Double Play

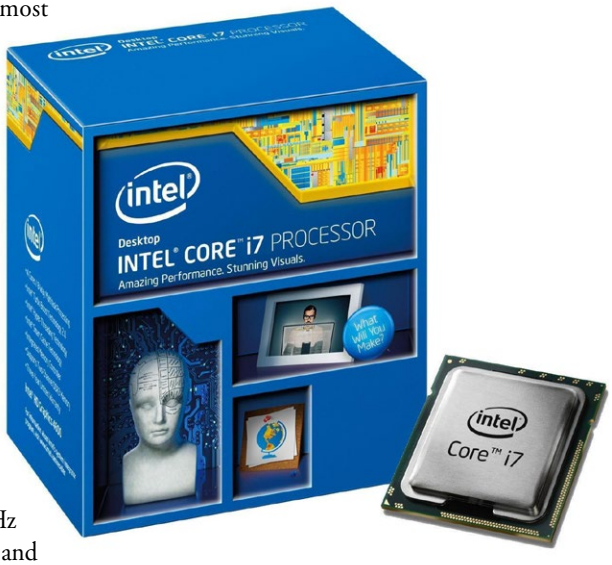
Intel's Haswell-E & Skylake Lineups Offer Power For All

Who is a power user? Sure, it's really easy to point to a $10,000 gaming PC—complete with a flagship processor, four graphics cards, PCIe SSDs, and all the requisite trimmings—and say, "that guy," but there's a better answer. We think that being a power user is more a state of mind than a state of hardware. True power users are those who make the most of the hardware available to them.

With a fleet of terrific, cutting-edge CPUs, Intel wants to make power users out of everyone, regardless of budget. Thanks to a pair of processor families, enthusiasts with a passion for pushing their CPUs have plenty of options.

Hail To The King

The undisputed champ of desktop performance continues its reign. The leader of the Haswell-E Dynasty, Intel's Core i7-5960X is as good as it gets. Armed with eight physical cores and Hyper-Threading, the 5960X bulls through demanding workloads 16 instructions at a time. Its 20MB of Intel Smart Cache is the most you'll find among any of Intel's desktop chips. The 5960X's 3GHz stock clock speed is expected for a processor that boasts so many discrete cores, and it's capable of dialing in a 3.5GHz Turbo frequency for lightly threaded loads.



A pair of ruthless six-core processors join the 5960X in formation. The Core i7-5930K and i7-5820K are clocked at 3.5GHz and 3.3GHz, respectively, and as you'll soon find out, there's potential for much higher clocks. Both of these chips are equipped with 15MB of Intel Smart Cache. Like the 5960X, the 5930K and 5820K can use Hyper-Threading to double the number of threads their cores can handle.

Each Haswell-E processor is plenty ferocious out of the box, but industrious power users can roll up their sleeves and unleash the full fury of the silicon. The chips are unlocked to make overclocking easier: Set a higher multiplier and get a higher clock. Of course, veteran enthusiasts know that overclocking still requires a fair amount of skill, but when you pair a Haswell-E CPU with a capable motherboard and cooler, you have the perfect recipe for maximizing these processors' performance. Thanks to Intel's Extreme Tuning utility, overclocking the 5960X, 5930K, or 5820K doesn't have to be a tedious, excruciating affair. Beginners can use the software to quickly and easily access extra processing horsepower, while experienced overclockers may be surprised at the number of dials and knobs at their disposal when using XTU.

Haswell-E also gives you access to a host of goodies, thanks to Intel's X99 chipset. DDR4 has gone mainstream, true, but the X99 platform truly lets your DDR4 modules shine. Thanks to the Haswell-E processors' integrated quad-channel memory controller, X99 motherboards provide tremendous memory bandwidth, especially after you factor in support for XMP profiles and high-end DDR4 modules that can exceed 4,000MTps (mega-transfers per second).

Gamers also stand to benefit from an abundance of PCIe lanes available to Haswell-E processors. The 5960X and 5930K both have 40 lanes at their disposal, putting a 4-way SLI or CrossFire setup within easy reach. The 5820K is limited to 28 lanes, but that's more than enough for a powerful multi-GPU setup.

Soar With Skylake

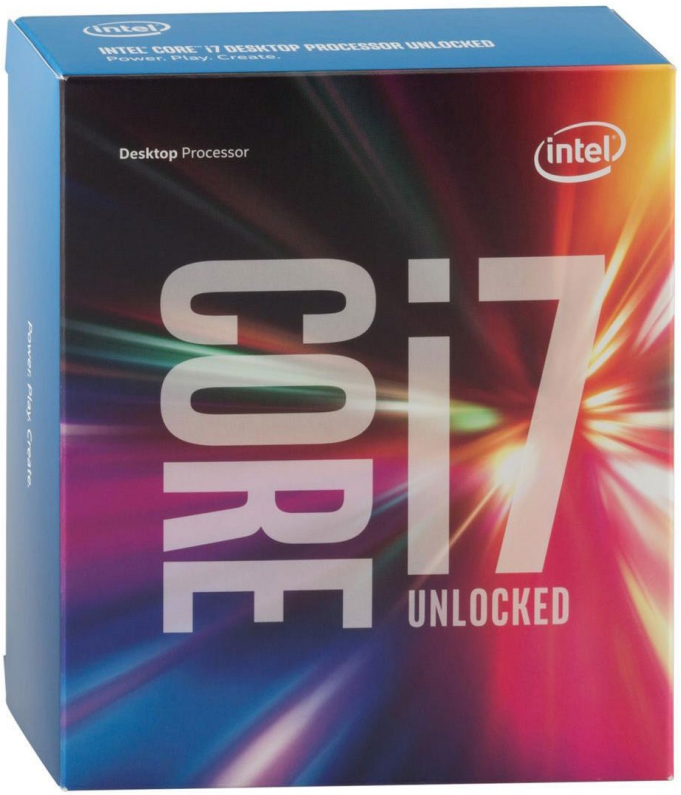
In case you haven't been paying attention, Intel recently updated its lineup of quad-core processors, too. Built on a 14nm process and formerly code-named "Skylake," Intel's 6th Generation Core processors are proof that you don't need to refinance your house or put up a kidney for sale on Craigslist to purchase the services of an incredible CPU.

The Core i7-6700K leads the 6th Generation Core family into battle. It's a quad-core processor, but like its Haswell-E cousins, Hyper-Threading lets the chip tackle twice as many simultaneous instructions per core. The 6700K starts with a stock clock of 4GHz, and Intel's Turbo Boost 2.0 can bump that up to 4.2GHz. It includes 8MB of Intel Smart Cache.

Rounding out our gallery of power-user processors is the Core i5-6600K, which has four physical cores, 6MB of Intel Smart Cache, and a 3.5GHz base frequency. With certain workloads, Turbo Boost can jack the 6600K's clocks to 3.9GHz, but the fun really begins when you take advantage of its unlocked multiplier.

Yes, the 6700K's and 6600K's unlocked multipliers are a big part of what make them true power-user processors. Intel has built these chips precisely for enthusiasts who prefer to tinker their way to faster speeds and better performance. K Series Skylake processors let you run the core ratio all the way up to 83X, increasing the resulting clock speed 100MHz at a time.

Going further, these CPUs are bristling with other options for overlockers. There are Turbo overrides for voltage and power, and you can also punch up the BCLK, increasing it in 1MHz increments. With the right supporting hardware, you may be able to push your BCLK to 200MHz or higher. In addition to these changes, the 6700K and 6600K have unlocked voltage controls, which should provide increased stability that ultimately leads to even higher frequencies.



For the first time ever, Skylake CPUs and their accompanying Z170 chipset bring DDR4 support to the masses. Previously, you had to have a HEDT (high-end desktop) processor to take advantage of the high-speed, low-voltage memory, but now mainstream builders can make the move to DDR4, too. Consistent with previous generations of Intel quad-core processors, the 6700K and 6600K have a dual-channel on-die memory controller. Both processors support up to 64GB of DDR4.

Would it surprise you to learn that Intel has also made improvements to that on-die memory controller? Previously, users could only overclock their memory modules by 200/266MHz. Skylake and the Z170 chipset halve that to 100/133MHz, giving much more control to those who like to manually overclock their memory. Naturally, Skylake still gives you XMP support for set-and-forget memory overclocking.

The Future, Sponsored By Z170

Maybe you're just not that into overclocking. It's OK, your secret's safe with us. You should know, though, that Skylake processors and the Z170 chipset have tons of cutting-edge features that don't have anything to do with overclocking. The new DMI 3.0 (Direct Media Interface) connection between the CPU and PCH has four lanes, and each lane delivers bandwidth up to 8GTps. The Z170's beefed-up Flex-IO hub gives motherboard manufacturers the ability to outfit their boards with even more PCIe lanes, USB 3.0 ports, or 6Gbps SATA connectors (now 26 total, almost 50% more than the Z97 chipset's 18). PCIe devices will have access to greater bandwidth through the Z170 chipset, giving next-gen storage drives all the "tubes" they need for breakneck speed. Add Intel exclusives such as Intel Ready Mode Technology, Intel Smart Sound Technology, and Intel Device Protection Technology with Boot Guard, and you have the foundation for a mighty machine that will last a long time. ■