Hands-on with Intel’s i7-1185G7 Tiger Lake prototype laptop



Enlarge / This MSI-built reference system is powered with a Tiger Lake i7-1185G7, the highest-end CPU in Intel’s upcoming lineup.
Jim Salter

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We’ve been very interested in Intel’s upcoming laptop CPUs, codenamed Tiger Lake, since the company’s Architecture Day event in August. Tiger Lake’s official launch event earlier this month didn’t offer much red meat for anyone already up-to-date on the news—but today, we finally have our own hands-

on test results to share.

Much as Intel did during Tiger Lake's launch event, we're going to focus heavily on Intel versus AMD in our own tests and analysis. In our opinion, the current generation-on-generation within Intel's own lineup is fairly boring (yes, it's faster than its old parts). Instead, the real question is whether Intel finally has an answer to AMD's Renoir architecture—and the answer isn't as simple as "yes" or "no."

Our reference system has the top-of-the-line Core i7-1185G7 CPU, tuned for a 28W default TDP—although that, too, gets complicated. For now, we'll just note that it's the fastest Tiger Lake CPU to be announced. However, assuming one i7-1185G7 system is much like the next would be a mistake.

Our Tiger Lake reference system

- Did we mention this is a reference system, not an actual retail-ready laptop? There are no ports at all on the right side.
  Jim Salter
- The only ports of any kind to be found on the MSI-built reference system are two USB-C ports, towards the back of the left side.
  Jim Salter
- The reference system may not be as power-efficient as fully tuned retail systems, so we don't do any battery life testing. It draws around 8W at desktop idle.
  Jim Salter
- The reference system draws 66W-68W at peak consumption, during the first several seconds of a Cinebench R20 all-threads run.
  Jim Salter

Before we dive into the performance analysis, let's get to know the prototype laptop supplied to us by Intel. The system

was built by MSI and, in many ways, it likely resembles what will become MSI's new Prestige 14 Evo retail system. That said, please *don't* draw any definite conclusions about a final retail system—particularly the Prestige 14 Evo—from what you see here.

Intel warned us that this was a reference system, not retail-ready, and likely not tuned the way retail versions will be. The platform also almost certainly doesn't have the retail port layout: this system has two USB-C ports, both on the left hand side, and absolutely *nothing* else.

The system also exhibited noticeable capacitor whine. If you have a good ear for electronics, you can actually hear the device "thinking" from the change in the faint, high-pitched noise as the CPU shifts in and out of turbo frequencies, which it does rapidly.

We also did not test and will not talk about the system's battery life in this review. Again, this isn't really a *laptop* to be reviewed—it's just a platform that enables us to put the i7-1185G7 to the test. We did, however, check the system power consumption at the wall using a Kill-A-Watt meter. Desktop idle varies from 7.5W-8.2W, and peak consumption (as measured during the first several seconds of a Cinebench R20 run) is about 66W-68W.

Performance

At first blush, you'd think the quad-core, octa-thread Core i7-1185G7 in this reference system is a mostly even match for the octa-core, octa-thread Ryzen 7 4700U in our Acer Swift SF314-42. As tested the way the system ships, it generally runs a little slower on multithreaded CPU tests, and it's noticeably faster on single-threaded CPU tests.

Core i7-1185G7	**Ryzen 7 4700U**	

Cores/Threads	4C/8T	8C/8T
configurable TDP	12W-28W	10W-25W
TDP as tested	28W	15W
Base clock	1.2GHz	2.0GHz
Boost/Turbo clock	up to 4.8GHz	up to 4.1GHz

This already isn't really a match to brag about—the Swift 3 wrapped around our Ryzen 7 4700U is a budget laptop that doesn't have the best thermals, and the 4700U itself is roughly in the middle of AMD's Renoir lineup. The 4700U is only second from the top in AMD's U series, and there's an entire H series for high-powered systems above that.

Of course, Intel has been getting sand kicked in its face for a while now, and seeing *something* like performance parity is refreshing, even if we have to compare the company's top-of-the-line CPU in a high-powered reference system versus a middling-high AMD CPU in a budget laptop. The comparison still has problems we need to iron out, though.

CPU power consumption / thermal budget

- At desktop idle, the i7-1185G7 draws a modest 1.2W or so. The 12.5W peak you see here is the power draw while Cinebench R20 opened, but before an actual benchmark began.
  Jim Salter
- While Cinebench R20 is running, power spikes to 56W—seen in the maximum column—but begins tailing off toward the 28W TDP within a few seconds. The 38.9W measurement you see here is during this tail-off phase.
  Jim Salter
- For the majority of Cinebench R20's multi-threaded render session, the 1185G7 sits at just under 28W, which is the reference system's configured TDP.
  Jim Salter

Tiger Lake, unlike previous generations of Intel mobile CPUs, only has a few SKUs. This looks like a blessing for consumers, but it's likely more of a curse. Laptop OEMs have an incredibly wide configurable range for each SKU's TDP (Thermal Design Power).

This means that one i7-1185G7 system is likely to perform very little like another—so now your less-technical colleagues not only won't pay attention to the difference between one i7 and another, they won't notice whether the *exact same* i7 SKU is configured for TDP of 12W, 28W, or anywhere in between.

Any i7-1185G7 system can *briefly* reach maximum turbo frequency and hit a power-consumption max of upwards of 50W, but the system doesn't stay there for more than a few seconds, before dropping clock enough to fall back to its configured TDP.

The length of time which the system is allowed to stay at the highest PL2 consumption is called "tau." Tau, along with the TDP itself, is configurable by the OEM. We seriously doubt tau will be disclosed on the box or in the advertising copy for many systems—and it can potentially have an even bigger impact than the TDP. A laptop allowed to run at PL2 (and draw 50+W) for minutes at a time will perform considerably higher (and exhibit a hellaciously higher power draw) than a competing system with the same TDP but a tau of only a few seconds.

At its out-of-box defaults, Intel's reference system—set on the middle of three notches in Windows 10's "performance" slider, found when clicking on the battery icon in the toolbar—is configured for a 28W TDP. Sliding the performance slider to the left sets TDP to 15W. The tau on the reference system isn't specified, but it appears to be roughly 25-30 seconds regardless of TDP, judging from our observations and Anandtech's.

If you slide the performance widget all the way to the right, the TDP remains 28W. But tau, on the other hand, becomes

governed by Adaptix, an algorithm that extends turbo time by dynamically regulating clock frequencies down when the CPU itself isn't the bottleneck. In general, users who enable Adaptix can expect a modest multithreaded performance gain with a somewhat larger corresponding power draw.

We did not directly test Adaptix, due to very limited time available with the reference system.

Multithreaded performance

- At 28W, the i7-1185G7 *almost* hangs with the Ryzen 7 4700U in our Swift SF314-42. But the 4700U isn't AMD's highest end U-series—and it's only running at 15W.
  Jim Salter
- Passmark tells much the same story as Cinebench—an 1185G7 running at 28W hangs even with a 4700U at 15W. When the 1185G7 is restricted to 15W, not so much.
  Jim Salter
- Geekbench 5 favors the 1185G7 heavily—and in sharp contrast to both Cinebench and Passmark.
  Jim Salter

In its default configuration, with a 28W TDP and roughly 25-second tau, the i7-1185G7 reference system runs pretty much neck-and-neck with a Ryzen 7 4700U-equipped Swift 3. We see the same basic relationship among all systems on both Cinebench R20 and Passmark. Geekbench 5 flattens the differences between all the processors in general, but it puts the 1185G7 at the head of the pack.

However, we suspect many retail 1185G7 systems won't be configured for a 28W TDP—they'll likely be configured at 15W TDP, just as both the Ryzen 7 4700U in the Swift 3 and the Ice Lake i7-1065G7 in the Dell XPS 13 are. When we drop the reference-system TDP limit to 15W by moving the slider hard left, we see a significant drop in performance. It actually falls slightly *below* the Dell's Ice Lake 1065G7 on Cinebench

R20, let alone the Acer’s Ryzen 7 4700U.

Since the i7-1185G7 is the highest-performance SKU announced for Tiger Lake, we felt that comparing it to the Ryzen 9 4900HS in our Asus ROG 14 gaming laptop would only be fair. The 4900HS in the ROG 14 is running at 35W TDP, and it utterly dominates the Tiger Lake i7 in both Cinebench R20 and Passmark testing. https://arstechnica.com/?p=1707377