

# Where Automation Connects.



PLX51-PBM

PROFIBUS DP Master/Slave to EtherNet/IP™ Gateway

> August 29, 2019 v1.0



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# **1. PREFACE**

### 1.1. INTRODUCTION

This manual describes the installation, operation, and diagnostics of the PLX51-PBM PROFIBUS DPV0/DPV1 Master/Slave module. The module will hereafter be collectively referred to as PLX51-PBM.

The PLX51-PBM allows you to interface PROFIBUS DP to EtherNet/IP<sup>™</sup>.

The PLX51-PBM can operate as a PROFIBUS DPV0/DPV1 Master or multiple PROFIBUS DPV0/DPV1 Slaves. This allows EtherNet/IP devices (e.g. Rockwell Logix platform) 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).

The PLX51-PBM slave feature can operate only as one or more PROFIBUS DPV0/DPV1 Slaves. This allows EtherNet/IP devices to exchange process, alarming, and diagnostic data with other PROFIBUS DP Master(s).

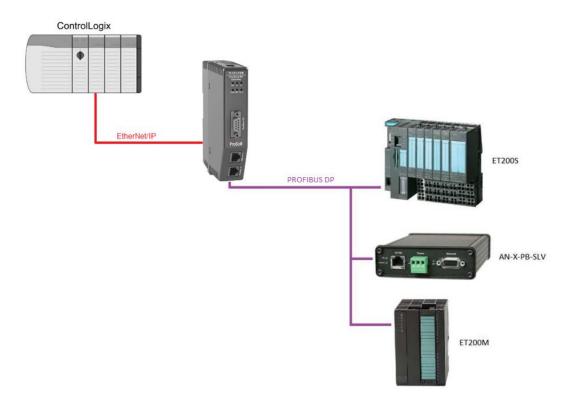


Figure 1.1 – PLX51-PBM Typical PROFIBUS Master Architecture

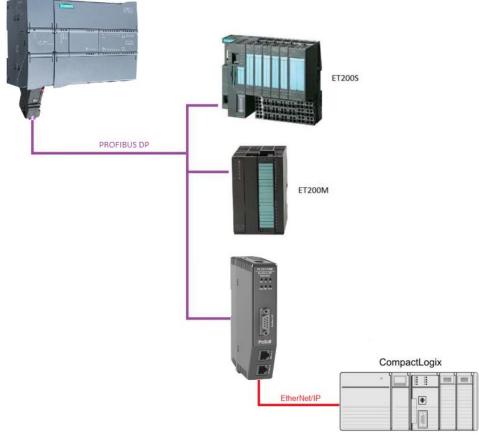


Figure 1.2 – PLX51-PBM Typical PROFIBUS Slave Architecture

## 1.2. FEATURES

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

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

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

#### PLX51-PBM as a PROFIBUS Master

The PLX51-PBM can exchange process data (DPV0) with up to 125 PROFIBUS DP slave devices, providing up to 1536 cyclic bytes input and 1536 bytes output data. The data is formatted into the engineering units for use in a Logix platform by using the automatically generated mapping imports for Logix User Defined Data Types (UDTs).

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

From a Logix controller, the PLX51-PBM allows you to monitor and extract DPV1 alarms from each slave device on the connected PROFIBUS DP fieldbus.

#### PLX51-PBM as a PROFIBUS Slave

The PLX51-PBM can also be configured to emulate up to 10 PROFIBUS slave devices, providing up to 1536 bytes of Input and Output Cyclic I/O data between EtherNet/IP devices and a PROFIBUS DP master. Each slave device emulated by the PLX51-PBM can be configured to provide DPV0 data exchange with a PROFIBUS Master on the network.

The data is formatted into the engineering units for use in a Logix platform by using the automatically generated mapping imports for Logix User Defined Data Types (UDTs).

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 is able to provide DPV1 alarming for the PROFIBUS Master.

The PLX51-PBM provides a range of statistics and tools to provide a detailed diagnostic overview of each emulated slave which speeds up fault finding. The PLX50 Configuration Utility allows you to perform a PROFIBUS DP packet capture of the running Fieldbus which can be used to analyze the bus behaviour and packets received. The PLX51-PBM also provides global and device specific statistics.

# 1.3. ARCHITECTURE

The figure below provides an example of a typical network setup for a PLX51-PBM PROFIBUS Master architecture using an EtherNet/IP interface.

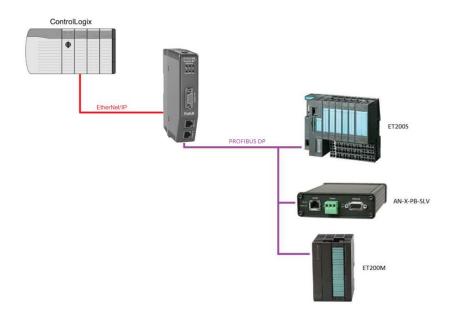


Figure 1.3 – PLX51-PBM PROFIBUS Master to EtherNet/IP architecture

The figure below provide an example of the typical network setup for a PLX51-PBM PROFIBUS Slave architecture using an EtherNet/IP interface.

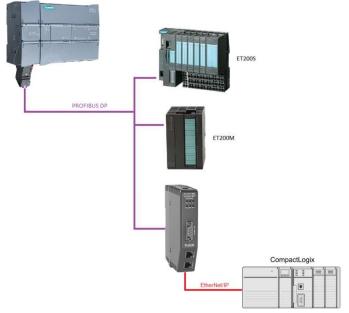


Figure 1.4 – PLX51-PBM PROFIBUS Slave to EtherNet/IP architecture

# 1.4. ADDITIONAL INFORMATION

The following documents contain additional information that can assist you with installation and operation.

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

Table 1.1 - Additional Information

# 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, use either of the following:

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

Table 1.2 – Support Details

# 2. INSTALLATION

# 2.1. MODULE LAYOUT

The PLX51-PBM has one RS485 PROFIBUS DP port as well as two Ethernet. The Ethernet cable must be wired according to industry standards, which can be found in the Additional Information section of this document.

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

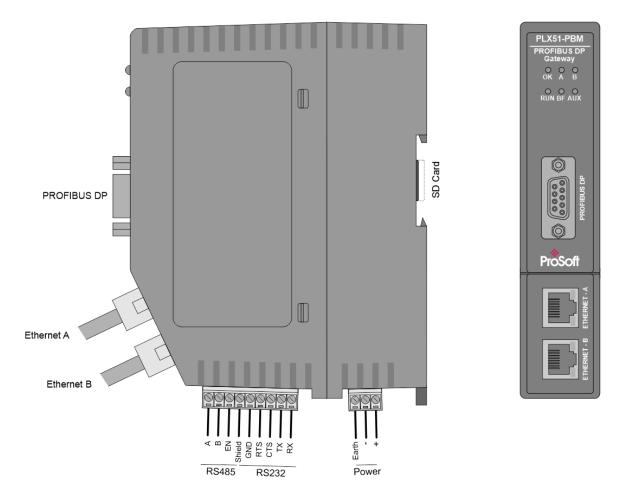


Figure 2.1 – PLX51-PBM Side and Front view

At the bottom of the PLX51-PBM module, there is one 3-way power connector.

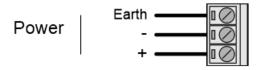


Figure 2.2 – PLX51-PBM Power connector

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



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

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

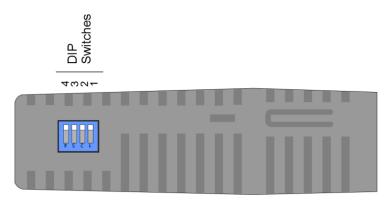


Figure 2.3 – PLX51-PBM Top view

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

Table 2.1. - DIP Switch Settings

## 2.2. MODULE MOUNTING

The PLX51-PBM provides a DIN rail clip to mount onto a 35mm DIN rail.

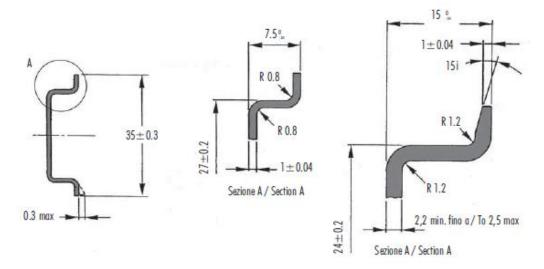


Figure 2.4 - DIN rail specification

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

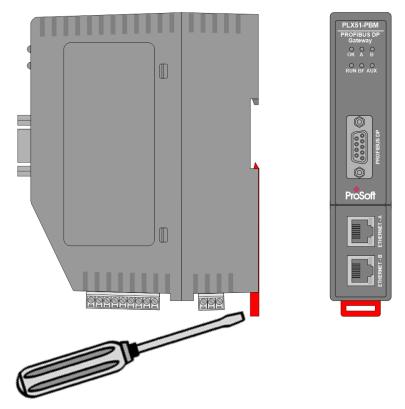


Figure 2.5 - DIN rail mouting

# 2.3. PROFIBUS DP PORT (RS485)

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

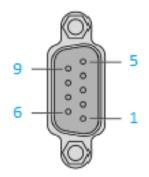


Figure 2.6 – PLX51-PBM PROFIBUS DP (RS485) DB9 connector

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

Table 2.2 – DB 9 Connector layout

# 3. SETUP

## **3.1. INSTALLING THE CONFIGURATION SOFTWARE**

All PLX51-PBM network setup and configuration is done in the ProSoft PLX50 Configuration Utility. This software can be downloaded from: <u>www.prosoft-technology.com</u>



Figure 3.1. - ProSoft PLX50 Configuration Utility Environment

# 3.2. NETWORK PARAMETERS

The PLX51-PBM has DHCP (Dynamic Host Configuration Protocol) enabled as factory default. Thus, a DHCP server must be used to provide the module with the required network parameters (IP address, subnet mask, etc.). There are a number of DHCP utilities available, however it is recommended that the DHCP server in the PLX50 Configuration Utility is used.

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

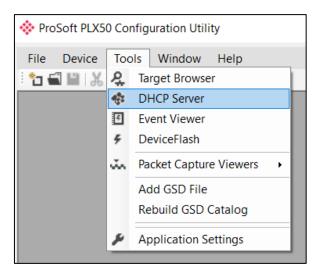
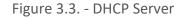


Figure 3.2. - Selecting DHCP Server

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

MAC Address							
W/ to / tuul coo	Vendor	Requests	Elapsed	Assigned IP	Assign	Status	Identity
00:0D:8D:F0:D7:00	-	27	0		Assign	Discover	



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

To assign an IP address, click on the corresponding **Assign** button. The Assign IP Address for MAC window opens.

Assign IP Address for MAC : 00:0D:8D:F0:E	D7:00 — 🗆 🗙
IP Address	Recent
192 . 168 . 1 . 172	
☑ Enable Static (Disable DHCP)	
Ok	Cancel

Figure 3.4. - Assigning IP Address for MAC

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

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

Once you click **OK**, the DHCP server will automatically assign the IP address to the module and then read the Identity object product name from the device.

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

00:0D:8D:F0:D7:00 - 56 3 192.168.1.172 Assign Complete PLX51-P	PLX51-PBM

Figure 3.5. - Successful IP address assignment

It is possible to force the PLX51-PBM back into DHCP mode by powering up the device with DIP switch 2 set to the **On** position.

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



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

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

Once the DHCP process is complete, the network settings can be set using the *Ethernet Port Configuration* via the *Target Browser*.

The *Target Browser* can be accessed under the *Tools* menu.

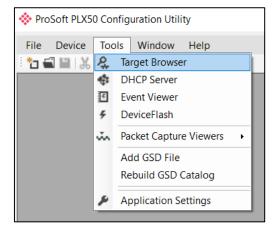


Figure 3.6. - Selecting the Target Browser

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

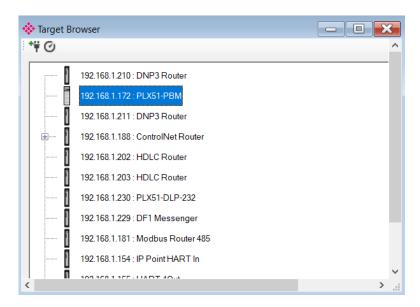


Figure 3.7. - Target Browser

l	192.168.1.202 : HDL	192.168.1.202 : HDLC Router				
	192.168.1.172 : P	Select				
	192.168.1.210 : D	Scan				
	192.168.1.203 : H	Add Child Node				
		Properties				
÷	192.168.1.188 : C	Port Configuration				
	192.168.1.155 : H	Reset Module +				
	192.168.1.154 ; IP Po	pint HART In				

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

Figure 3.8. - Selecting Port Configuration

The Ethernet port configuration parameters can be modified using the *Ethernet Port Configuration* window.

ort Configuration Inter	face Sta	tistic	s M	edia	a Statis	stics			
Network Configuration	Туре							Port 1	Port 2
🔘 Dynamic		N	/letho	d	DHC	P	~	Negotiation	Negotiation
Static								Auto 👻	Auto 👻
Static Configuration	n							Port Speed	Port Speed
IP Address	192	2	168	ŝý	1	33	176	100 -	-
Subnet Mask	255		255	-	255		0	Duplex	Duplex
Default Gateway	0	<u>.</u>	0	- 22	0		0	Full Duplex 💌	Half Duplex 👻
Primary NS	0	्	0	-	0	23	0	General	
Secondary NS	0		0	-	0	-	0	MAC Address	00:0D:8D:20:00:30
Domain Name									00.00.00.20.00.30
Host Name								TCP Inactivity Tin	neout 120 (s)

Figure 3.9. - Port Configuration

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

## 3.3. GSD FILE MANAGEMENT

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

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

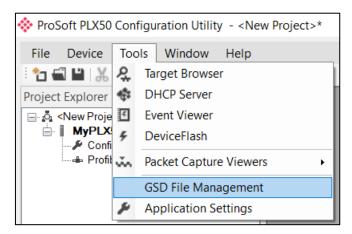


Figure 3.10 – Launching the GSD File Management Tool

**2** Once the tool opens, a list of registered slave devices are displayed, using their GSD files.

GSD File Manager							
atalog GSD File							
Filter Vendor	Model	ld	ent	Filenam	Ð		
(All)	× *		0x*		*	Res	et
Vendor	Model	Revision	GSD File	GSD Rev.	ldent.	Hardware	Software
Allen-Bradley	1747-APB	1.0	AB1100SL.GSD	0	0x1100	Series A	FRN1.0
ABB Kent-Taylor	600T PRESSURE FAMILY	V1.0	ABBI009B.GSD	2	0x009B	REVISIO	REVISIO
	2600T Pressure 263/265 2000T	1.03	ABB 04C2.GSD	3	0x04C2	8	0.24
ABB Automation	26001 Pressure 265/265 20001	1.00	100_0102.000				
ABB Automation Schneider Automation GmbH	170 DNT 110 00	V1.2	ASA_7512.GSD	1	0x7512	707619	708551.02
			_	1		707619 706664.05	708551.02 708070.02
Schneider Automation GmbH	170 DNT 110 00	V1.2	ASA_7512.GSD	1 1 1 1	0x7512	-	
Schneider Automation GmbH Schneider Automation GmbH	170 DNT 110 00 DEA203	V1.2 V1.2	ASA_7512.GSD ASA_A203.GSD ATVP2233.GSD	1 1 1 1 1 1	0x7512 0xA203	706664.05	708070.02

Figure 3.11 – GSD File Management Tool

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

1747-A
600T P
2600T
600

Figure 3.12 – GSD File Adding

4 Select the required GSD file and click **OPEN.** 

- → × ↑ 📙 > Tł	nis PC > Documents > ProSoft Technology	ٽ ~	Search ProS	oft Techno	logy	Q
Organize   New fold	er			• <b>•</b>		?
OneDrive - Person	Name	Date modified	Туре		Size	
. San This PC	📔 si2980e5.gsd	4/6/2018 8:27 AM	GSD File			29 I
3D Objects						
E Desktop						
📔 Documents						
👃 Downloads						
Downloads Music						
Music						
Music Pictures Videos	<					
Music Pictures Videos OS (C:)	< me: si2980e5.gsd	~	General Sta	tion Descri	iption ('	*.C ~

Figure 3.13 – Adding GSD File

**5** Once the file has been selected, the GSD File Management tool adds 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 from 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:

🚸 GSD File Manager	
Catalog GSD File	
🗲 Rebuild	
G Import	
C Export	Model *
Close	*
Vendor	Model
Allen-Bradley	1747-APB
ABB Kent-Taylor	600T PRESSURE FAMILY
ABB Automation	2600T Pressure 263/265 2000T
Schneider Automation GmbH	170 DNT 110 00
Schneider Automation GmbH	DEA203
Deutschmann Automation GmbH	Gateway ATV18-Profibus-DP

Figure 3.14 – GSD Catalog import/export

## 3.4. CREATING A NEW PROJECT

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

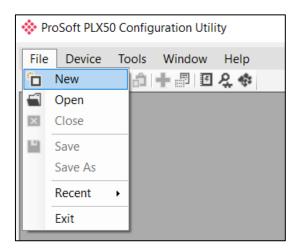


Figure 3.15 - Creating a new project

- 2 A PLX50 Configuration Utility Design Tool project is created, showing the *Project Explorer* tree view. To save the project use the **Save** option under the *File* menu.
- **3** A new device can now be added by selecting **Add** under the *Device* menu.

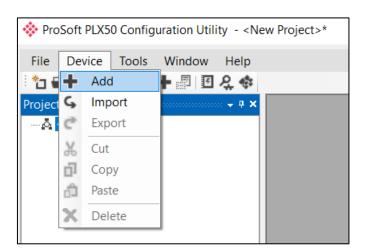


Figure 3.16 - Adding a new device

🔅 Add Ne	ew Device	>
Select Dev		
Image	Device Name 🔺	Description
Lee	DF1 Router	DF1 to Logix Communication Module
	PLX51-DL-232	Data Logger Module
I	PLX51-DLP-232	Data Logger Plus Module
I	PLX51-HART-4I	HART 4-Channel Input Communication Module
I	PLX51-HART-40	HART 4-Channel Output Communication Module
	PLX51-PBM	Profibus Gateway Master/Slave Module
I	PLX51-PBS	Profibus Gateway Slave Module
		Ok Cancel

**4** In the *Add New Device* window, the PLX51-PBM and click the **O**κ button.

Figure 3.17 – PLX51-PBM

5 The device appears in the *Project Explorer* tree and its configuration window opened.

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

MyPLX51-PBM - Configurat		
General Modbus Profibus A	Advanced	
Identity Instance Name	MyPLX51-PBM	
Description		
IP Address	0.0.0.0	
Operation		
Master Mode	StandaloneMaster	
Primary Interface	EtherNet/IP  V Data Padding Alignment	
EIP Connections	1 ~	
Remote Path		
	Ok Apply Cancel	

Figure 3.18 – PLX51-PBM configuration

### 3.5. PLX51-PBM PARAMETERS

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

Refer to the Additional Information section for documentation and installation links for ProSoft's PLX50 Configuration Utility.

3.5.1. GENERAL

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

WyPLX51-PBM - Configur	ation	_ 🗆 🗙
General Modbus Modbus	Addressing Profibus Logix Advanced	
Identity		
Instance Name	MyPLX51-PBM	
Description	My PLX51-PBM Profibus Gateway	
IP Address	192 . 168 . 1 . 172	
Operation		
Mode	StandaloneMaster V	
Primary Interface	EtherNet/IP v	
	Ok Apply Cancel	

Figure 3.19 – PLX51-PBM General configuration

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

### The General configuration consists of the following parameters:

Table 3.1 - General configuration parameters

#### 3.5.2. PROFIBUS – MASTER MODE

The PLX51-PBM PROFIBUS configuration is opened by either double-clicking on the module in the tree, or right-clicking the module and selecting *Configuration*. Then select the **PROFIBUS** tab.

General Modbus Modbus Addr	essing Profibus	Logix /	Advanced				
Basic Settings			Timing	20000	(tbits) [>5500]		
Station Address (TS)	1 ~		Slot Time (TSL)	100	(tbits) [> 0000]		
Highest Address (HSA)	125 🗸		Gap Update Factor	10	[1-100]		
BAUD Rate	45. <del>4</del> 5 ∨	(kbit/s)	Quiet Time (TQUI)	0	(tbits)	<ul> <li>Auto Recommend</li> </ul>	
Advanced Settings			Setup Time (TSET)	1	(tbits)		
Logix Comms Fail	Force to Offline	• ~	Profibus Cycle	123	(ms) [>4]		
Logix Program Mode	Force to Offline	• V	Default Watchdog	500	(ms)		
Modbus Comms Fail	Force to Offline	• V	Minimum TSDR	11	(tbits)		
Extra DPV1 Poll / Cycle	0 ~		Maximum TSDR	60	(tbits)		
Error Management			Idle Time 1 (Tid1)	37	(tbits)		
Token Rety Limit	3	[1-5]	Idle Time 2 (Tid2)	60	(tbits)		
Message Rety Limit	1						

Figure 3.20 – PLX51-PBM PROFIBUS configuration – Master mode

#### The PROFIBUS configuration consists of the following parameters:

Parameter	Description
	Basic Settings
Station Address (TS)	<b>PROFIBUS Station Address</b> for the PLX51-PBM module. TS should be unique 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)	<b>Highest Station Address</b> . 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	<b>Baud Rate</b> (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 should be supported by all slaves in the configuration. The baud rate should be selected depending on the cable length, see chapter " <i>PROFIBUS DP</i> ".

	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 <i>Program</i> mode, either:					
Logix Program Mode	Force to Offline					
	Force to Clear					
	The number of additional DPV1 Polls (Class 2) per PROFIBUS Cycle.					
Extra DPV1 Poll / 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: 0					
	Max: 15					
	Default: 3					
Message Retry Limit	<b>Message Retry Limit</b> is the number of telegram repetitions if the address doesn't react. Value must be in the following range:					
	Min: 0					
	Max: 15					
	Default: 1 Timing					
TTD	<b>Target Rotation Time</b> indicates the maximum time available for a token circulation					
TTR	(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 (in tbits) is the maximum time the PLX51-PBM will wait, after the					
Slot Time (TSL)	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	<b>Gap Update Factor:</b> 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)	<b>Quiet time</b> (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)	<b>Setup Time</b> (in tbits) is the reaction time on an event. Calculation of TSET must respect the rule:			
	Min: 1			
	Max: 494			
PROFIBUS Cycle	<b>PROFIBUS Cycle</b> (in ms) (read/Write) field defines the cyclic time the master will respect between two IO Data Exchange sequences. This parameter can be increased 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 clicking <b>Ok</b> or <b>Apply</b> .			
	<b>NOTE:</b> When the BAUD Rate is changed, <b>all</b> PROFIBUS timing parameters will be updated irrespective of the Auto Recommend check-box selection.			
Default Watchdog	Default Devices Watchdog (in ms) value defines the watchdog value assigned by			
(Read-Only)	default to all devices in the configuration.			
(Read-Only)				
Min TSDR	<b>Smallest Station</b> (in tbits) is the minimum time that a PROFIBUS DP slave must wait			
(Read-Only)	before it may answer. It must respect the rule:			
· · · · · ·				
	TQUI < MIN_TSDR Min: 11			
	Max: 1023			
	Largest Station (in thits) is the maximum time that a PROFIBUS DP slave may take			
Max TSDR	in order to answer. Calculation of MAX_TSDR must respect the rule:			
(Read-Only)				
	Min: 37			
	Max: 65525			
Idle Time 1 (Tid1)	Time Idle1 (in tbits) is the time between the acknowledgement frame or token			
	frame reception and the transmission of the next frame.			
(Read-Only)				
	Tid1 = Max(Tsyn+Tsm, MIN_TSDR)			
	with			
	Tsyn= 33			
	Tsm= 2 + 2* TSET + TQUI			
Idle Time 2 (Tid2)	<b>Time Idel2</b> (in tbits) is the time between the transmission of an unconfirmed packet			
(Read-Only)	and the transmission of the next packet.			
	Tid2 = Max (Tsyn+Tsm, MAX_TSDR)			
	with			
	Tsyn= 33			
	Tsm= 2 + 2* TSET + TQUI			

Table 3.2 - PROFIBUS configuration parameters



**NOTE:** When the BAUD Rate is changed, **all** the PROFIBUS timing parameters will change to the default values for that specific BAUD Rate.

#### 3.5.3. PROFIBUS – SLAVE MODE

The PLX51-PBM PROFIBUS configuration is opened by either double-clicking on the module in the tree, or right-clicking the module and selecting *Configuration*. Then select the **PROFIBUS** tab.

General       Modbus       Modbus Addressing       Profibus       Logix       Advanced         Basic Settings       Timing       TTR       20000       (tbits) [>5500]         Station Address (TS)       1       ✓       Image: Settings       Slot Time (TSL)       100       (tbits)         Highest Address (HSA)       125       ✓       BAUD Rate       45.45       ✓ (kbit/s)       Gap Update Factor       10       [1-100]       Quiet Time (TQUI)       0       (tbits)         Advanced Settings       Logix Comms Fail       Force to Offline       ✓       Profibus       Image: Setup Time (TSET)       11       (tbits)	×					
Station Address (TS)       1          Highest Address (HSA)       125          BAUD Rate       45.45       (kbit/s)         Advanced Settings       Gap Update Factor       10         Logic Common Spill       Famor to Officer       1	_					
Station Address (TS)       1          Highest Address (HSA)       125          BAUD Rate       45.45       (kbit/s)         Advanced Settings       Setup Time (TSL)       10         Logic Commo Soil       Setup Time (TSET)       1						
Highest Address (HSA)       125       Gap Update Factor       10       [1-100]         BAUD Rate       45.45       (kbit/s)       Quiet Time (TQUI)       0       (tbits)         Advanced Settings       Setup Time (TSET)       1       (tbits)						
BAUD Rate     45.45 v     (kbit/s)       Advanced Settings     Quiet Time (TQUI)     0       Logic Common Soil     Setup Time (TSET)     1						
Advanced Settings Setup Time (TSET) 1 (tbits)						
Logix Comms Fail Force to Offline V Profibus Cycle 123 (ms) [>4]						
Logix Program Mode Force to Offline ∨ Default Watchdog 500 (ms)						
Modbus Comms Fail         Force to Offline         Minimum TSDR         11         (tbits)						
Extra DPV1 Poll / Cycle 0 ~ Maximum TSDR 60 (tbits)						
Error Management (tbits)						
Token Rety Limit     3     [1-5]     60     (tbits)						
Message Rety Limit 1						
Ok Apply Cancel						

Figure 3.21 – PLX51-PBM PROFIBUS configuration – Slave mode

#### The PROFIBUS configuration consists of the following parameters:

Parameter	Description	
BAUD Rate	<b>Baud Rate</b> (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 should be selected depending on the cable length, see chapter " <i>PROFIBUS DP</i> "	

Table 3.3 - PROFIBUS configuration parameters – Slave Mode

#### 3.5.4. Logix

This section is used when the *Primary Interface* is set to *EtherNet/IP*.

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

MyPLX51-PBM - Configuration	- <b>•</b> ×
General Modbus Modbus Addressing Profibus Logix Advanced	
Logix	
EtherNet/IP Connections 1 V	
General       Modbus       Modbus Addressing       Profibus       Logix         Logix       EtherNet/IP Connections       1       ✓         Controller Path       192.168.1.102.1.0          Response Timeout       500       (ms)	
Response Timeout 500 (ms)	
Ok Apply Cancel	

Figure 3.22 – PLX51-PBM Logix configuration

The Logix configuration consists of the following parameters:

Parameter	Description		
EtherNet/IP Connections	The number of EtherNet/IP (CIP) Connections to be used in the exchange with Logix (1 to 4).		
	Note, this value must match that configured in the Logix IO tree.		
Controller Path	This is the CIP path to the Logix controller.		
	In PROFIBUS Slave Mode, this path will be used for the Class 3 data exchanges for DPV1 objects and alarms.		
	<b>Note:</b> This path can be either entered manually, or configured using the <i>Target Browser</i> .		
Response Timeout	The maximum time (ms) allowed for a Class 3 response from the Logix controller. Default: 5000 ms.		

Table 3.4 - Logix configuration parameters

To browse to a controller path, select the **BROWSE...** button to open the *Target Browser*. Then select a Logix controller and click **Ok**. The path updates automatically.

$\langle \phi \rangle$	Target	t Brow	ser 🗕	x
E*₽	0			Done
$ \Gamma$	[	192	.168.1.212 : DNP3 Router	^
		192	.168.1.232 : DNP3 Router	
		192	.168.1.181 : Modbus Router 485	
	ļ	_	.168.1.102 : 1756-EN2TR/C 217021900	
		•	00 : 1756-L62/B LOGIX5562	
	H	•	01 : 1756-EN2TR/B	
		····· [	02 : 1756-L75/B LOGIX5575	≡
			03 : 1756-EN2TR/C 217021900	
	4	+	04 : 1756-CNBR/E 11.005	
			06 : 1756-CNB/E 11.003	
			09:1756-IB16I/A DCIN ISOL	~
			Ok Cancel	

Figure 3.23 – Target Browser – Selecting Logix controller

### 3.5.5. Advanced

The PLX51-PBM Advanced configuration is opened by either double-clicking on the module in the tree, or right-clicking the module and selecting *Configuration*. Then select the **Advanced** tab.

MyPLX51-PBM - Configuration	
General Modbus Modbus Addressing Profibus Logix Advanced	_
General   Modbus   Modbus Addressing   Profibus   Logix   Advanced	
✓ DLR Enable	
Time Synchronization	
✓ NTP Enable	
NTP - Network Time Protocol	
Server IP Address 192 . 135 . 1 . 88	
Update Interval 60 (s)	
Ok Apply Cancel	

Figure 3.24 – PLX51-PBM Advanced configuration

The Advanced configuration consists of the following parameters:

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

Table 3.5 - Advanced configuration parameters

## 3.6. MODULE DOWNLOAD

Once the PLX51-PBM configuration is complete, it must be downloaded to the module. The configured IP address of the module is used to connect to the module.

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

💠 ProSoft PLX50 Configu	urati	ion Utility - PLX51_PBM_Testing	
File Device Tools	W	/indow Help	
: 🔁 🖼 🔛 🗶 🗗 🖧	÷	· · · · · · · · · · · · · · · · · · ·	
Project Explorer			
□ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □		X51-PRM)	
- P Configuration	×	Configuration	
Profibus Dev	$\checkmark$	Verify Configuration	
	*•0	Identity	
	5	Status	
	4₽	Go Offline	
	11-	Go Online	
	Ŧ	Download	
	Ť	Upload	
		DP Packet Capture	
	ø	Global Control	
	0	Сору	
	¢	Export	
	X	Delete	
	ç	Mapping Report	
	-		

Figure 3.25 - Selecting Download

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

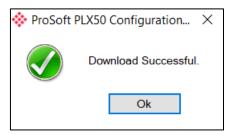


Figure 3.26 - Successful download

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

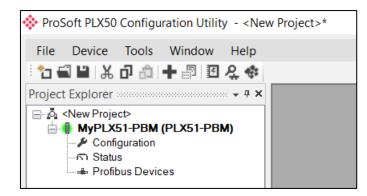


Figure 3.27 - Module online

# 3.7. DEVICE DISCOVERY (ONLINE) - MASTER MODE

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



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

#### 3.7.1. DISCOVERY

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

MyPLX5	51-PBM - S	tatus				
General	General Sta	atistics DPV1 Stat	stics Live List Disco	vered Nodes Ethernet Clients TCF	/ ARP	
St	tart Discove	ry S	tatus			
St	tation	Ident	Status	Vendor	Model	GSD

Figure 3.28 – Device Discovery

**2** To start a new device discovery, click the **START Discovery** button. Once the scan is complete, the detected slave devices are listed.



**NOTE:** The time to scan the bus depends on the BAUD Rate selected. The higher the BAUD rate, the faster the bus discovery scan time.

Start Discov	rery S	Status	Done		
Station	Ident	Status	Vendor	Model	GSD
18	0x801E	Data Exch	SIEMENS	ET 200M (IM153-2) DPV1, H, 1	si04801e.gsd

Figure 3.29 – Devices Found

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

1		
1	2	
	1	
1		/

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

📕 Му	PLX51-PBM - 1	Status					
Gen	eral General S	Statistics DPV1 Sta	tistics Live List Dis	scovered Nodes	Ethernet Clients	ICP / ARP	
	Start Discov	ery	Status		Done		
	Station	ldent	Status	Ve	endor	Model	GSD
	18	0x801E	Unconfigured	SIEMENS		ET 200M (IM153-2) DPV1, H, 1	si04801e.gsd
		+ Ad	d Device				
		🖋 Ch	ange Station Addr	ess			

Figure 3.30 – Adding discovered Field Devices

4 Select the GSD file to add the device to the PLX51-PBM configured device list.

🔆 GSD File Selector							×
Filter							
Vendor	Model	Ident		Filename			
(All)	× *	0x80	11E	*	Reset		
Vendor	Model	Revision	GSD File	GSD Rev.	ldent.	Hardware	Software
SIEMENS	ET 200M (IM153-2) DPV1, H, 12IO		si04801e.gsd		0x801E		V5.0.9

Figure 3.31 – Selecting the GSD for the slave device

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

IyPLX51-PBM - S	Status				
neral GeneralS	tatistics DPV1 Stat	istics Live List Dis	scovered Nodes Ethernet Clients	TCP / ARP	
Start Discov	ery S	itatus	Done		
Station	ldent	Status	Vendor	Model	GSD
18	0x801E	Data Exch	SIEMENS	ET 200M (IM153-2) DPV1, H, 1	si04801e.gsd
	neral General S Start Discov Station	Start Discovery S Station Ident	neral General Statistics DPV1 Statistics Live List Discovery Status Status Status Ident Status	neral General Statistics DPV1 Statistics Live List Discovered Nodes Ethernet Clients Start Discovery Status Done Station Ident Status Vendor	Operal Statistics         DPV1 Statistics         Live List         Discovered Nodes         Ethernet Clients         TCP / ARP           Start Discovery         Status         Done         Model           Station         Ident         Status         Vendor         Model

Figure 3.32 – 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 general defaults to station address 126.

**1** You can change the station address of a device (if the device is correctly set up) by right-clicking on the device in the *Discovery* list and selecting *Change Station Address*.

MyPLX51	-PBM - Status						
General (	General Statistics	DPV1 Statistics	Live List Dis	scovered Nodes E	Ethernet Clients	TCP / ARP	
Star	rt Discovery	Status		[	Done		
Stat	tion Id	ent	Status	Ven	dor	Model	GSD
	18 Ox	801E 🔶	+ Add Device			ET 200M (IM153-2) DPV1, H, 1	si04801e.gsd
		<b>عر</b>	Change Stat	tion Address			

Figure 3.33 – Changing Station Address

2 Select the new station address for the device. Click the SET button.

Change Station Address		×
Old Station Address	18	
Device Ident.	0x801E	
New Station Address	19 v 🗌 Lock	
Set	Cancel	

Figure 3.34 – Changing the Station Address.

**3** Once the request has been sent, you 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-dependant. In the Livelist, there is a period where both node addresses show up while the original station address is timing out.



**NOTE:** If the station address is set to an address that is already present on the DP network, it will result in communication failure of both devices.



**NOTE:** 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

**1** Add each PROFIBUS device to the PLX51-PBM by right-clicking on *PROFIBUS Devices* in the tree and selecting *Add PROFIBUS Device*.

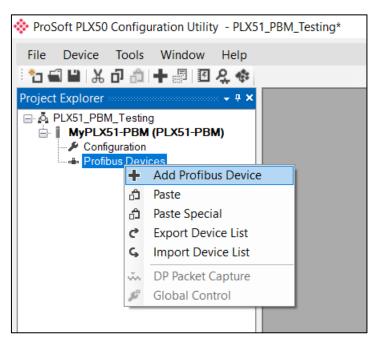


Figure 3.35 – Adding a PROFIBUS Field Device

2 Select the device to be added to the PLX51-PBM. This is done by selecting the device from the *GSD File Selector* and click **O**κ.

ter								
Vendor	Model	Ident	Fil	ename				
(All)	× *		0x*	*	Reset			
Vendor	Model	Revision	GSD File	GSD Rev.	ldent.	Hardware	Software	1
Telemecanique	STB NDP 1010	1.0	SA_063F.gsd	2	0x063F	1.0	1.01	
Telemecanique	STB NDP 2212	1.0	SA_0640+(4_08)+	2	0x0640	1.0	4.	
Telemecanique	STB NDP 2212	1.0	SA_0640.gsd	2	0x0640	1.0	4.	
SCHLEICHER	RIO 8I/O DP	V.1.0	SCHL0756.GSD	1	0x0756	38	0	
SCHLEICHER	RIO 16I DP	V.1.0	SCHL0758.GSD	1	0x0758	38	0	
SCHLEICHER	RIO 160 DP	V.1.0	SCHL075A.GSD	1	0x075A	38	0	
Telemecanique	XPSMC	1.0	SCHN0967.GSD	3	0x0967	1.0	1.0	
SIEMENS AG	CPU 1510SP-1 PN	V1	si0181C0.gsd	5	0x81C0	1	V1.7	
SIEMENS AG	CPU 1510SP F-1 PN	V1	si0181C1.gsd	5	0x81C1	1	V1.7	
SIEMENS AG	CPU 1512SP-1 PN	V1	si0181C2.gsd	5	0x81C2	1	V1.7	
SIEMENS AG	CPU 1512SP F-1 PN	V1	si0181C3.gsd	5	0x81C3	1	V1.7	
SIEMENS	ET 200M (IM153-2) DPV1, H, 12IO	V1.5	si04801e.gsd	5	0x801E	1	V5.0.9	
SIEMENS	ET 200S (IM151) DPV1		si04806a.gsd		0x806A			
Siemens AG	SINAMICS S120/S150 V4.5	V4.5	SI2680E5.GSE	5	0x80E5	С	V4.5	
Sigmono AC	SINAMICS \$120(\$150.\/4.9	1/4 9	ai2020a5 gad	5	0.2055	<b>U</b>	V/4 9	

Figure 3.36 – Selecting a PROFIBUS Field Device

**3** Once the device has been added, the *General Configuration* page opens and the device is added at the first open PROFIBUS Station Address.

ProSoft PLX50 Configuration Utility - PLX5	1_PBM_Testing*
File       Device       Tools       Window       Help         Image: State of the state of th	MyPLX51-PBM - 2 - Device Configuration     General Profibus Configuration DPV1 User Parameters Slot Configuration Start-up Parameters DPV1 Objects DPV1 Alarms     Instance     Instance Name ET200MIM1532DPV1
	Device Details GSD File si04801e.gsd Vendor SIEMENS Model ET 200M (IM153-2) DPV1, H, 12IO Identity 0x0801E Revision 5

Figure 3.37 – PROFIBUS Field Device Added

3.8.1. GENERAL

The *Device Configuration* is opened by either double-clicking on the slave device in the tree, or right-clicking the slave device and selecting *Configuration*.

	guration DPV	/1 User Parameters	s Slot Configuration	Start-up Parameters	DPV1 Objects	DPV1 Alarms
stance						
Instance Name	ET200MIM1	532DPV1				
evice Details						
evice Details	si04801e.gs	d				
	si04801e.gs SIEMENS	sd				
GSD File	SIEMENS	sd /153-2) DPV1, H, 1	210			

Figure 3.38 – General configuration parameters

The General configuration consists of the following parameters:

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

Table 3.6 – Device General configuration parameters

#### 3.8.2. PROFIBUS CONFIGURATION

The PROFIBUS configuration is opened by either double-clicking on the slave device in the tree, or right-clicking the slave device and selecting *Configuration*. Then select the **Profibus Configuration** tab.

eral Profibus Configuration DPV1 User Parameters Slot Configura	ation Start-up Parameters DPV1 Objects DPV1 Alarms
General Profibus Configuration	
Node Address 2 ~	Group Membership
TSDR 15 (tbits)	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$
Minimum Slave Interval 1 (x100 us)	
Watchdog	Freeze / Sync
✓ Watchdog Enable Value 500 (ms)	Freeze Enabled Sync. Enabled

Figure 3.39 – Field Device PROFIBUS configuration parameters

The PROFIBUS configuration	consists	of the	following parameters:
The PROFIDUS configuration	CONSISTS	or the	ionowing parameters.

Parameter	Description
Node Address	This is the station address configured for the added device. This is the address the PLX51- PBM will use to look for and configure the device for Data Exchange.
TSDR	This parameter is the minimum time that a PROFIBUS-DP slave must wait before it responds. It must respect the rule: Min: 11 Max: 1023 Default: 11
Minimum Slave Interval	This is the minimal time that the PROFIBUS must wait between two I/O 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	Used to monitor cyclic communication and must be significantly higher than the time required for one PROFIBUS cycle. If a slave does not receive a request frame for a period of time longer than the watchdog time, it will revert to its initial, power-up state and cyclic communication will have to be reestablished. The minimum and default values are defined by the PLX51-PBM Default Watchdog setting in the PLX51-PBM PROFIBUS configuration.
Group Membership	Specifies which groups the slave belongs to. A slave can be in multiple groups at a time (from 1 through 8). Groups are used by the master when it sends a Sync or Freeze command. PROFIBUS Group checkboxes are enabled when <i>Sync Mode</i> or <i>Freeze Mode</i> 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.

Table 3.7 – Field Device PROFIBUS configuration parameters

3.8.3. DPV1

The slave device DPV1 configuration is opened by either double-clicking on the slave device in the tree, or right-clicking the slave device and selecting *Configuration*. Then select the **DPV1** tab.

eneral Profibus Configuration DPV1 User Parameters Slot Con	figuration Start-up Parameters DPV1 Objects DPV1 Alarm
DPV1 Settings	
	Alarm Enables
Enable DPV1	Pull Plug Alarm
Base 1ms	Process Alarm
✓ Enable Fail Safe	Diagnostic Alarm
Check Config	Manufacturer Alarm
Alarm Mode 1 of each $\vee$	Status Alarm
Alarm Ack uses SAP50	Update Alarm

Figure 3.40 – DPV1 configuration parameters

The DPV1	configuration	consists of	of the fol	llowing parameters:
	configuration	001101000		no wing parameters.

Parameter	Description
Enable DPV1	Indicates if the slave supports DPV1 Class 1 access (read and write) or alarms. If the device does not support these DPV1 services, this parameter must be unchecked. The default value is based on the information provided by the GSD File.
Base 1ms	Indicates if the device should use the 1ms base time for watchdog time calculation. See the " <b>PROFIBUS Settings</b> " chapter for watchdog time calculation.
	By default, the field is unchecked which sets the watchdog base to 10 ms.
	<b>Note</b> : The watchdog value is always shown in the configuration panel in ms regardless of this time base setting.
Enable Fail Safe	The Fail Safe mode determines the behavior of the DP Slave outputs when the PROFIBUS Master is in CLEAR state:
	<ul> <li>If the slave is configured to be Fail Safe mode and supports this feature, then it will apply its own fallback value (the Master sends outputs with 0 length data).</li> </ul>
	• 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 parameter defines 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 is unchecked.
Alarm Mode	This parameter specifies the maximum number of possible active alarms for the device.
Alarm Ack uses SAP50	This parameter forces the PLX51-PBM to use Service Access Point (SAP) 50 to acknowledge alarms.
Alarm Enables	Enables specific alarms for the slave device to report. The available alarms are only available if specified in the device's GSD file:
	Pull Plug Alarm
	Process Alarm
	Diagnostic Alarm
	Manufacturer Alarm
	Status Alarm
	Update Alarm

Table 3.8 – DPV1 configuration parameters

## 3.8.4. User Parameters

The User Parameters configuration is opened by either double-clicking on the slave device in the tree, or right-clicking the slave device and selecting *Configuration*. Then select the **User Parameters** tab.

	Profibus Configuration DPV1	User Parameters Slot C	Configuration	Start-up Pa	rameters	DPV1 Object	cts DPV1 A	larms
Ext U	Jser Parameters							
	Paramet	er			Value			Notes
	Identifier-related diagnostics		enable				~	
	Submodule status		enable				~	
	Channel-related diagnostics		enable				~	
	Analog-value format		SIMATIC ST	7			~	
	Unbundled H-KIR		disable				~	
	MLFB		6ES7 153-2	2BA02-0XB	0		$\sim$	
Use	er Parameter Data							
	er Parameter Data 80 00 08 09 81 00 00 82 00 00 80 02							Default

Figure 3.41 – Device User Parameter configuration parameters

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

#### **3.8.5.** SLOT CONFIGURATION

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

🔅 MyPLX51-PBM	- 2 - Device Configuration										-	
General Profibu	Is Configuration DPV1 User Parameters	Slot Configuration	Start-up Parameters	DPV1 Objects	DPV1 Alar	ms						
Slot Configura	ation									[	Add Module	]
Slot	Description		Module				Data Point	Data Type	Byte Length	DP Offset	Ext User Prm	

Figure 3.42 – Field Device Slot Configuration

**1** To add a module, click the **ADD MODULE** button. The *Add Module* window lists the available modules from the GSD file.

Filt		Description *	Reset
	ID 🔺	Description	Info
	131	6ES7 332-5HB81-0AB0 2AO	Analog output module AO2/12bits, reconfigurable online, extended environ
	132	6ES7 334-0KE80-0AB0 4AI/2AO	Analog input/output module. Al4/12bits+AO2/12bits, extended environment
	133	6ES7 338-4BC01-0AB0 POS-INPUT	Position detection module POS-INPUT, supports clocking
	134	6GK7 342-2AH01-0XA0 CP342-2	Basic module for connecting PLC-i
	137	6ES7 322-1CF00-0AA0 8DO	Digital input module DO8 48-125V DC/1.5A, grouping 4
	138	6ES7 327-1BH00-0AB0 8DI/8DX	Digital I/O module DI8 24V / DX8 individually configurable channels as DI/D
	139	6ES7 331-7HF01-0AB0 8AI	Analog input Al8x14Bit, High Speed (tdp min = 1ms), supports clocking
	140	6ES7 338-7XF00-0AB0 IQ-Opto	Module 8 IQ-SENSE for the connection of IQ-SENSE devices
	141	6ES7 338-7XF00_IQ-ID1/128/129A	Module 8 IQ-SENSE for the connection of IQ-SENSE devices, mixed config
	142	6ES7 322-8BH01-0AB0 16DO_24V	Digital output module DO 16xDC24V/0.5A, with diagnostics, reconfigurable
	143	6ES7 332-7ND02-0AB0 4AO	Analog output module 4AO/16bits, supports clocking
	144	6ES7 331-7PF01-0AB0 RTD	Analog input module Al8xRTD, 16bits (internal 24bits according to Sigma D

Figure 3.43 – Module Selection

**2** The *Module Description* filter can be used to easily locate the required module. Once the module has been selected, click the **O**κ button.

**3** The module is added to the *Slot Configuration*.

	1 1 1				_							
eral	Profibus Configuration DPV1 User Parameter	Slot Configuration Start-up Parameters DPV1 Objects	DPV1 A	larm	S							
lot (	Configuration											Add Module
Slot	Description	Module				Data Poi	int	Data Typ	е	Byte Length	DP Offset	Ext User Prm
Slot	Description a6ES73271BH000AB	Module 138-6ES7 327-1BH00-0AB0 8DI/8DX		+	]		int V	Data Typ INT	e V			

Figure 3.44	– Slot	configuration -	(Logix)	)

SLOT CONFIGURATION - MODULES

Each added module 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. When using Logix, the *Description* is used to create the member of the device-specific UDTs. Therefore, no illegal Logix characters are permitted. It is also important that these descriptions are unique within a device.

	-														
neral Profibus	Configuration DPV1 L	User Parameters	Slot Configuration	Start-up Parameters	DPV1 Objects	DPV	1 Alaı	ms							
				Module					Data Poi	nt D	ata Tvo	e	Byte	DP	Add Module Ext User
Slot Configura Slot	Description		00.0507.007.101/	Module			+		Data Poi	_	ata Typ INT	be	Byte Length 2	DP Offset	

Figure 3.45 – Slot descriptions

Some modules provide module-specific *User Parameters* to further configure the module.

**1** 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.

Slot	Description			Module		
	DigitalInputs	+	Insert Module	B0 8DI/8DX	 +	
	DigitalOutputs	0	Configure Module		+	X
		×	Delete Module			
		+-	Add Data Point			
		≫•	Delete Data Point			

Figure 3.46 – Accessing Module-Specific User Parameters

**2** The *Module User Parameter Editor* window opens. The parameters and their enumerated options are derived from the GSD file.

	Parameter	Value		Notes
	[SlotNumber]	1		1-15
	Use channel 8 as output	No	~	
	Use channel 9 as output	No	~	
	Use channel 10 as output	No	~	
	Use channel 11 as output	Yes	~	
Þ	Use channel 12 as output	No	~	
	Use channel 13 as output	No Yes		
	Use channel 14 as output	INO	×	
	Use channel 15 as output	No	~	
_				
5	5F 01 00 10 00 00 00 00 00 00 00 00 00 00	0 00 00 00 00 00 08		Default

Figure 3.47 – Device Slot configuration additional parameters

**3** Once the slot parameters have been updated, click **OK**. This updates the *Extended User Parameters* and return to the *Slot Configuration* page.

When adding a slot, the data format and size defaults 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.

#### DATA POINTS

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.

Slot	Description	1	Mod	lule			
1	DigitalInputs DigitalOutputs	138-6ES7 327-1BH00-0-	+ © ×	Insert Module Configure Module Delete Module		+	
		-	<b>+</b> •	Add Data Point	1		
		1	ו	Delete Data Point			

Figure 3.48 – Adding / Removing Data Points



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

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

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

Slot Configuration

Slot	Description	Module			Data Poi	int	Data Typ	be	Byte Length	DP Offset
1	DigitalInputs	138-6ES7 327-1BH00-0AB0 8DI/8DX	+		Input	$\sim$	SINT	~	1	0
	DigitalInputs2		+	X	Input	~	SINT	~	1	1
	DigitalOutputs		+	X	Output	~	INT	~	2	0

Figure 3.49 – Configuring Data Points

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

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

Table 3.9 – Data Type – Byte Length Restrictions



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

**NOTE:** It is critical that the total sum of input and output bytes (of all the Data Points) match that required by the slave device. If not, this could cause unexpected results.



**NOTE:** The DP (Byte) Offset for each Data Point is automatically calculated.

```
SLOT CONFIGURATION - LOGIX SPECIFIC
```

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



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

Slot Configuration

Slo	t Description	Module			Data Po	int	Data Type	э	Byte Length	DP Offset	Ext User Prm
1	DigitalInputs	138-6ES7 327-1BH00-0AB0 8DI/8DX	+		Input	$\sim$	INT	$\sim$	2	0	155F01001
	DigitalOutputs		+	X	Output	$\sim$	INT	$\mathbf{\mathbf{\vee}}$	2	0	

Figure 3.50 – Slot configuration – Logix Example

#### 3.8.6. START-UP PARAMETERS

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

 MyPLX	51-PBN	1 - 2 - Device C	Configu	ation						
General	Profib	us Configuration	DPV1	User Parameters	Slot Configuration	Start-up Parameters	DPV1 Objects	DPV	1 Alarms	
Start		rameters ole Start-up Para	ameters							
			Descrip	tion	Slot	Index	Data Type		Value	
	*							$\sim$		

Figure 3.51 – Start-up Parameters

Enable the start-up parameters by selecting the *Enable Start-Up Parameters* checkbox. Then enter the required start-up parameters, as shown in the example below.

nt-Up Param	eters					
C Enable	Start-up Parameters					
	Description	Slot	Index	Data Type		Value
	Damping Factor	1	4	Real	$\sim$	5.25

Figure 3.52 – Start-up Parameters Example

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

# 3.9. ADDING PROFIBUS DP DEVICES - SLAVE MODE

Adding PROFIBUS devices to the PLX51-PBM is done by right-clicking on *PROFIBUS Devices* in the tree and selecting **Add PROFIBUS Device**.

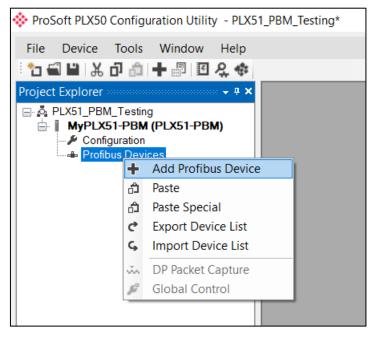


Figure 3.53 – Adding a PROFIBUS Field Device

When adding a PROFIBUS Device in Slave Mode, a static PLX51-PBM GSD file is automatically applied.

Module	GSD Filename
PLX51-PBM	PSFTS10FE.GSD

Table 3.10 – Slave GSD Files

#### 3.9.1. GENERAL

The PLX51-PBM slave feature *Device Configuration* window is opened by either doubleclicking on the slave device in the tree, or right-clicking the slave device and selecting *Configuration*.

🔆 MyPLX51-PBM - 2 - D	Device Cont	figuration					
General Profibus Confi	guration DF	PV1 User	r Parameters	Slot Configuration	Start-up Parameters	DPV1 Objects	DPV1 Alarms
Instance							
Instance Name	PLX51PBN	И					
Device Details							
GSD File	PSFTS10F	E.GSD					
Vendor	ProSoft Te	echnology	, Inc.				
Model	PLX51-PB	М					
Identity	0x010FE		Revision	5			

Figure 3.54 – General parameters

The General configuration consists of the following parameters:

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

Table 3.11 – Device General configuration parameters

#### 3.9.2. PROFIBUS CONFIGURATION

The PLX51-PBM slave feature PROFIBUS Configuration is opened by either double-clicking on the slave device in the tree, or right-clicking the slave device and selecting *Configuration*. Then select the **Profibus Configuration** tab.

eneral Profibus Configuration DPV1 User Parameters Slot Configur	ration Start-up Parameters DPV1 Objects DPV1 Alarms
General Profibus Configuration	
Node Address 2 V	Group Membership
TSDR 70 (tbits)	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$
Minimum Slave Interval 6 (x100 us)	
Watchdog	Freeze / Sync
✓ Watchdog Enable Value 500 (ms)	Freeze Enabled Sync. Enabled

Figure 3.55 – PROFIBUS Configuration parameters

The PROFIBUS configuration consists of the following parameters:

Parameter	Description
Node Address	This is the station address configured for the added device. This is the address the PLX51-PBM will use to look for and configure the device for Data Exchange.
TSDR	N/A
Minimum Slave Interval	N/A
Watchdog Enable	N/A
Watchdog Value	N/A
Group Membership	N/A

Table 3.12 – PROFIBUS configuration parameters

3.9.3. DPV1

The PLX51-PBM slave feature DPV1 configuration is opened by either double-clicking on the slave device in the tree, or right-clicking the slave device and selecting *Configuration*. Then select the **DPV1** tab.

neral Profibus Configuration DPV1 User Parameters Slot Configuration	on Start-up Parameters DPV1 Objects DPV1 A	larn
DPV1 Settings		
Enable DPV1	Alarm Enables	
	Pull Plug Alarm	
Base 1ms	Process Alarm	
Enable Fail Safe	Diagnostic Alarm	
Check Config	Manufacturer Alarm	
Alarm Mode 1 of each $\vee$	Status Alarm	
Alarm Ack uses SAP50	Update Alarm	

Figure 3.56 – DPV1 parameters

The DPV1 configuration consists of the following 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	N/A
Enable Fail Safe	N/A
Check Config	N/A
Alarm Mode	N/A
Alarm Ack uses SAP50	This will force the PLX51-PBM to use Service Access Point (SAP) 50 to acknowledge alarms.
Alarm Enables	N/A

Table 3.13 – DPV1 configuration parameters

3.9.4. SLOT CONFIGURATION

The PLX51-PBM slave feature Slot configuration is the same as the Master Mode. See section 3.8.5.

#### 3.9.5. DPV1 OBJECTS

The PLX51-PBM slave feature *DPV1 Objects* configuration window is opened by either doubleclicking on the slave device in the tree, or right-clicking the slave device and selecting *Configuration*. Then select the **DPV1 Objects** tab.

, initiality of the second sec	IVPLX51-PBMSIave - 2 - Device Configuration							
iener	aneral Profibus Configuration DPV1 User Parameters Slot Configuration Start-up Parameters DPV1 Objects DPV1 Alarms							
	DPV1 Objects							
DF	PV1 C	)bjects						
DF	PV1 C	Objects Slot	Index	Size	Functions		Tagname	
DF	PV1 C		Index 1	Size 32	Functions Read/Write	~	Tagname Slave01_Tagname	

Figure 3.57 – Device DPV1 Objects parameters – Logix

The DPV1 configuration consists of the following 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: <ul> <li>Read</li> <li>Write</li> <li>Read/Write</li> </ul>	
Tagname	The Logix Tagname where the data will be read / written.	

Table 3.14 – Device DPV1 Objects configuration parameters

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



**NOTE:** The Logix controller path must be correctly set for the tags to display in the browser.

🚸 Logix Tag Browser		-		x	
2 🗩 🖻					
	Dete Turce				
Tagname	Data Type		•	_	
+ MyPLX51PBM1:I1	_0135:PLX51_PBM_7E				
+ MyPLX51PBM1:I2	_0135:PLX51_PBM_7E6CF713:I:0				
+ MyPLX51PBM1:I3	_0135:PLX51_PBM_7E6CF713:I:0				
+ MyPLX51PBM1:I4	_0135:PLX51_PBM_7E				
+ MyPLX51PBM1:O1	_0135:PLX51_PBM_78F	5E13D:0	:0		
+ MyPLX51PBM1:O2	_0135:PLX51_PBM_78F	5E13D:0	:0		
+ MyPLX51PBM1:O3	_0135:PLX51_PBM_78F	5E13D:0	:0		
+ MyPLX51PBM1:O4	_0135:PLX51_PBM_78F	5E13D:0	:0		
+ MyPLX51PBM1_iTEMPPATMT184	MyPLX51PBM1_152	23EC4B			
+ MyPLX51PBM1_MasterControl	PSPLX51DPMaster	Control			
+ MyPLX51PBM1_MasterStatus	PSPLX51DPMaster	Status			
-Program:MainProgram	Program				
+ Slave01_Description	SINT[64]				
+ Slave01_Tagname	SINT[32]				
Ok	Cancel				
Tag DB Build Complete					

Figure 3.58 – Device DPV1 Objects Tag Browsing

## 3.9.6. DPV1 Alarms

The PLX51-PBM slave feature *DPV1 Alarms* window is opened by either double-clicking on the slave device in the tree, or right-clicking the slave device and selecting *Configuration*. Then select the **DPV1 Alarms** tab.



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

								_
General	Profibus Configura	on DPV1	User Parameters	Slot Configuration	Start-up Parameters	DPV1 Objects	DPV1 Alarms	
DPV	Alarms							
DPV				Teans	mo			
	Alarms Size			Tagna	ame			

Figure 3.59 – PV1 Alarms parameters (Logix)

#### The DPV1 configuration consists of the following 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)

Table 3.15 – Device DPV1 Alarms configuration parameters



# **NOTE:** The DP Master connected to the PLX51-PBM (in slave mode) will be able to configure the following alarms:

- Diagnostic Alarm
- Process Alarm
- Pull Plug Alarm
- Status Alarm
- Update Alarm
- Manufacturer Specific Alarm

## 3.10. LOGIX CONFIGURATION

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

## 3.10.1. EDS AOP (LOGIX V21+)

Before the module can be added to the tree, the PLX51-PBM's EDS file must be registered.

Using RSLinx, the EDS file can be uploaded from the device. The EDS file can also be downloaded from the product web page at <u>www.prosoft-technology.com</u>. The EDS file is then registered manually using the *EDS Hardware Installation Tool* shortcut under the *Tools* menu in Studio 5000.

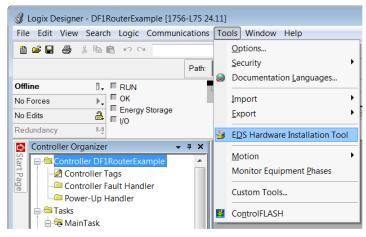


Figure 3.60 - EDS Hardware Installation Utility

After the EDS file has been registered, the PLX51-PBM can be added to the Logix I/O tree in Studio 5000.

**1** Under a suitable Ethernet bridge module in the tree, select the Ethernet network, right-click and select the **New Module** option.

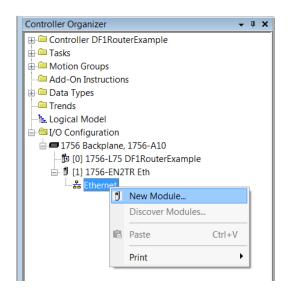


Figure 3.61 – Adding a module

2 The *Select Module Type* window opens. To easily search for the module, use the *Vendor* filter to select only the ProSoft Technology modules as shown in the figure below.

ect Module Type			
atalog Module Discovery	y Favorites		
PLX		Clear Filters	Show Filters *
<ul> <li>Catalog Number</li> <li>PLX51-DF1-MSG</li> <li>PLX51-DL</li> <li>PLX51-DLP</li> <li>PLX51-PBM</li> </ul>	Description DF1 Messenger Data Logger Data Logger Plus PLX51-PBM	Vendor     Category       Prosoft Tech     Communications Adapte       Prosoft Tech     Communications Adapte       Prosoft Tech     Communications Adapte	r
4 of 466 Module Typ	bes Found		Add to Favorites
Close on Create		Create	Close Help

Figure 3.62 – Selecting the module

**3** Locate and select the **PLX51-PBM** module and click the **CREATE** button. The *New Module* window opens, where you must specify the *Name* and *IP address* to complete the instantiation.

New M	lodule							×
General*	Connection	Module Info	Internet Protocol	Port Configuration				
Type: Vendor: Parent Name: Descripti	Pros eth2 PLX	51-PBM PLX51 oft Technology 51_PBM01			^	Ethernet Address O Private Networ IP Address: O Host Name:		÷ . 172
Revisio	nic Keying:	1.001 Compatible N I/O Connectio			Change			
Status: Cre	ating					ОК	Cancel	Help

Figure 3.63 – Module instantiation

4 Once the instantiation is complete, the module appears in the Logix I/O tree.

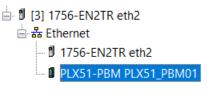


Figure 3.64 – Logix IO tree

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

E-PLX51_PBM01:I1	_0135:PLX51_PBM_7E6CF7	Read/Write
PLX51_PBM01:I1.ConnectionFaulted	BOOL	Read/Write
E PLX51_PBM01:I1.Data	SINT[500]	Read/Write
E PLX51_PBM01:01	_0135:PLX51_PBM_78F5E1	Read/Write
	_0135:PLX51_PBM_7E6CF7	Read/Write
E PLX51_PBM01:02	_0135:PLX51_PBM_78F5E1	Read/Write
E PLX51_PBM01:I3	_0135:PLX51_PBM_7E6CF7	Read/Write
	_0135:PLX51_PBM_78F5E1	Read/Write
E PLX51_PBM01:I4	_0135:PLX51_PBM_7E6CF7	Read/Write
E PLX51_PBM01:04	_0135:PLX51_PBM_78F5E1	Read/Write

Figure 3.65 – Module Defined Data Type

3.10.2. GENERIC MODULE PROFILE (LOGIX PRE-V21)



**NOTE:** When using a Generic Module Profile, you will need to modify the code generated by the PLX50 Configuration Utility (see <u>Logix Mapping</u>) to match the single connection profile. To do this, you must remove the connection number from the *Source* and *Destination* tag in the copy blocks (as shown in the example below).

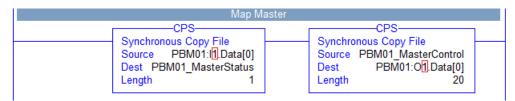


Figure 3.66 – Generated Logix Routine from PLX50 Configuration Utility (highlight connection number)

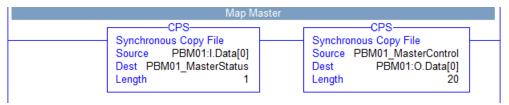


Figure 3.67 – Modified Logix Routine from PLX50 Configuration Utility for Generic Module Profile

1 When using Logix versions prior to version 21, the PLX51-PBM module must be added to the RSLogix 5000 I/O tree as a *Generic Ethernet Module*. This is achieved by rightclicking on the Ethernet Bridge in the RSLogix 5000 and selecting *New Module*. Select *ETHERNET-MODULE* and click **O**κ.

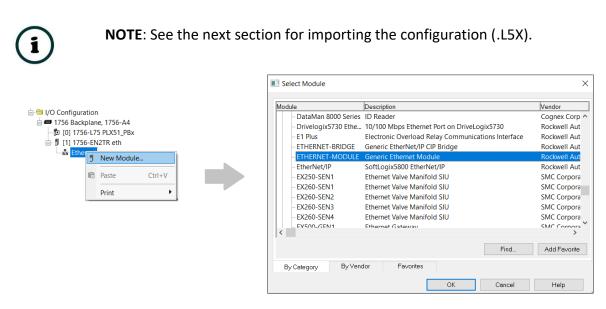


Figure 3.68 – Adding a Generic Ethernet Module in RSLogix 5000

2 Enter the *IP address, Input, Output,* and *Configuration* parameters of the PLX51-PBM.

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

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

Table 3.16 - RSLogix class 1 connection parameters for the PLX51-PBM module

New Module					×
Type: Vendor: Parent: Name: Description:	ETHERNET-MODULE Generic Ethernet I Rockwell Automation/Allen-Bradley eth PLX51PBM	Vodule Connection Parar Input:	neters Assembly Instance: 132	Size:	
	~	Output:	133	496 🔶 (8-bit)	
Comm Format: Address / Ho		Configuration:	102	0 (8-bit)	
IP Addres		Status Input:			
⊖ Host Nam	Le:	Status Output:			
	e Properties	OK	Can	cel Help	

Figure 3.69 - General module properties for PLX51-PBM

**3** In the *Connection* tab of the *Module Properties* window, enter the *Requested Packet Interval (RPI)*. This is the rate at which the input and output assemblies are exchanged in milliseconds. Refer to the Technical Specification section for further details on the limits of the RPI.

Module Properties: eth (ETHERNET-MODULE 1.1)	×
General Connection* Module Info	
Requested Packet Interval (RPI): 50.0 🖨 ms	(1.0 - 3200.0 ms)
Major Fault On Controller If Connection Fails While in Ru	n Mode
Use Unicast Connection over EtherNet/IP	
Module Fault	
Status: Offline OK	Cancel Apply Help

Figure 3.70 - Connection module properties in RSLogix 5000

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

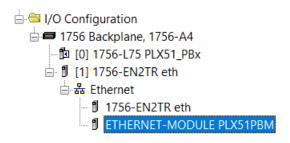


Figure 3.71 – RSLogix 5000 I/O module tree

## 3.10.3. MULTI-CONNECTION

The PLX51-PBM supports up to four Class 1 (cyclic data exchange) connections. This allows for more field device connections per PLX51-PBM because more data can be exchanged between the Logix controller and the PLX51-PBM.



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

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

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

MyPLX51-PBM - Configuration General Modbus Modbus Addre	ssing Profibus Logix Advanced
Logix EtherNet/IP Connection	
Controller Path	2 3 4 
Response Timeout	500 (ms)



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

Turner									Description	Constan
	PLX51-PBM PLX51-PBM									
Vendor:	Prosoft Technology									
Parent	eth2									
Na <u>m</u> e:	PBM01		Ethe	rnet Address						
Description:				Private Network: 19	2.168.1.	172 🛟				
Description.				Module Definitio	on					×
			(					7		
			F	levision:	1	$\sim$	001 韋	-		
			E	electronic Keying:	Compatil	ble Mo	dule		$\sim$	
			0	connections:						
l		~	L r	Name		Size		Tag S	Suffix	
Module Definition	n			I/O Connection		500	SINT	1	PBM01:I1	
Revision:	1.001			1/O Connection	Output		UNI	-	PBM01·O1	1
Electronic Keyir	ng: Compatible Module			I/O Connection 2	Input: Output	500	SINT	2	PBM01:I2 PBM01:O2	
Connections:	I/O Connection	^				500			PBM01:02	
	I/O Connection 2			I/O Connection 3	Output		SINT	3	PBM01:03	
	I/O Connection 3	~		I/O Connection 4		500	SINT	4	PBM01:I4	
		Change			Output	496		1	PBM01:04	

Figure 3.73 – Logix EtherNet/IP Connection Count

# 3.11. LOGIX MAPPING

The PLX50 Configuration Utility generates the required UDTs and Routines (based on the PLX51-PBM configuration) to map the required PROFIBUS Slave input and output data.

**1** Generate the required Logix and UDTs by right-clicking on the module's icon in the PLX50 Configuration Utility and selecting the **GENERATE LOGIX L5X** option.

ProSoft PLX50 Configuration Util	ity ·	- PBM Test
File Device Tools Window		elp
* 🔁 🖼 🔛   X 🗗 👘   🕂 📳 🖸	ę,	4 <sup>2</sup>
Project Explorer		<b>Ψ</b> ×
🖃 🧔 PBM Test		
MyPLX51-PBM1 (PLX51-P	<u>s</u>	Configuration
Configuration		Connection Path
Event Viewer	1	Verify Configuration
[002] iTEMPPATMT184		Identity
	5	Status
	#	Go Offline
	11-	Go Online
	+	Download
	↑	Upload
	ŭ.	DP Packet Capture
	ø	Global Control
	50	Generate Status Report
	dī.	Сору
	0	Export
	×	Delete
	¢	Generate Logix L5X
	ç	Mapping Report
	Ċ	Modbus Master Poll Report

Figure 3.74 – Selecting Generate Logix L5X

2 Select a suitable file name and path for the L5X file.

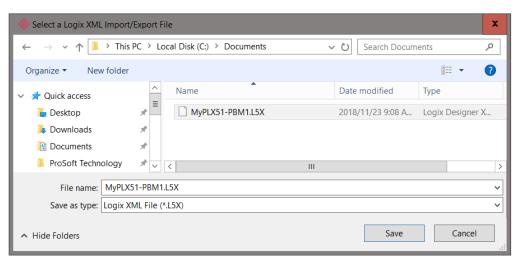


Figure 3.75 – Selecting the Logix L5X file name

**3** This L5X file can now be imported in to the Studio 5000 project. Right-click on a suitable *Program* and select **ADD**, and then click **IMPORT ROUTINE**.

Controller Organizer					
🕀 🧰 Controller Profibus	Gate	eway			
🖨 🔤 Tasks					
📄 🗟 MainTask	_				
🖨 🚭 MainProgram		A			New Deuties
Parameter		Add		1	New Routine
🔤 🖬 MainRouti	- Ab-	Cut	Ctrl+X		New Local Tag Ctrl+W
Unscheduled Pro	8	Сору	Ctrl+C		New Parameter
🗄 🗀 Motion Groups		Paste	Ctrl+V		
Add-On Instruction					Import Routine
🗄 🧰 Data Types		Delete	Del		
Trends		Verify			
Logical Model		Cross Reference	Ctrl+F	ι.	
i ⊡ ⊡ I/O Configuration		cross Reference	Curre		
1736 Backplane,		Browse Logic	Ctrl+L	ι.	
□ [0] 1756-EN2				1	
Ethernet		Online Edits	•		
<b>1</b> 756-EI		Print	+		
PLX51-I					
		Export Program			
		Properties	Alt+Enter		

Figure 3.76 – Importing the L5X file into Studio 5000

- 4 In the *File Open* window, select the L5X file and click **O**κ.
- **5** Since the imported mapping routine is not a Main Routine, it will need to be called from the current Main Routine using a JSR.

ISB	
Jump To Subroutine	
Routine Name MyPLX51PBM1Map	

Figure 3.77 – Calling the mapping routine

- 6 The import creates the following:
  - Mapping Routine
  - Multiple UDT (User-Defined Data Types)
  - Multiple Controller Tags

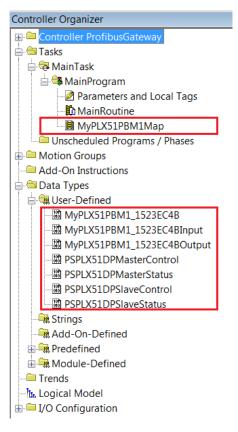


Figure 3.78 – Imported Logix Objects

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

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

MyPLX51PBM1_MasterControl	{}		PSPLX51DPMasterControl
H MyPLX51PBM1_MasterControl.MasterControl	3	Decimal	SINT
MyPLX51PBM1_MasterControl.DeviceEnable	{}	Decimal	BOOL[128]
MyPLX51PBM1_MasterControl.DeviceEnable[0]	0	Decimal	BOOL
MyPLX51PBM1_MasterControl.DeviceEnable[1]	1	Decimal	BOOL
MyPLX51PBM1_MasterControl.DeviceEnable[2]	1	Decimal	BOOL
-MyPLX51PBM1_MasterControl.DeviceEnable[3]	1	Decimal	BOOL
MyPLX51PBM1_MasterControl.DeviceEnable[4]	0	Decimal	BOOL
MyPLX51PBM1_MasterControl.DeviceEnable[5]	0	Decimal	BOOL
MyPLX51PBM1_MasterControl.DeviceEnable[6]	0	Decimal	BOOL
MyPLX51PBM1_MasterControl.DeviceEnable[124]	0	Decimal	BOOL
-MyPLX51PBM1_MasterControl.DeviceEnable[125]	0	Decimal	BOOL
MyPLX51PBM1_MasterControl.DeviceEnable[126]	0	Decimal	BOOL
MyPLX51PBM1_MasterControl.DeviceEnable[127]	0	Decimal	BOOL

Figure 3.79 – Master Control tag

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

MyPLX51PBM1_MasterStatus	{}		PSPLX51DPMasterStatus
MyPLX51PBM1_MasterStatus.ConfigValid	1	Decimal	BOOL
MyPLX51PBM1_MasterStatus.Owned	1	Decimal	BOOL
-MyPLX51PBM1_MasterStatus.DuplicateDPStation	0	Decimal	BOOL
MyPLX51PBM1_MasterStatus.ProfibusFieldbusError	0	Decimal	BOOL
MyPLX51PBM1_MasterStatus.ProfibusDeviceError	0	Decimal	BOOL
MyPLX51PBM1_MasterStatus.ProfibusOffline	0	Decimal	BOOL
-MyPLX51PBM1_MasterStatus.ProfibusStopped	0	Decimal	BOOL
-MyPLX51PBM1_MasterStatus.ProfibusClear	0	Decimal	BOOL
-MyPLX51PBM1_MasterStatus.ProfibusOperational	1	Decimal	BOOL
-MyPLX51PBM1_MasterStatus.SlaveMode	0	Decimal	BOOL
MyPLX51PBM1_MasterStatus.ConfigCRC	1537	Decimal	INT
MyPLX51PBM1_MasterStatus.DeviceLiveList	{}	Decimal	BOOL[128]
MyPLX51PBM1_MasterStatus.DeviceDataExchangeActive	{}	Decimal	BOOL[128]
MyPLX51PBM1_MasterStatus.DeviceAlarmPendingFlags	{}	Decimal	BOOL[128]
HypLX51PBM1_MasterStatus.DeviceDiagnosticPendingFlags	{}	Decimal	BOOL[128]

Figure 3.80 – Master Status tag

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

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

MyPLX51PBM1_iTEMPPATMT184	{}		MyPLX51PBM1_152365E6
HypLX51PBM1_iTEMPPATMT184.Input	{}		MyPLX51PBM1_152365E6Input
HypLX51PBM1_iTEMPPATMT184.Input.Status	{}		PSPLX51DPSIaveStatus
MyPLX51PBM1_iTEMPPATMT184.Input.Status.Online	0	Decimal	BOOL
MyPLX51PBM1_iTEMPPATMT184.Input.Status.DataExchangeActive	0	Decimal	BOOL
MyPLX51PBM1_iTEMPPATMT184.Input.Status.IdentMismatch	0	Decimal	BOOL
MyPLX51PBM1_iTEMPPATMT184.Input.Status.DisabledByOutputAssembly	0	Decimal	BOOL
MyPLX51PBM1_iTEMPPATMT184.Input.Status.DeviceError	0	Decimal	BOOL
-MyPLX51PBM1_iTEMPPATMT184.Input.Status.AlarmPending	0	Decimal	BOOL
MyPLX51PBM1_iTEMPPATMT184.Input.Status.DiagnosticsPending	0	Decimal	BOOL
MyPLX51PBM1_iTEMPPATMT184.Input.Status.OutputAssemblyNodeAddrMismatch	0	Decimal	BOOL
-MyPLX51PBM1_iTEMPPATMT184.Input.Status.MappingCRCMismatch	0	Decimal	BOOL
-MyPLX51PBM1_iTEMPPATMT184.Input.Status.SlaveClearOpMode	0	Decimal	BOOL
MyPLX51PBM1_iTEMPPATMT184.Input.Status.SlaveAlarmAck	0	Decimal	BOOL
MyPLX51PBM1_iTEMPPATMT184.Input.Status.StationNumber	0	Decimal	SINT
MyPLX51PBM1_iTEMPPATMT184.Input.Status.DeviceMappingCRC	0	Decimal	INT
-MyPLX51PBM1_iTEMPPATMT184.Input.TemperaturePV	0.0	Float	REAL
MyPLX51PBM1_iTEMPPATMT184.Input.TemperatureSts	0	Decimal	SINT
HypLX51PBM1_iTEMPPATMT184.Output	{}		MyPLX51PBM1_152365E6Outp
HypLX51PBM1_iTEMPPATMT184.OutputControl	{}		PSPLX51DPSIaveControl
MyPLX51PBM1_iTEMPPATMT184.Output.Control.StationNumber	0	Decimal	SINT
-MyPLX51PBM1_iTEMPPATMT184.Output.Control.AlarmTrigger	0	Decimal	BOOL
MyPLX51PBM1_iTEMPPATMT184.Output.Control.DeviceMappingCRC	0	Decimal	INT
-MyPLX51PBM1_iTEMPPATMT184.Output.DisplayValue	0.0	Float	REAL
MyPLX51PBM1_iTEMPPATMT184.OutputDisplayValueSts	0	Decimal	SINT

Figure 3.81 – Slave Device-Specific tag

# 4. OPERATION

# 4.1. LOGIX OPERATION

The PLX51-PBM can exchange data with a Logix controller by establishing a Class 1 connection.

## 4.1.1. PROFIBUS DP - MASTER

Once the PLX51-PBM and Logix controller have been correctly configured, the PLX51-PBM can exchange data with PROFIBUS slave devices.



**NOTE:** The module input and output assembly of each connection is an unpopulated array of data. The imported Logix routine (generated by PLX50 Configuration Utility) copies this data to the input and output assemblies.

#### MASTER STATUS

Below are the definitions for the Master Status UDT tags created by the PLX50 Configuration Utility.

{}		PSPLX51DPMasterStatus
1	Decimal	BOOL
1	Decimal	BOOL
0	Decimal	BOOL
0	Decimal	BOOL
1	Decimal	BOOL
0	Decimal	BOOL
0	Decimal	BOOL
0	Decimal	BOOL
1	Decimal	BOOL
0	Decimal	BOOL
-3271	Decimal	INT
{}	Decimal	BOOL[128]
	1 1 0 0 0 1 0 0 0 0 1 0 -3271 {} {}	<pre>{} 1 Decimal 1 Decimal 1 Decimal 0 Decimal 1 Decimal 1 Decimal 0 Decimal 0 Decimal 0 Decimal 1 Decimal 1 Decimal 1 Decimal 1 Decimal -3271 Decimal {} Decimal {} Decimal {} Decimal {} Decimal {} Decimal </pre>

Figure 4.1 – Master Status tags

Тад	Description
ConfigValid	Configuration has been downloaded to the PLX51-PBM and is being executed. 1 – PLX51-PBM has been successfully configured.
	0 – PLX51-PBM is not configured.
Owned	Indicates if the PLX51-PBM is owned by a Logix Controller with a connection count similar to what has been configured in the PLX50 Configuration Utility.
	1 – PLX51-PBM is connected.
	0 – PLX51-PBM is not connected.
DuplicateDPStation	Indicates that the PLX51-PBM has detected another PROFIBUS DP station with the same station address as itself and has entered a temporary Back-off mode.
	1 – Duplicate detected (Back-off mode active).
	0 – Normal (No duplicate detected).
	<b>NOTE:</b> In this condition, the PLX51-PBM will not communicate on the PROFIBUS DP network. Although the back-off time is approximately 5 seconds, should the conflicting DP master remain active on the PROFIBUS network, the PLX51-PBM will continuously re-enter the back-off mode.
PROFIBUSFieldbusError	There is a PROFIBUS network issue (e.g. cable unplugged, under/over terminated, etc.).
	1 – Fieldbus error detected.
	0 – Normal (No errors detected).
PROFIBUSDeviceError	At least one slave device has a communication issue (e.g. offline, not exchanging process data, etc.)
	1 – Device error detected.
	0 – Normal (No errors detected).
PROFIBUSOffline	The PROFIBUS network is offline and the PLX51-PBM will not communicate on the network.
	1 – PROFIBUS fieldbus state is OFFLINE.
	0 – PROFIBUS fieldbus state is <b>not</b> OFFLINE.
PROFIBUSStopped	The PROFIBUS network is running and the PLX51-PBM is communicating on the network, but it will not exchange any process data with any slave device. 1 – PROFIBUS fieldbus state is STOPPED.
	0 - PROFIBUS fieldbus state is not STOPPED.
PROFIBUSClear	The PROFIBUS network is running and the PLX51-PBM is communicating with all slave devices on the network, and if configured in the PLX51-PBM, the module will configure and exchange process data with each slave device. <b>NOTE</b> : In CLEAR mode the PLX51-PBM will not send any output data to any slave device.
	1 – PROFIBUS fieldbus state is CLEAR.
	0 – PROFIBUS fieldbus state is <b>not</b> CLEAR.
PROFIBUSOperational	The PROFIBUS network is running and the PLX51-PBM is communicating with all slave devices on the network, and if configured in the PLX51-PBM, the module will configure and exchange process data with each slave device.

	1 – PROFIBUS fieldbus state is operational.
	0 – PROFIBUS fieldbus state is <b>not</b> operational.
SlaveMode	When in Slave mode, the PLX51-PBM will emulate multiple PROFIBUS Slav devices.
	1 – The PLX51-PBM is in PROFIBUS Slave Mode.
	0 – The PLX51-PBM is <b>not</b> in PROFIBUS Slave Mode.
ConfigCRC	The signature of the configuration currently executing on the module.
DeviceLiveList	Indicates the nodes that are online on the local PROFIBUS network. Each b represents a node.
	When the bit is set to '1', the device is online.
	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
DeviceDataExchange Active	Indicates the nodes that are online and exchanging DPVO data on the loca PROFIBUS network. Each bit represents a node.
	When the bit is set to '1', the device is online and exchanging data.
	When the bit is set to '0', the device is not exchanging data on the PROFIBU 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 bit is set to '1', the device has an alarm pending that must be unloaded
	When the bit is set to '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
DeviceDiagnosticPending Flags	Indicates the nodes that have diagnostics pending on the local PROFIBU network. Each bit represents a node.
-	When the bit is set to '1', then the device has diagnostics pending that must b unloaded.
	When the bit is set to '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

Table 4.1 – Logix Master Status tags

# MASTER CONTROL

Set the PROFIBUS Operating mode from the PLX51-PBM Logix output assembly in the Logix controller.

⊟ MyPLX51PBM_MasterControl	{}	{	PSPLX51DPM	
MyPLX51PBM_MasterControl.MasterControl	0	Decimal	SINT	Master Control Command
MyPLX51PBM_MasterControl.RedundancyControl	0	Decimal	SINT	Redundancy Control Command
MyPLX51PBM_MasterControl.DeviceEnable	{}	{ Decimal	BOOL[128]	Device Enable (0=Disable, 1=Enable)
-MyPLX51PBM_MasterControl.DeviceEnable[0]	0	Decimal	BOOL	Device Enable (0=Disable, 1=Enable)
-MyPLX51PBM_MasterControl.DeviceEnable[1]	0	Decimal	BOOL	Device Enable (0=Disable, 1=Enable)
-MyPLX51PBM_MasterControl.DeviceEnable[2]	0	Decimal	BOOL	Device Enable (0=Disable, 1=Enable)
-MyPLX51PBM_MasterControl.DeviceEnable[3]	0	Decimal	BOOL	Device Enable (0=Disable, 1=Enable)

Figure	4.2 -	Master	Control	tags
--------	-------	--------	---------	------

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

Table 4.2 – Master Control tags

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

# STATUS AND DPV0 DATA EXCHANGE

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

MyPLX51PBM1_iTEMPPATMT184	{}		MyPLX51PBM1_152365E6
HypLX51PBM1_iTEMPPATMT184.Input	{}		MyPLX51PBM1_152365E6Input
MyPLX51PBM1_iTEMPPATMT184.Input.Status	{}		PSPLX51DPSIaveStatus
-MyPLX51PBM1_iTEMPPATMT184.Input.Status.Online	0	Decimal	BOOL
MyPLX51PBM1_iTEMPPATMT184.Input.Status.DataExchangeActive	0	Decimal	BOOL
-MyPLX51PBM1_iTEMPPATMT184.Input.Status.IdentMismatch	0	Decimal	BOOL
MyPLX51PBM1_iTEMPPATMT184.Input.Status.DisabledByOutputAssembly	0	Decimal	BOOL
-MyPLX51PBM1_iTEMPPATMT184.Input.Status.DeviceError	0	Decimal	BOOL
MyPLX51PBM1_iTEMPPATMT184.Input.Status.AlarmPending	0	Decimal	BOOL
MyPLX51PBM1_iTEMPPATMT184.Input.Status.DiagnosticsPending	0	Decimal	BOOL
MyPLX51PBM1_iTEMPPATMT184.Input.Status.OutputAssemblyNodeAddrMismatch	0	Decimal	BOOL
MyPLX51PBM1_iTEMPPATMT184.Input.Status.MappingCRCMismatch	0	Decimal	BOOL
MyPLX51PBM1_iTEMPPATMT184.Input.Status.SlaveClearOpMode	0	Decimal	BOOL
MyPLX51PBM1_iTEMPPATMT184.Input.Status.SlaveAlarmAck	0	Decimal	BOOL
MyPLX51PBM1_iTEMPPATMT184.Input.Status.StationNumber	0	Decimal	SINT
HyPLX51PBM1_iTEMPPATMT184.Input.Status.DeviceMappingCRC	0	Decimal	INT
-MyPLX51PBM1_iTEMPPATMT184.Input.TemperaturePV	0.0	Float	REAL
MyPLX51PBM1_iTEMPPATMT184.Input.TemperatureSts	0	Decimal	SINT
HypLX51PBM1_iTEMPPATMT184.Output	{}		MyPLX51PBM1_152365E6Output
HypLX51PBM1_iTEMPPATMT184.Output.Control	{}		PSPLX51DPSIaveControl
H MyPLX51PBM1_iTEMPPATMT184.Output Control.StationNumber	0	Decimal	SINT
-MyPLX51PBM1_iTEMPPATMT184.Output.Control.AlarmTrigger	0	Decimal	BOOL
HypLX51PBM1_iTEMPPATMT184.Output.Control.DeviceMappingCRC	0	Decimal	INT
-MyPLX51PBM1_iTEMPPATMT184.Output.DisplayValue	0.0	Float	REAL
MyPLX51PBM1_iTEMPPATMT184.Output.DisplayValueSts	0	Decimal	SINT

Figure 4.3 – Slave Device-Specific tag

Тад	Description
Status	
Online	Indicates if the device is online on the PROFIBUS network. 1 – Device is online 0 – Device is not online
DataExchangeActive	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
	You must ensure that all application code making use of data from a slave device first checks that the <i>DataExchangeActive</i> bit is 1.
IdentMismatch	Indicates if the device configured in the PLX50 Configuration Utility 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
Disabled By Output Assembly	Indicates if the device has not been enabled for data exchange in the PLX51-PBM device enable control bits.

	1 – Device has <b>not</b> been enabled for data exchange
	0 – Device has been enabled for data exchange
DeviceError	Indicates an error with the device.
	1 – Device has an error
	0 – Device has no error
	The error flag is 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.
	<ul> <li>When the data size of the DPV0 data exchange does not match what has been configured in the PLX50 Configuration Utility.</li> </ul>
	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 bit is set to '1', the device has an alarm pending that must be unloaded
	When the bit is set to '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 bit is set to '1', the device has diagnostics pending that must be unloaded
	When the bit is set to '0', the device does not have any diagnostics pending.
	0 – The node has no diagnostics pending
	1 – The node has diagnostics pending
OutputAssemblyNodeAddrMismatch	Indicates a mismatch between the actual device station address and the expected Logix mapping station address.
	0 – Station address matches
	1 – Station address mismatch
MappingCRCMismatch	If there is a mismatch in the mapping between Logix and the PLX51- PBM, it can result in data appearing in the incorrect location. This means you can be sending incorrect data to a device, which can have unpredictable results.
	0 – The mapping for the output data is correct
	1 – There is a mapping mismatch in the output data
SlaveClearOpMode	When the PLX51-PBM is in <b>Slave Mode</b> ; this indicates 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 <b>not</b> in CLEAR fieldbus mode
SlaveAlarmAck	When the PLX51-PBM is in <b>Slave Mode</b> ; this indicates 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 4.3 – Device Input tags

Тад	Description		
Control			
StationNumber	The station number entered by the Logix mapping code of the specific slave device.		
AlarmTrigger	When the PLX51-PBM is in <b>Slave Mode</b> ; when this bit changes 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.		

Table 4.4 – Device Output tags

# DPV1 EXPLICIT MESSAGING

The PLX51-PBM supports DPV1 Class 1 (MS1) and Class 2 (MS2) messaging, which can be used to read / write parameters in a slave device. The PLX51-PBM DPV1 communication is achieved

by using EtherNet/IP unconnected messaging (UCMM) or Class 3 connected messaging. The PLX51-PBM can buffer up to 10 DPV1 messages at a time.



**NOTE:** The slave device must support DPV1 messaging. You 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 is achievable if the slave device is in data exchange mode (i.e. the device is configured and exchanging cyclic data with the PLX51-PBM). Only the DP Master exchanging data with the slave device can read and write parameters using DPV1 MS1. Below are the EtherNet/IP CIP message parameters, as well as the request and response data structures.

A. DPV1 CLASS 1 READ

CIP MESSAGE:

Parameter	Description
Service Code	Ox4B (Hex)
Class	0x432 (Hex)
Instance	1
Attribute	N/A
Request Data Length	8

Table 4.5 – DPV1 Class 1 Read Message

## REQUEST DATA:

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

Table 4.6 – DPV1 Class 1 Read Request

### RESPONSE DATA:

Parameter	Data Type	Description
Status	Byte	Status of the DPV1 data exchange. See appendix for the definitions of the returned status.
Extended Status	Byte[3]	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 <i>Data Length</i> in the response.

Table 4.7 – DPV1 Class 1 Read Response

B. DPV1 CLASS 1 WRITE

CIP MESSAGE:

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

Table 4.8 – DPV1 Class 1 Write Message

REQUEST DATA:

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

Table 4.9 – DPV1 Class 1 Write Request

**RESPONSE DATA:** 

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

Table 4.10 – DPV1 Class 1 Write Response

# DPV1 CLASS 2 MESSAGING (MS2)

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

# C. DPV1 INITIALIZE (ESTABLISH CONNECTION)

#### CIP MESSAGE:

Description
0x4C (Hex)
0x432 (Hex)
1
N/A
20 + (2 + Source Net Address Length + Source MAC Address Length) + (2 + Destination Net Address Length + Destination MAC Address Length)

Table 4.11 – DPV1 Class 2 Initialize Message

#### REQUEST DATA:

Parameter	Data Type	Description
Timeout	DINT	The amount of time (in milliseconds) the PLX51-PBM waits for a DPV1 response before timing out and responding to the EtherNet/IP request with a Timeout Status.
Slave Address	Byte	The station number of the PROFIBUS device.
Reserved	Byte[3]	-
Send Timeout	Short	
Features Supported	Short	
Profile Features Supported	Short	
Profile Ident Number	Short	
Source Type	Byte	
Source Address Length	Byte	Refer to the PROFIBUS – DP Extensions to EN 50170 (DPV1) for
Destination Type	Byte	information regarding these parameters.
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[]

Table 4.12 – DPV1 Class 2 Initialize Request

#### **RESPONSE DATA:**

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.
Features Supported	Short	
Profile Features Supported	Short	Refer to the <i>PROFIBUS</i> – <i>DP Extensions to EN 50170 (DPV1)</i> for information regarding these parameters.
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).

Table 4.13 – DPV1 Class 2 Initialize Response

## D. DPV1 CLASS 2 ABORT

CIP MESSAGE:

Parameter Description

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

Table 4.14 – DPV1 Class 2 Abort Message

#### REQUEST DATA:

Parameter	Data Type	Description
Reserved	DINT	-
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
Instance Reason Code	Byte	information regarding these parameters.

Table 4.15 – DPV1 Class 2 Abort Request

### RESPONSE DATA:

Parameter	Data Type	Description
None	-	-

Table 4.16 – DPV1 Class 2 Abort Response

# E. DPV1 CLASS 2 READ

# CIP MESSAGE:

Parameter	Description
Service Code	0x4F (Hex)

Class	0x432 (Hex)
Instance	1
Attribute	N/A
Request Data Length	8

#### Table 4.17 – DPV1 Class 2 Read Message

#### REQUEST DATA:

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

Table 4.18 – DPV1 Class 2 Read Request

#### RESPONSE DATA:

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.

Table 4.19 – DPV1 Class 2 Read Response

# F. DPV1 CLASS 2 WRITE

CIP MESSAGE:

Parameter	Description
Service Code	0x50 (Hex)
Class	0x432 (Hex)

Instance	1
Attribute	N/A
Request Data Length	8 + Length of Data Payload

Table 4.20 – DPV1 Class 2 Write Message

REQUEST DATA:

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

Table 4.21 – DPV1 Class 2 Write Request

**RESPONSE DATA:** 

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.

Table 4.22 – DPV1 Class 2 Write Response

# PROFIBUS DIAGNOSTICS

The PLX51-PBM flags you when new diagnostics have been received. You can extract the diagnostics message from the PLX51-PBM by using EtherNet/IP unconnected messaging (UCMM) or Class 3 connected messaging.

G. NOTIFICATION

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

MASTER UDT

In the PLX51-PBM status tags (see *Logix Mapping* section), the *FieldDeviceDiagPending* tag is an array of Boolean tags that each represent a node on the network. Below is a description of the tag.

Тад	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', the device has diagnostics pending that must be unloaded. 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

Table 4.23 – PLX51-PBM Logix Tags Diagnostics Pending Indications

### FIELD DEVICE UDT

In the Device UDT status tags (see *Logix Mapping* section), the *DiagnosticsPending* indicates the device has diagnostics pending on the local PROFIBUS network. Below is a description of the tag.

Тад	Description
DiagnosticsPending	Indicates the device has diagnostics pending on the local PROFIBUS network. When the bit is set '1', the device has diagnostics pending that must be unloaded. When the bit is set '0', the device does not have any diagnostics pending. 0 – The node has diagnostics pending 1 – The node has diagnostics pending

Table 4.24 – PLX51-PBM UDT Diagnostics Pending Indications

# H. EXTRACTION

You can extract diagnostics by using the slave device node address. You can also decide how the diagnostics data must be extracted. This is changed by updating the *Mode* in the *Diagnostics Request* message. Below are the three modes that can be selected:

Mode Description	
------------------	--

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

Table 4.25 – Diagnostics Extract Message

# CIP MESSAGE

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

#### MESSAGE:

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

Table 4.26 – Diagnostics Extract Message

# REQUEST DATA:

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

# Table 4.27 – Diagnostics Extract Request

#### **RESPONSE DATA:**

Parameter	Data Type	Description
Status	Byte	This is the status of the DPV1 data exchange. See appendix for the definitions of the returned status.
Diagnostics data length	Byte	The number of diagnostic bytes that have been returned.

Diagnostics Data	Byte[]	Refer to the PROFIBUS Specification EN 50170 for information
		regarding the diagnostics.

Table 4.28 – Diagnostics Extract Response

GLOBAL CONTROL

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

CIP MESSAGE

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

#### MESSAGE:

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

Table 4.29 – Global Control Message

**REQUEST DATA:** 

Parameter	Data Type	Description
Timeout	DINT	The amount of time (in milliseconds) the PLX51-PBM waits for a response before timing out and responding to the EtherNet/IP request with a Timeout Status.
Control	Byte	The Global Control action:

		0 - Release the Clear mode for the devices	
		2 - Force the Clear Mode of devices	
		4 - Freeze	
		8 - UnFreeze	
		12 - UnFreeze	
		+ 16 - Sync	
		+ 32 – UnSync	
		+ 48 - UnSync	
Group	Byte	The destination Group.	

Table 4.30 – Global Control Request

RESPONSE DATA:

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

Table 4.31 – Global Control Response

# ALARMING

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



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

I. NOTIFICATION

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

### MASTER UDT

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

Тад	Description
FieldDeviceAlarmPending	Indicates the nodes that have an alarm pending on the local PROFIBUS network. Each bit represents a node. When the bit is set '1', the device has an alarm pending that must be unloaded. When the bit is set '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

### Table 4.32 – PLX51-PBM Tag Alarm Pending Indications

FIELD DEVICE UDT

In the Device UDT tags (see *Logix Mapping* section), the *AlarmPending* tag indicates the device has an alarm pending on the local PROFIBUS network.

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

Table 4.33 – Field Device UDT Alarm Pending Indications

J. EXTRACTION

CIP MESSAGE

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

#### MESSAGE:

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

Table 4.34 – Alarm Extract Message

#### REQUEST DATA:

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

Table 4.35 – Alarm Extract Request

**RESPONSE DATA:** 

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 <i>PROFIBUS Specification EN 50170</i> for information regarding the diagnostics.

Table 4.36 – Alarm Extract Response

# 4.1.2. PROFIBUS DP - SLAVE



**NOTE:** The imported Logix routine (generated by the PLX50 Configuration Utility) copies the module's input and output assembly of each connection to the structured input and output assemblies.

# GENERAL STATUS

Below are the definitions of the General Status UDT's created by the PLX50 Configuration Utility.

⊟ PBM01_MasterStatus	{}		PSPLX51DPMasterStatus
PBM01_MasterStatus.ConfigValid	1	Decimal	BOOL
-PBM01_MasterStatus.Owned	1	Decimal	BOOL
-PBM01_MasterStatus.DuplicateDPStation	0	Decimal	BOOL
-PBM01_MasterStatus.ProfibusFieldbusError	0	Decimal	BOOL
-PBM01_MasterStatus.ProfibusDeviceError	1	Decimal	BOOL
-PBM01_MasterStatus.ProfibusOffline	0	Decimal	BOOL
-PBM01_MasterStatus.ProfibusStopped	0	Decimal	BOOL
-PBM01_MasterStatus.ProfibusClear	0	Decimal	BOOL
-PBM01_MasterStatus.ProfibusOperational	1	Decimal	BOOL
-PBM01_MasterStatus.SlaveMode	0	Decimal	BOOL
PBM01_MasterStatus.ConfigCRC	-3271	Decimal	INT
PBM01_MasterStatus.DeviceLiveList	{}	Decimal	BOOL[128]
PBM01_MasterStatus.DeviceDataExchangeActive	{}	Decimal	BOOL[128]
■ PBM01_MasterStatus.DeviceAlarmPendingFlags	{}	Decimal	BOOL[128]
BM01_MasterStatus.DeviceDiagnosticPendingFlags	{}	Decimal	BOOL[128]

Figure 4.4 – Logix General Sta	tus tags
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Тад	Description	
ConfigValid	Configuration has been downloaded to the PLX51-PBM and is being executed.	
	1 – PLX51-PBM has been successfully configured.	
	0 – PLX51-PBM is not configured.	
Owned	Indicates if the PLX51-PBM is owned by a Logix Controller with a connection count similar to what has been configured in the PLX50 Configuration Utility.	
	1 – PLX51-PBM is connected.	
	0 – PLX51-PBM is not connected.	
DuplicateDPStation	Indicates that the PLX51-PBM has detected another PROFIBUS DP station with the same station address as itself and has entered a temporary Back-off mode.	
	1 – Duplicate detected (Back-off mode active).	
	0 – Normal (No duplicate detected).	
	(i) <b>NOTE</b> : In this condition, the PLX51-PBM will not communicate on the PROFIBUS DP network. Although the back-off time is approximately 5 seconds, should the conflicting DP master remain active on the PROFIBUS network, the PLX51-PBM will continuously re-enter back-off mode.	
PROFIBUSFieldbusError	There is a PROFIBUS network issue (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	Indicates if the PROFIBUS network is offline.
	1 – The PROFIBUS network is offline.
	0 – The PROFIBUS network is online (operational).
PROFIBUSStopped	Indicates if the state of the PROFIBUS network is in <i>Stopped</i> mode.
	1 – The PROFIBUS network is stopped.
	0 – The PROFIBUS network is not stopped.
PROFIBUSClear	Indicates is the state of the PROFIBUS network is in <i>Clear</i> mode.
	1 – The PROFIBUS network is in <i>Clear</i> mode.
	0 – The PROFIBUS network is not in <i>Clear</i> mode.
PROFIBUSOperational	Indicates is the state of the PROFIBUS network is in <i>Operation</i> mode.
	1 – The PROFIBUS network is in <i>Operation</i> mode.
	0 – The PROFIBUS network is not in <i>Operation</i> mode.
SlaveMode	When in <b>Slave</b> mode, the PLX51-PBM will emulate multiple PROFIBUS Slave devices.
	1 – The PLX51-PBM is in Slave Mode.
	0 – The PLX51-PBM is <b>not</b> in Slave Mode.
ConfigCRC	The signature of the configuration currently executing on the module.
DeviceLiveList	Indicates the nodes that are online on the local PROFIBUS network. Each bi represents a node.
	When the bit is set '1', the device is online.
	When the bit is set '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 DPVO data on the loca PROFIBUS network. Each bit represents a node.
	When the bit is set '1', the device is online and exchanging data.
	When the bit is set '0', the device is not exchanging data on the PROFIBU: 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 PROFIBU: network. Each bit represents a node.

	When the bit is set '1', the device has an alarm pending that must be unloaded. When the bit is set '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 bit is set '1', the device has diagnostics pending that must be unloaded.
	When the bit is set '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

Table 4.37 – Logix General Status tags

# GENERAL CONTROL

The PLX51-PBM Slave feature operates similar to Master mode, but each configured Slave is 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 PLX51-PBM becomes "alive" on the PROFIBUS network, and will start responding to a PROFIBUS DP Master.

PBS01_GeneralControl	{}		PSPLX51DPGeneralContro
PBS01_GeneralControl.MasterControl	0	Decimal	SINT
PBS01_GeneralControl.DeviceEnable	{}	Decimal	BOOL[128]
PBS01_GeneralControl.DeviceEnable[0]	0	Decimal	BOOL
PBS01_GeneralControl.DeviceEnable[1]	0	Decimal	BOOL
PBS01_GeneralControl.DeviceEnable[2]	1	Decimal	BOOL
PBS01_GeneralControl.DeviceEnable[3]	1	Decimal	BOOL
PBS01_GeneralControl.DeviceEnable[4]	1	Decimal	BOOL
PBS01_GeneralControl.DeviceEnable[5]	1	Decimal	BOOL
	• • •		i
PBS01_GeneralControl.DeviceEnable[122]	0	Decimal	BOOL
PBS01_GeneralControl.DeviceEnable[123]	0	Decimal	BOOL
PBS01_GeneralControl.DeviceEnable[124]	0	Decimal	BOOL
PBS01_GeneralControl.DeviceEnable[125]	0	Decimal	BOOL
PBS01_GeneralControl.DeviceEnable[126]	0	Decimal	BOOL
PBS01_GeneralControl.DeviceEnable[127]	0	Decimal	BOOL

Figuro	15-	General	Control	tage
riguie	4.5 -	General	CONTROL	lags

Тад	Description
MasterControl	This tag is used to set the state of the fieldbus network.
	0 – Set PROFIBUS network state to OFFLINE
	1 – Set PROFIBUS network state to STOP
	2 – Set PROFIBUS network state to CLEAR
	3 – Set PROFIBUS network state to OPERATIONAL
	<b>Note:</b> When operating as a PLX51-PBM DP Slave, the <i>MasterControl</i> parameter is not be used, but only the <i>DeviceEnable</i> bits
DeviceEnable	These bits enable nodes on the PROFIBUS network for data exchange. Each bit represents a slave node.
	When the bit is set '1', the device (if configured) will exchange data with the PLX51-PBM.
	When the bit is set '0', the device does exchange data with the PLX51-PBM.
	Bit 0 – Node 0 is enabled for data exchange
	Bit 1 – Node 1 is enabled for data exchange
	Bit 126 – Node 126 is enabled for data exchange

Table 4.38 – General Control tags

Monitoring faults (e.g. configured device not found) can be done by viewing the LEDs of the PLX51-PBM (see the *Diagnostics* section for more details), by going online in the PLX50 Configuration Utility and viewing the PLX51-PBM Slave and Device Diagnostics, or by viewing the input assembly of the PLX51-PBM in Logix.

## STATUS AND DPV0 DATA EXCHANGE

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

∃PBS01_PLX51PBS	{}		PBS01_10FF3E83
PBS01_PLX51PBS.Input	{}		PBS01_10FF3E83Input
PBS01_PLX51PBS.Input.Status	{}		PSPLX51DPSIaveStatus
PBS01_PLX51PBS.Input.Status.Online	1	Decimal	BOOL
PBS01_PLX51PBS.Input.Status.DataExchangeActive	1	Decimal	BOOL
-PBS01_PLX51PBS.Input.Status.IdentMismatch	0	Decimal	BOOL
-PBS01_PLX51PBS.Input.Status.DisabledByOutputAssembly	0	Decimal	BOOL
-PBS01_PLX51PBS.Input.Status.DeviceError	0	Decimal	BOOL
-PBS01_PLX51PBS.Input.Status.AlarmPending	0	Decimal	BOOL
-PBS01_PLX51PBS.Input.Status.DiagnosticsPending	0	Decimal	BOOL
-PBS01_PLX51PBS.Input.Status.OutputAssemblyNodeAddrMi	0	Decimal	BOOL
-PBS01_PLX51PBS.Input.Status.MappingCRCMismatch	0	Decimal	BOOL
-PBS01_PLX51PBS.Input.Status.SlaveClearOpMode	0	Decimal	BOOL
-PBS01_PLX51PBS.Input.Status.SlaveAlarmAck	0	Decimal	BOOL
PBS01_PLX51PBS.Input.Status.StationNumber	0	Decimal	SINT
PBS01_PLX51PBS.Input.Status.DeviceMappingCRC	0	Decimal	INT
PBS01_PLX51PBS.Input.Output1Byte	0	Decimal	SINT
PBS01_PLX51PBS.Input.Output2Bytes	{}	Decimal	SINT[2]
PBS01_PLX51PBS.Input.Output4Bytes	0.0	Float	REAL
PBS01_PLX51PBS.Input.Output8Bytes	{}	Decimal	SINT[8]
PBS01_PLX51PBS.Input.Output16Bytes	{}	Decimal	SINT[16]
PBS01_PLX51PBS.Output	{}		PBS01_10FF3E83Output
PBS01_PLX51PBS.Output.Control	{}		PSPLX51DPSIaveControl
PBS01_PLX51PBS.Output.Control.StationNumber	2	Decimal	SINT
-PBS01_PLX51PBS.Output.Control.AlarmTrigger	0	Decimal	BOOL
PBS01_PLX51PBS.Output.Control.DeviceMappingCRC	-27247	Decimal	INT
PBS01_PLX51PBS.Output.Input1Byte	33	Decimal	SINT
PBS01_PLX51PBS.Output.Input2Bytes	{}	Decimal	SINT[2]
-PBS01_PLX51PBS.Output.Input4Bytes	0.0	Float	REAL

Figure 4.6 – PLX51-PBM Slave Device-Specific tag

Тад	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	<ul> <li>This bit indicates if the device is configured and exchanging data on the PROFIBUS network.</li> <li>1 – Device is active and exchanging data</li> <li>0 – Device is not exchanging data</li> <li>Ensure that all application code making use of slave device data first checks that the <i>DataExchangeActive</i> bit is 1.</li> </ul>

IdentMismatch	The device configured in the DIVEC Configuration Utility and the
Tuentimismatch	The device configured in the PLX50 Configuration Utility 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
Disabled By Output Assembly	This bit indicates if the device has not been enabled for data exchange in the PLX51-PBM device enable control bits.
	1 – Device has <b>not</b> 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 PLX50 Configuration Utility.
	This Error flag is transient and will clear once a valid response is received.
AlarmPending	Indicates the device has an alarm pending on the PROFIBUS network.
	When the bit is set '1', the device has an alarm pending that must be unloaded.
	When the bit is set '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 bit is set '1', the device has diagnostics pending that must be unloaded.
	When the bit is set '0', the device does not have any diagnostics pending.
	0 – The node has no diagnostics pending
	1 – The node has diagnostics pending
OutputAssemblyNodeAddrMismatch	Indicates that there is a mismatch between the actual device station address and the expected Logix mapping station address.
	0 – Station address matches
	1 – Station address mismatch
MappingCRCMismatch	If there is a mismatch in the mapping between Logix and the PLX51- PBM, it can result in data appearing in the incorrect location. This means you 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	<ul> <li>When the PLX51-PBM is in Slave Mode; this indicates that the respective slave is in fieldbus CLEAR mode (received from the DP Master on the network).</li> <li>0 – Slave Station is in CLEAR fieldbus mode.</li> <li>1 – Slave Station is not in CLEAR fieldbus mode.</li> </ul>
SlaveAlarmAck	When the PLX51-PBM is in <b>Slave Mode</b> ; this indicates 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 4.39 – Device Input tags

Тад	Description
Control	
StationNumber	The station number entered by the Logix mapping code of the specific slave device.
AlarmTrigger	When the PLX51-PBM is in <b>Slave</b> Mode; when this bit changes 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.

Table 4.40 – Device Output tags

# DPV1 CLASS 1 MESSAGING (MS1)

The PLX51-PBM Slave feature supports DPV1 Class 1 (MS1) messaging. See the *DPV1 Objects* in the PLX50 Configuration Utility *Device Configuration* section for more information

regarding the configuration of the DPV1 Objects. You can configure several slot and index combinations for DPV1 Class 1 communication (for each added PROFIBUS Slave device).

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

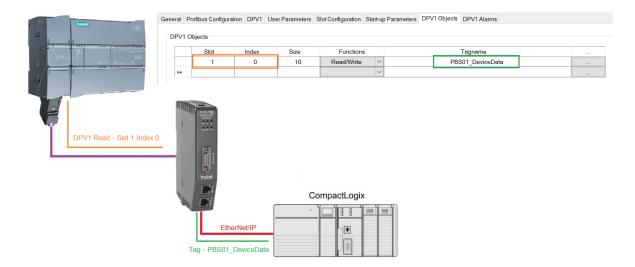


Figure 4.7 – PLX51-PBM DPV1 Object exchange

# ALARMING

The PLX51-PBM slave feature supports DPV1 Alarming. You can trigger an alarm from the Logix device output assembly, which will notify the PROFIBUS Master that a new alarm has

been generated. When the PROFIBUS Master sends a DPV1 alarm read command, the PLX51-PBM accesses the configured Logix tag to provide the required data for the specific alarm.



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

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

-	PBS01_PLX51PBS.Output	{}		PBS01_10FF3E83Output	
[	PBS01_PLX51PBS.Output.Control	{}		PSPLX51DPSIaveControl	
	PBS01_PLX51PBS.Output.Control.StationNumber	2	Decimal	SINT	
	-PBS01_PLX51PBS.Output.Control.AlarmTrigger	0	Decimal	BOOL	
	PBS01_PLX51PBS.Output.Control.DeviceMappingCRC	-27247	Decimal	INT	
[	PBS01_PLX51PBS.Output.Input1Byte	33	Decimal	SINT	

Figure 4.8 – PLX51-PBN	Slave Alarm Trigger
------------------------	---------------------

- **2** Once the alarm has been triggered, the PLX51-PBM reads the alarm data from the configured Logix tag and add it to the PROFIBUS diagnostics (which will then be read by the PROFIBUS Master).
- **3** When the PROFIBUS Master acknowledges the alarm, the *SlaveAlarmAck* bit in the field device input assembly is set, indicating to the Logix controller that the next alarm can be triggered.

PBS01_PLX51PBS.Input	{}		PBS01_10FF3E83Input
PBS01_PLX51PBS.Input.Status	{}		PSPLX51DPSIaveStatus
PBS01_PLX51PBS.Input.Status.Online	1	Decimal	BOOL
PBS01_PLX51PBS.Input.Status.DataExchangeActive	1	Decimal	BOOL
-PBS01_PLX51PBS.Input.Status.IdentMismatch	0	Decimal	BOOL
-PBS01_PLX51PBS.Input.Status.DisabledByOutputAssembly	0	Decimal	BOOL
-PBS01_PLX51PBS.Input.Status.DeviceError	0	Decimal	BOOL
-PBS01_PLX51PBS.Input.Status.AlarmPending	0	Decimal	BOOL
-PBS01_PLX51PBS.Input.Status.DiagnosticsPending	0	Decimal	BOOL
-PBS01_PLX51PBS.Input.Status.OutputAssemblyNodeAddrMi	0	Decimal	BOOL
-PBS01_PLX51PBS.Input.Status.MappingCRCMismatch	0	Decimal	BOOL
PBS01_PLX51PBS.Input.Status.SlaveClearOpMode	0	Decimal	BOOL
PBS01_PLX51PBS.Input.Status.SlaveAlarmAck	0	Decimal	BOOL
PBS01_PLX51PBS.Input.Status.StationNumber	0	Decimal	SINT
E PBS01_PLX51PBS.Input.Status.DeviceMappingCRC	0	Decimal	INT

Figure 4.9 – PLX51-PBM Alarm Acknowledge

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

Alarm Parameter	Byte Offset	Byte Size	Description
-----------------	----------------	--------------	-------------

Alarm Length	0	1	Length of the Alarm data at the bottom of the table.
			Refer to the <i>PROFIBUS Specification EN 50170</i> for information regarding the diagnostics.
Alarm Type	1	1	Examples: 1 - Diagnosis_Alarm
			3 - Pull_Alarm
			4 - Plug_Alarm
Alarm Slot	2	1	Refer to the <i>PROFIBUS Specification EN 50170</i> for information regarding the diagnostics.
			Refer to the <i>PROFIBUS Specification EN 50170</i> for information regarding the diagnostics.
			Examples:
Alarm Specifier	3	1	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 <i>PROFIBUS Specification EN 50170</i> for information regarding the diagnostics.

Table 4.41 – Slave Alarm Data Format

# An example of the Alarm Data is shown below:

Name	📰 🔺 Value	• Style	Data Type	Description
<ul> <li>DPV1Alarm</li> </ul>	{	.} Hex	SINT[40]	
DPV1Alarm[0]	16#0	5 Hex	SINT	Alarm Data Length
DPV1Alarm[1]	16#0	1 Hex	SINT	Alarm Type
DPV1Alarm[2]	16#0	3 Hex	SINT	Alarm Slot
DPV1Alarm[3]	16#0	1 Hex	SINT	Alarm Specifier
DPV1Alarm[4]	16#1	1 Hex	SINT	Alarm Data
DPV1Alarm[5]	16#2	2 Hex	SINT	
DPV1Alarm[6]	16#3	3 Hex	SINT	
DPV1Alarm[7]	16#4	4 Hex	SINT	
DPV1Alarm[8]	16#5	5 Hex	SINT	
DPV1Alarm[9]	16#0	0 Hex	SINT	

Figure 4.10 – DPV1 Alarm Data Example

# 4.2. EXPLICIT MESSAGING UTILITY

The PLX50 Configuration Utility provides a utility to initiate explicit messages to the PROFIBUS devices via the PLX51-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
- 1 Right-click on a PROFIBUS device and select the **EXPLICIT MESSAGING** option.

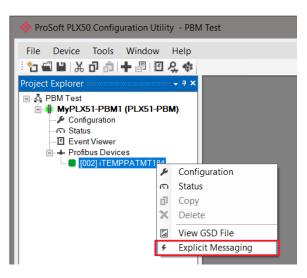


Figure 4.11 – Explicit Messaging Option

- 2 In the *Action* box, select the type of explicit message. Depending on the type selected, various other parameter controls will become available.
- **3** Once the parameters have been entered, click the **EXECUTE** button to initiate the explicit exchange.



**NOTE:** A Class 2 Initialization message will first be sent if a Class 2 connection has not already been established. The Class 2 connection remains open until the station address is changed, the manual **ABORT** button is selected, or the utility is closed.

🔅 MyPLX51-PBM1 - Exp	licit Messaging Utility			×
DPV1 Action				
Action	Read Diagnostics	~	Execute	
Station Address	2 🗸		Timeout 2000 (ms)	
Details				
Slot Number	0	Class 2 State	-	
Index	1	oluto	Initialize Abort	
Data Length	240		Aboit	
Request Data		Clear Diagnostic	c Latch	
				^
				~
Status			Ok	
Response Data	i			
24 00 0C 00 01 1	5			

Figure 4.12 – Explicit Messaging Utility

# 4.3. FIRMWARE UPGRADING

Using the PLX50 Configuration Utility, you can upgrade the PLX51-PBM firmware in the field.

**1** In the PLX50 Configuration Utility, go to the *Tools* menu and select the **DeviceFLASH** option.

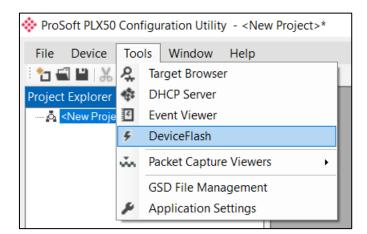


Figure 4.13 - DeviceFlash Tool

2 In the *Select a Device Flash File* window, select the appropriate AFB binary file and click **OPEN**.

🔅 Select a Device Flash File					×
$\leftarrow$ $\rightarrow$ $\checkmark$ $\uparrow$ $\blacksquare$ > This	PC > Documents > ProSoft Technology	~ Ū	Search ProSoft	[echnology	٩
Organize   New folder				-	?
🛆 OneDrive - Person	Name	Date modified	Туре	Size	
, This PC	DLX51_PBM_1001.afb	9/6/2018 10:07 AM	AFB File		532 KB
📙 3D Objects					
🔚 Desktop					
🗎 Documents					
🔈 Downloads					
🜗 Music					
E Pictures					
📕 Videos					
📞 OS (C:)					
🥌 Local Disk (D:)					
¥ ·	< Contract of the second secon				
File name	e: PLX51_PBM_1001.afb	~	Device Flash (*.	afb)	$\sim$
			Open	Cance	el

Figure 4.14 - Select the AFB binary

3 In the *Target Browser* window, select the PLX51-PBM's IP address and click **O**κ.

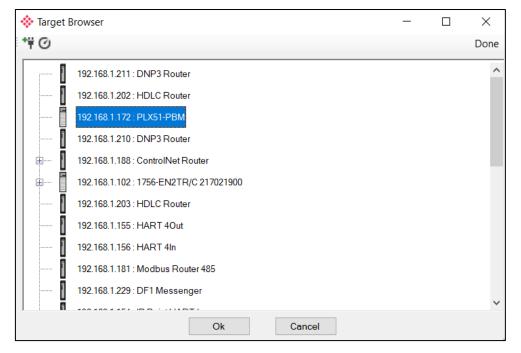


Figure 4.15 - Select the correct PLX51-PBM module

**4** Once the firmware update is complete, the *DeviceFlash* option provides the details of the updated module.

	Device Flash			
	File Tools			
E (	- co <i>4</i>			
Ι.				
	Parameter	Source File	Target Device	^
	Path	PLX51_PBM_1001	192.168.1.172	
	Product	PLX51-PBM	PLX51-PBM	
	Vendor	309	309	
	Device Type	12	12	
	Product Code	5228	5228	
	Revision	1.001	1.001	~
		Flash	Cancel	
C	Complete			

Figure 4.16 – PLX51-PBM successfully updated.



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

# 5. DEVICE TYPE MANAGER (DTM)

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

# 5.1. INSTALLATION

Download the latest version of the PLX51 DTM pack software from <u>www.prosoft-technology.com</u>.

The installation wizard guides you through the installation process.



Figure 5.1 – PLX51 DTM Pack Installation

# 5.2. CONFIGURATION

Before you configure a slave device by using its DTM, you need to update the DTM Catalogue of the selected Field Device Tool frame. The steps required for this action are slightly different for each FDT frame. Typically, you select the DTM Catalogue or Device Catalogue, and select *Refresh* or rebuild.

- 1 After the catalogue has been updated, the PLX51-PBM can be added to a new project.
- **2** From the *Add Device* function, select the PLX51-PBM DTM and click **O**κ. The example below makes use of PACTware FDT frame.

PACTware	:	
File Edit	Viev	v Project Device E
i 🗅 💕 🔒	3	🗗 - 🔛 🙀 i 🖂 😫
Project		<b>4</b> )
Device tag		🚺 <u>0</u> 🧦 Channel
🚊 HOST PC		
	10 B	Connect
	$\stackrel{\leftarrow \rightarrow}{=}$	Disconnect
		Topology Scan
		Diagnostic Scan
	<u>_</u>	Add device

Figure 5.2 – Adding new device

Device 🔺	Protocol	Vendor	Group	Device Version	FDT version	DTM version
CDI Communication FXA291	CDI	Endress+Hauser	not specified	1.08.00 / 2012	1.2.0.0	5.06.0400 / 2012-06-
CDI Communication TCP/IP	CDI TCP/IP	Endress+Hauser	not specified	1.08.00 / 2012	1.2.0.0	5.06.0400 / 2012-06-
CDI Communication USB	CDI USB	Endress+Hauser	not specified	1.08.00 / 2012	1.2.0.0	5.06.0400 / 2012-06-
CommDTM PROFIBUS DP-V1	Profibus DP/V1	Trebing & Himstedt Prozeßautor	not specified	4.0.0.9 / 2011-	1.2.0.0	4.0.0.9 / 2011-01-17
🐺 FF H1 CommDTM	Fieldbus FF H1	Endress+Hauser, Metso Automa	not specified	1.5 / 2009-08-1	1.2.0.0	1.5 / 2009-08-17
Flow Communication FXA193	ISS	Endress+Hauser	not specified	3.18.00 / 2012	1.2.0.0	6.06.1900 / 2012-06-
III FXA520	HART	Endress+Hauser	not specified	1.05.09 / 2011	1.2.0.0	1.05.09 / 2011-07-15
😔 HART Communication	HART	CodeWrights GmbH	not specified	1.0.52 / 2015-0	1.2.0.0	1.0.52 / 2015-03-17
HART OPC Client	HART	Endress+Hauser, Metso Automa	not specified	2.0 / 2009-05-2	1.2.0.0	2.0 / 2009-05-28
IPC (Level, Pressure) FXA193	IPC	Endress+Hauser	not specified	1.02.12 / 2008	1.2.0.0	1.02.12 / 2008-10-21
PCP (Readwin) TXU10/FXA29	PCP	Endress+Hauser	not specified	1.01.14 / 2009	1.2.0.0	1.01.14 / 2009-12-16
🕴 PLX51 PBM	Profibus DP/V1	ProSoft Technology Inc	not specified	1.001 / 2018-1	1.2.0.0	1.001 / 2018-11-27
🐺 PLX51-Hart-4I	HART	ProSoft Technology Inc	not specified	1.001 / 2018-0	1.2.0.0	1.001 / 2018-06-25
PLX51 PBM		·				

Figure 5.3 – Selecting PLX51-PBM DTM

**3** After instantiating the PLX51-PBM DTM, select the **PARAMETER** option.

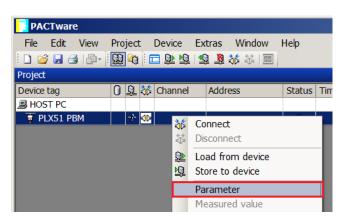


Figure 5.4 – Select Parameter option

**4** The PLX51-PBM DTM's configuration allows the CIP Path to the PLX51-PBM to be configured. This is typically the IP address of the PLX51-PBM. The path can either be entered manually or the Browse [...] button can be used to open the *Target Browser* to select the PLX51-PBM.

iguration			
92.168.1.176			
Ok		Cancel	
			-
	iguration 92.168.1.176 Ok	92.168.1.176	92.168.1.176

Figure 5.5 – PLX51-PBM CIP Path

ł	a Target B	Browser	×
P	ΨØ		Done
	•	192.168.1.176 : PLX51-PBM         192.168.1.202 : HDLC Router         192.168.1.179 : DNP3 Router/B         192.168.1.203 : HDLC Router         192.168.1.102 : 1756-EN2TR/C 217021900         192.168.1.175 : PLX51-PBS         192.168.1.156 : PLX51-HART-4I         192.168.1.154 : IP Point HART In	
		Ok Cancel	

Figure 5.6 – Target Browser

- **5** Once the PLX51-PBM DTM has been configured, the child Device DTMs can be added by right-clicking on the PLX51-PBM DTM icon and selecting **ADD Device**.
- 6 Select the matching device DTM. Click **O**κ.

Device	<ul> <li>Protocol</li> </ul>	Vendor	Group	Device Version FDT version	D٦٠
🏷 kajaaniMCA PA	Profibus DP/V1	Metso Automation	not specified	0 / 2004-03-21 1.2.0.0	1.2
🔈 kajaaniROTARY PA	Profibus DP/V1	Metso Automation	not specified	A/2007-03-30 1.2.0.0	1.2
👦 Level Profile DTM	Profibus DP/V1	Endress+Hauser	Level	1.5.67.11 / 200 1.2.0.0	1.5
D ND800PA	Profibus DP/V1	Metso Automation	Positioner	1.0 / 2003-01-1 1.2.0.0	1.2
D ND9000PA	Profibus DP/V1	Metso Automation	Positioner	SW 1.00-1.29 / 1.2.0.0	1.2
D9000PA	Profibus DP/V1	Metso Automation	Positioner	SW 1.30-1.50 / 1.2.0.0	1.2
D ND9000PA	Profibus DP/V1	Metso Automation	Positioner	SW 1.51-1.80 / 1.2.0.0	1.2
D9000PA	Profibus DP/V1	Metso Automation	Positioner	SW 4.00-4.99 / 1.2.0.0	1.2
Pressure Profile DTM	Profibus DP/V1	Endress+Hauser	Pressure	1.5.67.11 / 200 1.2.0.0	1.5
🖩 Promass 200 / 8x2Bxx / PA / FW 1	1.00.zz CDI; Profibus DP/V1	Endress+Hauser	Flow	1.0.0.0 / 2012- 1.2.0.0	1.3
🔈 Smart Pulp-PA	Profibus DP/V1	Metso Automation	not specified	M3 / 2004-02-0 1.2.0.0	1.2
Temperature Profile DTM	Profibus DP/V1	Endress+Hauser	Temperature	1.5.67.11 / 200 1.2.0.0	1.5
•				· · ·	
<pre>;**Device.PA_11_155F_0101_{ 200;**;**SOFTWARE_REVISIC BER::0x155F::0x9742;**;**IS</pre>	N_MIN::01.00.00;**;**SOFT			E_REVISION::3.2;**;**IDENT_	

Figure 5.7 – Device DTM Selection

**7** Once the child Device DTM has been added, a configuration window opens to set the Station *Node Address*. Click **O**κ.

ü PLX51 PBM	
Device Configuration —	
Node Address	3
Ok	Cancel

Figure 5.8 – Device DTM Node Address

# 5.1. OPERATION

**1** Once the FDT project is configured, the DTMs can be placed online by selecting the Online or *Connect* option.

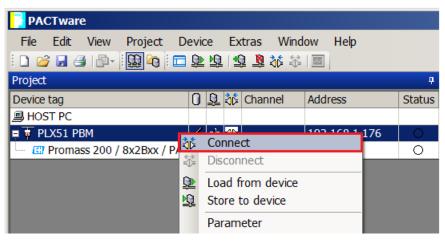


Figure 5.9 – DTM Connect

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

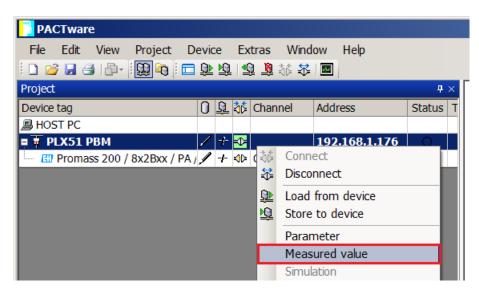


Figure 5.10 – Measured Value

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

🔋 PLX51 PBM #	Measured value			$\forall \ \triangleright \ \mathbf{X}$
	Device Name:	PLX51 PBM		*
	Description:	Ethernet Profibus DP Master		Drosoff
	Status:	Online		
General Live List	<u>General</u>			
	Config Valid	Valid	Sys MAC Address 00:60:35:2D:BB:36	
	Owned	Owned	Firmware Revision 🥎 1.001	
	Mode	C StandaloneMaster	Temperature 🔇 33.4 °C	
	Profibus State	Operational	Processor Scan 🔇 15 us	
	Master Node	۲ 🕐 🚺	Up Time 🚺 0d - 00:05:53	
	BAUD Rate	93.75	Ethernet Port 1 🕐 Up	
	Acyclic Request	ts 🔇 0	Ethernet Port 2 🔇 Down	
			DIP Switches SW1 - Safe Mode 🔇 Off	
			SW2 - Force DHCP 🙀 Off	

Figure 5.11 – PLX51-PBM DTM - General Status Page

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

	Dev	rice Name	P	LX51 I	PBM									.*.
	Des	cription:	E	thernet I	Profibus	s DP Ma	aster							ProSo
	Sta	tus:		🖉 Onlir	ne									
il it	Liv	e List												
·														
		Profibus	DP Live		0	4	6	0	7	0	0	Key		
		0	11	2 12	3 13	4	5 15	6 16	7	8 18	9 19			
		20	21	22	23	24	25	26	27	28	29		Not Available	
		30	31	32	33	34	35	36	37	38	39	X	Live + Data Exchange	
		40	41	42	43	44	45	46	47	48	49			
		50	51	52	53	54	55	56	57	58	59	×	Live + Not Exchanging	
		60	61	62	63	64	65	66	67	68	69	×	Configured + Not Live	
		70	71	72	73	74	75	76	77	78	79		Computed - Not Live	
		80	81	82	83	84	85	86	87	88	89	ХM	DP Master	
		90	91	92	93	94	95	96	97	98	99			
		100	101	102	103	104	105	106	107	108	109	X	Unconfigured	
		110	111	112	113	114	115	116	117	118	119			
		120	121	122	123	124	125							

Figure 5.12 – PLX51-PBM DTM - Live List Page

**5** The Slave Device DTM under the PLX51-PBM DTM can also be placed online by selecting the Online or *Connect* option.

PA	CTware	e							
File	Edit	View	Project	Devi	ce l	Extras	Window	Help	
1 🗋 🞽	i 🖬 👌	1 🗗 -		🗖 🔊	<u>N</u>	19 🧕	👬 🐳 🛛	]	
Project									<b>₽</b> ×
Device	tag			0	<u>Q</u> 3	🏂 Chai	nnel Ad	dress	9
🗐 HOS									
📮 🐺 P	L <b>X</b> 51 P	вм		/	+ <			2.168.1.1	76
·	Promas	ss 200 /	8x2Bxx /				0 3		
				VV	Conne	ct			
				÷	Discon	nect			

Figure 5.13 – Slave Device DTM Connect

**6** Depending on the device DTM, a number of online parameters, diagnostics and measure variables is displayed.

Bill Promass 200 / 8x2Bxx / PA / FW 1.00.zz / Dev.	Rev. 1 # Online parameteriza	ition 🔄 🗄 🗙
ØD		
Device name: Promass 200		0.0055 kg/s
Device tag: Promass 200PA	Volume flow: 200	0.0027 l/s Endress+Hauser
Status signal: 🧭 🔽 OK	Corrected volume flow: 🖉 -0	).0001 NI/s
🖬 💼 🛛 All parameters 🛛 🛛 🐼 😂 🛸		
Menu / Variable Value	Mass flow:	0.0055 kg/s
🖃 🦢 Promass 200	Volume flow:	0.0027 l/s
Access status tooling: Mainten     Display/operation	Corrected volume flow: 📿	-0.0001 NI/s
⇒ Setup	Density:	1000.0010 kg/m³
Diagnostics	Reference density:	1000.0100 kg/Nm <sup>3</sup>
Expert		
Locking status:	Temperature:	-1.0141 °C
P Access status display: Mainten		
Enter access code:		
System		
Measured values		
Process variables		
Totalizer		
Output values		
ter in the second seco		
Process parameters		
Measurement mode		
External compensation		
Calculated values		
🕀 🛅 Sensor adjustment 🗸		
🖾 Online	Process va	ariables
😍 Connected 🛛 💭 🔍 📄 🖉 Use	Role: Planning engineer	

Figure 5.14 – Device DTM

# 6. DIAGNOSTICS

# 6.1. LEDS

The module provides six LEDs for diagnostics purposes as shown below.



Figure 6.1 - PLX51-PBM LEDs

LED	Description
Ok	<u>Flashing Green</u> – The module has booted and is running correctly <b>without</b> any application configuration loaded.
	Solid Green – The module has booted and is running correctly with application configuration loaded.
	Solid Red – The module is not operating correctly. For example, if the module application firmware has been corrupted or there is a hardware fault.
А/В	This module has two Ethernet ports; A and B. Each LED represents each specific port. The Ethernet LED lights up when an Ethernet link has been detected (by plugging in a connected Ethernet cable). The LED flashes every time traffic is detected.

RUN	This LED indicates the PROFIBUS operating mode when in <b>Master</b> mode (Note that in <b>Slave</b> 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
	<u>Off</u> – This LED is N/A.
BF	This LED indicates the status of the PROFIBUS network when in <b>Master</b> mode, and the status of the configured field devices when in <b>Slave</b> Mode.
	Master
	Solid Red – There are bus communication errors.
	<u>Flashing Red</u> – There are field device errors.
	Off – There are no bus communication or device errors.
	Slave
	Solid Red – There are bus communication errors present (if no valid packet has been received by any configured slave for more than 1 second).
	<u>Flashing Red</u> – There are slave errors present (at least one slave has not been configured properly and is not exchanging DPV0 data).
	<u>Flashing Green</u> – All slaves are successfully exchanging DPV0 data and the DP network operational state is <b>clear</b> .
	Solid Green – All slaves are successfully exchanging DPV0 data and the DP network operational state is <b>operate</b> .
AUX	This LED is used for the activity on the Primary Interface (e.g. EtherNet/IP).
	<u>Flashing Green</u> – A valid packet is received from the Primary Interface.
	<u>Flashing Red</u> – A corrupted packet was received (e.g. failed checksum when using RS232 or RS485).

Table 6.1 - Module LED operation

# 6.2. MODULE STATUS MONITORING

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

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

💠 ProSoft PLX50 Configurati	on L	Jtility - PLX51_PBM_Testing
File Device Tools W	/indo	ow Help
*2●■■X0+		표 운 �
Project Explorer		×××××
PLX51_PBM_Testing	ME 4	DOLA
🔑 Configuration	1	Configuration
Profibus Devices		Verify Configuration
[018] ET200MII	*•O	Identity
	5	Status
		Go Offline
		Go Online
	-	Download
	Ť	Upload
	х.	DP Packet Capture
	s	Global Control
	ŋ	Сору
	¢	Export
	×	Delete
	¢	Mapping Report

Figure 6.2 - Selecting to Go Online

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

## 6.2.1. PLX51-PBM

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

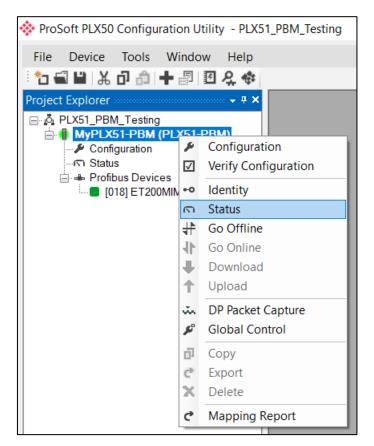


Figure 6.3 - Selecting PLX51-PBM online Status

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

### GENERAL

PBM01 - Status								X
General Slave Status Modbus	Statistics Ethernet Clients	TCP / ARP						
Config Valid	Valid	]	MAC Address		00:60:35:2D:	BB:36		
Owned	Owned		Temperature		34.7 °C	;		
Mode	Slave	-	Processor Scan		15.0 us	\$		
Profibus State	n/a	]	Ethernet Port 1		Up			
Master Node	1	]	Ethernet Port 2		Down			
BAUD Rate	19.2 kbit/s - Auto	]	Ethernet DLR		Linear			
IO bytes/second	48	]	NTP Status		Not Lock	ed		
Acyclic Requests Pending	n/a		DIP Switches	SW1	- Safe Mode	Off		
Up Time	0d - 00:01:38			SW2	- Force DHCP	Off		
Firmware Revision	1.001.010	]		SW3	- Config. Lock	Off		
Configuration Signature	0x3997	]		SW4	- Fixed IP Address	s Off		

The General tab displays the following general parameters:

Figure 6.4 – PLX51-PBM Status monitoring - General

Parameter	Description
Config Valid	Indicates if the downloaded configuration is valid and executing.
Owned	Indicates whether or not the module is currently owned (Class 1) by a Logix Controller.
Mode	Mode of operation of the module. The following states can be returned:
	Quiet
	This mode allows you to connect the PLX51-PBM to an active bus and run a DP packet capture. In this mode, the PLX51-PBM will not communicate on the DP Bus, but rather only listen.
	Standalone
	In this mode, the PLX51-PBM is the DP Master on the PROFIBUS network.
	Slave
	In this mode, the PLX51-PBM will emulate multiple PROFIBUS Slave devices.
PROFIBUS State (Master mode only)	This is the operational state of the PROFIBUS network. The following states can be returned:
	OFFLINE

	The PROFIBUS network is offline and the PLX51-PBM will not communicate on the network.
	<b>STOP</b> The PROFIBUS network is running and the PLX51-PBM is communicating on the network, but it will not exchange any process data with any slave device.
	<b>OPERATE</b> The PROFIBUS network is running and the PLX51-PBM is communicating with all slave devices on the network, and if configured in the PLX51-PBM, the module will configure and exchange process data with each slave device.
	<b>CLEAR</b> The PROFIBUS network is running and the PLX51-PBM is communicating with all slave devices on the network, and if configured in the PLX51-PBM, the module will configure and exchange process data with each slave device.
	<b>Note</b> : In CLEAR mode, the PLX51-PBM will not send any output data to any slave device.
Master Node (Master mode only)	The PROFIBUS Node address of the local PLX51-PBM when in Master mode.
BAUD Rate	The BAUD Rate of the PROFIBUS network.
IO bytes/second	The number of process variable bytes being exchanged between the PLX51-PBM and slave devices every second.
Acyclic Requests Pending	The number of acyclic requests (DPV1 Class 1 and Class 2 requests) pending.
Up Time	Indicates the elapsed time since the module was powered-up.
Firmware Revision	The current PLX51-PBM application firmware revision.
Configuration Signature	The current PLX51-PBM signature of the configuration.
MAC Address	Displays the module's unique Ethernet MAC address.
Temperature	The internal temperature of the module.
Processor Scan	The amount of time (microseconds) taken by the module's processor in the last scan.
Ethernet Port 1/2	The status of each Ethernet port. <b>Down</b> The Ethernet connector has <b>not been</b> successfully connected to an Ethernet network.
	Up The Ethernet connector has successfully connected to an Ethernet network.

	<b>Mirror Enabled</b> The Ethernet port is mirroring the traffic on the other Ethernet port.
Ethernet DLR (Device Level Ring)	The status of the Ethernet DLR.
	Disabled
	The DLR functionality has been disabled.
	Linear
	The DLR functionality has been enabled and the Ethernet network architecture is linear.
	Ring – Fault
	The DLR functionality has been enabled and the Ethernet network architecture is ring, but there is a fault with the network.
	Ring – Ok
	The DLR functionality has been enabled and the Ethernet network architecture is ring and is operating.
NTP Status	The status of the local NTP Client.
	Disabled
	The NTP time synchronization has been disabled.
	Locked
	NTP time synchronization has been enabled and the PLX51-PBM has locked onto the target time server.
	Not Locked
	NTP time synchronization has been enabled and the PLX51-PBM has not locked onto the target time server.
DIP Switch Position	The status of the DIP switches when the module booted.

Table 6.2 - Parameters displayed in the Status Monitoring – General Tab

#### SLAVE STATUS

The *Slave Status* tab displays the following parameters:

PBM01 - Status				
General Slave Status Modbus	Statistics	Ethernet Clients	TCP / ARP	
BAUD Rate	1	9.2 kbit/s	]	
Auto-BAUD		Enabled	]	
CLEAR Op-Mode		Normal		
Comms State		Ok		
Slave Count		1	]	
Last Response Time		15	(us)	Clear
Max Response Time		20	(us)	
Min Response Time		10	(us)	
Min Response Time			(33)	

Figure 6.5 – PLX51-PBM Status monitoring – Slave Status

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

Table 6.3 - Parameters displayed in the Status Monitoring – Slave Status Tab

## GENERAL STATISTICS

## The General Statistics tab displays the following general parameters:

General Statistics DPV1 Statistics Liv	ve List Discovered Nodes	Modbus Statistics Ethernet Clients TCP / ARP		
Statistics				
Counter	Value	Counter	Value	Clear
Tx Packet Count	3 938 071	FB Fault Count	0	Ciedi
Rx Packet Count	697 685	Device Fault Count	0	
Checksum Failed Packet Count	0	Acyclic Request Client Count Overrun	0	
No Reply Count	0	Token Pass Retry Count	0	
Set Slave Addr Tx Count	0	Token Pass Fail Count	0	
Set Slave Addr Rx Count	0	Unexpected Packet Received	0	
Set Slave Addr Err Count	0	FB Inactivity Count	2	
Global Ctrl Tx Count	57 006	Duplicate Station Detect Count	0	
Global Ctrl Rx Count	0	Invalid Response Length Count	0	
Last Profibus Cycle Time (us)	18 025	FDL Fault Count	0	
Max Profibus Cycle Time (us)	22 700	Extract Alarm Success Count	0	
Min Profibus Cycle Time (us)	13 438	Extract Alarm Fail Count	0	
Last Token Hold Time (us)	38 435	Initialize Parameter Set Success Count	0	
Max Token Hold Time (us)	69 923	Initialize Parameter Set Fail Count	0	
Min Token Hold Time (us)	11 031	Device Reconfigure Count	2	
Last Response Time (us)	-	Device Reparameterize Count	2	
Max Response Time (us)	-	Ext Diag Overflow Count	0	

Figure 6.6 – PLX51-PBM Status monitoring – General Statistics

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

Max PROFIBUS Cycle Time	The maximum time (in microseconds) the PROFIBUS Cycle took to complete.
Min PROFIBUS Cycle Time	The minimum time (in microseconds) the PROFIBUS Cycle took to complete.
Last Token Hold Time	The time (in microseconds) the PLX51-PBM held the token in the last token rotation.
Max Token Hold Time	The maximum time (in microseconds) the PLX51-PBM held the token.
Min Token Hold Time	The minimum time (in microseconds) the PLX51-PBM held the token.
Last Response Time	In a Multi DP Master system, this is the time it took (in microseconds) to respond to the last token passed from another DP Master.
Max Response Time	In a Multi DP Master system, this is the maximum time it took (in microseconds) to respond to a token passed from another DP Master.
Min Response Time	In a Multi DP Master system, this is the minimum time it took (in microseconds) to respond to a token passed from another DP Master.
FB Fault Count	The number of fieldbus faults that have occurred (e.g. devices going offline, corrupted packets, etc.)
Device Fault Count	The number of slave device faults that have occurred (e.g. device stops communicating during data exchange).
Acyclic Request Client Count Overrun	The number of times more than 10 acyclic requests needed to be buffered in which case the PLX51-PBM will reject the 11 <sup>th</sup> request.
Token Pass Retry Count	In a Multi DP Master system, this is the number of times the token pass from the PLX51-PBM had to be retransmitted because the receiving DP Master did not respond in time.
Token Pass Fail Count	When the number of consecutive Token Pass Retries reaches the configured token pass retry count after which that DP Master will be assumed as offline.
Unexpected Packet Received	The number of times a response is received from a slave device that was not expected (e.g. incorrect response, response from a different node, etc.).
FB Inactivity Count	The number of times the PLX51-PBM has determined that there are no other DP Masters on the PROFIBUS network.
Duplicate Station Detect Count	The number of times the PLX51-PBM has detected that there is another station on the network with the same station address as the local PLX51-PBM.
Invalid Response Length Count	The number of times a response is received from a slave device where the length is not correct (for example if the slave device is configured to provide 10 bytes of process data and only 5 bytes are returned during data exchange).
FDL Fault Count	The number of Data Link Layer function code faults received.

	This occurs when the remote PROFIBUS device rejects a function request, e.g. if the device is not in the correct state, or if it does not support that function. A list of FDL errors is tabulated in chapter 9.
Extract Alarm Success Count	The number of alarms that have successfully been extracted from slave devices.
Extract Alarm Fail Count	The number of alarms that have <b>not</b> 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.

Table 6.4 - Parameters displayed in the Status Monitoring – General Statistics Tab

## DPV1 STATISTICS

## The *DPV1 Statistics* tab displays the following general parameters:

neral	General Statistics	DPV1 Statistics	Live List	Discovered Nodes	Modbus Statistics	Ethernet Clients	TCP / ARP	
DPV:	1 Statistics							
	Cou	inter		Value	Clear			
D	PV1 Class 1 Read	Tx Count		0				
D	PV1 Class 1 Read	Rx Count		0				
D	PV1 Class 1 Read	Err Count		0				
D	PV1 Class 1 Write	Tx Count		0				
D	PV1 Class 1 Write	Rx Count		0				
D	PV1 Class 1 Write	Err Count		0				
D	PV1 Class 2 Init T	< Count		0				
D	PV1 Class 2 Init R	x Count		0				
D	PV1 Class 2 Init Er	rr Count		0				
D	PV1 Class 2 Abort	Tx Count		0				
D	PV1 Class 2 Abort	Rx Count		0				
D	PV1 Class 2 Read	Tx Count		0				
D	PV1 Class 2 Read	Rx Count		0				
D	PV1 Class 2 Read	Err Count		0				
D	PV1 Class 2 Write	Tx Count		0				
D	PV1 Class 2 Write	Rx Count		0				
D	PV1 Class 2 Write	Err Count		0				

Figure 6.7 – PLX51-PBM Status monitoring – DPV1 Statistics

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

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

Table 6.5 - Parameters displayed in the Status Monitoring – DPV1 Statistics Tab

### LIVE LIST

The *Live List* tab provides an overview of all slave devices and DP masters connected to the PROFIBUS network. Each station will be in one of six states.

	lenerary	Statistics	UPV	1 Statist		eList	Discov	ered N	lodes	Viodbus Statistics   I	Ethernet Clients TCP / ARP
ofib	us DP L	ive List									
0	1 M	2	3	4	5	6	7	8	9	Кеу	
1(	11	12	13	14	15	16	17	18	19	X	Not Available
20	21	22	23	24	25	26	27	28	29		
30	31	32	33	34	35	36	37	38	39	X	Live + Data Exchange
4(	41	42	43	44	45	46	47	48	49		
50	51	52	53	54	55	56	57	58	59	X	Live + Not Exchanging
60	61	62	63	64	65	66	67	68	69	X	Configured + Not Live
70	71	72	73	74	75	76	77	78	79		3
80	81	82	83	84	85	86	87	88	89	XM	DP Master
90	91	92	93	94	95	96	97	98	99		
10	) 101	102	103	104	105	106	107	108	109	X	Unconfigured
11	) 111	112	113	114	115	116	117	118	119		
12	) 121	122	123	124	125						

Figure 6.8 – PLX51-PBM Status monitoring – Live List

## DISCOVERED NODES

The *Discovered Nodes* tab provides more detail regarding each station on the PROFIBUS network (when compared to the *Live List*). You can scan the PROFIBUS network to extract further details from each device. From here, you can add the slave device or change the slave device station address. See the *Device Discovery* section.

	rery	Status	Done		
Station	Ident	Status	Vendor	Model	GSD
2	0x1523	Data Exch	Endress+Hauser	ITEMP PA TMT 184	EH3_1523.GSD
3	0x155F	Unconfigured			
15	0x04C2	Unconfigured			
16	0x80A6	Unconfigured			



## ETHERNET CLIENTS

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

<u> </u>	lyPLX51-PBM1 - Status								_ 0 ×
Ge	eneral General Statistics	DPV1 Statistics	Live List	Disc	overed Nodes	Modbus Statistics	Ethernet Clients TC	P/ARP	
	Ethernet Client Counts				EtherNet/IP T	able			
	Туре		Count	[	IP Address	Ses	sion Handle		
	ARP Clients		3						
	TCP Clients		2						
	EtherNet/IP Clients		0						

Figure 6.10 – PLX51-PBM Status monitoring – Ethernet Client Statistics

TCP/ARP

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

MyPLX51-PBM1 - Status	5				_ 0 ×
General General Statistics	B DPV1 Statistics Live List	Discovered Nodes Modbus S	Statistics Ethernet Clie	nts TCP / ARP	
ARP Table		TCP Table			
MAC Address	IP Address	MAC Address	Remote Port	Local Port	
18:DB:F2:10:06:0F	192.168.1.65	00:1D:9C:C4:2D:02	49697	44818	
00:1D:9C:C4:2D:02	192.168.1.129				
00.10.00.01.20.02	102.100.1120				

Figure 6.11 – PLX51-PBM Status monitoring – Ethernet TCP / ARP Statistics

## 6.2.2. DEVICE STATUS

The *Device Status* window of each PROFIBUS slave device connected to the PLX51-PBM is opened by right-clicking on the specific slave device icon in the PLX50 Configuration Utility tree, and selecting **STATUS**.

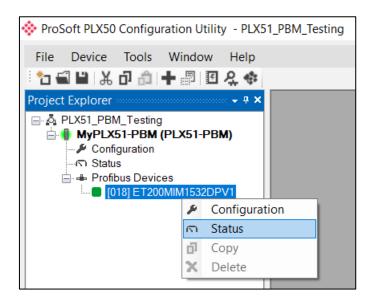


Figure 6.12 - Selecting slave status

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

### GENERAL – MASTER MODE

The General tab displays the following general parameters:

MyPLX51-PBM - 18	MyPLX51-PBM - 18 - Device Status						
General Statistics St	andard Diagnostics Extended Diagnostics						
Device Details		Device Status					
Node Address	18	Online					
Instance Name	ET200MIM1532DPV1	Data Exchange Active					
Vendor	SIEMENS	Enabled (PLC)					
Model	ET 200M (IM153-2) DPV1, H, 12IO	Ident Mismatch					
Identity	0x0801E	StationID Mismatch (PLC)					
Revision	5	CRC Mismatch (PLC)					
		Error					
		Alarm Pending					
		Diagnostics Pending					

Figure 6.13 – Device Status monitoring - General

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	entity The device PNO identity.	
Revision The device revision.		
Device Status	The current status of the device:	
	Online         The slave device is online.         Data Exchange Active         The slave device is exchanging DPV0 process data with the PLX51-PBM.         Disabled (PLC)         The slave device has been disabled from DPV0 data exchange from the Logix controller using the PLX51-PBM output assembly.	

Identity Mismatch
The device configured in the PLX50 Configuration Utility and the device online at the specific station address do not match.
StationID Mismatch (PLC)
The station address entered from the Logix controller using the PLX51-PBM output assembly does not match the station address of the configured slave device.
CRC Mismatch (PLC)
Indicates the mapping from the Logix controller does not match the configured mapping.
Error
Device Error flag.
Alarm Pending
An alarm is pending in the specific slave device.
Diagnostics Pending
There is new diagnostics pending in the slave device.

Table 6.6 - Device Status Monitoring – General Tab

## STATISTICS

The *Statistics* tab displays the following general parameters:

Statistics Standard Diagnostics External	nded Diagnostics			
fibus Statistics				
Counter	Value	Counter	Value	Clear
Tx Packet Count	60,103	DPV1 Class 2 Write Tx Count	0	
Rx Packet Count	60,102	DPV1 Class 2 Write Rx Count	0	
Checksum Failed Packet Count	0	DPV1 Class 2 Write Err Count	0	
No Reply Count	0	Set Slave Addr Tx Count	0	
DPV1 Class 1 Read Tx Count	0	Set Slave Addr Rx Count	0	
DPV1 Class 1 Read Rx Count	0	Set Slave Addr Err Count	0	
DPV1 Class 1 Read Err Count	0	Global Ctrl Tx Count	0	
DPV1 Class 1 Write Tx Count	0	Global Ctrl Rx Count	0	
DPV1 Class 1 Write Rx Count	0	Unexpected Packet Received	0	
DPV1 Class 1 Write Err Count	0	Invalid Response Length Count	0	
DPV1 Class 2 Init Tx Count	0	FDL Fault Count	0	
DPV1 Class 2 Init Rx Count	0	Extract Alarm Success Count	0	
DPV1 Class 2 Init Err Count	0	Extract Alarm Fail Count	0	
DPV1 Class 2 Abort Tx Count	0	Init Parameter Set Success Count	0	
DPV1 Class 2 Abort Rx Count	0	Init Parameter Set Fail Count	0	
DPV1 Class 2 Read Tx Count	0	Device Reconfigure Count	1	
DPV1 Class 2 Read Rx Count	0	Device Reparameterize Count	1	
DPV1 Class 2 Read Err Count	0	Ext Diag Overflow Count	0	

Figure 6.14 – Device Status monitoring - Statistics

Parameter	Description
Tx Packet Count	The number of PROFIBUS packets transmitted.
Rx Packet Count	The number of PROFIBUS packets received.
Checksum Failed Packet Count	The number of PROFIBUS packets that had a failed checksum.
No Reply Count	The number of PROFIBUS requests from the PLX51-PBM where the station did not respond.
DPV1 Class 1 Read Tx Count	The number of PROFIBUS DPV1 Class 1 Read requests sent from the PLX51-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 PLX51-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 PLX51-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 PLX51-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 PLX51-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 PLX51-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 PLX51-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 PLX51- PBM to the specific device.
Global Ctrl Rx Count	The number of PROFIBUS Global Control requests received by the PLX51- 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 <b>not</b> 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 DPVO 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.

Table 6.7 - Device Status Monitoring – Statistics Tab

#### STANDARD DIAGNOSTICS

The *Standard Diagnostics* tab displays the following general parameters:

PLX51-PBM - 18 - Device Stat	us				
eral Statistics Standard Diagno	ostics Extended Diagnostics				
Device Status					
	Enumerated				
Class1 Node 1	Not Existent	Invalid Slave Response	Watchdog Active		
Ident 0x0801	E Not Ready	Parameter Fault	Freeze Received		
Slave Rx Length 0	Configuration Fault	Other Master	Sync Received		
Slave Tx Length 4	Ext. Diagnostics Available	Parameter Request	Diagnostic Deactivated		
	Function Not Supported	Static Diagnostic	Diagnostic Overflow		
Raw Diagnostics Data					
43 00 00 08 82 00 00 00	00 00 00				
Set Paramater Response	Set Paramater Response E5 - ACK Acknowledge				
Set Config Response	E5 - ACK Acknowledge				

Figure 6.15 – Device Status monitoring – Standard Diagnostics

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 <i>PROFIBUS Specification EN 50170</i> for information regarding the diagnostics.
Raw Diagnostics Data	The raw diagnostics in a hexadecimal data string.
Set Parameter Response	The last response from the specific field device to the last set parameter telegram.
Set Config Response	The last response from the specific field device to the last check config telegram.

Table 6.8 - Device Status Monitoring – Standard Diagnostics Tab

## EXTENDED DIAGNOSTICS

The *Extended Diagnostics* are decoded and displayed in a table form. The diagnostics are decoded using the pre-configured GSD file.

PLX51-PBM - 18 - Device Status						
eral Statistics Standard Diagnostics Extended Diagnostics						
Extended Diagnostics						
Туре	Slot	Address	Description			
PA	1	16	Error appears			
PA	1	25	Hardware failure mechanics			
PA	1	29	Measurement failure			
PA	1	37	Maintenance required			
PA	1	55	Extension Available			
PA	1	71	Initialization active			

Figure 6.16 – Device Status monitoring – Extended Diagnostics

# 6.3. PROFIBUS PACKET CAPTURE

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

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

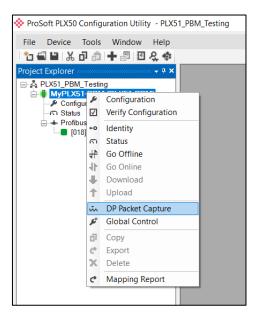


Figure 6.17 - Selecting PROFIBUS Packet Capture

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

								- • ×				
			0.	01.1	0	<b>D</b> .		D	0.015	D 104D		
	dex 🔺	Time	Dirn.	Status	Src	Dest	Function	Details	Src SAP	Dest SAP	PDU	Data
	Pr	ess STOP to v	iew resu	lts.								
Captur	ring	Packets : 936										

Figure 6.18 - PROFIBUS packet capture



**NOTE**: The module captures packets until you press the **STOP** button or when 10,000 DP packets have been reached.

**3** When the capture process is stopped, the PROFIBUS capture is presented as shown below.

<   • 0											
Index 🔺	Time	Dirn.	Status	Src	Dest	Function	Details	Src SAP	Dest SAP	PDU	Data
96	0.505445	Тx	Ok	1	73	Request	Request FDL St	-	-		10 49 01 49 93
97	0.507238	Тх	Ok	1	1	Token	-	-	-		DC 01 01
98	0.508246	Tx	Ok	1	1	Token	-	-	-		DC 01 01
99	0.509256	Тх	Ok	1	18	Request	SRD - Priority	-	-	7F 00 00 00	68 07 07 68 12 .
100	0.511083	Rx	Ok	-	-	ACK	Acknowledge	-	-		E5
101	0.511492	Тх	Ok	1	1	Token	-	-	-		DC 01 01
102	0.512496	Тx	Ok	1	1	Token	-	-	-		DC 01 01
103	0.513505	Тx	Ok	1	1	Token	-	-	-		DC 01 01
104	0.514513	Tx	Ok	1	1	Token	-	-	-		DC 01 01
105	0.515522	Тх	Ok	1	1	Token	-	-	-		DC 01 01
106	0.516530	Тx	Ok	1	1	Token	-	-	-		DC 01 01
107	0.517538	Тх	Ok	1	1	Token	-	-	-		DC 01 01
108	0.518546	Тx	Ok	1	1	Token	-	-	-		DC 01 01
109	0.519554	Тx	Ok	1	74	Request	Request FDL St	-	-		10 4A 01 49 94
110	0.521346	Тх	Ok	1	1	Token	-	-	-		DC 01 01
111	0.522355	Тх	Ok	1	1	Token	-	-	-		DC 01 01
112	0.523363	Тх	Ok	1	1	Token	-	-	-		DC 01 01
113	0.524372	Tx	Ok	1	1	Token	-	-	-		DC 01 01

Figure 6.19 - PROFIBUS Packet Capture complete

The captured PROFIBUS packets are tabulated as follows:

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

Table 6.9 - PROFIBUS Packet Capture fields

- **4** The packet capture can be saved to a file for further analysis by selecting the **SAVE** button on the toolbar.
- **5** Previously saved PROFIBUS Packet Capture files can be viewed by selecting the **PROFIBUS PACKET CAPTURE VIEWER** option in the *Tools* menu.

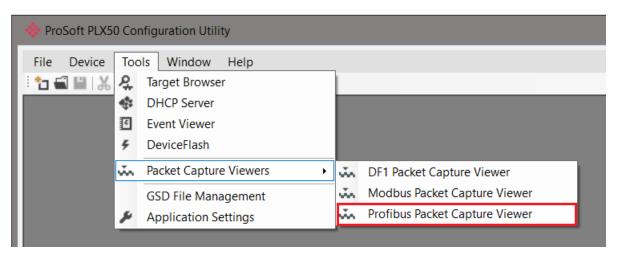


Figure 6.20 - Selecting the PROFIBUS Packet Capture Viewer

# 6.4. MODULE EVENT LOG

The PLX51-PBM logs various diagnostic records to an internal event log. These logs are stored in non-volatile memory and can be displayed using the PLX50 Configuration Utility or via the web interface.

**1** To view them in the PLX50 Configuration Utility, double-click on the **EVENT VIEWER** option in the Project Explorer tree.

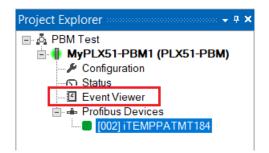


Figure 6.21. - Selecting the module Event Log

**2** The Event Log window opens and automatically reads all of the events from the module. The log entries are displayed with the latest record at the top. Custom sorting is achieved by double-clicking on the column headings.

Upload	led 8 records.		Filter (All)	~
Index .	Time	Up Time	Event	
7	2018/11/23 06:39:13.80	0 0d - 00:03:49	Application Config Valid	
6	2018/11/23 06:38:33.1	0 0d - 00:03:09	Fallback to Master Not Ready To	
5	2018/11/23 06:38:30.1	0 0d - 00:03:06	FB Operation Mode set to OPERATE	
4	2018/11/23 06:38:22.8	0 0d - 00:02:58	FB Operation Mode set to OFFLINE	
3	2018/11/23 06:38:12.40	0 0d - 00:02:48	Fallback to Master Not Ready To	
2	2018/11/23 06:38:09.46	0 0d - 00:02:45	FB Operation Mode set to OPERATE	
1	2018/11/23 06:37:52.69	0 0d - 00:02:28	FB Operation Mode set to OFFLINE	
0	2018/11/23 06:36:01.82	0 0d - 00:00:37	Log reset	

Figure 6.22. – Module Event Log

- **3** The log can also be stored to a file for future analysis, by selecting the **SAVE** button in the toolbar.
- 4 To view previously saved files, use the *Event Log Viewer* option under the *Tools* menu.

# 6.5. WEB SERVER

The PLX51-PBM provides a web server for diagnostics. This allows for connectivity to the module without the use of the PLX50 Configuration Utility or Logix.



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

Module: PLX51-Pl	BM Serial: 352DBB41 Firmwa	re Rev: 1.1	ProSof
Overview	Device Name	PLX51-PBM	
Ethernet	Serial number	352DBB41	
Event Logs	Firmware Revision	1.1	
Diagnostics	Vendor Id	309	
Application	Product Type	12	
Application	Product Code	5228	
	Uptime	2h 15m 54s	
	Date	1970/01/01	
	Time	02:15:56	
	Temperature	62.6223°C	
	Hardware MAC	00:60:35:2D:BB:41	
	System MAC	00:60:35:2D:BB:41	
		0.0.0.0	

Figure 6.23 - Web interface

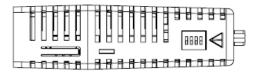


**NOTE:** The PLX51-PBM parameters and diagnostics in the web server will match those in the PLX50 Configuration Utility status.

# 7. TECHNICAL SPECIFICATIONS

# 7.1. DIMENSIONS

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



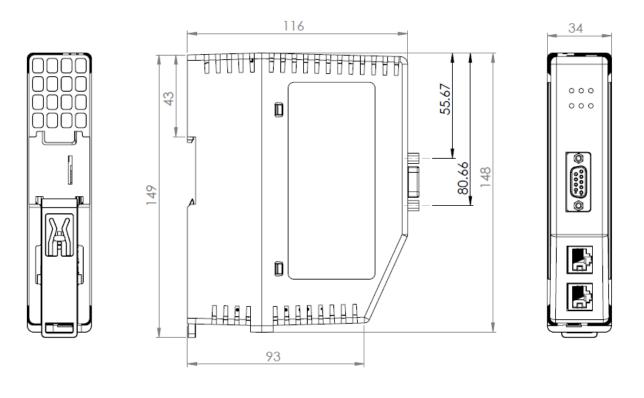




Figure 7.1 – PLX51-PBM enclosure dimensions

# 7.2. ELECTRICAL

Specification	Rating
Power requirements	Input: 10 to 36V DC
Power consumption	Maximum: 85mA @ 24V => 2.04W
Connector	3-way terminal
Conductors	24 to 18 AWG
Enclosure rating	IP20, NEMA/UL Open Type
Temperature	-20 to 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

Table 7.1 - Electrical specification

# 7.3. ETHERNET

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

Table 7.2 - Ethernet specification

## 7.4. PROFIBUS DP

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

Table 7.3 – PROFIBUS DP specification

# 7.5. AGENCY APPROVALS AND CERTIFICATIONS

Please visit our website: <u>www.prosoft-technology.com</u>

# 8. PROFIBUS DP

## 8.1. 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.

#### 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.

	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

Table 9.1 – PROFIBUS Protocol (OSI model)

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,
  - o station, module and channel-specific diagnostics
- DP-V1 contains enhancements geared towards process automation, in particular:
  - o acyclic data communication for parameter assignment
  - $\circ \quad \text{alarm handling} \quad$
- DP-V2 for isochronous mode and data exchange broadcast (slave-to-slave communication)

#### **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.

#### **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.

## 8.2. 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**'.

# 8.3. PROFIBUS MASTER CLASS 1 (DPM1) OR CLASS 2 (DPM2)

#### 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.

#### 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.

## 8.4. 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.

# 8.5. 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.

## 8.6. 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.

# 8.7. PROFIBUS DP CABLE DESCRIPTION

Parameter	Туре А
Surge Impedance	135165Ω
	(3 to 20 MHz)
Capacity	< 30 pF/m
Loop Resistance	< 110 Ω/km
Wire gauge	> 0.64 mm
Conductor area	> 0.34 mm <sup>2</sup>

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

Table 9.2 – PROFIBUS DP network cable

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.

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

Table 9.3 – PROFIBUS DP cable length

### 8.8. PROFIBUS DP CONNECTOR DESCRIPTION

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

Table 9.4 – PROFIBUS DP connector

# 9. APPENDIX

# 9.1. DPV1 RESPONSE STATUS (MASTER ONLY)

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

Table 9.1 – DP Status Response codes

# 9.2. DPV1 EXTENDED STATUS CODES (MASTER ONLY) – FDL ERROR

DP Status – Byte 0	Description
0h	ОК
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

Table 9.2 – DP Extended Status Response codes (FDL Error)



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

# 9.3. DPV1 EXTENDED STATUS CODES (MASTER ONLY) – DPV1 ERROR

#### 9.3.1. DPV1 READ/WRITE ERROR

#### DPV1 EXTENDED STATUS - BYTE 1

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

Table 9.3 – DP Extended Status Response codes (DPV1 Error) – Byte 1

#### DPV1 EXTENDED STATUS - BYTE 2

Bit 4 to 7 Value	Bit 0 to 3 Value	Description
0 to 9	-	Reserved
10	-	Application
	0	Read Error
	1	Write Error
	2	Module Failure
	3 to 7	Reserved
	8	Version Conflict
	9	Feature not supported
	10 to 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 to 15	User specific
12	-	Resource
	0	Read constrain conflict
	1	Write constrain conflict
	2	Resource busy
	3	Resource unavailable
	4 to 7	Reserved
	8 to 15	User specific
13 to 15	-	User specific

Table 9.4 – DP Extended Status Response codes (DPV1 Error) – Byte 2



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

#### 9.3.2. DPV1 Abort

#### DPV1 EXTENDED STATUS - BYTE 1 - SUBNET

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

Table 9.5 – DP Extended Status Response codes (DPV1 Error) – Byte 1 – Subnet

#### DPV1 EXTENDED STATUS - BYTE 2 – INSTANCE/REASON

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

Table 9.6 – DP Extended Status Response codes (DPV1 Error) – Byte 2 – Instance/Reason

# 10. SUPPORT, SERVICE & WARRANTY

# 10.1. 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:

- **1** Product Version Number
- 2 System architecture
- 3 Network details

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

- 1 Module configuration and associated ladder files, if any.
- 2 Module operation and any unusual behavior
- 3 Configuration/Debug status information
- 4 LED patterns
- **5** Details about the serial, Ethernet or Fieldbus devices interfaced to the module, if any.

**Note:** For technical support calls within the United States, ProSoft's 24/7 after-hours phone support is available for urgent plant-down issues. Detailed contact information for all our worldwide locations is available on the following page.

Asia Pacific	Europe / Middle East / Africa	
Regional Office	Regional Office	
Phone: +60.3.2247.1898	Phone: +33.(0)5.34.36.87.20	
asiapc@prosoft-technology.com	europe@prosoft-technology.com	
Languages spoken: Bahasa, Chinese, English, Japanese,	Languages spoken: French, English	
Korean	REGIONAL TECH SUPPORT	
REGIONAL TECH SUPPORT	support.emea@prosoft-technology.com	
support.ap@prosoft-technology.com	Middle East & Africa	
North Asia (China, Hong Kong)	Phone: +971.4.214.6911	
Phone: +86.21.5187.7337	mea@prosoft-technology.com	
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Languages spoken: Chinese, English	REGIONAL TECH SUPPORT	
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# 10.2. 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: <u>www.prosoft-technology.com/legal</u>

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