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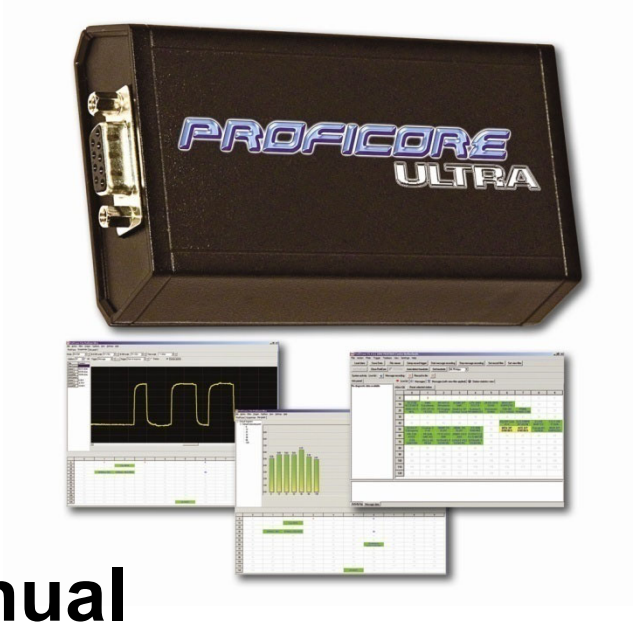

User Manual

ProfiTrace 2

PROFIBUS Combi-Analyzer on USB

PROFIBUS analyzer with powerful statistics
High-speed digital oscilloscope
Bar graphs
Topology scan
DP-V0/V1 master
Reporting

PROFIBUS to USB interface
Suitable for PROFIBUS DP and PA
9,6 kbps to 12 Mbps
ProfiTrace 2 is suitable for XP and Vista platforms

Version 1.6 – 7 October 2008

PROCENTEC

Safety Guidelines
This manual contains notices which you should observe to ensure your own personal safety, as well as to protect the product and connected equipment. These notices are highlighted in the manual by a warning sign and are marked as follows according to the level of danger:

 Draws your attention to important information on handling the product, a particular part of the documentation or the correct functioning of the product.

Warning
This device and its components may only be used for the applications described in this manual and only in connection with devices or components that comply with PROFIBUS and RS 485 interface. This product can only function correctly and safely if it is transported, stored, set up, installed, operated and maintained as recommended.

The ProfiCore Ultra is a CE class A product. In a domestic environment it may cause radio interference in which case the user may be required to take adequate measures.

Disclaimer of Liability
We have checked the contents of this manual as much as possible. Since deviations cannot be precluded entirely, we cannot guarantee full agreement. However, the content in this manual is reviewed regularly and any necessary corrections included in subsequent editions. Suggestions for improvement are welcomed.

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Important Information

Purpose of the Manual
This user manual provides information how to work with ProfiTrace 2.

Recycling and Disposal
The parts of the ProfiCore Ultra can be recycled. For further information about environment-friendly recycling and the procedure for disposing of your old equipment, please contact:

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• By email at support@procentec.com

Contents

1 Product Description

ProfiTrace 2 is the most powerful analyzer for PROFIBUS networks. It is the latest generation in the line of busmonitor technology because it combines all primary tools in one;
- Analyzer,
- Oscilloscope,
- Bar graph,
- Topology scan,
- DP-V0/V1 Master.
Technicians can check and troubleshoot the complete PROFIBUS network with 1 software package and 1 piece of hardware. This results in an enormous reduction in equipment, weight, costs and required knowledge.

The advanced USB hardware (ProfiCore Ultra) is internally equipped with a high-speed digital oscilloscope and able to capture bus signals running at 12 Mbps. It can also be used on PROFIBUS PA installations with the PA Probe Ultra.

ProfiTrace 2 is an essential tool for maintenance, commissioning and troubleshooting as well as product development. Typical failures such as noise, reflections, voltage drops, termination problems, double addresses, wire breaks and configuration faults are easily identified. Random errors such as overshoots, error telegrams, repeats and diagnostics can also be captured and logged. The results can also be exported to detailed reports which are accepted by the industry.

This revolutionary tool has been developed because of technological limitations of other available tools on the market. The service team of the PROCENTEC was frequently forced to invest heavily in interface cards and eventually could no longer accept the frustrations of PC locked licenses. That the prices of the tools are relatively high and the displayed information is too complex was another contributing factor. Therefore PROCENTEC decided to initiate the development of a tool that was ideally suited to our needs and those of the end-user.

This outstanding tool that fits in your pocket will boost the capabilities of service, maintenance and engineering technicians.

1.1 Product features

- ✓ **Analyzer with powerful statistics**
  Enhanced version of ProfiTrace 1: *Repeats, Fall-outs, Corrupted messages, Diagnostics, Cycle time, etc*.
- ✓ **High-speed digital oscilloscope**
  Differential voltage, A-line, B-line, Noise, Overshoots, Reflections, Triggers.
- ✓ **Bar graphs**
  Average, Min. and Max. values of the bus signals per device.
- ✓ **Topology scan**
  Automatic generation of the network topology.
- ✓ **Reporting**
  Automatic generation of detailed reports that are accepted by the industry.
- ✓ **DP-V0/V1 master**
  ProfiCaptain 1 has been completely integrated with even more features.
- ✓ **ProfiCore Ultra USB interface**
  Useable on PC platforms, no power supply required and elimination of spur lines.
- ✓ **DP and PA**
  The PA Probe Ultra makes a measurement on PA segments possible.
- ✓ **9,6 kbps to 12 Mbps**.
- ✓ Works on XP and Vista platforms.

1.2 Application areas

- ✓ **Troubleshooting & Maintenance** of PROFIBUS networks (*ProfiTrace, ScopeWare, Topology scan and ProfiCaptain*).
- ✓ **Commissioning** of PROFIBUS networks (*ProfiTrace, ScopeWare, Topology scan and ProfiCaptain*).
- ✓ PROFIBUS **product testing** and verification (*ProfiTrace, ScopeWare and ProfiCaptain*).
- ✓ Passive **cable testing** (*ScopeWare and ProfiCaptain*).
- ✓ **I/O testing** of PROFIBUS devices (*ProfiCaptain*).
- ✓ **Address setting** of PROFIBUS devices (*ProfiCaptain*).
- ✓ **Education**.

1.3 Detectable faults

ProfiTrace 2 can be used to detect almost all faults in PROFIBUS networks. The table below describes the sub-programs you need to find specific faults.

Faults on DP	**Passive cable** (No devices connected)	**No master active** (Slaves are connected)	**Running installation**
General communication faults		ProfiCaptain + ProfiTrace	ProfiTrace
Double address		ProfiCaptain + ProfiTrace	ProfiTrace
Wrong address		ProfiCaptain	ProfiTrace
No termination	ProfiCaptain + ScopeWare	ProfiCaptain + ScopeWare	ScopeWare
Too many termination	ProfiCaptain + ScopeWare	ProfiCaptain + ScopeWare	ScopeWare
Missing device		ProfiCaptain	ProfiTrace
Device diagnostics		ProfiCaptain	ProfiTrace
Short-circuit, break, crossed wires	ProfiCaptain + ScopeWare	ProfiCaptain + ScopeWare	ScopeWare
EMC problems	ScopeWare	ScopeWare	ScopeWare
1 Meter rule		ProfiCaptain + ScopeWare	ScopeWare
Configuration faults		ProfiCaptain	ProfiTrace

1.4 System requirements

In order to use ProfiTrace 2 and all sub programs, your computer system should include the hardware and software listed below:

Minimum requirements:

- ❑ Microsoft Windows XP or Vista
- ❑ 600 MHz Intel Pentium III processor or equivalent
- ❑ 256 MB of RAM
- ❑ 50 MB of available disk space
- ❑ 1024 x 768 resolution display
- ❑ 1 free USB 2.0 high-speed interface port supplying 400 mA
- ❑ 1 Mouse or other pointing device

Recommended (differences to minimum):

- ❑ 1 GHz Intel Pentium III processor or equivalent
- ❑ 512 MB of RAM
- ❑ 1280 x 1024 resolution display or better

Attention Users of Windows 98, 98 Second Edition and Millennium (Me)
PROCENTEC is not able to offer software downloads or replacement CDs for Windows 98, 98 Second Edition (SE) or Windows Millennium (Me) for ProfiTrace 2. Microsoft has stopped supporting these operating systems, and this change involves all suppliers.

If you received a software CD that lists any of these operating systems on the CD label, be sure to keep it in a safe place since it will no longer be available from PROCENTEC.

NOTE: The information in this document version supersedes any information in the digital or printed documentation. Although the software for Windows 98, 98 Second Edition, and Windows Me will no longer be available, it could be that ProfiTrace 2 works with these operating systems.

2 ProfiCore Ultra

The ProfiCore Ultra is the required hardware to use ProfiTrace 2. It has a robust industrial housing and translates PROFIBUS to USB and vice versa. Because of the USB interface, ProfiTrace 2 can be used on field laptops as well as desktop PCs.

The USB interface also eliminates spur lines. ProfiTrace 2 can be connected almost directly to the bus line and the laptop positioned on a distance. This is a perfect measurement solution for high-speed networks.

- When ProfiTrace 2 is in the analyzer mode, it passively records the data traffic. It does NOT behave as a master or slave.

- When ProfiCaptain is activated, the ProfiCore Ultra acts as a master and transmits messages on the bus.

2.1 Internal structure

ProfiCore Ultra has an isolated RS 485 interface (DB9 connector) and is equipped with a high-speed digital oscilloscope that is able to capture bus signals running at 12 Mbps (see Fig. 1).
It can also be used on PROFIBUS PA installations with the PA Probe Ultra.

The RS 485 driver is 1/5th of a standard PROFIBUS busload. The chance of disturbing a working installation is therefore reduced to a minimum.

ProfiCore Ultra has the capability to cache data in its on-board memory in case of windows performance problems or 'higher' priority tasks like the hard-disk. ProfiCore Ultra will NOT lose a single message.

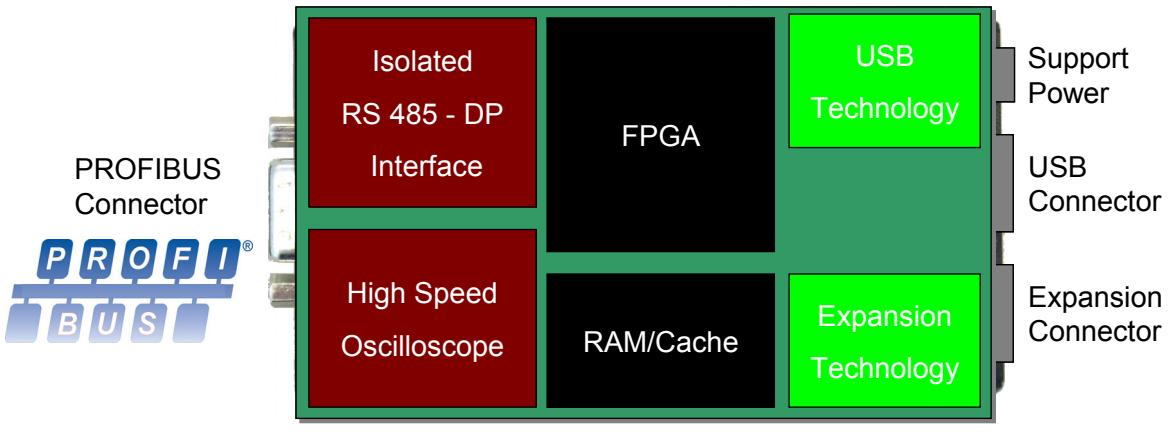


Fig. 1 - Internal structure of the ProfiCore Ultra

2.2 Support-power connectors

In normal cases ProfiCore Ultra does NOT REQUIRE AN ADDITIONAL POWER SUPPLY because of the USB connection.

If your laptop/PC is for some reason not able to supply the power to the ProfiCore, there are 2 options;

1) Micro-USB connection.
This requires an additional USB port of your laptop/PC. The Micro-USB cable is provided with the Troubleshooting Toolkit.

2) Adapter
The adapter has to supply 9 V - 500 mA with a power plug according to: NES/J 21, NES/J 21 W, NES/J 210 XNES/J 210. The adapter is NOT supplied with the product.

2.3 Expansion connector

ProfiCore Ultra has an expansion connector (RJ 45) which can be used for all kinds of additional functionality. ProfiTrace 2 uses the expansion connector to trigger an additional external oscilloscope.

3 Software Installation Instructions (Windows XP)

This chapter describes the installation for ProfiTrace 2 and the ProfiCore Ultra drivers. It is assumed that you have a basic knowledge of Windows operating systems. All example and dialogs are based on a US/UK based windows installation and may differ slightly based on upgrades, updates and enhancements. Please use the screenshots in conjunction with the description in order to press the appropriate buttons and other user interface items.

It is possible to install ProfiTrace 2 next to ProfiTrace 1, they are both using another default installation directory and the drivers are different. You can even run both applications at the same time.

3.1 Installation procedure

The installation of ProfiTrace has to be done with the following procedure:

- ❑ Preparations prior to installation.
- ❑ Installing the ProfiCore Ultra driver.
- ❑ Installing ProfiTrace.
- ❑ Connecting the ProfiCore Ultra to the USB port.
- ❑ Installing GSD files in ProfiTrace and ProfiCaptain.
- ❑ Setting colour preferences.

3.2 Prior to installation

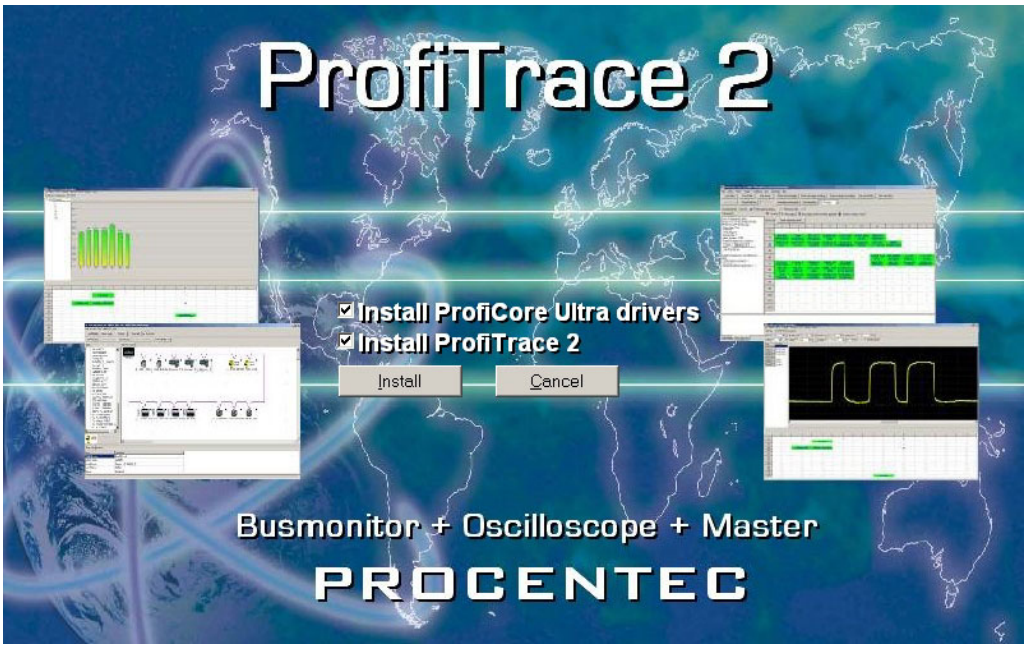
Prior to installation, follow the steps below:

- ❑ Make sure you always use the latest version of ProfiTrace and ProfiCore Ultra drivers. Updates can be downloaded from: www.procentec.com.
- ❑ Install the latest service packs and ‘hot fixes’ for Windows.
- ❑ Boot the PC in the normal mode of Windows (NOT in the safe mode).
- ❑ Under multi-user versions/installations of Windows make sure you have administrator rights.

ⓘ Do NOT connect the ProfiCore Ultra to the USB port (yet)!

3.3 Setup program

Insert the ProfiTrace CD in the CD-ROM drive and/or start the **Setup.exe**. The install shield will display an introduction screen (see next screenshot).



Click **"Install"** to install ProfiTrace and the ProfiCore Ultra driver. If you only want to install one of them, just unselect the option you want to skip.

3.4 ProfiCore Ultra driver installation

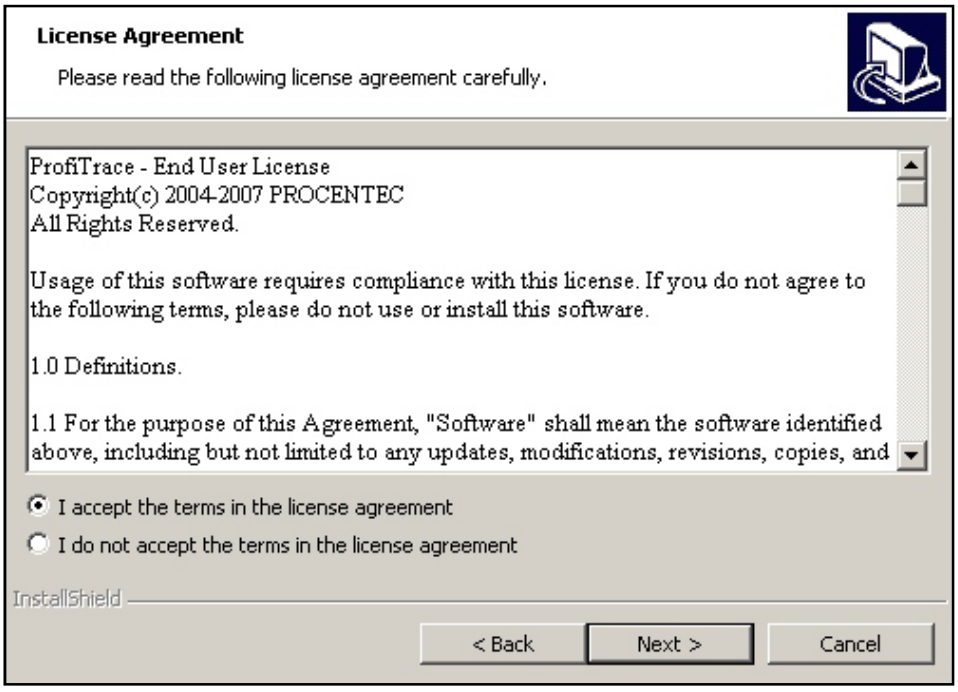
The install shield will first install the ProfiCore Ultra driver. In a window the results of the installation can be followed. Blue letters are OK, red letters indicate a problem. The driver can also be installed manually by starting "**DriverInstall.exe**".

3.5 ProfiTrace installation

After the ProfiCore Ultra driver has been installed the setup procedure continues with the installation of ProfiTrace.

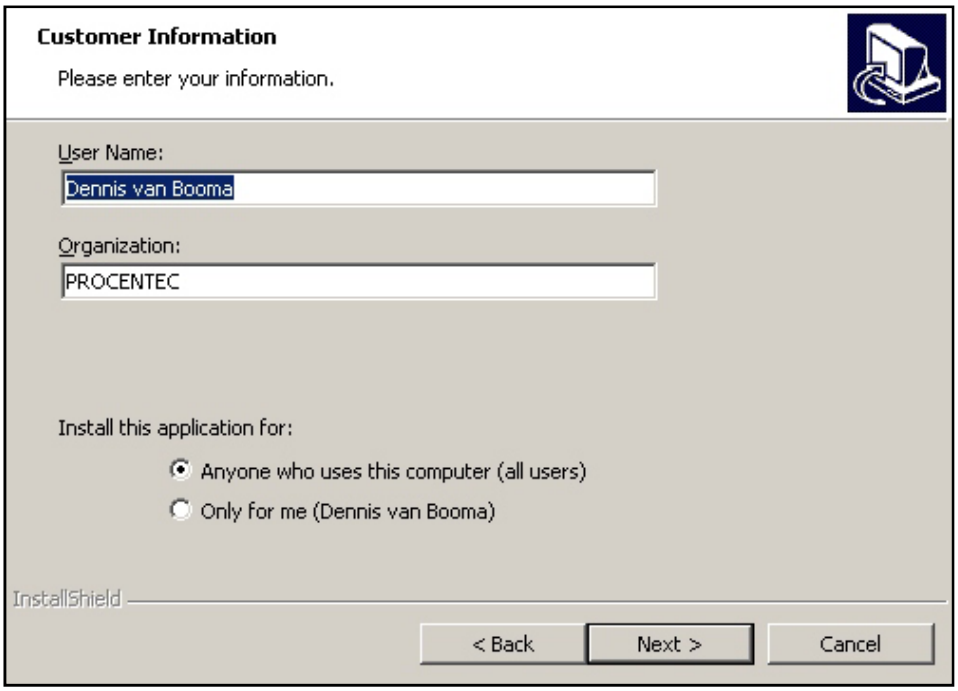
Click "**Next**" to proceed.

You have to accept the terms of the license agreement.



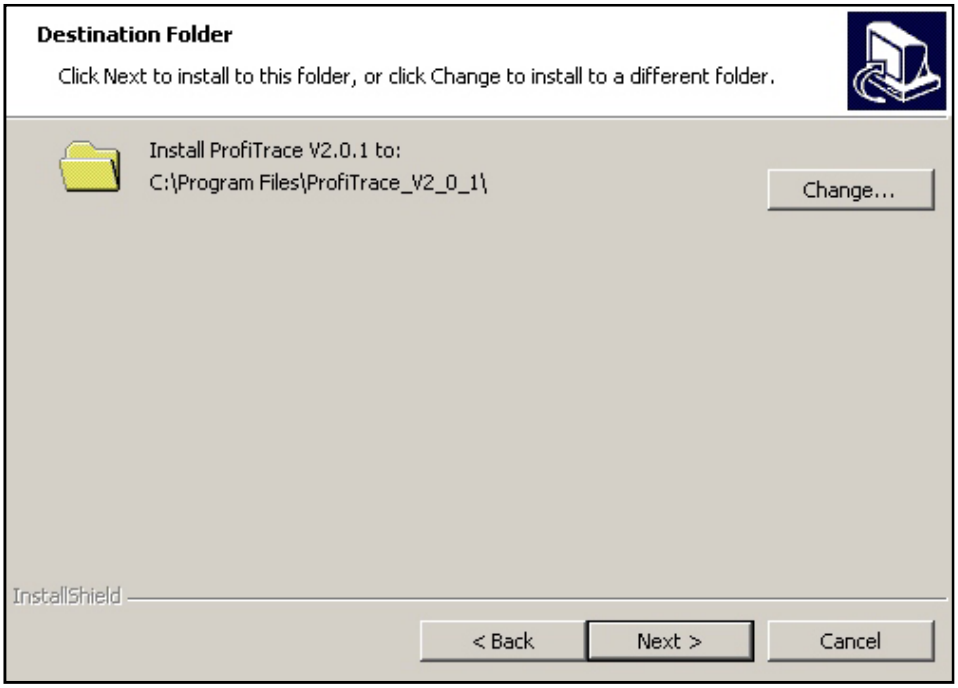
Click "**Next**" to proceed.

Fill in your name and organization.



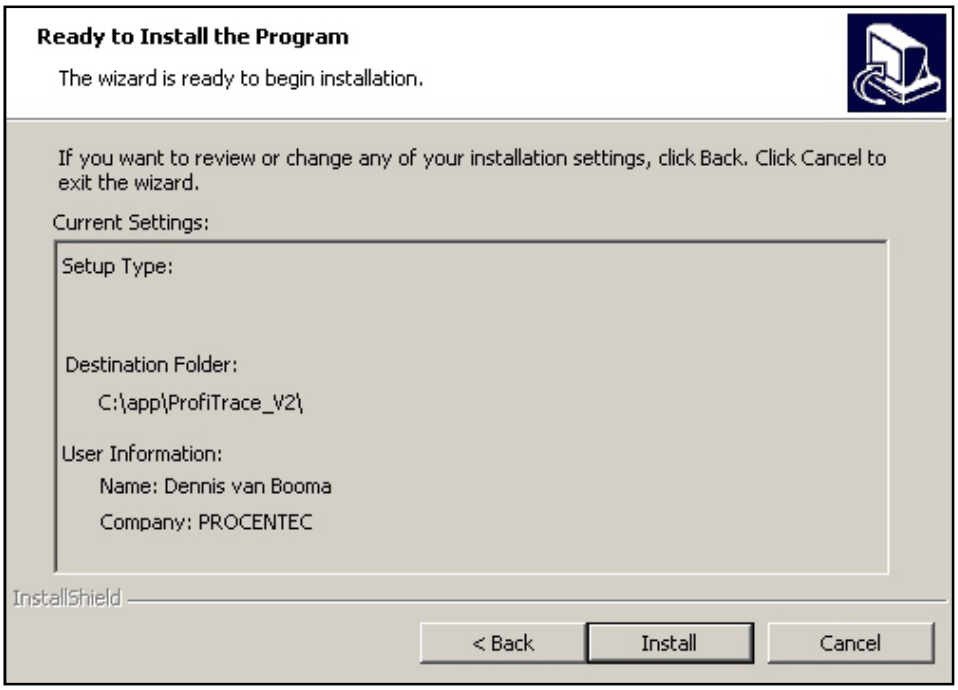
Click "**Next**" to proceed.

Select your destination folder.



Click "**Next**" to proceed.

Check your settings.



Click "**Install**" to start the installation process.

After the installation process, ProfiTrace is ready for use, however we recommend rebooting the PC.

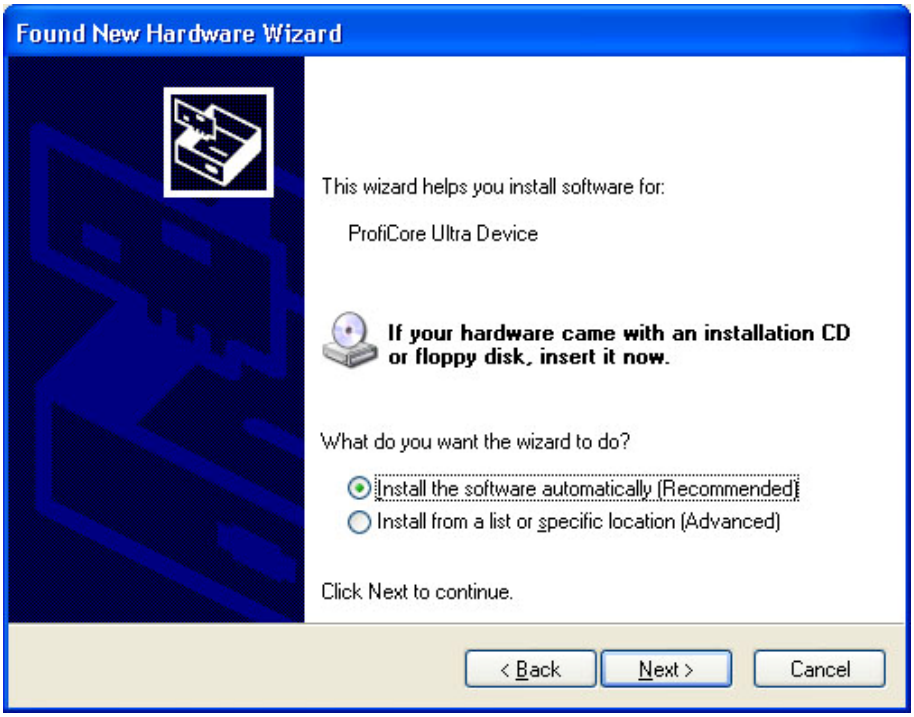
Click "**Finish**" to close the install shield.

3.6 Connecting ProfiCore Ultra to the USB port

After connecting the ProfiCore Ultra to the USB port, the last installation process will start.

Click "**Next**" to proceed.

Select the location of the drivers. Normally the first option is sufficient.



Click "**Next**" to proceed.

The driver is ready for use; however we recommend rebooting the PC.

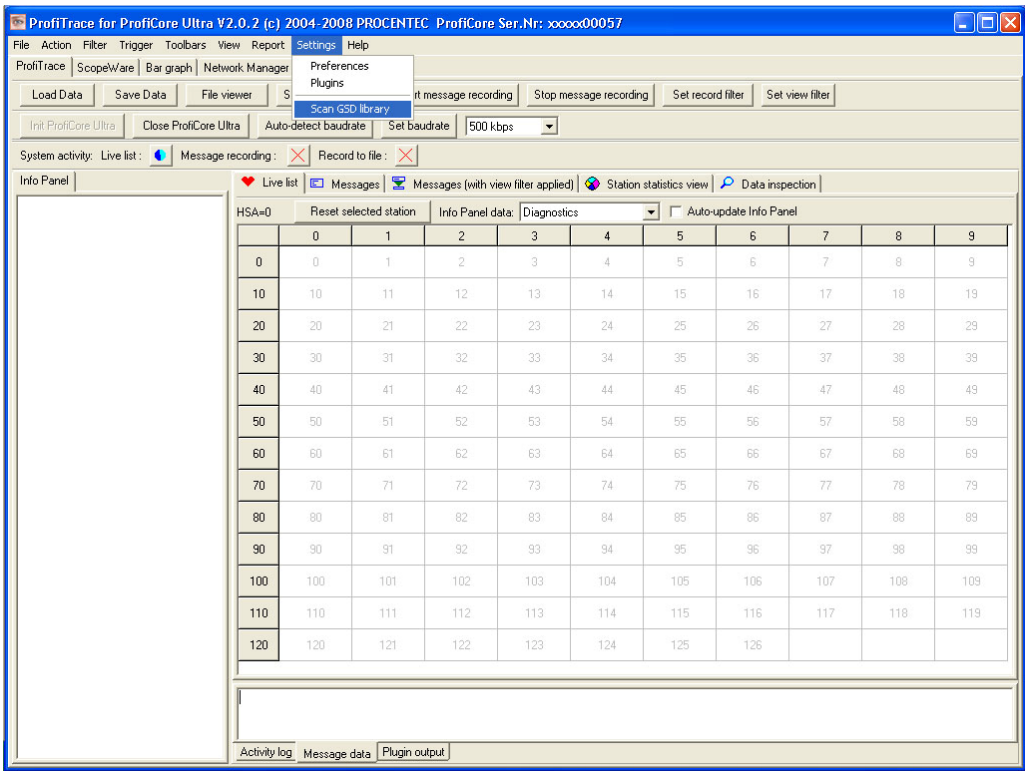
Click “**Finish**” to close the install shield.

When the ProfiCore Ultra is connected to another USB port or another ProfiCore Ultra to the same USB port, the driver installation process will start again (only once for every port or ProfiCore Ultra).

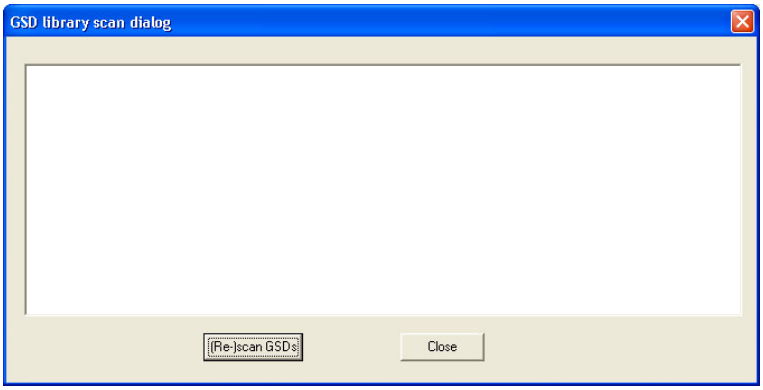
3.7 Installing GSD files in ProfiTrace

ProfiTrace has the capability to display the Model_Name of the device in the Live List. The Model_Name comes from the GSD file of the device. If you want to use this feature, you have to copy all the required GSD files to the "**GSD**" directory. You can also point to a GSD directory of another application (in the setting menu).

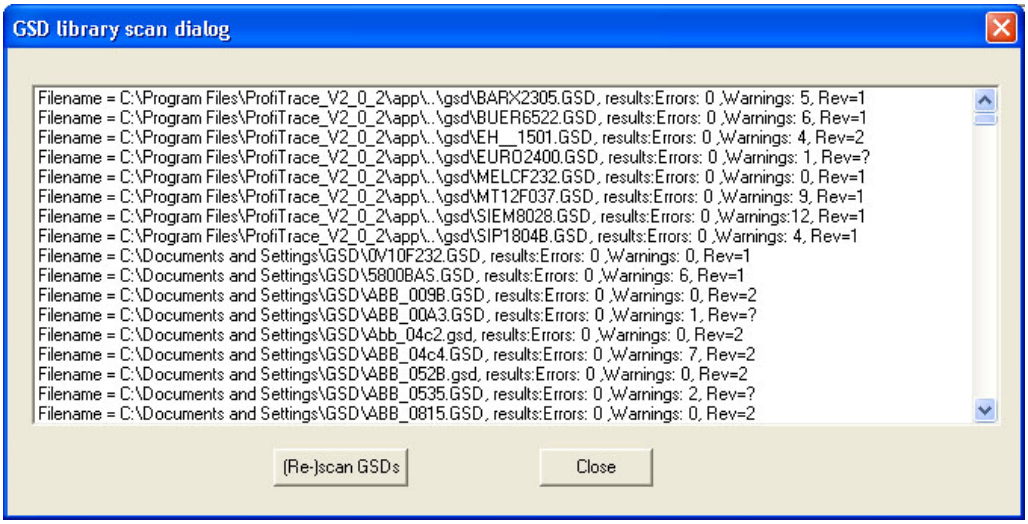
After the copy process, ProfiTrace has to scan the GSD files in order to create an internal catalogue. You only have to do this once! Unless you remove, add or edit a GSD file.



Click "**Settings**" followed by "**Scan GSD Library**" to proceed.



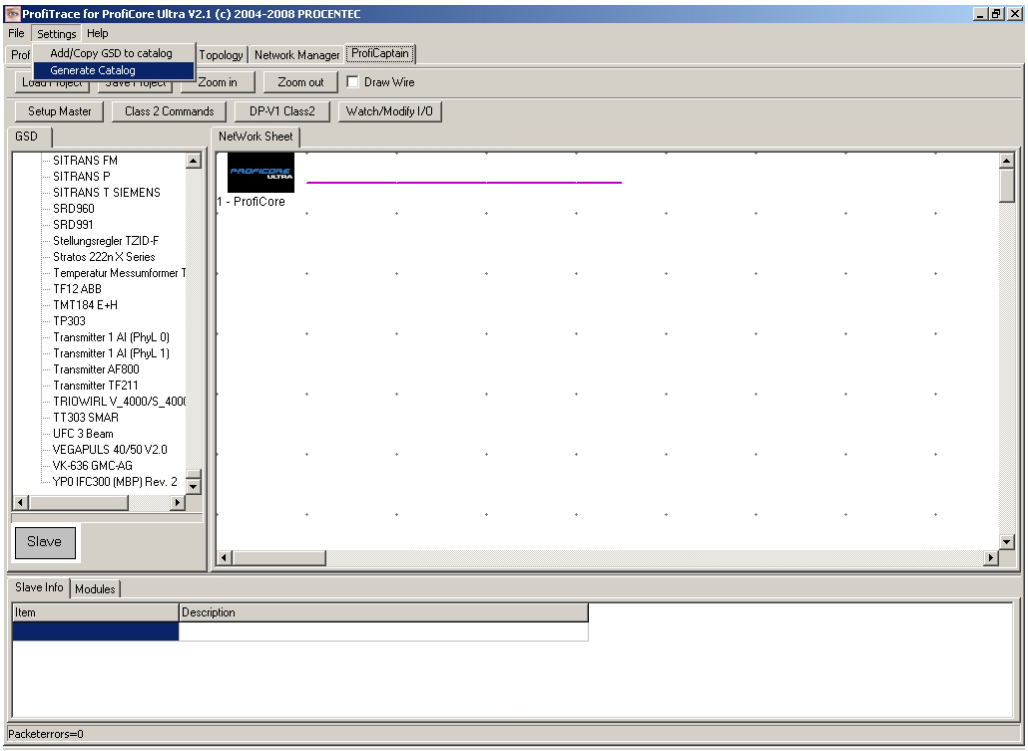
Click "**(Re)Scan GSDs**" to proceed.



Click “**Close**” to finish the GSD scanning.

3.8 Installing GSD files in ProfiCaptain

The catalog update of the GSD files in ProfiCaptain is not automatically linked with ProfiTrace. The scanning of GSD files has to be repeated in ProfiCaptain.

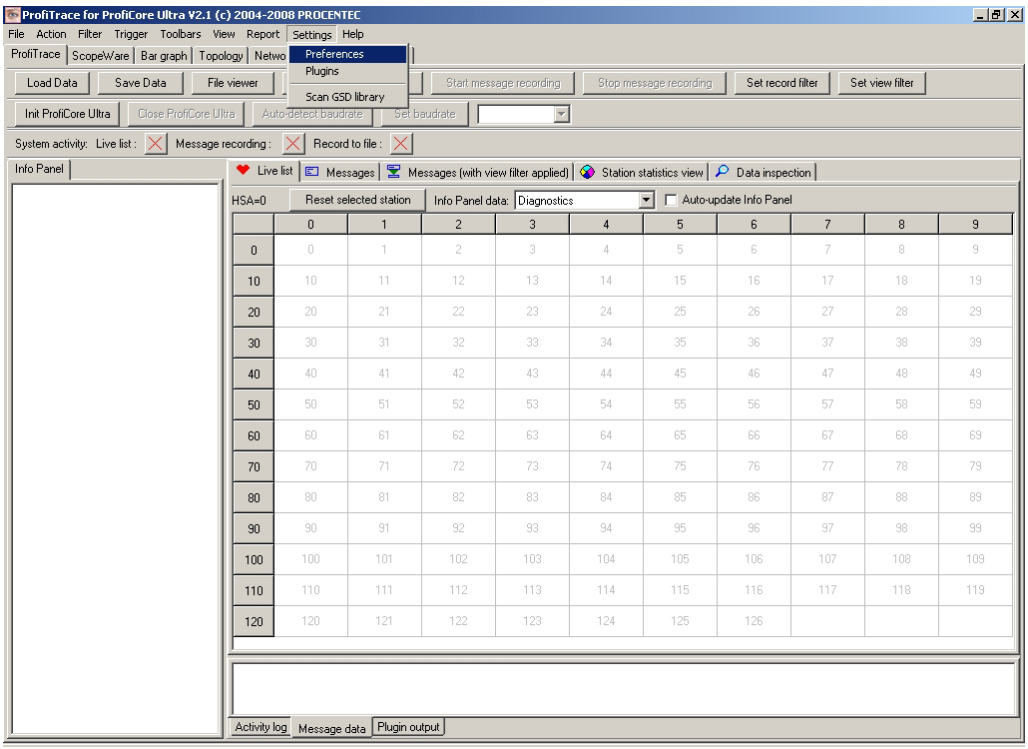


Click “**Settings**” followed by “**Generate Catalog**” to scan the GSD files.

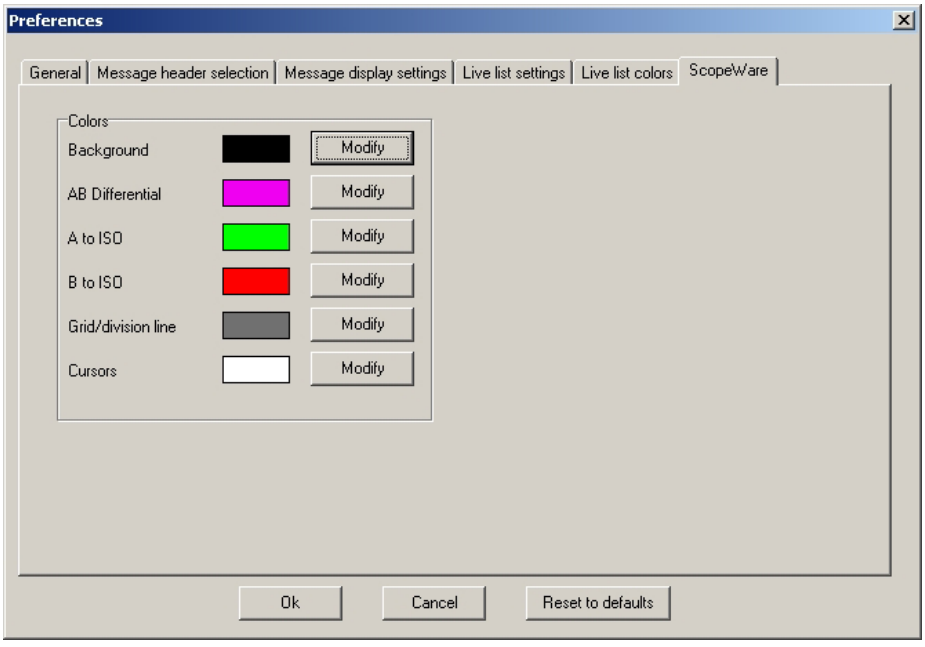
To remove a GSD file from the catalog you need to manually delete the file from the GSD directory and generate the catalog again (*Settings->Generate Catalog*).

3.9 Setting colour preferences

The colours of the ScopeWare (signals and background) can easily be set/adjusted in the Settings/Preferences menu.



Click "**Settings**" followed by "**Preferences**" to proceed.



Click on "**ScopeWare**" to set the oscilloscope colours.

For presentations it is recommended to set the AB Differential colour to Yellow.

If you want to adjust the Live List colours, click on "**Live List colours**".

3.10 Upgrades

It is the policy of PROCENTEC to release periodic upgrades. These upgrades do NOT overwrite the previous version! If you do not want to use the previous version anymore, you can follow this procedure:

- ❑ Uninstall the previous version by means of the Control panel in Windows.
- ❑ Rename or move the directory of the previous version to a more suitable name / location.
- ❑ Install the new version on-top of the directory from the previous version. If you are confronted with a warning about existing drivers which seems to be newer (see **Fig. 2**), just click 'Yes' and overwrite them.
- ❑ Update the shortcut on the desktop.

You have now access to all previous GSD, DAT, plugin and configuration files. After starting ProfiTrace, scan the GSD files again (also in ProfiCaptain).

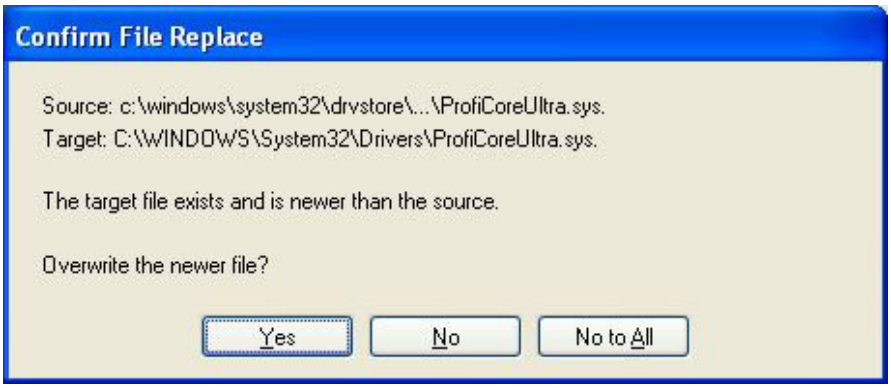


Fig. 2 – Warning prior to replacing drivers (confirm with Yes)

4 License System

4.1 Introduction

ProfiTrace 2 can be used Offline without licenses. For Online functionality, you need the license for the parts you want to use.

You can purchase a license for the following combinations:

- ProfiTrace 2
- ProfiTrace 2 + ScopeWare + Bar graph + Reporting
- ProfiTrace 2 + ScopeWare + Bar graph + Reporting + Topology scan
- <*Every combination*> + ProfiCaptain

The license you have purchased now can later on always be enhanced with extra functionality.

4.2 Characteristics of the license file name

The license is defined by a file with the extension **.PLD**. This file has to be copied automatically or manually to the "**\APP**" directory of ProfiTrace 2.

The license file is related to the serial number of the ProfiCore Ultra. On the bottom of the ProfiCore Ultra the serial number can be found. It is a 10-digit number. **Fig. 3** illustrates the serial number of the ProfiCore Ultra.

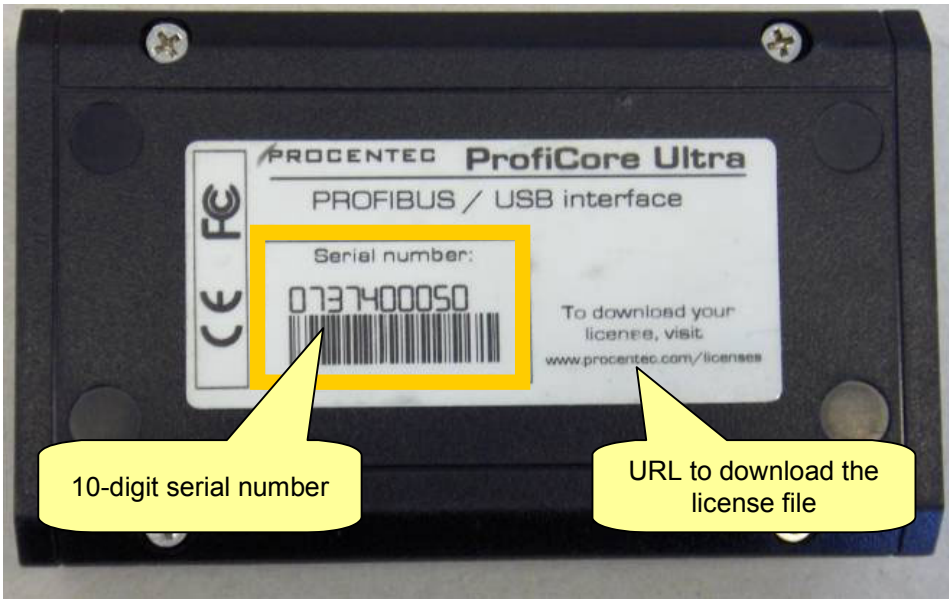


Fig. 3 – ProfiCore serial number

The license file for the ProfiCore Ultra in Fig. 3 is: **ProfiCoreUltra2_00050.PLD**

4.3 Storage location of the license files

It is allowed to store multiple licenses in the "**APP**" directory of ProfiTrace. It is also allowed to store the licenses on multiple PCs. The ProfiCore Ultra you utilize will determine the functionality of ProfiTrace. **Fig. 4** illustrates how licenses can be stored on multiple PCs.

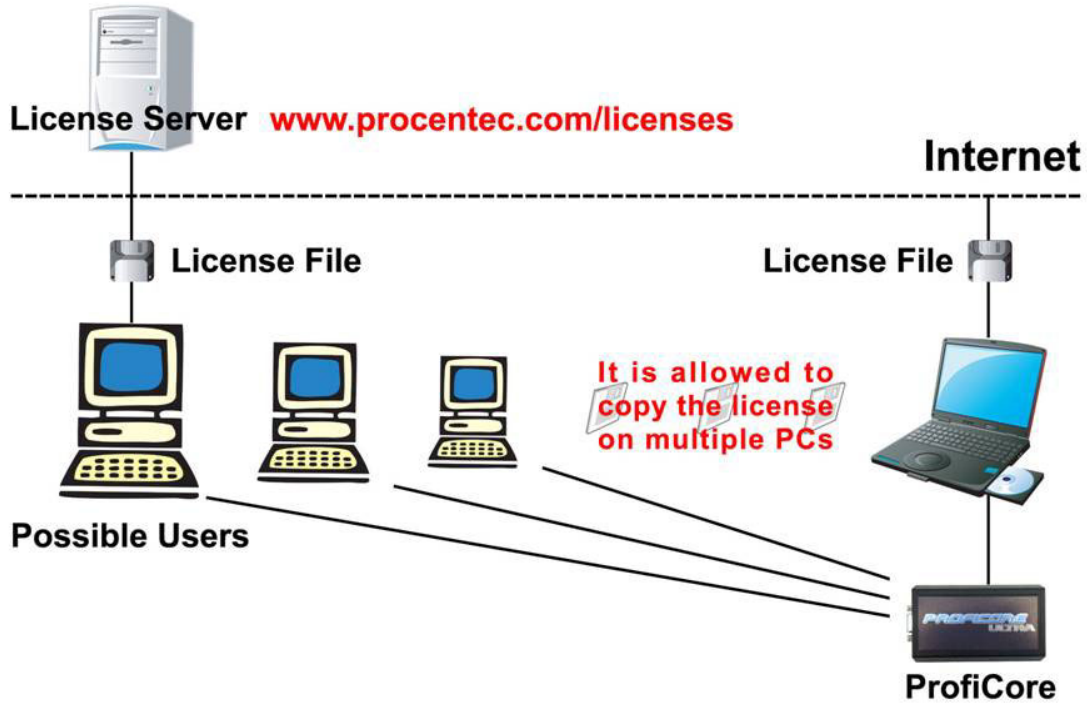


Fig. 4 – License files on multiple PCs

4.4 Obtaining the license files

There are 2 ways to obtain the license files (see **Fig. 5**):

1) You can download the license file through our website: **www.procentec.com/licenses**
Fill in your data and serial number of the ProfiCore Ultra (See paragraph **4.2** where to find the serial number).
Automatically a web page will open where you can directly download the license. After download you have to copy it to the **"\APP**" directory (see paragraph **4.3** for the storage location**)**.

2) If your PC has internet connection, you can download the license automatically through ProfiTrace. Connect the ProfiCore Ultra to the USB port and click on Init ProfiCore. ProfiTrace will inform you that it could NOT find a valid license file and an option will be offered to download it automatically.

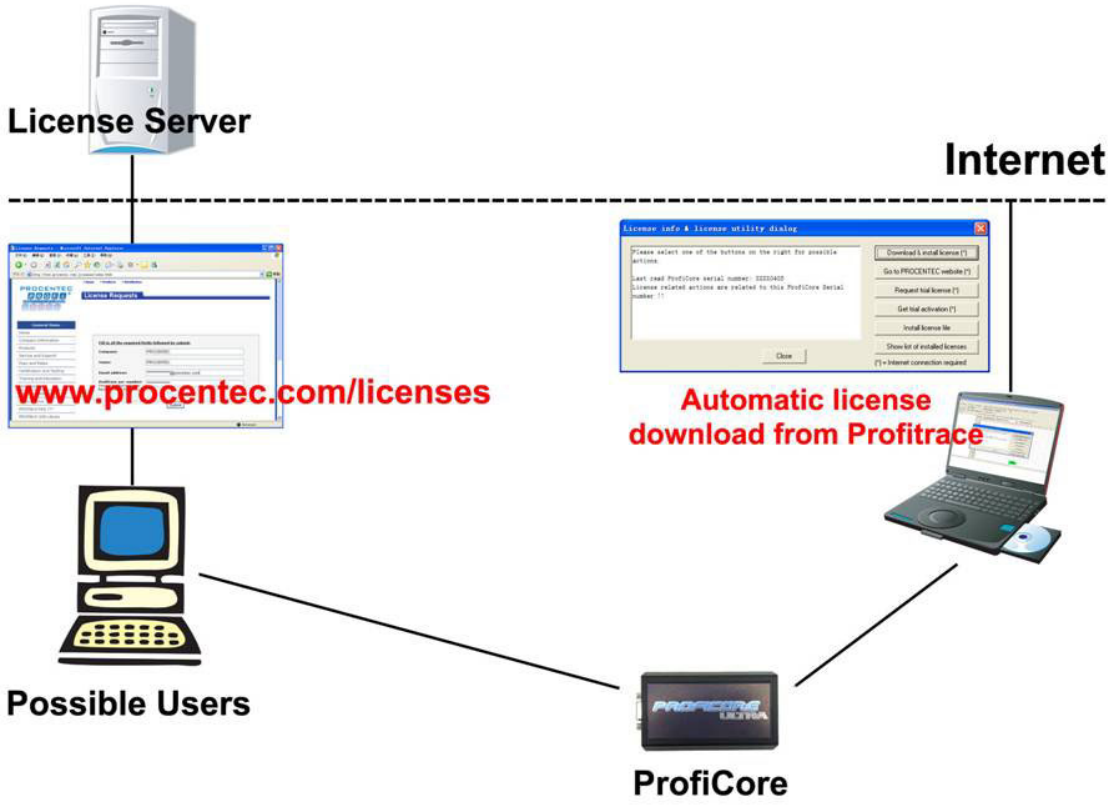


Fig. 5 – Obtaining the license files

5 Quick Start

5.1 Starting ProfiTrace 2

Connect the ProfiCore with the USB cable to your laptop/PC and the PROFIBUS connector to the installation. After starting up the ProfiTrace software, the screen as in **Fig. 6** should appear. Click on "Init ProfiCore Ultra" to start the software.

When you have a "PA Probe" attached to the ProfiCore Ultra it will be automatically detected!

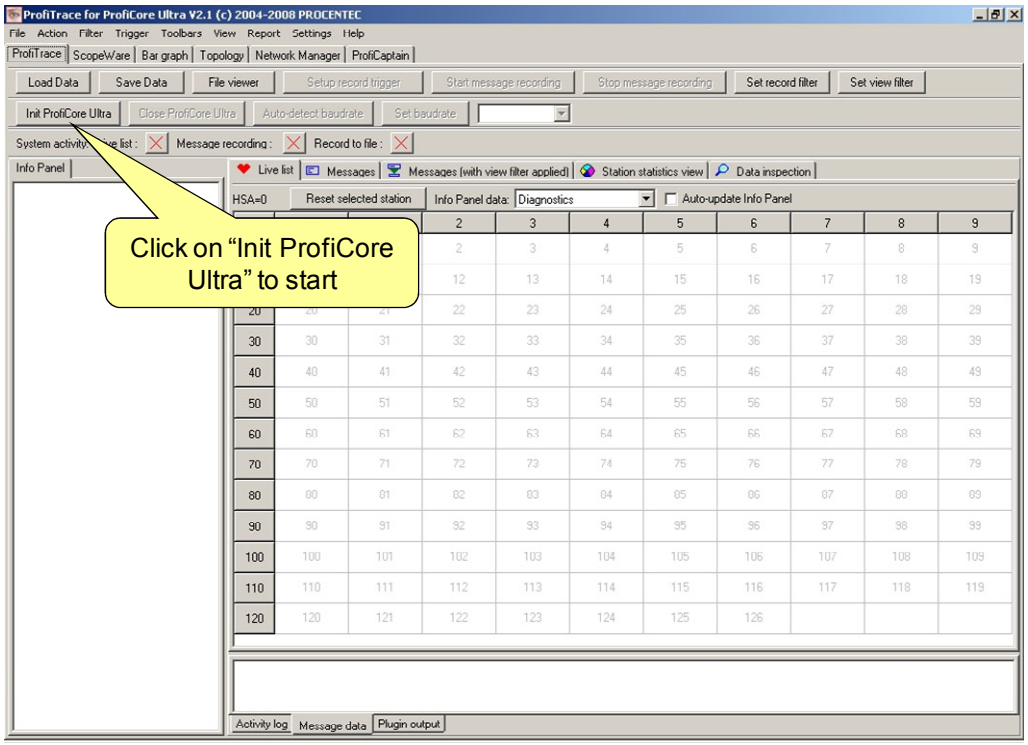


Fig. 6 - ProfiTrace start-up screen

After clicking on "Init ProfiCore Ultra", The ProfiTrace software:

1) Detects if ProfiCore Ultra is connected to the USB port.
2) Checks if the required license has been installed.
3) Scans the baudrate of the network.

After the baudrate has been detected, the Live List and the detected baudrate as in **Fig. 7** should be visible.

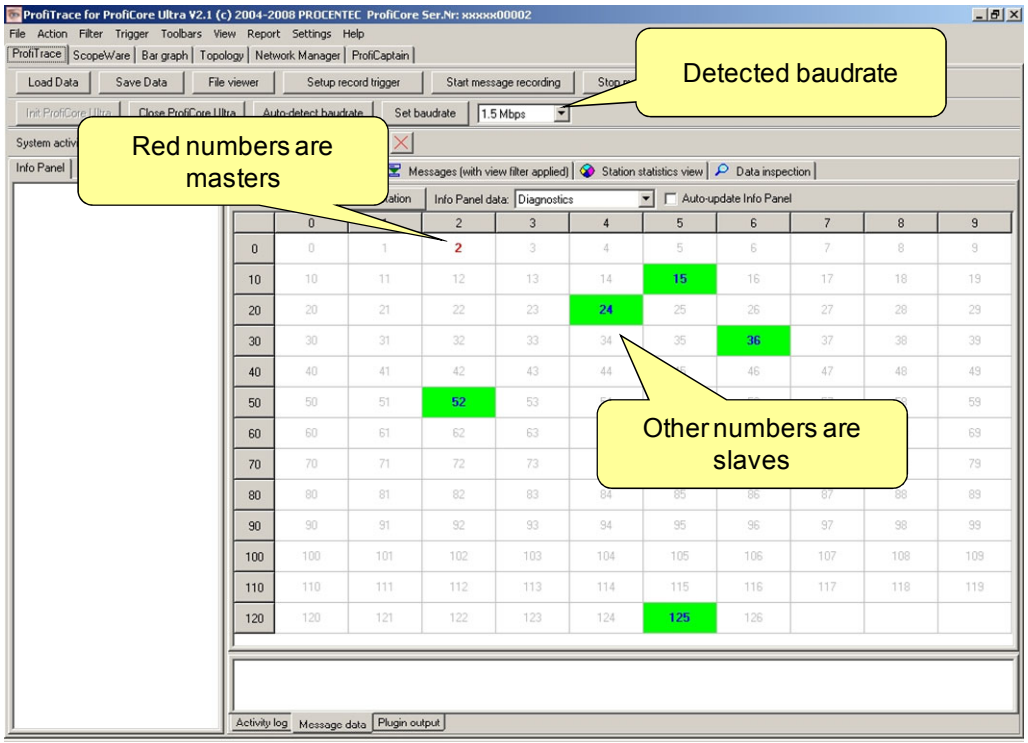


Fig. 7 – Live List after initialization

From this point the software can be easily navigated to different modes by just clicking on its representing tab (see **Fig. 8**):

- ProfiTrace: *Live List, Message Recording, Statistics and Data Inspection*
- ScopeWare
- Bar graph
- Topology scan
- ProfiCaptain *DP-V0/V1 class 1 and 2*

All modes work parallel. Navigating to another mode will NOT erase the information from the previous mode.

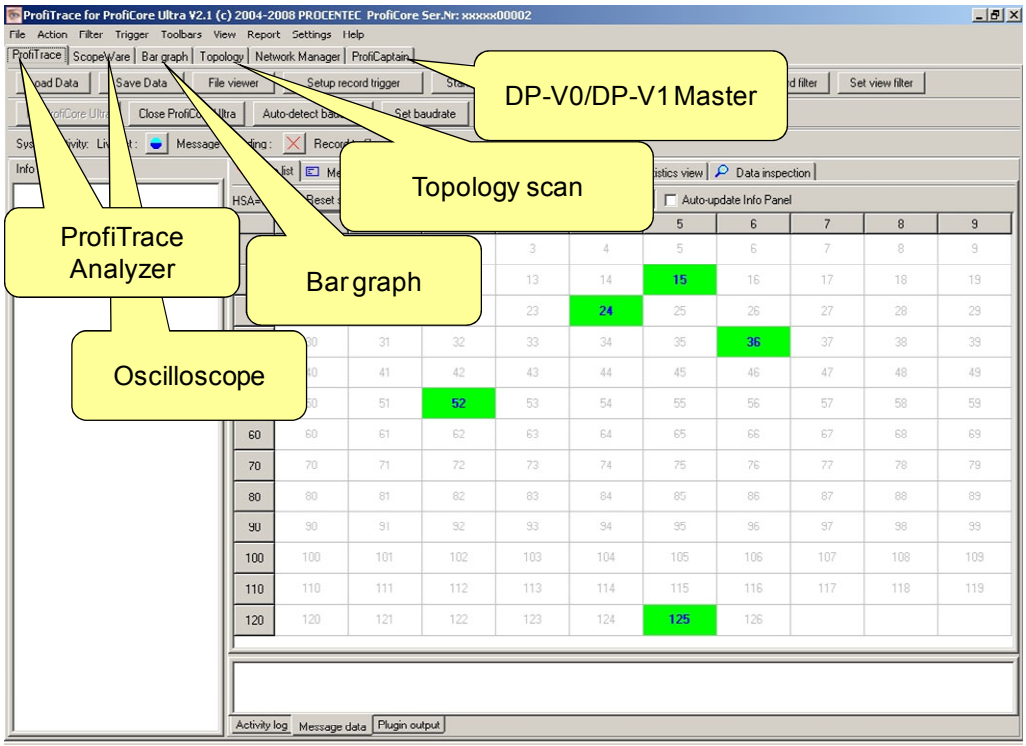


Fig. 8 – Navigating in ProfiTrace

5.2 ScopeWare

The ScopeWare is a real-time oscilloscope for the inspection of the signal quality. After selecting this tab the first time after starting ProfiTrace, the oscilloscope runs immediately in differential mode, displaying all signals that are measured (see **Fig. 9**). The time base and voltage levels can easily be adjusted.

The screen refresh can be halted by clicking on “freeze”.

By double-clicking on the devices in the Live List, the oscilloscope triggers on the respective device and only displays its signals. This is a perfect mode to inspect the signal quality for individual devices.

To display cursors for level and time analysis, click on “cursors”.

To have the oscilloscope carry out an A and B measurement, select “mode”. The oscilloscope will now display the A and B line separately.

A powerful feature of the oscilloscope is the Bit Interpretation Engine. It displays the bits that ProfiTrace detects on the bus. The end user can compare this with the signals that are measured with the oscilloscope and make a judgment about the signal quality (see **Fig. 10**).

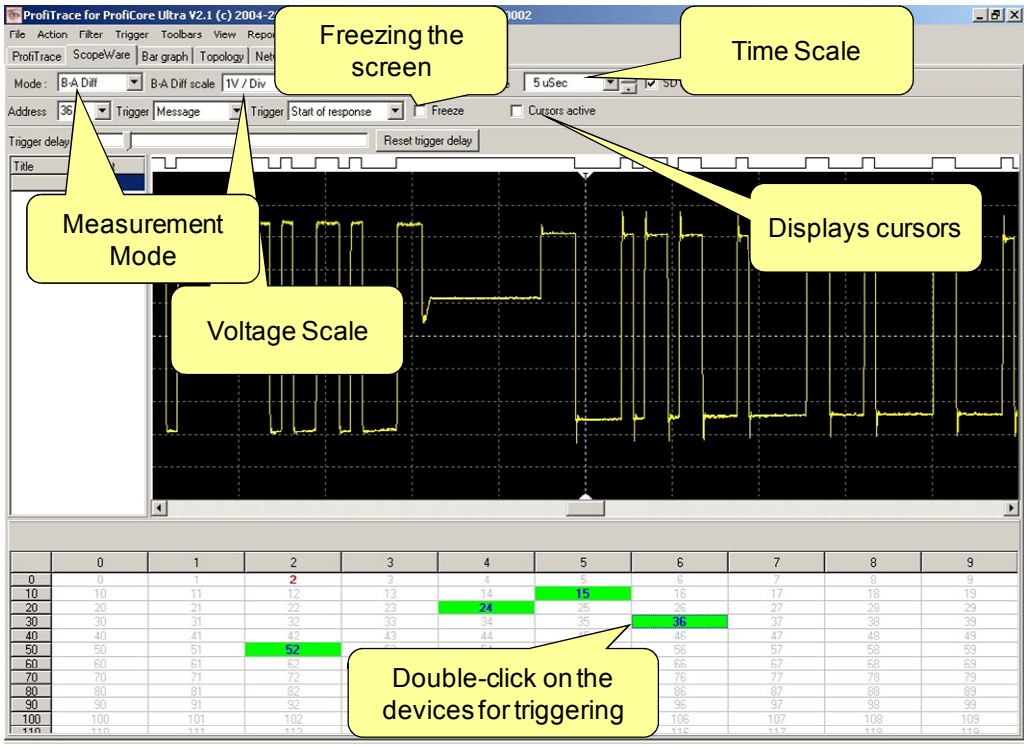


Fig. 9 – ScopeWare

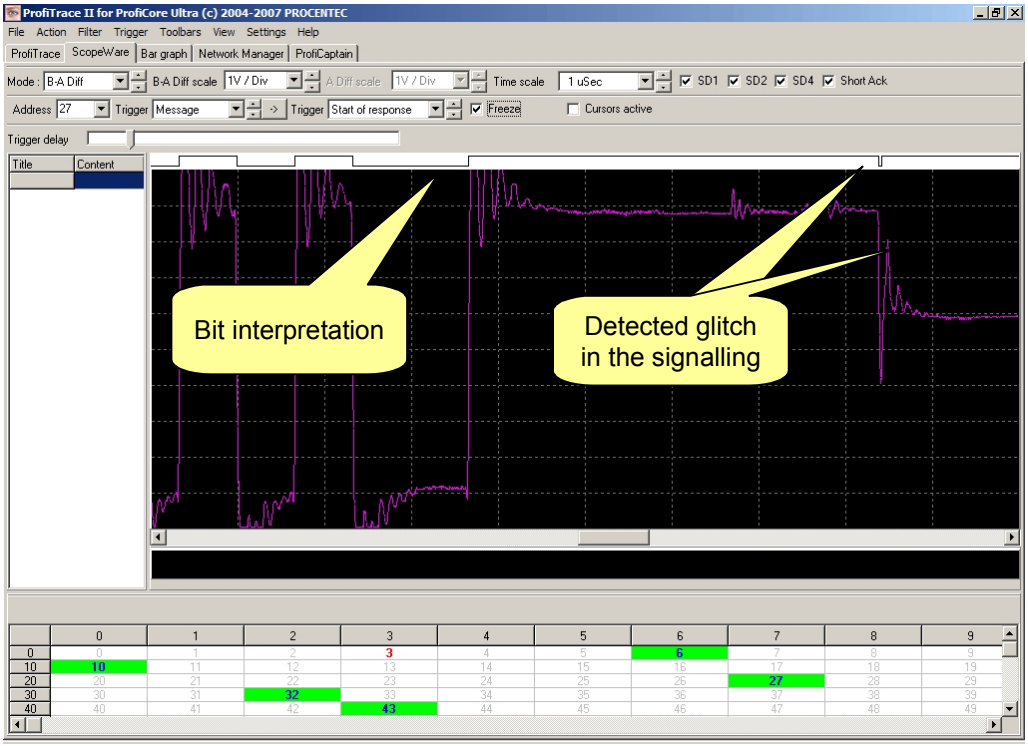


Fig. 10 – Bit interpretation

5.3 Bar graph

The Bar graph illustrates an average level of the signals from all available devices (see **Fig. 11**). It is a helpful utility to see an overall signal quality of the network.

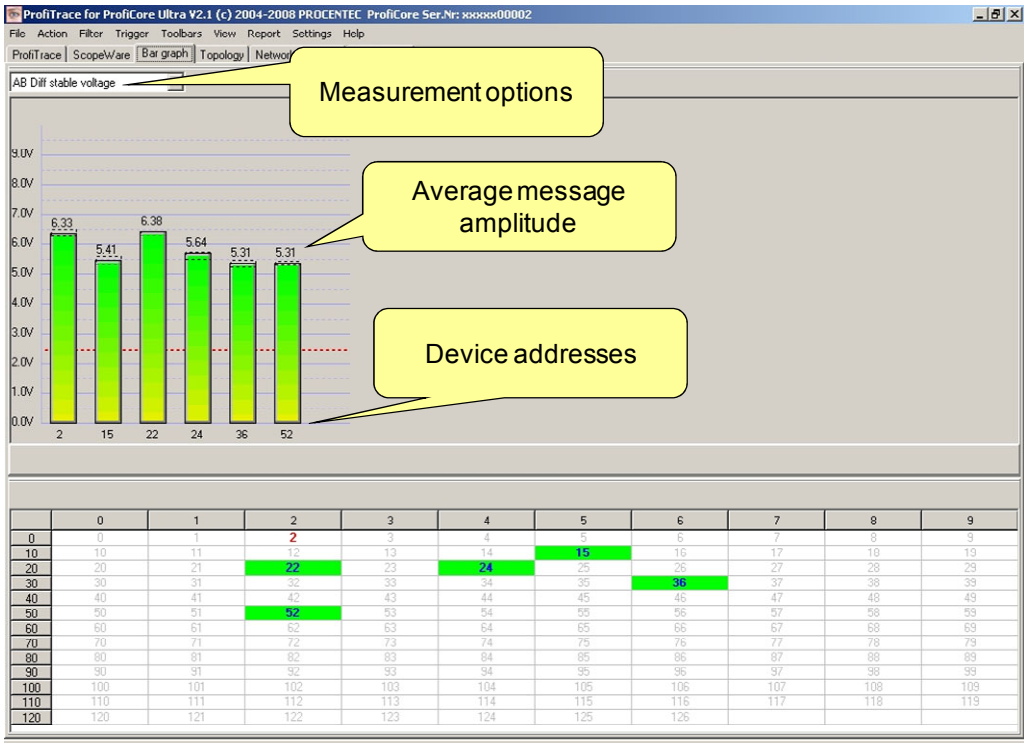


Fig. 11 – Bar graph

The average amplitude should be around 5 V. When there are bus problems the Bar graph will display different Voltage levels and the colour of the bars will change.

Fig. 12 shows an example of the Bar graph when the bus cable is missing termination or when there is a wire break. The voltage levels are much higher because of the extensive reflections.

Fig. 13 shows and example of the Bar graph when there is low impedance or short-circuit in the bus cable. The voltages are lower than normal and some bars are coloured red.

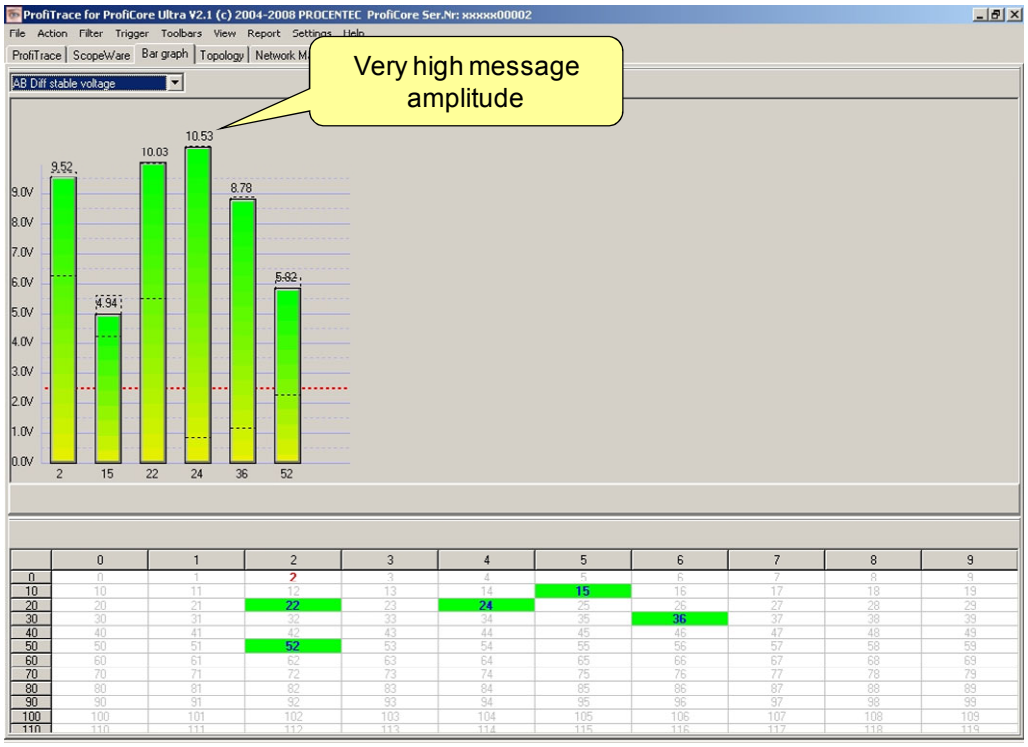


Fig. 12 – Bar graph when it senses missing termination or a wire break

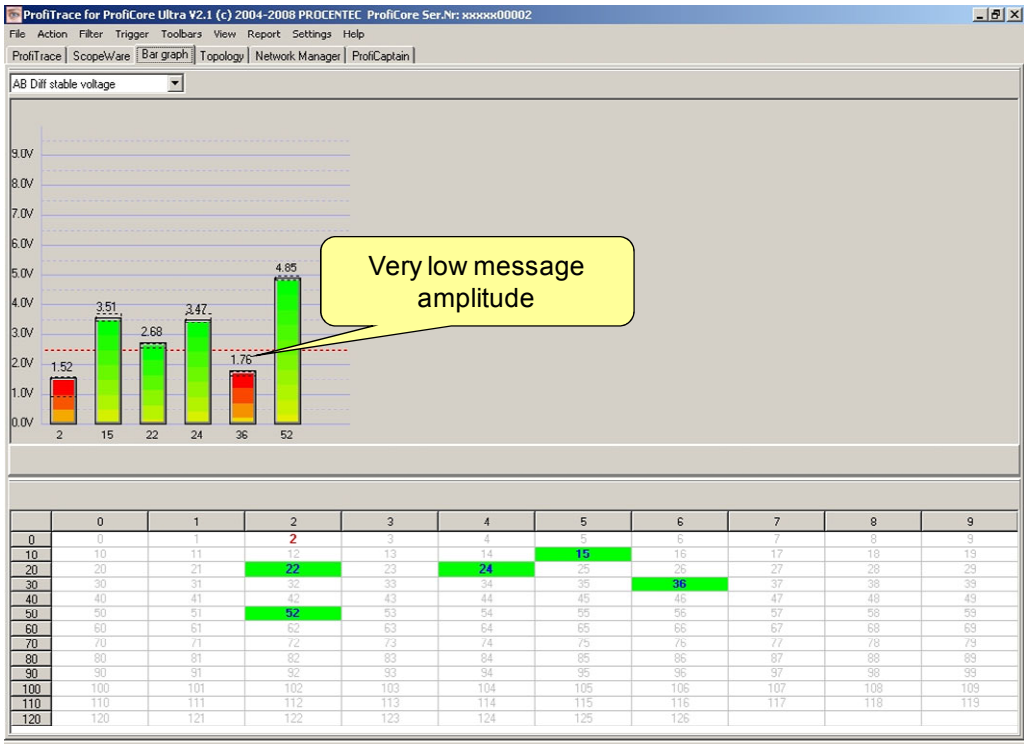


Fig. 13 – Bar graph when it senses a low impedance

5.3.1 Bar graph Modes

The Bar graph has 2 modes:
- AB Differential voltage
- AB Diff stable voltage

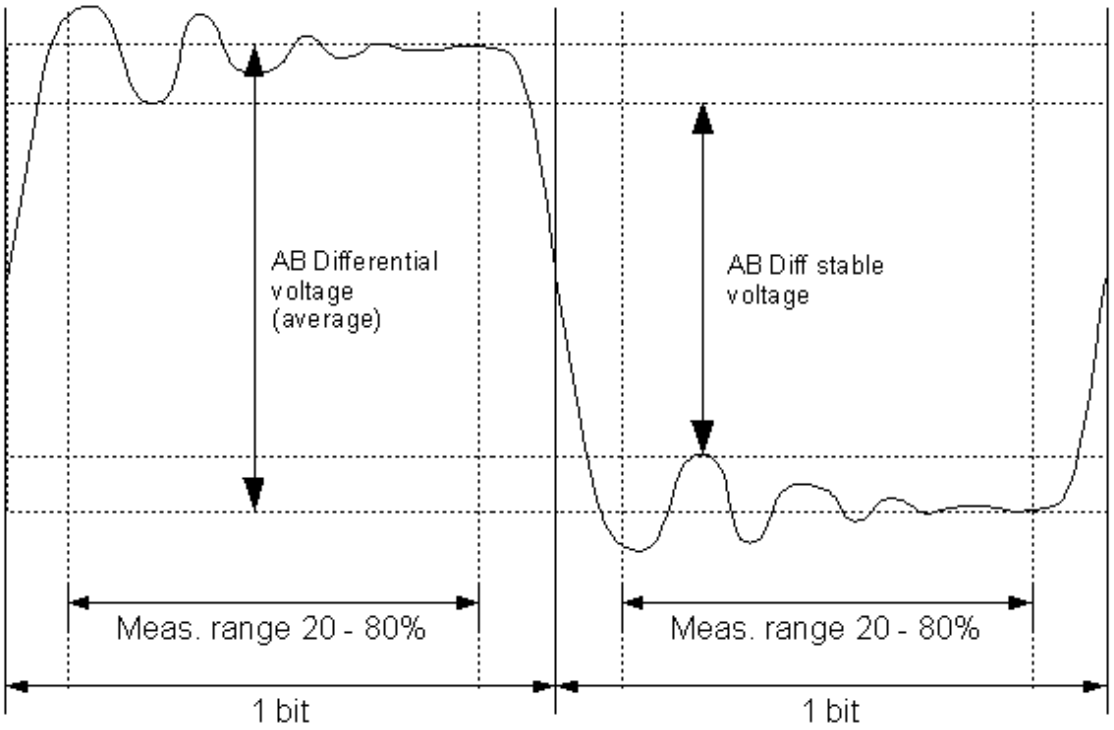


Fig. 14 – Measurement principle of the Bar graph modes

AB Differential voltage
The average voltage of the '1' part and '0' part is determined. The difference in voltage is the AB Differential voltage. This mode is useful to see if the general voltage for a device is not too low, maybe caused by long cable, wrong cable or a faulty bus interface.

AB Diff stable voltage
The lowest voltage of the '1' part is determined and the highest voltage of the '0' part is determined. The difference is the AB Diff stable voltage. This mode is useful to detect reflections on the bus that might corrupt the integrity of the signals (bit interpretation). Missing terminators can cause the voltages to go too low 'inside' the 1 and 0-bit, making the value lower than usual.

For both modes only the range between 20 and 80 % of the bit time is considered so that 'normal' rise and fall times do influence the results. If a value becomes lower than 2,5 V the bar will become red instead of green.

5.4 Topology scan

ProfiTrace has the capability to generate the topology of the PROFIBUS network without shutting down the installation! The Topology scan creates a clear network drawing that contains the location of the devices and length of the cable that links them (see **Fig. 15**).

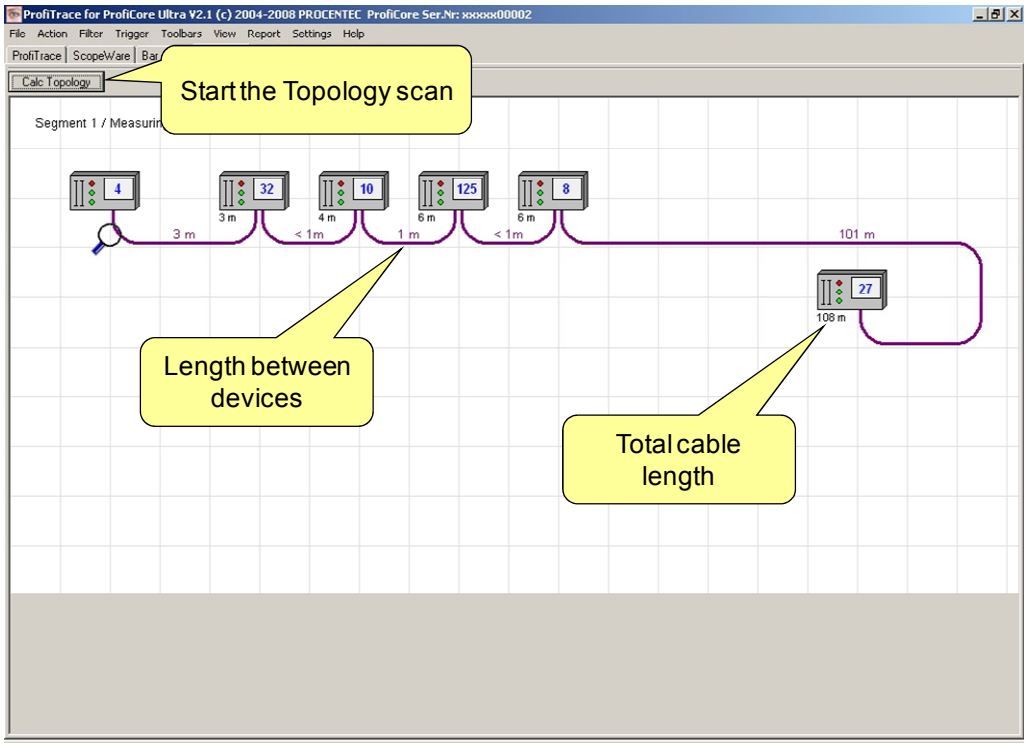


Fig. 15 - Topology scan

5.4.1 Restrictions for using the topology scan:

- Topology detection only works on 500 kbps and 1,5 Mbps.
- ProfiCore Ultra must be connected to the beginning or the end of the segment.
- You must know on which station address the ProfiCore Ultra is connected.
- Distances < 2 m or > 230 m (relative to the measurement point) cannot be measured reliably.
- The segment must be without disturbances (spurs, noise, incorrect termination, etc.).
- The segments/network must be installed according to the PROFIBUS installation guidelines.
- It is assumed that there is at least 1 meter of cable between the stations.
- Only the stations in the current segment/measurement point are calculated.
- You must know which devices are physically connected to the current segment and which are NOT!

5.5 ProfiCaptain

ProfiCaptain is a PROFIBUS DP-V0/DP-V1 class 1 and 2 master that has been designed for applications like: I/O tests, commissioning, parameterization and demonstrations. It fills the gaps that other products leave open and makes working with PROFIBUS a lot easier, faster and more fun. The main platform is a configuration environment in which the user can setup his slaves with the respective modules and parameters (See **Fig. 16**). After setting up the master, the user converts the slaves to Data Exchange without compilation or download.

ProfiCaptain is a master that sends information on the bus. The user should be aware of the consequences in multi-master networks when the baudrate and/or busparameters are not set correctly.

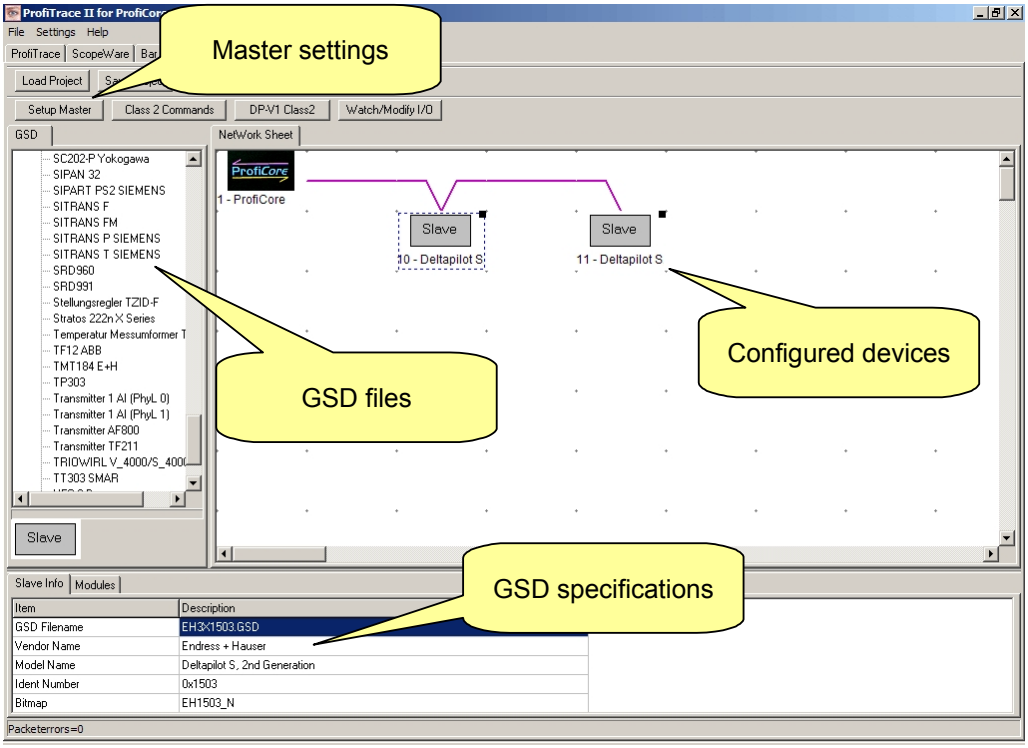


Fig. 16 – ProfiCaptain configuration utility

The I/Os can be easily watched and manipulated. If needed, class 2 functions and DP-V1 services can be applied on all devices in the network, even when they are not configured or belong to another master (see **Fig. 17**).

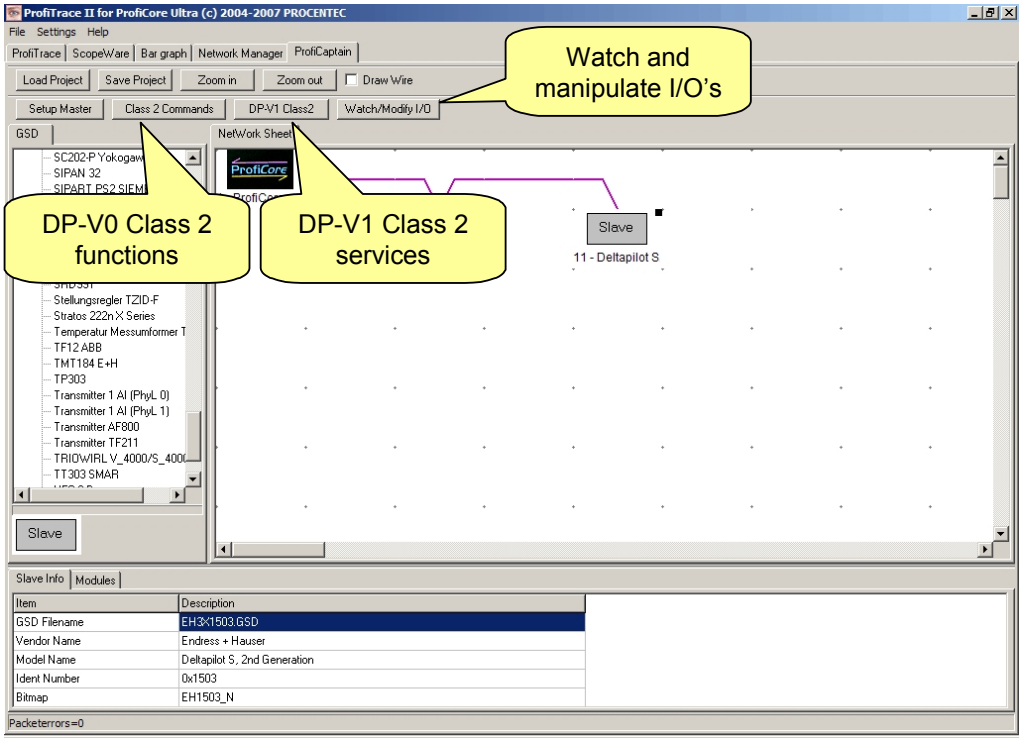


Fig. 17 – ProfiCaptain special functions

5.6 ProfiTrace

ProfiTrace itself is an analyzer to display a Live List, record messages, view statistics, inspect data, etc. (see **Fig. 18**).

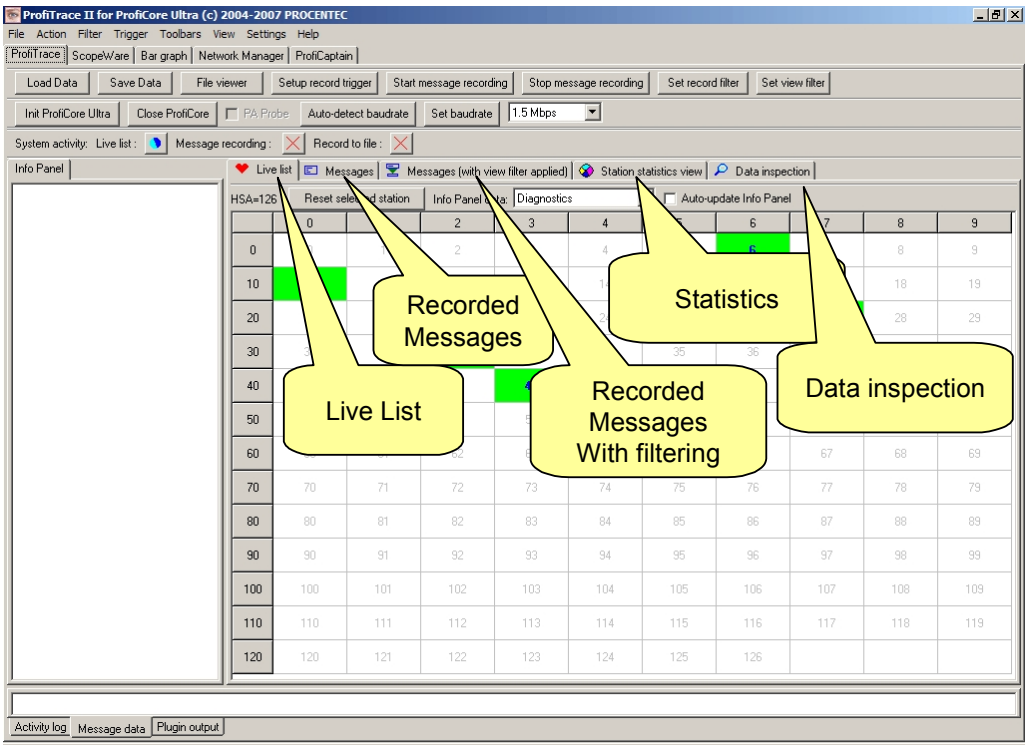


Fig. 18 – ProfiTrace functions

The Live List is a matrix that lists all the available devices. It is directly visible which devices are 'troublemakers'. With different background colours the status of the devices is displayed:
• Green: Device is in Data Exchange
• Yellow: Device is lost
• Red: Parameter fault
• Purple: Configuration fault
• No colour: on the bus but not in Data Exchange
The Live List can also generate the product name of the devices when a diagnostic message is captured (synchronized with the GSD library).

The statistics matrix is the most powerful feature of the analyzer. This field can really indicate how healthy the installation is. It displays all the important information that a user, especially a maintenance man is really interested in:
• The number of retry messages.
• The number of fall-outs.
• The bus cycle time.
• The number of diagnostic messages, etc.
Because this feature is available, the user does not have to inspect messages or do difficult operations to ensure the quality of the installation.

When the user wants to record messages, he has a perfect visual representation on the screen (see **Fig. 19** and **Fig. 20**).

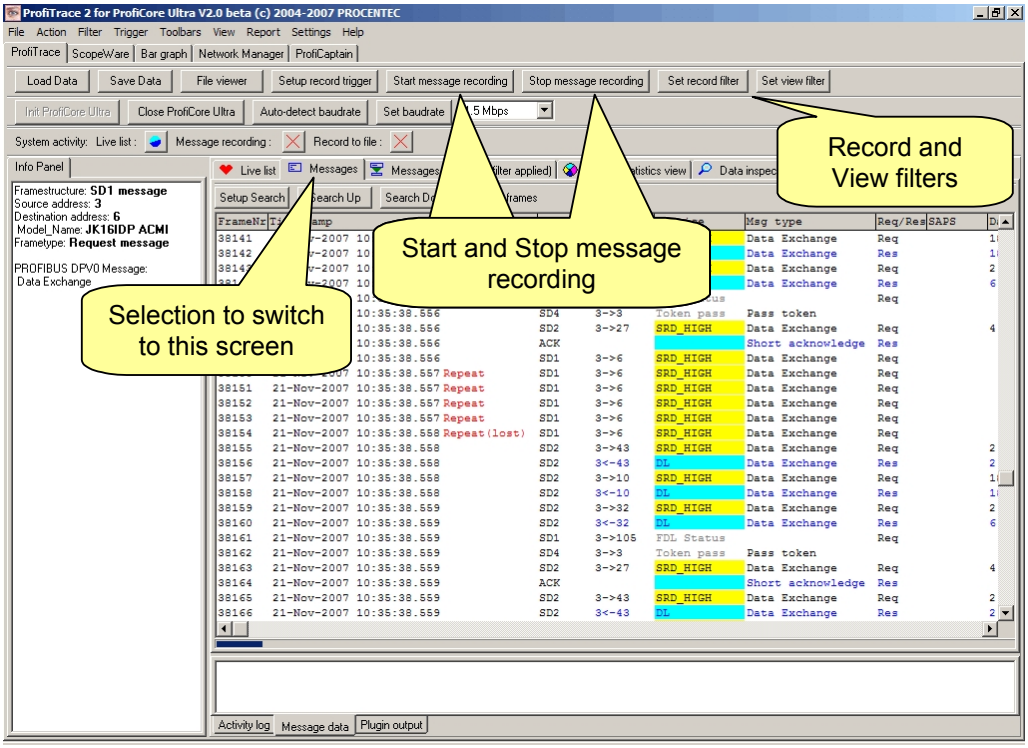


Fig. 19 - ProfiTrace message recording

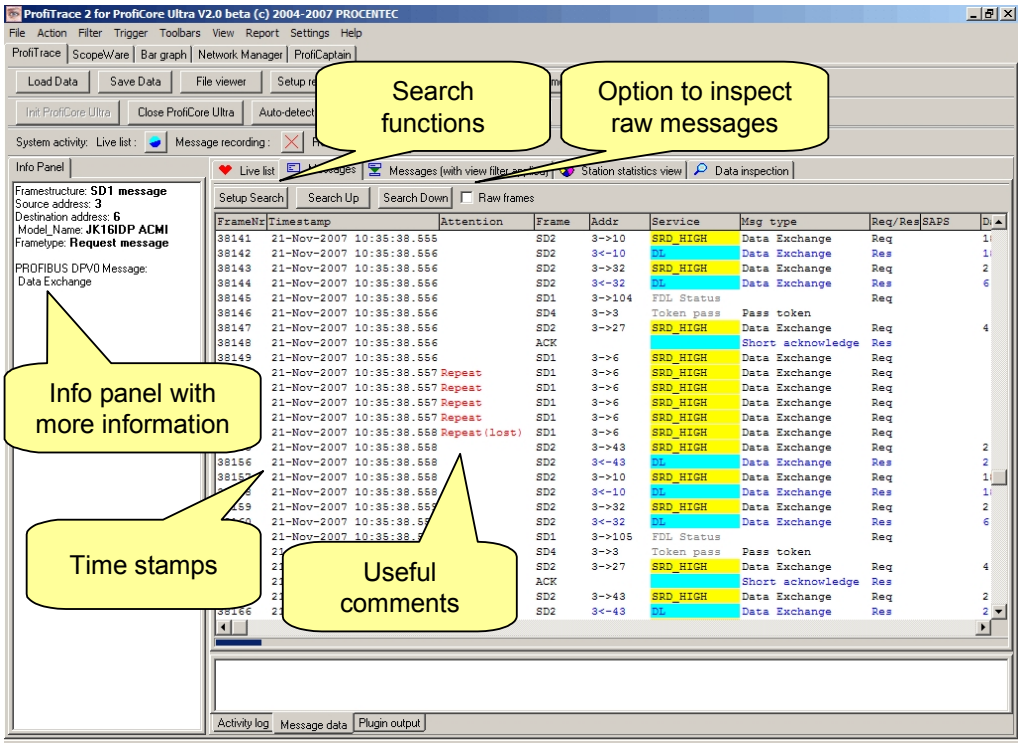


Fig. 20 – ProfiTrace message recording

After a GSD library is imported, it is also possible to inspect process values and see diagnostic information in understandable text. All the other basic busmonitor features like: logging, file management, search functions, etc are supported.

6 Oscilloscope Measurements (RS 485 – DP)

PROFIBUS is high-speed digital data communication, which means a multi-meter is not useable to measure the signal quality. An oscilloscope is required to verify the electrical signals on the cable and essential to detect; *EMC problems, reflections, many/less termination, wire breaks, etc.* The difficulty is how to identify one of these problems. This chapter describes example measurements on RS 485 – DP, which are made with ScopeWare. You can compare them with your measurement. Important for your measurements is that you are aware of the propagation time on the cable. With PROFIBUS this is about 4,2 ns/m. Disturbances travel with the same propagation time. By measuring the width of the reflections we can conclude where the disturbance is physically located. ScopeWare can do this calculation for you.

6.1 Acceptable signals

Acceptable signals are almost “real” square waves with an average amplitude of 5V. When the amplitude is higher, but the signals appear to be square waves, it is still acceptable. Modern RS 485 drivers can generate higher amplitudes. It is also important that the idle state has minimum noise. The idle state has to be 1 V. This is because of the powered termination. The spikes on the bits are normal. These are caused by the small spur line that is connected to the ProfiCore. Probably the cable length is relatively short in this installation. **Fig. 21** shows an example of acceptable signals in ScopeWare. **Fig. 11** shows an example of acceptable signals in the Bar graph.

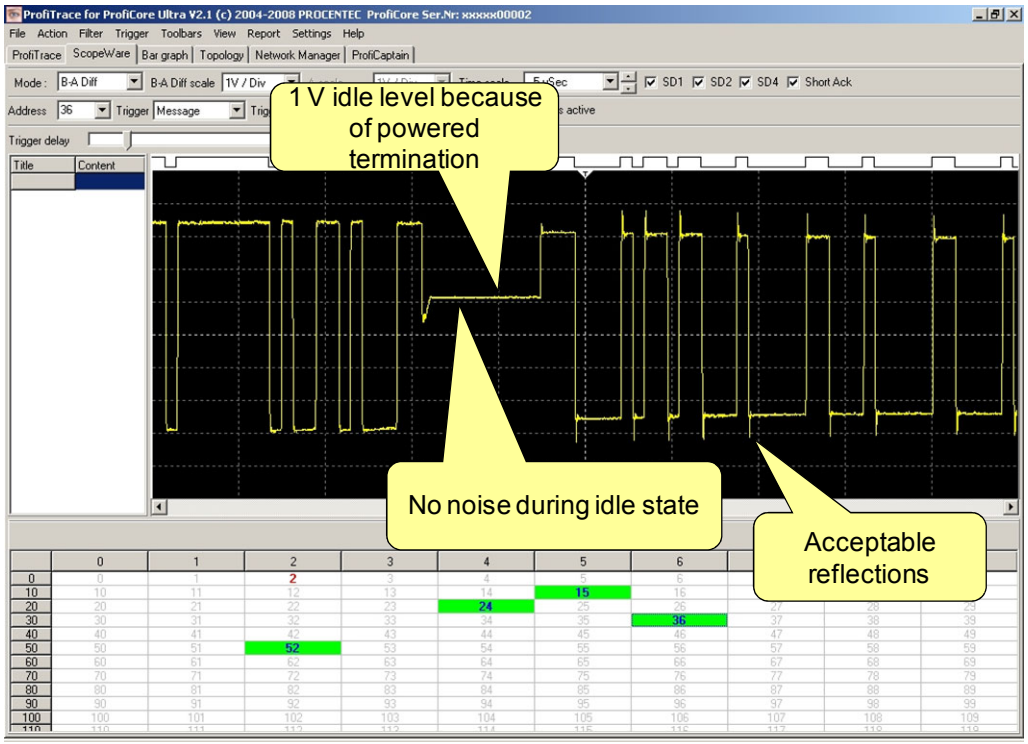


Fig. 21 – Acceptable RS 485 – DP Signals

6.2 Termination missing or wire break

When termination is missing or there is a wire break, the signals will reflect on the cable with an up-down effect. These reflections lead to a rise in the average signal amplitude. The width of the reflections can tell us the distance to the “problem point”. When the distance is nearby, the reflections are compressed in the bit. **Fig. 22** shows an example of termination missing or wire break nearby. The reflections corrupt the message because of the high amplitude. **Fig. 12** shows an example of the Bar graph in this situation.

Fig. 22 – Termination missing or wire break (nearby)

When the distance is far, the reflections end up in the adjacent bits. This effect corrupts messages. **Fig. 23** shows and example of termination missing or wire break when the distance is far. The user can make a conclusion if termination is missing or that there is a wire break by means of the installation drawings.

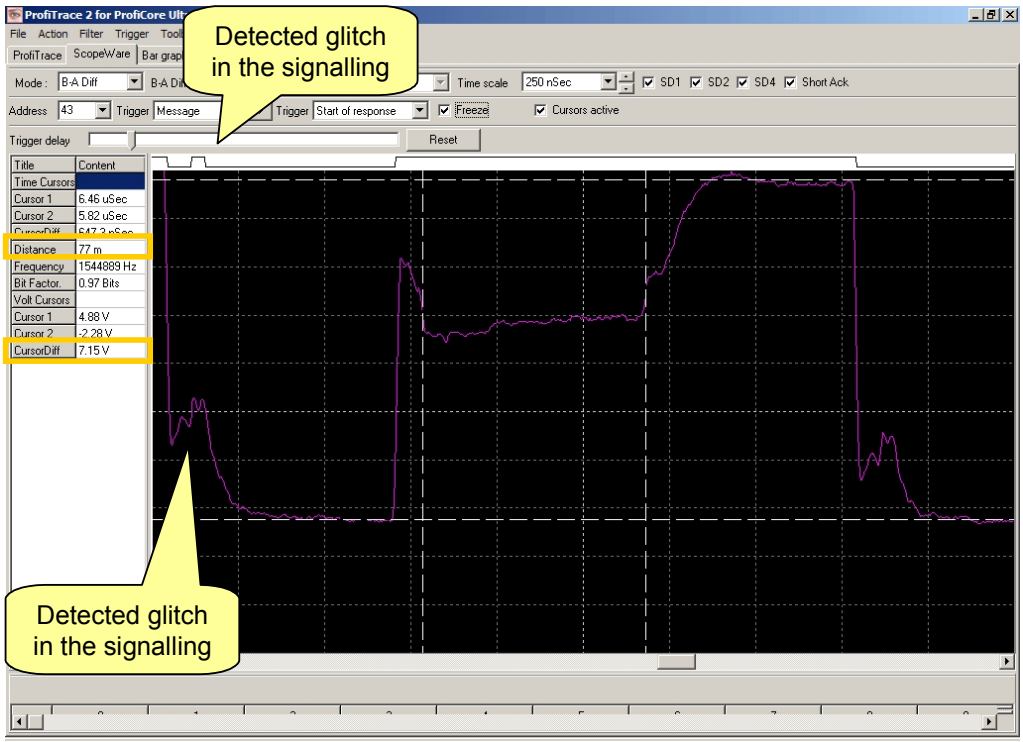


Fig. 23 – Termination missing or wire break (far)

6.3 Short circuit between the A and B line

When there is a short circuit between the A and B line, the reflection will step by step crash the signal to very low amplitude. The width of the steps can tell us the distance to the "problem point". When the distance is nearby, the reflections are compressed in the bit. **Fig. 24** shows an example of a short circuit nearby.

When the distance is far, the reflections end up in the adjacent bits, but the signal amplitude does not crash completely. The loop resistance causes left-over amplitude that could be enough for the devices to remain in Data Exchange. **Fig. 25** shows an example of a short circuit when the distance is far.

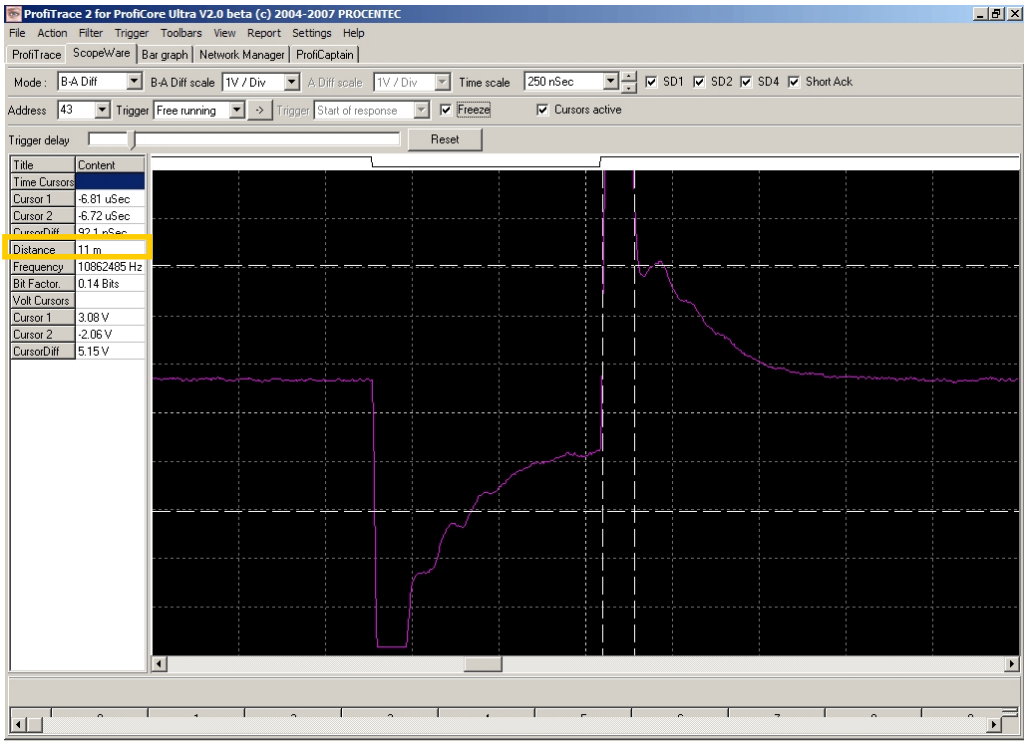


Fig. 24 – Short circuit between the A and B line (nearby)

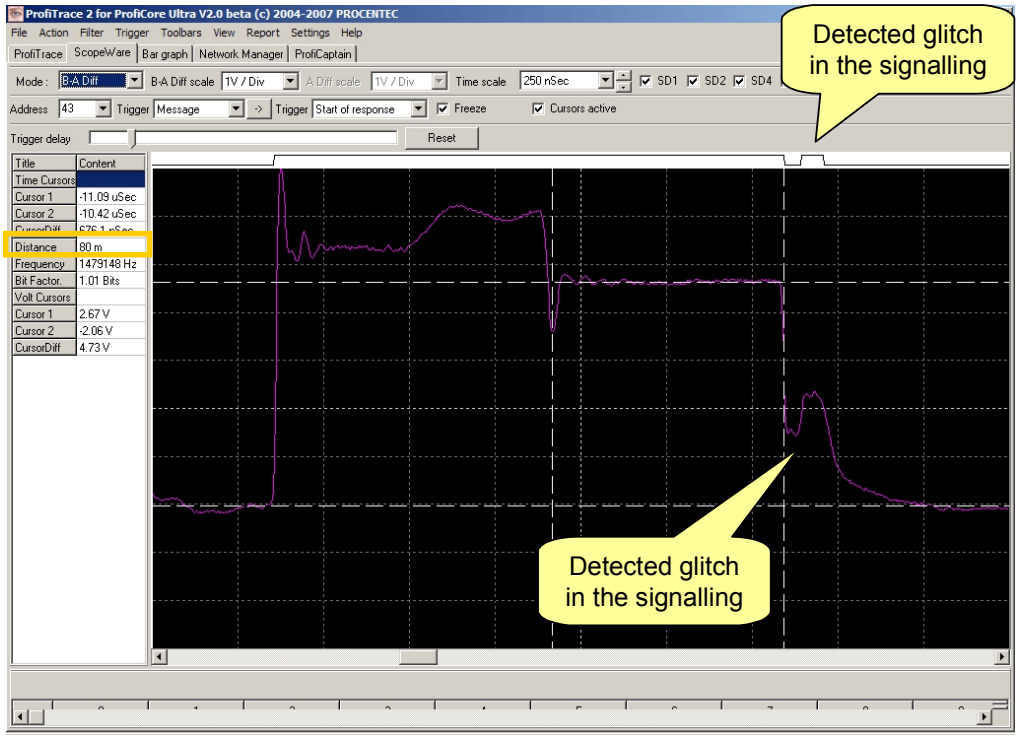


Fig. 25 – Short circuit between the A and B line (far)

7 Training

This chapter contains some exercises to enhance the practical knowledge of ProfiTrace 2.

7.1 First steps

Assignment 1 Software installation

- ❑ Install the ProfiTrace software on the PC/Laptop.
- ❑ Copy/Install the required license file in the \APP directory.
- ❑ Copy the required GSD files to the GSD directory of ProfiTrace.
- ❑ Connect the ProfiCore Ultra to the PC/Laptop.
- ❑ Test the installation by starting the software and click on 'Init ProfiCore'.

When the software is running, the Live List of the PROFIBUS Installation should be visible.

- ❑ Scan the GSD files and check the Live List by switching the PLC ON/OFF.
- ❑ Close ProfiTrace when this assignment is ready!!!!!!!

Assignment 2 Drawing of the installation

- ❑ Create a technical drawing of the PROFIBUS installation (finish it within 15 minutes).

Instructions:
- Indicate clearly the location of the devices with its name and if it is a master or slave.
- Indicate the network addresses by looking at the dip switches or rotary switches.
- Indicate how the cable is going in and out the connectors.
- Indicate the location of the termination.
- Do not remove cable tray covers or open connectors.

Assignment 3 Assessment of the connected devices

- ❑ Start and initialise ProfiTrace.
- ❑ What is the detected baudrate? _____
- ❑ How many masters and/or slaves does this installation have? _____
- ❑ Does the Live List correspond with your drawing? _____
- ❑ Scan the GSD library and switch the PLC (master) OFF/ON. Wait until the complete installation has restarted.
- ❑ Does the Live List correspond with your drawing? _____

- ❑ Adjust the detected differences in your drawing.

7.2 Basic faults with ProfiTrace

Assignment 1 Detecting basic faults

- ❑ Switch a slave OFF or remove the bus connector and investigate the Live List.
- ❑ Remove an I/O card of a slave and investigate the Live List. With some slaves you can see different behaviour when you switch it OFF/ON after removing the card.
- ❑ Change the network address of a slave and investigate the Live List (don't forget to switch the slave OFF/ON).
- ❑ Fix all the faults after this assignment!

Assignment 2 Statistics – Syncs, Station Lost and Retries

When a slave is not available and ProfiTrace is restarted afterwards, you can't see it in the Live List. For these situations the Statistics are a very important feature.

- ❑ Switch a slave OFF or remove the bus connector and investigate the Live List.
- ❑ Restart ProfiTrace and check the Live List.
- ❑ Open the statistics view.
- ❑ Go to the field 'Syncs' and analyse the values.
- ❑ Switch ON the slave and analyse the field 'Syncs' again. Repeat this with some other slaves.

The Syncs will show you how many cycles the slaves were not available for the master. You can also check how many times the slaves were not available.

- ❑ Go to the field 'Station Lost' and analyse the values.
- ❑ Fix all the faults! Check if the 'Syncs' have stopped.
- ❑ Click on 'Reset All' to clean up all the statistics.
- ❑ Go to the field 'Retries (total for this station)', switch OFF a slave and analyse the values.
- ❑ Fix all the faults! Check if the 'Syncs' have stopped.

7.3 Double address with ProfiTrace

Assignment 1 Double address

ProfiTrace can easily detect a double address.

- ❑ Generate a double address and check it in the Live List and the 'Syncs' in 'Statistics'.
- ❑ Go to the field 'Illegal responses to requests' and investigate what happens (on some masters this might not work).
- ❑ Fix all the faults! Check if the 'Syncs' and the 'Illegal responses to requests' have stopped.

7.4 Cycle time with ProfiTrace

Assignment 1 Cycle time

- ❑ Click on 'Reset All' to clean up all the statistics.
- ❑ Go to the field 'Data Exchange Interval (msec)'. What is the cycle time of the installation? _____
- ❑ Switch a slave OFF or remove 80% of the devices.
- ❑ What is the cycle time of the installation? _____
- ❑ Fix all the faults! Check if the 'Syncs' have stopped.

7.5 Recording messages

Assignment 1 Starting a message trace

- ❑ Make sure the installation works properly (No Syncs, Retries, etc.)
- ❑ Click on 'Messages' (should be an empty screen).
- ❑ Click on 'Start message recording'.

The screen should now be filling up with messages and on the bottom you should see an indication how full the message buffer is.

- ❑ Click on 'Stop message recording' to stop the recording.
- ❑ Investigate what you see (Timestamp, Frame, Addr, Service, MSG type, SAP, Datalen, Data).

Assignment 2 Search function

- ❑ Click again on 'Start Message Recording'.
- ❑ Switch a slave OFF.
- ❑ Click on 'Stop message recording'.
- ❑ Click on 'Setup Search'.
- ❑ Search for 'Repeated messages' and click OK.
- ❑ Click on 'Search Down'.
- ❑ You should have detected the moment of lost.
- ❑ Fix all the faults! Check if the 'Syncs' have stopped.

Assignment 3 Trigger function

- ❑ Click on 'Messages'.
- ❑ Click on 'Trigger' followed by 'Setup message record trigger'.
- ❑ Set: Enable, Retrigger, 10 Messages before, 10 Messages after (do not limit = off).
- ❑ Click on 'Setup trigger' and select repeated message.
- ❑ Click on 'Start Message Recording' (should be an empty screen).

- ❑ Switch a slave OFF (screen should be filling with 20+ messages).
- ❑ Investigate what you see.
- ❑ Fix all the faults! Check if the 'Syncs' have stopped.

8 Tips and Tricks

This chapter contains some tips and tricks to make working with ProfiTrace a lot easier.

8.1 Checklist to prepare your installation

The following items can be implemented in and around your installation to simplify PROFIBUS troubleshooting.

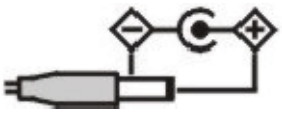
- ❑ Measurement connectors on every segment (start of the cable)
- ❑ Every segment has its own addressing range (10..19, 20..29, etc)
- ❑ Individual repeaters/OLMs can be powered up/down
- ❑ Individual devices can be powered up/down
- ❑ PLC/DCS at the beginning of the cable
- ❑ Diagnostics is enabled in the devices
- ❑ Installation drawing on 1 or 2 pages (with cable lengths and addresses)
- ❑ Addresses clearly marked on the devices
- ❑ All GSD files are available in ProfiTrace
- ❑ Access to the PLC/DCS configuration

8.2 Checklist to create a reliable installation

The following items can be implemented in and around your installation to make it more reliable.

- ❑ Repeater backbones with repeaters/ProfiHubs (isolation of problems)
- ❑ External powered termination (removing/adding devices)
- ❑ Reduce the baudrate (improves signal quality)
- ❑ Increase the repeats/retries (increases success rate)
- ❑ Reduce the spur/stub lines or use repeaters/ProfiHubs (improves signal quality)
- ❑ Cable as close as possible to ground (decreases EMC sensitivity)
- ❑ Additional grounding points (decreases EMC sensitivity)
- ❑ Activate the watchdog on all devices (safety)
- ❑ Use fibre optic for long distances (isolation of problems)

9 Technical Data of the ProfiCore Ultra

Technical Data ProfiCore Ultra	
Dimensions and weight	
Dimensions L x W x H (mm) with DB9 Weight	108 x 68 x 28 mm Approximately 125 g
Ambient conditions	
Operating temperature Storage temperature Isolation class	0 to +60° Celsius -20 to +70° Celsius IP 20 (DIN 40 050)
Power supply specifications	
USB current consumption (without adapter) Adapter Voltage Adapter current consumption	400 mA 9 V 400 mA
Connector descriptions	
DB9 (female) – PROFIBUS Expansion connector Power connector	Pin 3: B-line Pin 8: A-line Pin 6: VP Pin 5: DGND Case: Ground/Shield Pin 1: 3,3 V output power Pin 4: Trigger GND Pin 5: Trigger Pin 8: Power GND Opening: 6,0 mm Center pin: 1,95 mm Plug according to: NES/J 21, NES/J 21 W, NES/J 210 XNES/J 210 

Technical Data ProfiCore Ultra	
Oscilloscope specifications	
Frequency	2 x 192 MHz (A-line and B-line) 384 MHz (Differential measurement)
Bandwidth	100 MHz
Voltage	Differential: -9 to +9 V Single ended: -4,5 to +8,5 V (with the PA Probe ultra these values are different)

10 Hotkeys

General

F1	Help.

Messages

F2	Toggle between RAW frames and decoded frames.
F3	Switch the Timestamp column between Tbit, sec, ms, us, date and time.
F4	Switch the Idle Time and Deltatime column between Tbit, sec, ms, us, date and time.
F5	Toggle between Hex data and Decimal data.

11 Frequently Asked Questions

Will the Topology scan be able to scan through repeaters?
NO, You will not be able to scan through repeaters, but you can clearly see which devices are behind a repeater, because the cable length between them will be 0 m.

Can ProfiCore Ultra overload the bus when it is attached to a running installation?
ProfiCore Ultra is designed and produced around the latest RS 485 technology (1/5 of a standard bus load). This means the load of ProfiCore Ultra can be ignored on a full bus segment. Spur cables are also no problem, because the USB cable is the path to the PC (5 meters). ProfiCore Ultra can be connected very close to the network and the PC can be on a distance from the tap point.

The ProfiCore Ultra has an RS 485 interface for the DP bus. Is it possible to analyze a PA segment?
YES, if you want to use the ProfiCore Ultra on a PA bus, attach the PA probe to the ProfiCore Ultra. The PA probe transforms the extracted signals from the PA bus to information which is fed into the ProfiCore Ultra.

Which USB version is supported?
High speed USB 2.0 is supported by ProfiTrace 2.

Why are slaves that are not in data exchange blinking in the LiveList with a yellow background?
Your bus cycle is slower than the ProfiTrace update of the LiveList. You should make the update time higher. You can do this in the settings menu: *Preferences->Live List settings->Assume station lost after.*

Why are some devices in the Live List blinking from Red to Green?
The blinking devices, are devices that have master and slave functionality at the same time Red means master, Green a slave in Data Exchange. Nothing is wrong. But a lot of people make mistakes with the busparameters, because they have to be identical on all masters.

With other tools that use PCMCIA and PCI cards, the Live List stops when I select another function. Is this better organized with ProfiTrace?
YES, because of the ProfiTrace 2 structure everything keeps on running. You can select multiple options and processes that run separately.

For generating a PDF file of the report, can you advice a freeware PDF creator?
For creating PDF files you can use the freeware tool PDFill. You can download it at: www.pdfill.com

When I order ProfiTrace without the ScopeWare, Topology scan and Bar graph, can I buy these modules later?
YES, licenses for every single software option can be purchased at any time.

Can the Topology scan create a network drawing of the Profibus PA network?
At the moment it is only RS 485 (DP)! For PA it will be very difficult due to junction boxes and Ex barriers.

Is ProfiTrace 2 the same as the Profibus Tester, PBT3 and other analyzers?
ProfiTrace 2 is much better; it combines all the other clunky and expensive tools to just 1 simple USB interface. You only have to do 1 investment to get everything and it can do a lot more. Also you have integrated master functionality that the others cannot provide.

Can I get a trigger signal for an external oscilloscope from Proficore Ultra?
YES, ProfiCore Ultra still allows you to connect an external oscilloscope. But, we prefer you to use the ScopeWare which makes electrical measurements much easier.

Sometimes ProfiTrace cannot detect the baudrate. When I set it to manual, it works. What is the solution to solve this problem?
Sometimes the combination PC, ProfiCore and PROFIBUS can make it difficult for the software to detect the baudrate. This has to do with a certain timeout. This timeout can be set in: *Settings->Preferences->General*. Here you find the timeout for the baudrate detection. Set it to a higher value and in most cases this will solve the problem.

Message Recording

Can ProfiTrace 2 decode DP-V2 messages?
YES, ProfiTrace decodes DXB, SRD_MCAST and Isochrone spare DP-V2 related functions.

In networks that still have old FMS components, will I be able to see the SAPs and hex data from messages of these components?
YES, ProfiTrace will capture and display every PROFIBUS message. So, you can inspect the SAPs and the data. Also the Live List and large parts of the statistics are useable.

What is the 'Delta Time'?
It is the time from the first start-bit of the previous message to the first start-bit of the current message.

What is the 'Idle Time'?
The Idle Time is the inactivity between 2 messages. It refers to the previous message and the time that has elapsed before the current message is send. If the current message is a response, it is called the slave Tsdr (slave response time).

What is the 'Timestamp'?
The timestamp is calculated on the basis of a starting moment the user has defined and subsequent messages add to a delta-bittime to this beginning. This means that the timestamp internally consists of 2 parts: the time/date and the delta-bittimes that have passed.

Installation, Operating Systems and Interface hardware

I have problems installing the ProfiCore Ultra drivers with ProfiTrace V2.1.1. Can you help me?
On the day of the release of this version we discovered that the security certificates of the ProfiCore Ultra drivers were expired. This means; everybody who installs ProfiTrace gets a notification that the drivers were not installed. To work around this problem, you have to set the date of the PC back to 28 August 2008 or earlier, then install ProfiTrace and after installation change the date back to the correct setting.

Can I install ProfiTrace 2 next to ProfiTrace 1?
YES, it uses another default installation directory and the drivers are different. You can even run both applications at the same time.

Can I run ProfiTrace 2 on a Windows 2000 system?
This depends on 2 factors; the performance and the system has to be equipped with high speed USB 2.0 ports.

Can I run ProfiTrace 2 on a Windows Vista system?
It might be necessary to run in Windows XP Compatibility mode. You can set this in the properties of the exe file.

I have a CP5611 card. Can I run ProfiTrace on it?
NO, ProfiTrace works only with the ProfiCore hardware.

For the latest FAQ list check out our website!

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13 Order Codes

Component	Order code	Remarks
 **ProfiTrace 2**	30020	• ProfiCore Ultra • USB cable • ProfiTrace 2 (no oscilloscope, bargraph and topology scan function) - can be upgraded later!
 **Troubleshooting Toolkit Ultra**	37021	• ProfiCore Ultra • USB cable • ProfiTrace 2 • ScopeWare • Bar graph • Topology Scan • Reporting • Tap Connector 2 • Blue carrying case
 **Troubleshooting Toolkit Ultra Pro**	38021	• ProfiCore Ultra • USB cable • ProfiTrace 2 • ScopeWare • Bar graph • Topology Scan • Reporting • Tap Connector 2 • Blue carrying case **• PA Probe** **• ProfiCaptain 2**
Topology scan license	26010	License for existing customers.

14 Contents of the Troubleshooting Toolkit

PROFIBUS Troubleshooting Toolkit Ultra PRO (38021)

- ❑ ProfiCore Ultra
- ❑ USB cable (A to B)
- ❑ USB cable (A to mini, for extra power supply if needed)
- ❑ CD-ROM (download your license on www.procentec.com/licenses)
- ❑ TAP Connector 2
- ❑ Manual
- ❑ Pen
- ❑ **PA Probe, including 2 spare connectors (green)**

PROFIBUS Troubleshooting Toolkit Ultra PRO (37021)

- ❑ ProfiCore Ultra
- ❑ USB cable (A to B)
- ❑ USB cable (A to mini, for extra power supply if needed)
- ❑ CD-ROM (download your license on www.procentec.com/licenses)
- ❑ TAP Connector 2
- ❑ Manual
- ❑ Pen

15 Glossary

Address	Unique number of a device connected to the network. With PROFIBUS this can be 0 to 126. 127 is a broadcast address.
Analyzer	Software tool to observe the protocol traffic. Combi-Analyzers can also inspect the signal quality. Other term: Bus Monitor. Example: ProfiTrace.
Bit Time (TBit)	To help simplify timing calculations, it is convenient to normalize the time units. One Bit Time is the time it takes to transmit one bit and is the reciprocal of the baudrate and is calculated as follows; TBit = 1 (bit) / baudrate (bps). Examples: 12 Mbps --> TBit = 83 ns 1,5 Mbps --> TBit = 667 ns
Busparameters	Settings that define the timing behaviour on the bus. They are defined in the master. Examples: Tslot, MaxTSDR.
C	Capacitance.
Data Exchange	The state of a slave after parameterization and configuration has been completed, in which it cyclically exchanges I/O data with the master. Normally the slave stays forever in Data Exchange until the bus communication or device are stopped.
DGND	Digital Ground.
DIN	German Institute for Standardization (www.din.de).
DP-V0	DP-V0 is the basic stage of the PROFIBUS DP communication protocol. DP-V0 devices (master and slaves) perform the following basic functionalities: - Cyclic exchange of I/O data between controlling and slave devices - Device, Identifier (module) and Channel related Diagnosis - Parameterization of DP-slaves - Configuration of DP-slaves
DP-V1	DP-V1 is the first extension of PROFIBUS DP-V0. DP-V1 devices comply with the following features: - Device related diagnosis is replaced by status and alarms. - The first three octets of the user parameterization data are standardized. Optionally these devices may support: - Acyclic communication (MS1, MS2). - If alarms are used, MS1 is supported.

DP-V2	DP-V2 is the second stage of extension of PROFIBUS DP after DP-V1. DP-V2 devices shall comply with the following features: - Data Exchange Broadcast (DxB) for slave to slave communication (publisher/subscriber principle). - Isochronous Mode (time tick synchronized operating slaves, e.g. drives) - Up- and/or download of Load Region Data (domains) - Clock Control (synchronization within slaves) and Time Stamping - Redundancy.
DSAP	*See SAP.*
Electromagnetic Compatibility	See *EMC*.
EMC	The extent to which an electric or electronic device will tolerate electrical interference from other equipment (immunity), and will interfere with other equipment. Within the European Community as well as in other countries it is regulated by law that electric and electronic components and equipment comply with basic standards such as IEC 61000-6-2 or IEC 61326 or corresponding individual product standards.
FDL	Fieldbus Datalink Layer. Layer 2 of PROFIBUS.
GSD file	Generic Station Description. It is provided by the device manufacturer and contains a description of the PROFIBUS DP/PA device. GSD files provide a way for an open configuration tool to automatically get the device characteristics.
HSA	Highest Station Address, The highest address to which the master will look for new masters. This is done with the FDL Status message. It has nothing to do with the configured slaves! Default value is 126, but the end user can decrease it to a lower value. We recommend to keep it on 126 in order to display not configured slaves in the Live List. This value does not influence the I/O cycle time of the network.
Hub	A Hub refreshes a signal and passes the information on to all nodes which are connected to the Hub. Data frames which were received on one port are transferred to all the other ports (chicken foot topology).
Ident Number	The primary device identification is an Ident Number. This is a unique 16 bits number assigned by the PNO. It is stored within the device and defined in the corresponding GSD file. In addition it is part of the GSD file name. At runtime the Ident Number is used within the - Set slave address procedure - Parameterization telegram (byte 5 + 6) - Standard part of a diagnosis message (byte 5 + 6) The Ident Number can be retrieved from a device. Its main purpose is to make sure that a GSD file and configuration/parameterization data between master class 1 and its slave are matching.

Live List	The Live List is a matrix that lists all the available devices. It is directly visible which devices are 'troublemakers'. With different background colours the status of the devices is displayed. The Live List can also generate the product name of the devices when a diagnostic message is captured (synchronized with the GSD library).
MPI	Multiple Protocol Interface. Protocol defined by Siemens which uses the layer 1 and 2 of PROFIBUS (FDL).
PA	*See PROFIBUS PA.*
PCB	Printed Circuit Board.
PI	PROFIBUS International. The International PROFIBUS Organization based in Karlsruhe.
PNO	PROFIBUS Nutzer Organization. The German PROFIBUS Organization based in Karlsruhe.
PROFIBUS DP	Acronym for "PROFIBUS for Decentralized Peripherals". Specification of an open fieldbus system with the following characteristics: - Polling master-slave-system (cyclic communications, MS0) - Flying masters with robin round token passing coordination (MM) - Connection based (MS1) and connectionless (MS2, MS3) acyclic communication between masters and slaves Options (e.g.): - Data exchange broadcast (DXB), i.e. slave to slaves communication - Isochronous mode of slaves - Clock synchronization - Redundancy PROFIBUS DP is standardized within IEC 61158 and IEC 61784, communication profile families 3/1 and 3/2 The term "PROFIBUS DP" also is a synonym for the RS485 based deployments within factory automation.
PROFIBUS PA	Acronym for "PROFIBUS for Process Automation". This is an application profile based on PROFIBUS DP independent from the physical profiles (RS485, Fiber Optics, MBP). The requirements of continuous manufacturing are covered within the application profile "PA-Devices" and the extension MBP to the physical profiles.
Repeater	Active physical layer device that receives and retransmits all signals over a different port to increase the distance and number of devices for which signals can be correctly transferred for a given medium.

SAP	Service Access Point. This is a defined code/command that tells the slave what data is to be transmitted or which function is to be performed. There are always 2 SAPSs in a message; SSAP (Source Service Access Point) and/or DSAP (Destination Service Access Point). The SAPs are located on the first 2 bytes of the data unit in the SD2 message. Other message types do not carry SAPs. PROFIBUS DP-V0 uses SSAP 62 and DSAP 54 to 62. Example: 62-60 = Get Diagnostics, 62-61 Set Parameters Data Exchange messages do not use SAPs.
Spur	A cable connecting to a bus segment. Spurs are not recommended in PROFIBUS DP and prohibited with 12 Mbps and PROFIsafe operations. German term is "Stichleitung".
SSAP	*See SAP.*
Stub	See *Spur*.
Tbit	*See Bit Time.*
Termination	A powered resistor network at both ends of a segment to prevent reflections (for PROFIBUS DP).
Topology	In a communications network, the pattern of interconnection between network nodes; e.g. bus, ring, star configuration.

16 ISO 9001:2000 Certificate

QualityMasters

Stichting QualityMasters hereby declares that

PROCENTEC
WATERINGEN

Has a management system that meets the requirements of the standard

NEN-EN-ISO 9001:2000

For the scope

Providing training courses, technical support, product development and the exploitation of the test laboratory.

Date of issue	11th April 2008
Valid until	11th April 2013
Certificate number	NL 4792

On behalf of Stichting QualityMasters,

N.B. The failure to meet the conditions as set forth in the certification agreement, or non-compliance with the given standard and/or guidelines, may lead to the suspension or cancellation of the certificate.

This certificate remains the property of Stichting Quality Masters.

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17 Revision History

Version 1.2 - Added ISO 9001:2000 certificate. - Updated the Product description chapter. - Updated the Installation chapter. - Updated the FAQ chapter.
Version 1.3 - Added Proficore Ultra chapter. - Updated the Introduction chapter. - Updated the FAQ chapter. - Updated Technical data of the ProfiCore Ultra. - Updated the Installation chapter. - Updated the Training chapter. - Updated the Order codes. - Updated the Distributors. - Updated the Quick Start chapter. - Updated the Glossary.
Version 1.4 - Added Appendix with hotkeys. - Updated the Introduction chapter. - Updated the Quick start chapter (added a description of the Bar graph modes). - Updated the FAQ chapter. - Updated the Installation chapter. - Updated the Training chapter. - Updated the Glossary.
Version 1.5 - Added Appendix with contents of the toolkit. - Updated the Glossary. - Updated the Distributors. - Updated the Installation chapter.
Version 1.6 - Updated the Installation chapter. - Updated the FAQ chapter. - Updated the Distributors. - Updated the Glossary.

18 Next version

- Characteristics of the PB interface
- ProfiCore - LEDs
- Commissioning checklist
- How to connect the ProfiCore
- Screenshot of the installed directories
- Reporting
- Schematic Tapconnector
- ProfiCaptain FAQs
- Training – 7.5 – assignment 3 more explanation
- PICC Certificate
- PITL Certificate
- Form for mailing list registration
- Form for Bug reports / Product improvement

Glossary
- Reflection
- Retries
- Class1/2 master
- I&M

19 Notes

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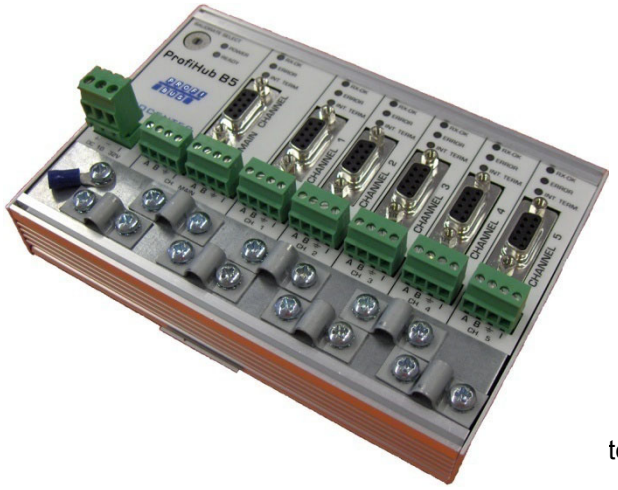

ProfiHub B5

- ✓ 5 Isolated channels.
- ✓ Transparent for PROFIBUS DP.
- ✓ DP - RS 485 specifications.
- ✓ 31 devices per channel.
- ✓ 9,6 Kbps to 12 Mbps.
- ✓ 1200 m spur line length.
- ✓ No Address required.
- ✓ Integrated termination.
- ✓ LEDs that indicate the onboard termination.
- ✓ Screw terminals and DB9 connectors.
- ✓ **IP 20 classification.**

ProfiHub A5

- ✓ 5 Isolated channels.
- ✓ Transparent for PROFIBUS DP.
- ✓ DP - RS 485 specifications.
- ✓ 31 devices per channel.
- ✓ 9,6 Kbps to 12 Mbps.
- ✓ 1200 m spur line length.
- ✓ No Address required.
- ✓ Integrated termination.
- ✓ **IP 65 classification.**

www.procentec.com/profihub