

Embedded Software Development Experience Summary

The Company

SolovatsSoft is a cost-effective provider of information technology (IT) services and products. The company provides services in the following areas:

- Web Development (Internet/Intranet)**
- e-Commerce/e-Business**
- Client/Server Application Development**
- Multi-Tier Application Development**
- Embedded systems firmware development, device drivers**
- Application Re-engineering**

◆ The Mission

SolovatsSoft's primary mission is to deliver global, state-of-the-art business solutions through the establishment of long-term relationships with its clients and strategic partners.

The company shall continue to establish business alliances with strong, aggressive, and rapidly growing IT service organizations on a worldwide basis to insure the ability to deliver cost-effective, high-quality services and solutions. This shall provide assurance that SolovatsSoft's can provide the "Best-of-Breed" manpower necessary to deliver solutions based on emerging technologies that permit **its clients to achieve competitive advantages** in their respective industries.

◆ Company profile

For over 15 years, SolovatsSoft has helped companies throughout the world such as Lucent, Sony, Siemens and others significantly lower their costs and increase their profits by translating business needs into solid software products.

We are specialists in planning, executing and deploying complex development projects.

- ⌋ **Our staff of over 200 developers** averages over 6 years of experience in software development. An experienced developer with the right skills is much more effective and faster than a developer with 1-2 years of experience and saves our clients money.
- ⌋ **85% of our staff has a master's degree** or higher.
- ⌋ **We have a very low employee turnover rate** (less than 5% per year). Our employees tend to stay with our company which means our client don't loss a valuable resource in the middle of a development job.
- ⌋ **In-house support** allows our engineers to go to a colleague or manager for help on specific problems without additional cost to the project.
- ⌋ **The location of our development centers** outside of the major centers in Russia allows us to keep our rates \$7-10 lower than those very competitive areas.
- ⌋ **We have technical support**, project managers and account managers located in San Francisco, Chicago and New York. Our clients have found it very helpful to have local project or account management in your office when needed, especially when starting a project and establishing the process of how we will work together.

- ↳ All of our employees are required to know English. Most of them read and write English well as well as speak and understand spoken English well.

Embedded Solutions Development Experience

◆ Embedded Development Services

Solovat has a department specializing in software system design for ARM, MIPS, PowerPC, x86 based processors and System-on-Chips (SoC), as well as in developing software/firmware for microprocessors, digital signal processors (DSP) and micro controllers. Our experience in embedded solutions enables us to provide high quality services of developing software and hardware for embedded systems.

- ☑ **On-demand software development**, including system components development (drivers, protocols and stacks, utilities) and OS installation, porting your applications on target platform, software localization;
- ☑ **Software and hardware integration** that implies delivering turnkey projects with development of missing components, software for testing, verification and benchmarking;
- ☑ **Installation of system software**, operating systems at the customer's option, development and debugging tools, build environment.

◆ Embedded software development services

- ☑ **Device drivers and system software development;**
- ☑ **Linux porting on a target platform and Linux BSP development;**
- ☑ **Custom Linux distributions for a target platform;**
- ☑ **Real-time software development;**
- ☑ **Protocols implementation;**
- ☑ **Target board bring-up and bootloaders;**

Programming languages:

C/C++, VHDL, Java, Python, Perl, Ruby, ASM x86/c51/AVR/ARM, XScale,ADSP,TI;

Development Systems and Tools:

P-CAD 200x, Keil uVision 2.14, VisualDSP++ 3.5 for ADSP, TI Code Composer, ISE 6.2, Synplify Pro 7.2, ModelSim 5.8, ALDEC Active-HDL v6.1, Matlab; Eclipse, CBuilderX, MS Visual Studio, Embedded Visual C++, Kdevelop, CVS, Subversion, GNU toolchains for x86/ARM/AVR, MinGW, Cygwin, Autotools; BLUEmagic 3.0 SDK, Axis Bluetooth stack for Linux

Interfaces and busses:

USB Host/Client/OTG, SSP/SPI/uWire UART, Flash Cards (CFII/MMC/SD), RS232, RS485, PCI, PCI-Express, VME, PCMCIA, CAN, ISA, Ethernet, IRDA, GPS, GSM/GPRS, IEEE 802.11, Bluetooth

Operating Systems:

- Linux, NetBSD, FreeBSD, MacOS, UNIX;
- Windows CE.net, Windows XP Embedded;
- RTOS: QNX, eCos, RTLinux, RTAI;
- Embedded Linux: uCLinux, LFS, DSPLinux, i-Linux;

Cross-platform libraries:

Qt/QtEmbedded, wxWidgets, Boost, SDL, ACE, JFace, SWT;

◆ Case Studies

Customer: Logitech Inc, USA (www.logitech.com)	
Project Name: Touchpad for IBM PC compatible	
Short description of the project	<ul style="list-style-type: none"> • Research & development of the software & hardware systems and research of the ergonomic factors of the touchpad implementation • Development of the firmware • Development of the test device driver for DOS and Windows • Development of the commercial device driver
Used technologies, tools, operating systems	Custom processor based on Z86E40 of Zilog <ul style="list-style-type: none"> • Assembler for Z86 MCU • C++ • Borland Delphi • MS-DOS • Windows
Comments	<ul style="list-style-type: none"> • The device had been connected to the PC via external interfaces like PS/2, COM-ports • The device had been developed in connection with Logitech's team in Fremont, California.
Commercial Production	Production volume -100,000 pcs/month
Patents *	Us5945980 Touchpad with active plane for pen detection
* There were given only patents which were issued to the active employees of SolovatSoft Ltd.	

Customer: Logitech Inc, USA (www.logitech.com)	
Project Name: Wireless game handler (joystick) without any hard support	
Short description of the project	<ul style="list-style-type: none"> • Development of the firmware • Development of the test device driver for DOS and Windows
Used technologies, tools, operating systems	<ul style="list-style-type: none"> • Microprocessor of the Microchip PIC family • Assembler for Microchip PIC family (MPASM) • Microchip's Integrated Development Environment (MPLAB) • HI-TECH PIC-C compiler for Microchip PIC family • MS Visual C++ • Borland Delphi • Windows
Comments	The device had been connected to the PC via GamePort

Customer: Logitech Inc, USA (www.logitech.com)	
Project Name: Interface module for IBM PC to transfer data through electric power networks	
Short description of the project	<ul style="list-style-type: none"> • Development of the firmware • Development of the test device driver for DOS and Windows
Used technologies, tools, operating systems	<ul style="list-style-type: none"> • Microprocessor of the Microchip PIC family • Assembler for Microchip PIC family (MPASM) • Microchip's Integrated Development Environment (MPLAB) • HI-TECH PIC-C compiler for Microchip PIC family • MS Visual C++ • Borland Delphi • Windows
Comments	The device had been connected to the PC via COM-port

Project Name: Replacing wired communication channel for device with wireless (Bluetooth based)	
Short description of the project	<p>The goal of this project was to replace standard communication interface of experimental PDA-like device based on RS232 with wireless interface based on Bluetooth technology. The replacement was performed at GAP level that is controlled by FW on the existing CPU by means of a serial "RS232" interface through the existing UART. The project was executed jointly by client and by our company, because it involved also hardware engineering (adding of Bluetooth device to circuit board). The following points were completed during the project:</p> <ul style="list-style-type: none">• Adaptations and integration of BT stack FW, to the processor• Application FW for managing the BT functionality and configuration• Modify current FW application on the processor to use BT/GAP instead of the previous cable bound external RS232 connection.
Used technologies and tools	BLUEmagic 3.0 SDK Bluetooth, BLUEmagic Bluetooth stack

Project Name: Bluetooth serial driver	
Short description of the project	<p>Our client had a custom made device with Bluetooth stack deployed. However the general performance of data transfer via BT was very poor. The objective of the project was to develop a new serial device driver to overcome this limitation.</p> <p>We had to design a stream interface device driver for PXA250 XScale processor (BTUART port). The driver was also required to have an interface that is similar to the HCI UART interface of Bluetooth. As a result, two-layered architecture having MDD and PDD layers was developed. DMA was used to transfer data from/to UART FIFO. The DMA buffer chaining mechanism was used for this purpose. The driver supported RTS/CTS flow control.</p>
Used technologies	Bluetooth serial driver

Project Name: Testing tools for electronic circuits Customer: Hardware engineers.	
Short description of the product	<p>JTAG controller is a software and hardware package consisting of the hardware controller connected to a tested board and software installed on a PC. The controller uses JTAG Boundary Scan technology, which is an industrial standard, IEEE 1149.1 – 1990 “Standard Test Access Port and Boundary Scan Architecture” (JTAG). JTAG controller is used for:</p> <ul style="list-style-type: none">• Printed circuit board diagnostics to detect technological defects (no-link, short circuit, etc);• Configuration of programmable chips (MCU , FPGA);• Memory programming and configuration (FLASH, EEPROM, FRAM);• Chip self-diagnostics interfacing;• In-circuit debugging and monitoring, OCD (On Chip Debug);• Functional verification (ASIC or FPGA)
Used technologies	JTAG Boundary Scan, USB


To know more about our experience in embedded development, please contact us:

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Appendix I

The below is a patent received by Mr. Vitaly Sumenkov and Vitaly Moiseev, SolovatsSoft's embedded software development experts.


 US005945980A

United States Patent [19]
Moiseev et al.

[54] **TOUCHPAD WITH ACTIVE PLANE FOR PEN DETECTION**

[75] Inventors: **Vitali D. Moiseev; Vitali P. Sumenkov; Andrey A. Tareev; Aleksey A. Tareev**, all of Ulyanovsk, Russian Federation; **Roland Singer**, Stuttgart, Germany

[73] Assignee: **Logitech, Inc.**, Fremont, Calif.

[21] Appl. No.: **08/970,947**

[22] Filed: **Nov. 14, 1997**

[51] Int. Cl.⁷ **G09G 5/00**

[52] U.S. CL **345/173; 345/157; 178/18.01; 178/19.04; 178/19.07**

[58] Field of Search **345/156, 157, 345/173-177; 178/19.01, 19.02, 19.06, 19.07, 20.04, 18.01, 18.02, 18.03, 18.04**

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[11] **Patent Number: 5,945,980**

[45] **Date of Patent: Aug. 31, 1999**

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[57] **ABSTRACT**

A touchpad which simulates an active stylus by providing pulses to the entire active plane (making it an active plane), instead of the stylus. This allows a simple, non-active stylus to compress the touchpad to bring the X, Y traces closer to the active plane at the point to be detected. The phase of the pulses applied to the active ground could be chosen to make a stylus look like a finger, or to differentiate it. The pulses are applied synchronously with the standard triangular waveform applied to traces in the trace matrix. The other traces not being sampled at a particular time are truly grounded, and thus are separated from the active plane.

25 Claims, 5 Drawing Sheets

