

GETAC X500

A FAST, MODERN, FULLY-RUGGED AND HIGHLY VERSATILE NOTEBOOK

By Conrad H. Blickenstorfer, September 2011

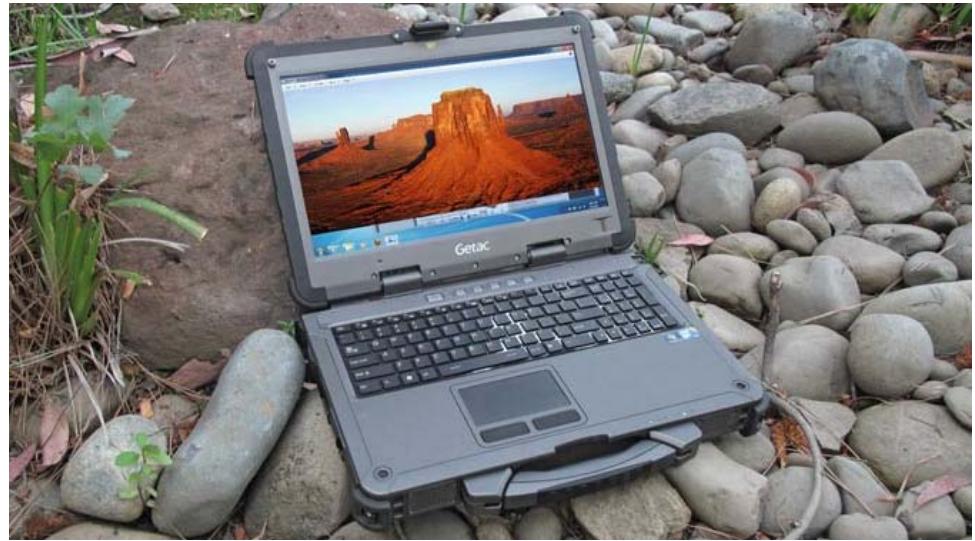
The Getac X500, first introduced in June 2011, combines the best features of three other Getac products into one machine. It is a full-size, full-featured rugged notebook computer that offers up-to-date technology, excellent connectivity, resistive multi-touch, superior performance, and optional PCI/PCIe expansion.

The Getac X500

To understand the importance of the Getac X500, one needs to take a broader look at rugged notebook computers where longevity, reliability, continuity and compatibility generally mandate backward compatibility with peripherals, mounting hardware, and certainly software and applications. However, technology doesn't stand still, and eventually platforms must move forward. With the full-size and completely modern X500, Getac has made that step into the future, breaking with the old 13.3-inch 4:3 aspect ratio formula that has been the rugged notebook standard for well over a decade. With an extremely bright 15.6-inch LCD display with Getac's unique resistive multi-touch and wide-format 1366 x 768 pixel resolution, the X500 has a larger display than any other machine in Getac's lineup (or in rival Panasonic's, for that matter). It also benefits from numerous technology advances, and has an attractive modern design. A fast Intel Core i7 processor provides excellent performance and optional nVidia GT330M discrete graphics are available as well. For those who need it, a PCI expansion unit provides access to conventional full-size expansion cards. Its availability means that special purpose functionality that is simply not available in standard notebooks can easily be integrated into the Getac X500.

Performance and battery life

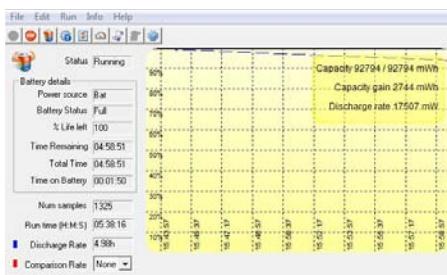
Getac had an easy time deciding what sort of performance to give its top-of-the-line X500. That's a) because big performance is expected from a marquee model, and b) because battery life probably matters a little less in a big 12-pound machine that will likely be used in vehicles and on desks than in smaller and



more portable designs that field personnel carry around. As a result, Getac went with a high-end Intel Core i7 dual core/quad thread processor running at 2.66GHz and able to operate at up to 3.33GHz in turbo mode (Intel's turbo mode allows the chip to overclock itself if certain conditions are met).

We ran Passmark Software's PerformanceTest 6.1 and also CrystalMark to quantify the X500's performance and found that Getac's processor decision paid off. The Getac X500 is the overall fastest rugged mobile computer we have tested to-date. Its benchmark performance was helped by the very high score of its Intel solid state disk. And the Getac X500 also aced the graphics benchmarks, aided by its NVIDIA GeForce GT330M 512MB discrete graphics controller.

A powerful processor and a big, bright display use a lot of power. The competition set the bar high in the older 13.3-inch rugged notebook class, with the Panasonic 31 and the GD-Itronix GD8000 reaching over eight hours of theoretical battery life in our tests. And Getac's own B300 having a theoretical battery life of 8 to 10 hours. The X500 does not quite reach those levels. It is too large and powerful for that. Running our BatteryMon benchmark with the X500 in ECO mode and the Windows Power Options set to Power Saver, we saw a minimum power draw of 16.5 watts, good for a theoretical battery life of about 5.5 hours. However, between the very good power management of the Intel Core i7, Windows 7's power management, and the Getac X500's power settings, the X500 can last a reasonably long time on a charge, and twice that via an optional second battery that goes into the media bay en lieu of the optical drive.



QuadraClear display technology

Most rugged notebooks will be used outdoors and sometimes in bright, direct sunlight where standard transmissive LCD displays wash out. That's why sunlight-readability has become a major selling point in the rugged notebook sector. For now, there are two practical methods of making a notebook screen readable outdoors: (a) crank up the brightness to the point where the light emitted by the screen is sufficiently greater than the ambient light reflected by the screen, or (b) treat the surface of the screen so it reflects much less light, which again allows the emitted light to exceed the reflected light.

All major rugged notebook makers have introduced their own sunlight-viewable technologies. Getac calls theirs "QuadraClear," referring to the four elements that comprise the technology: a very bright backlight, anti-reflective coatings, linear polarizer, and circular polarizer. All the major players use those technologies, and the difference boils down to backlight brightness, and the extent to which the optical coatings are applied and how the various layers are bonded (the fewer reflective surfaces, the better). All else being equal, display backlight power then determines the effective contrast ratio which translates into the degree of real world outdoor readability.

And a super-bright 1,000 nits LED backlight is what sets the X500 apart (a standard notebook backlight is in the 170 to 200 nits luminance range). To engage full backlight power (which is considerably brighter than the maximum of the standard brightness range) you push a special button above the keyboard. When you don't need it anymore, turn it off. That's much easier with a button than via menus. And having that hardware button is also the key to keeping power draw in check: when you need the superbright backlight, switch it on.

How does it all work in real life? Very well. The X500 screen is unusually bright, and its semi-matte surface and anti-glare treatment eliminate reflections that can make consumer notebook screens unreadable. You can adjust the backlight in 20 steps, and you can also totally turn it off the backlight via a function key combination. Where the display could stand

PERFORMANCE	Getac X500	Panasonic 31
Intel Processor	Core i7-620M	Core i5-540M
Clock speed	2.67/3.33GHz	2.53/3.07GHz
TDP	35 watts	35 watts
CPU Mark	1,033.0	997.3
2D Graphics Mark	323.9	263.1
Memory Mark	809.8	727.0
Disk Mark	1,613.1	590.4
3D Graphics Mark	487.1	487.5
Overall PassMark	851.1	613.5
BatteryMon (min. draw)	16.5 w	13.0 w
ALU	32,888	34,258
FPU	33,053	37,321
MEM	19,534	24,657
HDD	28,991	8,950
GDI	9,619	6,300
D2D	7,991	1,530
OGL	22,252	11,318
Overall CrystalMark	154,328	124,334

improvement is in its viewing angles. The horizontal viewing angle is good enough, with just some milkiness when viewed from the side. The vertical viewing angle, however, is narrow, with considerable chromatic aberrations as you change the angle.



Design and construction

The Getac X500 follows the company's established notebook design language that includes a magnesium-alloy housing, a matte black and gun-metal gray color scheme, and plenty of visible mechanical detail that all combine for a purposeful but elegant no-nonsense look. The Getac X500 exudes a "tool for tough jobs" look, and pulls it off looking classy and elegant rather than just industrial.

Getac usually makes its rugged machines work without a fan, but the powerful standard voltage 2.67GHz Intel Core i7-620M processor does require a small fan to remove the heat generated by the CPU and electronics. Note that the fan assembly is actually outside of the computer's sealed inner housing.

Below you can see the X500 with its metal bottom plate removed. You don't actually have to remove the whole bottom plate to gain access to the memory card slots or the mini-PCIe slot reserved for 3G wireless add-on functionality. For that, there are two removable service doors in the back cover.



The hard disk caddy is a well thought-out design consisting of a metal outer housing padded inside to further isolate the disk from harm.

The battery is a powerful 10.8 Volt/8,700mAH 94 watt-hour unit with a built-in gauge that shows charge status via four LED lights upon pressing the button next to it. You can't see the charge meter



when the battery is installed in the unit, but it comes in handy when you carry spare batteries around. The battery is not hot-swappable.

As a full-size ultra-rugged notebook, the X500 comes with a full complement of ports, all of which are protected either by hinged doors and plugs.

The X500's 102-key membrane keyboard is full-scale. It has black keys with white labels. Special keyboard functions use white symbols. Below the keyboard is a large and slightly recessed (so you can feel its boundaries in the dark) resistive touchpad and two mouse buttons. Resistive touchpads are not affected by wetness and can be used even with gloves on. They do, however, require a rather firm touch.

The keyboard has a red LED backlight that can be toggled on and off via a function-key. It's pleasant and clearly illuminates the keys in semi and full darkness.

Wireless and expansion

The Getac X500 comes with a Bluetooth Version 2.1 with EDR class 2 module and Intel Centrino Advanced-N 6300 802.11a/b/g/n WiFi. For Wide Area Network communication, there is an optional Gobi 2000 module that supports just about any radio and provider worldwide. A (very sensitive) integrated GPS receiver is also optionally available.

For expansion, there are two PC Card Type II slot and one ExpressCard 34/54 slot. There is also a Smart Card reader but we missed an SD Card or multi-card reader. Additional expansion is possible via the X500's Media Bay that contained an Sony Optiarc rewritable drive in our unit. It can be replaced with a second battery or a second hard drive that can work in a RAID configuration with the primary drive.

There is also the X500's optional PCI or PCIe expansion unit that fits under the computer, an approach that Getac offered in the older A790.

Security

Like most mobile hardware these days, the X500 offers various levels of hardware and software security to prevent unauthorized access as well as theft.

Our system included Infineon Technologies' Infineon Security Platform Solution, a very comprehensive security setup that works in conjunction with the X500's Trusted Platform Module (TPM) 1.2 hardware to create and manage computer-generated digital certificates. There is also a fingerprint reader and a wealth of Intel security technologies available through the new i7 chip. And for physical security don't forget a Kensington locking cable to use with the Kensington slot on the backside of the unit. It is inexpensive insurance against theft.

Getac G-Panel

The X500 comes with a number of special utilities and helper apps that make using the unit quicker and simpler. The handy Getac G-Manager combines a variety of functions into one tabbed utility that covers summary information, battery, light sensor, economy, GPS, ignition, and systems monitoring.

Touch screen

Our X500 review unit came with the optional resistive multi-touch screen that even works with gloves on. It can be used for both single and dual-touch gestures, and works best with vertical market custom apps specifically designed for the technology. It's not a replacement for an iPad, but may present productivity-enhanced additional functionality.

Ruggedness

As far as ruggedness goes, Getac terms the X500 an "ultra rugged laptop." The unit definitely looks and feels capable of absorbing rough handling and operating in demanding environmental conditions. The magnesium-alloy housing with its protective rubber bumpers on all four corners on top, large rubber bumpers at the bottom front and smaller bumpers at the bottom rear protect the unit from casual damage. The thick (and easily replaceable) bumpers on top not only provide excellent impact protection, but also keep the machine from getting scratched. The X500 has a very wide operating temperature range, making it suitable for use in virtually any operating environment from freezers to desert. The unit is IP65-sealed, can handle 1-meter drops, and is MIL-STD 810G compliant in all pertaining ruggedness tests.

Summary

With their new X500 platform, Getac offers a remarkable machine that not only combines the best features and functionality of some of the company's older models into one, but also makes available for the first time in the ultra-rugged market a laptop with a contemporary wide-format display. Add to that the optional PCI or PCIe expansion unit that fits under the computer, and we're looking at a machine that none of the other leading rugged manufacturers can match as of this writing.



GETAC X500 Specs

Type:	Fully-rugged Notebook PC
Housing:	Magnesium alloy case, sealed ports
Processor:	2.67GHz Intel Core i7-620M with 4MB L3 cache
OS:	Windows 7 Professional
Memory:	2GB DDR3 1333MHz, expandable to 8GB
Slots:	2 PC Card Type II and 1 Express Card 34/54mm, Smart Card; optional PCI expansion unit
Display:	15.6-inch/1366 x 768 pixel transmissive TFT, 1,000 nits (optional: 1920 x 1080 600 nits display)
Digitizer/Pens:	Resistive multi-touch screen (optional)
Keyboard:	Full-scale waterproof backlit membrane keyboard; optional waterproof backlit rubber keyboard
Storage:	Shock-mounted 320GB SATA HD or 160GB SSD
Size:	16.1 x 11.4 x 2.56 inches
Weight:	11.7 lbs. as tested (with battery and handle)
Ruggedness:	-4 to 140 F; IP65 sealing; 1 meter drop 26 times, shock, vibration, altitude and other criteria in accordance with MIL-STD-810G testing
Power:	Li-Ion (10.8V, 8,700mAh; 94 watt-hours), optional media bay battery (8,700mAh)
Communication:	Intel Centrino Ultimate-N 6200, Bluetooth 2.1 + EDR; optional Gobi 2000, GPS
Interface:	2 USB 2.0, RJ11, gigabit RJ45, 2 Serial, dock, 1394a, audio in/out, video, fingerprint scanner
Price:	Starting at US\$4,999
Contact:	GETAC us.getac.com • 1-866-464-3822 or 1-949-681-2900 ruggedsales@getac.com