Industrial Data Xchange The Industrial Data Communications Experts

Setting up the ProfiTrace Troubleshooting Kit

IDX

Technical Guide

A step-by-step process for configuring your ProfiTrace Troubleshooting Kit, ensuring that you are equipped with the knowledge and resources to effectively utilise this powerful tool for diagnosing and resolving issues within your PROFIBUS networks.

What is covered in this guide:

- Terminology Additional resources Required software Connect ProfiCore
- Initialise ProfiCore Review live list for errors Generate ProfiTrace reports Training

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1. Introduction

Congratulations on purchasing the ProfiTrace Troubleshooting Toolkit.

In this guide, we will walk you through the step-by-step process of configuring your ProfiTrace Troubleshooting Kit, ensuring that you are equipped with the knowledge and resources to effectively use this powerful tool for diagnosing and resolving issues within your PROFIBUS networks.

Whether you are a seasoned technician or new to the field, this guide will provide the essential information needed to get started quickly and efficiently. Let us dive in and harness the full potential of your ProfiTrace Troubleshooting Kit.

2. Terminology

Before you start reading this guide, it will be helpful if you become familiar with the following terminology:

- ProfiTrace Software: The software used to diagnose your PROFIBUS network.
- ProfiCore Ultra: The hardware device required to use and run ProfiTrace.
- PC: Stands for personal computer (Windows laptop, Windows tablet, Windows PC).

3. Additional resources

IDX offers an in-depth video tutorial demonstrating how to use ProfiTrace effectively, including the identification and interpretation of various issues within your PROFIBUS network based on displayed characteristics. You can access this tutorial on our YouTube channel.

- Link to YouTube channel: <u>https://www.youtube.com/@IndustrialDataXchange</u>
- Link to ProfiTrace tutorial: <u>https://www.youtube.com/watch?v=s1qOF7EZopk</u>

4. Required software

To begin troubleshooting on your network, you will need to download and install ProfiTrace from: https://www.anybus.com/technical-support/pages/files-and-documentation?ordercode=38022

Alternatively, you can manually navigate to **Anybus.com** -> hover over **'Products'** on the Menu -> select **'Diagnostics'** -> click on **'See all products'** -> scroll down to ProfiTrace.

There are multiple versions of the ProfiTrace software, but we recommend downloading the latest version:

| SOFTWARE | | | |
|-------------------|-------|-----------|----------|
| Profitrace V2.9.8 | 2.9.8 | 104.08 MB | Download |
| Profitrace V2.9.9 | 2.9.9 | 46.26 MB | Download |

Figure 1: ProfiTrace Software Versions

5. Connect ProfiCore

Once ProfiTrace is installed, open the program by clicking on the following icon:



Figure 2: ProfiTrace Software Icon

Next, you will need to connect ProfiCore to your PC. The ProfiCore is the hardware interface that will read and translate the electrical characteristics of your PROFIBUS network.



Figure 3: ProfiCore Ultra Hardware

This task can be accomplished using the USB AB cable. The USB-A side is the standard flat, rectangular plug, which is connected to your PC, and the USB-B side is the square plug with two curved edges which is connected to your ProfiCore.



Figure 4: USB AB Cable

6. Initialise ProfiCore

After opening the ProfiTrace software and connecting the ProfiCore via the USB port, initialise your ProfiCore by clicking on the 'Init ProfiCore Ultra' button illustrated in yellow in the screenshot that is visible on the next page.

| ProfiTrace for ProfiCore Ultra V2.9.8 | (c) 2004 | -2020 PROCENTEC | | | | | |
|---|-----------|-------------------------|---------------------------|---------------------------|----------------------------|--------------------|--|
| File Action Filter Trigger Toolbars View Report Settings Help | | | | | | | |
| ProfiTrace 💽 Overview ScopeWare Bar graph Topology Network Manager ProfiCaptain | | | | | | | |
| Load Data Save Data File viewer | Setup | record trigger Start me | essage recording Stop | message recording Se | et record filter Set view | filter | |
| Init ProfiCore Ultra Close ProfiCore Ultra | a Auto | -detect baudrate | paudrate | - Wizard | | | |
| System activity: Live list : 🔀 Message | recording | : X Record to file : | \times | | | | |
| Info Panel | 🔶 Live | e list 🗈 Messages 🛬 | Messages (with view filte | er applied) 😵 Station sta | atistics view 🔎 🔎 Data ins | pection | |
| | HSA=0 | Reset selected station | Info Panel data: Diagn | ostics 💌 🗖 | Auto-update Info Panel | 🔲 Show scope image | |
| | | 0 | 1 | 2 | 3 | 4 | |
| | 0 | 0 | 1 | 2 | 3 | 4 | |
| | 10 | 10 | 11 | 12 | 13 | 14 | |
| | 20 | 20 | 21 | 22 | 23 | 24 | |

Figure 5: Location of Init ProfiCore Ultra button

Upon initialising the ProfiCore, a prompt may arise to update its software license. The license is linked to the serial number of the ProfiCore. This means that a single ProfiCore can be used with multiple PC devices. Every time you connect your ProfiCore to a new PC, you will receive a prompt to update the licenses. However, if you have downloaded the license for a particular PC once, you would not need to download it again.

It is important to note that an internet connection is necessary to update the licenses for the ProfiCore. The file size is less than 1 MB. There is a chance that ProfiTrace might not prompt you to update your license. In such instances, you will have to manually update the license for the specific PC you are using.

If you do not receive an automatic prompt to update your license but encounter a license error preventing the initialisation of your ProfiCore Ultra (you should receive an error indicating the license is not updated), you can manually update the license by accessing the **'Help'** tab.

| ProfiTrace for ProfiCore Ultra V2.9.8 | (c) 2004 | -2020 PROCENTEC | | | | |
|--|-----------------|-----------------------------------|----------------------------------|--------------------------|-------------------------------|---------------------------------------|
| <u>File Action Filter Trigger Toolb</u> | ars <u>V</u> ie | w <u>R</u> eport <u>S</u> ettings | <u>H</u> elp | | | |
| ProfiTrace Overview ScopeWare I | 3ar graph | Topology Network Man | ager ProfiCaptain | | | |
| Load Data Save Data File viewer | Setup | record trigger Start me | essage recording Stop | message recording | et record filter Set view | / filter |
| Init ProfiCore Ultra Close ProfiCore Ultra | a Auto | -detect baudrate Set b | baudrate | - Wizard | | |
| System activity: Live list : 🔀 Message | recording | : X Record to file : | \times | | | |
| Info Panel | 🔶 Live | e list 🗈 Messages 🔽 | Messages (with view filt | er applied) 😵 Station st | atistics view 🔎 🔎 Data in: | spection |
| | | | | | 1 | · · · · · · · · · · · · · · · · · · · |
| | HSA=0 | Reset selected station | Info Panel data: Diagn | ostics 🗾 🗖 | Auto-update Info Panel | □ Show scope image |
| | HSA=0 | Reset selected station | Info Panel data: Diagn 1 | ostics 💽 Г | Auto-update Info Panel | Show scope image |
| | HSA=0 | Reset selected station 0 0 | Info Panel data: Diagn 1 | ostics ▼ □ 2 | Auto-update Info Panel | Show scope image |
| | HSA=0 | Reset selected station 0 0 10 | Info Panel data: Diagn 1 1 1 1 1 | 2 2 12 | Auto-update Info Panel 3 3 13 | Show scope image 4 4 14 |



From the 'Help' tab, navigate to 'License info tool'.

| ProfiTrace for ProfiCore Ultra V2.9.8 | (c) 2004 | -2020 PROCENTEC | | | | |
|---|-----------|----------------------------------|---------------------------------|--------------------------|----------------------------------|--------------------------------------|
| File Action Filter Trigger Toolb | ars Vie | w Report Settings | Help | | | |
| ProfiTrace Overview ScopeWare E | 3ar graph | Topology Network Man | a Contents | | | |
| Load Data Save Data File viewer | Setup | record trigger Start me | PDF manual | ding | et record filter Set view | / filter |
| Init ProfiCore Ultra Close ProfiCore Ultr | a Auto | -detect baudrate Set I | . License info to | ol I | | |
| System activity: Live list : 🔀 Message | recording | Record to file : | About | | | |
| Info Panel | 💙 Live | e list 🔳 Messages 🛬 | Messages (with view filte | er applied) 😽 Station st | tatistics view 🔎 🔎 Data in | spection |
| | | | | | | |
| | HSA=0 | Reset selected station | Info Panel data: Diagn | ostics 💽 Г | Auto-update Info Panel | Show scope image |
| | HSA=0 | Reset selected station | Info Panel data: Diagn 1 | ostics 💽 Г | Auto-update Info Panel | ☐ Show scope image |
| | HSA=0 | Reset selected station 0 0 | Info Panel data: Diagn 1 1 | ostics | Auto-update Info Panel | Show scope image |
| | HSA=0 | Reset selected station 0 0 10 | Info Panel data: Diagn 1 1 11 | ostics | Auto-update Info Panel 3 3 13 | Show scope image 4 14 |
| | HSA=0 | Reset selected station 0 0 10 20 | Info Panel data: Diagn 1 1 1 21 | ostics | Auto-update Info Panel 3 3 13 23 | Show scope image 4 14 24 |

Figure 7: Location of License into tool

This will open a window with a few options. To automatically update all licenses, click on **'Download & install license (*)'**.

| License info & license utility dialog | × |
|--|------------------------------------|
| Please select one of the buttons on the right for possible actions. | Download & install license (*) |
| No ProfiCore serial number is read yet. Some actions might not be possible yet. | Go to PROCENTEC website (*) |
| | Request trial license (*) |
| | Get trial activation (*) |
| | Install license file |
| | Show list of installed licenses |
| Ck | (*) = Internet connection required |

Figure 8: Location of Download & install license (*)

After updating your licenses, it is advisable to re-initialise your ProfiCore device. A pop-up window will appear to detect your network's baud rate.



Figure 9: Baud rate status information

If the ProfiCore is unable to automatically detect the baud rate, the PROFIBUS PLC might be experiencing a communication error.



If successful, a window will indicate that the baud rate has been detected, and the oscilloscope has been set up. You will also see a colour indicator of your network in **'Overview'**:

| ProfiTrace for ProfiCore Ultra V2.9.8 | 8 (c) 2004-2020 PROCENTEC P | rofiCore Ser.Nr: xxxxx15 | 090 | | | |
|--|----------------------------------|-----------------------------|----------------------------|---------------------------|--------------------|--|
| File Action Filter Trigger Toolb | oars View Report Setting | s Help | | | | |
| ProfiTrace 💽 <mark>Overview</mark> ScopeWare Bar graph Topology Network Manager ProfiCaptain | | | | | | |
| Load Data Save Data File viewer | r Setup record trigger Start r | message recording Stop | message recording Se | et record filter Set view | / filter | |
| Init ProfiCore Ultra Close ProfiCore Ultr | ra Auto-detect baudrate Se | t baudrate 9600 bps | ▼ Wizard | | | |
| System activity: Live list : 😒 Message | e recording : 🔀 Record to file : | × | | | | |
| Info Panel | 💙 Live list 🔳 Messages 🕻 | 🛃 Messages (with view filte | er applied) 😽 😵 Station st | atistics view 🛛 🔎 Data in | spection | |
| | HSA=0 Reset selected station | Info Panel data: Diagn | ostics 💌 🗖 | Auto-update Info Panel | ☐ Show scope image | |
| | 0 | 1 | 2 | 3 | 4 | |
| | 0 0 | 1 | 2 | 3 | 4 | |

Figure 11: Colour indicator of network

From the **'Overview'** page you can view the status of your network.

| ProfiTrace for ProfiC | ore Ultra V2.9.8 (c) 20 | 004-2020 PRC | CENTEC ProfiCore Ser.Nr: xxxxx15090 | |
|---------------------------|--------------------------|---------------------|-------------------------------------|--------------------------|
| File Action Filter | Trigger Toolbars | View Repor | t Settings Help | |
| ProfiTrace 🔵 Overview | ScopeWare Bar gra | ph Topology | Network Manager ProfiCaptain | |
| Reset Note: Resetting | also resets bargraph dat | ta, live list and s | tatistics! | |
| Network Condition Ir | ndicator | | Network Summary | |
| Measurement started: | 22/11/2023 10:45:06 | | Baudrate | 9600 bps |
| Measurement time: | 0 Days, 1:01:23 | | Nr. of masters | 0 |
| | | | Nr. of slaves | 0 |
| | 0 Days, 0:00:00 | 0.0% | - In Data-Exchange | 0 |
| | | | - With Parameter errors | 0 |
| | 0 Days, 0:00:00 | 0.0% | - With Configuration errors | 0 |
| | | | - With Critical I/O | 0 |
| | 0.0 | 100.00/ | Nr. of unconfigured slaves | 0 |
| | 0 Days, 1:01:25 | 100.0% | Total I/O data | 0 (0 inputs / 0 outputs) |
| Class C1DP+ | | | Fastest/Slowest data-exchange | |
| Class CIDP + | | | Fastest Input-change | |
| Network Condition Indicat | tor Details | | Fastest Output-change | |
| | | | Retries | 0 |
| | | | Slave lost | 0 |
| | | | Illegals | 0 |
| | | | Syncs | 0 |

Figure 12: View the status of your network

The **'Network Condition Indicator'** (overview tab) gives a general idea of the health of the PROFIBUS system. A traffic light indicates if the PROFIBUS network is okay (green), has problems but still runs (yellow) or has problems needing urgent attention (Red).

As a general guideline:

- Green indicates 60% to 100% health.
- Yellow indicates 40% to 59% health.
- Red indicates below 40% health.

After initialising your ProfiCore and ensuring it is engaged in data exchange, review your live list for any errors.

7. Review the live list for errors

The live list comprises all devices and their PROFIBUS addresses. Various errors are depicted with different colours, represented by a small square within a block.

- Green indicates the device is in data exchange.
- Yellow indicates the device is lost.
- Red indicates a parameter fault.
- Purple indicates a configuration fault.
- No colour indicates the device is on the bus but not in data exchange.

| ProfiTrace for ProfiCore Ultra V2.9.8 | 3 (c) 2004 | -2020 PROCENTEC | | | | |
|--|------------------|--------------------------------------|----------------------|--------------------------------|---------------------------|--------------------|
| <u>File Action Filter Trigger Tools</u> | oars <u>V</u> ie | w <u>R</u> eport <u>S</u> ettings | <u>H</u> elp | | | |
| ProfiTrace Overview ScopeWare | Bar graph | Topology Network Man | ager ProfiCaptain | | | |
| Load Data Save Data File viewe | Setup | record trigger Start m | essage recording | top message recording | et record filter Set view | / filter |
| Init ProfiCore Ultra Close ProfiCore Ult | ra Auto | o-detect baudrate Set | baudrate | - Wizard | | |
| System activity: Live list : 🔀 Message | e recording | : X Record to file : | X | | | |
| Info Panel | 🔶 🔶 Liv | <mark>e list</mark> 📰 Messages 🛬 | Messages (with view | filter applied) 🛛 😵 Station st | atistics view 🔎 🔎 Data in | spection |
| | HSA=0 | Reset selected station | Info Panel data: Dia | ignostics 💽 Г | Auto-update Info Panel | ☐ Show scope image |
| | | 0 | 1 | 2 | 3 | 4 |
| | 0 | 0 | 1 | 2 | 3 | 4 |

Figure 13: View of the Live List

On the **'Live List Page'** (located under the ProfiTrace tab, highlighted in yellow in the image above), you can view messages, station/device statistics, inspect data, and initiate message recording.

Additionally, you can view the oscilloscope image for each specific device:

| 💽 ProfiTrace for ProfiCore Ultra V2.9.8 (c) 2004-2020 PROCENTEC | |
|---|-------------------------|
| File Action Filter Trigger Toolbars View Report Settings Help | |
| ProfiTrace Overview ScopeWare Bar graph Topology Network Manager ProfiCaptain | |
| Mode: B-A Diff 💌 B-A Diff scale 1V / Div 💌 A scale 1V / Div 💌 Time scale 1 uSec 💌 🛋 🗹 SD1 🕏 | 🛛 SD2 🔽 SD4 🔽 Short Ack |
| Address 💽 Trigger Free running/Level trigger 💌 Trigger Mode 💽 🔽 Freeze image 🗖 Cursors active | Show bit markers |
| Trigger delay 🗌 🗌 Level trigger 🤄 Rising edge 💿 A | С В |
| Title Content | |
| | |
| | |



You should see a waveform as illustrated below:



Figure 15: Example of waveform

The A and B cores of the PROFIBUS RS485 cable can be examined individually, by viewing the A & B cores separately:



Figure 16: View of the A & B core

Examining the A and B cores separately allows for precise evaluation of electromagnetic compatibility (EMC) and noise issues. This enables targeted troubleshooting and mitigation strategies to ensure optimal signal integrity and reliability in PROFIBUS RS485 communication.

View the driver voltages of each specific device:



Figure 17: View of the driver voltages in a bar graph

8. Generate ProfiTrace Reports

The feature of generating reports enables you to monitor alterations within your network by producing weekly or monthly reports and comparing these changes with waveforms and driver voltages. This ensures the maintenance of a consistent level of health quality within your network. Moreover, the capability to generate reports enables you to send them to IDX for review. This enables us to provide remote assistance and offer insight regarding the health status of your network.

To generate a report, simply click on the **'Report'** tab:

| ProfiTrace for ProfiCore Ultra V2.9.8 | (c) 2004 | -2020 PROCENTEC | | | | |
|---|-----------|-------------------------|--------------------------|--------------------------|---------------------------|--------------------|
| File Action Filter Trigger Toolb | ars Vie | w Report Settings | Help | | | |
| ProfiTrace Overview ScopeWare B | ar graph | Topology Network Man | ager ProfiCaptain | | | |
| Load Data Save Data File viewer | Setup | record trigger Start me | essage recording Stop | message recording | et record filter Set view |) filter |
| Init ProfiCore Ultra Close ProfiCore Ultr | a Auto | o-detect baudrate | paudrate | - Wizard | | |
| System activity: Live list : 🔀 Message | recording | : X Record to file : | × | | | |
| Info Panel | 🧡 Liv | e list 🗈 Messages 둘 | Messages (with view filt | er applied) 😽 Station st | atistics view 🔎 🔎 Data in | spection |
| | HSA=0 | Reset selected station | Info Panel data: Diagn | ostics 💽 🔽 | Auto-update Info Panel | ☐ Show scope image |
| | | 0 | 1 | 2 | 3 | 4 |
| | 0 | 0 | 1 | 2 | 3 | 4 |
| | 10 | 10 | 11 | 12 | 13 | 14 |
| | 20 | 20 | 21 | 22 | 23 | 24 |



Then click on 'Generate report':

| 💿 ProfiTrace for ProfiCore Ultra V2.9.8 | (c) 2004 | -2020 PROCENTEC | | | | |
|--|-----------------|---|--|--|--|---------------------------|
| File Action Filter Trigger Toolb | ars Vie | w Report Settings | Help | | | |
| ProfiTrace Overview ScopeWare E | 3ar graph | To Generate re | port n | | | |
| Load Data Save Data File viewer | Setup | record trigger Start me | essage recording Stop | message recording | et record filter Set view | v filter |
| Init ProfiCore Ultra Close ProfiCore Ultr | a Auto | -detect baudrate | baudrate | - Wizard | | |
| System activity: Live list : 🗙 Message | recording | Record to file : | × | | | |
| a constant and a second | | | | | | |
| Into Panel | 🔶 Live | e list 🔳 Messages 🔀 | Messages (with view filte | er applied) 😽 Station st | tatistics view 🛛 🔎 Data in | spection |
| Into Panel | ♥ Live | e list 🗈 Messages 😒 Reset selected station | Messages (with view filte | erapplied) 😵 Station st ostics 💽 Г | tatistics view 🏳 🔑 Data in TAuto-update Info Panel | spection |
| Into Panel | ♥ Live | e list 🗈 Messages 😒 Reset selected station 0 | Messages (with view filte Info Panel data: Diagn 1 | er applied) 😵 Station st ostics 💽 Г 2 | atistics view 🔑 Data in Auto-update Info Panel 3 | spection Show scope image |
| Into Panel | ♥ Live HSA=0 | e list E Messages E Reset selected station 0 0 | Messages (with view filt Info Panel data: Diagn 1 | er applied) 😵 Station st ostics 💽 Г 2 2 | tatistics view P Data in Auto-update Info Panel 3 3 | spection Show scope image |

Figure 19: View of Generate Report

A pop-up window will prompt you to add relevant information such as location, network name, engineer, and company:

| 💽 Print report | | | _ | | × |
|--|---------------|---------------|---|-------|---|
| General information Section selection Custom logo Language | • | | | | |
| Location: MCC 01 | (mandatory) | | | | |
| Network name: AS01 - PROFIBUS Milling Network | (mandatory) | | | | |
| ✓ Project details: | | | | | |
| Weekly network audit. | | | | | A |
| | | | | | Ŧ |
| Remarks: | | | | | |
| Audited at ProfiHub Channel #1. | | | | | • |
| | | | | | Ŧ |
| Engineer name: Kyle | (mandatory) | | | | |
| Company name: Industrial Data Xchange | (mandatory) | | | | |
| Determine conclusion according to the tested subjects Exclude SYNCS from test conclusion | | | | | |
| Generate report | Load settings | Save settings | | Close | |

Figure 20: View of Print Report

After this, click **'Generate Report'**. You will be redirected to a print preview of your report. Save a copy on your desktop or in a dedicated folder.

If the report does not include bar graphs or scope images, navigate to the 'Print report' window -> select the second tab labelled 'Section selection' -> and check the box for 'Display a preview of the bar graph, topology, and scope images'. Finally, click 'Generate Report'.

| Print report | | | | \times |
|---|---|-----------------|-------|----------|
| General information Section select | Outon logo Language | | | |
| General information Section selection Section selection Device table Bar graph Topology Device details | Cutton logo Language Network manager content selector Display a preview of the bargraph, topology and scopeins Scope images time scale: 1 uSec The settings in the lat below will be saved inside the network Bar graph Topology Master and slave details P Only pirk the cuter's measurement point | ages manager | | |
| Generale report | Load settings | Save settings | Close | |

9. Training

To gain further insight into interpreting the data, we recommend attending our Certified PROFIBUS Installer with Troubleshooting and Maintenance course. For a comprehensive understanding of PROFIBUS, including ProfiTrace usage and interpreting data packets transmitted over the bus, we suggest our Certified PROFIBUS Engineer Course.

For more information on our Certified PROFIBUS courses, or any of our certified courses, please contact the IDX Academy at academy@idx.co.za, or call us on +27 11 548 9960. Additionally, you can browse and book courses on our website at: <u>https://www.idx.co.za/training</u>.

10. Conclusion

This document provides guidance on using the ProfiCore device efficiently within a PROFIBUS network. From updating licenses to monitoring device health via the live list, users are equipped with essential tools for ensuring smooth data exchange and troubleshooting potential issues.

With instructions on interpreting error colours and accessing various features like message recording, the document empowers users to effectively manage and maintain their PROFIBUS network infrastructure. By following the outlined procedures and using the provided resources, users can optimise the performance of their PROFIBUS systems, contributing to enhanced productivity and operational efficiency.

About Industrial Data Xchange:

Industrial Data Xchange (IDX) is an Industrial ICT Partner that provides industry-related products, services, solutions, and training. We assist you to establish, maintain and leverage connectivity within your infrastructure.

Connectivity for Business Benefit:

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