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## Keeping an eye on the physical layer

### User-friendliness through integration in asset management

**Fieldbus systems PROFIBUS PA and FOUNDATION fieldbus H1 owe their high degree of acceptance to their ability to transport diagnostic data as well as measured values from the field device to the control system. Moreover, modern fieldbus interfaces that connect the DCS to the field devices can be integrated into asset management via online monitoring. Automated integration simplifies monitoring and maintenance tasks and requires less specialized knowledge.**

Up-to-date information on the condition of the assets form the basis of modern maintenance methods. The maintenance requirement for the assets decreases, service life is lengthened, the reliability and availability of the production plant is enhanced,” says Dr. Hasso Drahten, former general manager of NAMUR and employee of Bayer Technology Services [1]. The fieldbus diagnostic module that is integrated into the power supply monitors the fieldbus Physical Layer (PL). The PL is easily integrated into the PAM and PCS and its availability can be monitored. The PL information is presented to the plant operator and the maintenance specialists in the same environment they use to process their day-to-day operations. Messages are received in a familiar format with similar information content. This ensures efficient operation of the complete plant, smoother production operations, and greater availability. These messages do not come in as a flood of information that still needs to be interpreted. Knowledge regarding the fieldbus is integrated into the PAM, which automatically interprets the data from a number of messages and prompts the operator to take action in clear, easy-to-understand text.

### Automatic integration

All information regarding the field device technology and the fieldbus network topology is available in an electronically-readable form following system engineering. These include a

view of the wiring topology, connected instruments, power supply for the fieldbus with optional redundancy, etc. The fieldbus diagnostic utility interprets the plant configuration available from system engineering and automatically adds its own configuration to it.

Automatic configuration offers

- a reduction from three hours to only a few minutes for each segment
- Correct assignment and display of each segment. Data from one ADM, which monitors up to four segments, segregated and sorted according to its level of importance.

PAM automatically stores the configuration and the history; it also automatically logs the status. Unnecessary manual entries are eliminated.

### **Safe to SIL3**

PROFIsafe and FOUNDATION fieldbus safety instrumented function (FF-SIF) are protocols that meet the requirements of SIL 3 and comply with NAMUR recommendation NE 97. The physical layer is not part of the evaluation. It is treated as a tunnel. The special feature: The infrastructure and medium do not enter into the SIL consideration; they have to be designed only to provide sufficient availability. For an informative overview of the subject, please refer to [2].

### **Summary**

Field device and physical layer messages are managed in one system. Availability of the installation is predictable and can be calculated; availability of the transmission medium is ensured. Complete integration in the control system further simplifies the handling of fieldbus systems. This leads to a reduction of unnecessary causes for error and higher efficiency in day-to-day operations. Professor Bender from ITM in Munich says, "A powerful Plant Asset Management system must also see the fieldbus, therefore no PAM without ADM!" [3]

### **Literature**

- [1] P&A-Kompendium. 2007/2008. Page 160f.
- [2] Hug, U., Kasten, T: Installation Technology For Safety-related Fieldbus, presented at the PCIC Petroleum and Chemical Industry Conference Europe, Basel, Switzerland 26-28.10.2005; published as special issue 198388 by Pepperl+Fuchs GmbH, February 2007.
- [3] Fieldbus Diagnostics „Fieldbus made visible“. Preface, page 5. Editor: Pepperl+Fuchs. Part no. 200056. Available as special issue.
- [4] Pepperl+Fuchs Technical White Paper: "Advanced online physical layer diagnostics" 12/2006 Part. No.198641. Available online and as print edition from Pepperl+Fuchs.

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Fig. 1: Physical layer as asset. All diagnostic information converges in an easy-to-operate system, including the fieldbus infrastructure.

The following list can be set as text box:

Physical layer configuration generated in the control technology:

- Virtual device for each monitored segment
- Corresponding device tag
- Symbol in topology view
- Operating messages
- Alarm messages
- Setup for the Advanced Diagnostic Module and its infrastructure

Interface technology	Convent.	Fieldbus	
	4...20 mA	without ADM	with ADM
Investment: installation and commissioning	46.5	21.5	<b>1.6</b>
Operation: maintenance requirements	37.5	21.5	<b>1.6</b>

Investment and operating costs compared. Case study for 1200 instruments installed in the field. Requirement in man days for conventional technology, fieldbus without and fieldbus with physical layer diagnosis. [4]

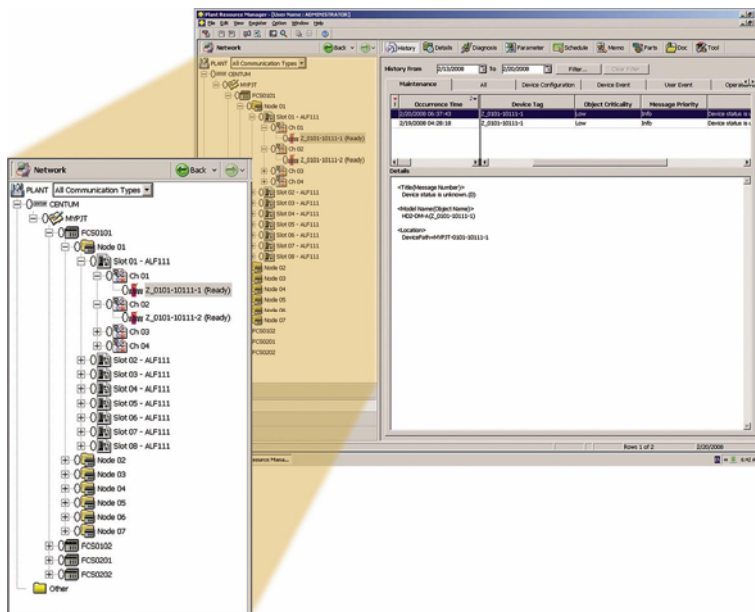


Fig. 2: The fieldbus displayed as an asset in the network status view of the control system. Plant driver and maintenance personnel receive the necessary information for their work in the required depth and within their customary environment.



Fig. 3: Fieldbus power supply with integrated Advanced Diagnostic Module for the physical layer. Special connections adapted to control technology enable simple plug and play functionality.