Open Solutions for the World of Automation
Welcome

House keeping points – Visits, Phones & Fires.

Visits – Toilets are through double doors to the right

Phones – Please switch off or set to Silent

Fires – If alarm sounds, follow Siemens staff, back outside by reception where you came in, turn right, head towards grass between main building and employee car park where you will find ‘Visitors’ assembly point.
Profibus & Profinet Update - Figures & Functions  Mark Freeman
Practical steps for a successful Profibus project  Xiu Ji
Coffee (approx 11.00am)
Introduction to Profinet  Andy Verwer
Using Industrial Ethernet Networks for Profinet  Peter Brown
Lunch (approx 12.30pm)
Commissioning & Maintenance - Fault Finding Demo  Andy Verwer
Coffee (approx 2.00pm)
Profinet Configuration – Incl. Profibus Integration and ProfiSafe  Peter Brown
Summary and Next Steps  Bob Squirrell
Close @ 3.30pm
Open Solutions for the World of Automation
Who is PI?

PROFIBUS & PROFINET International:
- 25 Regional PI Associations (RPA)
- 37 Competence Centers in 22 countries
- 12 PI Training Centers (PITC) in 9 countries
- 10 Test Labs in 6 countries
- >1,400 member companies worldwide
- >2,500 products
- 2 technologies: PROFIBUS + PROFINET

16 RPAs in Europe
In 2007: 4.5 Mio Nodes!

In 2008: 5 Mio Nodes!

In 2009: 3.1 Mio Nodes!

Target: 50 Mio. by 2012
PROFIBUS in Process Automation

**PROFIBUS PA Devices**

- 2001: 135,000
- 2002: 205,000
- 2003: 300,000
- 2004: 400,000
- 2005: 530,000
- 2006: 630,000
- 2007: 750,000

**PROFIBUS Nodes in PA**

- 2001: 1.6 Mio
- 2002: 2.1 Mio
- 2003: 2.8 Mio
- 2004: 3.3 Mio
- 2005: 4.0 Mio

**2009 - 5.4 Mio (13%)**

- +52%
- +46%
- +33%
- +33%
- +19%
- +19%
- +18%
PROFIsafe Nodes/Systems

<table>
<thead>
<tr>
<th>Year</th>
<th>PROFIsafe Nodes</th>
<th>PROFIsafe Systems</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004</td>
<td>80,000</td>
<td>11,000</td>
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<tr>
<td>2005</td>
<td>137,000</td>
<td>16,000</td>
</tr>
<tr>
<td>2006</td>
<td>230,000</td>
<td>26,000</td>
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<tr>
<td>2007</td>
<td>410,000</td>
<td>41,000</td>
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</tbody>
</table>

2009 – 850,000

+35%
+54%
+71%
+45%
+63%
+68%
+78%
+54%
+61%
+35%
PROFINET: What is counted?

- HMI
- Decentralised Peripherals
- Controllers
- Sensors
- Motion Control & Drives
- Robots

Andere Feldbusse

Security

Switching

Wireless

Decentralised Peripherals

Proxy

Robots
PROFINET Nodes

PROFINET - The leading Industrial Ethernet System

- Target 3 Mio.
- Growth 31.25%
- 1.14 Mio.
- 1.6 Mio.
- 2.1 Mio.
New Profinet Function - i Device

An IO controller can also be operated as an IO device

With IO controller functionality on the same interface

I-Device

- Simple and familiar IO interfacing of CPUs
- Interfacing of CPUs in different projects
- Saves on PN-PN couplers (transparent network)
New Profinet Function - Shared Device

Access to one device from several controllers
- Flexible assignment of channels and modules to different controllers
- For inputs and outputs

IO Controller 2
‘Energy Management’

IO Controller 1

IO Device
An IO controller can also be operated as an IO device

With IO controller functionality on the same interface

I-Device operates in shared mode

Shared I-Device

- Simple and familiar IO interfacing of CPUs
- Interfacing of CPUs in different projects
MRP – Media Redundancy Protocol

- IEC 61158-5-10
- Edition 1.0 2007-12

- Based on ring topology. The basic concepts of MRP and HSR are identical.

- Max. number (50) of ring nodes
  - PN IO controller
  - PN IO devices
  - Network infrastructure components (switches)

- Reconfiguration time 200ms
Saving of Energy is Required everywhere

... Saving of energy in production?
Companies represented on WG

- PI Group
- Profibus
- Profinet
- ProfiEnergy

- Siemens
- Phoenix Contact
- Rexroth Bosch Group
- Lenze
- Murr Elektronik
- ABB
- Bosch
- SCA Schucker
- PROFINET
- IFAK
- RWTH Aachen
- SEW Eurodrive
- Danfoss
- Hilscher
An Example From The Automotive Industry

Welding Robot Operating Curve - Typical Energy Consumption (kWh, 15min)

Energy consumption during breaks approx. 60%!

With PROFIenergy up to 80% savings!

Energy consumption in breaks appr. 60%

Loads not switched off

Weekend

Weekend
Weaknesses Of Current Solutions

Why has it not been done before?

Use of external hardware:
• Hardwired Relays
• Requires space, money and time
• Engineering and maintenance required
• Manual switch-off:
• Frequently only one main switch
• Start-up unreliable

Measures taken are application specific.
Cost soon outweighs the actual savings.
The role of PROFIenergy

- **ProfiEnergy is an Application profile of Profinet**
- **Standardised Commands using Acyclic comms.**
- **Switching mechanisms reside inside devices**
- **Pauses could be pre-determined, manual, or unexpected**
- **Intelligent devices decide how to react**

**Definition:**

PROFIenergy is a data interface based on PROFINET which permits coordinated and centrally controlled switching-off of loads in pauses independent of the vendor and device.
Implementation of PROFIenergy products

PROFINET Controller
- Sends PROFIenergy commands
- Coordinates switch-on/off sequence
- Info Request option: status information

PROFINET Supervisor
- Reads and visualises status and measured data

PROFINET Devices
- IO-Stations
  - Switch off non-required consumers and the encoder supply
- Drives
  - Switch off the intermediate circuit
- Power module

HMI
- Dim/slide switch off the display

PROFINET
Industrial Ethernet
The Industrial Communications Community
Delivering Greater Enterprise Advantage

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www.profibus.co.uk
www.profibus.com
www.profinet.com
Agenda

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