XPLORE iX104 XC6

XPLORE'S 6TH GENERATION OF THE ULTRA–RUGGED iX104 TABLET BRINGS STATE–OF–THE–ART TECHNOLOGY AND BLISTERING PERFORMANCE INTO THE FIELD

By Conrad H. Blickenstorfer, May 2014

While hundreds of millions now use sleek and elegant media tablets, and analysts predict unabated strength in the tablet market over the next several years, Xplore has always viewed tablets as serious tools for demanding jobs. In the process, Xplore became one of the most innovative players in the ultra-rugged mobile computer field, pioneering such concepts as modular expansion pods, dual mode digitizers, and truly outdoor-viewable displays. It's now Xplore's expectation that with the tablet form factor's massive success, the need for rugged mobility solutions will increasingly reach into extreme operating environments. To that extent, Xplore introduced the sixth generation iX104 line of ultra-rugged tablet computers in April of 2014.

What has changed in the 6th gen iX104?
For those familiar with the iX104 family of rugged tablet computers, here's what has, and hasn't, changed compared to the predecessor model:

Design: Outside there was, with the exception of some details, no need to change what was already one of the best rugged tablet computer designs available, and so the new iX104 retains the exterior looks and concept of Xplore's earlier iX104 models, going all the way back to the original. Most of the improvements are inside the computer.

Performance: To provide a very substantial boost in performance, Xplore switched from an aging first generation Intel Core i7-620U to state-of-the-art ultra-low voltage 4th generation "Haswell" Core i5 and i7 processors with Intel 8 Series chipsets.

Graphics: The Core i5-4300U has integrated Intel HD

Model	iX104 XC6	iX104C5	iC104C4
Year tested	2014	2011	2008
CPU	Core i5-4300U	Core i7-620UE	Core Duo U2500
CPU speed	1.9/2.9 GHz	1.06/2.13 GHz	1.20 GHz
CPU TDP	15 watts	18 watts	10 watts
Graphics	Intel HD 4400	Intel HD	Intel 945GME
RAM	4GB/16GB DDR3	4GB/8GB DDR3	1GB/2GB DDR2
Std. storage	128GB SSD	80GB HD	120GB HD
LCD nits	1,300	1,000	500
Battery	81.4 watt-hours	68.5 watt-hours	41 watt-hours
Battery life	up to 8.5 hrs	up to 6.5 hrs	up to 3.5 hrs
USB	2 x 3.0	2 x 3.0, 1 X 2.0	2 x 2.0
Cameras	HD cam + 5mp	3.0mp	NA
WiFi	802.11ac	802.11a/b/g/n	802.11a/g/n
Test weight	5.85 lbs.	5.45 lbs.	5.25 lbs.
Size	11.2x8.3x1.6	11.2x8.3x1.6	11.2x8.3x1.6
Touch	pen + resistive multi	pen + resistive	pen + resistive

Graphics 4400 with 20 execution units, and the Core i7-4650U Intel HD Graphics 5000 with 40 execution units. Both offer vastly improved performance and far more power-efficient operation.

Memory and storage: Maximum onboard memory has doubled to 16GB of faster DDR3L RAM. Solid state disk capacity has increased from 80GB to 128GB. With dual 128GB SSDs, the XC6 can be configured for RAID 0 striping (with significant performance enhancements) or RAID 1 mirroring.

USB 3.0: Intel Haswell CPUs support native USB 3.0 and PCIe 3.0 for superior transfer speeds. The XC6 takes advantage of that with two USB 3.0 ports.

Wireless: Wireless communications is much faster with 802.11ac WiFi, Bluetooth 4.0, and integrated AT&T LTE mobile broadband via Sierra Wireless Em7355 or Em7305 modules.

Camera: The old 3-mp still/video camera has been replaced by an integrated barcode-capable and much better 5-mp camera in the rear, and a front-facing HD camera for conferencing and video calls.

Touch: The display has an even brighter backlight (1,300 vs. 1,000 nits), and 10-finger resistive multi-touch that works in the rain and with gloves on.

Battery: The main battery has larger capacity (81.4 vs. 68.5 watt-hours) for longer rated battery life. Xplore claims up to 8.5 hours (vs up to 6.5 hours in the predecessor model). And that's conservative.

Ruggedness: The XC6 has incrementally improved ruggedness, most notably a wider operating temperature range (-30°, instead of -4° to 140°F).

HDMI: An HDMI-out port is now optionally available.

Intel Haswell: Much higher performance
While the overall exterior design of the iX104 platform has remained almost unchanged over its six generations, inside it's a very different story. The original machine had a 866MHz Pentium III processor, the 2nd gen machine a 1.1GHz Pentium M, the 3rd gen a somewhat quicker 1.4GHz Pentium M738, the C4 had a 1.2GHz Core Duo, and the C5 a 1.06GHz 1st gen Core i7. Different processors all, but through the generations Xplore clearly tried to strike a optimal balance between performance and battery life.

That attention to balance is no different in the new XC6, but this time the performance jump is

greater than ever before, going from the first generation to the much more powerful and much more efficient 4th generation of Intel Core processors. This transforms the electronically somewhat dated C5 rugged tablet platform into the state-of-the-art XC6.

We ran our standard performance benchmark suites to see how the new iX104 XC6 performs compared to its two most recent predecessors. As expected, the iX104 XC6 is a much faster machine than its predecessor by any measure. That is in part due to raw computing power, but also due to faster RAM, and the much higher performance of Haswell's integrated Intel HD Graphics. Speedy Toshiba solid state disks also helped, as did the RAID 0 configuration in our tester, which we highly recommend.

As a result, the Xplore iX104 XC6 scored a stunning PassMark 3X performance improvement over its C5 predecessor (which, in turn, scored 3X over its predecessor). A technology-based 3X performance boost in fields where speed gains are often measured in single digit percentage points is very impressive indeed, and also very noticeable. It is also the highest overall PassMark score we have recorded in a rugged device so far.

PERFORMANCE	iX104 XC6	iX104 C5
Intel Processor	Core i5-4300U	Core i7-620UE
Clock speed	1.9/2.9 GHz	1.06/2.13 GHz
TDP	15 watts	18 watts
CPU Mark	3,504.4	1,019.6
2D Graphics Mark	395.8	223.1
Memory Mark	1,491.2	798.1
Disk Mark	8,780.7	2,634.3
3D Graphics Mark	460.8	254.7
Overall PassMark	3,081.7	1,007.6
Min. observed draw	7.0 watts	10.5 watts
Overall CrystalMark	214,698	100,736

Superb sunlight-viewable display
Xplore had a good sunlight-viewable display when no one else did. In our 2005 review of the second gen iX104C2, we described Xplore's new "AllVue" display

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as an advanced LCD and digitizer assembly with multi-layer optic enhancements and production techniques that reduced screen reflectivity and glare, and enhanced the overall quality of the display. We praised AllVue as "as close to the perfect compromise as we've seen" but wished for wider viewing angles. With the C4, Xplore introduced AllVue Xtreme, which was considerably brighter than the original, but it still had a narrow vertical viewing angle. The C5 display fixed the viewing angle problem, and it also doubled backlight brightness to 1,000 nits. It was hard to see how the display could get much better with current technology.

Xplore agreed as the XC6 display remains the same, but Xplore bumped maximum backlight brightness up yet again, this time to 1,300 nits.

We shot some pictures comparing the XC6 with an iPad 3. The iPad's "retina" display gets excellent reviews, it is quite bright, and both have glossy displays, but that is where the similarities end. Outdoors, the iPad's glossy screen becomes very reflective, the Xplore's doesn't. Huge difference.

Dual-Mode touch screen and active pen
Xplore retained automatic dual-mode input in the XC6, but the Wacom pen is now complemented by 10-finger resistive multi-touch instead of just standard one-point resistive touch. The XC6 now offers the choice of the following input methods:

The Wacom pen — allows for very precise operation, and there is a lot of existing software designed specifically for the active pen. It has "cursor tracking" where the cursor follows the tip of the pen even if the pen doesn't touch the screen. The pen also allows very smooth strokes and handwriting.

Touch — the resistive multi-touch system on the XC6 recognizes up to ten simultaneous inputs. Most apps only need one or two, but some gestures require three or more. Resistive multi-touch needs a firmer touch than capacitive multi-touch, but it does work in the rain and with gloves on.

Passive stylus — resistive touch means it works with *any* passive stylus. Especially when working in classic Windows mode with its small check boxes and scrollers, that comes in handy. And due to the high performance of the XC6, even the stylus does smooth calligraphy, drawing and handwriting.

Mouse — when working in Windows 7 or desktop software in the Windows 8 classic mode, a standard keyboard and mouse easily convert the XC6 into a notebook/desktop.

Fully rugged
While electronics change all the time, ruggedness is defined by physics, and physics do not change. That's why the new XC6 looks almost identical to the first iX104 we reviewed over a decade ago. There was no need to redesign the tablet just for change's sake.

The rugged Xplore iX104 XC6 can handle just about any environmental condition, and it has the specs to prove it. Xplore claims independent testing to 17 different MIL-STD-810G procedures, and also IEC IP67 as well as HazLoc and MIL-STD-461F.

The machine has a very wide operating temperature range of -30 to 140 degrees Fahrenheit. That means it can be operated in virtually any thermal environment from deserts to freezers.

Vibration and transit shock are tested according to the procedures described in MIL-STD-810G. Since mobile computers are always in danger of being dropped, the "drop spec" is of special importance. Thanks to its rugged design, protective rubber bumpers and use of solid state storage, the iX104 XC6, while operating, can handle 4-foot drops to concrete on all surfaces, edges and corners. Xplore also claims a 7-foot operating drop spec to 2-inch plywood over concrete. This tablet won't break.

Sealing is important in a rugged machine as dust can gum up the works, and water can render a computer inoperable or destroy the electronics completely. Xplore claims IP67 and calls the machine "submersible" to one meter (3.3 feet).

Security
Data and access security is becoming an ever more important issue in mobile computing. The V110 offers TPM 1.2 functionality to store secured information. An optional common access card (CAC) reader requires insertion of a U.S. government issued ISO 7816 smart card to gain access to critical data. A Kensington-style lock slot can be used to secure the XC6 via a steel cable. Both available processors support vPro, a set of Intel security and remote management technologies that offer multiple lines of built-in defenses.

Surprisingly good camera
Most mobile computing devices include at least one camera these days. In smartphones, those cameras have become so good and convenient that they are in the process of replacing dedicated compact cameras. Unfortunately, cameras integrated into notebooks, tablets and handhelds have not lived up to expectations, falling way behind dedicated cameras and smartphones in terms of speed and quality.

We were pleasantly surprised to find the XC6 5-megapixel documentation camera *much* improved. Pictures were good enough to be useful for documentation, and they did not suffer from compression artifacts that often render integrated camera pics all but useless. The XC6 camera has a stepper motor

auto-focus that can lock in very sharp pictures, though at times it's hunting around for focus. Video, likewise, was unexpectedly good. Our test video shot at 720p resolution was crisp and sharp, and it never lagged behind, something that bedevils almost every integrated camera we've examined.

Summary
A 6th generation product, the XC6 is an exceedingly mature and field-proven platform. Its magnesium alloy case is virtually indestructible as well as dust and waterproof. With a footprint the size of a standard sheet of paper and weighing under six pounds, the XC6 is compact enough to be taken anywhere.

The XC6's 10.4-inch XGA IPS display with near perfect viewing angle from all directions is even brighter than before and easy to view indoors and out. It controls reflection well and remains usable even in bright sunlight. The dual-mode interface smartly combines an active digitizer for detail work and a multi-touch screen without a need to manually switch between the two. Since it's a resistive design, the XC6 can be operated with gloves and in the rain.

An inherently rugged design from the start, each successive generation of the iX104 has become tougher yet, and the XC6 should be able to handle just about any abuse out there in the field. And the XC6 is much faster than its predecessor.

Overall, an intelligent and very effective technology update that complements and enhances one of the best rugged tablet designs available today.

Xplore iX104 XC6 Specs

Type: Ultra-rugged tablet PC
Housing: Magnesium alloy case, bumpers, sealed ports
Processor: 1.9/2.9 GHz Core i5-4300U with 3MB L3 cache
Graphics: Intel HD Graphics 4400
OS: Windows 7 Professional or Windows 8.1 Professional
Memory: 4GB DDR3L 1,600Mhz, expandable to 16GB
Slots: MicroSD card, MicroSIM card, and OEM radio bay with two miniPCIe slots
Display: 10.4-inch/1024 x 768 pixel, 1,300 nits sunlight-readable display with 178-degree viewing angle
Digitizer/Pens: Auto-sensing dual-mode resistive 10-finger multi-touch and active Wacom digitizer
Keyboard: Onscreen; optional external
Storage: Single/dual 128GB SSD, or 240GB
Size: 11.2 x 8.258 x 1.6 inches
Ruggedness: -30° to 140°F (-35° to 60°C); IP67 sealing; drop/shock and other criteria in accordance with MIL-STD-810G testing; ESD/EMC; UL1604/ISA STD 12.12.01
Weight: 5.85 lbs. as tested, with battery and pen
Power: Li-Ion 7.6V/10,625mAh; 81.4 watt-hrs, "up to 8.5 hrs"
Communication: Intel Dual Band Wireless-AC 7260 + Bluetooth 4.0, opt. 4G LTE WWAN, uBlox GPS
Interface: 2 x USB 3.0, RJ45, RS232 (or VGA or HDMI), dock, audio in/out, HD webcam + 5mp rear camera
Price: Inquire
Contact: XPLORE • xploretech.com • 1-512-336-7797