ProSoft TECHNOLOGY

Where Automation Connects.

ILX56-PBM

PROFIBUS DPV1 Master/Slave

ControlLogix® Platform

February 19, 2024

USER MANUAL

Your Feedback Please

We always want you to feel that you made the right decision to use our products. If you have suggestions, comments, compliments or complaints about our products, documentation, or support, please write or call us.

ProSoft Technology, Inc.
+1 (661) 716-5100
+1 (661) 716-5101 (Fax)
www.prosoft-technology.com
support@prosoft-technology.com

ILX56-PBM User Manual
For Public Use.

February 19, 2024

Content Disclaimer

This documentation is not intended as a substitute for and is not to be used for determining suitability or reliability of these products for specific user applications. It is the duty of any such user or integrator to perform the appropriate and complete risk analysis, evaluation and testing of the products with respect to the relevant specific application or use thereof. Neither ProSoft Technology nor any of its affiliates or subsidiaries shall be responsible or liable for misuse of the information contained herein. Information in this document including illustrations, specifications and dimensions may contain technical inaccuracies or typographical errors. ProSoft Technology makes no warranty or representation as to its accuracy and assumes no liability for and reserves the right to correct such inaccuracies or errors at any time without notice. If you have any suggestions for improvements or amendments or have found errors in this publication, please notify us.

No part of this document may be reproduced in any form or by any means, electronic or mechanical, including photocopying, without express written permission of ProSoft Technology. All pertinent state, regional, and local safety regulations must be observed when installing and using this product. For reasons of safety and to help ensure compliance with documented system data, only the manufacturer should perform repairs to components. When devices are used for applications with technical safety requirements, the relevant instructions must be followed. Failure to use ProSoft Technology software or approved software with our hardware products may result in injury, harm, or improper operating results. Failure to observe this information can result in injury or equipment damage.

For professional users in the European Union

If you wish to discard electrical and electronic equipment (EEE), please contact your dealer or supplier for further information.

Warning – Cancer and Reproductive Harm – www.P65Warnings.ca.gov

Agency Approvals and Certifications

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

Contents

1 Preface

1.1 Introduction to the ILX56-PBM

This manual describes the installation, operation, and diagnostics of the ProSoft ILX56-PBM PROFIBUS DPV0/DPV1 Master/Slave module.

The ILX56-PBM slots into a 1756 ControlLogix backplane and allows the user to interface PROFIBUS DP to a ControlLogix controller via the ControlLogix backplane.

The ILX56-PBM can either operate as a PROFIBUS DPV0/DPV1 Master or multiple PROFIBUS DPV0/DPV1 Slaves. This will allow a ControlLogix controller 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 Variation

Product	PROFIBUS DP Master	PROFIBUS DP Slave
ILX56-PBM	Yes	Yes

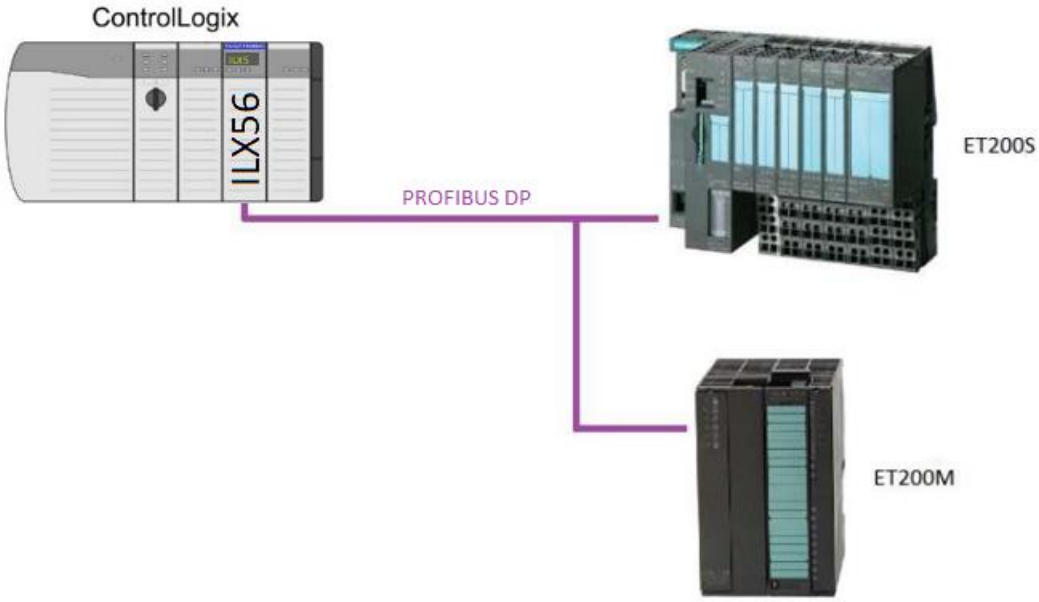


Figure 1.1 – ILX56-PBM typical PROFIBUS Master architecture

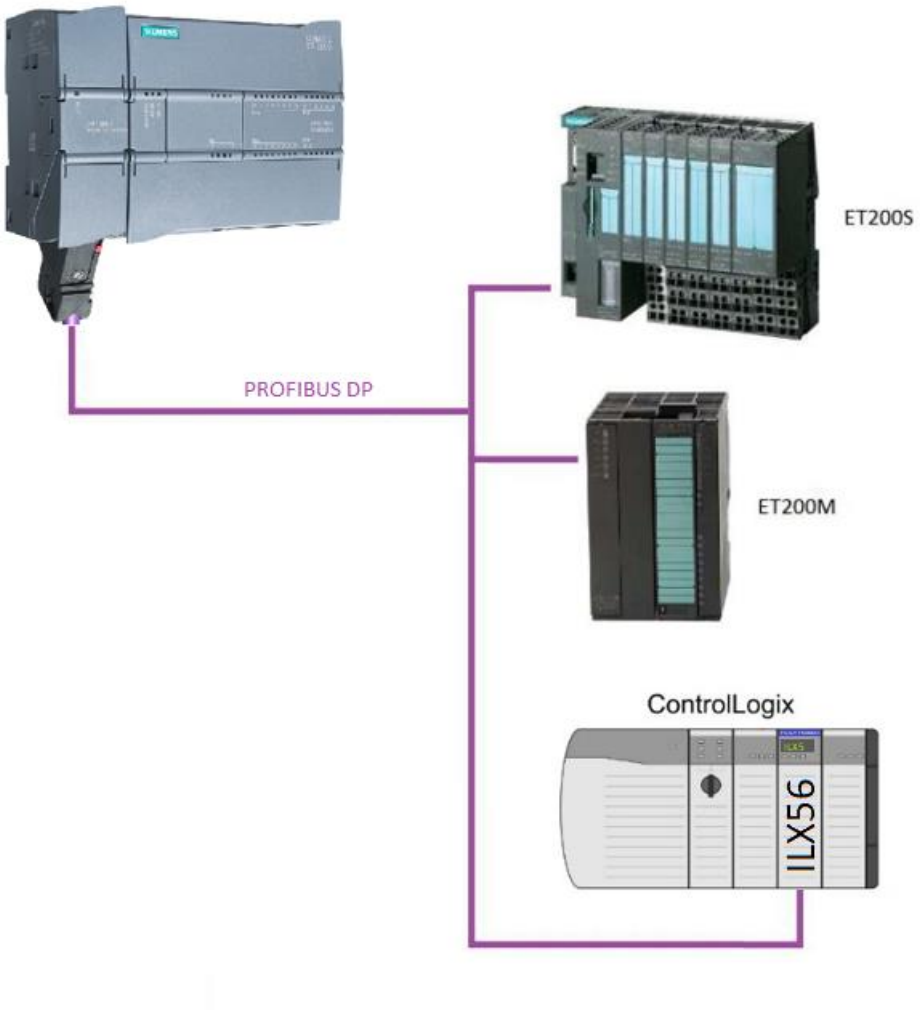


Figure 1.2 – ILX56-PBM typical PROFIBUS Slave architecture

1.2 Features

The ILX56-PBM, when configured as a Master can exchange up to 5000 bytes of PROFIBUS device and status data.

1.2.1 ILX56-PBM PROFIBUS Master

The ILX56-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 a ControlLogix platform by using the automatically generated mapping imports for Logix User Defined Data Types (UDTs). The latter ensures alignment with the 16-bit / 32-bit data structures.

The ILX56-PBM also provides DPV1 communication allowing the user to exchange DPV1 Class 1 and Class 2 data with each slave device. The ILX56-PBM Gateway DTM can be used to configure and parameterize each slave device using Device Type Manager (DTM) technology.

The ILX56-PBM will allow the user to monitor and extract DPV1 alarms from each slave device on the connected PROFIBUS DP fieldbus from a ControlLogix controller.

1.2.2 ILX56-PBM PROFIBUS Slave

The ILX56-PBM in slave mode can also be configured to emulate up to 10 PROFIBUS slave devices. Each slave device emulated by the ILX56-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 a ControlLogix platform by using the automatically generated mapping imports for Logix User Defined Data Types (UDTs). The latter ensures alignment with the 16-bit / 32-bit data structures.

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

The ILX56-PBM provides a range of statistics and tools to provide a detailed diagnostic overview emulated slave, 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 analyze the bus behavior and packets received. The ILX56-PBM also provides global and device specific statistics.

1.3 Architecture

The figure below provides an example of the typical network setup for a ILX56-PBM PROFIBUS Master architecture.

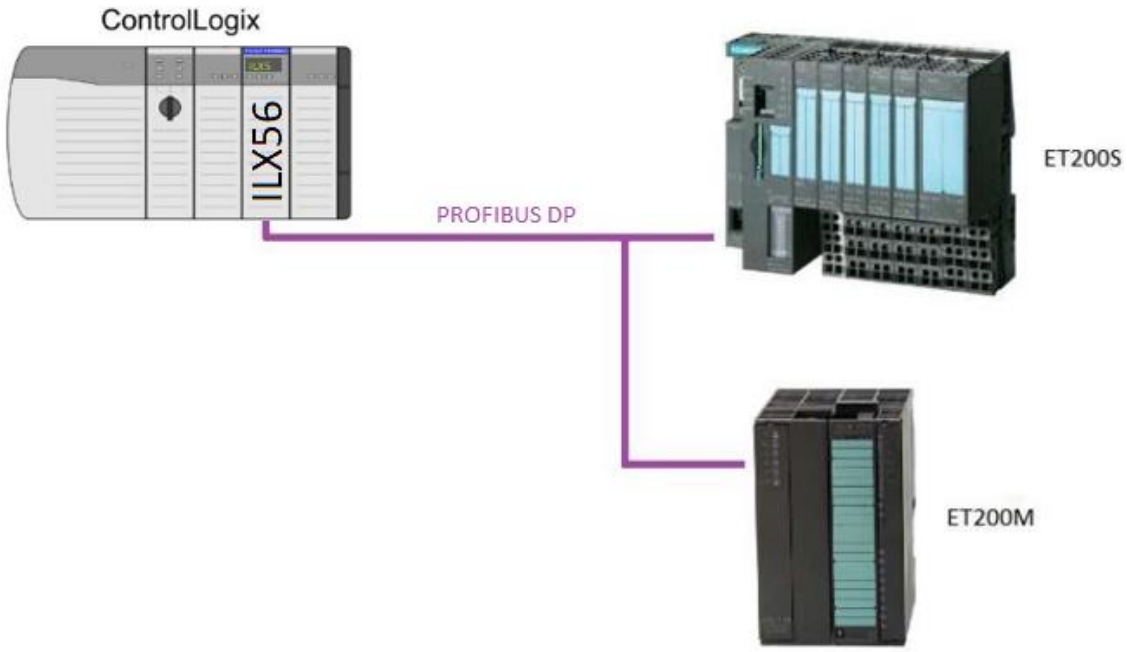


Figure 1.3 – ILX56-PBM as a PROFIBUS Master

The following figure provides an example of the typical network setup for a ILX56-PBM (as a PROFIBUS Slave) architecture.

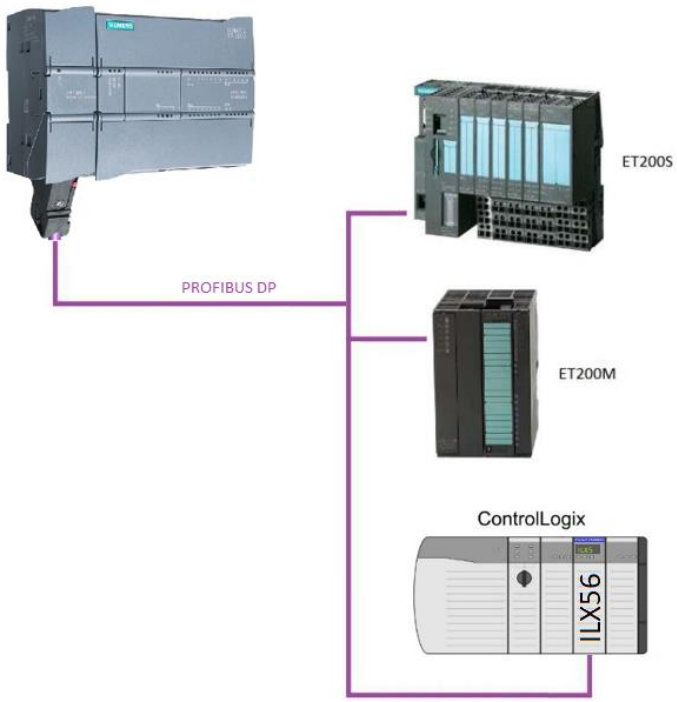


Figure 1.4 – ILX56-PBM as a PROFIBUS Slave

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
ILX56-PBM User Manual ILX56-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	www.prosoft-technology.com
Support email	support@prosoft-technology.com

1.6 Quickstart

For a Quickstart guide to configure the ILX56-PBM as a PROFIBUS Master to communicate with an ET200M PROFIBUS Slave, please see ILX56-PBM Quickstart on page 153.

2 Installation

2.1 Module Layout

The ILX56-PBM has one RS485 PROFIBUS DP port at the front of the module.

Note: All required power for the module is derived from the ControlLogix backplane.

The module provides 3 diagnostic LEDs and a 4-character alpha-numeric LED display. The LED display provides the mode and status of the module.

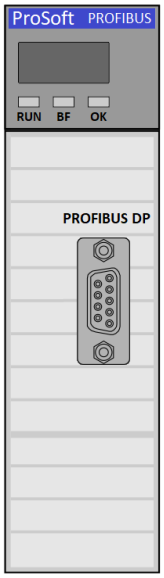


Figure 2.1 – ILX56-PBM front view

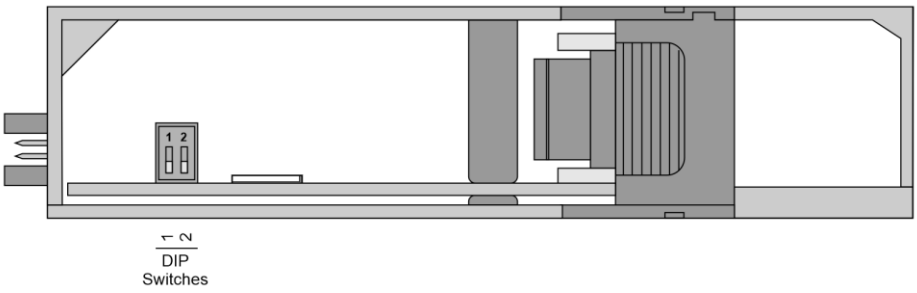


Figure 2.2 – ILX56-PBM bottom view

Located at the bottom of the module, there are two DIP switches and a SD memory card slot. These switches can only be accessed when the module is removed from the ControlLogix chassis.

Table 2.1. - DIP Switch Settings

DIP Switch	Description
DIP Switch 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 Switch 2	Used to prevent changes to the configuration.

2.2 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.

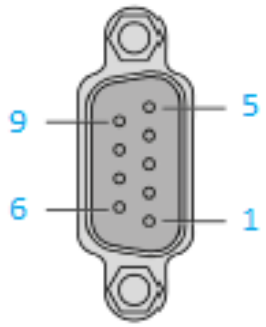


Figure 2.3 – ILX56-PBM PROFIBUS DP (RS485) DB9 connector

Table 2.2 – DB9 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

This section of the document will walk you through the set up process needed to use the ILX56-PBM module properly.

3.1 Install Configuration Software

The network setup and configuration of the module is done in 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 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 ILX56-PBM.

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

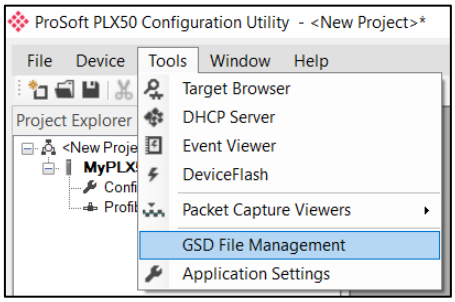


Figure 3.2 – Launching the GSD File Management Tool

2 Once the tool has been opened, a list of slave devices registered with their GSD files is displayed.

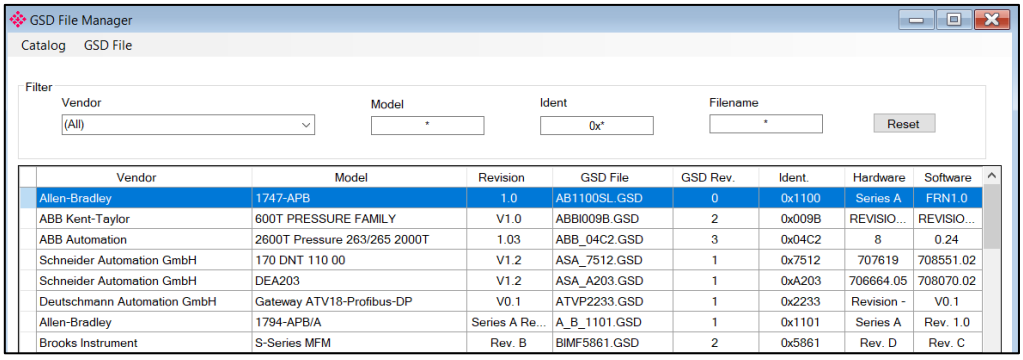


Figure 3.3 – GSD File Management Tool

3 To add a GSD file, select the *Add* option under the GSD File menu.

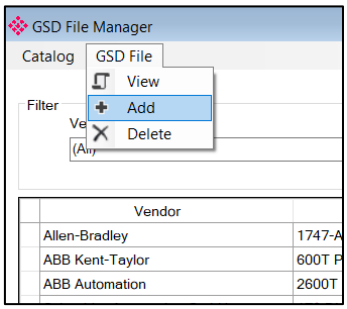


Figure 3.4 – GSD File Adding

4 Select the GSD file and click Open.

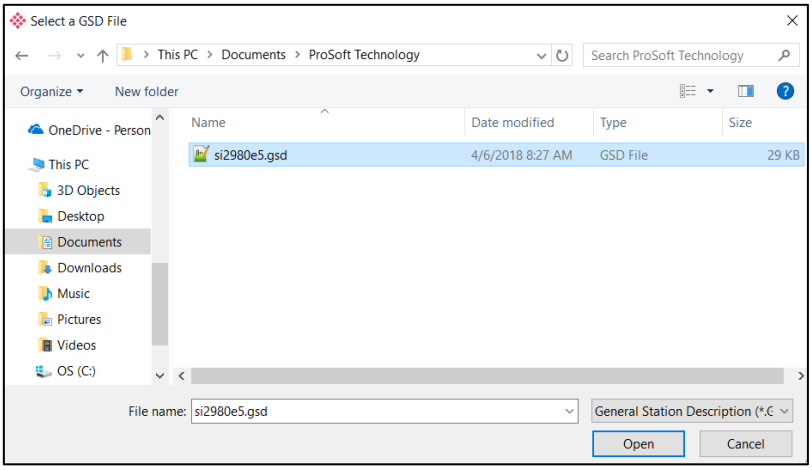


Figure 3.5 – GSD File Adding

5 The GSD File Management tool will add the slave device to the device list and recompile the GSD catalog.

6 A GSD catalog can be exported from one PLX50 Configuration Utility and imported into another PLX50 Configuration Utility on a different laptop. This is done by selecting the *Export* option under the Catalog menu in one Utility, then selecting the *Import* option in the other Utility.

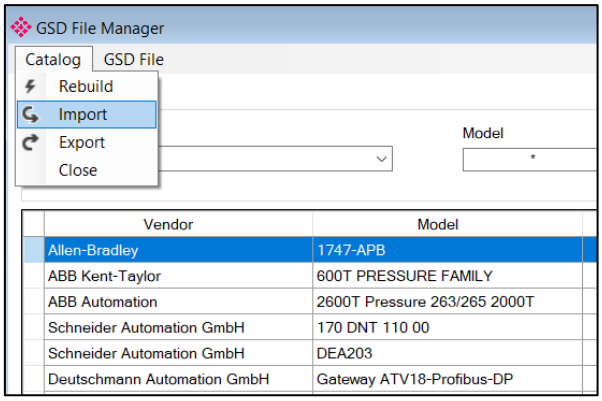


Figure 3.6 – GSD Catalog importing

3.3 Creating a New Project

Before the user can configure the module, a new PLX50 Configuration Utility project must be created.

1 Under the File menu, select New. A PLX50 Configuration Utility Design Tool project will be created, showing the Project Explorer tree view.

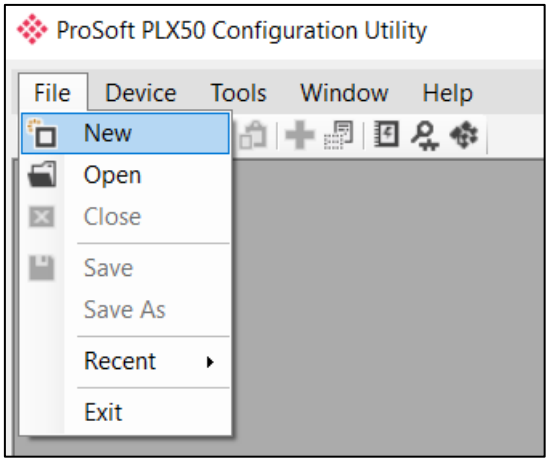


Figure 3.7 - Creating a new project

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

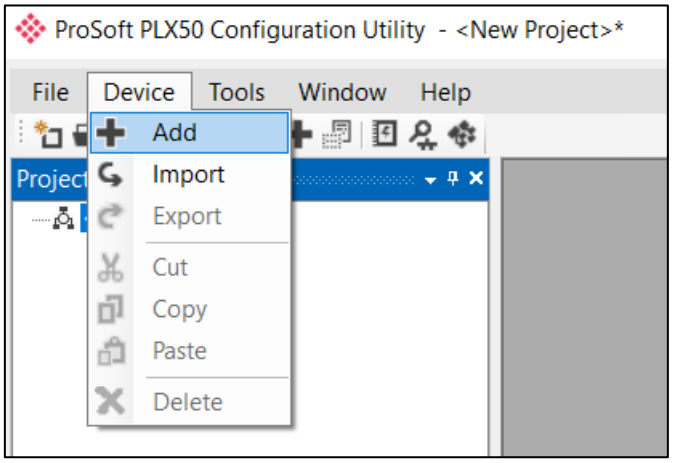


Figure 3.8 - Adding a new device

3 In the Add New Device window select either the ILX56-PBM and click the Ok button.

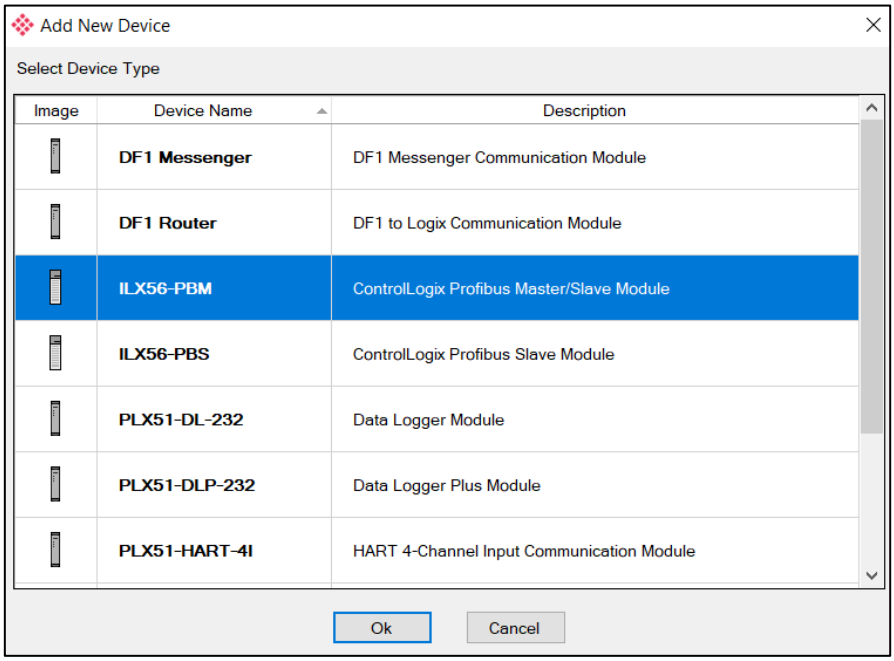
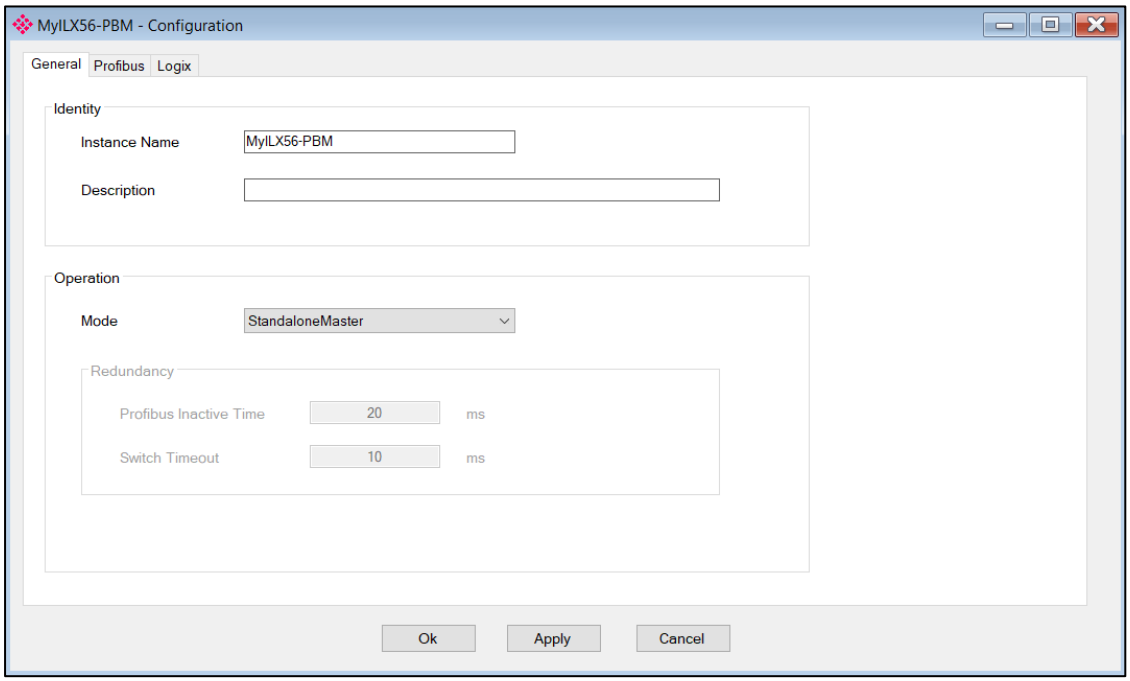


Figure 3.9 – ILX56-PBM

4 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*.



3.4 Copying and Moving a Project

The ProSoft fdt Configuration Manager software does not have a **Save As** option. This section explains how to copy and move a project.

1 The project Name, Location, and Solution Name are all defined when creating a new project.

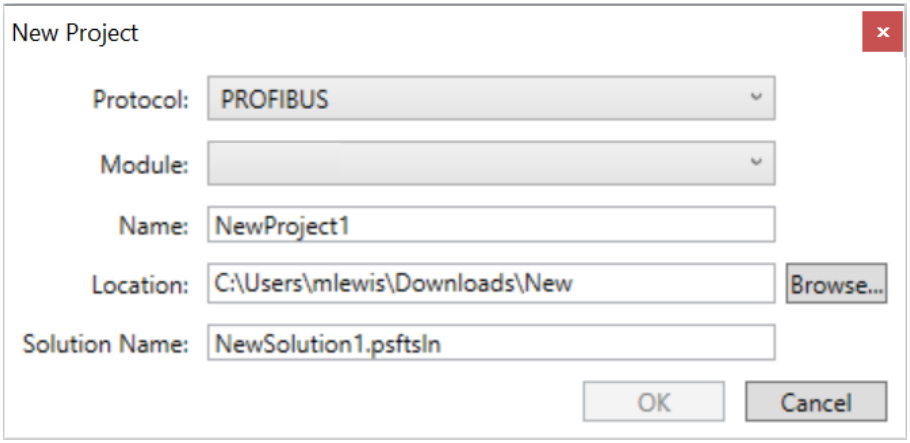


Figure 3.10 – Creating a new project

2 Browse to the folder location where the project was created/saved in.

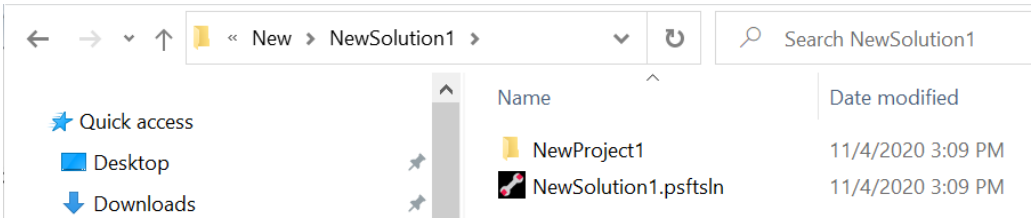


Figure 3.11 – Project location

3 The user can rename the solution file, but cannot rename the project folder or any files within the folder.

4 The user can now copy or move the solution file and project folder to another location or PC.

3.5 ILX56-PBM Parameters

The ILX56-PBM parameters will be configured by the PLX50 Configuration Utility.

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

3.5.1 General

The General configuration is shown in the following figure. The ILX56-PBM General configuration window is opened by either double-clicking on the module in the tree, or right-clicking the module and selecting *Configuration*.

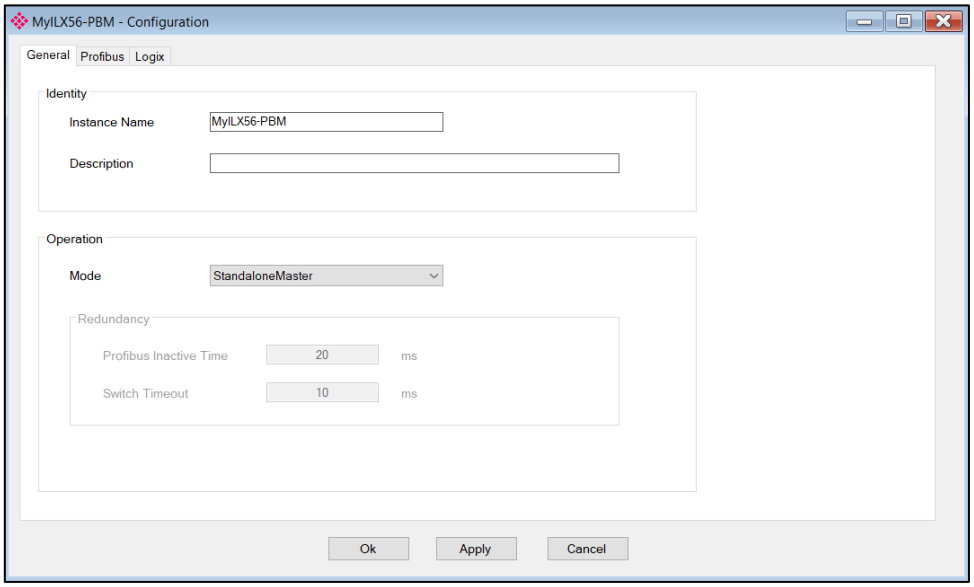


Figure 3.12 – ILX56-PBM General configuration

The General configuration consists of the following parameters:

Table 3.1 - General configuration parameters

Parameter	Description
Instance Name	User defined name to identify between various ILX56-PBM modules.
Description	Used to provide a more detail description of the application for the module.
Mode	The ILX56-PBM can operate in one of three modes: **Quiet** This mode allows the user to connect the ILX56-PBM to an active bus and run a DP packet capture. In this mode the ILX56-PBM will not communicate on the DP Bus but rather only listen. **Standalone Master** The ILX56-PBM is the standalone DP Master on the PROFIBUS network. **Redundant Master** The ILX56-PBM is the redundant DP Master on the PROFIBUS network. **Slave** The ILX56-PBM will emulate multiple PROFIBUS Slave devices.

3.5.2 PROFIBUS – Master Mode

The ILX56-PBM PROFIBUS Master configuration is shown in the following figure. The Configuration window is opened by either double-clicking on the module icon in the tree, or right-clicking the module icon and selecting *Configuration*.

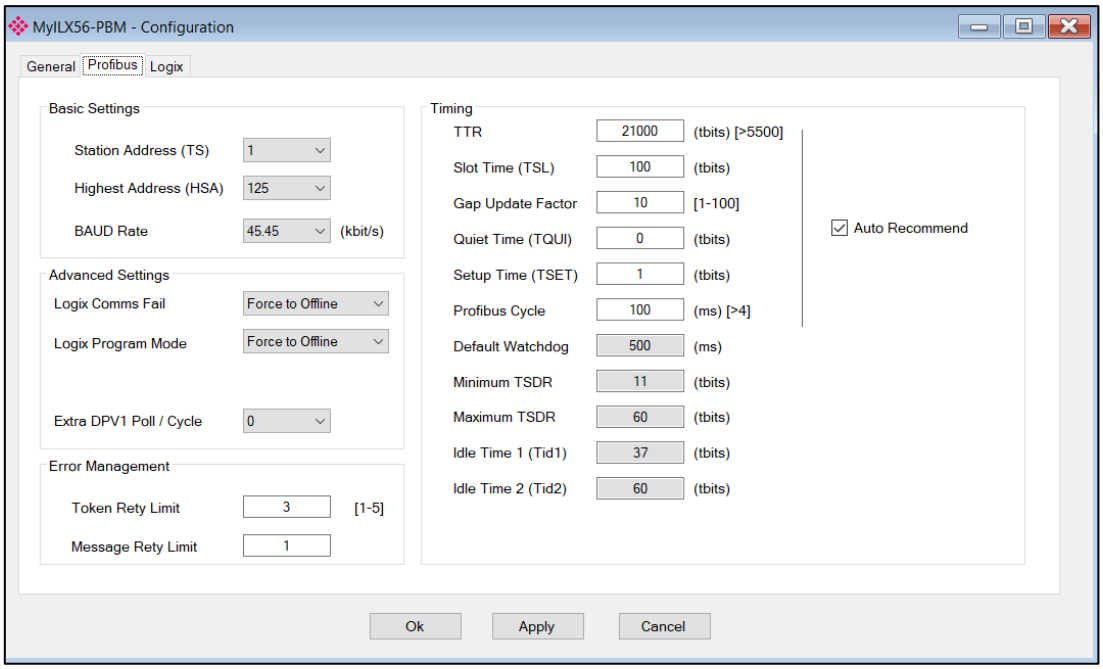


Figure 3.13 – ILX56-PBM PROFIBUS configuration – Master Mode

The PROFIBUS configuration consists of the following parameters:

Table 3.2 - PROFIBUS configuration parameters

Parameter	Description
Basic Settings	
Station Address (TS)	**PROFIBUS Station Address** for the ILX56-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
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.
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: 1 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: 1 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 ILX56-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.

3.5.3 PROFIBUS – Slave Mode

The PROFIBUS configuration (in Slave Mode) is shown in the following figure. The ILX56-PBM PROFIBUS configuration window is opened by either double-clicking on the module icon in the tree, or right-clicking the module icon and selecting *Configuration*.

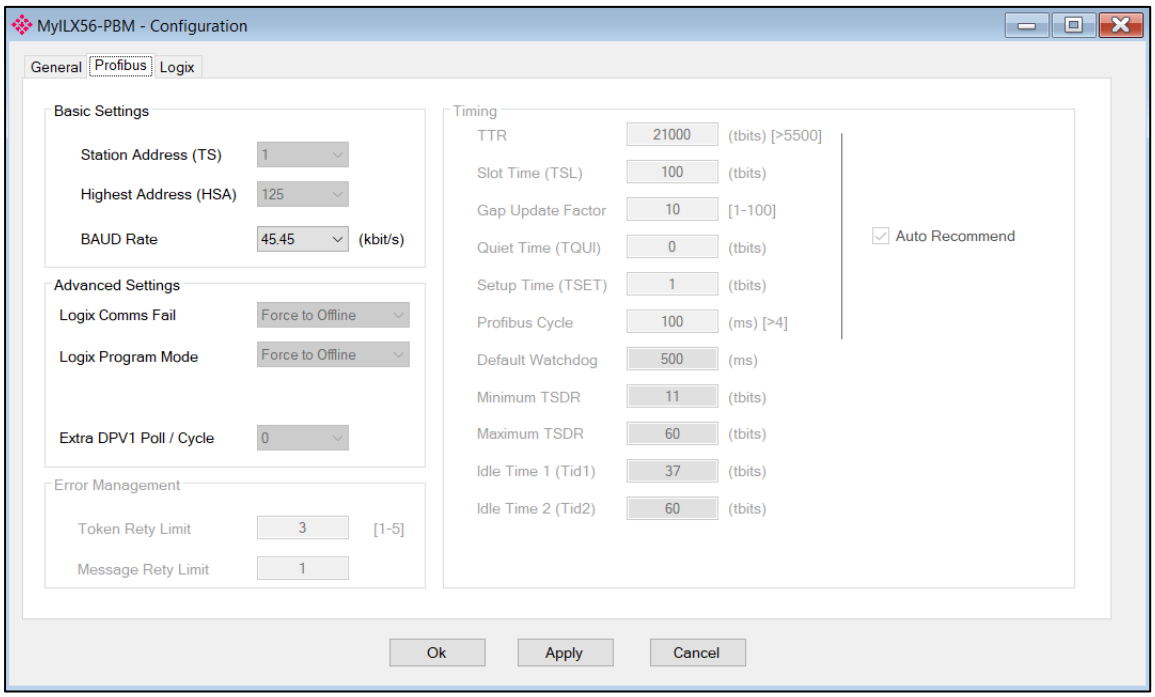


Figure 3.14 – ILX56-PBM PROFIBUS configuration – Slave Mode

The PROFIBUS configuration consists of the following parameters:

Table 3.3 - 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 “PROFIBUS DP” on page 146.

3.5.4 Logix

The Logix configuration is shown in the following figure. The ILX56-PBM Logix configuration window is opened by either double-clicking on the module icon in the tree, or right-clicking the module icon and selecting *Configuration*.

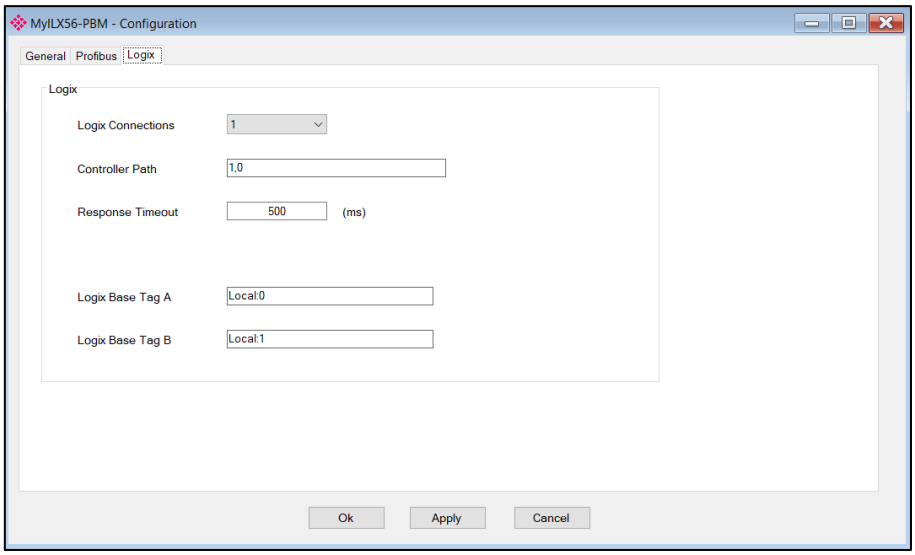


Figure 3.15 – ILX56-PBM Logix configuration

The Logix configuration consists of the following parameters:

Table 3.4 - Logix configuration parameters

Parameter	Description
Logix Connections	Master mode: 1 to 11 Logix (CIP) connections Slave mode: 1 to 10 Logix (CIP) connections Each backplane connection is configured with 500 bytes Output, 496 bytes Input, and 0 byte configuration. **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 entered manually.
Response Timeout	The maximum time (ms) allowed for a Class 3 response from the Logix controller.
Logix Base Tag A/B	This is the tagname of the ILX56-PBM used for the input and output assembly. For example, if the module is in the local slot connected to a Logix controller the base Logix tag will be Local:x (where x is the slot number). The base tagname is used when generating the Logix L5X file which will automatically map the required data. In a Standalone Master or Slave configuration only Logix Base Tag A will be relevant. In a Redundant Master configuration Logix Base Tag A and B will be for each of the redundant Master pair.

3.6 Module Download

Once the ILX56-PBM configuration has been completed, it must be downloaded to the module. The configured CIP path 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.

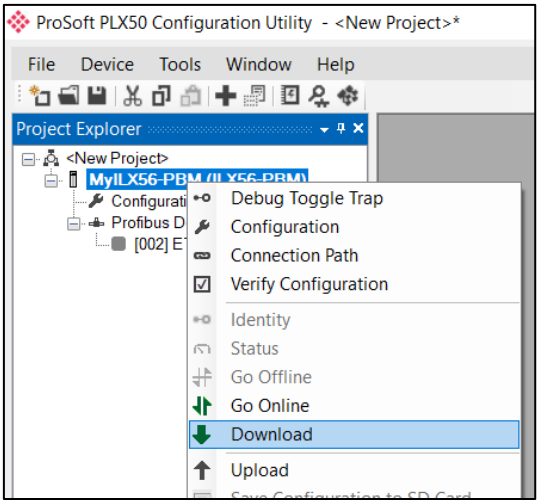


Figure 3.16 - Selecting Download

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

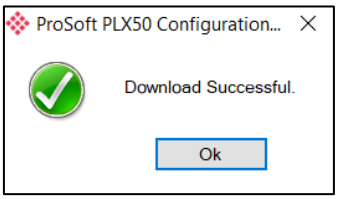


Figure 3.17 - Successful download

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.

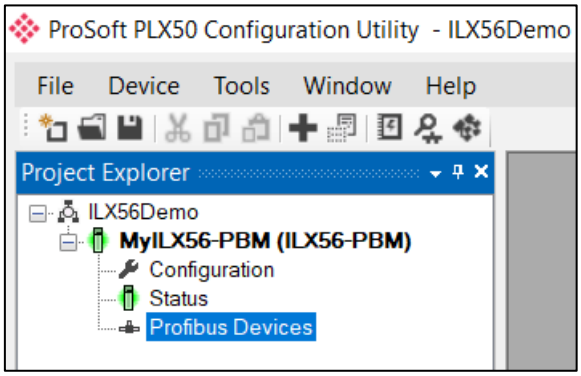


Figure 3.18 - Module online

3.7 Device Discovery (Online) – Master Mode

Once online with the ILX56-PBM in the PLX50 Configuration Utility the user will be able to scan the PROFIBUS network for slave devices.

Important: The ILX56-PBM must be in the Operational State to discover nodes on the PROFIBUS network. The ILX56-PBM and PROFIBUS devices must have matching PROFIBUS parameters (e.g. BAUD rate).

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 ILX56-PBM status window.

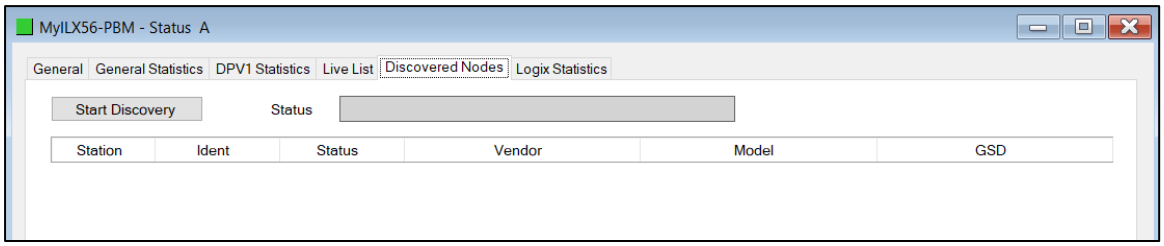


Figure 3.19 –Device Discovery

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.

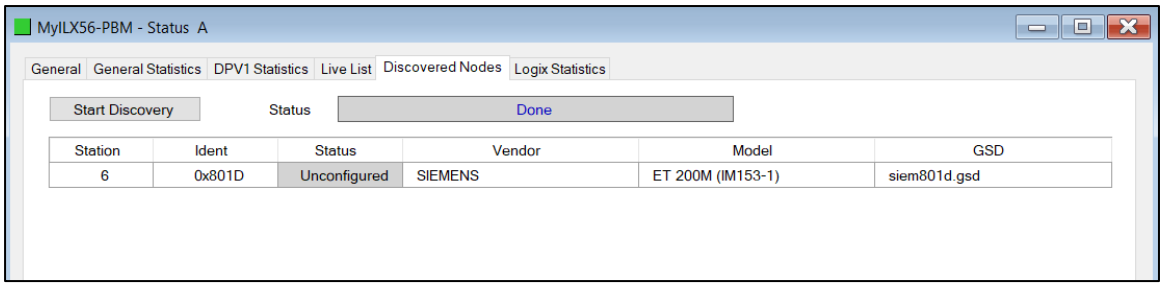


Figure 3.20 –Devices Found

If a device has been found that is not currently in the ILX56-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 ILX56-PBM configuration.

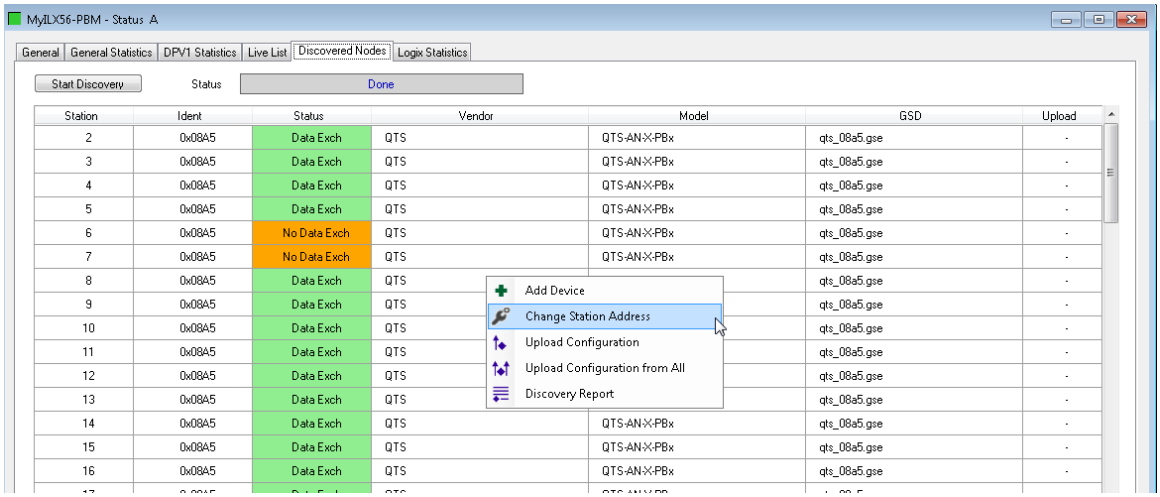


Figure 3.21 – Adding the Field Devices Found

The user will need to select the GSD file to add the device to the ILX56-PBM configured device list.

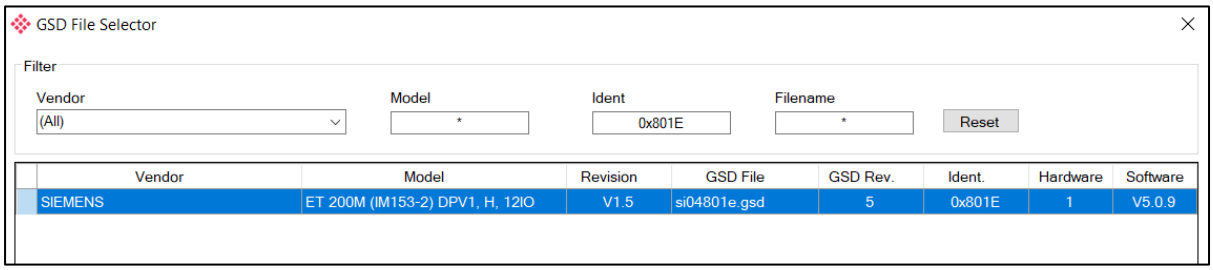


Figure 3.22 – Selecting the GSD for the slave device

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.

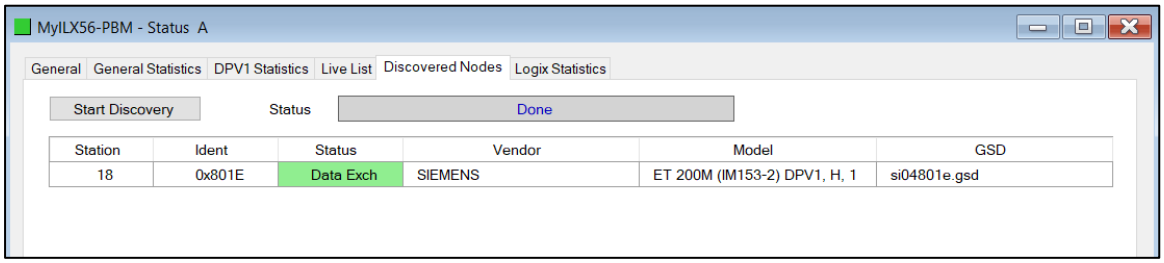


Figure 3.23 – Discovering running devices

3.7.2 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*.

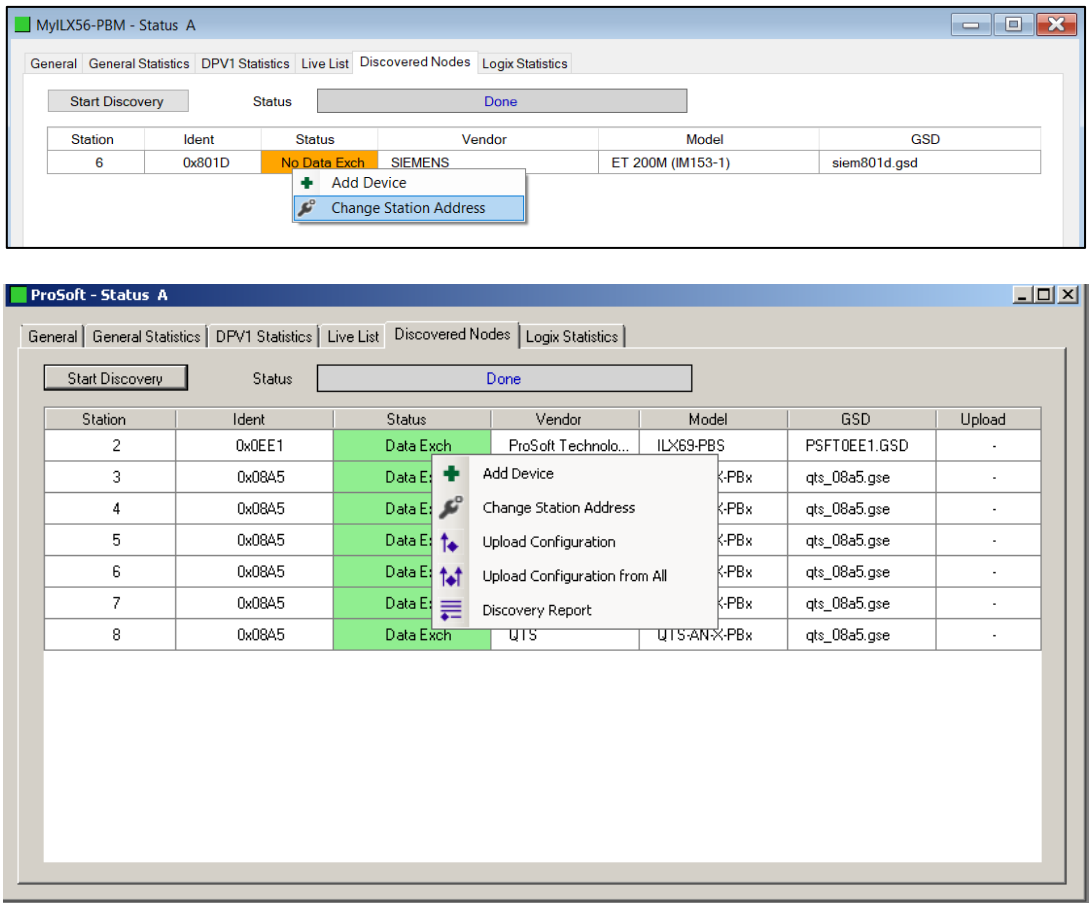


Figure 3.24 – Changing Station Address

Next, select the new station address for the device. Once selected press the Set button.

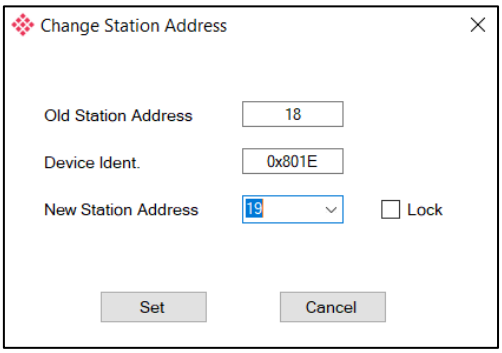


Figure 3.25 – Selecting new Station Address.

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).

3.8 Adding PROFIBUS DP Devices – Master Mode

The user will need to add each PROFIBUS device to the ILX56-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*.

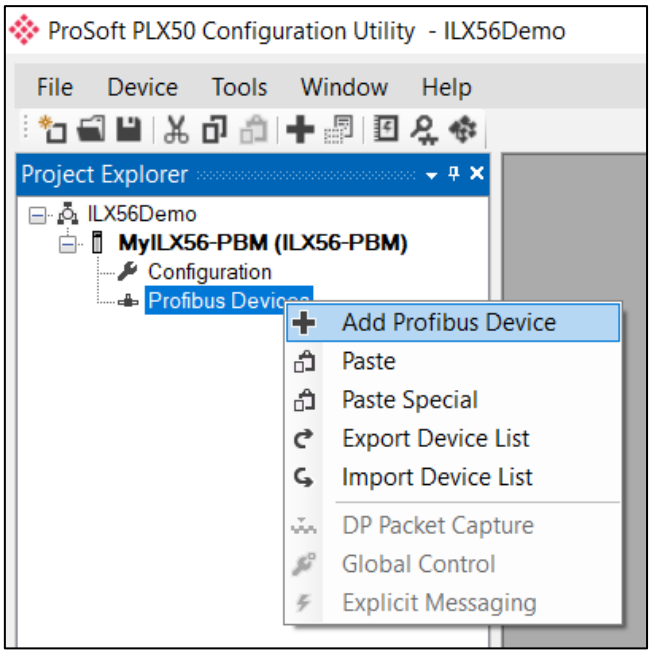


Figure 3.26 – Adding a PROFIBUS Field Device

Next the user will need to select the device to be added to the ILX56-PBM. This is done by selecting the device from the GSD File Selector and pressing *Ok*.

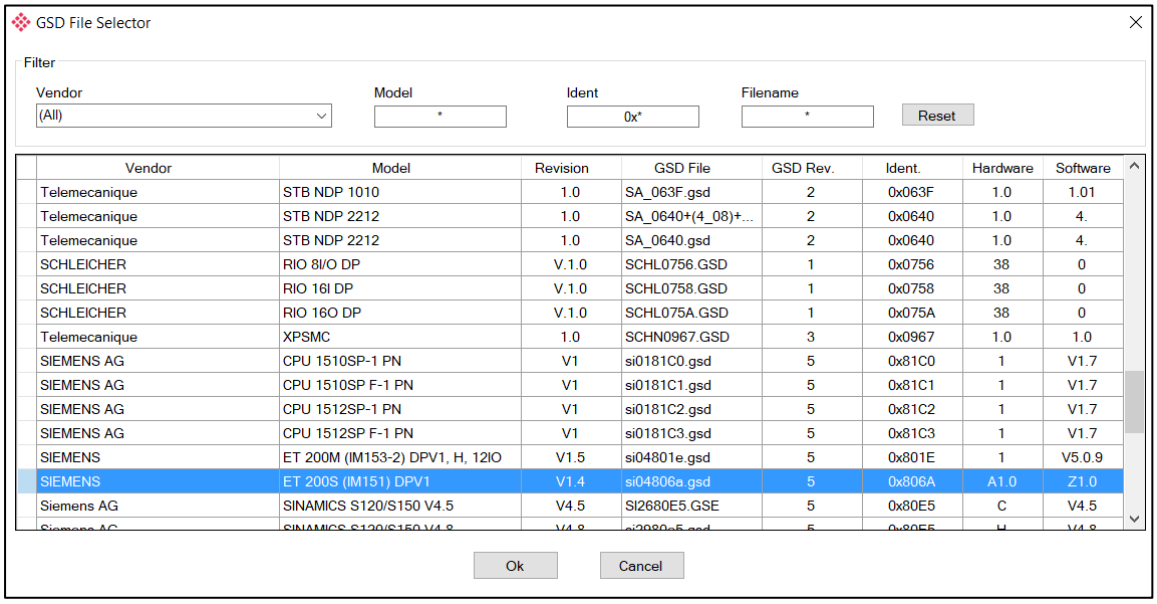


Figure 3.27 – Selecting a PROFIBUS Field Device

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.

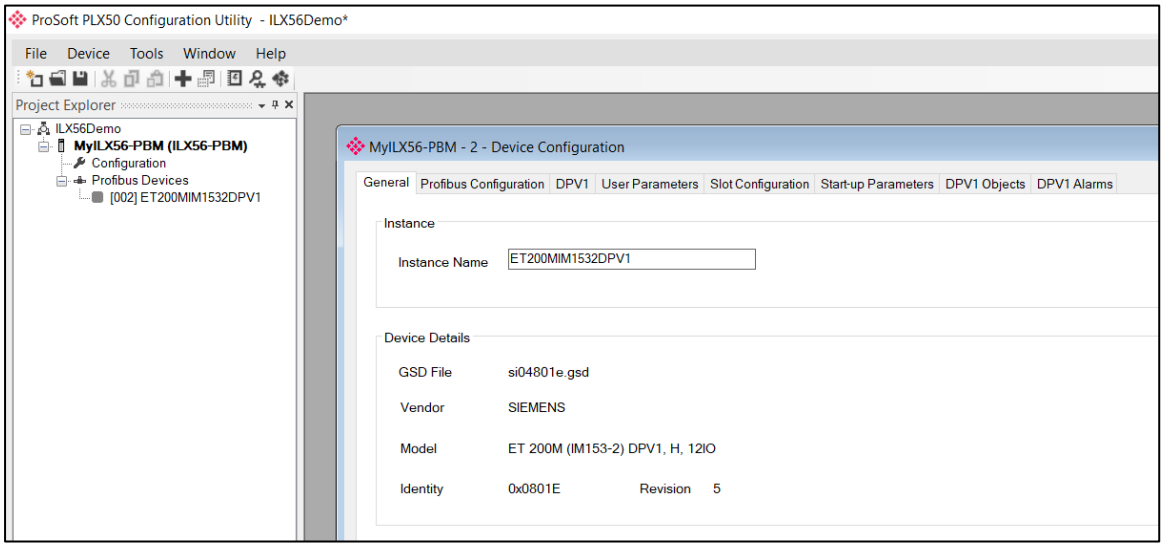


Figure 3.28 – PROFIBUS Field Device Added

3.8.1 General

The General configuration is shown in the following figure. 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*.

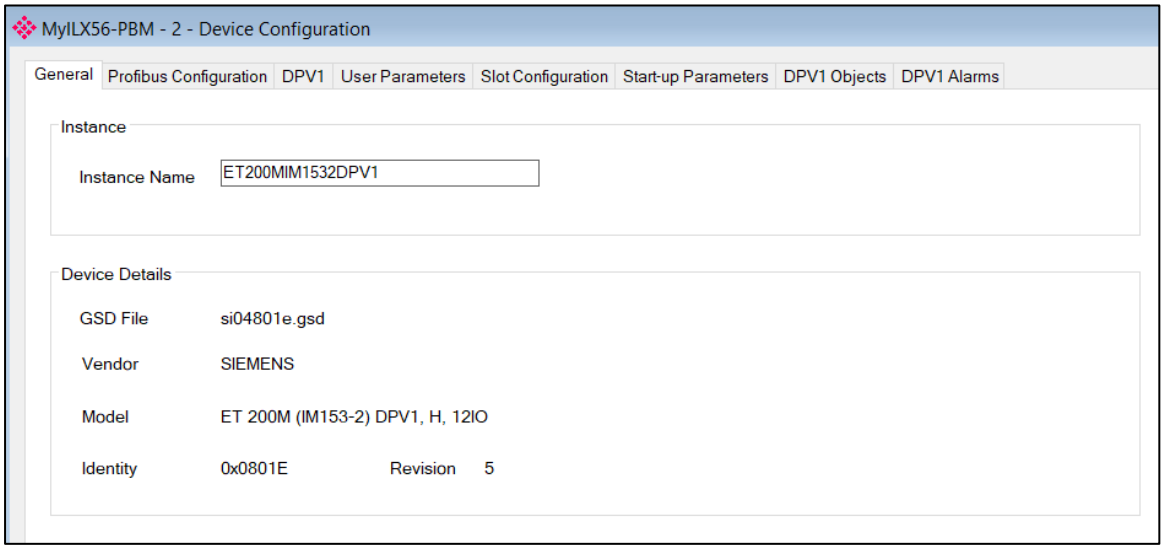


Figure 3.29 – Field Device General configuration parameters

The General configuration consists of the following parameters:

Table 3.5 – 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.

3.8.2 PROFIBUS Configuration

The PROFIBUS configuration is shown in the following figure. 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*.

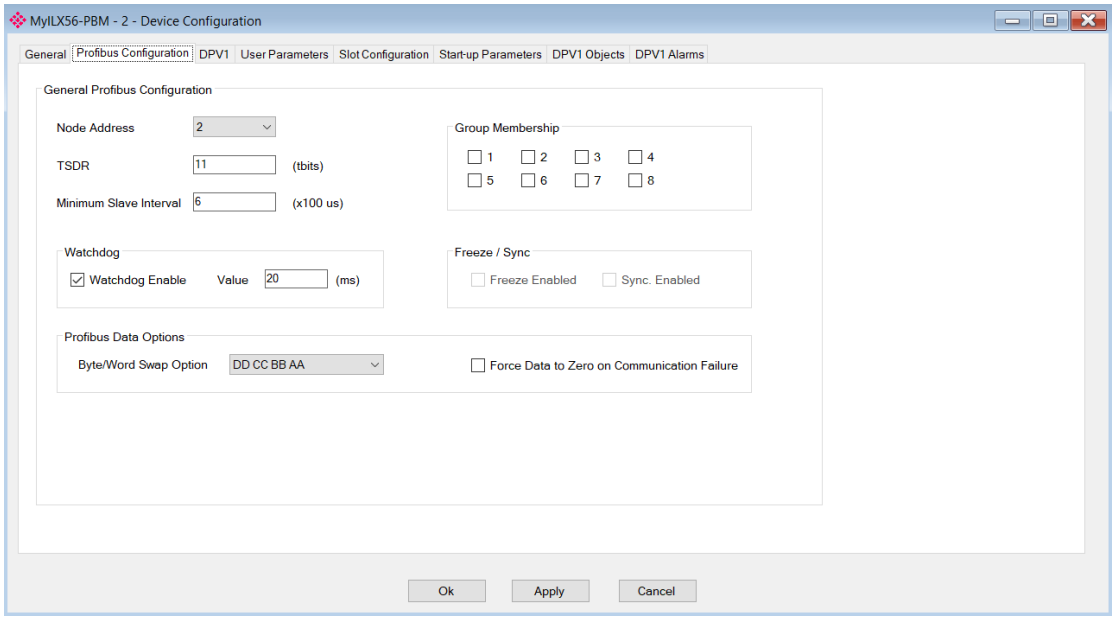


Figure 3.30 – Field Device PROFIBUS configuration parameters

The PROFIBUS configuration consists of the following parameters:

Table 3.6 – Field Device PROFIBUS configuration parameters

Parameter	Description
Node Address	This is the station address configured for the added device. This is the address the ILX56-PBM will use to look for and configure the device for Data Exchange.
TSDR	This parameter is the minimum time (tbits) 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 (microseconds) 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 ILX56-PBM Default Watchdog setting in the ILX56-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 following figure. 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*.

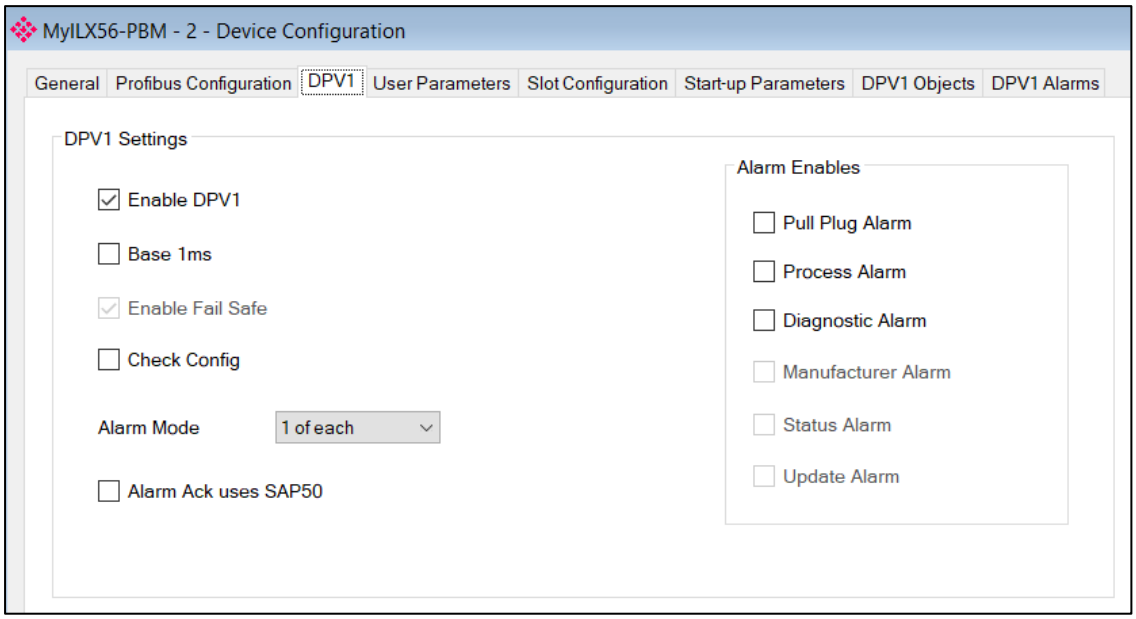


Figure 3.31 – Device DPV1 configuration parameters

The DPV1 configuration consists of the following parameters:

Table 3.7 – 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 “PROFIBUS Configuration” on page 33 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	Specifies the maximum number of possible active alarms for the device.

Alarm Ack uses SAP50	Forces the ILX56-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 following figure. 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*.

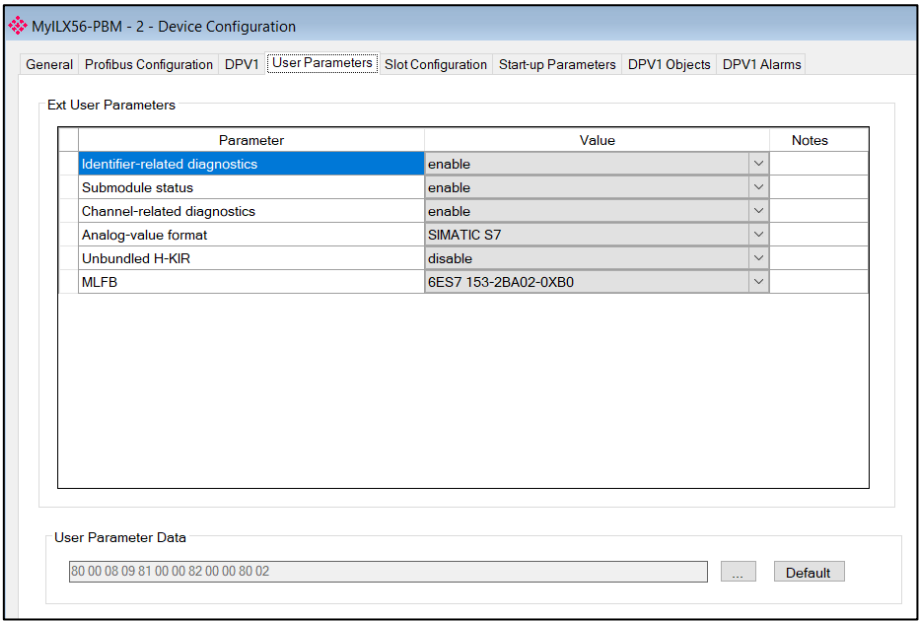


Figure 3.32 – Device User Parameter configuration parameters

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.

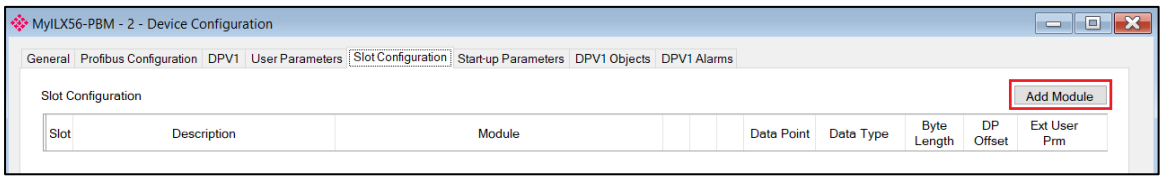


Figure 3.33 – Field Device Slot configuration start

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

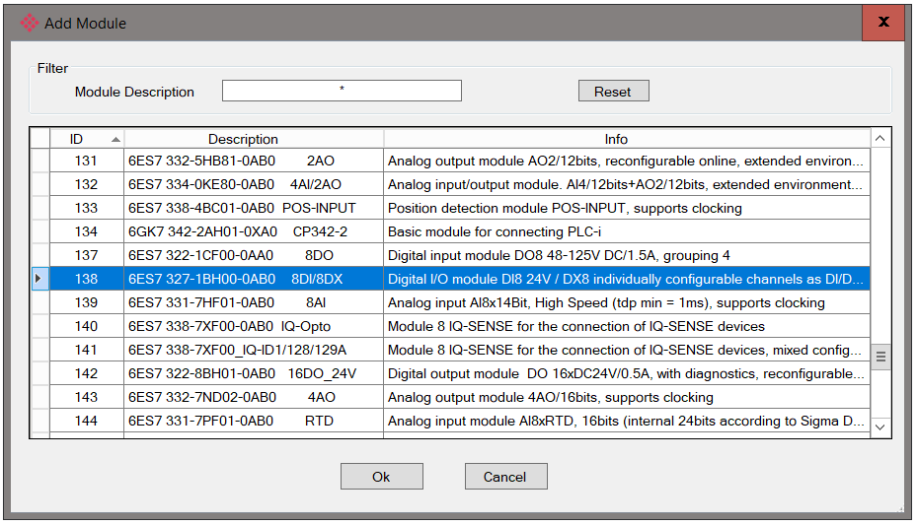


Figure 3.34 – Module Selection

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

The module will be added to the Slot configuration.

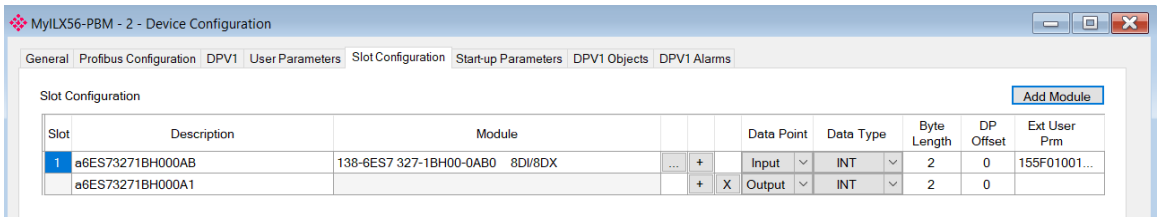


Figure 3.35 – Slot configuration – (Logix)

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.

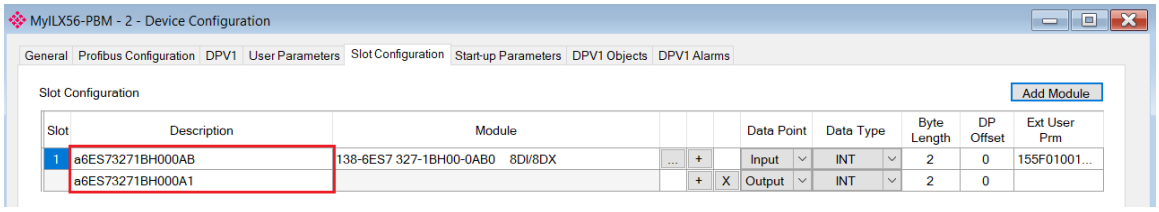


Figure 3.36 – Slot descriptions

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.

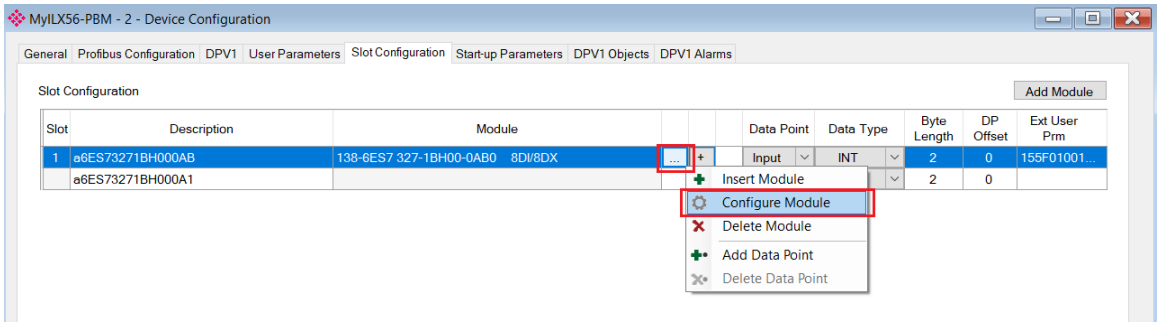


Figure 3.37 – Access Module Specific User Parameters

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

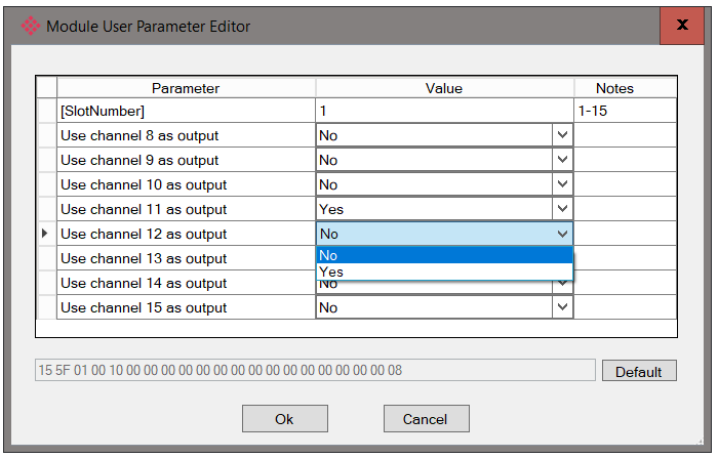


Figure 3.38 – Device Slot configuration additional parameters

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.

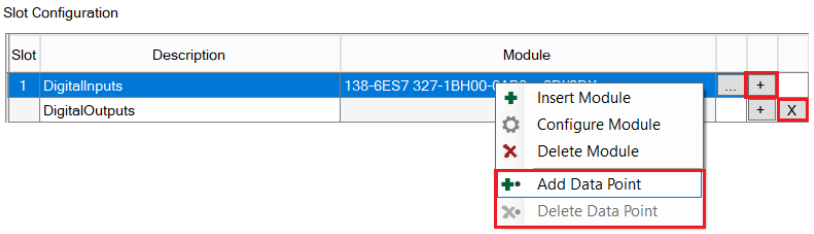


Figure 3.39 – Adding / Removing Data Points

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

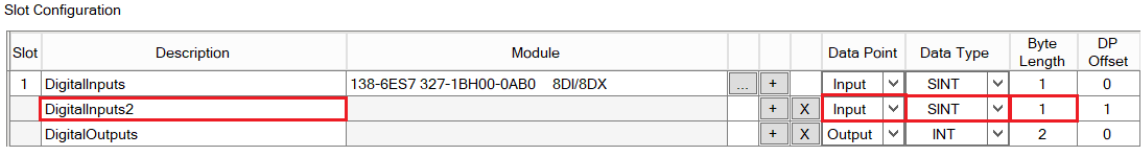


Figure 3.40 – Configuring Data Points

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 3.8 – 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.

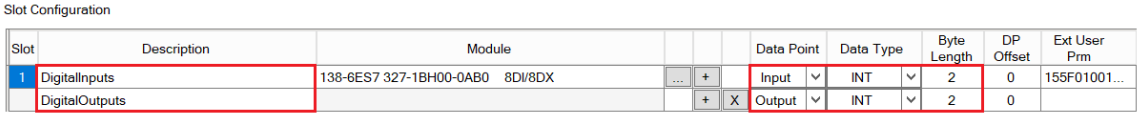


Figure 3.41 – Slot configuration – Logix Example

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.

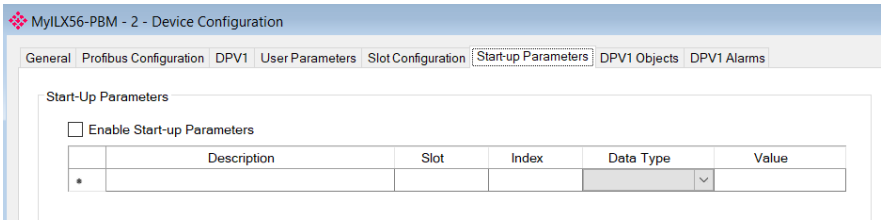


Figure 3.42 – Device Start-up Parameters

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 start-up parameters as shown below.

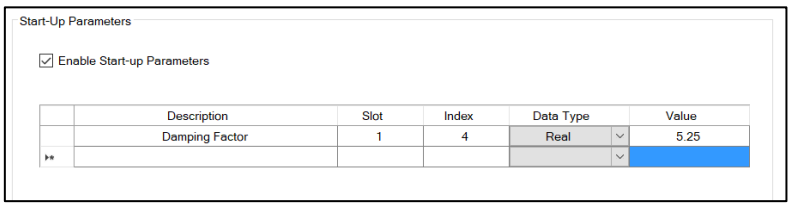


Figure 3.43 – Device Start-up Parameters Example

Once the slave device has been successfully parameterized and configured for Data Exchange the ILX56-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 ILX56-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***.

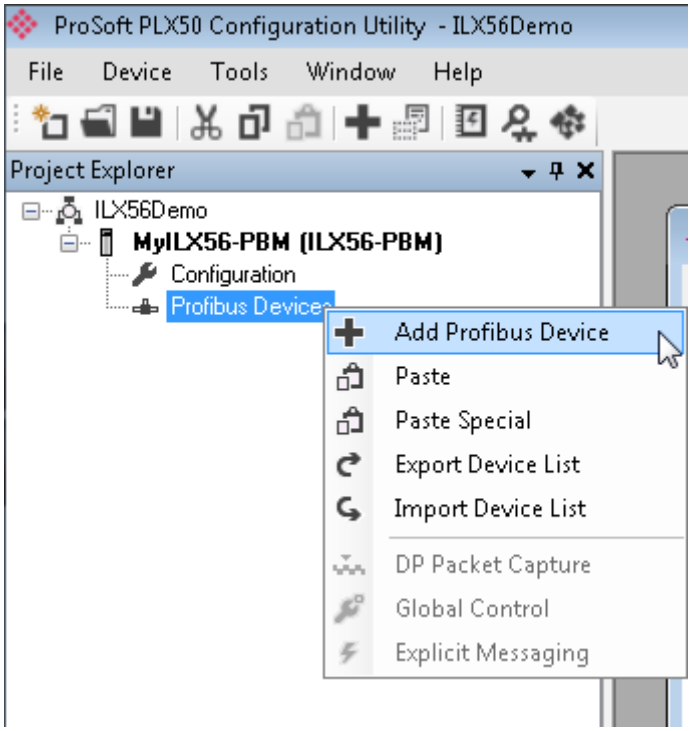


Figure 3.44 – Adding a PROFIBUS Field Device

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

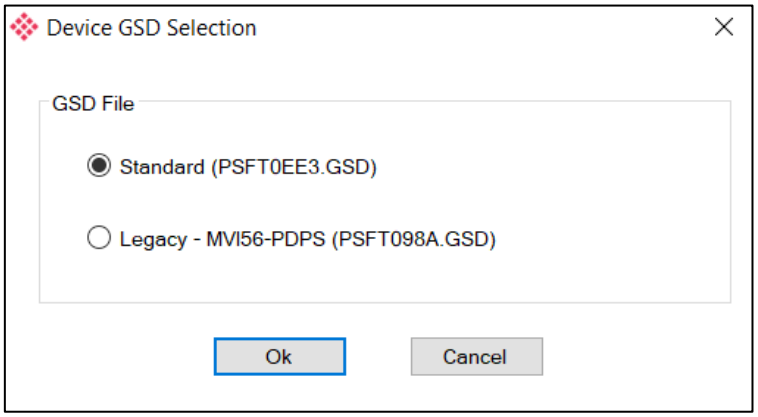


Figure 3.45 – Selecting a PROFIBUS Field Device

Table 3.9 – Slave GSD Files

Module	GSD Filename
ILX56-PBM	PSFT0EE2.GSD
MVI56-PDPS	PSFT098A.GSD

3.9.1 General

The General configuration is shown in the following figure. 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*.

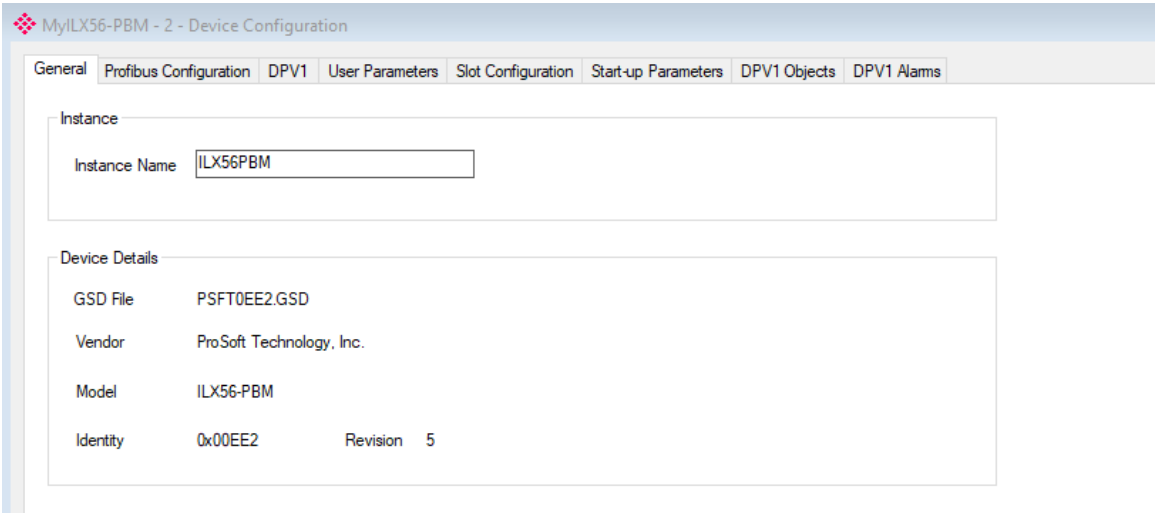


Figure 3.46 – Device General configuration parameters

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

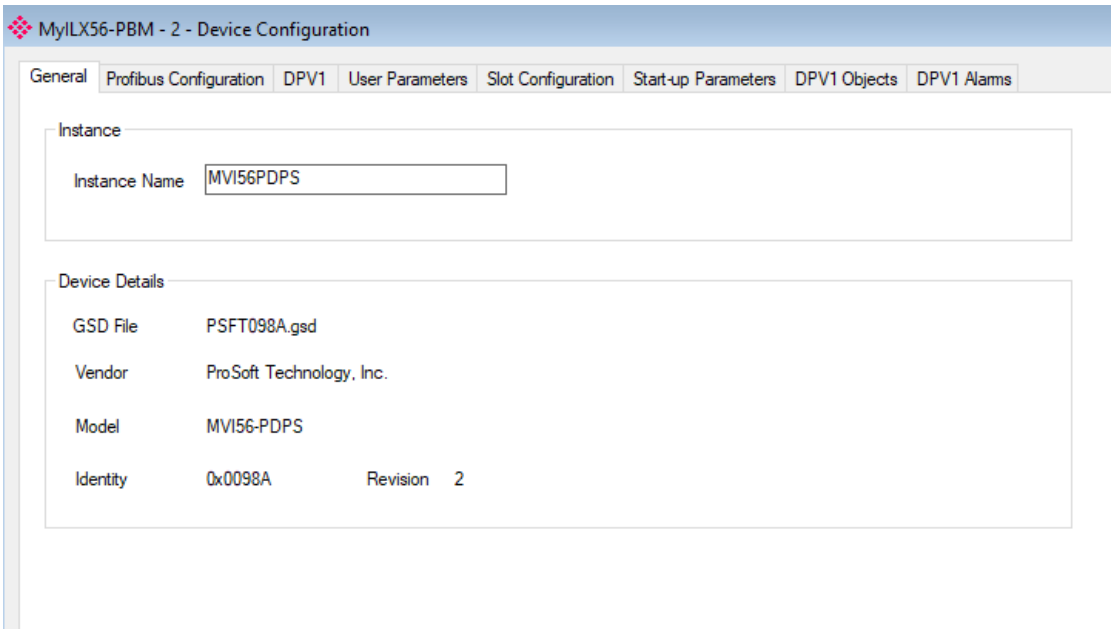


Figure 3.47 – Device General configuration parameters (legacy device)

The General configuration consists of the following parameters:

Table 3.10 –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 following figure. 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*.

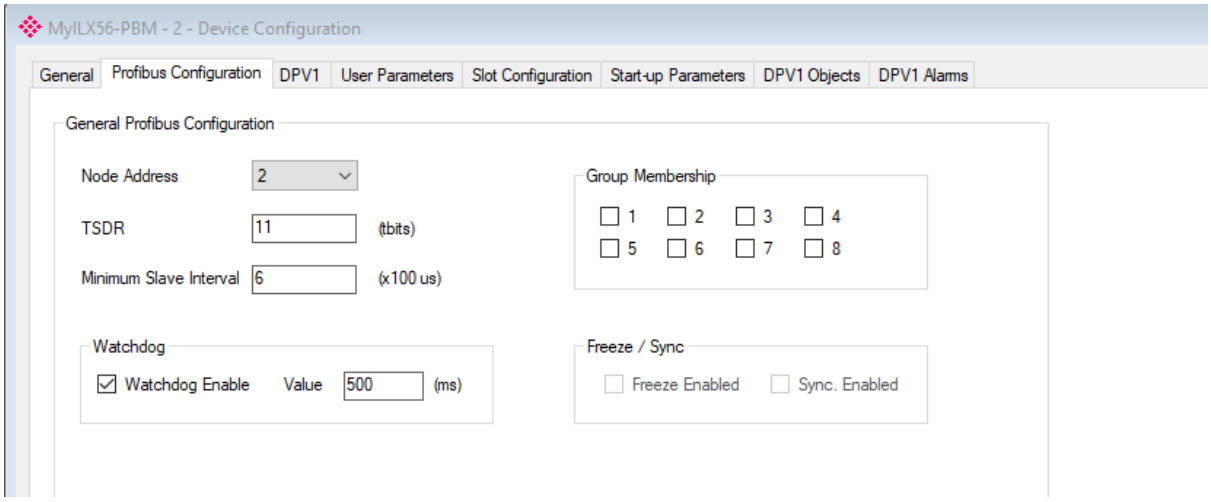


Figure 3.48 – Device PROFIBUS configuration parameters

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

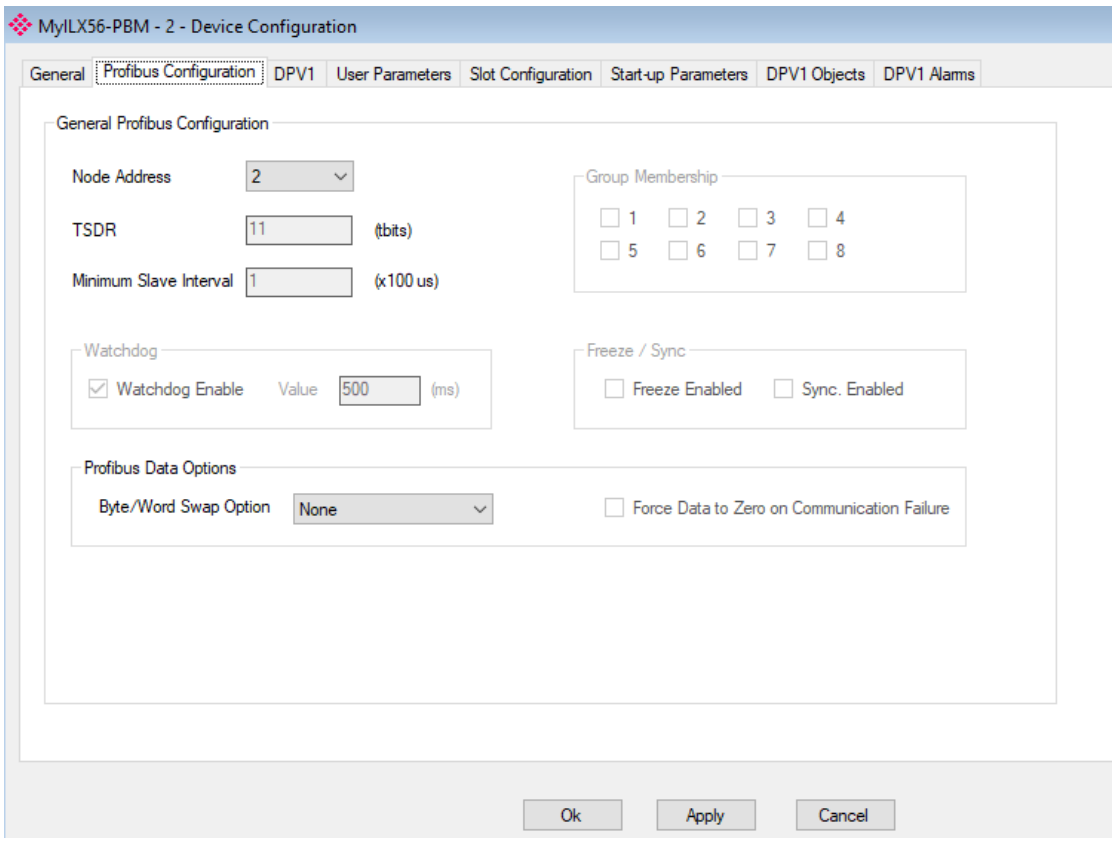


Figure 3.49 – Device PROFIBUS configuration parameters (legacy device)

The PROFIBUS configuration consists of the following parameters:

Table 3.11 – Field Device PROFIBUS configuration parameters

Parameter	Description
Node Address	This is the station address configured for the added device. This is the address the ILX56-PBM 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 following figure. 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*.

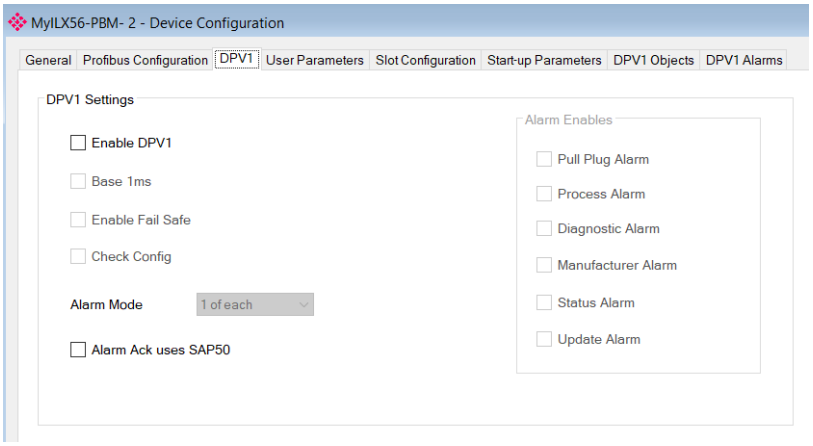


Figure 3.50 – Device DPV1 configuration parameters

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

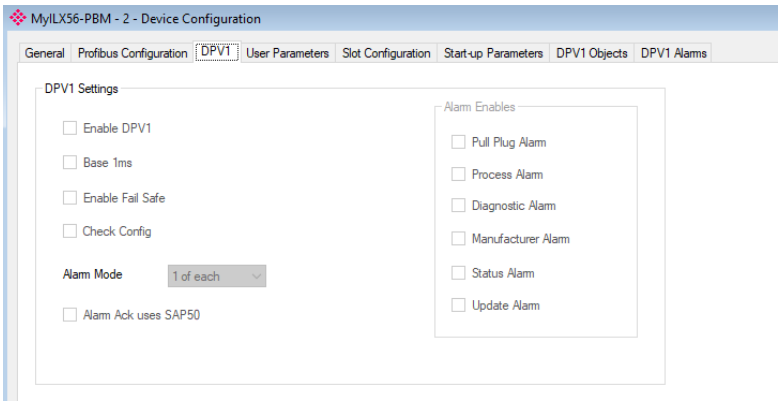


Figure 3.51 – Device DPV1 configuration parameters (legacy device)

The DPV1 configuration consists of the following parameters:

Table 3.12 – Device DPV1 configuration parameters

Parameter	Description
Enable DPV1	Enables the DPV1 capabilities of the ILX56-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 ILX56-PBM to use Service Access Point (SAP) 50 to acknowledge alarms.
Alarm Enables	N/A

3.9.4 Slot Configuration

The Slot configuration is the same as the Master Mode. See section 3.8.5.

3.9.5 DPV1 Objects

The DPV1 Objects configuration is shown in the following figure. 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*.

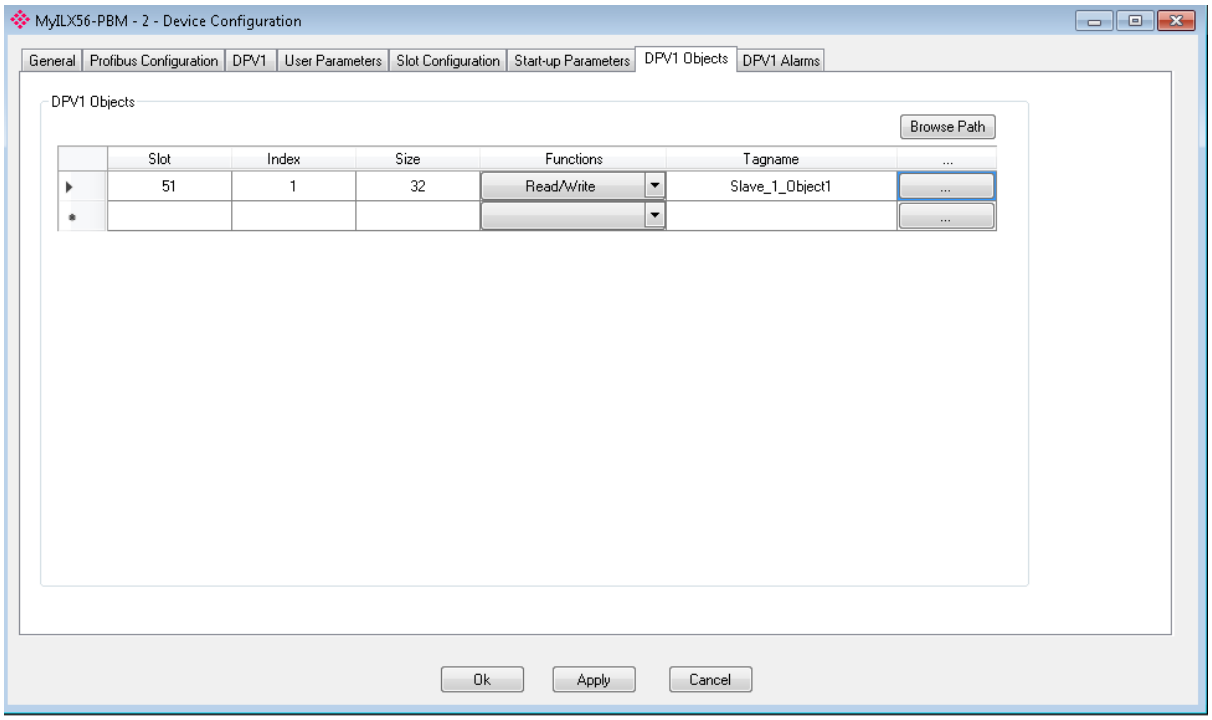


Figure 3.52 – Device DPV1 Objects configuration parameters – Logix

The DPV1 configuration consists of the following parameters:

Table 3.13 – 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)

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 first been correctly configured.

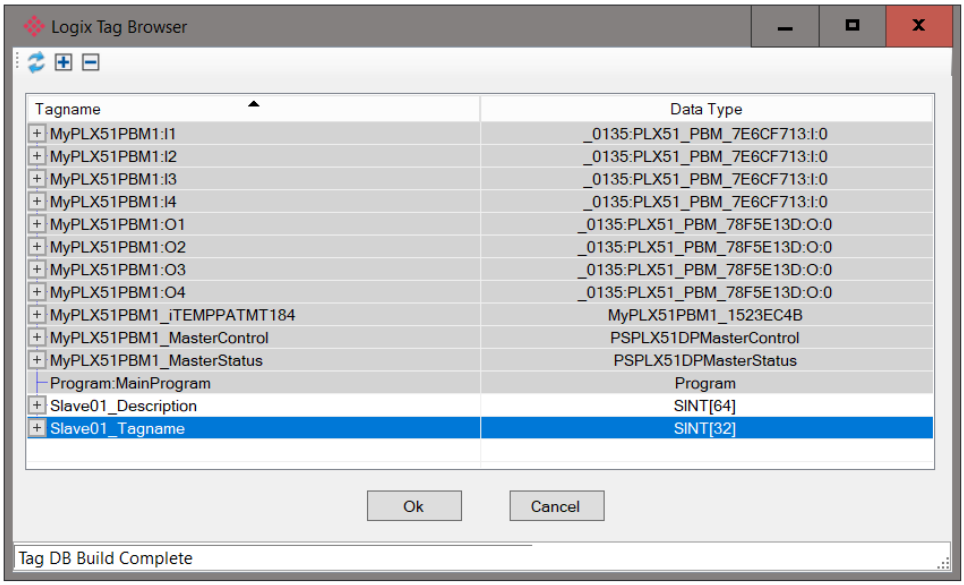


Figure 3.53 – Device DPV1 Objects Tag Browsing

3.9.6 DPV1 Alarms

The DPV1 Alarms configuration is shown in the following figure. 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.

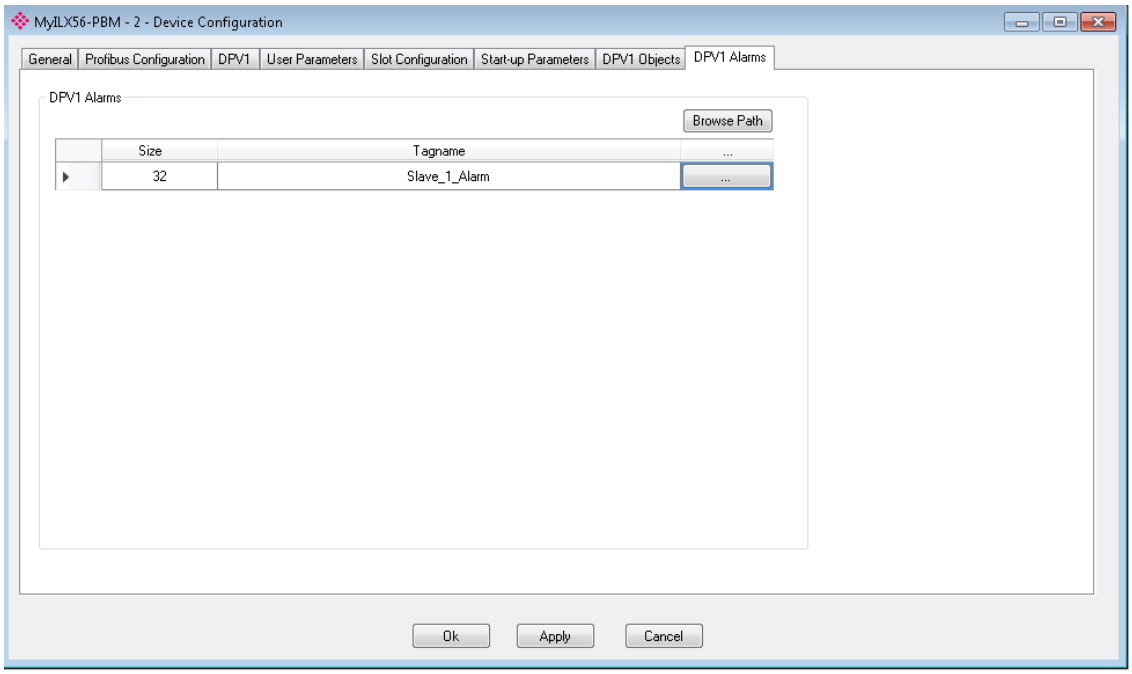


Figure 3.54 – Device DPV1 Alarms configuration parameters (Logix)

The DPV1 configuration consists of the following parameters:

Table 3.14 – 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)

Note: The DP Master connected to the ILX56-PBM (in slave mode) will be able to configure any of the following alarms: Diagnostic Alarm, Process Alarm, Pull Plug Alarm, Status Alarm, Update Alarm,Manufacturer Specific Alarm.

3.10 Studio 5000 Configuration

Note: The ILX56-PBM uses an Add-On Profile (AOP) for the 1756 Backplane. Therefore, minimum Studio 5000 version that can be used is v21.

For Studio 5000 v20 and below, a *Generic 1756 Module* profile can be used. Please visit www.prosoft-technology.com to download the *ILX56_PBM_Installing_Logix_v20_and_below.zip* file. It contains a .L5X file and instructions.

The ILX56-PBM module can be easily integrated with Allen-Bradley Logix family of controllers. Integration with the Logix family in Studio5000 makes use of the Add-On-Profile (AOP).

3.10.1 Installing the Add-On Profile (AOP)

The user will first need to install the ILX56-PBM AOP before the module can be added to the Logix I/O tree. User will need to download the AOP from product webpage of ProSoft Technology.com at www.prosoft-technology.com. Once downloaded extract the zip file, run the *MPSetup.exe* file, and follow the on-screen instructions.

3.10.2 Add Module to I/O Configuration

Integration with the Logix family in Studio5000 makes use of an AOP. Under the 1756 Backplane, right-click and select the New Module option.

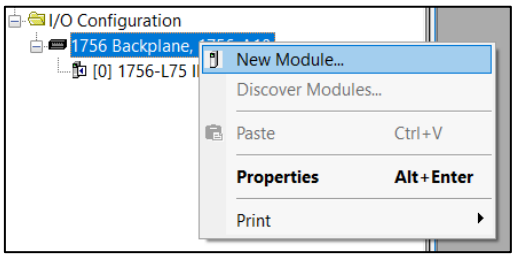


Figure 3.55 – Adding a module

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

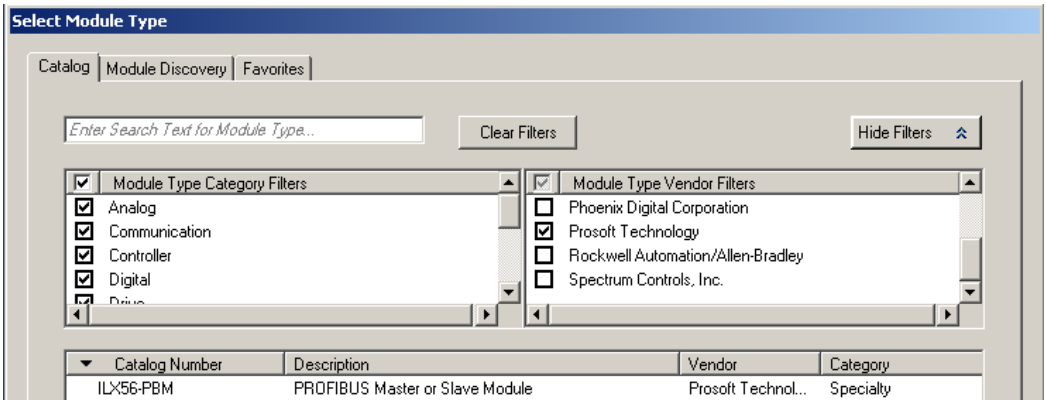


Figure 3.56 – Selecting the module

Locate and select the ILX56-PBM and select the *Create* option. The module configuration dialog will open, where the user must specify the Name and Slot as a minimum to complete the instantiation.

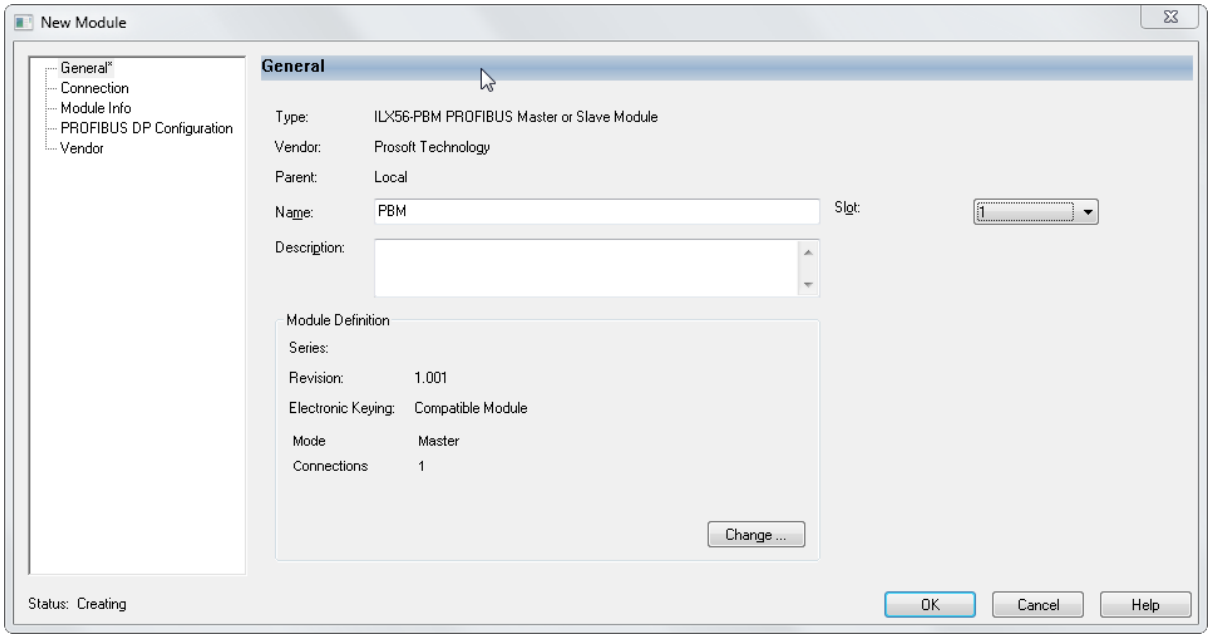


Figure 3.57 – Module instantiation

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

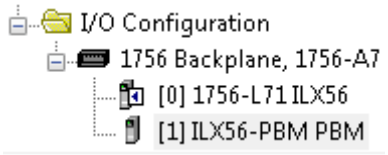


Figure 3.58 – Logix IO tree

The Module Defined Data Types will automatically be created during the instantiation process.

3.10.3 PLX50 Configuration Utility Project File

The ILX56-PBM AOP allows the user to save the PLX50 Configuration Utility project file in the AOP as well as launch PLX50 Configuration Utility from the AOP.

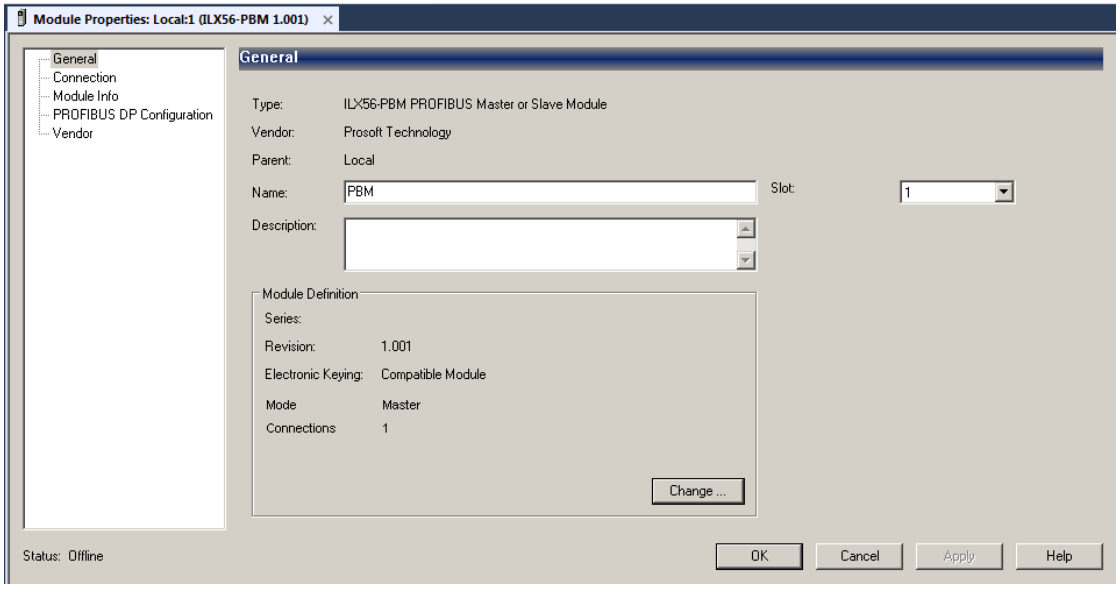


Figure 3.59 – AOP - PLX50 Configuration Utility

When no PLX50 Configuration Utility project has been defined the user can either *Browse* for an existing PLX50 Configuration Utility project. If no PLX50 Configuration Utility project has been defined the user can type in the project file name in the *PLX50 Configuration Utility Project File* textbox and select Launch PLX50 Configuration Utility.

Note: Once the file name has been entered, the user will need to press *Apply* before the *Launch PLX50 Configuration Utility* button will become available.

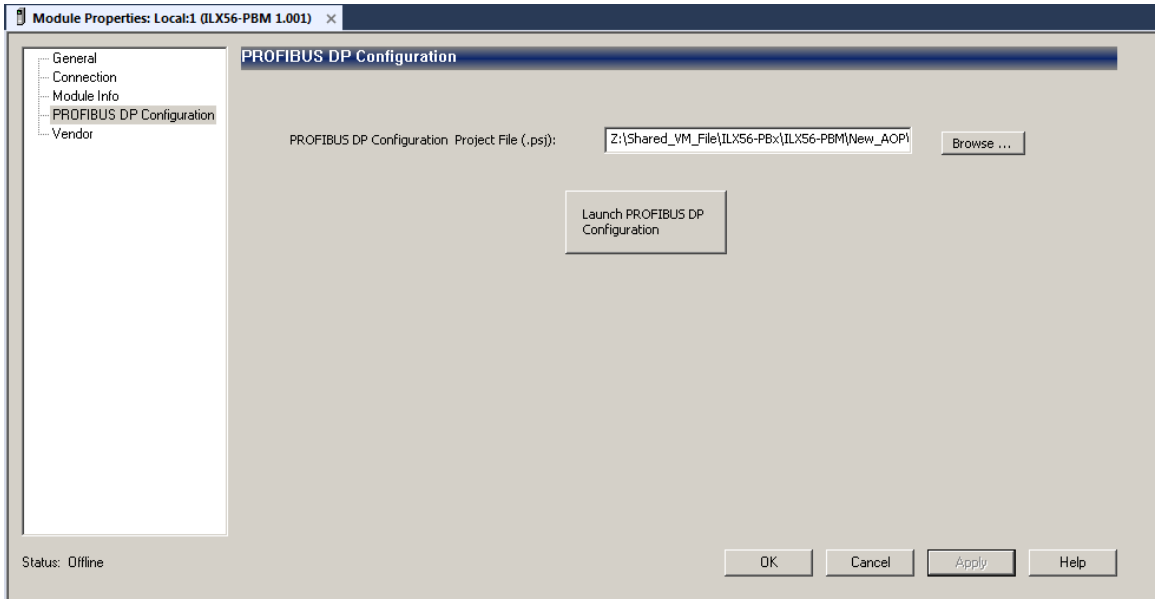


Figure 3.60 – AOP – Launch PLX50 Configuration Utility

3.11 Logix Mapping

The PLX50 Configuration Utility will generate the required UDTs and Routines (based on the ILX56-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.

Important: The user will need to ensure that the Logix Base Tag is correct for the generated Logix L5X code to work. The base tag will be the tag name for the module input and output assemblies in the Logix controller owning the module.

For example, if the ILX56-PBM is in the same local rack as the Logix controller owning it, the Logix Base Tag will be *Local:xx* (where xx is the slot number of the module). Below is an example where the ILX56-PBM is in slot 1 of the local rack connected to the Logix controller in the same rack.

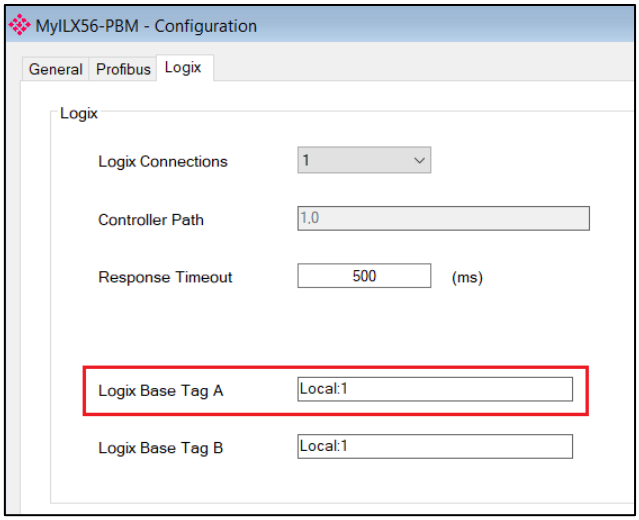


Figure 3.61 – Logix Base tag assignment in PLX50CU

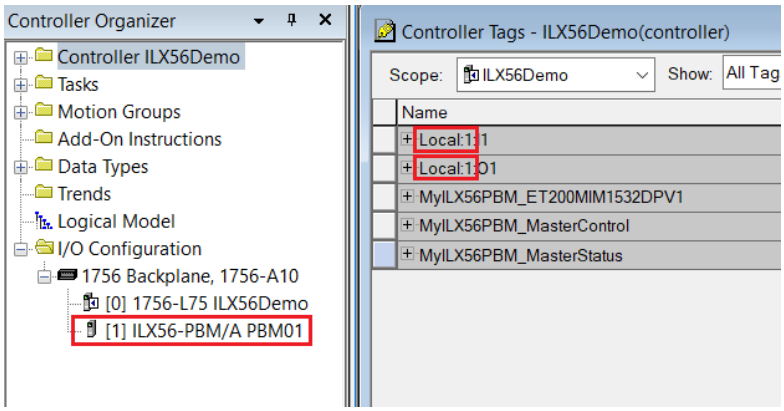


Figure 3.62 – Logix Base tag assignment in Studio 5000

If the module is in a remote rack the user will need to enter the Logix Base Tag based on the name of the remote rack (see the example below):

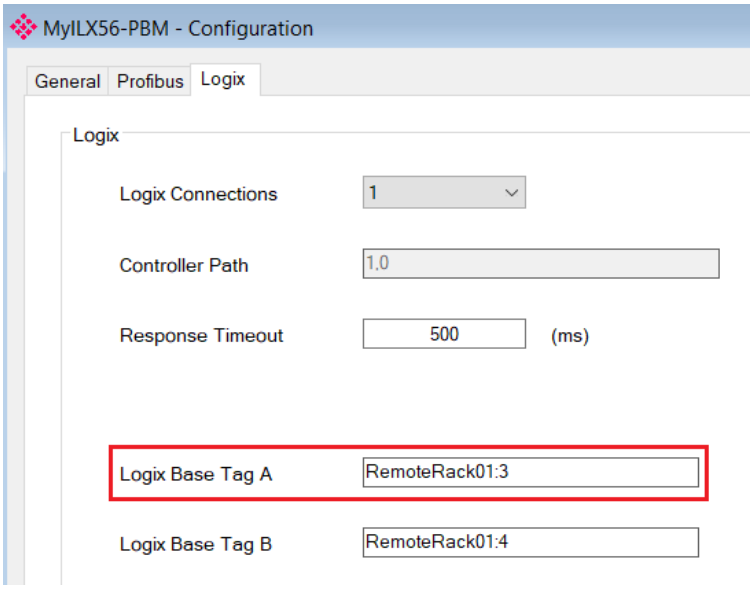


Figure 3.63 – Logix Base tag assignment in PLX50CU

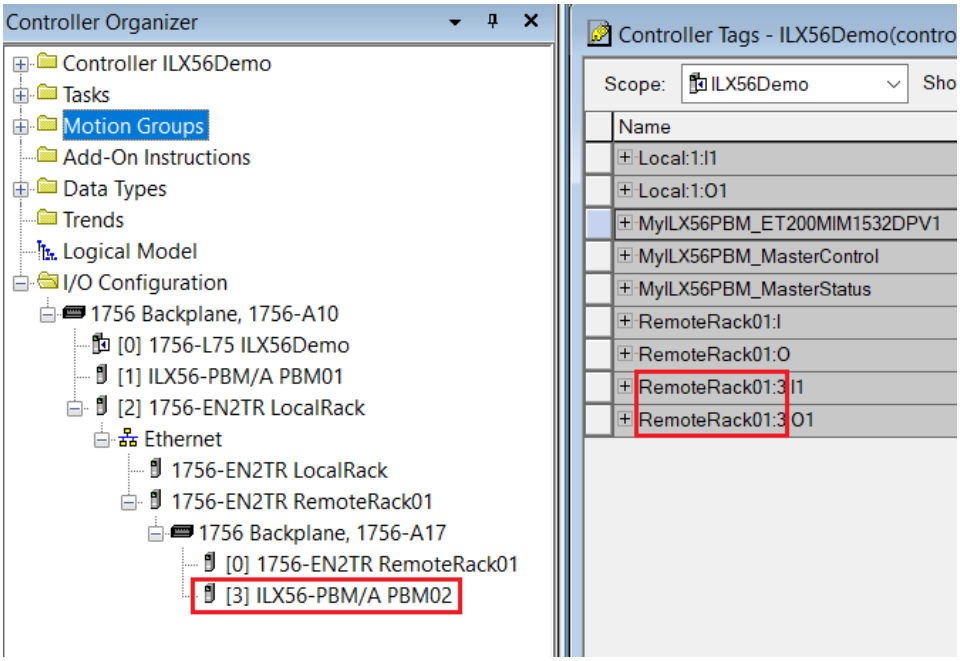


Figure 3.64 – Logix Base tag assignment in Studio 5000

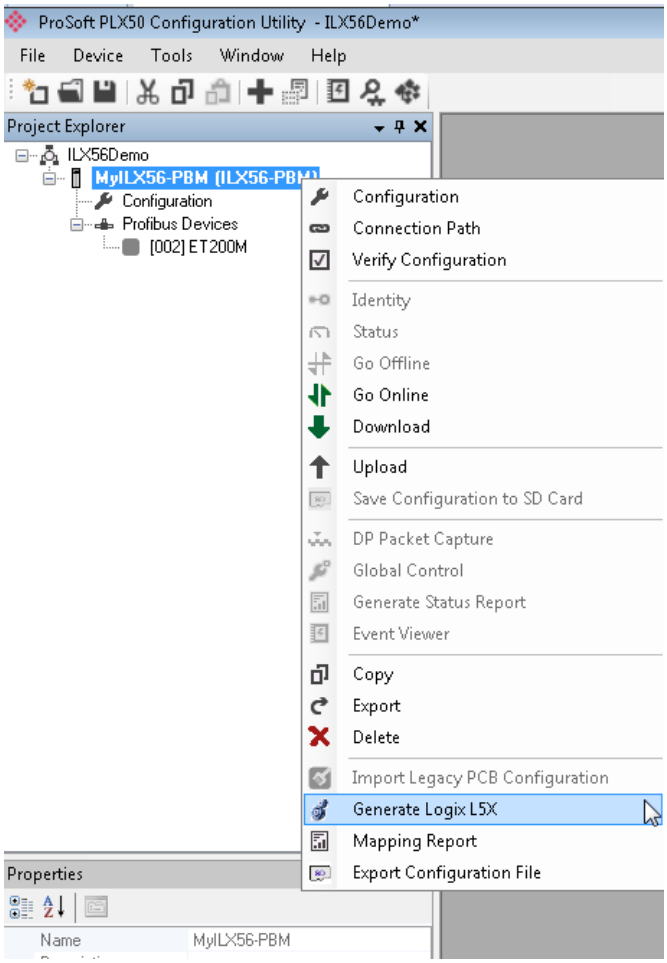


Figure 3.65 – Selecting Generate Logix L5X

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

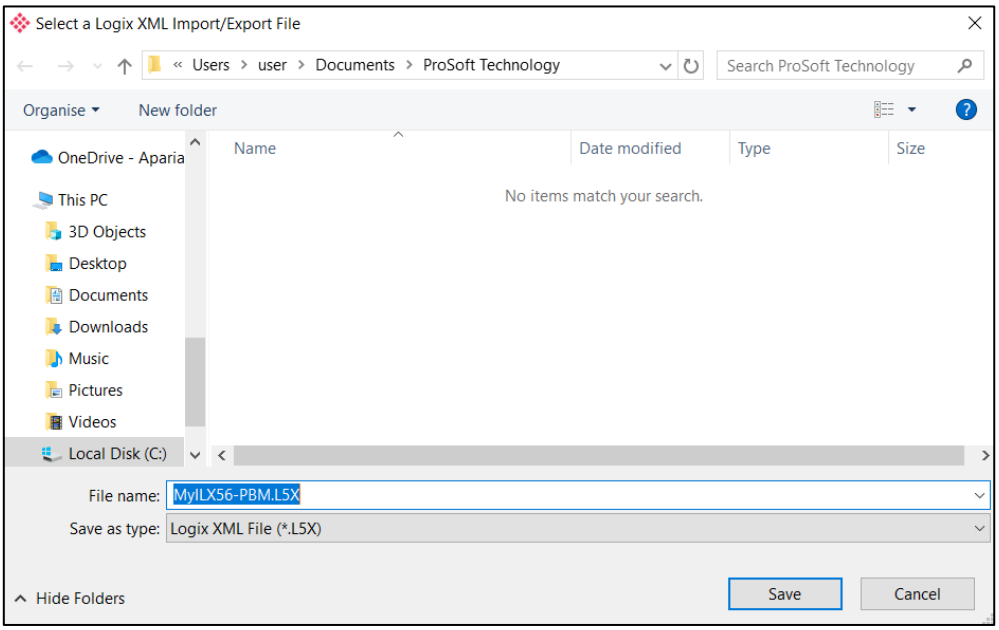


Figure 3.66 – Selecting the Logix L5X file name

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

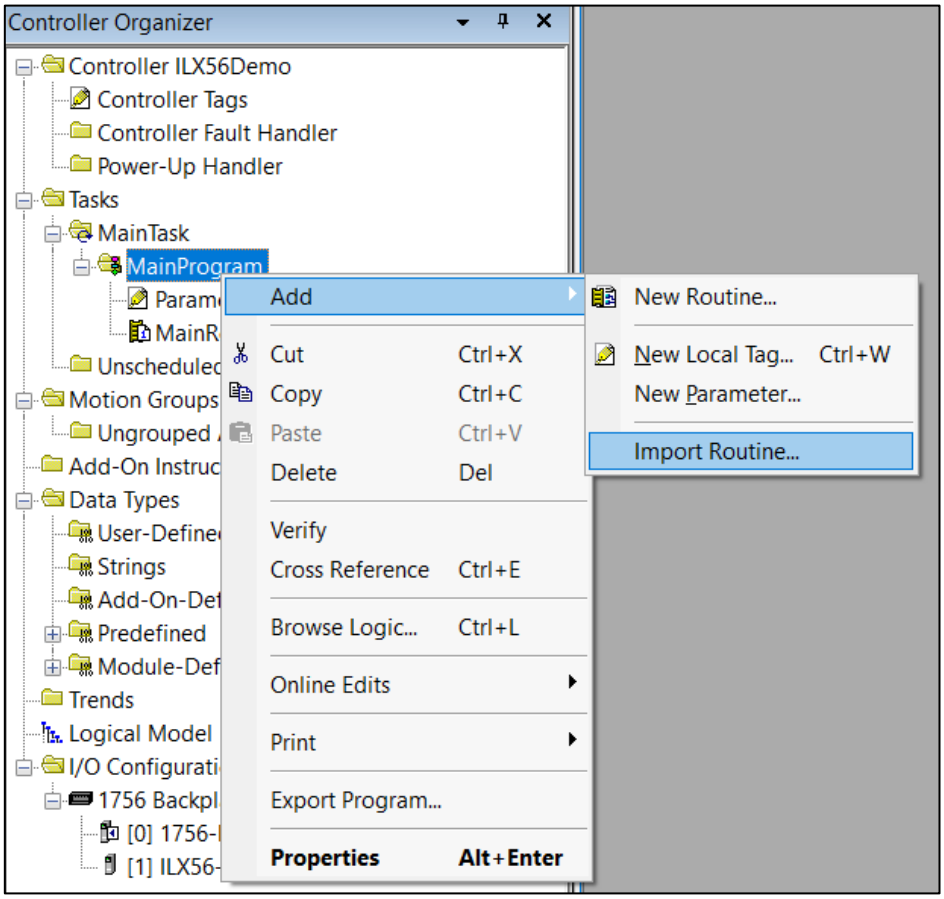


Figure 3.67 – Importing the L5X file into Studio 5000

In the file open dialog, select the previously created L5X file and press **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.

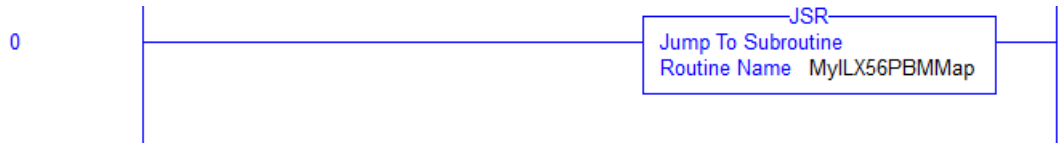


Figure 3.68 – Calling the mapping routine

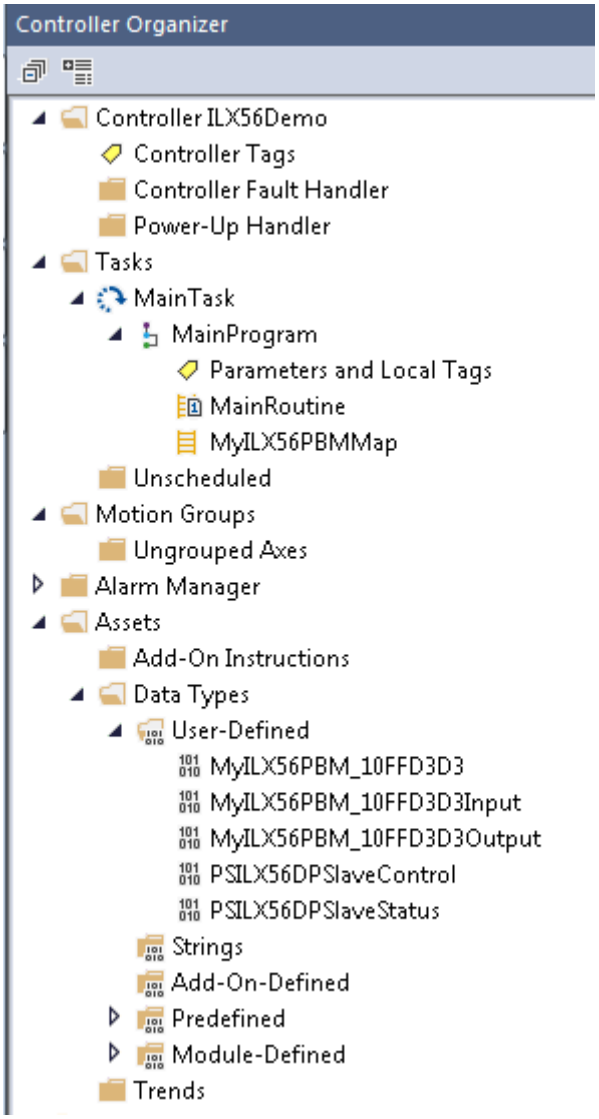


Figure 3.69 – Imported Logix Objects

A number of ILX56 specific (UDT) tags are created.

Local:3:O1	{...}	{...}		PS:ILX56_PBM:O1:0
Local:3:O1.CommandControl	16#03		Hex	SINT
Local:3:O1.RedundancyControl	16#00		Hex	SINT
Local:3:O1.Reserved	16#0000		Hex	INT
Local:3:O1.DeviceEnable	{...}	{...}		PS:DeviceEnable:O:0

Figure 3.70 – ILX56-specific tags

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.

Local:3:I1	{...}	{...}		PS:ILX56_PBM:I1:0
Local:3:I1.ConnectionFaulted	0		Decimal	BOOL
Local:3:I1.ModuleStatus	16#0000_0513		Hex	DINT
Local:3:I1.ConfigValid	16#1		Hex	BOOL
Local:3:I1.Owned	16#1		Hex	BOOL
Local:3:I1.DuplicateDPStation	16#0		Hex	BOOL
Local:3:I1.ProfibusFieldBusError	16#0		Hex	BOOL
Local:3:I1.ProfibusDeviceError	16#1		Hex	BOOL
Local:3:I1.ProfibusOffline	16#0		Hex	BOOL
Local:3:I1.ProfibusStopped	16#0		Hex	BOOL
Local:3:I1.ProfibusClear	16#0		Hex	BOOL
Local:3:I1.ProfibusOperational	16#1		Hex	BOOL
Local:3:I1.SlaveMode	16#0		Hex	BOOL
Local:3:I1.ControllerRun	16#1		Hex	BOOL
Local:3:I1.ModuleRedundancyEnabled	16#0		Hex	BOOL
Local:3:I1.ModuleRedundancyStatus	16#0		Hex	BOOL
Local:3:I1.ConfigCRC	16#2e95		Hex	INT
Local:3:I1.ActiveNodeCount	124		Decimal	SINT
Local:3:I1.SwitchOverTimeOut	10		Decimal	INT
Local:3:I1.DeviceLiveList	{...}	{...}		PS:OnlineSlaves:I:0
Local:3:I1.DeviceDataExchangeActive	{...}	{...}		PS:DataExchangeActi...
Local:3:I1.DeviceDeviceAlarmPending...	{...}	{...}		PS:PendingAlarmsSla...
Local:3:I1.DeviceDiagnosticPendingFla...	{...}	{...}		PS:DiagnosticsPendin...

Figure 3.71 – ILX56-specific tags

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

MyILX56PBM_ET200MIM1532DPV1	{...}		MyILX56PBM_...	
MyILX56PBM_ET200MIM1532DPV1.Input	{...}		MyILX56PBM_...	
MyILX56PBM_ET200MIM1532DPV1.Input.Status	{...}		PSPLX51DPSI...	
MyILX56PBM_ET200MIM1532DPV1.Input.Status.Online	0	Decimal	BOOL	Device Online (0=Offline, 1=Online)
MyILX56PBM_ET200MIM1532DPV1.Input.Status.DataExchangeActive	0	Decimal	BOOL	Data Exchange Active (0=Inactive, 1=Active)
MyILX56PBM_ET200MIM1532DPV1.Input.Status.IdentMismatch	0	Decimal	BOOL	Device Identity Mismatch (0=Ok, 1=Mismatch)
MyILX56PBM_ET200MIM1532DPV1.Input.Status.DisabledByOutputAssembly	0	Decimal	BOOL	Disabled by Output (0=Enabled, 1=Disabled)
MyILX56PBM_ET200MIM1532DPV1.Input.Status.DeviceError	0	Decimal	BOOL	Profibus Device Error (0=Ok, 1=Error)
MyILX56PBM_ET200MIM1532DPV1.Input.Status.AlarmPending	0	Decimal	BOOL	Alarm Pending (0=Not Pending, 1=Pending)
MyILX56PBM_ET200MIM1532DPV1.Input.Status.DiagnosticsPending	0	Decimal	BOOL	Diagnostics Pending (0=Not Pending, 1=Pending)
MyILX56PBM_ET200MIM1532DPV1.Input.Status.OutputAssemblyNodeAddrMismatch	0	Decimal	BOOL	Station Number Mismatch (0=Ok, 1=Mismatch)
MyILX56PBM_ET200MIM1532DPV1.Input.Status.MappingCRCMismatch	0	Decimal	BOOL	Mapping Checksum Mismatch (0=Ok, 1=Mismatch
MyILX56PBM_ET200MIM1532DPV1.Input.Status.SlaveClearOpMode	0	Decimal	BOOL	Slave Clear Operation Mode
MyILX56PBM_ET200MIM1532DPV1.Input.Status.SlaveAlarmAck	0	Decimal	BOOL	Slave Alarm Acknowledge
MyILX56PBM_ET200MIM1532DPV1.Input.Status.StationNumber	0	Decimal	SINT	Device Station Number
MyILX56PBM_ET200MIM1532DPV1.Input.Status.DeviceMappingCRC	16#0000	Hex	INT	Mapping checksum
MyILX56PBM_ET200MIM1532DPV1.Input.a6ES73271BH000AB	0	Decimal	INT	
MyILX56PBM_ET200MIM1532DPV1.Output	{...}		MyILX56PBM_...	
MyILX56PBM_ET200MIM1532DPV1.Output.Control	{...}		PSPLX51DPSI...	
MyILX56PBM_ET200MIM1532DPV1.Output.Control.StationNumber	0	Decimal	SINT	Device Station Number
MyILX56PBM_ET200MIM1532DPV1.Output.Control.AlarmTrigger	0	Decimal	BOOL	Device Alarm Trigger
MyILX56PBM_ET200MIM1532DPV1.Output.Control.DeviceMappingCRC	16#0000	Hex	INT	Mapping Checksum
MyILX56PBM_ET200MIM1532DPV1.Output.a6ES73271BH000A1	0	Decimal	INT	

Figure 3.72 – 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 with the ILX56-PBM. The AOI offered implements custom UDT's, controller tags, and logic that instantiates the CIP messages needed to perform:

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

To add the AOI, you must go into the *Controller Organizer* window, expand the **Tasks** window and double-click the **MainRoutine** under the **MainProgram** folder. Right-click on an empty rung in the routine, and click the **Import Rungs** option.

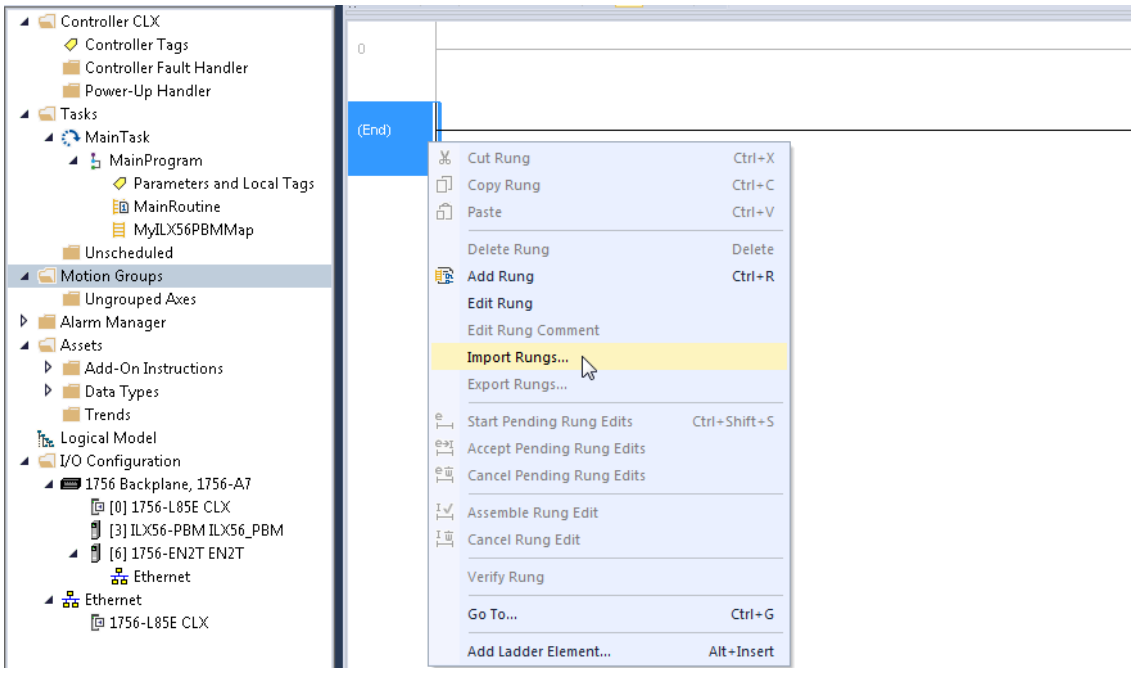


Figure 3.73 – Import Rungs option

Navigate to the location on your PC where the .L5X Add-On Instruction is saved. Select Open.

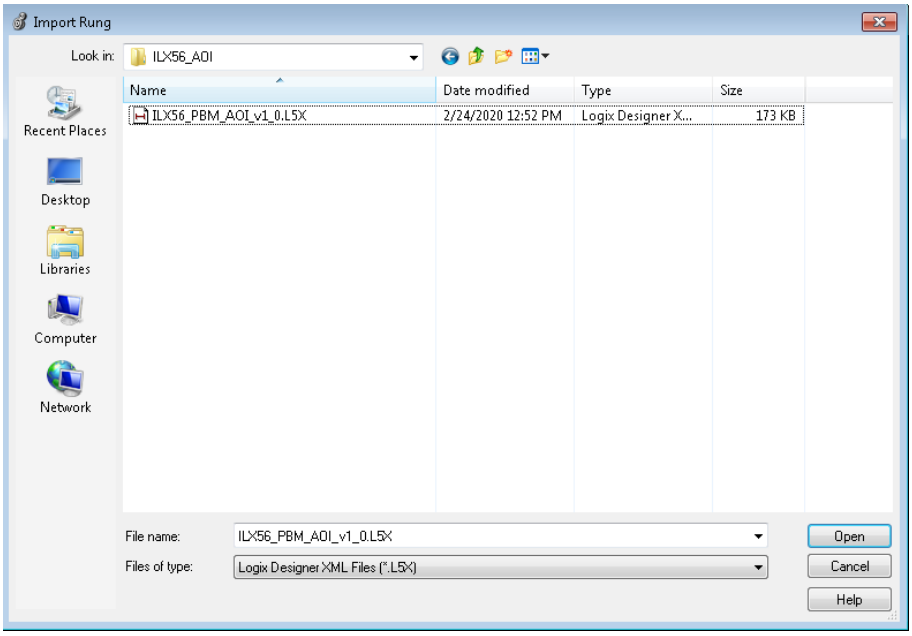


Figure 3.74 – Opening the .L5X Add-On Instruction

This causes the *Import Configuration* dialog box to open, which shows all of the controller tags to be created.

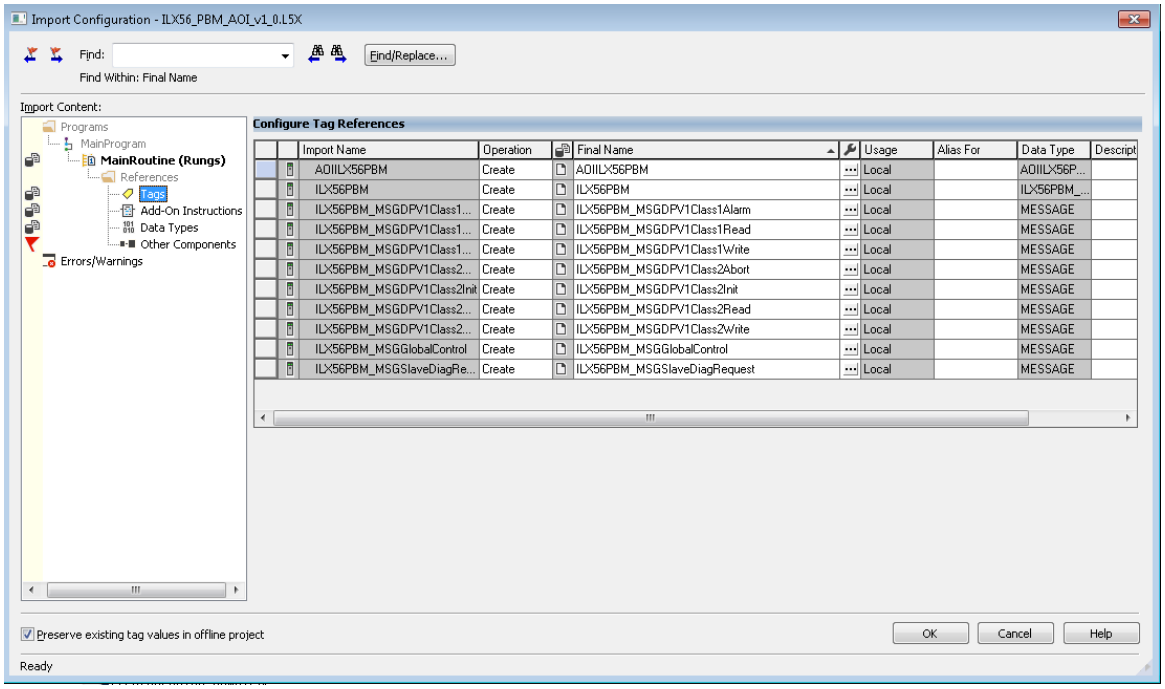


Figure 3.75 – Import Configuration dialog box

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

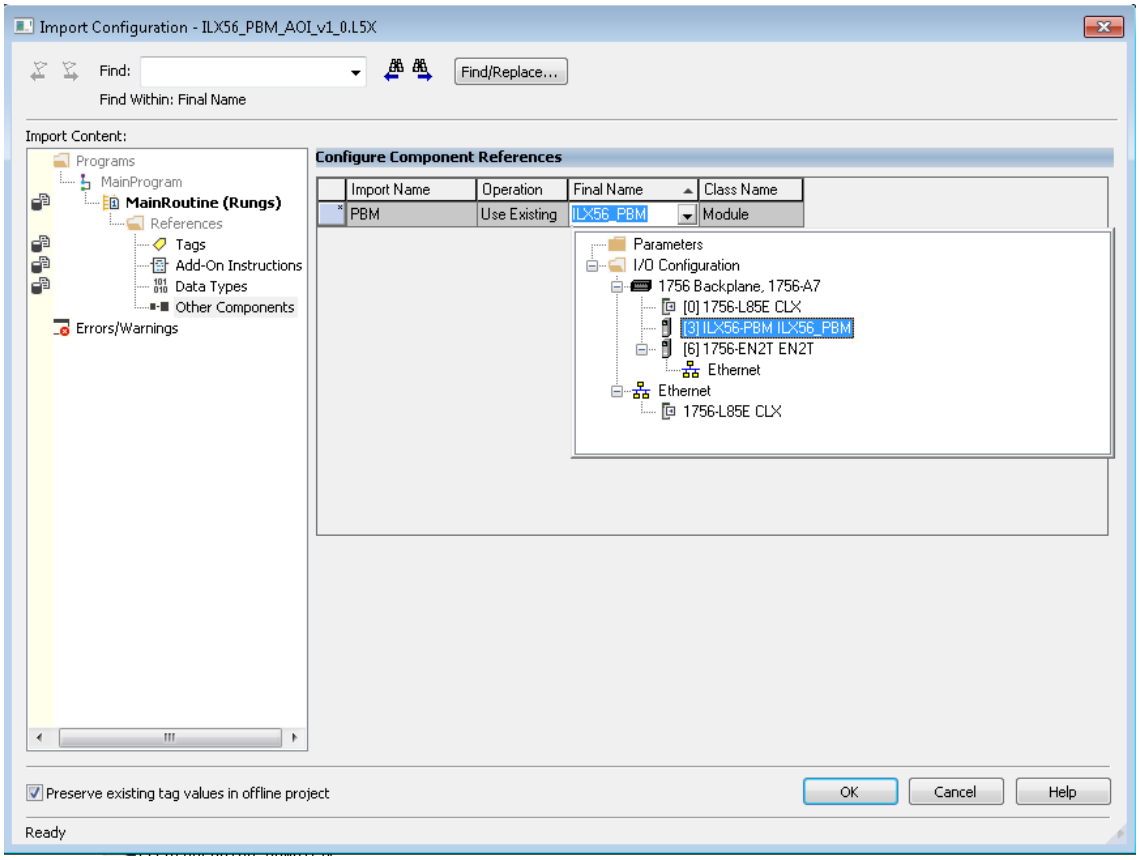


Figure 3.76 – Verifying the module name

Click **OK** to perform the import. When it is completed the Add-On Instruction rung will appear in the ladder.

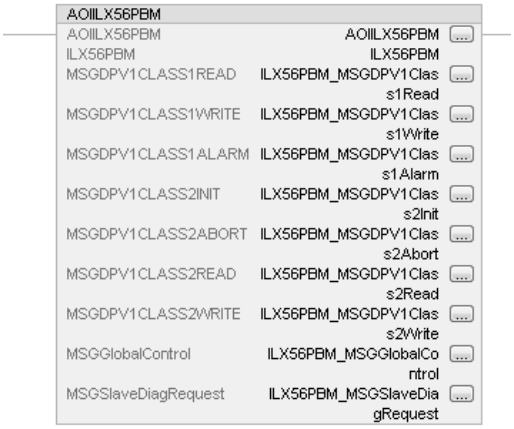


Figure 3.77 – Add-On Instruction rung in the ladder

Under the **Controller** folder, click the **Controller Tags**, and you are able to see the UDT's and controller tags that are imported with the Add-On Instruction.

ILX56PBM	{...}	{...}		ILX56PBM_MODULED...	
ILX56PBM.CONTROL	{...}	{...}		ILX56PBM_CONTROL	CONTROL CONTRO...
ILX56PBM.CONTROL.DPV1_Class1	{...}	{...}		ILX56PBM_CONTROL...	CONTROL CONTRO...
ILX56PBM.CONTROL.DPV1_Class1.Read	{...}	{...}		ILX56PBM_CONTROL...	CONTROL CONTRO...
ILX56PBM.CONTROL.DPV1_Class1.Write	{...}	{...}		ILX56PBM_CONTROL...	CONTROL CONTRO...
ILX56PBM.CONTROL.DPV1_Class1.Alarm	{...}	{...}		ILX56PBM_CONTROL...	DPV1 ALARM
ILX56PBM.CONTROL.DPV1_Class2	{...}	{...}		ILX56PBM_CONTROL...	CONTROL CONTRO...
ILX56PBM.CONTROL.DPV1_Class2.Init	{...}	{...}		ILX56PBM_CONTROL...	CONTROL CONTRO...
ILX56PBM.CONTROL.DPV1_Class2.Abort	{...}	{...}		ILX56PBM_CONTROL...	CONTROL CONTRO...
ILX56PBM.CONTROL.DPV1_Class2.Read	{...}	{...}		ILX56PBM_CONTROL...	CONTROL CONTRO...
ILX56PBM.CONTROL.DPV1_Class2.Write	{...}	{...}		ILX56PBM_CONTROL...	CONTROL CONTRO...
ILX56PBM.CONTROL.SlaveDiagnostics	{...}	{...}		ILX56PBM_CONTROL...	DPV1 DIAGNOSTICS
ILX56PBM.CONTROL.SlaveDiagnostics.Initiate	0		Decimal	BOOL	Initiate DPV1 Slave R...
ILX56PBM.CONTROL.SlaveDiagnostics.MSGStatus	{...}	{...}		ILX56PBM_MESSAGE_...	Message Status
ILX56PBM.CONTROL.SlaveDiagnostics.Request	{...}	{...}		ILX56PBM_CONTROL...	Request
ILX56PBM.CONTROL.SlaveDiagnostics.Response	{...}	{...}		ILX56PBM_CONTROL...	Response
ILX56PBM.CONTROL.GlobalControl	{...}	{...}		ILX56PBM_CONTROL...	DPV1 GLOBAL
ILX56PBM.CONTROL.GlobalControl.Initiate	0		Decimal	BOOL	Initiate DPV1 Slave R...
ILX56PBM.CONTROL.GlobalControl.MSGStatus	{...}	{...}		ILX56PBM_MESSAGE_...	Message Status
ILX56PBM.CONTROL.GlobalControl.Request	{...}	{...}		ILX56PBM_CONTROL...	Request
ILX56PBM.CONTROL.GlobalControl.Response	{...}	{...}		ILX56PBM_CONTROL...	Response
ILX56PBM_MSGDPV1Class1Alarm	{...}	{...}		MESSAGE	

Figure 3.78 – UDTs and controller tags

To perform Class 3 messaging with the AOI, you must first ensure that the module is in the OPERATIONAL state and exchanging data with its configured nodes. Navigate to the Controller Tag of the acyclic function you want to perform, and first verify that the Request parameters of the function are correct.

ILX56PBM.CONTROL.DPV1_Class1.Read	{...}
ILX56PBM.CONTROL.DPV1_Class1.Read.Initiate	0
ILX56PBM.CONTROL.DPV1_Class1.Read.MSGStatus	{...}
ILX56PBM.CONTROL.DPV1_Class1.Read.MSGStatus.Done	0
ILX56PBM.CONTROL.DPV1_Class1.Read.MSGStatus.Error	0
ILX56PBM.CONTROL.DPV1_Class1.Read.MSGStatus.DoneCount	0
ILX56PBM.CONTROL.DPV1_Class1.Read.MSGStatus.ErrorCount	0
ILX56PBM.CONTROL.DPV1_Class1.Read.Request	{...}
ILX56PBM.CONTROL.DPV1_Class1.Read.Request.Timeout	4000
ILX56PBM.CONTROL.DPV1_Class1.Read.Request.SlaveAddress	2
ILX56PBM.CONTROL.DPV1_Class1.Read.Request.SlotNumber	1
ILX56PBM.CONTROL.DPV1_Class1.Read.Request.Index	1
ILX56PBM.CONTROL.DPV1_Class1.Read.Request.Length	10
ILX56PBM.CONTROL.DPV1_Class1.Read.Response	{...}
ILX56PBM.CONTROL.DPV1_Class1.Write	{...}

Figure 3.79 – Request parameters

Once you have confirmed that the Request parameters are correct, enter a value of 1 in the *Initiate* tag and the Class 3 message will send.

ILX56PBM.CONTROL.DPV1_Class1.Read	{...}
ILX56PBM.CONTROL.DPV1_Class1.Read.Initiate	1
ILX56PBM.CONTROL.DPV1_Class1.Read.MSGStatus	{...}
ILX56PBM.CONTROL.DPV1_Class1.Read.MSGStatus.Done	0
ILX56PBM.CONTROL.DPV1_Class1.Read.MSGStatus.Error	0
ILX56PBM.CONTROL.DPV1_Class1.Read.MSGStatus.DoneCount	0
ILX56PBM.CONTROL.DPV1_Class1.Read.MSGStatus.ErrorCount	0
ILX56PBM.CONTROL.DPV1_Class1.Read.Request	{...}
ILX56PBM.CONTROL.DPV1_Class1.Read.Request.Timeout	4000
ILX56PBM.CONTROL.DPV1_Class1.Read.Request.SlaveAddress	2
ILX56PBM.CONTROL.DPV1_Class1.Read.Request.SlotNumber	1
ILX56PBM.CONTROL.DPV1_Class1.Read.Request.Index	1
ILX56PBM.CONTROL.DPV1_Class1.Read.Request.Length	10
ILX56PBM.CONTROL.DPV1_Class1.Read.Response	{...}

Figure 3.80 – Initiate tag

You can confirm that the message was sent and successful by monitoring the *MSGStatus* tag.

ILX56PBM.CONTROL.DPV1_Class1.Read	{...}
ILX56PBM.CONTROL.DPV1_Class1.Read.Initiate	0
ILX56PBM.CONTROL.DPV1_Class1.Read.MSGStatus	{...}
ILX56PBM.CONTROL.DPV1_Class1.Read.MSGStatus.Done	1
ILX56PBM.CONTROL.DPV1_Class1.Read.MSGStatus.Error	0
ILX56PBM.CONTROL.DPV1_Class1.Read.MSGStatus.DoneCount	1
ILX56PBM.CONTROL.DPV1_Class1.Read.MSGStatus.ErrorCount	0
ILX56PBM.CONTROL.DPV1_Class1.Read.Request	{...}
ILX56PBM.CONTROL.DPV1_Class1.Read.Request.Timeout	4000
ILX56PBM.CONTROL.DPV1_Class1.Read.Request.SlaveAddress	2
ILX56PBM.CONTROL.DPV1_Class1.Read.Request.SlotNumber	1
ILX56PBM.CONTROL.DPV1_Class1.Read.Request.Index	1
ILX56PBM.CONTROL.DPV1_Class1.Read.Request.Length	10
ILX56PBM.CONTROL.DPV1_Class1.Read.Response	{...}

Figure 3.81 – MSGStatus tag

The configured slave's response to the Class 3 message will be shown in the Response tag.

ILX56PBM.CONTROL.DPV1_Class1.Read	{...}
ILX56PBM.CONTROL.DPV1_Class1.Read.Initiate	0
ILX56PBM.CONTROL.DPV1_Class1.Read.MSGStatus	{...}
ILX56PBM.CONTROL.DPV1_Class1.Read.Request	{...}
ILX56PBM.CONTROL.DPV1_Class1.Read.Request.Timeout	4000
ILX56PBM.CONTROL.DPV1_Class1.Read.Request.SlaveAddress	2
ILX56PBM.CONTROL.DPV1_Class1.Read.Request.SlotNumber	1
ILX56PBM.CONTROL.DPV1_Class1.Read.Request.Index	1
ILX56PBM.CONTROL.DPV1_Class1.Read.Request.Length	10
ILX56PBM.CONTROL.DPV1_Class1.Read.Response	{...}
ILX56PBM.CONTROL.DPV1_Class1.Read.Response.Status	0
ILX56PBM.CONTROL.DPV1_Class1.Read.Response.ExtendedStatus1	0
ILX56PBM.CONTROL.DPV1_Class1.Read.Response.ExtendedStatus2	0
ILX56PBM.CONTROL.DPV1_Class1.Read.Response.ExtendedStatus3	0
ILX56PBM.CONTROL.DPV1_Class1.Read.Response.DataLength	16#10
ILX56PBM.CONTROL.DPV1_Class1.Read.Response.Reserved	16#00
ILX56PBM.CONTROL.DPV1_Class1.Read.Response.Data	16#55
ILX56PBM.CONTROL.DPV1_Class1.Read.Response.Data1	16#23
ILX56PBM.CONTROL.DPV1_Class1.Read.Response.Data2	16#11
ILX56PBM.CONTROL.DPV1_Class1.Read.Response.Data3	16#03
ILX56PBM.CONTROL.DPV1_Class1.Read.Response.Data4	16#65
ILX56PBM.CONTROL.DPV1_Class1.Read.Response.Data5	16#22
ILX56PBM.CONTROL.DPV1_Class1.Read.Response.Data6	16#01
ILX56PBM.CONTROL.DPV1_Class1.Read.Response.Data7	16#05
ILX56PBM.CONTROL.DPV1_Class1.Read.Response.Data8	16#08
ILX56PBM.CONTROL.DPV1_Class1.Read.Response.Data9	16#02
ILX56PBM.CONTROL.DPV1_Class1.Read.Response.Data10	16#00
ILX56PBM.CONTROL.DPV1_Class1.Read.Response.Data11	16#00

Figure 3.82 – Slave response

Repeat these steps for all of the other acyclic messaging functions in the ILX56-PBM.

4 SD Card

The ILX56-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.

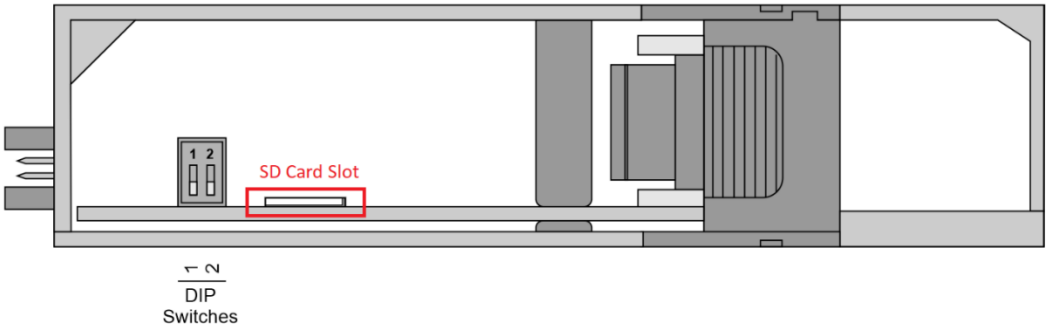


Figure 4.1 – Module Bottom View – SD Card Slot

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.

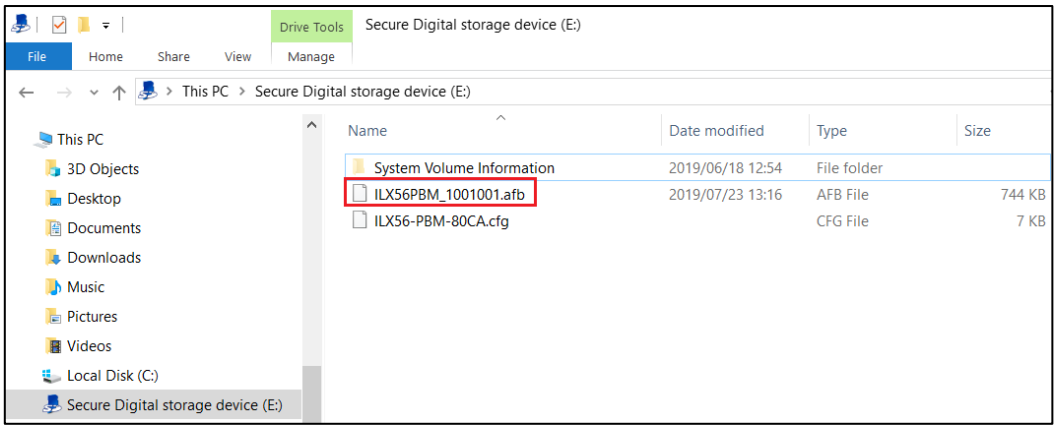


Figure 4.2 – SD Card – Firmware file

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 ILX56-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.

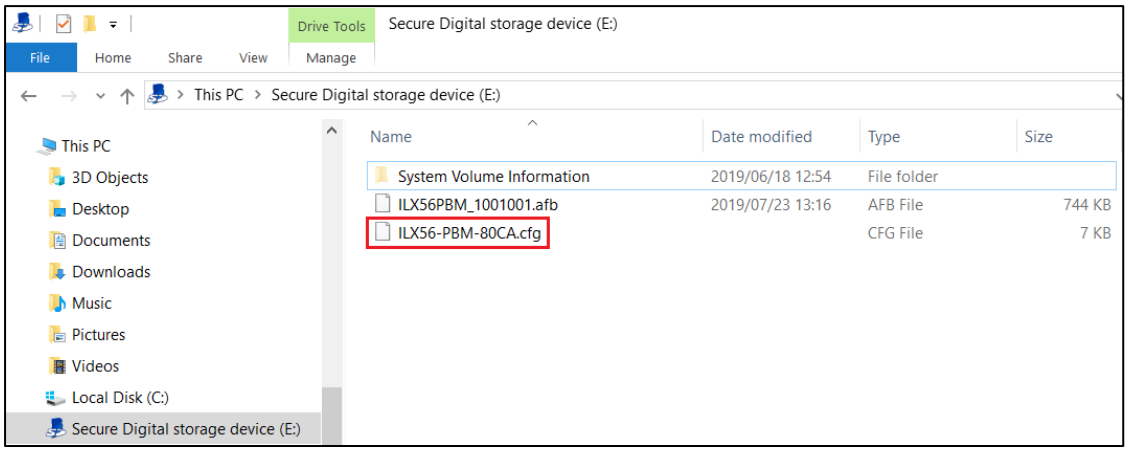


Figure 4.3 – SD Card – Configuration file

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.

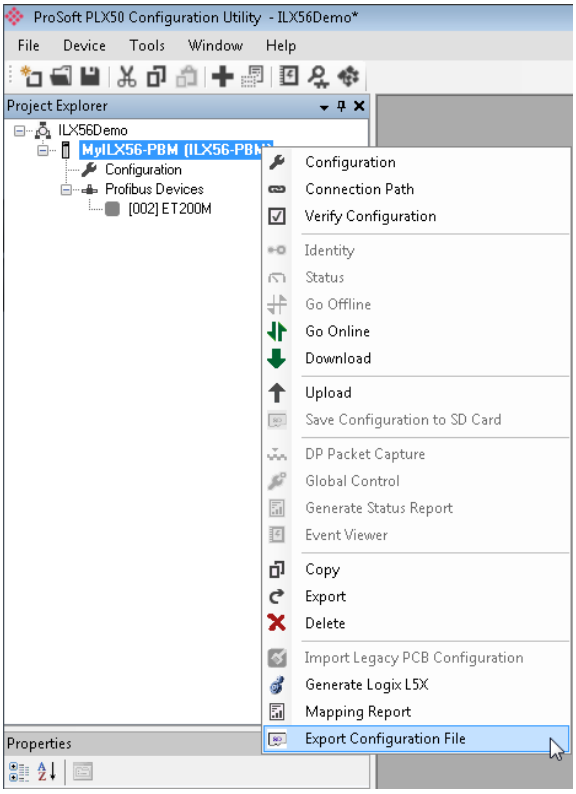


Figure 4.4 – Configuration Export for SD Card

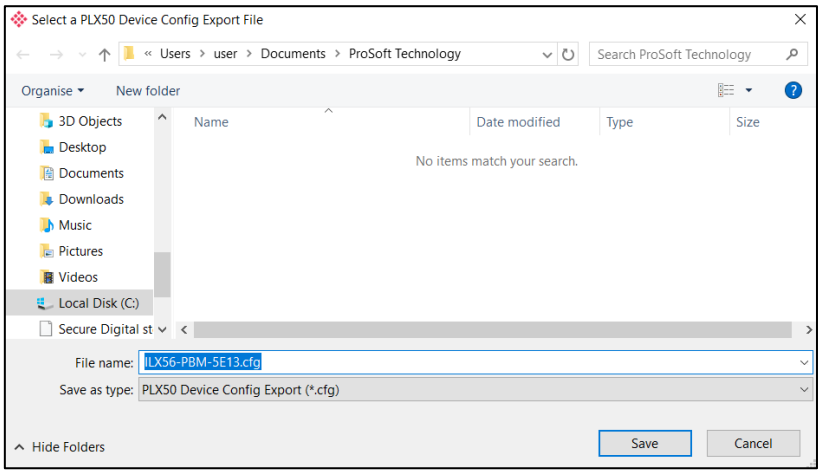


Figure 4.5 – Configuration Export for SD Card

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 ILX56-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.

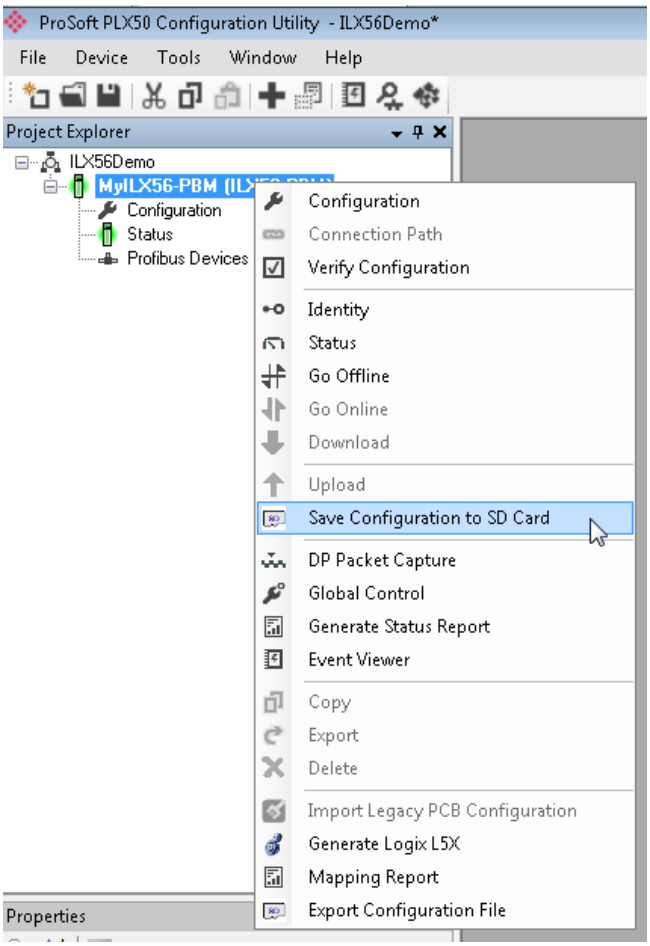


Figure 4.6 – Save Configuration to SD Card

5 Operation

5.1 Logix Operation

When the ILX56-PBM has been configured for Logix communication it will exchange data with a Logix controller by adding the ILX56-PBM in the IO tree and establishing a Class 1 connection.

5.1.1 PROFIBUS DP - Master

Once the ILX56-PBM and Logix controller have been correctly configured, the ILX56-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 bytes. The imported Logix routine (generated by PLX50CU) will copy this data between the decorated tags (UDT) and the input and output assemblies.

Master Status

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

Local:3:I1	{...}	{...}		PS:ILX56_PBM:I1:0
Local:3:I1.ConnectionFaulted	0		Decimal	BOOL
Local:3:I1.ModuleStatus	16#0000_0513		Hex	DINT
Local:3:I1.ConfigValid	16#1		Hex	BOOL
Local:3:I1.Owned	16#1		Hex	BOOL
Local:3:I1.DuplicateDPStation	16#0		Hex	BOOL
Local:3:I1.ProfibusFieldBusError	16#0		Hex	BOOL
Local:3:I1.ProfibusDeviceError	16#1		Hex	BOOL
Local:3:I1.ProfibusOffline	16#0		Hex	BOOL
Local:3:I1.ProfibusStopped	16#0		Hex	BOOL
Local:3:I1.ProfibusClear	16#0		Hex	BOOL
Local:3:I1.ProfibusOperational	16#1		Hex	BOOL
Local:3:I1.SlaveMode	16#0		Hex	BOOL
Local:3:I1.ControllerRun	16#1		Hex	BOOL
Local:3:I1.ModuleRedundancyEnabled	16#0		Hex	BOOL
Local:3:I1.ModuleRedundancyStatus	16#0		Hex	BOOL
Local:3:I1.ConfigCRC	16#2e95		Hex	INT
Local:3:I1.ActiveNodeCount	124		Decimal	SINT
Local:3:I1.SwitchOverTimeOut	10		Decimal	INT
Local:3:I1.DeviceLiveList	{...}	{...}		PS:OnlineSlaves:I:0
Local:3:I1.DeviceDataExchangeActive	{...}	{...}		PS:DataExchangeActi...
Local:3:I1.DeviceDeviceAlarmPending...	{...}	{...}		PS:PendingAlarmsSla...
Local:3:I1.DeviceDiagnosticPendingFla...	{...}	{...}		PS:DiagnosticsPendin...

Figure 5.1 – Logix Master Status tags

Table 5.1 – Logix Master Status tags

Tag	Description
ConnectionFaulted	Indicates if a connection fault has been detected. 1 – Connection fault 0 – No connection fault
Module Status	Indicates the status of the module. It reflects the status on all Bool data types in the following Controller Tags.

ConfigValid	Configuration has been downloaded to the ILX56-PBM and is being executed. 1 – ILX56-PBM has been successfully configured. 0 – ILX56-PBM is not configured.
Owned	Indicates if the ILX56-PBM is owned by a Logix Controller with a connection count similar to what has been configured in PLX50CU. 1 – ILX56-PBM is connected. 0 – ILX56-PBM is not connected.
DuplicateDPStation	Indicates that the ILX56-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 ILX56-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 ILX56-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	**For ILX56-PBM only;** the PROFIBUS network is offline and the ILX56-PBM will not communicate on the network. 1 – PROFIBUS fieldbus state is OFFLINE. 0 – PROFIBUS fieldbus state is **not** OFFLINE.
PROFIBUSStopped	**For ILX56-PBM only;** the PROFIBUS network is running and the ILX56-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	**For ILX56-PBM only;** the PROFIBUS network is running and the ILX56-PBM is communicating with all slave devices on the network, and if configured in the ILX56-PBM, the module will configure and exchange process data with each slave device. **Note:** In CLEAR mode the ILX56-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	**For ILX56-PBM only;** the PROFIBUS network is running and the ILX56-PBM is communicating with all slave devices on the network, and if configured in the ILX56-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 ILX56-PBM will emulate multiple PROFIBUS Slave devices. 1 – The ILX56-PBM is in Slave Mode. 0 – The ILX56-PBM is **not** in Slave Mode.
ControllerRun	The connected Logix controller is in RUN mode. 1 – RUN mode

	0 – PROGRAM / FAULT mode
ModuleRedundancyMode	Indicated the module has been configured for Module Redundancy. 1 – Redundancy Enabled 0 – Redundancy Disabled (Standalone)
ModuleRedundancyStatus	Indicates the Redundancy Status of the module. 1 – Active 0 – Standby
ConfigCRC	The signature of the configuration currently executing on the module.
ActiveNodeCount	The number of active and online PROFIBUS devices exchanging data with the master.
SwitchOverTimeOut	N/A
DeviceLiveList	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 ILX56-PBM Logix output assembly in the Logix controller.

Name	Value	Style	Data Type
Local:3:O1	{...}		PS:ILX56_PBM:O1:0
Local:3:O1.CommandControl	16#03	Hex	SINT
Local:3:O1.RedundancyControl	16#01	Hex	SINT
Local:3:O1.Reserved	16#0000	Hex	INT
Local:3:O1.DeviceEnable	{...}		PS:DeviceEnable:O:0
Local:3:O1.DeviceEnable.SI_enable_0	2#0000_0100	Binary	SINT
Local:3:O1.DeviceEnable.SlaveID_0	0	Decimal	BOOL
Local:3:O1.DeviceEnable.SlaveID_1	0	Decimal	BOOL
Local:3:O1.DeviceEnable.SlaveID_2	1	Decimal	BOOL
Local:3:O1.DeviceEnable.SlaveID_3	0	Decimal	BOOL
Local:3:O1.DeviceEnable.SlaveID_4	0	Decimal	BOOL
Local:3:O1.DeviceEnable.SlaveID_5	0	Decimal	BOOL
Local:3:O1.DeviceEnable.SlaveID_6	0	Decimal	BOOL
Local:3:O1.DeviceEnable.SlaveID_7	0	Decimal	BOOL
Local:3:O1.DeviceEnable.SI_enable_1	2#0000_0000	Binary	SINT
Local:3:O1.DeviceEnable.SlaveID_8	0	Decimal	BOOL
Local:3:O1.DeviceEnable.SlaveID_9	0	Decimal	BOOL
Local:3:O1.DeviceEnable.SlaveID_10	0	Decimal	BOOL
Local:3:O1.DeviceEnable.SlaveID_11	0	Decimal	BOOL
Local:3:O1.DeviceEnable.SlaveID_12	0	Decimal	BOOL
Local:3:O1.DeviceEnable.SlaveID_13	0	Decimal	BOOL

Figure 5.2 – Master Control tags

Table 5.2 – Master Control tags

Tag	Description
CommandControl	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	Used to confirm the changeover of the Active role from one module to another. 0 – Redundant module set to Standby mode. 1 – Redundant module set to Active mode. **Note:** This should be controlled by the dedicated RedundancyMaster AOI only.
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 ILX56-PBM and when the bit is off '0' the device does not exchange data with the ILX56-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 ILX56-PBM (see the *Diagnostics* section for more details), by going online with the module in the PLX50 Configuration Utility and viewing the ILX56-PBM Master and Device Diagnostics, or by viewing the input assembly of the ILX56-PBM in Logix.

Status and DPV0 Data Exchange

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

MyILX56PBM_ET200MIM1532DPV1	{...}		MyILX56PBM_...	
MyILX56PBM_ET200MIM1532DPV1.Input	{...}		MyILX56PBM_...	
MyILX56PBM_ET200MIM1532DPV1.Input.Status	{...}		PSPLX51DPSI...	
MyILX56PBM_ET200MIM1532DPV1.Input.Status.Online	0	Decimal	BOOL	Device Online (0=Offline, 1=Online)
MyILX56PBM_ET200MIM1532DPV1.Input.Status.DataExchangeActive	0	Decimal	BOOL	Data Exchange Active (0=Inactive, 1=Active)
MyILX56PBM_ET200MIM1532DPV1.Input.Status.IdentMismatch	0	Decimal	BOOL	Device Identity Mismatch (0=Ok, 1=Mismatch)
MyILX56PBM_ET200MIM1532DPV1.Input.Status.DisabledByOutputAssembly	0	Decimal	BOOL	Disabled by Output (0=Enabled, 1=Disabled)
MyILX56PBM_ET200MIM1532DPV1.Input.Status.DeviceError	0	Decimal	BOOL	Profibus Device Error (0=Ok, 1=Error)
MyILX56PBM_ET200MIM1532DPV1.Input.Status.AlarmPending	0	Decimal	BOOL	Alarm Pending (0=Not Pending, 1=Pending)
MyILX56PBM_ET200MIM1532DPV1.Input.Status.DiagnosticsPending	0	Decimal	BOOL	Diagnostics Pending (0=Not Pending, 1=Pending)
MyILX56PBM_ET200MIM1532DPV1.Input.Status.OutputAssemblyNodeAddrMismatch	0	Decimal	BOOL	Station Number Mismatch (0=Ok, 1=Mismatch)
MyILX56PBM_ET200MIM1532DPV1.Input.Status.MappingCRCMismatch	0	Decimal	BOOL	Mapping Checksum Mismatch (0=Ok, 1=Mismatch
MyILX56PBM_ET200MIM1532DPV1.Input.Status.SlaveClearOpMode	0	Decimal	BOOL	Slave Clear Operation Mode
MyILX56PBM_ET200MIM1532DPV1.Input.Status.SlaveAlarmAck	0	Decimal	BOOL	Slave Alarm Acknowledge
MyILX56PBM_ET200MIM1532DPV1.Input.Status.StationNumber	0	Decimal	SINT	Device Station Number
MyILX56PBM_ET200MIM1532DPV1.Input.Status.DeviceMappingCRC	16#0000	Hex	INT	Mapping checksum
MyILX56PBM_ET200MIM1532DPV1.Input.a6ES73271BH000AB	0	Decimal	INT	
MyILX56PBM_ET200MIM1532DPV1.Output	{...}		MyILX56PBM_...	
MyILX56PBM_ET200MIM1532DPV1.Output.Control	{...}		PSPLX51DPSI...	
MyILX56PBM_ET200MIM1532DPV1.Output.Control.StationNumber	0	Decimal	SINT	Device Station Number
MyILX56PBM_ET200MIM1532DPV1.Output.Control.AlarmTrigger	0	Decimal	BOOL	Device Alarm Trigger
MyILX56PBM_ET200MIM1532DPV1.Output.Control.DeviceMappingCRC	16#0000	Hex	INT	Mapping Checksum
MyILX56PBM_ET200MIM1532DPV1.Output.a6ES73271BH000A1	0	Decimal	INT	

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 ILX56-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 ILX56-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 ILX56-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 ILX56-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	When the ILX56-PBM is in Slave Mode; 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 Explicit Messaging

The ILX56-PBM supports DPV1 Class 1 (MS1) and Class 2 (MS2) messaging which can be used to read/write parameters in a slave device. The ILX56-PBM DPV1 communication uses unconnected messaging (UCMM) or Class 3 connected messaging. The ILX56-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 ILX56-PBM). Only the DP Master exchanging data with the slave device can read and write parameters using DPV1 MS1. Below are the Logix 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 ILX56-PBM waits for a DPV1 response before timing out and responding to the Logix 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 ILX56-PBM waits for a DPV1 response before timing out and responding to the Logix 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 Logix 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:

Note: The Source/Destination Address Length must be greater than '2'. For example, when utilizing a Source/Destination Type = 1, the Length must be 9 (API + SCL + Net Address + MAC Address)

Table 5.12 – DPV1 Class 2 Initialize Request

Parameter	Data Type	Description
Timeout	Long	The amount of time (in milliseconds) the ILX56-PBM waits for a DPV1 response before timing out and responding to the Logix request with a Timeout Status.
Slave Address	Byte	The station number of the PROFIBUS device.
Reserved	Byte[3]	-
Send Timeout	Short	Refer to the *PROFIBUS – DP Extensions to EN 50170 (DPV1)* for information regarding these parameters.
Features Supported	Short	
Profile Features Supported	Short	
Profile Ident Number	Short	
Source Type	Byte	
Source Address Length	Byte	
Destination Type	Byte	
Destination Address Length	Byte	
Source API	Byte	
Source SCL	Byte	
Source Net Address	Byte[]	
Source MAC Address	Byte[]	
Destination API	Byte	
Destination SCL	Byte	
Destination Net Address	Byte[]	
Destination MAC Address	Byte[]	

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	Refer to the *PROFIBUS – DP Extensions to EN 50170 (DPV1)* for information regarding these parameters.
Instance Reason Code	Byte	

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 ILX56-PBM waits for a DPV1 response before timing out and responding to the Logix 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 ILX56-PBM waits for a DPV1 response before timing out and responding to the Logix 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 ILX56-PBM will flag to the user when new diagnostics have been received. When new diagnostics have been flagged by the ILX56-PBM the user can extract the diagnostics message from the ILX56-PBM by using unconnected messaging (UCMM) or Class 3 connected messaging.

Notification

The ILX56-PBM will notify the user of pending diagnostics as shown below.

Master UDT

In the Status part of the ILX56-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 – ILX56-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 – ILX56-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 ILX56-PBM.
1	Read the slave device diagnostics that has been buffered in the ILX56-PBM and clear the Diagnostics Pending indication.
2	Force the ILX56-PBM to send a PROFIBUS Diagnostic Request to the specific slave device and return the diagnostics data received.

CIP Message

Below are the Logix CIP message parameters with 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	Amount of time (in ms) the ILX56-PBM waits for DPV1 response before timing out and responding to the Logix request with a Timeout Status.
Slave Address	Byte	The station number of the PROFIBUS device.
Mode	Byte	0 – Read the slave device diagnostics buffered in the ILX56-PBM. 1 – Read the slave device diagnostics that has been buffered in the ILX56-PBM and clear the Diagnostics Pending indication. 2 – Force the ILX56-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 commands which can be sent to slave devices.

CIP Message

Below are the Logix CIP message parameters with 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 ms) the ILX56-PBM waits for a response before timing out and responding to the Logix 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 ILX56-PBM will flag to the user when a new alarm has been received. When a new alarm has been flagged by the ILX56-PBM the user can extract the alarm from the ILX56-PBM by using unconnected messaging (UCMM) or Class 3 connected messaging.

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

Notification

The ILX56-PBM will notify the user of a pending alarm as shown below.

Master UDT

In the Status part of the ILX56-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 – ILX56-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 Logix 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 ILX56-PBM waits for a DPV1 response before timing out and responding to the Logix request with a Timeout Status.
Slave Address	Byte	The station number of the PROFIBUS device.

Response Data:

Table 5.36 – Alarm Extract Response

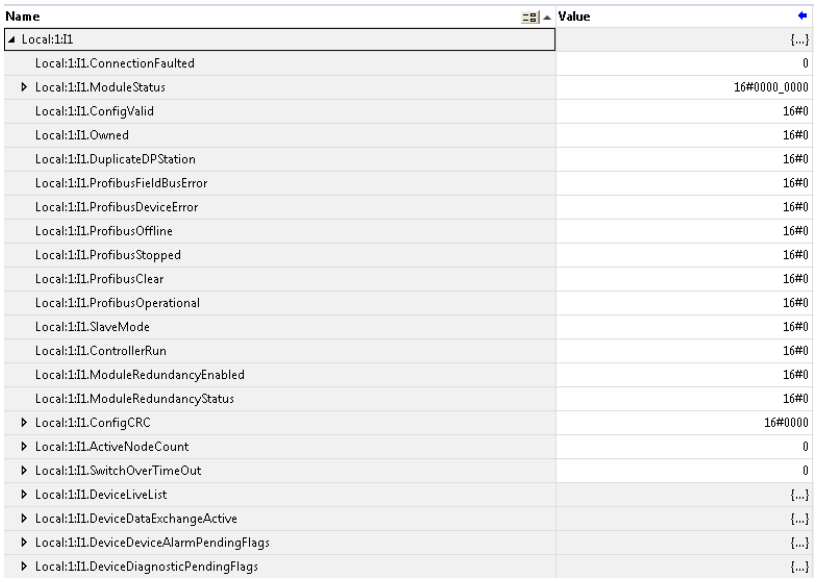
Parameter	Data Type	Description
Status	Byte	This is the status of the DPV1 data exchange. See appendix for the definitions of the returned status.
Extended Status	Byte[3]	This is the extended status of the DPV1 data exchange. See appendix for the definitions of the returned extended status.
Alarm data 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.

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.



Name	Value
Local:1:I1	{...}
Local:1:I1.ConnectionFaulted	0
Local:1:I1.ModuleStatus	16#0000_0000
Local:1:I1.ConfigValid	16#0
Local:1:I1.Owned	16#0
Local:1:I1.DuplicateDPStation	16#0
Local:1:I1.ProfibusFieldBusError	16#0
Local:1:I1.ProfibusDeviceError	16#0
Local:1:I1.ProfibusOffline	16#0
Local:1:I1.ProfibusStopped	16#0
Local:1:I1.ProfibusClear	16#0
Local:1:I1.ProfibusOperational	16#0
Local:1:I1.SlaveMode	16#0
Local:1:I1.ControllerRun	16#0
Local:1:I1.ModuleRedundancyEnabled	16#0
Local:1:I1.ModuleRedundancyStatus	16#0
Local:1:I1.ConfigCRC	16#0000
Local:1:I1.ActiveNodeCount	0
Local:1:I1.SwitchOverTimeOut	0
Local:1:I1.DeviceLiveList	{...}
Local:1:I1.DeviceDataExchangeActive	{...}
Local:1:I1.DeviceDeviceAlarmPendingFlags	{...}
Local:1:I1.DeviceDiagnosticPendingFlags	{...}

Figure 5.4 – Logix General Status tags

Table 5.37 – Logix General Status tags

Tag	Description
Module Status	Indication of the module status. It is a data type DINT Controller Tag which reflects the status on all Bool data type below this Controller Tag.
ConfigValid	Configuration has been downloaded to the ILX56-PBM and is being executed. 1 – ILX56-PBM has been successfully configured. 0 – ILX56-PBM is not configured.
Owned	Indicates if the ILX56-PBM is owned by a Logix Controller with a connection count similar to what has been configured in PLX50CU. 1 – ILX56-PBM is connected. 0 – ILX56-PBM is not connected.
DuplicateDPStation	Indicates that the ILX56-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 ILX56-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 ILX56-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	1 – PROFIBUS master is in offline mode 0 – PROFIBUS is not in offline mode
PROFIBUSStopped	1 – PROFIBUS master is in stopped mode 0 – PROFIBUS master not in stopped mode
PROFIBUSClear	1 – PROFIBUS master is in clear mode 0 – PROFIBUS master is not in clear mode
PROFIBUSOperational	1 – PROFIBUS master is in operational mode 0 – PROFIBUS master is not in operational mode
SlaveMode	When in Slave mode the ILX56-PBM will emulate multiple PROFIBUS Slave devices. 1 – The ILX56-PBM is in Slave Mode. 0 – The ILX56-PBM is **not** in Slave Mode.
ConfigCRC	The signature of the configuration currently executing on the module.
ActiveNodeCount	The number of active and online PROFIBUS devices exchanging data with the master.
SwitchOverTimeOut	N/A
DeviceLiveList	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 ILX56-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 Logix output assembly. Once the respective bit has been set in the DeviceEnable BOOL array the ILX56-PBM will become "alive" on the PROFIBUS network and will start responding to a PROFIBUS DP Master.

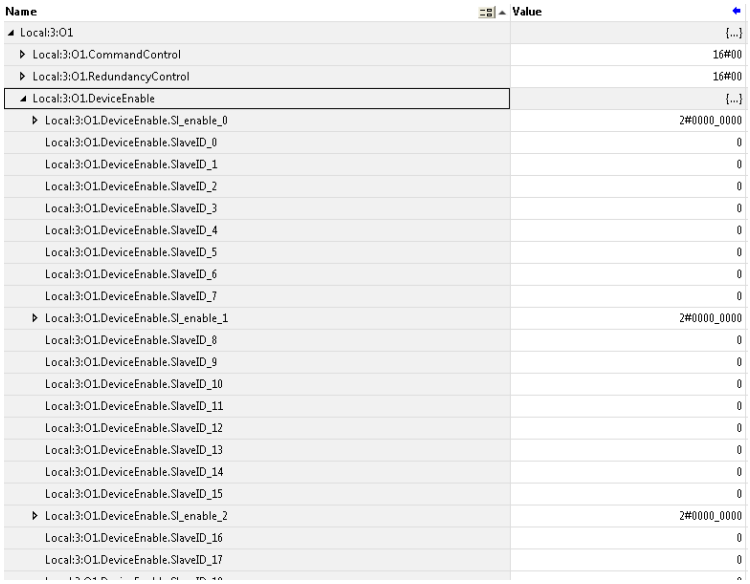


Figure 5.5 – General Control tags

Table 5.38 – General Control tags

Tag	Description
MasterControl	For ILX56-PBM only.
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 ILX56-PBM and when the bit is off '0' the device does exchange data with the ILX56-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

Note: When operating as a DP Slave the ILX56-PBM the MasterControl will not be used, but only the DeviceEnable bits.

The user will be able to see if there are any faults (e.g. configured device not found) by viewing the LEDs of the ILX56-PBM (see the *Diagnostics* section for more details), by going online with the module in the PLX50 Configuration Utility and viewing the ILX56-PBM Slave and Device Diagnostics, or by viewing the input assembly of the ILX56-PBM in Logix.

Status and DPV0 Data Exchange

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

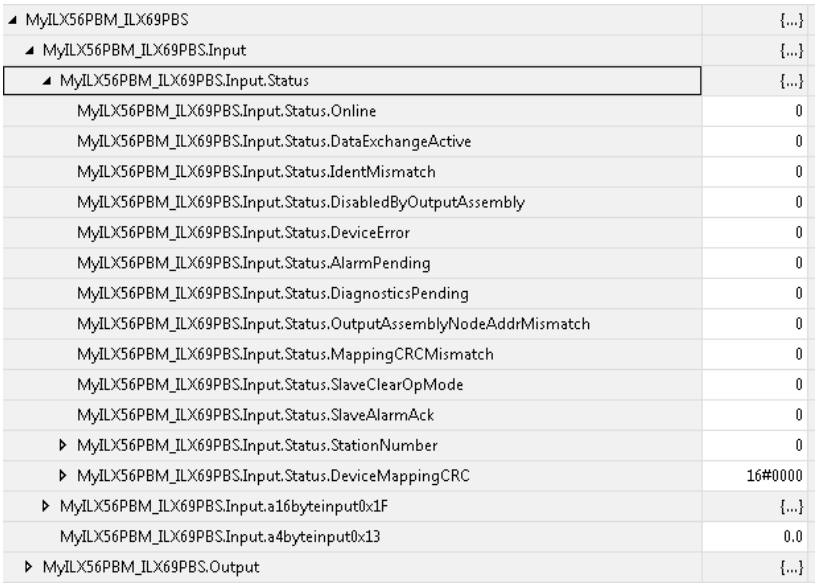


Figure 5.6 – ILX56-PBM Slave Device-Specific tag

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 ILX56-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 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 ILX56-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	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	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 the ILX56-PBM is in Slave Mode; 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 ILX56-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 ILX56-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 ILX56-PBM has been configured as a PROFIBUS Slave.

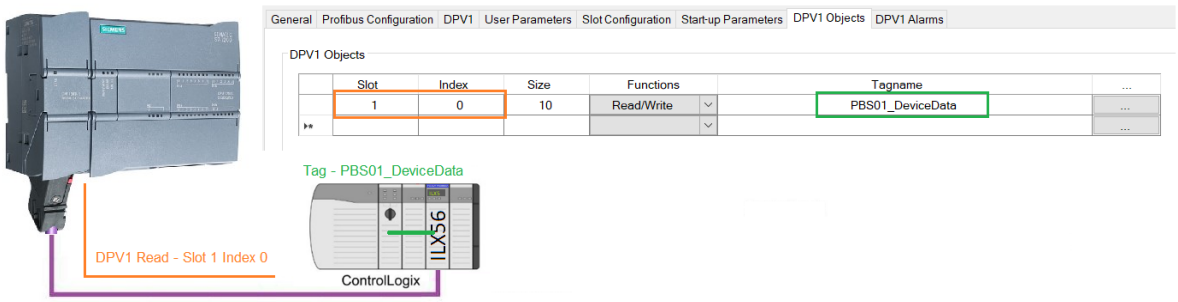


Figure 5.7 – ILX56-PBM DPV1 Object exchange

Alarming

The ILX56-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 ILX56-PBM will access the configured Logix tag to provide the required data for the specific alarm.

Note: The ILX56-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:

◢ MyILX56PBM_ILX69PBS.Output	{...}
◢ MyILX56PBM_ILX69PBS.Output.Control	{...}
▷ MyILX56PBM_ILX69PBS.Output.Control.StationNumber	2
MyILX56PBM_ILX69PBS.Output.Control.AlarmTrigger	0
▷ MyILX56PBM_ILX69PBS.Output.Control.DeviceMappingCRC	16#9591
▷ MyILX56PBM_ILX69PBS.Output.a16byteoutput0x2	{...}
MyILX56PBM_ILX69PBS.Output.a4byteoutput0x23	0.0

Figure 5.8 – ILX56-PBM Slave Alarm Trigger

Once the alarm has been triggered the ILX56-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.

◢ MyILX56PBM_ILX69PBS	{...}
◢ MyILX56PBM_ILX69PBS.Input	{...}
◢ MyILX56PBM_ILX69PBS.Input.Status	{...}
MyILX56PBM_ILX69PBS.Input.Status.Online	0
MyILX56PBM_ILX69PBS.Input.Status.DataExchangeActive	0
MyILX56PBM_ILX69PBS.Input.Status.IdentMismatch	0
MyILX56PBM_ILX69PBS.Input.Status.DisabledByOutputAssembly	0
MyILX56PBM_ILX69PBS.Input.Status.DeviceError	0
MyILX56PBM_ILX69PBS.Input.Status.AlarmPending	0
MyILX56PBM_ILX69PBS.Input.Status.DiagnosticsPending	0
MyILX56PBM_ILX69PBS.Input.Status.OutputAssemblyNodeAddrMismatch	0
MyILX56PBM_ILX69PBS.Input.Status.MappingCRCMismatch	0
MyILX56PBM_ILX69PBS.Input.Status.SlaveClearOpMode	0
MyILX56PBM_ILX69PBS.Input.Status.SlaveAlarmAck	0
▷ MyILX56PBM_ILX69PBS.Input.Status.StationNumber	0
▷ MyILX56PBM_ILX69PBS.Input.Status.DeviceMappingCRC	16#0000

Figure 5.9 – ILX56-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

Note: In the PLX50 Configuration Utility, the DPV1 Alarms *Size* byte value must be at least 4 or more than the *DPV1Alarm* (Alarm Data Length) controller tag.

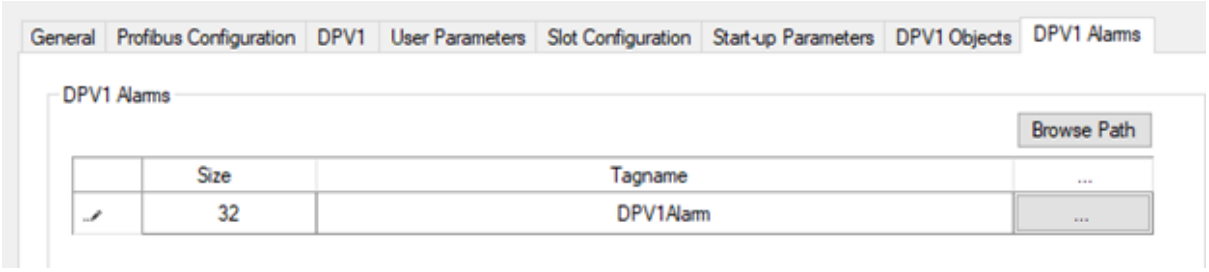


Figure 5.11 – DPV1 Alarm Size byte

Name	Value	Force	Style	Data Type	Description
DPV1Alarm	{...}	{...}	Decimal	SINT[40]	
DPV1Alarm[0]	28		Decimal	SINT	Alarm Data Length

Figure 5.12 – DPV1Alarm tag

5.2 Explicit Messaging Utility

The PLX50 Configuration Utility provides a utility to initiate explicit messages to the PROFIBUS devices via the ILX56-PBM. 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.

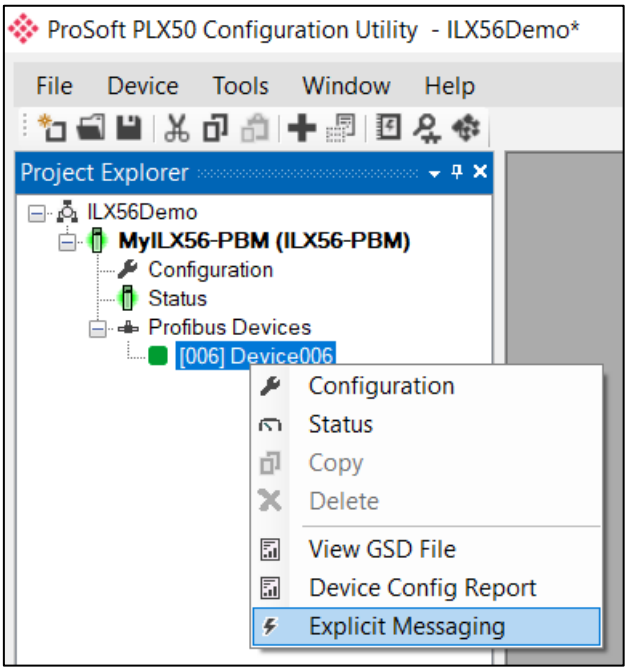


Figure 5.13 – Explicit Messaging Option

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.

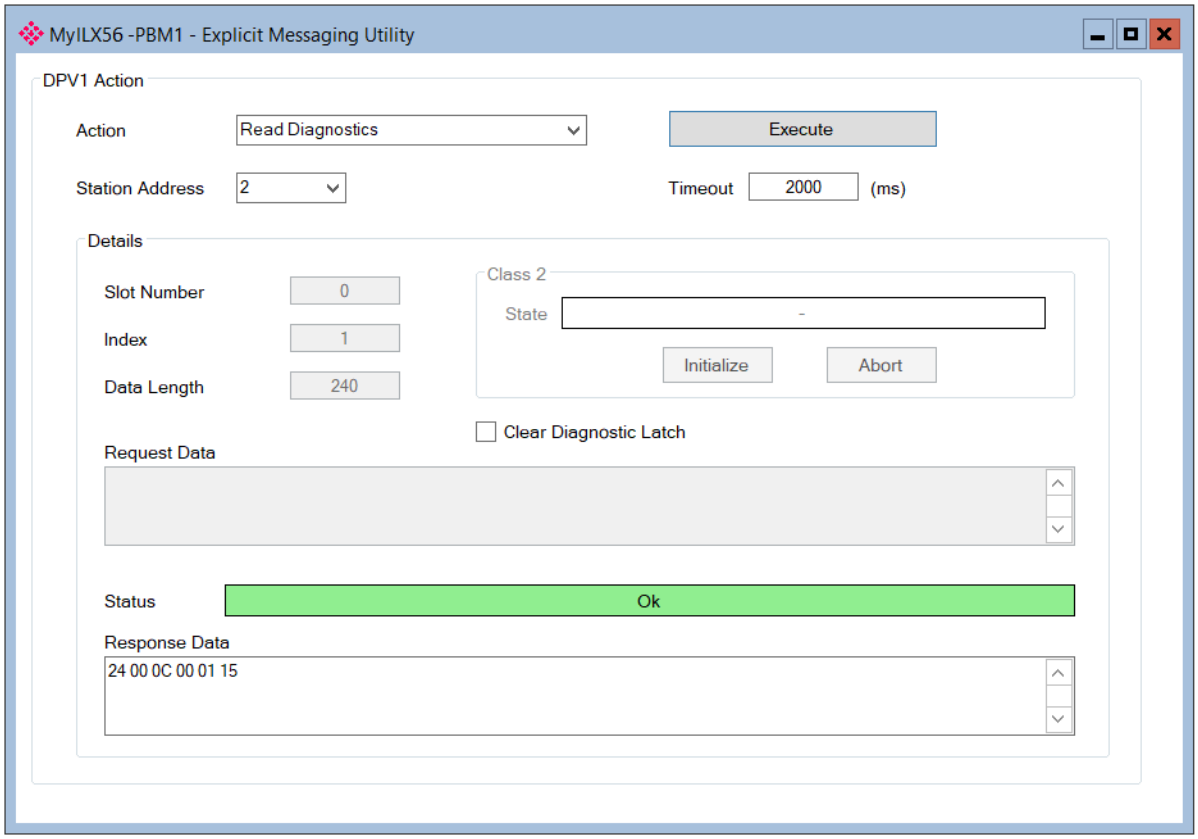


Figure 5.14 – Explicit Messaging Utility

5.3 Firmware Upgrade

The ILX56-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.

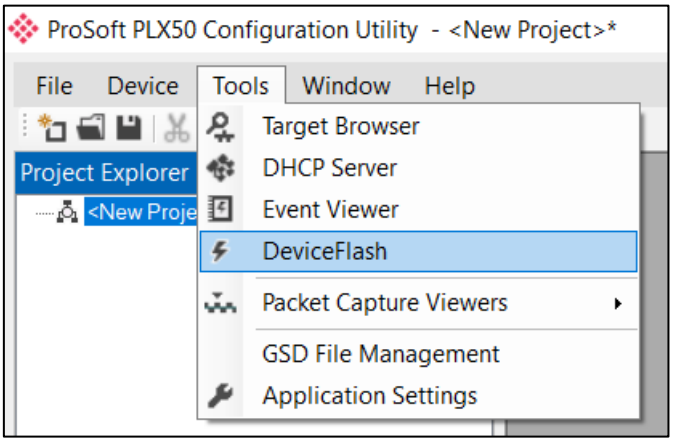


Figure 5.15 - DeviceFlash Tool

The user will need to select the appropriate AFB binary file which will be used to upgrade the ILX56-PBM firmware.

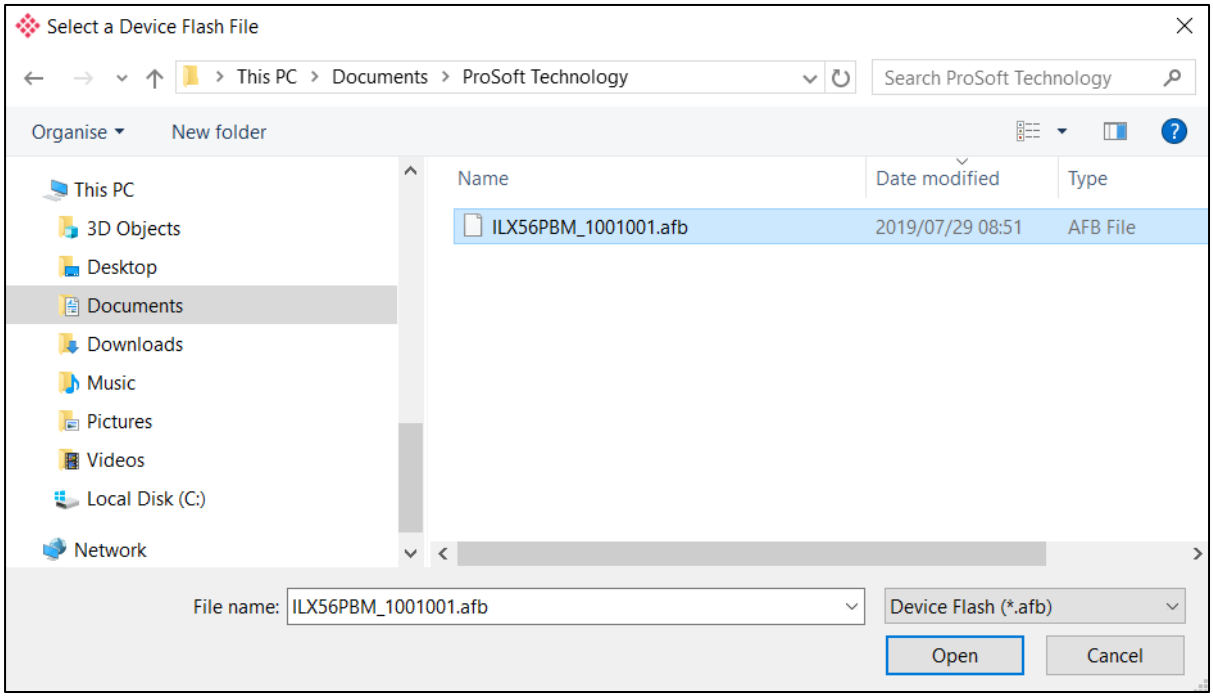


Figure 5.16 - Select the AFB binary

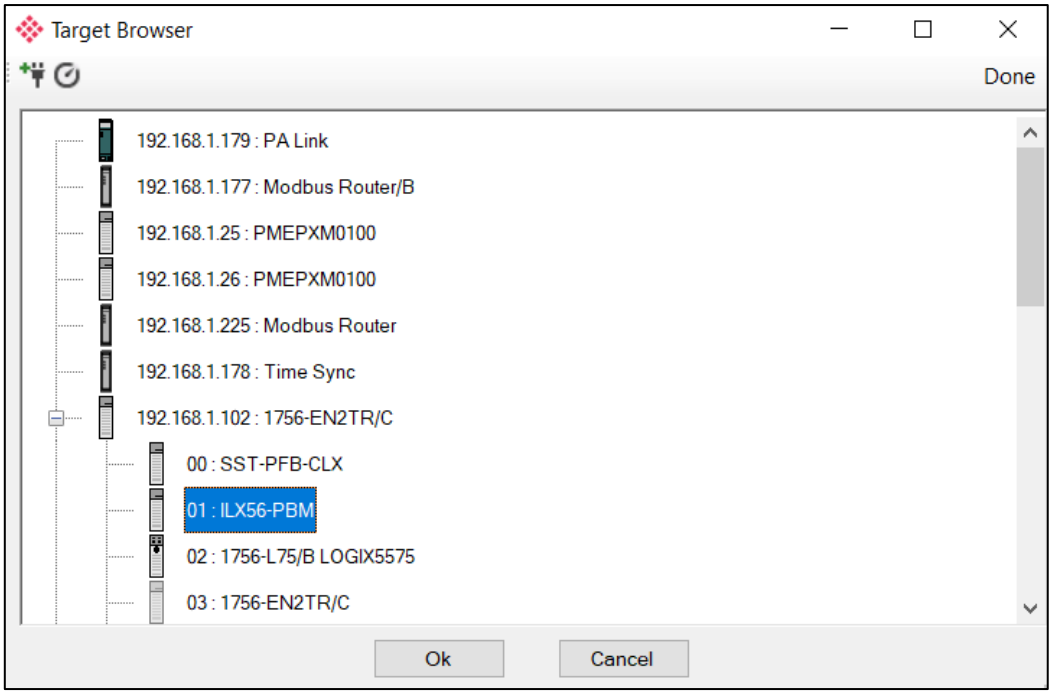


Figure 5.17 - Select the correct ILX56-PBM module

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

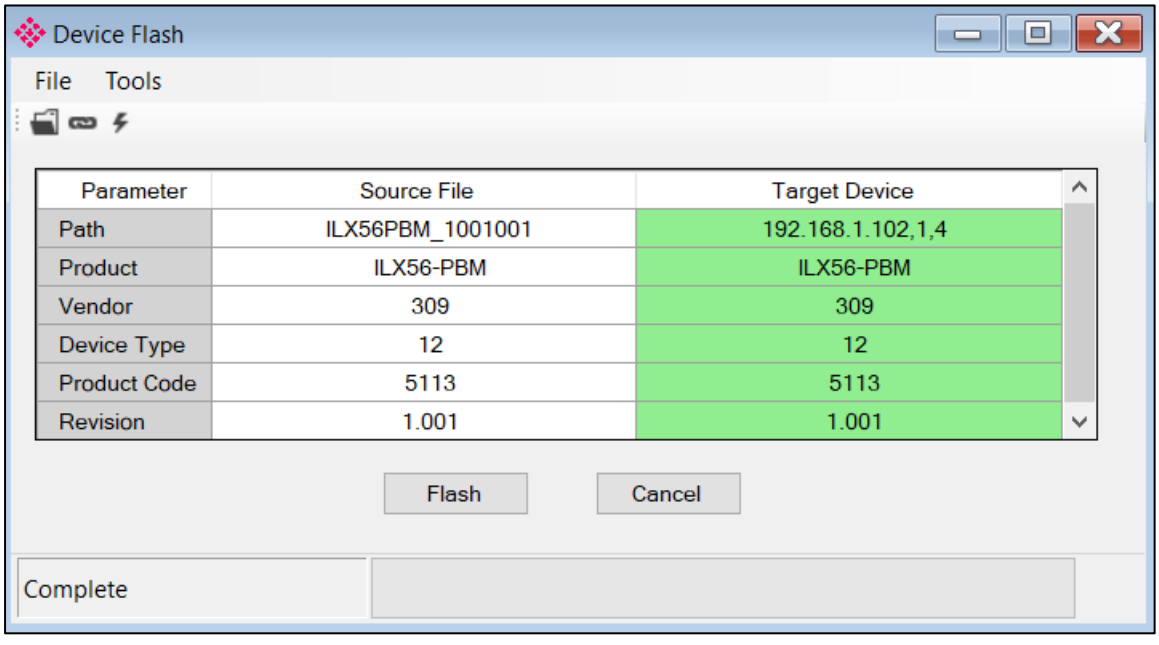


Figure 5.18 – ILX56-PBM successfully updated.

Important: The ILX56-PBM firmware is digitally signed so the user will only be able to flash the ILX56-PBM with authorized firmware.

5.4 Import Legacy PCB configuration

The ILX56-PBM allow the user to import legacy ProSoft Configuration Builder (PCB) file using the exported MVI56-PDPMV1.xml. This feature will allow the end user to save time as configuration created in the ProSoft Configuration Builder for the Profibus DP Configuration will directory be converted into ProSoft PLX50 Configuration Utility file.

1 Export the MVI56-PDPMV1's .xml file using ProSoft Configuration Builder (PCB).

2 Open PCB and double click on PROFIBUS DP icon.

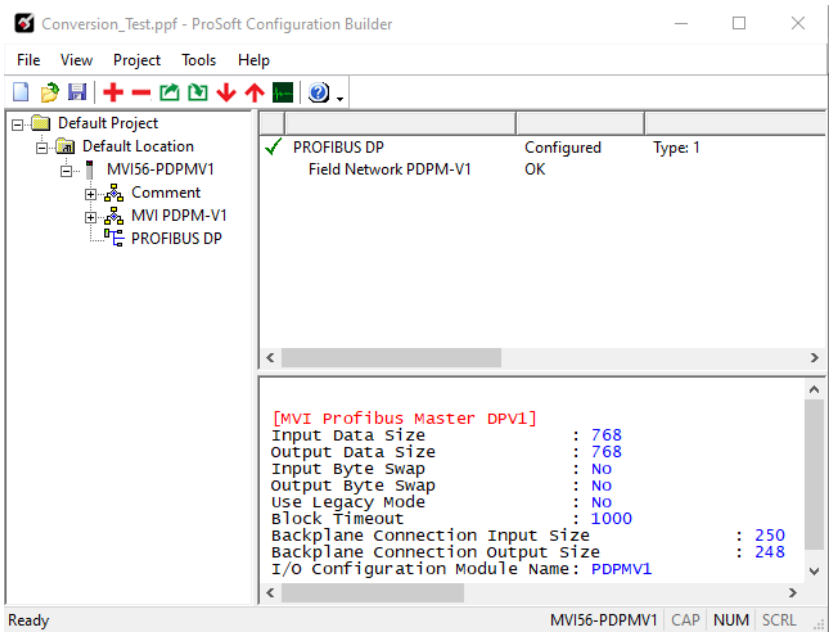


Figure 5.19 – ProSoft Configuration Builder

3 PDPMV1 PROFIBUS Master Setup window will open. Click on Export Master Config button.

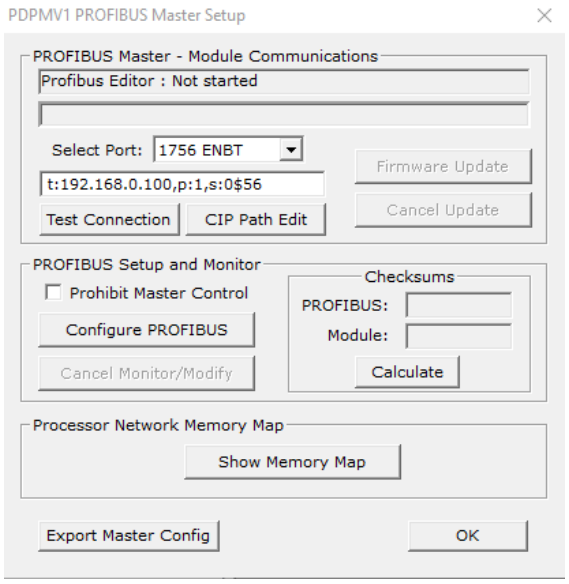


Figure 5.20 – Master Setup

4 Save the MVI56-PDPMV1.xml file in the directory where you will be able to access later with ProSoft PLX50 Configuration Utility.

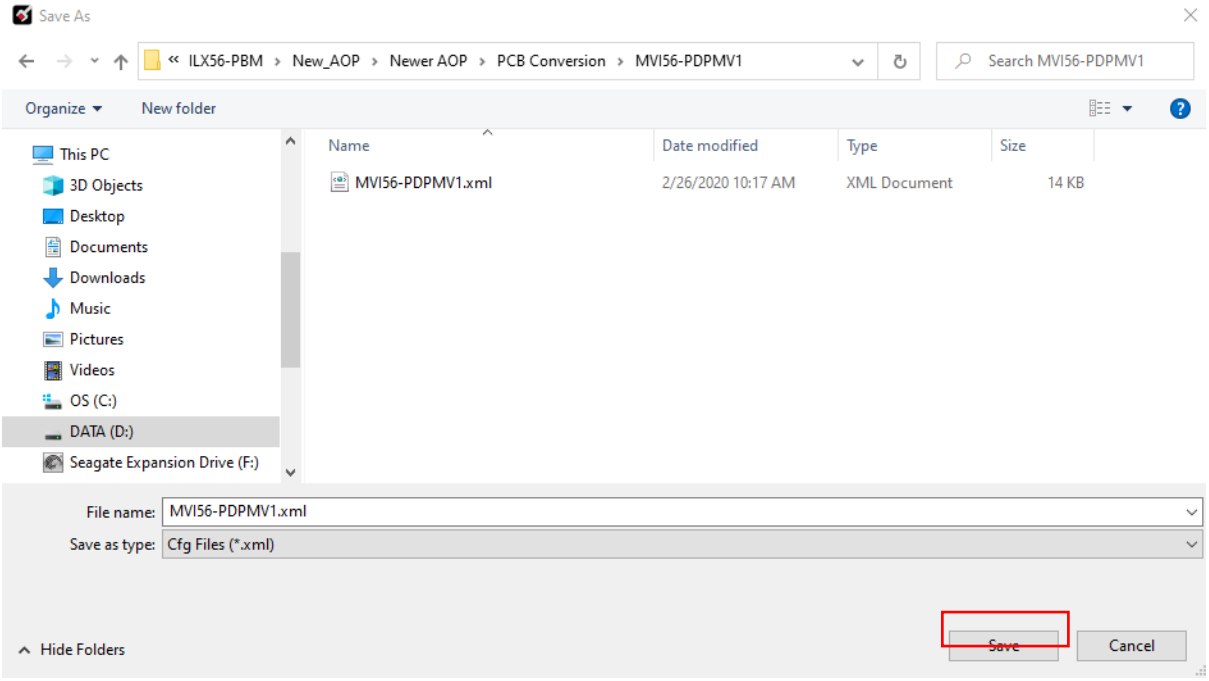


Figure 5.21 – Saving the MVI56-PDPMV1.xml file

5 Open the ProSoft PLX50 Configuration Utility software. Choose File and click New.

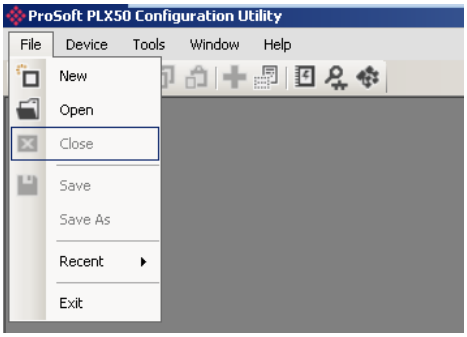


Figure 5.22 – Creating a new file

6 Right click on New Project and choose Add.

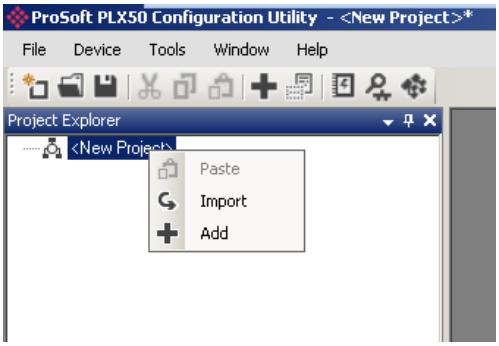


Figure 5.23 – Adding a project

7 Choose ILX56-PBM and click Ok.

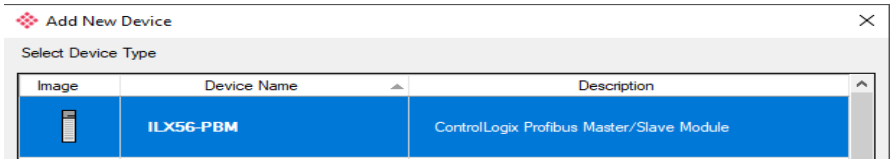


Figure 5.24 – Adding an ILX56-PBM project

8 Close the Configuration Window (ProSoft PLX50 Configuration Utility will not allow user to import legacy ProSoft Configuration Builder file unless this window is closed first)

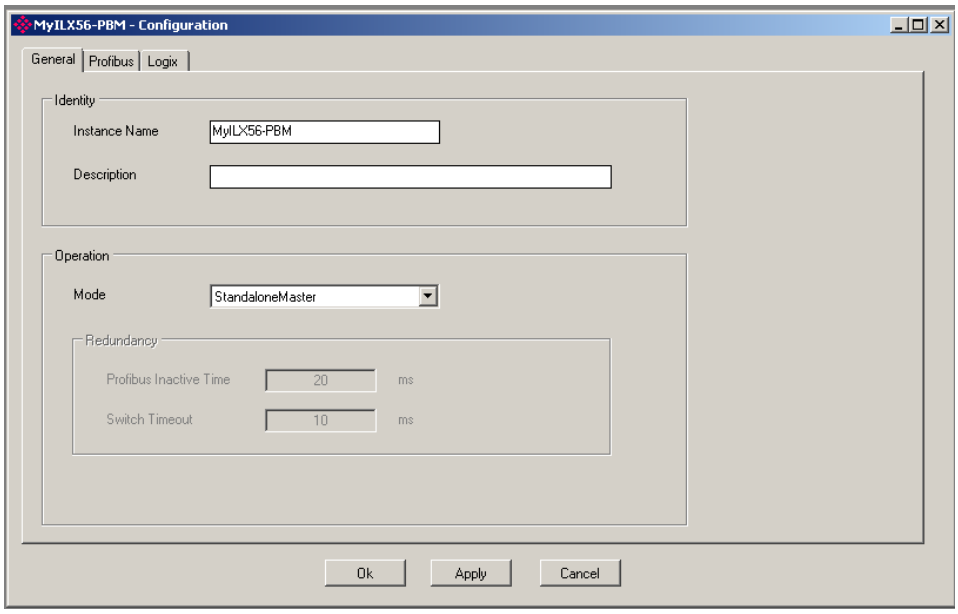


Figure 5.25 – Configuration window

9 Go to the menu bar and select Tools -> GSD File Management

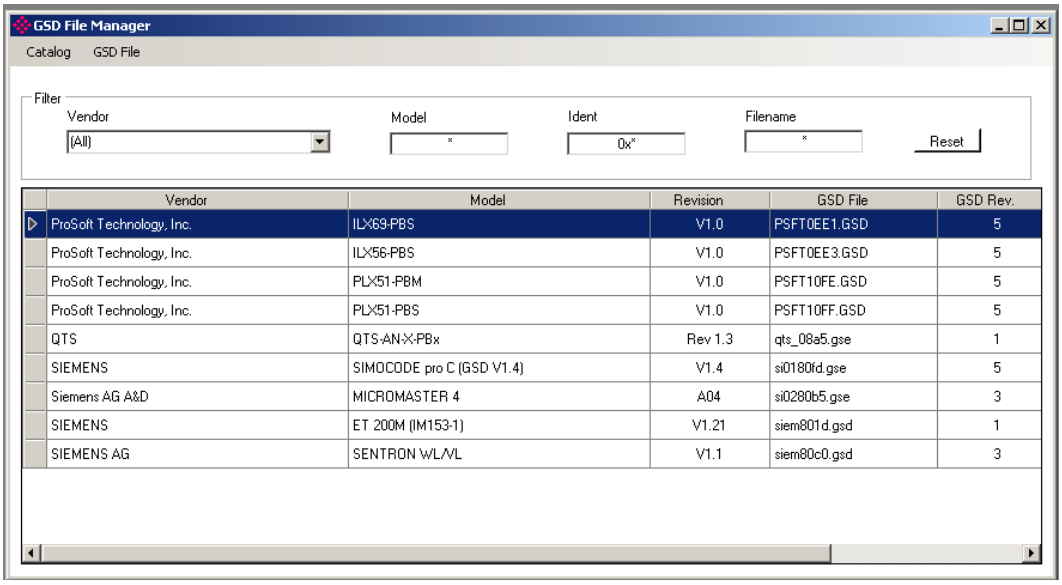


Figure 5.26 – GSD File Manager

10 Go the menu bar on the GSD file Manager Window and choose GSD File-> Add.

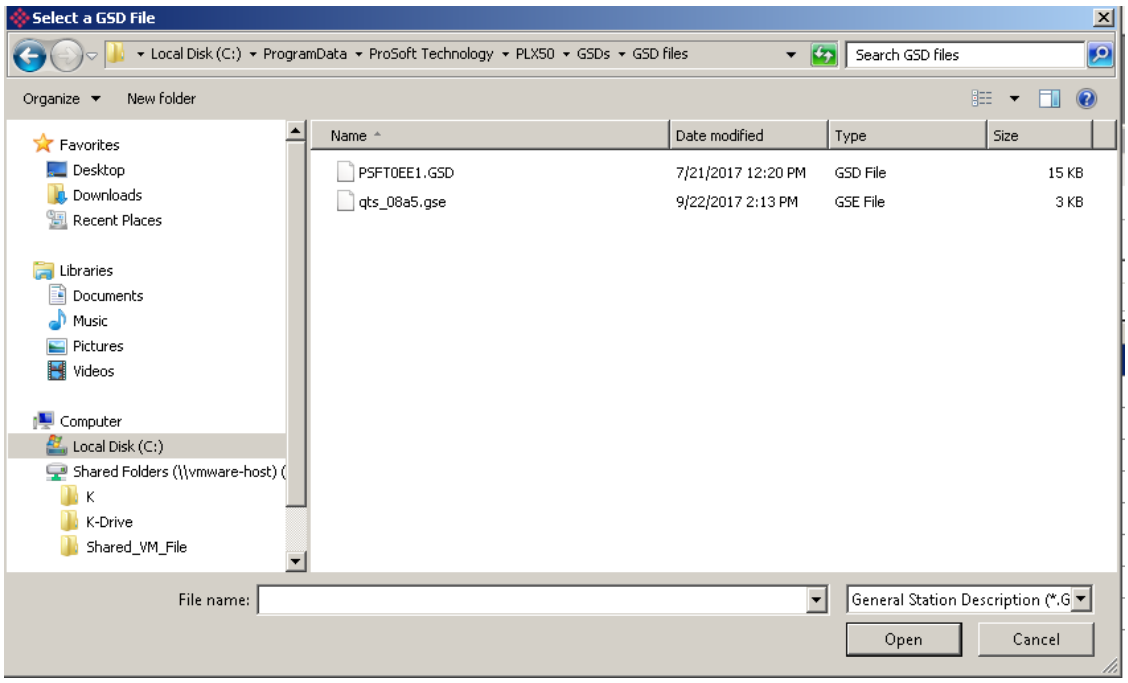


Figure 5.27 – Adding the GSD files

11 Add the GSD file(s) that are needed from the slave module(s) in the Profibus Network that were used in the original MVI56-PDPMV1 Profibus Network. Repeat this step for as many slave GSD files as needed in the Profibus Network for your application.

12 Close the GSD File Manager Window:

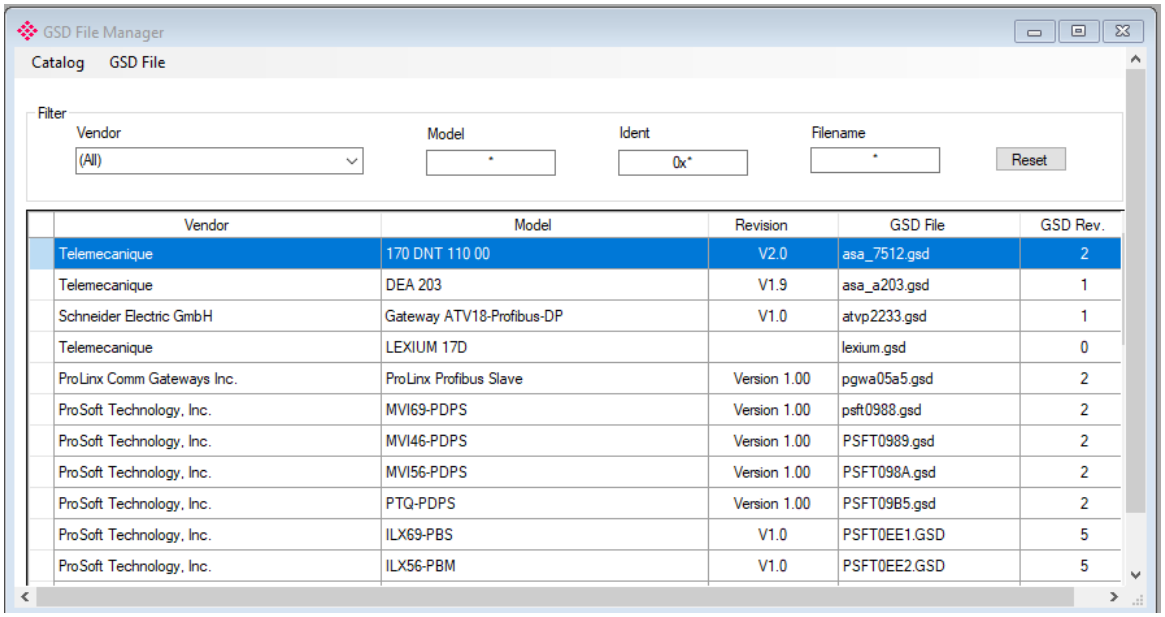


Figure 5.28 – GSD File Manager

13 In the PLX50 Configuration Utility go to the Project Explorer window and right click on the ILX56-PBM module and click on import legacy PCB Configuration.

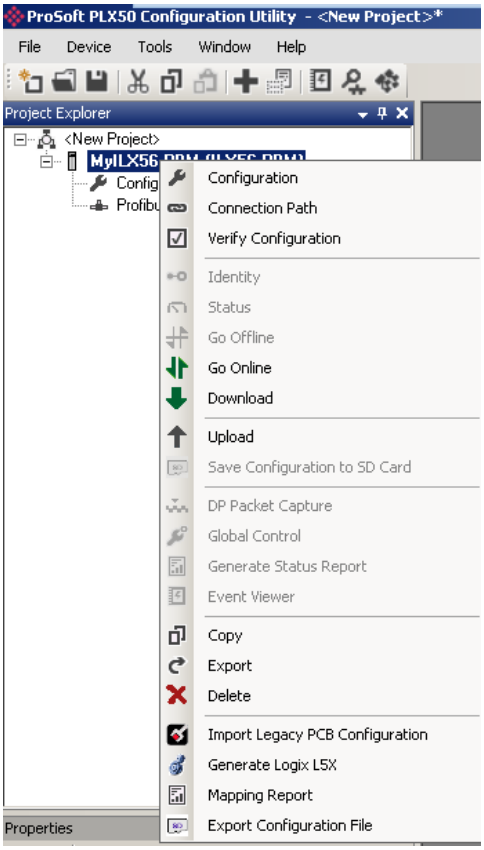


Figure 5.29 – Import Legacy PCB Configuration option

14 Select the MVI56-PDPMV1.xml you had previously saved in the previous steps and click Open.

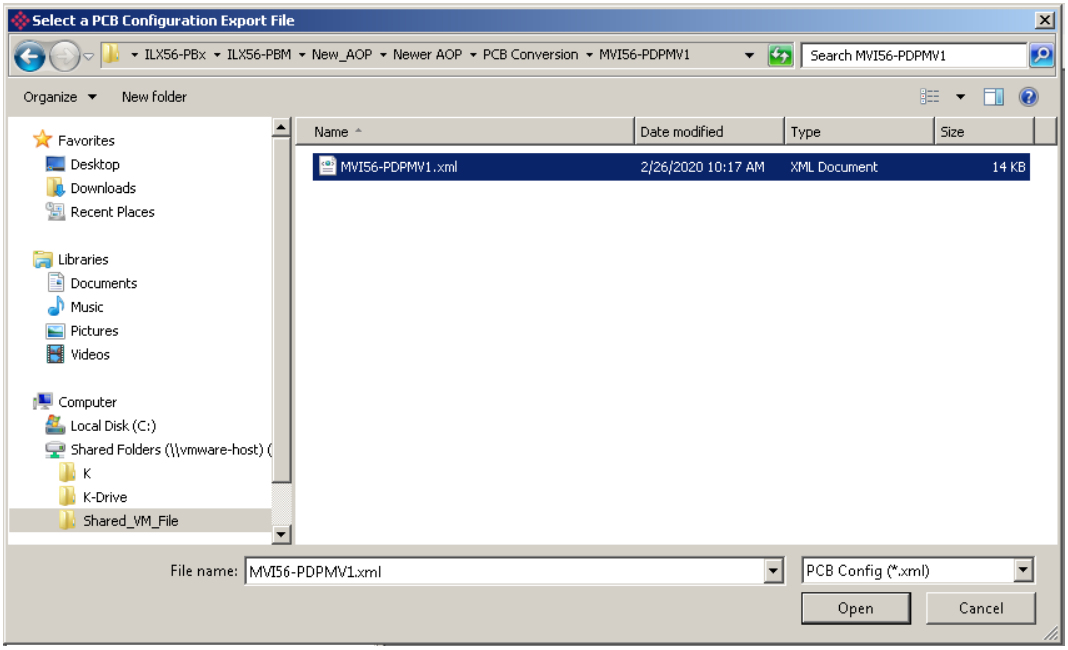
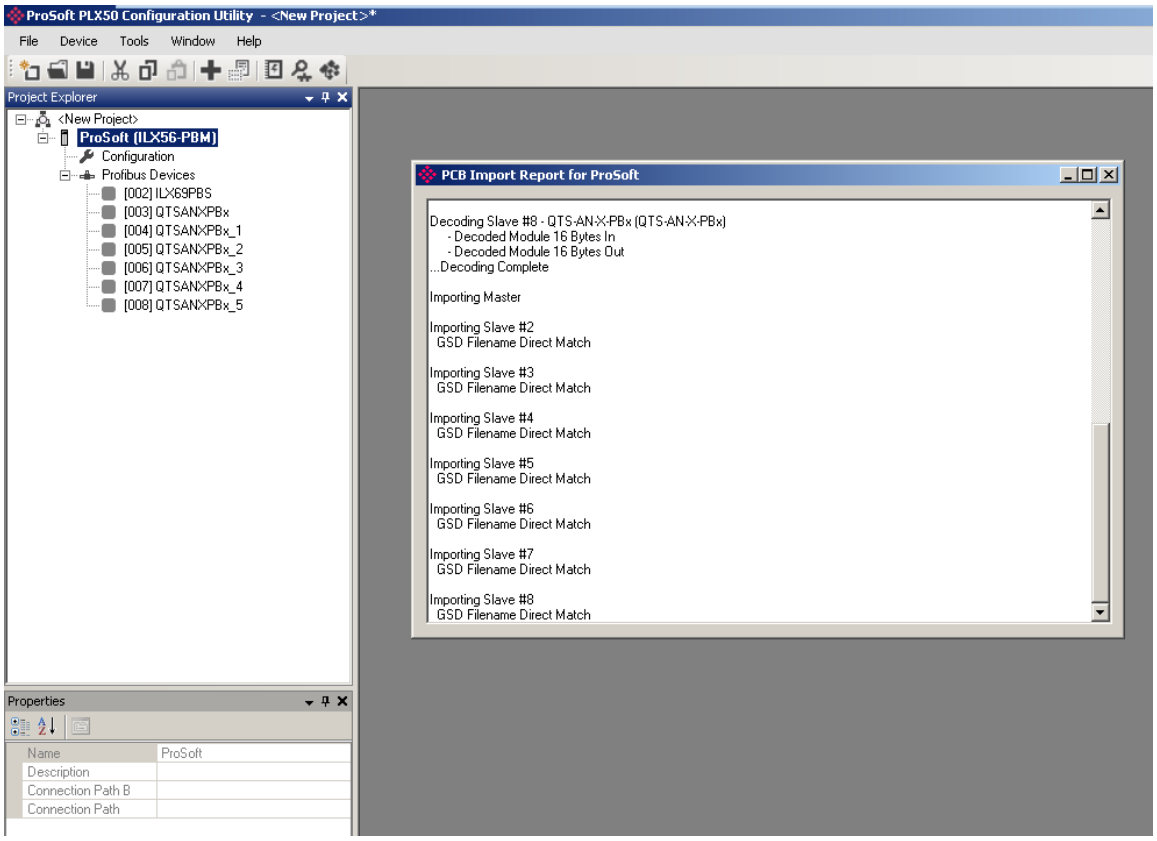


Figure 5.30 – Importing the MVI56-PDPMV1.xml file

The process of Importing Legacy PCB Configuration file is complete:



6 PROFIBUS Master Redundancy

The ILX56-PBM supports DP Master redundancy allowing two ILX56-PBM modules to be connected to the same PROFIBUS DP bus. The ILX56-PBM modules have the same configuration and operate in a one-active-one-standby strategy.

6.1 Redundancy Strategy

The ILX56-PBM redundancy strategy is based on two ILX56-PBM masters with the identical configuration. One in the ***Active*** state and the other in the ***Standby*** state.

The master selection between which ILX56-PBM module ("A" or "B") is the ***Active*** is generally made by redundancy Add-On-Instruction (AOI). However, because the switch-over of the DP Master functionality needs to happen asynchronously to the Logix AOI execution and module RPI, the Standby module will automatically take-over the Master role after it sees no valid traffic on the DP bus for a certain period. This parameter is the ***Profibus Inactive Time*** and is specified in milliseconds.

Once the Logix AOI detects the switch-over it will adjust the master selection to the new Active DP Master. This switch-over (confirmation) needs to occur within the ***Switch Timeout*** parameter to prevent the new Active master reverting to Standby and a disruption to the DP bus.

The necessary Logix code required to manage the redundancy, including the AOI is automatically generated by the PLX50 Configuration Utility.

6.2 Redundant Architecture

The figure below shows a typical redundant ILX56-PBM architecture. Both ILX56-PBM modules are connected to the same PROFIBUS DP bus.

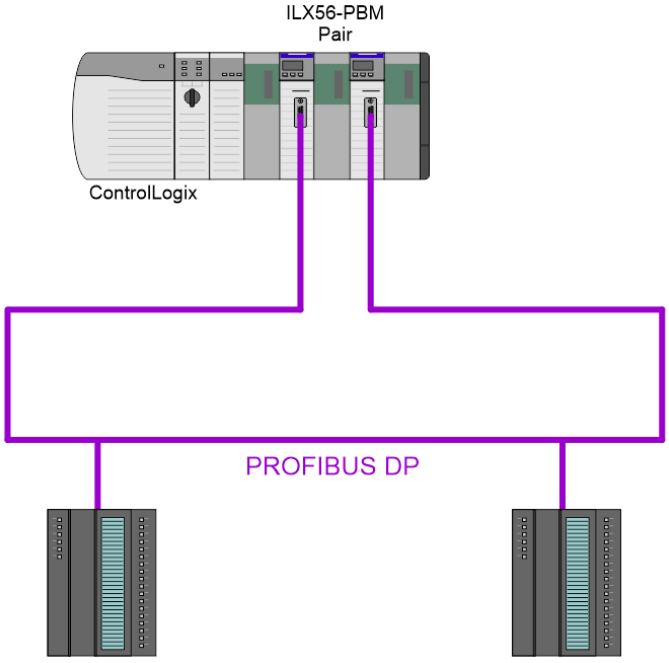


Figure 6.1 - Typical Redundant Architecture

The ILX56-PBM **modules** can be located in the same or different ControlLogix chassis.

6.3 ILX56-PBM Configuration

The configuration of a redundant ILX56-PBM is similar to that of a standalone with a few notable exceptions.

6.3.1 General Configuration

In the General tab of the ILX56-PBM configuration, set the ***Mode*** to ***Redundant Master*** and adjust the ***Profibus Inactive Time*** and ***Switch Timeout*** parameters as required.

When the ***Auto Recommend*** option is checked, then both the ***Profibus Inactive Time*** and ***Switch Timeout*** parameters will be automatically calculated when the configuration is applied. The calculation of the ***Switch Timeout*** parameter requires the user to input the module's RPI (Requested Packet Interval) as configured in the Logix IO tree.

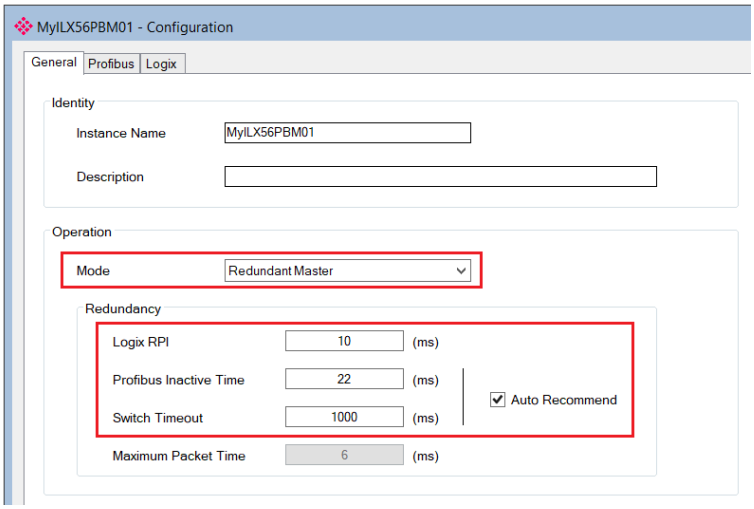


Figure 6.2 – Redundant Configuration - General

Profibus Inactive Time

The ***Profibus Inactive Time*** is used by the Standby Master to determine that there is no longer an Active master on the DP Bus. If no valid packets are received in this time, then a redundancy Switch will be triggered where the previously Standby ILX56-PBM will become Active. The parameter is specified in milliseconds.

This ***Profibus Inactive Time*** must be above the maximum DP Packet duration. The recommended value is 10 ms greater than twice the Maximum Packet Time, i.e.

Profibus Inactive Time **= 10 + (2 x Maximum Packet Time)**

The ***Maximum Packet Time*** is displayed for reference purposes.

Important: Failure to configure the ***Profibus Inactive Time*** correctly will result in unexpected behavior of the DP Master including slave devices disconnecting.

Important: The **Profibus Inactive Time** should be reconfigured after adding or modifying DP slave devices.

Important: The user will need to ensure that the ***Watchdog*** timeout for each slave device is at least three times the ***Profibus Inactive Time*** to avoid the Profibus slaves timing out the DPV0 communication.

Switch Timeout

The ***Switch Timeout*** is used by the module to override the Active / Standby command from the Logix AOI.

The ***Switch Timeout*** parameter is in milliseconds and should be the greater of 1000ms and 4 x the module RPI.

The minimum value is given as follows:

Switch Timeout = MaxOf(1000, (4 x RPI))

Important: Failure to configure the ***Switch Timeout*** correctly will result in unexpected behavior during a redundancy switch.

6.3.2 Profibus Configuration

In the *Profibus* configuration tab, ensure that the Logix Comms Fail parameter is set to Offline.

Failure to do so will cause both Masters to communicate on the DP Bus at the same time causing errors.

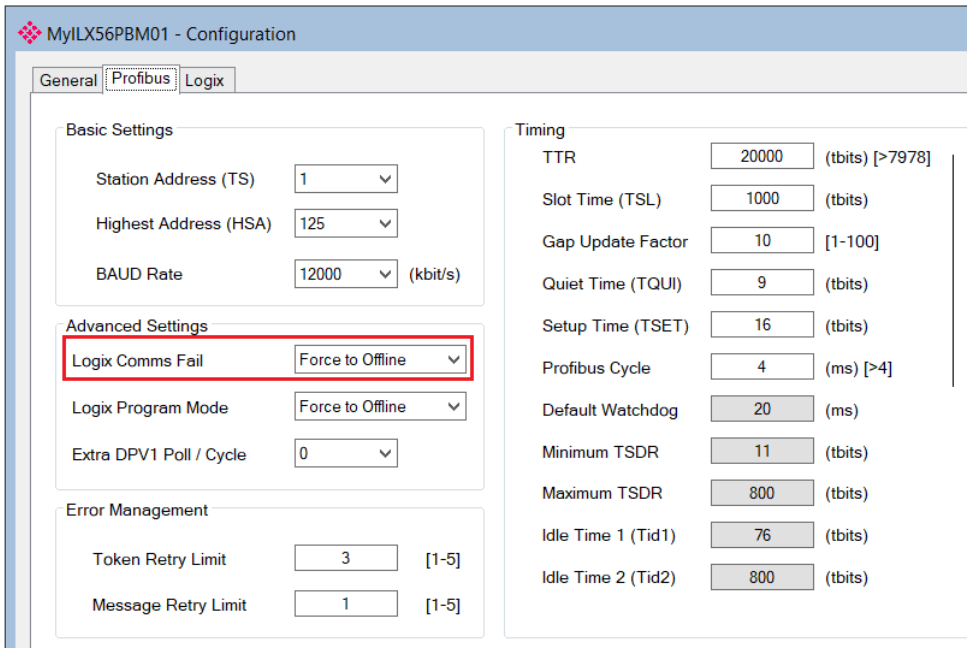


Figure 6.3 – Redundant Configuration - Profibus Configuration

6.4 Logix Configuration

The addition of a redundant ILX56-PBM module pair to the Logix IO tree follows the same procedure as a Standalone ILX56-PBM module, except two instances of the module are added.

It is important that the Logix Base tags configured in the PLX50 Configuration Utility match those of the module tags in Studio 5000. For the local chassis, this would typically be Local:[***slot***], where ***[slot]*** indicates the ControlLogix slot number.

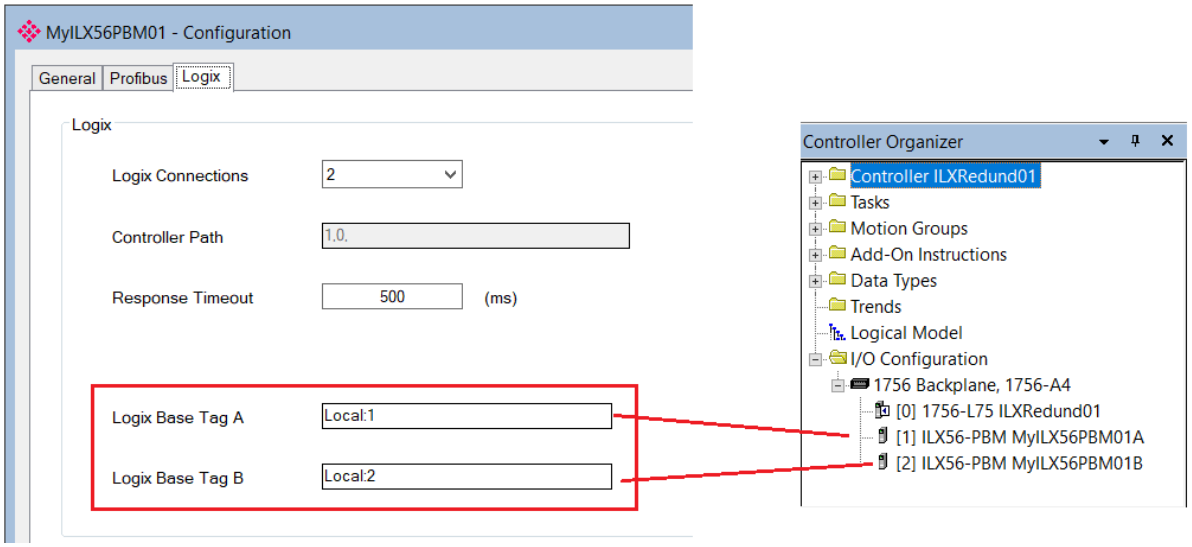


Figure 6.4 – Redundant Configuration – Logix Setup

After the ILX56-PBM modules have been added into the Logix IO tree, the mapping code can be imported. As in the case of the Standalone Master mode, the Logix code can be generated in the PLX50 Configuration Utility by right-clicking on the module and selecting the ***Generate Logix L5X*** option.

In addition to the slave device mapping code, the ***PSILX56RedundancyMaster*** AOI will be instantiated. This AOI is responsible for controlling the redundancy and mapping the first IO connection.

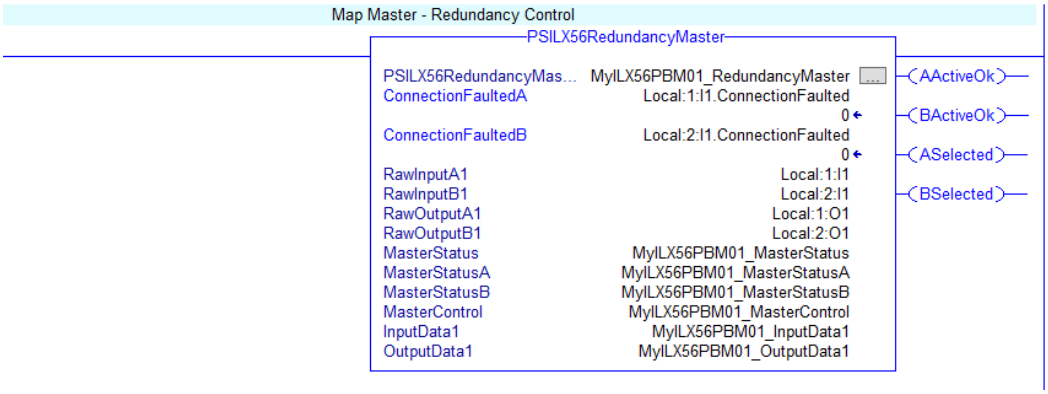


Figure 6.5 – Logix – Redundant Master AOI

The ***Redundant Master*** AOI has the following parameters:

Table 6.1 – Redundant Master AOI Parameters

Parameter	Description
ConnectionFaultedA	The ***Connection Faulted*** bit provided by module **A**'s AOP module-defined tag.
ConnectionFaultedB	The ***Connection Faulted*** bit provided by module **B**'s AOP module-defined tag.
RawInputA1	The input assembly of the first connection of module **A**.
RawInputB1	The input assembly of the first connection of module **B**.
RawOutputA1	The output assembly of the first connection of module **A**.
RawOutputB1	The output assembly of the first connection of module **B**.
MasterStatus	The ***MasterStatus*** structure of the current **active** module. The structure of this UDT is described in section 5. Note that this (resultant) ***MasterStatus*** structure should be used by the application code, rather than the ***MasterStatusA*** or ***MasterStatusB*** below.
MasterStatusA	The ***MasterStatus*** structure as reported by module **A**.
MasterStatusB	The ***MasterStatus*** structure as reported by module **B**.
MasterControl	The common ***MasterControl*** structure used by the application code to set the Profibus DP Mode and Enable Profibus Devices as described in Section 5. This structure is sent to both modules A and B, although the ***RedundancyControl*** tag is modified by the AOI. The user should not attempt to overwrite the ***RedundancyControl*** tag.
InputData1	The input data of the **active** module's first connection.
OutputData1	The output data sent to both module's first connection.

If the ILX56-PBM configuration is making use of more than one Class 1 connection, then a ***PSILX56RedundancyConnectionMap*** AOI will be instantiated for <u>each</u> additional class 1 connection.

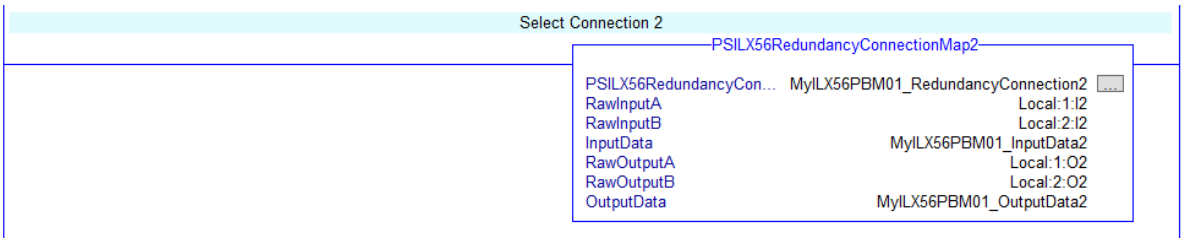


Figure 6.6 – Logix – Redundant Connection Map AOI

The ***Redundant Connection Map*** AOI has the following parameters:

Table 6.2 – Redundant Connection Map AOI Parameters

Parameter	Description
RawInputA	The input assembly of the referenced connection of module **A**.
RawInputB	The input assembly of the referenced connection of module **B**.
InputData	The input data of the **active** module's referenced connection.
RawOutputA	The output assembly of the referenced connection of module **A**.
RawOutputB	The output assembly of the referenced connection of module **B**.
OutputData	The output data sent to both module's referenced connection.

6.4.1 Remote Logix Chassis

The pair of ILX56-PBM modules can also be located in a remote (non-local) ControlLogix chassis as indicated in the example below.

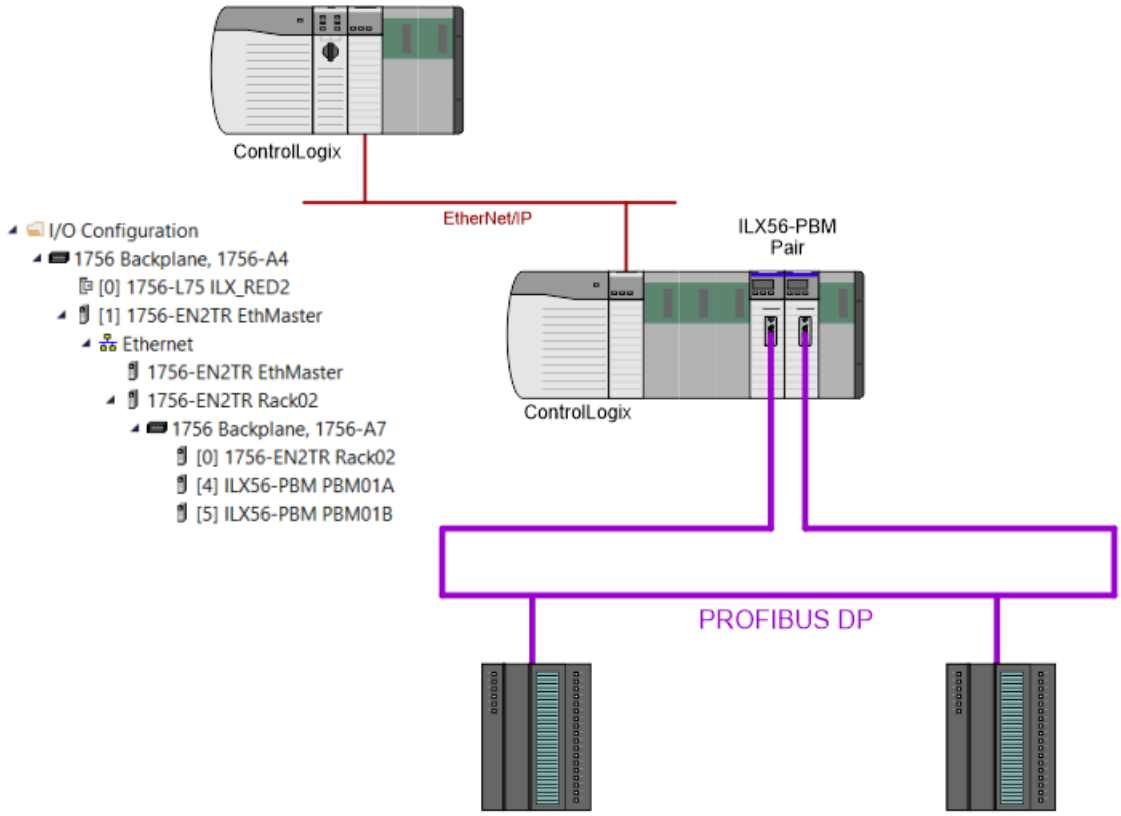


Figure 6.7 – Redundant ILX56-PBM pair located in Remote Chassis

The configuration for this remote pair of ILX56-PBMs is identical to that of a local pair with the exception of the Logix Base Tag configuration. Here the “Local” prefix must be replaced by the name of the remote ControlLogix adapter (e.g. 1756-EN2TR). Thus, the Logix Base Tag will be in the format **[*AdapterName*]:[*Slot*]**.

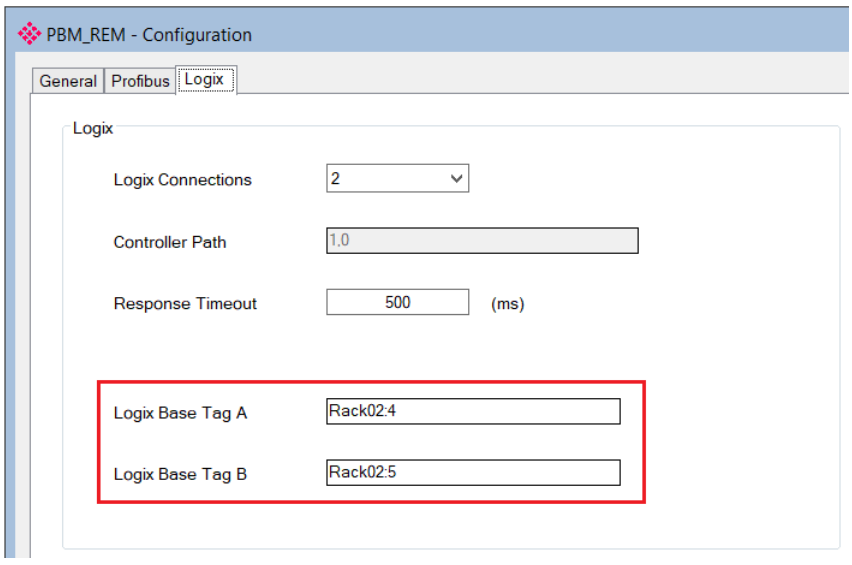


Figure 6.8 – Redundant and Remote Logix Tab

The Logix code generated by the PLX50 Configuration Utility will be adjusted accordingly.

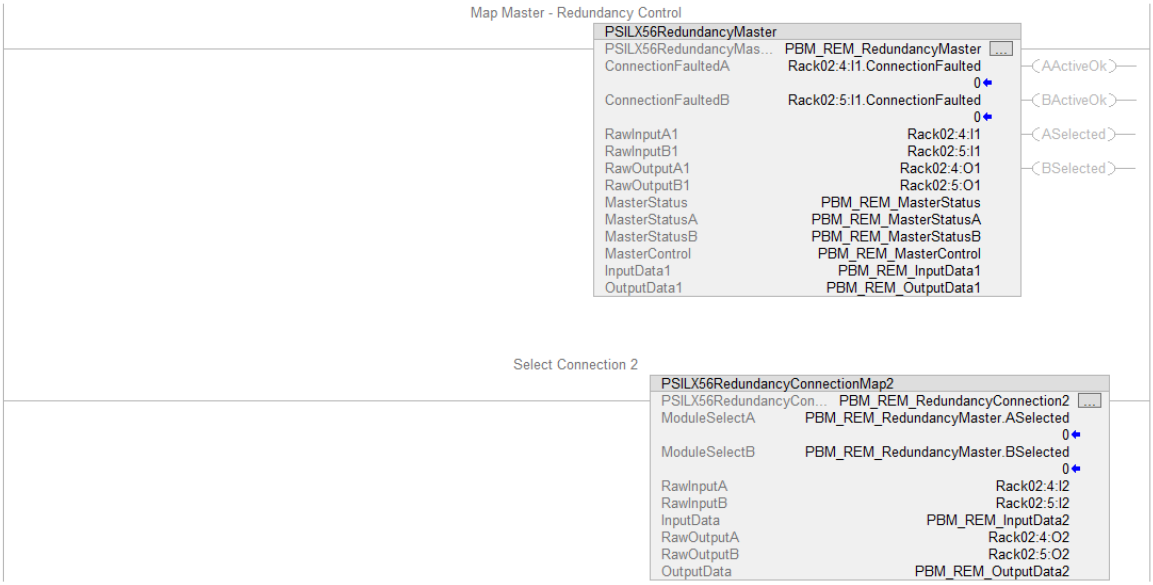


Figure 6.9 – Redundant and Remote Mapping Logic

6.5 Operation

The operation of the ILX56-PBM module in redundancy mode is similar to that in standalone mode.

Once the PLX50 Configuration Utility configuration has been finalized, it can be downloaded to the ILX56-PBM module pair. Before downloading it is important to confirm the connection paths to the two modules by right-clicking on the module pair a selecting Connection Path.

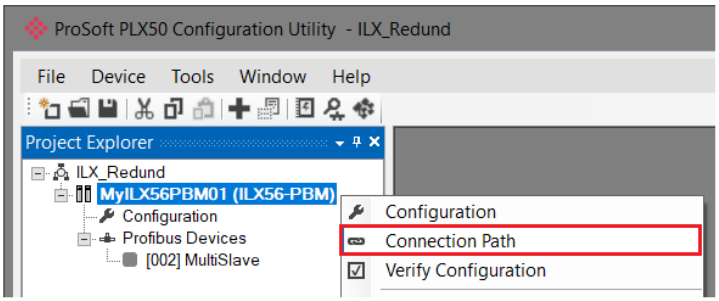


Figure 6.10 – Select Connection Path

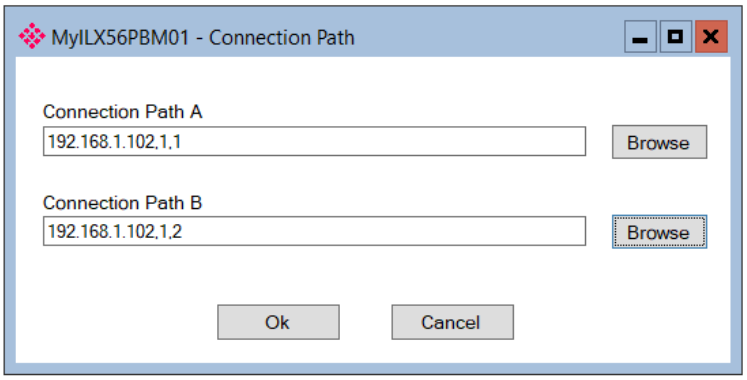


Figure 6.11 –Connection Path

The ***Download to Both*** option can then be selected, which will transfer the configuration to both the “A” and “B” ILX56-PBM modules.

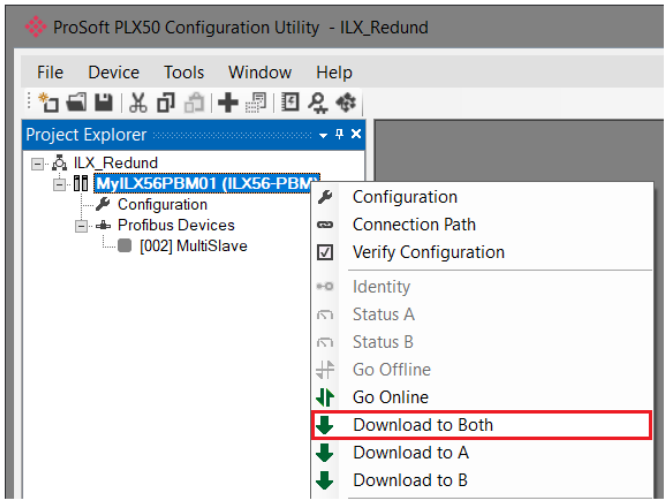


Figure 6.12 – Download to Both

7 Device Type Manager (DTM)

The ILX56-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 ILX56-PBM, the ProSoft ILX56 DTM pack will first need to be installed.

7.1 Installation

Installation of the ILX56 DTM pack is achieved by executing the following installer:

ProSoft Technology - ILX56 HART and PROFIBUS DTM Pack Setup.msi

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

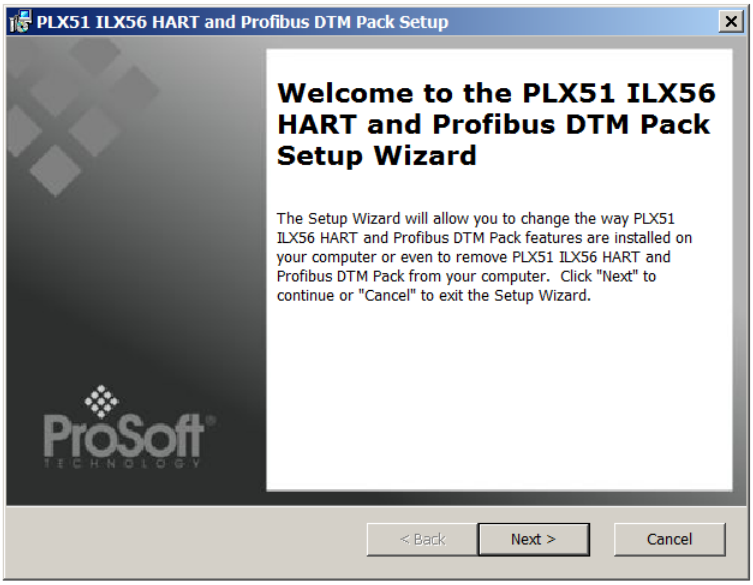


Figure 7.1 – ILX56 DTM Pack Installation

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 ILX56-PBM device can then be added to a new project. This involves selecting the Add Device function and then selecting the ILX56-PBM DTM. The example below makes use of PACTware FDT frame.

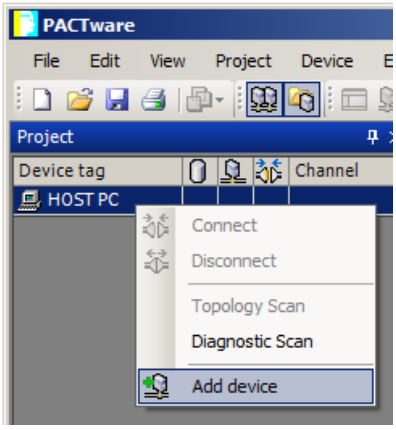


Figure 7.2 – Adding new device

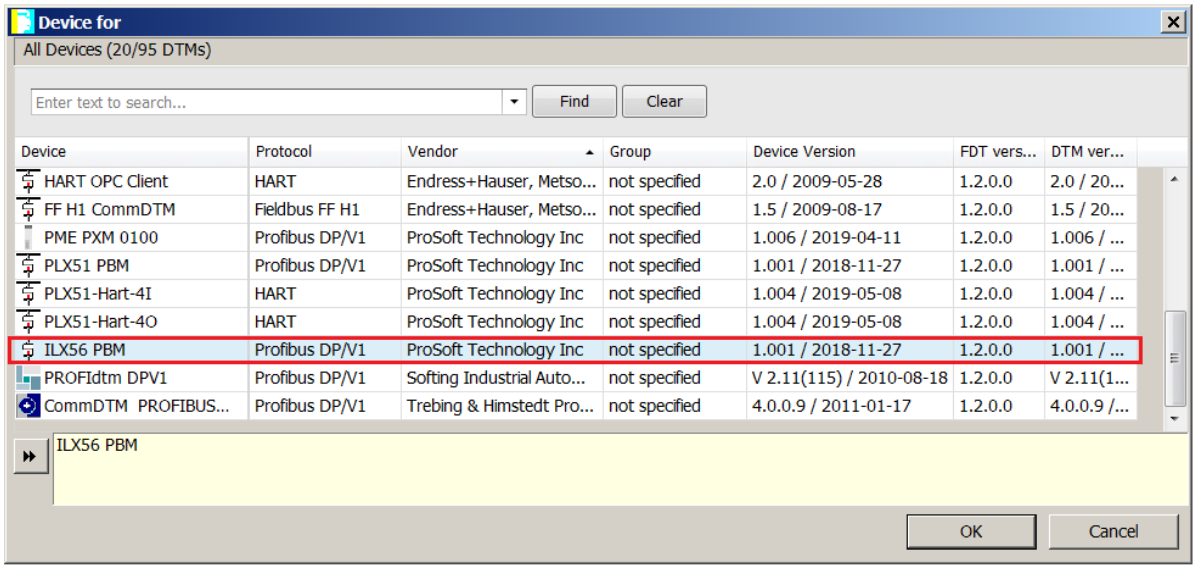


Figure 7.3 – Selecting ILX56-PBM DTM

After instantiating the ILX56-PBM DTM, select the Parameter option.

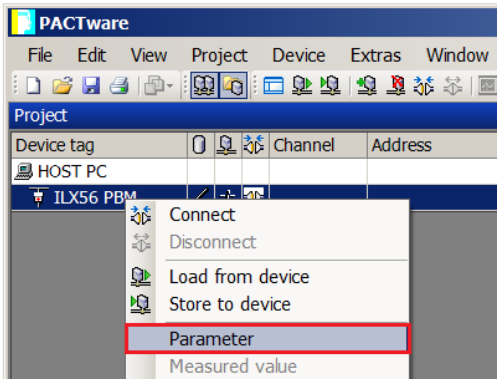


Figure 7.4 – Select Parameter option

The ILX56-PBM DTM's configuration allows the CIP Path to the ILX56-PBM to be configured.

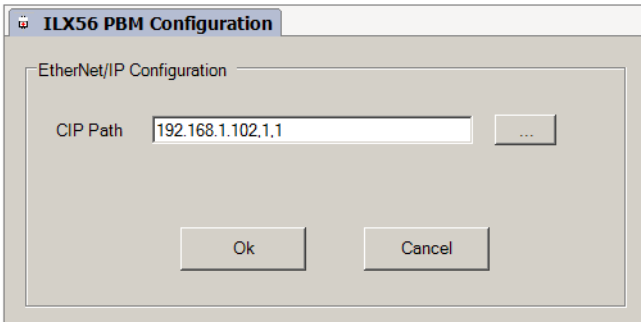


Figure 7.5 – ILX56-PBM CIP Path

The path can either be entered manually or the Browse button can be used to open the Target Browser, and then the ILX56-PBM can be selected.

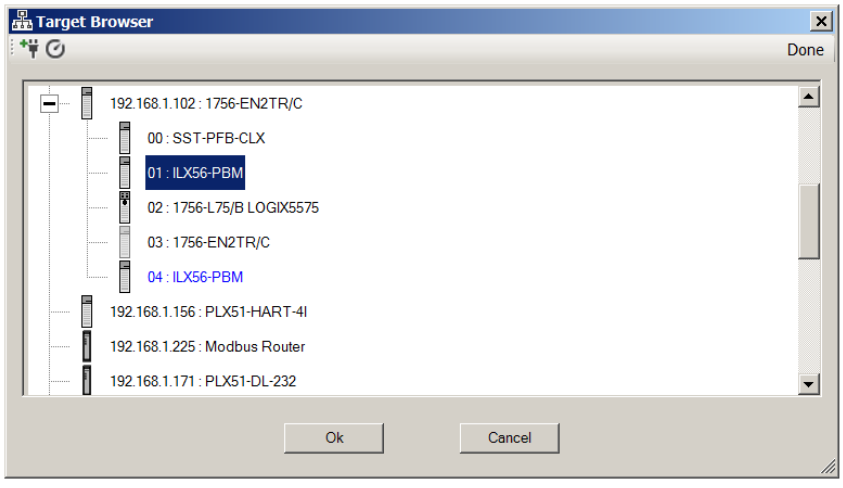


Figure 7.6 – Target Browser

Once the ILX56-PBM DTM has been configured, the child Device DTMs can be added by right-clicking on the ILX56-PBM DTM and selecting Add Device.

The user can then select the matching device DTM.

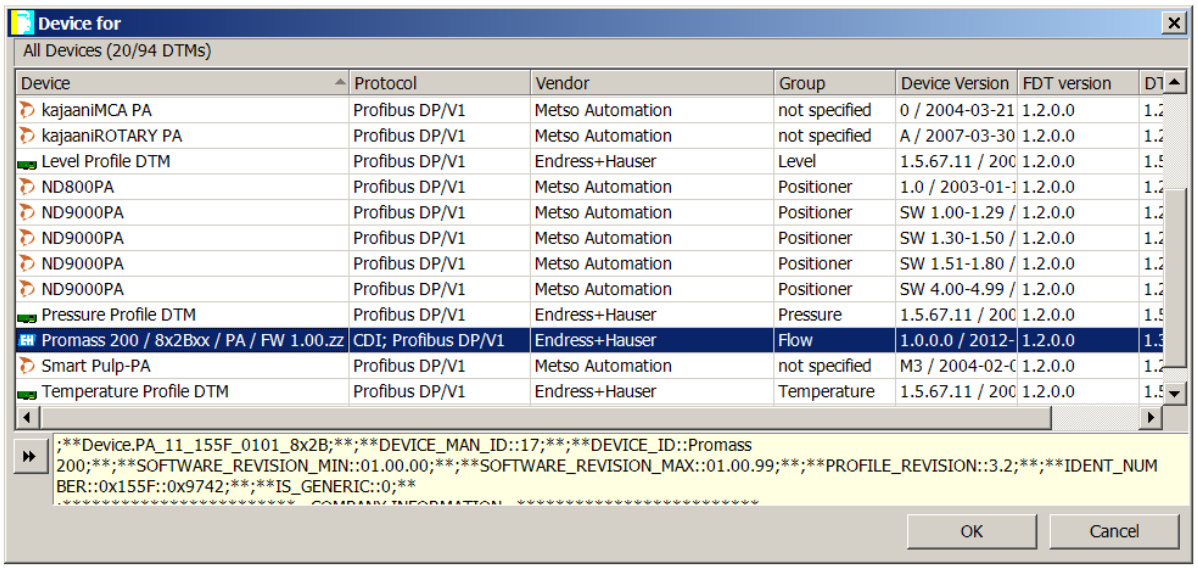


Figure 7.7 – Device DTM Selection

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

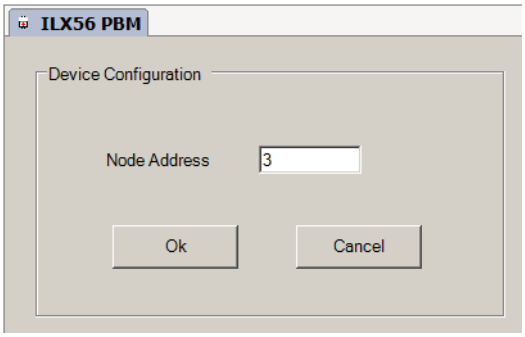


Figure 7.8 – Device DTM Node Address

7.3 Operation

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

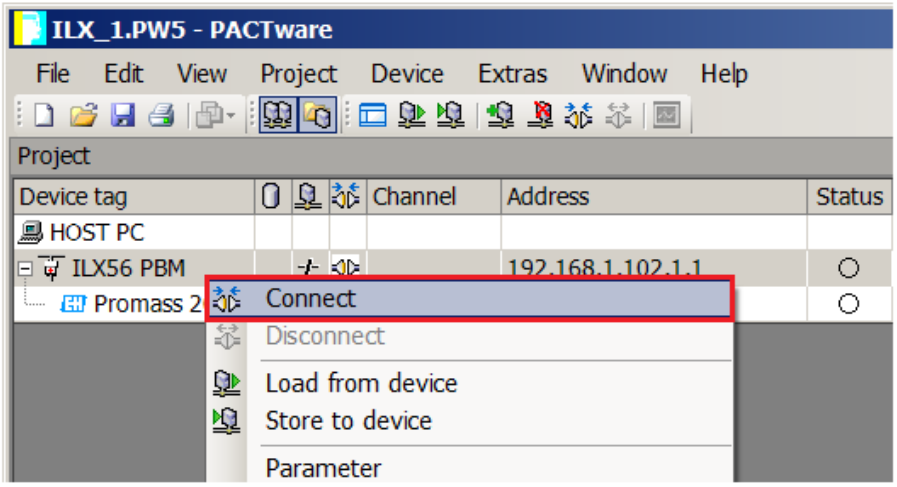


Figure 7.9 – DTM Connect

Once the ILX56-PBM DTM is online (connected) a number of diagnostic pages can be opened by selecting the Measure Value.

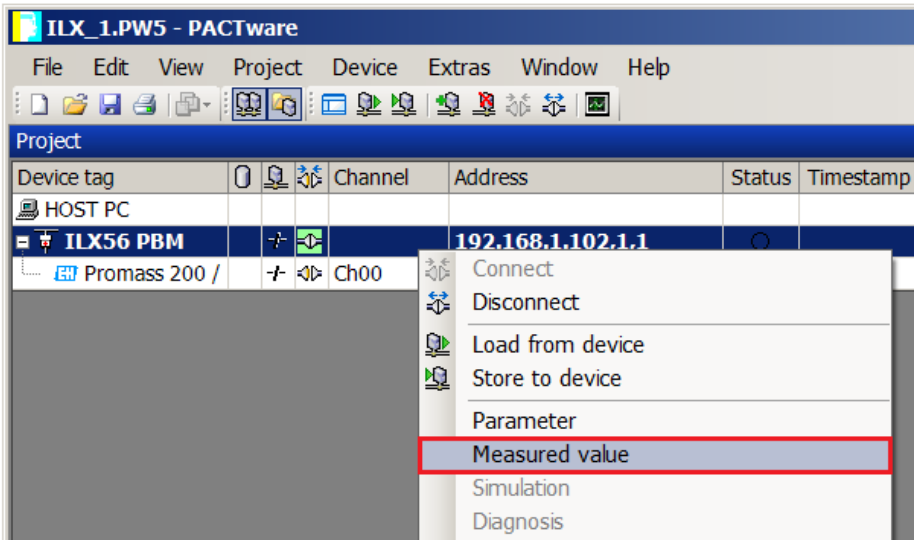


Figure 7.10 – Measured Value

The General page provides basic status information for the ILX56-PBM module, including LED status and CPU status etc.

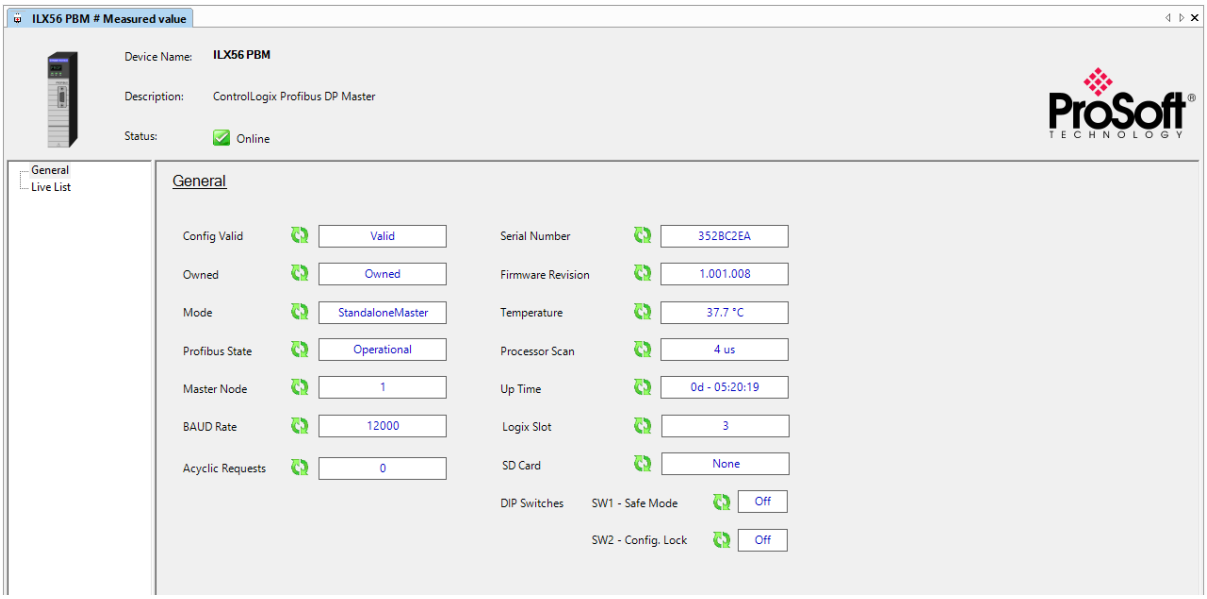


Figure 7.11 – ILX56-PBM DTM - General Status Page

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

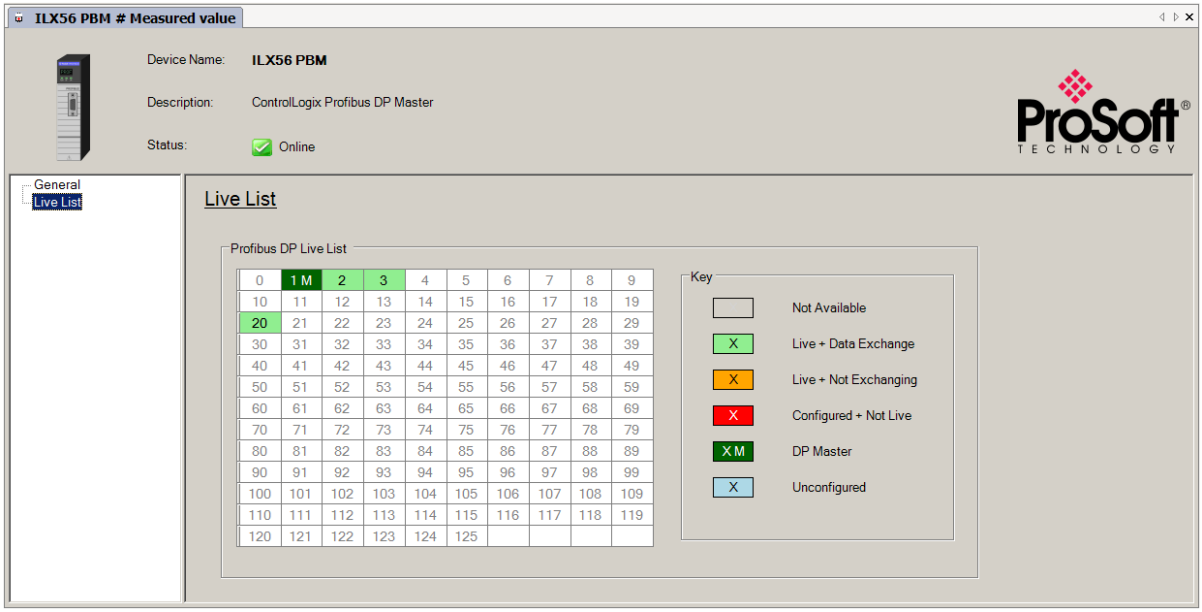


Figure 7.12 – ILX56-PBM DTM - Live List Page

Slave Device DTM under the ILX56-PBM DTM can also be brought online by selecting the Online or Connect option.

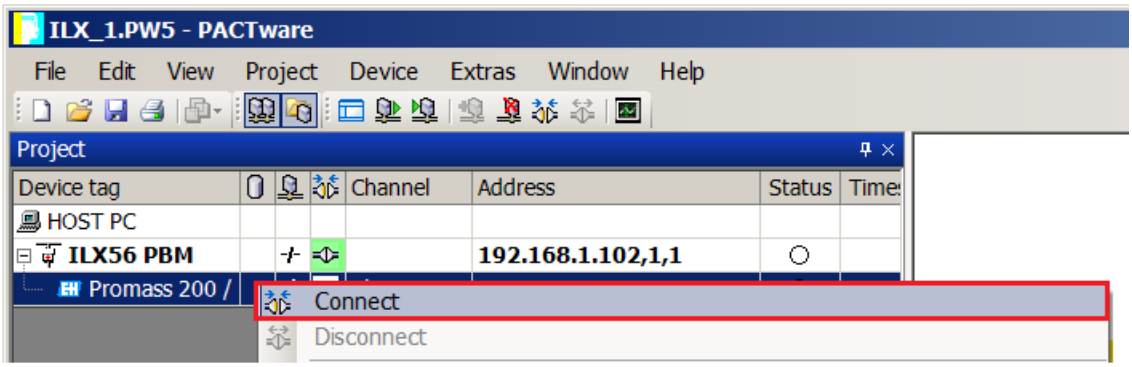


Figure 7.13 – Slave Device DTM Connect

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

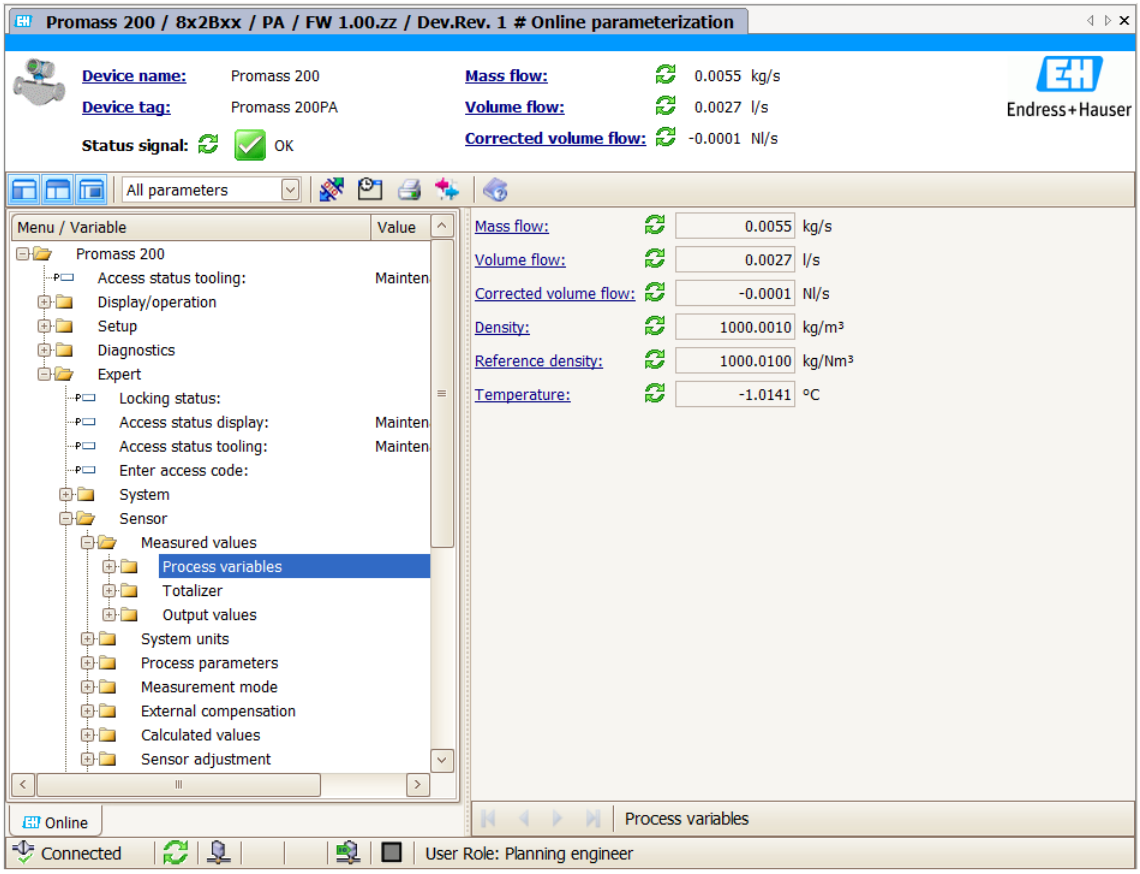


Figure 7.14 – Device DTM

8 Diagnostics

8.1 LEDs

The module provides 3 diagnostic LEDs and a 4-character alpha-numeric LED display for diagnostics purposes.

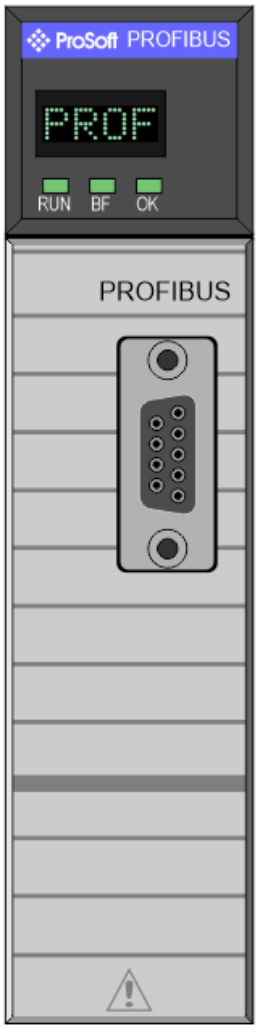


Figure 8.1 - ILX56-PBM LEDs

8.1.1 Module LEDs

Table 8.1 - Module LED operation

LED	Description
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 – A bus communication error has been detected: • The number of retries has exceeded the retry count (e.g. if there was a noise burst that caused many packets to be corrupted). • The devices on the PROFIBUS network are offline (e.g. faulty network). • A node on the PROFIBUS network has the same DP node address as the ILX56-PBM. 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***.
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.

8.1.2 LED Text

Table 8.2 - Module LED operation

LED Text	Description
TEST	The module is busy testing all hardware during bootup.
OK	The module has successfully booted, and all hardware testing has passed.
STOP mode	The PROFIBUS network is in **STOP** operational mode.
OPERATE mode	The PROFIBUS network is in **OPERATE** operational mode.
CLEAR mode	The PROFIBUS network is in **CLEAR** operational mode.
OFFLINE mode	The PROFIBUS network is in **OFFLINE** operational mode.
Device Fault	When the module is operating as a PROFIBUS slave, at least one slave device is not operating correctly.
Comms Fault	When the module is operating as a PROFIBUS slave, there is a communication fault (e.g. bus cable has been unplugged).
Bus Fault	When the module is operating as a PROFIBUS master, there is a communication fault (e.g. bus cable has been unplugged).
Slave Device Fault	When the module is operating as a PROFIBUS master, at least one slave device is not operating correctly.
PROFIBUS Master	The module is operating as a PROFIBUS Master.
PROFIBUS Slave	The module is operating as a PROFIBUS Slave.
Duplicate Station	A PROFIBUS station with a duplicate node has been detected.
Redundant Active	The module is in Redundant Master mode and is the active PROFIBUS Master.
Redundant Standby	The module is in Redundant Master mode and is the standby PROFIBUS Master.
No Config Loaded	No configuration has been loaded onto the ILX56-PBM.

The module LED will also display the instance name of the module configured in PLX50CU.

8.2 Monitoring Module Status

The ILX56-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.

To view the module's status in the PLX50 Configuration Utility environment, the ILX56-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.

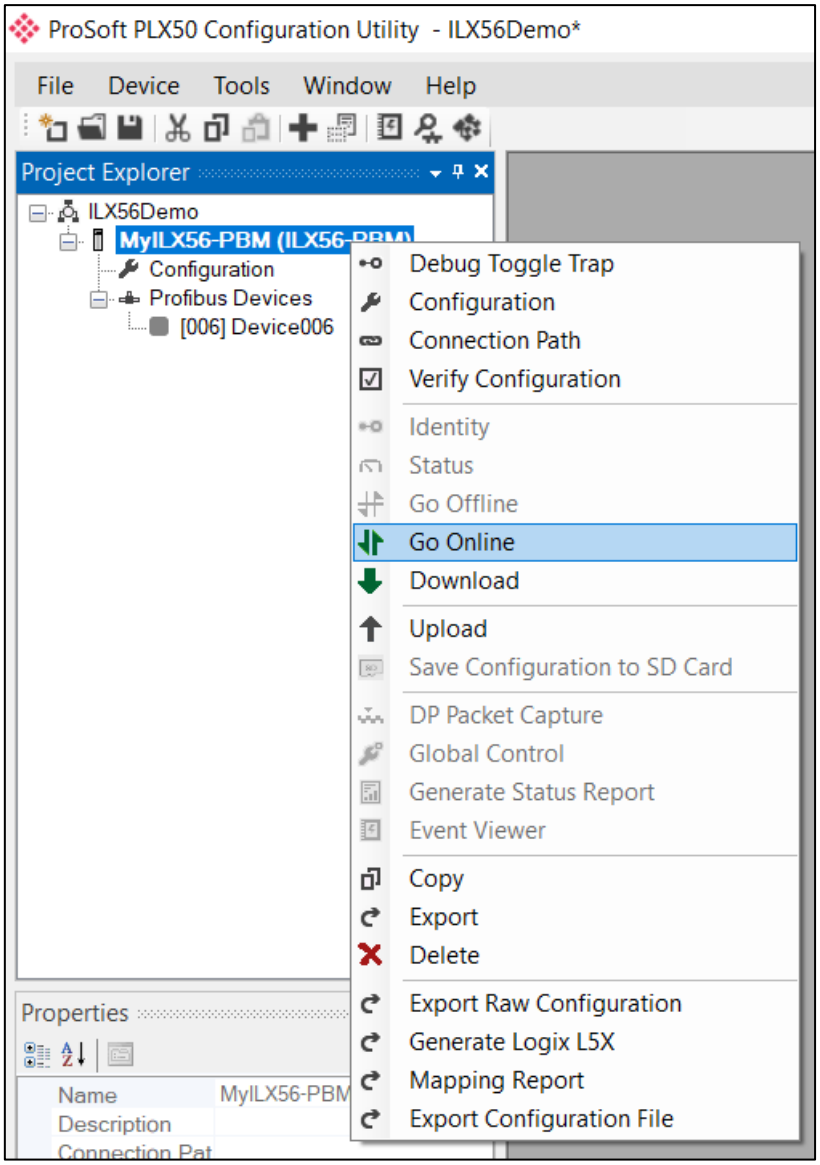


Figure 8.2 - Selecting to Go Online

The Online mode of the module/s is indicated by the icon in the Project Explorer tree.

8.2.1 Project Explorer – Non-Redundant Mode

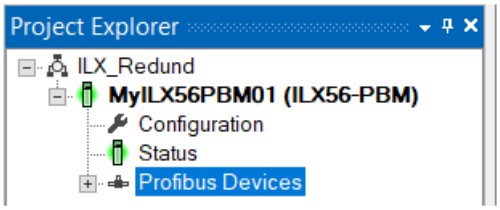
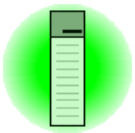
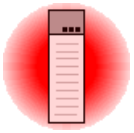


Figure 8.3 - Project Explorer - Non-Redundant

The status of the ILX56-PBM module in non-redundant mode is illustrated in the Project Explorer tree as follows:

Table 8.3 – Project Explorer – Non-Redundant

Icon	Description
	Offline
	Online
	Offline – Module was disconnected when previously online.

8.2.2 Project Explorer – Redundant Mode

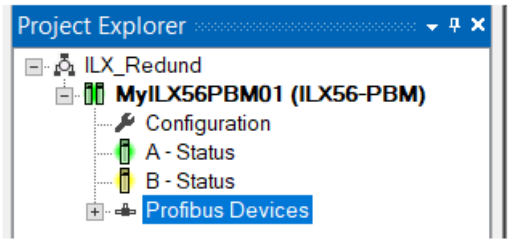
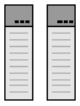


Figure 8.4 - Project Explorer - Redundant

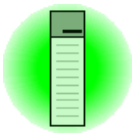
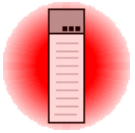
The status of the ILX56-PBM module pair in redundant mode is illustrated in the Project Explorer tree as follows:

Table 8.4 – Project Explorer – Redundant Pair

Icon	Description
	Offline
	Online (Both modules connected)
	Online – Partially (Only one of the modules connected)
	Offline – Modules were disconnected when previously online.

The status of the individual ILX56-PBM modules in redundant mode is illustrated in the Project Explorer tree as follows:

Table 8.5 – Project Explorer – Redundant Module

Icon	Description
	Offline
	Online and Active
	Online and Standby
	Offline – Module was disconnected when previously online.

8.2.3 Master Status

The Status monitoring window of the ILX56-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*.

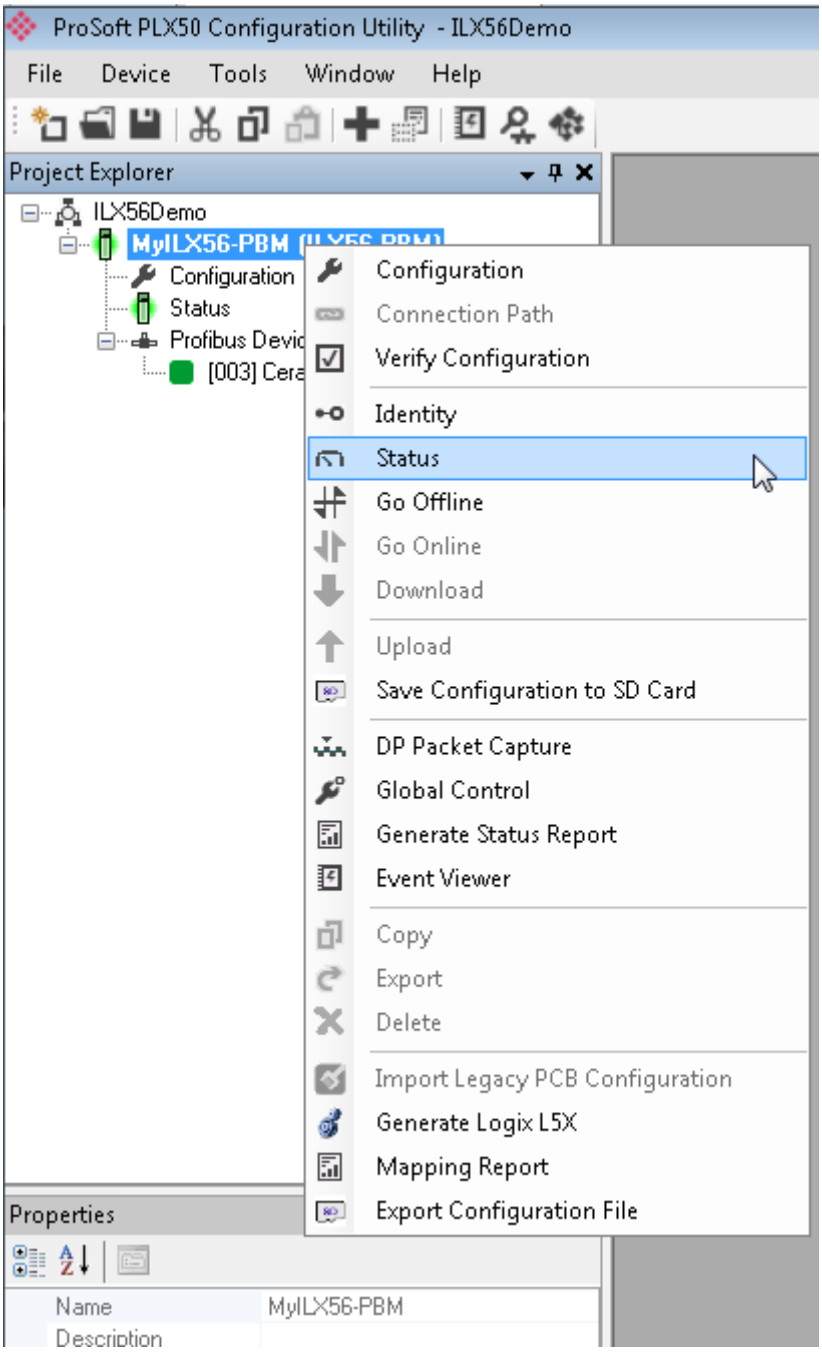


Figure 8.5 - Selecting ILX56-PBM online Status

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

General

The General tab displays the following general parameters:

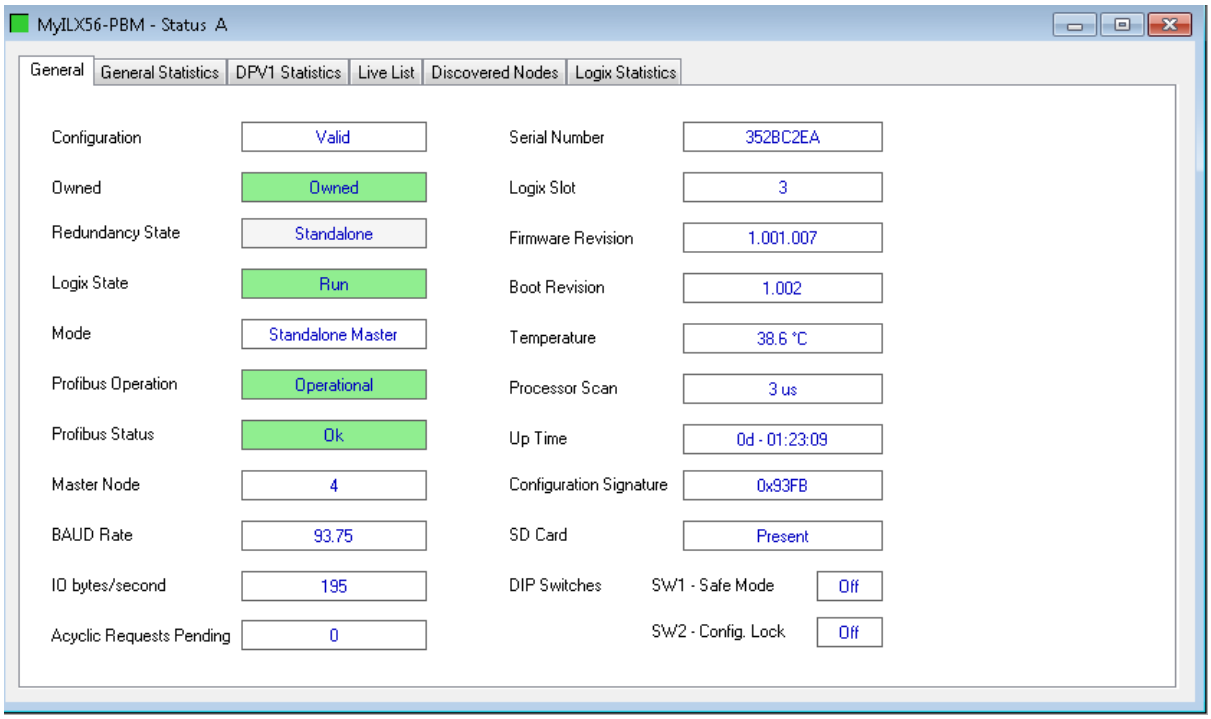


Figure 8.6 – ILX56-PBM Status monitoring - General

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

Parameter	Description
Configuration	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.
Redundancy State	This field provides the status of the module Master Redundancy: **Standalone** No DP Master Redundancy enabled **Active** DP Master Redundancy enabled, and the module is the active DP Master. **Standby** DP Master Redundancy enabled, and the module is the standby DP Master.
Logix State	Indicates the state of the connected Logix controller: **Run** – Controller is in RUN mode **Program** – Controller is in PROGRAM or FAULT mode or TEST mode.
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 ILX56-PBM to an active bus and run a DP packet capture. In this mode the ILX56-PBM will not communicate on the DP Bus but rather only listen. **Standalone Master (ILX56-PBM Only)** In this mode the ILX56-PBM is the standalone DP Master on the PROFIBUS network.

	Redundant Master (ILX56-PBM Only) In this mode the ILX56-PBM is the standalone DP Master on the PROFIBUS network. See the section on Redundant Masters for more information. **Slave** In this mode the ILX56-PBM will emulate multiple PROFIBUS Slave devices.
PROFIBUS Operation (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 ILX56-PBM will not communicate on the network. **STOP** The PROFIBUS network is running and the ILX56-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 ILX56-PBM is communicating with all slave devices on the network, and if configured in the ILX56-PBM, the module will configure and exchange process data with each slave device. **CLEAR** The PROFIBUS network is running and the ILX56-PBM is communicating with all slave devices on the network, and if configured in the ILX56-PBM, the module will configure and exchange process data with each slave device. **Note:** In CLEAR mode the ILX56-PBM will not send any output data to any slave device.
Profibus Status	Status of the PROFIBUS network: **Ok** – No PROFIBUS errors **Fieldbus Error** – PROFIBUS network issue detected (e.g. cable fault) **Device Error** – One or more PROFIBUS devices not communicating.
Master Node (Master mode only)	The PROFIBUS Node address of the local ILX56-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 ILX56-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.
Boot Revision	The bootloader firmware revision.
Configuration Signature	The signature of the configuration currently executing on the module.
Serial Number	Displays the module's serial number.
Logix Slot	The current slot in which the module resides of the ControlLogix rack.
Temperature	The internal temperature of the module.
Processor Scan	The amount of time (microseconds) taken by the module's processor in the last scan.
DIP Switch Position	The status of the DIP switches when the module booted.
SD Card	Indicates if a SD Card has been inserted into the module.

Slave Status

The Slave mode diagnostics tab displays the following parameters:

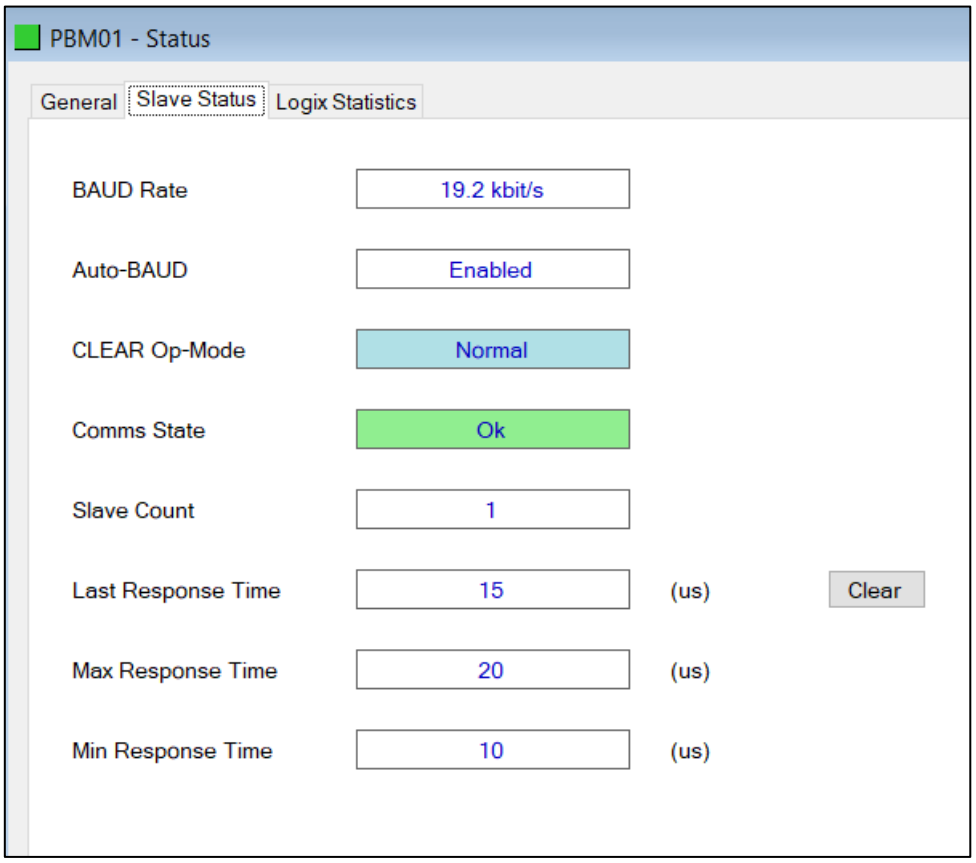


Figure 8.7 – ILX56-PBM Status monitoring – Slave Status

Table 8.7 - 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 ms) to respond to the last request from a DP Master.
Max Response Time	The maximum time it took (in ms) to respond to a request from a DP Master.
Min Response Time	The minimum time it took (in ms) to respond to a request from a DP Master.

General Statistics

The General Statistics tab displays the following general parameters:

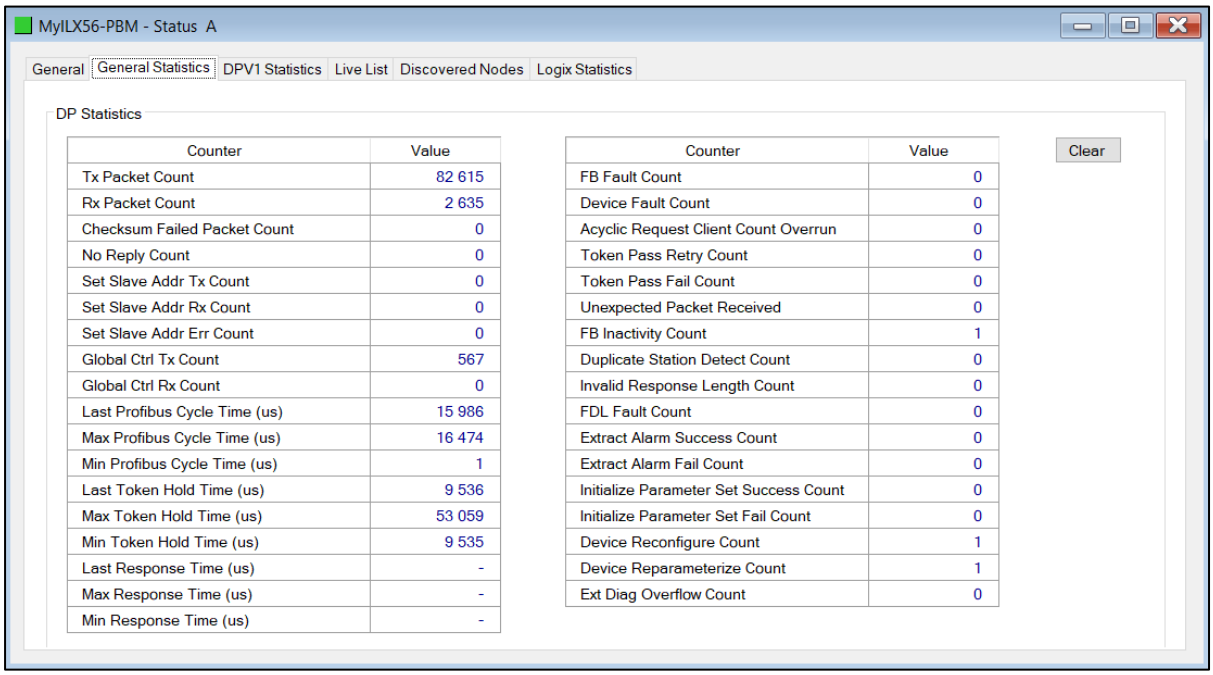


Figure 8.8 – ILX56-PBM Status monitoring – General Statistics

Table 8.8 - 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 ILX56-PBM where the station did not respond.
Set Slave Addr Tx Count	The number of PROFIBUS Set Slave Address requests sent from the ILX56-PBM.
Set Slave Addr Rx Count	The number of successful PROFIBUS Set Slave Address responses received from the specific slave device.
Set Slave Addr Err Count	The number of failed PROFIBUS Set Slave Address responses received from the specific slave device.
Global Ctrl Tx Count	The number of PROFIBUS Global Control requests sent from the ILX56-PBM.
Global Ctrl Rx Count	The number of PROFIBUS Global Control requests received by the ILX56-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 ILX56-PBM held the token in the last token rotation.
Max Token Hold Time	The maximum time (in microseconds) the ILX56-PBM held the token.
Min Token Hold Time	The minimum time (in microseconds) the ILX56-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 ILX56-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 ILX56-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 ILX56-PBM has determined that there are no other DP Masters on the PROFIBUS network.
Duplicate Station Detect Count	The number of times the ILX56-PBM has detected that there is another station on the network with the same station address as the local ILX56-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 the appendix.
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 tab displays the following general parameters:

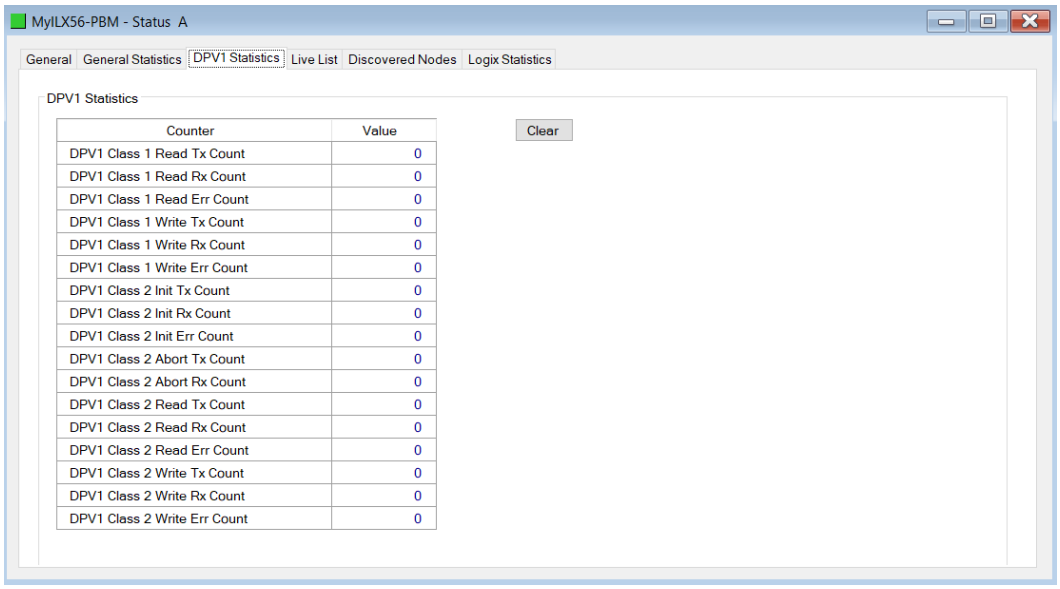


Figure 8.9 – ILX56-PBM Status monitoring – DPV1 Statistics

Table 8.9 - 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 ILX56-PBM.
DPV1 Class 1 Read Rx Count	The number of successful PROFIBUS DPV1 Class 1 Read responses received by the ILX56-PBM.
DPV1 Class 1 Read Err Count	The number of failed PROFIBUS DPV1 Class 1 Read responses received by the ILX56-PBM.
DPV1 Class 1 Write Tx Count	The number of PROFIBUS DPV1 Class 1 Write requests sent from the ILX56-PBM.
DPV1 Class 1 Write Rx Count	The number of successful PROFIBUS DPV1 Class 1 Write responses received by the ILX56-PBM.
DPV1 Class 1 Write Err Count	The number of failed PROFIBUS DPV1 Class 1 Write responses received by the ILX56-PBM.
DPV1 Class 2 Init Tx Count	The number of PROFIBUS DPV1 Class 2 Initialize requests sent from the ILX56-PBM.
DPV1 Class 2 Init Rx Count	The number of successful PROFIBUS DPV1 Class 2 Initialize responses by the ILX56-PBM.
DPV1 Class 2 Init Err Count	The number of failed PROFIBUS DPV1 Class 2 Initialize responses received by the ILX56-PBM.
DPV1 Class 2 Abort Tx Count	The number of PROFIBUS DPV1 Class 2 Abort requests sent from the ILX56-PBM.
DPV1 Class 2 Abort Rx Count	The number of PROFIBUS DPV1 Class 2 Abort messages received by the ILX56-PBM.
DPV1 Class 2 Read Tx Count	The number of PROFIBUS DPV1 Class 2 Read requests sent from the ILX56-PBM.
DPV1 Class 2 Read Rx Count	The number of successful PROFIBUS DPV1 Class 2 Read responses received by the ILX56-PBM
DPV1 Class 2 Read Err Count	The number of failed PROFIBUS DPV1 Class 2 Read responses received by the ILX56-PBM.

DPV1 Class 2 Write Tx Count	The number of PROFIBUS DPV1 Class 2 Write requests sent from the ILX56-PBM.
DPV1 Class 2 Write Rx Count	The number of successful PROFIBUS DPV1 Class 2 Write responses received by the ILX56-PBM.
DPV1 Class 2 Write Err Count	The number of failed PROFIBUS DPV1 Class 2 Write responses received by the ILX56-PBM.

Live List

The Live List tab in the ILX56-PBM 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.

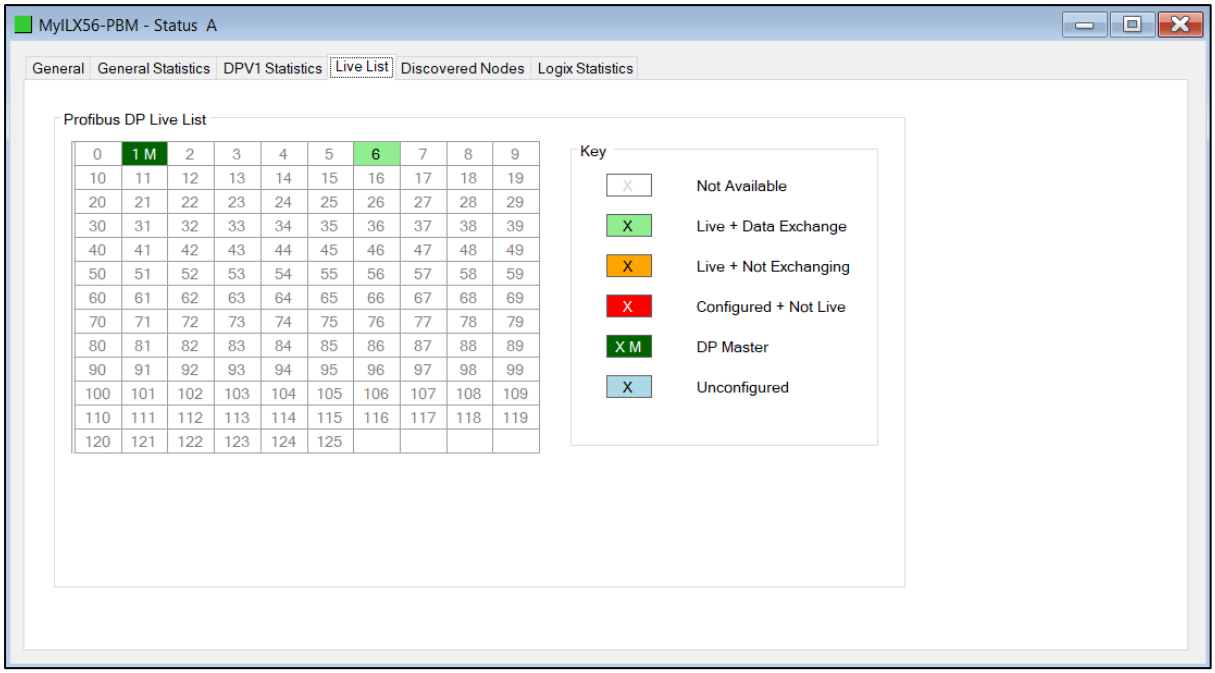


Figure 8.10 – ILX56-PBM Status monitoring – Live List

Discovered Nodes

The Discovered Nodes 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.

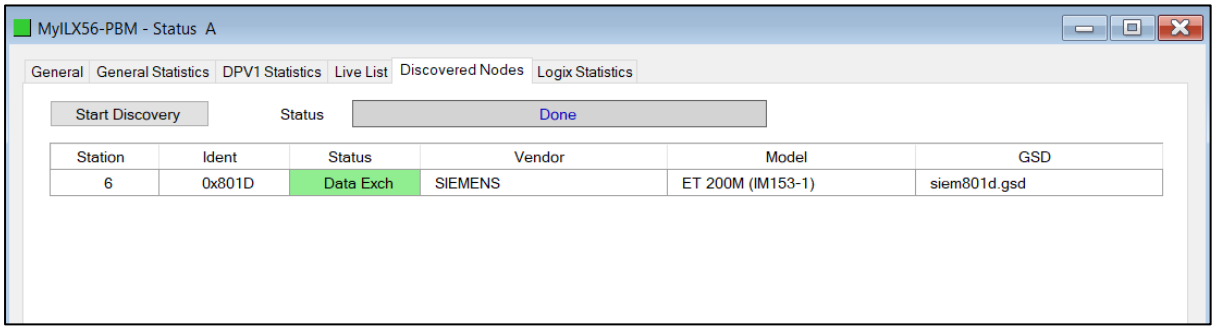


Figure 8.11 – ILX56-PBM Status monitoring – Discovered Nodes

Logix Statistics

The Logix statistics are the statistics for connections and messages from the ILX56-PBM to the Logix Controller. These are only used for Slave mode when DPV1 messaging and alarming are mapped to Logix tags.

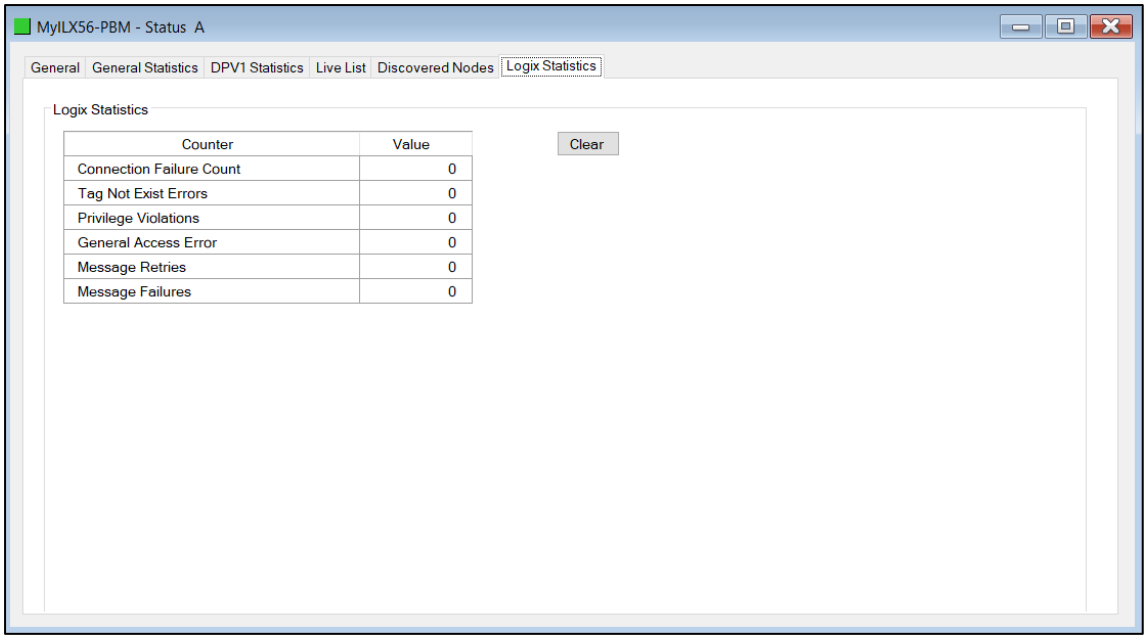


Figure 8.12 – Status Monitoring – Logix Statistics Tab

Table 8.10 - Parameters displayed in the Status Monitoring – Logix Statistics Tab

Parameter	Description
Connection Failures	The number of failed attempts at establishing a class 3 connections with a Logix controller.
Tag Not Exist Errors	The number of tag read and tag write transactions that failed due to the destination tag not existing.
Privilege Violation Errors	The number of tag read and tag write transactions that failed due to a privilege violation error. This may be caused by the External Access property of the Logix tag being set to either None or Read Only.
General Access Error	This statistic is used to indicate that the tag could not be accessed due to a general error (eg. writing to a tag more data than the actual array size).
Message Retries	This count increases when no response was received from the Logix Controller by the time the Message timeout is reached.
Message Failures	This count increases when the Message Retry Limit is reached and no response has been received from the Logix Controller.

8.2.4 Device Status

The Status monitoring window of each PROFIBUS slave device connected to the ILX56-PBM can be opened by right-clicking on the specific slave device in the PLX50 Configuration Utility tree and selecting *Status*.

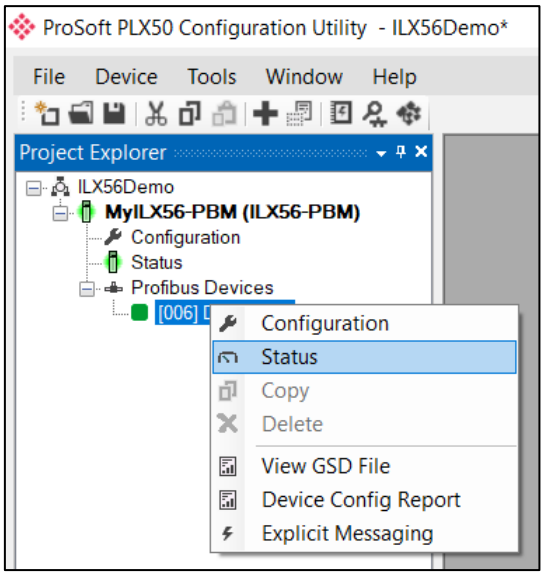


Figure 8.13 - Selecting slave device online Status

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

General – Master Mode

The General tab displays the following general parameters:

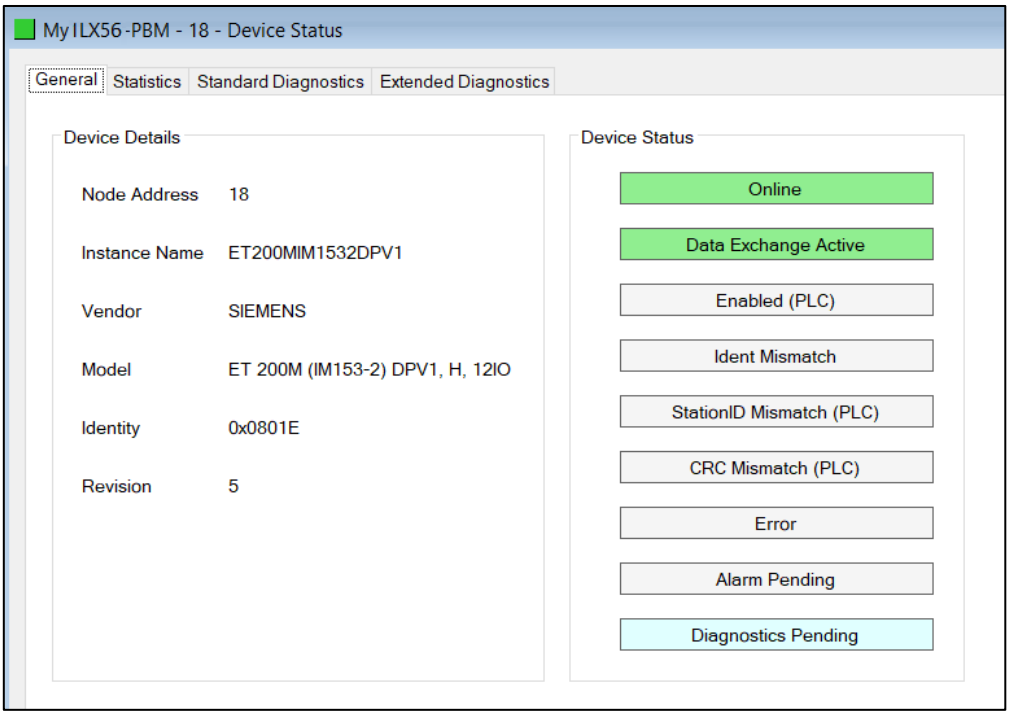


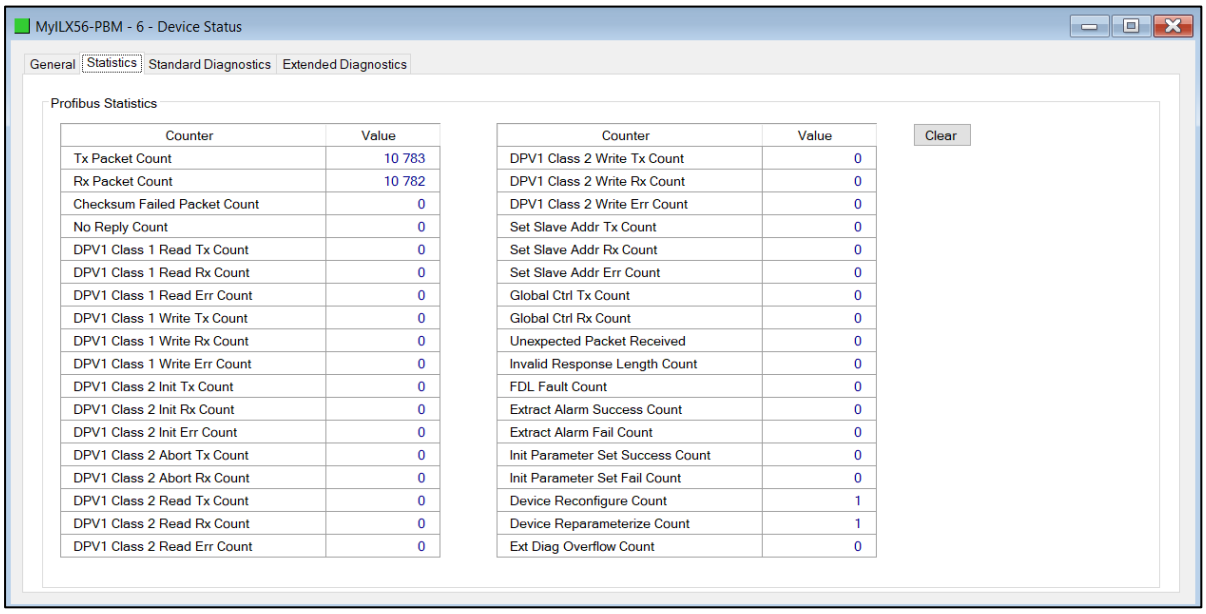
Figure 8.14 – Device Status monitoring - General

Table 8.11 - 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 ILX56-PBM. **Disabled (PLC)** The slave device has been disabled from DPV0 data exchange from the Logix controller using the ILX56-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 ILX56-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 displays the following general parameters:



Counter	Value
Tx Packet Count	10 783
Rx Packet Count	10 782
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 8.15 – Device Status monitoring - Statistics

Table 8.12 - 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 ILX56-PBM where the station did not respond.
DPV1 Class 1 Read Tx Count	The number of PROFIBUS DPV1 Class 1 Read requests sent from the ILX56-PBM to the specific device.
DPV1 Class 1 Read Rx Count	The number of successful PROFIBUS DPV1 Class 1 Read responses received from the specific device.
DPV1 Class 1 Read Err Count	The number of failed PROFIBUS DPV1 Class 1 Read responses received from the specific device.
DPV1 Class 1 Write Tx Count	The number of PROFIBUS DPV1 Class 1 Write requests sent from the ILX56-PBM to the specific device.
DPV1 Class 1 Write Rx Count	The number of successful PROFIBUS DPV1 Class 1 Write responses received from the specific device.
DPV1 Class 1 Write Err Count	The number of failed PROFIBUS DPV1 Class 1 Write responses received from the specific device.
DPV1 Class 2 Init Tx Count	The number of PROFIBUS DPV1 Class 2 Initialize requests sent from the ILX56-PBM to the specific device.
DPV1 Class 2 Init Rx Count	The number of successful PROFIBUS DPV1 Class 2 Initialize responses received from the specific device.
DPV1 Class 2 Init Err Count	The number of failed PROFIBUS DPV1 Class 2 Initialize responses received from the specific device.
DPV1 Class 2 Abort Tx Count	The number of PROFIBUS DPV1 Class 2 Abort requests sent from the ILX56-PBM to the specific device.
DPV1 Class 2 Abort Rx Count	The number of PROFIBUS DPV1 Class 2 Abort messages received from the specific device.

DPV1 Class 2 Read Tx Count	The number of PROFIBUS DPV1 Class 2 Read requests sent from the ILX56-PBM to the specific device.
DPV1 Class 2 Read Rx Count	The number of successful PROFIBUS DPV1 Class 2 Read responses received from the specific device.
DPV1 Class 2 Read Err Count	The number of failed PROFIBUS DPV1 Class 2 Read responses received from the specific device.
DPV1 Class 2 Write Tx Count	The number of PROFIBUS DPV1 Class 2 Write requests sent from the ILX56-PBM to the specific device.
DPV1 Class 2 Write Rx Count	The number of successful PROFIBUS DPV1 Class 2 Write responses received from the specific device.
DPV1 Class 2 Write Err Count	The number of failed PROFIBUS DPV1 Class 2 Write responses received from the specific device.
Set Slave Addr Tx Count	The number of PROFIBUS Set Slave Address requests sent from the ILX56-PBM to the specific device.
Set Slave Addr Rx Count	The number of successful PROFIBUS Set Slave Address responses received from the specific device.
Set Slave Addr Err Count	The number of failed PROFIBUS Set Slave Address responses received from the specific device.
Global Ctrl Tx Count	The number of PROFIBUS Global Control requests sent from the ILX56-PBM to the specific device.
Global Ctrl Rx Count	The number of PROFIBUS Global Control requests received by the ILX56-PBM from the specific 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.
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 tab displays the following general parameters:

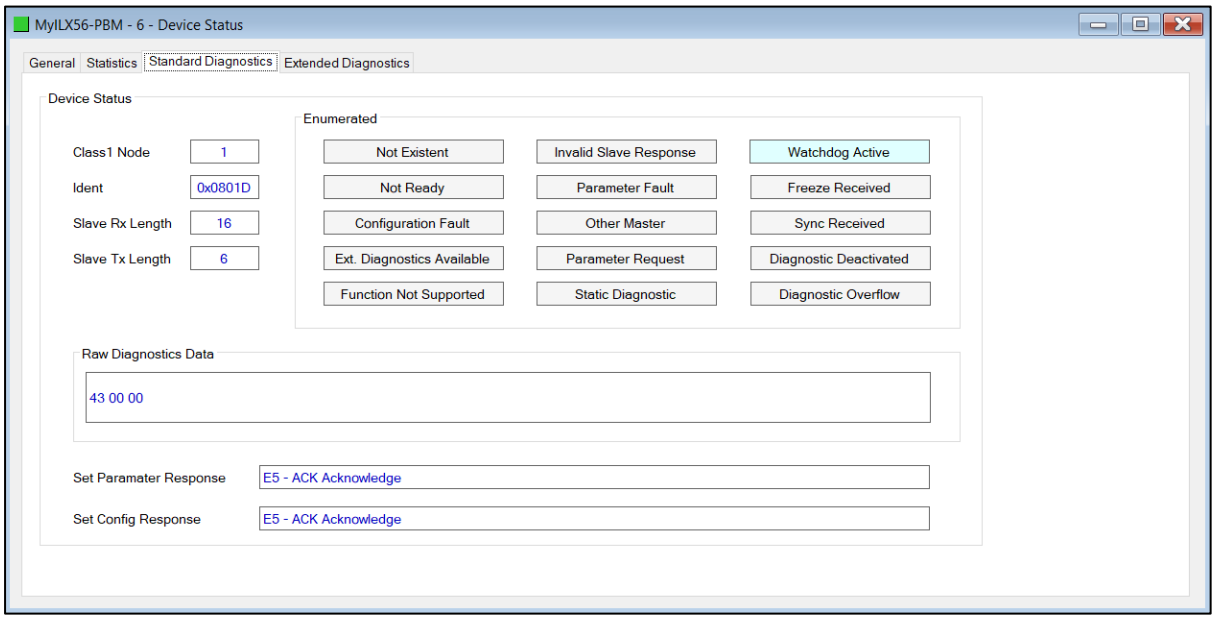


Figure 8.16 – Device Status monitoring – Standard Diagnostics

Table 8.13 - 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 are decoded and displayed in a table form. The diagnostics are decoded using the pre-configured GSD file.

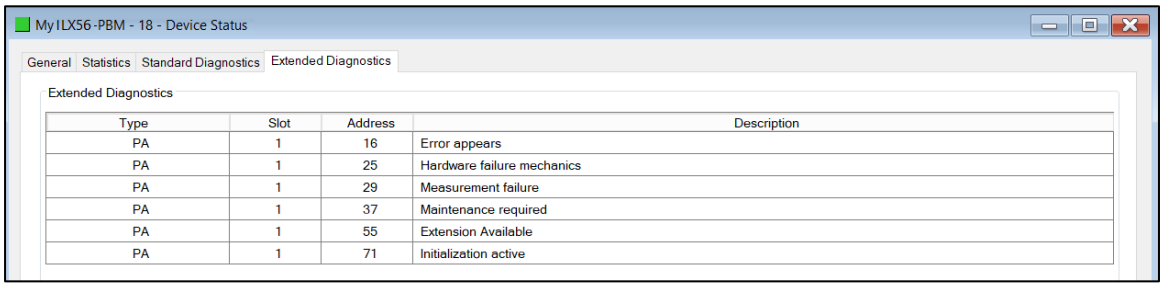


Figure 8.17 – Device Status monitoring – Extended Diagnostics

8.3 PROFIBUS Packet Capture

The module provides the capability to capture the PROFIBUS traffic for analysis. This 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.

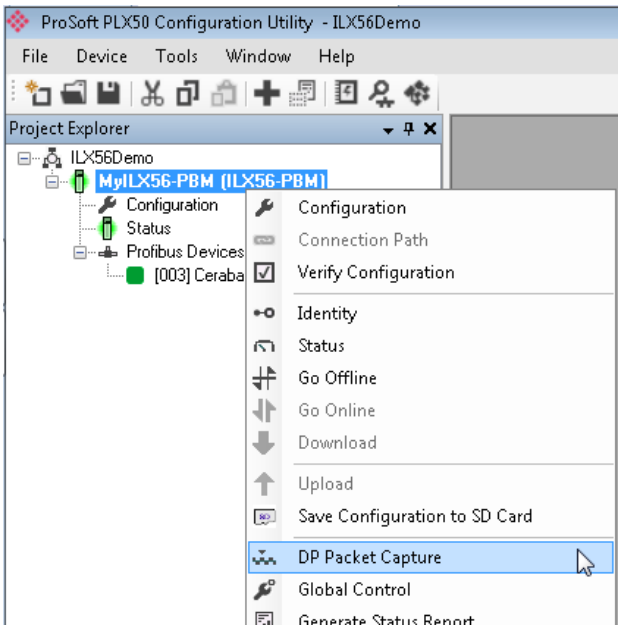


Figure 8.18 - Selecting PROFIBUS Packet Capture

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

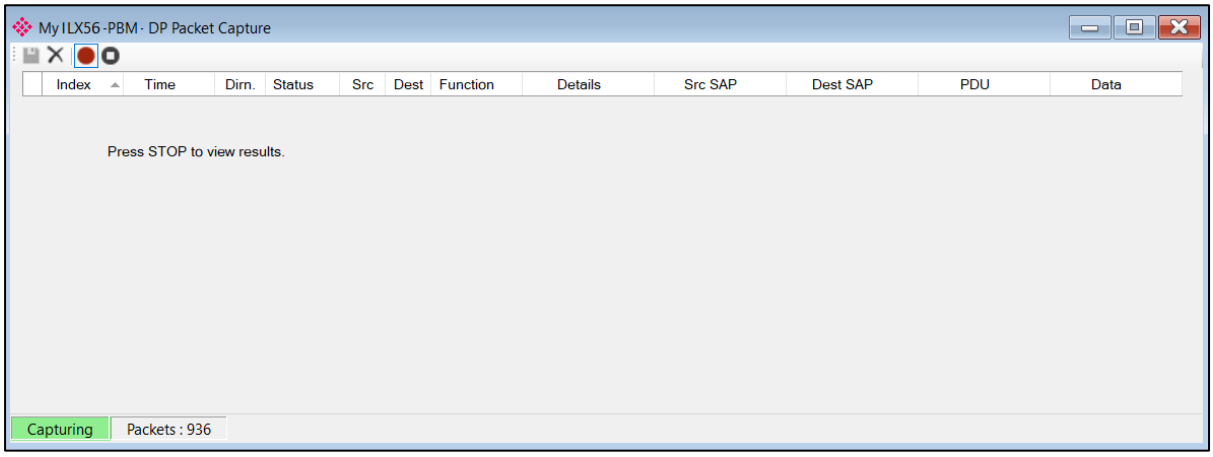
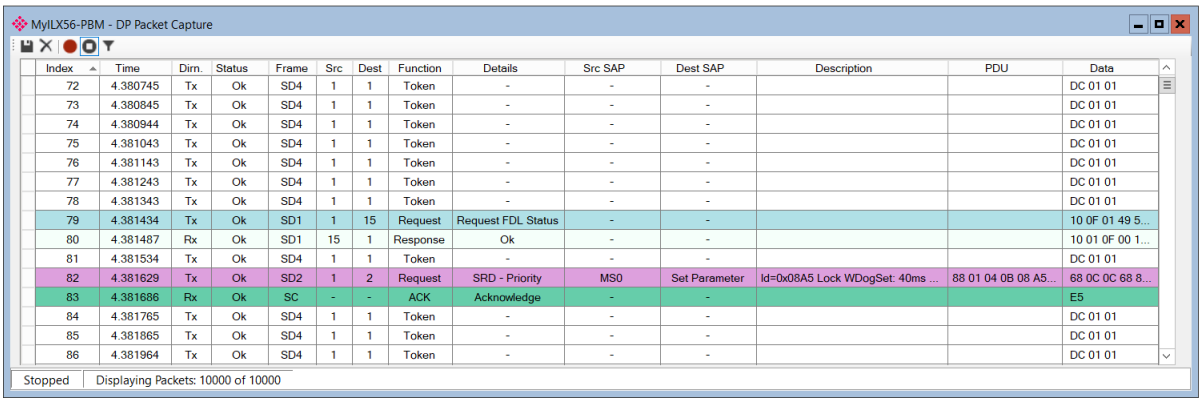


Figure 8.19 - PROFIBUS packet capture

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	Frame	Src	Dest	Function	Details	Src SAP	Dest SAP	Description	PDU	Data
72	4.380745	Tx	Ok	SD4	1	1	Token	-	-	-			DC 01 01
73	4.380845	Tx	Ok	SD4	1	1	Token	-	-	-			DC 01 01
74	4.380944	Tx	Ok	SD4	1	1	Token	-	-	-			DC 01 01
75	4.381043	Tx	Ok	SD4	1	1	Token	-	-	-			DC 01 01
76	4.381143	Tx	Ok	SD4	1	1	Token	-	-	-			DC 01 01
77	4.381243	Tx	Ok	SD4	1	1	Token	-	-	-			DC 01 01
78	4.381343	Tx	Ok	SD4	1	1	Token	-	-	-			DC 01 01
79	4.381434	Tx	Ok	SD1	1	15	Request	Request FDL Status	-	-			10 0F 01 49 5...
80	4.381487	Rx	Ok	SD1	15	1	Response	Ok	-	-			10 01 0F 00 1...
81	4.381534	Tx	Ok	SD4	1	1	Token	-	-	-			DC 01 01
82	4.381629	Tx	Ok	SD2	1	2	Request	SRD - Priority	MS0	Set Parameter	Id=0x08A5 Lock WDogSet: 40ms ...	88 01 04 0B 08 A5...	68 0C 0C 68 8...
83	4.381686	Rx	Ok	SC	-	-	ACK	Acknowledge	-	-			E5
84	4.381765	Tx	Ok	SD4	1	1	Token	-	-	-			DC 01 01
85	4.381865	Tx	Ok	SD4	1	1	Token	-	-	-			DC 01 01
86	4.381964	Tx	Ok	SD4	1	1	Token	-	-	-			DC 01 01

Figure 8.20 - PROFIBUS Packet Capture complete

The captured PROFIBUS packets are tabulated as follows:

Table 8.14 - 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.
Frame	PROFIBUS Frame type. (e.g. SD1, SD2, SD3 etc)
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.
Description	A more detailed description of the packet payload. Only applicable to specific packet types.
PDU	The PROFIBUS packet payload.
Data	The packet's raw data displayed in space delimited hex.

Additional detail about specific packets can be viewed by either double-clicking or right-clicking on the packet and selecting the Show Detail option.

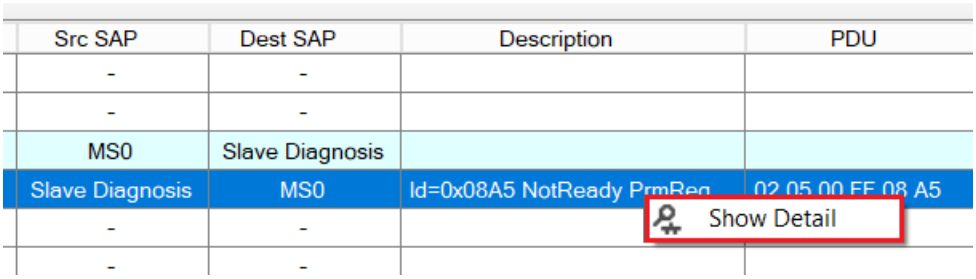


Figure 8.21 - PROFIBUS Packet Capture - Show Detail

A pop-up form will open displaying more relevant detail to the selected packet.

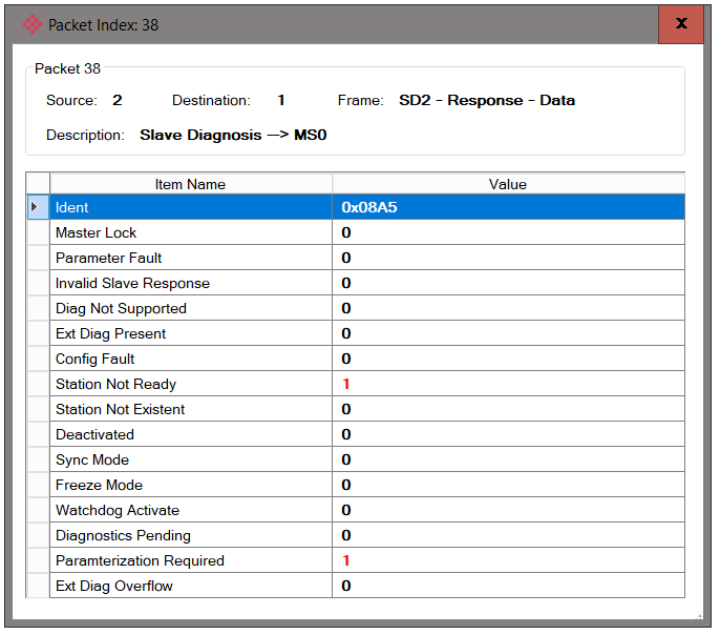


Figure 8.22 - PROFIBUS Packet Capture - Detail Example

The packet filter can be used to hide certain packet types. To open the packet filter click on the ***Filter*** icon in the toolbar.

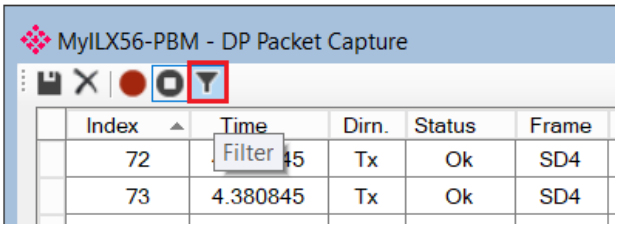


Figure 8.23 - PROFIBUS Packet Filter

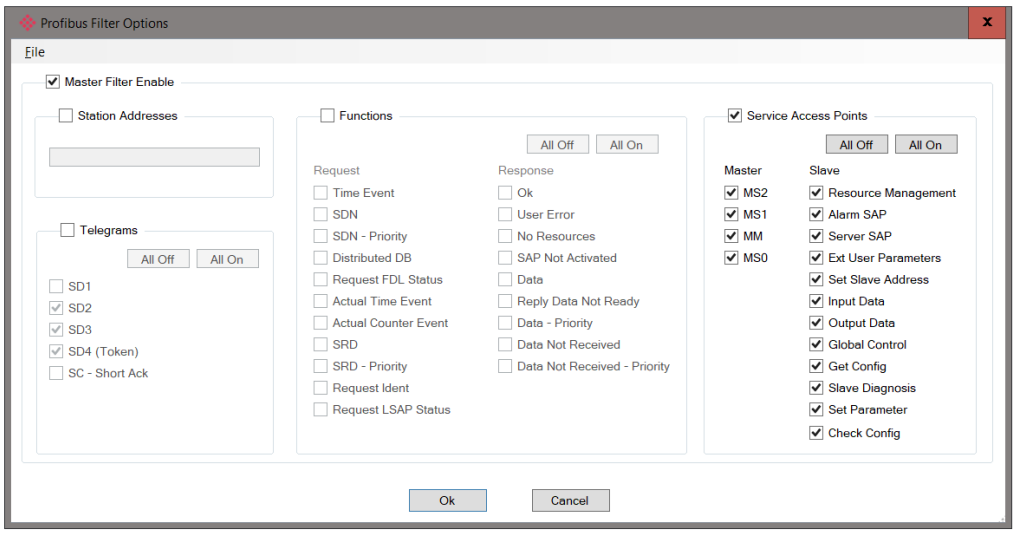


Figure 8.24 - PROFIBUS Packet Filter Options

PROFIBUS packets can be filtered on the following criteria:

- Station Address
- Telegram (Frame) Type
- Function
- Service Access Point

The selected Filter options can also be saved and re-opened for future use.

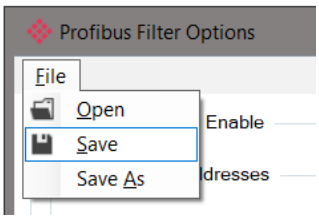


Figure 8.25 - PROFIBUS Packet Filter Options – Save / Open

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.

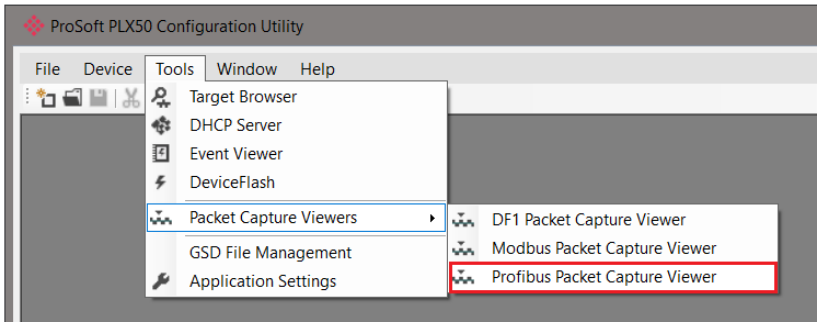


Figure 8.26 - Selecting the PROFIBUS Packet Capture Viewer

8.4 Module Event Log

The ILX56-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. To view them in the PLX50 Configuration Utility, select the Event Viewer option.

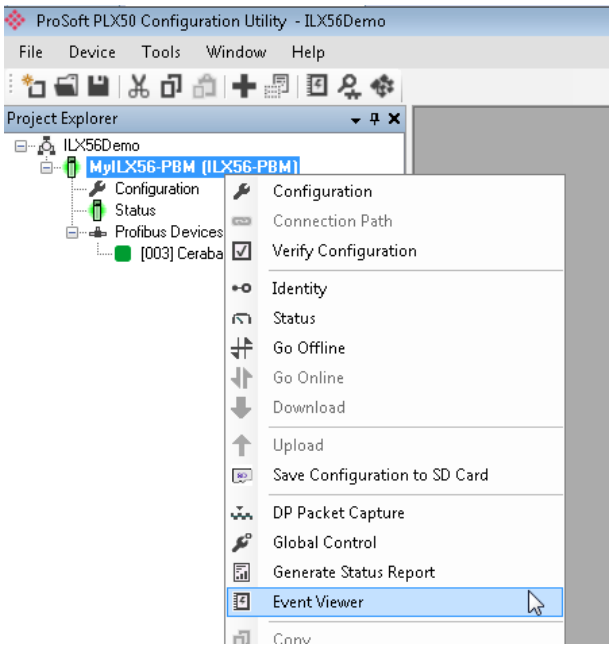
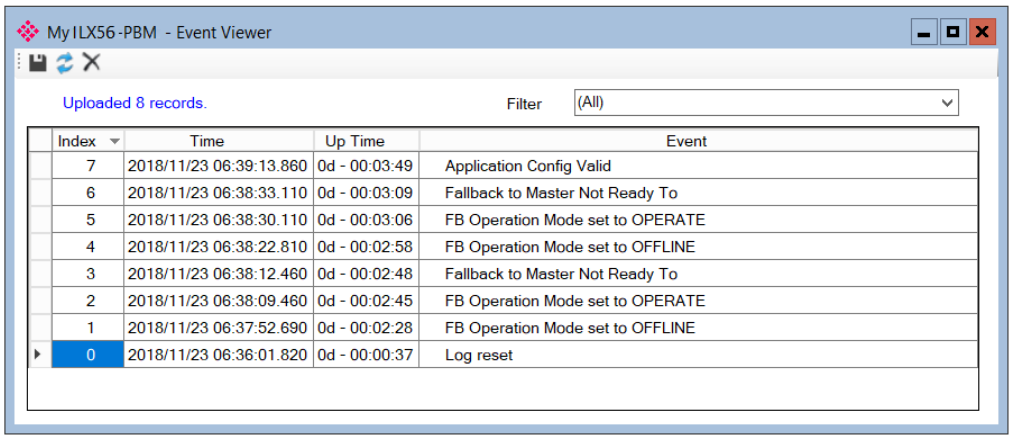


Figure 8.27. - Selecting the module Event Log

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 8.28. – 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.

9 Technical Specifications

9.1 Electrical

Table 9.1 - Electrical specification

Specification	Rating
Backplane Current Load	450 mA @ 5 VDC 2 mA @ 24 VDC
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

9.2 PROFIBUS DP

Table 9.2 – 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

9.3 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…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 ILX56-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 – 127	Reserved
128	DPV1
129 – 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 - 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 - 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 - 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 – 7	Reserved
Bit 4 – 5	00 – FDL 01 – MSAC_C2 10 – User 11 – Reserved
Bit 0 - 3	See EN 50170 Part 2

12 ILX56-PBM Quickstart

This chapter will walk you through the setup process needed to configure the ILX56-PBM as a PROFIBUS Master to communicate with an ET200M PROFIBUS Slave.

12.1 GSD File Management Tool

12.1.1 Installation

1. Download the ProSoft PLX50 Configuration Utility from http://www.prosoft-technology.com.
2. Run the PLX50 Configuration Utility Setup.msi to install the software.
3. Follow the Setup Wizard to complete the installing process.

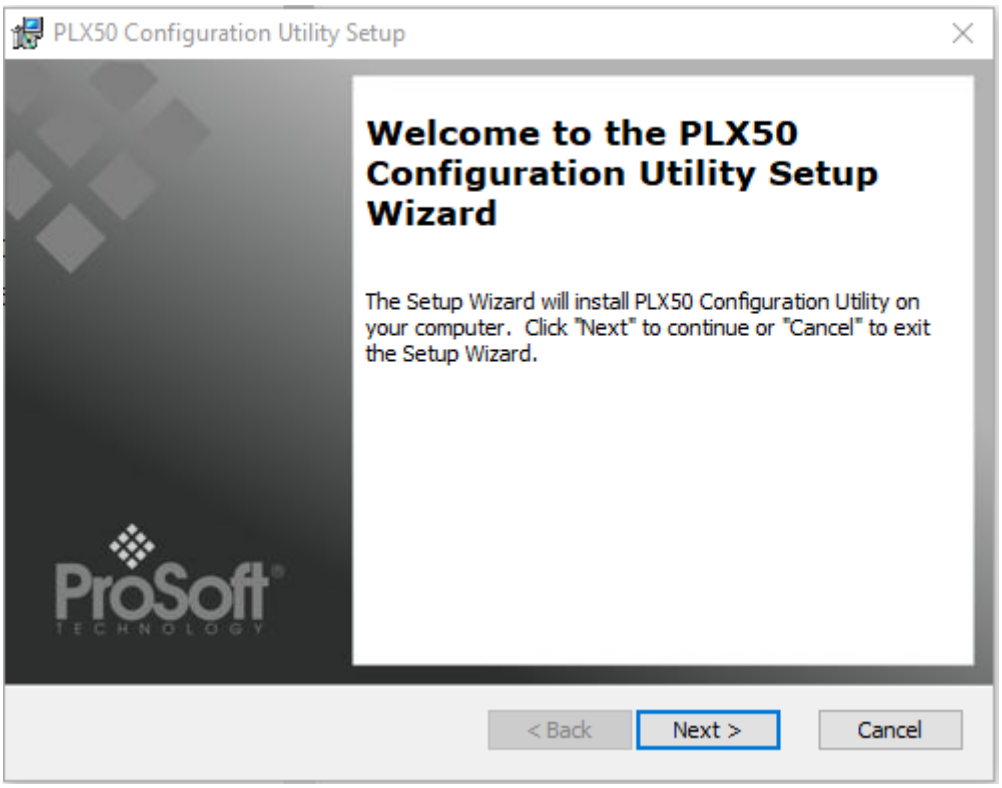


Figure 12.1 – PLX50 Configuration Utility Setup Wizard

12.1.2 Configuration

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

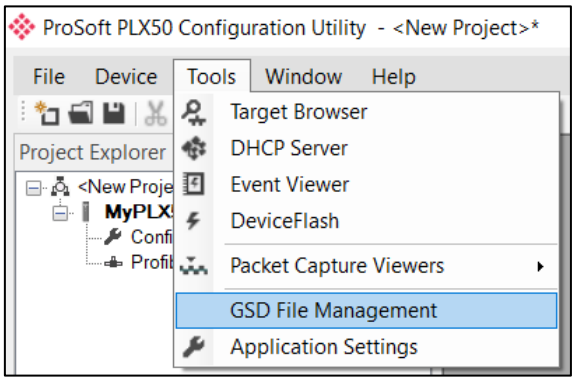


Figure 12.2 – GSD File Management option

Once the tool has been opened, a list of registered slave devices using their GSD files are displayed.

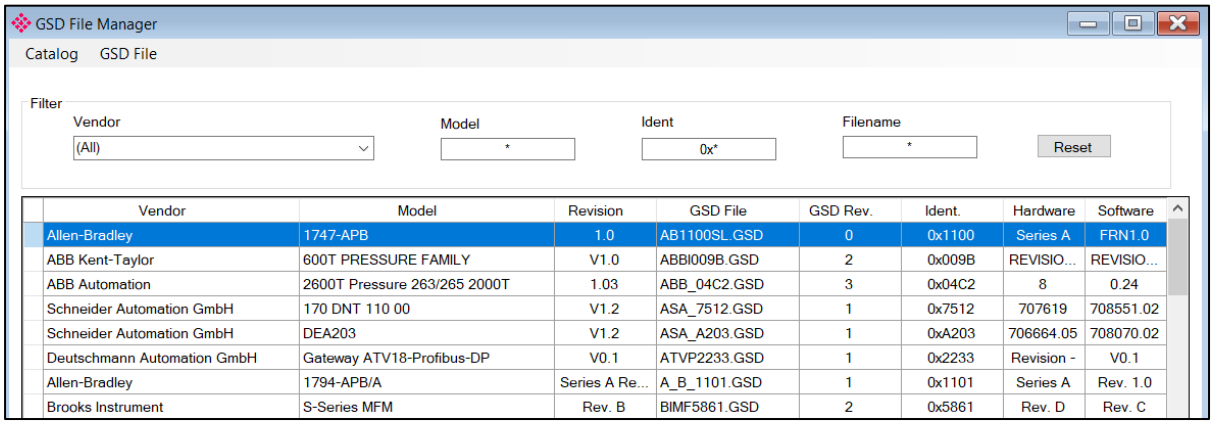


Figure 12.3 – Registered slave devices

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

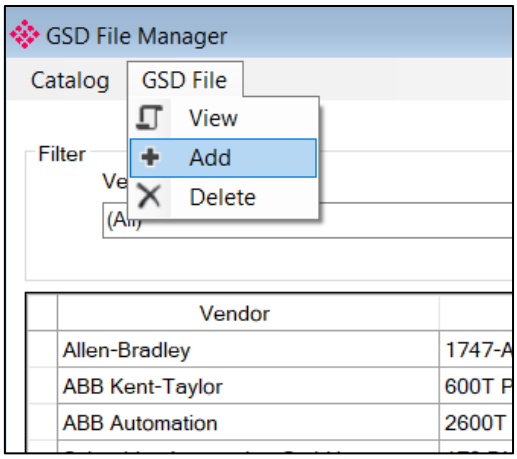


Figure 12.4 – Add option

Select the GSD file and click **Open**.

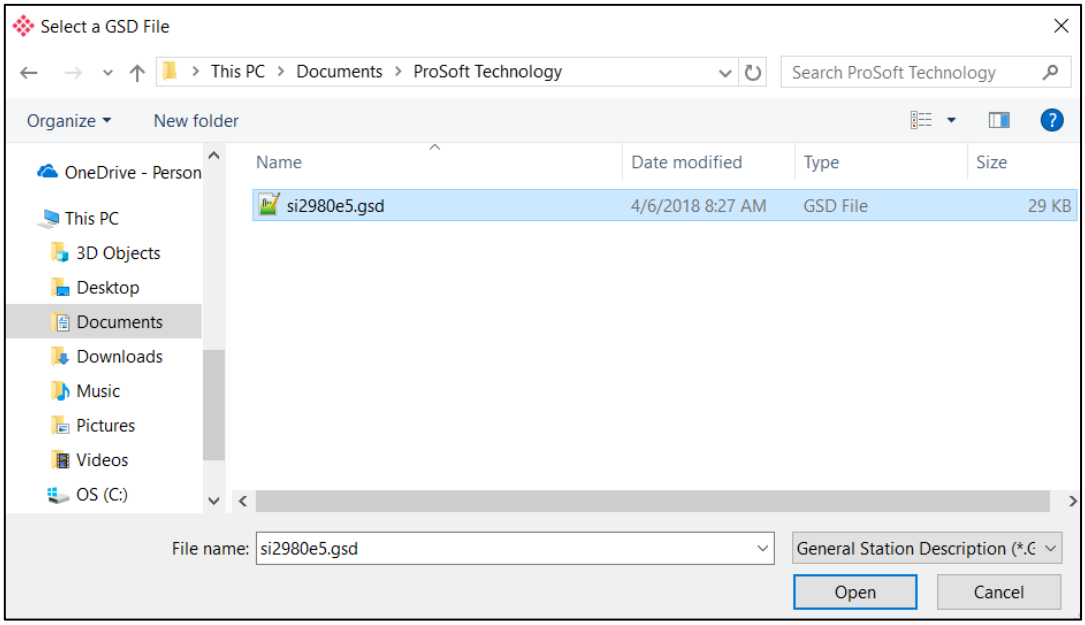


Figure 12.5 – Selecting the GSD file

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:

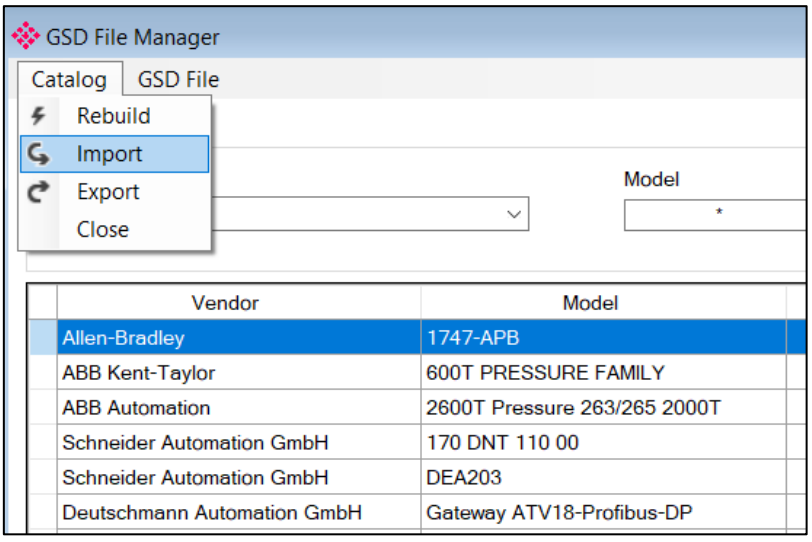


Figure 12.6 – Import and Export options

12.2 Creating a New Project

Note: If project was started from Studio 5000 Add-On Profile (AOP), the following step of creating a new project, can be skipped).

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

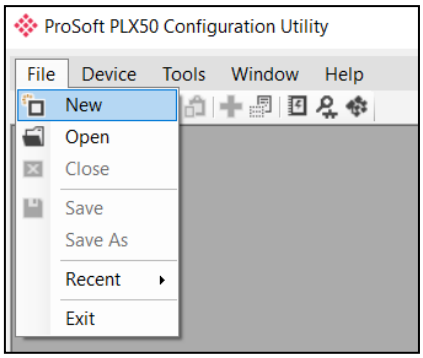


Figure 12.7 – Creating a new project

A PLX50 Configuration Utility Design Tool project will be created, showing the Project Explorer tree view.

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

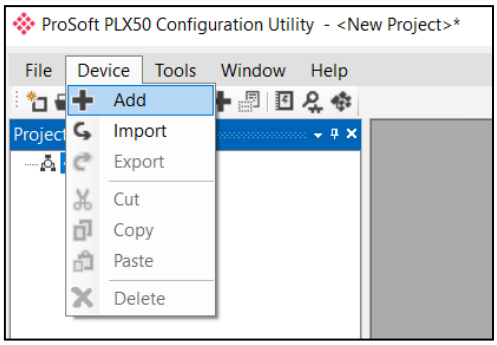


Figure 12.8 – Adding a new device

In the Add New Device window, select the ILX56-PBM and click the **Ok** button.

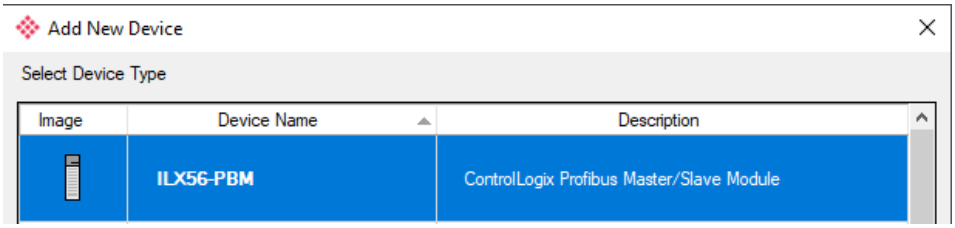


Figure 12.9 – Adding a new ILX56-PBM device

The device will appear in the Project Explorer tree with its configuration window opened.

12.2.1 PROFIBUS Configuration

Navigate to *Profibus* tab to update basic settings.

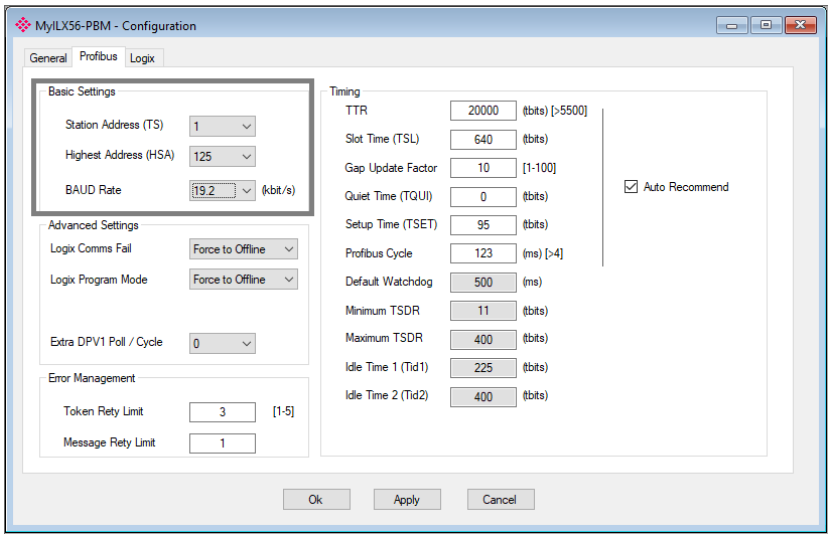


Figure 12.10 – Profibus tab

12.2.2 Logix Configuration

Update Logix Connections and Logix Base Tag A to reflect ILX56-PBM position in ControlLogix Rack. Click **Apply** and then the **Ok** button.

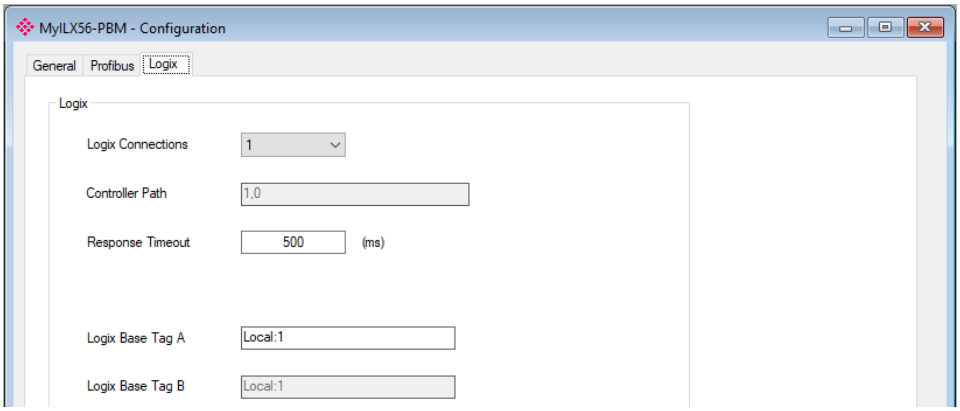


Figure 12.11 – Logix tab

12.3 Adding a PROFIBUS Device

The user will need to add each PROFIBUS device to the ILX56-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*.

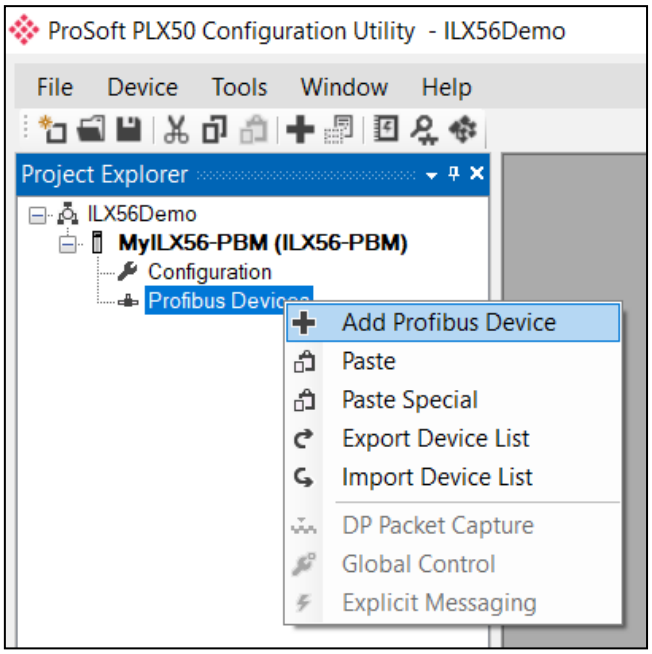


Figure 12.12 – Adding a PROFIBUS device

This is done by selecting the device from the GSD File Selector and pressing **Ok**. If GSD file is not available in GSD File Selector, navigate to tools and select GSD file management.

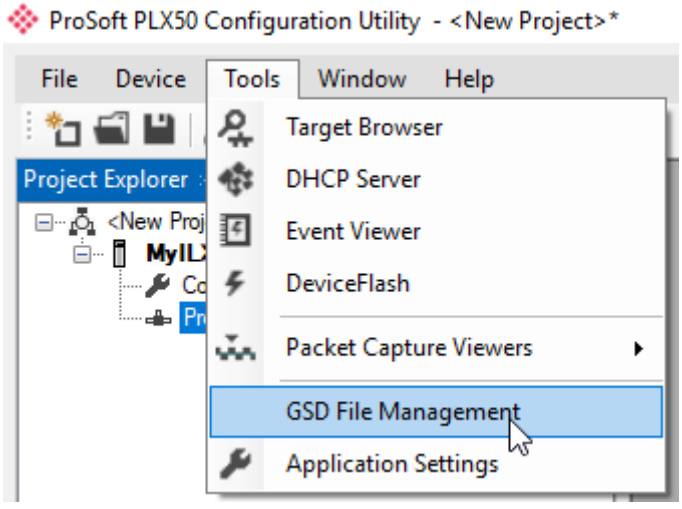


Figure 12.13 – GSD File Management option

Once the tool has been opened, a list of slave devices already registered using their GSD files.

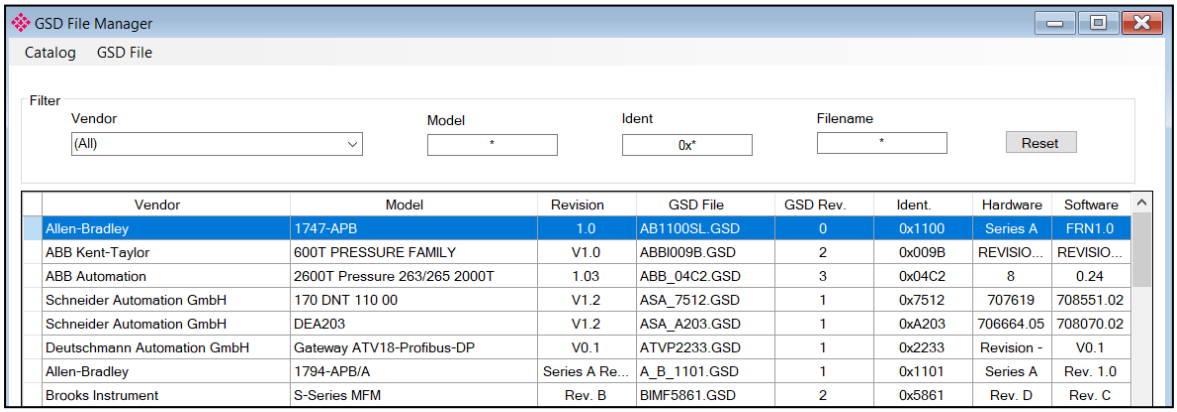


Figure 12.14 – Registered slave devices

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

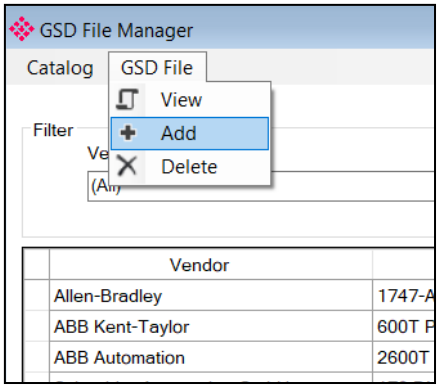


Figure 12.15 – Add option

The required GSD file will need to be selected. 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.

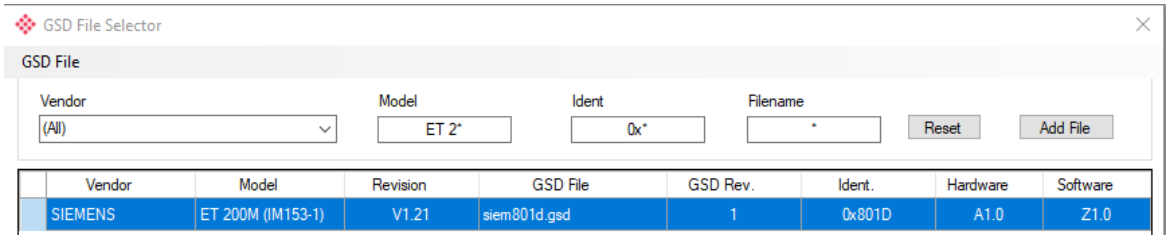


Figure 12.16 – New slave device

Select GSD file of device to add to project. 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.

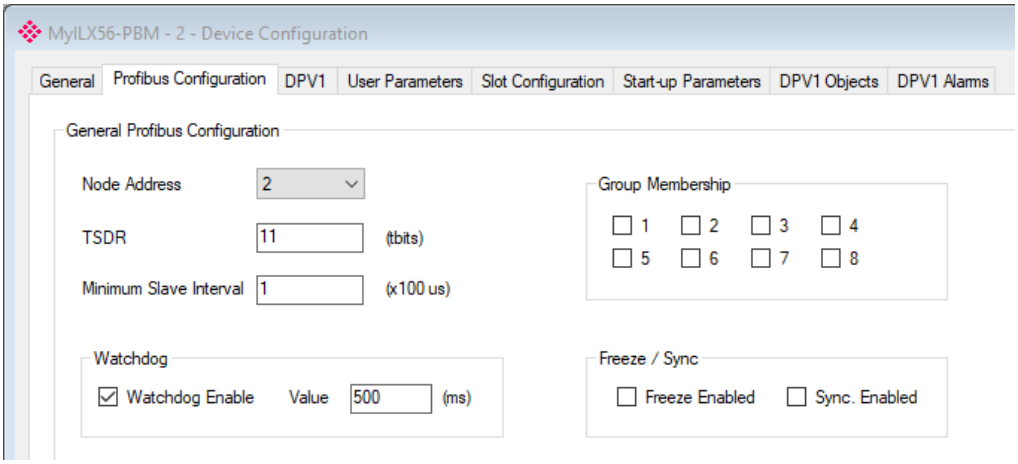


Figure 12.17 – Profibus Configuration

Navigate to Profibus Configuration tab. Assign the Node Address.

Navigate to *Slot Configuration* tab. Select **Add Module**.

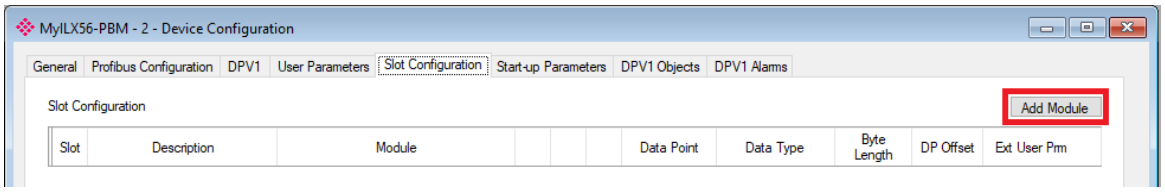


Figure 12.18 – Add Module

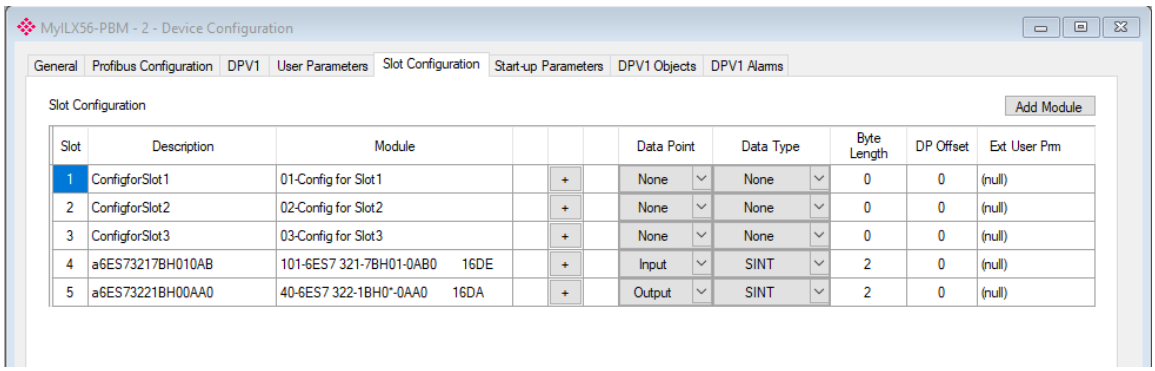


Figure 12.19 – Newly added modules

Add the appropriate modules and click the **Ok** button.

The Slave device ET200M is now configured in the ProSoft PLX50 Configuration Utility.

12.4 Downloading the Configuration to the Module

Establish a connection path for each module.

Right click device name and select **Connection Path**.

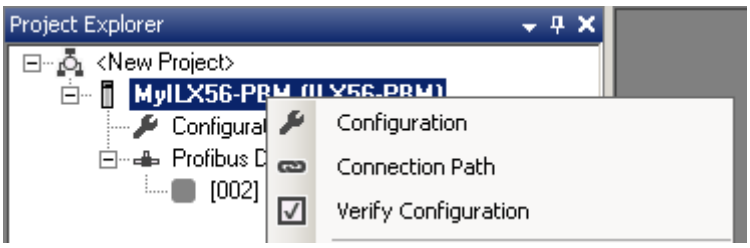


Figure 12.20 – Connection Path option

Select *Browse* to launch target browser. Navigate to the module, and press **Ok**.

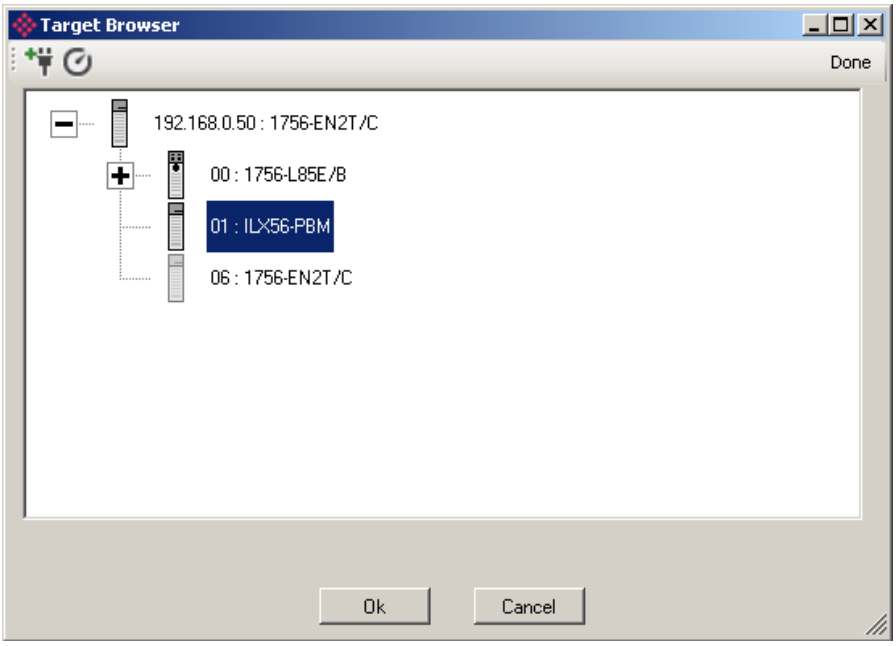


Figure 12.21 – Selecting the module

The Connection path will copy to Connection Path A. Select **Ok**.

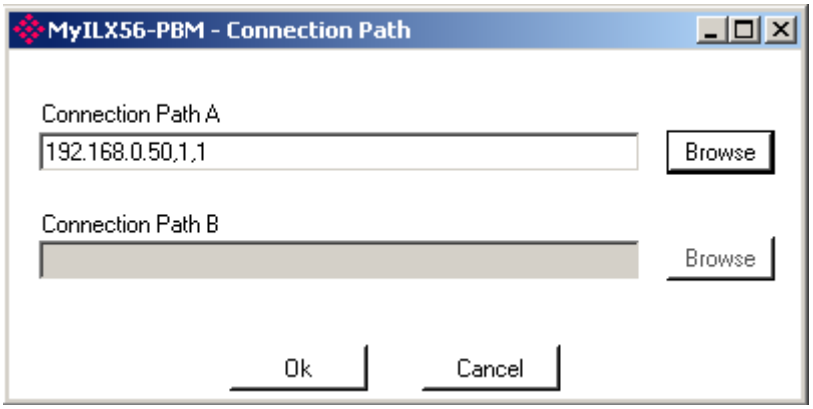


Figure 12.22 – Connection Path

Download device configuration. Right click device name and select **Download**.

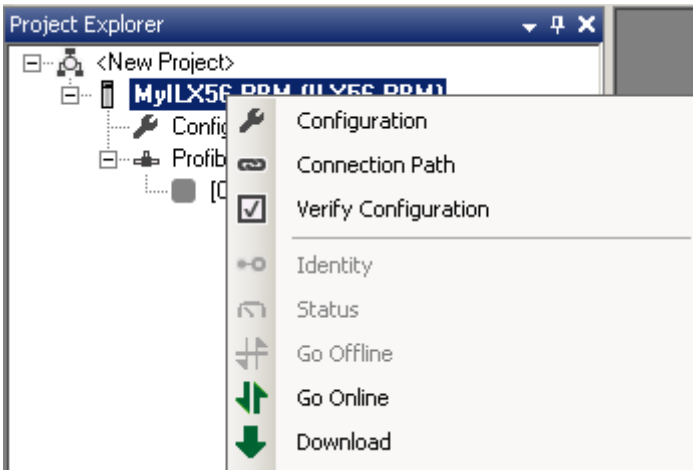


Figure 12.23 – Downloading the device configuration

The PLX50 CU device configuration is now complete.

12.5 ControlLogix Configuration

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.

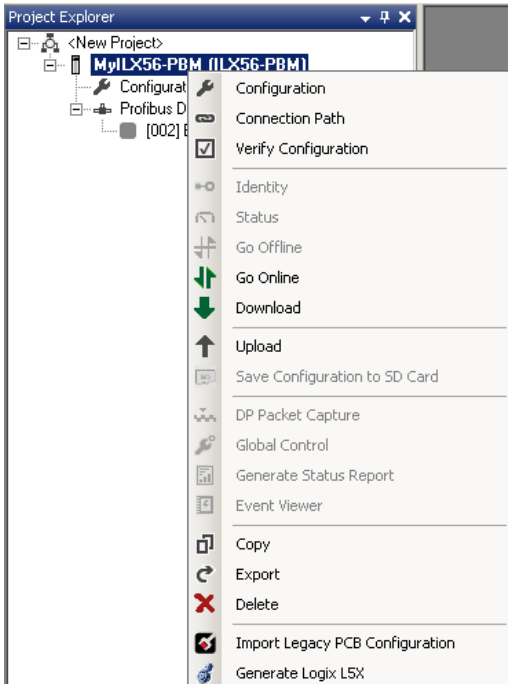


Figure 12.24 – Generate Logix L5X option

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

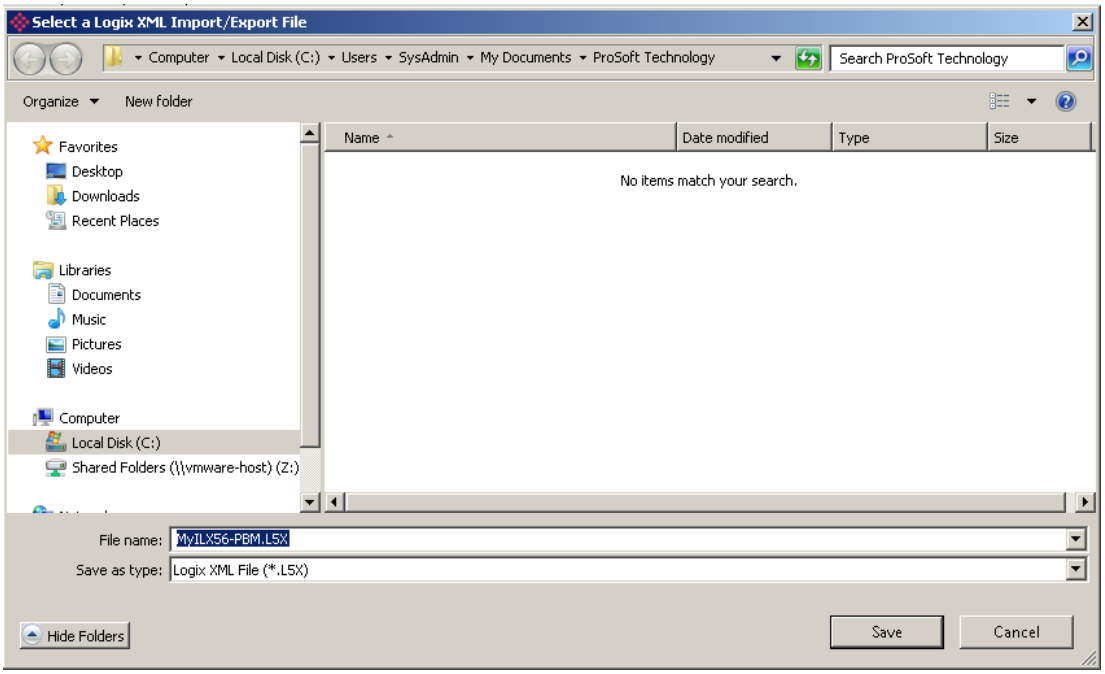


Figure 12.25 – File name and path for the L5X file

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

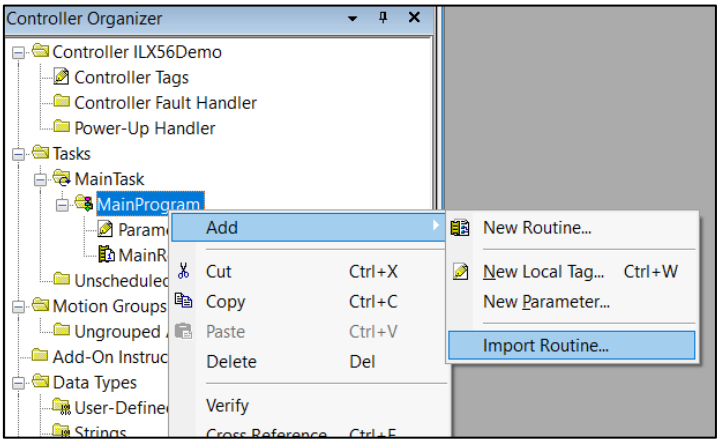


Figure 12.26 – Import Routine option

In the *File Open* dialog, select the 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.

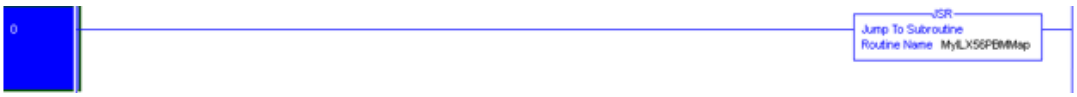


Figure 12.27 – Imported mapping routine

To enable place a value of 3 in Local:1:O1.CommandControl (3 – Set PROFIBUS network state to OPERATIONAL). You should expect the PROFIBUS slave device icon to change to green if the module is successful in exchanging data.

Figure 12.28 – Setting the value of CommandControl tag

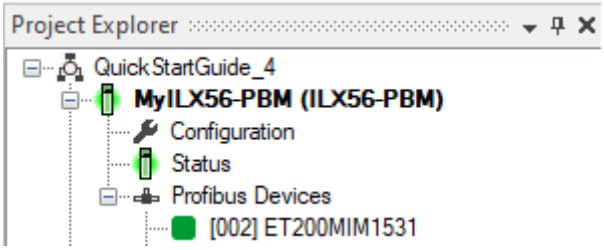


Figure 12.29 – Successful data exchange indicated by green icon

12.6 Cyclic Data

ET200M

To write cyclic data to the ET200M device, go to the appropriate controller tags and enter the bits you want to energize in the output module.

◢ MyILX56PBM_ET200MIM1531	{...}	{...}		MyILX56P...
▷ MyILX56PBM_ET200MIM1531.Input	{...}	{...}		MyILX56P...
◢ MyILX56PBM_ET200MIM1531.Output	{...}	{...}		MyILX56P...
◢ MyILX56PBM_ET200MIM1531.Output.Control	{...}	{...}		PSILX56DP...
▷ MyILX56PBM_ET200MIM1531.Output.Control.StationNumber	2		Decimal	SINT
MyILX56PBM_ET200MIM1531.Output.Control.AlarmTrigger	0		Decimal	BOOL
▷ MyILX56PBM_ET200MIM1531.Output.Control.DeviceMappingCRC	16#29ca		Hex	INT
◢ MyILX56PBM_ET200MIM1531.Output.a6ES73221BH00AA0	{...}	{...}	Decimal	SINT[2]
◢ MyILX56PBM_ET200MIM1531.Output.a6ES73221BH00AA0[0]	13		Decimal	SINT
MyILX56PBM_ET200MIM1531.Output.a6ES73221BH00AA0[0].0	1		Decimal	BOOL
MyILX56PBM_ET200MIM1531.Output.a6ES73221BH00AA0[0].1	0		Decimal	BOOL
MyILX56PBM_ET200MIM1531.Output.a6ES73221BH00AA0[0].2	1		Decimal	BOOL
MyILX56PBM_ET200MIM1531.Output.a6ES73221BH00AA0[0].3	1		Decimal	BOOL
MyILX56PBM_ET200MIM1531.Output.a6ES73221BH00AA0[0].4	0		Decimal	BOOL
MyILX56PBM_ET200MIM1531.Output.a6ES73221BH00AA0[0].5	0		Decimal	BOOL
MyILX56PBM_ET200MIM1531.Output.a6ES73221BH00AA0[0].6	0		Decimal	BOOL
MyILX56PBM_ET200MIM1531.Output.a6ES73221BH00AA0[0].7	0		Decimal	BOOL

Figure 12.30 – Output bits to be energized

Bit 0, 2, and 3 are currently being energized. For this example, the output bits have been connected straight back into the input bits. Below, the associated input bits have been energized by energizing the output bits in the ET200M device.

◢ MyILX56PBM_ET200MIM1531	{...}
◢ MyILX56PBM_ET200MIM1531.Input	{...}
▷ MyILX56PBM_ET200MIM1531.Input.Status	{...}
◢ MyILX56PBM_ET200MIM1531.Input.a6ES73217BH010AB	{...}
◢ MyILX56PBM_ET200MIM1531.Input.a6ES73217BH010AB[0]	13
MyILX56PBM_ET200MIM1531.Input.a6ES73217BH010AB[0].0	1
MyILX56PBM_ET200MIM1531.Input.a6ES73217BH010AB[0].1	0
MyILX56PBM_ET200MIM1531.Input.a6ES73217BH010AB[0].2	1
MyILX56PBM_ET200MIM1531.Input.a6ES73217BH010AB[0].3	1
MyILX56PBM_ET200MIM1531.Input.a6ES73217BH010AB[0].4	0
MyILX56PBM_ET200MIM1531.Input.a6ES73217BH010AB[0].5	0
MyILX56PBM_ET200MIM1531.Input.a6ES73217BH010AB[0].6	0
MyILX56PBM_ET200MIM1531.Input.a6ES73217BH010AB[0].7	0

Figure 12.31 – Associated input bits

13 Support, Service & Warranty

13.1 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.

North America (Corporate Location)	**Europe / Middle East / Africa Regional Office**
Phone: +1.661.716.5100 info@prosoft-technology.com Languages spoken: English, Spanish REGIONAL TECH SUPPORT support@prosoft-technology.com	Phone: +33.(0)5.34.36.87.20 france@prosoft-technology.com Languages spoken: French, English REGIONAL TECH SUPPORT support.emea@prosoft-technology.com
Latin America Regional Office	**Asia Pacific Regional Office**
Phone: +52.222.264.1814 latinam@prosoft-technology.com Languages spoken: Spanish, English REGIONAL TECH SUPPORT support.la@prosoft-technology.com	Phone: +60.3.2247.1898 asiapc@prosoft-technology.com Languages spoken: Bahasa, Chinese, English, Japanese, Korean REGIONAL TECH SUPPORT support.ap@prosoft-technology.com

For additional ProSoft Technology contacts in your area, please visit: www.prosoft-technology.com/About-Us/Contact-Us.

13.2 Warranty Information

For complete details regarding ProSoft Technology's TERMS & CONDITIONS OF SALE, WARRANTY, SUPPORT, SERVICE AND RETURN MATERIAL AUTHORIZATION INSTRUCTIONS, please see the documents at: www.prosoft-technology/legal