



## SIEMENS

# How Siemens Uses Mobile Embedded Intel® Processors to Help Customers Avoid Downtime

<b>Challenge</b>	Downtime equals catastrophe in a highly automated factory environment; so Siemens' customers demand high availability on the system platform. Operating around the clock, automated systems must deliver very high performance, even when subjected to higher ambient temperature, shock/vibration, dirt/dust, and space constraints—common in industrial settings. Long-term platform availability, scalability and stability are essential since automation systems have extended lifecycles. Siemens must meet all of these demands in a highly competitive business climate where turning a profit depends on keeping development costs low.
<b>Solution</b>	Siemens' latest box and panel PCs meet all of these demands via the high performance/low-power features of the embedded Intel® Pentium® M processor 760 at 2GHz and the Intel® 915GM chipset. Designed to support automation tasks that process high volumes of data, the SIMATIC* Box PC 627 and SIMATIC* Panel PC 677 are optimized for stability and reliability in harsh industrial settings.
<b>Why Intel?</b>	The new processors are some of the highest performance, lower-power processors currently available. These features in combination with robust embedded graphics and built-in RAID functionality enabled Siemens to deliver a tightly integrated platform in a small enclosure, with minimal development work—saving time and cutting costs.

[www.intel.com/go/industrial](http://www.intel.com/go/industrial)

## Background: Merging PC and Industrial Technologies

Increasing cooperation between the office PC and industrial technology environments may seem improbable. After all, office PC technology is generally very dynamic, with relatively short product lifecycles. Yet products developed for the industrial automation environment are expected to perform for a decade or more. So it may seem like a waste of energy to try merging the applications and technologies from these two groups into products that combine the advantages of both industries.

But Intel and Siemens don't think so. Increasingly, the standards and technologies developed for the PC industry are finding their way into the products used to control industrial automation systems. Because PC technology is often the foundation for the computing networks used by management, deploying PC technology on the factory floor enables easier vertical integration and better control over automated processes and systems. Most importantly, the computing standards that have led to higher levels of performance in less space in the PC industry can now do the same for industrial automation—where space on the factory floor is at a premium.

Intel and Siemens are working closely to understand the requirements of the industrial segment, and how those needs can be met through PC technology in new embedded components. This case study examines this relationship in more detail by showing how the new embedded Intel® Pentium® M processor 760 at 2GHz and the new Intel® 915GM chipset enabled Siemens to deliver two new industrial PCs that meet the demanding standards of the industrial automation environment.

## Industrial Enemy #1: Downtime

Manufacturing faces stiff competition from globally dispersed rivals. Economic viability depends on a 24x7x365 operations model. When the business never sleeps, there is no room for downtime—planned or unplanned.

Nowhere is this need more critical than in today's automated environments. Automated systems are the heartbeat in such diverse settings as manufacturing plants, refineries, pharmaceutical plants, hospitals, and amusement parks. Although quite different in function, these settings have common features: rugged environmental conditions, continuous operations and mission-critical functions.

### **SIMATIC\* Box PC 627 and SIMATIC\* Panel PC 677**

The new SIMATIC\* Box PC 627 and SIMATIC\* Panel PC 677 are available with the powerful Intel® Pentium® M processor 760 at 2GHz and are suitable for demanding automation tasks, such as visualization and computing, and the processing of large amounts of data. The extreme compact design is optimized for use in harsh industrial environments at ambient temperatures of up to 50 (Panel PC 677) / 55 (Box PC 627) degrees Celsius.

The configuration of the SIMATIC Box PC 627 and Panel PC 677 are scalable with a main memory expansion up to two gigabytes, SATA hard disk drives up to 80GB and optical drives, 110-230V AC or 24V DC power supplies, and the operating systems Windows\* 2000 or XP Professional. Two PCI slots, two Ethernet interfaces, one DVI-I interface and one Profibus\* interface are onboard, as well as four high-speed USB interfaces (USB 2.0). The Panel PC 677 offers one additional USB interface on the front—suitable for the connection of external mass memories such as USB memory sticks or a portable DVD writer.

For higher system availability and data security, there is an optional RAID1 mirror disk system, supported by the onboard RAID controller, and the integral vibration-suppressed double hard disk module. For especially compact solutions, such as in the control cabinet, the Box PC is installed in space saving "portrait assembly." Both the Box and Panel PCs have a compact flash drive slot, easily accessible from the outside, for operation without a hard disk, in low-maintenance, high-availability applications, for example.

Customers increasingly dependent on automation are sounding the battle cry for permanent, high availability. It's the primary reason why Siemens introduced the new SIMATIC\* Box PC 627 and SIMATIC\* Panel PC 677 for demanding automation tasks, such as visualization and computing. Designed with the harshest industrial settings in mind, Siemens' new PCs offer especially high performance with data protection to maintain high availability and minimize downtime.

## Design and Development Challenges

As developers well know, it's no easy task to deliver a high-performance, low-power system suitable for industrial settings. Numerous technology challenges must be overcome, especially in the processing components.

For starters, there's the need to keep power consumption to a minimum. Today's automated solutions must fit into small control cabinets that offer little or no ventilation and are subject to higher ambient temperatures. Counter that with the need for high performance so that these systems can run demanding applications like visualization.

Automation components are also expected to have a long product lifecycle, and Siemens requires their parts suppliers to commit to long product lifecycle support and delivery. A long roadmap is also important to meet future demands.

The highly competitive industrial PC segment also challenges Siemens to deliver versatile systems that can run a variety of applications. Keeping development costs to a minimum requires parts that are highly integrated, standards-based and scalable. Fast time to market is essential for success.

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**Dr. Lutz Heinrich,  
Siemens Product Manager for Industrial PCs**

Because Siemens needs to meet customer demands for high system availability and long-term reliability, they need components that can endure rugged environmental conditions without fail. Siemens engineers specified a high temperature rating of 55° Celsius, operating vibration up to 1 g, 24x7

operational endurance, and onboard SATA RAID for redundant data storage (by the means of mirror disks).

For the visual computing requirements of many industrial automation applications, Siemens needs processing components that support high-end graphics functions. Engineers identified these graphics requirements:

- Improved real-time behavior (reducing dependencies on graphics properties)
- Support for six different LVDS display devices
- Support for local flat panels with LVDS interface, external flat panels with DVI interface, and CRT display

## **The Solution: Embedded Intel® Processors and Chipsets**

For commercially available components that met their long list of requirements, Siemens had to look no further than Intel. “Intel came to us with a highly successful track record and the assurances that they could meet our long lifecycle requirements, which gave us the confidence in their technology for the long term,” explains Dr. Lutz Heinrich, product manager for industrial PCs, Siemens Automation and Drives Group. “Intel engineers also worked hard to understand the unique requirements of the industrial segment and made sure those features would be integrated into their embedded roadmap. That’s why they included such powerful graphics support in the new processors and chipsets.”

The close working relationship between Siemens and Intel paid off with cutting-edge solutions from both companies. “We were able to launch our new SIMATIC\* Box PC 627 and SIMATIC\* Panel PC 677 almost simultaneously with the new Intel® Pentium® M processor and Intel® 915GM chipset,” says Heinrich.

The new embedded Intel processor and chipset are some of the highest performance/lower-power components currently available. When combined on Siemens’ newly developed industrial PC board, the Intel chips enable both maximum performance and ruggedness in a compact design. Gunther Klima, head of Siemens’ Industrial PC Division, explains it this way: “The low thermal envelope allowed a more compact cooling solution and the integrated graphics functionality provided by the chipset decreased system cost by not requiring the use of a graphics card.”

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Klima continues: “In addition, the new technology supports our target to offer high system availability for our products. These new systems provide long-time availability and extensive, long-service life in combination with high quality, which are all crucial factors in avoiding expensive machine down time and/or expensive maintenance costs.” It’s a win for both Siemens and customers alike.

## **Mutual Benefits All Around**

Siemens and Intel have both readily admitted there are benefits to merging PC technology into industrial applications. Matthias Hofmann, head of marketing for Siemens Industrial PCs explains it this way: “We can offer our global customers a product range that is even more scalable; which means we are now able to supply industrial PC platforms, and thus PC-based solutions, of varying performance levels to suit individual customer requirements, while at the same time providing long-term availability. This is important to the extent that stability and long-term availability also play a leading role in the industrial automation market segment, alongside innovation, not to mention the high quality levels consolidated by the integration of the latest Intel technology.”

**“The relationship with Siemens helps us gain a better understanding of the industrial automation market segment so we can develop our products in an even more customer-oriented way.”**

**Phil Ames, Intel Marketing Manager for Embedded Processors**

Phil Ames, marketing manager for embedded Intel processors agrees: "The relationship with Siemens helps us gain a better understanding of the industrial automation market segment so we can develop our products in an even more customer-oriented way. Siemens has shown tremendous dedication to

helping us speed the exchange of information to our mutual benefit. This helps us improve our product quality through early lab and field tests. We also benefit from fast market penetration with our technology, thanks in part to the swift integration of our technology into Siemens industrial PCs."

## For more information:

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