something that will get budget gamers really excited about.
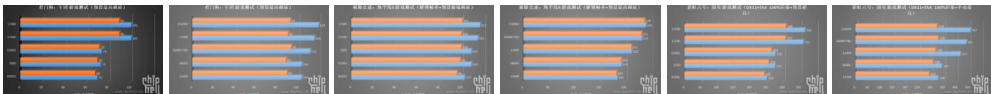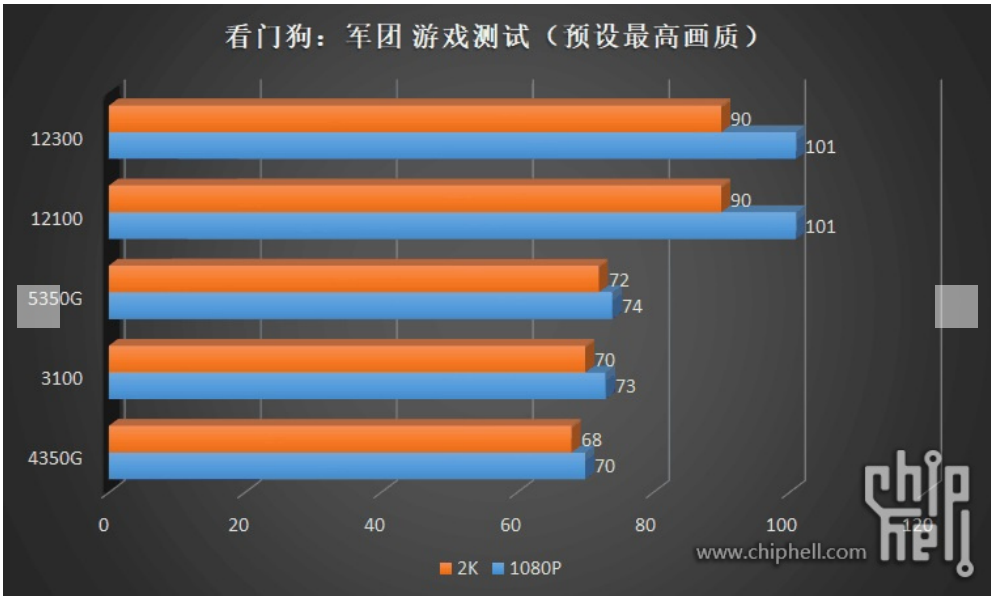
Intel Alder Lake Non-K Core i5 & Core i3 CPU Power Consumption

For several years, AMD has been the king of efficiency with its bleeding-edge 7nm chips. This spree has come to an end as not only the high-end chips, but the lower-end chips utilizing Intel's 10 ESF process nodes offer better efficiency. The Intel Core i5-12400 consumes 73W at max load while the AMD Ryzen 5 5600X with PBO consumes 119W of power. The Intel Core i3 chips do consume

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AIDA64 功耗测试

12400 H0	73.1
5600G	74.6
12400 C0	79.2
11400	110.95
5600X PBO	112.8
12600K	119.8

0   20   40   60   80   100   120

■ W

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Intel Alder Lake Non-K Core i5 & Core i3 CPU Temperatures

Finally, we have the temperatures where the Intel Core i5-12400 runs at a cool 58C versus the 86C on the AMD Ryzen 5 5600X. The Core i3's run slightly warmer than the Core i5 chip at up to 62C but that's much lower than the 68C of the Ryzen 3 5350G. There are also latency numbers provided in the charts below.

AIDA64 温度测试

12100	61
12300	62
4350G	67
5350G	68
3100	68

0   10   20   30   40   50   60   70

■ 摄氏度

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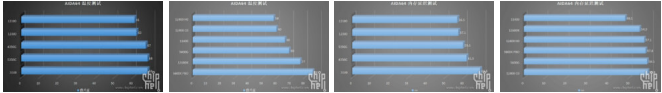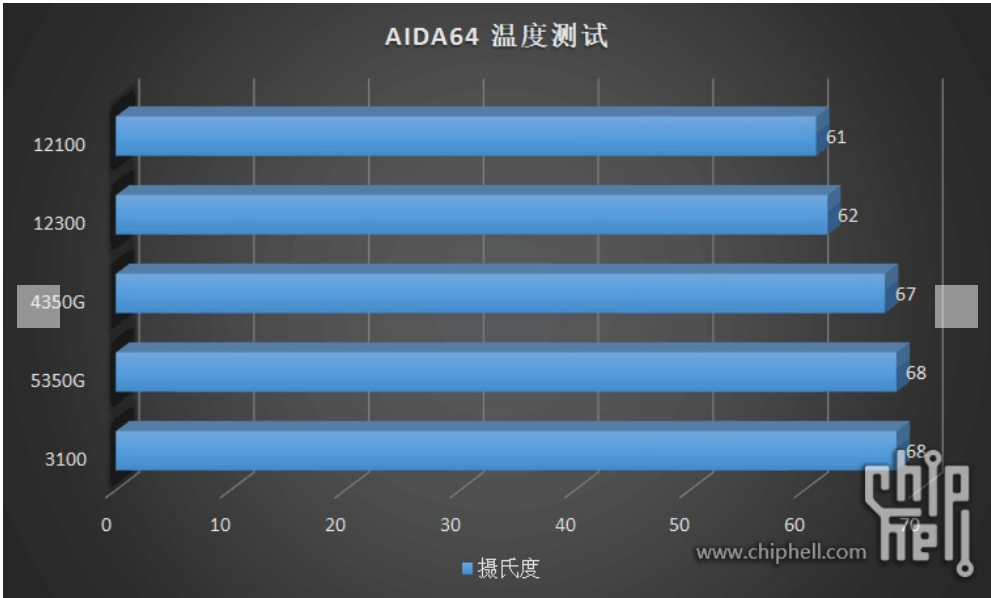
In addition to these, Vietnamese Voz forums have also published some early Intel Core i5-12400 CPU performance impressions and also tested the chip with the boxed CPU cooler which ends up with the chip running at around 70-80C at maximum load.
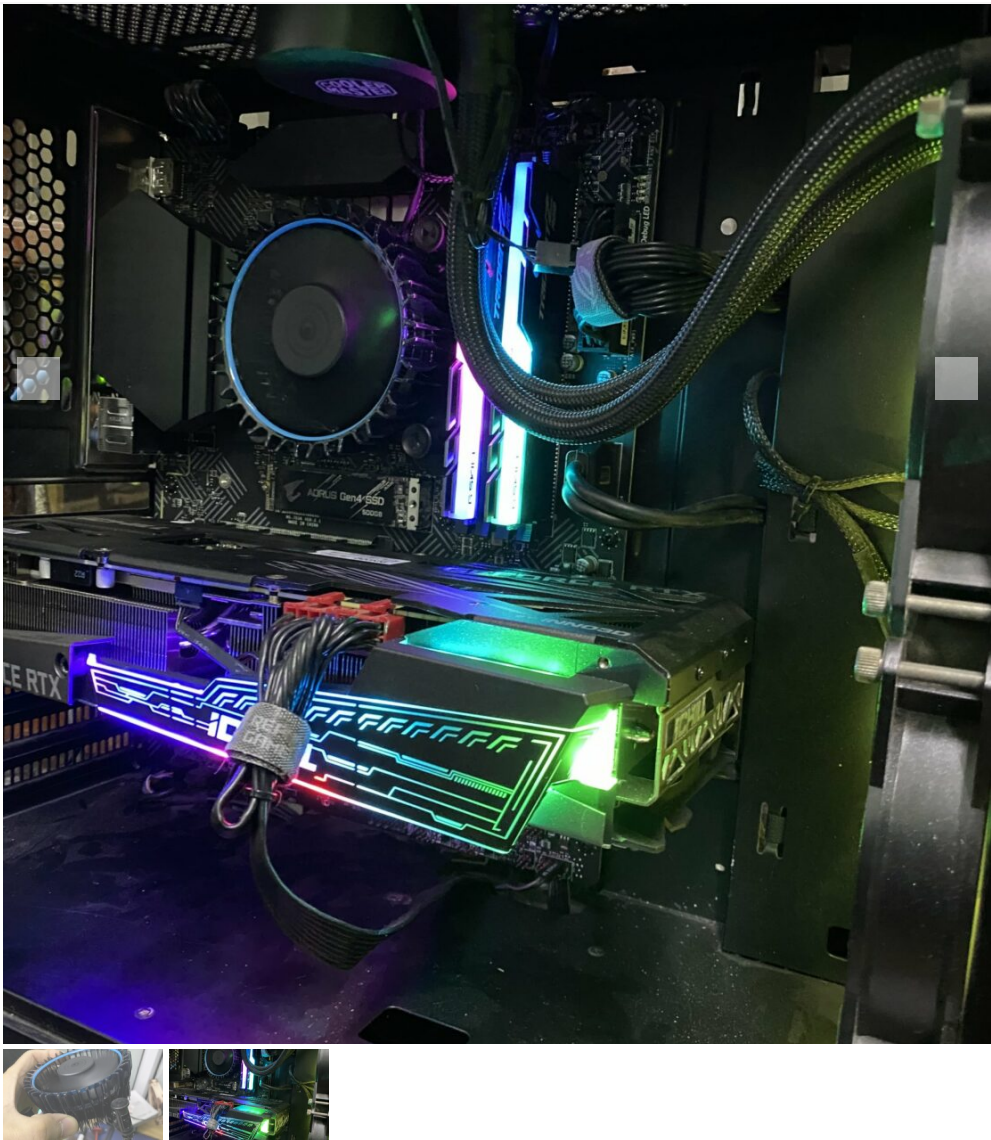
The chips look like a fantastic upgrade from an older 14nm platform and even those who might be running an older Zen platform and want to upgrade to something new. Intel's Non-K lineup has the potential to shake things up in the entry-level and mainstream segment just like the K-series chips did in the high-end segment. The Intel Alder Lake Core i5 and Core i3 CPUs will come with the new Intel boxed cooler which features a fancy new design and is fully compliant with the LGA 1700 socket. Aside from that, Intel will also debut its H670, B660, and H610 motherboards at CES 2022 which will bring the price of the Alder Lake further down & will carry both DDR5/DDR4 memory support.

Intel 12th Gen Alder Lake Desktop CPU Specs "Preliminary"

CPU Name	P-Core Count	E-Core Count	Total Core / Thread	P-Core Base / Boost (Max)	P-Core Boost (All-Core)	E-Core Base / Boost	E-Core Boost (All-Core)	L3 Cache	TDP (PL1)	TDP (PL2)	Expected (MSRP) Price
Core i9-12900KS	8	8	16 / 24	3.2 / 5.2 GHz	5.2 GHz	2.4 / 3.9 GHz	3.7 GHz	30 MB	125W	TBC	TBC
Core i9-12900K	8	8	16 / 24	3.2 / 5.2 GHz	5.0 GHz	2.4 / 3.9 GHz	3.7 GHz	30 MB	125W	241W	$599 US

				(Max)	Core)		Core)				
Core i9-12900	8	8	16 / 24	2.4 / 5.1 GHz	TBA	1.8 / TBA GHz	TBA	30 MB	65W	~200W	$520 US $500 US (F)
Core i9-12900T	8	8	16 / 24	TBA / 4.9 GHz	TBA	TBA	TBA	30 MB	35W	TBA	TBA
Core i7-12700K	8	4	12 / 20	3.6 / 5.0 GHz	4.7 GHz	2.7 / 3.8 GHz	3.6 GHz	25 MB	125W	190W	$419 US
Core i7-12700	8	4	12 / 20	2.1 / 4.9 GHz	TBA	1.6 / TBA GHz	TBA	25 MB	65W	~190W	$360 US $330 US (F)
Core i7-12700T	8	4	12 / 20	TBA / 4.7 GHz	TBA	TBA	TBA	25 MB	35W	TBA	TBA
Core i5-12600K	6	4	10 / 16	3.7 / 4.9 GHz	4.5 GHz	2.8 / 3.6 GHz	3.4 GHz	20 MB	125W	150W	$299 US
Core i5-12600	6	0	6 / 12	3.3 / 4.8 GHz	4.4 GHz	N/A	N/A	18 MB	65W	~200W	$240 US
Core i5-12500	6	0	6 / 12	3.0/ 4.6 GHz	TBA	N/A	N/A	18 MB	35W	TBA	$220 US
Core i5-12500T	6	0	6 / 12	TBA / 4.4 GHz	TBA	N/A	N/A	18 MB	35W	TBA	TBA
Core i5-12400	6	0	6 / 12	2.5 / 4.4 GHz	4.0 GHz	N/A	N/A	18 MB	65W	~150W	$210 US $180 US (F)
Core i5-12400T	6	0	6 / 12	TBA / 4.2 GHz	TBA	N/A	N/A	18 MB	35W	TBA	TBA
Core i3-12300	4	0	4 / 8	2.5 / 4.4 GHz	TBA	N/A	N/A	12 MB	60W 58W (F)	~100W	TBA
Core i3-12200T	4	0	4 / 8	TBA / 4.2 GHz	TBA	N/A	N/A	12 MB	35W	TBA	TBA
Core i3-12100	4	0	4 / 8	3.3 / 4.3 GHz	TBA	N/A	N/A	12 MB	60W 58W (F)	~100W	$140 US $110 US (F)
Core i3-12100T	4	0	4 / 8	TBA / 4.1 GHz	TBA	N/A	N/A	12 MB	35W	TBA	TBA
Intel Pentium G7400	2	0	2 / 4	3.7 GHz	N/A	N/A	N/A	6 MB	46W	TBA	$80 US
Intel Celeron G6900	2	0	2 / 4	3.4 GHz	N/A	N/A	N/A	4 MB	46W	TBA	$60 US

News Sources: Chiphell #1 , Chiphell #2

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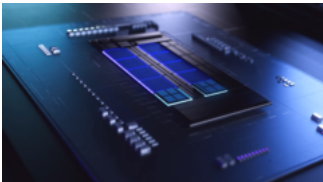Hassan Mujtaba • Dec 21   ⬆ 10

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