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SAMWELL **RUGGEDBOOK** SR820

NETBOOK FUNCTIONALITY IN A RUGGED TABLET PC SLATE COMPUTER

by Conrad H. Blickenstorfer

Taiwan-based Samwell Group is a global technology solutions provider concentrating on the convergence of Internet, computing, and telecom technologies and software applications. "RUGGEDBOOK" is Samwell's brand name for their complete line of semi-rugged and fully rugged mobile computing products that include convertible notebooks, ultra-mobile PCs, and the SR858 rugged Tablet PC shown here.

If a full-size tablet computer is too big and heavy, the Samwell RUGGEDBOOK SR820 rugged Tablet PC presents an interesting alternative that essentially provides Netbook functionality in a tablet form factor. Little clamshell netbooks are selling by the millions, so why not offer the same size and technology in a ruggedized touch screen device without the extra bulk and weight of a physical keyboard?

The RUGGEDBOOK SR820 fills two needs. With a weight of under three pounds it can be used as a smaller, lighter version of a full-size tablet PC. And with a footprint almost identical to those of most netbooks, it can serve as a ruggedized tablet version of a netbook. The Intel Atom-powered SR820 is also completely silent because it doesn't need a fan.

However, while the smaller size, lesser weight and more affordable price of netbooks compared to full notebooks mean you're giving up some features and performance, the same does not hold true for scaled-down tablets, at least not to the same extent. The SR820's 8.9 inch wide-format display is large enough for real work, and its 1024 x 600 pixel resolution is actually more than the 800 x 600 pixel SVGA resolution still found in many full-size tablets. The SR820 is powered by an Atom CPU that was designed to for economy at an affordable price and therefore cannot meet Intel Core processor performance, but since most full-size tablets also use low voltage processors, the speed difference is smaller than one expects. In essence, a prospective buyer will have to determine if netbook-class performance and a pressure-sensitive touch screen (as opposed to an active digitizer) meet project requirements. If they do, the SR820 certainly looks like a handy, attractive solution.

Taking a look at the SR820

Unlike some of the rugged UMPCs we've reviewed, the RUGGEDBOOK SR820, compact though it is, doesn't look like a scaled-down computer. It measures 10.1 x 6.2 inches and is an inch and a half thick. Its nine-inch touch screen looks large enough. And unlike some lightweight tablets, it has a full set of I/O ports, and they are all full size. It also runs the full version of the Windows XP Tablet PC Edition. The design is purposeful but not fancy. No chrome or style elements here; the SR820 is just a matt-black magnesium tablet with rubber bumpers on each corner for additional protection. There is no keypad and there are no hardware controls other than a number of large and very clearly marked membrane pushbuttons along the right side of the display.

Looking at the computer from all sides, there are ports underneath individual protective rubber plugs on the left and right (the red window indicates the optional laser scanner), and a surface-mount docking connector at the bottom. There are two additional cutouts each on top and on the bottom of the unit. They accommodate antennas and additional expansion.

Design and construction

While the RUGGEDBOOK SR820 may look like just a tablet version of a standard netbook, looks deceive. The SR820 is far better built than any consumer netbook, and it is far tougher and more durable. The device feels as if it were crafted from a solid block of metal, and there is no flexing or twisting at all.

Unlike the often very intricate housing/chassis constructions found in consumer tablets and notebooks, the supremely solid magnesium alloy case of the SR820 consists of just a lower box with the LCD lid on top of it, held together by ten long screws. Sealing consists of a rubber O-ring sitting in a groove around the entire perimeter. It is not actually a ring, but a length of rubber, that terminates with a sort of side-track.

There are two removable covers on the backside of the RUGGEDBOOK SR820 (both removed in the picture above). One covers the battery and expansion slots, the other the optional WWAN module.

The battery compartment is protected by a flat metal plate secured with four Philips screws. The battery itself is a rectangular block. Its capacity is 38 watt-hours (7.4 Volts, 5,200mAh). The battery contacts are not sealed towards the interior of the computer, so all sealing must be via the cover plate. To accomplish that, there is a flat ribbon O-ring seal held in place with a series of tiny pins. For proper sealing it's imperative that the seal, which is a bit of a dust and lint magnet, is in place and not compromised in any way. In fact, the seal must be carefully put in place after the battery has been inserted.

Inside the SR820, the Samwell-labeled mother-

board is extremely clean. It is a one-piece solution with a separate I/O board that, in our system, included a VGA port, a USB port and a laser scanner.

Samwell offers two different I/O configurations. One adds a standard DB-9 RS232 serial port, the other replaces that port with the window for the optional Symbol laser scanner. Our test had:

- 2 USB 2.0
- 1 VGA RJ45 + 2 audio jacks
- 1 RJ45 LAN
- 2 audio jacks
- Laser scanner
- Docking/port replicator connector

The optional dock adds three USB ports, a RS232 serial port, a LAN port, and DC power. The dock attaches to the bottom of the unit and also provides vehicle mounting options. The image below shows the SR820 in the dock, here shown with RAM's patented ball and socket mounting system that allows you to mount practically anything anywhere.

For expansion, the battery compartment also contains an SD Card slot and a SIM slot for use with the optional WWAN module. Having the SD Card slot inside the unit, and under a screw-down door, means the card is safe, but it is not readily accessible.

One concern I have is that the I/O ports completely rely on the protective rubber plugs for sealing, i.e. the connectors behind the protective plugs do not have additional sealing. The plugs fit well and are replaceable, but you have to firmly push them into place to get a reliable seal, and that's not easy when you wear gloves or when it's cold on the job.

Ruggedness

As the brand name implies, the RUGGEDBOOK SR820 is fully rugged. Its magnesium construction feels like it is made to last, and it can take quite a beating. Its inherent toughness is enhanced by rubber bumpers on all corners that are actually steel caps with rubber on top. This makes them far more stable than rubber-only bumpers, and they securely attach to the unit without the need of glue. The picture to the right shows one of the bumpers.

Samwell performed a variety of MIL-STD-810F/810G testing, both inhouse and through SGS Group external testing. The SR820 passed the MIL-STD 810G Method 516.6 Procedure VI "drop test" that includes 26 drops to concrete on each face, edge and corner from 48 inches. It also passed mechanical shock, random vibration, temperature/humidity cycling as well as high/low temperature tests.

As far as sealing against the elements goes, the SR820 carries IP65 ingress protection where the "6" means the unit is totally protected against dust, and the "5" means the machine is protected against low pressure water jets from all directions, although limited ingress is permitted. The standard operating temperature range is 41 to 122 degrees Fahrenheit for

hard disk versions, and 32 to 140 degrees Fahrenheit for systems equipped with a solid state drive (SSD). There is no low temperature option that would allow operation in freezers and similar deployments.

The pictures below show some of the independent ruggedness testing performed at SGS Group labs.


Powered by Intel Atom

The RUGGEDBOOK SR820 is based on Intel's Atom processor architecture. Intel introduced the Atom platform a couple of years ago as an optimized solution for devices that did not require Intel Core processor performance or simply needed a processor solution that generated less heat and used less power. Intel met its goals, and Atom processors have been hugely popular and a hit for Intel, with millions of Atom-powered netbooks sold, and the chip being used in a growing number of vertical market devices. So let's take a look at Atom's background.

In an attempt at fending off criticism over its mediocre mobile processor offerings, Intel's goals for the Atom were low power consumption and low cost while still delivering adequate (or, as is often used, "targeted") performance. To achieve that, the Atom platform was an entirely new design that allowed Atom chips to use much less power than even the slowed-down ultra-low voltage mobile versions of Intel's Core processors. There are trade-off, of course. In order to preserve power and keep costs down, most Atom chips only have one core and instead use HyperThreading, an older Intel technique that uses two threads without increasing power consumption.

Atom processor architecture is fairly simple (if any processor with its millions of transistors can be called simple) but includes a lot of power conservation features. A special bus mode minimizes power needed to transmit data to the processor. During periods of inactivity, cache is flushing cache data to system memory. Other Intel power conservation modes were improved and a new standby mode can essentially shut down the processor. Combined, these measures can result in greatly reduced overall power draw while still providing acceptable performance.

The Z530P used in the SR820 is part of the original Z5xx family of Atom processors, codenamed "Silverthorne." The "P" means the chip uses the
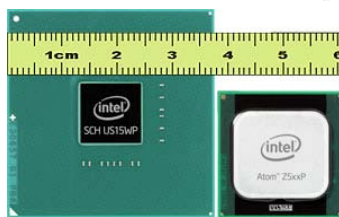

"large footprint" version with a 22 x 22 mm package size (as opposed to the tiny 13 x 14 mm package footprint for the original version) that can handle industrial temperature ranges. Intel targeted Silverthorne at mobile internet devices (MIDs), but they have also become common in rugged mobile and embedded devices. The Silverthorne chips use the "Poulsbo" System Controller Hub that was developed

specifically for the Z5xx Series. The chipset—which supports PCI-E, SDIO, DDR2, LVDS, ATA 100, LPC and more—uses only about 2.3 watts, which means the total power consumption of the CPU and chipset combined isn't even 5 watts! That is only a fraction of what conventional Intel notebook processors and chipsets use. And the Poulsbo chipset even has hardware support for H.264 and other HD decoding.

Power consumption

A major selling point of the Intel Atom processor architecture is its minuscule power consumption. In the past, however, we've come across Atom-powered devices that did not make full use of the Atom's power savings modes, with the result that power draw was less impressive than it should have been. How well does the SR820 take advantage of Atom?

The answer is "extremely well." We used Passmark Software's BatteryMon power management benchmark utility to measure the SR820's power draw. With both WiFi and Bluetooth radios off and the screen brightness set to its lowest level, we found a very modest discharge rate of about 6.5 watts. At this rate, the SR820's 38 watt-hour battery lasts 5.75 hours. Not bad for a device with a bright 8.9-inch display and a relatively small battery.
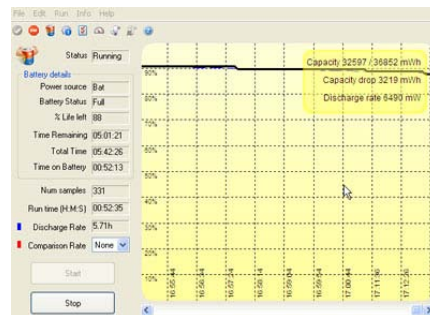
In real life you probably want WiFi and Bluetooth turned on. In our tests, this added only about a quarter of a watt of power draw—almost negligible. Turning the display's LED backlight up to full power has a larger impact and adds about a watt and a half, with the SR820 still only drawing about 8.5 watts.

Samwell did a great job putting the SR820's Atom processor's power management and low power consumption to good use. The company's estimate of up to six hours of battery life seems achievable.

Performance

Being such a fuel miser, how fast is the SR820? Based on our benchmark library of Atom Z530 systems, we expected the machine to feel about as fast as a consumer netbook (which are actually based on a different family of Atom processors) and its relative performance compared to most full-size rugged tablets on the market to be at about the 60-65% level.

We used Passmark Software's PerformanceTest 6.1 that runs about 30 tests covering CPU, 2D graphics, 3D graphics, memory, and disk and then computes scores for each category and an overall PassMark score. For comparison, we're listing benchmark results for devices with different versions of the Z-Series Atom processor, the Atom N270 used in millions of netbooks, and also the Intel Core Duo

PERFORMANCE COMPARISON Model	Samwell SR820	Handheld Algiz 8	Logic Instr. FieldBook	Panasonic H1 Field	GD-Itronix Duo-Touch 2	Winmate I80
Processor	Atom Z530P	Atom Z510	Atom Z530P	Atom Z540	U2500	Atom N270
CPU Speed	1.60 GHz	1.10 GHz	1.60GHz	1.86Hz	1.20GHz	1.60Hz
Thermal Design Power (TDP)	2.3 watts	2.2 watts	2.3 watts	2.4 watts	10.0 watts	2.5 watts
CPU Mark	248.7	107.8	235.5	275.4	631.1	162.7
2D Graphics Mark	101.8	92.3	84.6	115.7	164.4	212.3
Memory Mark	222.5	128.6	224.4	242.7	240.6	224.0
Disk Mark	218.6	245.7	266.4	284.8	318.8	382.5
3D Graphics Mark	18.6	14.5	9.8	10.1	101.4	81.3
Overall PassMark	**167.4**	**116.1**	**170.3**	**191.9**	**312.6**	**200.2**

U2500 used in many standard-size tablet PCs.

The benchmark figures show pretty much what we expected. They demonstrate where Atom Z530-based systems fit in in general, what the performance difference is between Atom processors with different clock speeds, how Atom "Silverthorne" devices compare with Atom "Diamondville" systems, and how Atom compares with the Core Duo U2500. In essence, Atom-based systems deliver netbook performance, which makes them quite suitable for a wide variety of tasks, although they cannot meet the performance of Core Duo-based systems such as those with the popular 1.2GHz Core Duo U2500

Note that benchmarks are only an approximate indicator of performance, and that they can yield misleading results when different processor architectures are being compared. However, after having run hundreds of benchmarks, we found that the bottomline is usually a good indication of a system's overall performance.

In daily usage, the RUGGEDBOOK SR820 feels lively and responsive, and it is definitely up to most jobs. However, Atom processors do have performance limits, so those with high performance requirements must ascertain that an Atom-based system can handle their applications.

Storage
Our SR820 review unit came with a 4,200rpm 120GB Toshiba MK6028GAL hard disk. This is a 1.8-inch design with a Parallel ATA interface and an almost unbelievable 300,000 hours mean time to failure. That's almost 35 years!

The disk assembly weighs only over three ounces, uses very little power (around one watt while reading or writing, about 0.4 watt while idle), and operates silently. Its lower operating temperature limit of 41 degrees Fahrenheit, however, limits the SR820 to the same value. The SR820 can also be ordered with a Solid State Disk (SSD) storage with 16 or 32B capacity, which also lowers the operating temperature range to 32F.

Wireless communication
As expected in a modern mobile computer, the SR820 includes WiFi and Bluetooth and can also be ordered with additional wireless options.

For WiFi, the tablet comes standard with an AzureWave 802.11b/g/n WiFi AW-NE768 wireless network adapter. It is a very compact PCIe mini card that supports both the legacy 802.11b/g protocols as well as the new N standard protocol with its much faster receive data rates of up to 300Mbps (802.11a/b/g is good for up to 54Mbps). In addition to the potential 5X bandwidth and up to 3X range increase, the AzureWave module is very power-efficient.

A Broadcom Bluetooth Class II version 2.1 with EDR (Enhanced Data Rate) module provides theoretical maximum speed of up to 3 megabits per second.

Optionally available is a cellular voice/data radio. Our review unit had a Bandluxe HSUPA M250 mini-PCIe card that supports Triband HSDPA/UMTS (800, 1900, 2100 MHz) and Quadband GSM/GPRS/EDGE (850, 900, 1800 and 1900). Maximum HSPA/WCDMA downlink data rate is 7.2 mbps, uplink 2 mbps. The Bandluxe module comes with an attractive and quite extensive control panel with settings (network and radio selection, SMS, SIM), statistics (up and download and connection log), contacts, profiles, an SMS screen (inbox, outbox, compose, drafts) and a cool home screen that shows connection time and data. Optional laser scanning is provided by an integrated 3.3

Volt Symbol SE955 I100R module, a frictionless miniature scan engine designed for superior reliability, enormous ruggedness (shock up to 2000Gs!), and great durability thanks to a Liquid Polymer scan element. It can do up to 100 scans per second, yet accurately captures even damaged and poor quality code. Note, however, that the scanner module takes the place of the RS232 serial port, so it's either one or the other, but not both. The scanner module is shown to the right.

Supported codes of the Flash-upgradeable scanner include UPC-A, UPC-E, UPC-E1, EAN-8, EAN-13, Bookland EAN, Code 128, Code 39, Code 93, Code 11, Interleaved 2 of 5, Discrete 2 of 5, Chinese 2 of 5, Codeba, MSI and RSS.

According to Samwell, a Symbol SE4500/PL4507 1D/2D imager will be optionally available the end of May 2010. It will read all major 1D codes as well as the following 2D symbologies: PDF417, MicroPDF417, Composite, RSS, TLC-39, Datamatrix, QR code, Micro QR code, Aztec, MaxiCode and the US PostNet, US Planet, UK Postal, Australian Postal, Japan Postal Dutch Postal (KIX) postal codes.

Integrated camera
The SR820 has an integrated 2-megapixel camera mounted in the center top of the backside of the computer. The camera is meant to be used to document conditions or whatever benefits from image documentation. It can be accessed via custom applications, but also from the "Scanners and Cameras" utility that's part of Windows XP.

Unlike many cameras integrated into handhelds or tablets, the one in the SR820 works amazingly well and provides sharp and decent quality pictures. In fact, the 1600 x 1200 pixel images are good enough to do things like taking pictures of labels, documents and other subjects where being able to see and read fine detail is crucial. Note that the Windows utility is very basic and offers no control over exposure settings. For that, you'll need a dedicated camera utilities or software that supports the camera.

If a basic 2-megapixel camera is not enough, as of May 2010, Samwell offers an optional integrated 5-megapixel camera with auto-focus for those who heavily rely on image documentation capabilities in their mobile computers.

Competent 8.9-inch display
The SR820's N089L6-L02 WSVGA LCD display comes from Chi Mei, which is the third largest LCD manufacturer in the world. It has LED backlight, vertical striping, 3H hard coating, 180 nit brightness, a 40-pin LVDS interface, an operating range of 32-122 degrees Fahrenheit, and can display 256k colors. Lifetime of the LED light bar is 15,000 hours (which means you'll likely never have to replace it), horizontal viewing angle is 45 degrees in each direction, vertical viewing angle a more modest 20 degree up and 45 degree down.

Like most tablet PCs, the RUGGEDBOOK SR820 will be used outdoors where the display must be viewable under many lighting conditions. Our unit came with the optional sunlight-viewable display. The picture below shows an outdoor comparison between the SR820 and an Acer Aspire One netbook. The SR820's display is a bit brighter and hugely more readable thanks to very

SAMWELL RUGGEDBOOK
SR820

Type: Rugged Tablet PC (fanless design)

Chassis/housing: Magnesium alloy chassis/housing, rubber bumpers

Processor: 1.6GHz Intel Atom Z530P with 512KB L2 cache and 533MHz FSB

Graphics/chipset: Intel "Poulsbo" System Controller Hub US15WP, Intel Graphics Media Accelerator 500 (Intel GMA 500) with 3D graphics (integrated in US15WP)

Thermal Design Power: 2.3 watts

OS: Windows XP Tablet PC Edition

Memory: 2GB DDR2 800MHz in one slot

Display: 8.9" WSVGA (1024 x 600 pixel) TFT with LED backlighting; optional sunlight readable version

Digitizer/Pens: 4-wire resistive touch screen

Keyboard: Onscreen keyboard

Storage: 60 GB shockmounted 1.8-inch 4200rpm PATA hard disk (Toshiba MK6028GAL); optional 16/32GB solid state disk

Expansions slots: 1 SD Card + 1 SIM

Size: 10.1" x 6.2" x 1.5" (inc. rubber bumpers)

Weight: 2.9 pounds as tested (with battery and bumpers)

Ruggedness: Shock (SSD): MIL-STD 810G, 506.6 VI: 4-foot drop, over concrete, onto each edge, face and corner (26 drops total); Mechanical shock (SSD) MIL-STD 810GF, 516.5 Procedure I: 40G saw-tooth pulse while operating (3 shocks each axis, 18 total); Vibration: random wave forms 1-200 Hz 90 min per axis; Ingress Protection: IP65; Operating Temperature: 32 to 140 degrees Fahrenheit (SSD), 41 to 122 degrees Fahrenheit (HD); Temperature/humidity: MIL-STD-801G, Method 507.5; Altitude 15,000 feet operating per MIL-STD-810G, Method 500.5, Procedure II

Power: Dual 7.4 Volts, 5,200mAh 38 watt-hour Li-Ion battery system ("6 hours")

Communication: Wireless options 802.11b/g/n WiFi, Bluetooth V2.1 + EDR (Class 2); optional integrated 50-channel uBlox GPS, 1D or 1D/2D barcode scanner, HSUPA/E-GPRS 3G mobile broadband (WWAN uses mini-PCIe slot)

Interface: 2 USB 2.0, 1 RS232 (or barcode scanner), RJ45, VGA, audio in/out, integrated 2-megapixel camera (optional 5-megapixel camera with autofocus by end of May 2010)

Price: depends on configuration

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effective anti-glare coating. The Acer's glossy screen has so much reflection as to make it almost useless.

When looked at from an angle, the SR820 display remains perfectly readable, although it loses some of its brightness. The Acer's gloss screen and bezel, on the other hand, are a nightmare for outdoor work.

In direct sunlight, no backlight is strong enough to be a match for the sun, so Samwell's decision to stay with a relatively modest backlight that will not quickly drain the battery seems reasonable. To its credit, the consumer market Acer netbook remains quite readable as well.

As far as display size and resolution go, nine inches diagonal is perfectly adequate, and the 1024 x 600 WSVGA display resolution is the same as that on millions of netbooks. The display is very crisp and sharp. Dimming is via hardware controls in eight steps, but does not go down to 0%. The narrow vertical viewing angle means you have to look at the display from just the right angle to get the best picture. One drawback of WSVGA is that it tends to cut off the bottom of web pages and applications designed for full 1024 x 768 XGA resolution; if that is a problem, you can set the SR820 to interpolated XGA mode. It loses a bit of crispness, and the aspect ratio is off a bit, but it's a workable solution.

Digitizer

The SR820 has a 4-wire resistive touch screen that can either be used with the small telescopic stylus or with a finger. It's configured with the PenMount control panel that includes these settings screens:

■ **Calibrate** handles touch calibration using 4, 9, 16, or 25 points, with 25 points offering the maximum accuracy. In advanced mode you can opt to show calibration data.

■ **Settings** lets you pick either mouse emulation mode or click-on-touch, enable a beep sound to occur on pen down or pen up (or both), and even set its frequency and duration. You can also engage a cursor stabilizer to eliminate cursor jitter, and you can set how the digitizer should handle right clicks.

■ **Edge Compensation** determines how the digitizer acts along the perimeter of the display where it is sometimes hard to accurately control the cursor.

While resistive touch panels work well, they do not take full advantage of the many Microsoft and third party pen utilities designed for use with an active inductive digitizer that is not available on this machine. The SR800 does come with the Microsoft Input Panel where you can enter text with the onscreen keyboard or with either a free-form or combed handwriting input window. Ink does not go on easy, and the hesitation in ink flow interferes with recognition. This should not be an issue with this sort of machine, and so there may have been a driver or settings problem on our system. Unfortunately, the same ink issues hamper the use of potentially very valuable utilities such as Microsoft Journal, which all rely on the smooth flow of ink.

So while the SR820 resistive digitizer works well for screen navigation, it still would be nice to have an active digitizer option or a dual input panel option that supports both active pen and touch.

Keyboard and text entry methods

Being a tablet PC, the RUGGEDBOOK SR820 neither has a physical keyboard nor a lot of external physical controls. Whatever there is lined up along the right side of the display. The controls include an on/off switch, separate buttons to turn Bluetooth and WiFi on and off, a security button that issues a Windows Alt-Ctl-Del that brings up the Windows Task Manager, and a display rotation button that toggles between landscape and portrait. There are also screen brightness and volume controls. There are no physical function buttons of any kind.

The pictures below show Microsoft's input panel that includes a comprehensive onscreen QWERTY keyboard that can be toggled between to show standard F1-F12 function keys. The soft keyboard, however, requires the stylus and does not work well with touch (unless you use a fingernail).

The input panel also includes two versions for handwritten input, one combed with individual boxes for each symbol, and one free form. All applications work with these soft keyboards.
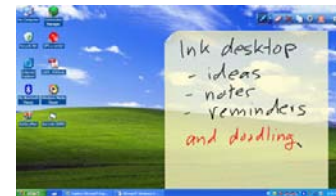
Recognition and pen functionality

Equipped with a touch screen, the SR820 offers functionality that is not available on standard PCs. That includes handwriting recognition, a fascinating technology that due to unrealistic expectations received negative press over the years.

The Microsoft Input Panel offers good handwriting recognition support but using it with the SR820's resistive digitizer requires some getting used to. Once mastered it works quite well. The recognizer works as is, but can also be trained to learn specific styles of handwriting and how to recognize characters or words the recognition engine has problems with.

In order to take full advantage of a pen-based computer, users should install some of the freely available utilities and applications specifically developed for pen and touch input. Microsoft offers the free "Experience Pack for Tablet PC" for download. We installed it on the SR820 and recommend it.

The Experience Pack includes games and demonstrations, but also such useful utilities as the "Ink Desktop" that lets you take handwritten notes directly onto an always visible notepad. I also liked the "Snipping Tool" that lets you select and annotate any part of a website, content or document by drawing a line around it or by selecting a window. Snipping Tool is perhaps of most useful utilities on a tablet device like the SR820, and I found myself using it a lot.

The SR820 comes with Microsoft Journal, an electronic notepad that can be a great productivity tool. You can write notes in electronic ink, do quick doodles and drawings, convert handwritten notes to text, email notes, and so on. As with the Snipping Tool, there are different size and color pens, highlighters and also an eraser. Again, this works a lot better with an active digitizer, and so we still hope Samwell will offer one as an option.

Summary: Samwell RUGGEDBOOK SR820

The Samwell RUGGEDBOOK SR820 provides netbook size and convenience in a rugged tablet form factor. Measuring just 10.1 x 6.2 x 1.5 inches and weighing under three pounds, the SR820 is smaller and lighter than full-size rugged tablets without requiring many compromises. Its 8.9-inch touch screen with 1024 x 600 resolution (1024 x 768 interpolated) is large enough to be useful. There is good wired connectivity on board, all the connectors are standard size, and there is a wealth of wireless functionality (including available GPS and 3G radio) and also an 2-megapixel integrated camera and optional laser scanner.

Powered by an 1.6GHz Intel Atom Z530P processor, the SR820 provides a balance between decent performance and long battery life, thanks to the very low heat dissipation of the processor all without the need of a fan. While heavy-duty multimedia is not the SR820's strong side, it feels quick and responsive in most situations, and the 38 watt-hour battery lasts for up to six hours.

The 8.9-inch display is bright and sharp, and offers good outdoor viewability without any glare. The resistive touch screen works well and is highly configurable, but does not offer the smooth inking of an active digitizer (which we'd like to see as an option).

For a very compact tablet computer, the SR820 has good onboard connectivity with USB, LAN, VGA, audio and either a serial port or a laser scanner, as well as additional connectivity via the optional dock. For onboard storage expansion there is a user-accessible SD card slot in the battery compartment. The integrated 2-megapixel camera offers very good image quality for documentation.

The SR820's nicely designed magnesium alloy chassis, rock-solid construction, and steel-backed rubber bumper protection combine to make a rugged, durable tablet computer able to withstand accidents and exposure to the elements in the field. The device is also well-sealed with individual rubber plugs, though we'd like to see the actual ports sealed as well.

With the RUGGEDBOOK SR820, Samwell introduces a the tablet equivalent of a rugged netbook computer. It's smaller and lighter than standard-size tablets, has most of the features and performance, but is much more compact and offers better battery life.