

XPLORE XSLate L10

XPLORE EVOLVES ITS COMPACT WINDOWS TABLET INTO A VERSATILE, SCALEABLE PLATFORM OF LIGHTWEIGHT TABLETS, HARD-HANDLE TABLETS, AND 2-IN-1 HYBRIDS

by Conrad H. Blickenstorfer; photography by Carol Cotton

On June 19, 2018, Xplore Technologies Corp. introduced their next generation rugged tablet platform, the L10. We're referring to the L10 as a platform rather than just a product because it actually comes in three form factors. These are a pure tablet (XSLATE L10), a version with hard handle and an optional integrated barcode reader for ergonomic all-day data capture (XPAD L10), and a 2-in-1 designed to be a full laptop replacement (XBOOK L10).

The reason for the new L10 platform was to take the popular XSLATE B10 and not only enhance and improve it with state-of-the-art technology, but evolve it into a comprehensive tablet ecosystem covering a wide range of performance and functionality demands. Hence this new trio of very rugged mobile computers for the field and use under the harshest conditions, and all sharing the same extensions, add-ons and accessories.

Evolution of the L10 platform

For those familiar with the Xplore Windows-based B10 and Android-based D10 (and the earlier Bobcat and RangerX) rugged tablets, the new L10 platform looks largely the same, but it has been improved and reworked in many areas:

- **Design:** The display aspect ratio has changed from 16:9 to 16:10, and the XSLATE B10's carbon fiber bezel has given way to solid dark gray throughout the device. The XPAD version with a hard handle is a separate design. The XBOOK mostly adds keyboard and kickstand to a standard XSLATE L10.
- **Performance:** Big difference here. On the high end, the L10 leaps ahead a full three Intel Core processor generations, from 5th ("Broadwell") to 8th ("Kaby Lake R"). On the low end, there is a two generation jump from "Bay Trail" to "Apollo Lake" (both of the Intel Atom lineage).
- **Graphics:** The Intel HD Graphics 505 graphics integrated in the Pentium N4200 processors available for the low-end L10 is a GT1 tier version of the Intel Processor Graphics Gen 9 generation and includes 18 Execution Units. The Intel UHD Graphics 620 graphics integrated in the Core processors available for the L10 are GT2 tier versions of the Intel Processor Graphics Gen 9 generation, include 24 Execution Units, and run at higher speeds.
- **Memory and storage:** L10 units get from 4GB to 16GB of RAM. Solid state disk capacity is 128GB, but SSDs up to 256GB are available. For mass storage, the Pentium version is limited to SATA SSDs up to 512GB; the Core versions may opt for much faster PCIe-based SSDs up to 1TB. The microSD card slot remains externally accessible.



- **USB Type C:** In addition to two USB 3.0 ports, the L10 also gets a USB-C port with its smaller, reversible connector. The USB-C port supports the USB 2.0, USB 3.0 and DisplayPort-out standards.
- **Wireless:** Much faster Intel Dual Band Wireless-AC 8265 + Bluetooth V4.2. The optional 4G LTE mobile broadband module supports LTE-A Pro, CAT-12, Dual nanoSim, up to 600% faster download, and 300% faster upload than earlier gens.
- **Camera:** New 13-megapixel camera in the rear, and a front-facing FHD 2-megapixel webcam.
- **Display:** The 10.1-inch 16:10 aspect ratio IPS display uses direct bonding, has perfect viewing angles, and is available in 500 or 1000 nit backlight versions. Display resolution goes up to 1920 x 1200 pixel for a very noticeable increase in sharpness.
- **Touch:** The L10 uses projected capacitive 10-finger multi-touch with auto mode switching to glove and wet conditions. Wacom or (battery-powered) ePen active digitizers available for anything that needs more precision than finger touch.
- **Battery:** The main battery now snaps into the body of the L10, making it quicker and easier to swap. The standard battery packs 36 watt-hours, with a battery life claim up to 10 hours; a 98 watt-hour optional extended battery lasts up to 27 hours.
- **Ruggedness:** The L10 can handle 6-foot drops. IP65 sealing carries over, and as before, external ports are sealed on the inside, too. This means water won't leak in even if those ports are left open.
- **HDMI:** The L10 has an optional HDMI-in port.

- **Legacy ports:** The L10 has an optional dedicated true RS232 port.
- **Scanning:** The XPAD version of the L10 can be ordered with a 1D/2D integrated scanner located in the hard handle.

Design and implementation

The L10 tablet, like the earlier B10, measures 11.1 x 7.7 inches (281 x 195 mm) and is 0.85 inches (22 mm) thick. The hard handle XPAD version is 2.3 inches taller (11.1 x 10.0 inches) and weighs 3.26 pounds. The L10 has a polycarbonate plastic housing with elastomer edge and corner protection over an internal magnesium alloy frame. It is an elegant, distinctive look that's purposeful, functional, and ergonomic.

The front view shows that Xplore designed the tablet to primarily be used in landscape mode, but it also quickly snaps into landscape or upside down mode if the tablet is turned. For hardware controls, there's a Windows button in the bottom center of the face. Above the display are the camera, the ambient light sensor, as well as dual microphones. To the right of the screen are four small indicator lights and the unit's fingerprint scanner.

The picture below shows the XSLATE L10's left side with its heat exchanger slots and an I/O block that has a protective door (removed for better viewing of the ports) that can be locked to ward against accidental opening. The I/O block includes the audio jack, two full-size USB 3.0 ports, a reversible USB-C port (can be used for video-out), and a microSDXC card slot.

On the right side is the power switch, a tiny round "security" button that brings up the alt-ctl-del menu, and a volume rocker. All buttons have tiny embossed markings. On the bottom right is a protective door that covers the power and RJ45 LAN jacks. On the oth-





er side is the unit's optional port, here used for an HDMI-in port (true serial is also an option).

A Kensington lock slot for physical security is on the back of the device, where users also find almost two dozen screw inserts for industry standard mounts as well as the large variety of bolt-on attachments.

The XSLATE L10 consists of two polycarbonate plastic halves. The front contains most electronics. A magnesium alloy frame provides a strong foundation for the motherboard and components. The halves are secured together with Philips screws. The seal between the halves is a tongue-and-groove design.

The XSLATE L10 battery snaps into the backside of the tablet. The springloaded sliding lock itself can be secured with a screw. The Li-Ion battery (7.6V, 4.770mAh, 36 watt-hours) has a rubber friction seal to keep dust and liquids away from the battery contacts and also the dual micro-SIMs. The L10's battery can be exchanged for a spare in seconds. No need to power down; the L10 has an internal bridge battery that provides power for a battery exchange.

The XSLATE L10 has a small fan as part of Xplore's internal thermal management system that also includes a custom copper heat spreader and heat piping to regulate heating and cooling in extreme temperatures. We'd rather not have a fan, but at this point it remains a necessity to guarantee safe operating temperatures and also guard against heat-related performance throttling. Xplore commented that the fan makes it possible for the XSLATE B10 to maintain full performance over the entire operating temperature range. Given that we've witnessed performance of some fanless designs drop dramatically when the system gets hot, including a fan makes sense.



Four processor options

The XSLATE L10 is available with four different processors. Three of them are from Intel's line of 8th generation "Kaby Lake Refresh" CPUs, and one from the lower end "Apollo Lake" lineup.

The big news with "Kaby Lake Refresh" is that for the first time Intel's ultra-low voltage mobile processors are available in quad-core versions. Xplore jumped on that with the L10, giving the platform a performance edge over tablets using earlier generation dual core CPUs. Top performance, of course, adds cost, not only due to the chip itself, but also due to supporting technology. So Xplore offers a lower-end L10 with a Pentium N4200 chip as well. The N4200 is also a quad-core design, but one with Intel Atom DNA. The reason why Xplore did this is not only to offer two different performance levels, but also to have successors for both the old XSLATE B10 and the old Bobcat. The B10 was roughly twice as fast as the Bobcat, and Xplore wanted to migrate that performance ratio to the new L10 platform.



To see how the two versions of the Xplore XSLATE L10 perform compared to the B10 and Bobcat they are replacing, we ran our standard Passmark Software PerformanceTest v6.1, a suite of several dozen tests covering CPU, 2D graphics, 3D graphics, memory.

The results are astonishing. The overall PassMark score of 5,962.9 clocked by the 8650U-equipped version of the XSLATE L10 with PCIe-based storage is far and away the fastest we've ever recorded with version 6.1 of the PassMark benchmark suite.

The results are equally amazing for the lower-end Pentium N4200 version of the L10. It actually beat Xplore's old high-end B10, even though that model was based on a powerful 5th generation Core processor. The relatively lowly N4200 machine couldn't match the old B10 in graphics, memory and disk benchmarking, but ran away with it in processor performance, clocking a narrow overall victory over the B10.

So based on PassMark v6.1, the Core-based XSLATE L10 is easily twice as fast as the already quick Pentium-based version. And the new "low-end" L10 is as quick as the old "high-end" B10.

To cross-check, we also ran the PassMark 9.0 benchmark suite on both versions. There, the 8650U-based machine also clocked the, as of June 2018, highest overall benchmark score we've ever recorded at RuggedPCReview.com.



PERFORMANCE	XSLate L10	XSLate B10
CPU Mark	10,289.7	3,845.5
2D Graphics Mark	423.2	416.9
Memory Mark	2,613.7	1,241.2
Disk Mark	12,791.2	4,946.9
3D Graphics Mark	805.9	460.1
PassMark	5,962.9	2,364.7

Very low power draw

Our two L10 test units came with the standard battery that packs a modest 36 watt-hours. Xplore claims "up to 10 hours," which is a couple of hours more than the advertised battery life for the predecessor XSLATE B10. Given that the XSLATE is far more powerful than the old B10, can this be possible? We used PassMark's BatteryMon to measure power draw on the Core i7-8650U version of the L10 with the 1,000 nits screen.

With the Windows 10 power slider on "Best battery life" and backlight on "Darkest," we saw as little as 3.0 watts. That's 1.5 watts less than the last XSLATE B10 we tested, and translates into a theoretical battery life of 12 hours with the standard battery.

Moving the power slider all the way to "Best performance" and the backlight on "Darkest," we saw as low as 3.1 watts, which means about 11.6 hours. With brightness on "Suggested" we saw 4.3 watts (8.4 hours). Cranking the backlight up to maximum, draw rose quite a bit to 8.5 watts, good for a theoretical 4.2 hours.

We also did the battery drawdown test with the Pentium N4200 unit, also with the 1,000 nits screen. Interestingly, despite the much lower Thermal Design Power of just 6 watts versus the 15 watts of the Core CPU, power draw was between 3% and 9% higher. This may be due to the more sophisticated power savings technologies in 8th gen Core processors or it could simply be an optimization issue in preproduction units.

Overall, given its very impressive performance, the L10 is also quite power-efficient. The minimum observed power draw is considerably less than what we had found in any prior Xplore tablet in this class. However, do note that full display brightness still significantly increases power draw and lowers battery life.

Finally, the usual qualifier: battery life is as relative as gas mileage in a car, or more so. Putting full, continuous load on the system will draw down battery power much more quickly.

Cameras

Camera resolution has been bumped up to 13-megapixel in the rear, and 2-megapixel webcam in the front. That's roughly on par with modern smartphones. For years, cameras integrated into rugged handhelds and tablets lagged way behind compared to what was available on phones. That never made sense to us. The purpose of such integrated cameras was to give a device another means of data collection, but they were rarely adequate for the job.

The L10 platform doesn't have that problem. The cameras are good enough for many documentation tasks. No need to whip out the personal smartphone or bring along a separate dedicated camera.

Unfortunately, the standard Windows 10 Camera app is very basic and in no way takes full advantage of either of the integrated cameras. We definitely recommend searching for a third party camera app that can take advantage of all of the imaging hardware's features.



Multi-touch vs. gloves and rain

Like the Bobcat and the XSLATE B10, the L10 platform uses projected capacitive touch, the same touch technology hundreds of millions love on their smartphones and tablets. Procap enables that effortless, smooth tapping, panning, pinching and zooming pioneered by the iPhone and iPad, something tablet users today instinctively expect from a tablet.

Initially, one problem with capacitive touch was that the technology works great when finger-tapping on a clean, dry screen, but not so well outdoors on the job with gloves on or in the rain. Since most Xplore customers use their tablets outdoors, Xplore early on provided their capacitive touch tablets with special "glove" and "wet" modes. On the XSLATE B10, modes had to be selected via a special control utility. In the new L10 platform, mode switching is automatic; the tablet senses conditions and adjusts sensitivity and calibration automatically.

How well does it work? Given that it's a tough problem to solve, remarkably well. Rain and wetness is an especially difficult issue. Water is an excellent conductor and water sprayed or falling onto a touch screen will make it impossible to measure capacitance between electrodes. So the L10 may provides wet touch functionality by significantly decreasing the sensitivity of the touch controller, and also by using a special screen protector that makes water pearl and bead enough so that there isn't uncontrolled conductivity between different parts of the display surface.

Using capacitive touch with gloves on is a different issue. Since procap is based on measuring the capacitance between two electrodes, if a glove gets between the finger and the display surface, the touch controller can't sense the finger and thus can't measure the capacitance. Xplore likely addressed that by increasing the sensitivity of the touch controller.

Don't expect perfection in those modes. Glove and wet touch is not for doing precision operations on the screen. But it is good enough to keep the tablet operational with touch-optimized custom apps.

Since Windows often requires more precision than a finger tap can provide, Xplore also offers a versions of the L10 with an active Wacom pen. Wacom pen technology is very mature and is very widely supported on Windows systems. The pens do not require a battery. A short one (3.5 inch) comes with the standard tablet version of the L10, a longer one (5.5 inch) with the hard handle version. Each form factor provides a

pen garage for storage, and also a tether.

As an alternate, Xplore also offer a battery-powered (AAAA battery) ePen that supports pressure sensitivity and has two mouse buttons. It is available in the XPAD or the XSLATE/XBOOK with the soft top handle accessory.



Remarkable ruggedness

Ruggedness — providing mobile computers that can operate in and survive harsh environmental conditions — is the core of Xplore's business. Unlike consumer electronics that are designed to be stylish, trendy, eye-catching and inexpensive to produce, rugged equipment is conceived and built around durability and ruggedness. Sometimes that comes the expense of attractive, pleasing design.

The XSLATE L10, however, is an elegant device that exudes good industrial design. That isn't easy with tablets where the goal is to provide a good display in the thinnest, lightest package possible. The L10 exudes toughness with its materials, coloring and integrated bumpers and protection. It looks functional but never boring. But how much toughness did Xplore bake into the L10 tablet platform? A lot.

Any time you use a mobile computer out there in the field, there's the ever-present possibility that it may slip out of your hands and fall. Not onto carpeting like in an office, but onto concrete, gravel, rocks or worse. The drop test described in Section 516.6 of the US MIL-STD-810G mandates an item to be dropped from four feet (the height a portable item is usually held while being carried or in use) onto every possible surface or edge or corner, for a total of 26 drops. The item does not have to be turned on, it simply must still work after each drop. And if it doesn't, the standard allows up to five items. As long as one makes it through the tests, it's a pass. That made no sense to Xplore. After all, out there in the field users won't have four spares. And the device may well be on when it falls. And there are tall folks, so a device may drop from higher than four feet.

So Xplore did the test on *a single unit* that was on during the entire battery of 26 drops. And they did it from *six feet*. It passed.

In the field it can get very cold and very hot. The

device must be able to handle that. The L10 tablet can operate in temperatures as low as -4 degrees Fahrenheit and as high as 140 degrees Fahrenheit (-20 to +60 Celsius), enough for virtually any deployment.

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 IP65 for the XSLATE L10, where the "6" stands for being dustproof and the "5" for the ability to handle low pressure water jets from all directions.



The XSLATE L10 does have a fairly large number of exterior openings for all of its slots, ports, connectors, and batteries. That means a large number of seals that must be in perfect condition, and protective doors that must have intact seals and must be closed carefully. Xplore knows that and, in response, sealed all of the unit's ports from the inside. That way, frequently used protective doors can remain open and accommodate cabling while still providing full sealing.

As always, your particular application will make the ability to pass some of those tests either vital or meaningless. Xplore provides more, and more thorough, ruggedness testing specs than most, so anyone interested in the XSLATE L10 should examine them closely and also check with Xplore for additional test results.

Xplore XSLate L10: Summary



With the XSLATE L10 platform, Xplore Technologies has evolved the tablet form factor to a next level. 2-in-1 and hard handle versions of tablets are not new, but to offer them all in integrated variants of one platform, that we haven't seen before. Add to that an exceptionally wide range of performance scaling, and the Xplore L10 tablet ecosystem has an awful lot to offer.

The basic L10 tablet is visually almost identical to Xplore's older and existing 10-inch class tablets, but that's misleading as the L10 is a far more powerful design. A trio of Intel 8th generation "Kaby Lake Refresh" Core processor provide the kind of performance many field professional need for complex work. If that's not needed, a low end Intel Pentium-based version is still as fast as the old high-end Xplore XSLATE B10. And despite its considerable ruggedness thanks to a tough magnesium alloy frame, polycarbonate housing, and elastomer corner and edge protection, the handy tablet weighs under three pounds. With a footprint barely larger than an iPad, the XSLATE L10 fits virtually anywhere.

The L10's 500 or 1,000 nits 10.1-inch 1920 x 1200 pixel IPS display with near perfect viewing angle from all directions is bright

and easy on the eyes, indoors and out. It does a decent job controlling reflection and remaining usable even in bright sunlight. Using capacitive multi-touch, Xplore also baked in automatic switching between "glove" and "wet" modes. Also available are active pen versions that provide the kind of precision needed for certain applications.

The XPAD version of the L10 addresses the needs of customers who like a hard handle with integrated scanner and programmable buttons. And the XBOOK version turns the L10 tablet into a full-function laptop replacement with its well-matched detachable keyboard and kickstand.

Combined with available PCIe-based storage, all three of the available high-end Intel 8th generation Core processors provide exceptionally high performance (as June 2018, the highest we have tested). Wireless communication is state-of-the-art with 802.11ac WiFi, Bluetooth 4.2, and available Sierra 7565 4G LTE mobile broadband.

With the XSLATE L10, Xplore Technologies now offers mobile professionals the choice of various form factors and various performance levels in one compact, elegant, lightweight and very compelling tablet platform. -- Conrad H. Blickenstorfer, June 2018

Xplore XSLate L10 Specifications

Type: Rugged Tablet PC platform with XSLATE, XPAD (handle), and XBOOK (2-in-1 keyboard) form factors

Introduced: June 2018

Processor:
 Quad-core Intel Core i7 8650U (Kaby Lake Refresh)
 Quad-core Intel Core i5 8350U (Kaby Lake Refresh)
 Quad-core Intel Core i5 8250U (Kaby Lake Refresh)
 Quad-core Intel Pentium N4200 (Apollo Lake)

OS: Windows 10

Memory:
 4GB (Pentium N4200 only)
 8GB (Pentium N4200 & Core i5 8250U only)
 16GB (Core i5 vPro 8350U & Core i7 vPro 8650U only)

Graphics: Core processors: Integrated Intel UHD Graphics 620; Pentium: Intel HD Graphics 505

Display: 10.1-inch/1920 x 1200 pixel (16 : 10 aspect ratio, 220 ppi), direct-bonded IPS TFT, 178-degree viewing angle, 500 or 1,000 nit

Digitizer: Standard display: capacitive multi-touch, 500 nits, or ViewAnywhere display: capacitive multi-touch 1,000 nits, or ViewAnywhere display: capacitive multi-touch 1,000 nits with active Wacom pen

Keyboard: Onscreen; optional external

Storage: Core i5/i7 CPUs: 128GB SATA SSD, 256GB / 512GB / 1TB PCIe SSD; Pentium CPU: 64GB / 128GB / 256GB / 512GB SATA SSD

Expansion slots: 1 x Micro SDHC card slot, 2 x Nano SIM (4FF), optional CAC/SmartCard reader

Housing: 3% to 95% non-condensing, 30°C to 60°C

Operating temperature: -4° to 140°F (-20° to 60°C)

Ingress protection: IP65 (IEC 60529)

Humidity: 95% - non-non condensing, operating

Drop: Operating: 6 foot (183cm) drop 26 times onto plywood over concrete, all on 1 unit

Vibration: Minimum Integrity Non-operating, Composite Wheel Operating

Altitude: 40,000 feet for 1 hour, operating. MIL-STD-810G, Method 500.5, Procedure II

Intrinsic safety: ANSI/ISA 12.12.01-2013

Size:
 XSLATE: 11.1 x 7.7 x 0.88 (281 x 195 x 22 mm)
 XPAD: 11.1 x 10.0 x 0.88 (281 x 256 x 22 mm)
 XBOOK: 11.1 x 10.0 x 0.88 (281 x 256 x 22 mm)

Weight:
 XSLATE: 2.9 lbs (1.31kg) with standard battery and pen
 XPAD: 3.26 lbs (1.48kg) with standard battery and pen
 XBOOK: unknown

Power: Li-Ion 7.6V, 4,770mAh, 36 watt-hours ("up to 10 hours"), optional extended battery Li-Ion 98 watt-hours ("combined up to 27 hours")

Cameras: Integrated 13 megapixel camera with flash (rear), integrated 2 megapixel FHD camera (front)

Security: Integrated fingerprint reader, Trusted Platform Module (TPM) 2.0, optional CAC / SmartCard reader, Computrace, removable SSD panel

Communication: Intel Dual Band Wireless-AC 8265 + Bluetooth V4.2 (EDR + BLE), NFC; optional internal Sierra Wireless EM7565 4G LTE with GNSS (GPS + GLONASS + Galileo + Beidou) OR discrete u-blox GNSS (GPS + GLONASS with SBAS (WAAAS, EGNOS and MSAS)), optional pass-through antenna includes five ports for MIMO WWAN, MIMO WLAN and GPS

Interface: 2 x USB 3.0, 1 x RJ45 gigabit LAN, 1 x USB Type C (USB 2.0/ 3.0, Display Port out), audio in/out; optional: 1 x HDMI-in OR 1 x native serial RS232, dock

Price: Starting at US\$2,199 (Pentium)

Warranty: Standard 3-year warranty, 4 and 5 year options, optional xDefend program

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