

Motion R12

SLEEK, LIGHTWEIGHT RUGGEDIZED INTEL HASWELL-POWERED 12.5-INCH FULL 1080P TABLET WITH DUAL-MODE INPUT AND A WEALTH OF ACCESSORIES

by Conrad H. Blickenstorfer; photography by Carol Cotton

Sacramento, Dec. 2014 — In early 2014 when most available consumer tablets still had smallish 7 or 10-inch displays, tablet computing pioneer Motion announced the rugged Motion R12 with a large 12.5-inch screen. Motion created the new tablet specifically for mobile professionals who needed more screen real estate, more durability, more versatility, and more performance than is commonly available in consumer media tablets. We lauded the R12 as a “well-conceived tablet” in our initial preview, and we’ve now had a chance for extended hands-on with an R12 production tablet.

There’s much to like. The Motion R12 has that large (for a tablet) 12.5-inch display with full 1920 x 1080p resolution, measures a still handy 12.9 x 8.1 inches, is only 0.65 inches thick, and weighs just under three pounds. It’s amazing how much roomier the screen feels than that of a standard 10-inch tablet. There’s ample room to work on the R12 and then some.

Continuing with specs, Motion offers 4 or 8GB of power-efficient DDR3L SDRAM and solid state disks with capacities up to 256GB. Wired communication includes a full-size USB 3.0 port, HDMI, a 3mm audio jack, docking, and there’s also an SD card slot.

As a modern device, the R12 has a 9-axis Micro Electro Mechanical Sensors array that includes an accelerometer, eCompass and gyroscope, and there’s also an ambient light sensor. Motion has always been big on audio, and so the R12 includes a multi-directional array microphone system as well as two speakers.

For wireless, there’s Intel Dual Band Wireless-AC 7260 WiFi that also includes Bluetooth 4.0. Optionally available is either 4G LTE mobile broadband with GNSS (a combo that can use our GPS and the Russian GLONASS GPS) or a dedicated u-blox 7 GPS module. There are two cameras, with 2.0 megapixel resolution in the front and 8.0 megapixel in the rear.

The R12 being a commercial tool for professionals in various fields, Motion offers numerous extras and accessories that extend the tablet’s features and abilities. An example is the “SlateMate” bolt-on module can include up to three separate I/O devices like scanners, RFID, and even a legacy serial port.

Performance commensurate with the big screen and the expected professional grade use is provided by an Intel “Haswell” 4th generation i5 or i7 Core processor, indicating that this is a high end product.

Taking a closer look at the Motion R12

Motion has well over a decade’s worth of experience in tablets. The company burst onto the scene back in 2001/2002 when Microsoft launched its Tablet PC initiative. By concentrating on tablets and tablets only, Motion succeeded where many other early tablet makers failed. By concentrating on business and enterprise, Motion became familiar with the needs of those



customers and offers the specialized accessories, extensions, and solutions they need.

In design, rather than following fashion trends Motion has always favored a form-follows-function approach with understated elegance. That was evident in the company’s early adoption of Intel’s practical MCA (Mobile Clinical Assistant) reference design with its handle and integrated peripherals, a platform that serves Motion’s customers well to this day in the company’s C5 and F5 product lines. Motion has also been an early adopter of new technologies that make field

What makes the R12 instantly recognizable is its unique shape. Where other tablets are rectangles with rounded corners, the R12 is an elongated octagon with its chamfered corners clipped at a shallow angle. Motion said they wanted something memorable to differentiate themselves, and the sloped edges were designed to make it easy to pick the tablet up from a flat surface. We also suspect that the R12’s unusual shape may well make it less prone to impact damage.

The image on the lower left shows the right side of the R12 tablet with the protective hinged covers open.

Here’s what’s available, from left to right:

- Power adapter jack (the power brick is remarkably compact: 3.6 x 1.6 x 1 inches)
- 3mm audio-out port
- Full-size USB 3.0 port
- Full-size HDMI port
- SD/SDHC/SDXC card slot (tested with 32GB card)
- SIM card slot above the SD card slot
- Fingerprint reader
- Attachment point for supplied coiled pen tether
- Bay for the supplied Wacom active pen

The left side of the R12 contains the heat exchanger exhaust, the power button, a “security button” that issues a Ctrl-Alt-Del, and a battery charge indicator. The top has three microphones, two facing front and one rear. There are also separate volume up and down buttons. The bottom has the docking station contacts, dual speakers, and two loops to attach a carry handle.

As is usually the case with Motion products, controls are small and tucked out of the way, rather than serving as design elements. Most buttons are simply slightly elevated areas with embossed icons in the rubbery housing material. There are no color markings here that can easily scratch off.

Some functions are so well integrated that they are almost hidden. An example is the clever 5-LED charge meter of the battery. Both the LEDs and the activation button are built right into some of the hundreds



professionals’ lives easier. These include superior displays, high quality audio, dual mode input, and capacitive multi-touch when almost no one else had it.

This makes it no surprise that, once again, Motion created a tablet that’s different visibly and under the hood. Below is a look at the R12 tablet from the front and from all four sides. Note how the R12 is slender for a ruggedized tablet, and also how all I/O is neatly integrated into the design.



of elevated little dots that make the device grippier to hold (see picture to the right). The activator button is in the dot to the left of the LEDs.

Design and construction

The Motion R12 consists of a polycarbonate shallow pan-like bottom half upon which the flat top part with the display fits like a cover. Both parts are black, with the bottom having a rubberized grip pattern to add friction and help emphasize the rugged look. A slightly raised rubber lip around the perimeter of the tablet protects the display glass in case of a drop.

The battery measures 6 x 4.5 inches and is only 3/8th of an inch thick. It fits into its compartment without an additional cover over it. It uses Lithium-Polymer technology and packs 43 watt hours (14.8 Volts, 2,900 mAh). The battery is secured in place with a single friction slider. It won't come loose by accident.

Opening the R12 is a challenge because several of the small Philips screws that hold the halves together are hidden underneath little rubber plugs, some of which neatly blend into the housing's dotted surface treatment pattern. Once all have been found and undone, the two halves easily separate, with just one ribbon cable connecting the two sides. Or so one thinks at first; there's also a second and very short ribbon for the touch subsystem that will come off and is not easy to put back in place.

Inside, things are quite complex. The electronics in the bottom half of the housing remind of an elaborate settlement surrounding the battery compartment atrium. There's a U-shaped motherboard, numerous modules, boards, connections, bar codes, thermal conduits, heat exchangers, plenty of shielding, and so on. It's the opposite of the circuitry inside an iPad that's all condensed into a couple of tiny hyper-integrated boards.

What's obvious is that the R12 is a very rugged design built around a tough internal magnesium chassis. It forms a solid basis for the tablet's large display, boards and modules, and the Wacom digitizer.

Something else that's quickly obvious is how much care Motion's designers took in making sure nothing ever comes loose — all plug-in modules are not only secured in place with a screw, but there are also small metal retainers that keep antenna connectors safely in place.

Overall, this is more of the more complex designs we've seen. It also means Motion can probably relatively easily update and customize the unit with replacement or enhancement modules and components.

Sealing between the two halves of the housing is via a soft plastic sleeve that fits around the entire top half perimeter, and then forms a seal against the slightly bevelled inside perimeter of the bottom half once the two halves are compressed together.

Available with two very different Intel "Haswell" Y-Series processors

Customers love speed and performance, but not the larger cost, size and weight that come with it. In the end, designing a system usually means an optimal balance between performance, size, weight and cost. For the R12, intended to be a professional grade computing tool, Motion decided to go with Intel Core power and versatility rather than a less complex Intel Atom-based solution, but it had to as power-efficient as possible. That meant Intel's Y-Series of Core processors.

The dual-core 1.7GHz Intel Core i7-4610Y chip in our review R12 tablet can reach turbo speeds of up to 2.9GHz. The chip, really a System on Chip (SoC), is part of Intel's "Haswell" 4th generation of Core processors. Y-Series chips were initially created by Intel for passively cooled tablets and 2-in-1 devices. Thermal Design Power, including graphics and integrated chipset, is just 11.5 watts, way lower even than the super-efficient U-Series processors we now commonly see in rugged tablets and convertibles. Intel even introduced a new concept called Scenario Design Power (SDP) to highlight the new Y-Series chips. SDP refers to the power the chip consumes doing *standard* tablet tasks. The idea here is that the chip can do everyday tasks at full speed, using just 6 watts. It can handle higher load, but — in passively cooled systems — either not at full speed or only in short bursts.

CPU Choices	Intel Core i-4210Y	Intel Core i7-4610Y
Code name	Haswell	Haswell
Lithography	22nm	22nm
Cores/threads	2/4	2/4
Base clock speed	1.50GHz	1.70GHz
Turbo speed	1.90GHz	2.90GHz
Thermal design power	11.5 watts	11.5 watts
Scenario design power	6 watts	6 watts
Smart cache	3mb	4mb
Instruction set	64-bit	64-bit
Graphics	HD 4200	HD 4200
Graphics base speed	200MHz	200MHz
Graphics max speed	850MHz	850MHz
USB 3.0	yes	yes
Intel vPro	no	yes
Intel Virtualization	no	yes
Intel SIPP	no	yes
Intel trusted execution	no	yes

Motion offers the R12 with either a Core i5-4210Y or the Core i7-4610Y. The table above shows a comparison of the chips' major specs. At first sight, there doesn't seem to be a great difference between the two, though Intel charges about \$110 more for the i7 version than for the i5, and that's in manufacturer quantities. So why would one select the pricier i7?

One area is clock speed, 1.50GHz for the i5, 1.70GHz for the i7. Not much of a difference, but the i7 can reach bursts of up to 2.90GHz whereas the i5 tops out at a much lower 1.90GHz. Since both chips have the same scenario design power and thermal design power, i.e. they can go faster only so long as they don't exceed a certain temperature, the mechanics of the much higher burst speed of the i7 version are not clear, and we'd

have to benchmark both versions under various operating conditions to get an idea of real-world performance characteristics. There's one hint, though: while Intel originally designed the Y-Series chips for fanless devices, the R12 *does* have a small fan, and therefore helps the i7 chip stay cooler, and thus likely operate at a higher performance level for longer.

To use one of our beloved automotive analogies, the two chips are like small turbocharged engines that can make a lot of power for short periods. The i7 can operate at much higher "boost" (2.90GHz max instead of just 1.90GHz), and the R12's fan acts like an automotive intercooler that allows longer periods of maximum boost.

As is, we ran the R12 through our standard PassMark and CrystalMark benchmark suites to test its performance in various categories. To provide an idea of how the R12 with its Y-Series Haswell chip compares with Motion's newly upgraded but lower end CL920 tablet we're adding the CL920's results as well.

PERFORMANCE	Motion R12	Motion CL920
Processor	Core i7-4610Y	Pentium N3540
OS tested with	Windows 8.1	Windows 8.1
Base clock Speed	1.70GHz	2.16GHz
Thermal Design Power	11.5 watts	7.5 watts
CPU Mark	3,569.1	2,635.7
2D Graphics Mark	501.8	183.4
Memory Mark	1,223.4	550.1
Disk Mark	2,243.7	2,323.8
3D Graphics Mark	410.1	146.5
PassMark	1,751.8	1,318.7
ALU	41,840	34,814
FPU	39,598	29,921
MEM	43,164	22,989
HDD	37,594	29,423
GDI	15,891	6,312
D2D	7,000	3,792
OGL	11,732	4,244
CrystalMark	196,819	134,495

The data is quite interesting. At least in benchmark testing in our lab, the super-low voltage Y-Series chip seems to have no problems matching standard U-Series chips with much higher 15 and 17 watt thermal design power ratings in raw processor performance. Graphics performance, likewise, was excellent. But again, we don't know what limitations Intel's "scenario design power" might have on sustained performance under heavy load and high temperatures. But between its intended use and the R12's fan cooling, customers may well get their high performance cake and eat it, too. For those undecided between Motion's R12 and the lower-end (but very quick) CL920, the R12 is probably overall about another 40-50% faster.

Should you get the i7 version or save some money with the i5? Under normal load we don't expect much difference in performance, but the i7 will provide speed bursts that may make a noticeable difference. Also, deployment that need to make use of various special Intel technologies (like vPro) may require the i7.

Power consumption

What impact does the R12's interesting Y-Series processor have on power consumption and battery life? We used Passmark Software's BatteryMon power man-



agement benchmark utility to measure power draw under various operating conditions.

With the Windows power options set to "Motion Optimized" and display brightness at its lowest, we saw an idle power draw of just 3.2 watts. In "Power Saver" mode it was the same 3.2 watts, and in "High Performance" mode about 3.6 watts, all with the backlight at its lowest. That's with the tablet being awake, just idling along.

In "Motion Optimized" mode with the backlight at 50% we saw 3.8 watts, and with the backlight at full strength 4.4 watts. Putting load on the processor by running full-screen 1080p MP4 video, we saw about 6.8 watts with the screen on full bright.

What do those very low power draw figures mean in terms of battery life? The R12's thin Li-Polymer battery has a capacity of 43 watt-hours, the same as the iPad 3 and 4. Dividing that by the 3.2 watt minimum draw means well over 13 hours of battery life with the system staying awake the whole time. Even under the maximum 6.8 watt draw we observed, it'd still mean well over six hours. Motion itself claims "over 9 hours" and that seems quite achievable.

That said, we did notice a few things. First, while power draw of systems with low and standard voltage chips is generally quite steady and thus predictable, the Y-Series chip seems to shift in and out of various power conservation modes, with a corresponding fluctuation of power draw. Second, our measured figures were with the unit's fan off. We noticed significantly higher power draw whenever the fan (which has variable speeds) came on.

High-quality full HD 12.5-inch display

No discussion of a Motion product would be complete without commenting on its display. That's because they always seem to be ahead of the curve. Not only does the R12 offer an unusually large screen with the same full 1920 x 1080 pixel resolution that's providing HD video on virtually all of today's large flatscreen TVs, but there's also Gorilla Glass 3 that provides even more protection against breakage and scratching than the first two generations.

Display quality is very important in tablets. While users sit down in front of a notebook or desktop display and look at it head-on, the viewing angle of tablets varies depending on how it's being held. So the display's ability to control reflections and producing a steady, unchanging image regardless of viewing angle is crucial.

The Motion R12 display, which uses IPS (In Plane Switching) technology, offers a perfect horizontal and vertical viewing angle. The picture remains viewable throughout that range, with color remaining true and unchanged when viewed from above, below, left and right. It's also bright and vibrant.

Other than mentioning Gorilla Glass, Motion's documentation doesn't specify measures employed to maximize viewability and control reflections. That's usually done by minimizing the number of reflective surfaces in the LCD assembly via bonding layers together and via polarizers and anti-reflective and anti-glare coatings. As is, the R12 display surface is glossy like the great majority of tablets available today.

How well does it work? Rather well. The pictures below show the R12 side by side with an Apple iPad 3. The iPad has a very good display and it's being used by tens or hundreds of millions outdoors every day.

The first picture below shows the two tablets in bright outdoors in a semi-shaded area with plenty of contrasts. Both screens have their brightness at their

highest setting. What's instantly obvious in the top row are the harsh mirror-like reflection on the iPad, whereas the R12 screen shows none. When switching the position of the tablets, the R12 also reflects a bit, but the reflections are more muted and have a slightly blueish hue.



In the picture collection below, the two angle comparisons again show some reflections on both tablets, with the R12 offering somewhat better reflection control. The comparison picture on the right shows both tablets facing the open sky on a bright but overcast day without direct sun. Neither of the tablets washes out completely, and once again there is the slightly blueish hue on the R12 and a noticeable difference in the harshness of the reflections between the tablets.



As far as display size and resolution go, roughly 10 inches diagonal is currently considered by many the sweet spot for mobile tablets. Apple chose it for the iPad, and the iPad's boxier 4:3 aspect ratio remains quite common in tablets. However, the R12's wider 16:9 ratio works better in landscape mode, and that's how Windows is used by far the most often.

Overall, the R12's 1920 x 1080 FHD display resolution makes for a very crisp and sharp viewing experience. It's not quite "retina" class as individual pixels remain just barely visible. 1920 x 1080 pixel on the R12's 12.5-inch screen translates into about 176 dots per inch, behind the Microsoft Surface Pro models' 208 to 216 dpi range, but ahead of numerous Kindle Fire and Samsung Galaxy models, and far ahead of most notebook and desktop monitors.

Digitizer: capacitive multi-touch and active Wacom pen

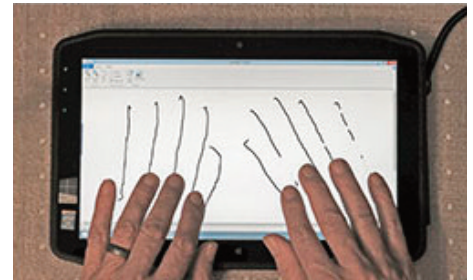
Using a desktop OS such as Microsoft Windows on a tablet means making things work without the mouse classic Windows was designed around. That has always been a challenge, one that Microsoft tried to address with an active pen when it launched its Tablet PC/Windows XP Tablet PC Edition initiative over a decade ago.

For a very long time, tablets used either resistive touch that worked with a finger or a passive stylus, or they had an active digitizer with a special pen, usual-

ly of the Wacom variety, and sometimes they used both together. That all changed when first the iPhone and then the iPad popularized capacitive multi-touch with its effortless panning and pinching and zooming.

With Windows, capacitive touch is a mixed bag because, on the one hand, Windows 8.1 pretty much requires it for its tiled/new-style/Metro interface but, on the other hand, the small check boxes and narrow scrollers of Windows 7 and the legacy Desktop in Windows 8.x can be hard to handle with touch.

Motion addressed this by giving the R12 both 10-point capacitive multi-touch (as demonstrated in MS Paint in the picture below) and a standard Wacom inductive pen that does not need a battery. The Wacom active digitizer has been around for decades and is as mature as it can get.



Among Wacom's strengths is "hovering," i.e. the cursor following the tip of the pen even if the pen does not touch the surface. And since Microsoft always supported the Wacom digitizer, there's plenty of software that supports it. One of the problems with Wacom pen tablets used to be that you were totally sunk if you lost the (costly) pen. That's not an issue with the R12 because its super-responsive capacitive touch interface allows users to operate the tablet effortlessly, albeit not quite as precisely, even without the pen.

Cameras good enough for real work

Like virtually all tablets, smartphones and notebooks these days, the Motion R12 has integrated imaging capabilities via dual cameras. One of them faces to the front and has 2.0 megapixel resolution. This one is for video conferencing. The other faces to the rear and has 8.0 megapixel resolution. That one is for workflow documentation.

Our review machine came with the SnapWorks camera app by Motion. Its user interface is uncluttered and intuitive, and the R12 makes a satisfying mechanical camera clicking sound whenever a picture is taken. Motion developed this app specifically to support inspection workflows where the ability to quickly annotate a photo with field notes using the pen or touch interface comes in handy, as does the ability to automatically incorporate a GPS and time stamp.

The pictures below were taken with the R12's camera in its highest resolution.

We only had limited time to work with the R12's cameras, but what we learned was quite encouraging.





For years, one of our biggest gripes with vertical and industrial market rugged computing gear was the low quality of its integrated cameras, to the extent where most were hardly useful at all. Given that every smartphone today has good to excellent cameras, something had to happen. Apparently Motion agreed, as the internal documentation camera of the R12 is vastly better than most of what we've seen.

We don't know the origin and all the specs of the R12 documentation camera and we didn't have enough time to draw definite conclusions, but, as the title of this section suggests, the R12 cameras are clearly good enough for real work, and that's big progress.

Remarkable ruggedness

One of the issues facing vertical and industrial market tablet manufacturers is just how rugged to make their tablets. Hundreds of millions are using tablets now, but with the trend towards thinner and thinner consumer market tablets, a lot of those tablets are simply too fragile for field or even enterprise use. So with business customers wanting tablets that hold up on

the job, but also look and feel as much as the popular consumer products, what degree of ruggedness is right? Motion's approach is to offer tablets that are durable and tough enough for their intended deployments, but without making them too big and heavy. The 3-pound R12 is a primary example of that philosophy.

In their ruggedness testing, Motion concentrated on scenarios the tablet will likely encounter, and situations and locations where the R12 will primarily be deployed. That included extensive vehicle crash testing with the tablet and its docks.

The R12 can handle 4-foot drops, which is important because a tablet dropped to the ground while being operated in a standing position will fall from approximately that height.

The R12 further has IP54 sealing, where the "5" means protection against dust and the "4" protection against water spray from all directions, albeit with limited ingress permitted. That's not the total immunity to the elements that an IP67 rating provides, but definitely good enough for the R12's intended use.

The R12's operating temperature range is a fairly



Motion R12 Specs

- Type:** Rugged Windows tablet
- Processor:** Dual-core Intel "Haswell" Core i7/2.9GHz i7-4610Y, or 1.5/1.9 GHz Core i5-4210Y, TDP 11.5 watts
- OS:** Windows 7 or Windows 8.1 Professional
- Memory:** 4GB or 8GB 1,600MHz DDR3L SDRAM
- Graphics:** Intel HD Graphics 4200
- Display:** 12.5" 1920 x 1080 pixel wide-viewing angle IPS LCD with Corning Gorilla Glass 3
- Digitizer:** Dual-mode capacitive 10-point touch and Wacom active pen (does not need pen)
- Keyboard:** Onscreen keyboard, optional wireless hardware keyboard using EasyPair technology
- Storage:** 64GB, 128GB or 256GB Solid State Drive
- Slots:** 1 x SDHC Card, 1 x SIM card
- Housing:** Rubberized enclosure over magnesium-alloy internal frame
- Operating temperature:** 14°F to 131°F (-10°C to 55°C)
- Ingress protection:** IP54
- Humidity:** Est. 8 to 80% without condensation
- Drop:** 4-foot drop per MIL-STD-810G
- Vibration:** Est. MIL-STD-810G, Method 514.6, Proc. I Cat. 4, Fig. 514.6C-1; MIL-STD-810G, Method 514.6, Proc. I Cat. 24, Fig. 514.6E-1
- Altitude:** Est. up to 15,000 feet operating
- Safety:** AS/NZS 3260:1997 and 60950-1 (2nd Edition); FCC/ANSI C63.4; UL, CUL, CE (IEC/EN60950-1; 2009 +All); IEC/EN 60950-1 2nd Edition (2009); CAN/CSARSS-102; FCC OET65 Supplement C; ETSI EN 62311:2008; LVD (73/23/EEC); EU Directives 2002/95/EC, 2002/96/EC, 2006/66/EC and amendments; Substances of Very High Concern (SVHC) Article 59.1 of Reg No. 1907/2006 of the European Parliament /REACH; California Proposition 65; Technical Instructions for Safe Transport of Dangerous; Goods by Air (ICAO Doc #9284); Emergency Response Guidance for Aircraft incidents involving Dangerous Goods (ICAO Doc #9481)
- Regulatory:** AS/NZS 3548:1995 Class B, 4268; AS/ACIF 5042.1 and AS/ACIF 5042.3 (WCDMA/HSDPA); AS/ACIF 5042.1 and AS/ACIF 5042.3 (GSM/EDGE); CAN/CSA ICES-003 Class B, RSS-210 Issue 7, RSS-132 and RSS-133 (1xRTT/EVDO); CENELEC EN 55022 Class B (CISPR22), 55024 (CISPR24), EN 61000-3-2, 61000-3-3; ETSI EN 301-893, 300-328, 301-489-1, 301-489-7, 301-489-17, 301-489-24, 301-511, 301-908; FCC Part 15 Subpart B Class B, 15 Subpart C (2.4Ghz), Subpart E (5Ghz), Part 22 H and Part 24 E (1xRTT/EVDO); R&TTE (89/336/EEC) and (99/5/EC)
- Size:** 12.9 x 8.1 x 0.65 inches (328 x 206 x 17 mm)
- Weight:** 2.95 pounds (1.34 kg.) incl. battery pack
- Power:** Rechargeable, replaceable externally accessible 14.8 Volt, 2,900mAh 43 WHr Lithium-Polymer ("over 9 hours")
- Cameras:** Front-facing 2.0-megapixel camera, rear-facing 8.0-megapixel camera
- Communication:** Intel Dual Band Wireless-AC 7260 plus Bluetooth 4.0, dual array front mics, rear mic; optional 4G LTE mobile broadband with GNSS (GPS + GLONASS) OR Navisys Technology GE-730 (u-blox 7) GPS module with SBAS
- Interface:** 1 x USB 3.0, 1 x HDMI, 1 x 3mm audio, power, dock
- Price:** Starting at US\$2,295
- Security:** TPM 1.2, optional Absolute Computrace Complete, WinMagic Secure Doc Disk Encryption
- Warranty:** 1-year standard, multi-year options
- Contact:** Motion Computing
www.motioncomputing.com
sales@motioncomputing.com
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wide 14 to 131 degrees Fahrenheit, which should cover the vast majority of intended deployments for this class of tablets.

As usual, Motion also provides a long lists of safety and regulatory requirements that the R12 meets, and additional ruggedness criteria are probably covered in there.

Subjectively, Motion's slender business tablets don't generally look as tough and rugged as they actually are. But as our internal inspection revealed, looks are deceiving. With its heavy-duty magnesium frame inside and the rubberized guards and protection outside, the R12 can handle a significant amount of punishment. Then add the shatter and scratch-resistant Gorilla Glass, the skillfully integrated controls, the lack of trim that may come off, and the R12 is a trust-inspiring unit indeed.

Note that Motion also lists unspecified additional MIL-STD-810G testing, but the documentation does not state which specific testing was performed.

Docks and accessories

Motion offers a large variety of docks and accessories for the R12 tablet. They are designed to provide protection and extra functionality. Available, among other, are:



■ Top left: the R12 Series dock transforms the R12 into a full desktop computer. It has an integrated battery charger.

■ Top right: the R12 Series wireless keyboard stand automatically pairs with any R12 tablet. When not in use, it can be magnetically attached to the back of the tablet.

■ Bottom left: the lockable R12 Series Secure Mobile Vehicle Dock can accommodate the tablet even with the SlateMate or carrying case.

■ Bottom right: the R12 Series SlateMate data acquisition module can be configured with up to three I/O devices (serial port, 1D/2D bar code reader, HF RFID).

Note that Motion designed the optional keyboard as a "tablet first" keyboard. It attaches to the tablet in an ergonomic way that doesn't prevent the user from accessing the display and operating the tablet while the keyboard is attached. There is also a proprietary communication protocol called "Easy Pair" that allows the keyboard to connect automatically and securely while eliminating the need to enter a pairing code.

Motion R12 Rugged Tablet PC: Summary

The uniquely designed R12 is the venerable Motion J3600's sleeker, lighter, and faster successor. It is a very well-conceived tablet that offers enterprise and business customers what Motion found they want and need in real life and on the job.

Powered by your choice of an ultra-low voltage Intel "Haswell" Core i5 or i7 Y-Series processor, the R12 provides excellent performance without quickly draining its externally accessible and replaceable 43 watt-hour Lithium-Polymer battery. Motion wisely included a small fan to allow the processors to operate at high speed even under load and higher temperatures, thus facilitating consistently high performance.

The large 12.5-inch display offers full 1920 x 1080 pixel HD resolution, the same as HDTVs. It is very sharp and bright enough even for outdoor use. Optical treatments soften the reflections inherent in "glossy" displays, and the screen offers excellent viewability from any angle. The 10-point capacitive multi-touch interface works as smoothly and effortlessly as users have come to expect from consumer devices. For precision work, the Motion R12 also has an active Wacom digitizer pen that does not need a battery.

The Motion R12 has a full-size USB 3.0 port, a standard HDMI port, an audio jack, three microphones, dual speakers, an SD Card reader, a fingerprint reader, and it can accommodate scanners, RFID, and even a legacy serial port through its optional "SlateMate" bolt-on module. The integrated 8-megapixel documentation camera and Motion's SnapWorks camera application can easily be used for high quality workflow documentation.

The Motion R12 is a very solid and ergonomic design that is instantly recognizable with its unique chamfered corners. A tough magnesium frame inside the unit provides strength, and all ports are sealed with tight-fitting rubber plugs.



With the R12, Motion Computing offers a rugged, modern and highly configurable Windows tablet with strong performance and a bright, sharp 12.5-inch capacitive multi-touch display large enough even complex applications.

— Conrad H. Blickenstorfer, RuggedPCReview

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