Industrial PC – The Hardware Platform for the Digital Enterprise
Presented by Alessandra da Silva
Manufacturing in America │ March 14-15, 2018
Before we start… A Penny for Your Thoughts

At the end of the session, share your feedback via MiA App - and get a chance to win tickets to the Detroit Tigers baseball game!
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  - Digitalization & Industrial PCs
  - Why use an Industrial PC?
  - PC-based Control and PC-based Automation
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    - Hardware
    - Software
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Technology and Innovation are driving CHANGES in our lives…
Digitalization changes everything.....
But what about Industry?
What digitalization means to the industry
Solutions Technological trends are driving transformation

Current drivers of Digitalization

- Operational excellence
- Big Data and Analytics
- Mobility of Devices
- Virtualization and Cloud computing
- All-time network access
- Simulation
- Integrated solutions
- Cyber Security
- Paperless manufacturing
What digitalization means to the industry

Solutions Technological trends are driving transformation

Digitalization will continue to change the entire industry sector

- Shorter time to market
- Increased flexibility in volatile, heterogenous, global markets
- Optimized productivity
- Energy and resource efficiency
- Closed-loop quality and traceability
- Continuous, safe and reliable operations
Integrating and digitalizing the entire value chain is key to staying competitive in the future
Integrating technical domains into ONE data model

- Digital Twin of the product
- Digital Twin of the production process
- Digital Twin of the equipment

Cloud-based, open IoT operating system: MindSphere
Holistic approach
Specific for end customers
NX - Integrated CAD/CAE/CAM
Realizing innovation with 3D simulation

1. Product design
2. Production planning
3. Production engineering
4. Production execution
5. Services

Realizing innovation with 3D simulation
Human simulation to simulate, analyze, and optimize assembly processes and ergonomics
Simulate, visualize, analyze, and optimize production systems and logistics processes
Mechatronics Engineering and Virtual Commissioning

1. Product design
2. Production planning
3. Production engineering
4. Production execution
5. Services

Digital Twin of SIMATIC S7-1500 for TIA Portal
MES and TIA coordinate the manufacture of individualized products
Plant performance with MindSphere

1. Product design
2. Production planning
3. Production engineering
4. Production execution
5. Services

Lifecycle and Data Analytics
Industrial PCs - Trends and Requirements
Digitalization, Industry 4.0 and IIoT as market driver

- **The “hunger for data”**
  The idea of the “Transparent Plant” generates a high amount of data, where typical automation devices can’t handle.

- **Process large amount of data**
  To process large amount of data the performance, intelligence, openness and flexibility of a PC is needed.

- **Security and availability**
  The data (often sensitive), requires data high availability and security.

- **Fast and collaborative execution**
  The multiple connections between many devices, require fast and multitasking of processes execution.

- **Ruggedness**
  PCs are being used closer and closer to the machines.

These trends increased demand for Industrial PCs.
Industrial PC (IPC) versus White Box
Why an Industrial PC?

What's the main difference between and Industrial PC and White box?
Hardware construction – all components of an Industrial PC are “industrial grade”. These components have longer life cycle, better quality and are built to a higher standard.

Industrial PCs are designed for industrial environments due:
- Rugged enclosures
- The redundancy
- The amount and type of interfaces
- The flexibility, versatility and high performance
- Long life cycle and compatibility
PC-based Control and PC-based Automation

What is it?
PC-based controls are industrial control system that utilizes a PC as a control platform. PC-Based Automation combines the features of PLC-Control and open PC-Architecture on one industrial device!

When use a PC based solution (e.g.)?
- When large amount of data needs to be processed and stored
- Multitask capability is a requisite
- Collaborative execution of processes is needed
- Security is required
SIMATIC Industrial PC
Reliable and rugged hardware platform for the digital enterprise
SIMATIC IPCs
Combine innovative technologies and maximum reliability in industrial use

- **Latest PC technology**
  Future-proof thanks to modern interfaces and processors with performance reserves

- **High quality in production and development**
  In-house mainboard and BIOS development, with 36h run-in test at maximum load and 40°C

- **Long-term availability and compatibility**
  Up to 10 years after start of delivery, with simple migration to successor generation, and extended SW License Agreements

- **We’re going into extra time**
  36-month warranty without surcharge – or 48 months with a new service option

- **Integrated diagnostics**
  Avoidance of standstills through preventive maintenance concepts

Choose from our 90 million configurations available
SIMATIC IPCS
Diverse application options with one hardware platform

**Data collector & converter**
- Data recording directly at the machine
- Interface between machine and IT level
- Link to corporate information systems

**Automation tasks**
- Control and visualization with one device
- Complex SCADA applications
- Flexible integration of PC hardware and software

**Industrial servers and workstations**
- PC applications in production
- Machine-level server applications
- Data management in control rooms
Quality assurance in our production
Main Board and Run In

- 100% X-ray check as integral process step during SMD mounting
- 100% Function check of the boards in real system environment

- ✔ Software loading to all known media BIOS programming
- ✔ Loading of customer owned and Siemens software
- ✔ Generation of PED Data for track and trace
- ✔ Power loss simulation
- ✔ Environment simulation
- ✔ Stress robustness
- ✔ Function test
### SIMATIC IPCs

**Quality in industries with special requirements**

#### Software expansions and certificates
(F & B, Pharma, Energy, …)

- GMP / FDA-compliant
- Audit
- Electronic signature
- Energy management acc. to DIN ISO 50001
- Tracking & Tracing
- Order control

#### Hardware certificates
F & B, Oil & Gas, Pharma, Chemicals, Marine, Automotive, …

- Inox fully enclosed
- Ex – Panel PC
- PRO – Panel PC
- Box PCs with ATEX
- IPC 647D / 847D

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Totally Integrated Automation Portal (TIA Portal) … the gateway to automation solutions within the Digital Enterprise

Totally Integrated Automation Portal

- Common data management
- Security integrated
- Safety integrated
- Diagnostics
- Energy Management

- One common framework
- Unique and consistent user interface concept
- Common and centralized Service
- Global library concepts
- IPC fully integrated in TIA Portal
SIMATIC IPC
Service for 36 months at no extra charge

1) Wear and tear as well as problems that arise due to improper handling of devices are excluded from promotion.

2) For hard disk defects that require system to be restored, repair service will only cover restoring installation to original working condition. Uploading of additional software and drivers used by customer and setting up operating software are not covered.

3) Additional 12 months warranty for full 48 months available as option
Fast and Competent Help Thanks to 36 Repair Centers in 29 Countries Worldwide

Certified repair centers with well-trained personnel and original spare parts from Siemens
Need customization?
Individual SIMATIC Products in customized design

We can adapt our Industrial PCs with the modifications necessary to satisfy your requirements, including:

- Customized software and hardware
- Individual design variations over custom software images
- Specific tests / Certification
- Customized service, support and logistic agreements
Siemens makes easier for customers to get the units faster
Drop shipment or local US-based production

**Shipments directly to the customer**
Drop shipment from German factory to our customers worldwide

**Most popular configurations for U.S. based customers**
Nano and Micro (box and panel) series

**Quality Guarantees Your Success**
Same rigorous processes and quality standards as those units produced in Germany

**Assembled in USA**
Qualify products for government contracts
SIMATIC IPCs - Comprehensive product portfolio with reduced complexity, thanks to platform concept

**Platform strategy:**
- Full compatibility in software and drivers
- Reduced evaluation effort
- High flexibility in choice of design
- Cost reductions thanks to reduced spare parts inventory
Embedded IPC
Reliable, flexible, and versatile
SIMATIC IPC227E / IPC277E
Optimized performance in a compact design

Great range of displays
7” – 19” widescreen displays for modern visualization – also as Multitouch version in 15” and 19”

Performance
Optimized performance with dual & quad core processors

Compact design
Minimized housing for space-saving mountings

Maintenance-free & fanless
Ideal for industrial use and continuous operation

Modern interfaces
Easy connection to automation and IT networks
SIMATIC IPC427E / IPC477E
High performance, zero maintenance and flexible configuration

**Powerful Intel processors**
scalable from Celeron, Core i to Xeon with up to 16 GB RAM

**Panel PC version up to 24”**
for powerful HMI solutions - also as Multitouch version

**High ruggedness**
and zero-maintenance design without rotating parts for applications directly on the machine – also available with IP65

**Manifold configuration**
and flexible assembly options for optimum solutions

**Numerous interfaces**
onboard (e.g. 3 x Ethernet) and expansion options with up to two PCIe cards
Basic IPC

PC technology at an attractive price
SIMATIC IPC327E / IPC377E
PC-Technology at an attractive price

Latest PC technology
with Intel Celeron Quad Core, up to 8 GB RAM and mini PCIe for easy expandability

Approved Standards
with USB 3.0, DisplayPort, 6 Serial Ports and more for easy integration into existing systems

SIMATIC Quality
designed for 24/7 operation with standard Run-in-Tests and certificates

Attractive Pricing
with great price-performance ratio for cost effective realization of diverse applications

Available from stock
with reduced complexity in 8 preconfigured variants for shorter delivery time
# SIMATIC IPC347E
An industrial Rack PC with high performance at an optimized price

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
<th>Image</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reliable uninterrupted duty</td>
<td>Industry-standard design and system tests in development and production</td>
<td><img src="image-url" alt="Image" /></td>
</tr>
<tr>
<td>Increased dust protection</td>
<td>Overpressure ventilation and dust filter</td>
<td><img src="image-url" alt="Image" /></td>
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<tr>
<td>Optimized price</td>
<td>in equipment and design</td>
<td><img src="image-url" alt="Image" /></td>
</tr>
<tr>
<td>High performance</td>
<td>Intel Core i5 processors and expandable primary storage</td>
<td><img src="image-url" alt="Image" /></td>
</tr>
<tr>
<td>Maintenance-friendly enclosure</td>
<td>Front USB and externally accessible fan</td>
<td><img src="image-url" alt="Image" /></td>
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Advanced and High-end IPC

Platform for higher performance, availability, and efficiency
SIMATIC IPC627D / IPC677D / IPC827D
Best features the PC-Technology can offer the Automation Industry

- **High performance** with Intel Core processors of the 4th generation. Now also with Intel Xeon processors for even more performance

- **Maximum ruggedness** and reliability for the installation direct at the machine

- **Great expandability** with up to 5 PCIe cards for more flexibility

- **Secure data storage** with RAID system for a long-term data availability

- **Modern visualization** with up to brilliant 22" Full HD Display as singletouch or multitouch
SIMATIC IPC547G / IPC647D / IPC847D
High performance, functionality and expandability for versatile applications

High performance
With powerful Intel processors for demanding applications

Maximum data and system availability with RAID system, integrated UPS or redundant power supply

Modern visualization with up to 5 displays without additional installation effort

Great expandability with up to 11 PCIe cards for more flexibility

High ruggedness and reliability for the industrial use
Remote operator panels and HMI PRO

Fast, intuitive operator panels with options of all-round IP65 protection solutions
SIMATIC Industrial Flat Panel and Thin Clients
The suitable solution for individual customer requirements

Enhances the machine with brilliant devices in modern design as single touch or multi-touch (IFP only) versions with 12, 15, 19 and 22 inches fronts

Individual operator-control philosophies with innovative touchscreen technologies

Flexible operator-control concepts with devices that can be installed remotely at any distance from the IPC

Flexible installation both at and outside the control cabinet

Use in harsh industrial environments without additional measures
The PRO operator devices
PROtected with SIMATIC HMI

**Economical**
Engineering with the aid of WinCC in the TIA Portal, with easy changeover and ready to work

**Configurable**
Location of use, simple connection and individually expandable

**Reliable**
Availability, operational reliability and all-round protection

**… and always in perfect style!**
Product design, individual design and easy to use
Configuring with the help of the SIMATIC HMI PRO system concept

<table>
<thead>
<tr>
<th>Basic units</th>
<th>Expansion and system components</th>
<th>Mounting options</th>
</tr>
</thead>
</table>
| • Any selection and combination of basic units for maximum flexibility.  
• Choice of Siemens design or neutral front (without Siemens logo) | • Expansion components with all-round IP65 protection matching your requirements in rough environments close at the machine-level | • Standardized fastening options for high degree of investment protection  
• As required for your application: on pedestal or support arm |

A uniform look & feel for all SIMATIC HMI devices with all-round IP65 protection
Industry-standard operator terminals in modern design for flexible and innovative operator control concepts

**Unlimited remote installation**

- 12" SIMATIC Industrial Thin Client
- Single-touch

- 19" SIMATIC IFP1900 INOX PRO (Ethernet monitor)
- 22"

**Multi-touch**

- 19"
- 22"

**Compact**

- Ethernet

**Remote installation up to 30 m**

- 15" Key
- 19"
- 22"

- Ethernet

- 15"
- 12"

- 19" SIMATIC Industrial Flat Panel

- 15"
- 19"
- 22"

- 15" SIMATIC IFP1900 PRO (with all-round IP65 protection)

- DVI / DisplayPort

**SIMATIC Panel PCs**

- 19"
- 22"

**SIMATIC Industrial Flat Panel (Ethernet monitor)**

- 19"
- 15"
HMI Ex
Certified devices for hazardous areas
SIMATIC HMI Ex devices for potentially explosive atmospheres
The suitable solution for individual customer requirements

Enhances the machine with brilliant devices in modern design

Individual operator control philosophies with innovative touch technologies

Flexible operator control concepts with control units that can be installed remotely

Flexible installation both inside and outside the control cabinet

Use in Ex zones 1 and 2 with no time-consuming measures
## New generation of Ex IPCs
Portfolio overview Panel PCs in hazardous zones

<table>
<thead>
<tr>
<th>Installation type</th>
<th>Panel Ex2 15&quot;, 19&quot;</th>
<th>Panel PC Ex OG 15&quot;, 22&quot;</th>
<th>Panel Ex NG 22&quot;-24&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Built-in unit</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Target industry</td>
<td>Process industry</td>
<td>Oil and gas</td>
<td>Chemical, pharmaceutical, food and beverages</td>
</tr>
<tr>
<td></td>
<td>Oil and gas (outdoor)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Industrial PC</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Thin client</td>
<td>✓</td>
<td></td>
<td>✓</td>
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</tbody>
</table>
Industrial Tablet
The tablet for your daily challenges
**SIMATIC ITP1000**  
Basis for maximum productivity and economic efficiency

<table>
<thead>
<tr>
<th>Designed to be used in industry</th>
<th>✓</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rugged and reliable</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Configurable and customizable hardware</th>
<th>✓</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tailored to the customer requirements</td>
<td></td>
</tr>
<tr>
<td>Customized design, functions and Software</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Latest Technology and flexibility</th>
<th>✓</th>
</tr>
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<tbody>
<tr>
<td>Latest Intel Core i5 &quot;Skylake&quot; CPU, with RFID, barcode reader, camera, USB, RS232, LAN, WLAN, Bluetooth</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Long availability</th>
<th>✓</th>
</tr>
</thead>
<tbody>
<tr>
<td>Approx. 3.5 years of active marketing and 5 years spare parts</td>
<td></td>
</tr>
</tbody>
</table>

Participate in the rapidly growing number of mobile devices in industry. 
Position yourself as a solution provider in the field of mobile applications in industry.
SIMATIC ITP1000
New fields of applications and applications

Mobile Panels

Mobile panels are designed for dedicated tasks in the field of mobile (fail-safe) operator control and monitoring

Differentiation from ITP1000:
- Wired (fail-safe) operator control and monitoring
- Direct keys
- Longer product availability

SIMATIC ITP1000

The SIMATIC ITP is used in a wide variety of applications in the fields of service, production, measurement/test engineering, and daily life.

Differentiation ITP

- Configuration with TIA Portal by means of 15" display possible
- S5 interface / EPROMMER
- Shorter product availability

SIMATIC Field PG

Field PGs are used as programming and configuring devices in service and engineering

Differentiation from ITP1000:
- Wired (fail-safe) operator control and monitoring
- Direct keys
- Longer product availability

Long-term available, Windows based Industry Tablet PC with many interfaces and integrated functions
Industrial Gateway

The intelligent gateway to connect the field level to the IT level / cloud
SIMATIC IOT2040

SIMATIC quality
Designed for 24/7 operation in industrial environment

Automation.Connected
Easy connection to automation level with PROFINET* and openness to cloud based solutions

Expandability & connectivity
With mPCIe, industrialized IO module and various standard interfaces & available protocol drivers

Performance & deterministic
Intel Quark® CPU and 1 GB RAM as well as x86-deterministic and battery buffered real-time-clock

Openness
Free programmable in high-level languages (e.g. Java, C++) via various IDEs (e.g. Eclipse) and compilers for Yocto Linux

*) planned
SIMATIC IOT2040
Intelligent data gateway with limited computing functionality

Maker Boards
Free programmable boards / single board PCs without housing and certifications with focus on maker market.
Teach. Learn. Make.

SIMATIC IOT2040
Additional features compared to standard maker boards:
+ Industrial robustness
+ 24/7 operation
+ Real time clock
+ Standard interfaces
+ Housing and DIN rail mount
Enhancement capabilities:
Expandable by ARDUINO & mPCIe

SIMATIC IPC
Additional features compared to SIMATIC IOT2000:
+ Windows support
+ Performance and mass storage
+ Industrial server functionality
+ HMI applications
+ SIMATIC Software controller
+ TIA / IPC diagnosis
+ Expandability
SIMATIC IOT2000 forum
Managed forum with getting started, application support and FAQs

SIMATIC IOT2000 Online Forum

Getting started
- Getting started and setting up to start with IOT2000 application development.
  - Hardware setup
  - System console and driver for debugging
  - Development environment (Arduino IDE or Yocto Linux Eclipse IDE)

Application examples
- cloud connect use case
- sensor connection
- ...

Base image as download
- µSD Card base image for download
- Usage of all onboard interfaces possible

Initial content provided by Siemens

Further content provided by IOT2000 community and Siemens

www.siemens.de/iot2000-forum
SIMATIC Software

Fast detection and efficient prevention of system failures
Downtimes or failures are avoided through timely detection of hardware faults and software errors.

The flexible and worldwide access to diagnostic data reduces travel costs and minimizes on-site service times.

The data exchange with other systems and the automatic signaling and operation reduces manual effort.

Based on exact diagnostic data, long-term and cost-optimized service measures can be planned: "The right measures at the right time."
Optimized for use on SIMATIC IPCs

- Prevention of data loss and associated consequences.
- Efficient and customized adaptations of existing hard disks to your own needs with minimum effort.
- Planning of actions at the optimal time via calendar.
- A fast and easy data backup and restoration and the migrating and cloning of hard disks saves time and reduces costs.
- Data can be easily and reliably deleted, which prevents misuse and loss of know-how.
Remote service with SIMATIC IPC Remote Manager

Most efficient remote service because a ready-to-run operating system is not needed. This reduces the need for on-site deployment.

Combines with the other SIMATIC IPC software products to enable completely new service concepts.

BIOS updates or program updates do not require personnel on-site.

"Remote Boot" and "Disk Redirection" permit booting from different boot media and even from ISO files on the management PC.

With Remote Power Control, the SIMATIC IPC can be switched off and on via remote access for maintenance purposes or for energy saving.
SIMATIC Automation Software

Embedded bundles and software packages for your IPC
## SCADA Systems
WinCC V7.x / Professional / OA Packages for SIMATIC IPC

### Available for
All SIMATIC IPC - Box, Panel, Rack PCs

### Savings for bundles
Up to 30% savings (compared to regular WinCC list price)

### High degree of security
Thanks to precautions on administrator and user side

### Plant-wide, central user administration
with individual assignment of rights

---

**Savings only valid within one order – software and hardware.**

Please be aware of the specific system requirements of the specific WinCC version.
SIMATIC S7-1500 Software Controller
Maximum Reliability with PC-based Control Tasks

Independency of Windows
Maximum controller availability even in case of Windows failure or during installation of updates

Easy integration of PC applications
No PC knowledge by the PLC programmer required

Safety Integrated
One controller and one engineering for standard and failsafe applications

Complete configuration in the TIA Portal
No Windows settings required for the software controller

Increased security
Protection of intellectual property and manipulation protection
New SIMATIC Controller generation
Always the right controller performance with integrated functions
### Siemens Industrial PC – For today and tomorrow

**Multiple Physical Form Factors**
- Panel PCs
- Box PCs
- Rack Mount PCs
- Thin Clients
- External Monitors
- Industrial Tablet PC

**In-House Development**
- Designed for Industry
- BIOS
- Motherboards
- Housings
- X-Ray / Vibration Test
- 36-hour Burn-in

**Value Add**
- Built to Order
- 36 Month Warranty
- 15+ Year MTBF
- Integrated Diagnostics
- WinCC Certified/TIA
- Long-term Availability

SIMATIC IPCs offer an innovative platform to prepare your machines and plants for the digitalization challenges!
SIMATIC IPC
Discover more…

SIMATIC IPC Videos
Learn more about the functionality of the SIMATIC IPC videos

SIMATIC IPC Brochure
Discover the full spectrum of the SIMATIC IPCs
SIMATIC IPC - Brochure

TIA Selection Tool
Configure your own IPC – easy and comfortable
siemens.com/tia-selection-tool
We are driving the Digital Enterprise together with our customers.
How did we do? Share your thoughts to win!

Got 1 minute? Rate this seminar via MiA App for a chance to win Detroit Tigers tickets:
After MiA, seminar slides will be available at:

http://www.usa.siemens.com/mia-seminars
Questions?

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