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PLX51-PBM

PROFIBUS DPV0/DPV1 Master or Slave to EtherNet/IP™ or Modbus® Gateway

May 16, 2023

USER MANUAL

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PLX51-PBM User Manual
For Public Use.

May 16, 2023

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1 Preface

1.1 Introduction to the PLX51-PBM

This manual describes the installation, operation, and diagnostics of the ProSoft PLX51-PBM PROFIBUS DPV0/DPV1 Master/Slave module.

The PLX51-PBM allows the user to interface PROFIBUS DP to EtherNet/IP or Modbus (RTU232, RTU485, TCP/IP).

The PLX51-PBM can either operate as a PROFIBUS DPV0/DPV1 Master or multiple PROFIBUS DPV0/DPV1 Slaves. This will allow EtherNet/IP devices (e.g. Rockwell Logix platform) or Modbus devices to exchange process, alarming, and diagnostic data with PROFIBUS DP devices as well as provide parameterization and asset management of slave devices using Device Type Managers (DTMs).

Table 1.1 – Product Variations

Product	PROFIBUS DP Master	PROFIBUS DP Slave
PLX51-PBM	Yes	Yes

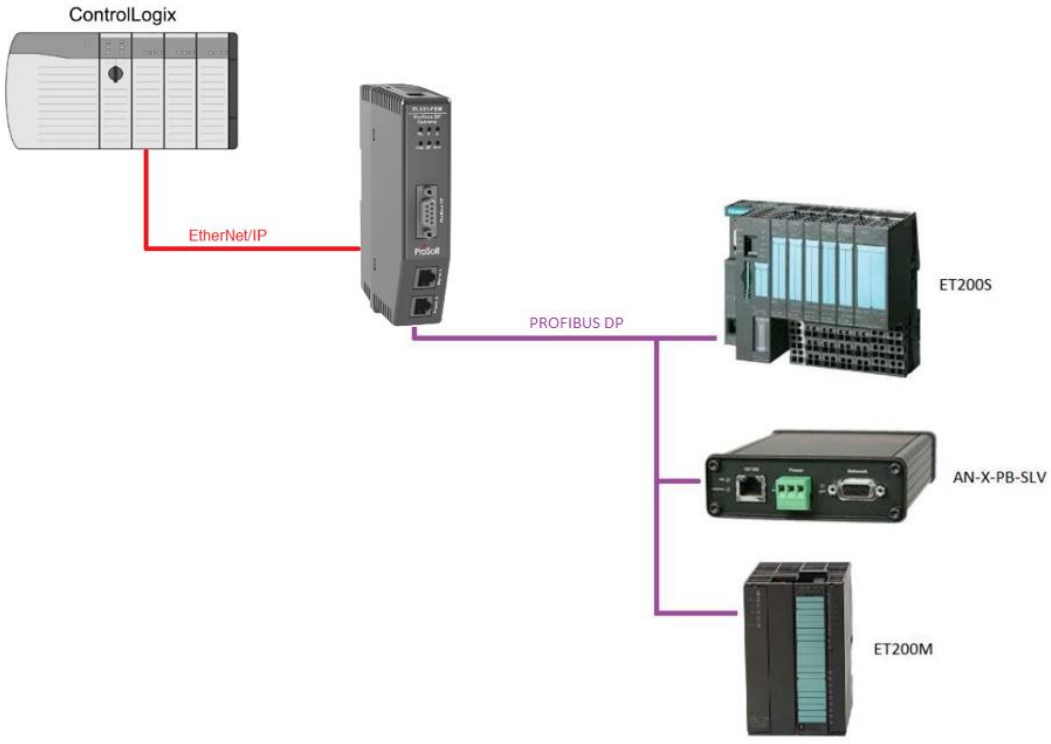


Figure 1.1 – PLX51-PBM typical PROFIBUS Master architecture

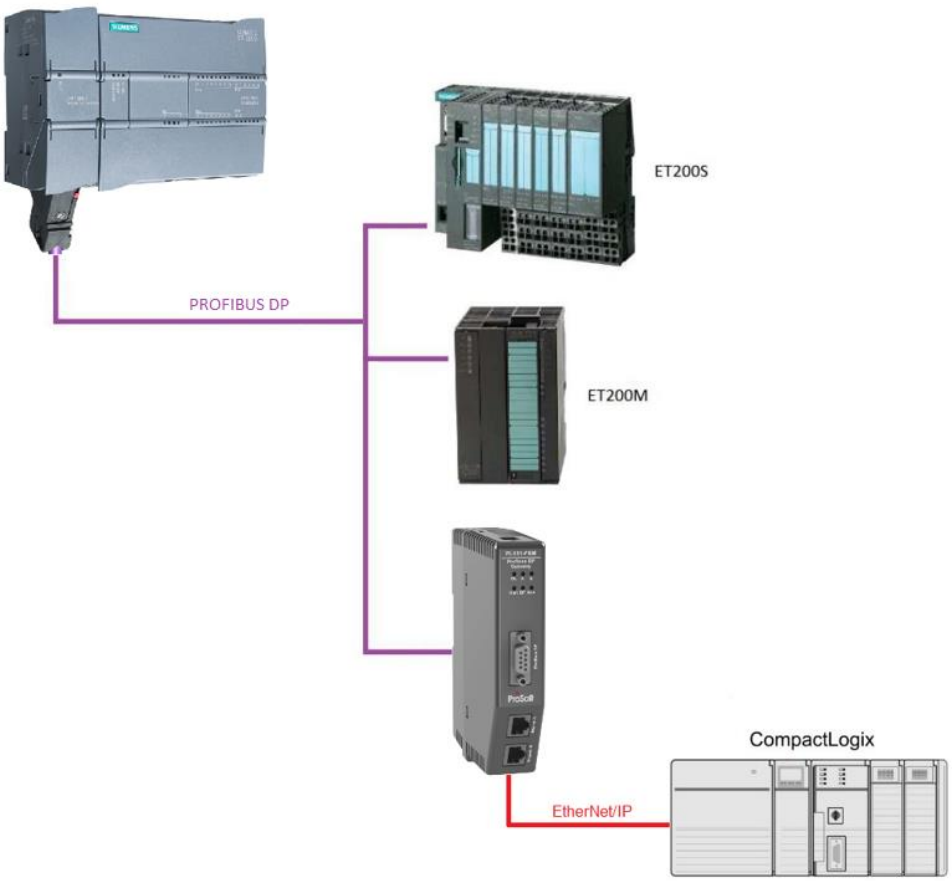


Figure 1.2 – PLX51-PBM typical PROFIBUS Slave architecture

1.2 Features

The PLX51-PBM will allow the user to interface PROFIBUS DPV0/DPV1 to either EtherNet/IP or Modbus.

The PLX51-PBM can be set to operate as either a PROFIBUS DP Master or Slave.

The PLX51-PBM, when configured as a Master can exchange up to 2 kilobytes of PROFIBUS device and status data (72 bytes are reserved for master status, and 8 bytes for each configured slave).

The PLX51-PBM has two Ethernet ports allowing the user to have either a Linear or Ring (Device Level Ring – DLR) Ethernet topology. The Ethernet ports can also be setup for port mirroring allowing for better fault analysis.

The PLX51-PBM can synchronize to an NTP Server allowing for automatic time synchronization. The PLX51-PBM also supports an onboard non-volatile event log for improved fault finding.

1.2.1 PROFIBUS Master

The PLX51-PBM can exchange process data (DPV0) with up to 125 PROFIBUS DP slave devices. The data is formatted into the engineering units for use in either a Logix platform or Modbus device by using the automatically generated mapping imports for Logix User Defined Data Types (UDTs) or padding for Modbus Registers. The latter ensures alignment with the 16-bit data structure.

The PLX51-PBM also provides DPV1 communication allowing the user to exchange DPV1 Class 1 and Class 2 data with each slave device. The PLX51-PBM Gateway DTM can be used to configure and parameterize each slave device using Device Type Manager (DTM) technology.

The PLX51-PBM will allow the user to monitor and extract DPV1 alarms from each slave device on the connected PROFIBUS DP fieldbus from either a Logix controller or Modbus Master device.

1.2.2 PROFIBUS Slave

The PLX51-PBM can also be configured to emulate up to 10 PROFIBUS slave devices. Each slave device emulated by the PLX51-PBM can be configured to provide DPV0 data exchange with a PROFIBUS Master on the network.

The data will be formatted into the engineering units for use in either a Logix platform or Modbus device by using the automatically generated mapping imports for Logix User Defined Data Types (UDTs) or padding for Modbus Registers. The latter ensures alignment with the 16-bit data structure.

Each emulated slave can also be configured to exchange DPV1 Class 1 data by mapping either Logix tags or Modbus registers for the relevant DPV1 data exchange. Each emulated slave will also be able to provide DPV1 alarming for the PROFIBUS Master.

The PLX51-PBM provides a range of statistics and tools to provide a detailed diagnostic overview of each PLX51-PBM which speeds-up fault finding. The Configuration Utility allows the user to perform a PROFIBUS DP packet capture of the running fieldbus which can be used to analyse the bus behaviour and packets received. The PLX51-PBM also provides global and device specific statistics.

1.3 Architecture

The figures below provide an example of the typical network setup for a PROFIBUS Master architecture using either an EtherNet/IP or Modbus Interface.

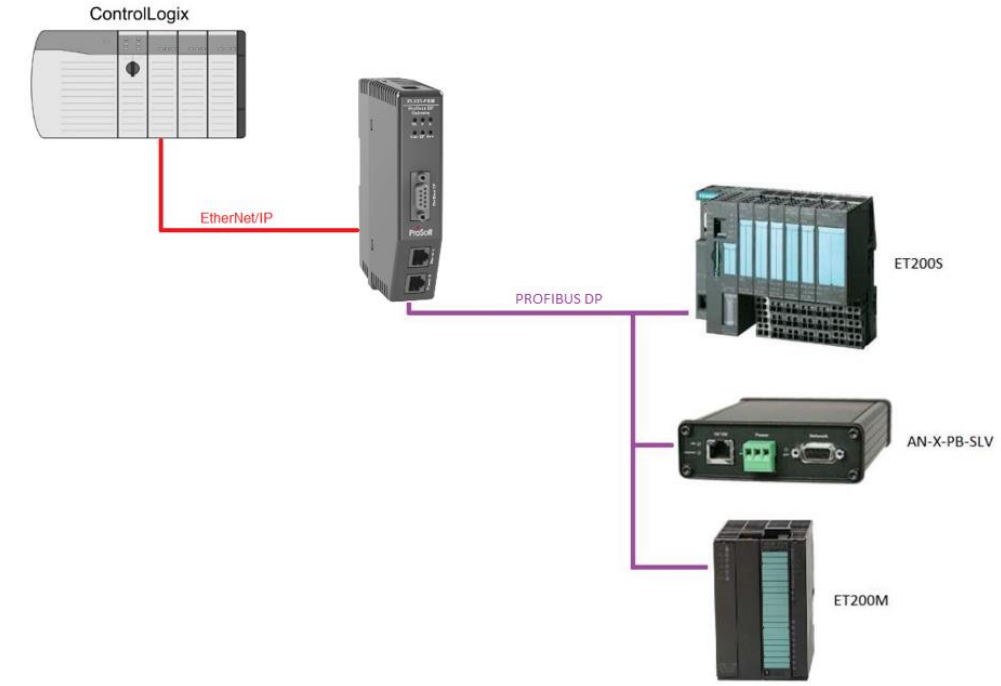


Figure 1.3 – PLX51-PBM PROFIBUS Master to EtherNet/IP architecture

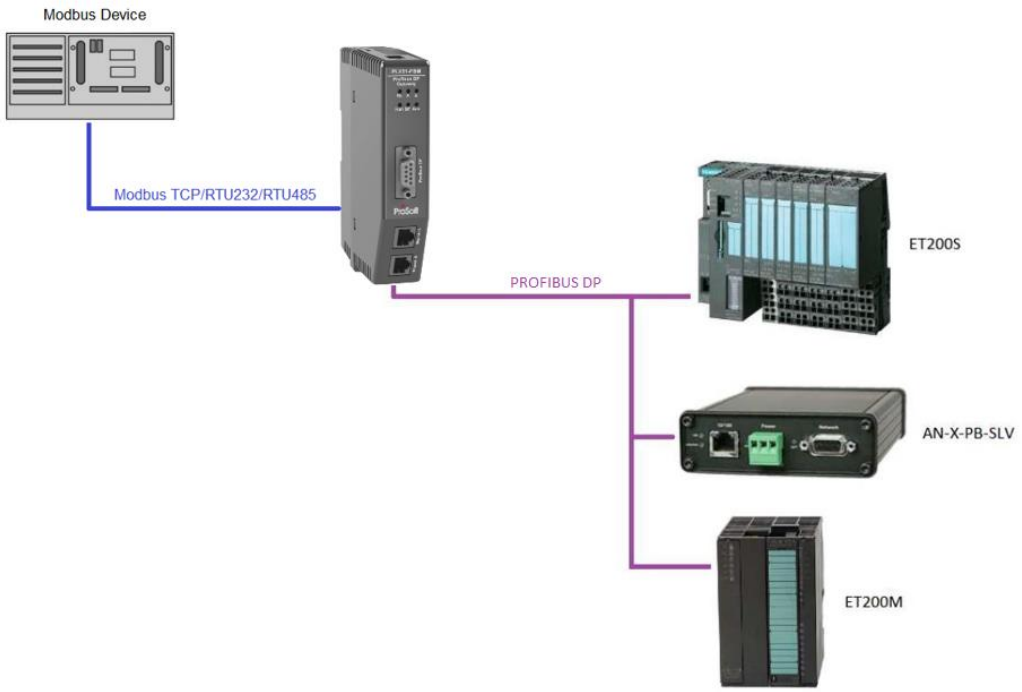


Figure 1.4 – PLX51-PBM PROFIBUS Master to Modbus (TCP/RTU232/RTU485) architecture

The following figures provide an example of the typical network setup for a PROFIBUS Slave(s) architecture using either an EtherNet/IP or Modbus Interface.

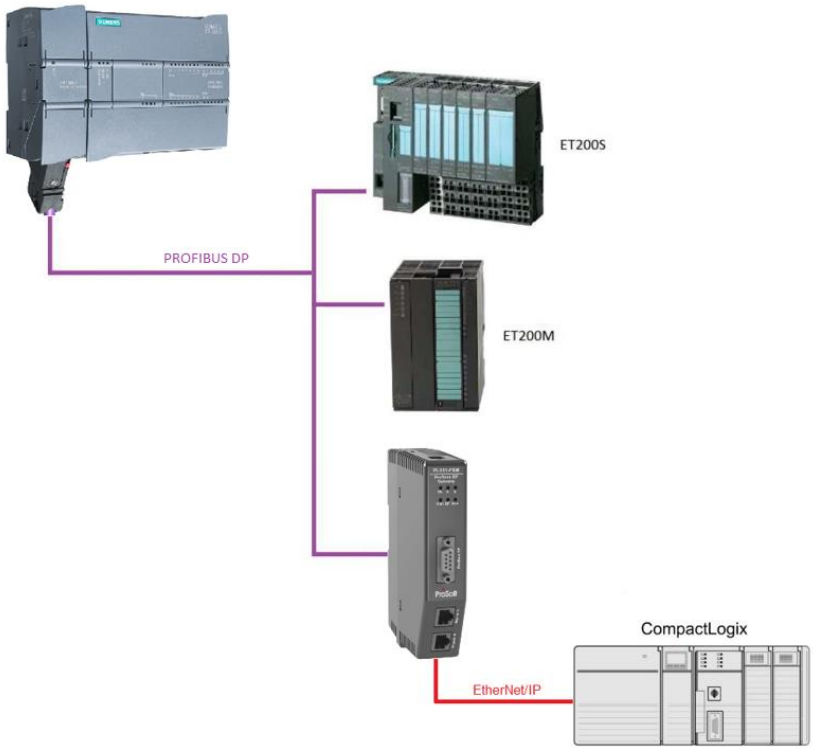


Figure 1.5 – PLX51-PBM PROFIBUS Slave to EtherNet/IP architecture

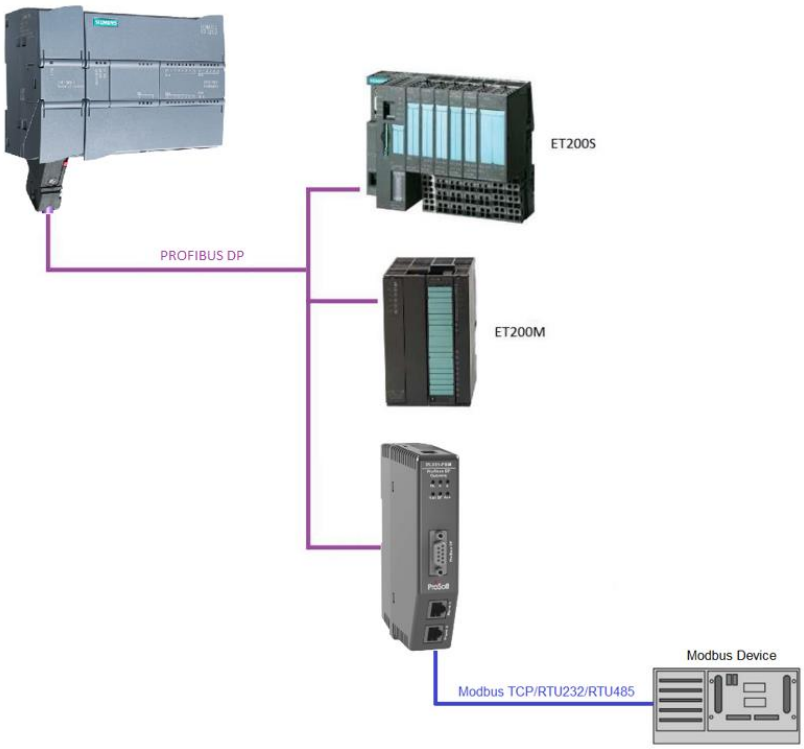


Figure 1.6 – PLX51-PBM PROFIBUS Slave to Modbus (TCP/IP/RTU232/RTU485) architecture

1.4 Additional Information

The following documents contain additional information that can assist the user with the module installation and operation.

Table 1.2 - Additional Information

Resource	Link
PLX50 Configuration Utility Installation	www.prosoft-technology.com
PLX51-PBM User Manual PLX51-PBM Datasheet	www.prosoft-technology.com

1.5 Support

Technical support is provided via the Web (in the form of user manuals, FAQ, datasheets etc.) to assist with installation, operation, and diagnostics.

For additional support the user can use either of the following:

Table 1.3 – Support Details

Resource	Link
Contact us web link	www.prosoft-technology.com
Support email	support@prosoft-technology.com

2 Installation

2.1 Module Layout

The PLX51-PBM has one RS485 PROFIBUS DP port as well as two Ethernet ports at the front of the module. The Ethernet cable must be wired according to industry standards which can be found in the additional information section of this document.

The module provides six diagnostic LEDs as shown in the front view figure below. These LEDs are used to provide information regarding the module system operation, the Ethernet interface, the auxiliary communication interface (RS232/RS485), and the PROFIBUS network status.

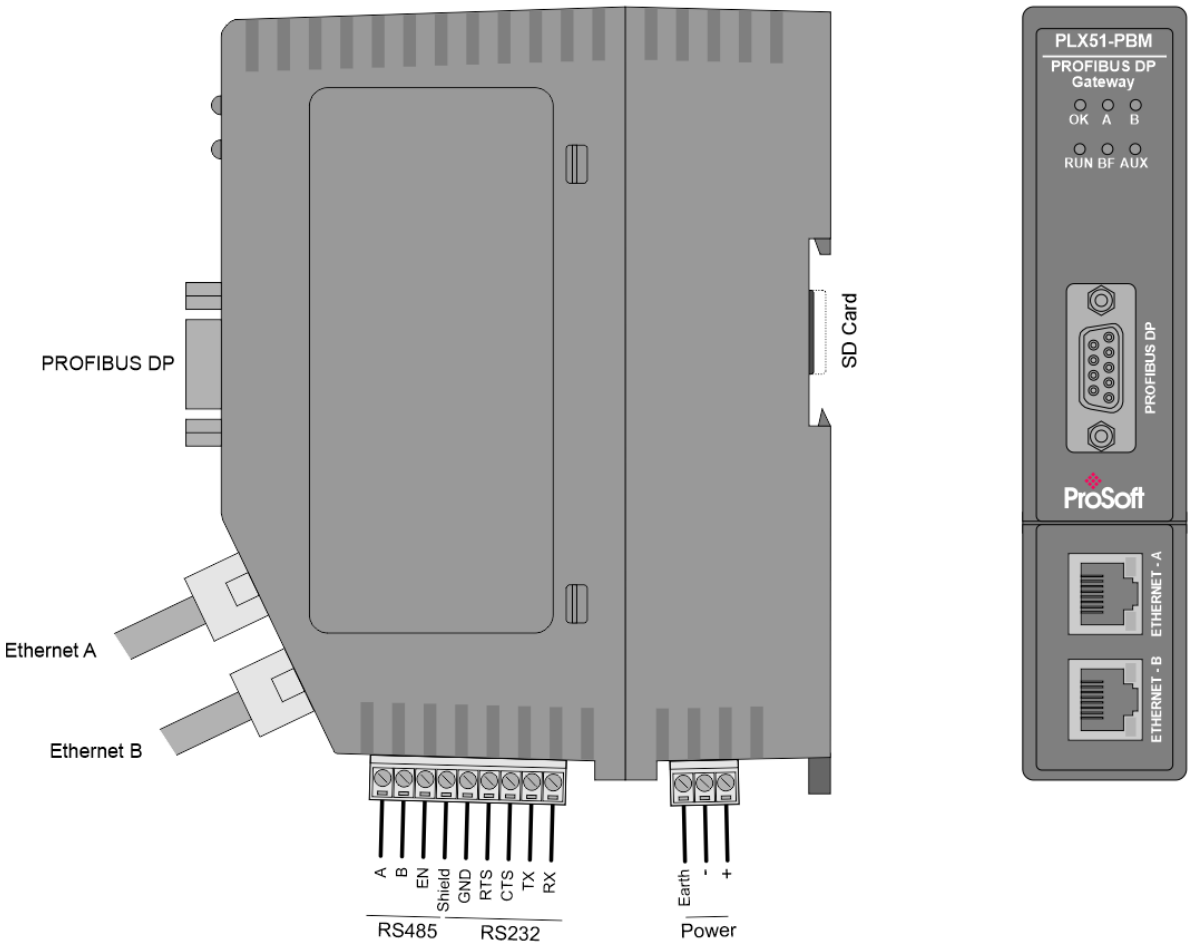


Figure 2.1 – PLX51-PBM Front and Side view

At the bottom of the PLX51-PBM module, there is one 3-way power connector and one 9-way communications connector (the communications connector will be used for RS232 and RS485 when communicating to Modbus RTU devices).

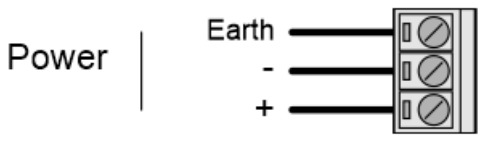


Figure 2.2 – PLX51-PBM Power connector

The PLX51-PBM has an input voltage range of 10-36Vdc that needs to be applied to the module via the power connector. The power connector also provides an Earth connection for the PLX51-PBM.

IMPORTANT: It is recommended to always have a good clean earth connected to the module via the Earth connector on the power connector.

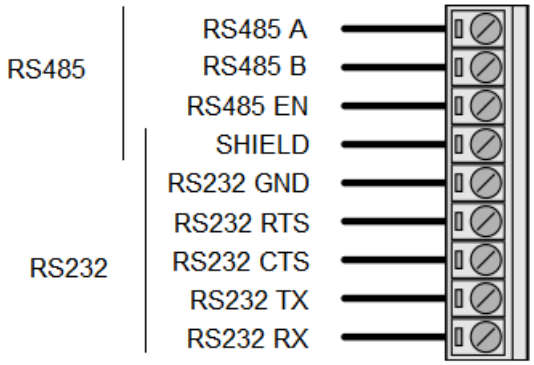


Figure 2.3 – PLX51-PBM Auxiliary communications connector

The RS485 port provides the standard A and B conductors as well as a RS485 drive enable. The (EN) transmit drive enable is provided to allow the PLX51-PBM to be used with repeaters and radios that may require a transmit enable line. Note that the EN line is referenced to RS232 GND when an RS485 mode is selected.

The RS232 port provides the standard communication conductors (RX, TX, and GND) as well as hardware handshaking lines for legacy systems (RTS – Request to Send, CTS – Clear to Send).

Both RS232 and RS485 share a common cable shield connection which should be connected to the shield of the outgoing cable (RS232 and/or RS485).

At the back of the module, there is slot for a SD memory card. The module provides four DIP switches at the top of the enclosure as shown in the top view figure below.

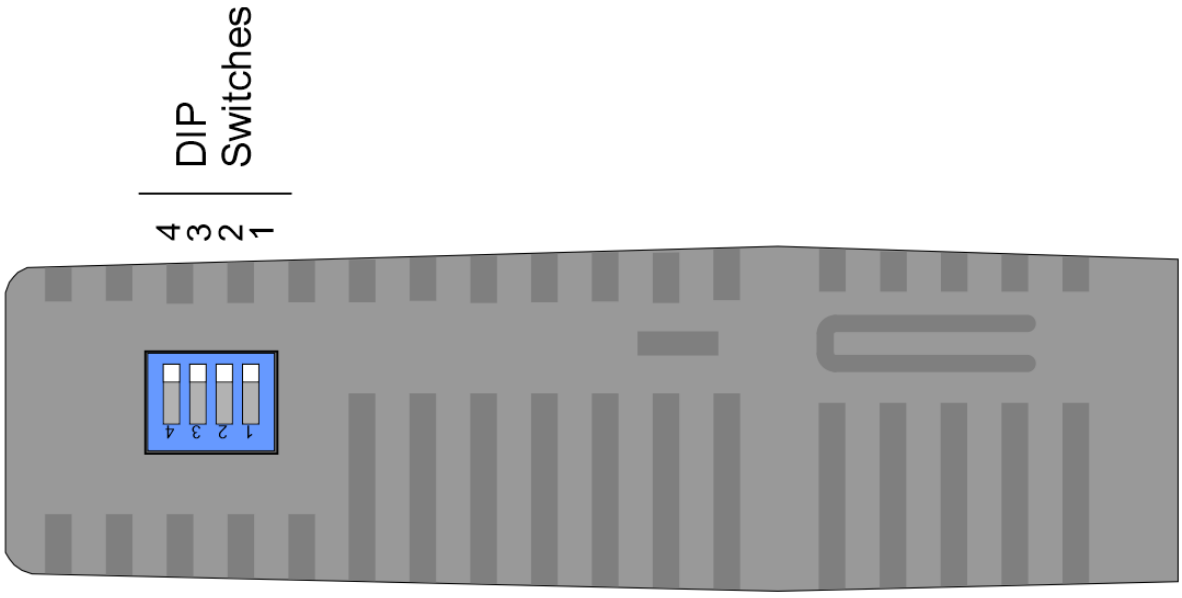


Figure 2.4 – PLX51-PBM Top view

Table 2.1. - DIP Switch Settings

DIP Switch	Description
DIP 1	Used to force the module into “Safe Mode”. When in “Safe Mode” the module will not load the application firmware and will wait for new firmware to be downloaded. This should only be used in the rare occasion when a firmware update was interrupted at a critical stage.
DIP 2	This will force the module into DHCP mode which is useful when the user has forgotten the IP address of the module.
DIP 3	This DIP Switch is used to lock the configuration from being overwritten by the PLX50 Configuration Utility. When set the PLX50 Configuration Utility will not be able to download to the PLX51-PBM module.
DIP 4	When this DIP Switch is set at bootup it will force the module Ethernet IP address to 192.168.1.100 and network mask 255.255.255.0. The user can then switch the DIP switch off and assign the module a static IP address if needed.

2.2 Module Mounting

The module provides a DIN rail clip to mount onto a 35mm DIN rail.

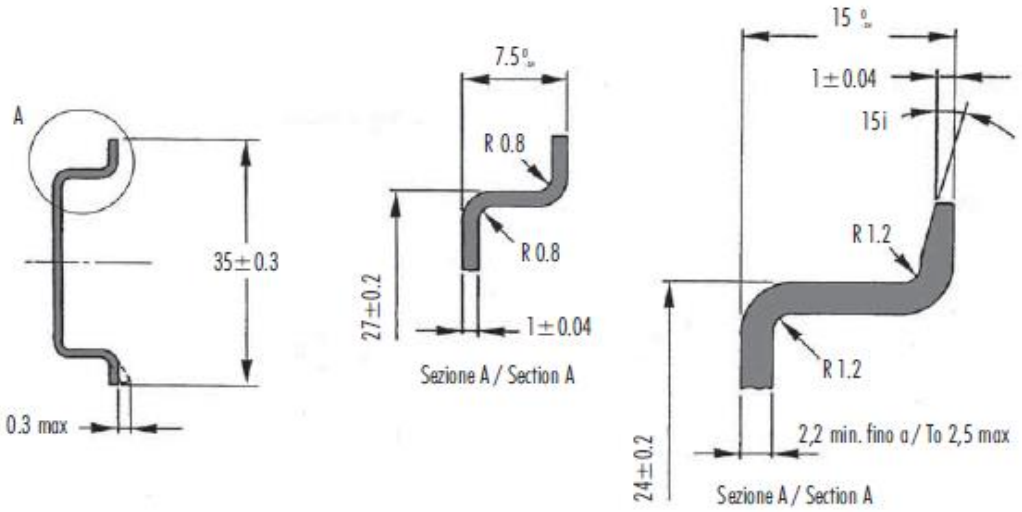


Figure 2.5 - DIN rail specification

The DIN rail clip is mounted on the bottom of the module at the back as shown in the figure below. Use a flat screw driver to pull the clip downward. This will enable the user to mount the module onto the DIN rail. Once the module is mounted onto the DIN rail the clip must be pushed upwards to lock the module onto the DIN rail.

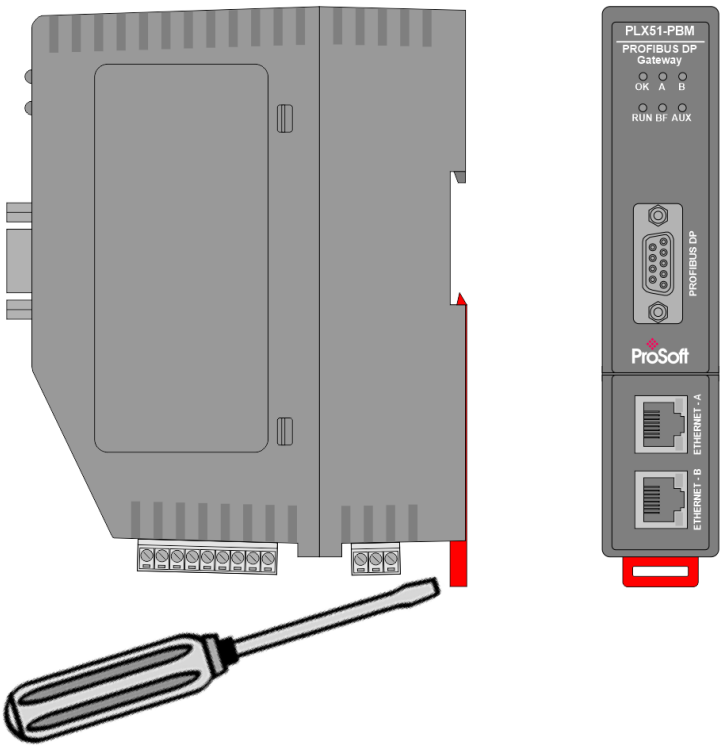


Figure 2.6 - DIN rail mouting

2.3 PROFIBUS DP Port (RS485)

The PROFIBUS DP port uses a female DB9 connector. This provides connection for the communication conductors, cable shielding and +5Vdc output power.

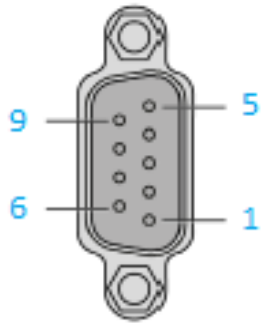


Figure 2.7 – PLX51-PBM PROFIBUS DP (RS485) DB9 connector

Table 2.2 – DB 9 Connector layout

Pin	Signal	Description
1	-	Not connected
2	-	Not connected
3	RxD/TxD-P	Data received and transmit (+)
4	CNTR-P	Control signal to repeater (+)
5	DGND	Reference potential for +5Vdc
6	VP	+5Vdc for terminating resistors (active termination)
7	-	Not connected
8	RxD/TxD-N	Data received and transmit (-)
9	-	Not connected

3 Setup

3.1 Install Configuration Software

All the network setup and configuration of the module is achieved by means of the ProSoft PLX50 Configuration Utility. This software can be downloaded from:

www.prosoft-technology.com.

Figure 3.1. - ProSoft PLX50 Configuration Utility Environment

3.2 Network Parameters

The module will have DHCP (Dynamic Host Configuration Protocol) enabled as factory default. Thus, a DHCP server must be used to provide the module with the required network parameters (IP address, subnet mask, etc.). There are a number of DHCP utilities available, however it is recommended that the DHCP server in the PLX50 Configuration Utility be used.

Within the PLX50 Configuration Utility environment, the DHCP server can be found under the Tools menu.

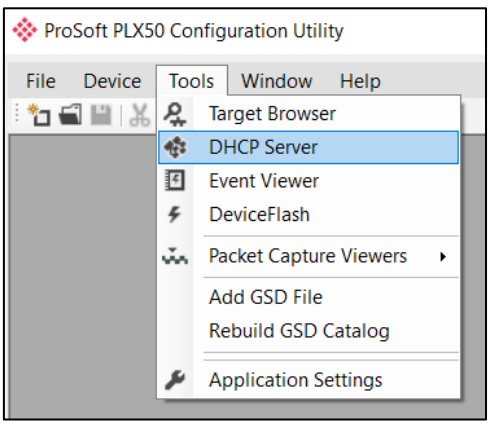


Figure 3.2. - Selecting DHCP Server

Once opened, the DHCP server will listen on all available network adapters for DHCP requests and display their corresponding MAC addresses.

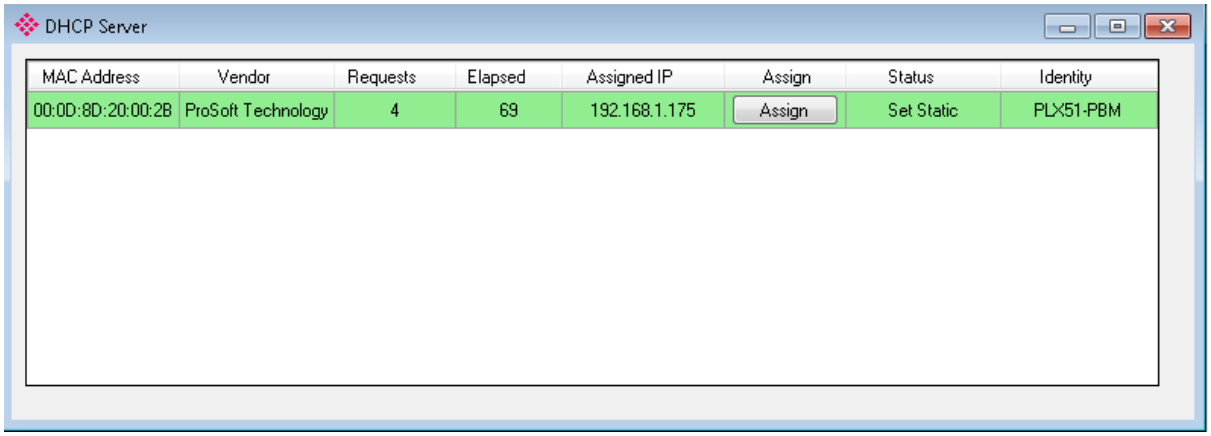


Figure 3.3. - DHCP Server

NOTE: If the DHCP requests are not displayed in the DHCP Server it may be due to the local PC's firewall. During installation the necessary firewall rules are automatically created for the Windows firewall. Another possibility is that another DHCP Server is operational on the network and it has assigned the IP address.

To assign an IP address, click on the corresponding "Assign" button. The IP Address Assignment window will open.

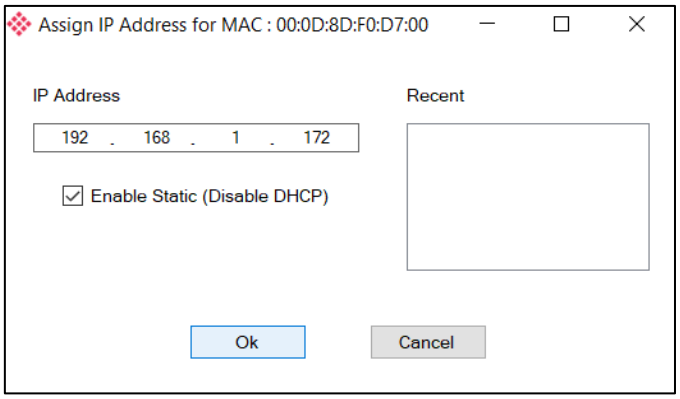


Figure 3.4. - Assigning IP Address

The required IP address can then be either entered, or a recently used IP address can be selected by clicking on an item in the Recent List.

If the "Enable Static" checkbox is checked, then the IP address will be set to static after the IP assignment, thereby disabling future DHCP requests.

Once the IP address window has been accepted, the DHCP server will automatically assign the IP address to the module and then read the Identity object Product name from the device.

The successful assignment of the IP address by the device is indicated by the green background of the associated row.

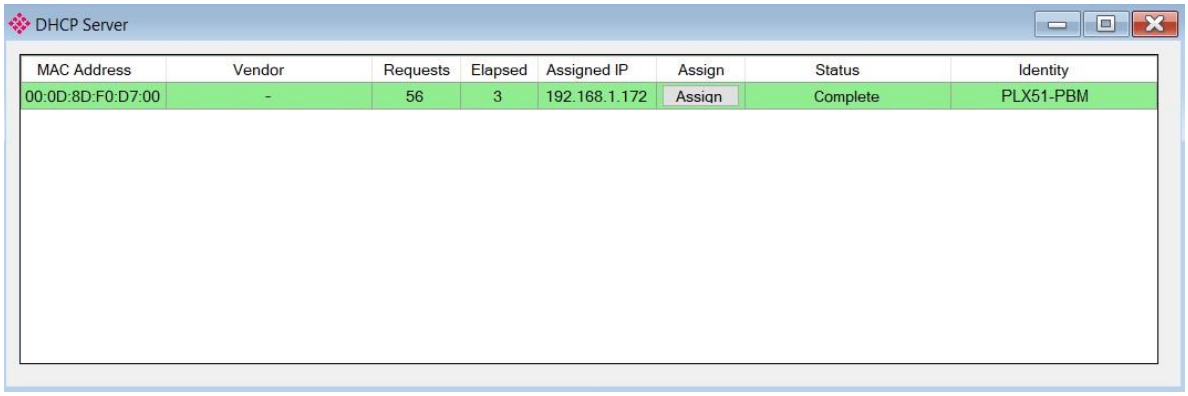


Figure 3.5. - Successful IP address assignment

It is possible to force the module back into DHCP mode by powering up the device with DIP switch 2 set to the On position.

A new IP address can then be assigned by repeating the previous steps.

IMPORTANT: It is important to return DIP switch 2 back to Off position, to avoid the module returning to a DHCP mode after the power is cycled again.

In addition to the setting the IP address, a number of other network parameters can be set during the DHCP process. These settings can be viewed and edited in the PLX50 Configuration Utility Application Settings, in the DHCP Server tab.

Once the DHCP process has been completed, the network settings can be set using the Ethernet Port Configuration via the Target Browser.

The Target Browser can be accessed under the Tools menu.

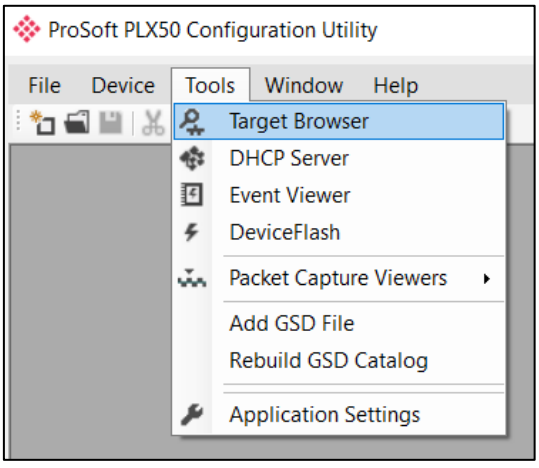


Figure 3.6. - Selecting the Target Browser

The Target Browser automatically scans the Ethernet network for EtherNet/IP devices.

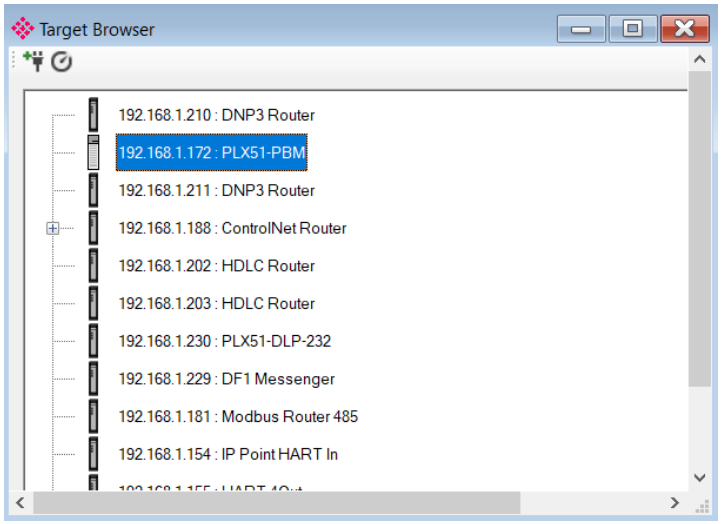


Figure 3.7. - Target Browser

Right-clicking on a device, reveals the context menu, including the Port Configuration option.

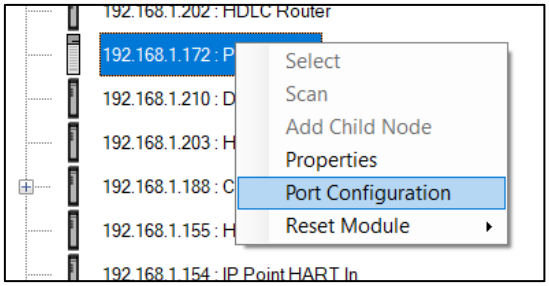


Figure 3.8. - Selecting Port Configuration

All the relevant Ethernet port configuration parameters can be modified using the Port Configuration window.

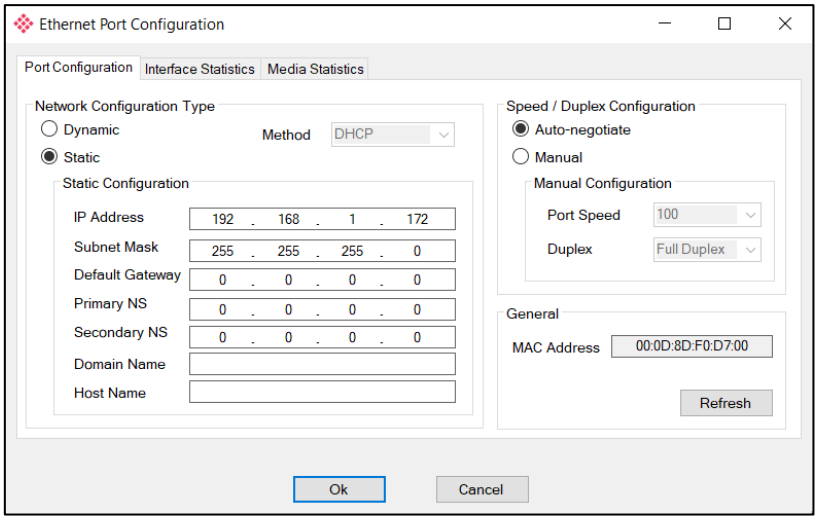


Figure 3.9. - Port Configuration

Alternatively, these parameters can be modified using Rockwell Automation's RSLinx software.

3.3 GSD File Management

Each PROFIBUS device has a GSD file that is required to provide information needed to configure the device for data exchange. The PLX50 Configuration Utility manages the GSD library which is used for adding devices to the PLX51-PBM.

The GSD File Management Tool is opened by selecting *GSD File Management* under the Tool menu in the configuration utility.

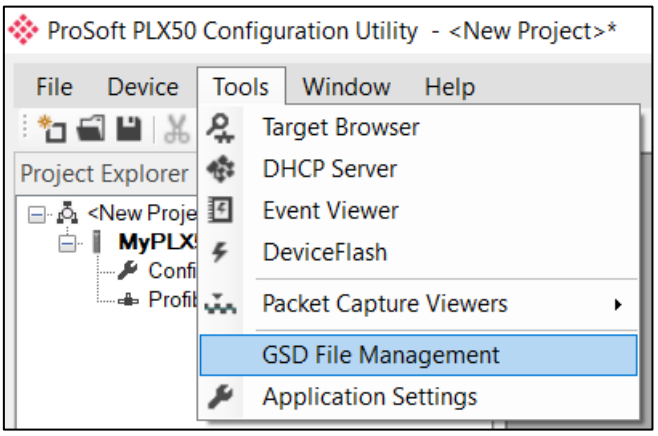
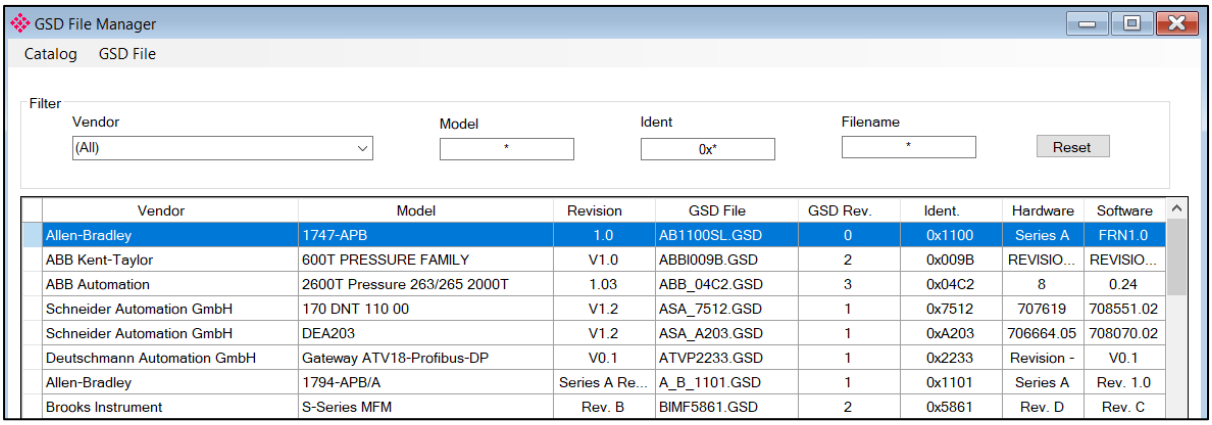


Figure 3.10 – Launching the GSD File Management Tool

Once the tool has been opened, a list of registered slave devices (using their GSD files) will appear.



Vendor	Model	Revision	GSD File	GSD Rev.	Ident.	Hardware	Software
Allen-Bradley	1747-APB	1.0	AB1100SL.GSD	0	0x1100	Series A	FRN1.0
ABB Kent-Taylor	600T PRESSURE FAMILY	V1.0	ABBI009B.GSD	2	0x009B	REVISIO...	REVISIO...
ABB Automation	2600T Pressure 263/265 2000T	1.03	ABB_04C2.GSD	3	0x04C2	8	0.24
Schneider Automation GmbH	170 DNT 110 00	V1.2	ASA_7512.GSD	1	0x7512	707619	708551.02
Schneider Automation GmbH	DEA203	V1.2	ASA_A203.GSD	1	0xA203	706664.05	708070.02
Deutschmann Automation GmbH	Gateway ATV18-Profibus-DP	V0.1	ATVP2233.GSD	1	0x2233	Revision -	V0.1
Allen-Bradley	1794-APB/A	Series A Re...	A_B_1101.GSD	1	0x1101	Series A	Rev. 1.0
Brooks Instrument	S-Series MFM	Rev. B	BIMF5861.GSD	2	0x5861	Rev. D	Rev. C

Figure 3.11 – GSD File Management Tool

To add a GSD file, the user will need to select the *Add* option under the GSD File menu.

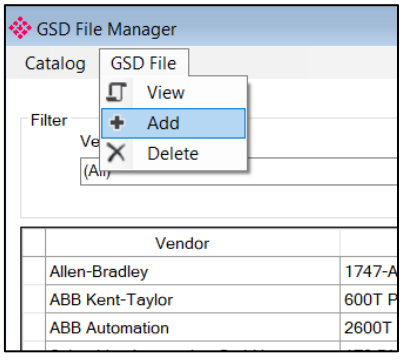


Figure 3.12 – GSD File Adding

The required GSD file will need to be selected as shown below:

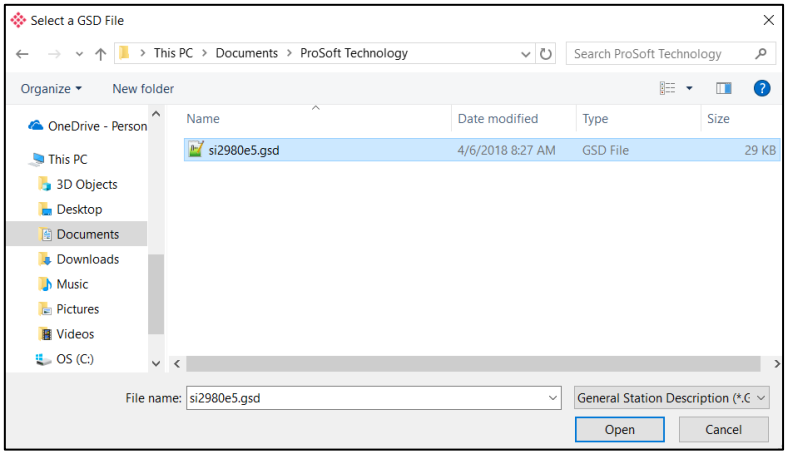


Figure 3.13 – GSD File Adding

Once the file has been selected the GSD File Management tool will add the slave device to the device list and recompile the GSD catalog.

A GSD catalog can be exported from another PLX50 Configuration Utility by exporting the GSD catalog on one PLX50 Configuration Utility and importing it in another. This is done by selecting either *Import* or *Export* under the Catalog menu as shown below:

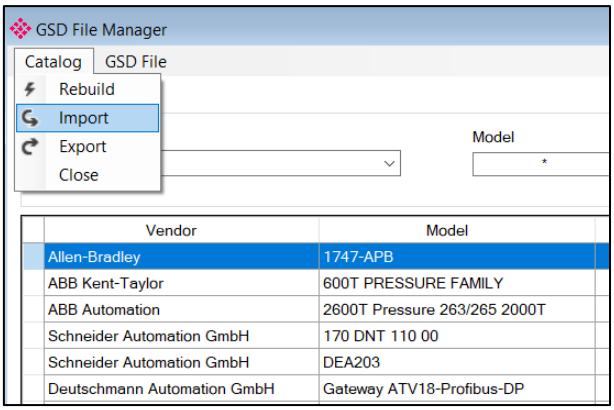


Figure 3.14 – GSD Catalog importing

3.4 Creating a New Project

Before the user can configure the module, a new PLX50 Configuration Utility project must be created. Under the File menu, select New.

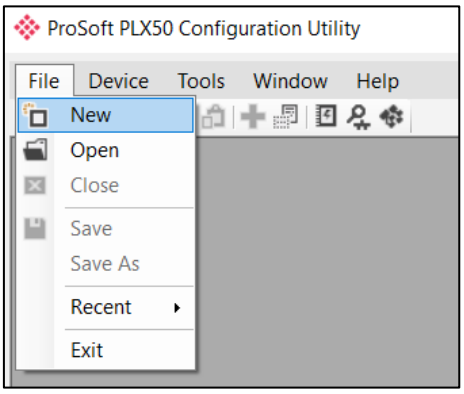


Figure 3.15 - Creating a new project

A PLX50 Configuration Utility Design Tool project will be created, showing the Project Explorer tree view. To save the project use the Save option under the File menu.

A new device can now be added by selecting Add under the Device menu.

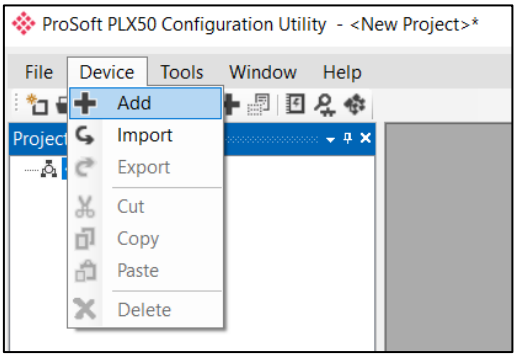


Figure 3.16 - Adding a new device

In the Add New Device window, select the PLX51-PBM and click the Ok button.

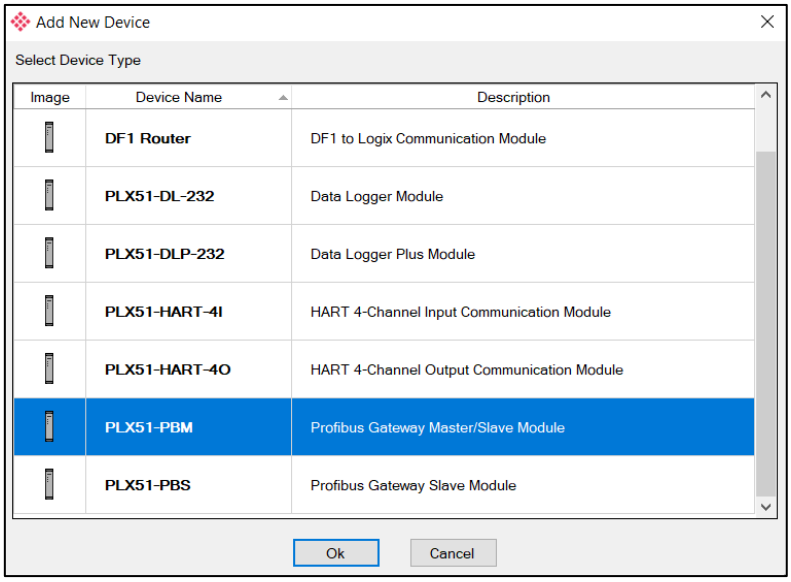


Figure 3.17 – PLX51-PBM

The device will appear in the Project Explorer tree as shown below, and its configuration window opened.

The device configuration window can be reopened by either double clicking the module in the Project Explorer tree or right-clicking the module and selecting *Configuration*.

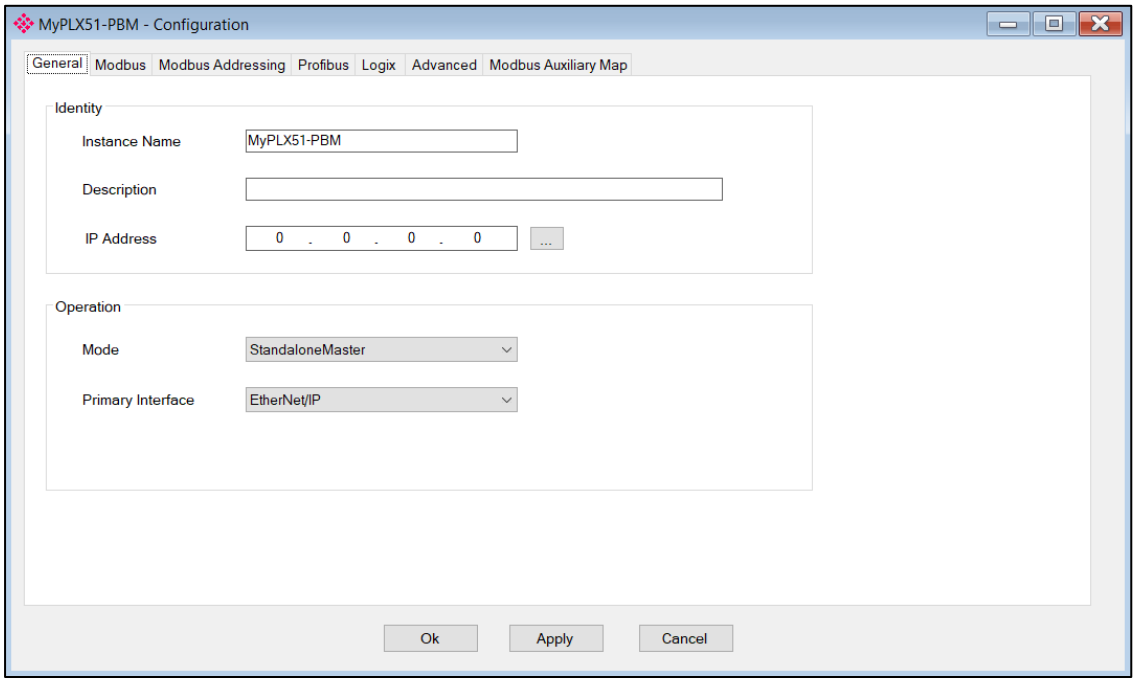


Figure 3.18 – PLX51-PBM configuration

3.5 PLX51-PBM Parameters

The PLX51-PBM parameters will be configured by the PLX50 Configuration Utility.

Refer to the additional information section for documentation and installation links for ProSoft Technology's PLX50 Configuration Utility.

3.5.1 General

The General configuration is shown in the figure below. The PLX51-PBM General configuration window is opened by either double clicking on the module in the tree or right-clicking the module and selecting *Configuration*.

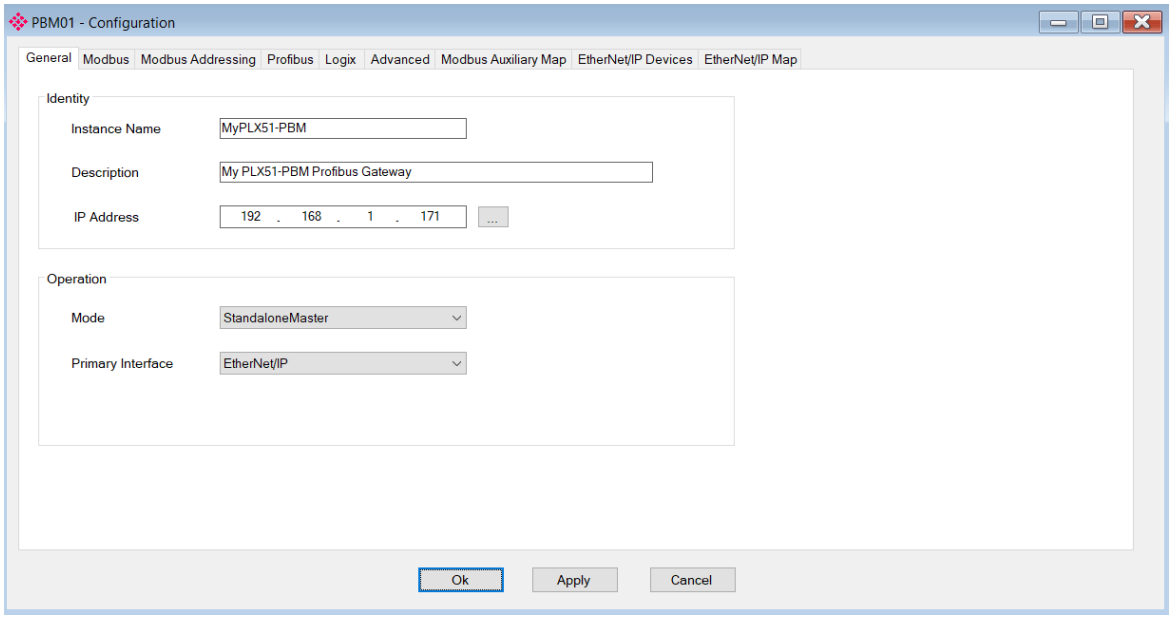


Figure 3.19 – PLX51-PBM General configuration

The General configuration consists of the following parameters:

Table 3.1 - General configuration parameters

Parameter	Description
Instance Name	This parameter is a user defined name to identify between various PLX51-PBM modules.
Description	This parameter is used to provide a more detail description of the application for the module.
IP Address	The IP address of the module.
Mode	The PLX51-PBM can operate in one of three modes: **Quiet** This mode allows the user to connect the PLX51-PBM to an active bus and run a DP packet capture. In this mode the PLX51-PBM will not communicate on the DP Bus but rather only listen. **Standalone Master** In this mode the PLX51-PBM is the DP Master on the PROFIBUS network. **Slave** In this mode the PLX51-PBM will emulate multiple PROFIBUS Slave devices.
Primary Interface	This is the network the PLX51-PBM will interface the PROFIBUS network. ▪ EtherNet/IP (Logix)

	▪ Modbus TCP/IP Master ▪ Modbus RTU Master – RS232 ▪ Modbus RTU Master – RS485 ▪ Modbus TCP/IP Slave ▪ Modbus RTU Slave – RS232 ▪ Modbus RTU Slave – RS485 ▪ EtherNet/IP Explicit Messaging (only when operating as a DP Slave)

3.5.2 Modbus

The Modbus configuration is shown in the figure below. The PLX51-PBM Modbus configuration window is opened by either double clicking on the module in the tree or right-clicking the module and selecting *Configuration*.

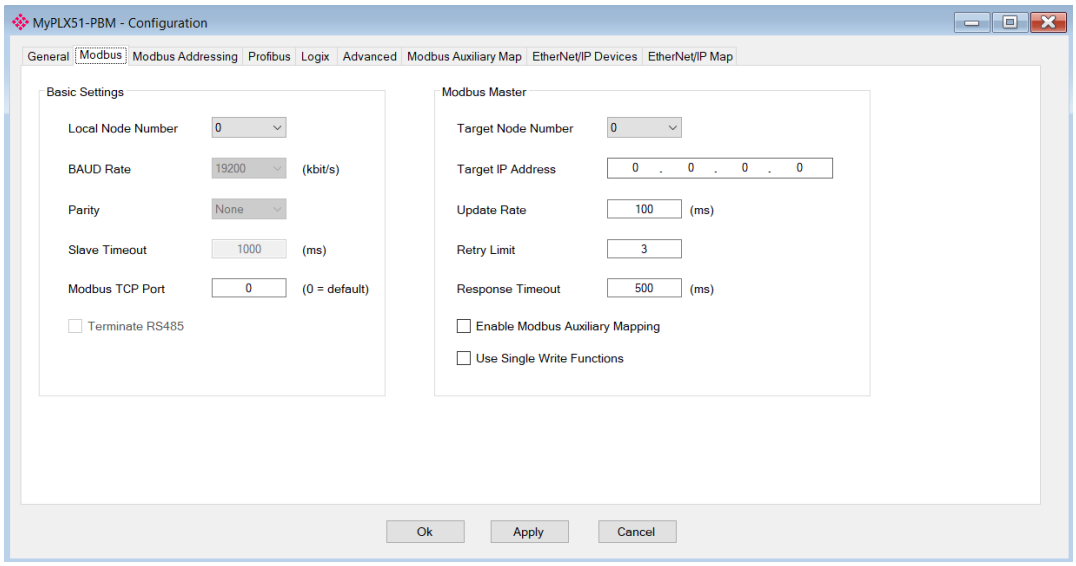


Figure 3.20 – PLX51-PBM Modbus configuration

The Modbus configuration consists of the following parameters:

Table 3.2 - Modbus configuration parameters

Parameter	Description
Local Node Number	The Modbus Node Number that will be used when the PLX51-PBM is in the Stand-alone Master mode and a Modbus Slave.
BAUD Rate	When the Primary Interface is set to Modbus RTU (232/485) then this setting is the BAUD Rate over the serial communication.
Parity	When the Primary Interface is set to Modbus RTU (232/485) then this setting is the Parity over the serial communication.
Slave Timeout	The slave timeout time in milliseconds.
Modbus TCP Port	The TCP port to be used for the Modbus communication can be configured. If a zero is entered, the module will use the standard TCP port 502.
Terminate RS485	Enables the on-board 124Ω RS485 terminating resistor.
Modbus Master	
Target Node Number	The remote Modbus node to poll. (Modbus Master only)
Target IP Address	The remote Modbus IP Address to poll. (Modbus TCP Master only)
Update Rate	The period (in milliseconds) between master requests to the target Modbus device. (Modbus Master only)
Retry Limit	The number of successive Modbus request retries (Modbus Master only)
Response Timeout	The time (in milliseconds) the module will wait for a Modbus response (Modbus Master only)
Enable Modbus Auxiliary Mapping	When this is enabled the PLX51-PBM will be able to read from, and write to, multiple Modbus Slaves by using the Modbus Auxiliary Map tab. **IMPORTANT:** When Modbus Auxiliary Mapping is enabled, the automatic polling of referenced Modbus registers is disabled. It is the user's responsibility to ensure that all the required Profibus control and data registers are collected from the appropriate remote Modbus slave devices.

Use Single Write Functions	When operating as a Modbus Master, the PLX51-PBM will use Modbus Single Write functions in the Modbus Auxiliary Map when this option has been selected and the write function has an element count of 1.

3.5.3 Modbus Addressing

The Modbus Addressing configuration is shown in the figure below. The PLX51-PBM Modbus Addressing configuration window is opened by either double clicking on the module in the tree or right-clicking the module and selecting *Configuration*.

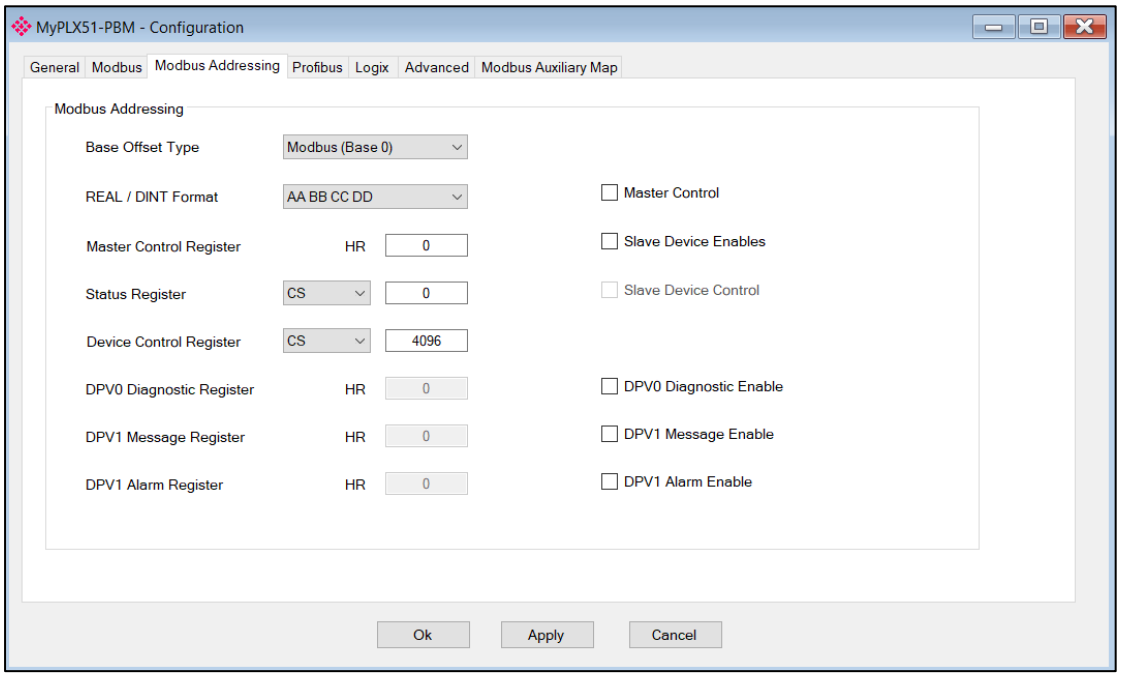


Figure 3.21 – PLX51-PBM (Master Mode) Modbus Addressing configuration

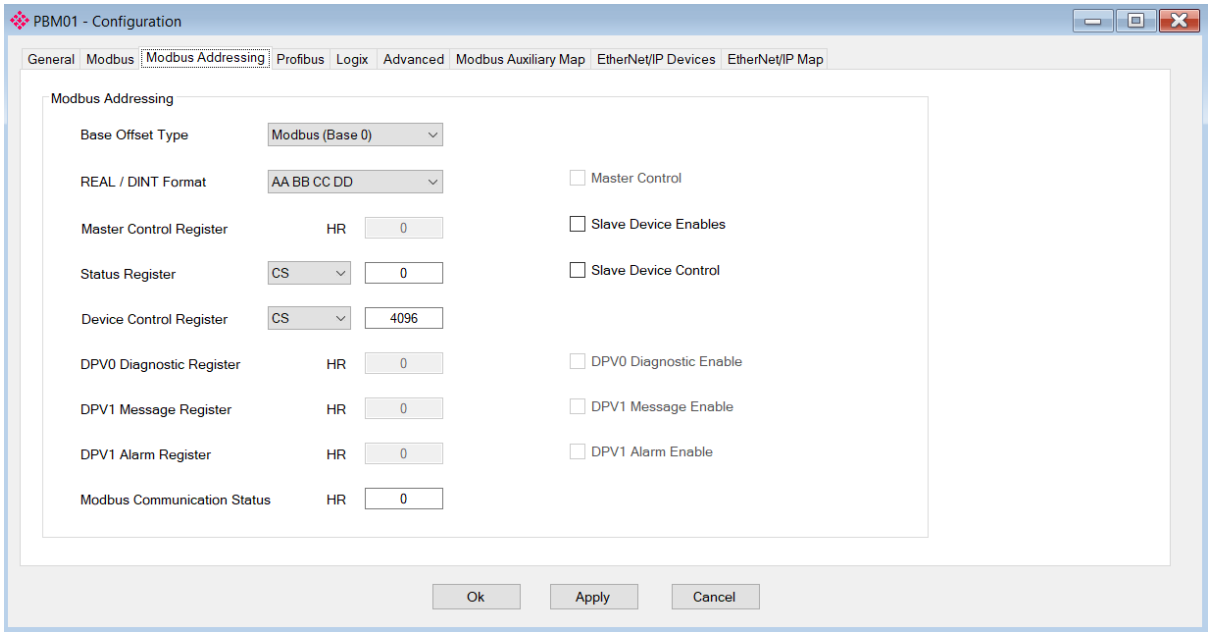


Figure 3.22 – PLX51-PBM (Slave Mode) Modbus Addressing configuration

The Modbus configuration consists of the following parameters:

Table 3.3 - Modbus Addressing configuration parameters

Parameter	Description
Base Offset Type	Base Address Offset Type Modbus (Base 0) – Conventional Modbus addressing where the first address is 0. PLC (Base 1) – PLC addressing, where the first address is 1.
Real Format	For a Real (single floating point) number this setting shows the format of the data will be presented when using a Modbus Primary Interface. The format (byte re-ordering) options are as follows: AA BB CC DD BB AA DD CC DD CC BB AA CC DD AA BB
Master Control HR Offset	The Modbus Holding Register address starting offset for the Master Control. (PROFIBUS Master mode only)
Status Register	The Modbus Coil or Holding Register address starting offset for the Module status.
Device Control Register	The Modbus Coil or Holding Register address starting offset for the Slave Device Control bits.
DPV0 Diagnostic Register	The Modbus Holding Register address starting offset for DPV0 Diagnostics. (PROFIBUS Master mode only)
DPV1 Message Register	The Modbus Holding Register address starting offset for DPV1 Messaging. (PROFIBUS Master mode only)
DPV1 Alarm Register	The Modbus Holding Register address starting offset for DPV1 Alarms. (PROFIBUS Master mode only)
Modbus Communication Status	The Modbus Holding Register address starting offset for Modbus Communication Status (when operating as a Modbus Master or Modbus Slave). This can be mapped to DPV0 data which can be used by the Profibus DP Master or Slave to take action when the Modbus communication is down or has faulted. See the *Modbus Operation* section for details regarding the Modbus data for the Modbus Communication Status.
Master Control	Enables the Master Control bits. (PROFIBUS Master mode only) When Enabled, the PROFIBUS operational state (Offline, Stop, Run, Clear) is controlled by the module through the use of the Master Control Register. When Disabled, the PROFIBUS operational state is set to Run.
Slave Device Enables	Enables the individual Slave Device Enable bits. When Enabled, the remote device can enable/disable each slave device through the use of the Device Control Register. When Disabled, all slave devices are enabled.
Slave Device Control	Enables the Slave Device Control (Alarm Triggers) (PROFIBUS Slave mode only) When Enabled, the Slave device can generate Alarms through the use of the Device Control Register. When Disabled, no slave device alarming is possible.
DPV0 Diagnostic Enable	(PROFIBUS Master mode only) This will allow the user to enable or disable the retrieving of PROFIBUS Diagnostics from a field device using DPV0 Diagnostic HR Offset.
DPV1 Message Enable	(PROFIBUS Master mode only) This will allow the user to enable or disable the retrieving of data using DPV1 Class 1 messaging from a field device using DPV1 Message HR Offset.
DPV1 Alarm Enable	(PROFIBUS Master mode only) This will allow the user to enable or disable the retrieving of PROFIBUS Alarms from a field device using DPV1 Alarm HR Offset.

IMPORTANT: The range of configured Modbus registers for each register type may not exceed 10,000.

3.5.4 PROFIBUS – Master Mode

The PROFIBUS configuration (in Master Mode) is shown in the figure below. The PLX51-PBM PROFIBUS configuration window is opened by either double clicking on the module in the tree or right-clicking the module and selecting *Configuration*.

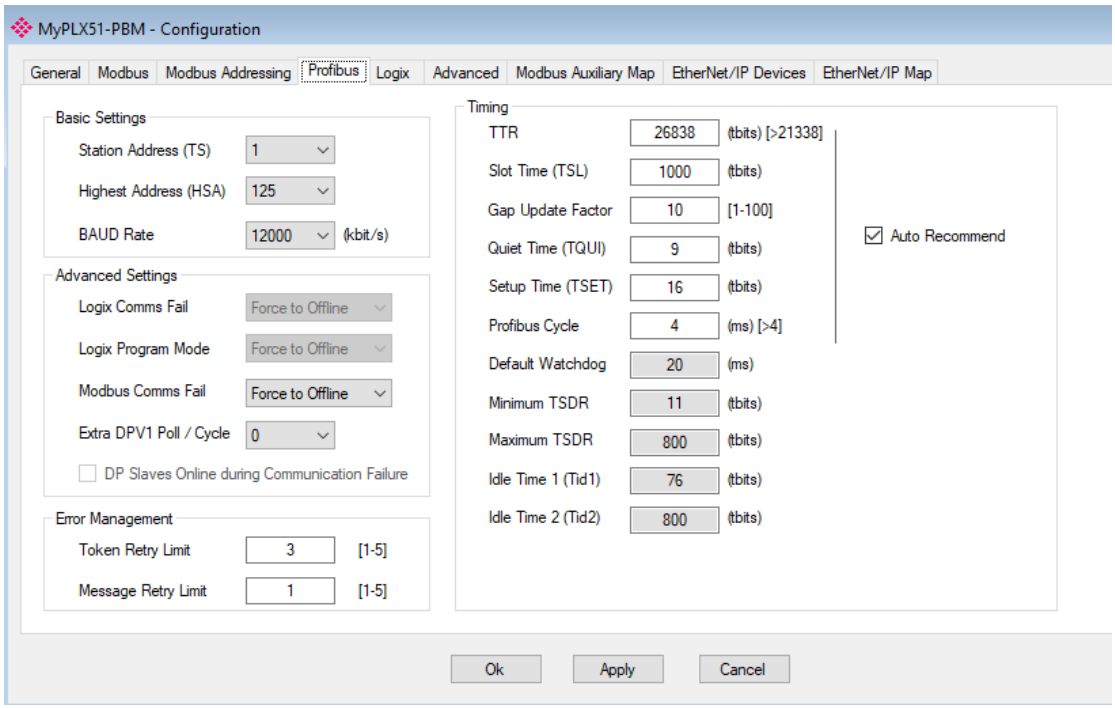


Figure 3.23 – PLX51-PBM PROFIBUS configuration – Master Mode

The PROFIBUS configuration consists of the following parameters:

Table 3.4 - PROFIBUS configuration parameters

Parameter	Description
Basic Settings	
Station Address (TS)	PROFIBUS Station Address for the PLX51-PBM module. TS should be different than any other slaves address on the PROFIBUS network, it should also be less-than or equal to the HSA below: Min: 0 Max: 126 Default: 1
Highest Address (HSA)	Highest Station Address. This is the highest station address of the active stations (masters). Passive stations (slaves) can have a higher address than the HSA. A low HSA is better for PROFIBUS performance. Min: 1 Max: 126 Default: 126
BAUD Rate	Baud Rate (in Kbps) of the PROFIBUS network: 9.6, 19.2, 45.45, 93.75, 187.5, 500, 1500, 3000, 6000 or 12000 Kbps. The baud rate selected should be supported by all slaves in the configuration. The baud rate should be selected depending on the cable length, see chapter “PROFIBUS DP”
Advanced Settings	
Logix Comms Fail	Specifies the PROFIBUS Master behavior when losing communication with Logix, either: ▪ Force to Offline

	▪ Force to Clear
Logix Program Mode	Specifies the PROFIBUS Master behavior when Logix is set in Program mode, either: ▪ Force to Offline ▪ Force to Clear
Modbus Comms Fail	Specifies the PROFIBUS Master behavior when losing communication with the Modbus device, either: ▪ Force to Offline ▪ Force to Clear
Extra DPV1 Poll / Cycle	The number of additional DPV1 Polls (Class 2) per PROFIBUS Cycle. Increasing this parameter results in faster Asset Management DTM updates.
DP Slaves Online during Communication Failure (Slave Mode Only)	This parameter will allow the DP DPV0 communication to continue when communication it lost on either Modbus (Master or Slave) or EtherNet/IP Explicit Messaging. When this is not set, the DP DPV0 communication will be stopped when the communication to the previously mentioned interfaces is lost.
Error Management	
Token Retry Limit	Token Retry Limit is the number of times that a PROFIBUS Master tries to pass the token before deciding that a station is not there. Value must be in the following range: Min: 0 Max: 5 Default: 3
Message Retry Limit	Message Retry Limit is the number of telegram repetitions if the address doesn't react. Value must be in the following range: Min: 0 Max: 5 Default: 1
Timing	
TTR	Target Rotation Time indicates the maximum time available for a token circulation (time for PROFIBUS token to be passed to another master and be back). It takes in account the number of slaves with their IO size (data exchanges telegram), different telegrams needed and their duration times (FDL status, global control, pass token), all mandatory timing with respect to the PROFIBUS standard (time slot, min and max Tsdr, Tqui, Tset, …) and a safety margin which allows bandwidth for acyclic messages (DPV1, …). Min: 0 Max: 16777215
Slot Time (TSL)	Slot Time (in tbits) is the maximum time the PLX51-PBM will wait, after the transmission of a request, for the reception of the first byte (Tchar) of an answer. (It allows detecting a timeout.) It can be increased when repeaters are used in the PROFIBUS network topology. The value must respect the rule: Min: 37 Max: 16383
Gap Update Factor	Gap Update Factor: The range of addresses between 2 consecutive active stations is called GAP. This GAP is submitted to a cyclic check during which the system identifies the station condition (not ready, ready or passive). Min: 1 Max: 100
Quiet Time (TQUI)	Quiet time (in tbits) is the time that a station may need to switch from sending to receiving. It must respect the rule: TQUI < MIN_TSDR Min: 0 Max: 255

Setup Time (TSET)	Setup Time (in tbits) is the reaction time on an event. Calculation of TSET must respect the rule: Min: 1 Max: 494
PROFIBUS Cycle	PROFIBUS Cycle (in ms) (read/Write) field defines the cyclic time the master will respect between two IO Data Exchange sequences. This parameter can be increased by the user when the PROFIBUS network load does not allow the processing of acyclic requests.
Auto Recommend	When Enabled, all timing parameters will be updated with recommended calculations when the Ok or Apply button is pressed. **IMPORTANT:** When the user changes the BAUD Rate, all PROFIBUS timing parameters will be updated irrespective of the Auto Recommend check-box selection.
Default Watchdog (Read-Only)	Default Devices Watchdog (in ms) value defines the watchdog value assigned by default to all devices in the configuration.
Min TSDR (Read-Only)	Smallest Station (in tbits) is the minimum time that a PROFIBUS DP slave must wait before it may answer. It must respect the rule: TQUI < MIN_TSDR Min: 11 Max: 1023
Max TSDR (Read-Only)	Largest Station (in tbits) is the maximum time that a PROFIBUS DP slave may take in order to answer. Calculation of MAX_TSDR must respect the rule: Min: 37 Max: 65525
Idle Time 1 (Tid1) (Read-Only)	Time Idle1 (in tbits) is the time between the acknowledgement frame or token frame reception and the transmission of the next frame. Tid1 = Max(Tsyn+Tsm, MIN_TSDR) with Tsyn= 33 Tsm= 2 + 2* TSET + TQUI
Idle Time 2 (Tid2) (Read-Only)	Time Idel2 (in tbits) is the time between the transmission of an unconfirmed packet and the transmission of the next packet. Tid2 = Max (Tsyn+Tsm, MAX_TSDR) with Tsyn= 33 Tsm= 2 + 2* TSET + TQUI

IMPORTANT: When the user changes the BAUD Rate **all** the PROFIBUS timing parameters will change to the default values for that specific BAUD Rate.

3.5.5 PROFIBUS – Slave Mode

The PROFIBUS configuration (in Slave Mode) is shown in the figure below. The PLX51-PBM PROFIBUS configuration window is opened by either double clicking on the module in the tree or right-clicking the module and selecting *Configuration*.

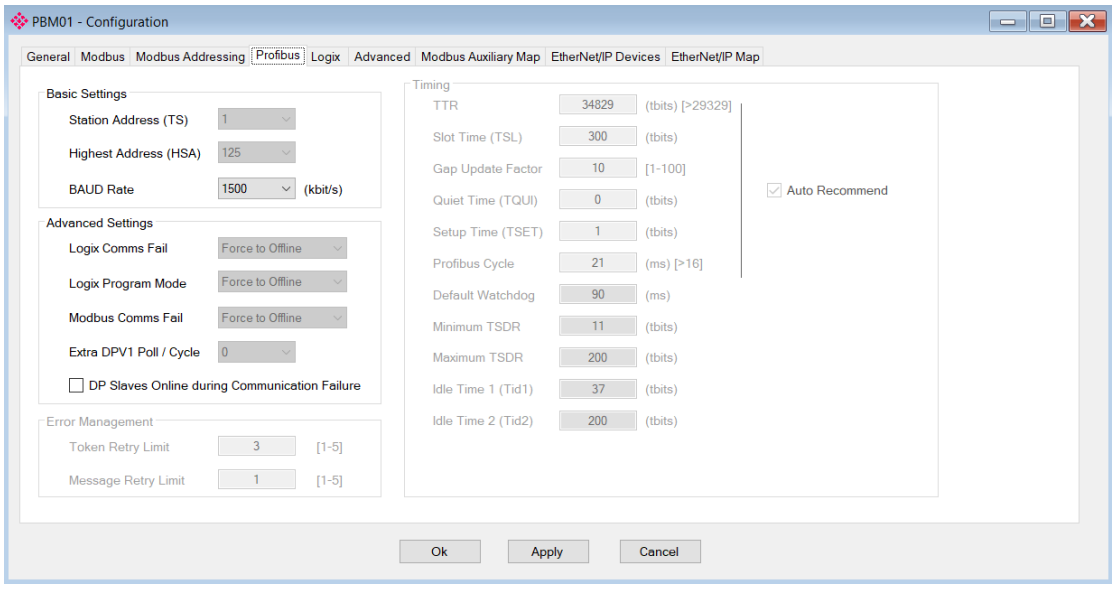


Figure 3.24 – PLX51-PBM PROFIBUS configuration – Slave Mode

The PROFIBUS configuration consists of the following parameters:

Table 3.5 - PROFIBUS configuration parameters – Slave Mode

Parameter	Description
BAUD Rate	Baud Rate (in Kbps) of the PROFIBUS network: 9.6, 19.2, 45.45, 93.75, 187.5, 500, 1500, 3000, 6000 or 12000 Kbps. The baud rate selected should be supported by all slaves in the configuration. The baud rate should be selected depending on the cable length, see chapter “PROFIBUS DP”
DP Slaves Online during Communication Failure	This parameter will allow the DP DPV0 communication to continue when communication it lost on either Modbus (Master or Slave) or EtherNet/IP Explicit Messaging. When this is not set, the DP DPV0 communication will be stopped when the communication to the previously mentioned interfaces is lost.

3.5.6 Logix

The Logix configuration is shown in the figure below. It is only relevant when the Primary Interface is set to EtherNet/IP.

The PLX51-PBM Logix configuration window is opened by either double clicking on the module in the tree or right-clicking the module and selecting *Configuration*.

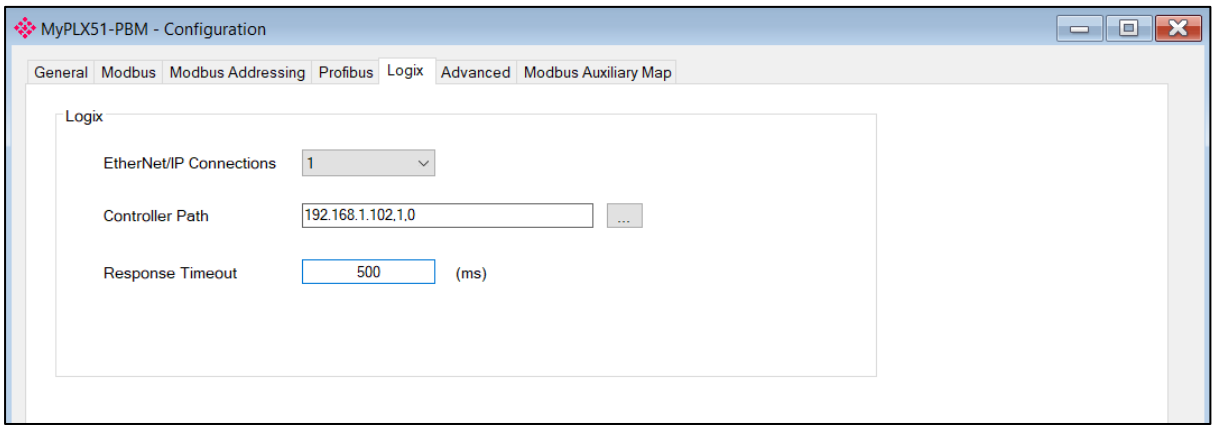


Figure 3.25 – PLX51-PBM Logix configuration

The Logix configuration consists of the following parameters:

Table 3.6 - Logix configuration parameters

Parameter	Description
EtherNet/IP Connections	The number of EtherNet/IP (CIP) Connections to be used in the exchange with Logix (1 to 4). Note, this value must match that configured in the Logix IO tree.
Controller Path	This is the CIP path to the Logix controller. In PROFIBUS Slave Mode, this path will be used for the Class 3 data exchanges for DPV1 objects and alarms. Note: This path can be either entered manually, or configured using the Target Browser.
Response Timeout	The maximum time (ms) allowed for a Class 3 response from the Logix controller.

To browse to a controller path, select the Browse ("…") button to open the Target Browser. Then select a Logix controller and select Ok. The path will then be updated automatically.

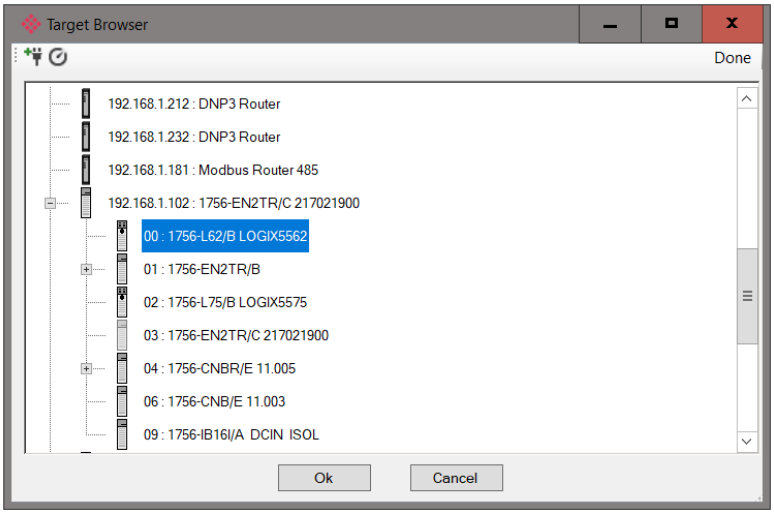


Figure 3.26 – Target Browser – Selecting Logix controller

3.5.7 Advanced

The Advanced configuration is shown in the figure below. The PLX51-PBM Advanced configuration window is opened by either double clicking on the module in the tree or right-clicking the module and selecting *Configuration*.

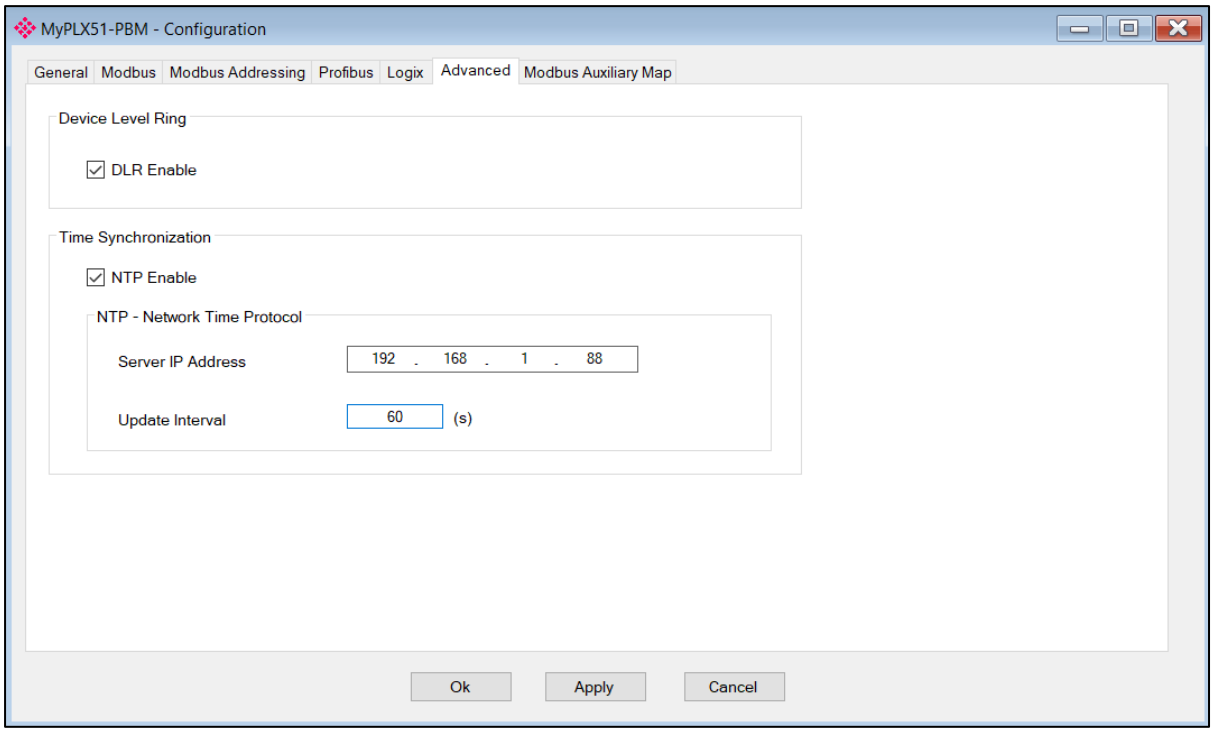


Figure 3.27 – PLX51-PBM Advanced configuration

The Advanced configuration consists of the following parameters:

Table 3.7 - Advanced configuration parameters

Parameter	Description
DLR Enable	This must be set to enable Device Level Ring operation when the PLX51-PBM will be operating in an Ethernet DLR.
NTP Enable	The PLX51-PBM can synchronize its onboard clock to an NTP Server by enabling NTP.
NTP – Server IP Address	This setting is the IP address of the NTP Server which will be used as a time source.
NTP – Update Interval	This setting is the updated interval (in seconds) that the PLX51-PBM will request time from the NTP Server.

3.5.8 Modbus Auxiliary Map

The Modbus Auxiliary Map configuration is shown in the figure below. This table will be enabled when *Enable Modbus Auxiliary Mapping* has been enabled in the Modbus tab and configured for Modbus Master. This will allow the user to read and/or write any internal PLX51-PBM Modbus Register to any Modbus Slave. Up to 20 Modbus Slaves can be connected and up to 200 mapped items can be configured.

IMPORTANT: When Modbus Auxiliary Mapping is enabled, the automatic polling of referenced Modbus registers is disabled. It is the user's responsibility to ensure that all the required PROFIBUS control and data registers are collected from the appropriate remote Modbus slave devices.

The PLX51-PBM Modbus Auxiliary Map configuration window is opened by either double clicking on the module in the tree or right-clicking the module and selecting *Configuration*.

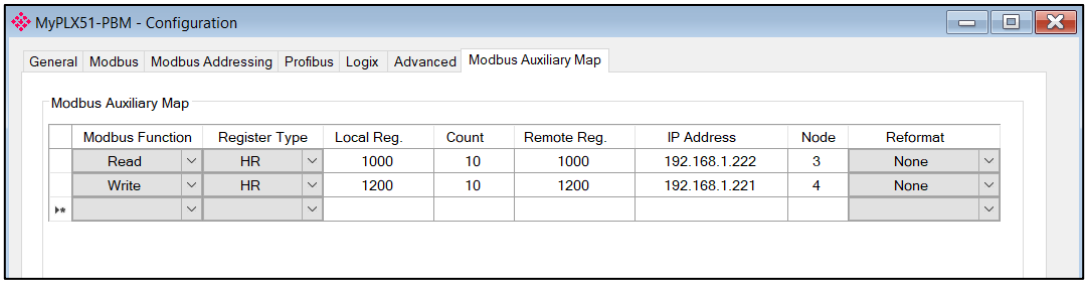


Figure 3.28 – PLX51-PBM Modbus Auxiliary Map configuration

The Modbus Auxiliary Map configuration consists of the following parameters:

Table 3.8 - Modbus Auxiliary Map configuration parameters

Parameter	Description
Modbus Function	This is the Modbus function that is used with the Modbus Slave. **Read** – Read a Modbus Register (eg. HR, IR, CS, or IS) from a Modbus Slave. **Write** – Write a Modbus Register (eg. HR or CS) to a Modbus Slave.
Register Type	Modbus Register Type: **CS** – Coil Status **IS** – Input Status **IR** – Input Register **HR** – Holding Register
Local Reg.	The local PLX51-PBM Modbus address.
Count	The number of Modbus elements to read or write.
Remote Reg.	The remote slave Modbus address.
IP Address	The IP address of the remote Modbus TCP slave.
Node	The Modbus Node address of the remote Modbus slave.
Reformat	How the data is formatted before reading or writing from/to the Modbus slave. **None** – No reformatting will be done. **BB AA** – 16bit Byte swap **BB AA DD CC** – 32bit Byte Swap **CC DD AA BB** – Word Swap **DD CC BB AA** – Word and Byte Swap

3.5.9 EtherNet/IP Devices

This tab is enabled when the Primary Interface selected is EtherNet/IP Explicit Messaging.

IMPORTANT: EtherNet/IP Explicit Messaging is only allowed when the PLX51-PBM is operating as a Profibus Slave.

The EtherNet/IP Devices configuration is shown in the figure below. Up to 5 EtherNet/IP devices can be configured with up to 50 EtherNet/IP mapped items allowing for either explicit EtherNet/IP Class 3 or Unconnected Messaging (UCMM) to any of the 5 configured devices. The data from each EtherNet/IP device is written to or read from a data table with a size of 10Kbytes. See the *Explicit EtherNet/IP Messaging Operation* section for more details.

The PLX51-PBM EtherNet/IP Devices configuration window is opened by either double clicking on the module in the tree or right-clicking the module and selecting *Configuration*.

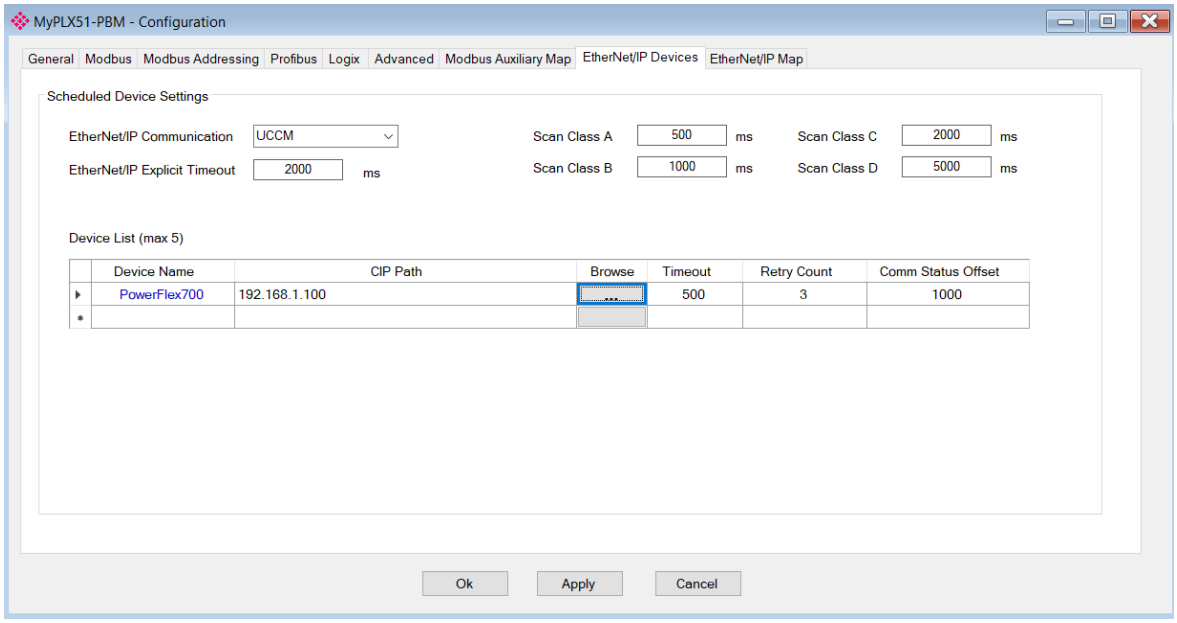


Figure 3.29 – PLX51-PBM EtherNet/IP Devices configuration

The EtherNet/IP Devices configuration consists of the following parameters:

Table 3.9 – EtherNet/IP Devices configuration parameters

Parameter	Description
EtherNet/IP Communication	The module can use either ***Class 3*** or ***Unconnected Messaging*** when communicating to the target EtherNet/IP device.
EtherNet/IP Explicit Timeout	The amount of time with no successful EtherNet/IP responses before the module sets the EtherNet/IP interface in fault. If *DP Slaves Online during Communication Failure* has not been set, then all DP slaves being emulated will go offline on the Profibus DP network.
Scan Class A, B, C, D	The configurable update rates for each mapped item in the EtherNet/IP Map.
Device List (per device)	
Device Name	The user assigned name for the specific device.

CIP Path	The CIP Path to the target device. It can either be entered manually or the user can browse to them by clicking the ***Browse*** button. The Target Browser will open and automatically scan for all available EtherNet/IP devices. If the Ethernet/IP module is a bridge module, it can be expanded by right-clicking on the module and selecting the ***Scan*** option. The required EtherNet/IP device can then be chosen by selecting it and clicking the ***Ok*** button, or by double-clicking on the target module.
Timeout	The amount of time the PLX51-PBM module will wait for a response from the target EtherNet/IP device.
Retry Count	The number of retires before the target EtherNet/IP device is considered offline.
Comm Status Offset	This is the offset in the data table (used to map EtherNet/IP device data) which provides the communication status of each EtherNet/IP device. The Communication Status is as shown below: Bit 0 - (1) Device online / (0) Device offline. Bit 1 to 7 – Reserved.

3.5.10 EtherNet/IP Map

This tab is enabled when the Primary Interface selected is EtherNet/IP Explicit Messaging.

IMPORTANT: EtherNet/IP Explicit Messaging is only allowed when the PLX51-PBM is operating as a Profibus Slave.

The EtherNet/IP Map configuration is shown in the figure below. Up to 5 EtherNet/IP devices can be configured with up to 50 EtherNet/IP mapped items allowing for either explicit EtherNet/IP Class 3 or Unconnected Messaging (UCMM) to any of the 5 configured devices. The data from each EtherNet/IP device is written to or read from a data table with a size of 10Kbytes. See the *Explicit EtherNet/IP Messaging Operation* section for more details.

The PLX51-PBM EtherNet/IP Map configuration window is opened by either double clicking on the module in the tree or right-clicking the module and selecting *Configuration*.

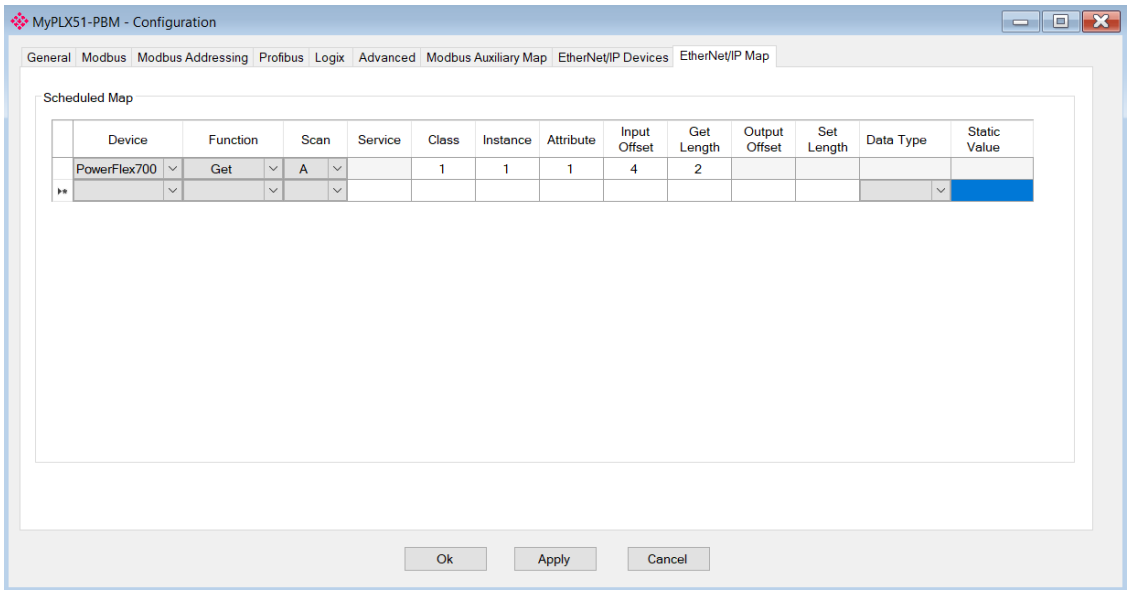


Figure 3.30 – PLX51-PBM EtherNet/IP Map configuration

The EtherNet/IP Map configuration consists of the following parameters:

Table 3.10 – EtherNet/IP Map configuration parameters

Parameter	Description
Device	The device name configured in the previous EtherNet/IP Devices tab. The selected device will be used for executing the communication function.
Function	The user can select one of four functions. **Get** The module will read data from the target EtherNet/IP device by using the Get Single Attribute CIP function. The received data will be placed into the Data Table at the ***Input Offset*** location configured in this tab. **Set** The module will write data to the target EtherNet/IP device by using the Set Single Attribute CIP function. The data to be written will be retrieved from the Data Table at the ***Output Offset*** location configured in this tab. **Set Static** Similar to the Set function above, but the data to be written will be fixed (equal to the *Static Value*) parameter in this configuration window. This function will typically be used with the single Scan class which means the PLX51-PBM can be setup to write the fixed value only once when the target device communication has been established. **Custom** This function allows the user to use a custom Service and write and read data in the same transaction. The user will need to see which custom services that target device supports in that device's user manual.
Scan	The user can select Scan Class **A**, **B**, **C** or **D** (which was configured in the EtherNet/IP Devices tab). The specific mapped item will then be executed at that configured scan class rate. The user can also select the **S** class which means that the mapped item will only execute once when communication to the target device is established. If the target device goes offline, then the mapped items with this class will be re-armed.
Service	The custom CIP service/function which is only available when the ***Custom*** function has been selected.
Class, Instance, Attribute	The CIP class, instance, and attribute of the request message to be sent.
CN In Offset	The location in the Data Table where the received data will be written. This will only be available for ***Get*** and ***Custom*** functions.
Get Length	The length of the data to be received. If the number of bytes received is more than the Get Length, then the data will **not** be written to the Data Table. This will only be available for ***Get*** and ***Custom*** functions.
CN Out Offset	The location in the Data Table where the data to be written to the target device will be read from. This will only be available for **Set** and ***Custom*** functions.
Set Length	The length of the data to be written. This will only be available for ***Set*** and ***Custom*** functions.
Data Type	The data type of the Static Value. This will only be available for ***Set Static*** function.
Static Value	The value to be written to the target device when the ***Set Static*** function has been selected. **Note**: When using the SINT Array data type, the values must be entered as space-delimited hex values. For example: 05 34 2E A1

3.6 Module Download

Once the PLX51-PBM configuration has been completed, it must be downloaded to the module. The configured IP address of the module will be used to connect to the module.

To initiate the download, right-click on the module and select the Download option.

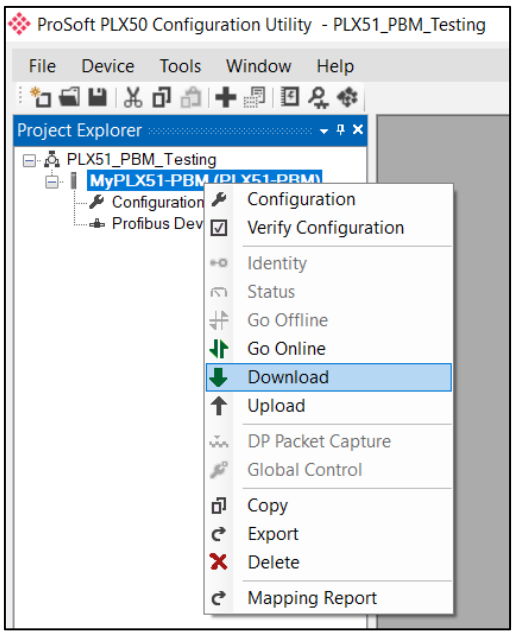


Figure 3.31 - Selecting Download

Once complete, the user will be notified that the download was successful.

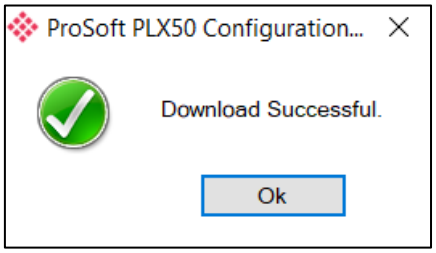


Figure 3.32 - Successful download

Within the PLX50 Configuration Utility environment the module will be in the Online state, indicated by the green circle around the module. The module is now configured and will start operating immediately.

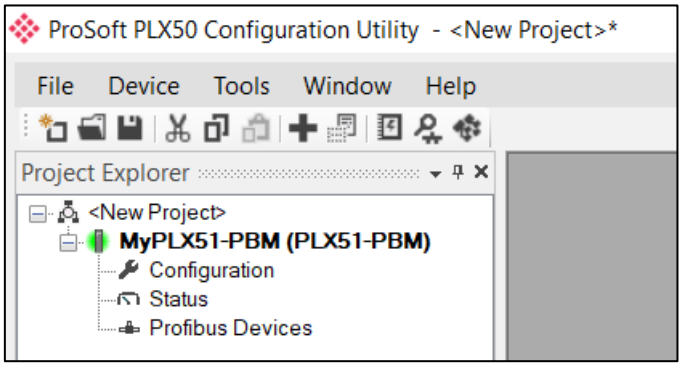


Figure 3.33 - Module online

3.7 Device Discovery (Online) – Master Mode

Once online with the PLX51-PBM in the PLX50 Configuration Utility the user will be able to scan the PROFIBUS network for slave devices.

IMPORTANT: If the incorrect PROFIBUS parameters has been configured (e.g. BAUD rate) it will result in the PLX51-PBM not seeing any slave devices on the PROFIBUS network.

IMPORTANT: If the module is connected to the primary interface (e.g., EtherNet/IP) when attempting a Device Discovery, ensure that the Master Control is set to a value greater than zero to ensure the Profibus State is **not** OFFLINE.

3.7.1 Discovery

The slave device discovery can be found by selecting the *Discovered Nodes* tab in the PLX51-PBM status window.

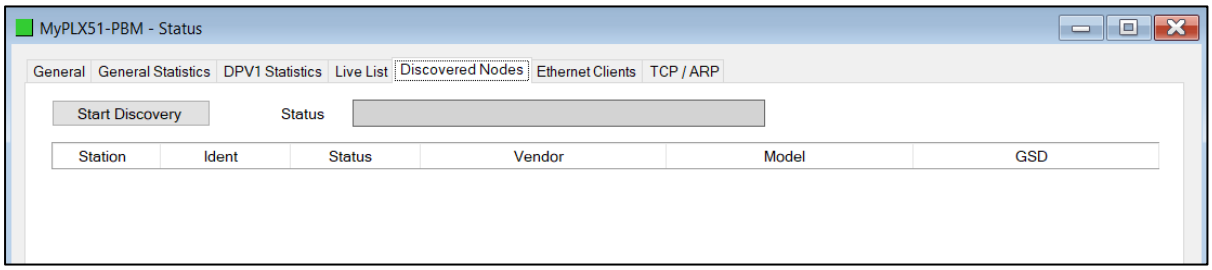


Figure 3.34 –Device Discovery

To start a new device discovery the *Start Discovery* button must be pressed. Once the discovery is done the slave devices found will be listed below.

NOTE: The time to scan the bus will depend on the BAUD Rate selected. The higher the BAUD rate the faster the bus discovery scan time will be.

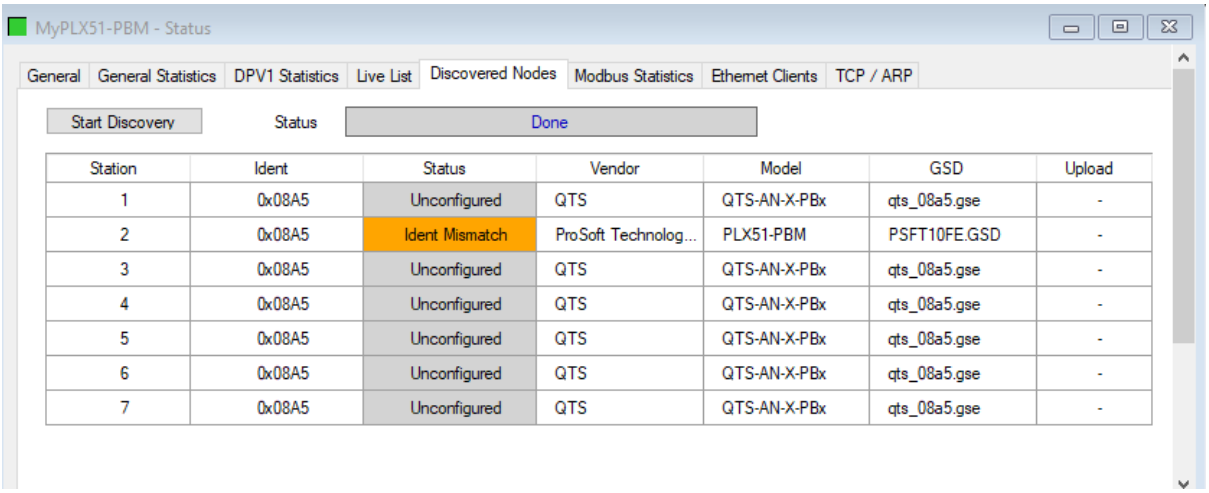


Figure 3.35 –Devices Found

If a device has been found that is not currently in the PLX51-PBM configured device list the user will be able to add the device from this window by right-clicking on the device and selecting *Add Device*.

NOTE: The GSD file will need to be already registered before a device can be added to the PLX51-PBM configuration.

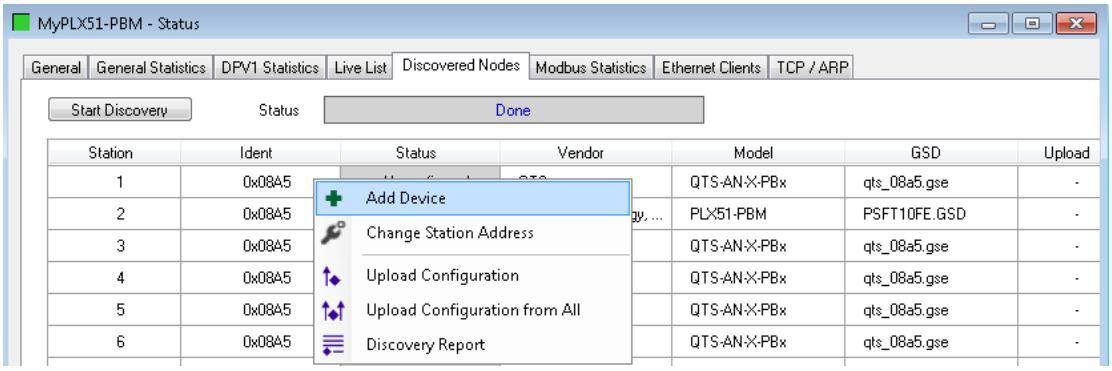


Figure 3.36 – Adding the Field Devices Found

The user will need to select the GSD file add the device to the PLX51-PBM configured device list.

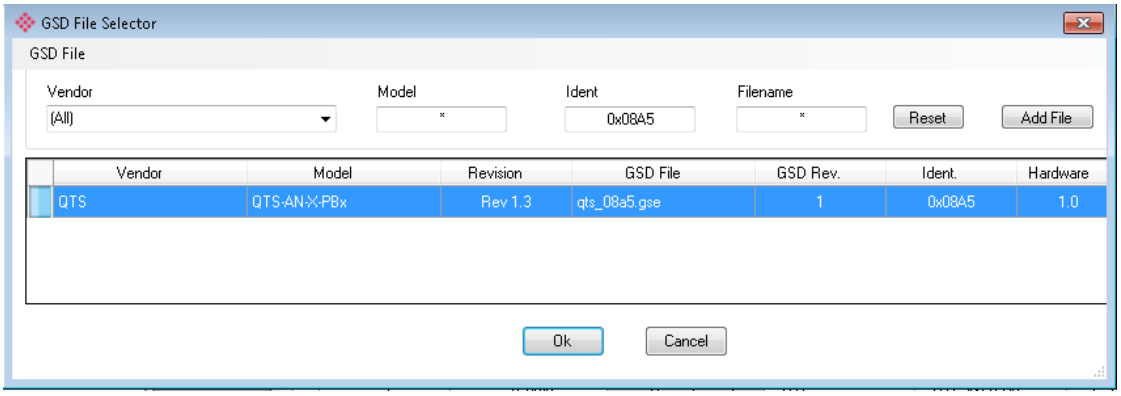


Figure 3.37 – Selecting the GSD for the slave device

Once the devices have been correctly set up (as well as the correct mapping is in Logix) the devices will show up as exchanging data.

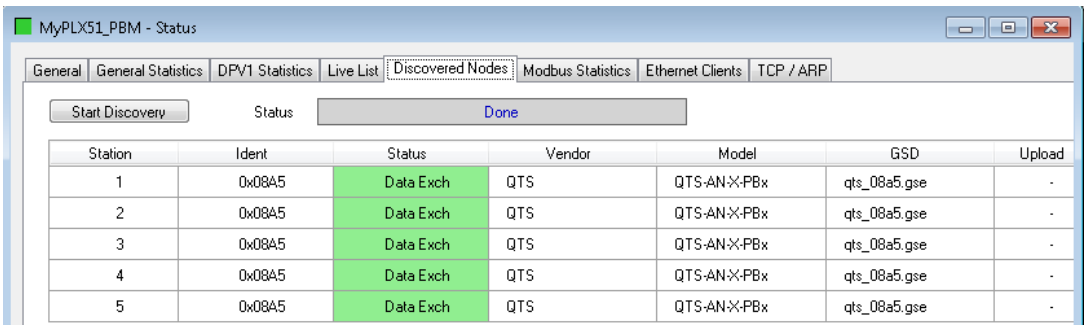


Figure 3.38 – Discovering running devices

3.7.2 Device Station Configuration Upload

The PLX50CU can also upload the DPV0 communication configuration from each DP Slave. The uploaded configuration will be used when creating a new module from the Discovery List (as described in the section above).

IMPORTANT: The configuration must be uploaded from the DP Slave **before** adding the module from the discovery list. The configuration of an already instantiated DP Slave will not be changed.

The DPV0 communication configuration can be uploaded by right clicking on the discovery list and selecting *Upload Configuration from All.*

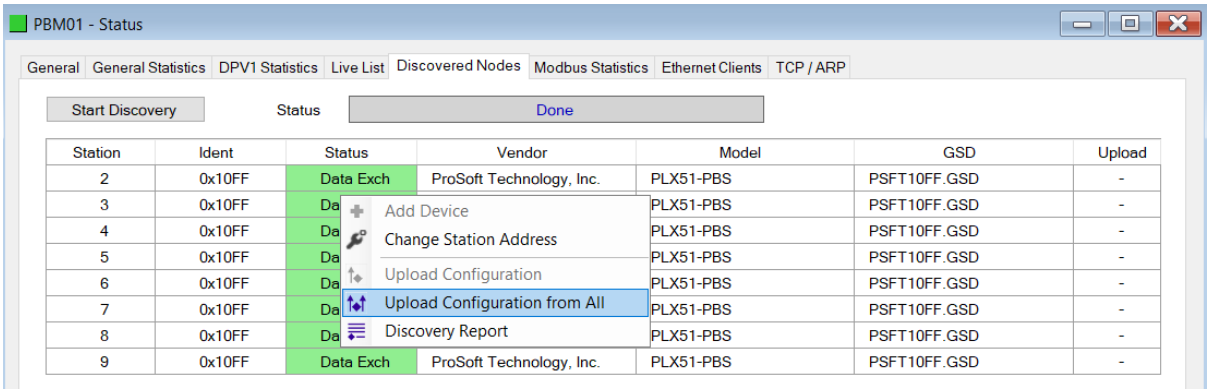


Figure 3.39 – Selecting to upload the configuration from all Slaves.

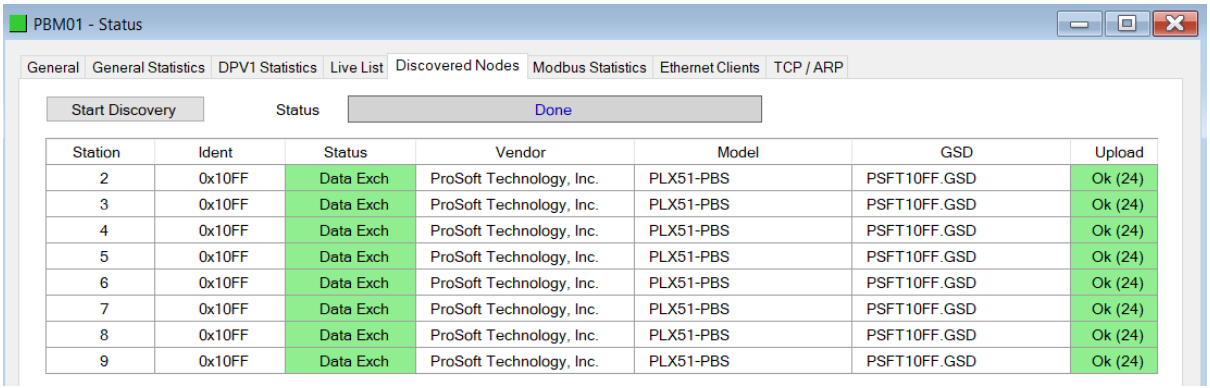


Figure 3.40 – DPV0 Communication Configuration successfully uploaded.

3.7.3 Device Station Address Change

Certain devices can be set up to allow remotely changing of the station address. Devices with this option set generally defaults to station address 126. The user can change the station address of a device (if the device is correctly setup) by right-clicking on the device in the Discovery Lost and selecting *Change Station Address*.

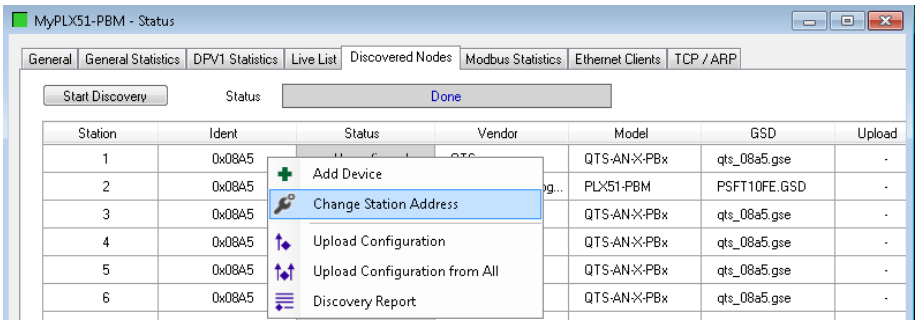


Figure 3.41 – Changing Station Address

Next the user will need to select the new station address for the device. Once selected press the Set button.

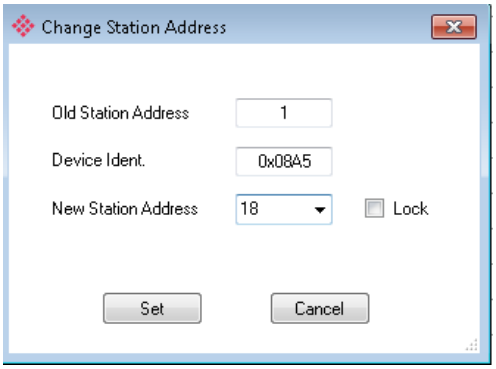


Figure 3.42 – Selecting new Station Address.

Once the request has been sent the user can either start a new network discovery to confirm the address has changed or monitor the Livelist (see the *Diagnostics* section).

NOTE: The amount of time for the device to appear at the new station address is device depended. In the Livelist there will be a period where both node addresses show up while the original station address is timing out.

IMPORTANT: If the user sets the station address to an address that is already present on the DP network it will result in communication failure of both devices.

IMPORTANT: Generally, the device will need to be in the correct state before it will accept a command to change its station address (i.e. must not be in data exchange state).

3.7.4 Discovery Report

This report summarizes the following device information found during discovery: Address, Identity Number, Status of configuration, Device name, GSD filename, and Upload Configuration status.

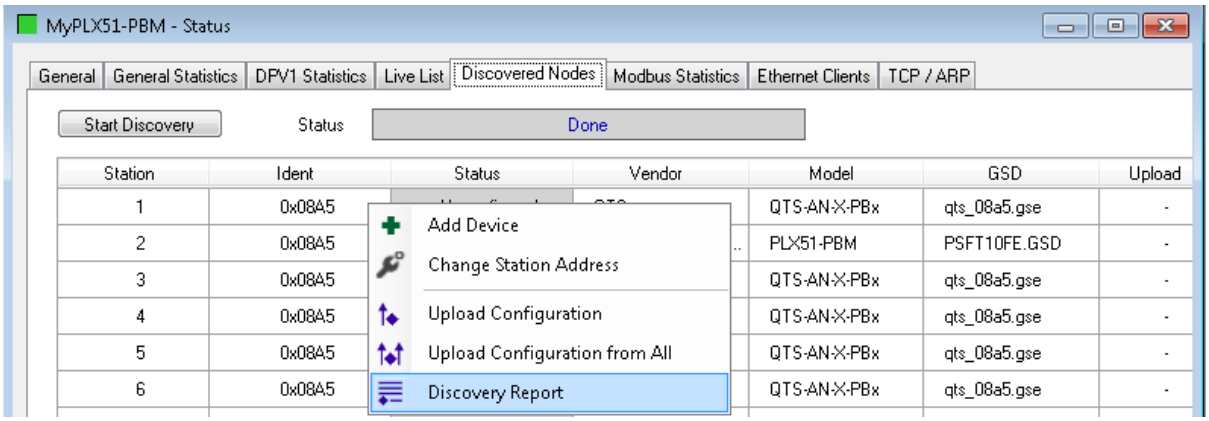


Figure 3.43 – Accessing the Discovery Report

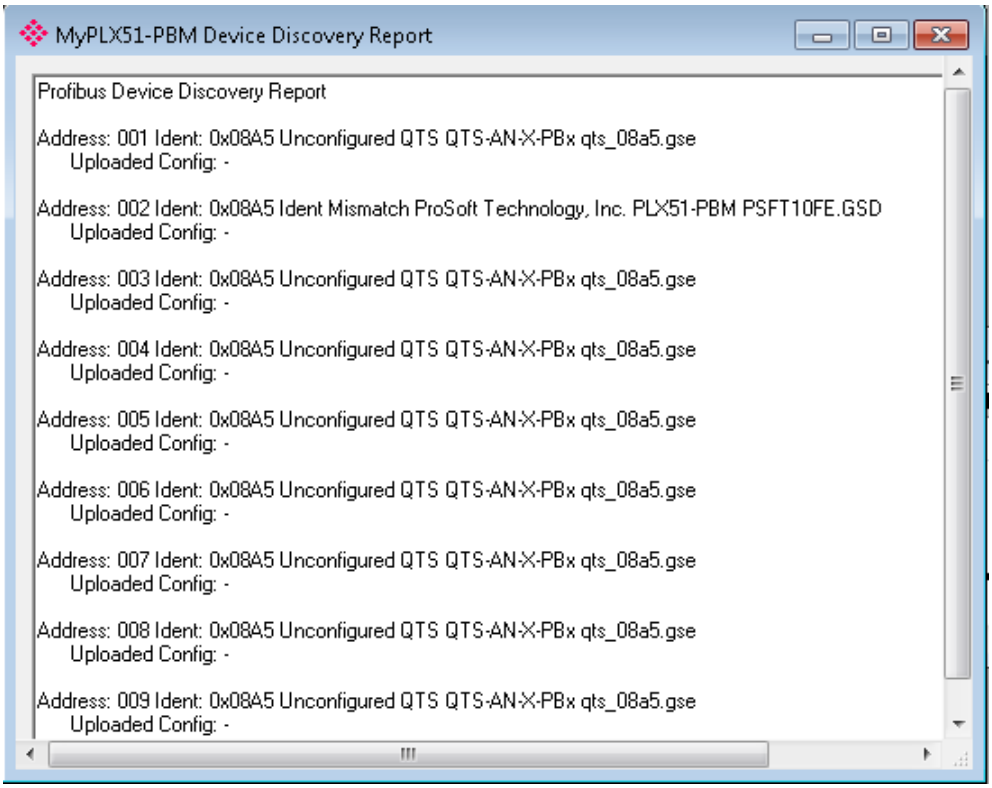


Figure 3.44 – Discovery Report

3.8 Adding PROFIBUS DP Devices – Master Mode

The user will need to add each PROFIBUS device to the PLX51-PBM which can then be configured. This is done by right-clicking on the *PROFIBUS Devices* item in the tree and selecting *Add PROFIBUS Device*.

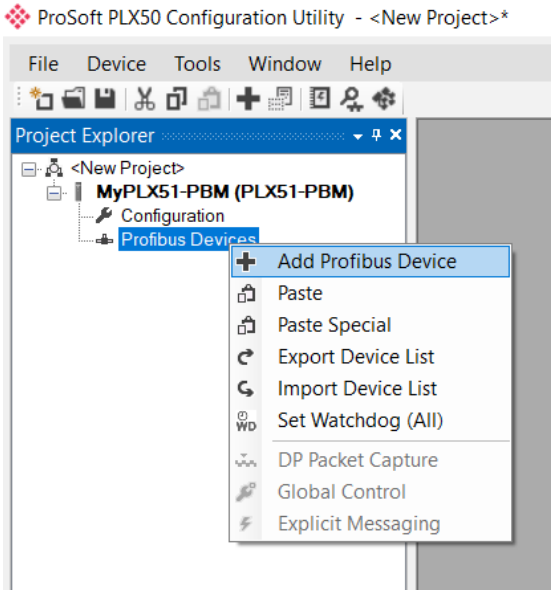
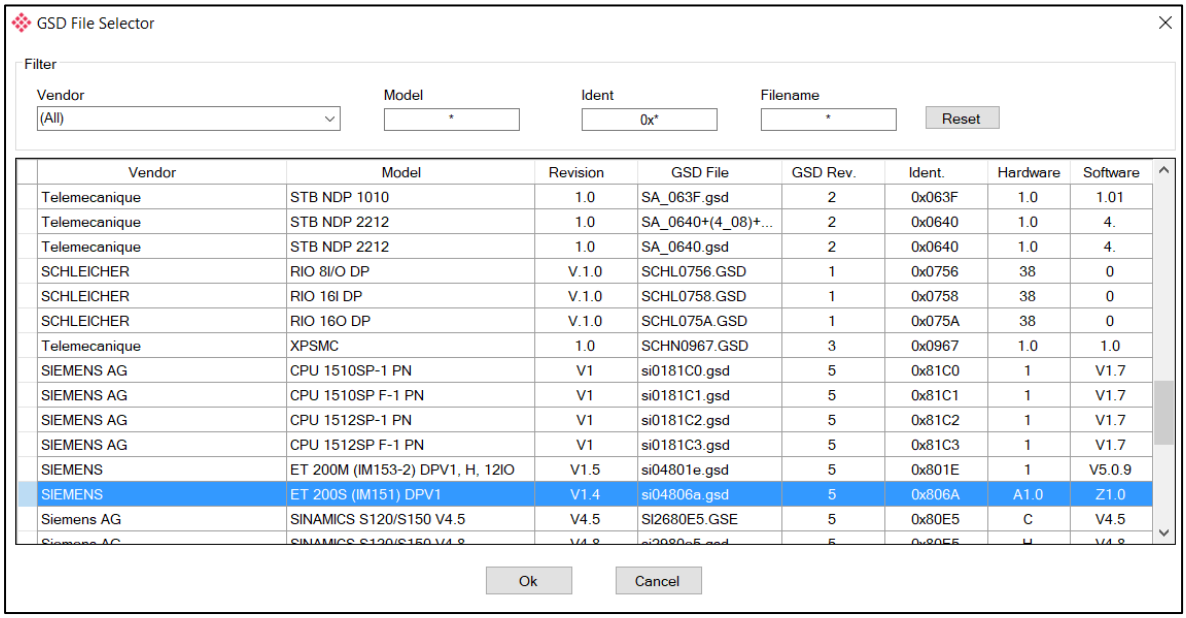


Figure 3.45 – Adding a PROFIBUS Field Device

The user will need to select the device to be added to the PLX51-PBM. This is done by selecting the device from the GSD File Selector and pressing *Ok*.



Vendor	Model	Revision	GSD File	GSD Rev.	Ident.	Hardware	Software
Telemecanique	STB NDP 1010	1.0	SA_063F.gsd	2	0x063F	1.0	1.01
Telemecanique	STB NDP 2212	1.0	SA_0640+(4_08)+...	2	0x0640	1.0	4.
Telemecanique	STB NDP 2212	1.0	SA_0640.gsd	2	0x0640	1.0	4.
SCHLEICHER	RIO 8I/O DP	V.1.0	SCHL0756.GSD	1	0x0756	38	0
SCHLEICHER	RIO 16I DP	V.1.0	SCHL0758.GSD	1	0x0758	38	0
SCHLEICHER	RIO 16O DP	V.1.0	SCHL075A.GSD	1	0x075A	38	0
Telemecanique	XPSMC	1.0	SCHN0967.GSD	3	0x0967	1.0	1.0
SIEMENS AG	CPU 1510SP-1 PN	V1	si0181C0.gsd	5	0x81C0	1	V1.7
SIEMENS AG	CPU 1510SP F-1 PN	V1	si0181C1.gsd	5	0x81C1	1	V1.7
SIEMENS AG	CPU 1512SP-1 PN	V1	si0181C2.gsd	5	0x81C2	1	V1.7
SIEMENS AG	CPU 1512SP F-1 PN	V1	si0181C3.gsd	5	0x81C3	1	V1.7
SIEMENS	ET 200M (IM153-2) DPV1, H, 12IO	V1.5	si04801e.gsd	5	0x801E	1	V5.0.9
SIEMENS	ET 200S (IM151) DPV1	V1.4	si04806a.gsd	5	0x806A	A1.0	Z1.0
Siemens AG	SINAMICS S120/S150 V4.5	V4.5	SI2680E5.GSE	5	0x80E5	C	V4.5

Figure 3.46 – Selecting a PROFIBUS Field Device

Once the device has been added the General Configuration page will be opened and the device will be added at the first open PROFIBUS Station Address.

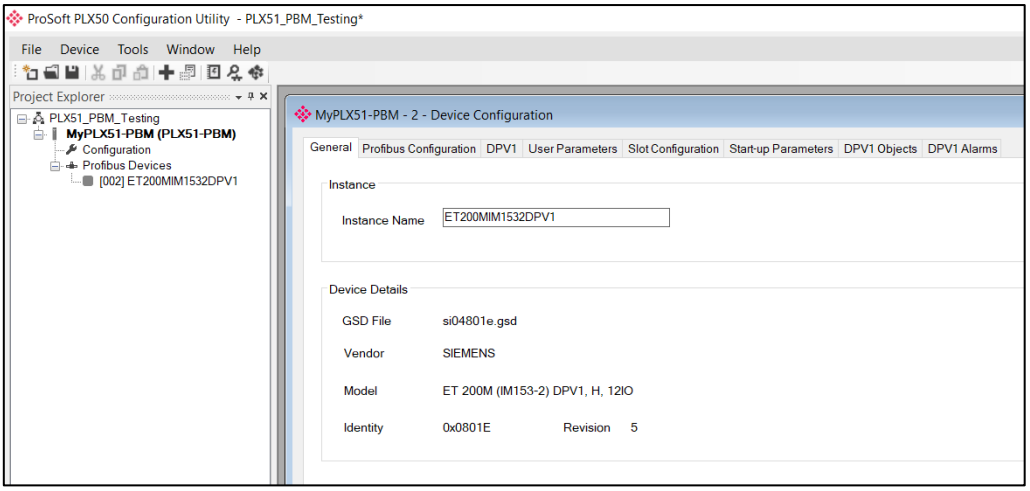


Figure 3.47 – PROFIBUS Field Device Added

3.8.1 General

The General configuration is shown in the figure below. The Device General configuration window is opened by either double clicking on the slave device in the tree or right-clicking the slave device and selecting *Configuration*.

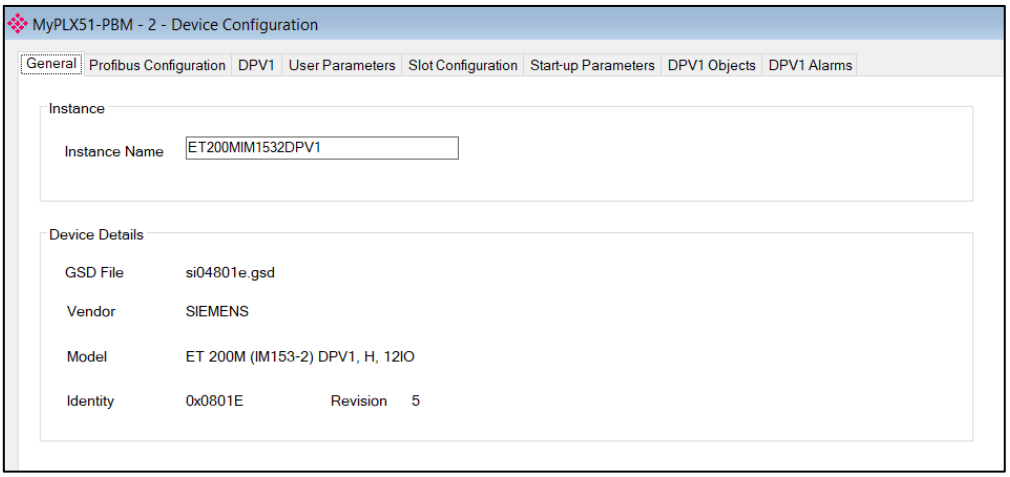


Figure 3.48 – Field Device General configuration parameters

The General configuration consists of the following parameters:

Parameter	Description
Instance Name	The device instance name which will be used to create the Tag names and UDTs in Logix.

Table 3.11 –Device General configuration parameters

3.8.2 PROFIBUS Configuration

The PROFIBUS configuration is shown in the figure below. The Device PROFIBUS configuration window is opened by either double clicking on the slave device in the tree or right-clicking the slave device and selecting *Configuration*.

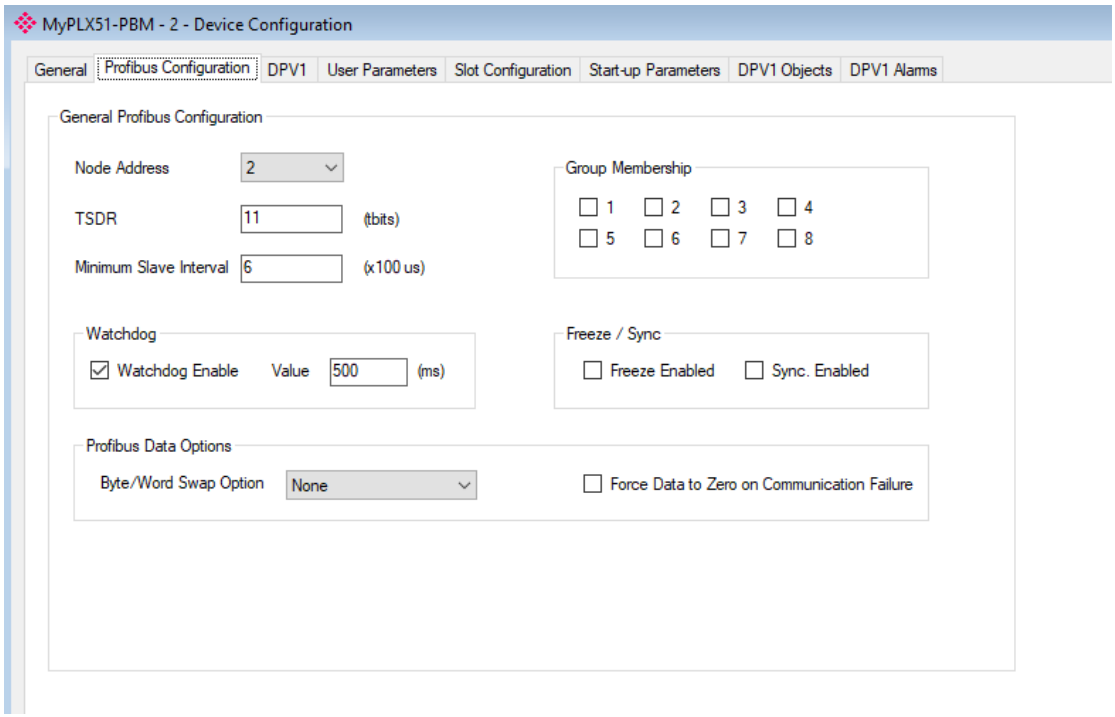


Figure 3.49 – Field Device PROFIBUS configuration parameters

The PROFIBUS configuration consists of the following parameters:

Table 3.12 – Field Device PROFIBUS configuration parameters

Parameter	Description
Node Address	This is the station address configured for the added device. This is the address the PLX51-PBM will use to look for and configure the device for Data Exchange.
TSDR	This parameter is the minimum time that a PROFIBUS-DP slave must wait before it responds. It must respect the rule: Min: 11 Max: 1023 Default: 11
Minimum Slave Interval	This is the minimal time that the PROFIBUS must wait between two IO data exchanges with this device. The default value proposed comes from the GSD File. Min: 1 Max: 65535
Watchdog Enable	Enables the watchdog for the slave device data exchange. The slave device monitors the data exchange rate (PROFIBUS Cycle) and it must be less than the Watchdog Value else the slave device will change back into an unconfigured state.
Watchdog Value	Is used to monitor cyclic communication and must be significantly higher than the time required for one PROFIBUS cycle. If a slave does not receive a request frame for a period of time longer than the watchdog time, it will revert to its initial, power-up state and cyclic communication will have to be reestablished.

	The minimum and default values are defined by the PLX51-PBM Default Watchdog setting in the PLX51-PBM PROFIBUS configuration.
Group Membership	Specifies which groups the slave belongs to. A slave can be in multiple groups at a time (from 1 through 8). Groups are used by the master when it sends a Sync or Freeze command. PROFIBUS Group checkboxes are enabled when Sync Mode or Freeze Mode checkboxes are checked.
Freeze Enabled	User data transmission Synchronization control commands enable the synchronization of inputs. Freeze Mode field is unchecked by default.
Sync Enabled	User data transmission Synchronization control commands enable the synchronization of outputs. Sync Mode is unchecked by default.
Byte/Word Swap Option	This parameter will reformat the input and output Profibus DPV0 communication data. Below are the reformat options if the normal data format is AA BB CC DD: **None** **BB AA** **DD CC BB AA** **CC DD AA BB**
Force Data to Zero on Communication Failure	When this parameter is set it will force the last data received from a DP device to be forced to zero if the DPV0 communication to that specific device is lost.

3.8.3 DPV1

The DPV1 configuration is shown in the figure below. The slave device DPV1 configuration window is opened by either double clicking on the slave device in the tree or right-clicking the slave device and selecting *Configuration*.

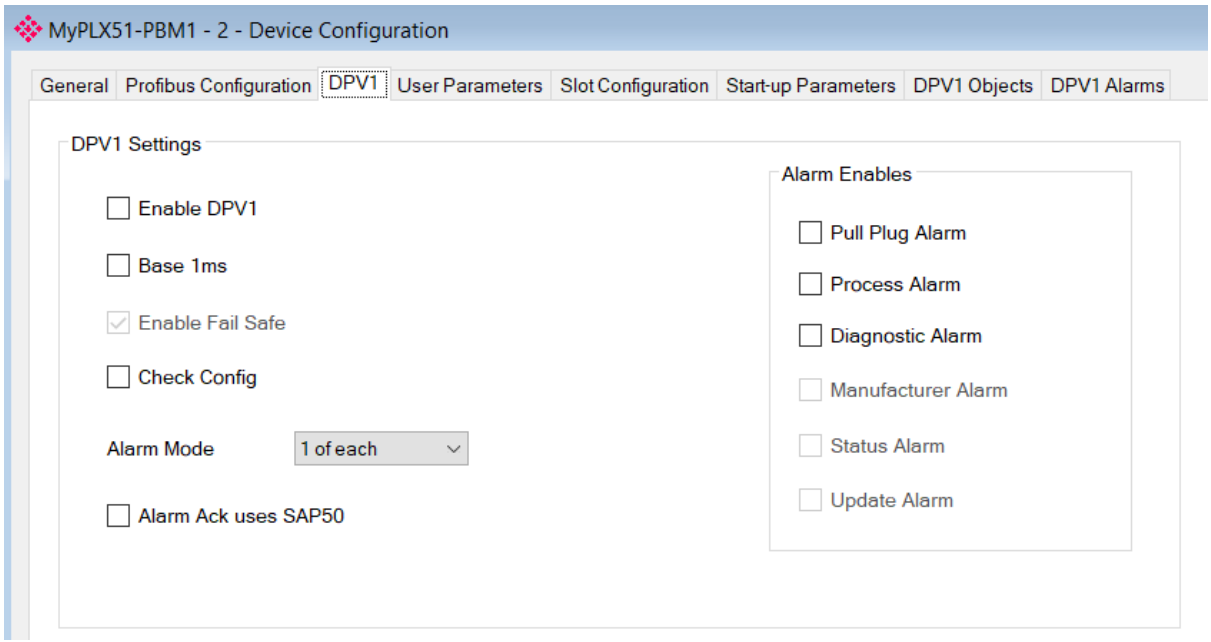


Figure 3.50 – Device DPV1 configuration parameters

The DPV1 configuration consists of the following parameters:

Table 3.13 – Device DPV1 configuration parameters

Parameter	Description
Enable DPV1	Indicates if the slave supports DPV1 Class 1 access (read and write) or alarms. **If the device does not support these DPV1 services, this parameter must be unchecked.** The default value is based on the information provided by the GSD File.
Base 1ms	Indicates if the device should use the 1ms base time for watchdog time calculation. See the chapter “PROFIBUS Settings” below for watchdog time calculation. By default, the field will be unchecked which sets the watchdog base to 10 ms. **NOTE:** the watchdog value is always shown in the configuration panel in ms regardless of this time base setting.
Enable Fail Safe	The failsafe mode determines the behavior of the DP Slave outputs when the PROFIBUS Master is in CLEAR state: If the slave is configured to be failsafe and supports this feature, then it will apply its own fallback value (the Master sends outputs with 0 length data) If not, the Master sends output data at 0 If this feature is supported by the device, the check box must be checked. If the device does not support it, this parameter must be unchecked. The default value is based on the information provided by the GSD File.
Check Config	This checkbox is used to define the reaction to the reception of configuration data. If the check box is not set, the check is as described in EN 50170. If the check box is set, the check is made according to a specific user definition. By default, the field will be unchecked.
Alarm Mode	This parameter specifies the maximum number of possible active alarms for the device.

Alarm Ack uses SAP50	This will force the PLX51-PBM to use Service Access Point (SAP) 50 to acknowledge alarms.
Alarm Enables	Enables specific alarms for the slave device to report on if active. The available alarms are listed below and are only available if specified in the device's GSD file: ▪ Pull Plug Alarm ▪ Process Alarm ▪ Diagnostic Alarm ▪ Manufacturer Alarm ▪ Status Alarm ▪ Update Alarm

3.8.4 User Parameters

The User Parameter configuration is shown in the figure below. The device User Parameter configuration window is opened by either double clicking on the slave device in the tree or right-clicking the slave device and selecting *Configuration*.

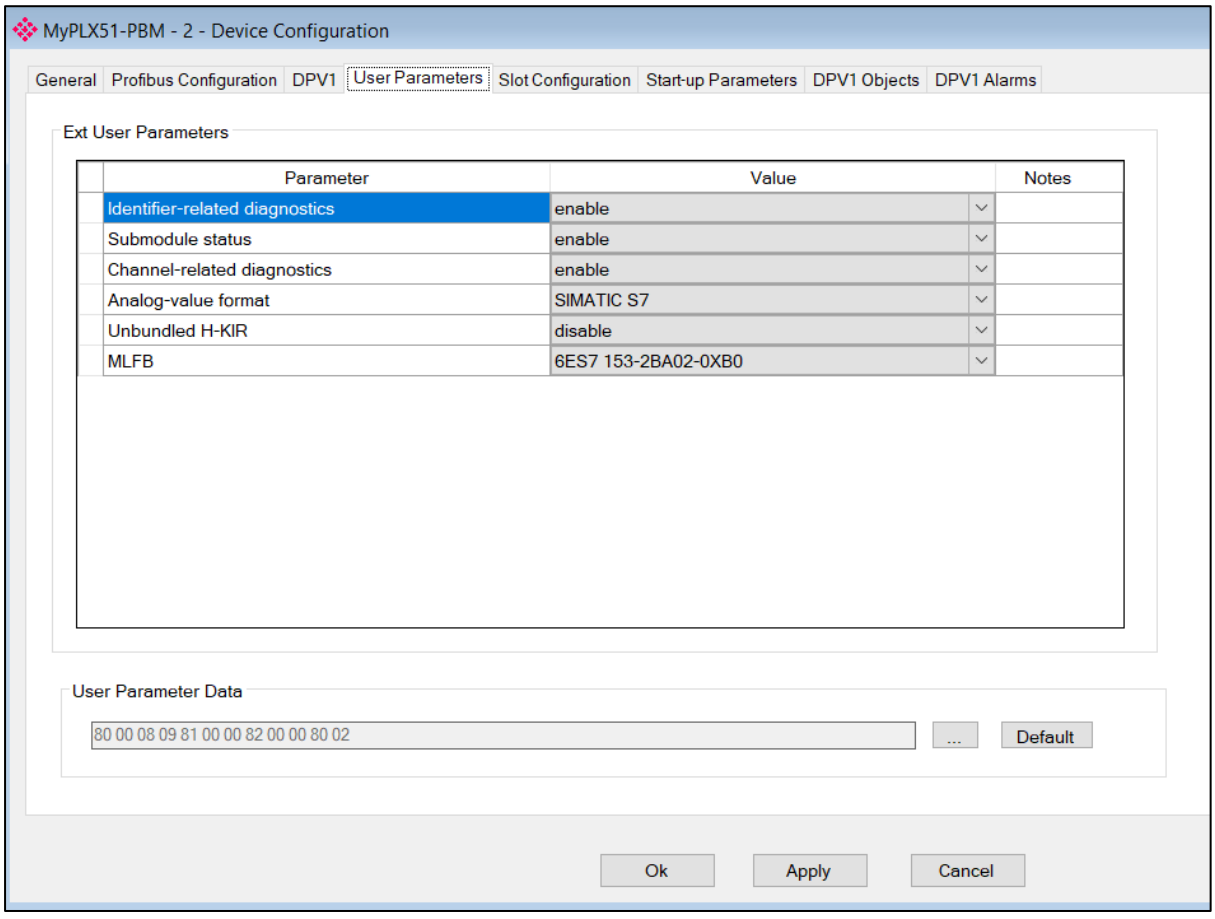


Figure 3.51 – Device User Parameter configuration parameters

The User Parameter configuration consists of the device specific user configuration. This is extracted from the device GSD file and can be used to configure device specific parameters. When one of the parameters is changed the User Parameter Data will be updated which is sent to the device in the Set Parameter telegram.

3.8.5 Slot Configuration

Each slave device can have multiple slots that can be configured. A slot can be a place holder for a process variable or a placeholder for a specific piece of hardware. In the example below the PROFIBUS slave device added is an IO adapter which can have multiple additional IO modules which will be represented as additional slots.

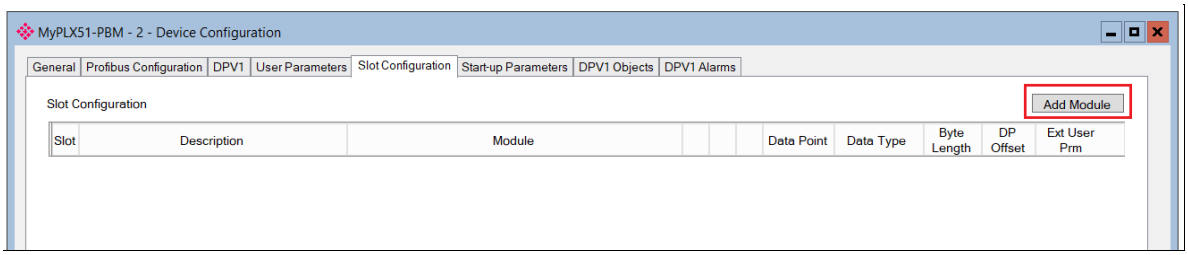


Figure 3.52 – Field Device Slot configuration start

To add a module, select the ***Add Module*** button. The module selection form will appear listing all the available modules from the GSD file.

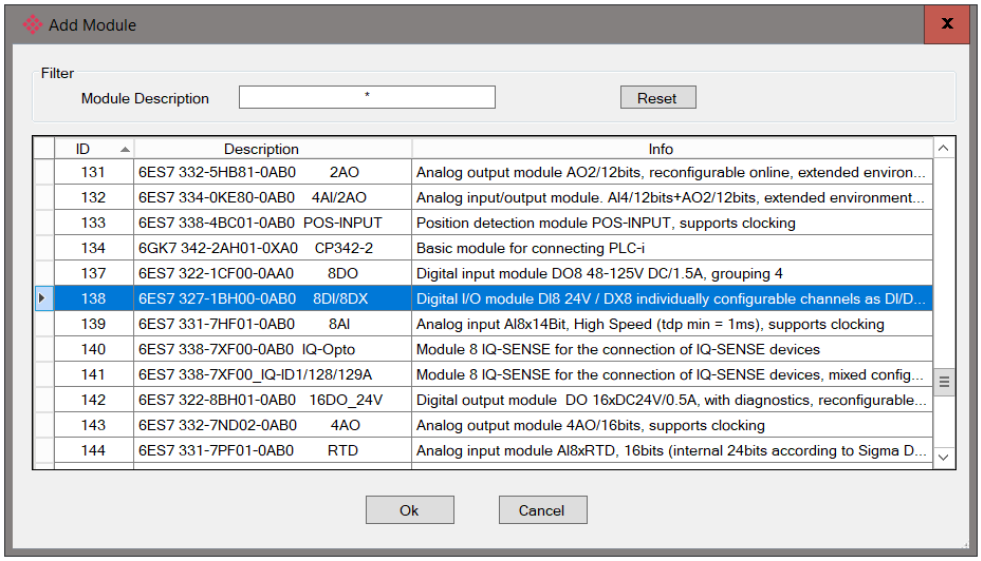


Figure 3.53 – Module Selection

The ***Module Description*** filter can be used in conjunction with the wildcard character (“***”**) to easily locate the required module. Once the required module has been selected press the ***Ok*** button.

The module will be added to the Slot configuration. The layout of the slot configuration differs slightly depending on whether Logix or Modbus has been selected as the Primary Interface.

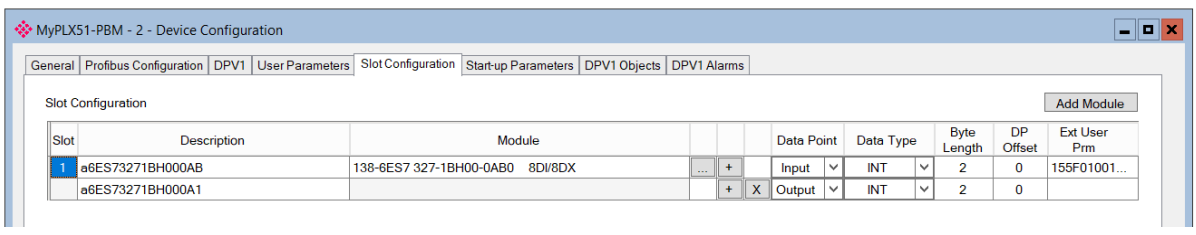


Figure 3.54 – Slot configuration – (Logix)

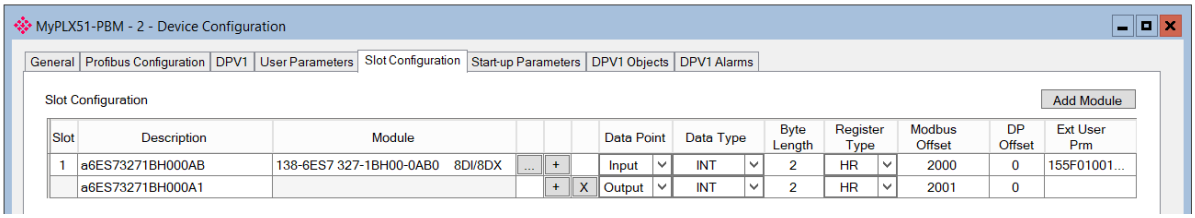


Figure 3.55 – Slot configuration – (Modbus)

Slot Configuration - General

Each module added can consist of one or more Data Points. In the example below the module has two Data Points, one Input and one Output.

The description of each is based on the module name (from GSD file) but can be edited by the user. When using Logix this Description is used to create the member of the device-specific UDTs and thus no illegal Logix characters are permitted. It is also important that these descriptions are unique within a device.

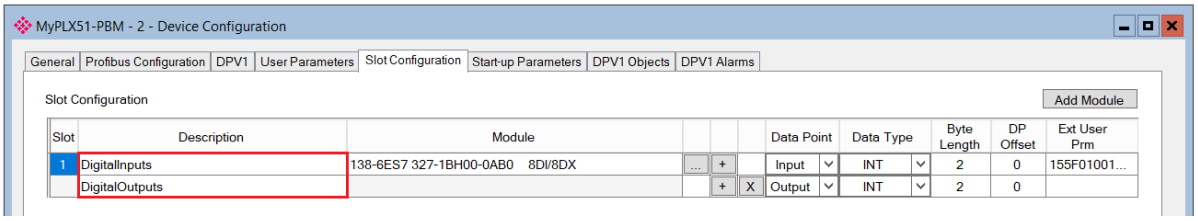


Figure 3.56 – Slot descriptions

Some modules provide module specific User Parameters to further configure the module. These parameters can be accessed by either clicking on the Configure (**…**) button or by right-clicking on the Module and selecting the ***Configure Module*** option in the context menu.

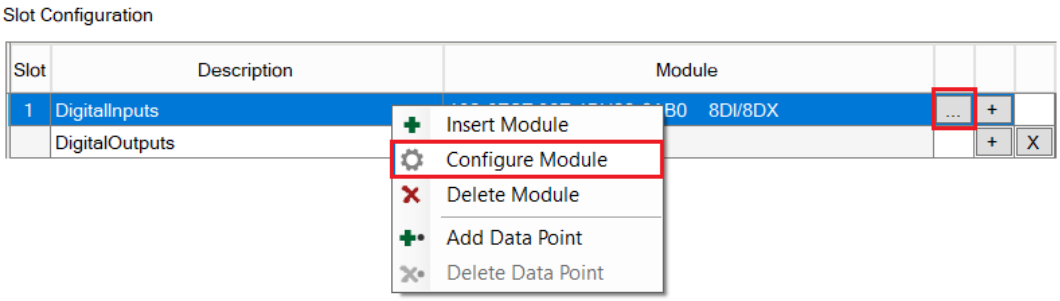


Figure 3.57 – Access Module Specific User Parameters

The Module User Parameter Editor will appear. The parameters and their enumerated options are derived from the GSD file.

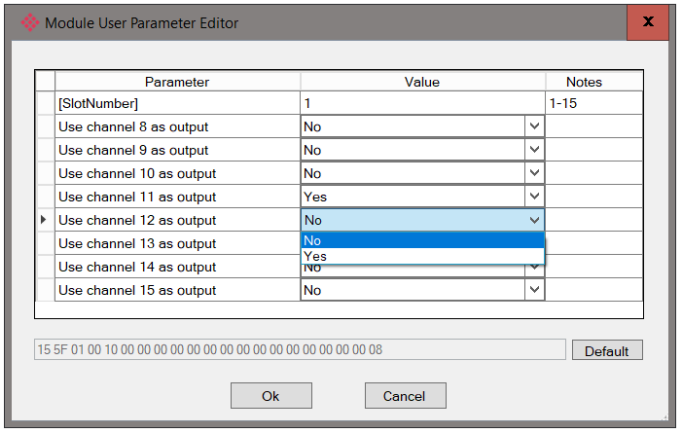


Figure 3.58 – Device Slot configuration additional parameters

Once the slot parameters have been updated the user can click the ***OK*** button which will update the Extended User Parameters and return to the Slot Configuration page.

When adding a slot, the data format and size will default to that of the selected module in the GSD file. Depending on the GSD file, the default configuration may not be preferred and can be changed by the user.

Formatting the modules data can be achieved by a combination of adding or removing Data Points and changing the Data Type of each.

Data Points can be added by either right-clicking on the module and selecting ***Add Data Point*** or by clicking on the "**+**" button.

Data Points can be removed by either right-clicking on the module and selecting ***Delete Data Point*** or by clicking on the "**X**" button.

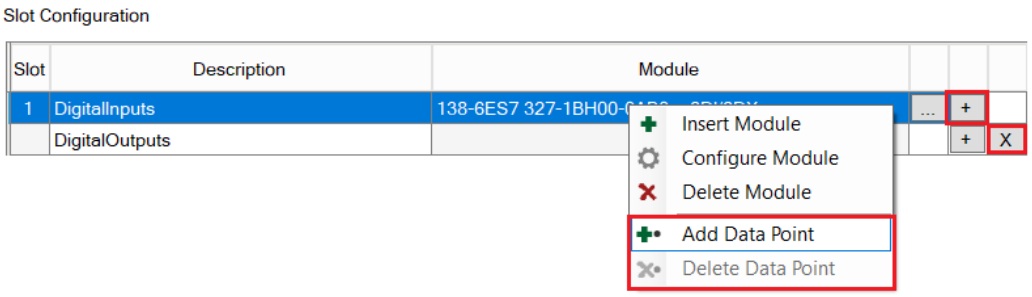


Figure 3.59 – Adding / Removing Data Points

NOTE: Each module must contain at least one Data Point.

After adding a new Data Point, the following should be configured:

- Description
- Data Point Type (Input, Output, None)
- Data Type
- Byte Length

Slot Configuration

Slot	Description	Module				Data Point	Data Type	Byte Length	DP Offset
1	DigitalInputs	138-6ES7 327-1BH00-0AB0 8DI/8DX	...	+		Input	SINT	1	0
	DigitalInputs2			+	X	Input	SINT	1	1
	DigitalOutputs			+	X	Output	INT	2	0

Figure 3.60 – Configuring Data Points

After updating the Data Type, the Byte Length will be set to match the selected Data Type. By modifying the Byte Length thereafter, an array of that Data Type can be configured. It is however important that the Byte Length is always a multiple of the base Data Length.

Data Type	Byte Length MUST be a multiple of:
BOOL	1
SINT	1
INT	2
DINT	4
REAL	4

Table 3.14 – Data Type – Byte Length Restrictions

IMPORTANT: It is critical that the configured Byte Length be a multiple of the base Data Type.

IMPORTANT: It is critical that the total sum of input and output bytes (of all the Data Points) match that required by the slave device. Not adhering to this could cause unexpected results.

NOTE: The DP (Byte) Offset for each the Data Point will be automatically calculated.

Slot Configuration – Logix Specific

When using Logix as the Primary Interface, the PROFIBUS Data Points will be packed and padded to match a device specific UDT. All the Inputs will be collated together and then all the Outputs.

IMPORTANT: It is important that the Data Point Descriptions do not contain any illegal characters and are not duplicated within a device. Failing to do so will create errors when generating and importing the mapping L5X into Studio 5000.

Slot Configuration

Slot	Description	Module				Data Point	Data Type	Byte Length	DP Offset	Ext User Prm
1	DigitalInputs	138-6ES7 327-1BH00-0AB0 8DI/8DX	...	+		Input	INT	2	0	155F01001...
	DigitalOutputs			+	X	Output	INT	2	0	

Figure 3.61 – Slot configuration – Logix Example

Slot Configuration – Modbus Specific

When using Modbus as the Primary Interface, it is important to configure the Modbus Register Type and Modbus Offset correctly to ensure that multiple Data Points are not mapped to the same Modbus data area.

Slot Configuration

Slot	Description	Module				Data Point	Data Type	Byte Length	Register Type	Modbus Offset	DP Offset	Ext User Prm
1	DigitalInputs	138-6ES7 327-1BH00-0AB0 8DI/8DX	...	+		Input	INT	2	HR	2000	0	155F01001...
	DigitalOutputs			+	X	Output	INT	2	HR	2001	0	

Figure 3.62 – Slot configuration – Modbus Example

IMPORTANT: It is important that the Data Point Register Type and Modbus Offset does not result in multiple Data Points overlapping. Such conflicts will cause unexpected results.

IMPORTANT: It is important that the Data Point Register Type is appropriate for the Data Type, Type (Input/Output) and Modbus interface type (Master/Slave).

IMPORTANT: The range of configured Modbus registers for each register type may not exceed 10,000.

To simplify the Modbus register assignment process, the user can select the ***Assign Modbus from Here*** option, after right-clicking on a particular mapped item. Once the assignment process is complete, all the mapped items below, and including, the selected item will be updated.

Slot Configuration

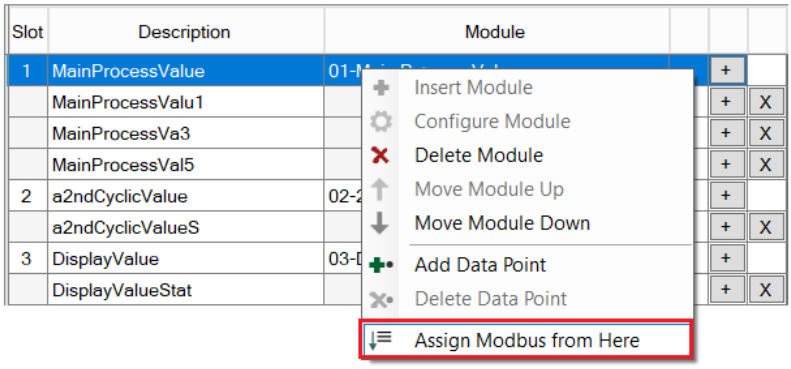


Figure 3.63 – Slot configuration – Selecting Assign Modbus from Here option

After selecting this option, the ***Modbus Assignment*** form will open.

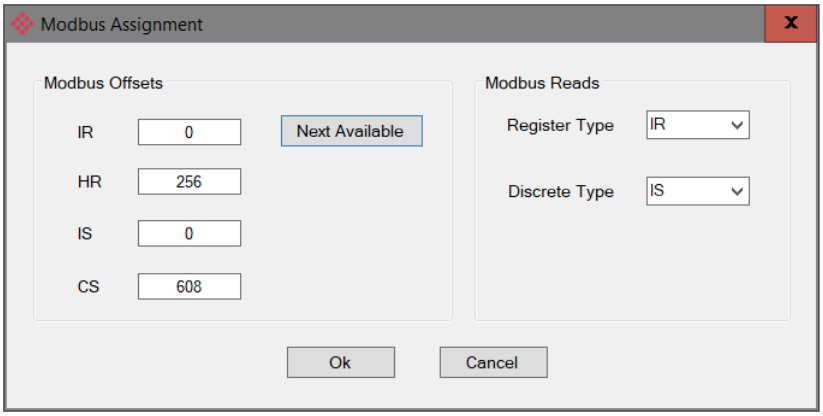


Figure 3.64 – Modbus Assignment

The ***Modbus Offsets*** for each Modbus data type will default to the next available register after the last one referenced. These offsets will be used as the starting registers for the auto-assignment, and can be modified by the user as required.

The ***Next Available*** button, will return the offsets to their default values.

The automatic assignment of registers will take into account the data type of each data point. In the case of Modbus reads, the assigned type could be either an Input Register (IR) or Holding Register (HR) for non-Booleans and either a Digital Input (IS) or Coil (CS) for Booleans.

The user can specify their preference using the ***Register Type*** and ***Discrete Type*** combo box options in the ***Modbus Reads*** section.

Once the ***Ok*** button has been clicked, the Modbus ***Register Type*** and ***Modbus Offset*** for the selected, and subsequent items, will be updated.

3.8.6 Start-up Parameters

Each slave device can have a set of start-up parameters associated with it which will be updated once Data Exchange is active using DPV1 Class 1 messaging. Thus, the user can have specific parameters that must be updated after the device is initialized for data exchange which will simplify device replacement.

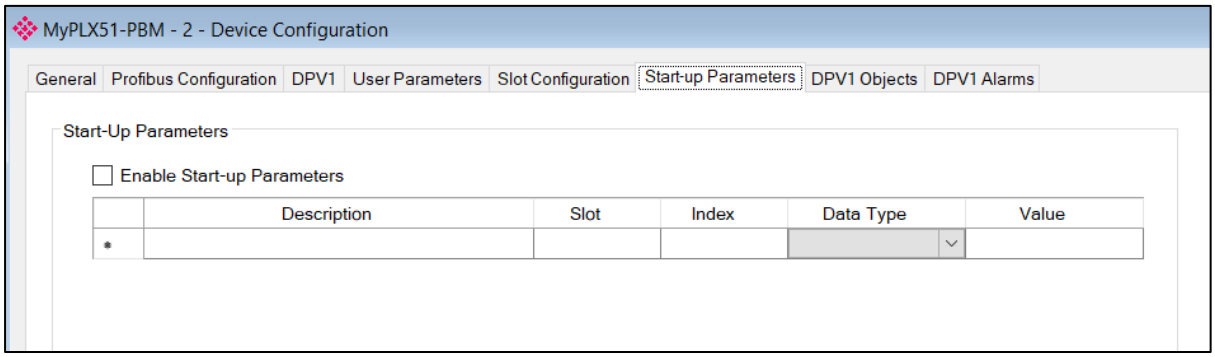


Figure 3.65 – Device Start-up Parameters

The user will need to enable the Start-up parameters by selecting the *Enable Start-Up Parameters* checkbox. Then the user will need to enter the required start-up parameters as shown below.

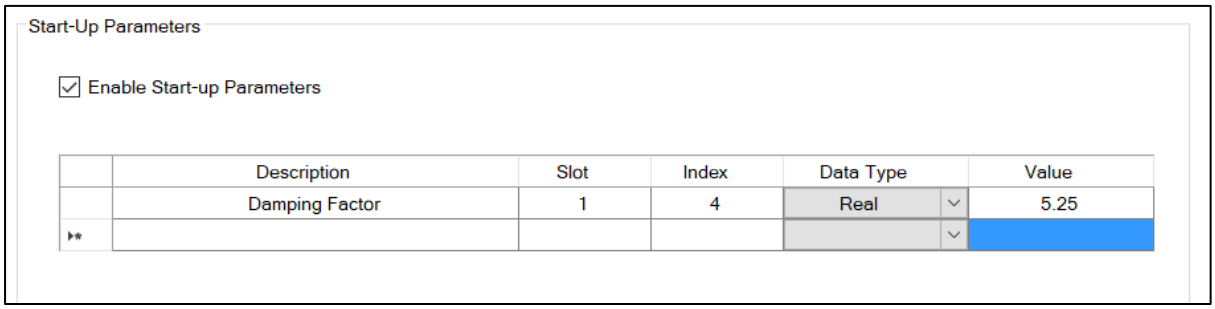


Figure 3.66 – Device Start-up Parameters Example

Once the slave device has been successfully parameterized and configured for Data Exchange the PLX51-PBM will update one parameter at a time for each slave device.

3.9 Adding PROFIBUS DP Devices – Slave Mode

The user will need to add each PROFIBUS device to the PLX51-PBM, which can then be configured. This is done by right-clicking on the ***PROFIBUS Devices*** item in the tree and selecting ***Add PROFIBUS Device***.

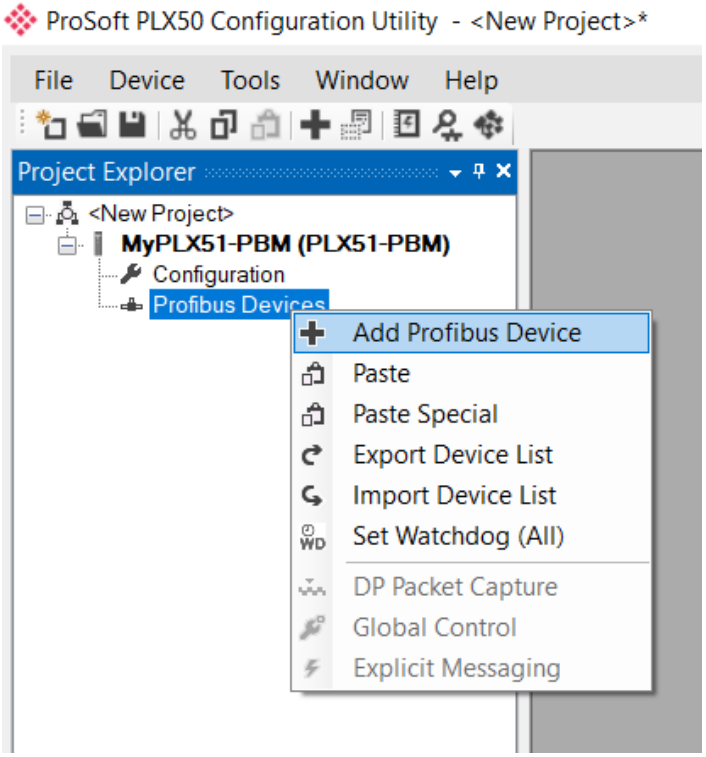


Figure 3.67 – Adding a PROFIBUS Field Device

When adding a PROFIBUS Device in Slave Mode, the user can select any of the following devices to add:

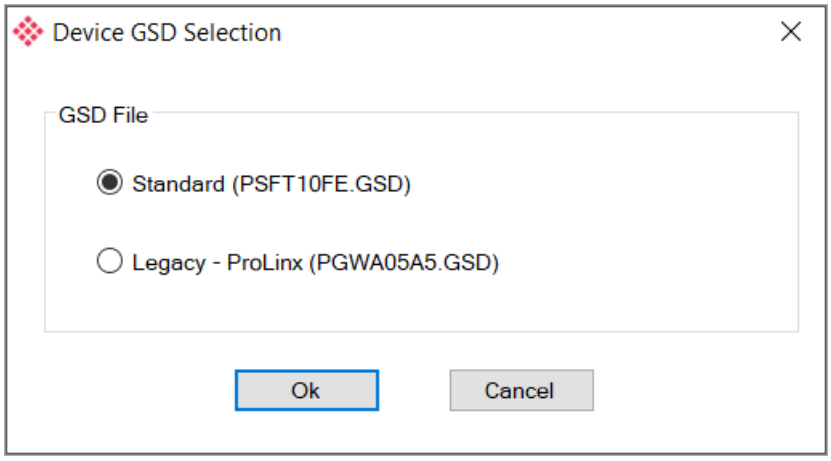


Figure 3.68 – Selecting a PROFIBUS Field Device

Table 3.15 – Slave GSD Files

Module	GSD Filename
PLX51-PBM	PSFT10FE.GSD
ProLinx	PGWA05A5.GSD

3.9.1 General

The General configuration is shown in the figure below. The Device General configuration window is opened by either double clicking on the slave device in the tree or right-clicking the slave device and selecting *Configuration*.

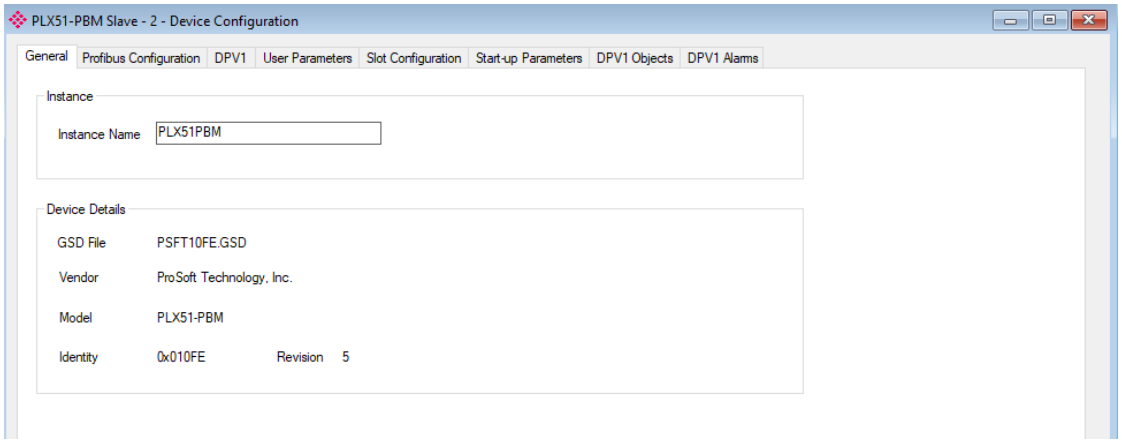


Figure 3.69 – Device General configuration parameters

When the module is emulating the legacy device, the PLX51-PBM General configuration parameters will appear as follows:

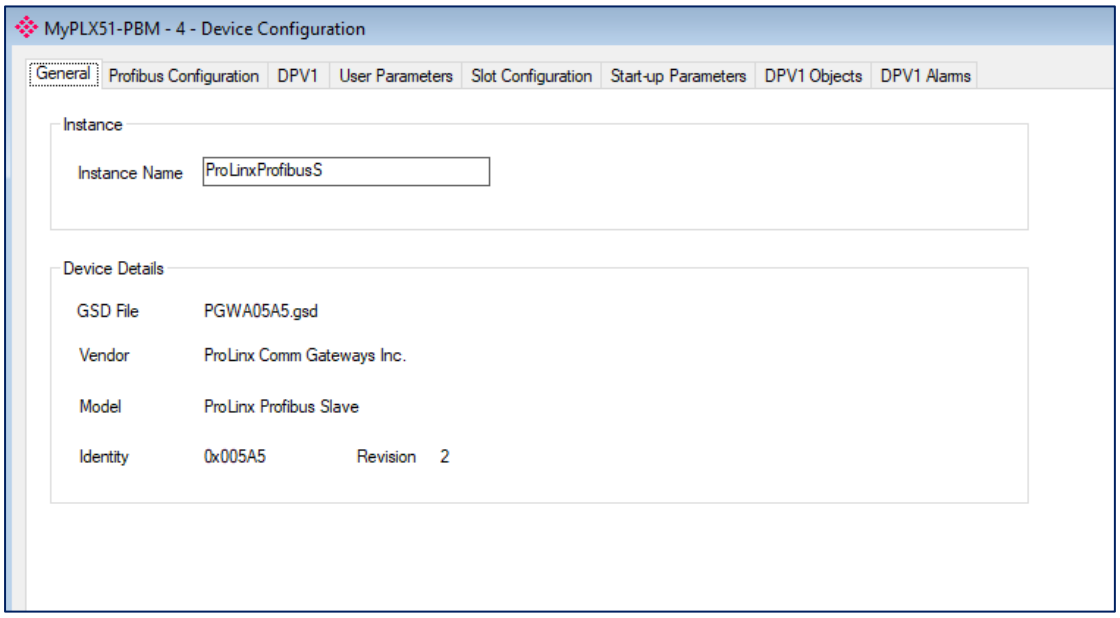


Figure 3.70 – Device General configuration parameters (legacy device)

The General configuration consists of the following parameters:

Table 3.16 –Device General configuration parameters

Parameter	Description
Instance Name	The device instance name which will be used to create the Tag names and UDTs in Logix.

3.9.2 PROFIBUS Configuration

The PROFIBUS configuration is shown in the figure below. The Device PROFIBUS configuration window is opened by either double clicking on the slave device in the tree or right-clicking the slave device and selecting *Configuration*.

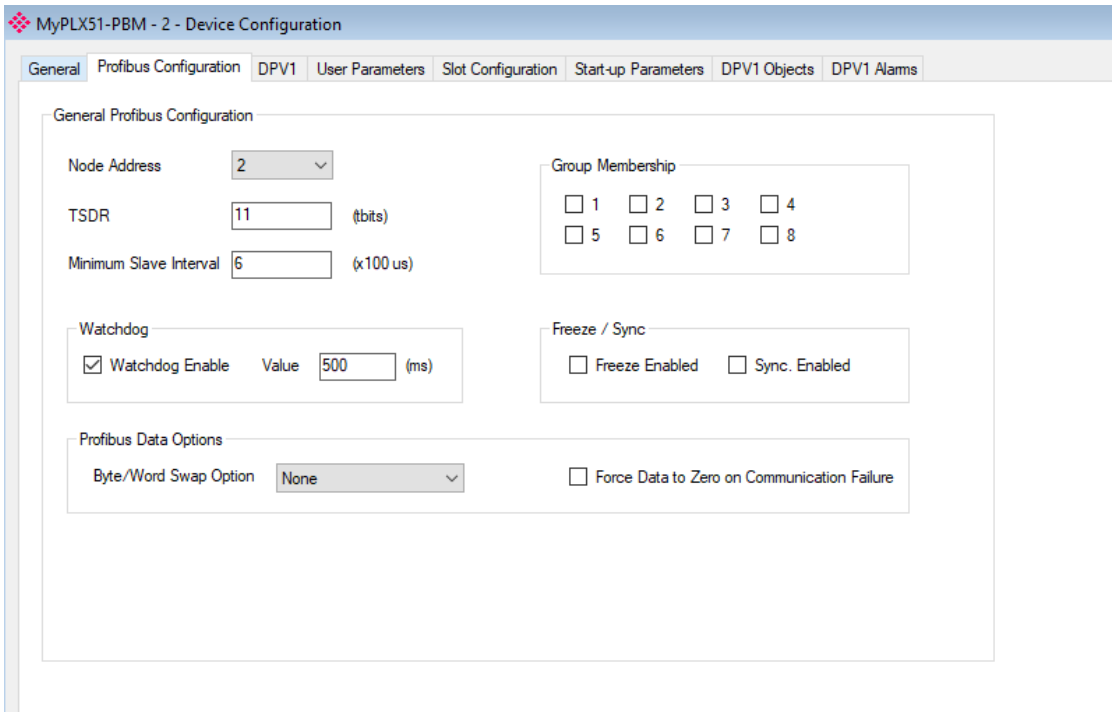


Figure 3.71 – Device PROFIBUS configuration parameters

When the module is emulating the legacy device, the PLX51-PBM Profibus Configuration parameters will appear as follows:

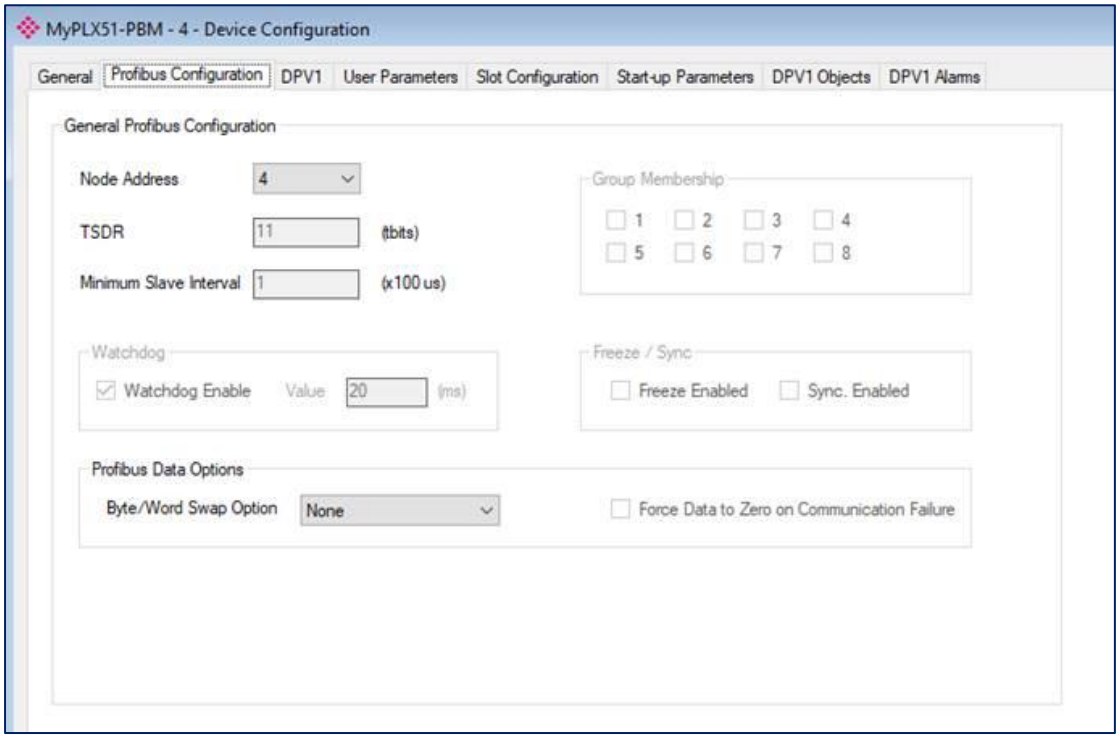


Figure 3.72 – Device PROFIBUS configuration parameters (legacy device)

The PROFIBUS configuration consists of the following parameters:

Table 3.17 – Field Device PROFIBUS configuration parameters

Parameter	Description
Node Address	This is the station address configured for the added device. This is the address the DP PROFIBUS Master will use to look for and configure the device for Data Exchange.
TSDR	N/A
Minimum Slave Interval	N/A
Watchdog Enable	N/A
Watchdog Value	N/A
Group Membership	N/A
Byte/Word Swap Option	This parameter will reformat the input and output Profibus DPV0 communication data. Below are the reformat options if the normal data format is AA BB CC DD: **None** **BB AA** **DD CC BB AA** **CC DD AA BB**

3.9.3 DPV1

The DPV1 configuration is shown in the figure below. The slave device DPV1 configuration window is opened by either double clicking on the slave device in the tree or right-clicking the slave device and selecting *Configuration*.

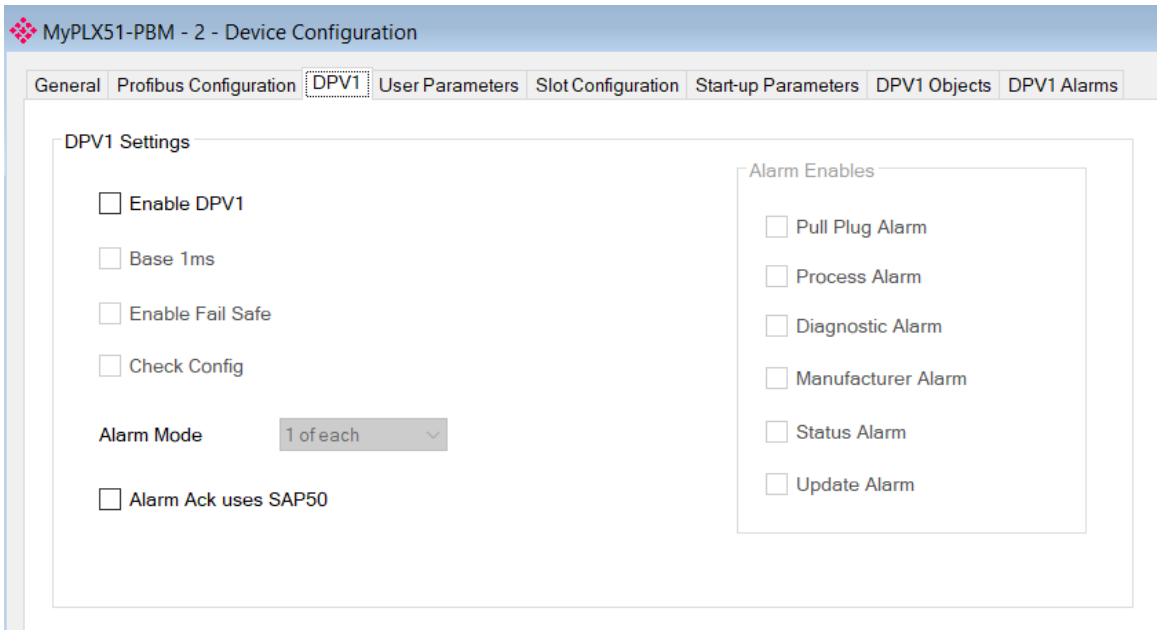


Figure 3.73 – Device DPV1 configuration parameters

When the module is emulating the legacy device, the PLX51-PBM DPV1 configuration parameters will appear as follows:

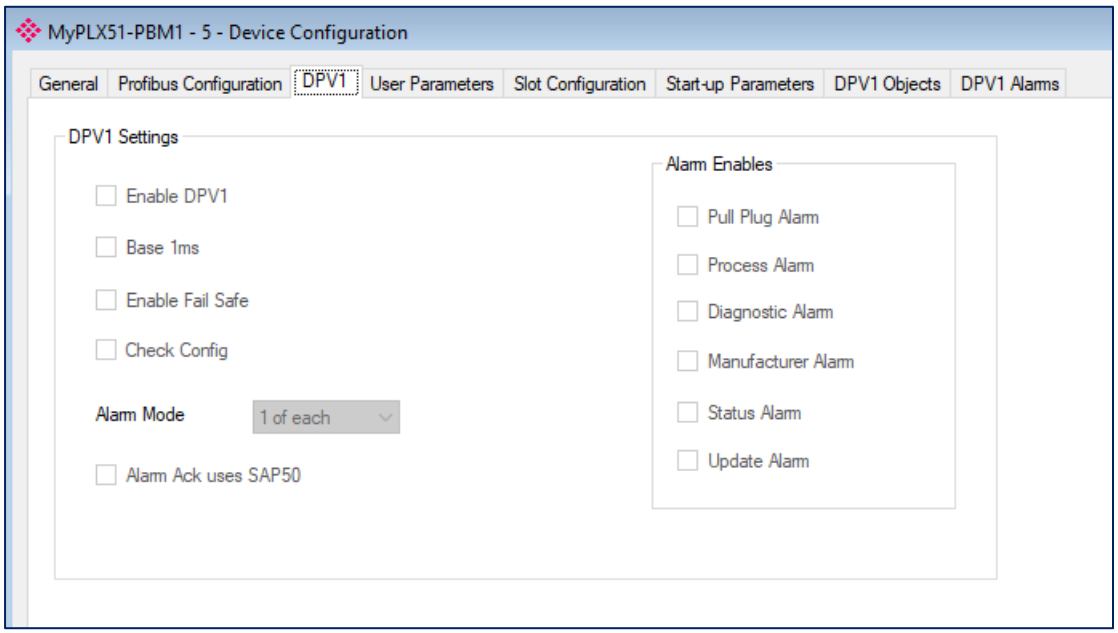


Figure 3.74 – Device DPV1 configuration parameters (legacy device)

The DPV1 configuration consists of the following parameters:

Table 3.18 – Device DPV1 configuration parameters

Parameter	Description
Enable DPV1	Enables DPV1 capabilities for the PLX51-PBM in Slave Mode. **Note:** DPV1 capabilities are not available when the module is emulating the legacy device.
Base 1ms	N/A
Enable Fail Safe	N/A
Check Config	N/A
Alarm Mode	N/A
Alarm Ack uses SAP50	This will force the PROFIBUS DP Master to use Service Access Point (SAP) 50 to acknowledge alarms.
Alarm Enables	N/A

3.9.4 User Parameters

Note: You must configure the slave device's user parameters in the settings of the PROFIBUS DP Master.

The User Parameter configuration is shown in the figure below. The device User Parameter configuration window is opened by either double clicking on the slave device in the tree or right-clicking the slave device and selecting *Configuration*.

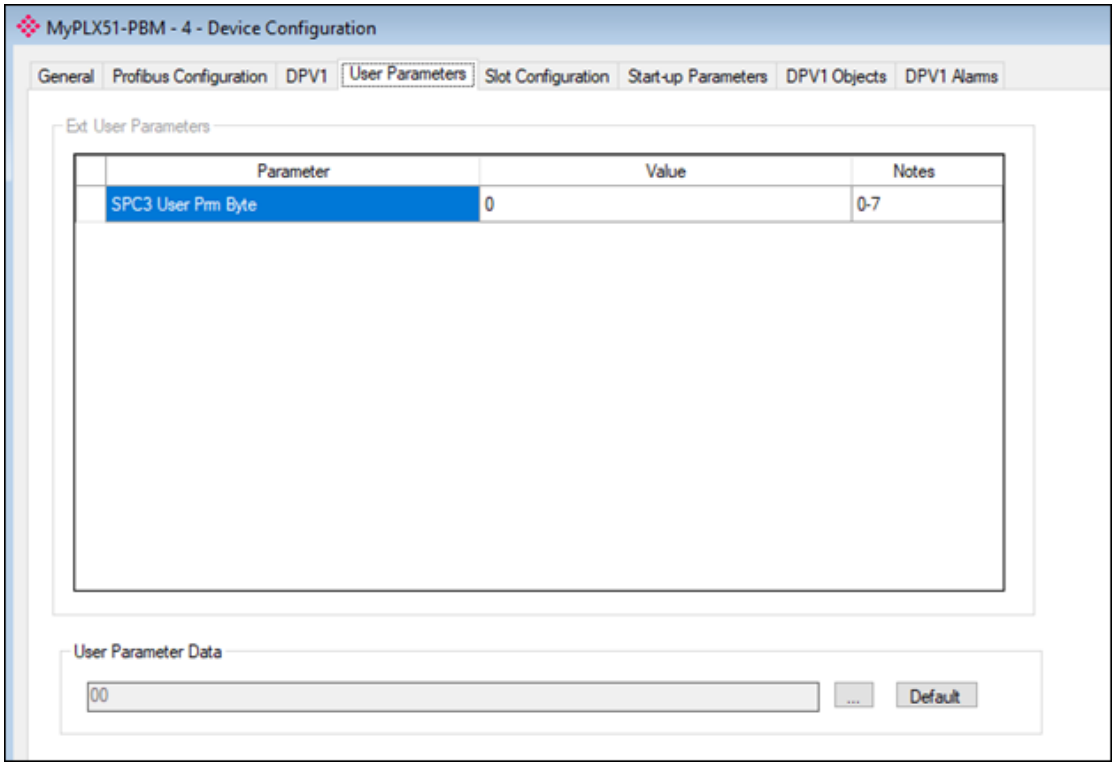


Figure 3.75 – Device User Parameter configuration parameters (legacy device)

3.9.5 Slot Configuration

Each slave device can have multiple slots that can be configured. A slot can be a place holder for a process variable or a placeholder for a specific piece of hardware. In the example below the PROFIBUS slave device added is an IO adapter which can have multiple additional IO modules which will be represented as additional slots.

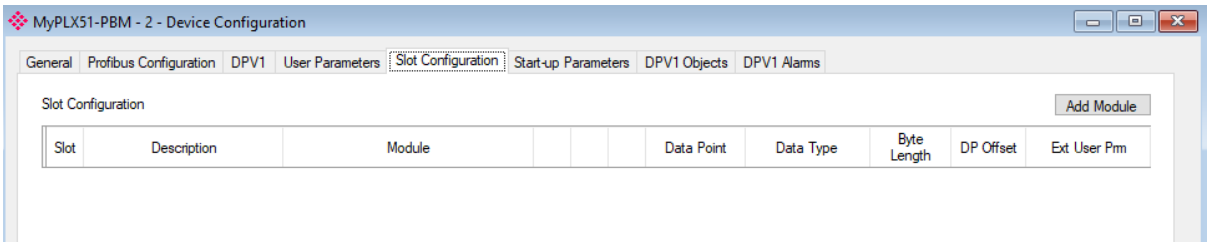


Figure 3.76 – Field Device Slot configuration start

To add a module, select the ***Add Module*** button. The module selection form will appear listing all the available modules from the GSD file.

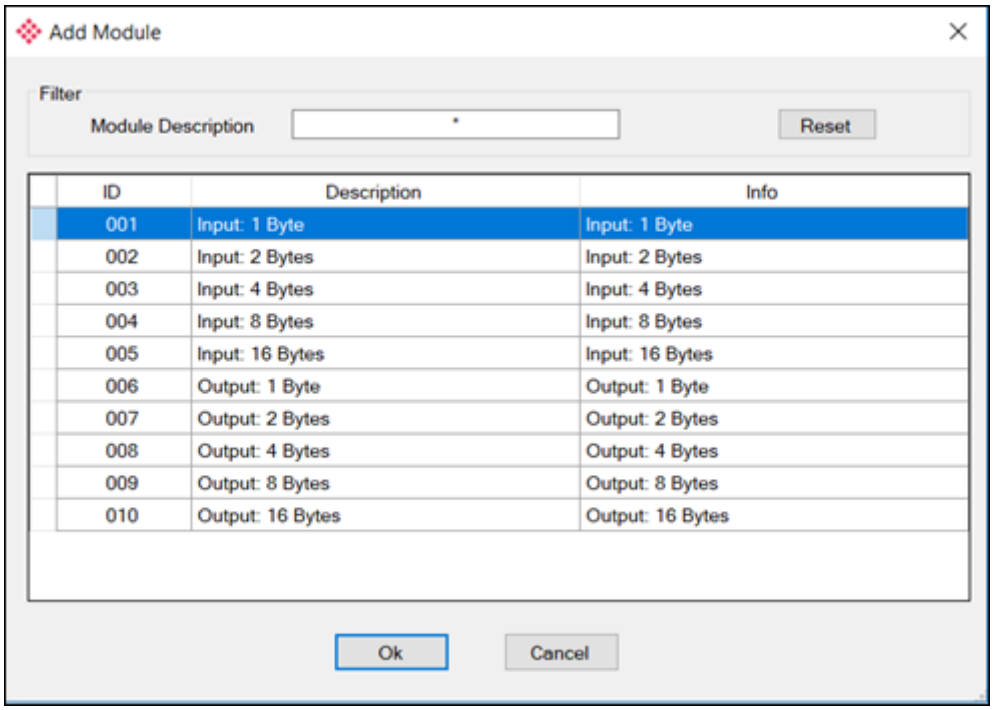
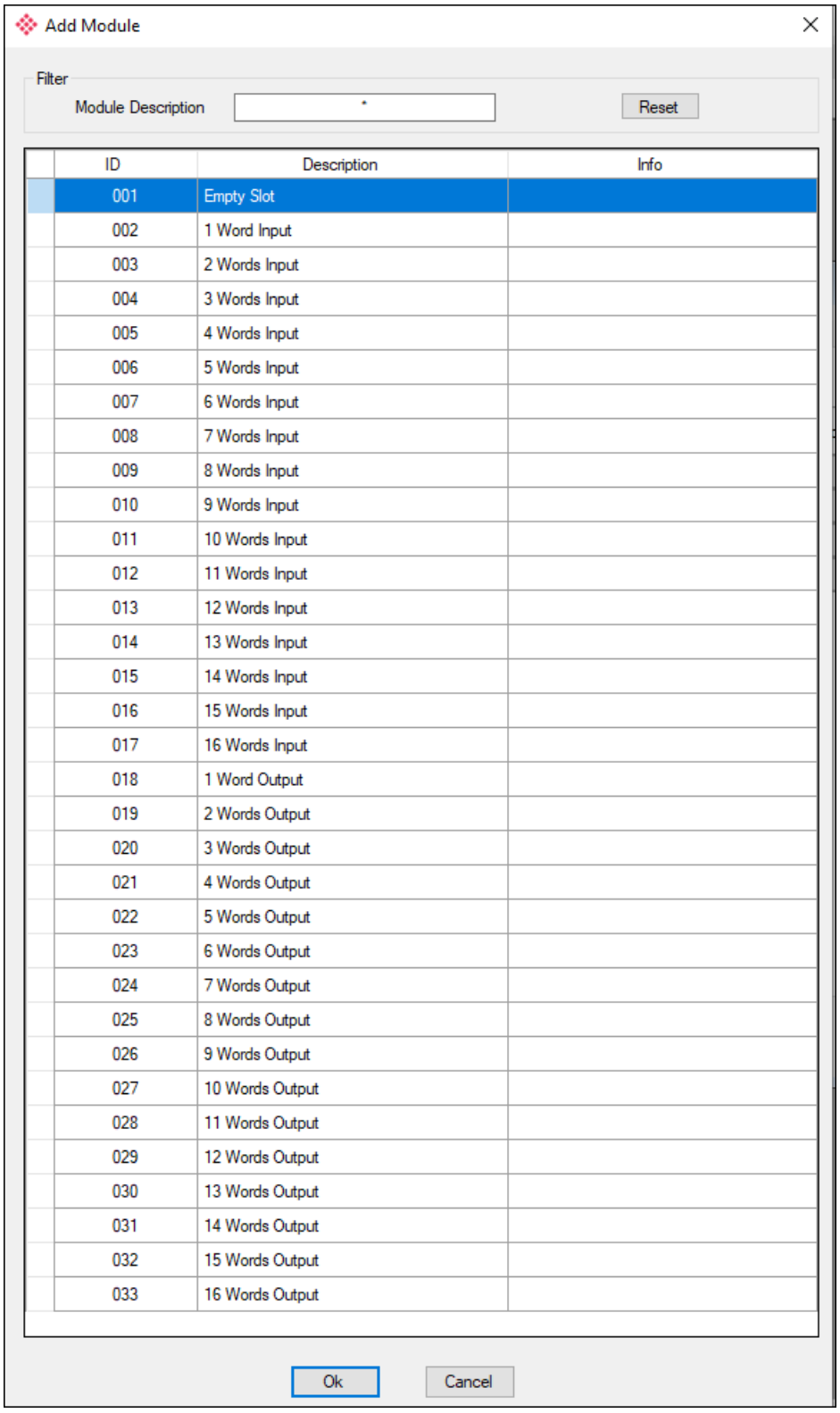


Figure 3.77 – Module Selection for the PLX51-PBM slave device selected

Note: Note: You must configure the slave device's user parameters in the settings of the PROFIBUS DP Master:



The ***Module Description*** filter can be used in conjunction with the wildcard character ("***") to easily locate the required module. Once the required module has been selected press the ***Ok*** button.

The module will be added to the Slot configuration. The layout of the slot configuration differs slightly depending on whether Logix, Explicit EtherNet/IP, or Modbus has been selected as the Primary Interface.

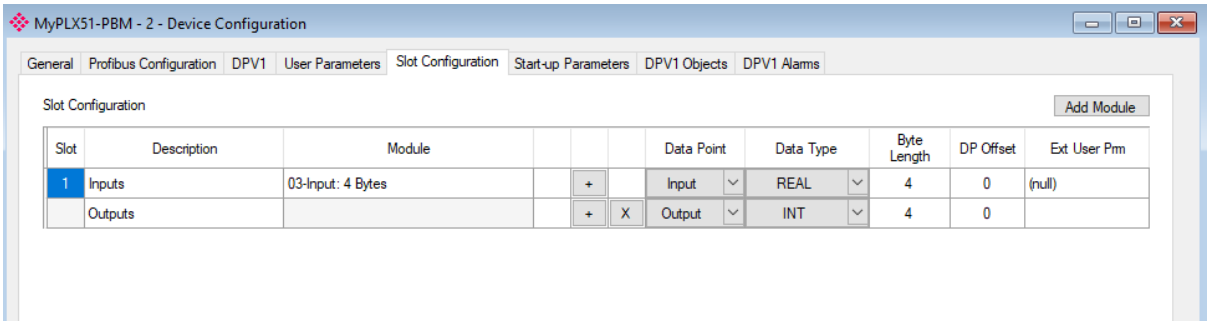


Figure 3.78 – Slot configuration – (Logix)

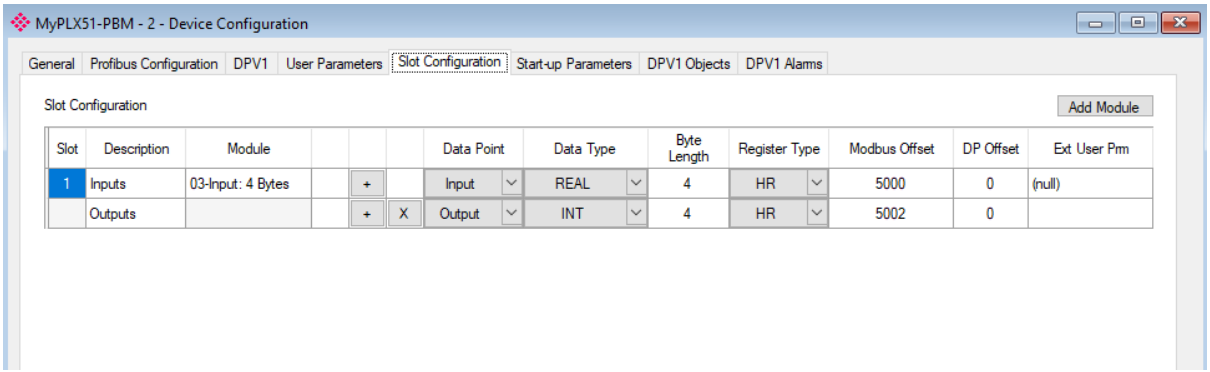


Figure 3.79 – Slot configuration – (Modbus)

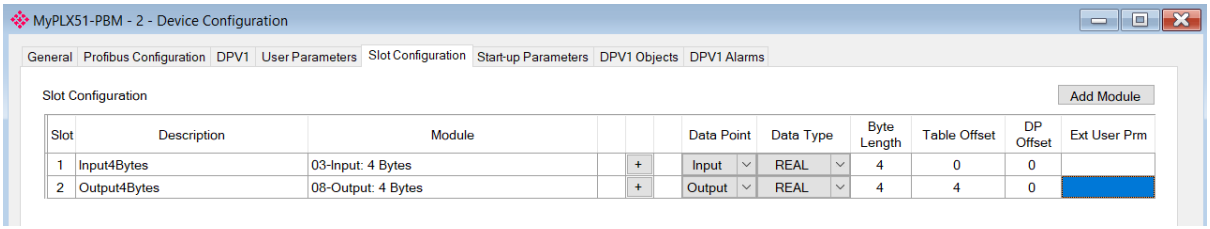


Figure 3.80 – Slot configuration – (Explicit EtherNet/IP)

When the module is emulating the legacy device, the slot configuration for Logix, Modbus, and Explicit EtherNet/IP will appear as follows:

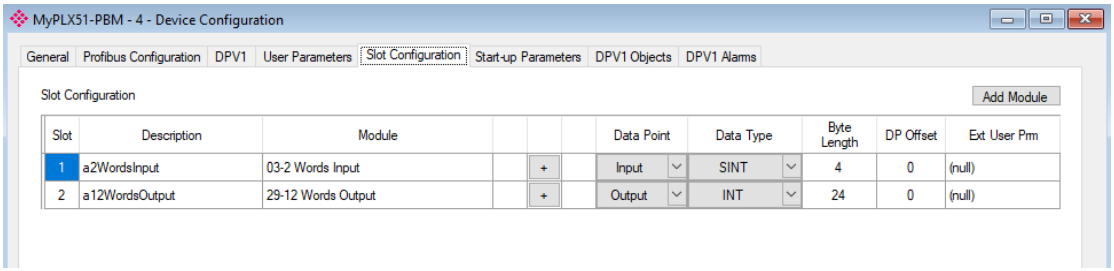


Figure 3.81 – Slot configuration – (Logix) (legacy device)

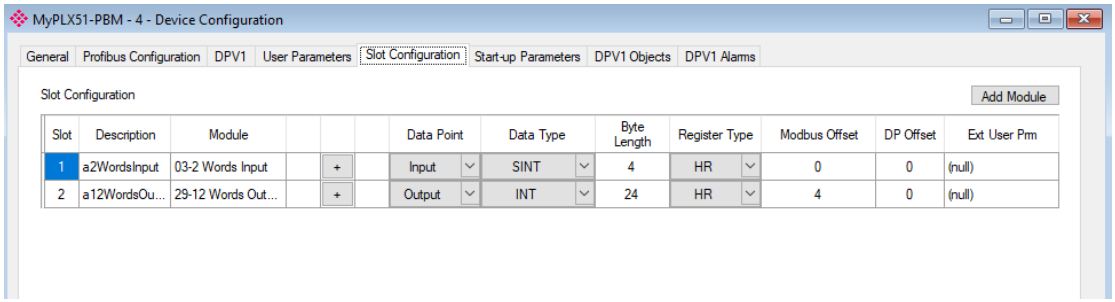


Figure 3.82 – Slot configuration – (Modbus) (legacy device)

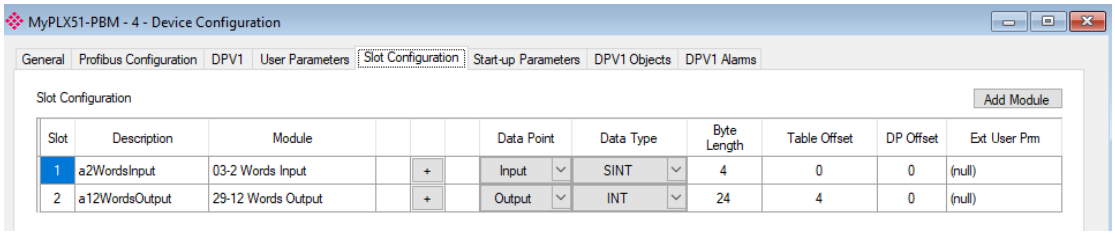


Figure 3.83 – Slot configuration – (Explicit EtherNet/IP) (legacy device)

Slot Configuration - General

Each module added can consist of one or more Data Points. In the example below the module has two Data Points, one Input and one Output.

The description of each is based on the module name (from GSD file) but can be edited by the user. When using Logix this Description is used to create the member of the device-specific UDTs and thus no illegal Logix characters are permitted. It is also important that these descriptions are unique within a device.

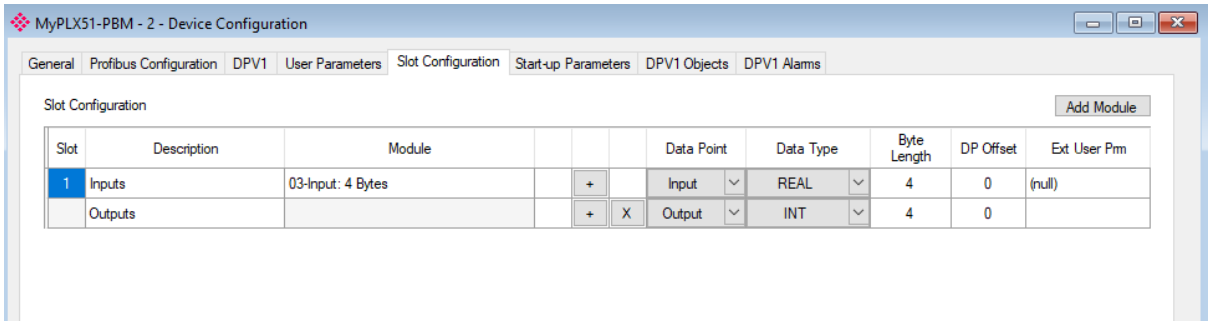


Figure 3.84 – Slot descriptions

When adding a slot, the data format and size will default to that of the selected module in the GSD file.

Formatting the module's data can be achieved by a combination of adding or removing Data Points and changing the Data Type of each.

Data Points can be added by either right-clicking on the module and selecting ***Add Data Point*** or by clicking on the "**+**" button.

Data Points can be removed by either right-clicking on the module and selecting ***Delete Data Point*** or by clicking on the "**X**" button.

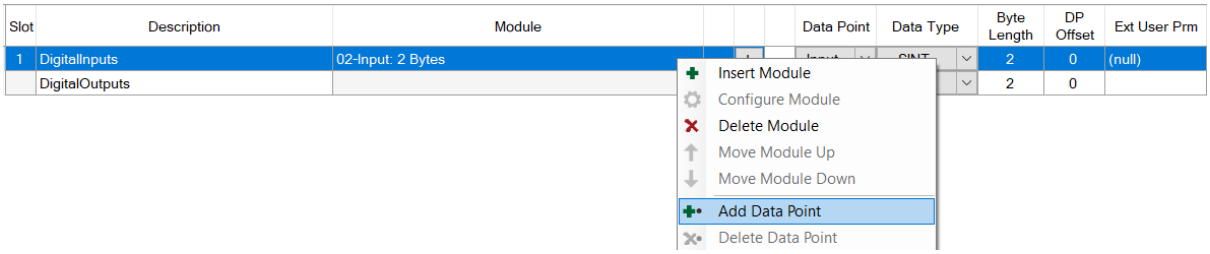


Figure 3.85 – Adding / Removing Data Points

NOTE: Each module must contain at least one Data Point.

After adding a new Data Point, the following should be configured:

- Description
- Data Point Type (Input, Output, None)
- Data Type
- Byte Length

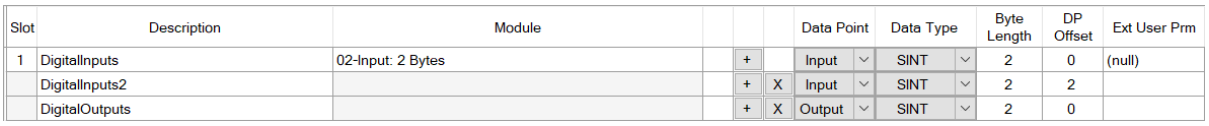


Figure 3.86 – Configuring Data Points

After updating the Data Type, the Byte Length will be set to match the selected Data Type. By modifying the Byte Length thereafter, an array of that Data Type can be configured. It is however important that the Byte Length is always a multiple of the base Data Length.

Table 3.19 – Data Type – Byte Length Restrictions

Data Type	Byte Length MUST be a multiple of:
BOOL	1
SINT	1
INT	2
DINT	4
REAL	4

IMPORTANT: It is critical that the configured Byte Length be a multiple of the base Data Type.

IMPORTANT: It is critical that the total sum of input and output bytes (of all the Data Points) match that required by the slave device. Not adhering to this could cause unexpected results.

NOTE: The DP (Byte) Offset for each the Data Point will be automatically calculated.

Slot Configuration – Logix Specific

When using Logix as the Primary Interface, the PROFIBUS Data Points will be packed and padded to match a device specific UDT. All the Inputs will be collated together and then all the Outputs.

IMPORTANT: It is important that the Data Point Descriptions do not contain any illegal characters and are not duplicated within a device. Failing to do so will create errors when generating and importing the mapping L5X into Studio 5000.

Slot	Description	Module				Data Point	Data Type	Byte Length	DP Offset	Ext User Prm
1	DigitalInputs	02-Input: 2 Bytes		+		Input	SINT	2	0	(null)
	DigitalInputs2			+	X	Input	SINT	2	2	
	DigitalOutputs			+	X	Output	SINT	2	0	

Figure 3.87 – Slot configuration – Logix Example

Slot Configuration – Modbus Specific

When using Modbus as the Primary Interface, it is important to configure the Modbus Register Type and Modbus Offset correctly to ensure that multiple Data Points are not mapped to the same Modbus data area.

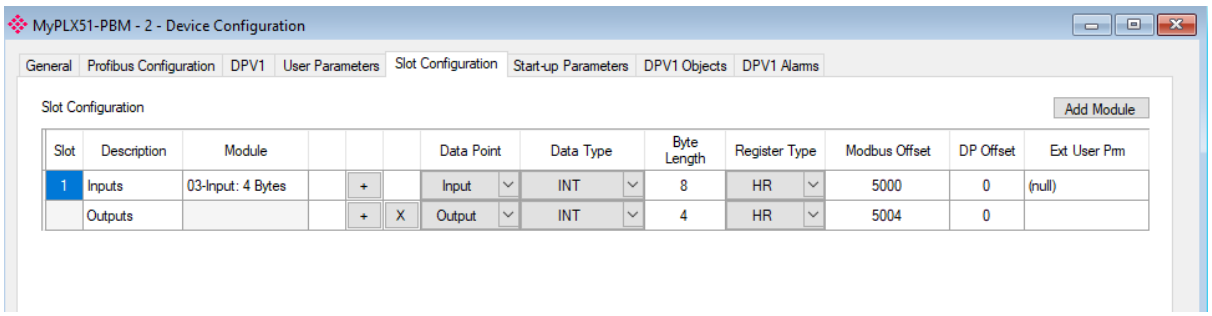


Figure 3.88 – Slot configuration – Modbus Example

IMPORTANT: It is important that the Data Point Register Type and Modbus Offset does not result in multiple Data Points overlapping. Such conflicts will cause unexpected results.

IMPORTANT: It is important that the Data Point Register Type is appropriate for the Data Type, Type (Input/Output) and Modbus interface type (Master/Slave).

IMPORTANT: The range of configured Modbus registers for each register type may not exceed 10,000.

To simplify the Modbus register assignment process, the user can select the ***Assign Modbus from Here*** option, after right-clicking on a particular mapped item. Once the assignment process is complete, all the mapped items below, and including, the selected item will be updated.

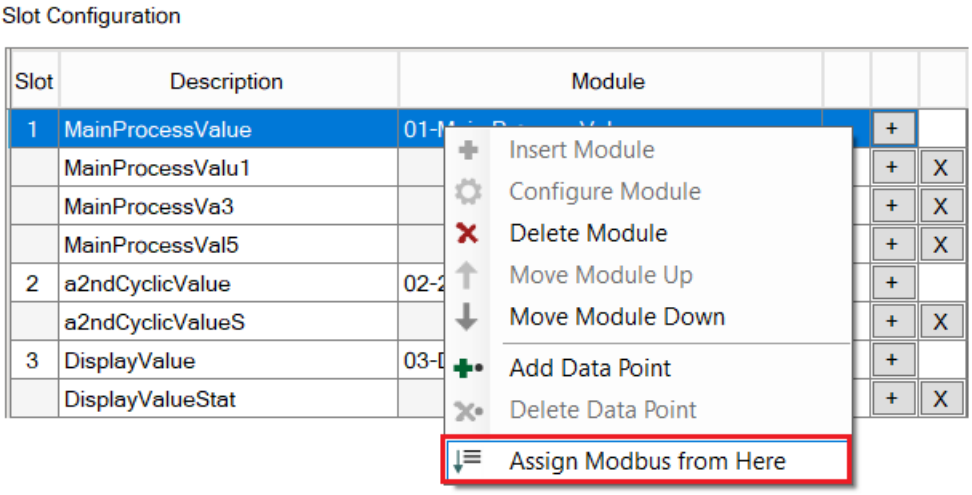


Figure 3.89 – Slot configuration – Selecting Assign Modbus from Here option

After selecting this option, the ***Modbus Assignment*** form will open.

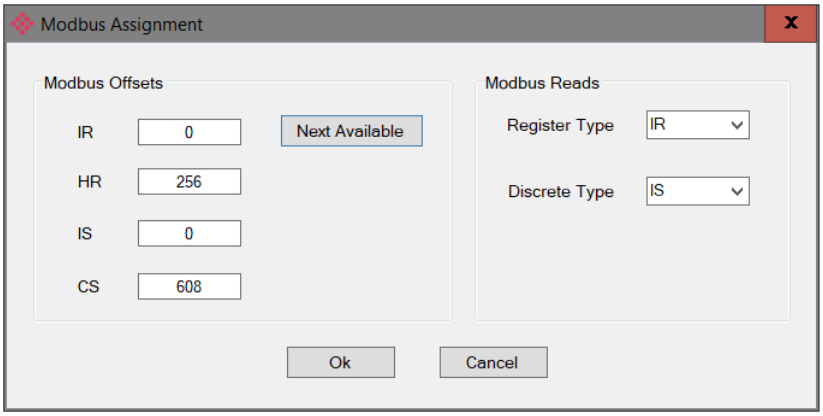


Figure 3.90 – Modbus Assignment

The ***Modbus Offsets*** for each Modbus data type will default to the next available register after the last one referenced. These offsets will be used as the starting registers for the auto-assignment, and can be modified by the user as required.

The ***Next Available*** button, will return the offsets to their default values.

The automatic assignment of registers will take into account the data type of each data point. In the case of Modbus reads, the assigned type could be either an Input Register (IR) or Holding Register (HR) for non-Booleans and either a Digital Input (IS) or Coil (CS) for Booleans.

The user can specify their preference using the ***Register Type*** and ***Discrete Type*** combo box options in the ***Modbus Reads*** section.

Once the ***Ok*** button has been clicked, the Modbus ***Register Type*** and ***Modbus Offset*** for the selected, and subsequent items, will be updated.

Slot Configuration – Explicit EtherNet/IP Specific

When using Explicit EtherNet/IP as the Primary Interface, it is important to configure the Table Offset correctly to ensure that multiple Data Points are not mapped to the same Data Table area.

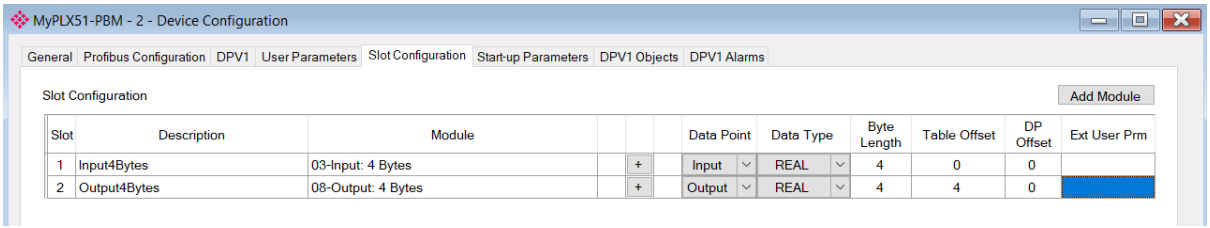


Figure 3.91 – Slot configuration – Explicit EtherNet/IP Example

IMPORTANT: It is important that the Data Point Register Type and Data Table Offset does not result in multiple Data Points overlapping. Such conflicts will cause unexpected results.

IMPORTANT: The range of configured Data Table Offsets for each register type may not exceed 10,000.

3.9.6 DPV1 Objects

The DPV1 Objects configuration is shown in the figure below. The slave device DPV1 Objects configuration window is opened by either double clicking on the slave device in the tree or right-clicking the slave device and selecting *Configuration*.

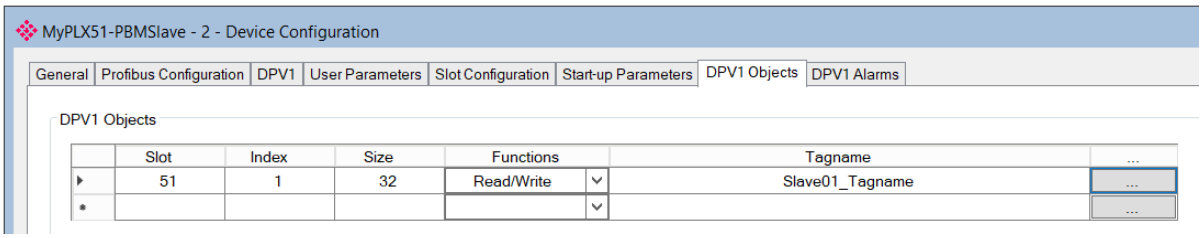


Figure 3.92 – Device DPV1 Objects configuration parameters – Logix

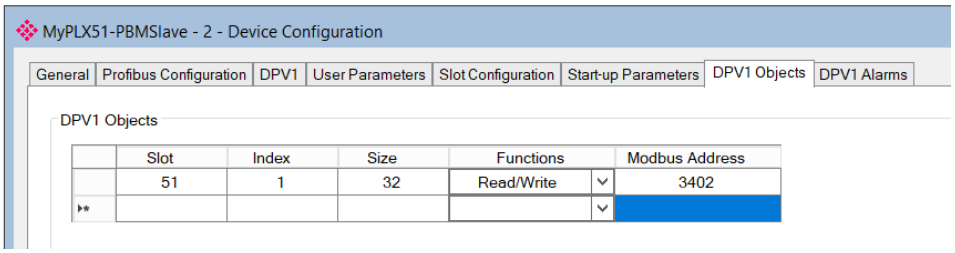


Figure 3.93 – Device DPV1 Objects configuration parameters – Modbus

The DPV1 configuration consists of the following parameters:

Table 3.20 – Device DPV1 Objects configuration parameters

Parameter	Description
Slot	The Slot number to which the PROFIBUS DP transaction will be directed.
Index	The Index number to which the PROFIBUS DP transaction will be directed.
Size	The size (bytes) of the transaction.
Functions	The Functions supported by the Slave device for this object: ▪ Read ▪ Write ▪ Read/Write
Tagname	The Logix Tagname where the data will be read / written. (Logix Only)
Modbus Address	The Modbus Holding Register Address where the data will be read / written. (Modbus Only)

The Logix Tagname can be either entered manually or selected using the Logix Tag Browser. The Tag Browser can be launched by clicking on the Browse button (…) adjacent to the Tagname.

NOTE: The list of Logix tags will not be available if the Logix controller path has not been correctly configured.

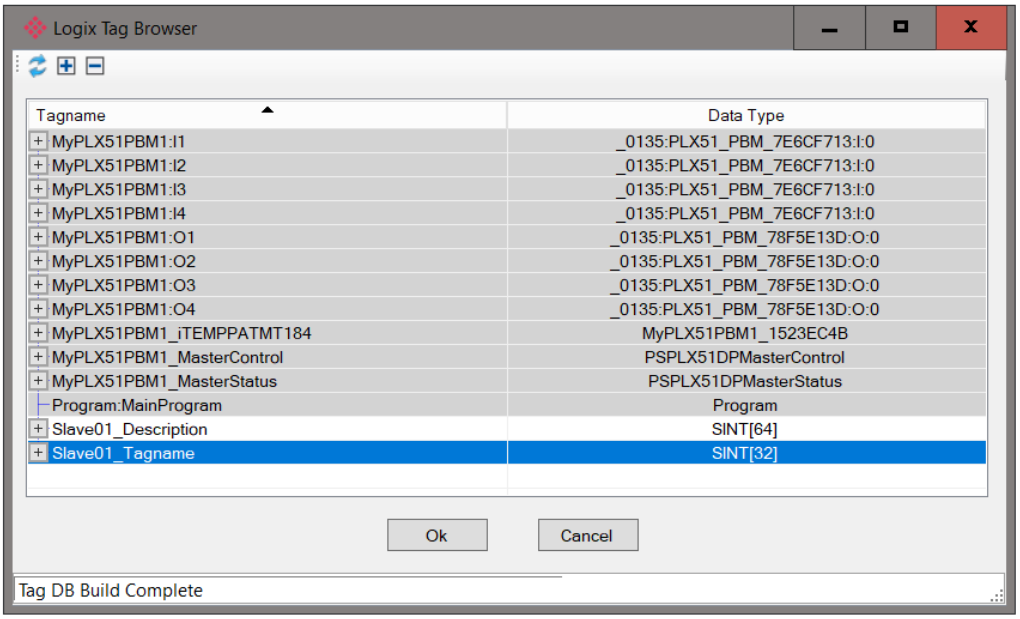


Figure 3.94 – Device DPV1 Objects Tag Browsing

3.9.7 DPV1 Alarms

The DPV1 Alarms configuration is shown in the figure below. The slave device DPV1 Alarms configuration window is opened by either double clicking on the slave device in the tree or right-clicking the slave device and selecting *Configuration*.

IMPORTANT: The Size of the DPV1 Alarm **must** be greater than 4 or the alarm triggering will not execute.

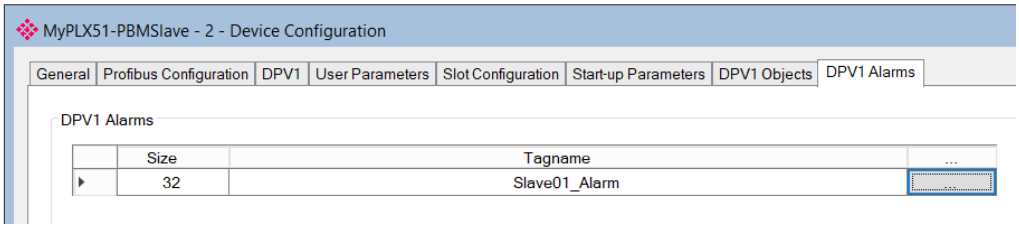


Figure 3.95 – Device DPV1 Alarms configuration parameters (Logix)

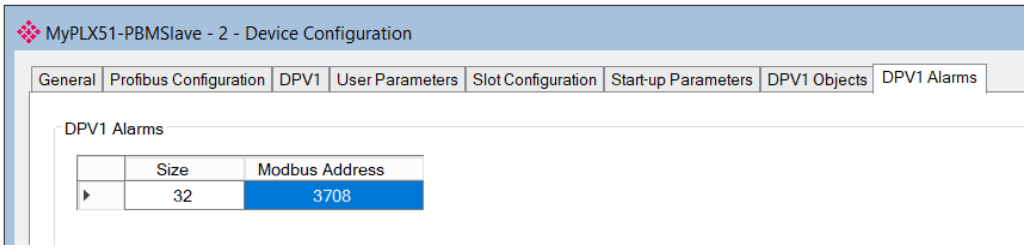


Figure 3.96 – Device DPV1 Alarms configuration parameters (Modbus)

The DPV1 configuration consists of the following parameters:

Table 3.21 – Device DPV1 Alarms configuration parameters

Parameter	Description
Size	The size (bytes) of the Alarm object.
Tagname	The Logix Tagname from where the alarm data will be read. (Logix Only)
Modbus Address	The Modbus Holding Register Address from where the alarm data will be read. (Modbus Only)

Note: The DP Master connected to the PLX51-PBM (in slave mode) will be able to configure either of the following alarms: Diagnostic Alarm, Process Alarm, Pull Plug Alarm, Status Alarm, Update Alarm, Manufacturer Specific Alarm.

3.10 Logix Configuration

The PLX51-PBM can be easily integrated with Allen-Bradley Logix family of controllers. Integration with the Logix family in Studio5000 makes use of the EDS Add-On-Profile (AOP) or a Generic Module Profile.

3.10.1 EDS AOP (Logix V21+)

Before the module can be added to the tree the module's EDS file must be registered.

Using RSLinx, the EDS file can be uploaded from the device after which the EDS Hardware Installation tool will be invoked to complete the registration.

Alternatively, the EDS file can be downloaded from the product web page at www.prosoft-technology.com and registered manually using the EDS Hardware Installation Tool shortcut under the Tools menu in Studio 5000.

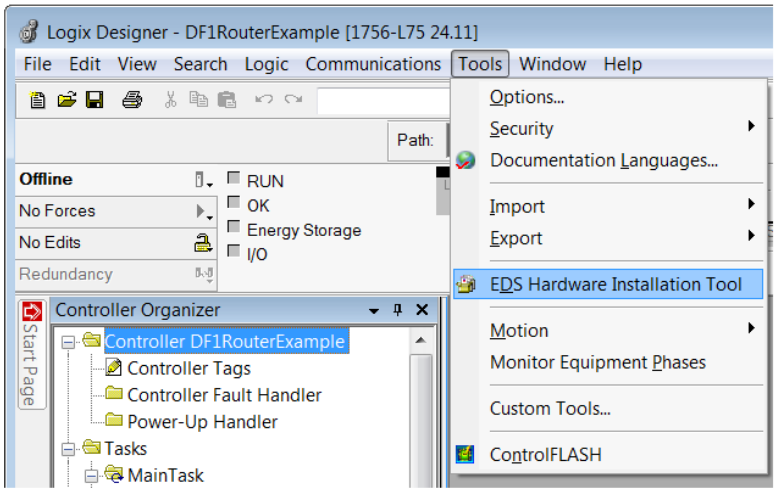


Figure 3.97 - EDS Hardware Installation Utility

After the EDS file has been registered, the module can be added to the Logix IO tree in Studio 5000. Under a suitable Ethernet bridge module in the tree, select the Ethernet network, right-click and select the New Module option.

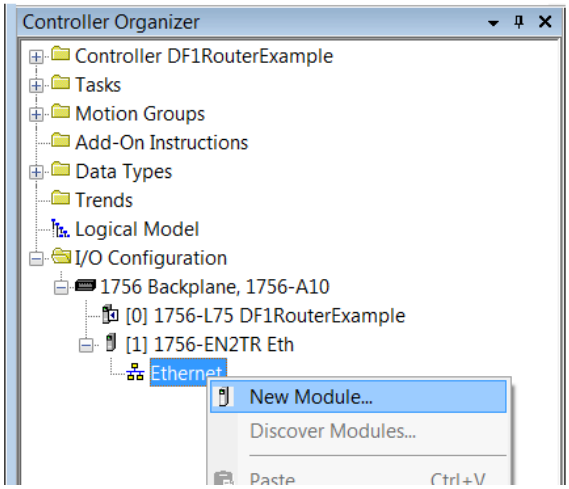


Figure 3.98 – Adding a module

The module selection dialog will open. To find the module more easily, use the Vendor filter to select only the ProSoft Technology modules as shown in the figure below.

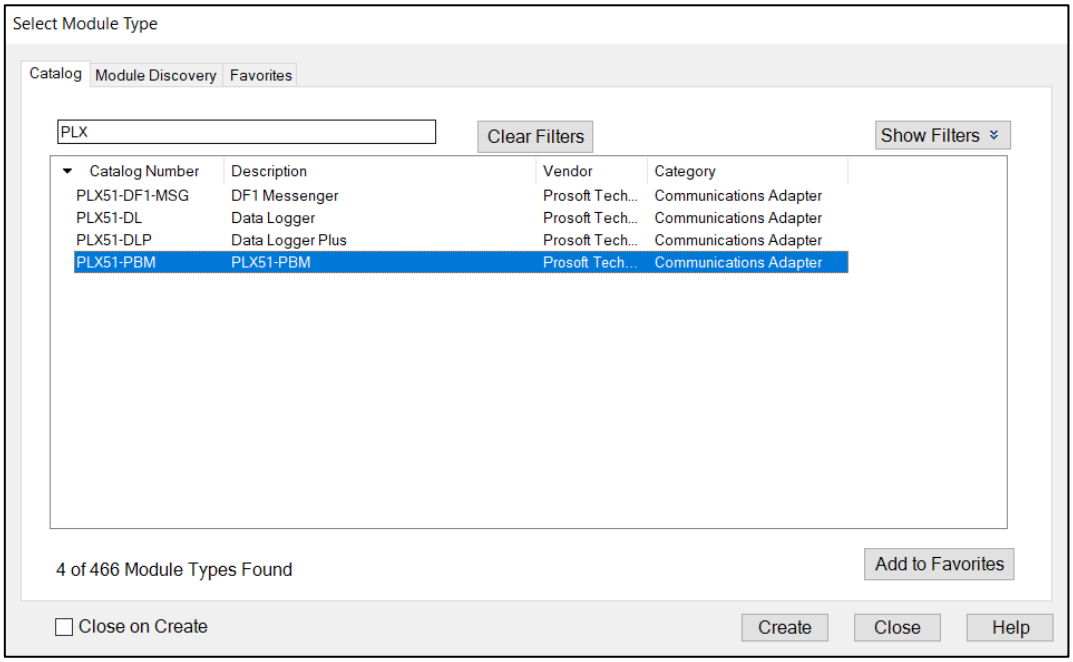


Figure 3.99 – Selecting the module

Locate and select the PLX51-PBM module and select the ***Create*** option. The module configuration dialog will open, where the user must specify the Name and IP address as a minimum to complete the instantiation.

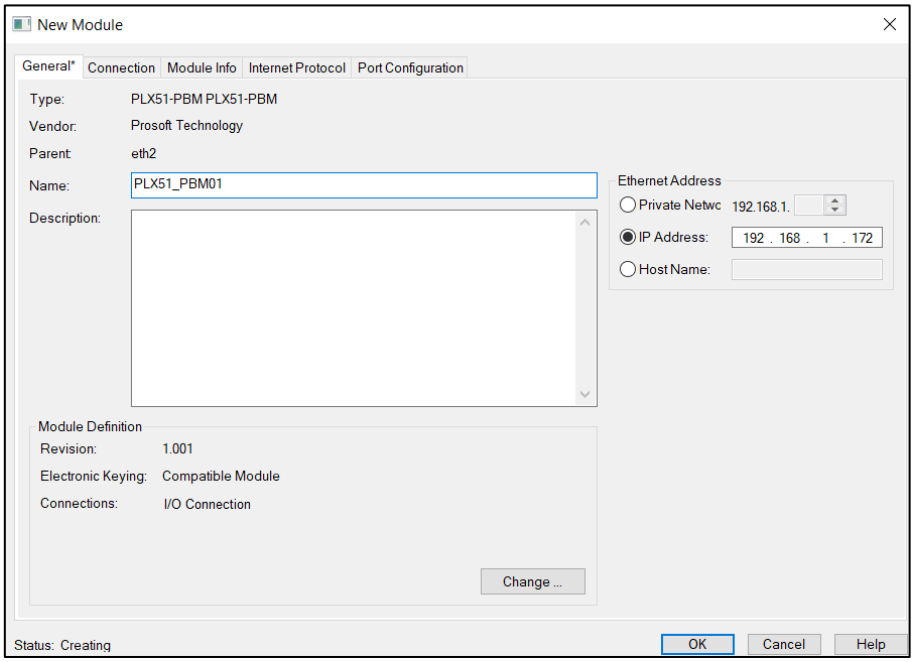


Figure 3.100 – Module instantiation

Once the instantiation is complete the module will appear in the Logix IO tree.

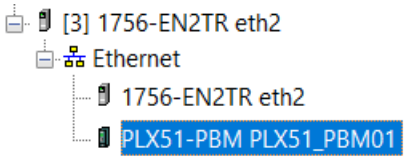


Figure 3.101 – Logix IO tree

The Module Defined Data Types will automatically be created during the instantiation process. These data types provide meaningful structures to the module data. An excerpt of the Input Image is shown in the following figure.

PLX51_PBM01:I1	_0135:PLX51_PBM_7E6CF7...		Read/Write
PLX51_PBM01:I1.ConnectionFaulted	BOOL		Read/Write
PLX51_PBM01:I1.Data	SINT[500]		Read/Write
PLX51_PBM01:O1	_0135:PLX51_PBM_78F5E1...		Read/Write
PLX51_PBM01:I2	_0135:PLX51_PBM_7E6CF7...		Read/Write
PLX51_PBM01:O2	_0135:PLX51_PBM_78F5E1...		Read/Write
PLX51_PBM01:I3	_0135:PLX51_PBM_7E6CF7...		Read/Write
PLX51_PBM01:O3	_0135:PLX51_PBM_78F5E1...		Read/Write
PLX51_PBM01:I4	_0135:PLX51_PBM_7E6CF7...		Read/Write
PLX51_PBM01:O4	_0135:PLX51_PBM_78F5E1...		Read/Write

Figure 3.102 – Module Defined Data Type

3.10.2 Generic Module Profile (Logix Pre-V21)

IMPORTANT: When using a Generic Module Profile, the user will need to modify the code generated by the PLX50CU to match the single connection profile. To do this the user must remove the connection number from the source and destination tag in the copy blocks (as shown in the example below).

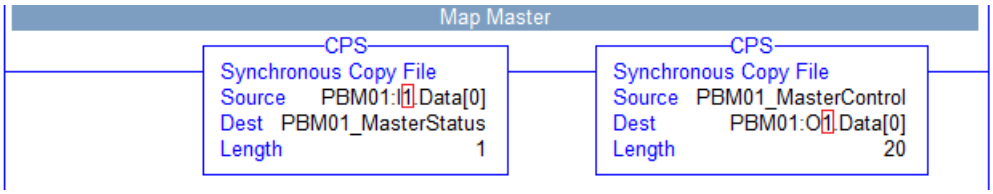


Figure 3.103 – Generated Logix Routine from PLX50CU (highlight connection number)

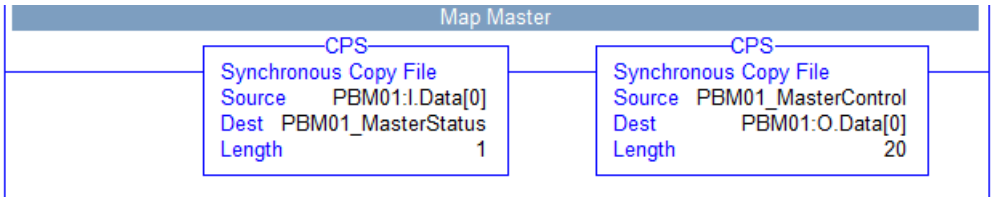


Figure 3.104 – Modified Logix Routine from PLX50CU for Generic Module Profile

When using Logix versions prior to version 21, then the PLX51-PBM module must be added to the RSLogix 5000 I/O tree as a generic Ethernet module. This is achieved by right clicking on the Ethernet Bridge in the RSLogix 5000 and selecting *New Module* after which the *ETHERNET-MODULE* is selected to be added as shown in the figure below.

NOTE: See the next section for importing the configuration (L5X).

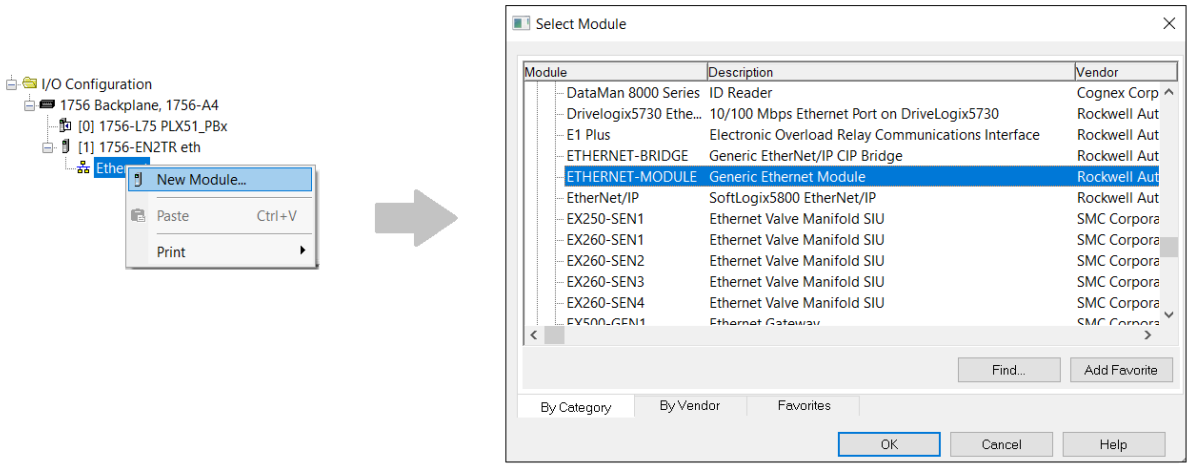


Figure 3.105 - Add a Generic Ethernet Module in RSLogix 5000

The user must enter the IP address of the PLX51-PBM module that will be used. The assembly instance and size must also be added for the input, output, and configuration in the connection parameters section.

The required connection parameters for the PLX51-PBM module are shown below:

Table 3.22 - RSLogix class 1 connection parameters for the PLX51-PBM module

Connection Parameter	Assembly Instance	Size
Input	132	500 (8-bit)
Output	133	496 (8-bit)
Configuration	102	0 (8-bit)

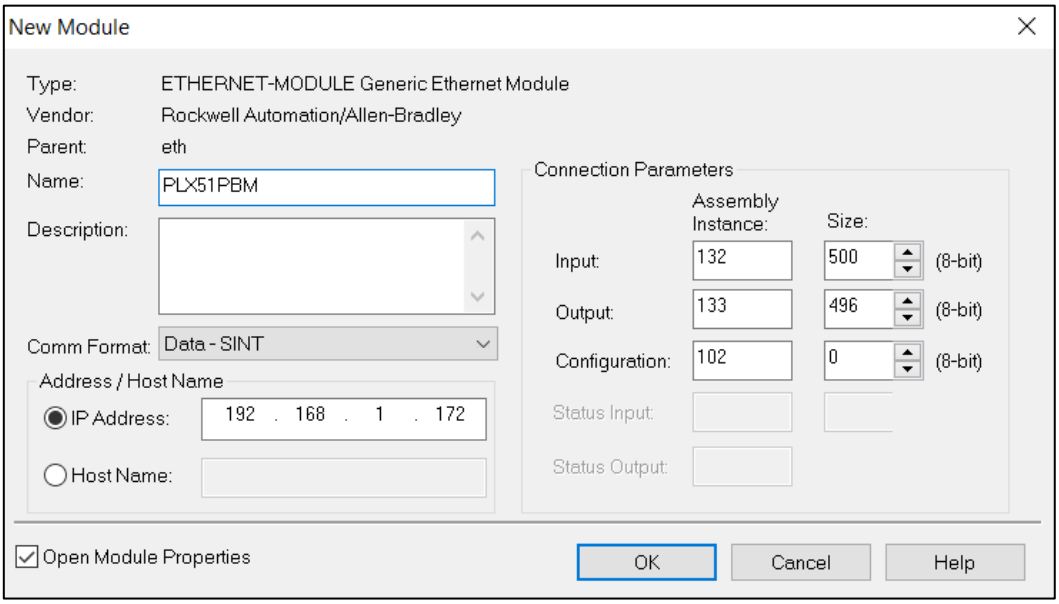


Figure 3.106 - RSLogix 5000 General module properties for PLX51-PBM module

IMPORTANT: The user will need to enter the exact connection parameters before the module will establish a class 1 connection with the Logix controller.

Next, the user needs to add the connection requested packet interval (RPI). This is the rate at which the input and output assemblies are exchanged. Refer to the technical specification section in this document for further details on the limits of the RPI.

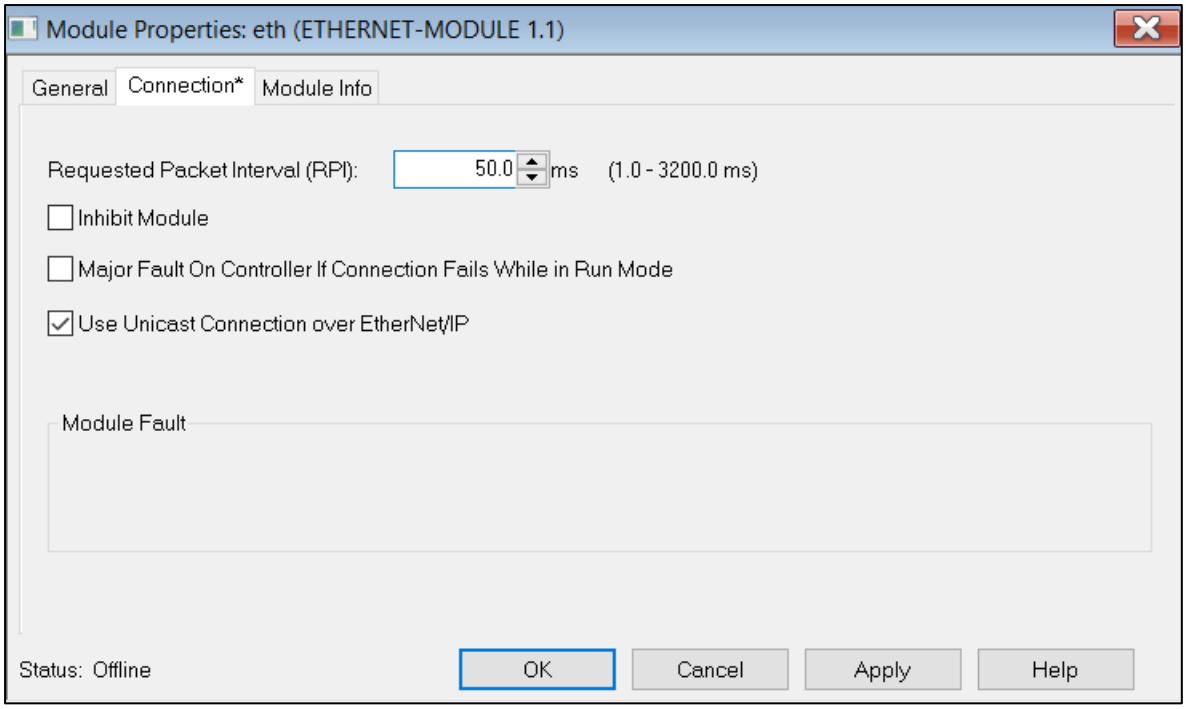


Figure 3.107 - Connection module properties in RSLogix 5000

Once the module has been added to the RSLogix 5000 I/O tree the Logix controller will be ready to connect to the PLX51-PBM with a Class 1 connection.

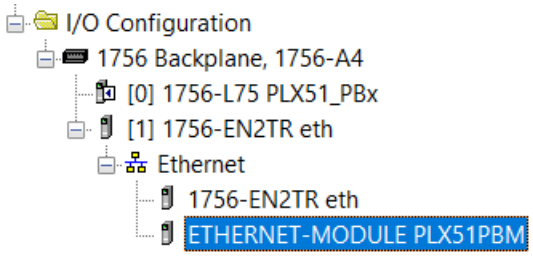


Figure 3.108 – RSLogix 5000 I/O module tree

3.10.3 Multi-Connection

The PLX51-PBM supports up to four Class 1 (cyclic data exchange) connections. This will allow the user to have more field devices per PLX51-PBM because more data can be exchanged between the Logix controller and the PLX51-PBM.

IMPORTANT: This only applies when the user has implemented the PLX51-PBM into Logix using an EDS AOP. When using a Generic Module Profile in Logix (pre-Logix v21) the user will only be able to use 1 Logix Connection.

When the user verifies the PLX50 Configuration Utility project (this is done by right-clicking on the device and selecting *Verify Configuration*), the software will indicate if all the current configuration will fit into the selected EtherNet/IP Connection count. If not, the user will need to increase the connection count.

In the PLX50 Configuration Utility the user can set the number of EtherNet/IP Connections in the Logix tab of the configuration window (as shown below):

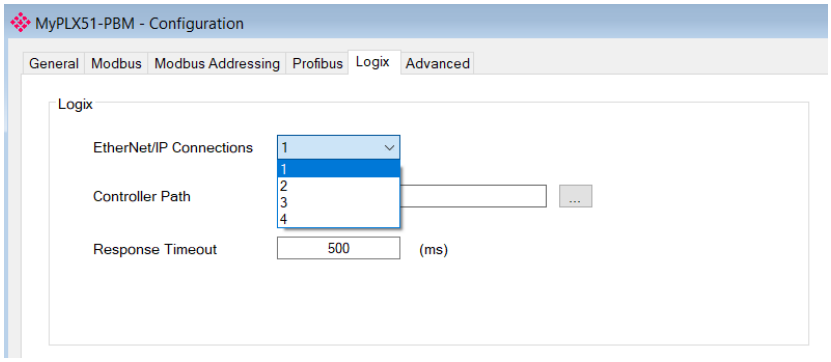


Figure 3.109 – PLX50CU EtherNet/IP Connection Count

In Logix the user can increase/decrease the connection count using the EDS AOP (as shown below):

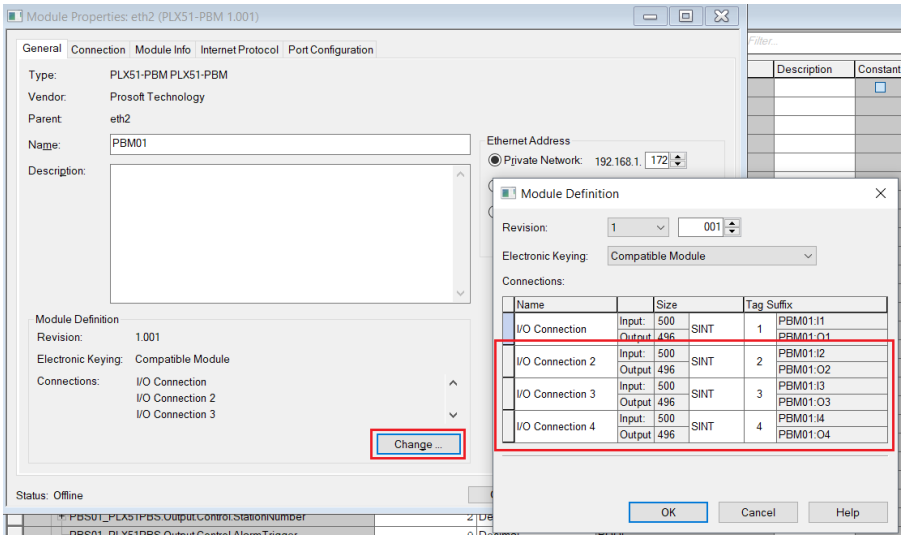


Figure 3.110 – Logix EtherNet/IP Connection Count

3.11 Logix Mapping

The PLX50 Configuration Utility will generate the required UDTs and Routines (based on the PLX51-PBM configuration) to map the required PROFIBUS Slave input and output data. The user will need to generate the required Logix and UDTs by right-clicking on the module in the PLX50 Configuration Utility and selecting the ***Generate Logix L5X*** option.

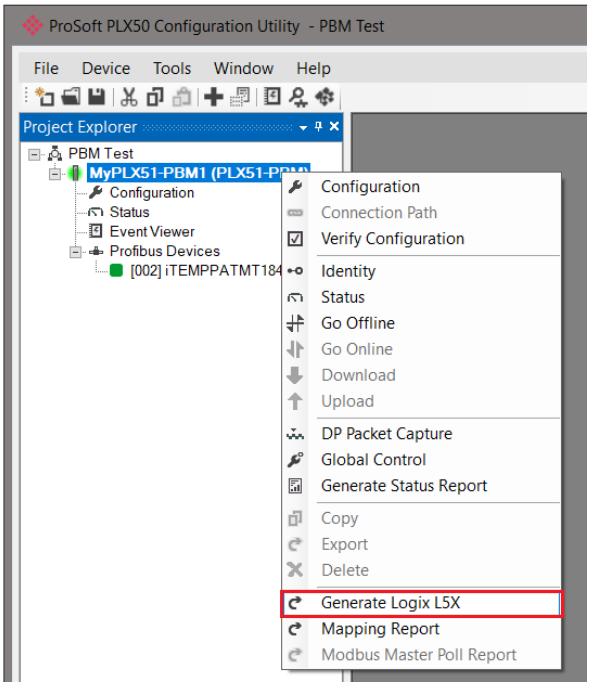


Figure 3.111 – Selecting Generate Logix L5X

The user will then be prompted to select a suitable file name and path for the L5X file.

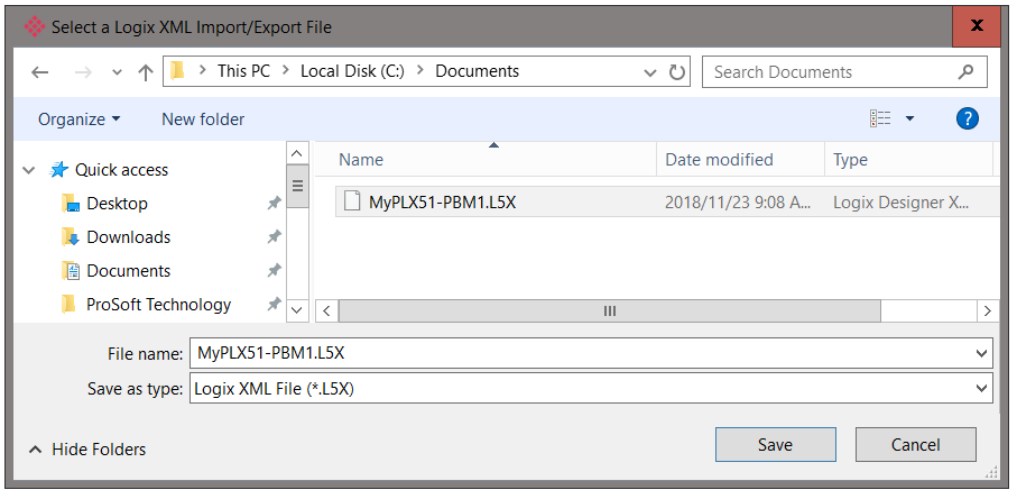


Figure 3.112 – Selecting the Logix L5X file name

This L5X file can now be imported in to the Studio 5000 project by right-clicking on a suitable ***Program*** and selecting ***Add***, and then ***Import Routine***.

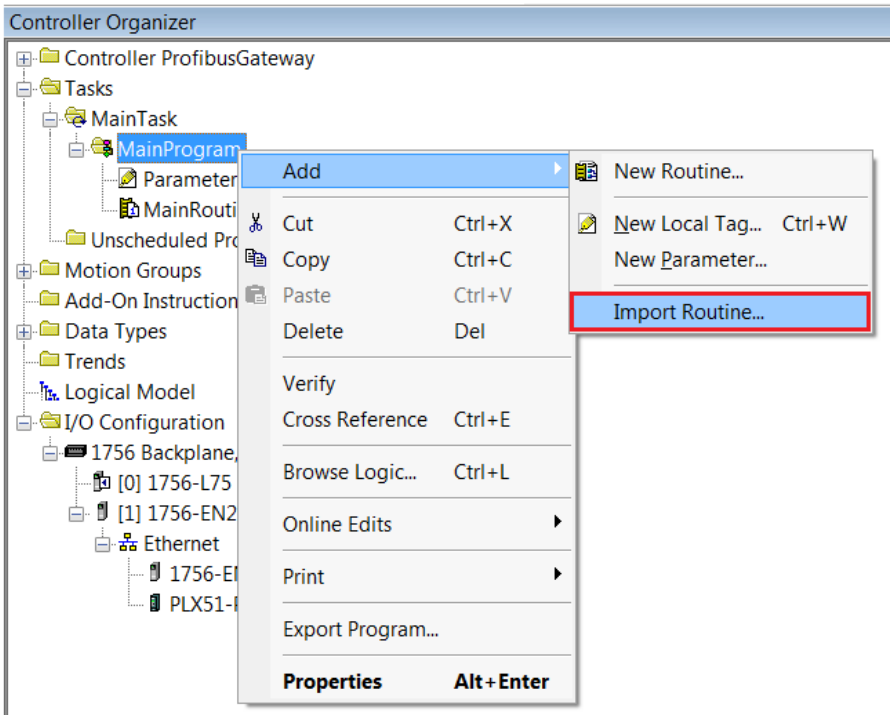


Figure 3.113 – Importing the L5X file into Studio 5000

In the file open dialog select the previously created L5X file and accept the import by pressing Ok.

The import will create the following:

- Mapping Routine
- Multiple UDT (User-Defined Data Types)
- Multiple Controller Tags

Since the imported mapping routine is not a Main Routine, it will need to be called from the current Main Routine.

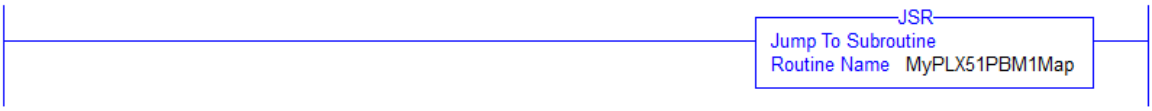


Figure 3.114 – Calling the mapping routine

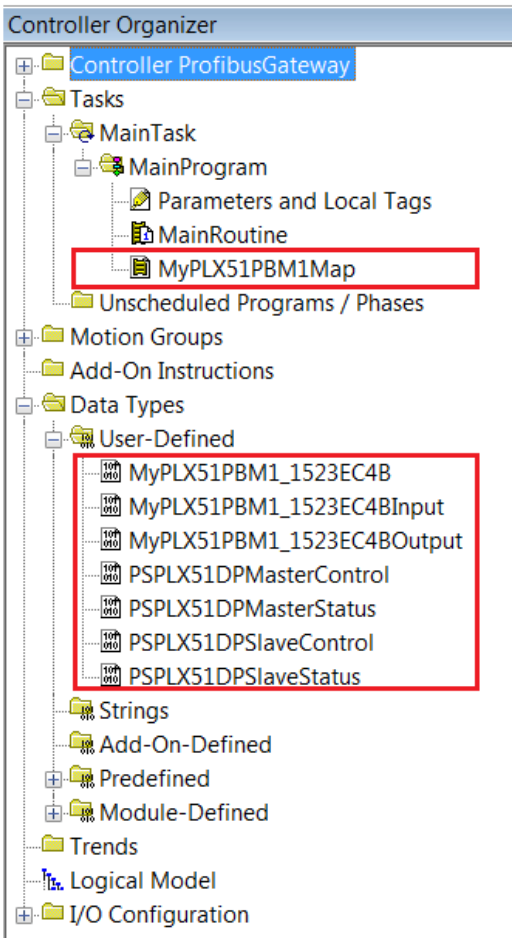


Figure 3.115 – Imported Logix Objects

A number of PLX51 specific (UDT) tags are created.

The Master Control tag is used to set the PROFIBUS Mode and to Enable the individual Slave Devices.

MyPLX51PBM1_MasterControl	{...}		PSPLX51DPMasterControl
MyPLX51PBM1_MasterControl.MasterControl	3	Decimal	SINT
MyPLX51PBM1_MasterControl.DeviceEnable	{...}	Decimal	BOOL[128]
MyPLX51PBM1_MasterControl.DeviceEnable[0]	0	Decimal	BOOL
MyPLX51PBM1_MasterControl.DeviceEnable[1]	1	Decimal	BOOL
MyPLX51PBM1_MasterControl.DeviceEnable[2]	1	Decimal	BOOL
MyPLX51PBM1_MasterControl.DeviceEnable[3]	1	Decimal	BOOL
MyPLX51PBM1_MasterControl.DeviceEnable[4]	0	Decimal	BOOL
MyPLX51PBM1_MasterControl.DeviceEnable[5]	0	Decimal	BOOL
MyPLX51PBM1_MasterControl.DeviceEnable[6]	0	Decimal	BOOL

MyPLX51PBM1_MasterControl.DeviceEnable[124]	0	Decimal	BOOL
MyPLX51PBM1_MasterControl.DeviceEnable[125]	0	Decimal	BOOL
MyPLX51PBM1_MasterControl.DeviceEnable[126]	0	Decimal	BOOL
MyPLX51PBM1_MasterControl.DeviceEnable[127]	0	Decimal	BOOL

Figure 3.116 – Master Control tag

The Master Status tag displays the status of the PROFIBUS Master, including arrays to show the LiveList, Data Exchange Active, Alarm and Diagnostic pending status of each slave device.

⊟ MyPLX51PBM1_MasterStatus	{...}		PSPLX51DPMasterStatus
MyPLX51PBM1_MasterStatus.ConfigValid	1	Decimal	BOOL
MyPLX51PBM1_MasterStatus.Owned	1	Decimal	BOOL
MyPLX51PBM1_MasterStatus.DuplicateDPStation	0	Decimal	BOOL
MyPLX51PBM1_MasterStatus.ProfibusFieldbusError	0	Decimal	BOOL
MyPLX51PBM1_MasterStatus.ProfibusDeviceError	0	Decimal	BOOL
MyPLX51PBM1_MasterStatus.ProfibusOffline	0	Decimal	BOOL
MyPLX51PBM1_MasterStatus.ProfibusStopped	0	Decimal	BOOL
MyPLX51PBM1_MasterStatus.ProfibusClear	0	Decimal	BOOL
MyPLX51PBM1_MasterStatus.ProfibusOperational	1	Decimal	BOOL
MyPLX51PBM1_MasterStatus.SlaveMode	0	Decimal	BOOL
⊞ MyPLX51PBM1_MasterStatus.ConfigCRC	1537	Decimal	INT
⊞ MyPLX51PBM1_MasterStatus.DeviceLiveList	{...}	Decimal	BOOL[128]
⊞ MyPLX51PBM1_MasterStatus.DeviceDataExchangeActive	{...}	Decimal	BOOL[128]
⊞ MyPLX51PBM1_MasterStatus.DeviceAlarmPendingFlags	{...}	Decimal	BOOL[128]
⊞ MyPLX51PBM1_MasterStatus.DeviceDiagnosticPendingFlags	{...}	Decimal	BOOL[128]

Figure 3.117 – Master Status tag

There is also a tag created for each configured slave device. The structure of which comprises the following:

- Input Status - Status related to slave device
- Input Data – As specified in the Input Data Points in the Slot configuration
- Output Control – Used to trigger alarms
- Output Data – As specified in the Output Data Points in the Slot configuration

⊟ MyPLX51PBM1_iTEMPPATMT184	{...}		MyPLX51PBM1_152365E6
⊟ MyPLX51PBM1_iTEMPPATMT184.Input	{...}		MyPLX51PBM1_152365E6Input
⊟ MyPLX51PBM1_iTEMPPATMT184.Input.Status	{...}		PSPLX51DPSlaveStatus
MyPLX51PBM1_iTEMPPATMT184.Input.Status.Online	0	Decimal	BOOL
MyPLX51PBM1_iTEMPPATMT184.Input.Status.DataExchangeActive	0	Decimal	BOOL
MyPLX51PBM1_iTEMPPATMT184.Input.Status.IdentMismatch	0	Decimal	BOOL
MyPLX51PBM1_iTEMPPATMT184.Input.Status.DisabledByOutputAssembly	0	Decimal	BOOL
MyPLX51PBM1_iTEMPPATMT184.Input.Status.DeviceError	0	Decimal	BOOL
MyPLX51PBM1_iTEMPPATMT184.Input.Status.AlarmPending	0	Decimal	BOOL
MyPLX51PBM1_iTEMPPATMT184.Input.Status.DiagnosticsPending	0	Decimal	BOOL
MyPLX51PBM1_iTEMPPATMT184.Input.Status.OutputAssemblyNodeAddrMismatch	0	Decimal	BOOL
MyPLX51PBM1_iTEMPPATMT184.Input.Status.MappingCRCMismatch	0	Decimal	BOOL
MyPLX51PBM1_iTEMPPATMT184.Input.Status.SlaveClearOpMode	0	Decimal	BOOL
MyPLX51PBM1_iTEMPPATMT184.Input.Status.SlaveAlarmAck	0	Decimal	BOOL
⊞ MyPLX51PBM1_iTEMPPATMT184.Input.Status.StationNumber	0	Decimal	SINT
⊞ MyPLX51PBM1_iTEMPPATMT184.Input.Status.DeviceMappingCRC	0	Decimal	INT
MyPLX51PBM1_iTEMPPATMT184.Input.TemperaturePV	0.0	Float	REAL
⊞ MyPLX51PBM1_iTEMPPATMT184.Input.TemperatureSts	0	Decimal	SINT
⊟ MyPLX51PBM1_iTEMPPATMT184.Output	{...}		MyPLX51PBM1_152365E6Output
⊟ MyPLX51PBM1_iTEMPPATMT184.Output.Control	{...}		PSPLX51DPSlaveControl
⊞ MyPLX51PBM1_iTEMPPATMT184.Output.Control.StationNumber	0	Decimal	SINT
MyPLX51PBM1_iTEMPPATMT184.Output.Control.AlarmTrigger	0	Decimal	BOOL
⊞ MyPLX51PBM1_iTEMPPATMT184.Output.Control.DeviceMappingCRC	0	Decimal	INT
MyPLX51PBM1_iTEMPPATMT184.Output.DisplayValue	0.0	Float	REAL
⊞ MyPLX51PBM1_iTEMPPATMT184.Output.DisplayValueSts	0	Decimal	SINT

Figure 3.118 – Slave Device-Specific tag

3.12 Importing the Add-On Instruction (AOI)

A custom Add-On Instruction (AOI) is offered and recommended for use in the performance and monitoring of Class 3 messaging (connected or unconnected) with the PLX51-PBM. The AOI offered implements custom UDT's, controller tags, and logic that instantiates the Ethernet/IP CIP messages to perform the following acyclic messaging services:

- DPV1 Class 1 Write/Read
- Alarms
- DPV1 Class 2 Initiate/Abort/Write/Read
- Extraction of Slave Diagnostics (DPV0)
- Global Control Commands

1 In the **Controller Organizer** window, expand the **Tasks** folder and double-click the **MainRoutine** under the **MainProgram** section.

2 Right-click on an empty rung in the routine, and click the *Import Rungs* option.

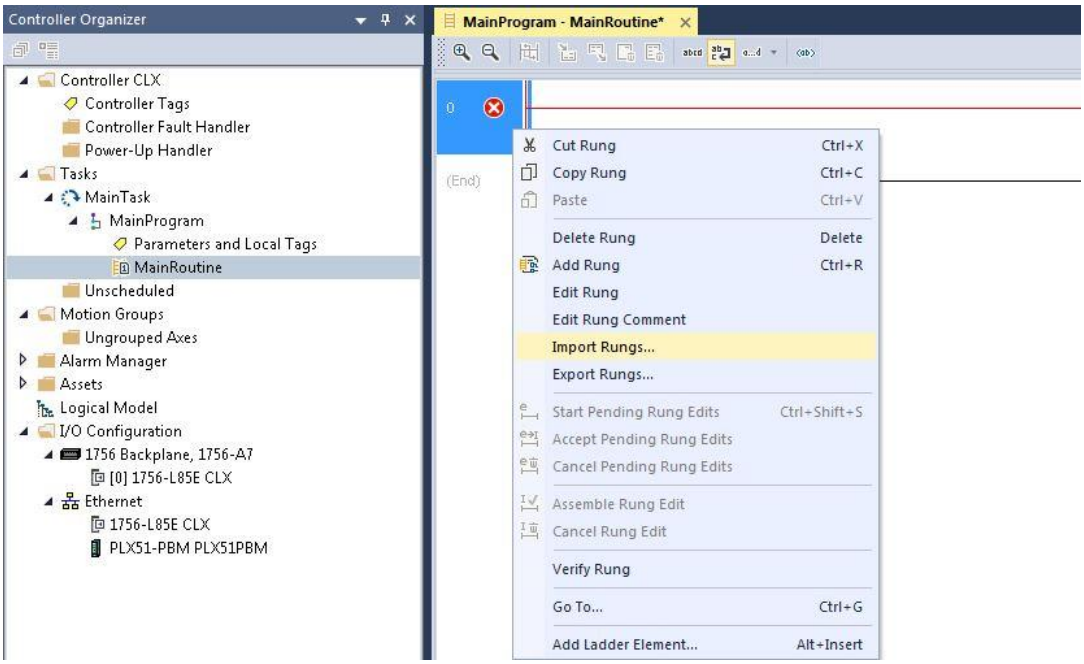


Figure 3.101 - Import Rung

3 Navigate to the location where the .L5X Add-On Instruction is saved. Select **Open**.

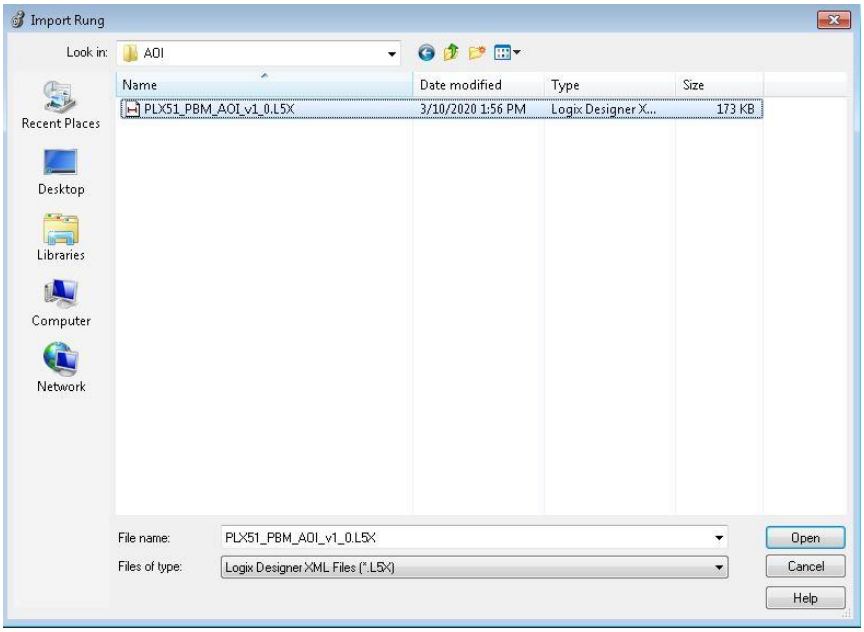


Figure 3.102 – AOI File Selection

4 The *Import Configuration* dialog box opens. It displays the controller tags to be created.

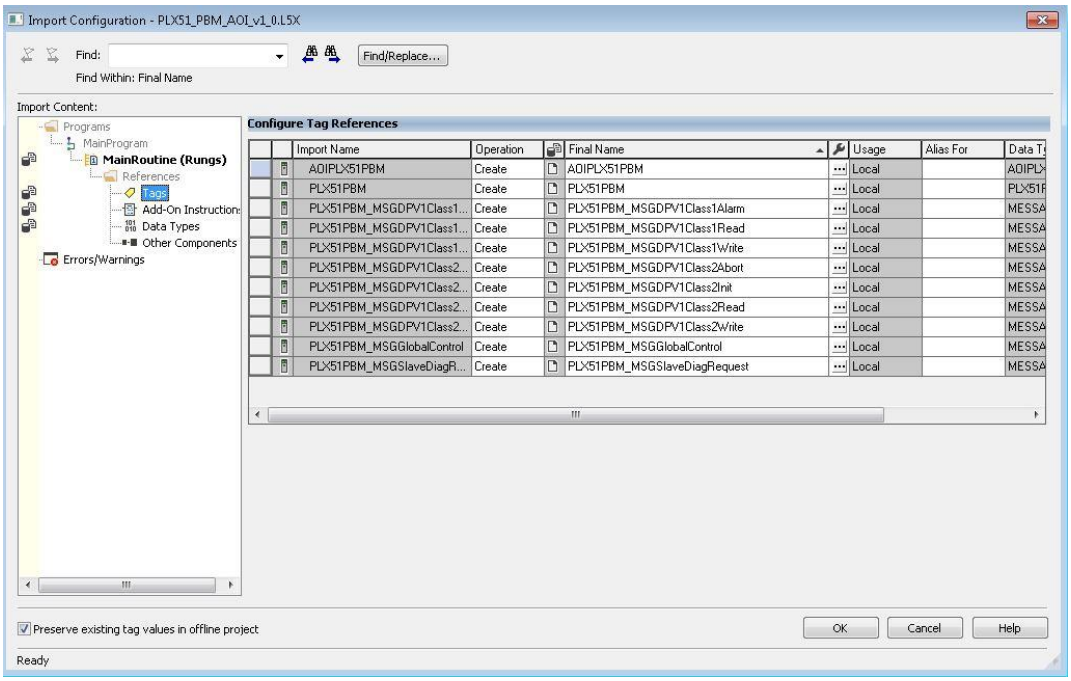
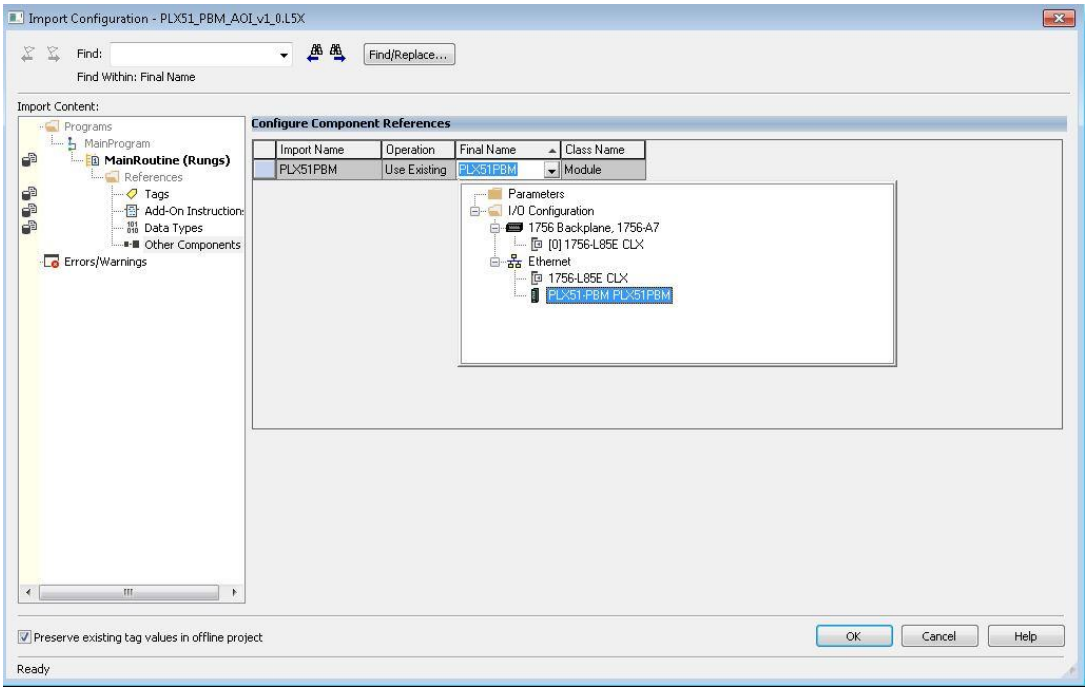


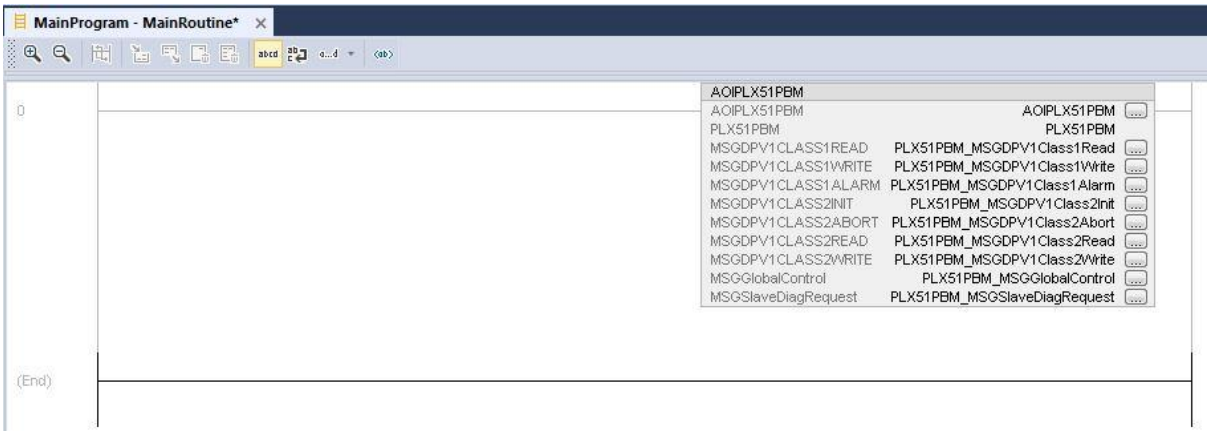
Figure 3.103 – Controller Tags Imported

5 Under the *Other Components* section, verify that the *Final Name* of the module matches the existing module name in your Logix project.



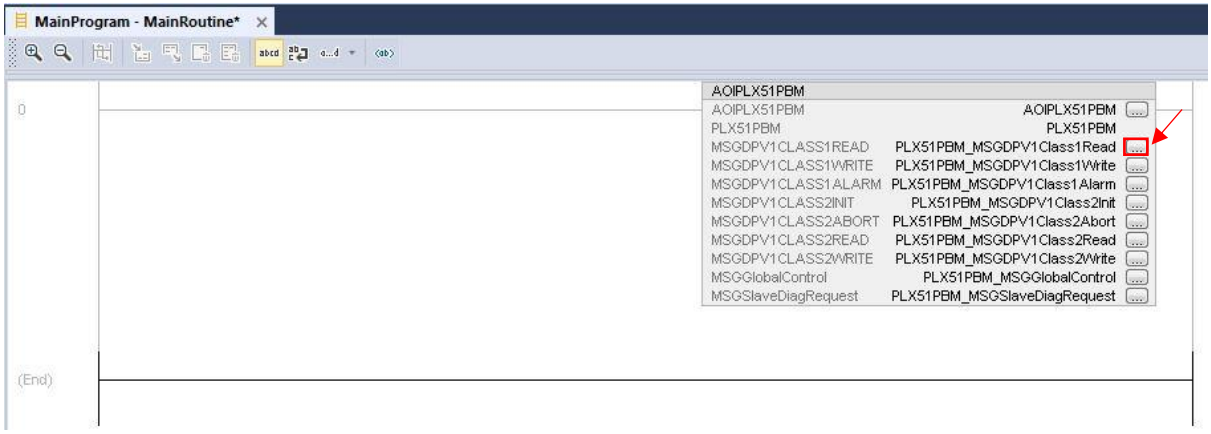
3.104 – Final Name of Module

6 Click **OK** to perform the import. When complete, the Add-On Instruction rung appears in the routine.



3.105 – Add-On Instruction Rung

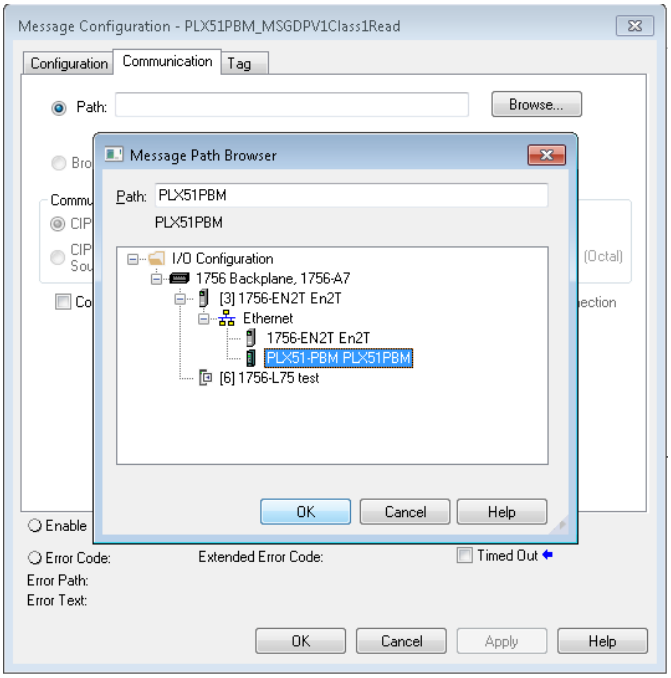
7 Click the Configuration Dialog box of one of the Ethernet/IP CIP messages.



3.106 – Configuration Dialog

8 The *Message Configuration* window of the CIP message opens.

9 To ensure that the path of communication is correct, go to the *Communication* tab and click the **BROWSE** option of the Path parameter. Click the module within the *I/O Configuration* list, then click **OK**.



3.107 – Message Path Browser

10 Click **OK** in the *Message Configuration* window. Repeat for every CIP message provided within the AOI.

11 Navigate to the *Controller Organizer* window. Double click on the *Controller Tags* folder.

3.108 – Controller Tags Folder

12 The PLX51-PBM controller tags have been imported along with the Add-On Instruction. The *PLX51PBM.CONTROL* UDT contains the tags that control all of the acyclic messaging functions.

PLX51PBM	{...}	{...}		PLX51PB...	AOIPLX51PBM
PLX51PBM.CONTROL	{...}	{...}		PLX51PB...	AOIPLX51PBM CONTROL CONTROLL..
PLX51PBM.CONTROL.DPV1_Class1	{...}	{...}		PLX51PB...	AOIPLX51PBM DPV1 Class 1
PLX51PBM.CONTROL.DPV1_Class1.Read	{...}	{...}		PLX51PB...	AOIPLX51PBM DPV1 Class 1 Read
PLX51PBM.CONTROL.DPV1_Class1.Read.Initiate	0		Dec...	BOOL	AOIPLX51PBM Initiate DPV1 Class 1 R...
PLX51PBM.CONTROL.DPV1_Class1.Read.MSGStatus	{...}	{...}		PLX51PB...	AOIPLX51PBM Message Status
PLX51PBM.CONTROL.DPV1_Class1.Read.Request	{...}	{...}		PLX51PB...	AOIPLX51PBM Request
PLX51PBM.CONTROL.DPV1_Class1.Read.Response	{...}	{...}		PLX51PB...	AOIPLX51PBM Response
PLX51PBM.CONTROL.DPV1_Class1.Write	{...}	{...}		PLX51PB...	AOIPLX51PBM DPV1 Class 1 Write
PLX51PBM.CONTROL.DPV1_Class1.Alarm	{...}	{...}		PLX51PB...	AOIPLX51PBM DPV1 Class 1 Alarm
PLX51PBM.CONTROL.DPV1_Class2	{...}	{...}		PLX51PB...	AOIPLX51PBM DPV1 Class 2
PLX51PBM.CONTROL.DPV1_Class2.Init	{...}	{...}		PLX51PB...	AOIPLX51PBM DPV1 Class 2 Init
PLX51PBM.CONTROL.DPV1_Class2.Abort	{...}	{...}		PLX51PB...	AOIPLX51PBM DPV1 Class 2 Abort
PLX51PBM.CONTROL.DPV1_Class2.Read	{...}	{...}		PLX51PB...	AOIPLX51PBM DPV1 Class 2 Read
PLX51PBM.CONTROL.DPV1_Class2.Write	{...}	{...}		PLX51PB...	AOIPLX51PBM DPV1 Class 2 Write
PLX51PBM.CONTROL.SlaveDiagnostics	{...}	{...}		PLX51PB...	AOIPLX51PBM Diagnostics Request
PLX51PBM.CONTROL.SlaveDiagnostics.Initiate	0		Dec...	BOOL	AOIPLX51PBM Initiate Diagnostics Ext..
PLX51PBM.CONTROL.SlaveDiagnostics.MSGStatus	{...}	{...}		PLX51PB...	AOIPLX51PBM Message Status
PLX51PBM.CONTROL.SlaveDiagnostics.Request	{...}	{...}		PLX51PB...	AOIPLX51PBM Request
PLX51PBM.CONTROL.SlaveDiagnostics.Response	{...}	{...}		PLX51PB...	AOIPLX51PBM Response
PLX51PBM.CONTROL.GlobalControl	{...}	{...}		PLX51PB...	AOIPLX51PBM Global Control
PLX51PBM.CONTROL.GlobalControl.Initiate	0		Dec...	BOOL	AOIPLX51PBM Initiate Global Control ..
PLX51PBM.CONTROL.GlobalControl.MSGStatus	{...}	{...}		PLX51PB...	AOIPLX51PBM Message Status
PLX51PBM.CONTROL.GlobalControl.Request	{...}	{...}		PLX51PB...	AOIPLX51PBM Request
PLX51PBM.CONTROL.GlobalControl.Response	{...}	{...}		PLX51PB...	AOIPLX51PBM Response

3.109 – PLX51PBM.CONTROL Controller Tags

3.12.1 Class 3 Messaging

1 To perform Class 3 messaging with the AOI, you must first ensure that the PLX51-PBM is in the OPERATIONAL state and exchanging data with its configured nodes.

> **NOTE:** The slave device must support DPV1 messaging. The *DPV1 Enable* bit must be set in the user parameters of the slave device in the PLX50 Configuration Utility.

2 Go to the Controller Tag of the acyclic function you want to perform, and verify that the *Request* parameters of the function are correct.

◢ PLX51PBM.CONTROL.DPV1_Class1.Read	{...}
PLX51PBM.CONTROL.DPV1_Class1.Read.Initiate	0
◢ PLX51PBM.CONTROL.DPV1_Class1.Read.MSGStatus	{...}
PLX51PBM.CONTROL.DPV1_Class1.Read.MSGStatus.Done	1
PLX51PBM.CONTROL.DPV1_Class1.Read.MSGStatus.Error	0
▷ PLX51PBM.CONTROL.DPV1_Class1.Read.MSGStatus.DoneCount	15
▷ PLX51PBM.CONTROL.DPV1_Class1.Read.MSGStatus.ErrorCount	0
◢ PLX51PBM.CONTROL.DPV1_Class1.Read.Request	{...}
▷ PLX51PBM.CONTROL.DPV1_Class1.Read.Request.Timeout	4000
▷ PLX51PBM.CONTROL.DPV1_Class1.Read.Request.SlaveAddress	2
▷ PLX51PBM.CONTROL.DPV1_Class1.Read.Request.SlotNumber	1
▷ PLX51PBM.CONTROL.DPV1_Class1.Read.Request.Index	1
▷ PLX51PBM.CONTROL.DPV1_Class1.Read.Request.Length	10
◢ PLX51PBM.CONTROL.DPV1_Class1.Read.Response	{...}

Figure 3.110 – DPV1 Class 1 Read Request Parameters

3 Once verified, enter a value of '**1**' in the *Initiate* tag to send the Class 3 message.

◢ PLX51PBM.CONTROL.DPV1_Class1.Read	{...}
PLX51PBM.CONTROL.DPV1_Class1.Read.Initiate	0
◢ PLX51PBM.CONTROL.DPV1_Class1.Read.MSGStatus	{...}
PLX51PBM.CONTROL.DPV1_Class1.Read.MSGStatus.Done	1
PLX51PBM.CONTROL.DPV1_Class1.Read.MSGStatus.Error	0
▷ PLX51PBM.CONTROL.DPV1_Class1.Read.MSGStatus.DoneCount	15
▷ PLX51PBM.CONTROL.DPV1_Class1.Read.MSGStatus.ErrorCount	0
◢ PLX51PBM.CONTROL.DPV1_Class1.Read.Request	{...}
▷ PLX51PBM.CONTROL.DPV1_Class1.Read.Request.Timeout	4000
▷ PLX51PBM.CONTROL.DPV1_Class1.Read.Request.SlaveAddress	2
▷ PLX51PBM.CONTROL.DPV1_Class1.Read.Request.SlotNumber	1
▷ PLX51PBM.CONTROL.DPV1_Class1.Read.Request.Index	1
▷ PLX51PBM.CONTROL.DPV1_Class1.Read.Request.Length	10
◢ PLX51PBM.CONTROL.DPV1_Class1.Read.Response	{...}

Figure 3.111 – DPV1 Class 1 Read Initiate

4 Confirm the message was successfully sent by monitoring the *MSGStatus* tag.

◢ PLX51PBM.CONTROL.DPV1_Class1.Read	{...}
PLX51PBM.CONTROL.DPV1_Class1.Read.Initiate	0
◢ PLX51PBM.CONTROL.DPV1_Class1.Read.MSGStatus	{...}
PLX51PBM.CONTROL.DPV1_Class1.Read.MSGStatus.Done	1
PLX51PBM.CONTROL.DPV1_Class1.Read.MSGStatus.Error	0
▷ PLX51PBM.CONTROL.DPV1_Class1.Read.MSGStatus.DoneCount	15
▷ PLX51PBM.CONTROL.DPV1_Class1.Read.MSGStatus.ErrorCount	0
◢ PLX51PBM.CONTROL.DPV1_Class1.Read.Request	{...}
▷ PLX51PBM.CONTROL.DPV1_Class1.Read.Request.Timeout	4000
▷ PLX51PBM.CONTROL.DPV1_Class1.Read.Request.SlaveAddress	2
▷ PLX51PBM.CONTROL.DPV1_Class1.Read.Request.SlotNumber	1
▷ PLX51PBM.CONTROL.DPV1_Class1.Read.Request.Index	1
▷ PLX51PBM.CONTROL.DPV1_Class1.Read.Request.Length	10
◢ PLX51PBM.CONTROL.DPV1_Class1.Read.Response	{...}

Figure 3.112 – DPV1 Class 1 Read Message Status

5 The slave's response to the acyclic message function is shown in the *Response* tags.

◢ PLX51PBM.CONTROL.DPV1_Class1	{...}
◢ PLX51PBM.CONTROL.DPV1_Class1.Read	{...}
PLX51PBM.CONTROL.DPV1_Class1.Read.Initiate	0
◢ PLX51PBM.CONTROL.DPV1_Class1.Read.MSGStatus	{...}
PLX51PBM.CONTROL.DPV1_Class1.Read.MSGStatus.Done	1
PLX51PBM.CONTROL.DPV1_Class1.Read.MSGStatus.Error	0
▷ PLX51PBM.CONTROL.DPV1_Class1.Read.MSGStatus.DoneCount	15
▷ PLX51PBM.CONTROL.DPV1_Class1.Read.MSGStatus.ErrorCount	0
◢ PLX51PBM.CONTROL.DPV1_Class1.Read.Request	{...}
▷ PLX51PBM.CONTROL.DPV1_Class1.Read.Request.Timeout	4000
▷ PLX51PBM.CONTROL.DPV1_Class1.Read.Request.SlaveAddress	2
▷ PLX51PBM.CONTROL.DPV1_Class1.Read.Request.SlotNumber	1
▷ PLX51PBM.CONTROL.DPV1_Class1.Read.Request.Index	1
▷ PLX51PBM.CONTROL.DPV1_Class1.Read.Request.Length	10
◢ PLX51PBM.CONTROL.DPV1_Class1.Read.Response	{...}
▷ PLX51PBM.CONTROL.DPV1_Class1.Read.Response.Status	0
▷ PLX51PBM.CONTROL.DPV1_Class1.Read.Response.ExtendedSt...	0
▷ PLX51PBM.CONTROL.DPV1_Class1.Read.Response.ExtendedSt...	0
▷ PLX51PBM.CONTROL.DPV1_Class1.Read.Response.ExtendedSt...	0
▷ PLX51PBM.CONTROL.DPV1_Class1.Read.Response.DataLength	16#07
▷ PLX51PBM.CONTROL.DPV1_Class1.Read.Response.Reserved	16#00
▷ PLX51PBM.CONTROL.DPV1_Class1.Read.Response.Data	16#64
▷ PLX51PBM.CONTROL.DPV1_Class1.Read.Response.Data1	16#88
▷ PLX51PBM.CONTROL.DPV1_Class1.Read.Response.Data2	16#12
▷ PLX51PBM.CONTROL.DPV1_Class1.Read.Response.Data3	16#0b
▷ PLX51PBM.CONTROL.DPV1_Class1.Read.Response.Data4	16#05
▷ PLX51PBM.CONTROL.DPV1_Class1.Read.Response.Data5	16#01
▷ PLX51PBM.CONTROL.DPV1_Class1.Read.Response.Data6	16#cc

Figure 3.113 – DPV1 Class 1 Read Response

3.12.2 DPV1 Class 2 Initialize

To perform a DPV1 Class 2 Read/Write, a DPV1 Class 2 Initialize message must first be sent to the DPV1 Slave to begin the communication connection. The PLX51-PBM Add-On Instruction (AOI) handles the source/destination address information of the Initialization request. A detailed description of how the AOI controls the source/destination address information of the DPV1 Class 2 Initialize request is provided below. Please see *PROFIBUS DP - Master* on page 102 for more information on the DPV1 Class 2 Initialization Request parameters.

Overview

A DPV1 Class 2 Initialize (Init) request can be sent with or without additional source or destination address information. The additional address information includes the optional Network/MAC address. The parameters *Source Type* and *Destination Type* indicate the presence of the optional Network/MAC address. The DPV1 Class 2 Init request UDT provides 6 bytes for the Network address and 10 bytes for the MAC address, for both the Source and Destination. The Source/Destination Address Length must represent the total length of the Source/Destination address information sent within the DPV1 Class 2 Init request.

Source Type = 0 & Destination Type = 0

The Controller Tags for the DPV1 Class 2 Init request are populated with default values. The Source Type (Source_Type) and Destination Type (Dest_Type) are both set to **0**. Therefore, the Init request will be sent without the optional Source/Destination Network and MAC Address information.

PLX51PBM.CONTROL.DPV1_Class2.Init.Request	{...}	{.		PLX51PBM_CONTRO...	AOIPLX51PBM Request
PLX51PBM.CONTROL.DPV1_Class2.Init.Request.Timeout	4000		Decimal	DINT	AOIPLX51PBM Timeo...
PLX51PBM.CONTROL.DPV1_Class2.Init.Request.SlaveAddress	2		Decimal	SINT	AOIPLX51PBM Slave ...
PLX51PBM.CONTROL.DPV1_Class2.Init.Request.Reserved1	0		Decimal	SINT	AOIPLX51PBM Reserv...
PLX51PBM.CONTROL.DPV1_Class2.Init.Request.Reserved2	0		Decimal	SINT	AOIPLX51PBM Reserv...
PLX51PBM.CONTROL.DPV1_Class2.Init.Request.Reserved3	0		Decimal	SINT	AOIPLX51PBM Reserv...
PLX51PBM.CONTROL.DPV1_Class2.Init.Request.Send_Timeout	10		Decimal	INT	AOIPLX51PBM Send ...
PLX51PBM.CONTROL.DPV1_Class2.Init.Request.Features_Supp	0		Decimal	INT	AOIPLX51PBM Featur...
PLX51PBM.CONTROL.DPV1_Class2.Init.Request.Profile_Features_Supp	0		Decimal	INT	AOIPLX51PBM Profile...
PLX51PBM.CONTROL.DPV1_Class2.Init.Request.Profile_Ident_Number	0		Decimal	INT	AOIPLX51PBM Profile...
PLX51PBM.CONTROL.DPV1_Class2.Init.Request.Source_Type	0		Decimal	SINT	AOIPLX51PBM Sourc...
PLX51PBM.CONTROL.DPV1_Class2.Init.Request.Source_Addr_Len	2		Decimal	SINT	AOIPLX51PBM Sourc...
PLX51PBM.CONTROL.DPV1_Class2.Init.Request.Dest_Type	0		Decimal	SINT	AOIPLX51PBM Destin...
PLX51PBM.CONTROL.DPV1_Class2.Init.Request.Dest_Addr_Len	2		Decimal	SINT	AOIPLX51PBM Destin...
PLX51PBM.CONTROL.DPV1_Class2.Init.Request.Source_API	0		Decimal	SINT	AOIPLX51PBM Sourc...
PLX51PBM.CONTROL.DPV1_Class2.Init.Request.Source_SCL	0		Decimal	SINT	AOIPLX51PBM Sourc...
PLX51PBM.CONTROL.DPV1_Class2.Init.Request.Source_Net_Addr_1	0		Decimal	SINT	AOIPLX51PBM Sourc...
PLX51PBM.CONTROL.DPV1_Class2.Init.Request.Source_Net_Addr_2	0		Decimal	SINT	AOIPLX51PBM Sourc...
PLX51PBM.CONTROL.DPV1_Class2.Init.Request.Source_Net_Addr_3	0		Decimal	SINT	AOIPLX51PBM Sourc...
PLX51PBM.CONTROL.DPV1_Class2.Init.Request.Source_Net_Addr_4	0		Decimal	SINT	AOIPLX51PBM Sourc...
PLX51PBM.CONTROL.DPV1_Class2.Init.Request.Source_Net_Addr_5	0		Decimal	SINT	AOIPLX51PBM Sourc...
PLX51PBM.CONTROL.DPV1_Class2.Init.Request.Source_Net_Addr_6	0		Decimal	SINT	AOIPLX51PBM Sourc...
PLX51PBM.CONTROL.DPV1_Class2.Init.Request.Source_MAC_Addr_1	0		Decimal	SINT	AOIPLX51PBM Sourc...
PLX51PBM.CONTROL.DPV1_Class2.Init.Request.Source_MAC_Addr_2	0		Decimal	SINT	AOIPLX51PBM Sourc...
PLX51PBM.CONTROL.DPV1_Class2.Init.Request.Source_MAC_Addr_3	0		Decimal	SINT	AOIPLX51PBM Sourc...
PLX51PBM.CONTROL.DPV1_Class2.Init.Request.Source_MAC_Addr_4	0		Decimal	SINT	AOIPLX51PBM Sourc...
PLX51PBM.CONTROL.DPV1_Class2.Init.Request.Source_MAC_Addr_5	0		Decimal	SINT	AOIPLX51PBM Sourc...
PLX51PBM.CONTROL.DPV1_Class2.Init.Request.Source_MAC_Addr_6	0		Decimal	SINT	AOIPLX51PBM Sourc...
PLX51PBM.CONTROL.DPV1_Class2.Init.Request.Source_MAC_Addr_7	0		Decimal	SINT	AOIPLX51PBM Sourc...
PLX51PBM.CONTROL.DPV1_Class2.Init.Request.Source_MAC_Addr_8	0		Decimal	SINT	AOIPLX51PBM Sourc...
PLX51PBM.CONTROL.DPV1_Class2.Init.Request.Source_MAC_Addr_9	0		Decimal	SINT	AOIPLX51PBM Sourc...
PLX51PBM.CONTROL.DPV1_Class2.Init.Request.Source_MAC_Addr_10	0		Decimal	SINT	AOIPLX51PBM Sourc...
PLX51PBM.CONTROL.DPV1_Class2.Init.Request.Destination_API	0		Decimal	SINT	AOIPLX51PBM Destin...
PLX51PBM.CONTROL.DPV1_Class2.Init.Request.Destination_SCL	0		Decimal	SINT	AOIPLX51PBM Destin...

Figure 3.113 – DPV1 Class 2 Init Request Default Values

When the DPV1 Class 2 Init is initiated, and the Source Type (Source_Type) and Destination Type (Dest_Type) are both **0**, the AOI will set:

- The Source Address Length (Source_Addr_Len) and Destination Address Length (Dest_Addr_Len) to **2**.
- The Ethernet/IP CIP Message Request length (MSGDPV1CLASS2INIT.REQ_LEN) to **24**.
- Copies the Destination API (Destination_API) and Destination SCL (Destination_SCL) to the appropriate locations of the request.

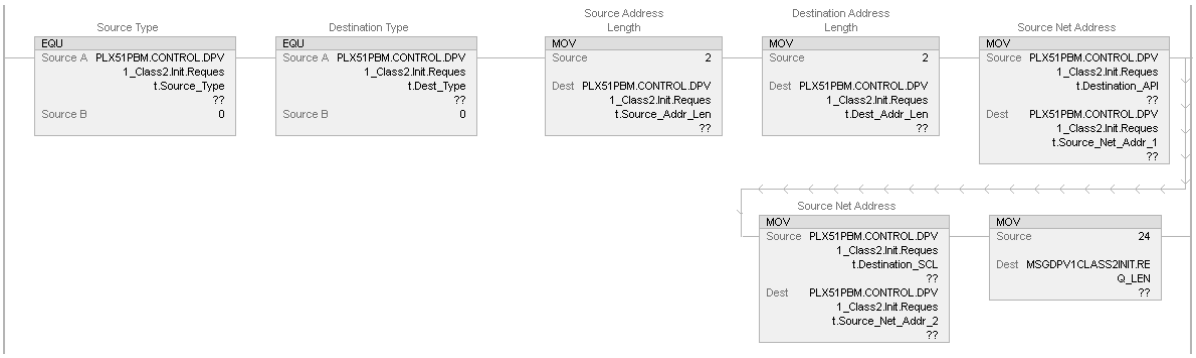


Figure 3.114 – Implemented AOI Logic for Source/Destination Type = 0

Source Type = 1 & Destination Type = 0

When the DPV1 Class 2 Init is initiated, and the Source Type (Source_Type) is **1** and the Destination Type (Dest_Type) is **0**, the AOI will set:

- The Source Address Length (Source_Addr_Len) to **18**.
- The Destination Address Length (Dest_Addr_Len) to **2**.
- The Ethernet/IP CIP Message Request length (MSGDPV1CLASS2INIT.REQ_LEN) to **40**.

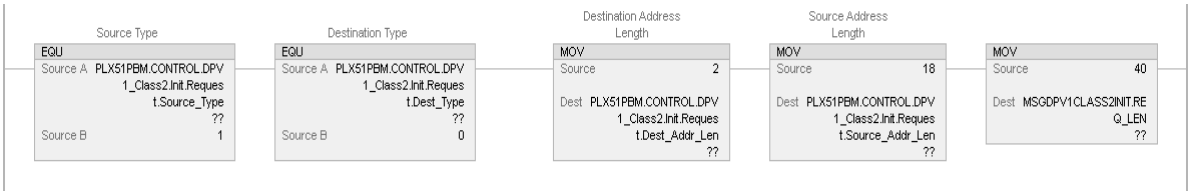


Figure 3.115 – Implemented AOI Logic for Source Type = 1 and Destination Type = 0

Source Type = 0 & Destination Type = 1

When the DPV1 Class 2 Init is initiated, and the Source Type (Source_Type) is **0** and the Destination Type (Dest_Type) is **1**, the AOI will set:

- The Source Address Length (Source_Addr_Len) to **2**.
- The Destination Address Length (Dest_Addr_Len) to **16**.
- The Ethernet/IP CIP Message Request length (MSGDPV1CLASS2INIT.REQ_LEN) to **38**.
- Copies all of the Destination address information tags (API, SCL, Network/MAC Address) to the appropriate tags of the request message.

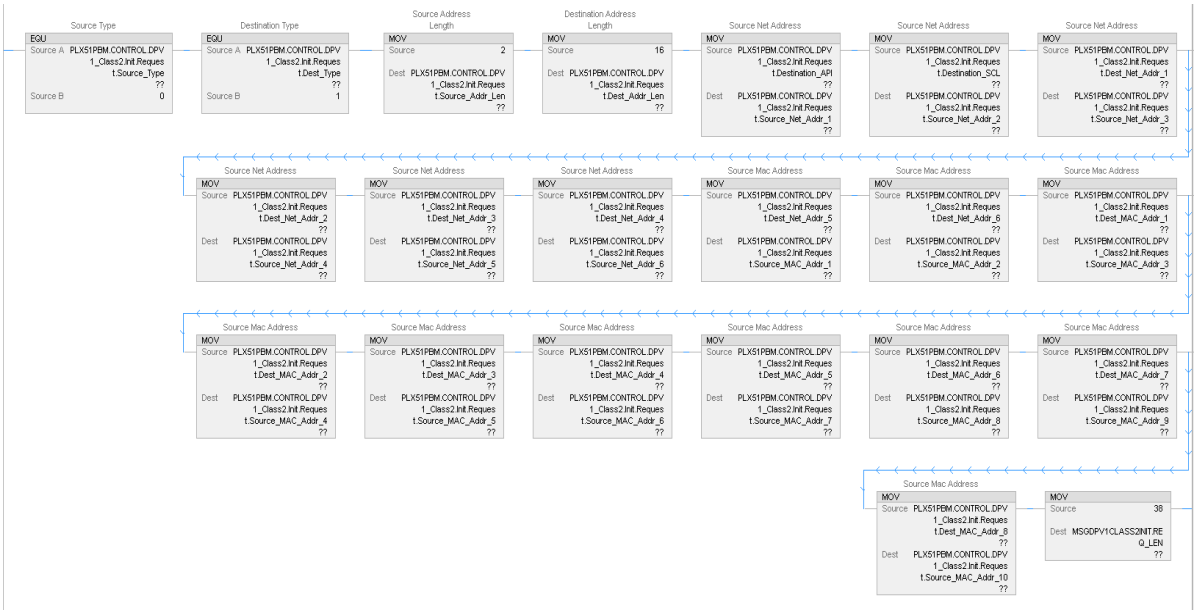


Figure 3.116 – Implemented AOI Logic for Source Type = 0 and Destination Type = 1

Source Type = 1 & Destination Type = 1

When the DPV1 Class 2 Init is initiated, and the Source Type (Source_Type) and Destination Type (Dest_Type) are both **1**, the AOI will set:

- The Source Address Length (Source_Addr_Len) and the Destination Address Length (Dest_Addr_Len) both to **18**.
- The Ethernet/IP CIP Message Request length (MSGDPV1CLASS2INIT.REQ_LEN) to **56**.

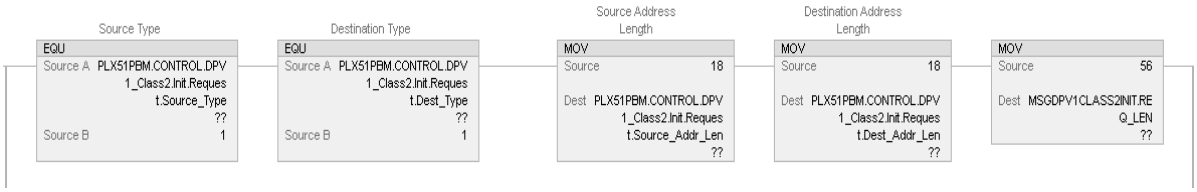


Figure 3.117 – Implemented AOI Logic for Source/Destination Type = 1

4 SD Card

The PLX51-PBM supports an SD Card (see below) which can be used for disaster recovery. The SD Card can be pre-loaded with the required firmware and/or application configuration.

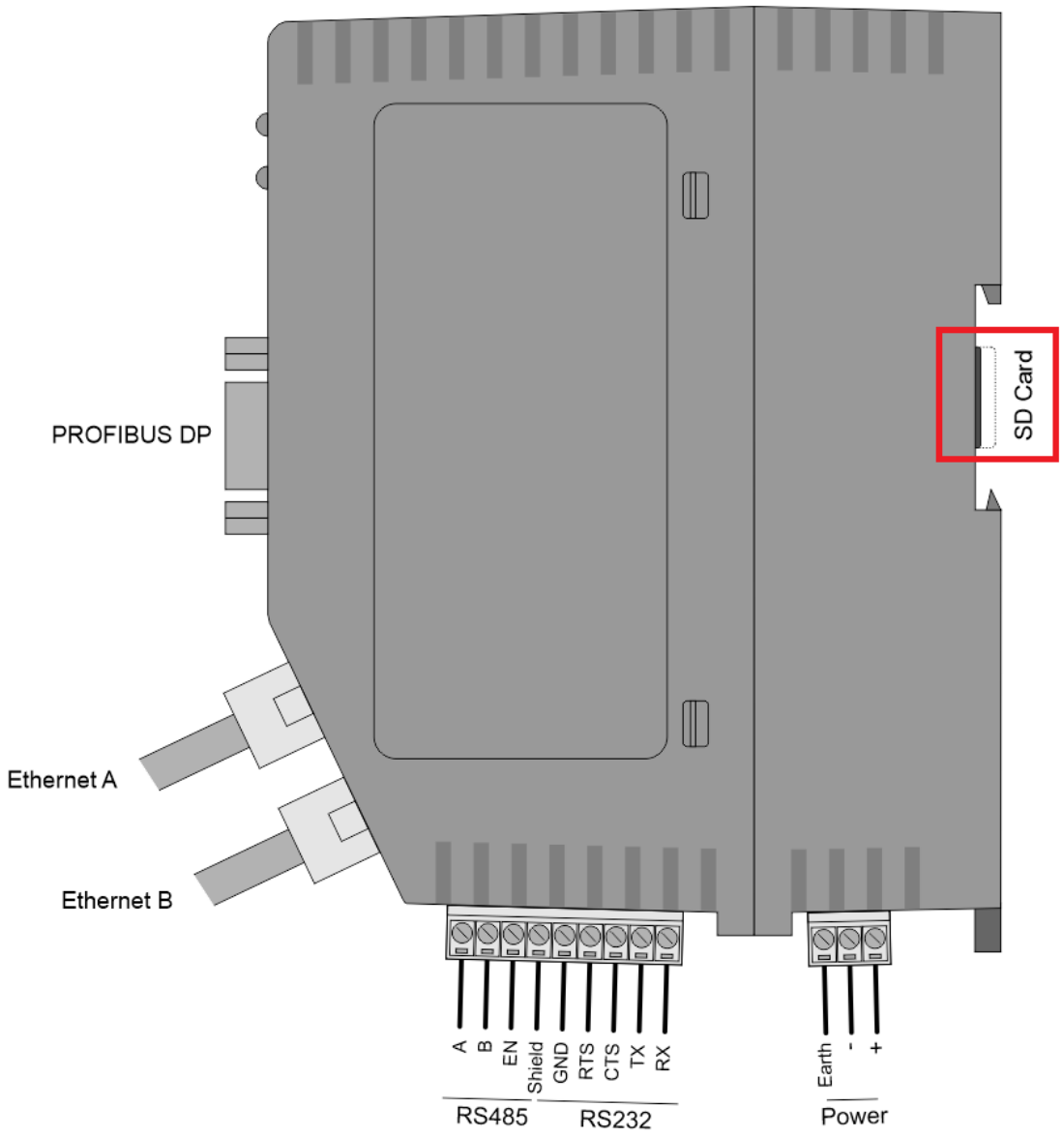


Figure 4.1 – Module Side View – SD Card Slot

IMPORTANT: The user will need to ensure that the SD Card has been formatted for FAT32.

IMPORTANT: All needed files must be copied into the root directory of the SD Card. The module will not use files which are located in folders.

4.1 Firmware

The user can copy the required firmware (which can be downloaded from the ProSoft website) onto the root directory of the SD Card.

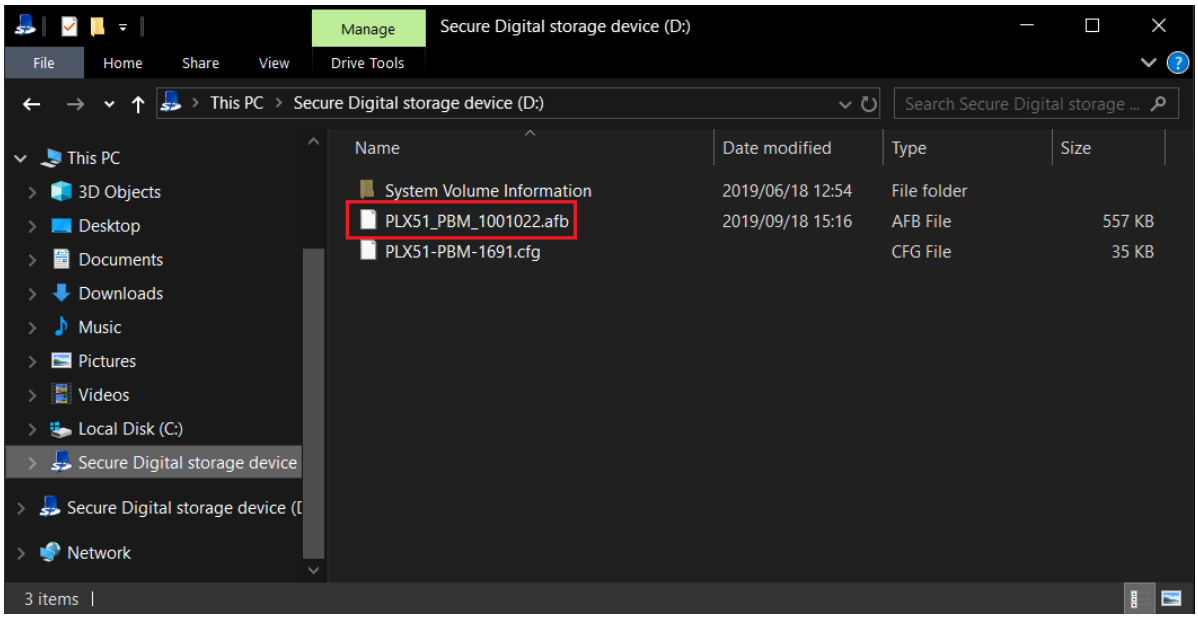


Figure 4.2 – SD Card – Firmware file

IMPORTANT: The filename of the firmware file must not be changed. The specific module will use only the firmware that is valid (e.g. the PLX51-PBM will only use the PBM firmware file).

IMPORTANT: If more than one firmware file, with different firmware revisions, of the same product is on the SD Card it can cause the module to constantly firmware upgrade the module.

If a faulty module is replaced the user can insert the SD Card with the firmware file on into the new module. While the module is booting it can detect if the firmware on the new module is different from that on the SD Card. If yes, the firmware will either be upgraded or downgraded to the firmware revision on the SD Card.

4.2 Configuration

If a faulty module is replaced the user can insert the SD Card with the configuration file on into the new module. The new module will determine if the configuration on the SD Card is different than the currently loaded configuration (even when there is no configuration on the module). If different, the configuration on the SD Card will be downloaded into the module's NV memory before the module starts executing.

The user can add the PLX50CU configuration file to the SD Card root directory in one of two ways.

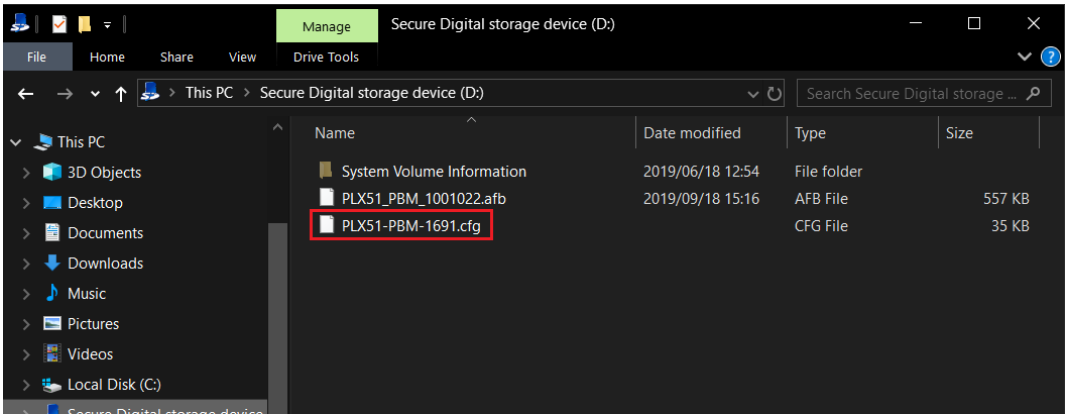


Figure 4.3 – SD Card – Configuration file

4.2.1 Manual Copy

Once the user has created the needed application configuration in the PLX50CU the configuration can be exported to a file that can be used on the SD Card. Once the file has been created the user can copy this file into the root directory of the SD Card.

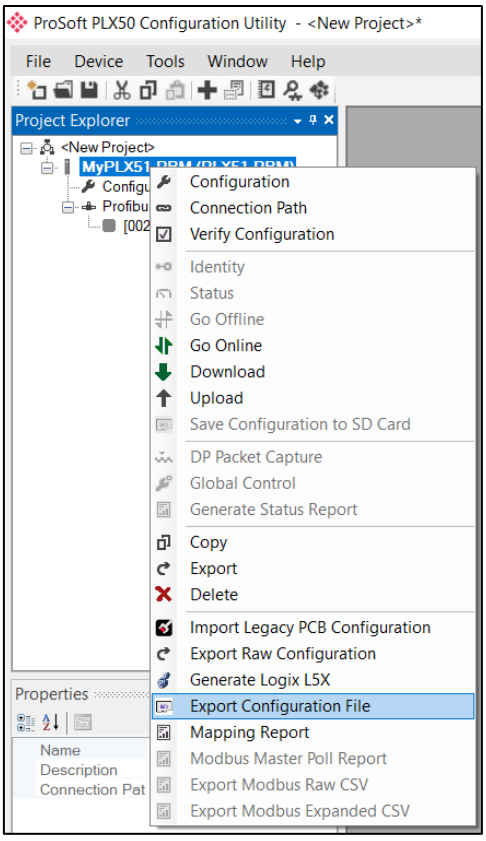


Figure 4.4 – Configuration Export for SD Card

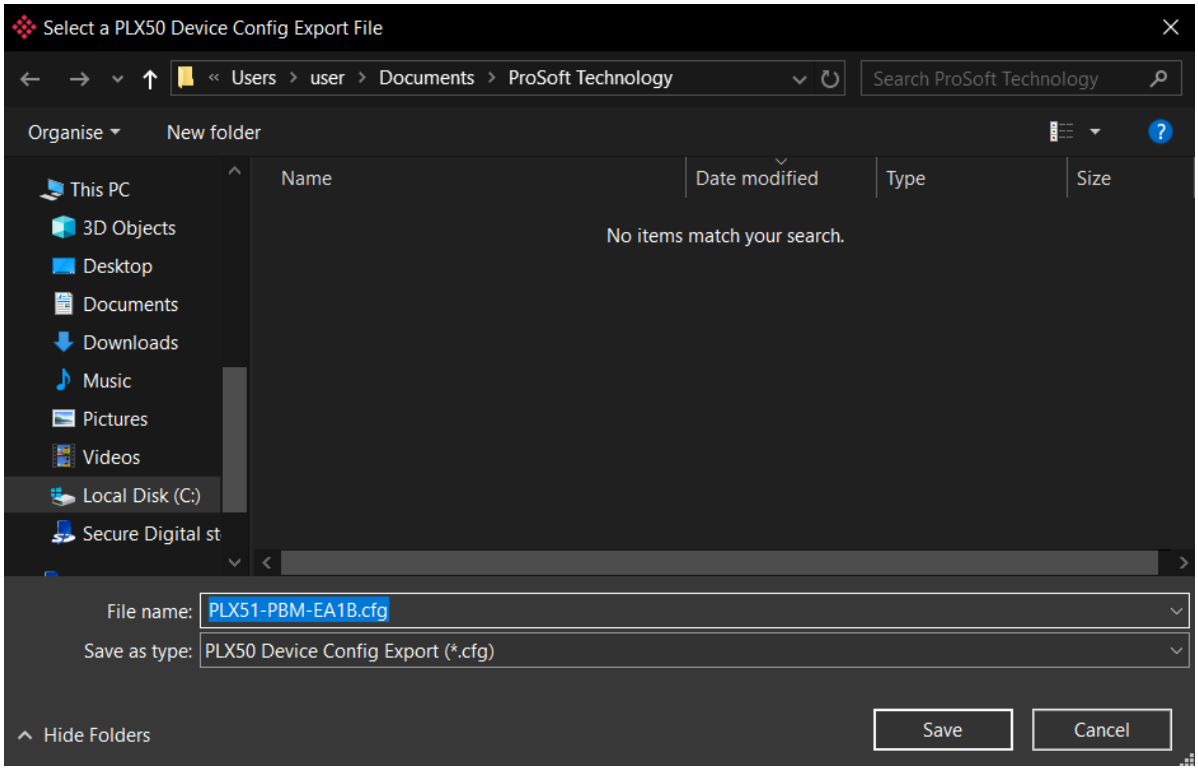


Figure 4.5 – Configuration Export for SD Card

IMPORTANT: The filename of the configuration file must not be changed. The specific module will use only the configuration that is valid (e.g. the PLX51-PBM will only use the PBM configuration file).

IMPORTANT: If more than one configuration file, with different configuration signatures, of the same product is on the SD Card then only the last configuration will be used.

4.2.2 PLX50CU Upload

When the SD Card has been inserted into the module and the user is online with the module in PLX50CU, then the user has the option to directly upload the configuration on to the SD Card using the *Save Configuration to SD Card* option. This will copy the configuration that has been downloaded to the module directly to the SD Card without the need to remove it from the module and inserted into a PC.

IMPORTANT: All other configuration files in the SD Card root directory will be deleted when the upload is done.

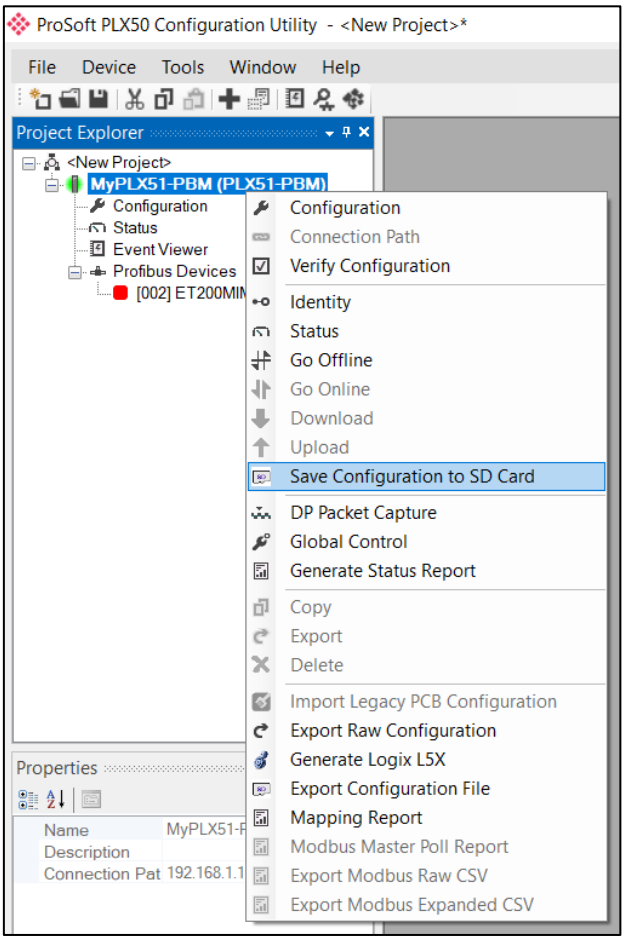


Figure 4.6 – Save Configuration to SD Card

5 Operation

5.1 Logix Operation

When the PLX51-PBM has been configured for Logix communication (by setting the Primary Interface to EtherNet/IP) it will exchange data with a Logix controller (e.g. ControlLogix or CompactLogix) by adding the PLX51-PBM module under an Ethernet bridge in the IO tree and establishing a Class 1 connection.

5.1.1 PROFIBUS DP - Master

Once the PLX51-PBM and Logix controller have been correctly configured, the PLX51-PBM will start exchanging data with PROFIBUS slave devices.

IMPORTANT: The module input and output assembly of each connection will be an undecorated array of data. The imported Logix routine (generated by PLX50CU) will copy this data to the input and output assemblies.

Master Status

Below are the definitions for the tags in the Master Status UDT created by the PLX50CU.

◢ MyPLX51PBM_MasterStatus	{...}	{...}		PSPLX51DPMasterStatus
MyPLX51PBM_MasterStatus.ConfigValid	1		Decimal	BOOL
MyPLX51PBM_MasterStatus.Owned	1		Decimal	BOOL
MyPLX51PBM_MasterStatus.DuplicateDPStation	0		Decimal	BOOL
MyPLX51PBM_MasterStatus.ProfibusFieldbusError	0		Decimal	BOOL
MyPLX51PBM_MasterStatus.ProfibusDeviceError	0		Decimal	BOOL
MyPLX51PBM_MasterStatus.ProfibusOffline	0		Decimal	BOOL
MyPLX51PBM_MasterStatus.ProfibusStopped	0		Decimal	BOOL
MyPLX51PBM_MasterStatus.ProfibusClear	0		Decimal	BOOL
MyPLX51PBM_MasterStatus.ProfibusOperational	1		Decimal	BOOL
MyPLX51PBM_MasterStatus.SlaveMode	0		Decimal	BOOL
MyPLX51PBM_MasterStatus.PLCRun	0		Decimal	BOOL
▷ MyPLX51PBM_MasterStatus.ConfigCRC	16#741a		Hex	INT
▷ MyPLX51PBM_MasterStatus.ActiveNodeCount	3		Decimal	SINT
▷ MyPLX51PBM_MasterStatus.DeviceLiveList	{...}	{...}	Decimal	BOOL[128]
▷ MyPLX51PBM_MasterStatus.DeviceDataExchangeActive	{...}	{...}	Decimal	BOOL[128]
▷ MyPLX51PBM_MasterStatus.DeviceAlarmPendingFlags	{...}	{...}	Decimal	BOOL[128]
▷ MyPLX51PBM_MasterStatus.DeviceDiagnosticPendingFlags	{...}	{...}	Decimal	BOOL[128]

Figure 5.1 – Logix Master Status tags

Table 5.1 – Logix Master Status tags

Tag	Description
ConfigValid	Configuration has been downloaded to the PLX51-PBM and is being executed. 1 – PLX51-PBM has been successfully configured. 0 – PLX51-PBM is not configured.
Owned	Indicates if the PLX51-PBM is owned by a Logix Controller with a connection count similar to what has been configured in PLX50CU. 1 – PLX51-PBM is connected. 0 – PLX51-PBM is not connected.

DuplicateDPStation	Indicates that the PLX51-PBM has detected another PROFIBUS DP station with the same station address as itself and has entered a temporary Back-off mode. 1 – Duplicate detected (Back-off mode active). 0 – Normal (No duplicate detected). **NOTE**: In this condition the PLX51-PBM will not communicate on the PROFIBUS DP network. Although the back-off time is approximately 5 seconds, should the conflicting DP master remain active on the PROFIBUS network, the PLX51-PBM will continuously re-enter the back-off mode.
PROFIBUSFieldbusError	There is a PROFIBUS network issues (e.g. cable unplugged, under/over terminated, etc.). 1 – Fieldbus error detected. 0 – Normal (No errors detected).
PROFIBUSDeviceError	At least one slave device has a communication issue (e.g. offline, not exchanging process data, etc.) 1 – Device error detected. 0 – Normal (No errors detected).
PROFIBUSOffline	The PROFIBUS network is offline and the PLX51-PBM will not communicate on the network. 1 – PROFIBUS fieldbus state is OFFLINE. 0 – PROFIBUS fieldbus state is **not** OFFLINE.
PROFIBUSStopped	The PROFIBUS network is running and the PLX51-PBM is communicating on the network, but it will not exchange any process data with any slave device. 1 – PROFIBUS fieldbus state is STOPPED. 0 – PROFIBUS fieldbus state is **not** STOPPED.
PROFIBUSClear	The PROFIBUS network is running and the PLX51-PBM is communicating with all slave devices on the network, and if configured in the PLX51-PBM, the module will configure and exchange process data with each slave device. **NOTE**: In CLEAR mode the PLX51-PBM will not send any output data to any slave device. 1 – PROFIBUS fieldbus state is CLEAR. 0 – PROFIBUS fieldbus state is **not** CLEAR.
PROFIBUSOperational	The PROFIBUS network is running and the PLX51-PBM is communicating with all slave devices on the network, and if configured in the PLX51-PBM, the module will configure and exchange process data with each slave device. 1 – PROFIBUS fieldbus state is OPERATE. 0 – PROFIBUS fieldbus state is **not** OPERATE.
SlaveMode	When in Slave mode the PLX51-PBM will emulate multiple PROFIBUS Slave devices. This indicates when the PLX51-PBM is in Slave mode. 1 – The PLX51-PBM is in Slave Mode. 0 – The PLX51-PBM is **not** in Slave Mode.
ConfigCRC	The signature of the configuration currently executing on the module.
DeviceListList	Indicates the nodes that are online on the local PROFIBUS network. Each bit represents a node. When the specific bit is set ‘1’ then the device is online and when the bit is off ‘0’ the device is not on the PROFIBUS network. Bit 0 – Node 0 Online Bit 1 – Node 1 Online Bit 126 – Node 126 Online

DeviceDataExchangeActive	Indicates the nodes that are online and exchanging DPV0 data on the local PROFIBUS network. Each bit represents a node. When the specific bit is set '1' then the device is online and exchanging data and when the bit is off '0' the device is not exchanging data on the PROFIBUS network. Bit 0 – Node 0 Exchanging DPV0 Data Bit 1 – Node 1 Exchanging DPV0 Data Bit 126 – Node 126 Exchanging DPV0 Data
DeviceAlarmPendingFlags	Indicates the nodes that have an alarm pending on the local PROFIBUS network. Each bit represents a node. When the specific bit is set '1' then the device has an alarm pending that must be unloaded and when the bit is off '0' the device does not have an alarm pending. Bit 0 – Node 0 has an alarm pending Bit 1 – Node 1 has an alarm pending Bit 126 – Node 126 has an alarm pending
DeviceDiagnosticPendingFlags	Indicates the nodes that have diagnostics pending on the local PROFIBUS network. Each bit represents a node. When the specific bit is set '1' then the device has diagnostics pending that must be unloaded and when the bit is off '0' the device does not have any diagnostics pending. Bit 0 – Node 0 has diagnostics pending Bit 1 – Node 1 has diagnostics pending Bit 126 – Node 126 has diagnostics pending

Master Control

The user will need to set the PROFIBUS Operating mode from the PLX51-PBM Logix output assembly in the Logix controller.

◢ MyPLX51PBM_MasterControl	{...}	{...}		PSPLX51DPMasterControl
▶ MyPLX51PBM_MasterControl.MasterControl	3		Decimal	SINT
▶ MyPLX51PBM_MasterControl.RedundancyControl	0		Decimal	SINT
◢ MyPLX51PBM_MasterControl.DeviceEnable	{...}	{...}	Decimal	BOOL[128]
MyPLX51PBM_MasterControl.DeviceEnable[0]	0		Decimal	BOOL
MyPLX51PBM_MasterControl.DeviceEnable[1]	1		Decimal	BOOL
MyPLX51PBM_MasterControl.DeviceEnable[2]	1		Decimal	BOOL
MyPLX51PBM_MasterControl.DeviceEnable[3]	0		Decimal	BOOL
MyPLX51PBM_MasterControl.DeviceEnable[4]	1		Decimal	BOOL
MyPLX51PBM_MasterControl.DeviceEnable[5]	0		Decimal	BOOL
MyPLX51PBM_MasterControl.DeviceEnable[6]	0		Decimal	BOOL
MyPLX51PBM_MasterControl.DeviceEnable[7]	0		Decimal	BOOL
MyPLX51PBM_MasterControl.DeviceEnable[8]	0		Decimal	BOOL
MyPLX51PBM_MasterControl.DeviceEnable[9]	0		Decimal	BOOL

Figure 5.2 – Master Control tags

Table 5.2 – Master Control tags

Tag	Description
MasterControl	This tag is used to set the state of the fieldbus network. 0 – Set PROFIBUS network state to OFFLINE 1 – Set PROFIBUS network state to STOP 2 – Set PROFIBUS network state to CLEAR 3 – Set PROFIBUS network state to OPERATIONAL
RedundancyControl	This field is currently reserved.
DeviceEnable	These bits enable nodes on the PROFIBUS network for data exchange. Each bit represents a node. When the specific bit is set '1' then the device (if configured) will exchange data with the PLX51-PBM and when the bit is off '0' the device does exchange data with the PLX51-PBM. Bit 0 – Node 0 is enabled for data exchange Bit 1 – Node 1 is enabled for data exchange Bit 126 – Node 126 is enabled for data exchange

The user will be able to see if there are any faults (e.g. configured device not found) by viewing the LEDs of the PLX51-PBM (see the *Diagnostics* section for more details), by going online with the module in the PLX50 Configuration Utility and viewing the PLX51-PBM Master and Device Diagnostics, or by viewing the input assembly of the PLX51-PBM in Logix.

Status and DPV0 Data Exchange

The DPV0 data is exchanged with Logix using the Class 1 EtherNet/IP connection. The device-specific tag contains all the input and output data fields as well as important control and status information.

MyPLX51PBM1_iTEMPPATMT184	{...}		MyPLX51PBM1_152365E6
MyPLX51PBM1_iTEMPPATMT184.Input	{...}		MyPLX51PBM1_152365E6Input
MyPLX51PBM1_iTEMPPATMT184.Input.Status	{...}		PSPLX51DPSlaveStatus
MyPLX51PBM1_iTEMPPATMT184.Input.Status.Online	0	Decimal	BOOL
MyPLX51PBM1_iTEMPPATMT184.Input.Status.DataExchangeActive	0	Decimal	BOOL
MyPLX51PBM1_iTEMPPATMT184.Input.Status.IdentMismatch	0	Decimal	BOOL
MyPLX51PBM1_iTEMPPATMT184.Input.Status.DisabledByOutputAssembly	0	Decimal	BOOL
MyPLX51PBM1_iTEMPPATMT184.Input.Status.DeviceError	0	Decimal	BOOL
MyPLX51PBM1_iTEMPPATMT184.Input.Status.AlarmPending	0	Decimal	BOOL
MyPLX51PBM1_iTEMPPATMT184.Input.Status.DiagnosticsPending	0	Decimal	BOOL
MyPLX51PBM1_iTEMPPATMT184.Input.Status.OutputAssemblyNodeAddrMismatch	0	Decimal	BOOL
MyPLX51PBM1_iTEMPPATMT184.Input.Status.MappingCRCMismatch	0	Decimal	BOOL
MyPLX51PBM1_iTEMPPATMT184.Input.Status.SlaveClearOpMode	0	Decimal	BOOL
MyPLX51PBM1_iTEMPPATMT184.Input.Status.SlaveAlarmAck	0	Decimal	BOOL
MyPLX51PBM1_iTEMPPATMT184.Input.Status.StationNumber	0	Decimal	SINT
MyPLX51PBM1_iTEMPPATMT184.Input.Status.DeviceMappingCRC	0	Decimal	INT
MyPLX51PBM1_iTEMPPATMT184.Input.TemperaturePV	0.0	Float	REAL
MyPLX51PBM1_iTEMPPATMT184.Input.TemperatureSts	0	Decimal	SINT
MyPLX51PBM1_iTEMPPATMT184.Output	{...}		MyPLX51PBM1_152365E6Output
MyPLX51PBM1_iTEMPPATMT184.Output.Control	{...}		PSPLX51DPSlaveControl
MyPLX51PBM1_iTEMPPATMT184.Output.Control.StationNumber	0	Decimal	SINT
MyPLX51PBM1_iTEMPPATMT184.Output.Control.AlarmTrigger	0	Decimal	BOOL
MyPLX51PBM1_iTEMPPATMT184.Output.Control.DeviceMappingCRC	0	Decimal	INT
MyPLX51PBM1_iTEMPPATMT184.Output.DisplayValue	0.0	Float	REAL
MyPLX51PBM1_iTEMPPATMT184.Output.DisplayValueSts	0	Decimal	SINT

Figure 5.3 – Slave Device-Specific tag

Table 5.3 – Device Input tags

Tag	Description
Status	
Online	This bit indicates if the device is online on the PROFIBUS network. 1 – Device is online 0 – Device is not online
DataExchangeActive	This bit indicates if the device is configured and exchanging data on the PROFIBUS network. 1 – Device is active and exchanging data 0 – Device is not exchanging data The user must ensure that all application code making use of data from a slave device first checks that the ***DataExchangeActive*** bit is 1.
IdentMismatch	The device configured in the PLX50CU and the device at the configured node address do not match because they have different ident numbers. 1 – Online device Ident does not match configured device 0 – Online device and configured device ident match
DisabledByOutputAssembly	This bit indicates if the device has not been enabled for data exchange in the PLX51-PBM device enable control bits. 1 – Device has **not** been enabled for data exchange 0 – Device has been enabled for data exchange
DeviceError	This bit indicates an error with the device. 1 – Device has an error. 0 – Device has no error.

	The error flag will be set when one of the following conditions occur: If there is an ident mismatch during slave parameterization, When receiving any form of FDL fault (data link layer fault). For example: SAP Not Activated or Resource Not Available. When the data size of the DPV0 data exchange does not match what has been configured in the PLX50CU. This Error flag is transient and will clear once a valid response is received.
AlarmPending	Indicates the device has an alarm pending on the local PROFIBUS network. When the specific bit is set '1' then the device has an alarm pending that must be unloaded and when the bit is off '0' the device does not have an alarm pending. 0 – The node has no alarm pending 1 – The node has an alarm pending
DiagnosticsPending	Indicates the device has diagnostics pending on the local PROFIBUS network. When the specific bit is set '1' then the device has diagnostics pending that must be unloaded and when the bit is off '0' the device does not have any diagnostics pending. 0 – The node has no diagnostics pending 1 – The node has diagnostics pending
OutputAssemblyNodeAddrMismatch	This bit indicates that there is a mismatch between the actual device station address and the expected Logix mapping station address. 0 – Station address matches 1 – Station address mismatch
MappingCRCMismatch	If there is a mismatch in the mapping between Logix and the PLX51-PBM it can result in data appearing in the incorrect location which means the user can be sending incorrect data to a device which can have unpredicted results. 0 – The mapping for the output data is correct 1 – There is a mapping mismatch in the output data
SlaveClearOpMode	When the PLX51-PBM is in **Slave Mode**; this will indicate that the respective slave is in fieldbus CLEAR mode (received from the DP Master on the network). 0 – Slave Station is in CLEAR fieldbus mode 1 – Slave Station is **not** in CLEAR fieldbus mode
SlaveAlarmAck	When the PLX51-PBM is in **Slave Mode**; this will indicate that the respective emulated slave has received an acknowledgement for the pending alarm. 0 – Slave Station has received an Alarm Acknowledgement for last pending alarm 1 – No Alarm Acknowledgement have been received for a pending alarm or there is no alarm pending
StationNumber	The station number of the specific slave device.
DeviceMappingCRC	The checksum of the Mapping for the specific slave device.
DeviceSpecificInputDataFields	The tags created for the input data will be slave specific.

Table 5.4 – Device Output tags

Tag	**Description**
Control	
StationNumber	The station number entered by the Logix mapping code of the specific slave device.
AlarmTrigger	N/A. Slave Mode Only.
DeviceMappingCRC	The checksum of the mapping that was applied by the generated Logix code used to verify if the mapping being used is valid.
DeviceSpecificOutputDataFields	The tags created for the output data will be slave specific.

DPV1 Explicit Messaging

The PLX51-PBM supports DPV1 Class 1 (MS1) and Class 2 (MS2) messaging which can be used to read / write parameters in a slave device. The PLX51-PBM DPV1 communication is achieved by using EtherNet/IP unconnected messaging (UCMM) or Class 3 connected messaging. The PLX51-PBM can buffer up to 10 DPV1 messages at a time.

NOTE: The slave device must support DPV1 messaging. The user must also set the DPV1 Enable bit in the user parameters of the slave device in the PLX50 Configuration Utility.

DPV1 Class 1 Messaging (MS1)

DPV1 Class 1 messaging will only be achievable if the slave device is in data exchange mode (i.e. the device is configured and exchanging cyclic data with the PLX51-PBM). Only the DP Master exchanging data with the slave device can read and write parameters using DPV1 MS1. Below are the EtherNet/IP CIP message parameters as well as the request and response data structures.

DPV1 Class 1 Read

CIP Message:

Table 5.5 – DPV1 Class 1 Read Message

Parameter	Description
Service Code	0x4B (Hex)
Class	0x432 (Hex)
Instance	1
Attribute	N/A
Request Data Length	8

Request Data:

Table 5.6 – DPV1 Class 1 Read Request

Parameter	Data Type	Description
Timeout	Long	The amount of time (in milliseconds) the PLX51-PBM waits for a DPV1 response before timing out and responding to the EtherNet/IP request with a Timeout Status.
Slave Address	Byte	The station number of the PROFIBUS device.
Slot Number	Byte	The DPV1 Slot number which must be read.
Index	Byte	The DPV1 Index number which must be read.
Data Length	Byte	The maximum number of bytes that must be read.

Response Data:

Table 5.7 – DPV1 Class 1 Read Response

Parameter	Data Type	Description
Status	Byte	This is the status of the DPV1 data exchange. See appendix for the definitions of the returned status.
Extended Status	Byte[3]	This is the extended status of the DPV1 data exchange. See appendix for the definitions of the returned extended status.
Data Length	Byte	The length of the data returned.
Reserved	Byte	-
Data	Byte[]	The data from the DPV1 Read request. The number of bytes will be equal to the Data Length in the response.

DPV1 Class 1 Write

CIP Message:

Table 5.8 – DPV1 Class 1 Write Message

Parameter	Description
Service Code	0x4C (Hex)
Class	0x432 (Hex)
Instance	1
Attribute	N/A
Request Data Length	8 + Length of Data Payload

Request Data:

Table 5.9 – DPV1 Class 1 Write Request

Parameter	Data Type	Description
Timeout	Long	The amount of time (in milliseconds) the PLX51-PBM waits for a DPV1 response before timing out and responding to the EtherNet/IP request with a Timeout Status.
Slave Address	Byte	The station number of the PROFIBUS device.
Slot Number	Byte	The DPV1 Slot number for the write request.
Index	Byte	The DPV1 Index number for the write request.
Data Length	Byte	The number of bytes that must be written.
Data	Byte[]	The data that will be written to the specific address. The number of bytes will be equal to the Data Length in the request.

Response Data:

Table 5.10 – DPV1 Class 1 Write Response

Parameter	Data Type	Description
Status	Byte	This is the status of the DPV1 data exchange. See appendix for the definitions of the returned status.
Extended Status	Byte[3]	This is the extended status of the DPV1 data exchange. See appendix for the definitions of the returned extended status.
Data Length	Byte	The length of the data that was written.

DPV1 Class 2 Messaging (MS2)

DPV1 Class 2 messaging is possible from several DP masters simultaneously, but the connection must be established explicitly by each DP Master. Below are the EtherNet/IP CIP message parameters as well as the request and response data structures.

DPV1 Initialize (Establish Connection)

CIP Message:

Table 5.11 – DPV1 Class 2 Initialize Message

Parameter	Description
Service Code	0x4D (Hex)
Class	0x432 (Hex)
Instance	1
Attribute	N/A
Request Data Length	20 + (2 + Source Net Address Length + Source MAC Address Length) + (2 + Destination Net Address Length + Destination MAC Address Length)

Request Data:

Table 5.12 – DPV1 Class 2 Initialize Request

Parameter	Data Type	Description
Timeout	Long	The amount of time (in milliseconds) the PLX51-PBM waits for a DPV1 response before timing out and responding to the EtherNet/IP request with a Timeout Status.
Slave Address	Byte	The station number of the PROFIBUS device.
Reserved	Byte[3]	-
Send Timeout	Short	The total time of the Class 2 connection. Time is based off 10ms.
Features Supported	Short	The services supported by the PLX51-PBM. Octet 1: Bit 0: This bit is set if the DPV1 Class 2 Read/Write services are supported by the PLX51-PBM. Bit 1-7: Reserved. Octet 2: Reserved.
Profile Features Supported	Short	The profile specific services supported by the PLX51-PBM. The meaning of the bits are vendor/profile specific.
Profile Ident Number	Short	This parameter defines a unique profile definition, independent from the Identity Number. If the requested profile is supported by the slave, it will be mirrored in the response.
Source Type	Byte	This indicates the use of an optional Network/MAC address (Source Type = 1) in the address information of the source.
Source Address Length	Byte	The total length of the address information of the source. The source address includes the: Source API, Source SCL, and an optional Source Network/MAC Address.
Destination Type	Byte	This indicates the use of an optional Network/MAC address (Destination Type = 1) in the address information of the destination.
Destination Address Length	Byte	The total length of the address information of the destination. The destination address includes the: Destination API, Destination SCL, and an optional Destination Network/MAC Address.
Source API	Byte	The application process instance of the source.
Source SCL	Byte	The access level of the source (0 = no access level used).

Source Net Address	Byte[6]	The network address of the source (optional).
Source MAC Address	Byte[]	The MAC address of the source (optional).
Destination API	Byte	The application process instance of the destination.
Destination SCL	Byte	The access level of the destination (0 = no access level used).
Destination Net Address	Byte[6]	The network address of the destination (optional).
Destination MAC Address	Byte[]	The MAC address of the destination (optional).

Response Data:

Table 5.13 – DPV1 Class 2 Initialize Response

Parameter	Data Type	Description
Status	Byte	This is the status of the DPV1 data exchange. See appendix for the definitions of the returned status.
Extended Status	Byte[3]	This is the extended status of the DPV1 data exchange. See appendix for the definitions of the returned extended status.
Send Timeout	Short	Timeout time for Class 2 connection in ms.
Features Supported	Short	Refer to the *PROFIBUS – DP Extensions to EN 50170 (DPV1)* for information regarding these parameters.
Profile Features Supported	Short	
Profile Ident Number	Short	
Connection Reference	Byte	The connection reference is a reference number that must be used for further communication on this connection (e.g. Read, Write, or Abort).

DPV1 Class 2 Abort

CIP Message:

Table 5.14 – DPV1 Class 2 Abort Message

Parameter	Description
Service Code	0x4E (Hex)
Class	0x432 (Hex)
Instance	1
Attribute	N/A
Request Data Length	7

Request Data:

Table 5.15 – DPV1 Class 2 Abort Request

Parameter	Data Type	Description
Reserved	Long	-
Connection Reference	Byte	Connection Reference Received from the DPV1 Class 2 Initialize Response.
Subnet	Byte	Location of the source of the abort request. (0 = NO, 1 = SUBNET-LOCAL, 2 = SUBNET-REMOTE, 3-255 = Reserved)
Instance Reason Code	Byte	The Instance indicates the protocol instance that detected a problem in the abort request (FDL, MSAC_C2, USER). The Reason Code indicates the reason for the abort request. Refer to the *PROFIBUS – DP Extensions to EN 50170 (DPV1)* for more information regarding this parameter.

Response Data:

Table 5.16 – DPV1 Class 2 Abort Response

Parameter	Data Type	Description
None	-	-

DPV1 Class 2 Read

CIP Message:

Table 5.17 – DPV1 Class 2 Read Message

Parameter	Description
Service Code	0x4F (Hex)
Class	0x432 (Hex)
Instance	1
Attribute	N/A
Request Data Length	8

Request Data:

Table 5.18 – DPV1 Class 2 Read Request

Parameter	Data Type	Description
Timeout	Long	The amount of time (in milliseconds) the PLX51-PBM waits for a DPV1 response before timing out and responding to the EtherNet/IP request with a Timeout Status.
Connection Reference	Byte	Connection Reference Received from the DPV1 Class 2 Initialize Response.
Slot Number	Byte	The DPV1 Slot number which must be read.
Index	Byte	The DPV1 Index number which must be read.
Data Length	Byte	The maximum number of bytes that must be read.

Response Data:

Table 5.19 – DPV1 Class 2 Read Response

Parameter	Data Type	Description
Status	Byte	This is the status of the DPV1 data exchange. See appendix for the definitions of the returned status.
Extended Status	Byte[3]	This is the extended status of the DPV1 data exchange. See appendix for the definitions of the returned extended status.
Data Length	Byte	The length of the data returned.
Reserved	Byte	-
Data	Byte[]	The data from the DPV1 Read request. The number of bytes will be equal to the Data Length in the response.

DPV1 Class 2 Write

CIP Message:

Table 5.20 – DPV1 Class 2 Write Message

Parameter	Description
Service Code	0x50 (Hex)
Class	0x432 (Hex)
Instance	1
Attribute	N/A
Request Data Length	8 + Length of Data Payload

Request Data:

Table 5.21 – DPV1 Class 2 Write Request

Parameter	Data Type	Description
Timeout	Long	The amount of time (in milliseconds) the PLX51-PBM waits for a DPV1 response before timing out and responding to the EtherNet/IP request with a Timeout Status.
Connection Reference	Byte	Connection Reference Received from the DPV1 Class 2 Initialize Response.
Slot Number	Byte	The DPV1 Slot number for the write request.
Index	Byte	The DPV1 Index number for the write request.
Data Length	Byte	The number of bytes that must be written.
Data	Byte[]	The data that will be written to the specific address. The number of bytes will be equal to the Data Length in the request.

Response Data:

Table 5.22 – DPV1 Class 2 Write Response

Parameter	Data Type	Description
Status	Byte	This is the status of the DPV1 data exchange. See appendix for the definitions of the returned status.
Extended Status	Byte[3]	This is the extended status of the DPV1 data exchange. See appendix for the definitions of the returned extended status.
Data Length	Byte	The length of the data that was written.

PROFIBUS Diagnostics

The PLX51-PBM will flag to the user when new diagnostics have been received. When new diagnostics have been flagged by the PLX51-PBM the user can extract the diagnostics message from the PLX51-PBM by using EtherNet/IP unconnected messaging (UCMM) or Class 3 connected messaging.

Notification

The PLX51-PBM will notify the user of pending diagnostics as shown below.

Master UDT

In the Status part of the PLX51-PBM tags (see *Logix Mapping* section) there is a tag FieldDeviceDiagPending. This is an array of Boolean tags each of which represents a node on the network. Below is a description of the tag.

Table 5.23 – PLX51-PBM Logix Tags Diagnostics Pending Indications

Tag	Description
FieldDeviceDiagPending	Indicates the nodes that have diagnostics pending on the local PROFIBUS network. Each bit represents a node. When the specific bit is set '1' then the device has diagnostics pending that must be unloaded and when the bit is off '0' the device does not have any diagnostics pending. Bit 0 – Node 0 has diagnostics pending Bit 1 – Node 1 has diagnostics pending Bit 126 – Node 126 has diagnostics pending

Field Device UDT

In the Status part of the Device UDT (see *Logix Mapping* section) there is a tag DiagnosticsPending. Below is a description of the tag.

Table 5.24 – PLX51-PBM UDT Diagnostics Pending Indications

Tag	Description
DiagnosticsPending	Indicates the device has diagnostics pending on the local PROFIBUS network. When the specific bit is set '1' then the device has diagnostics pending that must be unloaded and when the bit is off '0' the device does not have any diagnostics pending. 0 – The node has diagnostics pending 1 – The node has diagnostics pending

Extraction

The user can extract diagnostics by using the slave device node address. The user can also decide how the diagnostics data must be extracted. This is changed by updating the mode in the Diagnostics Request message. There are one of three modes that can be selected:

Table 5.25 – Diagnostics Extract Message

Mode	Description
0	Read the slave device diagnostics that has been buffered in the PLX51-PBM.
1	Read the slave device diagnostics that has been buffered in the PLX51-PBM and clear the Diagnostics Pending indication.
2	Force the PLX51-PBM to send a PROFIBUS Diagnostic Request to the specific slave device and return the diagnostics data received.

CIP Message

Below are the EtherNet/IP CIP message parameters as well as the request and response data structures.

Table 5.26 – Diagnostics Extract Message

Parameter	Description
Service Code	0x52 (Hex)
Class	0x432 (Hex)
Instance	1
Attribute	N/A
Request Data Length	6

Request Data:

Table 5.27 – Diagnostics Extract Request

Parameter	Data Type	Description
Timeout	Long	The amount of time (in milliseconds) the PLX51-PBM waits for a DPV1 response before timing out and responding to the EtherNet/IP request with a Timeout Status.
Slave Address	Byte	The station number of the PROFIBUS device.
Mode	Byte	0 – Read the slave device diagnostics that has been buffered in the PLX51-PBM. 1 – Read the slave device diagnostics that has been buffered in the PLX51-PBM and clear the Diagnostics Pending indication. 2 – Force the PLX51-PBM to send a PROFIBUS Diagnostic Request to the specific slave device and return the diagnostics data received.

Response Data:

Table 5.28 – Diagnostics Extract Response

Parameter	Data Type	Description
Status	Byte	This is the status of the DPV1 data exchange. See appendix for the definitions of the returned status.
Reserved	Byte	-
Diagnostics data length	Byte	The number of diagnostic bytes that have been returned.
Reserved	Byte	-
Diagnostics Data	Byte[]	Refer to the *PROFIBUS Specification EN 50170* for information regarding the diagnostics.

Global Control

Global control commands are multi-cast PROFIBUS commands which can be sent to a group of slave devices.

CIP Message

Below are the EtherNet/IP CIP message parameters as well as the request and response data structures.

Table 5.29 – Global Control Message

Parameter	Description
Service Code	0x54 (Hex)
Class	0x432 (Hex)
Instance	1
Attribute	N/A
Request Data Length	6

Request Data:

Table 5.30 – Global Control Request

Parameter	Data Type	Description
Timeout	Long	The amount of time (in milliseconds) the PLX51-PBM waits for a response before timing out and responding to the EtherNet/IP request with a Timeout Status.
Control	Byte	The Global Control action: 0 - Release the Clear mode for the devices 2 - Force the Clear Mode of devices 4 - Freeze 8 - UnFreeze 12 - UnFreeze + 16 - Sync + 32 – UnSync + 48 - UnSync
Group	Byte	The destination Group.

Response Data:

Table 5.31 – Global Control Response

Parameter	Data Type	Description
Status	Byte	This is the status of the Global Control transmission: 0x00 – Success 0x13 – Failed

Alarming

The PLX51-PBM will flag to the user when a new alarm has been received. When a new alarm has been flagged by the PLX51-PBM the user can extract the alarm from the PLX51-PBM by using EtherNet/IP unconnected messaging (UCMM) or Class 3 connected messaging.

NOTE: If there is more than one alarm pending then after extract the alarm the alarm pending will be set again to indicate there are more alarms to unload.

Notification

The PLX51-PBM will notify the user of a pending alarm as shown below.

Master UDT

In the Status part of the PLX51-PBM tags (see *Logix Mapping* section) there is a tag FieldDeviceAlarmPending. This is an array of Boolean tags each of which represents a node on the network. Below is a description of the tag.

Table 5.32 – PLX51-PBM Tag Alarm Pending Indications

Tag	Description
FieldDeviceAlarmPending	Indicates the nodes that have an alarm pending on the local PROFIBUS network. Each bit represents a node. When the specific bit is set '1' then the device has an alarm pending that must be unloaded and when the bit is off '0' the device does not have an alarm pending. Bit 0 – Node 0 has an alarm pending Bit 1 – Node 1 has an alarm pending Bit 126 – Node 126 has an alarm pending

Field Device UDT

In the Status part of the Device UDT (see *Logix Mapping* section) there is a tag AlarmPending. Below is a description of the tag.

Table 5.33 – Field Device UDT Alarm Pending Indications

Tag	Description
AlarmPending	Indicates the device has an alarm pending on the local PROFIBUS network. When the specific bit is set '1' then the device has an alarm pending that must be unloaded and when the bit is off '0' the device does not have an alarm pending. 0 – The node has an alarm pending 1 – The node has an alarm pending

Extraction

CIP Message

The user can extract an alarm by using the slave device node address. Below are the EtherNet/IP CIP message parameters as well as the request and response data structures.

Table 5.34 – Alarm Extract Message

Parameter	Description
Service Code	0x51 (Hex)
Class	0x432 (Hex)
Instance	1
Attribute	N/A
Request Data Length	5

Request Data:

Table 5.35 – Alarm Extract Request

Parameter	Data Type	Description
Timeout	Long	The amount of time (in milliseconds) the PLX51-PBM waits for a DPV1 response before timing out and responding to the EtherNet/IP request with a Timeout Status.
Slave Address	Byte	The station number of the PROFIBUS device.

Response Data:

Table 5.36 – Alarm Extract Response

Parameter	Data Type	Description
Status	Byte	This is the status of the DPV1 data exchange. See appendix for the definitions of the returned status.
Extended Status	Byte[3]	This is the extended status of the DPV1 data exchange. See appendix for the definitions of the returned extended status.
Alarm data length	Byte	The amount of alarm bytes that have been returned.
Alarm data	Byte[]	Refer to the *PROFIBUS Specification EN 50170* for information regarding the diagnostics. Below is the basic structure of the alarm data: **Byte 0 – Alarm Type** 1 – Diagnosis Alarm 2 – Process Alarm 3 – Pull Alarm 4 – Plug Alarm 5 – Status Alarm 6 – Update Alarm **Byte 1 – Slot Number** Range 0 - 254 **Byte 2 - Bit 0 to 1 – Alarm Specifier** 0 – No further differentiation 1 – Fault occurred and slot it not ok 2 – Fault disappeared, and slot is ok 3 – One fault disappeared, and slot is not ok **Byte 2 - Bit 3 to 7 – Sequence Number** Range 1 - 32 **Byte 3 to 59 – Alarm Data Description**

5.1.2 PROFIBUS DP - Slave

IMPORTANT: The module input and output assembly of each connection will be an undecorated array of data. The imported Logix routine (generated by PLX50CU) will copy this data to the structed input and output assemblies.

General Status

Below are the definitions for the tags in the General Status UDT created by the PLX50CU.

◢ MyPLX51PBM1_GeneralStatus	{...} {.		PSPLX51DPGeneralStatus
MyPLX51PBM1_GeneralStatus.ConfigValid	1	Decimal	BOOL
MyPLX51PBM1_GeneralStatus.Owned	1	Decimal	BOOL
MyPLX51PBM1_GeneralStatus.DuplicateDPStation	0	Decimal	BOOL
MyPLX51PBM1_GeneralStatus.ProfibusFieldbusError	0	Decimal	BOOL
MyPLX51PBM1_GeneralStatus.ProfibusDeviceError	0	Decimal	BOOL
MyPLX51PBM1_GeneralStatus.ProfibusOffline	0	Decimal	BOOL
MyPLX51PBM1_GeneralStatus.ProfibusStopped	0	Decimal	BOOL
MyPLX51PBM1_GeneralStatus.ProfibusClear	0	Decimal	BOOL
MyPLX51PBM1_GeneralStatus.ProfibusOperational	0	Decimal	BOOL
MyPLX51PBM1_GeneralStatus.SlaveMode	1	Decimal	BOOL
MyPLX51PBM1_GeneralStatus.PLCRun	0	Decimal	BOOL
▶ MyPLX51PBM1_GeneralStatus.ConfigCRC	16#347c	Hex	INT
▶ MyPLX51PBM1_GeneralStatus.ActiveNodeCount	1	Decimal	SINT
▶ MyPLX51PBM1_GeneralStatus.DeviceLiveList	{...} {.	Decimal	BOOL[128]
▶ MyPLX51PBM1_GeneralStatus.DeviceDataExchangeActive	{...} {.	Decimal	BOOL[128]
▶ MyPLX51PBM1_GeneralStatus.DeviceAlarmPendingFlags	{...} {.	Decimal	BOOL[128]
▶ MyPLX51PBM1_GeneralStatus.DeviceDiagnosticPendingFlags	{...} {.	Decimal	BOOL[128]

Figure 5.4 – Logix General Status tags

Table 5.37 – Logix General Status tags

Tag	Description
ConfigValid	Configuration has been downloaded to the PLX51-PBM and is being executed. 1 – PLX51-PBM has been successfully configured. 0 – PLX51-PBM is not configured.
Owned	Indicates if the PLX51-PBM is owned by a Logix Controller with a connection count similar to what has been configured in PLX50CU. 1 – PLX51-PBM is connected. 0 – PLX51-PBM is not connected.
DuplicateDPStation	N/A. Master Mode Only.
PROFIBUSFieldbusError	There is a PROFIBUS network issues (e.g. cable unplugged, under/over terminated, etc.). 1 – Fieldbus error detected. 0 – Normal (No errors detected).
PROFIBUSDeviceError	At least one slave device has a communication issue (e.g. offline, not exchanging process data, etc.) 1 – Device error detected. 0 – Normal (No errors detected).
PROFIBUSOffline	N/A. Master Mode Only.
PROFIBUSStopped	N/A. Master Mode Only.
PROFIBUSClear	N/A. Master Mode Only.
PROFIBUSOperational	N/A. Master Mode Only.
SlaveMode	When in Slave mode the PLX51-PBM will emulate multiple PROFIBUS Slave devices. When configured to interface to Modbus the PLX51-PBM will be a Modbus Master.

	1 – The PLX51-PBM is in Slave Mode. 0 – The PLX51-PBM is **not** in Slave Mode.
ConfigCRC	The signature of the configuration currently executing on the module.
DeviceListList	Indicates the nodes that are online on the local PROFIBUS network. Each bit represents a node. When the specific bit is set '1' then the device is online and when the bit is off '0' the device is not on the PROFIBUS network. Bit 0 – Node 0 Online Bit 1 – Node 1 Online Bit 126 – Node 126 Online
DeviceDataExchangeActive	Indicates the nodes that are online and exchanging DPV0 data on the local PROFIBUS network. Each bit represents a node. When the specific bit is set '1' then the device is online and exchanging data and when the bit is off '0' the device is not exchanging data on the PROFIBUS network. Bit 0 – Node 0 Exchanging DPV0 Data Bit 1 – Node 1 Exchanging DPV0 Data Bit 126 – Node 126 Exchanging DPV0 Data
DeviceAlarmPendingFlags	Indicates the nodes that have an alarm pending on the local PROFIBUS network. Each bit represents a node. When the specific bit is set '1' then the device has an alarm pending that must be unloaded and when the bit is off '0' the device does not have an alarm pending. Bit 0 – Node 0 has an alarm pending Bit 1 – Node 1 has an alarm pending Bit 126 – Node 126 has an alarm pending
DeviceDiagnosticPendingFlags	Indicates the nodes that have diagnostics pending on the local PROFIBUS network. Each bit represents a node. When the specific bit is set '1' then the device has diagnostics pending that must be unloaded and when the bit is off '0' the device does not have any diagnostics pending. Bit 0 – Node 0 has diagnostics pending Bit 1 – Node 1 has diagnostics pending ……. Bit 126 – Node 126 has diagnostics pending

General Control

The PLX51-PBM in Slave mode will operate similar to when in Master mode, but each configured Slave will be enabled by setting the correct enable bit in either the Logix output assembly. Once the respective bit has been set in the DeviceEnable BOOL array the PLX51-PBM will become “alive” on the PROFIBUS network and will start responding to a PROFIBUS DP Master.

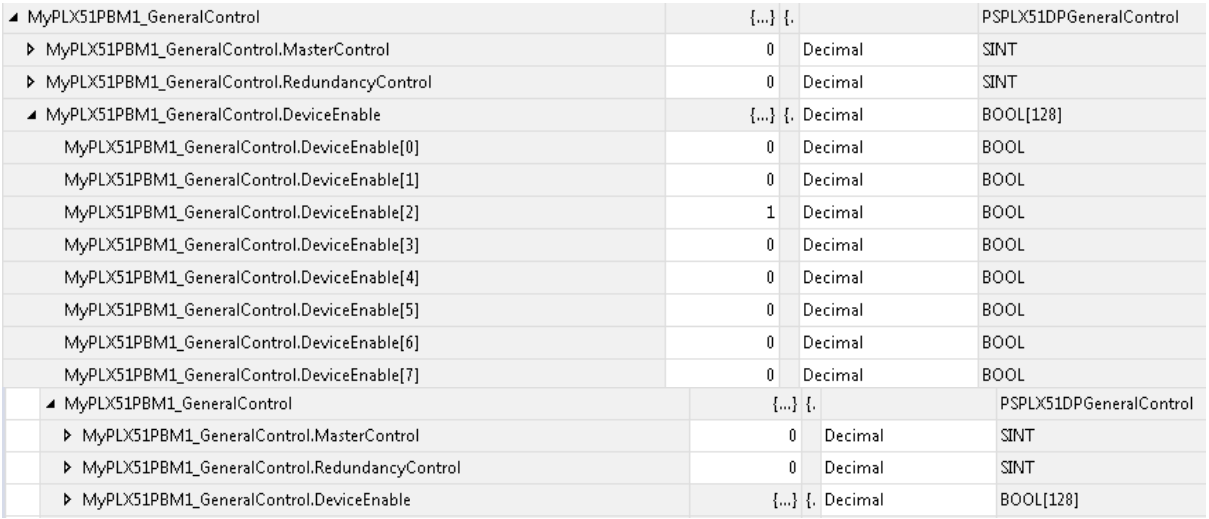


Figure 5.5 – General Control tags

Table 5.38 – General Control tags

Tag	Description
MasterControl	N/A. Master Mode Only.
RedundancyControl	Reserved.
DeviceEnable	These bits enable nodes on the PROFIBUS network for data exchange. Each bit represents a node. When the specific bit is set ‘1’ then the device (if configured) will exchange data with the PLX51-PBM and when the bit is off ‘0’ the device does exchange data with the PLX51-PBM. Bit 0 – Node 0 is enabled for data exchange Bit 1 – Node 1 is enabled for data exchange Bit 126 – Node 126 is enabled for data exchange

The user will be able to see if there are any faults (e.g. configured device not found) by viewing the LEDs of the PLX51-PBM (see the *Diagnostics* section for more details), by going online with the module in the PLX50 Configuration Utility and viewing the PLX51-PBM Slave and Device Diagnostics, or by viewing the input assembly of the PLX51-PBM Slave in Logix.

Status and DPV0 Data Exchange

The DPV0 data is exchanged with Logix using the Class 1 EtherNet/IP connection. The device-specific tag contains all the input and output data fields as well as important control and status information.

◢ MyPLX51PBM1_PLX51PBM	{...}	{...}		MyPLX51PBM1_10FE0207
◢ MyPLX51PBM1_PLX51PBM.Input	{...}	{...}		MyPLX51PBM1_10FE0207Input
◢ MyPLX51PBM1_PLX51PBM.Input.Status	{...}	{...}		PSPLX51DPSlaveStatus
MyPLX51PBM1_PLX51PBM.Input.Status.Online	1		Decimal	BOOL
MyPLX51PBM1_PLX51PBM.Input.Status.DataExchangeActive	1		Decimal	BOOL
MyPLX51PBM1_PLX51PBM.Input.Status.IdentMismatch	0		Decimal	BOOL
MyPLX51PBM1_PLX51PBM.Input.Status.DisabledByOutputAssembly	0		Decimal	BOOL
MyPLX51PBM1_PLX51PBM.Input.Status.DeviceError	0		Decimal	BOOL
MyPLX51PBM1_PLX51PBM.Input.Status.AlarmPending	0		Decimal	BOOL
MyPLX51PBM1_PLX51PBM.Input.Status.DiagnosticsPending	0		Decimal	BOOL
MyPLX51PBM1_PLX51PBM.Input.Status.OutputAssemblyNodeAddrMismatch	0		Decimal	BOOL
MyPLX51PBM1_PLX51PBM.Input.Status.MappingCRCMismatch	0		Decimal	BOOL
MyPLX51PBM1_PLX51PBM.Input.Status.SlaveClearOpMode	0		Decimal	BOOL
MyPLX51PBM1_PLX51PBM.Input.Status.SlaveAlarmAck	0		Decimal	BOOL
▷ MyPLX51PBM1_PLX51PBM.Input.Status.StationNumber	2		Decimal	SINT
▷ MyPLX51PBM1_PLX51PBM.Input.Status.DeviceMappingCRC	16#347c		Hex	INT
▷ MyPLX51PBM1_PLX51PBM.Input.Output16Bytes	{...}	{...}	Decimal	SINT[16]
▷ MyPLX51PBM1_PLX51PBM.Input.Output16Bytes1	{...}	{...}	Decimal	SINT[16]
▷ MyPLX51PBM1_PLX51PBM.Input.Output16Bytes2	{...}	{...}	Decimal	INT[8]
◢ MyPLX51PBM1_PLX51PBM.Output	{...}	{...}		MyPLX51PBM1_10FE0207Output
◢ MyPLX51PBM1_PLX51PBM.Output.Control	{...}	{...}		PSPLX51DPSlaveControl
▷ MyPLX51PBM1_PLX51PBM.Output.Control.StationNumber	2		Decimal	SINT
MyPLX51PBM1_PLX51PBM.Output.Control.AlarmTrigger	0		Decimal	BOOL
▷ MyPLX51PBM1_PLX51PBM.Output.Control.DeviceMappingCRC	16#347c		Hex	INT
▷ MyPLX51PBM1_PLX51PBM.Output.Input16Bytes	{...}	{...}	Decimal	SINT[16]
▷ MyPLX51PBM1_PLX51PBM.Output.Input16Bytes1	{...}	{...}	Decimal	SINT[16]
▷ MyPLX51PBM1_PLX51PBM.Output.Input16Bytes2	{...}	{...}	Decimal	INT[8]

Figure 5.6 – PLX51-PBM Slave Device-Specific tag

Table 5.39 – Device Input tags

Tag	Description
Status	
Online	This bit indicates if the device is online on the PROFIBUS network. 1 – Device is online 0 – Device is not online
DataExchangeActive	This bit indicates if the device is configured and exchanging data on the PROFIBUS network. 1 – Device is active and exchanging data 0 – Device is not exchanging data The user must ensure that all application code making use of data from a slave device first checks that the ***DataExchangeActive*** bit is 1.
IdentMismatch	The device configured in the PLX50CU and the device at the configured node address do not match because they have different ident numbers. 1 – Online device Ident does not match configured device 0 – Online device and configured device ident match

DisabledByOutputAssembly	This bit indicates if the device has not been enabled for data exchange in the PLX51-PBM device enable control bits. 1 – Device has **not** been enabled for data exchange 0 – Device has been enabled for data exchange
DeviceError	This bit indicates an error with the device. 1 – Device has an error. 0 – Device has no error. The error flag will be set when one of the following conditions occur: If there is an ident mismatch during slave parameterization, When receiving any form of FDL fault (data link layer fault). For example: SAP Not Activated or Resource Not Available. When the data size of the DPV0 data exchange does not match what has been configured in the PLX50CU. This Error flag is transient and will clear once a valid response is received.
AlarmPending	Indicates the device has an alarm pending on the local PROFIBUS network. When the specific bit is set '1' then the device has an alarm pending that must be unloaded and when the bit is off '0' the device does not have an alarm pending. 0 – The node has no alarm pending 1 – The node has an alarm pending
DiagnosticsPending	Indicates the device has diagnostics pending on the local PROFIBUS network. When the specific bit is set '1' then the device has diagnostics pending that must be unloaded and when the bit is off '0' the device does not have any diagnostics pending. 0 – The node has no diagnostics pending 1 – The node has diagnostics pending
OutputAssemblyNodeAddrMismatch	This bit indicates that there is a mismatch between the actual device station address and the expected Logix mapping station address. 0 – Station address matches 1 – Station address mismatch
MappingCRCMismatch	If there is a mismatch in the mapping between Logix and the PLX51-PBM it can result in data appearing in the incorrect location which means the user can be sending incorrect data to a device which can have unpredicted results. 0 – The mapping for the output data is correct. 1 – There is a mapping mismatch in the output data.
SlaveClearOpMode	When the PLX51-PBM is in **Slave Mode**; this will indicate that the respective slave is in fieldbus CLEAR mode (received from the DP Master on the network). 0 – Slave Station is in CLEAR fieldbus mode. 1 – Slave Station is **not** in CLEAR fieldbus mode.
SlaveAlarmAck	When the PLX51-PBM is in **Slave Mode**; this will indicate that the respective emulated slave has received an acknowledgement for the pending alarm. 0 – Slave Station has received an Alarm Acknowledgement for last pending alarm. 1 – No Alarm Acknowledgement have been received for a pending alarm or there is no alarm pending.
StationNumber	The station number of the specific slave device.
DeviceMappingCRC	The checksum of the Mapping for the specific slave device.
DeviceSpecificInputDataFields	The tags created for the input data will be slave specific.

Table 5.40 – Device Output tags

Tag	Description
Control	
StationNumber	The station number entered by the Logix mapping code of the specific slave device.
AlarmTrigger	When this bit is transitioned from 0 to 1 it will trigger an alarm notification to the DP Master.
DeviceMappingCRC	The checksum of the mapping that was applied by the generated Logix code used to verify if the mapping being used is valid.
DeviceSpecificOutputDataFields	The tags created for the output data will be slave specific.

DPV1 Class 1 Messaging (MS1)

The PLX51-PBM supports DPV1 Class 1 (MS1) messaging when operating as a PROFIBUS Slave. See the DPV1 Objects in the PLX50 Configuration Utility device configuration section for more information regarding the configuration of the DPV1 Objects. The user can configure several slot and index combinations for DPV1 Class 1 communication (for each added PROFIBUS Slave device).

When the PROFIBUS Master sends a DPV1 read/write command for the configured slot and index, the PLX51-PBM will access the configured Logix tag to provide the required data. The data that will be written or read will be extracted from the Logix SINT array configured in the DPV1 objects of the device configuration window. Below is an example of the DPV1 operation when the PLX51-PBM has been configured as a PROFIBUS Slave.

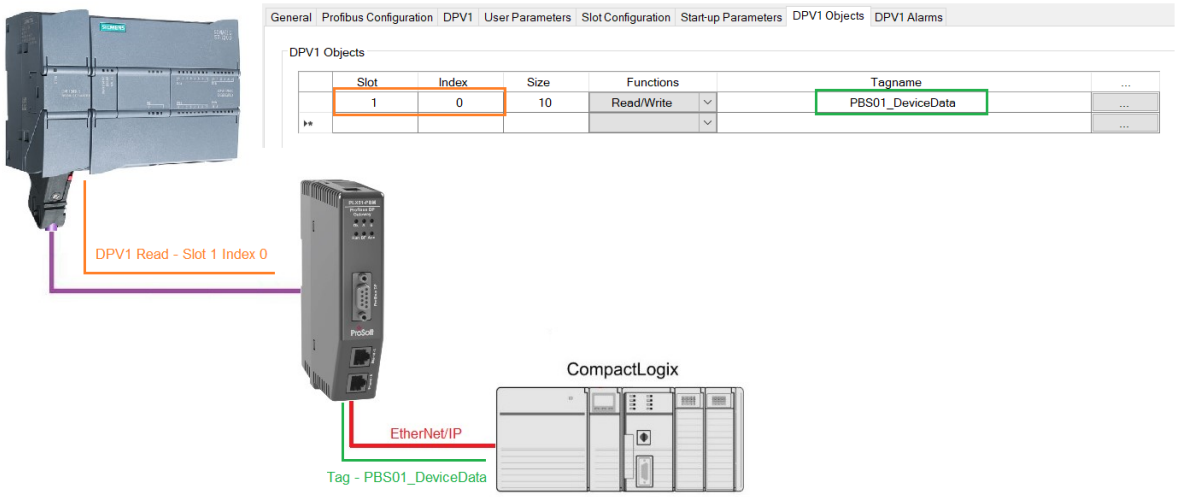


Figure 5.7 – PLX51-PBM DPV1 Object exchange

Alarming

The PLX51-PBM supports DPV1 Alarming when operating as a PROFIBUS Slave. The user can trigger an alarm from the Logix device output assembly which will notify the PROFIBUS Master that a new alarm has been generated. When the PROFIBUS Master sends a DPV1 alarm read command, the PLX51-PBM will access the configured Logix tag to provide the required data for the specific alarm.

NOTE: The PLX51-PBM can only allow one alarm to be triggered at a time.

To trigger an alarm notification for the PROFIBUS Master the user will need to toggle (from 0 to 1) the AlarmTrigger tag in the field device output assembly as shown below:

◢ MyPLX51PBM1_PLX51PBM	{...}	{.		MyPLX51PBM1_10FE...
▷ MyPLX51PBM1_PLX51PBM.Input	{...}	{.		MyPLX51PBM1_10FE...
◢ MyPLX51PBM1_PLX51PBM.Output	{...}	{.		MyPLX51PBM1_10FE...
◢ MyPLX51PBM1_PLX51PBM.Output.Control	{...}	{.		PSPLX51DPSlaveCont...
▷ MyPLX51PBM1_PLX51PBM.Output.Control.StationNumber	2		Decimal	SINT
MyPLX51PBM1_PLX51PBM.Output.Control.AlarmTrigger	1		Decimal	BOOL
▷ MyPLX51PBM1_PLX51PBM.Output.Control.DeviceMappingCRC	16#347c		Hex	INT

Figure 5.8 – PLX51-PBM Slave Alarm Trigger

Once the alarm has been triggered the PLX51-PBM will read the alarm data from the configured Logix tag and add it to the PROFIBUS diagnostics (which will then be read by the PROFIBUS Master).

When the PROFIBUS Master acknowledges the alarm the SlaveAlarmAck bit in the input assembly for the field device will be set indicating to the Logix controller that the next alarm can be triggered.

◢ MyPLX51PBM1_PLX51PBM.Input	{...}	{...}		MyPLX51PBM1_10FE0207...
◢ MyPLX51PBM1_PLX51PBM.Input.Status	{...}	{...}		PSPLX51DPSlaveStatus
MyPLX51PBM1_PLX51PBM.Input.Status.Online	1		Decimal	BOOL
MyPLX51PBM1_PLX51PBM.Input.Status.DataExchangeActive	1		Decimal	BOOL
MyPLX51PBM1_PLX51PBM.Input.Status.IdentMismatch	0		Decimal	BOOL
MyPLX51PBM1_PLX51PBM.Input.Status.DisabledByOutputAssembly	0		Decimal	BOOL
MyPLX51PBM1_PLX51PBM.Input.Status.DeviceError	0		Decimal	BOOL
MyPLX51PBM1_PLX51PBM.Input.Status.AlarmPending	0		Decimal	BOOL
MyPLX51PBM1_PLX51PBM.Input.Status.DiagnosticsPending	0		Decimal	BOOL
MyPLX51PBM1_PLX51PBM.Input.Status.OutputAssemblyNodeAddrMismatch	0		Decimal	BOOL
MyPLX51PBM1_PLX51PBM.Input.Status.MappingCRCMismatch	0		Decimal	BOOL
MyPLX51PBM1_PLX51PBM.Input.Status.SlaveClearOpMode	0		Decimal	BOOL
MyPLX51PBM1_PLX51PBM.Input.Status.SlaveAlarmAck	1		Decimal	BOOL
▷ MyPLX51PBM1_PLX51PBM.Input.Status.StationNumber	2		Decimal	SINT
▷ MyPLX51PBM1_PLX51PBM.Input.Status.DeviceMappingCRC	16#347c		Hex	INT

Figure 5.9 – PLX51-PBM Alarm Acknowledge

NOTE: An alarm will only be triggered when the AlarmTrigger tag is toggled from 0 to 1.

The format of the DPV1 Alarm data in the Logix SINT array is shown below:

Table 5.41 – Slave Alarm Data Format

Alarm Parameter	Byte Offset	Byte Size	Description
Alarm Length	0	1	This is the length of the Alarm data at the bottom of the table.
Alarm Type	1	1	Refer to the PROFIBUS Specification EN 50170 for information regarding the diagnostics. Below are some examples: 1 - Diagnosis_Alarm 3 - Pull_Alarm 4 - Plug_Alarm
Alarm Slot	2	1	Refer to the PROFIBUS Specification EN 50170 for information regarding the diagnostics.
Alarm Specifier	3	1	Refer to the PROFIBUS Specification EN 50170 for information regarding the diagnostics. Below are some examples: 0 - no further differentiation 1 – Incident appeared 2 – Incident disappeared and slot is ok 3 - One incident disappeared, others remain
Alarm data	4	Alarm Length	Refer to the PROFIBUS Specification EN 50170 for information regarding the diagnostics.

An example of the Alarm Data is shown below:

Name	Value	Style	Data Type	Description
◢ DPV1Alarm	{...}	Hex	SINT[40]	
▷ DPV1Alarm[0]	16#05	Hex	SINT	Alarm Data Length
▷ DPV1Alarm[1]	16#01	Hex	SINT	Alarm Type
▷ DPV1Alarm[2]	16#03	Hex	SINT	Alarm Slot
▷ DPV1Alarm[3]	16#01	Hex	SINT	Alarm Specifier
▷ DPV1Alarm[4]	16#11	Hex	SINT	Alarm Data ...
▷ DPV1Alarm[5]	16#22	Hex	SINT	
▷ DPV1Alarm[6]	16#33	Hex	SINT	
▷ DPV1Alarm[7]	16#44	Hex	SINT	
▷ DPV1Alarm[8]	16#55	Hex	SINT	
▷ DPV1Alarm[9]	16#00	Hex	SINT	

Figure 5.10 –DPV1 Alarm Data Example

Below are some basic definitions for certain alarm parameters:

Parameter	Description
Alarm Type	1 – Diagnosis Alarm 2 – Process Alarm 3 – Pull Alarm 4 – Plug Alarm 5 – Status Alarm 6 – Update Alarm
Slot Number	Range: 0 to 254
Alarm Specifier (Bit 0 to 1)	0 – No further differentiation 1 – Fault occurred and slot it not ok 2 – Fault disappeared, and slot is ok 3 – One fault disappeared, and slot is not ok

5.2 Modbus Operation

When the PLX51-PBM has been setup for Modbus communication it will exchange data with a remote Modbus device. Depending on the Primary Interface selection, the PLX51-PBM will either function as a Modbus Master or Modbus Slave.

NOTE: When configured as a Modbus Slave the Modbus Master device will need to read and write all required data from the configured Modbus address ranges. When configured as a Modbus Master the PLX51-PBM will automatically update the required Modbus registers in the configured remote target.

5.2.1 PROFIBUS DP - Master

Once the PLX51-PBM and Modbus device have been correctly configured, the PLX51-PBM will start exchanging data with PROFIBUS slave devices. The user will need to set the PROFIBUS Operating mode from the relevant Modbus Mapping Register.

Master and Slave Device Status

The Master Control command is set in Holding (HR) registers starting at the **Master Control Register** offset**.**

Table 5.42 – Modbus Master Control

HR Offset	Description
	Master Control Command
0	0 - Set PROFIBUS OFFLINE 1 - Set PROFIBUS STOP 2 - Set PROFIBUS CLEAR 3 - Set PROFIBUS OPERATIONAL

The Master and Slave Status is populated in either Coil (CS) or Holding (HR) registers starting at the **Status Register** offset.

Table 5.43 – Modbus Master and Device Status

CS Offset	Description
Master Status	
0	Configuration Valid
1	Owned
2	Duplicate DP Station
3	PROFIBUS Fieldbus Error
4	PROFIBUS Device Error
5	PROFIBUS OFFLINE
6	PROFIBUS STOPPED
7	PROFIBUS CLEAR
8	PROFIBUS OPERATIONAL
9	Master/Slave Mode (1 = Slave Mode)
32 - 158	Live List Flags (Station Address 0 - 126)
160 - 286	Data Exchange Flags (Station Address 0 - 126)
288 - 414	Alarm Pending Flags (Station Address 0 - 126)
416 - 542	Diagnostic Pending Flags (Station Address 0 - 126)
Slave Device Status	
544 + (16 x [Station Address])	Online
545 + (16 x [Station Address])	Data Exchange Active

546 + (16 x [Station Address])	Ident Mismatch
547 + (16 x [Station Address])	Disabled by Output Assembly
548 + (16 x [Station Address])	Device Error
549 + (16 x [Station Address])	Alarm Pending
550 + (16 x [Station Address])	Diagnostics Pending
551 + (16 x [Station Address])	Output Assembly Station Address Mismatch
552 + (16 x [Station Address])	Mapping CRC Mismatch
553 + (16 x [Station Address])	Slave Clear Op Mode
554 + (16 x [Station Address])	Slave Alarm Ack

The Slave Device Enable is located in either Coil (CS) or Holding (HR) registers starting at the Device Control Register offset.

Table 5.44 – Modbus Slave Device Control

CS Offset	**Description**
Device Enable	
0 + [Station Address]	Device Enable (Station Address 0 - 126)

The Modbus Communication Status is located in Holding (HR) registers starting at the *Modbus Communication Status offset* configured in the *Modbus Addressing* tab.

Table 5.45 – Modbus Communication Status

HR Offset	**Description**
Modbus Communication Status when operating as a Modbus Slave	
0	Bit 0 – PLX51-PBM Modbus Slave Communication Status 1 – Modbus Communication Ok 0 – Modbus Communication Failed
Modbus Communication Status when operating as a Modbus Master	
1	Bit 0 – Modbus Node 0 Communication Status 1 – Modbus Communication Ok 0 – Modbus Communication Failed
2	Bit 0 – Modbus Node 1 Communication Status 1 – Modbus Communication Ok 0 – Modbus Communication Failed
..	..
254	Bit 0 – Modbus Node 253 Communication Status 1 – Modbus Communication Ok 0 – Modbus Communication Failed
255	Bit 0 – Modbus Node 254 Communication Status 1 – Modbus Communication Ok 0 – Modbus Communication Failed

DPV0 Data Exchange

The DPV0 data exchange for each slave device is configured in the slot configuration.

Slot Configuration

Slot	Description	Module				Data Point	Data Type	Byte Length	Register Type	Modbus Offset	DP Offset	Ext User Prm
1	a6ES73271BH000AB	138-6ES7 327-1BH00-0AB0 8DI/8DX	...	+		Input	INT	2	HR	2000	0	155F01001...
	a6ES73271BH000A1			+	X	Output	INT	2	HR	2001	0	

Figure 5.11 – Slave Device Slot configuration – Modbus

DPV1 Class 1 Messaging (MS1)

The user can exchange DPV1 Class 1 data with a field device using the configured Modbus Registers. The user will need to enable DPV1 Messages and set the required DPV1 Message HR Offset in the Modbus addressing tab of the Configuration window (see below).

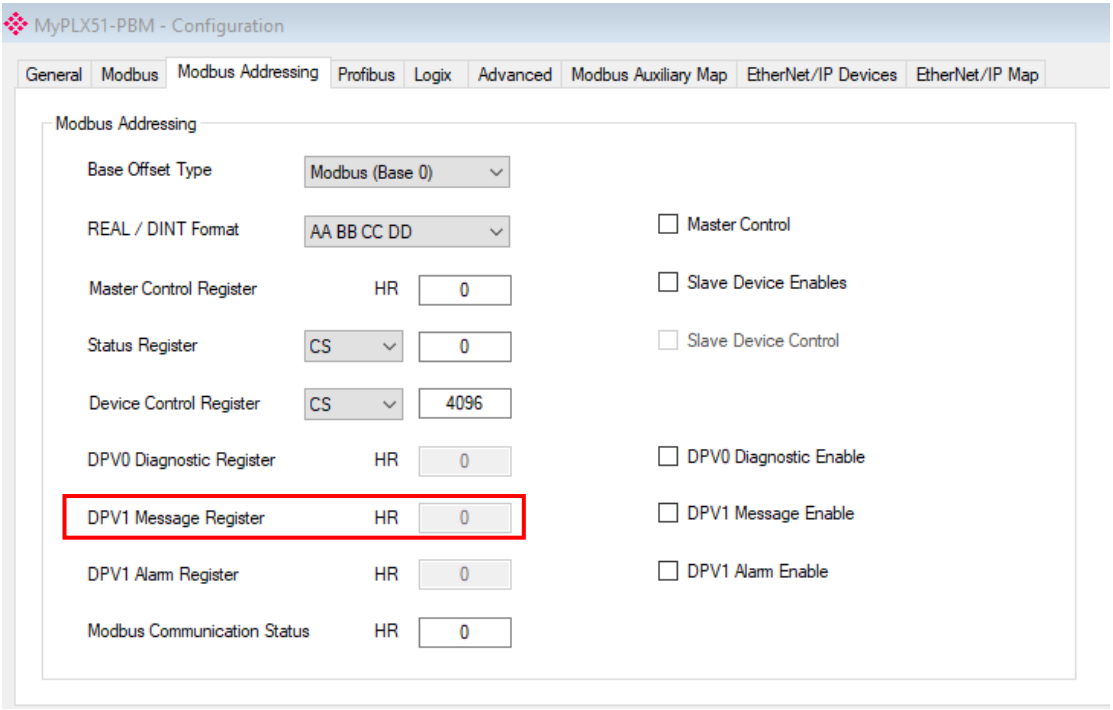


Figure 5.12 – DPV1 Message Holding Register parameters

The user will need to setup the required messaging parameters in the Holding Register fields and then set the trigger bit to enable the DPV1 Message transaction to begin. Once the transaction is complete the response part of the Holding Registers will be updated.

NOTE: The user will need to toggle the trigger Holding Register from 0 to 1 before the transaction will begin.

Below is the format of the Holding Registers used for DPV1 Class 1 Messaging.

Table 5.46 – Modbus DPV1 Class 1 Request Message Holding Register Format

DPV1 Request	Holding Register Offset	Description
Trigger	0	Bit 0 – Trigger Message Send
Timeout	1	The time in Milliseconds if no response has been received before the transaction times out
Slave Address	2	Target PROFIBUS Slave node address
Function	3	0 – Read 1 – Write
Data Size	4	Size of the data to follow
Data	5	Request data (eg. Slot, Index, Size, and Data)

Table 5.47 – Modbus DPV1 Class 1 Response Message Holding Register Format

DPV1 Response	Holding Register Offset	Description
Response Size	128	Size of all bytes following
Status	129	This is the status of the DPV1 data exchange. See appendix for the definitions of the returned status.
Reserved	130	
Data Size	131	The size of the data to follow.
Data	132	The response data

PROFIBUS Diagnostics

The user can extract the PROFIBUS Diagnostics from a field device using the configured Modbus Registers. The user will need to enable DPV0 Diagnostic and set the required DPV0 Diagnostic HR Offset in the Modbus addressing tab of the Configuration window (see below).

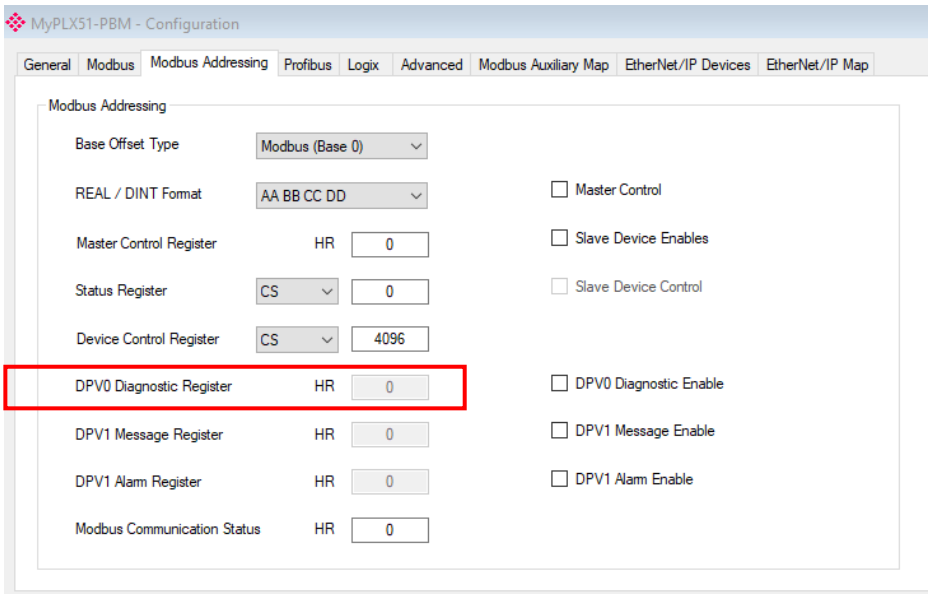


Figure 5.13 – DPV0 Diagnostic Holding Register parameters

The user will need to setup the required messaging parameters in the Holding Register fields and then set the trigger bit to extract the PROFIBUS Diagnostics from a field device. Once the transaction is complete the response part of the Holding Registers will be updated.

NOTE: The user will need to toggle the trigger Holding Register from 0 to 1 before the transaction will begin.

Below is the format of the Holding Registers used for retrieving DPV0 Diagnostics.

Table 5.48 – Modbus DPV0 Diagnostic Request Message Holding Register Format

Diagnostic Request	Holding Register Offset	Description
Trigger	0	Bit 0 – Trigger Message Send
Timeout	1	The time in Milliseconds if no response has been received before the transaction times out
Slave Address	2	Target PROFIBUS Slave node address
Mode	3	0 – Read Diagnostic Buffer stored in the PLX51-PBM 1 – Read Diagnostic Buffer stored in the PLX51-PBM and Clear the Diagnostics Pending bit

Table 5.49 – Modbus DPV0 Diagnostic Response Message Holding Register Format

Diagnostic Response	Holding Register Offset	Description
Status	4	This is the status of the request. See appendix for the definitions of the returned status.
Data Size	5	The size of the diagnostics data to follow.
Data	6	The diagnostics data

Alarming

The user can extract DPV1 Alarm data from a field device using the configured Modbus Registers. The user will need to enable DPV1 Alarm and set the required DPV1 Alarm HR Offset in the Modbus addressing tab of the Configuration window (see below).

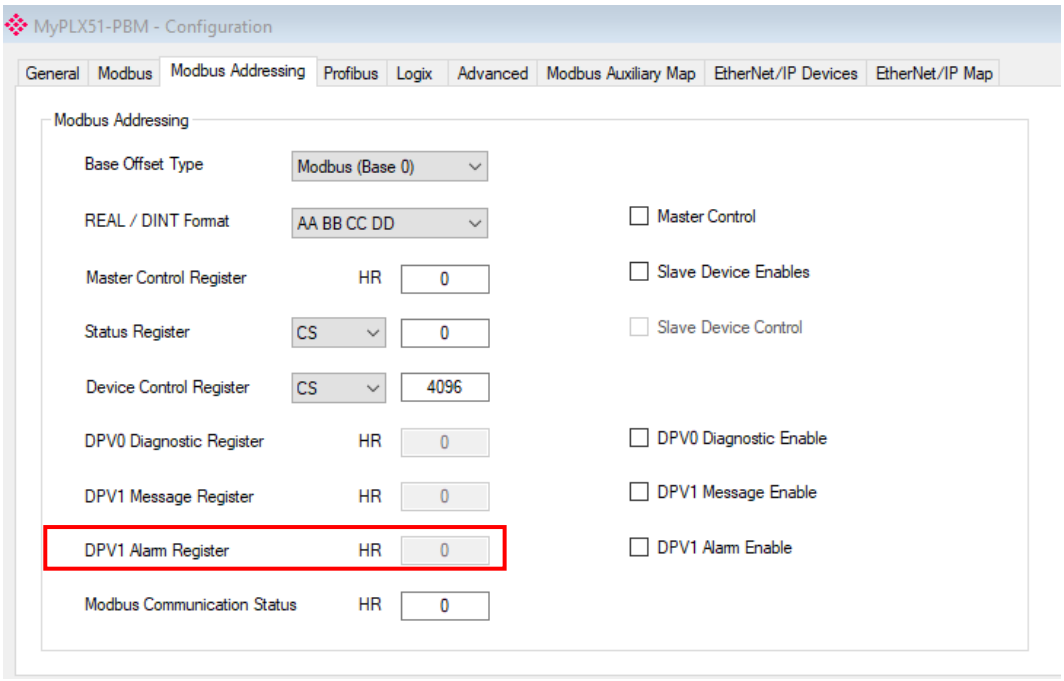


Figure 5.14 – DPV1 Alarm Holding Register parameters

The user will need to setup the required messaging parameters in the Holding Register fields and then set the trigger bit to enable the DPV1 Alarm retrieving to begin. Once the transaction is complete the response part of the Holding Registers will be updated.

NOTE: The user will need to toggle the trigger Holding Register from 0 to 1 before the transaction will begin.

Below is the format of the Holding Registers used for DPV1 Alarming.

Table 5.50 – Modbus DPV1 Alarm Request Message Holding Register Format

Alarm Request	Holding Register Offset	Description
Trigger	0	Bit 0 – Trigger Message Send
Timeout	1	The time in Milliseconds if no response has been received before the transaction times out
Slave Address	2	Target PROFIBUS Slave node address

Table 5.51 – Modbus DPV1 Alarm Response Message Holding Register Format

Alarm Response	Holding Register Offset	Description
Status	3	This is the status of the DPV1 data exchange. See appendix for the definitions of the returned status.
Alarm Block Size	4	The size of the alarm data to follow.
Alarm Data	5	The retrieved alarm data. Below is the basic structure of the alarm data: **Byte 0 – Alarm Type** 1 – Diagnosis Alarm 2 – Process Alarm 3 – Pull Alarm 4 – Plug Alarm 5 – Status Alarm 6 – Update Alarm **Byte 1 – Slot Number** Range 0 - 254 **Byte 2 - Bit 0 to 1 – Alarm Specifier** 0 – No further differentiation 1 – Fault occurred and slot it not ok 2 – Fault disappeared, and slot is ok 3 – One fault disappeared, and slot is not ok **Byte 2 - Bit 3 to 7 – Sequence Number** Range 1 - 32 **Byte 3 to 59 – Alarm Data Description**

Modbus Auxiliary Map

The Modbus Auxiliary Map can be used to read or write Modbus data from the local PLX51-PBM to a remote Modbus Slave. This will be enabled when *Enable Modbus Auxiliary Mapping* has been enabled in the Modbus tab and configured for Modbus Master. Up to 20 Modbus Slaves can be connected and up to 200 mapped items can be configured.

IMPORTANT: When Modbus Auxiliary Mapping is enabled, the automatic polling of referenced Modbus registers is disabled. It is the user's responsibility to ensure that all the required PROFIBUS control and data registers are collected from the appropriate remote Modbus slave devices.

5.2.2 PROFIBUS DP - Slave

The PLX51-PBM in Slave mode will operate similar to when in Master mode, but each configured Slave will be enabled by setting the correct enable bit in the Device Control Register. Once the respective bit has been set in the Device Control Register the PLX51-PBM Slave will become “alive” on the PROFIBUS network and will start responding to a PROFIBUS DP Master.

Slave Device Status

The Slave Status is populated in Coil (CS) or Holding (HR) registers starting at the **Status Register** offset**.**

Table 5.52 – Modbus Master and Device Status

CS Offset	Description
Master Status	
0	Configuration Valid
1	Owned
2	Duplicate DP Station
3	PROFIBUS Fieldbus Error
4	PROFIBUS Device Error
5	PROFIBUS OFFLINE
6	PROFIBUS STOPPED
7	PROFIBUS CLEAR
8	PROFIBUS OPERATIONAL
9	Master/Slave Mode (1 = Slave Mode)
32 - 158	Live List Flags (Station Address 0 - 126)
160 - 286	Data Exchange Flags (Station Address 0 - 126)
288 - 414	Alarm Pending Flags (Station Address 0 - 126)
416 - 542	Diagnostic Pending Flags (Station Address 0 - 126)
Slave Device Status	
544 + (16 x [Station Address])	Online
545 + (16 x [Station Address])	Data Exchange Active
546 + (16 x [Station Address])	Ident Mismatch
547 + (16 x [Station Address])	Disabled by Output Assembly
548 + (16 x [Station Address])	Device Error
549 + (16 x [Station Address])	Alarm Pending
550 + (16 x [Station Address])	Diagnostics Pending
551 + (16 x [Station Address])	Output Assembly Station Address Mismatch
552 + (16 x [Station Address])	Mapping CRC Mismatch
553 + (16 x [Station Address])	Slave Clear Op Mode
554 + (16 x [Station Address])	Slave Alarm Ack

The Slave Device Enable and (Alarm) Control is located in Coil (CS) or Holding (HR) registers starting at the Device Control Register offset.

Table 5.53 – Modbus Slave Device Control

CS Offset	Description
Device Enable	
0 + [Station Address]	Device Enable (Station Address 0 - 126)
Device Control	
128 + (8 x [Station Address])	DPV1 Alarm Trigger

The Modbus Communication Status is located in Holding (HR) registers starting at the *Modbus Communication Status offset* configured in the *Modbus Addressing* tab.

Table 5.54 – Modbus Communication Status

HR Offset	Description
Modbus Communication Status when operating as a **Modbus Slave**	
0	Bit 0 – PLX51-PBM Modbus Slave Communication Status 1 – Modbus Communication Ok 0 – Modbus Communication Failed
Modbus Communication Status when operating as a **Modbus Master**	
0	Bit 0 – Modbus Node 0 Communication Status 1 – Modbus Communication Ok 0 – Modbus Communication Failed
1	Bit 0 – Modbus Node 1 Communication Status 1 – Modbus Communication Ok 0 – Modbus Communication Failed
..	..
253	Bit 0 – Modbus Node 253 Communication Status 1 – Modbus Communication Ok 0 – Modbus Communication Failed
254	Bit 0 – Modbus Node 254 Communication Status 1 – Modbus Communication Ok 0 – Modbus Communication Failed

DPV0 Data Exchange

The DPV0 data exchange for each slave device is configured in the slot configuration.

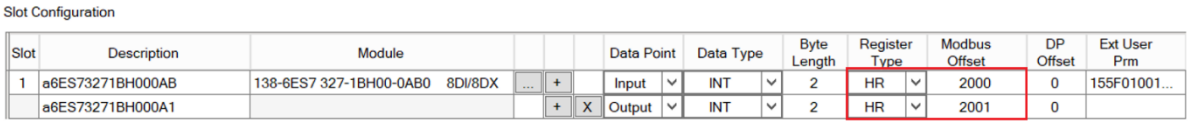
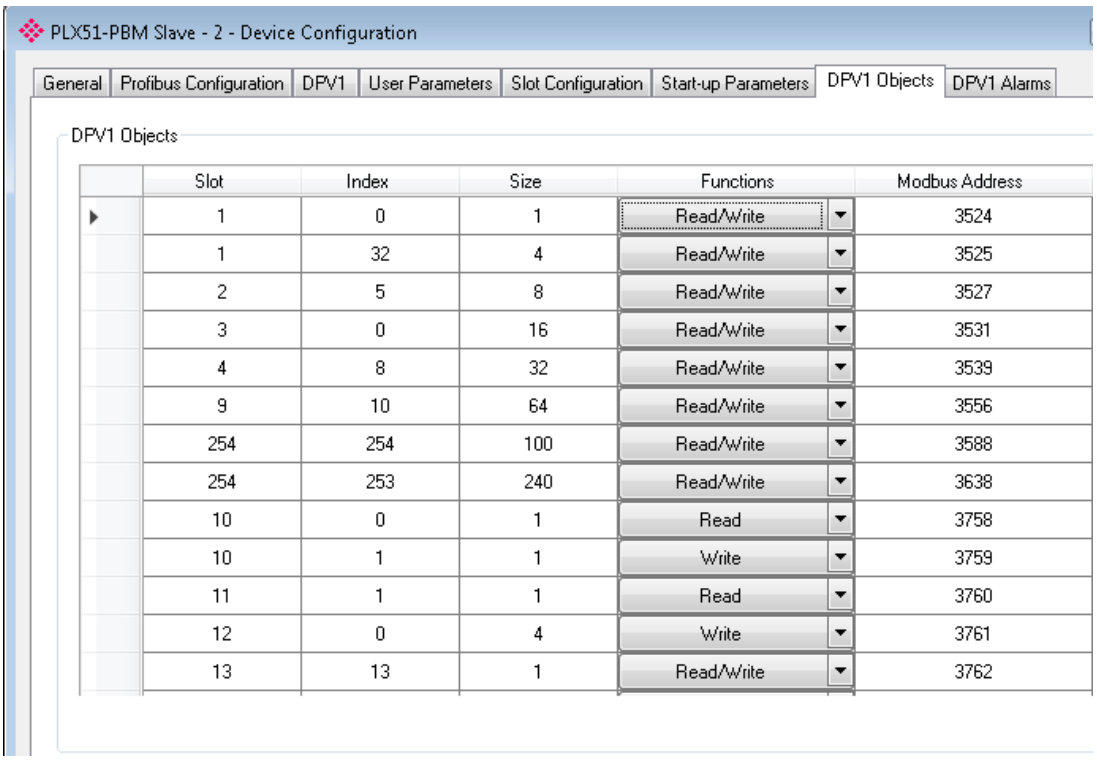


Figure 5.15 – Slave Device Slot configuration – Modbus

DPV1 Class 1 Messaging (MS1)

The user can exchange DPV1 Class 1 data with a configured field device using the configured Modbus Registers. The user will need to assign Slot and Index combinations to Modbus Holding Register Addresses (see below).



Slot	Index	Size	Functions	Modbus Address
1	0	1	Read/Write	3524
1	32	4	Read/Write	3525
2	5	8	Read/Write	3527
3	0	16	Read/Write	3531
4	8	32	Read/Write	3539
9	10	64	Read/Write	3556
254	254	100	Read/Write	3588
254	253	240	Read/Write	3638
10	0	1	Read	3758
10	1	1	Write	3759
11	1	1	Read	3760
12	0	4	Write	3761
13	13	1	Read/Write	3762

Figure 5.16 – DPV1 Objects Holding Register address

Once the PROFIBUS Master reads or writes to a DPV1 Class 1 Slot/Index, the PLX51-PBM will use the data located at the configured Modbus Address.

NOTE: If the PLX51-PBM has been setup as a Modbus Master then the data will be read or written to the specific Modbus HR address in the target device when the DPV1 Message request is received on the PROFIBUS network.

Alarming

The PLX51-PBM supports DPV1 Alarming when operating as a PROFIBUS Slave. The user can trigger an alarm from the Modbus Device Control Register offset which will notify the PROFIBUS Master that a new alarm has been generated. When the PROFIBUS Master sends a DPV1 alarm read command, the PLX51-PBM will access the configured Modbus Holding address to provide the required data for the specific alarm.

NOTE: The PLX51-PBM can only allow one alarm to be triggered at a time.

To trigger an alarm notification for the PROFIBUS Master the user will need to toggle (from 0 to 1) the Alarm Trigger bit in the Device Control Register Offset as shown below:

Table 5.55 – Modbus Slave Device Control

CS Offset	Description
Device Control	
128 + (8 x [Station Address])	DPV1 Alarm Trigger

Once the alarm has been triggered the PLX51-PBM will read/write the alarm data from the configured Modbus Holding Register address range and add it to the PROFIBUS diagnostics (which will then be read by the PROFIBUS Master) as shown below.

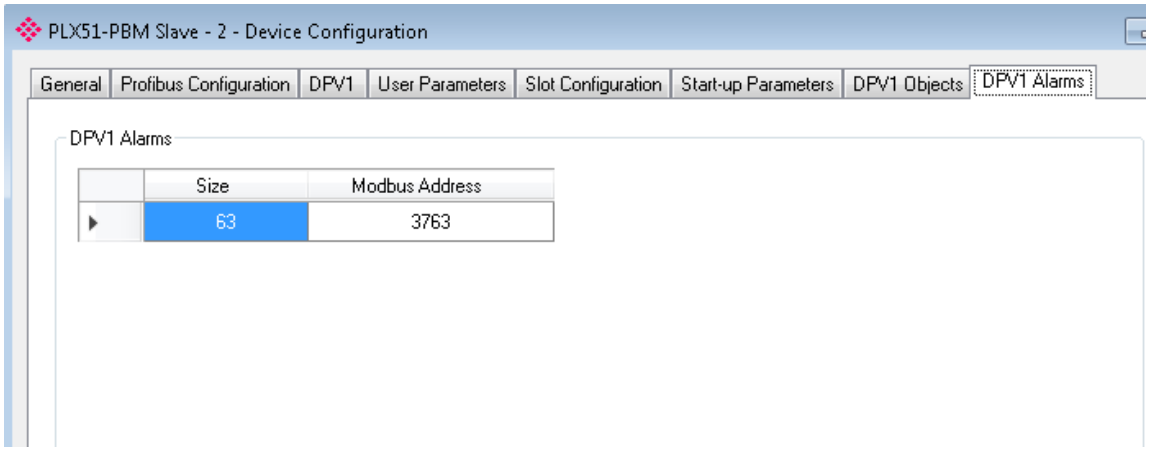


Figure 5.17 – DPV1 Alarm Holding Register address

When the PROFIBUS Master acknowledges the alarm, the SlaveAlarmAck bit will be set, indicating that the next alarm can be triggered.

Table 5.56 – Modbus Device Status

CS Offset	Description
Slave Device Status	
544 + (16 x [Station Address])	Online
545 + (16 x [Station Address])	Data Exchange Active
546 + (16 x [Station Address])	Ident Mismatch
547 + (16 x [Station Address])	Disabled by Output Assembly
548 + (16 x [Station Address])	Device Error
549 + (16 x [Station Address])	Alarm Pending
550 + (16 x [Station Address])	Diagnostics Pending
551 + (16 x [Station Address])	Output Assembly Station Address Mismatch
552 + (16 x [Station Address])	Mapping CRC Mismatch
553 + (16 x [Station Address])	Slave Clear Op Mode
554 + (16 x [Station Address])	**Slave Alarm Ack**

NOTE: An alarm is triggered when the Alarm Trigger bit toggles from 0 to 1.

The format of the DPV1 Alarm data in the Modbus Holding Register array is shown below:

Table 5.57 – Slave Alarm Data Format

Alarm Parameter	Holding Register Offset	Byte Size	Description
Alarm Length	0 – low byte	1	Length of the Alarm Data in bytes. See appendix for the definitions of the returned status.
Alarm Type	0 – hi byte	1	Refer to the PROFIBUS Specification EN 50170 for information regarding the diagnostics. Below are some examples: 1 - Diagnosis_Alarm 3 - Pull_Alarm 4 - Plug_Alarm
Alarm Slot	1 – low byte	1	Refer to the PROFIBUS Specification EN 50170 for information regarding the diagnostics.
Alarm Specifier	1 – high byte	1	Refer to the PROFIBUS Specification EN 50170 for information regarding the diagnostics. Below are some examples: 0 - no further differentiation 1 – Incident appeared 2 – Incident disappeared and slot is ok 3 - One incident disappeared, others remain
Alarm data	2	Alarm Length	Refer to the PROFIBUS Specification EN 50170 for information regarding the diagnostics.

Modbus Auxiliary Map

The Modbus Auxiliary Map can be used to read or write Modbus data from the local PLX51-PBM to a remote Modbus Slave. This will be enabled when *Enable Modbus Auxiliary Mapping* has been enabled in the Modbus tab and configured for Modbus Master. Up to 20 Modbus Slaves can be connected and up to 200 mapped items can be configured.

IMPORTANT: When Modbus Auxiliary Mapping is enabled, the automatic polling of referenced Modbus registers is disabled. It is the user's responsibility to ensure that all the required PROFIBUS control and data registers are collected from the appropriate remote Modbus slave devices.

5.3 EtherNet/IP Explicit Messaging Operation

When the PLX51-PBM has been setup for EtherNet/IP Explicit Messaging communication it will exchange data with remote EtherNet/IP devices using either connected Class 3 messaging or Unconnected Messaging (UCMM). This will allow the user to exchange data between a EtherNet/IP device and a Profibus DP Master.

IMPORTANT: EtherNet/IP Explicit Messaging is only allowed when the PLX51-PBM is operating as a Profibus Slave.

The user can map up to 10Kbytes of EtherNet/IP data to the PLX51-PBM module which can then be mapped to DPV0 communication data for any of the configured DP Slaves.

Each EtherNet/IP device configured can also provide communication status which can be mapped to DPV0 data to inform the DP Master that the PLX51-PBM (in slave mode) has lost communication with a specific EtherNet/IP device. The user will need to enter the location in the Data Table where the communication status for the device can be found (as shown below).

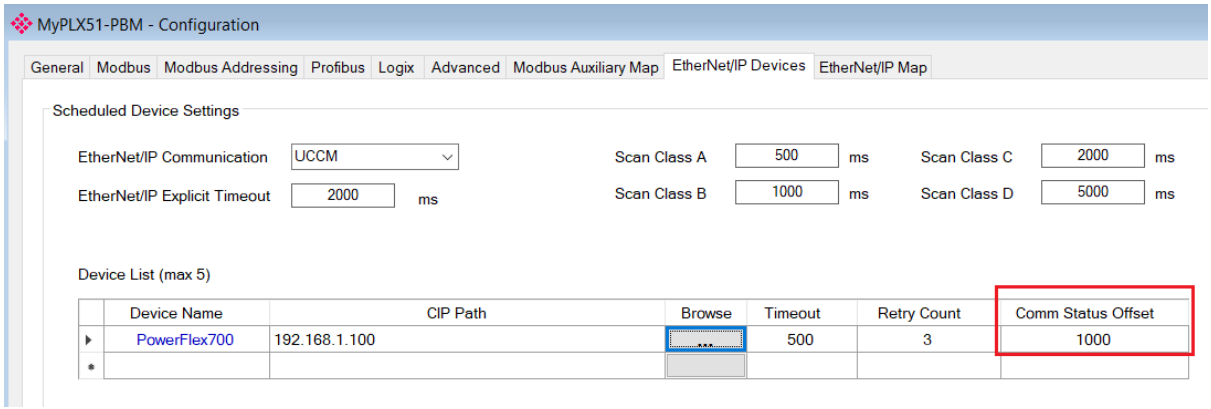


Figure 5.18 – EtherNet/IP Explicit Messaging Communication Status

Communication Status per EtherNet/IP device

Bit 0 - (1) Device online / (0) Device offline.

Bit 1 to 7 – Reserved.

5.4 Explicit Messaging Utility

For PLX51-PBM Master mode only, the PLX50 Configuration Utility provides a utility to initiate explicit messages to the PROFIBUS devices. The messaging options include the following:

- DPV1 Class 1 Read
- DPV1 Class 1 Write
- DPV1 Class 2 Read
- DPV1 Class 2 Write
- Read Diagnostics
- Read Alarms

To open this utility, right-click on a PROFIBUS device and select the ***Explicit Messaging*** option.

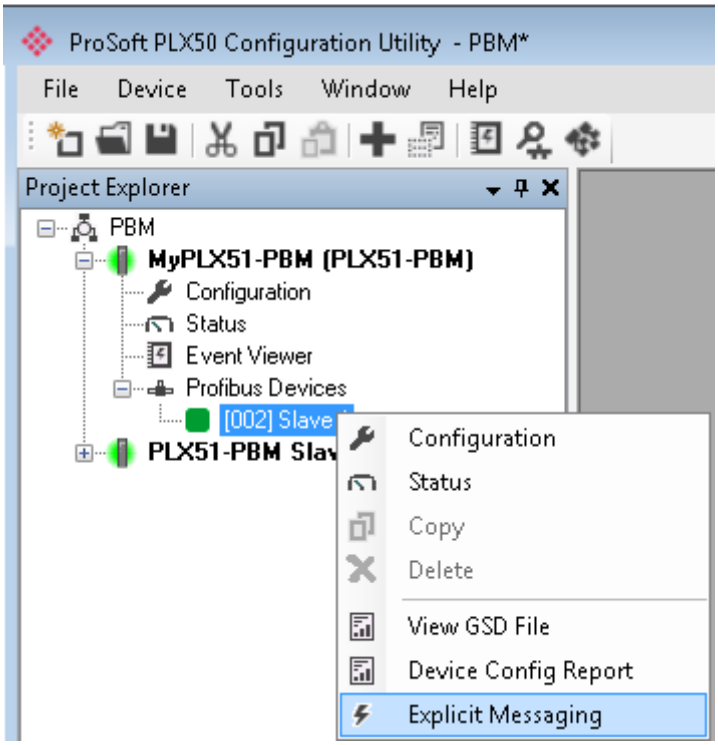


Figure 5.19 – Explicit Messaging Option

Use the ***Action*** combo-box to select the type of explicit message. Depending on the type selected, various other parameter controls will become available. Once the correct parameters have been entered select the ***Execute*** button to initiate the explicit exchange.

NOTE: For Class 2 messages, if a class 2 connection has not already been established, then a Class 2 Initialization message will first be sent. The class 2 connection will then remain open until either the station address is changed, the manual ***Abort*** button is selected, or the utility is closed.

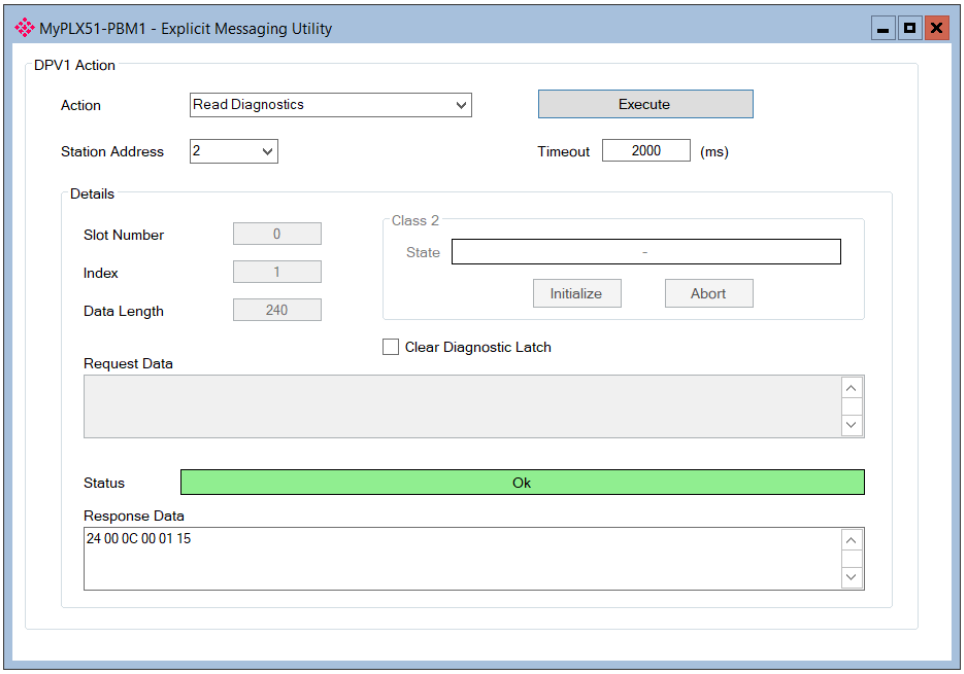


Figure 5.20 – Explicit Messaging Utility

5.5 Firmware Upgrade

The PLX51-PBM allows the user to upgrade the module firmware in the field. If the firmware needs to be updated the user will need to use the PLX50 Configuration Utility to update it.

In the PLX50 Configuration Utility go to the Tool menu and select the *DeviceFlash* option.

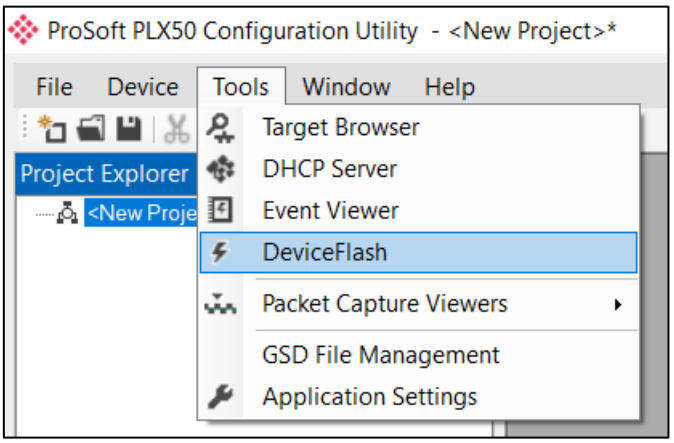


Figure 5.21 - DeviceFlash Tool

The user will need to select the appropriate AFB binary file which will be used to upgrade the PLX51-PBM firmware.

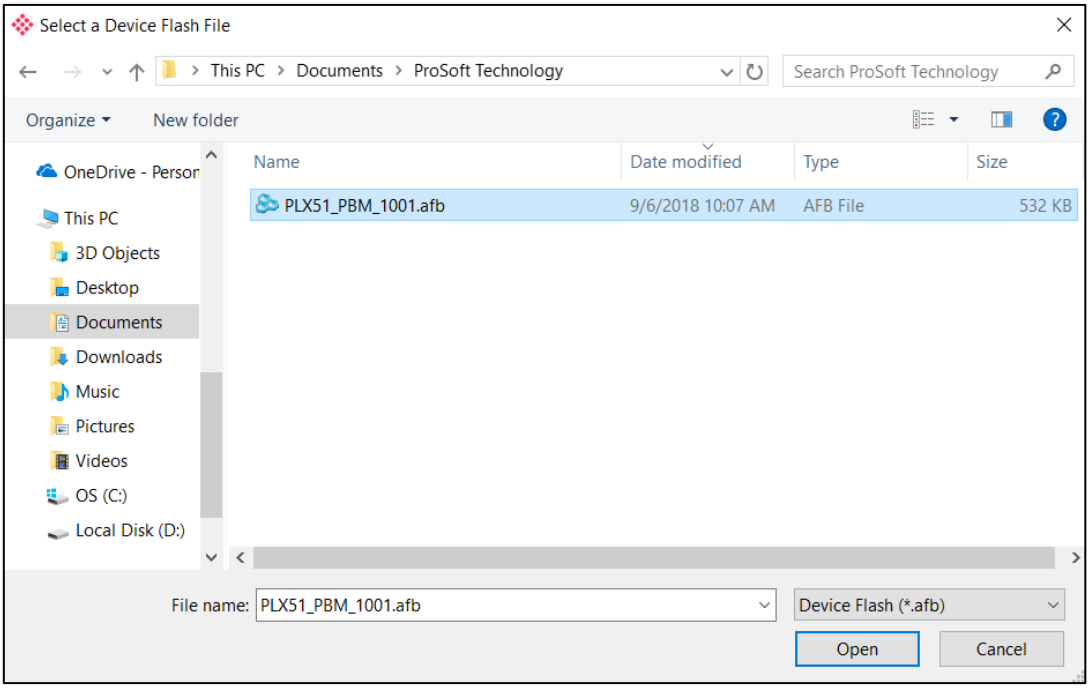


Figure 5.22 - Select the AFB binary

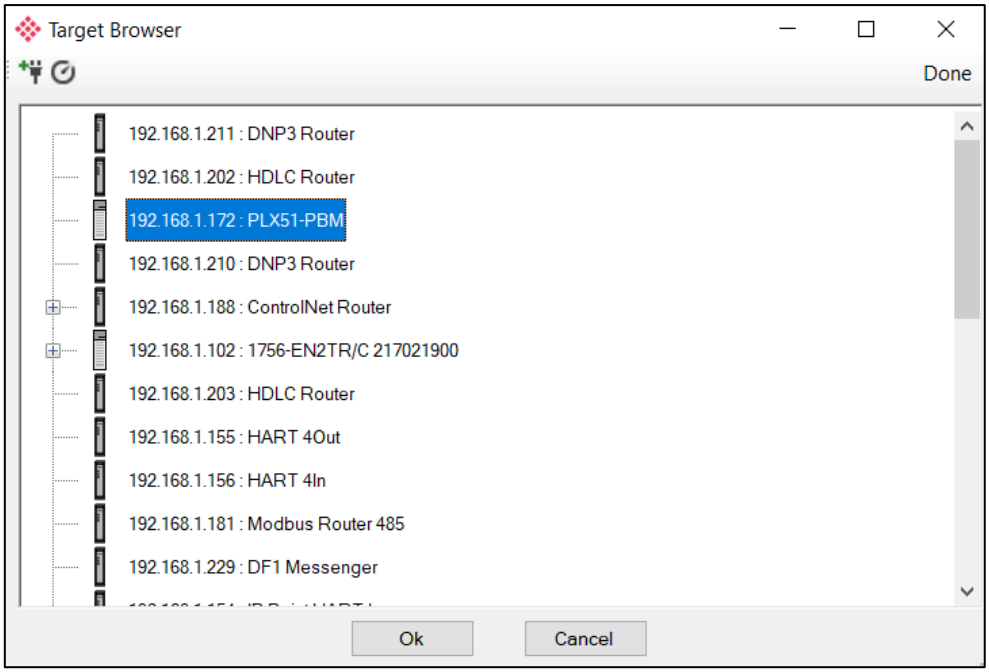


Figure 5.23 - Select the correct PLX51-PBM module

Once the module is done upgrading the firmware the Device Flash tool will provide the user with the details of the updated module.

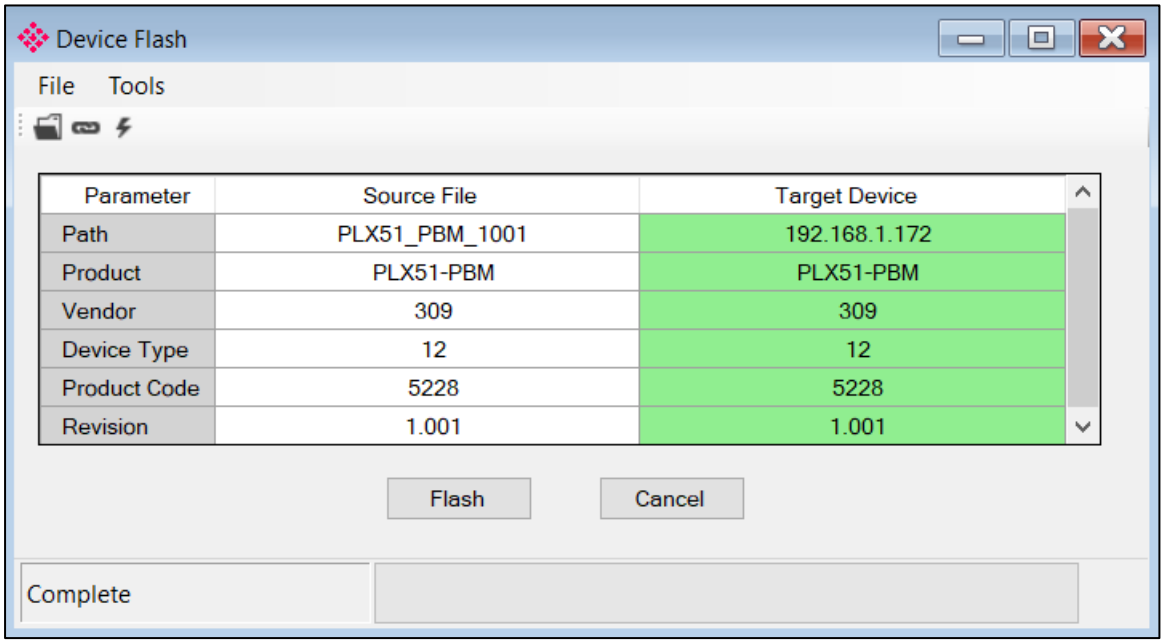


Figure 5.24 – PLX51-PBM successfully updated.

IMPORTANT: The PLX51-PBM firmware is digitally signed so the user will only be able to flash the PLX51-PBM with authorized firmware.

6 Migrating Legacy PCB Projects

The PLX50 Configuration Utility provides a method to simplify the migration from a ProSoft Configuration Builder (PCB) PROFIBUS application to a PLX51-PBM application. The process involves first exporting the configuration from the PCB software and then importing it into the PLX50 Configuration Utility.

Before importing a PCB application, ensure that all the necessary GSD files have first been registered in the PLX50 Configuration Utility's GSD Manager.

The PCB import requires a PLX51-PBM project with no existing slave devices configured.

Open the ProSoft Configuration Builder (PCB) software and open the existing PROFIBUS project.

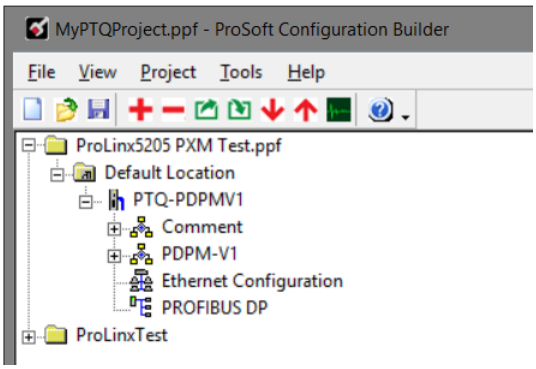


Figure 6.1 – PCB Project

Expand the PROFIBUS configuration and right-click on the ***PROFIBUS DP*** menu item and select the ***Configure*** option.

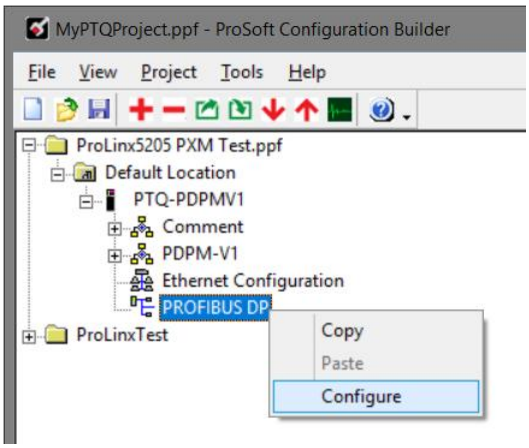


Figure 6.2 – PCB PROFIBUS DP Configuration

The PROFIBUS Master window will open. Select the ***Export Master Config*** button located at the bottom of the window.

If the ***Export Master Config*** button is disabled, then first select the ***Configure PROFIBUS*** button. This will open the PROFIBUS configuration tool, once this tool has been closed the ***Export Master Config*** button will then be enabled.

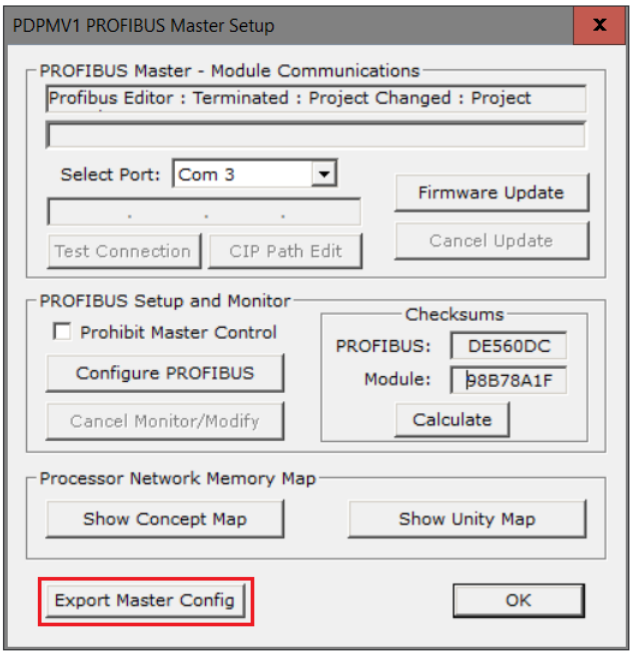


Figure 6.3 – PCB Export Master Configuration

The generated export (XML) file can then be saved.

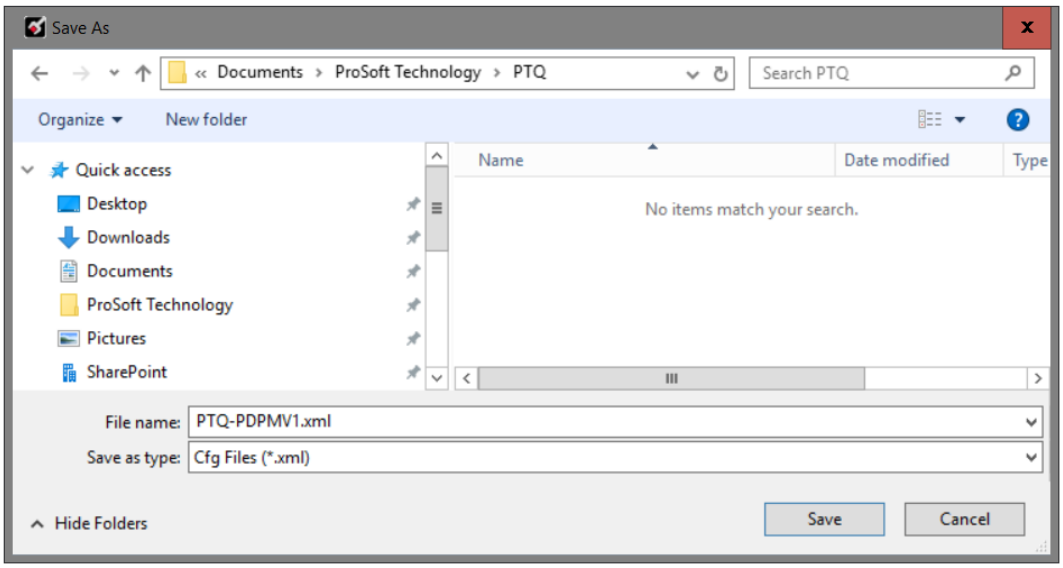


Figure 6.4 – PCB – Save Export XML File

In the PLX50 Configuration Utility, right-click on the ***PLX51-PBM*** module and select the ***Import Legacy PCB Configuration*** option.

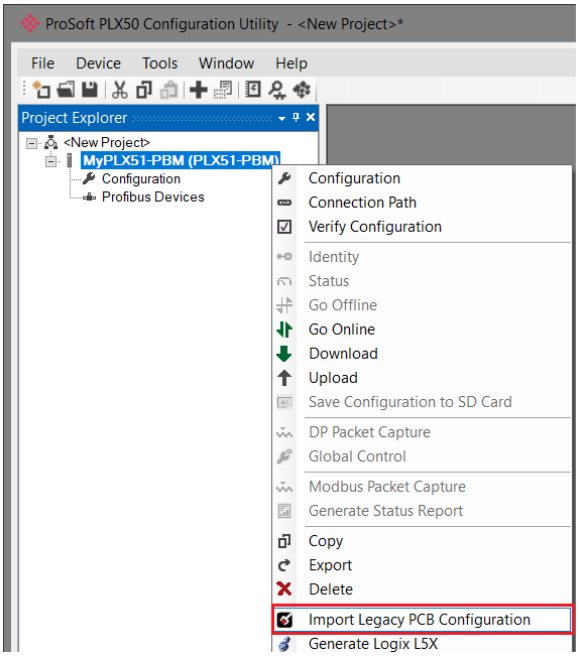


Figure 6.5 – Import Legacy PCB Configuration

After the import is complete, an ***Import Report*** summary will be shown, and may indicate any issues encountered during the import process.

If an exact GSD filename is not found, a suitable (matching) alternative will be sought.

The master and slave device configurations can then be modified if required.

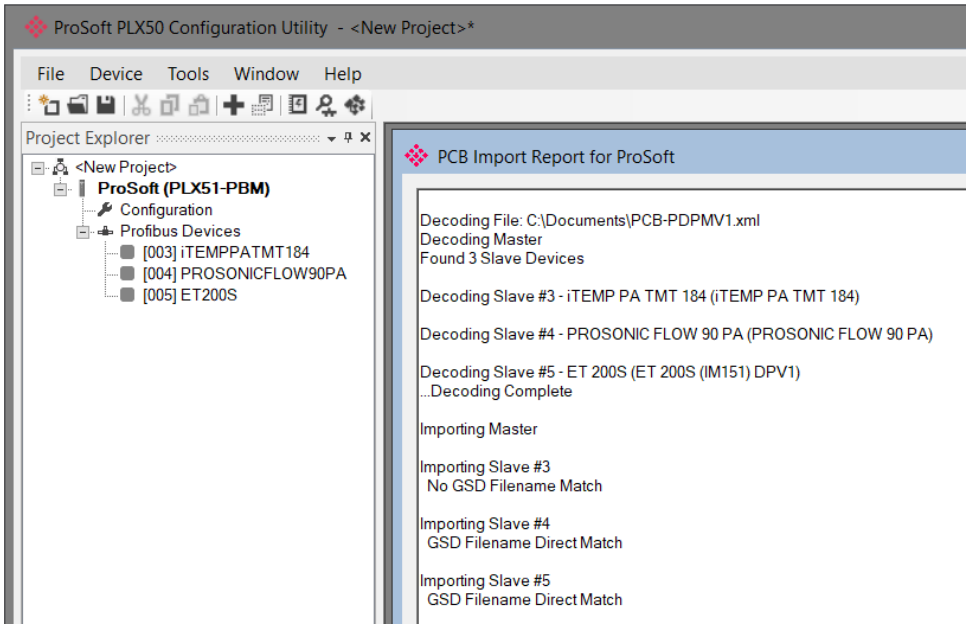


Figure 6.6 – Legacy PCB Import Report

7 Device Type Manager (DTM)

The PLX51-PBM supports FDT / DTM technology, allowing the user to configure any slave device using its DTM (Device Type Manager) in any standard FDT Frame (Field Device Tool). To use a device DTM with the PLX51-PBM, the ProSoft PLX51 DTM pack will first need to be installed.

7.1 Installation

Installation of the PLX51 DTM pack is achieved by executing the following installer from www.prosoft-technology.com:

ProSoft Technology - ILX51 HART and PROFIBUS DTM Pack 1.xxx Setup.msi

The installation wizard will guide the user through the installation process.

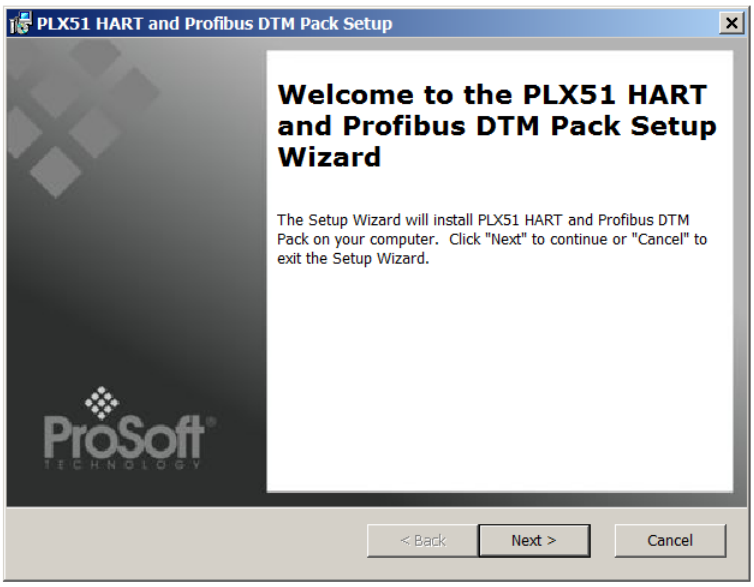


Figure 7.1 – PLX51 DTM Pack Installation

7.2 Configuration

Once the DTM pack is installed, the selected FDT Frame would need to have its DTM Catalogue updated. The steps required for this action are slightly different for each FDT frame. Typically, one selects the DTM Catalogue or Device Catalogue and select Refresh or rebuild.

After the catalogue has been updated, the PLX51-PBM device can then be added to a new project. This involves selecting the Add Device function and then selecting the PLX51-PBM DTM. The example below makes use of PACTware FDT frame.

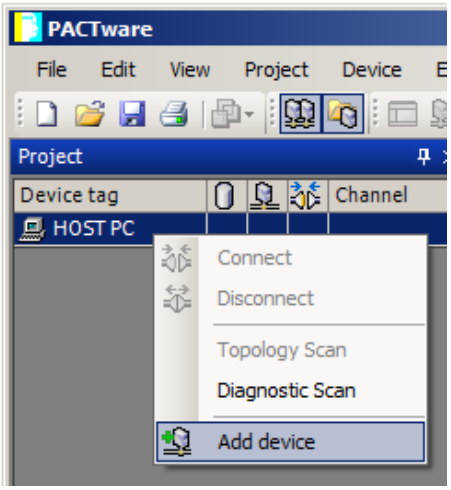


Figure 7.2 – Adding new device

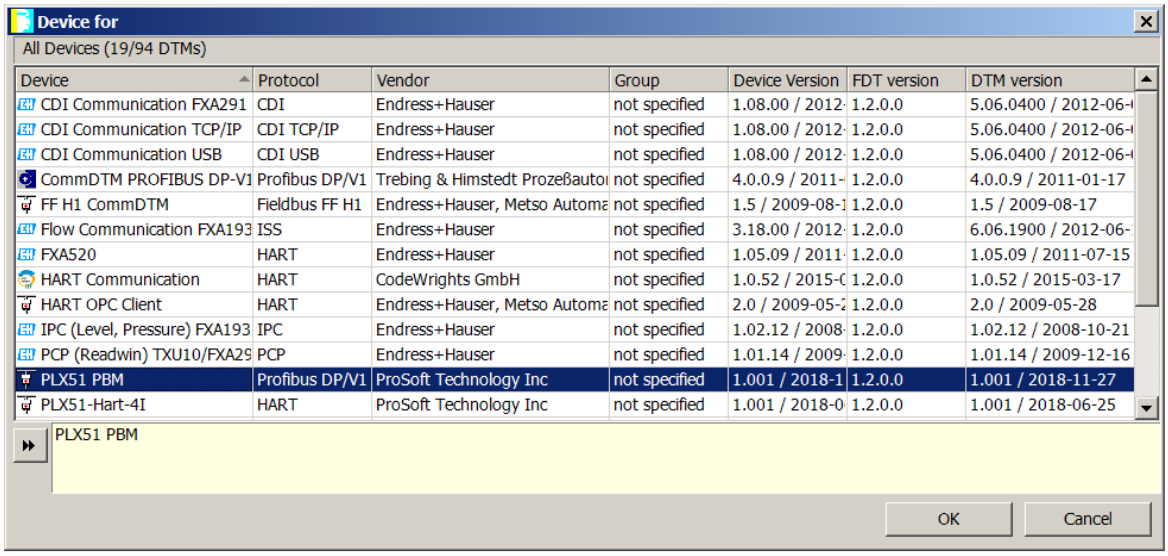


Figure 7.3 – Selecting PLX51-PBM DTM

After instantiating the PLX51-PBM DTM, select the Parameter option.

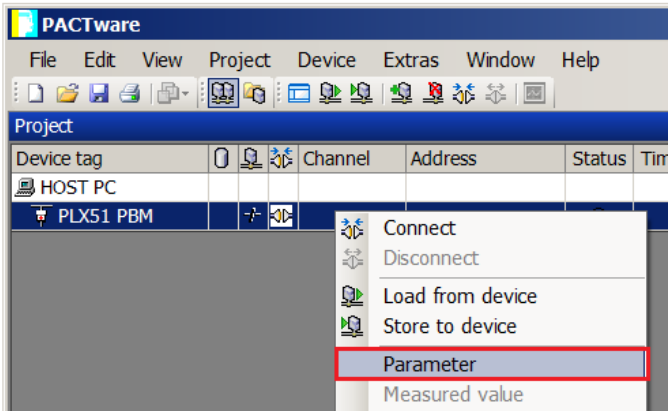


Figure 7.4 – Select Parameter option

The PLX51-PBM DTM's configuration allows the CIP Path to the PLX51-PBM to be configured. This is typically just the IP address of the PLX51-PBM.

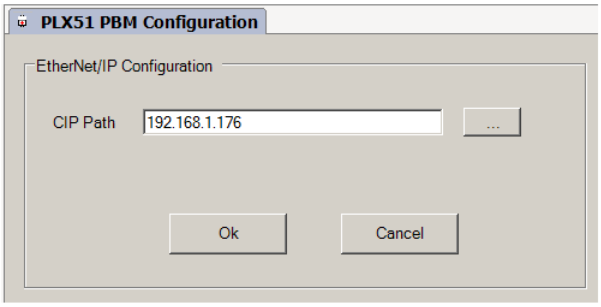


Figure 7.5 – PLX51-PBM CIP Path

The path can either be entered manually or the Browse button can be used to open the Target Browser, and then the PLX51-PBM can be selected.

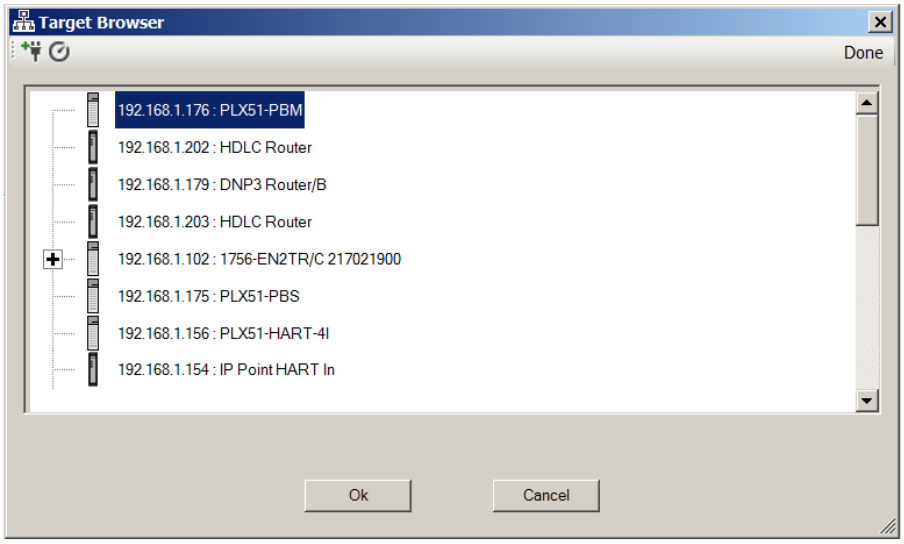


Figure 7.6 – Target Browser

Once the PLX51-PBM DTM has been configured, the child Device DTMs can be added by right-clicking on the PLX51-PBM DTM and selecting Add Device.

The user can then select the matching device DTM.

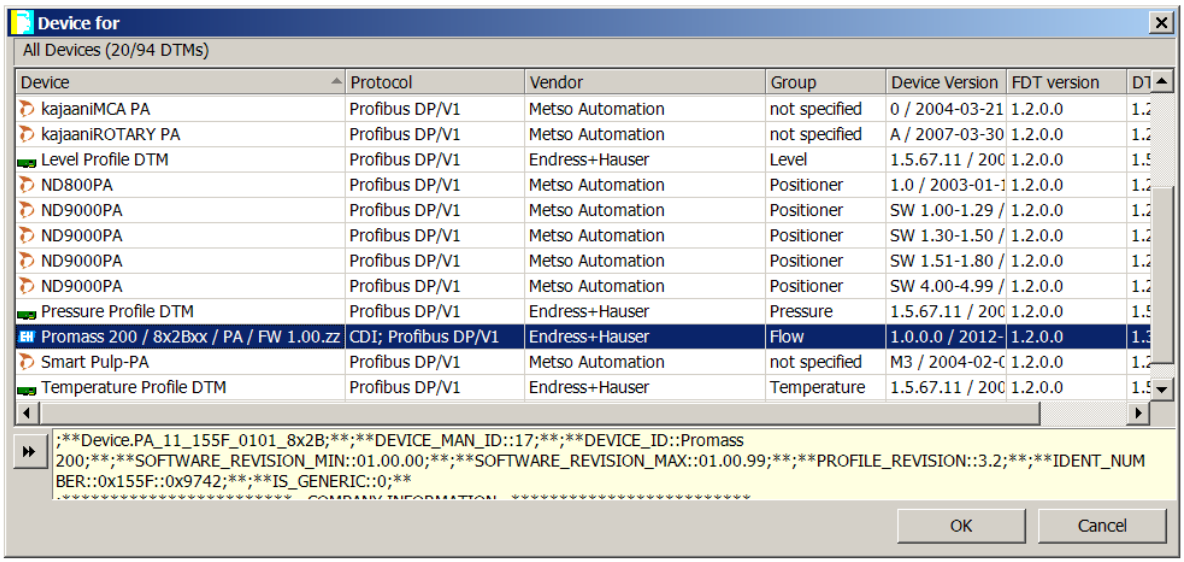


Figure 7.7 – Device DTM Selection

Once the child Device DTM has been added, a configuration window opens to set the Station Node address.

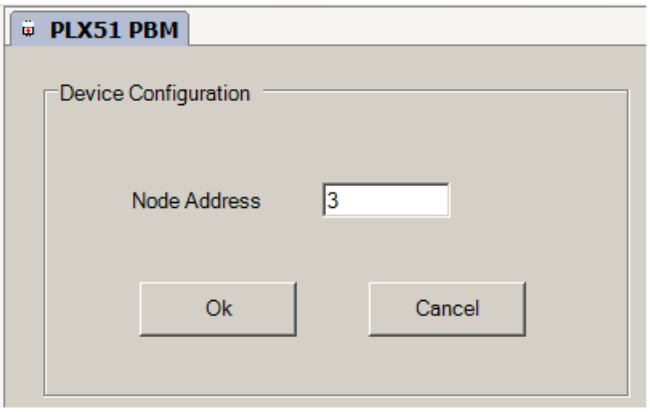


Figure 7.8 – Device DTM Node Address

7.3 Operation

After the FDT project has been configured, the DTMs can be place online by selecting the Online or Connect option.

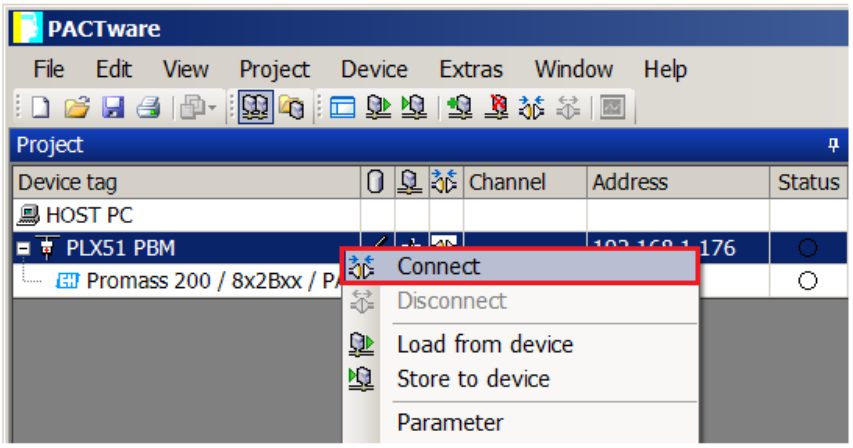


Figure 7.9 – DTM Connect

Once the PLX51-PBM DTM is online (connected) a number of diagnostic pages can be opened by selecting the Measure Value.

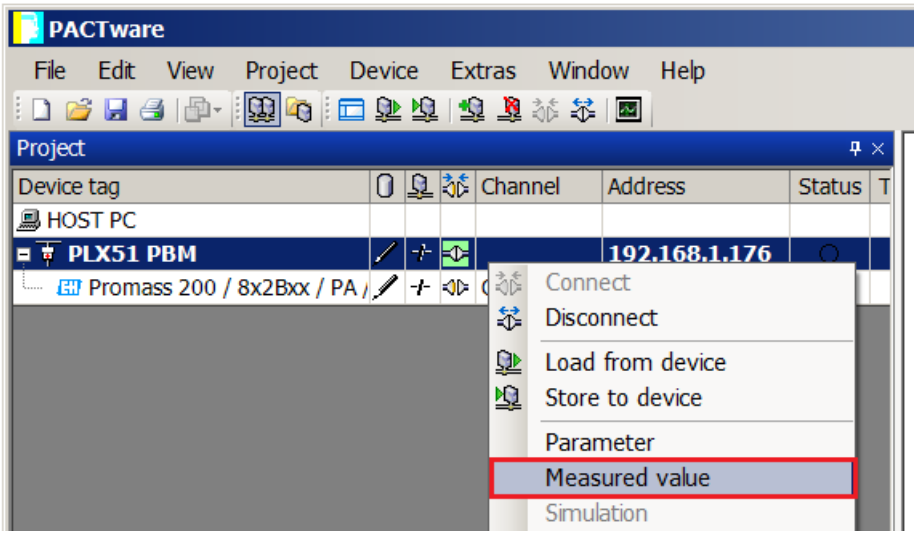


Figure 7.10 – Measured Value

The General page provides basic status information for the PLX51-PBM module, including LED status and CPU status etc.

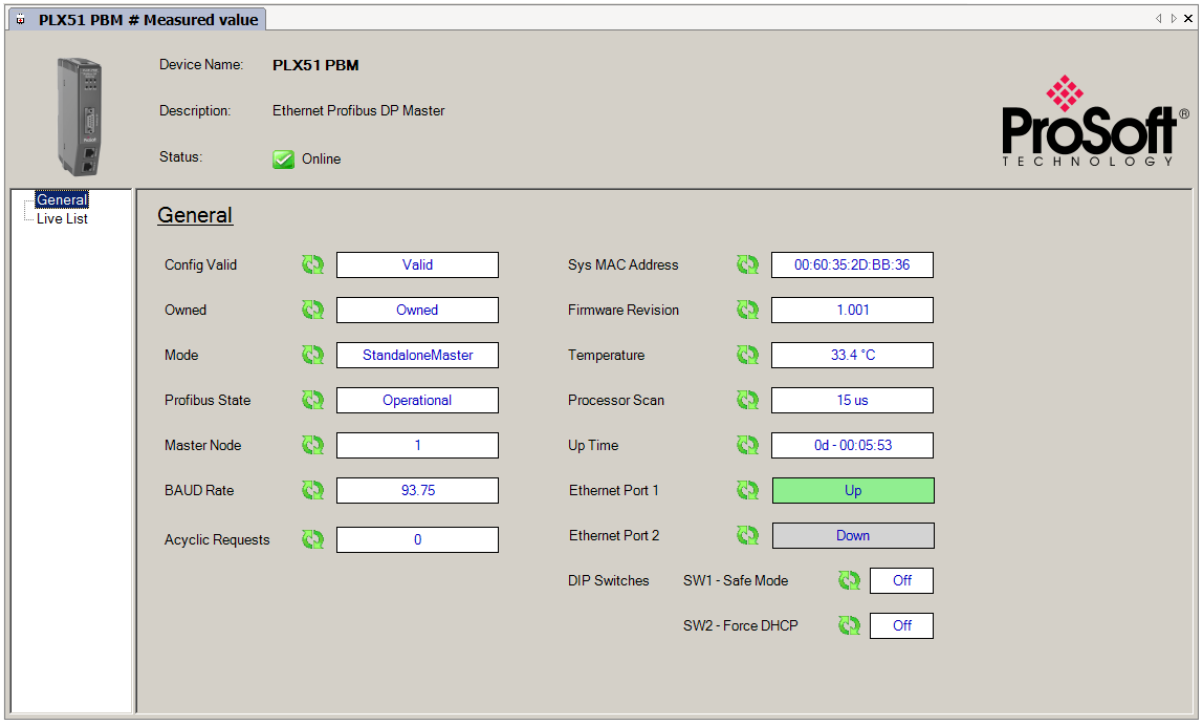


Figure 7.11 – PLX51-PBM DTM - General Status Page

The Live List page shows the state of the devices on the PROFIBUS network.

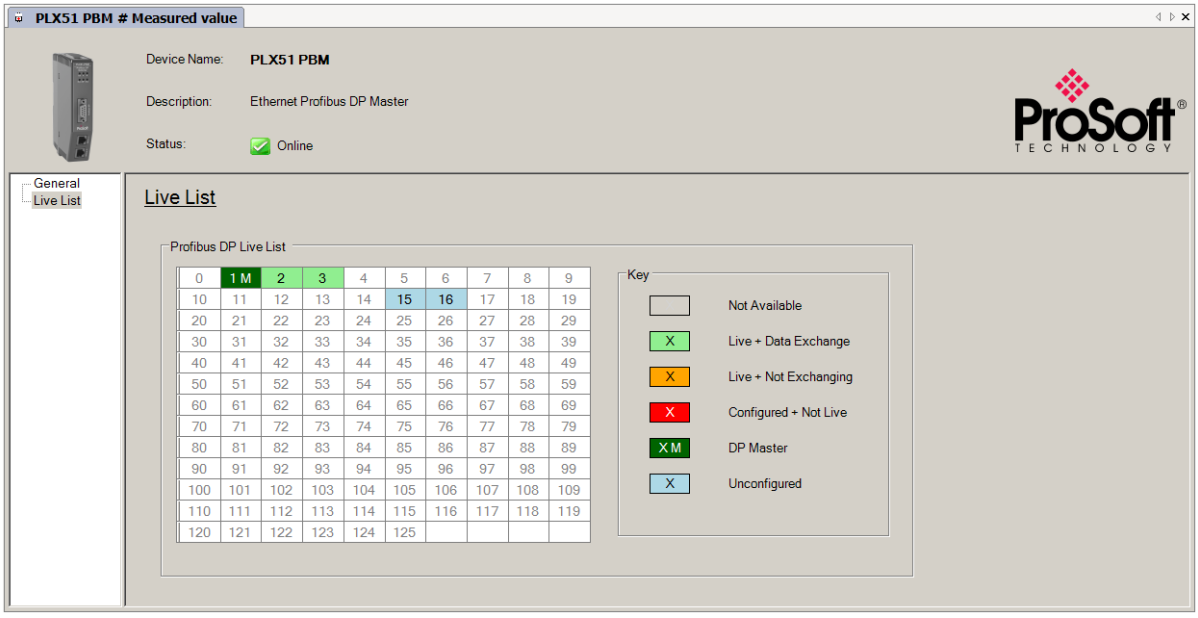


Figure 7.12 – PLX51-PBM DTM - Live List Page

Slave Device DTM under the PLX51-PBM DTM can also be brought online by selecting the Online or Connect option.

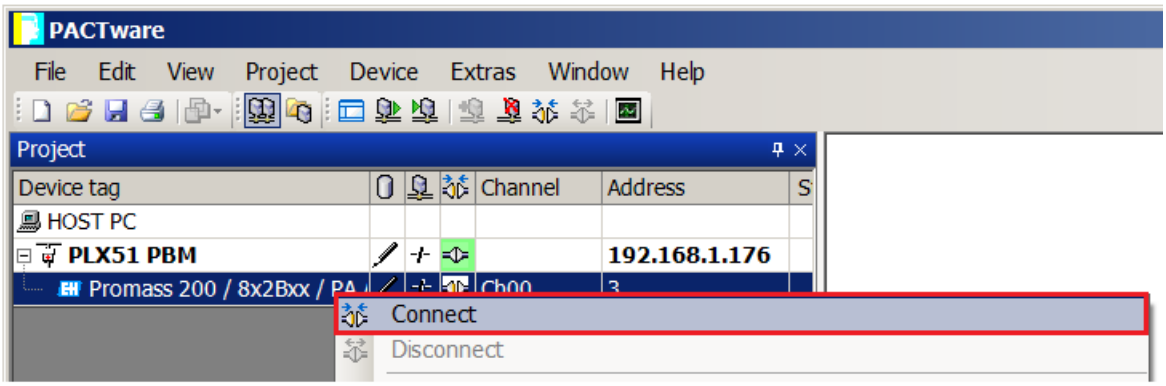


Figure 7.13 – Slave Device DTM Connect

Depending on the device DTM, a number of online parameters, diagnostics and measure variables can be displayed.

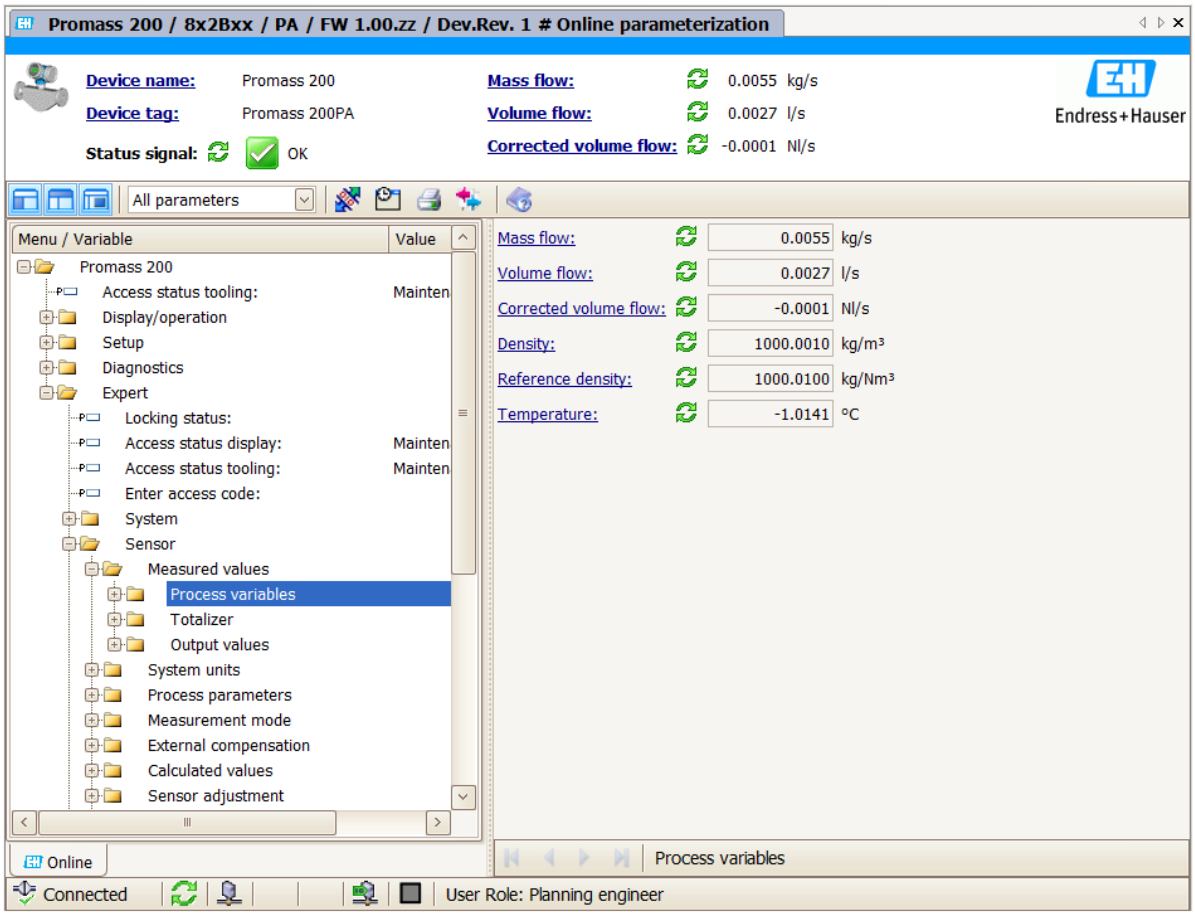


Figure 7.14 – Device DTM

8 Diagnostics

8.1 LEDs

The module provides six LEDs for diagnostics purposes as shown below. A description of each LED is given in the table below.

Figure 8.1 - PLX51-PBM LEDs

Table 8.1 - Module LED operation

LED	Description
Ok	The module LED will provide information regarding the system-level operation of the module. Thus, if the LED is red then the module is not operating correctly. For example, if the module application firmware has been corrupted or there is a hardware fault the module will have a red Module LED. If the LED is green (flashing), then the module has booted and is running correctly **without** any application configuration loaded. If the LED is green (solid), then the module has booted and is running correctly **with** application configuration loaded.
A / B	The Ethernet LED will light up when an Ethernet link has been detected (by plugging in a connected Ethernet cable). The LED will flash every time traffic was detected. This module has two Ethernet ports A and B. Each LEDs represents each specific port.
Run	This LED will indicate the PROFIBUS operating mode when in Master mode (Note that in Slave mode this LED is N/A). **Master** Solid Red – The PROFIBUS network is in STOP mode. Flashing Green – The PROFIBUS network is in CLEAR mode. Solid Green – The PROFIBUS network is in OPERATE mode. Off - The PROFIBUS network is OFFLINE. **Slave** Off – For Slave mode this LED is N/A.

BF	This LED indicates the status of the PROFIBUS network when in Master mode and the status of the configured field devices when in Slave Mode. **Master** Solid Red – There are bus communication errors Flashing Red – There are field device errors Off – There are no bus communication or device errors **Slave** Solid Red – There are bus communication errors (if no valid packet has been received by any configured slave for more than 1s). Flashing Red – There are slave errors (at least one slave has not been configured properly and is not exchanging DPV0 data). Flashing Green – All slaves are successfully exchanging DPV0 data and the DP network operational state is **clear**. Solid Green – All slaves are successfully exchanging DPV0 data and the DP network operational state is **operate**.
Aux	The activity LED is used for the activity on the Primary Interface (e.g. EtherNet/IP, Modbus RTU, or Modbus TCP). Thus, every time a valid packet is received from the Primary Interface the LED will toggle green. The LED will toggle red if a corrupted packet was received (e.g. failed checksum when using RS232 or RS485).

8.2 Module Status Monitoring

The PLX51-PBM provides a range of statistics which can assist with module operation, maintenance, and fault finding. The statistics can be accessed in full by the PLX50 Configuration Utility or using the web server in the module.

To view the module's status in the PLX50 Configuration Utility environment, the PLX51-PBM must be online. If the module is not already Online (following a recent configuration download), then right-click on the module and select the *Go Online* option.

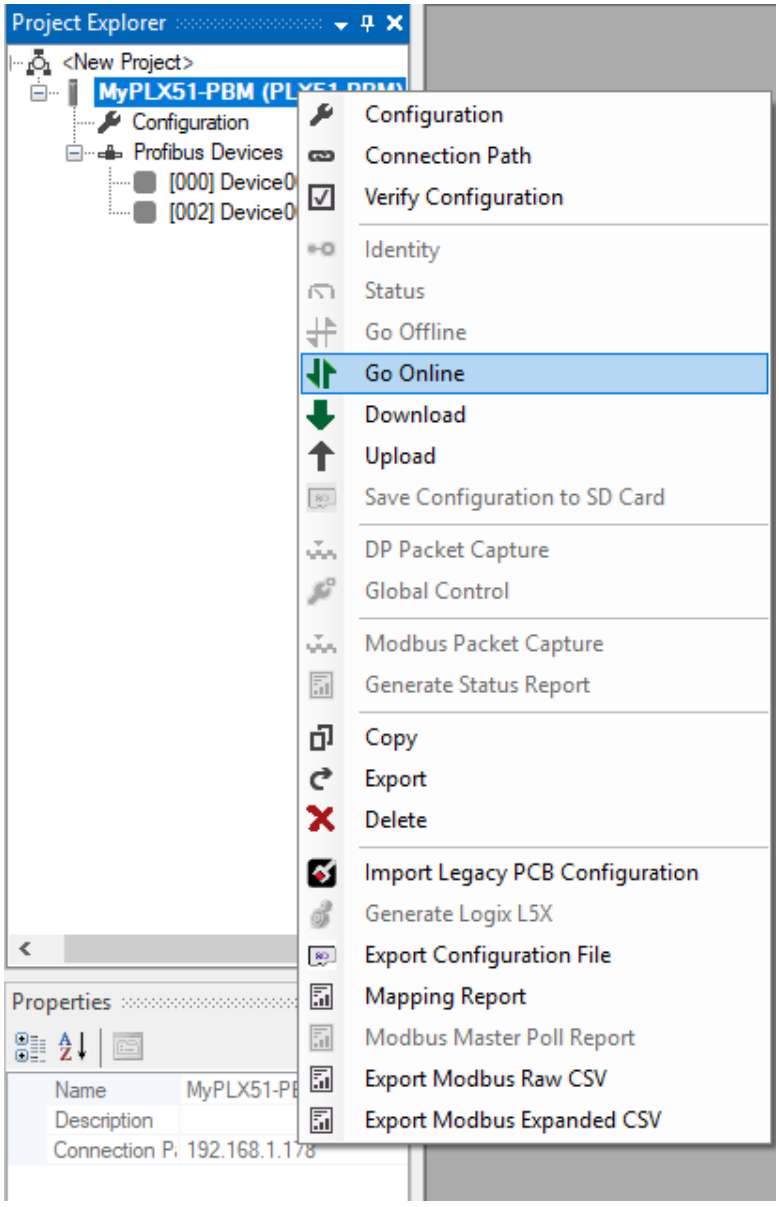


Figure 8.2 - Selecting to Go Online

The Online mode is indicated by the green circle behind the module in the Project Explorer tree.

8.2.1 PLX51-PBM Status Window

The Status monitoring window of the PLX51-PBM can be opened by either double-clicking on the *Status* item in the Project Explorer tree, or by right-clicking on the module and selecting *Status*.

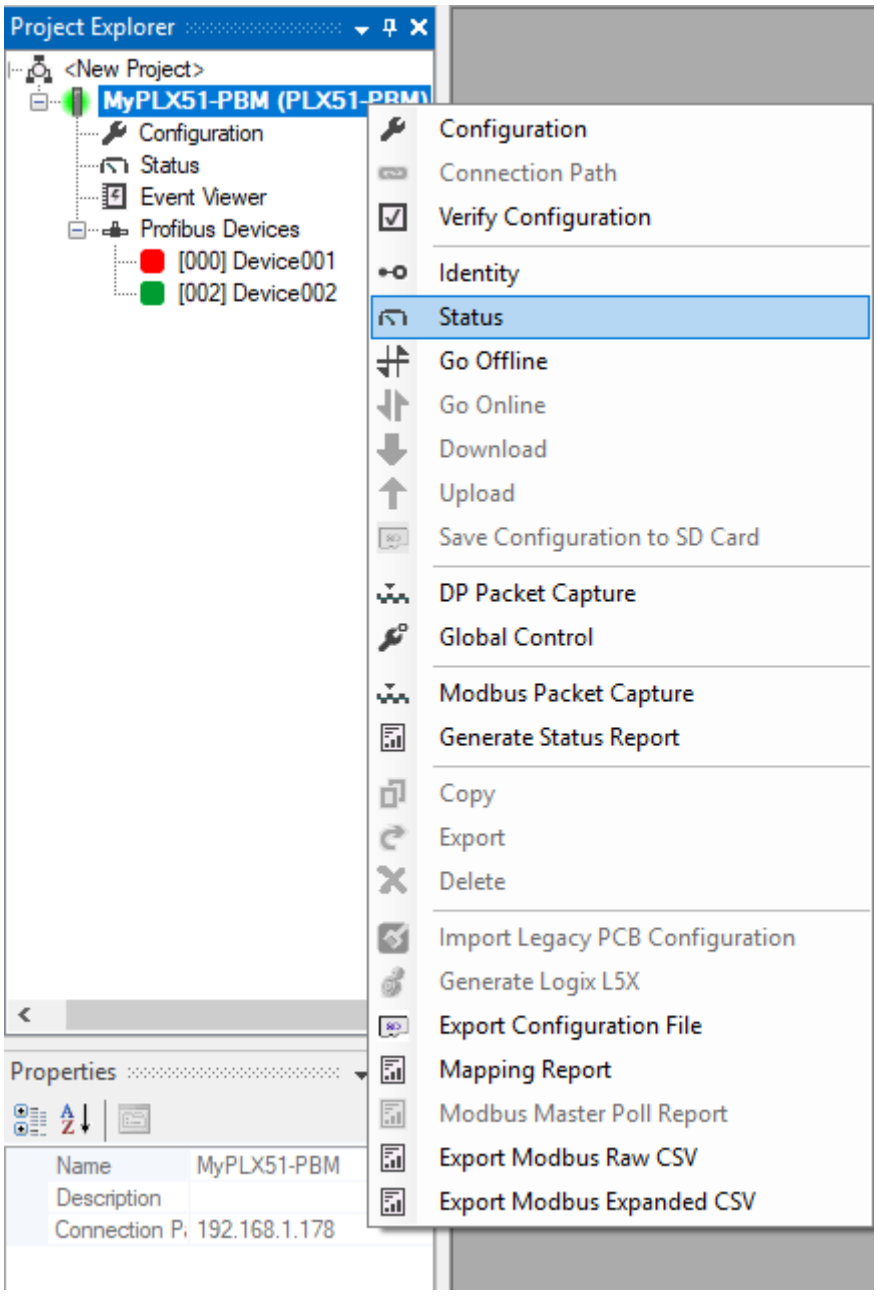


Figure 8.3 - Selecting PLX51-PBM online Status

The status window contains multiple tabs to display the current status of the module.

8.2.2 PLX51-PBM Master Mode Status

General

The General tab displays the following general parameters:

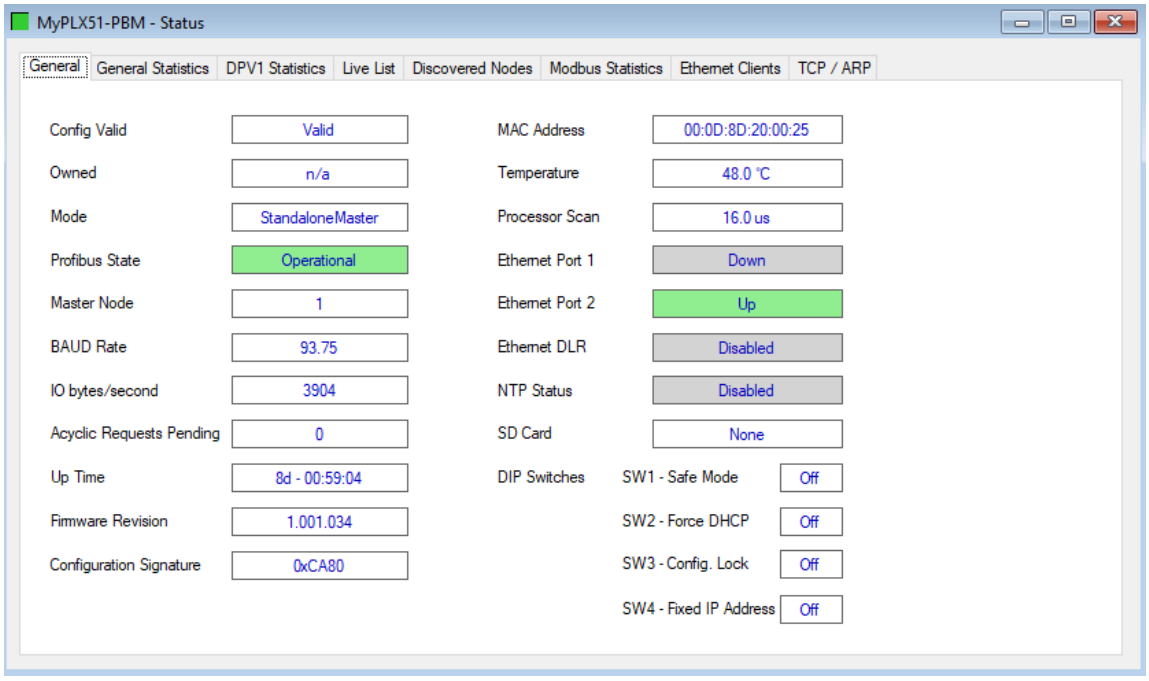


Figure 8.4 - PLX51-PBM (Master Mode) General parameters

Table 8.2 - Parameters displayed in the Status Monitoring – General Tab

Parameter	Description
Config Valid	Indicates if the downloaded configuration is valid and executing.
Owned	Indicates whether or not the module is currently owned (Class 1) by a Logix Controller.
Mode	This is the mode of operation of the module. The following states can be returned: **Quiet:** This mode allows the user to connect the PLX51-PBM to an active bus and run a DP packet capture. In this mode the PLX51-PBM will not communicate on the DP Bus but rather only listen. **Standalone:** In this mode the PLX51-PBM is the DP Master on the PROFIBUS network. **Slave:** In this mode the PLX51-PBM will emulate multiple PROFIBUS Slave devices.
PROFIBUS State (Master mode only)	This is the operational state of the PROFIBUS network. The following states can be returned: **OFFLINE:** The PROFIBUS network is offline and the PLX51-PBM will not communicate on the network. **STOP:** The PROFIBUS network is running and the PLX51-PBM is communicating on the network, but it will not exchange any process data with any slave device. **OPERATE:** The PROFIBUS network is running and the PLX51-PBM is communicating with all slave devices on the network, and if configured in the PLX51-PBM, the module will configure and exchange process data with each slave device. **CLEAR:** The PROFIBUS network is running and the PLX51-PBM is communicating with all slave devices on the network, and if configured in the PLX51-PBM, the module will configure and exchange process data with each slave device.

	NOTE: In CLEAR mode the PLX51-PBM will not send any output data to any slave device.
Master Node (Master mode only)	The PROFIBUS Node address of the local PLX51-PBM when in Master mode.
BAUD Rate	The BAUD Rate of the PROFIBUS network.
IO bytes/second	The number of process variable bytes being exchanged between the PLX51-PBM and slave devices every second.
Acyclic Requests Pending	The number of acyclic requests (DPV1 Class 1 and Class 2 requests) pending.
Up Time	Indicates the elapsed time since the module was powered-up.
Firmware Revision	The application firmware revision currently executing.
Configuration Signature	The signature of the configuration currently executing on the module.
MAC Address	Displays the module's unique Ethernet MAC address.
Temperature	The internal temperature of the module.
Processor Scan	The amount of time (microseconds) taken by the module's processor in the last scan.
Ethernet Port 1/2	This is the status of each Ethernet port. **Down:** The Ethernet connector has not been successfully connected to an Ethernet network. **Up:** The Ethernet connector has successfully connected to an Ethernet network. **Mirror Enabled:** The Ethernet port is mirroring the traffic on the other Ethernet port.
Ethernet DLR (Device Level Ring)	The status of the Ethernet DLR. **Disabled -** Device Level Ring functionality has been disabled. **Linear -** The DLR functionality has been enabled and the Ethernet network architecture is linear. **Ring – Fault:** The DLR functionality has been enabled and the Ethernet network architecture is ring, but there is a fault with the network. **Ring – Ok:** The DLR functionality has been enabled and the Ethernet network architecture is ring and is operating as expected.
NTP Status	The status of the local NTP Client. **Disabled:** The NTP time synchronization has been disabled. **Locked:** NTP time synchronization has been enabled and the PLX51-PBM has locked onto the target time server. **Not Locked:** NTP time synchronization has been enabled and the PLX51-PBM has not locked onto the target time server.
DIP Switch Position	The status of the DIP switches when the module booted.

General Statistics

The General Statistics (PLX51-PBM Master mode only) tab displays the following general parameters:

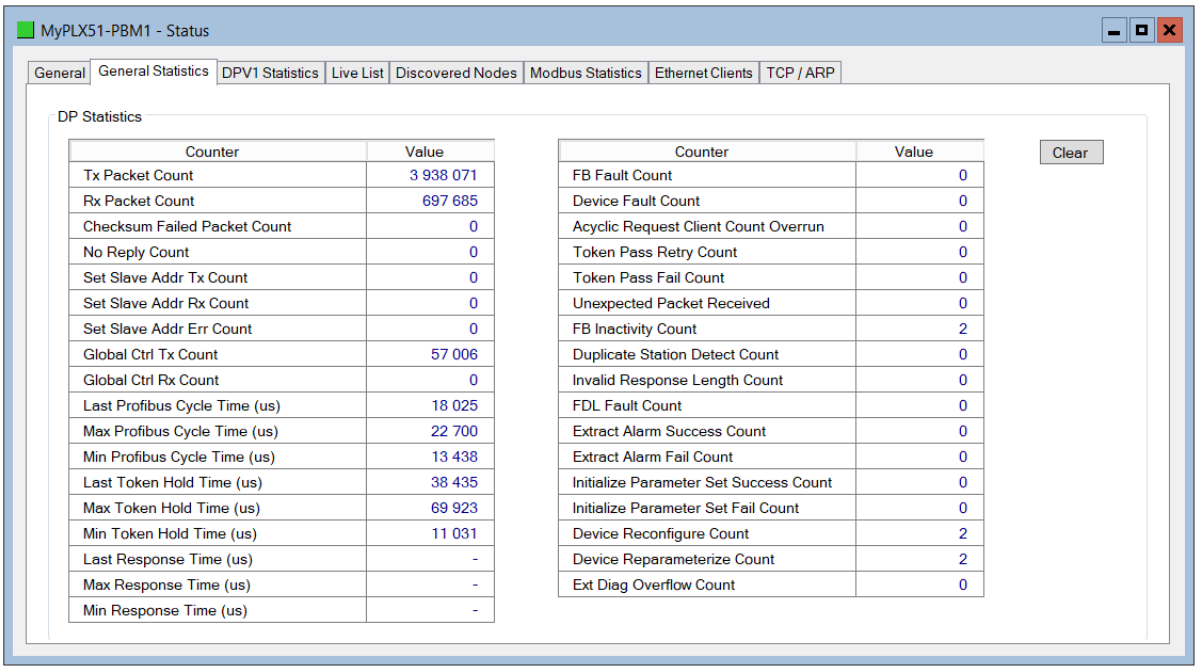


Figure 8.5 – PLX51-PBM (Master Mode) Status monitoring – General Statistics

Table 8.3 - Parameters displayed in the Status Monitoring – General Statistics Tab

Parameter	Description
Tx Packet Count	The number of PROFIBUS packets transmitted.
Rx Packet Count	The number of PROFIBUS packets received.
Checksum Failed Packet Count	The number of PROFIBUS packets that had a failed checksum.
No Reply Count	The number of PROFIBUS requests from the PLX51-PBM where the station did not respond.
Set Slave Addr Tx Count	The number of PROFIBUS Set Slave Address requests sent from the PLX51-PBM.
Set Slave Addr Rx Count	The number of successful PROFIBUS Set Slave Address responses received.
Set Slave Addr Err Count	The number of failed PROFIBUS Set Slave Address responses received.
Global Ctrl Tx Count	The number of PROFIBUS Global Control requests sent from the PLX51-PBM.
Global Ctrl Rx Count	The number of PROFIBUS Global Control responses received by the PLX51-PBM.
Last PROFIBUS Cycle Time	The time (in microseconds) the last PROFIBUS Cycle took to complete.
Max PROFIBUS Cycle Time	The maximum time (in microseconds) the PROFIBUS Cycle took to complete.
Min PROFIBUS Cycle Time	The minimum time (in microseconds) the PROFIBUS Cycle took to complete.
Last Token Hold Time	The time (in microseconds) the PLX51-PBM held the token in the last token rotation.
Max Token Hold Time	The maximum time (in microseconds) the PLX51-PBM held the token.

Min Token Hold Time	The minimum time (in microseconds) the PLX51-PBM held the token.
Last Response Time	In a Multi DP Master system, this is the time it took (in microseconds) to respond to the last token passed from another DP Master.
Max Response Time	In a Multi DP Master system, this is the maximum time it took (in microseconds) to respond to a token passed from another DP Master.
Min Response Time	In a Multi DP Master system, this is the minimum time it took (in microseconds) to respond to a token passed from another DP Master.
FB Fault Count	The number of fieldbus faults that have occurred (e.g. devices going offline, corrupted packets, etc.)
Device Fault Count	The number of slave device faults that have occurred (e.g. device stops communicating during data exchange).
Acyclic Request Client Count Overrun	The number of times more than 10 acyclic requests needed to be buffered in which case the PLX51-PBM will reject the 11th request.
Token Pass Retry Count	In a Multi DP Master system, this is the number of times the token pass from the PLX51-PBM had to be retransmitted because the receiving DP Master did not respond in time.
Token Pass Fail Count	When the number of consecutive Token Pass Retries reaches the configured token pass retry count after which that DP Master will be assumed as offline.
Unexpected Packet Received	The number of times a response is received from a slave device that was not expected (e.g. incorrect response, response from a different node, etc.).
FB Inactivity Count	The number of times the PLX51-PBM has determined that there are no other DP Masters on the PROFIBUS network.
Duplicate Station Detect Count	The number of times the PLX51-PBM has detected that there is another station on the network with the same station address as the local PLX51-PBM.
Invalid Response Length Count	The number of times a response is received from a slave device where the length is not correct (for example if the slave device is configured to provide 10 bytes of process data and only 5 bytes are returned during data exchange).
FDL Fault Count	The number of Data Link Layer function code faults received. This occurs when the remote PROFIBUS device rejects a function request, e.g. if the device is not in the correct state, or if it does not support that function. A list of FDL errors is tabulated in chapter 9.
Extract Alarm Success Count	The number of alarms that have successfully been extracted from slave devices.
Extract Alarm Fail Count	The number of alarms that have not successfully been extracted from slave devices.
Initialize Parameter Set Success Count	The number of parameters that have successfully been set after the device has been configured for data exchange.
Initialize Parameter Set Fail Count	The number of parameters that have failed to set after the device has been configured for DPV0 data exchange.
Device Reconfigure Count	The number of times a slave device has been (re)configured for DPV0 data exchange.
Device Reparameterize Count	The number of times a slave device has been (re)parameterized for DPV0 data exchange.
Ext Diag Overflow Count	The number of times a slave device has returned diagnostics data that could not fit into a single PROFIBUS frame.

DPV1 Statistics

The DPV1 Statistics (PLX51-PBM Master mode only) tab displays the following general parameters:

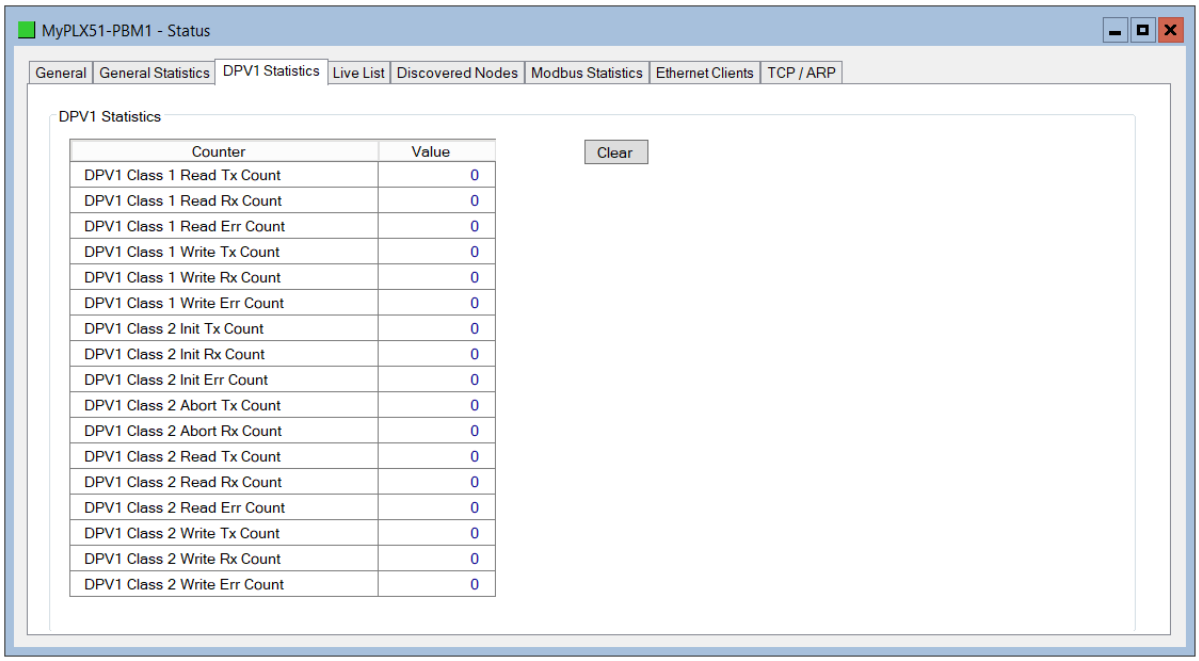


Figure 8.6 – PLX51-PBM (Master Mode) Status monitoring – DPV1 Statistics

Table 8.4 - Parameters displayed in the Status Monitoring – DPV1 Statistics Tab

Parameter	Description
DPV1 Class 1 Read Tx Count	The number of PROFIBUS DPV1 Class 1 Read requests sent from the PLX51-PBM.
DPV1 Class 1 Read Rx Count	The number of successful PROFIBUS DPV1 Class 1 Read responses received by the PLX51-PBM.
DPV1 Class 1 Read Err Count	The number of failed PROFIBUS DPV1 Class 1 Read responses received by the PLX51-PBM.
DPV1 Class 1 Write Tx Count	The number of PROFIBUS DPV1 Class 1 Write requests sent from the PLX51-PBM.
DPV1 Class 1 Write Rx Count	The number of successful PROFIBUS DPV1 Class 1 Write responses received by the PLX51-PBM.
DPV1 Class 1 Write Err Count	The number of failed PROFIBUS DPV1 Class 1 Write responses received by the PLX51-PBM.
DPV1 Class 2 Init Tx Count	The number of PROFIBUS DPV1 Class 2 Initialize requests sent from the PLX51-PBM.
DPV1 Class 2 Init Rx Count	The number of successful PROFIBUS DPV1 Class 2 Initialize responses by the PLX51-PBM.
DPV1 Class 2 Init Err Count	The number of failed PROFIBUS DPV1 Class 2 Initialize responses received by the PLX51-PBM.
DPV1 Class 2 Abort Tx Count	The number of PROFIBUS DPV1 Class 2 Abort requests sent from the PLX51-PBM.
DPV1 Class 2 Abort Rx Count	The number of PROFIBUS DPV1 Class 2 Abort messages received by the PLX51-PBM.
DPV1 Class 2 Read Tx Count	The number of PROFIBUS DPV1 Class 2 Read requests sent from the PLX51-PBM.
DPV1 Class 2 Read Rx Count	The number of successful PROFIBUS DPV1 Class 2 Read responses received by the PLX51-PBM

DPV1 Class 2 Read Err Count	The number of failed PROFIBUS DPV1 Class 2 Read responses received by the PLX51-PBM.
DPV1 Class 2 Write Tx Count	The number of PROFIBUS DPV1 Class 2 Write requests sent from the PLX51-PBM.
DPV1 Class 2 Write Rx Count	The number of successful PROFIBUS DPV1 Class 2 Write responses received by the PLX51-PBM.
DPV1 Class 2 Write Err Count	The number of failed PROFIBUS DPV1 Class 2 Write responses received by the PLX51-PBM.

Live List

The Live List tab in the PLX51-PBM (Master mode only) status monitoring provides the user with an overview of all slave devices and DP masters connected to the PROFIBUS network. Each station will be in one of six states that are provided in the Live List page.

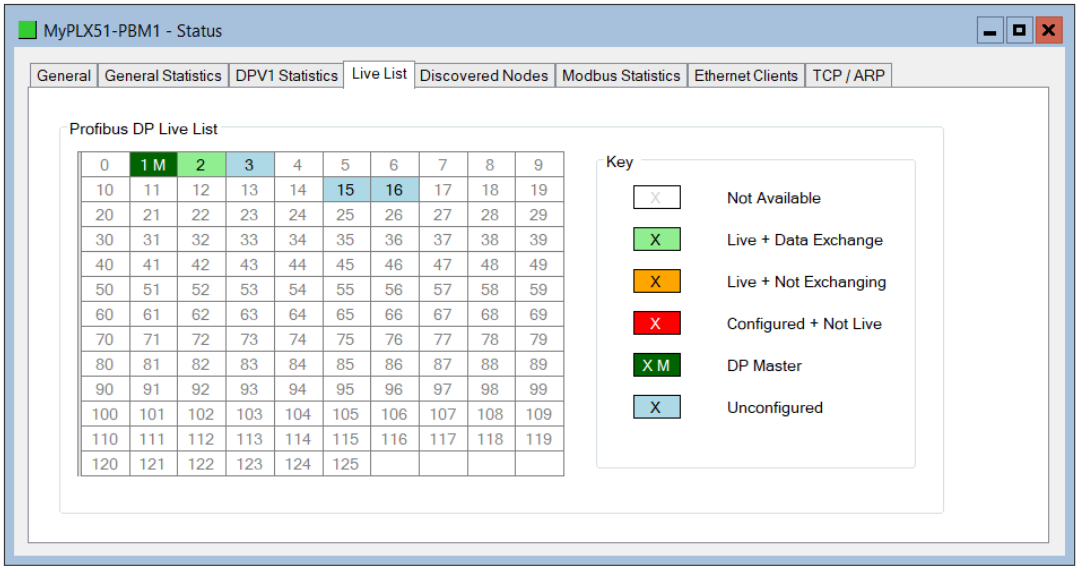


Figure 8.7 – PLX51-PBM (Master Mode) Status monitoring – Live List

Discovered Nodes

The Discovered Nodes (PLX51-PBM Master mode only) status page provides the user with more detail regarding each station on the PROFIBUS network (when compared to the live list). The user can scan the PROFIBUS network to extract further details from each device. From here the user can add the slave device or change the slave device station address. See the *Device Discovery* section.

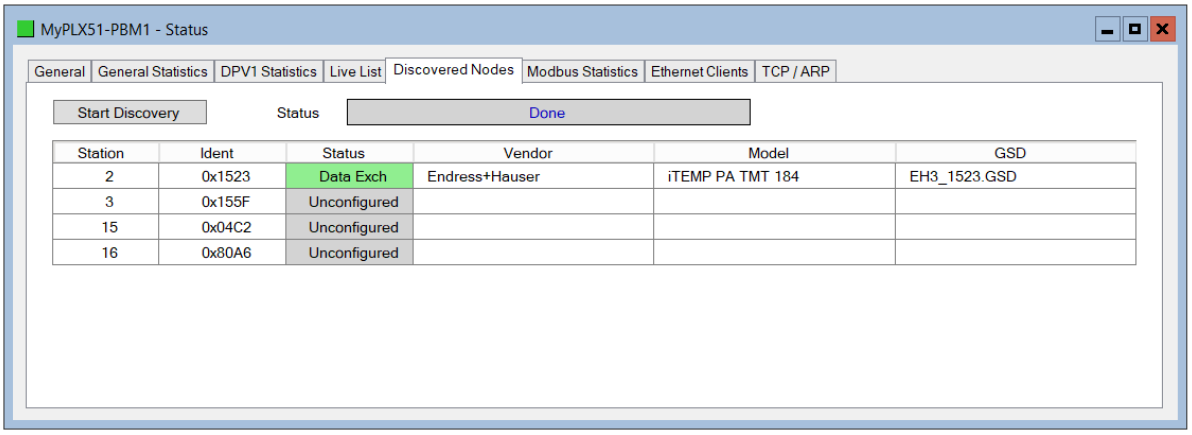


Figure 8.8 – PLX51-PBM (Master Mode) Status monitoring – Discovered Nodes

Modbus Statistics

The Modbus Statistics tab displays the statistics associated with the Modbus communication and mapping.

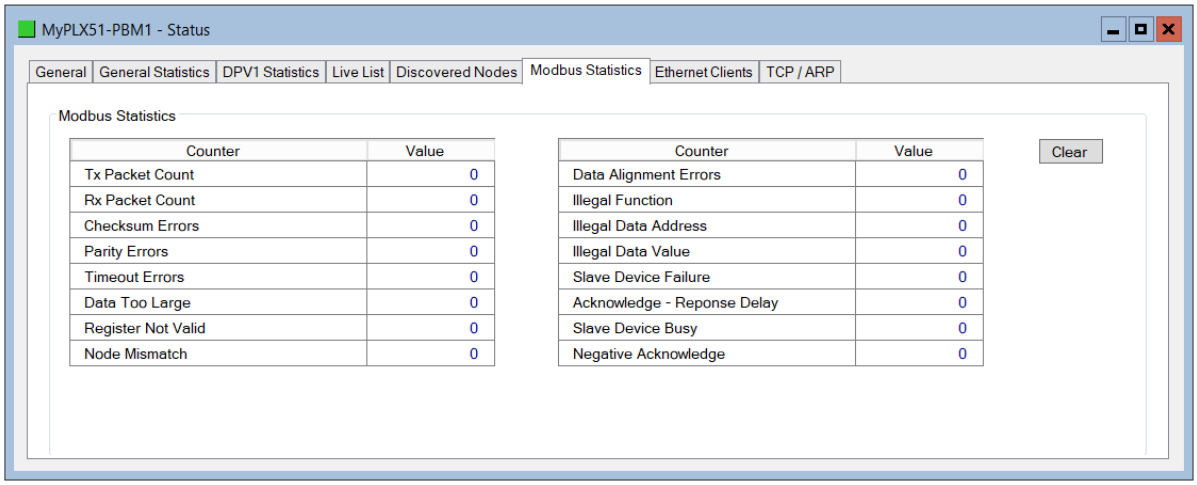


Figure 8.9 – PLX51-PBM Master mode status monitoring – Modbus Statistics

Table 8.5 – Modbus statistics

Statistic	Description
Tx Packet Count	The number of Modbus packets sent by the module.
Rx Packet Count	The number of Modbus packets received by the module.
Checksum errors	The number of corrupted Modbus packets received by the module.
Parity errors	The number of bytes with parity errors received by the module.
Timeout Errors	The number of message response timeouts the module has encountered.
Data Too Large	The number of Modbus requests or responses where the data was too large to process.
Register Not Valid	The number of Modbus requests containing an invalid register.
Node Mismatch	The received Modbus request did not match the module's Modbus node address.
Data Alignment Errors	The Modbus request and associated mapped item is not byte aligned with the destination Logix tag.
Illegal Function	The number of times the Modbus device responded with an Illegal Function exception.
Illegal Data Address	The number of times the Modbus device responded with an Illegal Data Address exception.
Illegal Data Value	The number of times the Modbus device responded with an Illegal Data Value exception.
Slave Device Failure	The number of times the Modbus device responded with a Device Failure exception.
Acknowledge –Response Delay	The number of times the Modbus device responded with an Acknowledge exception.
Slave Device Busy	The number of times the Modbus device responded with a Slave Busy exception.
Negative Acknowledge	The number of times the Modbus device responded with a Negative Acknowledge exception.

Modbus Devices

The Modbus Devices tab displays the active Modbus Client/Server devices the module is communicating with.

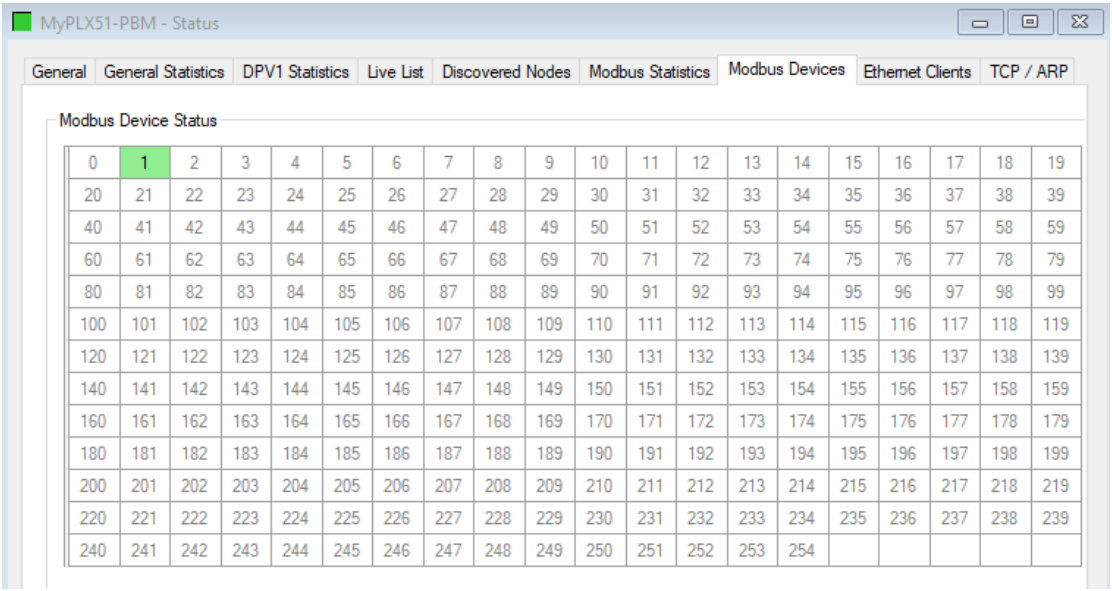


Figure 8.10 – PLX51-PBM Master mode status monitoring – Modbus Devices

Ethernet Clients

The Ethernet Clients tab displays details of the Ethernet and EtherNet/IP clients connected to the PLX51-PBM.

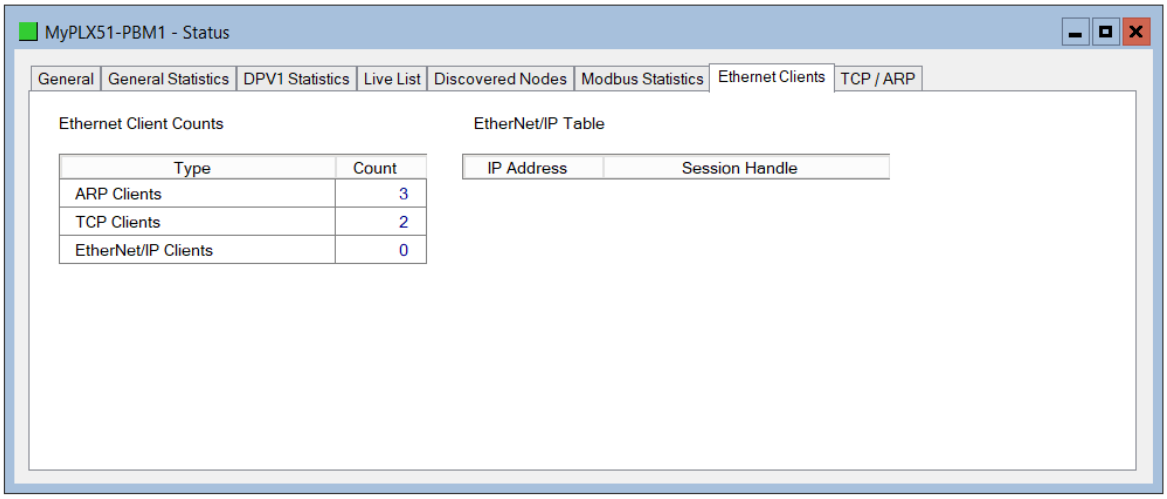


Figure 8.11 – PLX51-PBM (Master mode) status monitoring – Ethernet Client Statistics

TCP/ARP

The TCP/ARP tab displays details of the internal Ethernet ARP and TCP lists of the PLX51-PBM.

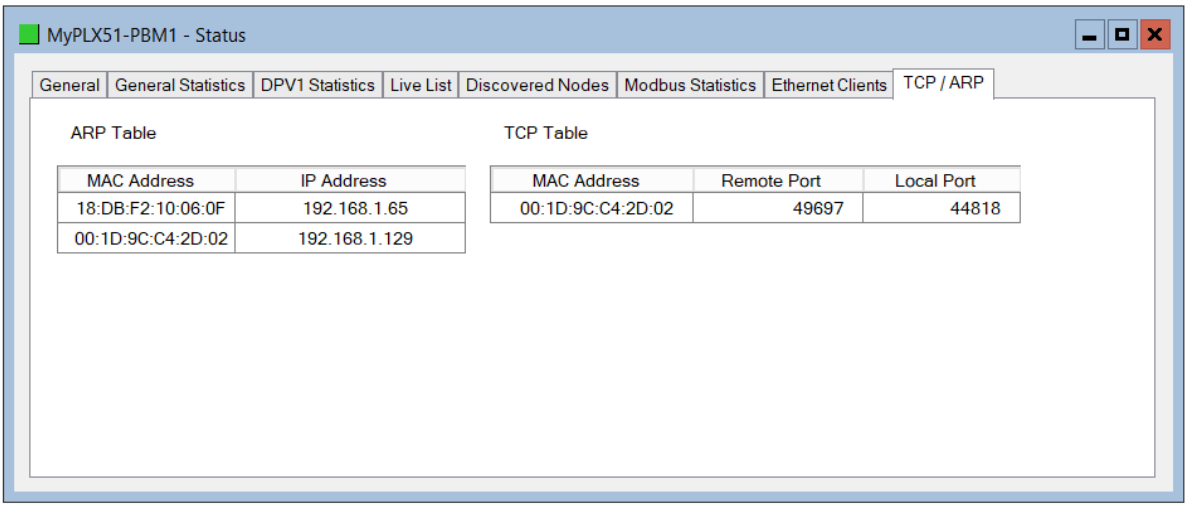


Figure 8.12 – PLX51-PBM (Master mode) status monitoring – Ethernet TCP / ARP Statistics

8.2.3 PLX51-PBM Slave Mode Status

General

The General tab displays the following general parameters. For more information, please see page 159.

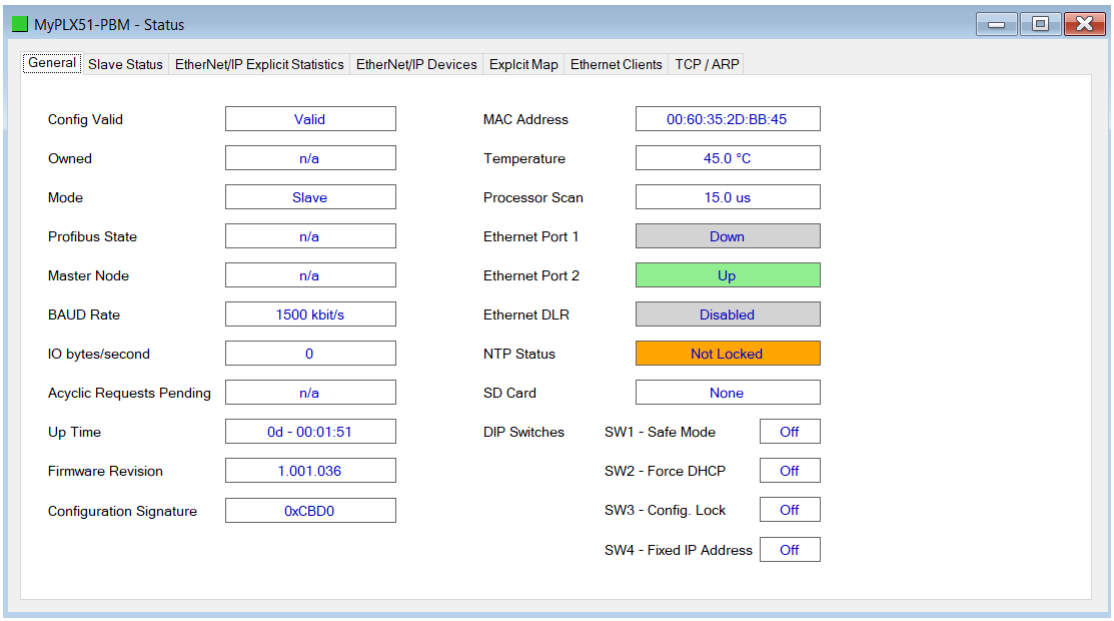


Figure 8.13 - PLX51-PBM (Slave Mode) General parameters

Slave Status

The PLX51-PBM Slave mode diagnostics tab displays the following parameters.

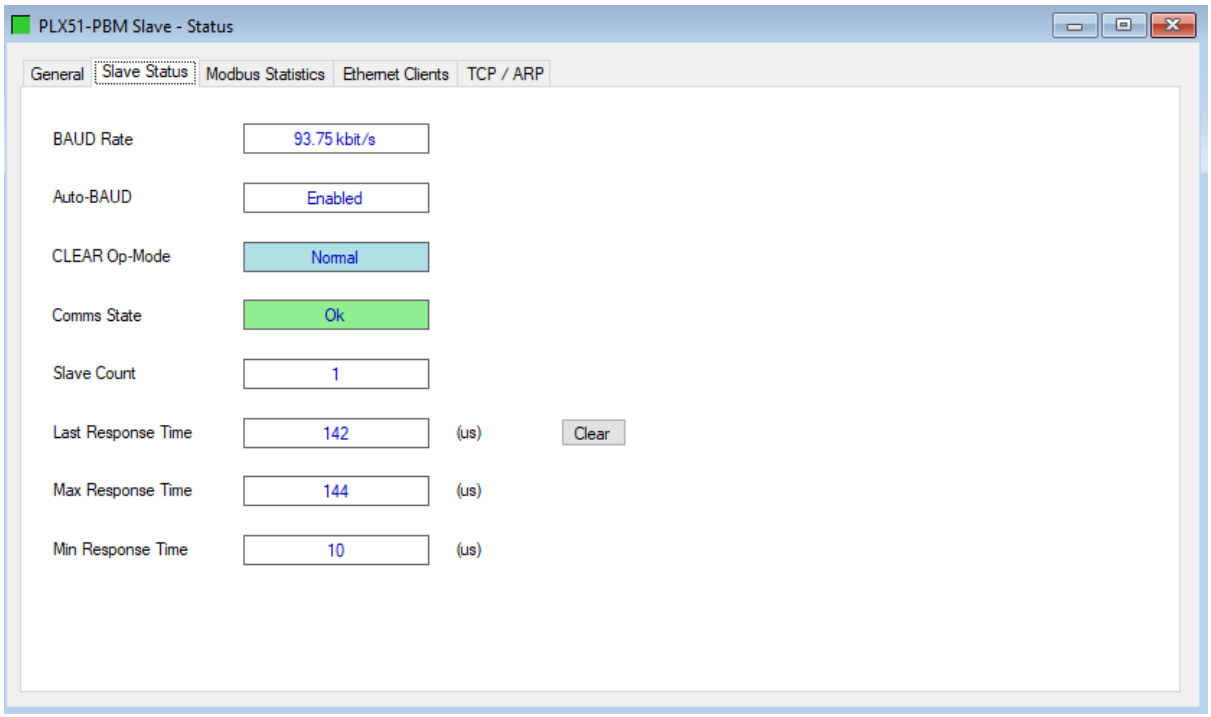


Figure 8.14 – PLX51-PBM (Slave Mode) Status monitoring

Table 8.6 - Parameters displayed in the Status Monitoring – Slave Status Tab

Parameter	Description
BAUD Rate	Current BAUD rate of the PROFIBUS Network
Auto-BAUD	If the BAUD rate for the PROFIBUS Network will be automatically detected
CLEAR Op-Mode	If the operational state of the PROFIBUS Network is CLEAR
Comms State	**OK** All configured slaves are operating correctly. **Failure** At least one of the configured devices are not operating correctly.
Slave Count	Number of slaves configured
Last Response Time	The time it took (in microseconds) to respond to the last request from a DP Master.
Max Response Time	The maximum time it took (in microseconds) to respond to a request from a DP Master.
Min Response Time	The minimum time it took (in microseconds) to respond to a request from a DP Master.

Modbus Statistics

The Modbus Statistics tab displays the statistics associated with the Modbus communication and mapping. For more information, please see page 165.

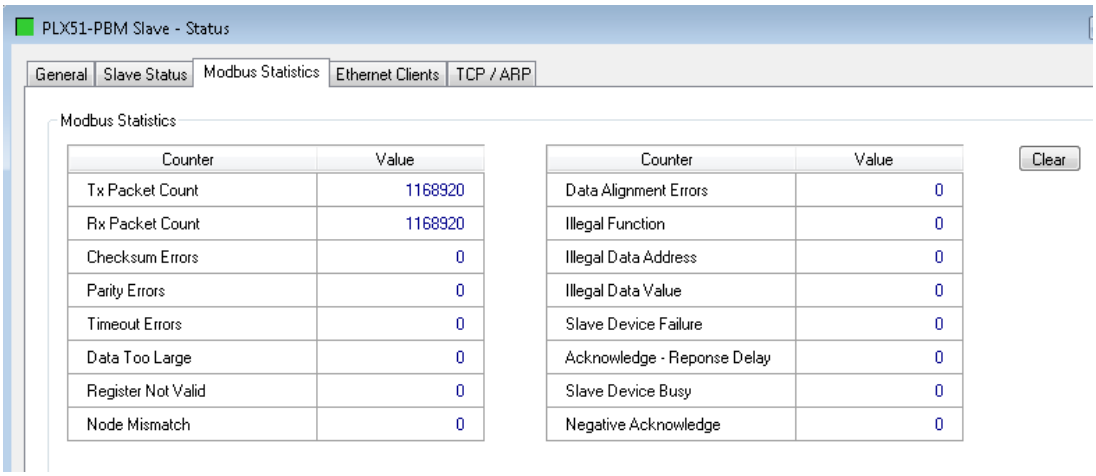


Figure 8.15 – PLX51-PBM Slave mode status monitoring – Modbus Statistics

Modbus Devices

The Modbus Devices tab displays the active Modbus Client/Server devices the module is communicating with.

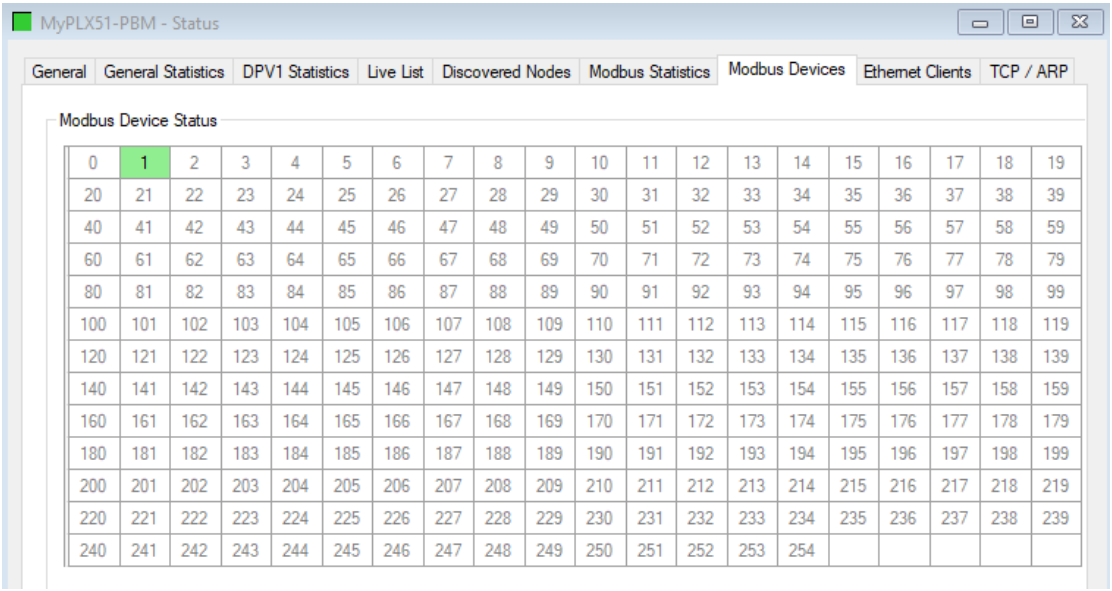


Figure 8.16 – PLX51-PBM Master mode status monitoring – Modbus Devices

EtherNet/IP Explicit Statistics

The EtherNet/IP Explicit Statistics tab displays the statistics for the combined EtherNet/IP target devices when the *Primary Interface* has been set to *EtherNet/IP Explicit Messaging*.

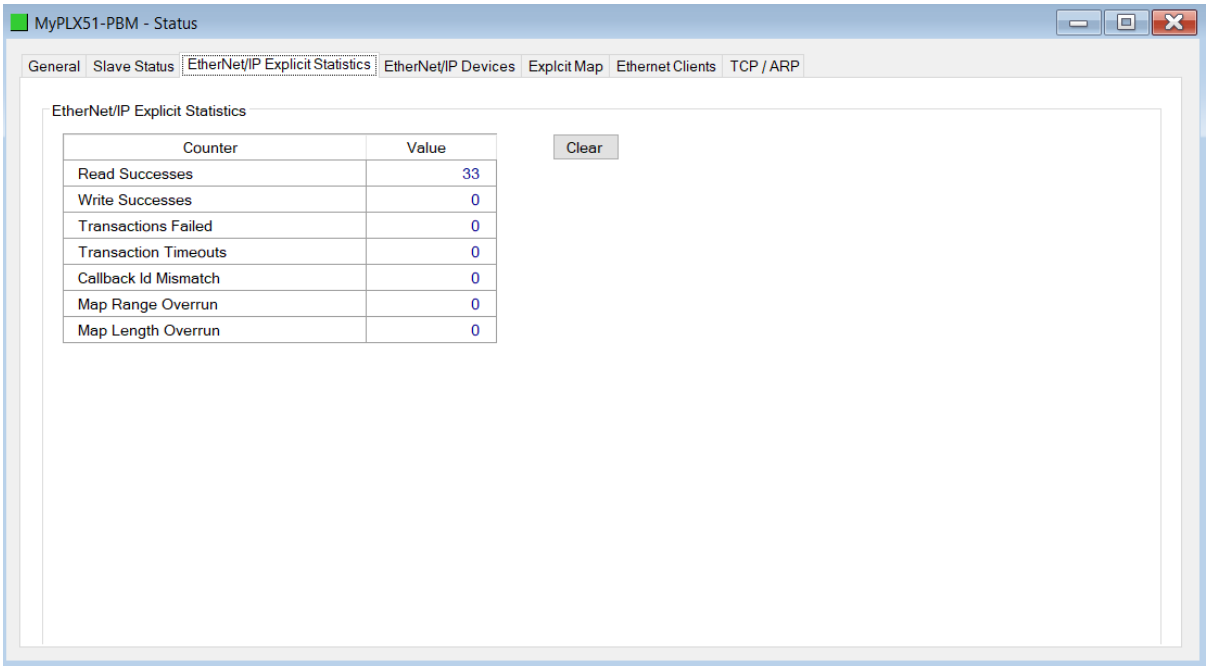


Figure 8.17 – PLX51-PBM Slave mode status monitoring – EtherNet/IP Explicit Statistics

Table 8.7 - Parameters displayed in the Status Monitoring – EtherNet/IP Explicit Statistics

Parameter	Description
Read Successes	The number of successful Explicit EtherNet/IP read message transactions.
Write Successes	The number of successful Explicit EtherNet/IP write message transactions.
Transactions Failed	The number of failed Explicit EtherNet/IP message transactions. For example, if the target EtherNet/IP device responded with an error.
Transaction Timeouts	The number of times the target EtherNet/IP device did not respond within the configured timeout time.
Callback Id Mismatch	The received response from the EtherNet/IP device does not match the request sent.
Map Range Overrun	The response is larger than the upper limit of the Data Table.
Map Length Overrun	The response is larger than the configured expected response size.

EtherNet/IP Devices

This shows all the configured EtherNet/IP devices used for Explicit EtherNet/IP Messaging and the current communication status. **Green** being online and exchanging data, **Red** indicating that the target device is offline.

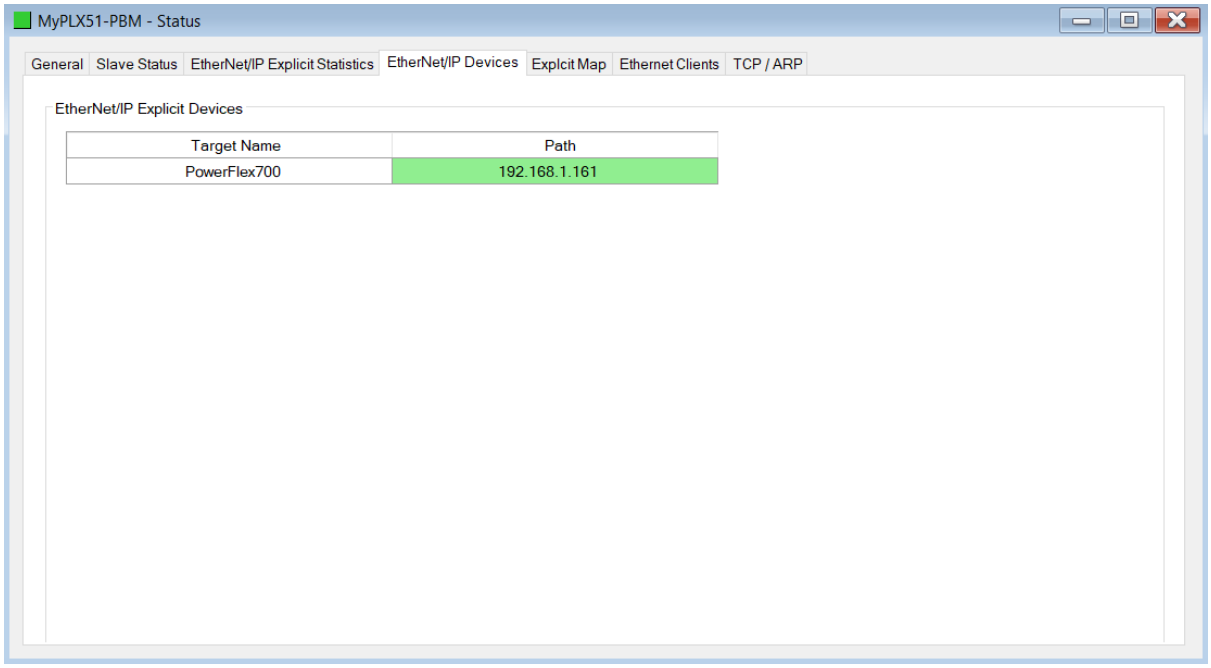


Figure 8.18 – PLX51-PBM Slave mode status monitoring – EtherNet/IP Devices

Explicit Map

This shows all the mapped EtherNet/IP explicit messaged used for Explicit EtherNet/IP Messaging. Each time there is a successful transaction the *Count* will increase and the item will briefly go green.

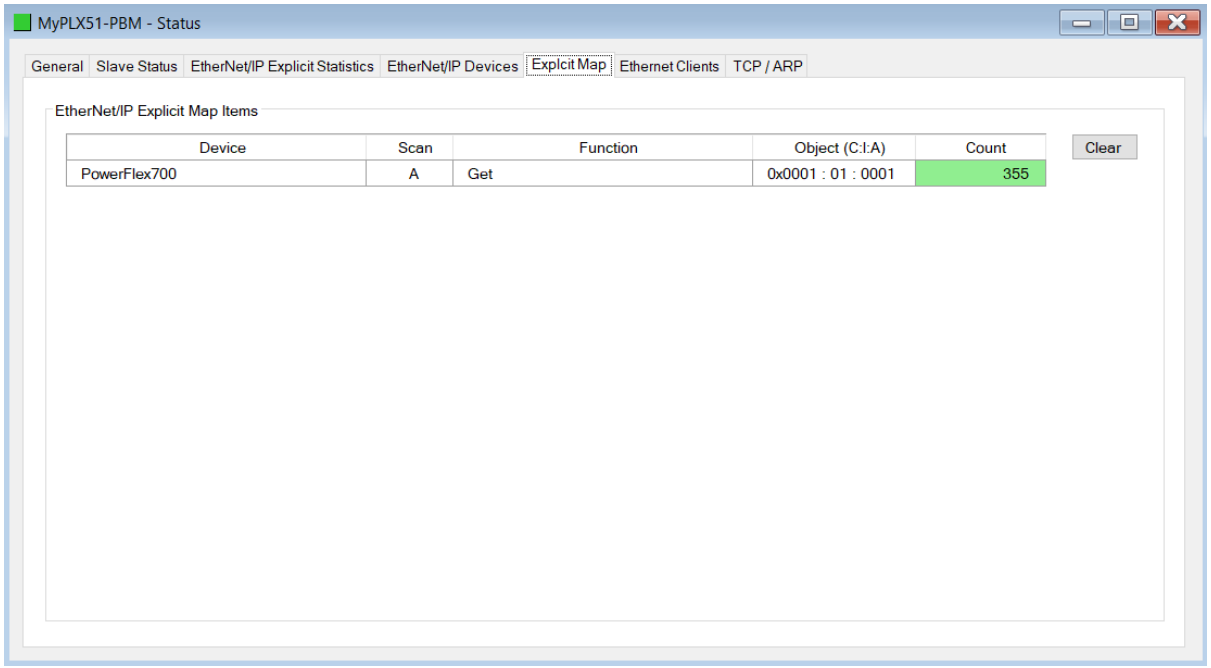


Figure 8.19 – PLX51-PBM Slave mode status monitoring – Explicit Map

Ethernet Clients

The Ethernet Clients tab displays details of the Ethernet and EtherNet/IP clients connected to the PLX51-PBM.

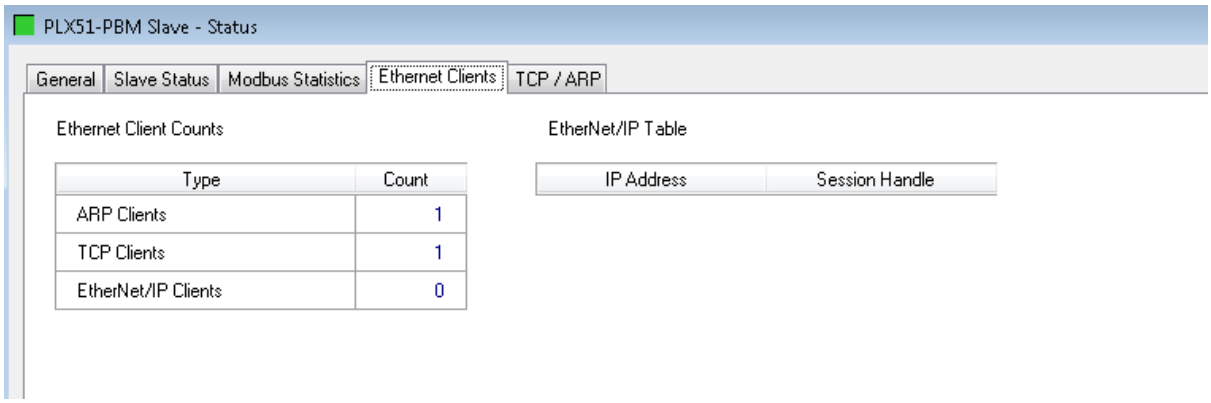


Figure 8.20 – PLX51-PBM (Slave mode) status monitoring – Ethernet Client Statistics

TCP/ARP

The TCP/ARP tab displays details of the internal Ethernet ARP and TCP lists of the PLX51-PBM.

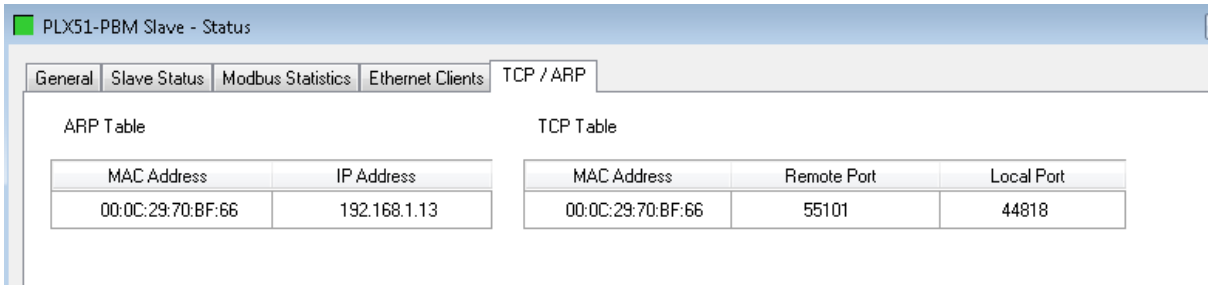


Figure 8.21 – PLX51-PBM (Slave mode) status monitoring – Ethernet TCP / ARP Statistics

8.2.4 PROFIBUS Slave Status

The Status monitoring window of each PROFIBUS slave device connected to the PLX51-PBM can be opened by right-clicking on the specific slave device in the PLX50 Configuration Utility tree and selecting *Status*.

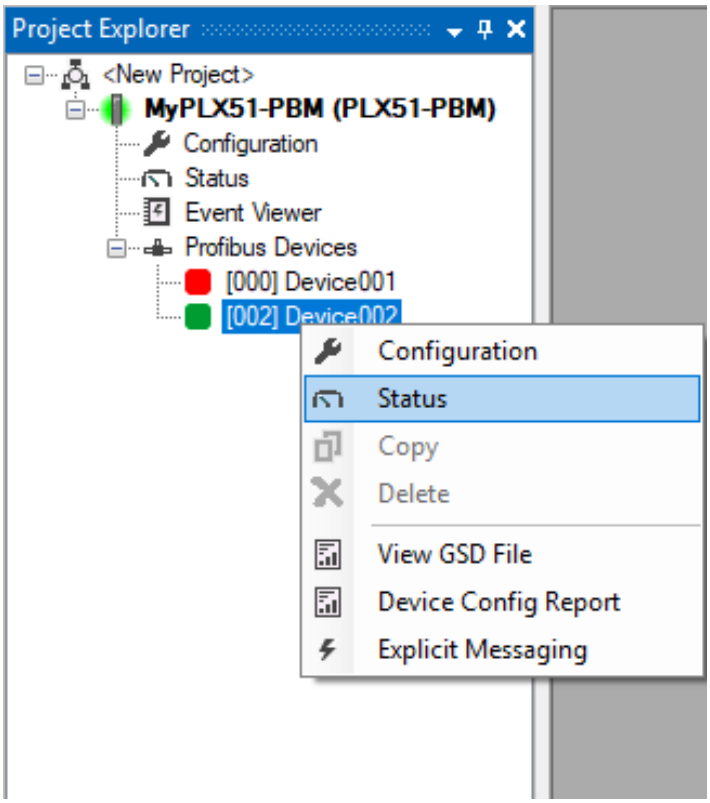


Figure 8.22 - Selecting slave device online Status

The device status window contains multiple tabs to display the current status of the specific slave device.

General

The General tab (for both PLX51-PBM Master and Slave modes) displays the following general parameters:

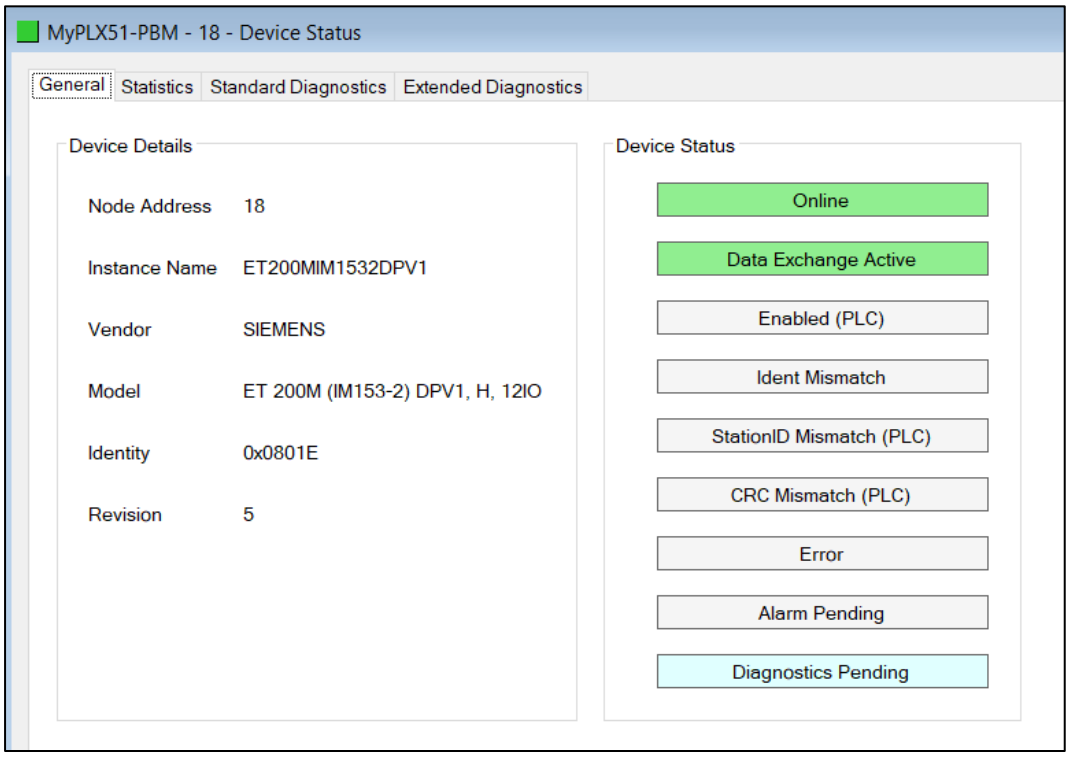


Figure 8.23 – PLX51-PBM (Master Mode) Device Status - General

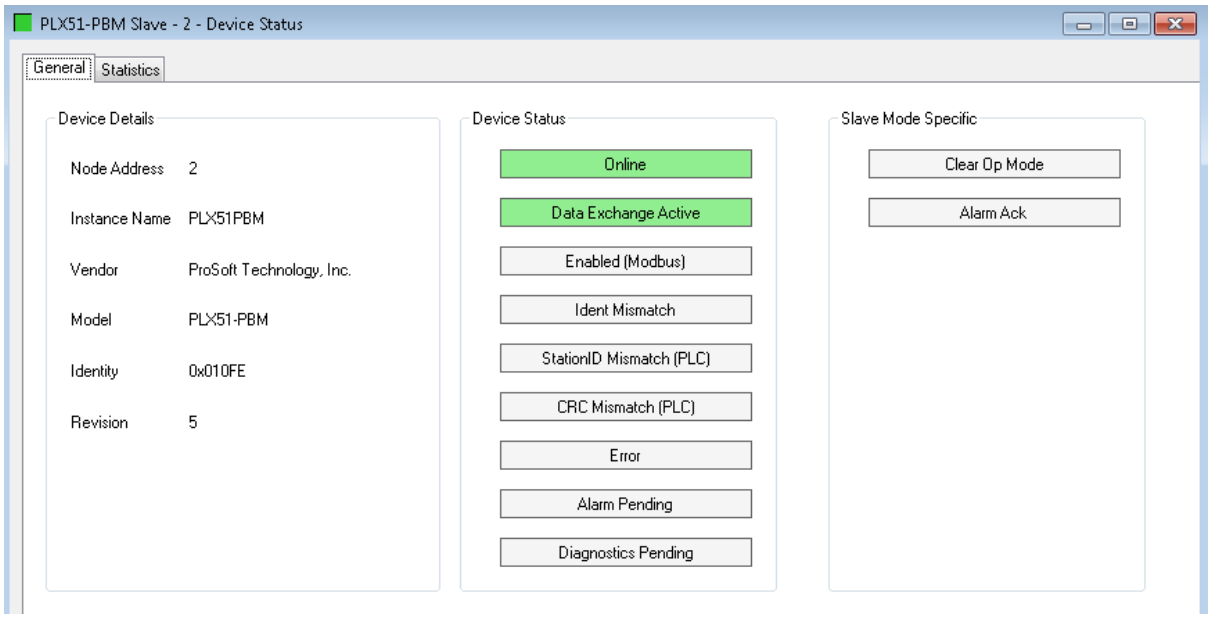


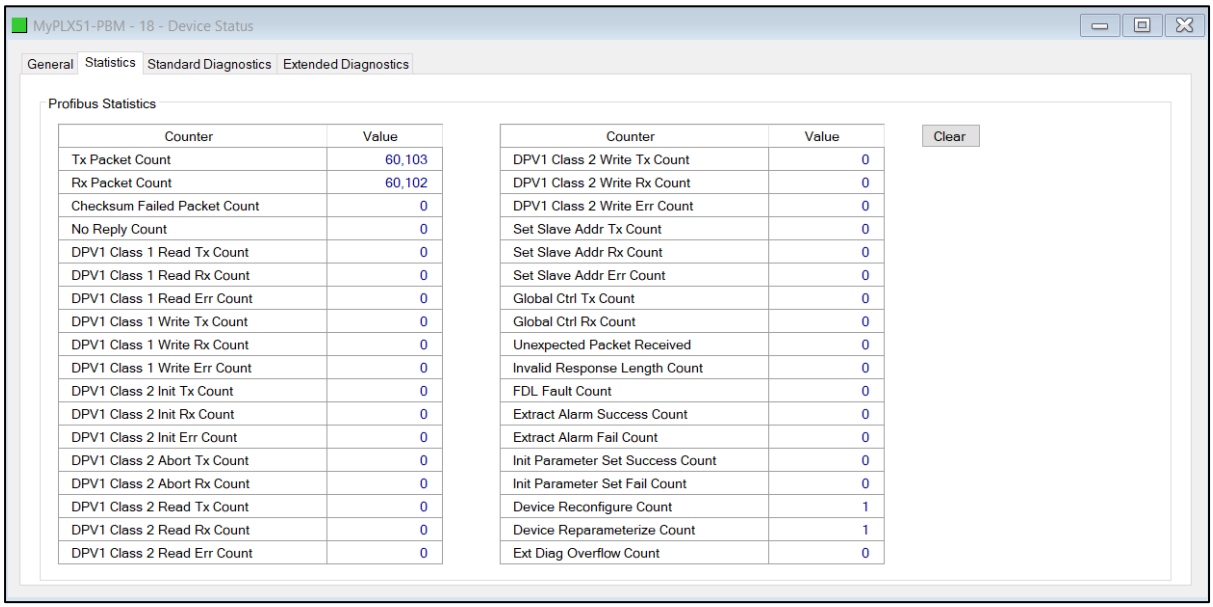
Figure 8.24 – PLX51-PBM (Slave Mode) Device Status - General

Table 8.8 - Device Status Monitoring – General Tab

Parameter	Description
Node Address	The selected slave device station address
Instance Name	The configured instance name of the device
Vendor	The device Vendor name
Model	The device Model name
Identity	The device PNO identity
Revision	The device revision
Device Status	The current status of the device: **Online** The slave device is online. **Data Exchange Active** The slave device is exchanging DPV0 process data with the PLX51-PBM. **Disabled (PLC)** The slave device has been disabled from DPV0 data exchange from the Logix controller using the PLX51-PBM output assembly. **Identity Mismatch** The device configured in the PLX50 Configuration Utility and the device online at the specific station address do not match. **StationID Mismatch (PLC)** The station address entered from the Logix controller using the PLX51-PBM output assembly does not match the station address of the configured slave device. **CRC Mismatch (PLC)** Indicates the mapping from the Logix controller does not match the configured mapping. **Error** Device Error flag **Alarm Pending** An alarm is pending in the specific slave device. **Diagnostics Pending** There is new diagnostics pending in the slave device.

Statistics

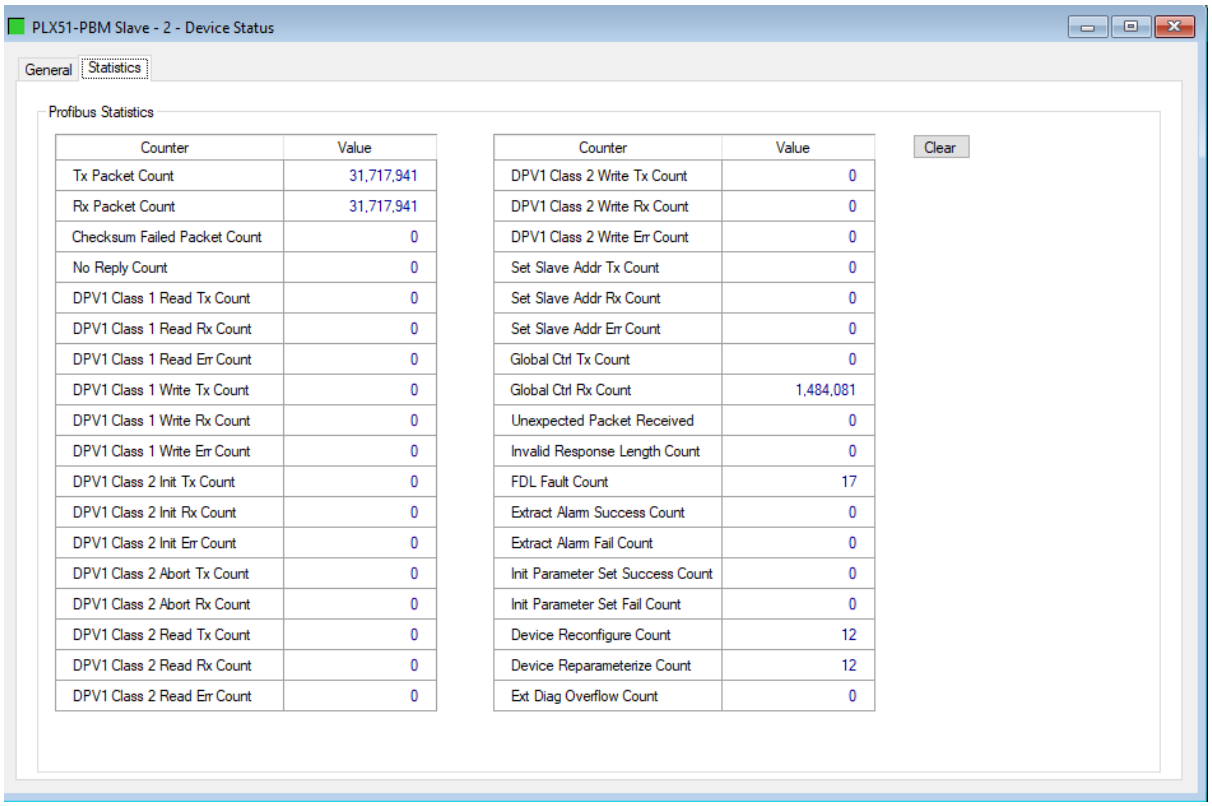
The Statistics tab (for both PLX51-PBM Master and Slave modes) displays the following general parameters:



Counter	Value
Tx Packet Count	60,103
Rx Packet Count	60,102
Checksum Failed Packet Count	0
No Reply Count	0
DPV1 Class 1 Read Tx Count	0
DPV1 Class 1 Read Rx Count	0
DPV1 Class 1 Read Err Count	0
DPV1 Class 1 Write Tx Count	0
DPV1 Class 1 Write Rx Count	0
DPV1 Class 1 Write Err Count	0
DPV1 Class 2 Init Tx Count	0
DPV1 Class 2 Init Rx Count	0
DPV1 Class 2 Init Err Count	0
DPV1 Class 2 Abort Tx Count	0
DPV1 Class 2 Abort Rx Count	0
DPV1 Class 2 Read Tx Count	0
DPV1 Class 2 Read Rx Count	0
DPV1 Class 2 Read Err Count	0

Counter	Value
DPV1 Class 2 Write Tx Count	0
DPV1 Class 2 Write Rx Count	0
DPV1 Class 2 Write Err Count	0
Set Slave Addr Tx Count	0
Set Slave Addr Rx Count	0
Set Slave Addr Err Count	0
Global Ctrl Tx Count	0
Global Ctrl Rx Count	0
Unexpected Packet Received	0
Invalid Response Length Count	0
FDL Fault Count	0
Extract Alarm Success Count	0
Extract Alarm Fail Count	0
Init Parameter Set Success Count	0
Init Parameter Set Fail Count	0
Device Reconfigure Count	1
Device Reparameterize Count	1
Ext Diag Overflow Count	0

Figure 8.25 – Device Status monitoring (PLX51-PBM Master mode) - Statistics



Counter	Value
Tx Packet Count	31,717,941
Rx Packet Count	31,717,941
Checksum Failed Packet Count	0
No Reply Count	0
DPV1 Class 1 Read Tx Count	0
DPV1 Class 1 Read Rx Count	0
DPV1 Class 1 Read Err Count	0
DPV1 Class 1 Write Tx Count	0
DPV1 Class 1 Write Rx Count	0
DPV1 Class 1 Write Err Count	0
DPV1 Class 2 Init Tx Count	0
DPV1 Class 2 Init Rx Count	0
DPV1 Class 2 Init Err Count	0
DPV1 Class 2 Abort Tx Count	0
DPV1 Class 2 Abort Rx Count	0
DPV1 Class 2 Read Tx Count	0
DPV1 Class 2 Read Rx Count	0
DPV1 Class 2 Read Err Count	0

Counter	Value
DPV1 Class 2 Write Tx Count	0
DPV1 Class 2 Write Rx Count	0
DPV1 Class 2 Write Err Count	0
Set Slave Addr Tx Count	0
Set Slave Addr Rx Count	0
Set Slave Addr Err Count	0
Global Ctrl Tx Count	0
Global Ctrl Rx Count	1,484,081
Unexpected Packet Received	0
Invalid Response Length Count	0
FDL Fault Count	17
Extract Alarm Success Count	0
Extract Alarm Fail Count	0
Init Parameter Set Success Count	0
Init Parameter Set Fail Count	0
Device Reconfigure Count	12
Device Reparameterize Count	12
Ext Diag Overflow Count	0

Figure 8.26 – Device Status monitoring (PLX51-PBM Slave mode) – Statistics

Table 8.9 - Device Status Monitoring – Statistics Tab

Parameter	Description
Tx Packet Count	The number of PROFIBUS packets transmitted.
Rx Packet Count	The number of PROFIBUS packets received.
Checksum Failed Packet Count	The number of PROFIBUS packets that had a failed checksum.
No Reply Count	The number of PROFIBUS requests from the PLX51-PBM (or DP Master if in Slave Mode) where the station did not respond.
DPV1 Class 1 Read Tx Count	The number of PROFIBUS DPV1 Class 1 Read requests sent from the PLX51-PBM to the specific device. PLX51-PBM Slave mode: The number of DPV1 Class 1 Read responses sent by the specific device.
DPV1 Class 1 Read Rx Count	The number of successful PROFIBUS DPV1 Class 1 Read responses received from the specific device. PLX51-PBM Slave mode: The number of DPV1 Class 1 Read requests received by the specific device.
DPV1 Class 1 Read Err Count	The number of failed PROFIBUS DPV1 Class 1 Read responses received from the specific device. (N/A for PLX51-PBM Slave mode)
DPV1 Class 1 Write Tx Count	The number of PROFIBUS DPV1 Class 1 Write requests sent from the PLX51-PBM to the specific device. PLX51-PBM Slave mode: The number of DPV1 Class 1 Write responses sent by the specific device.
DPV1 Class 1 Write Rx Count	The number of successful PROFIBUS DPV1 Class 1 Write responses received from the specific device. PLX51-PBM Slave mode: The number of DPV1 Class 1 Write requests received by the specific device.
DPV1 Class 1 Write Err Count	The number of failed PROFIBUS DPV1 Class 1 Write responses received from the specific device. (N/A for PLX51-PBM Slave mode)
DPV1 Class 2 Init Tx Count	(PLX51-PBM Master mode only) The number of PROFIBUS DPV1 Class 2 Initialize requests sent from the PLX51-PBM to the specific device.
DPV1 Class 2 Init Rx Count	(PLX51-PBM Master mode only) The number of successful PROFIBUS DPV1 Class 2 Initialize responses received from the specific device.
DPV1 Class 2 Init Err Count	(PLX51-PBM Master mode only) The number of failed PROFIBUS DPV1 Class 2 Initialize responses received from the specific device.
DPV1 Class 2 Abort Tx Count	(PLX51-PBM Master mode only) The number of PROFIBUS DPV1 Class 2 Abort requests sent from the PLX51-PBM to the specific device.
DPV1 Class 2 Abort Rx Count	(PLX51-PBM Master mode only) The number of PROFIBUS DPV1 Class 2 Abort messages received from the specific device.
DPV1 Class 2 Read Tx Count	(PLX51-PBM Master mode only) The number of PROFIBUS DPV1 Class 2 Read requests sent from the PLX51-PBM to the specific device.
DPV1 Class 2 Read Rx Count	(PLX51-PBM Master mode only) The number of successful PROFIBUS DPV1 Class 2 Read responses received from the specific device.
DPV1 Class 2 Read Err Count	(PLX51-PBM Master mode only) The number of failed PROFIBUS DPV1 Class 2 Read responses received from the specific device.
DPV1 Class 2 Write Tx Count	(PLX51-PBM Master mode only) The number of PROFIBUS DPV1 Class 2 Write requests sent from the PLX51-PBM to the specific device.

DPV1 Class 2 Write Rx Count	(PLX51-PBM Master mode only) The number of successful PROFIBUS DPV1 Class 2 Write responses received from the specific device.
DPV1 Class 2 Write Err Count	(PLX51-PBM Master mode only) The number of failed PROFIBUS DPV1 Class 2 Write responses received from the specific device.
Set Slave Addr Tx Count	(PLX51-PBM Master mode only) The number of PROFIBUS Set Slave Address requests sent from the PLX51-PBM to the specific device.
Set Slave Addr Rx Count	(PLX51-PBM Master mode only) The number of successful PROFIBUS Set Slave Address responses received from the specific device.
Set Slave Addr Err Count	(PLX51-PBM Master mode only) The number of failed PROFIBUS Set Slave Address responses received from the specific device.
Global Ctrl Tx Count	PLX51-PBM Master Mode: The number of PROFIBUS Global Control requests sent from the PLX51-PBM to the specific device. PLX51-PBM Slave Mode: The number of PROFIBUS Global Control responses sent by the specific slave device.
Global Ctrl Rx Count	PLX51-PBM Master Mode: The number of PROFIBUS Global Control requests received by the PLX51-PBM from the specific device. PLX51-PBM Slave Mode: The number of PROFIBUS Global Control requests received by the specific slave device.
Unexpected Packet Received	The number of times a response is received from the device that was not expected (e.g. incorrect response, response from a different node, etc.).
Invalid Response Length Count	The number of times a response is received from the device where the length is not correct (for example if the device is configured to provide 10 bytes of process data and only 5 bytes are returned during data exchange).
FDL Fault Count	The number of Data Link Layer function code faults received from the specific device.
Extract Alarm Success Count	The number of alarms that have successfully been extracted from the specific device.
Extract Alarm Fail Count	The number of alarms that have **not** successfully been extracted from the specific device. PLX51-PBM Slave mode: N/A
Initialize Parameter Set Success Count	The number of parameters that have successfully been set after the device has been configured for data exchange for the specific device.
Initialize Parameter Set Fail Count	The number of parameters that have failed to set after the device has been configured for DPV0 data exchange for the specific device.
Device Reconfigure Count	The number of times the device has been (re)configured for DPV0 data exchange.
Device Reparameterize Count	The number of times the device has been (re)parameterized for DPV0 data exchange.
Ext Diag Overflow Count	The number of times the device has returned diagnostics data that could not fit into a single PROFIBUS frame.

Standard Diagnostics

The Standard Diagnostics (PLX51-PBM Master mode only) tab displays the following general parameters:

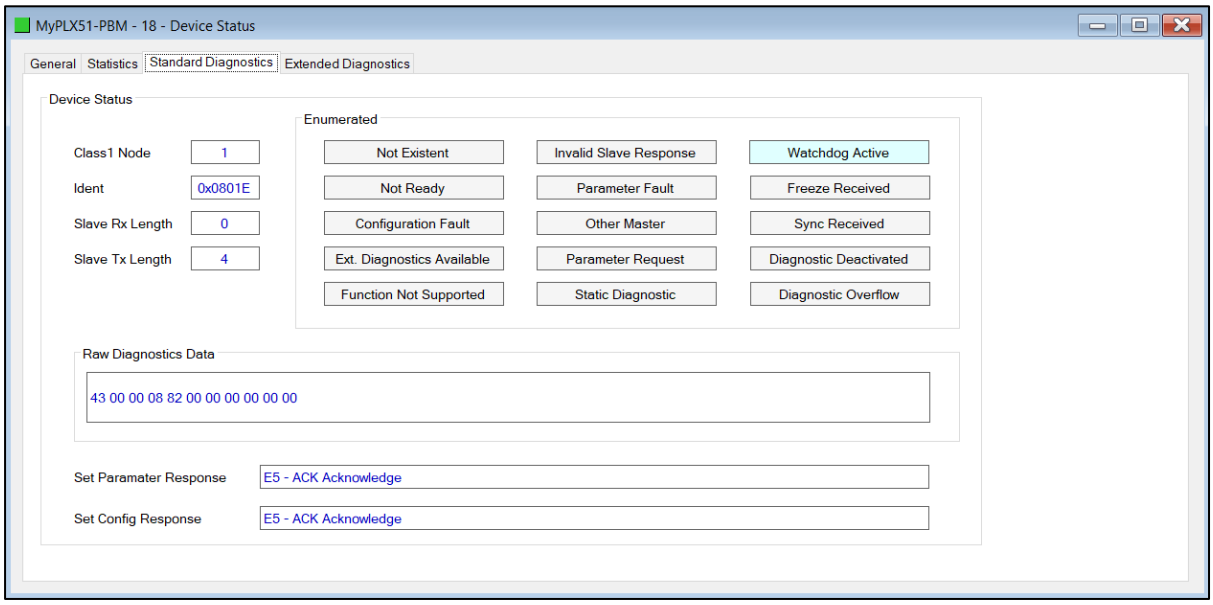


Figure 8.27 – Device Status monitoring – Standard Diagnostics

Table 8.10 - Device Status Monitoring – Standard Diagnostics Tab

Parameter	Description
Class 1 Node	The station address of the DP Master that configured the specific device for DPV0 communication.
Ident	The PNO Identification number of the device on the PROFIBUS network.
Slave Rx Length	The number of process data (DPV0) bytes expected from the device.
Slave Tx Length	The number of process data (DPV0) bytes that will be sent to the device.
Enumerated	Refer to the *PROFIBUS Specification EN 50170* for information regarding the diagnostics.
Raw Diagnostics Data	The raw diagnostics in a hexadecimal data string.
Set Parameter Response	This is the last response from the specific field device to the last set parameter telegram.
Set Config Response	This is the last response from the specific field device to the last check config telegram.

Extended Diagnostics

The Extended Diagnostics (PLX51-PBM Master mode only) are decoded and displayed in a table form. The diagnostics are decoded using the pre-configured GSD file.

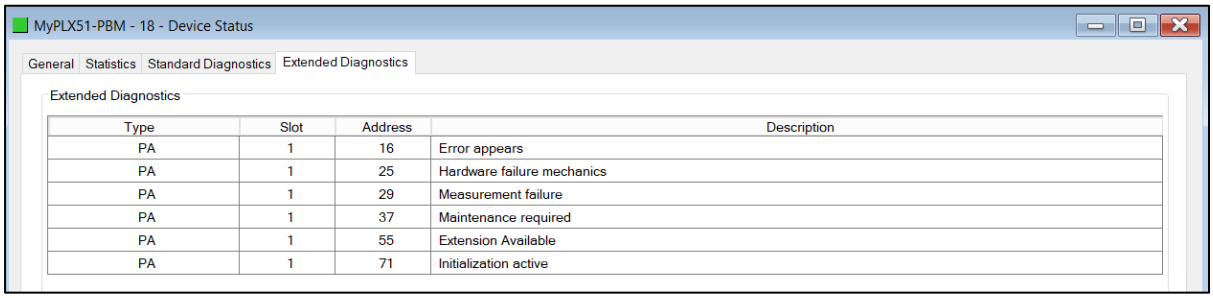


Figure 8.28 – Device Status monitoring – Extended Diagnostics

8.3 PROFIBUS Packet Capture

The module provides the capability to capture the PROFIBUS traffic for analysis. The will allow the user and the support team to view the packet stream. To invoke the capture of the module, double-click on the DP Packet Capture item in the Project Explorer tree.

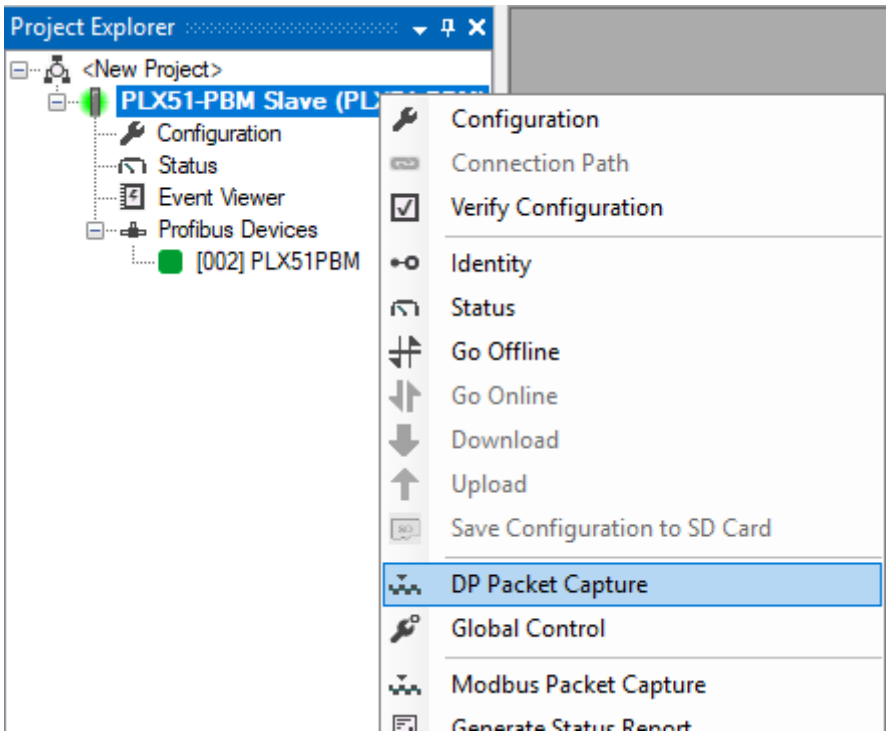


Figure 8.29 - Selecting PROFIBUS Packet Capture

The DP Packet Capture window will open and automatically start capturing all PROFIBUS packets.

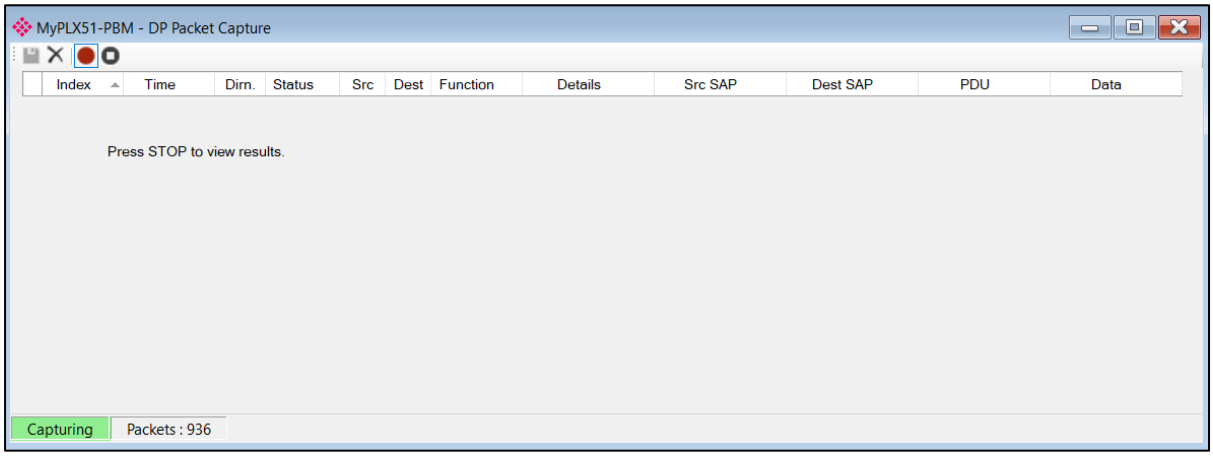
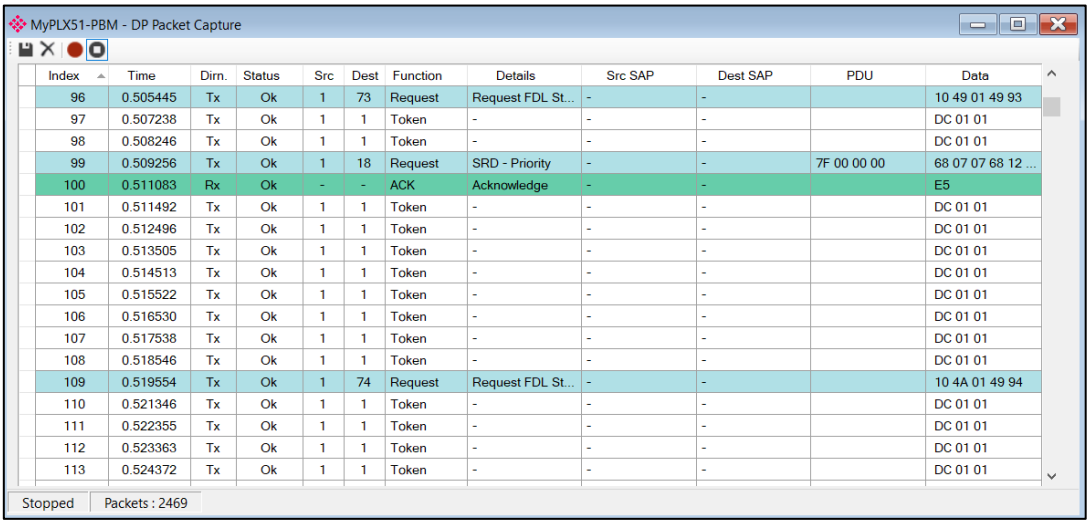


Figure 8.30 - PROFIBUS packet capture

NOTE: The module will capture packets until the user presses *Stop* or when 10,000 DP packets have been reached.

When the capture process is stopped then the PROFIBUS capture will be presented as shown below.



Index	Time	Dirn.	Status	Src	Dest	Function	Details	Src SAP	Dest SAP	PDU	Data
96	0.505445	Tx	Ok	1	73	Request	Request FDL St...	-	-		10 49 01 49 93
97	0.507238	Tx	Ok	1	1	Token	-	-	-		DC 01 01
98	0.508246	Tx	Ok	1	1	Token	-	-	-		DC 01 01
99	0.509256	Tx	Ok	1	18	Request	SRD - Priority	-	-	7F 00 00 00	68 07 07 68 12 ...
100	0.511083	Rx	Ok	-	-	ACK	Acknowledge	-	-		E5
101	0.511492	Tx	Ok	1	1	Token	-	-	-		DC 01 01
102	0.512496	Tx	Ok	1	1	Token	-	-	-		DC 01 01
103	0.513505	Tx	Ok	1	1	Token	-	-	-		DC 01 01
104	0.514513	Tx	Ok	1	1	Token	-	-	-		DC 01 01
105	0.515522	Tx	Ok	1	1	Token	-	-	-		DC 01 01
106	0.516530	Tx	Ok	1	1	Token	-	-	-		DC 01 01
107	0.517538	Tx	Ok	1	1	Token	-	-	-		DC 01 01
108	0.518546	Tx	Ok	1	1	Token	-	-	-		DC 01 01
109	0.519554	Tx	Ok	1	74	Request	Request FDL St...	-	-		10 4A 01 49 94
110	0.521346	Tx	Ok	1	1	Token	-	-	-		DC 01 01
111	0.522355	Tx	Ok	1	1	Token	-	-	-		DC 01 01
112	0.523363	Tx	Ok	1	1	Token	-	-	-		DC 01 01
113	0.524372	Tx	Ok	1	1	Token	-	-	-		DC 01 01

Figure 8.31 - PROFIBUS Packet Capture complete

The captured PROFIBUS packets are tabulated as follows:

Table 8.11 - PROFIBUS Packet Capture fields

Statistic	Description
Index	The packet index incremented for each packet sent or received.
Time	The time is measured in microseconds (us) and is started at a fraction of a second and continued until the packet capture is done.
Dirn.	The direction of the packet, either transmitted (Tx) or received (Rx).
Status	The status of the packet. Received packets are checked for valid PROFIBUS constructs and valid checksums.
Src	PROFIBUS node address of the message source.
Dest	PROFIBUS node address of the message destination.
Function	The PROFIBUS function (e.g. Token, Request, etc.)
Details	Additional details associated with the PROFIBUS command/function.
Src SAP	The source Service Access Point (SAP) when used.
Dest SAP	The destination Service Access Point (SAP) when used.
PDU	The PROFIBUS packet payload.
Data	The packet's raw data displayed in space delimited hex.

The packet capture can be saved to a file for further analysis, by selecting the Save button on the toolbar. Previously saved PROFIBUS Packet Capture files can be viewed by selecting the *PROFIBUS Packet Capture Viewer* option in the tools menu.

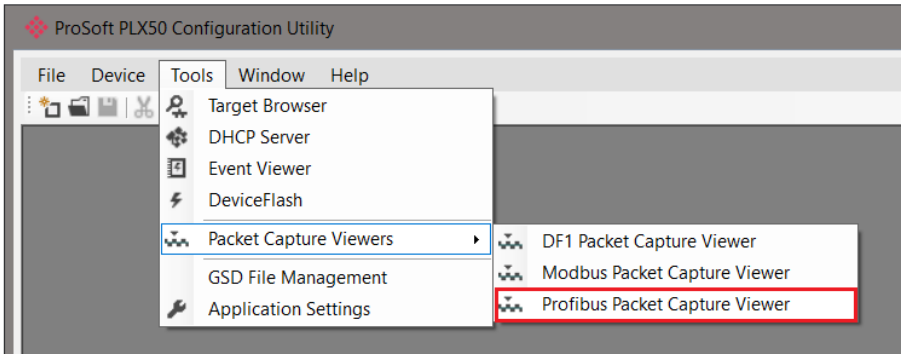


Figure 8.32 - Selecting the PROFIBUS Packet Capture Viewer

8.4 Modbus Packet Capture

The PLX51-PBM allows you to capture the Modbus traffic for analysis.

1 To invoke the capture of the module, right-click on the *PLX51-PBM* icon and double-click on the **MODBUS PACKET CAPTURE** item in the Project Explorer tree.

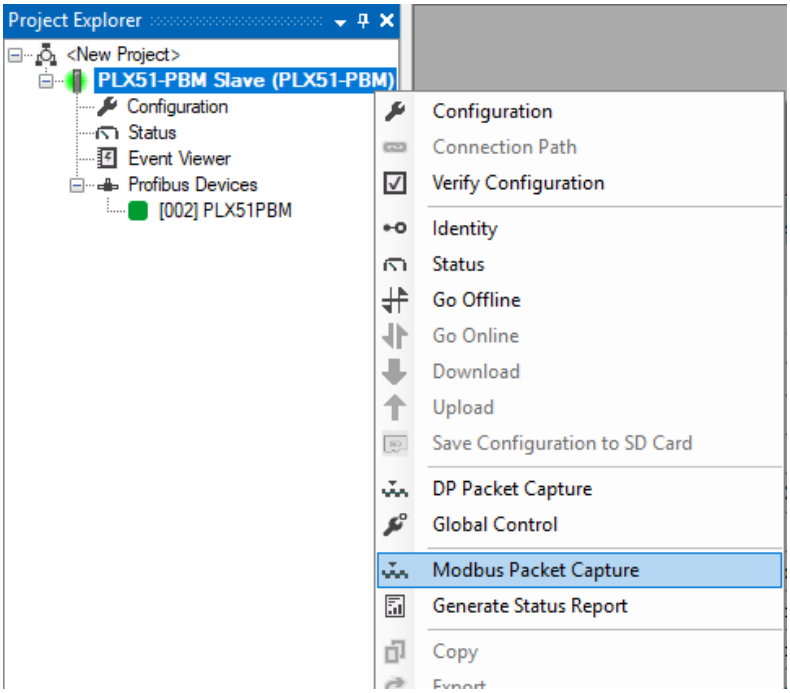


Figure 8.33 - Selecting Modbus Packet Capture

2 The *DP Packet Capture* window opens and automatically starts capturing all Modbus packets.

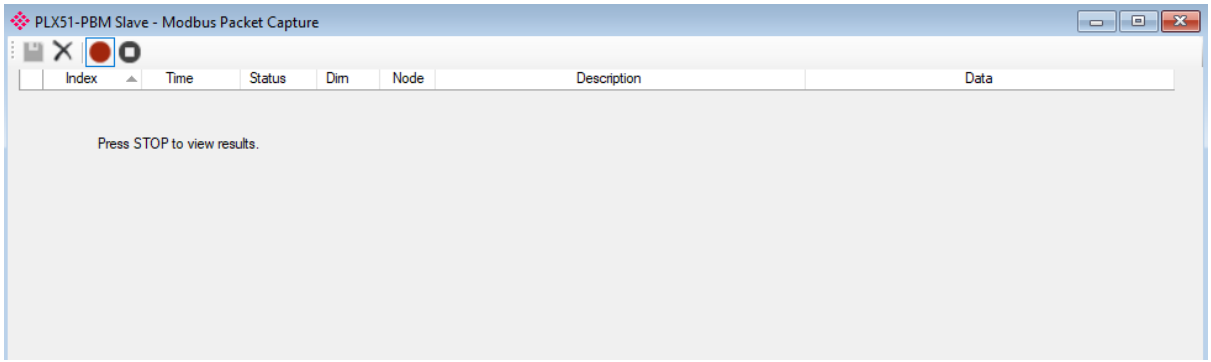


Figure 8.34 - Modbus packet capture

NOTE: The module captures packets until you press the **STOP** button**.** If the packet capture reaches ~10,000 packets, it will automatically store the capture into a file, and will keep doing so for every 10,000 packets.

3 When the capture process is stopped, the Modbus capture is presented as shown below. It will keep capturing until you press **STOP**.

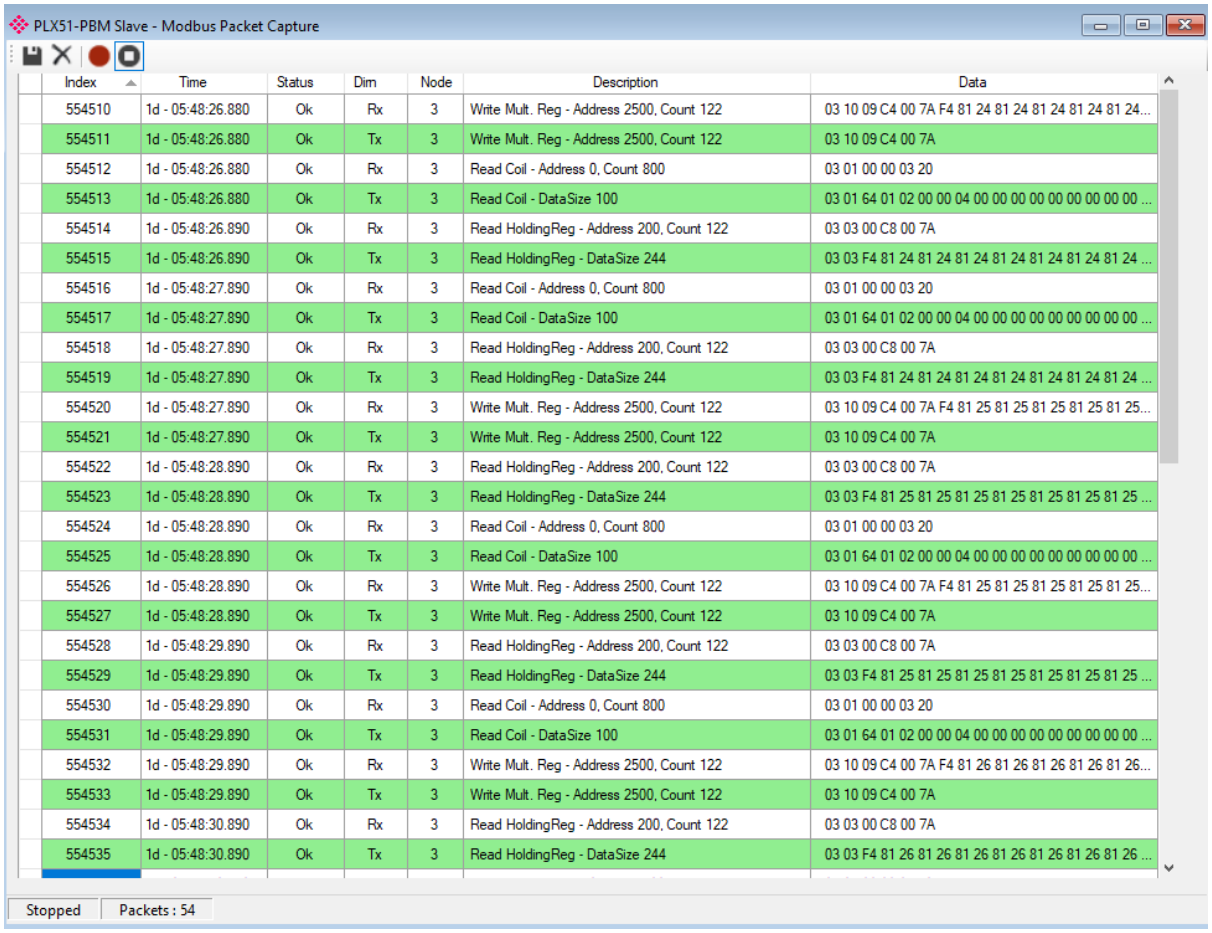


Figure 8.35 - Modbus Packet Capture complete

The captured Modbus values are tabulated as follows:

Table 8.12 – Captured Modbus values

Statistic	Description
Index	The packet index incremented for each packet sent or received.
Time	The time is started at a fraction of a second and continued until the packet capture is done. Time is based off the Up Time of the module.
Status	The status of the packet. Packets are checked for valid Modbus constructs and valid checksums.
Dirn.	The direction of the packet, either transmitted (Tx) or received (Rx).
Node	Modbus Slave ID
Description	Modbus Function Code, Database starting address, Count
Data	Modbus message construction, in HEX format.

8.5 Module Event Log

The PLX51-PBM module logs various diagnostic records to an internal event log. These logs are stored in non-volatile memory and can be displayed using the PLX50 Configuration Utility or via the web interface. To view them in the PLX50 Configuration Utility, select the Event Viewer option in the Project Explorer tree.

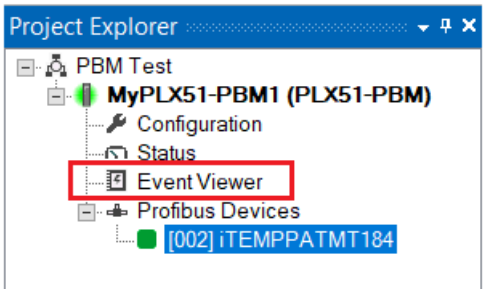
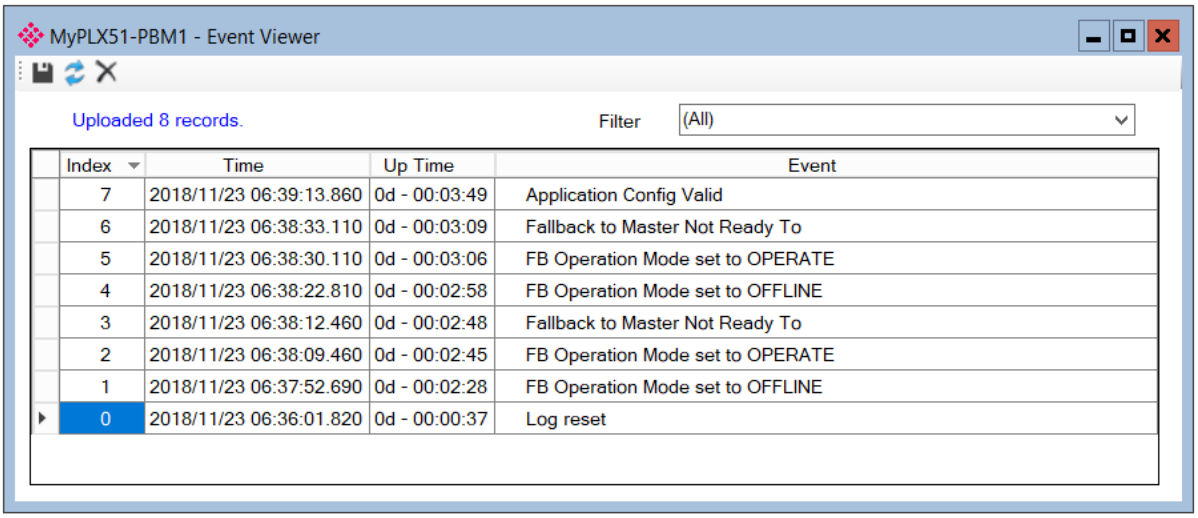


Figure 8.36. - Selecting the module Event Log

The Event Log window will open and automatically read all the events from the module. The log entries are sorted so as to have the latest record at the top. Custom sorting is achieved by double-clicking on the column headings.



Index	Time	Up Time	Event
7	2018/11/23 06:39:13.860	0d - 00:03:49	Application Config Valid
6	2018/11/23 06:38:33.110	0d - 00:03:09	Fallback to Master Not Ready To
5	2018/11/23 06:38:30.110	0d - 00:03:06	FB Operation Mode set to OPERATE
4	2018/11/23 06:38:22.810	0d - 00:02:58	FB Operation Mode set to OFFLINE
3	2018/11/23 06:38:12.460	0d - 00:02:48	Fallback to Master Not Ready To
2	2018/11/23 06:38:09.460	0d - 00:02:45	FB Operation Mode set to OPERATE
1	2018/11/23 06:37:52.690	0d - 00:02:28	FB Operation Mode set to OFFLINE
0	2018/11/23 06:36:01.820	0d - 00:00:37	Log reset

Figure 8.37. – Module Event Log

The log can also be stored to a file for future analysis, by selecting the Save button in the tool menu.

To view previously saved files, use the Event Log Viewer option under the Tools menu.

8.6 Web Server

The PLX51-PBM provides a web server allowing a user without the PLX50 Configuration Utility, Logix, or Modbus device to view various diagnostics of the module.

NOTE: The web server is view **only** and thus no parameters or configuration can be altered from the web interface.

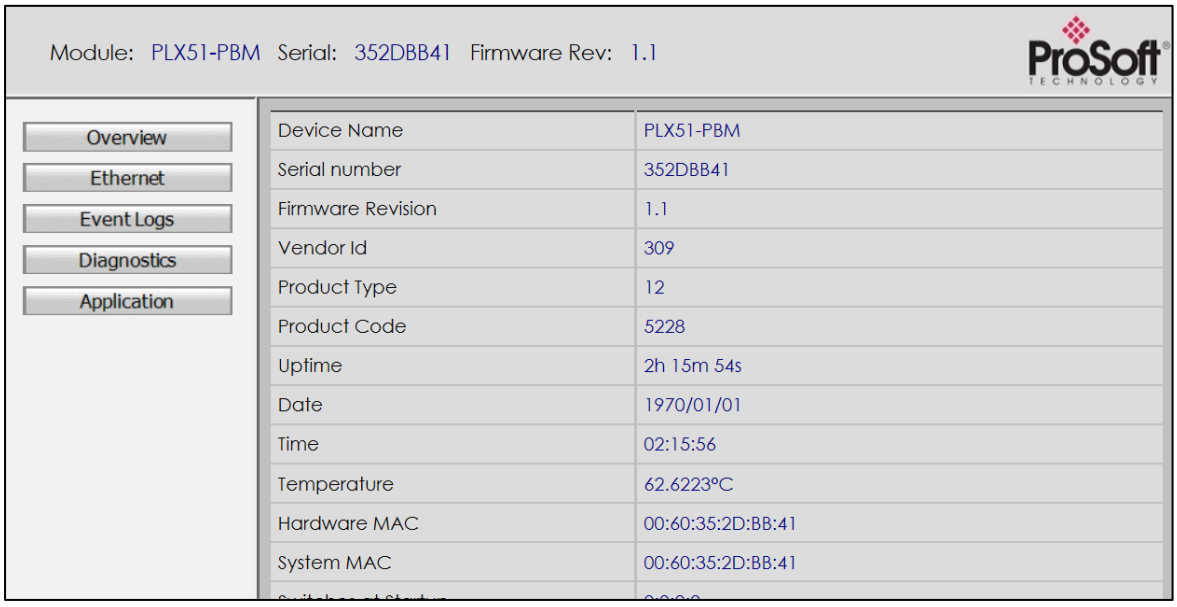


Figure 8.38 - Web interface

NOTE: The parameters and diagnostics in the webserver will match those in the PLX50 Configuration Utility status monitoring of the PLX51-PBM.

9 Technical Specifications

9.1 Dimensions

Below are the enclosure dimensions. All dimensions are in millimeters.

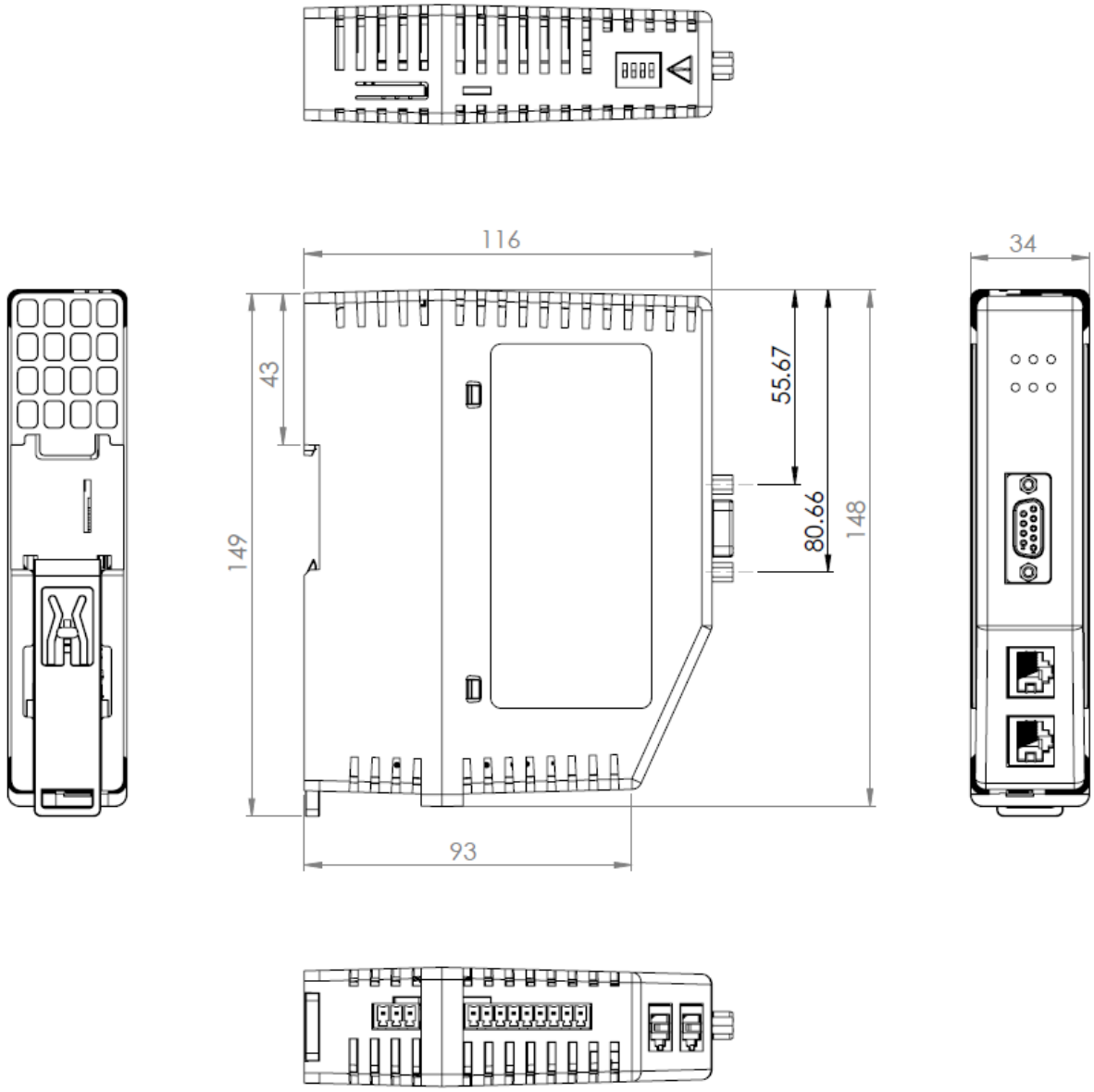


Figure 9.1 – PLX51-PBM enclosure dimensions

9.2 Electrical

Table 9.1 - Electrical specification

Specification	Rating
Power requirements	Input: 10 – 36V DC
Power consumption	Maximum: 85mA @ 24V => 2.04W
Connector	3-way terminal
Conductors	24 – 18 AWG
Enclosure rating	IP20, NEMA/UL Open Type
Temperature	-20 – 70 °C
Earth connection	Yes, terminal based
Emissions	IEC61000-6-4
ESD Immunity	EN 61000-4-2
Radiated RF Immunity	IEC 61000-4-3
EFT/B Immunity	EFT: IEC 61000-4-4
Surge Immunity	Surge: IEC 61000-4-5
Conducted RF Immunity	IEC 61000-4-6

9.3 EtherNet/IP

Table 9.2 - Ethernet specification

Specification	Rating
Connector	RJ45
Conductors	CAT5 STP/UTP
ARP connections	Max 40
TCP connections	Max 40
CIP connections	Max 10
Communication rate	10/100Mbps
Duplex mode	Full/Half
Auto-MDIX support	Yes
Embedded switch	Yes, 2 x Ethernet ports

9.4 Modbus TCP/IP

Table 9.3 – Modbus TCP/IP specification

Specification	Rating
Mode	Client or Server
Connector	RJ45
Conductors	CAT5 STP/UTP
ARP connections	Max 40: 20 Client, 20 Server
Communication rate	10/100Mbps
Duplex mode	Full / Half / Auto Negotiate
Auto-MDIX support	Yes

9.5 PROFIBUS DP

Table 9.4 – PROFIBUS DP specification

Specification	Rating
Connector	Female DB9 connector
Conductor	See *PROFIBUS DP* Section.
DP Master Mode Support	DPV0 Data Exchange DPV1 Class 1 Messaging DPV1 Class 2 Messaging DPV1 Alarming
DP Slave Mode Support	DPV0 Data Exchange DPV1 Class 1 Messaging DPV1 Alarming
Isolated	Yes
BAUD Rate supported	9.6 kbps 19.2 kbps 45.45 kbps 93.75 kbps 187.5 kbps 500 kbps 1.5 Mbps 3 Mbps 6 Mbps 12 Mbps

9.6 Certifications

Please visit our website: www.prosoft-technology.com

10 PROFIBUS DP

10.1 Introduction

PROFIBUS is a vendor-independent, open fieldbus standard for a wide range of applications in manufacturing, process and building automation. Vendor independence and openness are guaranteed by the PROFIBUS standard EN 50 170. With PROFIBUS, devices of different manufacturers can communicate without special interface adjustments. PROFIBUS can be used for both high-speed time critical data transmission and extensive complex communication tasks. The PROFIBUS family consists of three compatible versions.

10.1.1 PROFIBUS DP

Optimized for high speed and inexpensive hookup, this PROFIBUS version is designed especially for communication between automation control systems and distributed I/O at the device level. PROFIBUS-DP can be used to replace parallel signal transmission with 24 V or 4-20 mA.

Table 9.1 – PROFIBUS Protocol (OSI model)

OSI Layer		PROFIBUS		
7	Application	DPV0	DPV1	DPV2
6	Presentation			
5	Session			
4	Transport			
3	Network			
2	Data Link	FDL		
1	Physical	EIA-485	Optical	MBP

To utilize these functions, various service levels of the DP protocol were defined:

- DP-V0 provides the basic functionality of DP, including
  - cyclic data exchange,
  - station, module and channel-specific diagnostics
- DP-V1 contains enhancements geared towards process automation, in particular
  - acyclic data communication for parameter assignment
  - alarm handling
- DP-V2 for isochronous mode and data exchange broadcast (slave-to-slave communication)

10.1.2 PROFIBUS PA

PROFIBUS PA is designed especially for process automation. It permits sensors and actuators to be connected on one common bus line through a dedicated DP/PA gateway or link between the PROFIBUS DP and PROFIBUS PA networks, even in intrinsically-safe areas. PROFIBUS PA permits data communication and power over the bus using a 2-wire technology according to the international standard IEC 1158-2.

10.1.3 PROFIBUS FMS

PROFIBUS FMS is the general-purpose solution for communication tasks at the cell level. Powerful FMS services open up a wide range of applications and provide great flexibility. PROFIBUS FMS can also be used for extensive and complex communication tasks. This protocol is the first developed for PROFIBUS, but it is no longer currently used.

PROFIBUS specifies the technical and functional characteristics of a serial fieldbus system with which decentralized digital controllers can be networked together from the field level to the cell level.

10.2 PROFIBUS Master and Slave

PROFIBUS distinguishes between master devices and slave devices.

Master devices determine the data communication on the bus. A master can send messages without an external request when it holds the bus access rights (the token). Masters are also called '**active stations**' in the PROFIBUS protocol.

Slave devices are peripheral devices. Typical slave devices include input/output devices, valves, drives and measuring transmitters. They do not have bus access rights and they can only acknowledge received messages or send messages to the master when requested to do so. Slaves are also called '**passive stations**'.

10.3 PROFIBUS Master Class 1 (DPM1) or class 2 (DPM2)

10.3.1 PROFIBUS DP Master class 1 (DPM1)

A class 1 master handles the normal communication or exchange of data with the slaves assigned to it. This is typically a PLC.

It uses **cyclic communication** to exchange process data with its associated slaves. The class 1 master sets the baud rate and the slave's auto-detect this rate. Each slave device is assigned to one master and only that master may write output data to that slave. Other masters may read information from any slave but can only write output data to their own assigned slaves.

10.3.2 PROFIBUS DP Master class 2 (DPM2)

A class 2 master is a special device primarily used for commissioning slaves and for diagnostic purposes. This is typically a Supervisor. It uses **acyclic communication** over what is known as the **MS2 channel**. A DPM2 does not have to be permanently connected to the bus system.

10.4 Cyclic Communication

The DP master class 1 cyclically exchanges data with all of the slaves assigned to it. This service is configured. During the configuration process, master and slave addresses are assigned, the bus parameters are defined, the types and numbers of modules (in the case of modular slaves) are specified, user-selectable parameter choices are made, etc.

Before data exchange can take place, the master will send parameterization and configuration telegrams to all of its assigned slaves. These parameters and configuration data are checked by the slaves. If both are valid, the master will initiate cyclic I/O data communication with the slave devices.

10.5 Acyclic Communication

In addition to the cyclic data exchange, the PROFIBUS protocol has the option of acyclic communication. This service is not configured. There are 2 different communication channels possible between the requested master and the slave:

- **MS1 channel** (MS1 connection): can only be established if cyclic data exchange is taking place between that master (DPM1) and the slave
- **MS2 channel** (MS2 connection): is possible with several masters simultaneously, but the connection must be established explicitly by the master.

Acyclic reading and writing of data requires an established MS1 or MS2 connection.

For the MS1 channel, 3 conditions must be satisfied:

- The slave device must support the MS1 channel (key *C1_Read_Write_supp* at 1 in the GSD file)
- The DPV1_enable bit must be set during the parameter assignment
- Data exchange is taking place

For the MS2 channel, the connection must be explicitly initiated by the master. The maximum number of possible MS2 connections to the slave must not be reached. The connection can be closed by either the master or the slave device.

10.6 Topology of PROFIBUS DP

PROFIBUS devices are connected in a bus structure. Up to 32 stations (master or slaves) can be connected in one segment. The bus is terminated by an active bus terminator at the beginning and end of each segment. Both bus terminations must always be powered. When more than 32 stations are used, repeaters (line amplifiers) must be used to connect the individual bus segments.

10.7 PROFIBUS DP Cable Description

Only one type of cable can be used for PROFIBUS network:

Table 9.2 – PROFIBUS DP network cable

Parameter	Type A
Surge Impedance	135 to 165Ω (3 to 20 MHz)
Capacity	<30 pF/m
Loop Resistance	<110 Ω/km
Wire gauge	>0.64 mm
Conductor area	>0.34 mm²

The maximum cable length depends on the transmission speed and cable type. The specified cable length can be increased using the repeaters. The use of more than 3 repeaters in series is not recommended.

Table 9.3 – PROFIBUS DP cable length

Baudrate (kbps)	9.6	19.2	93.75	187.5	500	1500	3000-12000
Length A (m)	1200	1200	1200	1000	400	200	100

10.8 PROFIBUS DP Connector Description

Table 9.4 – PROFIBUS DP connector

DB9 Pin Description	DB9 Pin#	DB9 Termination with PLX51-PBM
Chassis ground	1	
Reserved	2	
Data+ / B	3	In case of termination connect this pin to Pin 8 (Data - / A) with 220 ohm resistor
Tx enable	4	
Isolated ground	5	Connect this pin to Pin 8 (Data - / A) with 390 ohm resistor
Voltage plus	6	Connect this pin to Pin 3 (Data + / B) with 390 ohm resistor
Reserved	7	
Data- / A	8	
Reserved	9	

11 Appendix

11.1 DPV1 Response Status (Master Only)

Table 11.1 – DP Status Response codes

DP Status	Description
00h	Successful
05h	FDL error (see extended error code)
06h	DPV1 Error (see extended error code)
07h	Another command is already in progress for this slave / class 2 connection.
11h	Online state expected
13h	Invalid slave response
17h	Timeout passed

11.2 DPV1 Extended Status Codes (Master Only) – FDL Error

Table 11.2 – DP Extended Status Response codes (FDL Error)

DP Status – Byte 0	Description
0h	OK
1h	User error, SAP locked
2h	No resource for sending data, tried to send to SAP that was not configured
3h	No service available (SAP does not exist)
4h	Access point blocked

NOTE: With an FDL Error, Extended Status bytes 2 and 3 will be zero.

11.3 DPV1 Extended Status Codes (Master Only) – DPV1 Error

11.3.1 DPV1 Read/Write Error

DPV1 Extended Status - Byte 1

Table 11.3 – DP Extended Status Response codes (DPV1 Error) – Byte 1

Value	Description
0 to 127	Reserved
128	DPV1
129 to 253	Reserved
254	PROFIBUS FMS
255	N/A

DPV1 Extended Status - Byte 2

Table 11.4 – DP Extended Status Response codes (DPV1 Error) – Byte 2

Bit 4 to 7 Value	Bit 0 to 3 Value	Description
0 to 9	-	Reserved
10	-	Application
	0	Read Error
	1	Write Error
	2	Module Failure
	3 - 7	Reserved
	8	Version Conflict
	9	Feature not supported
	10 - 15	User Specific
11	-	Access
	0	Invalid Index
	1	Write length error
	2	Invalid Slot
	3	Type conflict
	4	Invalid area
	5	State conflict
	6	Access Denied
	7	Invalid range
	8	Invalid parameter
	9	Invalid type
	10 - 15	User specific
12	-	Resource
	0	Read constrain conflict
	1	Write constrain conflict
	2	Resource busy
	3	Resource unavailble
	4 – 7	Reserved
	8 - 15	User specific
13 to 15	-	User specific

NOTE: With a DPV1 Read/Write Error, Extended Status Byte 3 will be manufacturer specific.

11.3.2 DPV1 Abort

DPV1 Extended Status - Byte 1 - Subnet

Table 11.5 – DP Extended Status Response codes (DPV1 Error) – Byte 1 – Subnet

Value	Description
0	No Subnet
1	Local Subnet
2	Remote Subnet
3 to 255	Reserved

DPV1 Extended Status - Byte 2 – Instance/Reason

Table 11.6 – DP Extended Status Response codes (DPV1 Error) – Byte 2 – Instance/Reason

Value	Description
Bit 6 to 7	Reserved
Bit 4 to 5	00 – FDL 01 – MSAC_C2 10 – User 11 – Reserved
Bit 0 to 3	See EN 50170 Part 2

12 Support, Service & Warranty

12.1 Contacting Technical Support

ProSoft Technology, Inc. is committed to providing the most efficient and effective support possible. Before calling, please gather the following information to assist in expediting this process:

- Product Version Number
- System architecture
- Network details

If the issue is hardware related, we will also need information regarding:

- Module configuration and associated ladder files, if any
- Module operation and any unusual behavior
- Configuration/Debug status information
- LED patterns
- Details about the interfaced serial, Ethernet or Fieldbus devices

Note: For technical support calls within the United States, ProSoft Technology's 24/7 after-hours phone support is available for urgent plant-down issues.

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12.2 Warranty Information

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