PROFINET Diagnostics

Solutions for Installing, Commissioning and Maintaining PROFINET Networks

Network Acceptance Testing

Cable Testing

Trouble-shooting

Network Monitoring

Network Management

Industrial

softing

PROFINET DIAGNOSTICS

While PROFINET has become an established communication standard in industrial automation, the diagnostics of PROFINET networks still is new territory for many users. Profound changes brought about by the shift from traditional fieldbus systems to PROFINET have led to new typical root causes for network problems and failures. Network configuration has become more complex and changes in the network are more frequent. New tools and solutions are therefore needed which allow users to handle new network diagnostic and network management tasks across a plant's entire life cycle.

SOFTING EXPERTISE

For more than 30 years, Softing Industrial has been a world leading expert for digital data exchange in industrial automation. Since the very early specification and development stages of this technology, Softing has offered PROFINET products, solutions and services. Softing products cover diagnostic needs during the entire network lifecycle, including installation, commissioning and network operation. As a result, users can operate and maintain their PROFINET networks more efficiently, reduce the risk of network failures, and thus increase the availability of their plants as well as reduce overall downtime.

Cable Testing

During network installation, cable tests are recommended to reduce risks of failure during network operation. In particular, this applies to custom-tailored cables or cables which are hard to replace after installation (e.g. backbone connections). Depending on individual requirements, either cable qualification or even more rigorous cable certification can be performed.

NetXpert 1400 IE is Softing's offer for cable qualification. The product provides a complete solution for cable testing, performance analysis and troubleshoo ting of Industrial Ethernet networks, enabling rapid, simple verification and documentation of the capability of cabling links with RJ45 and M12 connectors. **WireXpert 500 IE** meets all requirements for cable certification, if full cable qualification is not sufficient.

Complete Set of Cable Test Functionality

- Verification (simple test of network structure and correct wiring)
- Qualification (functional test checking data transfer rates)
- Certification (assessment according to applicable standards)
- Troubleshooting (detection of typical Ethernet issues based on standardized transfer tests)

State-of-the-Art Cable Qualification Tests

- Signal-to-noise ratio (SNR)
- Bit error rate test (BERT) and packet error rate test, evaluation based on IEEE 802.3 (Ethernet fault tolerance)
- Determination of runtime ratio

Extensive Certification Functionality (WireXpert 500 IE only)

- Set of supported standards
- Frequencies up to 500 MHz
- Start of measurement with a single tap
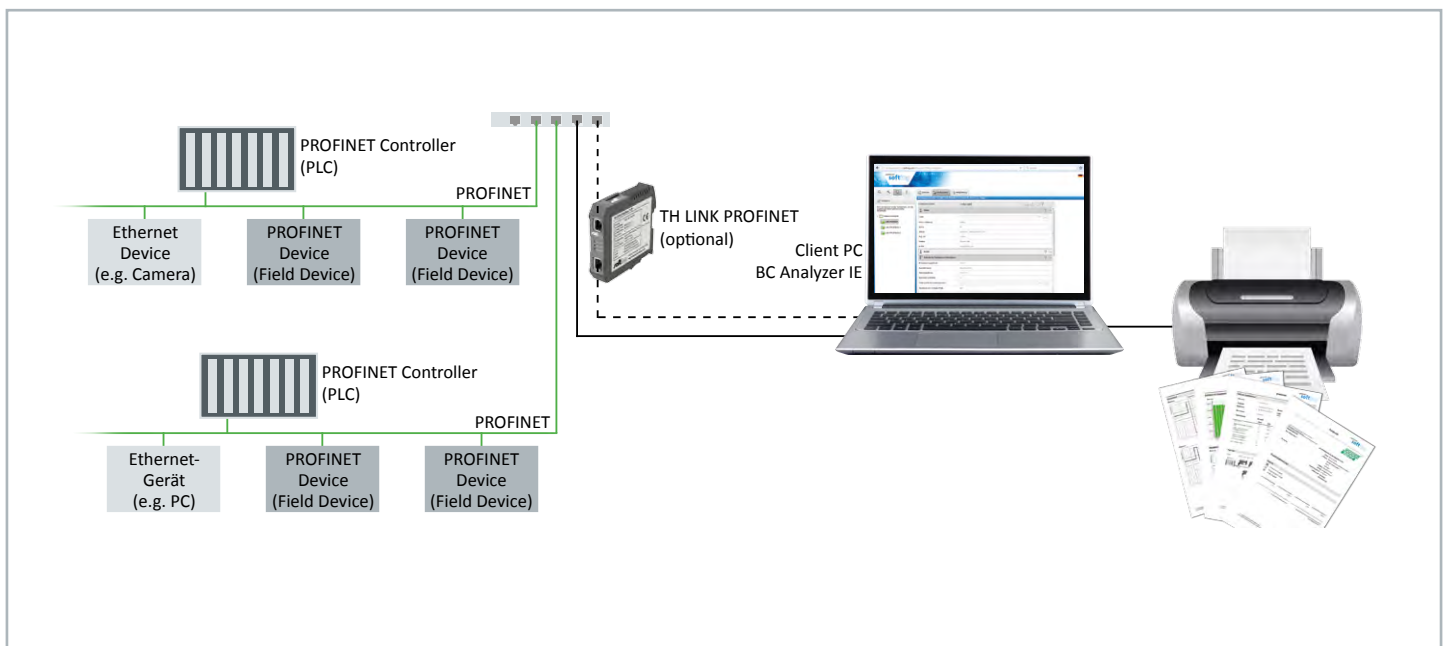- 6" industrial touch-sensitive LCD

Documentation and Reporting of Measurements

- Measurement data stored in internal memory
- SD card for additional memory
- USB connection for alternative transfer of measurement data to PC and creation of professional reports

Network Acceptance Testing and Troubleshooting

Network acceptance testing is a critical step during plant commissioning. At this phase, a specific network test procedure based on clear criteria is defined and executed and its results are documented. In case of unexpected network errors during the commissioning phase, root causes of network problems have to be identified and eliminated efficiently.

busCHECK Analyzer IE is a software product for network acceptance testing and troubleshooting of PROFINET networks. For network acceptance testing, users can automatically execute test procedures and create test reports based on PROFIBUS & PROFINET International (PI) recommendations. The product also automatically generates further network documents such as graphical network topologies, inventory lists and reference measurements. For troubleshooting, busCHECK Analyzer IE helps to detect and fix a broad range of network errors, including unavailable network devices, large amounts of error packages on a particular switch port or the use of incorrect device names.

Mobile PC Software

- Functionality for acceptance tests
- Diagnostics list, error statistics and network statistics
- Enhanced flexibility by supporting online as well as offline mode
- Flexible definition of acceptance criteria

Automated Generation of Acceptance Test Documents

- PROFINET acceptance test reports
- Graphical topology
- Inventory list
- Reference measurement

Supporting Collaboration Between End Users and Their Suppliers

- Exchange of test project configuration data
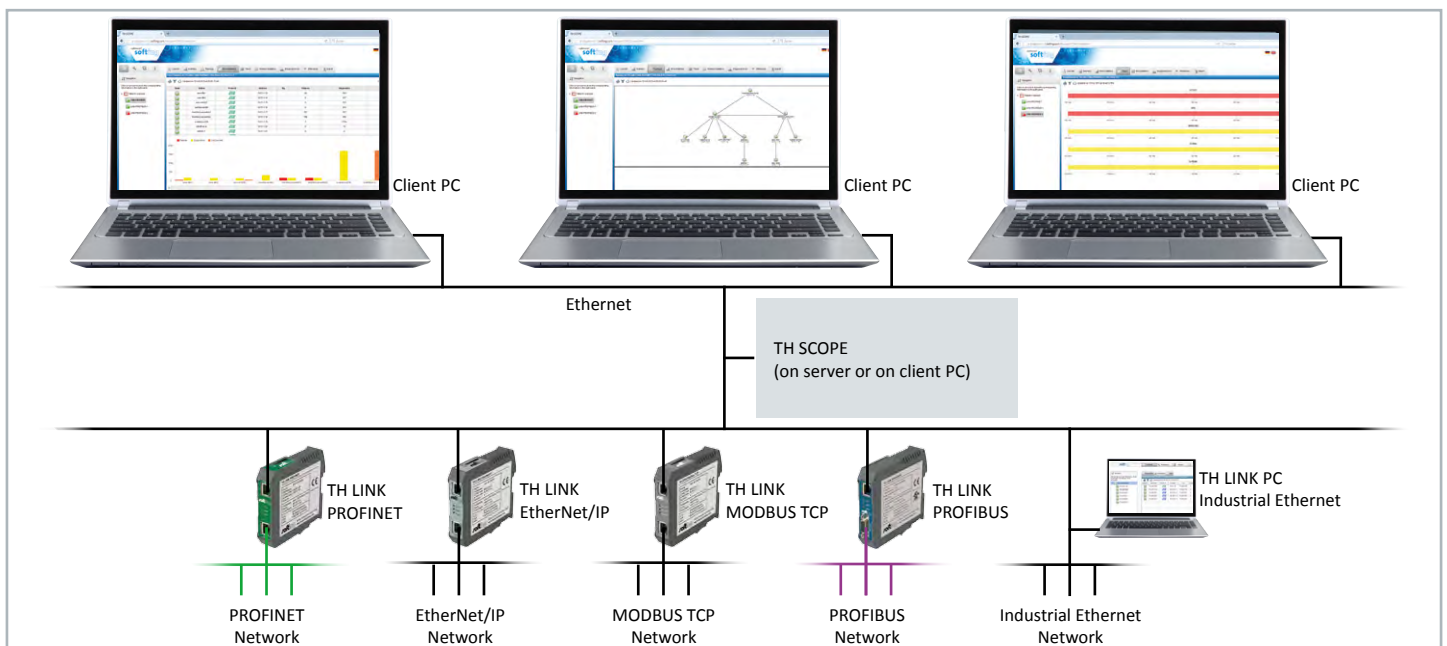- Exchange of reference measurements

Full Integration with Softing Network Monitoring Solution

- Read and compare BC Analyzer IE reference measurements with TH SCOPE
- Use data from TH LINK devices

Network Monitoring and Management

During plant operation, maintenance personnel needs to know the status and health of the communication network at all times. In addition, tasks like firmware updates for network devices or the replacement of a defect device have to be performed. Also early indicators for emerging problems are of interest, allowing to address them before they lead to major failures or even plant downtime.

The **TH SCOPE** diagnostic and supervision software combined with network interfaces of the **TH LINK** family enable permanent network monitoring and management, targeted to the needs and requirements of plant operators and maintenance personnel. They automatically monitor network health and status, support typical network management tasks such as device firmware checks and they provide hints for troubleshooting in case of problems.

Comprehensive Diagnostics Functionality

- Stationary operation checking overall network status, entries in diagnostics list, error statistics
- Fault identification, localization and analysis

Comprehensive Representation and Analysis of Diagnostics Data

- Data on network communication (e.g. load, error statistics)
- Data from network configuration (e.g. device names, firmware version, topology)
- Diagnostic messages (network and device diagnostics)

Functionality for Network Management and Predictive Maintenance

- Performance of checks for determining successful maintenance and device exchange, e.g. firmware checks, network load
- Automated alarming and set-up of predictive maintenance schedule, e.g. based on network load, number of error frames, attenuation reserve

Flexible Integration into Existing Systems and Processes

- Integration of network data into monitoring tools and supervisory control systems via SNMP and OPC
- Export of all diagnostic data, support of further processing in applications such as Microsoft Excel
- Web-based access, local or remote

Training and Services

To complement its product portfolio, Softing also offers training and services regarding PROFINET network diagnostics. As official PROFINET COMPETENCE CENTER and CERTIFIED TRAINING CENTER, Softing offers training addressing the basics of PROFINET technology and the standard-compliant installation and reliable operation of PROFINET networks.

Softing services include **consultancy on network acceptance testing**, e.g. how to apply the commissioning guideline of the PI organization to a specific situation. Upon request, Softing engineers can execute a **network acceptance test** and provide a **report of the results**. On-site troubleshooting complements the Softing network diagnostic services.

SERVICE

TRAINING

CONSULTING

Technology Training

- PROFINET overview
- Technological basics
- Details of specifications
- PROFINET implementation
- PI certificate upon successful passing of "Certified PROFINET Engineer" examination

Troubleshooting Training

- Practice-oriented introduction to Ethernet basics and PROFINET specification
- Focus on correct network installation and structured troubleshooting approach
- PI certificate at successful pass of "Certified PROFINET Installer" examination

On-Site Troubleshooting Services

- Determination of installation quality (e.g. for cables and connectors)
- Check of network configuration including available bandwidth and baudrates
- Network assessment regarding EMC, shield, etc.
- Report including proof of reliable communication or recommended problem solving measures

Network Acceptance Test Services and Consulting

- Creation of customer-specific acceptance test guidelines based on recommendations by PI organization
- Execution of PROFINET network acceptance tests
- Creation of test reports, inventory lists, reference measurements
- Advice on how to improve network performance and robustness