

Solution Brief
Industrial Control
& Automation

Flexible, Small and Rugged: Siemens AG Builds its New Microbox Industrial PC with Intel's Leading Embedded Platform Technologies

The Siemens SIMATIC IPC427C industrial PC delivers the performance of the Intel® Core™2 Duo processor in a fanless and disk-free compact design

Background

Flexibility has become the name of the game for designers of industrial automation equipment. Siemens AG is meeting that challenge with the latest in its line of SIMATIC Microbox industrial PCs that deliver industry-leading embedded computing technologies in a small, highly integrated, rugged package.

Several embedded Intel® processors, including the Intel® Core™2 Duo processor, are available with Mobile Intel® GM45 Express chipset in validated platform configurations. Backed by Intel's 7-year extended lifecycle support, these platforms provide Siemens with the combination of optimum performance per watt, scalability, low power consumption and broad software compatibility demanded by today's industrial automation environment. The result is a flexible system designed for comprehensive process control, visualization and communication using PROFIBUS* or PROFINET* (real-time industrial Ethernet) standards.

Challenge

The leading industrial computing design engineers at Siemens faced the challenge of integrating the latest embedded computing technologies – including the performance per watt of an Intel Core2 Duo processor, DDR3 memory, Serial ATA-2 peripheral interface and solid state drive storage – in a rugged, fanless, compact design flexible enough for use in Box and Panel PCs.

Solution

To enable a scalable range of performance for the IPC427C design, Siemens based the computing platform on a choice of three Intel processors: the Intel® Core™2 Duo processor SU9300, the Intel® Core™2 Solo processor ULV SU3300 and Intel® Celeron® M processor ULV 722. Other platform ingredients

include the Intel® 82GM45 Graphics Memory Controller Hub (GMCH) northbridge, Intel® I/O Controller Hub 9M (ICH-9M) southbridge, the Intel® GMA X4500 integrated graphics controller and a disk-free flash memory storage solution based on the 32 GByte SATA Intel® Performance Solid-State Drive (Intel® PSSD).

Performance and Interoperability in a Small, Fanless Design

The Siemens SIMATIC IPC427C is a compact, high-performance embedded computing platform that provides plant engineers and switch cabinet manufacturers with flexible solutions for a variety of tasks:

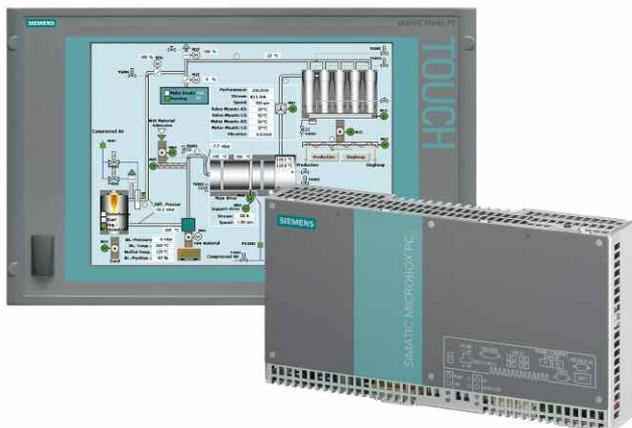
- Open-loop and closed-loop control of process and machine data
- Industrial process visualization tasks using display solutions such as information terminals and large-scale displays
- Data communications when used as an intelligent network gateway or protocol converter.

The use of a variety of different embedded Intel processors provides the IPC427C with the flexibility to handle a broad range of applications including real-time multitasking automation solutions based on C/C++ software and Siemens RMOS3 real-time operating system. Siemens makes reference to the fact that embedded Intel® architecture-based platforms are broadly supported by drivers required for operating systems used in industrial automation.

The platform is ideally suited for Siemens' WinAC-based Totally Integrated Automation (TIA) environment. Reliance on embedded platforms such as the IPC427C based on Intel architecture enables Siemens TIA to support computing requirements at all levels within a plant, from field level, to production control, all the way up to the corporate management level.

“In addition to providing excellent performance per watt, the IPC427C platform based on the embedded Intel® Core™2 Duo processor and Mobile Intel® GM45 Express chipset is an ideal fit for Siemens' Totally Integrated Automation (TIA).”

“By supporting interoperability between the controller, human machine interface (HMI) and the control system, this platform can help to reduce the complexity of the automation solution, save plant engineering time and lower operational costs through continuous diagnostics.”



SIMATIC IPC427C and SIMATIC HMI IPC477C

Matthias Hofmann
Head of Marketing Industrial PC & Power Supply, Siemens AG

Integrating the Latest Embedded Technologies

Intel Core2 Duo processors for embedded computing are members of Intel's growing product line of multi-core processors. The Intel Core2 Duo processor provides Siemens with the enhanced energy-efficient performance of Intel's industry-leading 45nm process technology and the advantages of seven-year lifecycle support.

The IPC427C can be equipped with any of three Intel processors, each available in a platform configured with the Mobile Intel GM45 Express chipset for embedded computing. The Intel Core2 Duo processor features two complete execution cores, a shared L2 cache and intelligent power management features. Intel® 64 architecture provides Siemens with the flexibility to run both 64-bit and 32-bit applications and operating systems.

Flexibility to Meet Industrial Requirements

Embedded Intel® platforms provide Siemens engineers the capabilities they need to implement a high performance industrial automation computer based on a fanless, disk-free platform designed for maximum flexibility in the industrial automation environment.

- Scalable, energy-efficient computing performance and a choice of platform configurations
- A rugged compact design with solid state storage
- Software compatibility with existing Siemens platforms based on Intel architecture
- Flexible mounting options, including front portrait assembly kit, DIN rail mounting or wall mounting
- Comprehensive system diagnostics and remote manageability
- Flexible peripherals and network interfaces designed for easy expandability.
- Also available as a panel PC including a human machine interface (HMI) with a brilliant display

In addition to the performance of Intel processors, the Siemens SIMATIC 427C platform supports up to 4 GBytes of DDR3 memory, graphics performance to support the Windows Vista Aero* user interface, and Intel® Virtualization Technology, including Intel® Virtualization Technology for Directed I/O (Intel® VT-d) and Intel® Virtualization Technology for IA-32, Intel® 64 and Intel® Architecture (Intel® VT-x).

Designed for maximum compactness and ruggedness, the SIMATIC 427C can be used directly at the machine level, with low mounting depth and continuous operation up to 55°C ambient temperature. The device can be flexibly configured with either one or two mass storage units, consisting of an optional 32 Gbyte solid state drive, SATA hard disk, or up to two 8 Gbyte Compact Flash* Cards.

The SIMATIC IPC427C also includes two LAN 10/100/1000 Mbit/s connections, onboard PROFIBUS or optional PROFINET interfaces, four high-speed USB 2.0 ports and a serial interface with optional second interface. For centralized I/O, the system is expandable with up to three PC104 plug-in cards.

About Siemens AG

Siemens AG is a global leader in electronics and electrical engineering in the industrial, energy and healthcare sectors. The company has approximately 400,000 employees in continuing operations, working to develop and manufacture products, design and install complex systems, and tailor a wide range of solutions for individual customer requirements.

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