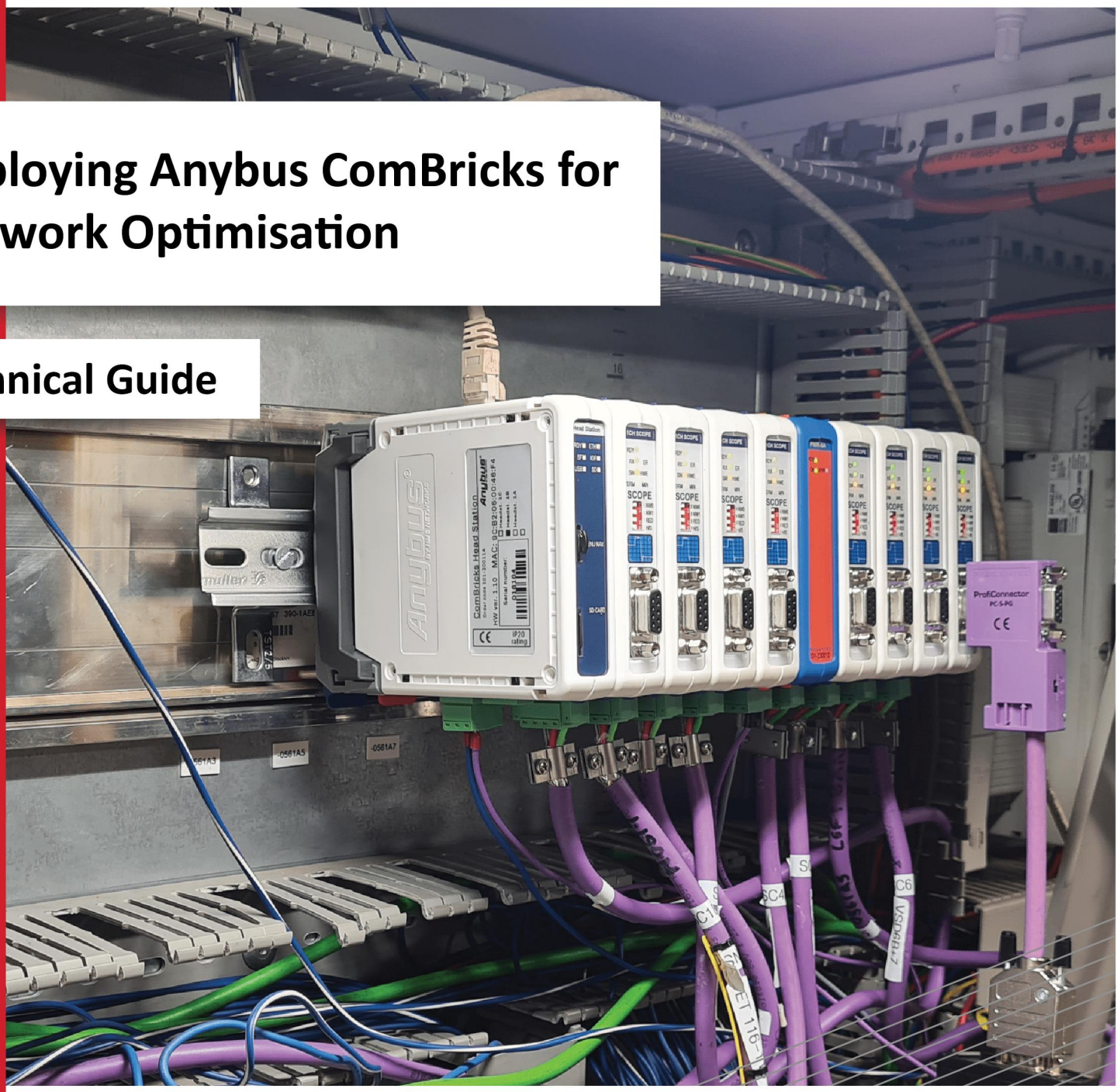
Industrial Data Xchange

The Industrial Data Communications Experts

Deploying Anybus ComBricks for Network Optimisation

Technical Guide



This document provides a comprehensive guide for deploying Anybus ComBricks systems across diverse network configurations, offering detailed instructions for integration with common components like PLCs, OLMs and repeaters.

It also outlines replacement processes for transitioning from traditional devices to ComBricks, ensuring seamless installation, optimal performance, and efficient troubleshooting in industrial environments.

What's covered in this guide:

Common network components influencing the ComBricks installation • ComBricks high-level vs. scope-level monitoring • ComBricks high-level and scope-level scenarios • Configuring ComBricks for optimal performance

Contents

1. Introduction

This document aims to provide a comprehensive guide for deploying Anybus ComBricks (hereafter referred to as ComBricks) systems across diverse network configurations. It provides detailed instructions and scenarios for integrating ComBricks with common network components such as PLCs, Optical Link Modules (OLMs), and repeaters. The document outlines specific use cases, including high-level and scope-level monitoring, to ensure seamless installation and optimal performance in different industrial environments.

Additionally, this guide addresses the replacement processes for existing network components with ComBricks, offering clear pathways for transitioning from traditional devices like Siemens Diagnostic Repeaters and ProfiHubs to the more advanced ComBricks system. By presenting both theoretical and practical approaches, the document aims to facilitate effective planning, execution, and troubleshooting during the deployment phase, enhancing the reliability and efficiency of network operations.

2. Overview of ComBricks

Anybus ComBricks is a versatile modular platform designed to enhance industrial network management and monitoring. It offers advanced diagnostic capabilities for PROFIBUS networks, enabling real-time monitoring and troubleshooting to maintain optimal network performance. With its modular architecture, ComBricks allows users to customise their setup by adding various modules, such as repeaters, fibre optic interfaces, and PROFIBUS device modules, to meet specific network requirements. This flexibility makes it a powerful tool for industries that require robust and reliable communication networks.

One of the standouts features of ComBricks is its ability to provide continuous, remote monitoring of network health. The platform can send alerts and detailed reports on network issues, helping to prevent downtime by allowing maintenance teams to address potential problems before they escalate. By integrating web-based monitoring, ComBricks offers a user-friendly interface that enables users to access network data from anywhere, providing critical insights that aid in proactive maintenance and efficient network management.

Additionally, ComBricks supports the seamless replacement of traditional network components, such as repeaters and Optical Link Modules (OLMs), with its advanced modules. This capability simplifies network upgrades and expansions, ensuring compatibility with existing infrastructure while enhancing overall performance. By consolidating network diagnostics and component management into a single, scalable platform, ComBricks helps industries streamline operations, reduce maintenance costs, and improve the reliability of their communication networks.

Modular solution with monitoring capabilities

ComBricks is a modular solution that combines the intelligence and management of a Head Station module (the brains behind permanent monitoring) with various plugin modules that share a common expandable backplane and power.

These modules not only perform standard network component functions, such as repeating but also gather information directly from connected networks to analyse their health. This approach promotes a proactive rather than reactive stance towards network management.

Figure 1: Example of an Anybus ComBricks Head station, backplane, fibre module and scope repeater.

Head Station types and capabilities

The ComBricks Head Station retrieves information from the modules and displays it on an integrated web page for analysis. There are four types of Head Stations: 1A, 1B, 1C, and 1Z. Head Station 1A is used solely for network segmentation without monitoring capabilities. Head Station 1B can monitor one network, 1C can monitor four networks, and 1Z can monitor three networks.

PROFIBUS DP modules and power requirements

Two PROFIBUS DP modules are available for monitoring: the ComBricks 1 Channel Repeater and the ComBricks 1 Channel SCOPE Repeater. The 1 Channel Repeater is a standard RS 485 PROFIBUS repeater with diagnostic LEDs and redundancy features, supporting bus speeds up to 12 Megabits per second (Mbps). The SCOPE Repeater adds an integrated quality oscilloscope for enhanced diagnostics.

Both modules can be cascaded unlimitedly, strengthen the PROFIBUS DP signal, and support up to thirty-one devices per channel. For configurations exceeding five SCOPE Repeaters, a Power Module is necessary to provide sufficient power, supporting up to ten scope cards along with the Head Station Module. Redundant power requires at least two Power Modules.

3. Common network components influencing the ComBricks installation

The installation of ComBricks in a network is influenced by several key components:

3.1. Programmable Logic Controller (PLC)

The PLC serves as the central control unit of the plant, executing an automation program that reads inputs from various sensors and issues commands to actuators throughout the facility. Several major vendors supply PLCs and related PROFIBUS equipment for industrial applications, including Siemens, ABB, Yokogawa, Schneider Electric, and others. ComBricks plays a critical role in monitoring the interactions between the PLC and field devices on the network, offering alerts and detailed information on any issues that may arise in these communications.

Figure 2: PLC

3.2. Optical Link Module (OLM)

An OLM is a critical part of the PROFIBUS architecture, as it allows for PROFIBUS networks to be distributed across an entire plant, whilst also maintaining electrical isolation between the different buildings of the plant. OLMs are responsible for converting PROFIBUS RS-485 communication to fibre and vice versa. Common usage of an OLM is when distances between PROFIBUS devices exceed the required standards, two OLMs are placed closer to the PROFIBUS devices and fibre cable is run between the OLMs. A conversion of RS-485 to fibre and vice versa is established to enhance the expected functioning of the network.

Figure 3: OLM

3.3. Repeaters

Repeaters are used to extend PROFIBUS segments to allow for further distances, more devices and for the elimination of interference and Electromagnetic interference (EMI). Repeaters are also used for splitting up the architecture of PROFIBUS systems to suit the application of the plant. There are various types of repeaters available within the industry. These vary mainly by the number of outputs or segments offered. On the next page is a list of the common repeaters that will influence the ComBricks installation.

3.3.1. Standard single-channel repeater

A single-channel repeater has two inputs, one for an incoming segment and the other for an outgoing segment. It is designed to extend PROFIBUS segments to allow for further distance or for allowing increased number of PROFIBUS nodes. Common single-channel repeaters include the Siemens 6ES7972-0AA02-0XA0 and the Anybus B1 Repeater.

Figure 4: Single Channel Repeater

3.3.2. Siemens diagnostic repeater

The Siemens diagnostic repeater is a multi-channel device that receives a single PROFIBUS channel and outputs to two additional segments. It expands the main segment into two separate segments. These repeaters can also function as PROFIBUS devices, allowing them to be integrated into the PLC hardware configuration for diagnostic purposes. While they lack piggyback access ports on their segments, they feature a single isolated port dedicated to programming.

Figure 5: Siemens Diagnostic Repeater

3.3.3. Anybus ProfiHub

The Anybus ProfiHub is a sophisticated multi-channel repeater designed to facilitate a star network architecture within a PROFIBUS system. It is beneficial in substations, where it helps to divide drives and switchgear into smaller segments, reducing interference and network noise. Additionally, the ProfiHub effectively isolates faulty segments, preventing issues from affecting other parts of the network. The ProfiHub comes in two variants, the ProfiHub B5+R with five channels and the ProfiHub B2+R with two channels.

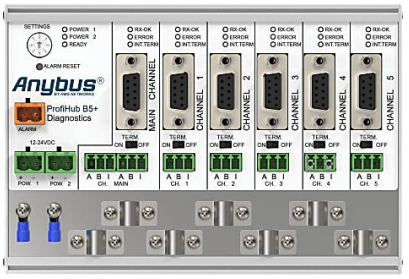


Figure 6: Anybus ProfiHub

ComBricks functions similarly to the ProfiHub, as it can repeat PROFIBUS traffic between the various cards installed on its backplane. Therefore, replacing a ProfiHub with ComBricks while maintaining the existing network architecture is a seamless and logical choice.

4. ComBricks high-level vs. scope-level monitoring

ComBricks can be deployed to a PROFIBUS network for either high-level monitoring, scope-level monitoring, or a combination of both. Additionally, you can choose to monitor every segment at the scope-level or only select segments.

4.1. ComBricks high-level monitoring

ComBricks high-level monitoring will provide you with a complete live list of your network, and PROFIBUS DP network statistics, such as a count of:

- Lost devices
- Message repeats
- Illegal messages
- A network event log
- Synchronisation errors
- Diagnostic messages (sent and received)
- Devices with parameter issues
- Email triggers and events

The message recording feature allows you to set up triggers for specific errors that may occur on the network during breakdowns. These recorded messages are saved to an SD card, can be downloaded, and reviewed using Anybus ProfiTrace software when needed.

The event log captures date- and time-stamped records of all events within the network, stored on the ComBricks monitoring unit. This feature is valuable for identifying trends and troubleshooting network issues.

ComBricks enables you to send email notifications to key personnel whenever an issue arises or is anticipated. You can configure triggers based on your preferences, such as lost connections, sync issues, repeats, illegal states, diagnostics, loss of the controller/PLC, or detected baud rate changes.

4.2. ComBricks scope-level monitoring

Scope-level monitoring has all the benefits of high-level monitoring but also includes a built-in oscilloscope, which:

- It allows you to monitor the electrical characteristics of the connected segment, such as the signal waveforms and driver voltages.
- This will help you to identify signal quality-related issues such as termination faults, EMI/EMC, faulty cabling, faulty connectors, segment length issues, faulty devices, and other impedance-related issues.
- Expand your network event log and email trigger alert capabilities, as you can also setup triggers based on the electrical characteristics of the segment.
- This will assist engineers in pre-emptively avoiding network failures and assist with fault-finding when checking the health of the network.
- Can be expanded to use SNAP, a revolutionary network monitoring solution that uses AI-driven algorithms. SNAP analyses low-level electrical signals, traffic, and error data, translating the results into easily understandable graphics. This innovative solution detects, locates, and identifies network faults and latent hardware issues, providing real-time insights for efficient repair and maintenance.
- Gives the ability for remote fault finding of networks, allowing the site to take advantage of centralised resources. This saves time in fault finding, removing the need for travel and site admission challenges.

5. ComBricks high-level and scope-level scenarios

This section outlines the key scenarios for implementing ComBricks in both high-level and scope-level monitoring setups. Each scenario provides practical guidance on configuring and installing ComBricks to ensure optimal performance and monitoring capabilities.

5.1. High-level scenario (PLC)

Generally, where high-level monitoring is implemented the ComBricks are installed close to the PLC. High-level monitoring requires at least a 1B Head Station and a 1 Channel Repeater, which are available as part of a ComBricks Eco-Monitoring Kit. Here is a typical installation method for placing ComBricks near the PLC for high-level monitoring:

5.1.1. PLC start of segment. ComBricks first device in segment.

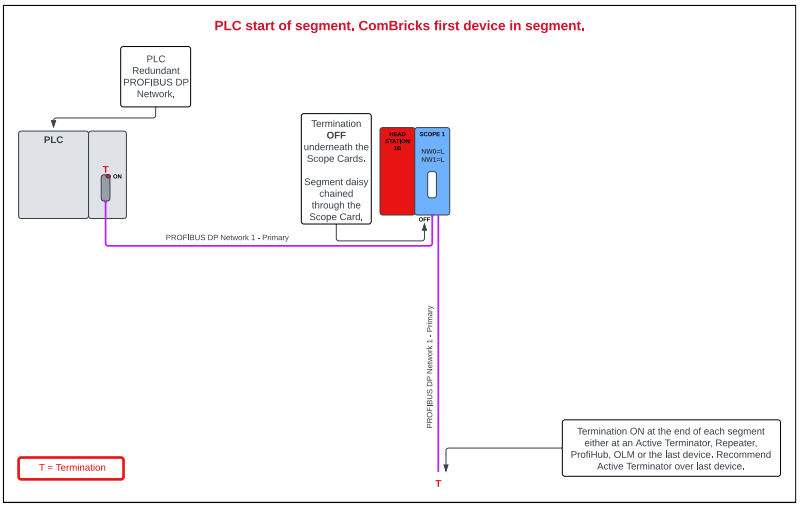


Figure 7: PLC start of segment. ComBricks first device in segment.

5.2. Scope-level scenario (PLC)

Scope-level monitoring requires a minimum of a ComBricks 1B Head Station and a 1 Channel SCOPE Repeater. These components are offered in two kit options: the ComBricks Standard Monitoring Kit (1 segment) and the ComBricks Advanced Monitoring Kit (4 segments). You can expand the system by adding additional SCOPE repeater cards to tailor the architecture to your specific needs.

On the following page, you will find three scenarios detailing the most common methods for installing ComBricks near a PLC:

5.2.1. PLC start of segment. ComBricks first device in segment.

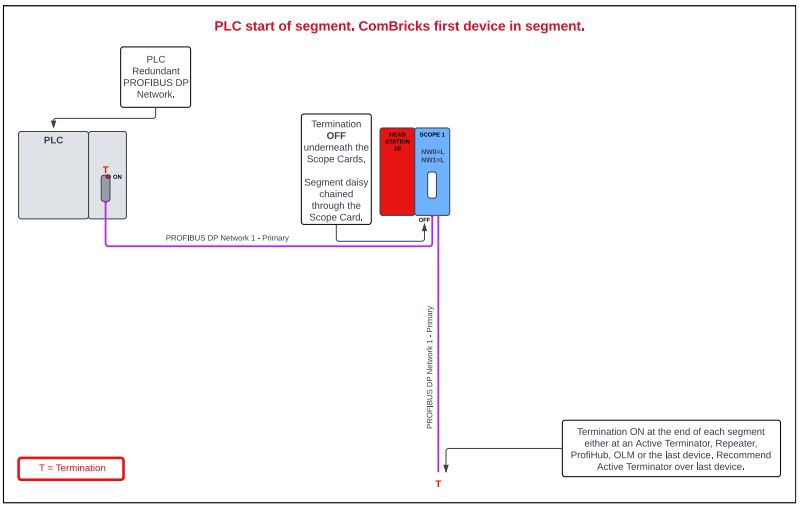


Figure 8: PLC start of segment. ComBricks first device in segment.

Description:

- The segment begins at the PLC with termination set to ON.
- Termination at the scope card is OFF, as the PROFIBUS cable is daisy-chained through it.
- Ensure termination is ON at the end of the segment.

Advantages:

- Scope-level monitoring of segment.
- If the ComBricks loses power, the PROFIBUS network will still work, but without the remote monitoring capability of the ComBricks where a single scope card is installed.

5.2.2. PLC within segment. ComBricks replaces PLC as start of segment.

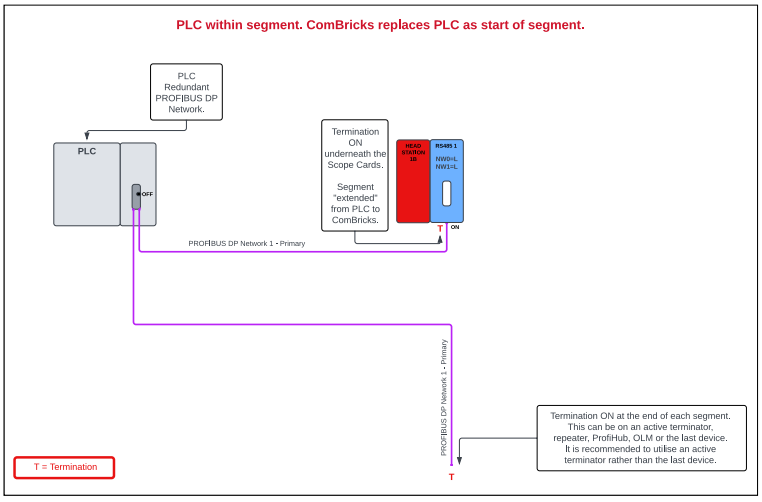


Figure 9: PLC within segment. ComBricks replaces PLC as start of segment.

Description:

- The segment begins at the ComBricks unit, replacing the PLC as the segment's starting point.
- Termination on the scope card is ON because the segment starts at the scope card.
- Ensure termination is ON at the end of each segment.

Disadvantage:

- There is a risk of network unpowered termination if the ComBricks loses power. To mitigate this, use an active terminator instead of relying on the ComBricks unit for termination, or leverage the redundant power supply capability of the ComBricks unit.

5.2.3. PLC within segment. ComBricks next device after PLC within segment.

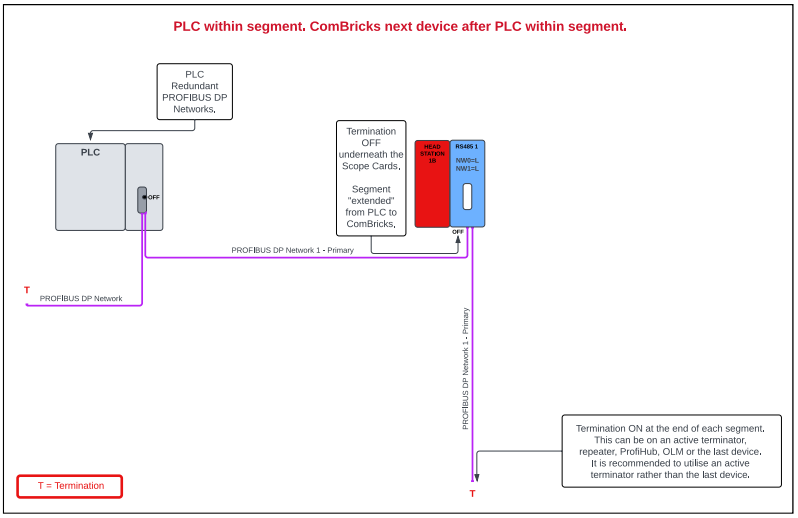


Figure 10: PLC within segment. ComBricks next device after PLC within segment.

Description:

- The PLC is included in the segment via daisy chaining, with the ComBricks as the next device after the PLC.
- Termination at the scope card is OFF, because the segment is daisy chained through it.
- Ensure termination is ON at the end of the segment.

Advantage:

- If the ComBricks loses power, the PROFIBUS network will remain healthy, but without the remote monitoring capability of the ComBricks.

5.3. Scope-level scenario (OLM)

Here are three scenarios outlining the most common methods for installing ComBricks near an OLM:

5.3.1. OLM start of segment. ComBricks first device in segment.

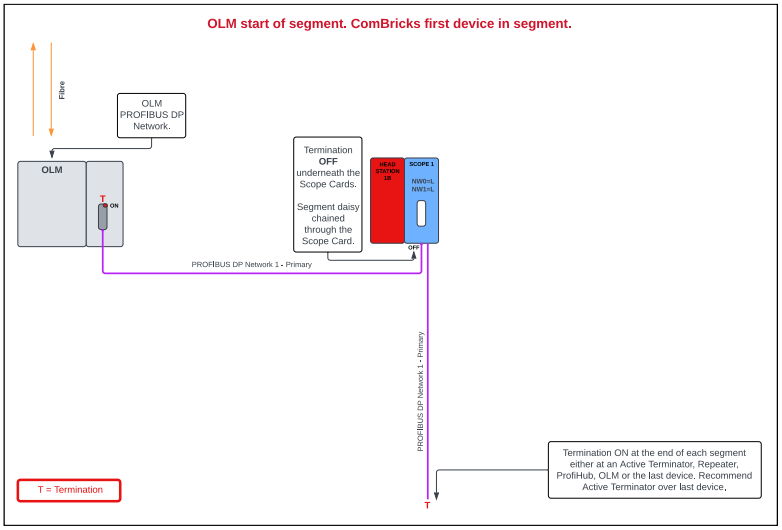


Figure 11: OLM start of segment. ComBricks first device in segment.

Description:

- The segment begins at the OLM.
- Termination at the scope card is OFF, as the segment is daisy-chained through it.
- Ensure termination is ON at the end of each segment.

Advantage:

- If the ComBricks loses power, the PROFIBUS network will still work, but without the remote monitoring capability of the ComBricks.

5.3.2. OLM within segment. ComBricks replaces OLM as start of segment.

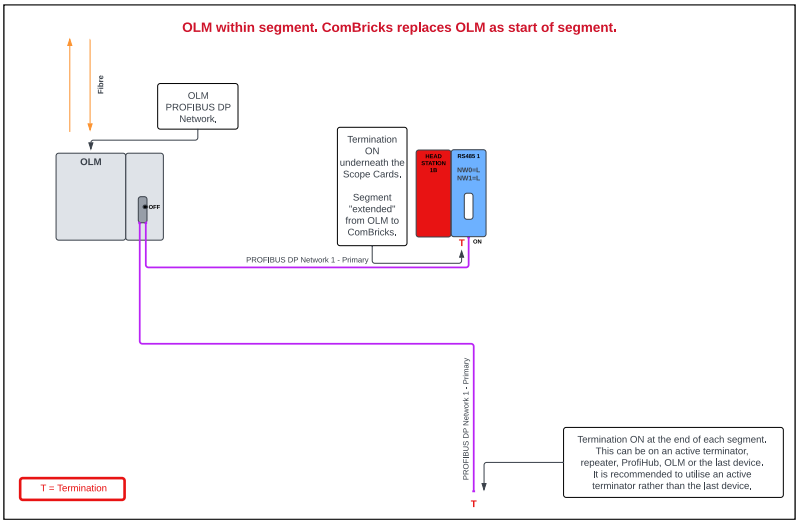


Figure 12: OLM within segment. ComBricks replaces OLM as start of segment.

Description:

- The segment begins at the ComBricks unit, replacing the OLM as the segment's starting point.
- Termination on the scope card is ON because the segment starts at the scope card.
- Ensure termination is ON at the end of each segment.

Disadvantage:

- There is a risk of network unpowered termination if the ComBricks loses power. To mitigate this, use an active terminator instead of relying on the ComBricks unit for termination, or leverage the redundant power supply capability of the ComBricks unit.

5.3.3. OLM within segment. ComBricks next device after OLM within segment.

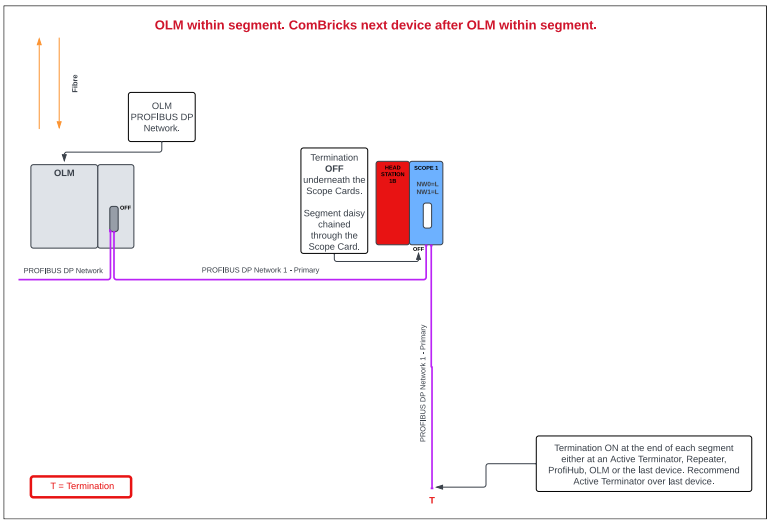


Figure 13: OLM within segment. ComBricks next device after OLM within segment.

Description:

- The OLM is within the segment and not at the beginning.
- Place the ComBricks after the OLM before the next device.
- Termination at the scope card is OFF, because the segment is daisy chained through it.
- Ensure termination is ON at the end of the segment.

Advantage:

- If the ComBricks loses power, the PROFIBUS network will remain healthy, but without the remote monitoring capability of the ComBricks.

5.4. Scope-level scenario (ProfiHub B5+R after OLM)

The following scenario involves an OLM connected to a ProfiHub B5+R through the main channel, with all five segments in use.

5.4.1. Installation before ComBricks

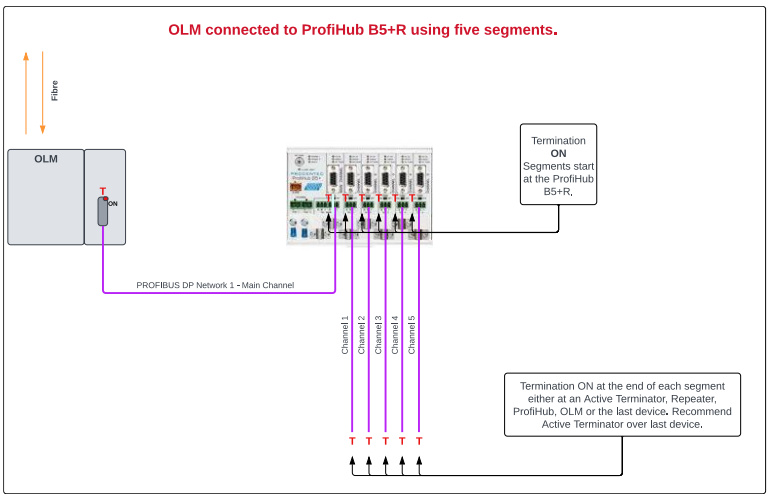


Figure 14: OLM connected to ProfiHub B5+R using five segments.

Description:

- The segment begins at the OLM and connects to the main channel of the ProfiHub B5+R.
- Termination is ON, on both the OLM and the main channel of the ProfiHub B5+R.
- Segment 1 on Channel 1, Channel 1 terminated on the ProfiHub B5+R, and at the end of the segment.
- Segment 2 on Channel 2, Channel 2 terminated on the ProfiHub B5+R, and at the end of the segment.
- Segment 3 on Channel 3, Channel 3 terminated on the ProfiHub B5+R, and at the end of the segment.
- Segment 4 on Channel 4, Channel 4 terminated on the ProfiHub B5+R, and at the end of the segment.
- Segment 5 on Channel 5, Channel 5 terminated on the ProfiHub B5+R, and at the end of the segment.

5.4.2. Installation after replacement of ProfiHub with ComBricks

This setup offers two options. The first option involves using a Head Station, six scope cards, and a 6A power module for centralised monitoring, while option two uses five scope cards to reduce costs but sacrifices electrical isolation for the PLC and the first segment. Both options ensure seamless integration with existing segments and optimise network performance.

Option 1

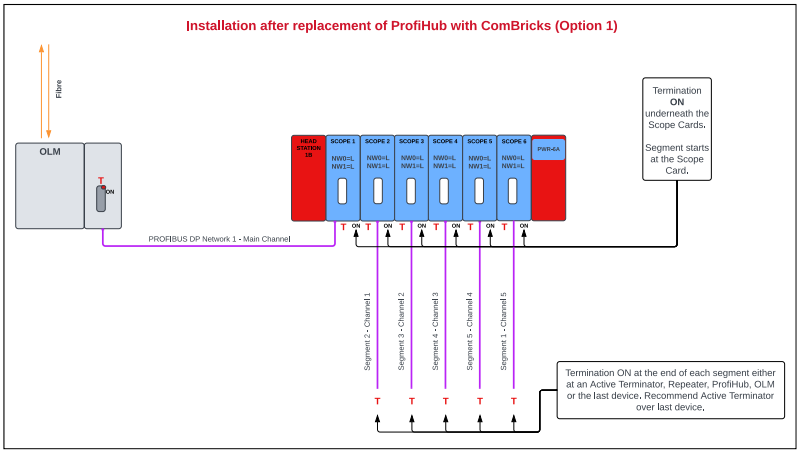


Figure 15: Installation after replacement of ProfiHub with ComBricks (Option 1)

Description:

- The ProfiHub B5+R is replaced with one Head Station, six scope cards, and a 6A power module, as the setup exceeds five scope cards.
- The segment begins at the OLM and connects to the first scope card, with termination ON because the segment ends at this scope card.
- Channel 1 - Segment 1 is connected to the second scope card, termination is ON since this is the start of the segment.
- Channel 2 - Segment 2 is connected to the third scope card, termination is ON since this is the start of the segment.
- Channel 3 - Segment 3 is connected to the fourth scope card, termination is ON since this is the start of the segment.
- Channel 4 - Segment 4 is connected to the fifth scope card, termination is ON since this is the start of the segment.
- Channel 5 - Segment 5 is connected to the sixth scope card, termination is ON since this is the start of the segment.

- Ensure termination is ON at the end of each segment.

Advantage:

- Centralised monitoring across all segments within a substation.

Option 2

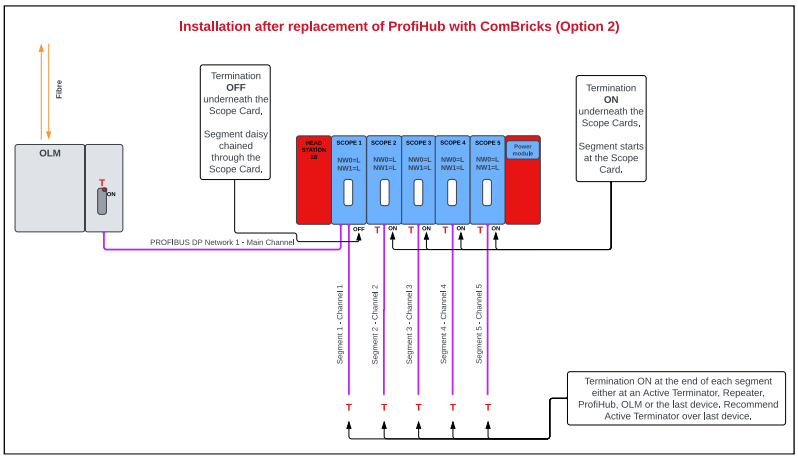


Figure 16: Installation after replacement of ProfiHub with ComBricks (Option 2)

Description:

- The ProfiHub B5+R is replaced with one Head Station, five scope cards and a 6A power module, as the setup exceeds five scope cards.
- The segment begins at the OLM and connects to the first scope card, with termination OFF because the segment ends at this scope card.
- Channel 2 - Segment 2 is connected to the second scope card, termination is ON since this is the start of the segment.
- Channel 3 - Segment 3 is connected to the third scope card, termination is ON since this is the start of the segment.
- Channel 4 - Segment 4 is connected to the fourth scope card, termination is ON since this is the start of the segment.
- Channel 5 - Segment 5 is connected to the fifth scope card, termination is ON since this is the start of the segment.
- Ensure termination is ON at the end of each segment.

Advantage:

- Reduces costs by using one less ComBricks scope repeater, combining the PLC and the first segment on a single card.

Disadvantage:

- It lacks electrical isolation for the PLC and the first segment, making PLC communications more vulnerable compared to the ProfiHub B5+R.

5.5. Scope-level scenario (Siemens Diagnostic Repeater)

Here are several methods for replacing Diagnostic Repeaters with ComBricks:

5.5.1. ComBricks replacement - OLM and 1 DP Network - DR DP 2 and 3

Before

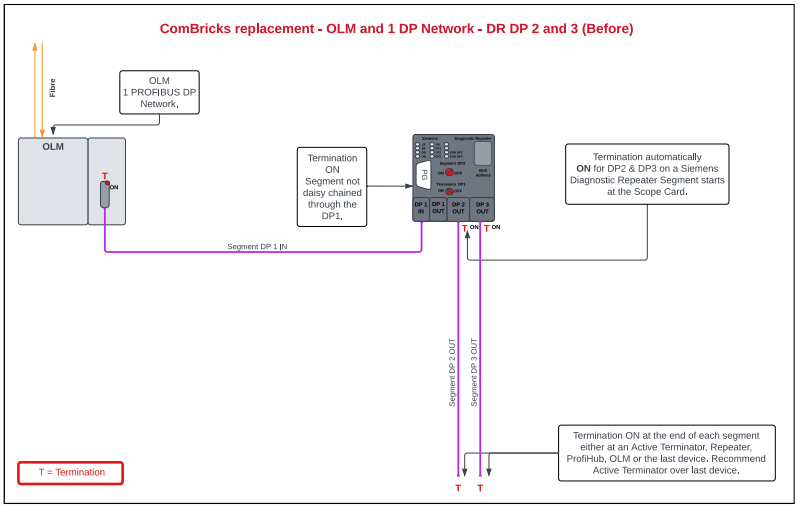


Figure 17: ComBricks replacement - OLM and 1 DP Network - DR DP 2 and 3 (Before)

Description:

- The segment starts at the OLM.
- Termination is ON DP1, segment is not daisy-chained through DP1.
- Termination automatically ON for DP2 and DP3 on the Diagnostic Repeater.
- Ensure termination is ON at the end of each segment.

After

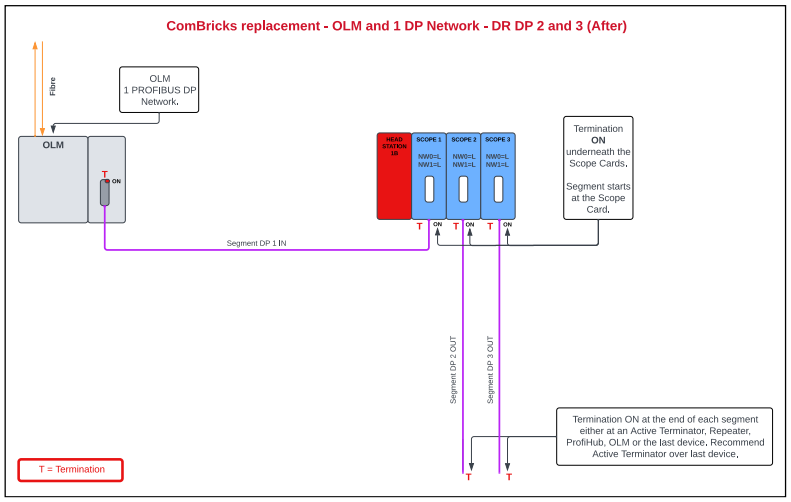


Figure 18: ComBricks replacement - OLM and 1 DP Network - DR DP 2 and 3 (After)

Description:

- The Diagnostic Repeater is replaced with a Head station and three scope cards.
- The segment starts at the OLM.
- Termination of the first scope card is ON because the segment is not daisy chained through it.
- Segment 2 is connected to the second scope card; termination is ON since this is the start of the segment.

- Segment 3 is connected to the third scope card; termination is ON since this is the start of the segment.
- Ensure termination is ON at the end of each segment.

Advantages:

- The channels are electrically isolated.
- Piggyback access points are available on all three segments.

5.5.2. ComBricks replacement for Siemens DR - OLM - 1 DP Network - DP2

Before

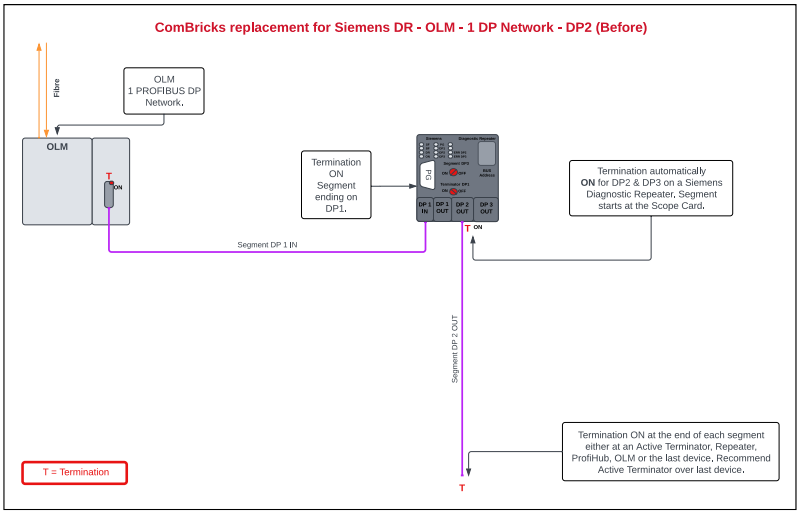


Figure 19: ComBricks replacement for Siemens DR - OLM - 1 DP Network - DP2 (Before)

Description:

- The segment starts at the OLM.
- Termination is ON DP1, segment is not daisy-chained through DP1.
- Termination automatically ON for DP2 and DP3 on the Diagnostic Repeater.
- Ensure termination is ON at the end of each segment.

After

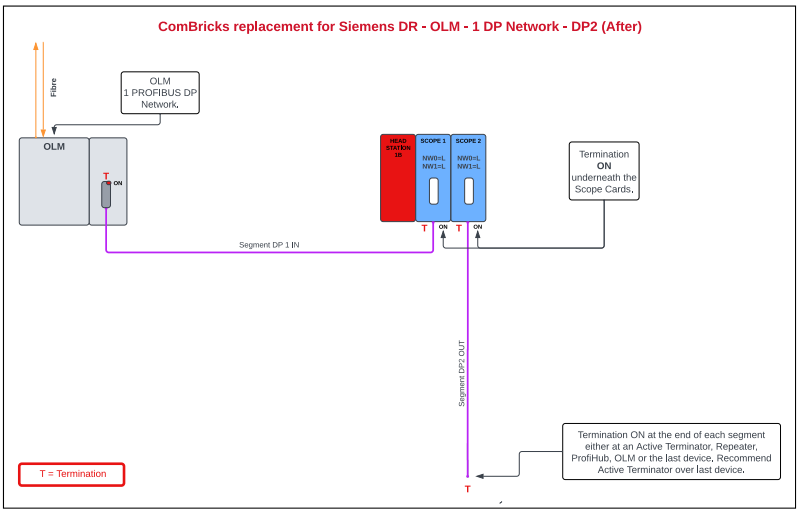


Figure 20: ComBricks replacement for Siemens DR - OLM - 1 DP Network - DP2 (After)

Description:

- The Diagnostic Repeater is replaced with a Head station and two scope cards.
- The segment starts at the OLM.
- Termination of the first scope card is ON because the segment is not daisy chained.
- Segment 2 is connected to the second scope card; termination is ON since this is the start of the segment.
- Ensure termination is ON at the end of each segment.

Advantages:

- The channels are electrically isolated.
- Piggyback access points are available on both segments.

5.5.3. ComBricks replacement for Siemens DR - OLM - 1 DP Network - DP1

Before

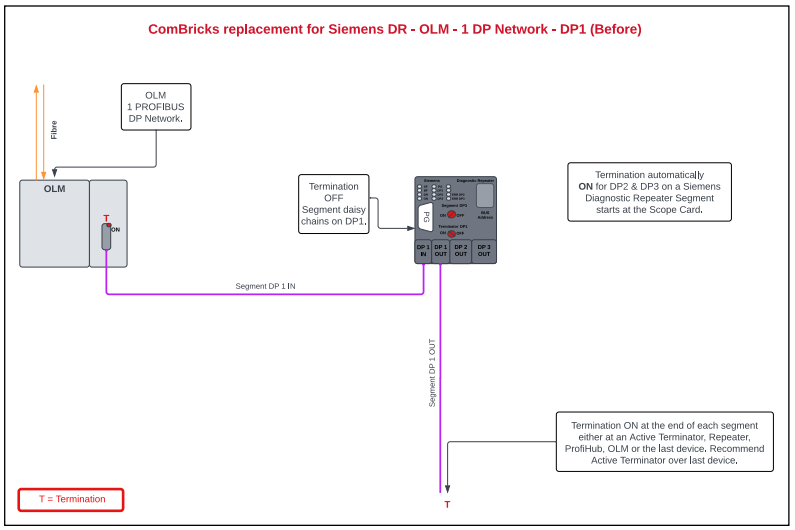


Figure 21: ComBricks replacement for Siemens DR - OLM - 1 DP Network - DP1 (Before)

Description:

- The segment starts at the OLM.
- Termination is OFF on DP1, segment is not daisy chained through DP1.
- Termination automatically ON for DP2 and DP3 on the Diagnostic Repeater.
- Ensure termination is ON at the end of each segment.

After

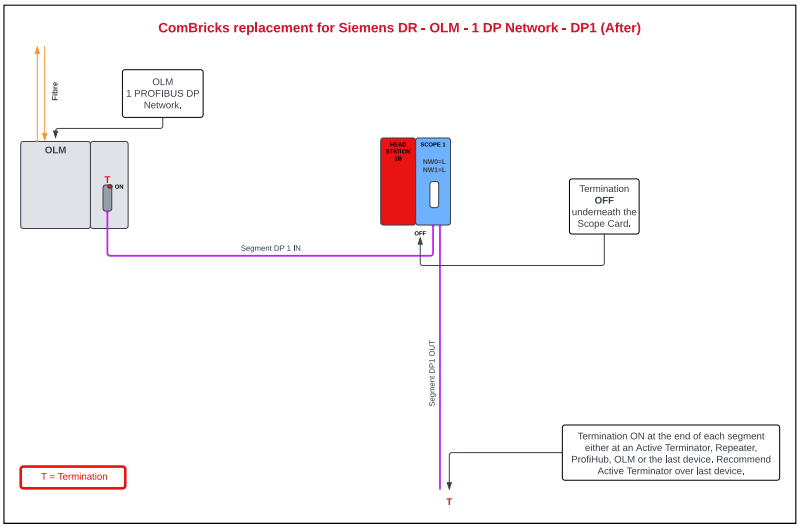


Figure 22: ComBricks replacement for Siemens DR - OLM - 1 DP Network - DP1 (After)

Description:

- The Diagnostic Repeater is replaced with a Head station and a single scope card.
- The segment starts at the OLM, and it is daisy-chained through the first scope card.
- Termination at the scope card is OFF, because the segment is daisy chained through it.
- Ensure termination is ON at the end of each segment.

Advantages:

- If the ComBricks loses power, the PROFIBUS network will remain healthy, but without the remote monitoring capability of the ComBricks.
- Multiple additional segments can be added easily, by adding in additional scope cards.

5.5.4. ComBricks replacement for Siemens Diagnostic Repeater - OLM - DP Network - DP1, DP2 and DP3

Before

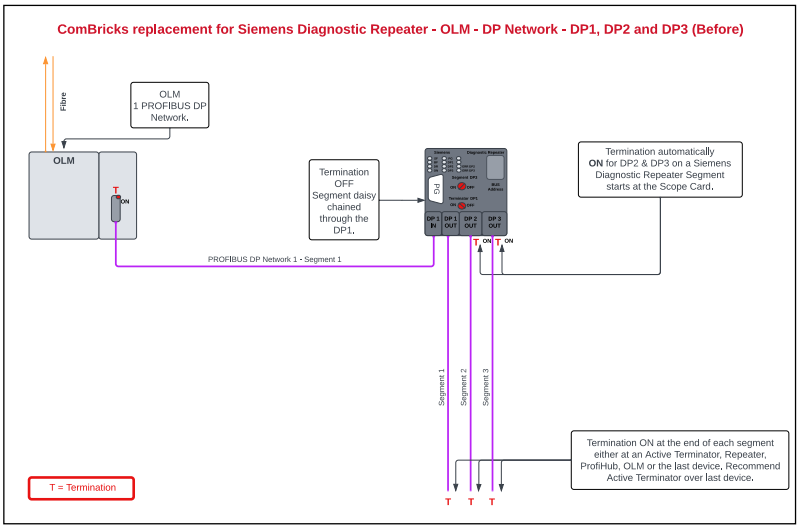


Figure 23: ComBricks replacement for Siemens Diagnostic Repeater - OLM - DP Network - DP1, DP2 and DP3 (Before)

Description:

- The segment starts at the OLM.
- Termination is OFF on DP1, segment daisy chained through DP1 to segment 1.

- Termination automatically ON for DP2 and DP3 on the Diagnostic Repeater.
- Ensure termination is ON at the end of each segment.

After

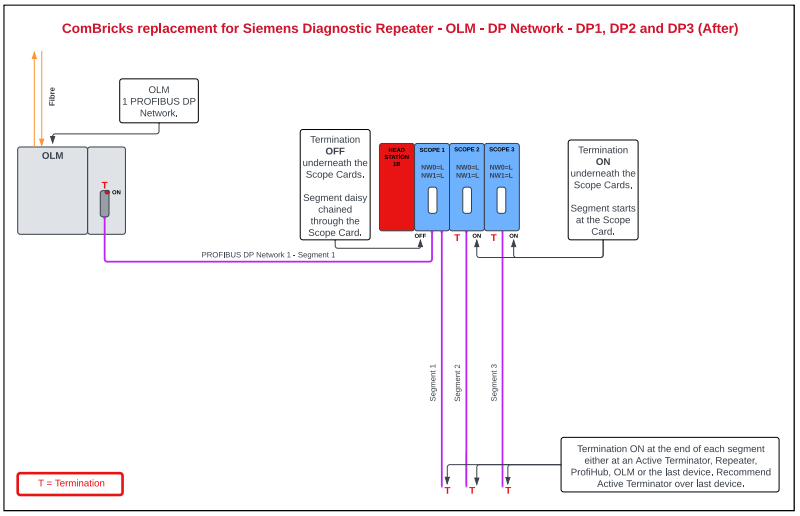


Figure 24: ComBricks replacement for Siemens Diagnostic Repeater - OLM - DP Network - DP1, DP2 and DP3 (After)

Description:

- The Diagnostic Repeater is replaced with a Head station and four scope cards.
- The segment starts at the OLM, and it is not daisy-chained through the first scope card.
- Segment DP 1 out is connected to the second scope card, termination is ON since this is the start of the segment.
- Segment DP 2 out is connected to the third scope card, termination is ON since this is the start of the segment.
- Segment DP 3 out is connected to the fourth scope card, termination is ON since this is the start of the segment.
- Ensure termination is ON at the end of each segment.

Advantages:

- Each segment is electrically isolated.
- Multiple additional segments can be added easily, by adding in additional scope cards.

5.6. ComBricks replacement for 2 Siemens DR OLM - 1 DP Network - DP1, DP2 and DP3

5.6.1. Installation before ComBricks

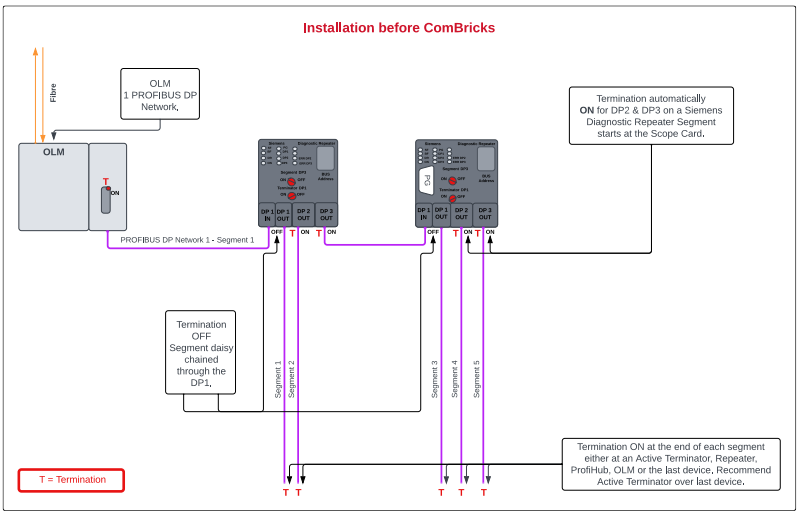


Figure 25: Installation before ComBricks

Description

- The segment starts at the OLM.
- Termination is OFF on DP1, segment daisy-chained through DP1 to segment 1.
- Termination automatically ON for DP2 and DP3 on the Diagnostic Repeater.
- DP3 is connected to the IN of DP1 on the second Diagnostic Repeater.
- Termination is OFF on DP1, segment daisy-chained through DP1 to segment 1 of the second Diagnostic Repeater.
- DP2 and DP3 of the second Diagnostic Repeater have segment 2 and segment 3, respectively.
- Ensure termination is ON at the end of each segment.

5.6.2. Installation after replacement of Diagnostic Repeaters

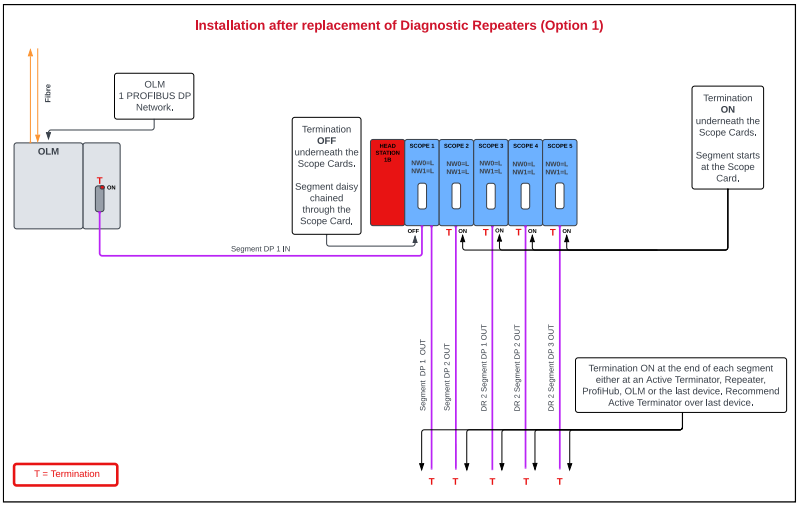


Figure 26: Installation after replacement of Diagnostic Repeaters (Option 1)

Description:

- The two Diagnostic Repeaters are replaced with one Head station and five scope cards.
- The segment starts at the OLM and is daisy-chained through the first scope card, the daisy-chained segment being Segment 1 DP 1 Out.
- Termination of the scope card is OFF because the segment is daisy-chained through the scope

card.

- Segment DP 2 Out is connected to the second scope card, termination is ON since this is the start of the segment.
- DR 2 Segment DP 1 Out is connected to the third scope card, termination is ON since this is the start of the segment.
- DR 2 Segment DP 2 Out is connected to the fourth scope card, termination is ON since this is the start of the segment.
- DR 2 Segment DP 3 Out is connected to the fifth scope card, termination is ON since this is the start of the segment.
- Ensure termination is ON at the end of each segment.

Advantage:

- The entire system is encapsulated in a single unit.
- Fewer scope cards are used, as the controller shares a segment with the first channel output.

5.6.3. Installation after replacement of Diagnostic Repeaters

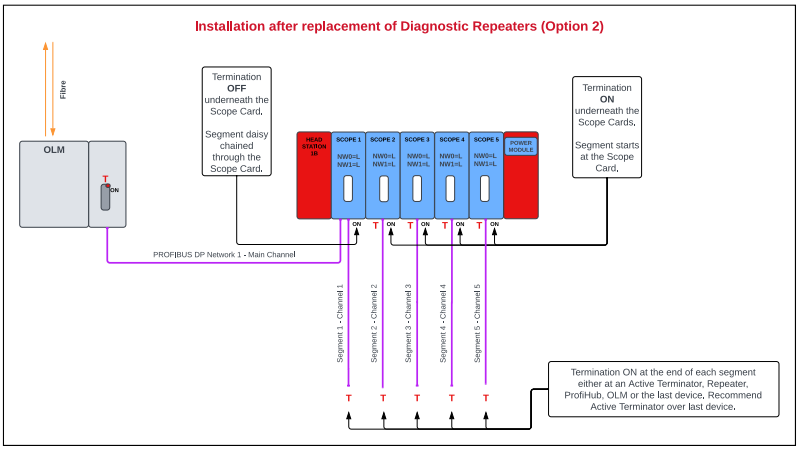


Figure 27: Installation after replacement of Diagnostic Repeaters (Option 2)

Description:

- The two Diagnostic Repeaters are replaced with one Head Station, six scope cards and a power module.
- The Segment starts at the OLM, and is connected to the first scope card, termination is ON both at OLM and scope since this is a segment.
- Segment DP 1 Out is connected to the second scope card, termination is ON since this is the start of the segment.
- Segment DP 2 Out is connected to the third scope card, termination is ON since this is the start of the segment.
- DR 2 Segment DP 1 Out is connected to the fourth scope card, termination is ON since this is the start of the segment.
- DR 2 Segment DP 2 Out is connected to the fifth scope card, termination is ON since this is the start of the segment.
- DR 2 Segment DP 3 Out is connected to the sixth scope card, termination is ON since this is the start of the segment.
- Far-right, there is a power module, the power module is required when using more than five scope cards but less than ten scope cards.
- Ensure termination is ON at the end of each segment.

Advantage:

- Isolates each segment, including the OLM segment on the main channel. This will improve network robustness.

6. Configuring ComBricks for optimal performance

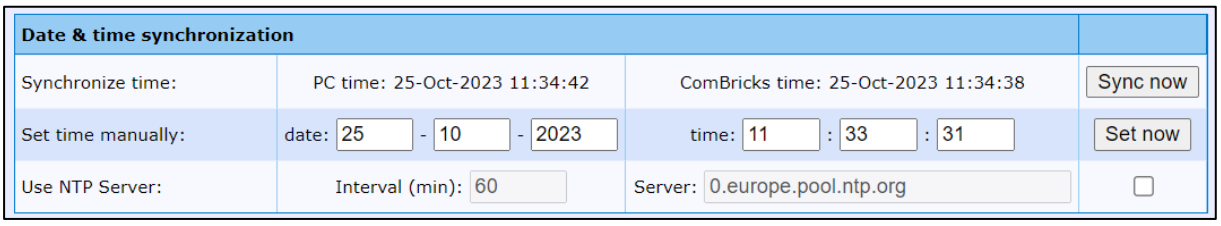
6.1. Access the ComBricks Head Station

- You can access the ComBricks Head Station either remotely via its IP address or locally by connecting a LAN cable to the Ethernet port at the top of the unit. Remote access using the IP address is the preferred method.
- After gaining access to the Head Station, navigate to the left-hand menu, scroll to the bottom, and find the 'Configuration' section.

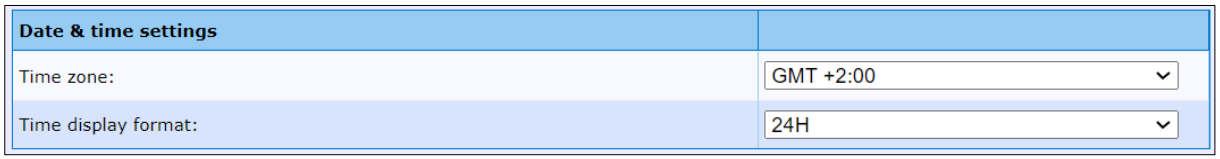
6.2. Set the date, time, site details and language

- Next, select the 'General' option from the menu.

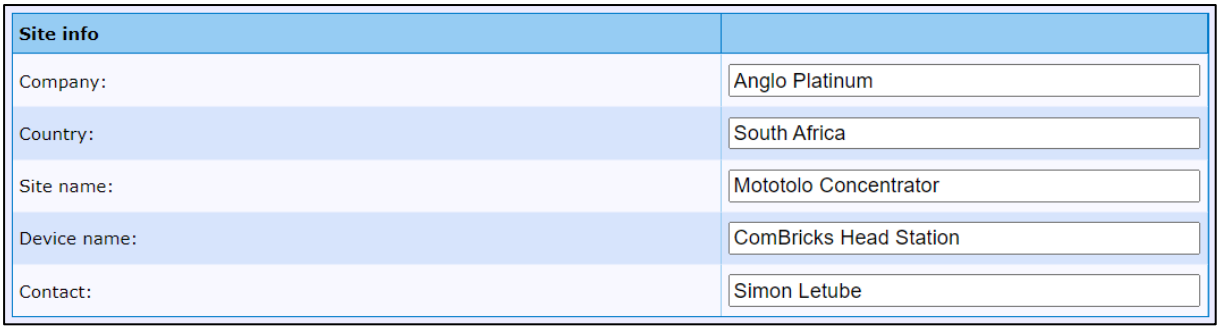
- In the 'General' section, you will need to configure several key settings, starting with the time. You can set the time by syncing the Head Station with your PC or laptop, manually entering the time, or using an NTP Server. For optimal network-wide synchronisation, it is recommended to use an NTP Server whenever possible.



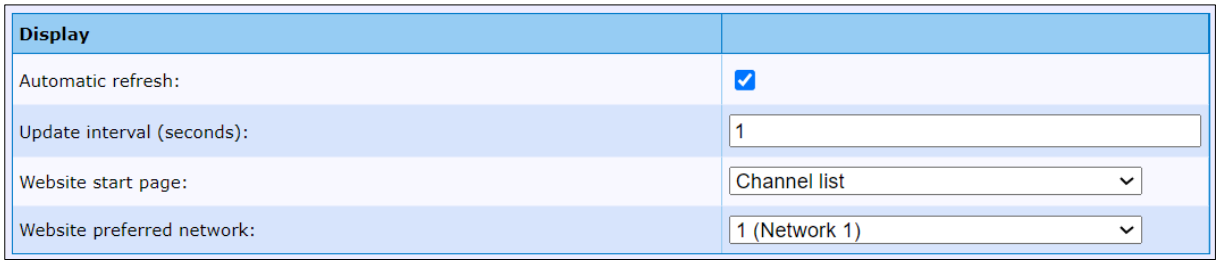
- After setting the time, configure the time zone and time format. South Africa uses the GMT +2 time zone and typically follows a 24-hour time format.



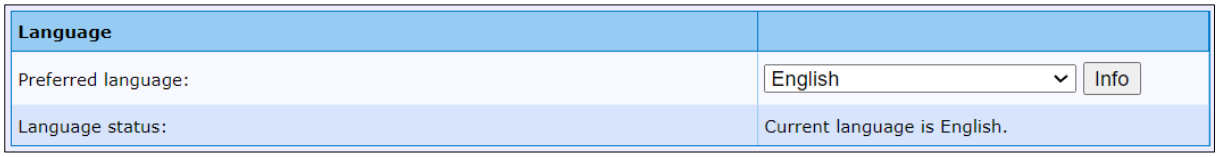
- Next, enter the site's information, including key details such as the company name, country of operation, site name, device name, and site contact.



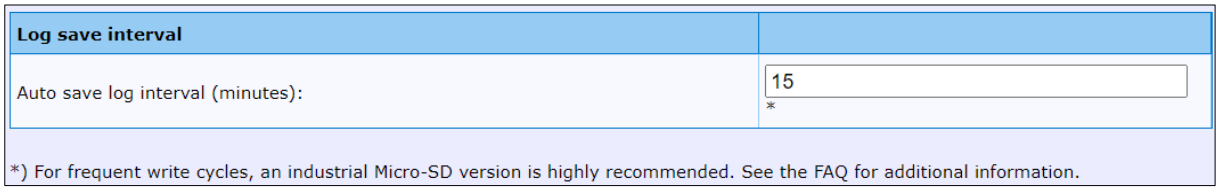
- Next, update the display settings. The start page determines the initial page displayed when accessing the ComBricks device. If your Head Station monitors multiple networks, you can also select which network appears first. The default settings are suitable for most operations, but adjustments can be made as needed.



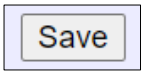
- Select your preferred language (English is currently the only applicable option):



- Next, set the 'Auto Save Log Interval,' which controls how frequently the 'Network Event Log' is updated. The standard interval is 15 minutes, but it is recommended to use a MicroSD card in the Head Station if you wish to extend this interval.

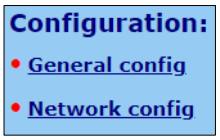


- After completing the steps above, make sure to save your settings by clicking the save option at the bottom left-hand side of the page.

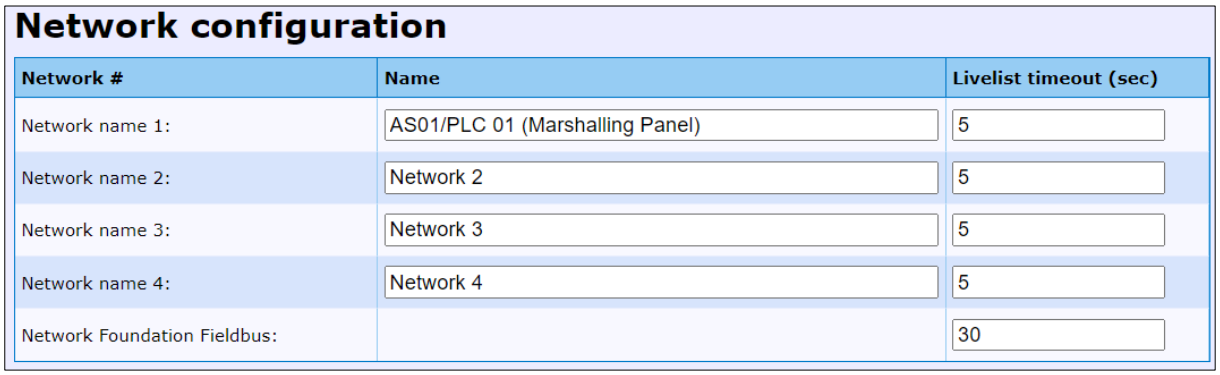


6.3. Network configuration

- Next, in the left-hand menu under 'Configuration,' go to 'Networks.'



- In the first table, if you are using a Head Station Type 1C, you can name all four networks. Otherwise, you will use 'Network Name 1,' where you can rename the network as needed.

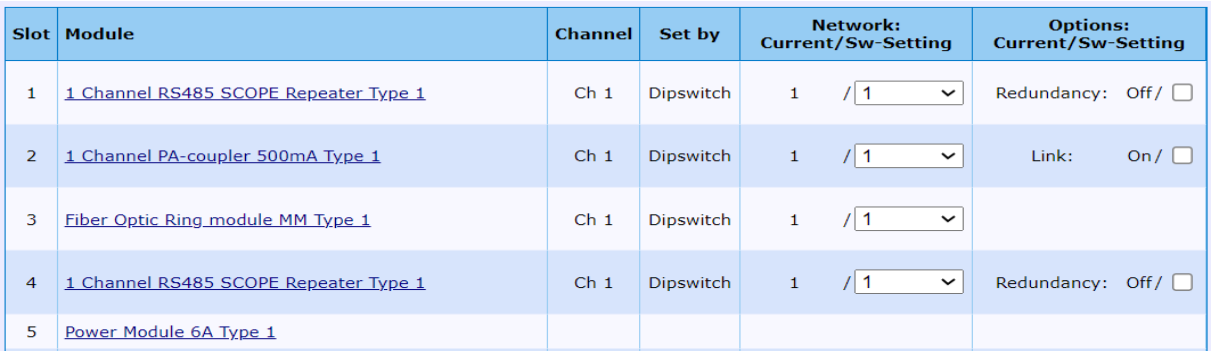


Network configuration

Network #	Name	Livelist timeout (sec)
Network name 1:	AS01/PLC 01 (Marshalling Panel)	5
Network name 2:	Network 2	5
Network name 3:	Network 3	5
Network name 4:	Network 4	5
Network Foundation Fieldbus:		30

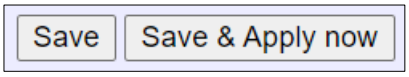
- No changes are required in the next table unless you have multiple networks routed through a single Head Station or a 1C Head Station with multiple networks.

  Remember, you can connect up to ten high-speed ComBricks modules per Head Station.



Slot	Module	Channel	Set by	Network: Current/Sw-Setting	Options: Current/Sw-Setting
1	1 Channel RS485 SCOPE Repeater Type 1	Ch 1	Dipswitch	1 / 1	Redundancy: Off /
2	1 Channel PA-coupler 500mA Type 1	Ch 1	Dipswitch	1 / 1	Link: On /
3	Fiber Optic Ring module MM Type 1	Ch 1	Dipswitch	1 / 1	
4	1 Channel RS485 SCOPE Repeater Type 1	Ch 1	Dipswitch	1 / 1	Redundancy: Off /
5	Power Module 6A Type 1				

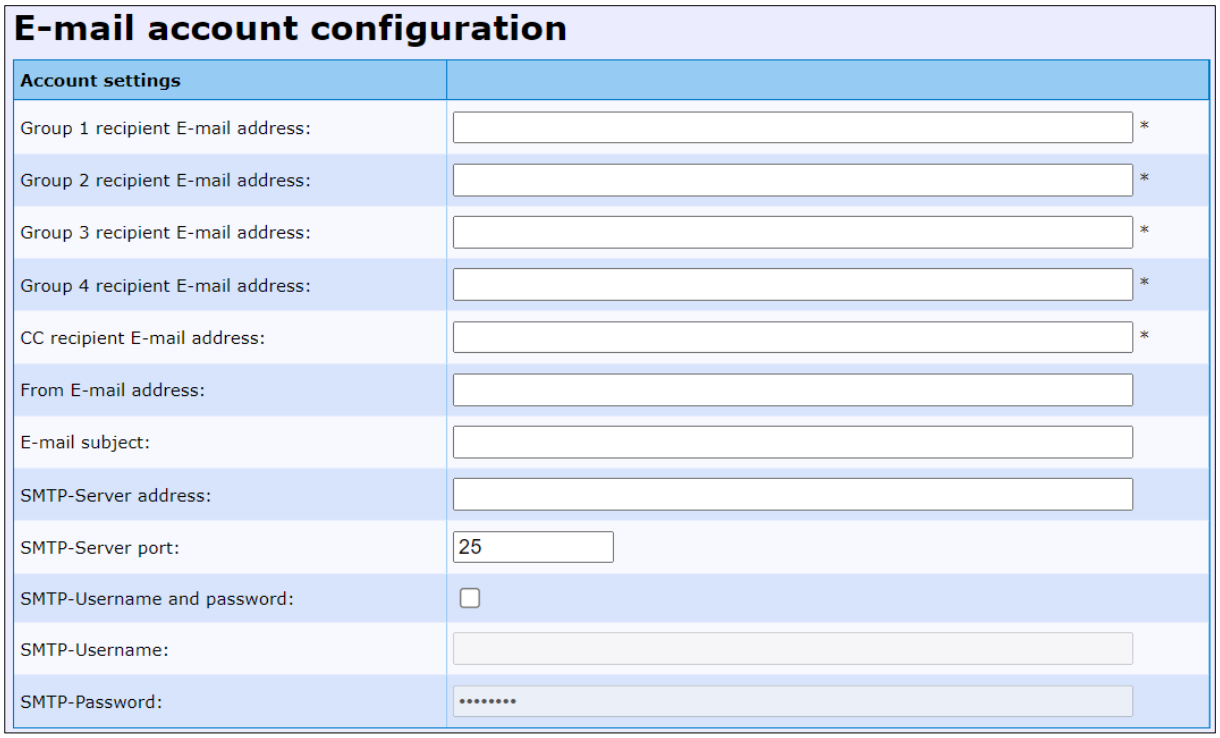
- After completing all the steps above, be sure to save your settings by clicking the save option at the bottom left-hand side of the page.



6.4. Set up the email account

- Next, IDX recommends configuring the email account. Click on 'E-mail account config' to proceed. This is an optional but useful feature of the ComBricks solution, allowing you to define the email accounts that will be notified if an issue arises within your network.

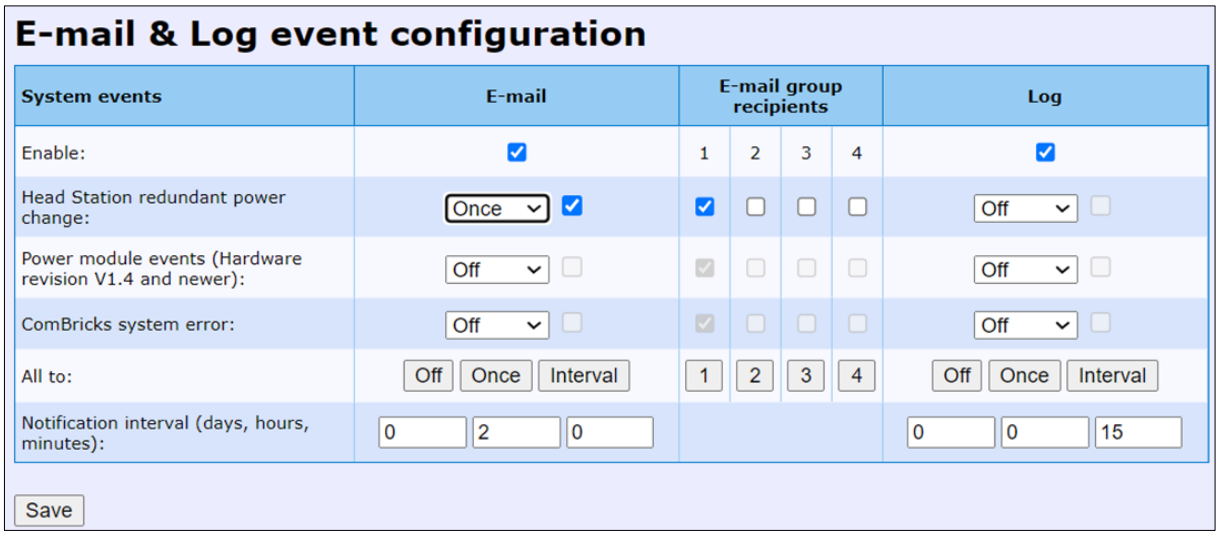
- As shown in the image below, groups 1 to 4 and the 'CC Recipient' are the email addresses that will be notified when an issue occurs. You will need to enter the SMTP server details for the email sender.



- Groups can contain up to three email addresses separated by a semicolon or a comma:

- It is recommended to create and use email groups instead of individual user email addresses. This allows you to contact more than three people at once. Under 'ProfiTrace OE (Over Ethernet)' is the 'Email & Log Event Config' section.

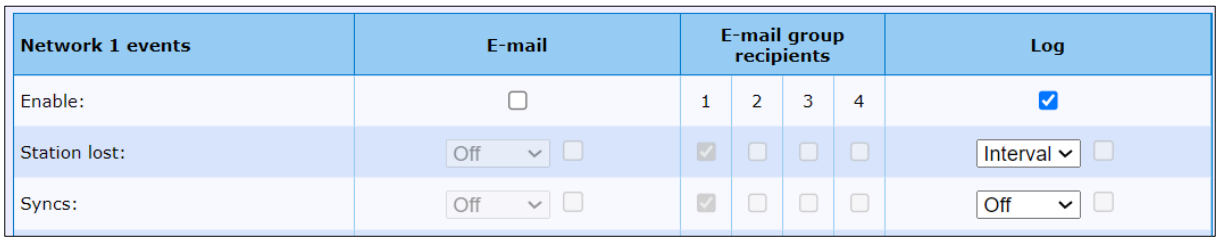
- Here, you will define the conditions that trigger the SMTP server to send an email to the relevant personnel or group responsible for PROFIBUS or network uptime in your organisation.



- The 'System Events' column specifies the reasons you receive an email.
- The 'Email' column determines how often an email is sent for that specific event (never, once, or at

specific intervals).

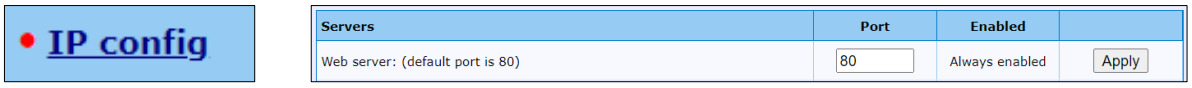
- The ‘Log’ column indicates whether the event is added to the ‘Network Event Log,’ which tracks historical events. You can define when this event is logged (never, once, or at specific intervals).
- ‘Email Group Recipients’ is where you define the groups that will receive the emails. As mentioned earlier, these groups are set up in the ‘Email Account Config’ section.
- If you select ‘interval’ as the option, you can specify how frequently the event triggers the interval in the last row.
- The same applies to ‘Alarms’ under ‘Configuration’. Here, you can define which group is emailed for specific network events, such as illegal messages, repeats, baud rate changes, etc.



- There is a separate alarm table for each network (networks 1-to-4) depending on the type of head station you’re using.

6.5. Note regarding the Atlas setup

Regarding the Atlas setup, ensure that the web server port is set to 80. This setting can be found under the IP configuration.



6.6. Setting tag names

Under ‘Tag names’, define tag names for each ComBricks module or device on your PROFIBUS network.

7. Conclusion

This document provides a guide for deploying Anybus ComBricks across various network configurations, ensuring seamless integration with critical network components like PLCs, OLMs, and repeaters. It outlines the necessary steps for high-level and scope-level monitoring and the replacement of traditional network components with ComBricks, facilitating smoother transitions to advanced network solutions.

By following the instructions and scenarios provided in this guide, users can ensure efficient setup, troubleshooting, and optimisation, improving the reliability and efficiency of their network operations. The flexibility of the ComBricks system, with its scalable solution and user-friendly interface, makes it an essential tool for industries seeking robust, high-performance communication networks.

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