



Lenovo ThinkPad T400 Review

by Kevin O'Brien

The new 14-inch ThinkPad T400 is the latest Lenovo notebook based off of the Intel Montevina platform. This computer offers all new features such as hybrid graphics, LED backlit displays, and power-saving refinements that let the notebook get extraordinary battery life. With all these changes taking place, Lenovo has also managed to keep the notebook looking as classic (boring) as ever, just how ThinkPad lovers like it.

Our ThinkPad T400 specifications:

Screen: 1440 x 900 WXGA+ LED Backlit (Matte finish)
Processor: Intel Core 2 Duo T9600 (2.83GHz, 1066MHz FSB, 6MB Cache)
Memory: 2GB DDR3 RAM
Storage: 160GB HDD (7200rpm)
Optical Drive: DVD+/-RW
Wireless: 802.11a/b/g/n, Bluetooth 2.0
Graphics: ATI Mobility Radeon 3470 w/ 256MB (hybrid switching)
Built-in web camera
Battery: 84Wh 9-cell and 56Wh 6-cell
Dimensions: 13.2" x 9.4" x 1.47/1.12"
Weight: 5.lbs 4.8oz with 6-cell, 5lbs 10.8oz with 9-cell
Retail Price: \$2,189



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Build and Design

The design of the T400 has changed a bit. The changes are subtle to the untrained eye, but they are there. The right side is now gently sloped similar to what can be found on the older T4x series, where the sides angle inward instead of dropping off flat. First clue about this is the optical drive bezel which sports a nice beveled edge. The rubber feet have also been slightly tweaked, now

feeling softer, and you get an additional springy nub. Getting past the minor case design changes, the ThinkPad is every bit as boring as all of those preceding it. We have the same paint, same rubbery texture, and we still have our ThinkPad logo.



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Upgrade and expansion is a step harder than most notebooks, but still very simple. To gain access to all user-replaceable parts, you simply remove five screws and carefully remove the palmrest and keyboard. Here you gain access to an open WWAN slot, another for Turbo Memory or UWB, two DDR3 memory slots, and your wireless card. At this stage you can also see the processor and heatsink, but a few additional items must be removed before you can lift those items out. Although this setup does seem like Lenovo is trying lock the user away from upgrading parts, they fully allow anyone to handle upgrading or adding components to their notebook without voiding the warranty. Processor swaps or messing with other advanced components might not be as kosher though. The hard drive is the only item accessible from the outside of the case (besides the battery) and is easily removed with a single screw.



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Build quality is very similar to the previous generation T61, with all of its strengths and weaknesses. Fit and finish are great with most parts, but you still have a good amount of battery wiggle in the back, as well as the cheaper feeling plastic LCD lid. The molded plastic panels throughout the notebook feel sturdy, with only mild flex near the card slots. On our particular configuration with the SD card reader taking the place of the PC-Card slot and we get a cheap plastic blank instead of a spring loaded flap. Without the plastic blank in place the palmrest does want to bend down at that location under stress. Another odd trait I noticed was additional flex on the right side of the keyboard, where my T60 is solid as a rock, but the T400 wants to give in just a bit. It is still very strong compared to other notebooks, but not as rock solid as the older model.

What still works and what doesn't

Those who have older ThinkPad accessories from the T6x/R6x generation will be happy to know all of the older docking stations are still fully compatible with the new notebooks. I can't say for certain that the older equipment won't be replaced with newer revisions that offer different connections, but at least you won't need to upgrade.

The optical bay connections have changed from the previous generation, moving more towards a SATA style connector, rendering older drive incompatible. The power connection for use with the UltraBay battery remained the same though.

Display

The display on our review model is a 6-bit LG LED backlit panel. Lenovo's official spec sheet lists this screen as 300:1 contrast, but the LG specification is 500:1. Overall the panel is easy on the eyes with even light distribution and a wide adjustment range for the LED backlighting. The highest backlight setting is very bright, easy outshining my IPS FlexView panel by a wide margin. Colors are vibrant, although the whites do lean heavily on the cooler/blue side. Vertical angles are better than average, with a modest sweet spot before colors start to invert and wash out. Horizontal viewing range is better, with colors washing out slightly, but still staying accurate.



T60 screen (left) and T400 screen (right)
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For those curious about sunlight readability, I ventured outside on a very bright and sunny day to snap some pictures of the T400 at max brightness. The picture makes the screen out to be just a tad dimmer than it looks in person, but it is perfectly serviceable outside. The only thing that would really prevent you from seeing the screen is reflections blinding you from just being outside on a sunny day. You should also note that max brightness chops about one hour of battery life away from the 9-cell model where it would otherwise be pushing close to 10 hours at 60% brightness.



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Comparing this screen to the older WXGA+ screen is no contest, with the newer LED backlit model being better in many ways. Whites look cleaner, colors look better, backlight is more even, and best of all is bright enough to view in sunshine. It is well worth the extra money, and you would be foolish not to get it if you are configuring the notebook yourself. Below are comparison images showing the T60 screen (left) and the T400 screen (right).



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Keyboard and Touchpad

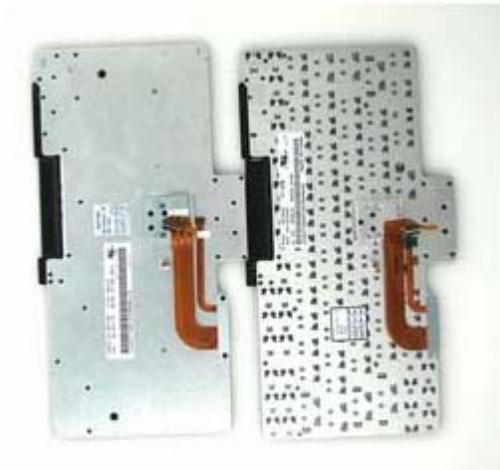
The keyboard layout has stayed the same, with only very minor changes in the feel of the key presses. Some of this may be attributed to the differences in keyboard suppliers (NMB, ALPS, and Chicony) though, as my T60 came with the "clickier" Chicony keyboard, whereas the T400 is much quieter. The keyboard strength seems to have changed, with more flex present on the right side of the keyboard. To find the culprit of this flex, I took apart the notebook and inspected the keyboard area.



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To my great surprise, I found Lenovo had completely redesigned the keyboard, with weight savings as the primary goal. The old design has a much stronger back-plate, which is removed on the new revision. This cuts weight by 25 percent (6oz to 4.5oz) from the old model, but at the huge disadvantage of tarnishing the long-standing ThinkPad keyboard reputation. For now I am leaning towards weight savings, instead of cost savings as the main redesign reason, but I still don't like it. Anyone who knows the ThinkPad name knows at least two things; boring business notebook and great keyboard. If you take away the keyboard and make other weight reducing or durability reducing changes to the notebook design, you will no doubt alienate many of your followers. I

really hope Lenovo takes notice at this, cause I would take a brick glued to the bottom of the case before over a keyboard change such as this.



T60 keyboard (left) versus T400 keyboard (right)
([view large image](#))

As with older models, the liquid drains are still in place, ready to get your notebook out of harm's way if a stray coffee or soda spills all over it.

The touchpad has grown compared to the T61, expanding to the width of the lower touchpad buttons. With the ThinkPad touchpads always being the runts compared to other notebook designs, this change was very welcomed (even if they did paint scroll arrows on it). The texture is identical to the older touchpad, and sensitivity is just as good. Compared to my T60, the touchpad buttons feel much firmer, and have more support from edge to edge. On the T60's touchpad, the far left and right side tend to sag slightly, while the T400's touchpad buttons have equal support from side to side.



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My only disappointment with the touchpad was the lack of red strips. After seeing the X300 and X200 that offered "legacy" red strips on the touchpoint buttons, I was upset to see that Lenovo didn't include that finishing touch on the T-series keyboard.

Performance

Our Lenovo ThinkPad T400 came with the Intel T9600 processor, clocking in at 2.8GHz, and jammed packed with 6MB of cache. For graphics, Lenovo included an ATI Radeon 3470 video card with 256MB of GDDR3 memory. A speedy 160 GB 7200 RPM hard drive was also included, which helped applications load without much lag. This notebook was outstanding for day to day use, and

had enough power to handle most games around the office to kill some time. Half-Life 2 in native resolution (1440x900) kept above 30FPS even in heavy action scenes. Portal was another favorite that worked very well at native resolution, keeping framerates above 40FPS throughout most of the game.

For users who don't wish to have as much 3D acceleration (or power consumption) during day to day work, you can switch between the Intel X4500 integrated graphics and ATI 3470 dedicated graphics. This switch can be made on-the-fly without a reboot. Not using the dedicated graphics resulted two hours of additional battery life.

wPrime is a program that forces the processor to do recursive mathematical calculations, the advantage of this program is that it is multi-threaded and can use both processor cores at once, thereby giving more accurate benchmarking measurements than Super Pi.

Notebook / CPU	wPrime 32M time
Lenovo T400 (Intel Core 2 Duo T9600 @ 2.8GHz)	27.410s
Lenovo T500 (Intel Core 2 Duo T9600 @ 2.8GHz)	27.471s
Lenovo T61 (Intel Core 2 Duo T7300 @ 2.0GHz)	42.025s
Dell Vostro 1500 (Intel Core 2 Duo T5470 @ 1.6GHz)	53.827s
HP Pavilion dv6500z (AMD Turion 64 X2 TL-60 @ 2.0GHz)	40.759s
Systemax Assault Ruggedized (Core 2 Duo T7200 @2.0GHz)	41.982s
Toshiba Tecra M9 (Core 2 Duo T7500 @2.2GHz)	37.299s
HP Compaq 6910p (Core 2 Duo T7300 @ 2GHz)	40.965s
Sony VAIO TZ (Core 2 Duo U7600 @ 1.20GHz)	76.240s
Zepto 6024W (Core 2 Duo T7300 @ 2GHz)	42.385s
Lenovo T61 (Core 2 Duo T7500 @ 2.2GHz)	37.705s
Alienware M5750 (Core 2 Duo T7600 @ 2.33GHz)	38.327s
Hewlett Packard DV6000z (Turion X2 TL-60 @ 2.0GHz)	38.720s

PCMark05 comparison results:

Notebook	PCMark05 Score
Lenovo T400 (2.80GHz Intel T9600, ATI Radeon 3470 256MB GDDR3)	6,589 PCMarks
Lenovo T400 (2.80GHz Intel T9600, Intel X4500)	N/A
Lenovo T500 (2.80GHz Intel T9600, ATI Radeon 3650 256MB)	7,050 PCMarks

GDDR3)	
Lenovo T500 (2.80GHz Intel T9600, Intel X4500)	5,689 PCMarks
Lenovo T61 Standard Screen (2.0GHz Intel T7300, NVIDIA NVS 140M 256MB)	4,839 PCMarks
Dell Vostro 1500 (1.6GHz Intel Core 2 Duo T5470, NVIDIA GeForce Go 8400M GS)	3,585 PCMarks
Dell Inspiron 1420 (2.2GHz Intel Core 2 Duo T7500, NVIDIA GeForce Go 8400M GS)	4,925 PCMarks
Sony VAIO FZ (2.0GHz Intel Core 2 Duo T7300, Intel X3100)	3,377 PCMarks
Dell XPS M1330 (2.0GHz Intel Core 2 Duo T7300, NVIDIA GeForce Go 8400M GS)	4,591 PCMarks
Lenovo ThinkPad X61 (2.0GHz Intel Core 2 Duo T7300, Intel X3100)	4,153 PCMarks
Lenovo 3000 V200 (2.0GHz Intel Core 2 Duo T7300, Intel X3100)	3,987 PCMarks
Lenovo T60 Widescreen (2.0GHz Intel T7200, ATI X1400 128MB)	4,189 PCMarks
HP dv6000t (2.16GHz Intel T7400, NVIDIA GeForce Go 7400)	4,234 PCMarks
Sony VAIO SZ -110B in Speed Mode (Using Nvidia GeForce Go 7400)	3,637 PCMarks

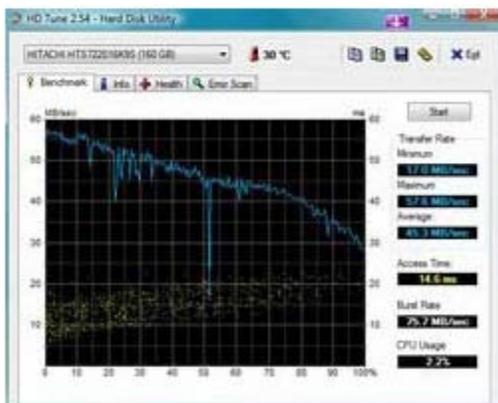
3DMark06 comparison results:

Notebook	3DMark06 Score
Lenovo T400 (2.80GHz Intel T9600, ATI Radeon 3470 256MB GDDR3)	2,575 3DMarks
Lenovo T400 (2.80GHz Intel T9600, Intel X4500)	809 3DMarks
Lenovo T500 (2.80GHz Intel T9600, ATI Radeon 3650 256MB GDDR3)	4,371 3DMarks
Lenovo T500 (2.80GHz Intel T9600, Intel X4500)	809 3DMarks
Lenovo T61 Standard Screen (2.0GHz Intel T7300, NVIDIA NVS 140M 256MB)	1,441 3DMarks
Dell Vostro 1500 (1.6GHz Intel Core 2 Duo T5470, NVIDIA	1,269 3DMarks

GeForce Go 8400M GS)	
Dell Inspiron 1420 (2.2GHz Intel Core 2 Duo T7500, NVIDIA GeForce Go 8400M GS 128MB)	1,329 3DMarks
Sony VAIO FZ (2.0GHz Intel Core 2 Duo T7300, Intel X3100)	532 3DMarks
Dell XPS M1330 (2.0GHz Intel Core 2 Duo T7300, NVIDIA GeForce Go 8400M GS 128MB)	1,408 3DMarks
Samsung Q70 (2.0GHz Core 2 Duo T7300 and nVidia 8400M G GPU)	1,069 3DMarks
Asus F3sv-A1 (Core 2 Duo T7300 2.0GHz, Nvidia 8600M GS 256MB)	2,344 3DMarks
Alienware Area 51 m5550 (2.33GHz Core 2 Duo, nVidia GeForce Go 7600 256MB)	2,183 3DMarks
Fujitsu Siemens Amilo Xi 1526 (1.66 Core Duo, nVidia 7600Go 256 MB)	2,144 3DMarks
Samsung X60plus (2.0GHz Core 2 Duo T7200, ATI X1700 256MB)	1,831 3DMarks
Asus A6J (1.83GHz Core Duo, ATI X1600 128MB)	1,819 3DMarks
HP dv6000t (2.16 GHz Intel T7400, NVIDIA GeForce Go 7400)	827 3DMarks
Sony VAIO SZ -110B in Speed Mode (Using Nvidia GeForce Go 7400)	794 3DMarks

As an added bonus, we also tested the T400 with the new PCMark Vantage benchmark, and the T400 with ATI Radeon 3470 enabled returned a score of 4,374.

HDTune storage drive performance test:



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Speakers and Audio

Audio performance is one category the Lenovo T400 did not excel in, which is pretty common for business oriented notebooks. Bass and midrange were lacking and they weren't even able to get to loud volume levels. For watching the occasional video or listening to a webcast they would be fine, but headphones come highly recommended.

Battery Life

I don't think I have ever used the word "insane" to describe battery life before and there is no doubt that the 14" T400 falls into that category. To get 10 hours of battery life from a notebook this size, most people think you would need a huge battery attached to the bottom of the case, another battery taking the place of the optical drive, and a big battery sticking out the back. With the T400 you can reach 9 hours and 41 minutes with the wireless enabled, screen backlight at 60%, and the laptop in integrated graphics mode using only the 84Wh 9-cell battery. In this situation the notebook is only consuming roughly 8.5 watts of power. In dedicated graphics mode under the same settings battery life falls by exactly 2 hours down to 7 hours and 41 minutes, and power draw increases to 10.5 watts. The 6-cell battery managed 6 hours and 4 hours and 28 minutes respectively.



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I don't really know how long your average work or school day is, but 10 hours of juice is more than enough to get me through my day.

For those thinking about gaming with the T400 on battery power, you should have no problem with the 9-cell battery. Playing Portal with all GPU and CPU at peak performance levels the notebook estimate 3 hours of battery life remaining. While it is a big drop from nearly 10 hours under normal circumstances, you have more than enough time to play around through a few classes or meetings if needed.



6-cell battery [\(view large image\)](#)



9-cell battery [\(view large image\)](#)

Frequent travelers will enjoy the T400 as a movie playing notebook on flights or just trying to pass time wherever. When watching XVID encoded movies off the hard drive the 9-cell had an estimated 6 hours and 45 minutes of battery life, drawing 13 watts of power. Plenty of time to cover two full length movies. For those who must still use optical media for movies, you lose more than an hour of battery life with the optical drive needing to spin throughout the video.

Ports and Features

Port selection rates average on the T400, with 3 USB ports and no digital video output. You do have VGA, but it is not the best option if you want to hook the notebook up to an HDTV. As mentioned about in the Build and Design section, the T400 with the SD-Card reader option nixes one the PC-Card slot. For those thinking about using legacy external cards, you may want to reconsider that option.

One feature that has been on ThinkPads almost forever is the ThinkLight, which is a small white LED located above the screen that illuminates the keyboard. On every other model we have reviewed that has this light, it works as intended and gives a little light on the keys. On the T400 the shroud in front of the LED isn't big enough, and the end result is a light blinding you. Your night vision is taken away and in the end it is a useful feature turned worthless by lack of proper design. Not exactly sure how it made it past quality control, but unless you have the screen tilted forward to an extreme degree you end up as blind as a bat.

Front: Firewire, Wireless On/Off, Headphone/Mic



[\(view large image\)](#)

Rear: Kensington lock slot, AC Power



[\(view large image\)](#)

Left: VGA, Modem, LAN, two USB, Expresscard/54, SD-Card Reader



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Right: Optical drive, one USB



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Heat and Noise

The cooling system seemed greatly improved over the prior generations, letting the notebook run whisper quiet and very cool to the touch under most circumstances. I say most, since gaming did seem to make it run on the high side. When not gaming, one thing really working towards the system temperatures advantage was the very lower power consumption. Consuming almost half the power of the previous generation really helped reduce overall temperatures.

Heat under normal conditions (listed in degrees Fahrenheit):

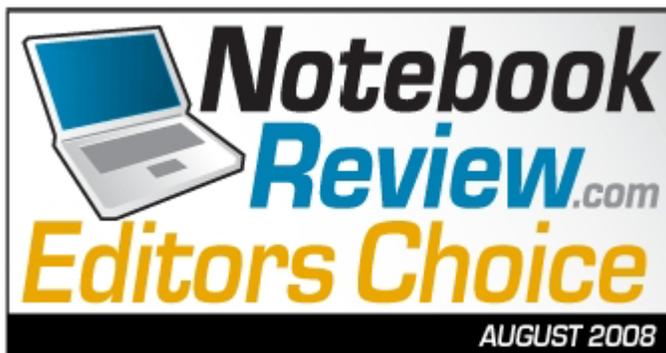


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Conclusion



The Lenovo ThinkPad T400 proved to be an exceptional 14" business notebook, giving almost

unheard-of battery performance under modest running conditions. Nearly 10 hours of runtime with the extended battery easily puts this notebook into the all-day computing category. System performance with the Intel T9400 processor and ATI 3470 graphics was great, handling everything we threw at it, even some video games. The T400 is not without its flaws though, having a decent amount of keyboard flex and a keyboard light that blinds you. Even with its flaws, with a starting price under \$1,000 this notebook easily outperforms any other computer in its category.

Pros

- 10 hours of battery life with the 9-cell battery!
- Very bright LED backlit LCD
- Under normal conditions is very cool and quiet
- Hybrid graphics that let you switch between great 3D performance or great battery life

Cons

- Keyboard flex in a ThinkPad ... the end of an era.
- Keyboard light that blinds you instead of just illuminating the keyboard