

The Sirius Story

In 2004, FiveRivers Technologies in Pakistan decided to embark on a project that, at its very least, was an adventurous, risk prone and highly innovative experiment. Our goal was to figure out how we could deliver an Information Technology appliance to the whole world. Yes, the whole world. A long shot for a small company based in Pakistan? Stranger things have happened.

Why would anyone even bother trying something like this? Aren't there millions of PCs in use already? Sure, there are lots of PCs out there, but the vast majority of the population of developing countries – which also happens to be the vast majority of the population on earth – is still unable to take advantage of the IT Revolution. Certainly, things are better now than they were 10 years ago. One hears about the stories of a VoIP phone in a remote village somewhere in Pakistan or India, a Wi-fi network in an underdeveloped African Country... but these are individual, isolated projects which are far, far away from creating substantial social impact at a global scale.

Why has there been a 30 year lag between the birth of the PC industry and the general availability of such technology to everyone that needs it, regardless of geographic location, caste, colour or creed? The answers are simple to understand but have proven difficult to address. Computers are expensive. When most developing countries have per capita incomes approaching \$400, certainly, widespread deployment of a \$500 computer is impractical. More often than not, computers require an electricity grid in order to operate – a reliable and relatively clean one at that, if any measure of long term use is to be expected. Electricity, when sporadically available, is normally not very clean or reliable in developing countries. Computers are complex to configure and use. Modern operating systems, whether Windows or the open source Linux, are suffering from code-bloat. They are beasts to run and configure when you contrast their complexity with the technologically unsophisticated and not necessarily literate audience of a globally relevant computer. Often embedded with moving parts and mechanisms sensitive to dust prone environments, many computers are simply unsuited for prolonged use in many open environments.



The first Sirius Prototype

Projects that have been carried out, or are being carried out currently, to produce inexpensive computers use a very western definition of, “low cost”. Whereas \$150 may not be much to someone who thinks of it as the price of 2 decent dress shirts, it is certainly quite a bit to an ordinary citizen of a developing country. Also, the approach taken to develop these low cost solutions can be summarized as follows: Start with a PC and chop things off until you've reduced cost to what sounds reasonable to the designers. Fundamental assumptions about what a computer is and what level of functionality it should provide remain basically unmodified. For instance, Windows and Linux were both designed with considerations that included a high degree of multitasking capability, support for a large number of peripherals, expandability and compatibility with a thousands of software and hardware products. However configurable an OS may claim to be, all of these contribute to the bulk and complexity of the operating system, which will then necessarily require more powerful hardware in order to function and run all the supporting processes, drivers, daemons and modules that are necessary for the OS to function. None of these are key requirements for the majority of the world's population.

Keeping all this in mind - and with one eye on the successes and failures of numerous “popular PC” projects, such as the One-Laptop-Per-Child initiative, the failed Simputer initiative in India, Mr. Rajesh Jain's work in the area of network based computing, AMD and Intel's attempts at low cost computing, commoditized motherboards coming out of China and the burgeoning cell-phone industry - we decided to try and tackle the problem on our own.

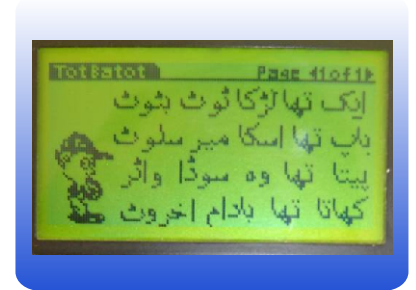
The result was a simple design, now two years in the making. Now operating under the code-name Sirius, the design makes use of multiple, very inexpensive yet reasonably powerful processors, a low cost LCD screen, rechargeable batteries, a communications capability to interface with other computers (PCs included), cell phones and peripherals, zero moving parts, a full fledged keyboard and a form factor that lies somewhere between a PDA and a sub notebook. Since we were not trying to get either Linux or Windows to run on this device, we didn't have to tie ourselves to a bill of materials built around more expensive processors and components that could viably run either of these operating systems.

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Our design philosophy was to focus on individual tasks that we thought were relevant in our user context – we chose to optimize around the kinds of things our users would want to do – rather than be driven by the need to design a motherboard that could run a popular OS. As long as our device can do word processing, communications, act as a multilingual library and perform other such tasks, it doesn't matter whether we are running an OS compatible with the latest SATA RAID controller.

While freeing ourselves from the constraints of the norm, we knew we would still have to keep our design – both hardware and software – extremely open. This would allow others to build on top of what we are able to put together. Applications, expansion peripherals, interfaces, end-to-end solutions... things that we can never dream of.

It was also very important for us not to take the approach that some other low cost computer projects were espousing as the primary way in which to reduce cost; i.e. to rely on high volumes. While the OLPC project talked about volume in hundreds of millions of units eventually leading to a \$160 cost per machine, we wanted to create something that could be assembled in a garage if need be, for well under \$100 in single unit quantities. Sure, if we can leverage larger quantities, our prices would be cut in half or better. The merits of our design include its intrinsic low cost.



The timeless "Tot Batot" Story running on Sirius

So where are we in our development at the moment? We have a running Sirius system with an OS (our homebrewed, AlephOS) and a few sample applications, including the Urdu/English book reader alluded to earlier in this text. Our design is based around three Philips 8051 instruction set compatible processors, each of which can run at 40 MHz. We use a backlit, 240x120 monochrome LCD and a full QWERTY keyboard. Our device is externally programmable, meaning that we can upgrade the applications and system software simply by plugging in a cable and running a PC update utility. Sirius also has a serial port that will be used to can download content and synch with PCs (multiple devices can use a single PC as an information conduit), interface with peripherals or other Sirius handhelds. An MMC/SD Card interface allows storage of large amounts of data. The unit employs internal, rechargeable batteries that should run all three processors for 2+ hours. With some power control software in development we should be able to more than double the usable time per-charge.

We have also produced a complete set of development tools, including a development board and a PC based software emulator for our device. These tools are designed as a way to get students, professors, other companies and individuals innovating on top of this platform and lending new capabilities to it.

We expect that in the next few months we will be able to make the first Sirius versions available in the local market. Other than the individual electronic components, such as ICs and LCDs, these will be designed, built and assembled completely in Pakistan.

FiveRivers is currently in conversations with a few computer science and electrical engineers schools in Pakistan to encourage them to conduct research and design projects based on Sirius. Each additional project means more hardware capabilities, or a new application. The sky is the limit.

The Sirius project may appear ridiculously aggressive in its goals and terribly brash in its approach. It is both things. It's not just about building a computer. It's about looking at computers in an entirely different way. Once we get the first general-purpose Sirius version in use, our next goal is to develop a \$10 computing appliance. We're just getting started on the most important Information Technology project that anyone's ever attempted.