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, 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 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 800GB to 128GB. With dual 128GB SSDs, the XC6 can be configured for RAID 0 stripping (with significant performance enhancements) or RAID 1 mirroring.

**USB 3.0:** Intel Haswell CPUs support native USB 3.0 and PCle 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 Em7350 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**Camera:** The old 3-mp still/video camera has been replaced by an integrated barcode-capable and much better 5-mp camera in the rear, and a front-facing HD camera for conferencing and video calls.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 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°C, instead of -4°C 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 1.26GHz 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 disk drives 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.

**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 “AllView” display...
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 Xzreme, 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. 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.

### 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 hand helds 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.