

SAMWELL RUGGEDBOOK MCA9

INTEL ATOM-POWERED MOBILE CLINICAL ASSISTANT IN A SLEEK, SPACE-SAVING FORM FACTOR

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 rugged convertible notebooks, ultra-mobile PCs, Tablet PCs, and Mobile Clinical Assistants such as the RUGGEDBOOK MCA9 shown here.

The RUGGEDBOOK Mobile Clinical Assistant MCA9 is based on the company's RUGGEDBOOK SR820 model, a very interesting 2.4-pound computer that essentially provides Netbook functionality in a tablet form factor. However, unlike the SR820 that is geared for duty in demanding outdoors environments, the MCA9 was designed to break into the increasingly lucrative medical and clinical computing market.

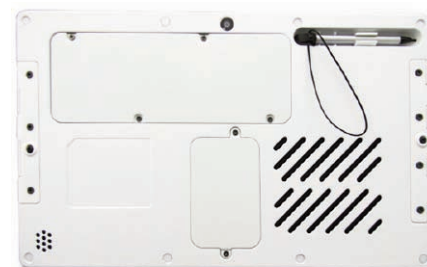
The folks at Samwell properly observed that with the increasing availability of wireless communication, health care personnel no longer only operate fixed computers but also mobile devices. These portable systems are



used for computer-aided dispatching, point-of-care reporting and many other clinical data capture and monitoring tasks. Operation in clinical environments requires computing equipment that is easy to clean and disinfect, and also equipment that is water resistant and rugged enough to withstand daily wear and tear as well as the occasional drop.

Those familiar with Mobile Clinical Assistant devices know that most of the MCA products on the market today closely follow the Intel MCA reference platform that was first introduced in early 2007. The goals of that platform were easy to use, easy to carry, easy to clean and disinfect, and capable of capturing data in a variety of ways, including RFID and bar code scanning. There is,

however, no law that says all MCAs must follow the Intel reference design. In fact, it can be argued that there really is no com-



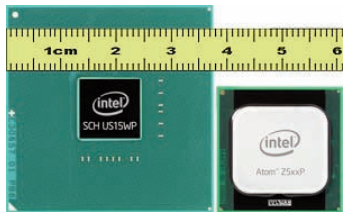
puting need to have an integrated carry handle and that the very popular wide aspect-ratio WSVGA display format is a suitable alternative to standard XGA. So why not use Samwell's impressive RUGGEDBOOK SR820 as the basis for a MCA? Indeed, why not. So let's take a look at the MCA9.

Small size and weight

The sleek device measures about 10 x 6 inches and is just an inch and a quarter thick. Weight is about 2.6 pounds, making it easy to take this machine just about anywhere, and also considerably less than all other current MCAs. It's also about the same as your average non-rugged keyboard-based netbook with this size display. The wide-format display measures 8.9 inches diagonally, which is smaller than that of a standard MCA, but large enough to have been accepted by many millions of netbook users.

Efficient Intel Atom processor

On the processor side, Samwell chose the Intel Atom Z530P, which is running at the same 1.6GHz clock speed as the Atom chips powering tens of millions of netbooks. The accompanying US15WP chipset includes a GMA graphics system, high definition audio, a SATA controller, and PCIe, SD and USB support, and



uses only about 2.3 watts, which means that the total CPU

and chipset consumption isn't even 5 watts. This low power consumption affords the MCA9 two qualities that are almost mandatory for use in clinical environments: Long battery life and no fan. The lack of a need for a fan is particularly important as MCAs must have as few nooks and crannies where dirt and germs can accumulate as possible!

Storage

For storage, the MCA9 slate comes with a fast, reliable and rugged 16GB solid state disk, and another 16GB via SD Card storage (Samwell initially also listed a 1.8-inch 120GB SATA hard disk, so that presumably remains available).

Communication

For communication, the MCA9 includes Bluetooth Class II, Version 2.1 with EDR (Enhanced Data Rate) and 802.11a/g/n WiFi. There are also optional WWAN modules that support Triband HSDPA/UMTS (800, 1900, 2100 MHz) and Quadband GSM/GPRS/EDGE (850, 900, 1800 and 1900).

Scanning and data capture

Since clinical environments heavily depend on quick and accurate data capture, the MCA9 has an integrated 13.56 MHz RFID reader that supports the ISO/IEC 15693 ("proximity cards") and ISO 14443 A/B standards ("vicinity cards"). The MCA9 can also accommodate

an internal 1D or 1D/2D barcode scanner.

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.



Integrated camera for documentation

The MCA9 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 MCA9 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, Samwell offers an optional integrated 5-megapixel camera with auto-focus for those who heavily rely on image documentation capabilities in their mobile computers.

Display

The MCA9's 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.

As a tablet computer that will be used in clinical environments, the RUGGEDBOOK MCA9's display must be viewable under a wide variety of lighting conditions.

The MCA9's display is bright and very readable thanks to excellent anti-glare coating. When looked at from an angle, the SR820 display remains readable, too, although it loses some of its brightness.

As far as display size and resolution go, nine inches diagonal is adequate, and the 1024 x 600 WSVGA display resolution is the same as that on millions of netbooks. Dimming is via hardware controls in eight steps, but does not go down to 0%. The somewhat 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 MCA9 to interpolated XGA mode. It loses a bit of crispness, and the aspect ratio is off a bit, but it's a workable solution.

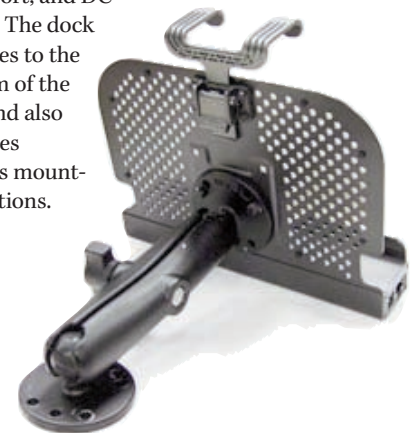
Ports

Samwell offers two different I/O configurations for the MCA9/SR820 platform. One adds a standard DB-9 RS232 serial port, the other replaces that port with the window for the optional Symbol laser scanner.

- 2 USB 2.0
- 1 VGA RJ45 + 2 audio jacks
- 1 RJ45 LAN
- 2 audio jacks
- Laser scanner (or RS232)
- Docking/port replicator connector



All of the MCA9's ports are on the left and the right side of the device. 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 various mounting options.



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

Performance

Being such a fuel miser, how fast is the MCA9? We did not have a chance to run full benchmarks on the MCA9, but based on extensive testing of the MCA9's SR820 sibling and based on our benchmark library of Atom Z530 systems, we expect the MCA9 to feel about as fast or a bit faster than standard consumer netbooks (which are actually based on a different family of Atom processors).

The tablet shows performance data of the SR820 and a number of competing industrial tablets. Since the MCA9 uses a solid state disk instead of our test SR820's hard disk, we expect the MCA9 score would be higher.

Expansion

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.

Battery life

A major selling point of the Intel Atom processor architecture is its minuscule power consumption that comes in handy not only in the field, but also in clinical settings where devices are often carried

around for hours. How well does the MCA9 take advantage of its Atom-based technology? Based on our power usage testing with the SR820 that shares the MCA9's electronics, probably very well.

We used Passmark Software's Battery-Mon power management benchmark utility to measure the platform'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 platform's 38 watt-hour battery lasted 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 system still only drawing about 8.5 watts.

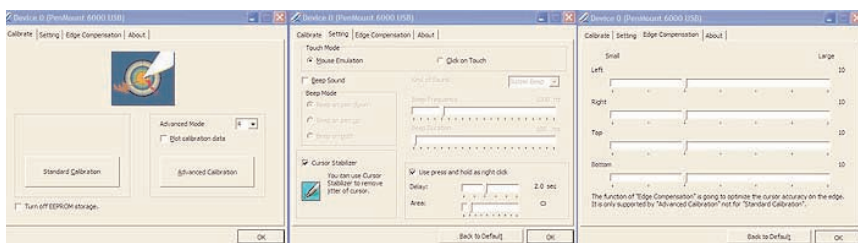
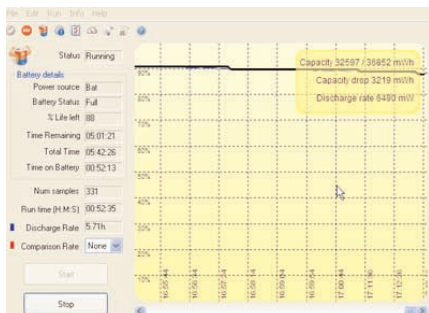
Samwell did a commendable job putting the MCA9's Atom processor's power management and low power consumption to optimal use. The company's estimate of up to six hours of battery life seems achievable, making the platform suitable for extended operation away from a power outlet.

Operation

Mobile operation is via touch/stylus. Alongside the right edge of the display is a button area that contains hardware controls for power, WiFi, Bluetooth, screen rotation, brightness, volume, but no directional navigation.

Digitizer

The MCA9 has a 4-wire resistive touch screen that can either be used with the supplied small telescopic stylus or with a



SAMWELL RUGGEDBOOK MCA9

Type: Rugged Mobile Clinical Assistant (fanless design)

Chassis/housing: Magnesium alloy chassis/housing

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

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

Thermal Design Power: 2.3 watts

OS: Windows 7 or 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: 16GB solid state disk + 16GB SDHC

Expansions slots: 1 SD Card + 1 SIM

Size: 9.9" x 6.0" x 1.3" (252 x 153 x 33mm)

Weight: 2.6 US pounds (1.2kg)

Ruggedness: Ingress Protection: IP65; Operating Temperature: 32 to 140 °F (0 to 60°C)

EMI/Safety: FCC, CE, cUL (EN 60601-1 and EN60601-2)

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

Communication: Wireless options: 802.11b/g/n, Bluetooth Class 2 v2.1 with EDR, 13.56 MHz RFID reader (supports ISO/IEC 15693 & ISO 14443 A/B standard); optional WWAN module (HSUPA/E-GPRS)

Interface: 2 USB 2.0, 1 mini-USB, gigabit RJ-45, RJ-11, video, audio in/out, multi-IO port (contact pin with USB/RS232/Power signal) for cradle, optional 2 or 5-megapixel camera and optional 1D or 1D/2D barcode reader

Price: depends on configuration

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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 offering the maximum accuracy.

- **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.

Do realize that while resistive touch panels work well, they do not take full advantage of the many Microsoft and third party pen utili-

ties designed for use with an active inductive digitizer that is not available on this machine.

Keyboard and text entry methods

Being a tablet computer, the RUGGEDBOOK MCA9 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-Ctrl-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.

Microsoft's input panel both in Windows XP and Windows 7 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 and quite a bit of pressure).

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. In addition, there are several handy touch/pen utilities such as the "Snapping Tool" shown below to the left.

Ruggedness and sealing

As the brand name implies, the RUGGEDBOOK MCA9 is a rugged device. Its magnesium construction feels like it is made to last, and it can take quite a beating. Compared to the industrial SR820 version, the MCA9 does not have rubber bumpers. This means a bit less of extra protection, but it also makes the MCA9 lighter and handier.



As far as sealing against the elements goes, the MCA9 carries impressive 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 a very wide 32 to 140 degrees Fahrenheit.

Samwell performs extensive inhouse ruggedness testing as well as independent testing at SGS Group labs. Samwell claims compliance with a battery of MIL-STD-810G testing procedures.

Summary: Samwell RUGGEDBOOK MCA9

The Samwell RUGGEDBOOK MCA9 is a small and handy tablet computer designed for use in medical and clinical environments. Combining compact size, low weight, ruggedness and sealing, the fanless MCA9 is a compelling solution for a variety of clinical environment computing, diagnostics, documentation and reporting tasks. Its fanless design, lack of openings, and color scheme make it easy to clean and disinfect. Its high-efficiency Intel Atom processor means long battery life, its solid state disk means silent operation, and its bright 8.9-inch wide-format touch screen remains viewable under any lighting conditions. Magnesium construction, a wide operating temperature range, and IP65 sealing provide the ruggedness and durability required for use in even the most demanding environment.

