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PLX51-DL-232

Data Logger Data Storage Module

June 22, 2022

USER MANUAL

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PLX51-DL-232 User Manual For Public Use.

June 22, 2022

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1 Preface

1.1 Introduction to the Data Logger

This manual describes the installation, configuration, operation, and diagnostics of the PLX51-DL-232. The PLX51-DL-232 can read and store data from Logix Controllers, DF1 Serial Interfaces, or Modbus devices. The PLX51-DL-232 has the capacity to store over 16 million records in its solid-state non-volatile memory. Each stored record includes a Date Time stamp with a 50 ms resolution, Tag Name, Data Type, and Value.

The PLX51-DL-232 can be used to log data at a remote site with limited communication with its base. The PLX51-DL-232 is also used to store records on mobile equipment such as trucks, drilling rigs, or snow plows. Once the equipment returns back to its base, the historical data can be uploaded and transferred to a more permanent storage device. The PLX51-DL-232 can also be configured to collect data which is only downloaded and examined if a fault occurs, otherwise the data is overwritten.

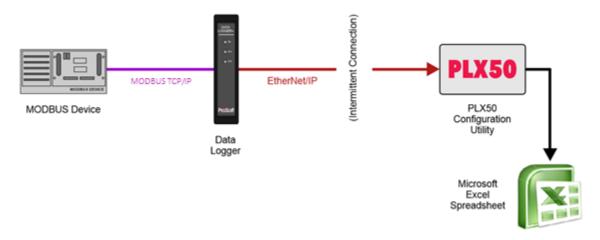


Figure 1.1. – Non-Historian Option

1.2 Features

The PLX51-DL-232 provides temporary extensive on-board storage capability for storing process tags. A total of 16,777,216 records can be stored in its non-volatile memory.

Each record consists of the following data:

Parameter	Link
Data Tima	UTC Time includes: Year, Month, Day, Hour, Minute, Second, Milliseconds.
Date Time	Time has a resolution of 50 milliseconds.
Tag Name	As defined in Controller or in the PLX50 Configuration Utility for other sources
Data Type	BOOL, SINT, INT, DINT, or REAL
Value	Logix Tag / DF1 File / Modbus Register value

Table 1.1. – Components of a Record

The Log Index is managed by the PLX51-DL-232 and incremented each time a new record is stored. The Unload Index is managed externally by the unload service. It is only incremented after a record has been logged successfully to a text file. The records can be unloaded in Logix with the Example Code. Both the Log Index and Unload Indices loop around, eventually reaching the end of the cache. The cache becomes 100% full when the Log Index loops around and equals the Unload Index. In this situation, either older records are overwritten (Log Mode = Overwrite) or newer records are not logged (Log Mode = Hold).

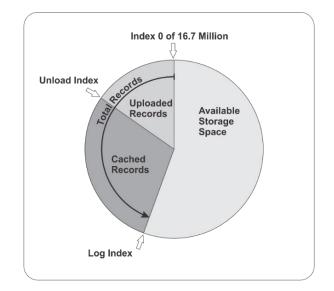


Figure 1.2. - Memory Schematic

The PLX51-DL-232 is configured using the ProSoft PLX50 Configuration Utility. This program can be downloaded from <u>www.prosoft-technology.com</u>, free of charge. The PLX50 Configuration Utility offers various configuration methods, including a controller tag browser. The PLX50 Configuration Utility can also be used to monitor the status and download historical data to a local file.

The PLX51-DL-232 can operate in both a Logix "owned" and standalone mode. With a Logix connection, the input and output assemblies provide additional diagnostics information. This information is available in the Logix controller environment.

The PLX51-DL-232 uses isolated RS232 for DF1 communication. The RS232 port also uses a terminal block for convenient installation.

A built-in webserver provides detailed diagnostics of system configuration and operation.

1.3 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
User Manual	
Datasheet	www.prosoft-technology.com
Example Code & UDTs	
Ethernet wiring standard	www.cisco.com/c/en/us/td/docs/video/cds/cde/cde205_220_420/installation/guid e/cde205_220_420_hig/Connectors.html
CIP Routing	The CIP Networks Library, Volume 1, Appendix C:Data Management

Table 1.2 Additional Inform	nation
-----------------------------	--------

2 Installation

2.1 Module Layout

The PLX51-DL-232 has three ports at the bottom of the enclosure, as shown in the figure below. The ports are used for Ethernet, RS232 serial, and power.

The DC power port uses a three-way connector (+ positive, - negative, and Earth).

The RS232 port uses a four-way connector (**Tx** Transmit, **Rx** Receive, **Gnd** Ground, and **Shield** earth connection).

The Ethernet cable must be wired according to industry standards which can be found in the additional information section of this document.

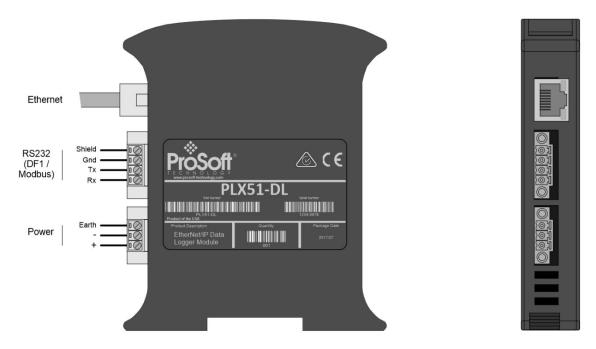


Figure 2.1. – Data Logger side and bottom view

The PLX51-DL-232 provides three diagnostic LEDs (**Ok**, **Act**, and **Eth**). These LEDs provide information on system operation, the Ethernet interface, and the auxiliary communication interface (RS232).



Figure 2.2. – Module front and top view

The PLX51-DL-232 has four DIP switches at the top of the enclosure as shown above.

DIP Switch	Description
DIP 1	Used to force the PLX51-DL-232 into "Safe Mode". When in "Safe Mode", the PLX51-DL-232 does not load the application firmware. It waits for new firmware to be downloaded. This should only be used when a firmware update was interrupted at a critical stage.
DIP 2	Used to force the PLX51-DL-232 into DHCP mode, useful when the user has forgotten the IP address of the PLX51-DL-232.
DIP 3	Reserved
DIP 4	Reserved

2.2 Module Mounting

The PLX51-DL-232 provides a DIN rail clip to mount onto a 35mm DIN rail.

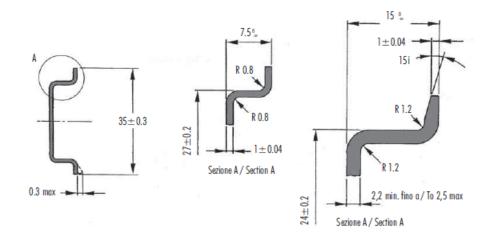


Figure 2.3. - DIN rail specification

The DIN rail clip is mounted on the bottom of the PLX51-DL-232. Use a flat screw driver to pull the clip downward. Once the PLX51-DL-232 is mounted onto the DIN rail, the clip must be pushed upward to lock the PLX51-DL-232 in place.

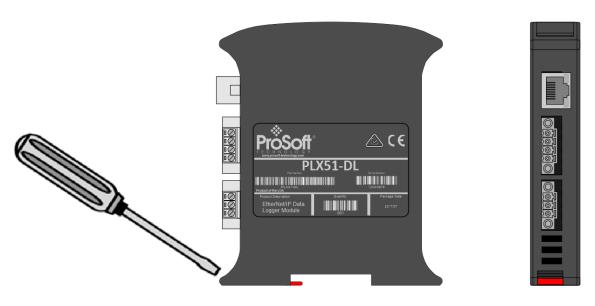


Figure 2.4. - DIN rail mouting

2.3 Power

A three-way power connector is used to connect + positive, - negative, and Earth. The PLX51-DL-232 requires an input voltage of 10 to 28 Vdc.

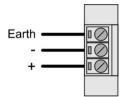


Figure 2.5. - Power connector

2.4 RS232 Port

The RS232 connector is used to connect the Transmit (Tx), Receive (Rx), and Ground conductors for serial communication. The shield terminal can be used for shielded cable in high noise environments.

Important: The shield of the RS232 port is internally connected to the power connector earth. Thus, when using a shield it is important to connect the Earth terminal on the power connector to a clean earth. Failing to do this can lower the signal quality of the RS232 communication.

Important: When using a shielded cable, it is important that only one end of the shield is connected to earth to avoid current loops. It is recommended to connect the shield to the PLX51-DL-232, and not to the other Serial device.

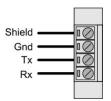


Figure 2.6. - RS232 connector

2.5 Ethernet Port

The Ethernet connector should be wired according to industry standards. Refer to the additional information section in this document for further details.

3 Setup

3.1 Install Configuration Software

The PLX51-DL-232 is configured using the PLX50 Configuration Utility environment. This software can be downloaded from <u>www.prosoft-technology.com</u>.



Figure 3.1. - PLX50 Configuration Utility Environment

3.2 Network Parameters

3.2.1 DHCP Server Settings

By default, the PLX51-DL-232 has DHCP (Dynamic Host Configuration Protocol) enabled. Thus, a DHCP server must be used to provide the PLX51-DL-232 with the required network parameters (IP address, subnet mask, etc.). There are a number of DHCP utilities available. However, it is recommended to use the DHCP server in the PLX50 Configuration Utility.

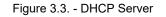
1 Within the PLX50 Configuration Utility, click on **TOOLS > DHCP SERVER**.

ProSoft PLX50) Con	figuration Utility
File Device	Tool	s Window Help
📩 🗐 🗐 🕺	ዲ	Target Browser
	\$. 1	DHCP Server
	4	Event Viewer
	4	DeviceFlash
	ŭ.	Packet Capture Viewers
		Add GSD File
		Rebuild GSD Catalog
	۶	Application Settings

Figure 3.2. - Selecting DHCP Server

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

00:0D:8D:F0:D7:02 - 2 2 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.

3 To assign an IP address, click on the corresponding **Assign** button. The *Assign IP Address* dialog box opens.

💸 Assign IP Addre	ss for MAC : 00:0D:8[D:F0:D7:02 —	
IP Address		Recent	
192 _ 168	. 1 . 170	192.168.1.173 192.168.1.172	
🗹 Enable St	atic (Disable DHCP)		
	Ok	Cancel	

Figure 3.4. - Assigning IP Address

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

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

- 4 Click **OK** when complete.
- 5 Once the Assign IP Address dialog box has been accepted, the DHCP server automatically assigns the IP address to the PLX51-DL-232 and reads the *Identity Object Product* name from the device. The device indicates a green background upon successful assignment of the IP address.

DHCP Server							
MAC Address	Vendor	Requests	Elapsed	Assigned IP	Assign	Status	Identity
0:0D:8D:F0:D7:02	-	18	2	192.168.1.170	Assign	Set Static	Data Logger

Figure 3.5. - Successful IP address assignment

It is possible to force the PLX51-DL-232 into DHCP mode by powering up the device with DIP switch 2 in the **On** position. A new IP address can then be assigned by repeating the previous steps.

Important: It is important to return DIP switch 2 back to Off position, to avoid the PLX51-DL-232 returning to a DHCP mode after the power is cycled again.

In addition to the setting the IP address, other network parameters can be set during the DHCP process. These settings can be viewed and edited by clicking on **TOOLS** > **APPLICATION SETTINGS**.

3.2.2 Network Settings

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

1 Click on Tools > Target Browser

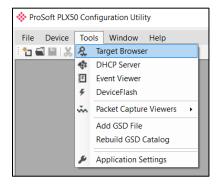


Figure 3.6. - Selecting the Target Browser

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



Figure 3.7. - Target Browser

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

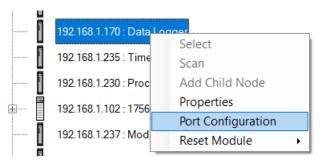


Figure 3.8. - Selecting Port Configuration

4 All relevant Ethernet port configuration parameters can be modified using the *Port Configuration* dialog box.

🔅 Ethernet Port Configura	ation	- 🗆 X
Port Configuration Interfac	e Statistics Media Statistics	
Network Configuration T	Method DHCP v	Speed / Duplex Configuration Auto-negotiate Manual
Static Configuration		Manual Configuration
IP Address	192 . 168 . 1 . 170	Port Speed 100 V
Subnet Mask	255 _ 255 _ 255 _ 0	Duplex Full Duplex
Default Gateway	0.0.0.0	
Primary NS	0_0_0_0	General
Secondary NS Domain Name	0.0.0.0	MAC Address 00:0D:8D:F0:D7:02
Host Name		Refresh
	Ok	ancel

Figure 3.9. - Port Configuration

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

3.3 Creating a New Project

Before you configure the PLX51-DL-232, a new PLX50 Configuration Utility project must be created.

1 Click on **File > New**.

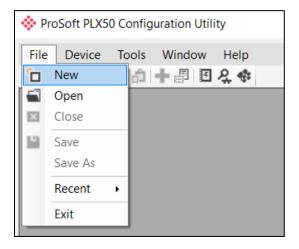


Figure 3.10. - Creating a new project

- **2** A new project is created and displayed in the Project Explorer tree view.
- **3** Add a new device by clicking on **DEVICE > ADD**.

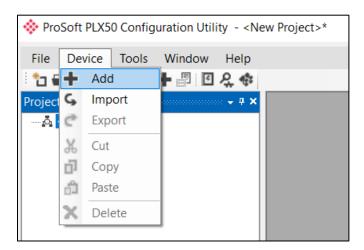


Figure 3.11 - Adding a new device

4 In the *Add New Device* dialog box, select the PLX51-DL-232 and click the **Ok** button.

Add Ne Select Dev	ісе Туре	X
Image	Device Name 🔺	Description
1	Data Logger	Data Logger Module
	DF1 Messenger	DF1 Messenger Communication Module
	DF1 Router	DF1 to Logix Communication Module
		Ok Cancel

Figure 3.12 – Selecting a new PLX51-DL-232

5 The device appears in the Project Explorer tree, and its configuration window is opened. The device configuration window can also be opened by double-clicking the PLX51-DL-232 icon in the Project Explorer tree, or right-clicking the PLX51-DL-232 icon and selecting *Configuration*.

💠 Data Logger - Conf	figuration	- • ×
General Serial Logi	jix Source DF1 Source (Disabled) Modbus Source (Disabled)	
Instance Name	Data Logger	
Description		
IP Address	0.0.0.0 Major Revision 1 v	
Data Source	Logix ~	
Logging Mode	Overwrite ~	
	Ok Apply Cancel	

Figure 3.13 – PLX51-DL-232 configuration

3.4 Configuring the PLX51-DL-232

The PLX51-DL-232 is configured by the PLX50 Configuration Utility. The configuration consists of a general configuration, serial configuration for DF1 or Modbus RTU, data source configuration, and tag selections. The PLX51-DL-232 configuration is saved in non-volatile memory that persists when the PLX51-DL-232 is powered down.

Important: When a firmware upgrade is performed, the PLX51-DL-232 will clear all configuration and cached records.

3.4.1 General Tab

The general configuration is shown in the figure below. The general configuration window is opened by either double-clicking on the PLX51-DL-232 icon in the tree, or right-clicking the PLX51-DL-232 icon and selecting *Configuration*.

💠 Data Logger - Conf	ïguration	- • ×
General Serial Logi	x Source (Disabled) Modbus Source (Disabled)	
Instance Name	Data Logger	
Description		
IP Address	192 . 168 . 1 . 170 Major Revision 1 ~	
	Logix ~	
Data Source	Luğıx v	
Logging Mode	Overwrite ~	
	Ok Apply Cancel	

Figure 3.14 - General Configuration (Data Logger)

The general configuration consists of the following parameters:

Parameter	Description
Instance Name	This parameter is a user defined name to identify between various PLX51-DL-232's.
Description	This parameter is used to provide a more detailed description of the PLX51-DL-232.
Major Revision	The major revision of the PLX51-DL-232.
IP Address	The PLX51-DL-232's IP address used by the PLX50 Configuration Utility to communicate with the PLX51-DL-232.
Data Source	This parameter selects the source of the data.
	Logix – Rockwell Automation ControlLogix or Compact Logix controller
	DF1 – Serial DF1

Parameter	Description	
	ModbusRTU – Serial Modbus	
	ModbusTCP – Modbus over Ethernet	
Logging Mode	This parameter determines if records are overwritten once the memory is filled.	
	Overwrite = Old records are overwritten, giving priority to newer data.	
	Hold = Old records are preserved while new records are not stored.	

3.4.2 Serial Tab

The *Serial* tab is shown in the figure below. The Serial configuration is opened by either double-clicking on the PLX51-DL-232 icon in the tree, or right-clicking the PLX51-DL-232 icon and selecting *Configuration*. Select the *Serial* tab.

Data Logger - Configuration			×
General Serial Logix Source DF	1 Source (Disabled) Modbus	Source (Disabled)	
	1200 ~ None ~	Retry Limit 3 [0-10] Timeout 20 [2-60] (x 50 ms)	
		Reply Msg Wait 2 [2-60] (x 50 ms)	
DF1			
Protocol	Full Duplex ~	Node Address 0 ~	
Error Detection	BCC ~	Enable Duplicate Detection	
Embedded Responses	Auto ~		
		Ok Apply Cancel	

Figure 3.15 - Serial configuration

The Serial configuration (*Serial* tab) consists of general Serial and DF1-specific parameters. For Modbus RTU, only the *Baud Rate* and *Parity* need be configured.

Parameter	Description
Baud Rate	This configures the speed of the data that is sent across the RS232 serial network. The PLX51-DL-232 provides the following speeds: 1200, 2400, 4800, 9600, 19200, 38400, 57600, and 115200
Parity	This configures the parity of the RS232 serial port. The PLX51-DL-232 allows for Even, Odd, or None.
Protocol	This configures the PLX51-DL-232 to operate in full duplex or half duplex mode on the DF1 network.
Error Detection	The PLX51-DL-232 can be configured to perform either BCC or CRC checksum validation on incoming and outgoing packets. CRC checksums is a much stronger validation method, but is more processor-intensive to perform.
Embedded Response	This configures the PLX51-DL-232 to add the acknowledge responses in the data payload. It can be configured to be Auto Detect or On.

Table 3.2 - Serial ModbusRTU and DF1 configuration parameters

Parameter	Description
	This function is only available in Full Duplex mode.
Node Address	The node address is the local node address of the PLX51-DL-232.
Retry Limit	This determines how many times the PLX51-DL-232 must retry and message exchange before failing it.
Timeout	This determines the interval between retries for a failed message exchange.
Reply Msg Wait	This is the minimum delay before the DF1 reply is transmitted to the DF1 device.
Duplicate Detection	This configures the PLX51-DL-232 to check for duplicate packets and flagging them.

3.5 Data Source Configuration

The Data Source tabs determine the PLX51-DL-232 communication mode used to acquire data. The Data Source options include:

- Logix Source ControlLogix and Compact Logix controllers
- *DF1 Source* For collecting data over DF1 Serial communications
- Modbus Source for ModbusRTU (Serial) and ModbusTCP (Ethernet) communications

Once the data source is selected, each tab allows the configuration of up to three source devices and a total of 200 tags.

Tags can be logged as a result of their individual log criteria **or** via a group trigger. There are eight trigger groups (A thru H), and a tag can be a member of any trigger group. Groups are in turn triggered by one or more tags. The triggering of a group ensures all its member's values are logged at the same instance.

3.5.1 Group and Tag Triggers

Three parameters determine when a tag is triggered:

- Delta Y (Δ y) A change in the value of the tag by this amount or more, AND
- Min ΔT The minimum time in seconds between each consecutive trigger, OR
- Max ΔT The maximum time between each consecutive trigger. Setting the Max ΔT to '**0**' disables the "heartbeat" and allows you to log on trigger.

The first two parameters work together to ensure tags are not logged too frequently, and the Max ΔT is set at a minimum logging frequency.

	Target Name		Target Tag	Group Trigger	Group Member	Data Type		Digital Set	∆у	Min ∆T	Max ∆T
Þ	Truck6	-	OutputRate			SINT	•	-	1	10	300
	Truck6	•	TankLevel			INT	-	-	10	60	300
	Truck6	-	Speed	A	AB	SINT	-	-	10	5	300
	Truck6	-	Direction		AB	REAL	•	-	10	30	300
	Truck6	-	Temp	В	В	REAL	•	-	3	60	300
	Truck6	•	Міх		В	SINT	-	-	1	20	300
	Truck6	-	Pressure	В	В	REAL	-	-	1	20	300
*		-					-	•			

Figure 3.16 – Group and Tag Triggers

3.5.2 Logix Source

The *Logix Source* tab is used to configure tags from Rockwell Automation Logix controllers over EtherNet/IP. The PLX51-DL-232 can read tags from up to three separate controllers. A *Target Name* must be provided. This acts as a reference to the Logix CIP path. The *Target Name* does not have to match the actual controller name set in RSLogix. The Controller's CIP Path can either be typed in or selected from a list in the *Target Browser*.

Data	a Logger - Configuratio	n										
Gene	eral Serial Logix Source	DF1 Source (Disabled) Modbus So	ource (Disabled)									
Lo	ogix Devices (max. of 3 ite	ems.)										
	Target Name		Lo	ogix Controller Path					В	rowse	Brows	e Tags
Þ	Truck6	Truck6 192.168.1.6,1,3										
•	•											
L	ogix Tag (max. of 200 iter Target Name	ms.)	Target Tag				up Grou	p Data er Type		Δу	Min ΔT	Max ΔT
-	Truck6 V DoorL	ock				ing	yer nemb	BOOL	\sim	1	1	3600
Þ									~			
1												
			Ok	Apply	Cancel							

Figure 3.17 – Logix Source Configuration Tab

6 Click the **BROWSE** button in the browse column to launch the *Target Browser*. The *Target Browser* opens and automatically scans for all available EtherNet/IP devices.

🔆 Target Browser	
*¥ Ø	Done
192.168.1.212 : DNP3 Router	^
192.168.1.232 : DNP3 Router	
192.168.1.186 : XPosition	_
192.168.1.102 : 1756-EN2TR/C 217021900	
00 : 1756-L62/B LOGIX5562	
02 : 1756-L75/B LOGIX5575	
03 : 1756-EN2TR/C 217021900	
04 : 1756-CNB/E 11.003	
05 : 1756-OW16I/A RELAY n.o. Q01	
192.168.1.171 : Data Logger Plus	
192.168.1.235 : Time Sync	~

Figure 3.18 – Target Browser Window

7 If the Ethernet/IP module is a bridge module, it can be expanded by right-clicking on the PLX51-DL-232 icon and selecting the *Scan* option.

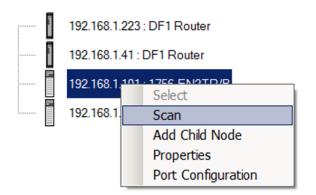


Figure 3.19 - Scanning node in the Target Browser

8 The Logix controller can be selected by clicking the **Ok** button, or by double-clicking on the controller module.

9 Once the controller references have been configured, the individual Logix tags can be added. Tags can either be entered manually or selected by using the *Tag Browser* associated with each controller.

	Target Name		Target Tag	Group Trigger	Group Member	Data Type	-	Digital Set		∆у	Min ∆T	Max ∆T
Þ	Truck6	-	DoorLock			BOOL	-	NO_YES	•	1	30	3600
	Truck6	-	RunTime			DINT	-		-	600	600	3600
	Truck6	-	Direction		A	REAL	-		-	5	30	1800
	Truck6	-	Speed	А	A	SINT	-		-	5	30	1800
*		•					-		•			

Figure 3.20 - Logix Tag configuration

Important: Tag names need to match in order for the PLX51-DL-232 to correctly identify the tag. Full tag names are needed for tags to be located in program scopes.

10 To launch the *Tag Browser*, click the **BROWSE TAGS** button associated with the controller. Tags that are were already selected and identified are highlighted in green. See Fig 3.24.

		20 Max Delta T 300			
gname	Selected	Data Type	Delta Y	Min deltaT	Max delta T
Direction		REAL			
DoorLock		BOOL			
HopperLevel		SINT			
Mix	V	SINT	1	20	300
OutputRate	V	SINT	1	20	300
Pressure	V	REAL	1	20	300
Program:MainProgram		Program			
Program:OneSecond		Program			
RunTime		DINT			
Speed		SINT			
TankLevel		INT			
Temp		REAL			

Figure 3.21 – Tag Browser Selection

11 Tags can be removed by selecting the rows in the left margin, and right-clicking to display the **DELETE** option.

Logi	x Tag (max. of 20	0 ite	ems.)
	Target Name		
	Truck6	•	DoorLock
	Truck6	•	RunTime
	Truck6	•	Direction
	Truck6	Ţ	Speed
	Delete	ļ	

Figure 3.22 – Deleting Tags

3.5.3 DF1 Source

A maximum of three DF1 Sources can be configured. The configuration of each source requires a *Device Name* (used as a reference for tag data sources), the *Device Type* (either PLC5 or SLC), and a *Node Address*.

Each DF1 Tag requires a unique *Tagname* and *Data Address*.

Device Name Device Type Node Address JoeSoap PLC5 V 4 V															
++	JoeS	oap	PLC5	~		 ~									
					1										
	,		00.7												
	ags (max. Device	of 2	00 items.)					Data	Crown	Group				Min	Max
Name Tagname				TagID	Address	Trigger	/ember	Digital Set		∆у	ΔT	ΔΤ			
J	oeSoap	\sim	TT_103_PV				PLC5001	N11:12				\sim	1	1	3600
	JoeSoap V TT_103_Status				PLC5002	N11:13				\sim	1	1	3600		
J	oeSoap	\sim	NDE_Bearing_Ten	р			PLC5003	N18:3				\sim	1	1	3600
*		\sim										\sim			

Figure 3.23 – DF1 Source configuration

3.5.4 Modbus Source

Both Modbus RTU and Modbus TCP/IP are configured using the *Modbus Source* tab. For Modbus RTU, a maximum of three Modbus sources can be configured. The configuration of each source requires a *Device Name* (used as a reference for tag data sources), the *IP Address* (Modbus TCP/IP only), and a *Node Address*.

_	Device Nam PumpHou		IP Address 192.168.4.55	Node Ad	dress												
•*	Pumphou	se	192.100.4.35	0	~												
lod	lbus Tag (max.	of 2	00 items.)														
	Device Name		Tagname		TaglD	Func		Register	Data T	ype	Group Trigger	Group /lember	Digital Set		Δу	Min ∆T	Max ∆T
	PumpHouse	\sim	Current		MB001	HReg	\sim	1	REAL	\sim	Α	Α		\sim	0.5	1	60
	PumpHouse	\sim	Voltage		MB002	HReg	\sim	2	REAL	~	Α	Α		\sim	3	1	60
	PumpHouse	\sim	PressureSwitch		MB003	HReg	\sim	3	BOOL	~				~	1	1	60
•*]~					\sim			\sim				\sim			

Fig 3.24 – Modbus Source Configuration

3.6 Module Download

Once the configuration is complete, it must be downloaded to the PLX51-DL-232.

Before downloading, the connection path of the PLX51-DL-232 should be set. This path automatically defaults to the PLX51-DL-232 IP address, as set in the PLX51-DL-232 configuration. It can be modified if the PLX51-DL-232 is not on a local network.

1 The connection path can be set by right-clicking on the PLX51-DL-232 icon and selecting the *Connection Path* option.

🚸 ProSoft PLX50 Configu	ratio	on Utility - Manual*
File Device Tools	Wi	ndow Help
1 🖬 🖬 👗 🗗 🏦	+ :	🖻 🗹 🛠 🍫
Project Explorer		
Configuration	۶	Configuration
	8	Connection Path
	41	Go Online
	Ŧ	Download
	Ť	Upload
	1	Verify Configuration
	ŋ	Сору
	¢	Export
	×	Delete

Fig 3.25 – Modbus Source Configuration

2 The new connection path can be entered manually or selected by means of the *Target Browser*.

🔅 Data Logger - Co	onnection Path		
Connection Path 192.168.1.170	Ok	Cancel	Browse

Figure 3.26 - Connection Path

3 To initiate the download, right-click on the PLX51-DL-232 icon and select *Download*.

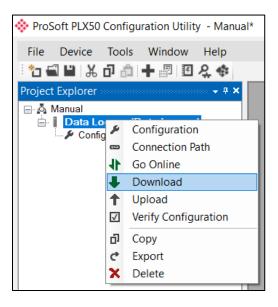


Figure 3.27 - Connection Path

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

🔅 ProSoft F	PLX50 Configuration \times
	Download Successful.
	Ok

Figure 3.28 - Successful download

5 During the download process, the PLX51-DL-232's time will be compared to that of the PC's time. Should the difference be greater than 30 seconds, you will be prompted to set the PLX51-DL-232 time to that of the PC time.

🚸 ProSoft I	PLX50 Configuration Utility	, ×
?	Module time is currently : Would you like to set the	
	Yes	Cancel

Figure 3.29 – Setting module time

6 The PLX51-DL-232 time is used only for the event log. Within the PLX50 Configuration Utility environment, the PLX51-DL-232 will be in the *Online* state, indicated by the green circle around the PLX51-DL-232 icon.

🔅 Pro	Soft PLX50	Configu	ration Utilit	y - Manua
File	Device	Tools	Window	Help
	3 1 1 %	ට බ	╋ 🖉 🖸	£.‡
Projec	t Explorer			0000 👻 🕂 🗙
	Manual Data Lo Confi Ether Statu Even Modt	guration net Port C s t Viewer Packet Ca	apture	0

Figure 3.30 - Module Online

7 The PLX51-DL-232 is now configured.

4 RSLogix 5000 Configuration

4.1 Add Module to I/O Configuration

The PLX51-DL-232 can operate in both a Logix "owned" and standalone mode. When the PLX51-DL-232 operates in a Logix "owned" mode, the PLX51-DL-232 needs to be added to the RSLogix 5000 / Studio5000 IO tree, as a generic Ethernet module.

1 Right-click on the Ethernet Bridge in RSLogix 5000 and select *New Module*. Then select *ETHERNET-MODULE* and click **Ok**.

Select Module	Description	×
- 2097-V34PR3 - 2097-V34PR5 - 2097-V34PR6 - 2364F RGU-EN1	Kinetix 300, 2A, 480V, No Filter Kinetix 300, 2A, 480V, No Filter Kinetix 300, 6A, 480V, No Filter Regen Bus Supply via 1203-EN1 10/100 Mbps Ethernet Port on DriveLogix5730 Generic Ethernet Module EtherNet/IP Panelview SoftLogix5800 EtherNet/IP Multi Drive via 22-COMM-E AC Drive via 22-COMM-E AC Drive via 22-COMM-E AC Drive via 22-COMM-E	
By Category By Vendor	Favorites OK Cancel	Add Favorite

Figure 4.1 - Add a Generic Ethernet Module in RSLogix 5000

2 Enter the IP address of the PLX51-DL-232. The *Assembly Instance* and *Size* must also be added for the input, output, and configuration in the *Connection Parameters* section. Below are the required connection parameters.

Connection Parameter	Assembly Instance	Size
Input	103	29 (32-bit)
Output	104	1 (32-bit)
Configuration	102	0 (8-bit)

Table 4.1 - RSLogix class 1 connection parameters for the Data Logger

Module Prope	erties: EtherNet_Bridge (ETHERNET-MC)DULE 1.1)			X
General Conne	ction Module Info				
Туре:	ETHERNET-MODULE Generic Ethernet M	lodule			
Vendor:	Allen-Bradley				
Parent:	EtherNet_Bridge				
Name:	DL01	Connection Paran	neters		
Description:			Assembly Instance:	Size:	
		Input:	103	29 🔶 (32	2-bit)
	~	Output:	104	1 🔹 (32	2-bit)
Comm Format:	Data - DINT 🗸 🗸	Configuration:	102	0 (8-	·bit)
Address / Ho:	st Name	conngaration.		· · · · · · · · · · · · · · · · · · ·	Siy
IP Addres	s: 192 . 168 . 1 . 231	Status Input:			
⊖ Host Nam	e:	Status Output:			
Status: Offline	OK	Cancel	Apply	Help	

Figure 4.2 - RSLogix General module properties in RSLogix 5000

3 Add the connection requested packet interval (RPI). This is the rate at which the input and output assemblies are exchanged. The recommended value is 500 ms. Refer to the technical specification section in this document for further details on the limits of the RPI.

Important: Although the PLX51-DL-232 is capable of running with an RPI of 10 ms, it is recommended to set the RPI to 500 ms to avoid unnecessary overloading of the PLX51-DL-232 processor.

General Connection Module Info	
	(1.0. 2000.0
Requested Packet Interval (RPI): 500.0 + ms	(1.0 - 3200.0 ms)
Inhibit Module	
Major Fault On Controller If Connection Fails While in R	un Mode
✓ Use Unicast Connection over EtherNet/IP	

Figure 4.3 - Connection module properties in RSLogix 5000

4 Once the PLX51-DL-232 has been added to the RSLogix 5000 IO tree, assign the User Defined Types (UDTs) to the input and output assemblies. You can import the required UDTs by right-clicking on the *User-Defined* sub-folder in the *Data Types* folder and selecting *Import Data Type*. The assemblies are then assigned to the UDTs with a ladder copy instruction (COP).

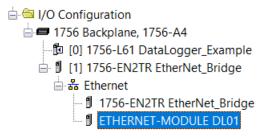


Figure 4.4 – RSLogix 5000 I/O module tree

4.2 Importing UDT's and Mapping Routines

To simplify the mapping of the input image, an RSLogix 5000 Routine Partial Import (.L5X) file is provided.

1 Right-click on the required Program and select the *Import Routine* option.

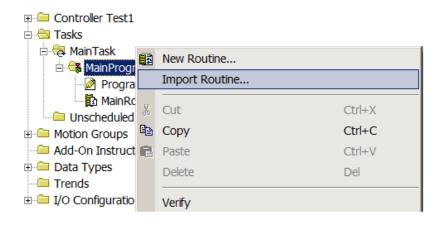


Figure 4.5 - RSLogix 5000 Importing Data Logger specific routine and UDTs

2 Select the proper .L5X file.

🗸 Import Routin	e			×
Look in:	PLX51-DL	×	🧭 🎯 🥬 🛄 🔻	
Quick access	Name	^ outineAndUDTs.L5X	Date modified 8/6/2017 5:10 PM	Type Logix Designer
Desktop Libraries				
This PC				
Network	 File name: Files of type: Files containing: Into: 	DataLoggerRoutineAndUDTs.L5X RSLogix 5000 XML Files (*.L5X) Routine MainProgram	 	> Import Cancel Help

Figure 4.6 - Selecting partial import file

The import creates the following:

- The required UDTs (user defined data types)
- Controller tags representing the Input Assembly.
- A routine mapping the PLX51-DL-232 to the aforementioned tag.

3 You may need to change the routine to map to the correct PLX51-DL-232 instance name. Make sure that the mapping routine is called by the Program's Main Routine.

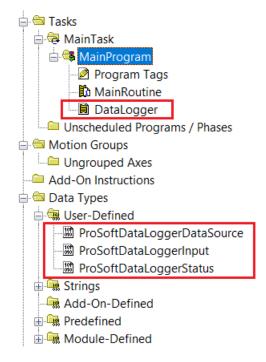


Figure 4.7 - Imported RSLogix 5000 objects

Refer to the Additional Information section of this document for an RSLogix 5000 project example, as well as the required UDTs.

4.3 RSLogix 5000 assemblies

When the PLX51-DL-232 operates in a Logix "owned" mode, the Logix controller establishes a class 1 cyclic communication connection with the PLX51-DL-232. An input assembly is exchanged at a fixed interval. The provided UDTs convert the input arrays into tag-based assemblies. Refer to the Additional Information section in this document for more information on the input UDTs. There are no Output or Configuration assemblies.

∃-DataLoggerInput	{}	{}		ProSoftDataLoggerInput
+ DataLoggerInput.Instance		{}		STRING
DataLoggerInput.Status	{}	{}		ProSoftDataLoggerStatus
 DataLoggerInput.Status.Running 	1		Decimal	BOOL
 DataLoggerInput.Status.ConfigurationValid 	0		Decimal	BOOL
 DataLoggerInput.Status.ContinuousLogging 	0		Decimal	BOOL
DataLoggerInput.Status.LoggingInhibited	0		Decimal	BOOL
DataLoggerInput.Status.LoggingStopped	0		Decimal	BOOL
DataLoggerInput.CachePercentageUsed	0.0		Float	REAL
DataLoggerInput.CacheRecordCount	0		Decimal	DINT
DataLoggerInput.TotalRecordCount	0		Decimal	DINT
DataLoggerInput.ActiveTagCount	0		Decimal	DINT
DataLoggerInput.DataSource	{}	{}		ProSoftDataLoggerDataSource
DataLoggerInput.DataSource.EtherNetIP	1		Decimal	BOOL
DataLoggerInput.DataSource.DF1	1		Decimal	BOOL
DataLoggerInput.DataSource.ModbusRTU	1		Decimal	BOOL
DataLoggerInput.DataSource.ModbusTCP	1		Decimal	BOOL
🕒 DataLoggerInput.DataSourceReadCount	0		Decimal	DINT

Figure 4.8 - Input assembly UDT structure

4.3.1 Input Assembly

The following parameters are used in the input assembly of the PLX51-DL-232.

Parameter	Datatype	Description
Instance	STRING	Instance name of the PLX51-DL-232 that was configured under the <i>General Configuration</i> tab in the PLX50 Configuration Utility.
Status.Running	BOOL	Set if the PLX51-DL-232 has a valid configuration and is reading tags.
Status.ConfigValid	BOOL	Set if a valid configuration is executing in the PLX51-DL-232.
Status.ContinuousLogging	BOOL	Set if Logging Mode is set to Overwrite, clear for Hold.
Status.ConfigurationValid	BOOL	Set if a valid configuration is executing in the PLX51-DL-232.
Status.LoggingInhibited	BOOL	Not Used.
Status.LoggingStopped	BOOL	Not Used.
CachePercentage	REAL	The number of cached records not yet uploaded, as a percentage of the total record capacity of 16,777,216.
CacheRecordCount	DINT	The number of cached records not yet uploaded.
TotalRecordCount	DINT	The total number of cached records uploaded or not.
ActiveTagCount	DINT	The number of individual tags configured to be read.
DataSource.EtherNetIP	BOOL	Set if the data source is set to Logix.
DataSource.DF1	BOOL	Set if the data source is set to DF1.

Table 4.2 - RSLogix 5000 input assembly parameters

Parameter	Datatype	Description
DataSource.ModbusRTU	BOOL	Set if the data source is set to Modbus RTU.
DataSource.ModbusTCP BOC		Set if the data source is set to Modbus TCP/IP.
DataSourceReadCount	DINT	The number of tag reads from the configured data source.

Important: The PLX51-DL-232 can poll single BOOL tags only. It cannot poll from an array of BOOL's.

5 Diagnostics

5.1 LEDs

The PLX51-DL-232 provides three LEDs for diagnostics purposes as shown below.



Figure 5.1 - Data Logger front view

Table 5.1	- Module LED operat	ion
1 4010 0.1		

LED	Description
Ok	The Ok LED provides information of the system-level operation of the PLX51-DL-232.
	If the LED is green, then the PLX51-DL-232 has booted and is running correctly.
	If the LED is red, then the PLX51-DL-232 is not operating correctly. For example, if the PLX51-DL-232 application firmware has been corrupted or there is a hardware fault, Ok LED will be red.
Act	The Act LED is used for the RS232 serial port. For every successful received DF1 or Modbus-RTU packet, the Act LED toggles green. The LED toggles red if a corrupted packet is received (eg. failed checksum).
Eth	The Eth LED illuminates when an Ethernet link is detected (by plugging in a connected Ethernet cable). The LED flashes when traffic is detected.

5.2 Module Status Monitoring

The PLX51-DL-232 provides a range of statistics that can assist with module operation, maintenance, and troubleshooting. The statistics can be accessed by the PLX50 Configuration Utility or using the PLX51-DL-232 web server.

1 To view the PLX51-DL-232's status in the PLX50 Configuration Utility, the PLX51-DL-232 must be online. If the PLX51-DL-232 is not Online (following a recent configuration download), right-click on the PLX51-DL-232 icon and select the *Go Online* option.

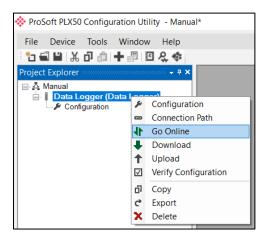


Figure 5.2 - Selecting to Go Online

2 The *Online* mode is indicated by the green circle behind the PLX51-DL-232 in the Project Explorer tree.

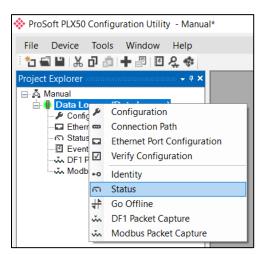


Figure 5.3 - Selecting online Status

3 The *Status* window is opened by either double-clicking on the *Status* option in the Project Explorer tree, or by right-clicking on the PLX51-DL-232 icon and selecting *Status*.

4 The *Status* window contains multiple tabs to display the current status of the PLX51-DL-232.

Data Logger - Statu	5	
General Statistics Ta	g Status Recent Records Reco	ord Management CIP Statistics Ethernet Clients TCP / ARP
Data Source	Logix	MAC Address 00:0D:8D:F0:D7:02
State	Running	Temperature 37.4 °C
Logging Mode	Overwrite	Processor Scan 10.7 us
Logging State	Enabled	Ethernet Cable Length ≈ 20 m
Owned	Owned	DIP Switches SW1 - Safe Mode Off
Up Time	0d - 00:18:45	SW2 - Force DHCP Off
Module Time	8/16/2017 5:49:11 PM	SW3 - Reserved Off
		SW4 - Reserved Off
	Set to PC Time	(Updated only on boot up.)

Figure 5.4 - Status monitoring - General

5.2.1 General Tab

The *General* tab displays the following general parameters as well as setting the PLX51-DL-232 time to the PC time:

Parameter	Description
Data Source	Logix, DF1, Modbus RTU, Modbus TCP/IP
State	This is the current state of the module.
	Running
	The module is reading tags and logging to the log.
	Stopped
	The module is idle and not reading tags or logging data.
Logging Mode	Hold or Overwrite – determines if records are overwritten when the cache is full.
Logging State	This is the current state of the logging in the module.
	Running
	Data is being read from the source and logged if the criteria is met.
	Running Rollover
	Data is being read from the source and logged if the criteria is met. In this state the event index has rolled over at least once.
	Inhibited
	The module has stopped reading and logging data, because the user has inhibited it from Logix.
	Stopped
	The module has stopped logging data, because it has reached maximum events and the module is set to not overwrite.
Owned	Indicates whether or not the PLX51-DL-232 is currently owned (Class 1) by a Logix controller.
Up Time	Indicates the elapsed time since the PLX51-DL-232 was powered up.
Module Time	Indicates the PLX51-DL-232's internal time. The PLX51-DL-232 time is stored in UTC (Universal Coordinate Time) but displayed on this page according to the local PC Time Zone settings
MAC Address	Displays the PLX51-DL-232's unique Ethernet MAC address.
Temperature	Internal temperature of the PLX51-DL-232.
Processor Scan	Amount of time (microseconds) taken by the PLX51-DL-232's processor in the last scan.
DIP Switch Position	Status of the DIP switches when the PLX51-DL-232 booted.
	Note that this status will not change if the DIP switches are altered when the PLX51- DL-232 is running.

Table 5.2 - Parameters displayed in the Status Monitoring – General Tab

5.2.2 Statistics tab

The Statistics tab displays the statistics of the record cache and data source.

neral Statistics Tag Status	Recent Records	Record Management CIP Statist	ics Ethernet Clients	CP/ARP
Cache Statistics		Logix Statistics	Clear Logix Counte	rs
Counter	Value	Counter	Value	9
Total Records	16777216	Current Connections		1
Cache Records	16764398	Connection Failures		0
Cache Percentage	99.924 %	Tag Not Exist Errors		0
Active Tags	200	Privilege Violations		0
Data Source Reads	7682	Tag Reads	1976	23
Log Index	9407982			
Unload Index	9420800			

Figure 5.5 - Status monitoring - Transactions

Table 5	5.3 – Ca	ache S	tatistics
---------	----------	--------	-----------

Statistic	Description
Total Records	The total number of cached records, uploaded or not.
Cache Records	The number of cached records not yet uploaded.
Cache Percentage	The number of cached records not yet uploaded, as a percentage of the total record capacity of 16,777,216.
Active Tags	The number of individual tags configured to be read.
Data Source Reads	The number of tag reads from the configured data source.
Log Index	The current record index being written to.
Unload Index	The upload record index. Managed by the Unload Service.

Table 5.4 – Logix statistics

Statistic	Description
Current Connections	The number of current open class 3 connections.
Connection Failures	The number of failed attempts at establishing a class 3 connection with a Logix controller.
Tag Not Exist Errors	The number of failed tag read/write transactions due to a non-existent destination tag.
Privilege Violations	The number of failed tag read/write transactions due to a privilege violation error.
	This may be caused by the <i>External Access</i> property of the Logix tag being set to either None or Read Only .
Tag Reads	The number of tag read transactions executed by the PLX51-DL-232.

5.2.3 Tag Status Tab

The *Tag Status* tab provides current values for all tags, along with their trigger settings. The following tag mapping statistics are only relevant when the PLX51-DL-232 is running in either *Reactive Tag* or *Scheduled Tag* mode.

		Recent Records Record Mana	3				
TagID	Device	Tagname	Value	Δу	Time	Min ∆T	Max ∆T
1	MBR01	Reg01	40.000	0	0.0	0.0	1.0
2	MBR01	Reg02	3.000	15	0.0	1.0	1.0
3	MBR01	Reg03	1.000	1	0.0	1.0	1.0
4	MBR01	Reg04	50.000	15	0.0	1.0	1.0
5	MBR01	Reg05	1234	15	0.0	1.0	1.0
7	MBR01	Reg06	9998	1000	0.0	1.0	1.0
8	MBR01	Reg07	0.000	100	4294	1.0	1.0
9	MBR01	Reg09	40.000	1	0.0	1.0	1.0
		.					

Figure 5.6 – Tag Status

Statistic	Description
TagID	Configured Tag ID for the specific Tag/Register/File.
Device	The configured source device where the tag is extracted.
Tagname	The Tagname configured for the specific tag.
Value	The last read value from the specific tag.
Delta Y	Configured deadband for the tag value.
Time	The time in seconds since the last data was logged.
Min Delta Time	Minimum time in seconds between consecutive data logging.
Max Delta Time	Maximum time in seconds between consecutive data logging.

5.2.4 Recent Records Tab

The *Recent Records* tab provides a list of the last records recorded with their time stamp and value.

Index	Date Time	TagID	Device	Tagname	Value
3141	3/27/2018 6:44:55 AM	3	Logix129	MyRealArr[0]	0
3142	3/27/2018 7:44:55 AM	7	Logix129	MyRealArr[5]	0
3143	3/27/2018 7:44:55 AM	1	Logix129	MyReal1	33.8
3144	3/27/2018 7:44:55 AM	2	Logix129	MyDINT1	8335108
3145	3/27/2018 7:44:55 AM	3	Logix129	MyRealArr[0]	0
3146	3/27/2018 7:44:55 AM	4	Logix129	MyRealArr[1]	0
3147	3/27/2018 7:44:55 AM	5	Logix129	MyRealArr[3]	0
3148	3/27/2018 7:44:55 AM	6	Logix129	MyRealArr[4]	0

Figure 5.7 - Recent Records

Table 5.6 – Recent F	Records
----------------------	---------

Statistic	Description
Index	Logged data index.
Date Time	The time stamp when the data was logged.
Tag ID	Configured Tag ID for the specific Tag/Register/File.
Device	The configured source device where the tag is extracted.
Tagname	The Tagname configured for the specific tag.
Value	The last logged value from the specific tag.

5.2.5 Record Management Tab

The *Record Management* tab manages the PLX51-DL-232 records. Records can be downloaded to a (.csv) file format. Options to reset the log indices and erasing the cache are also available.

Data Logger - Status	
General Statistics Tag Status Recent Records Record Management CIP Statistics Ethernet Clients	TCP / ARP
Upload All Records to CSV	
Upload Unread Records to CSV	
Opload Onread Records to CSV	
Reset Records	
Free Deserd Morres	
Erase Record Storage	

Figure 5.8 – Record Management

Table 5.7 – Record Management

Parameter	Description
Upload All Records to CSV	Upload all records currently in the module.
Upload Unread Records to CSV	Upload unread records currently in the module.
Reset Records	Resets the log indices
Erase Record Storage	Erases the cache of all records

5.2.6 CIP Statistics Tab

The *CIP Statistics* tab provides a set of Common Industrial Protocol (CIP) communication statistics.

Counter	Value	Cle	ar Counters	
Class 1 Timeout Count	0			
Class 1 Forward Open Count	1			
Class 1 Forward Close Count	0			
Class 1 Connection Count	1			
Class 3 Timeout Count	14			
Class 3 Forward Open Count	0			
Class 3 Forward Close Count	0			
Class 3 Connection Count	1			

Figure 5.9 – CIP Statistics

Statistic	Description
Class 1 Timeout Count	Number of times a Class 1 connection has timed out
Class 1 Forward Open Count	Number of Class 1 Connection establish attempts
Class 1 Forward Close Count	Number of Class 1 Connection close attempts
Class 1 Connection Count	Number of Class 1 Connections currently active
Class 3 Timeout Count	Number of times a Class 3 connection has timed out
Class 3 Forward Open Count	Number of Class 3 Connection establish attempts
Class 3 Forward Close Count	Number of Class 3 Connection close attempts
Class 3 Connection Count	Number of Class 3 Connections currently active

5.2.7 Ethernet Clients Tab

The *Ethernet Clients* tab provides a count of EtherNet Client and EtherNet/IP connections.

neral Statistics Tag Status Rece	ent Records Record N	Aanagement CIP Statistics		
Ethernet Client Counts		EtherNet/IP Table		
Туре	Count	IP Address	Session Handle	
ARP Clients	5	192.168.1.129	7000A509	
TCP Clients	3			
EtherNet/IP Clients	1			

Figure 5.10 – Ethernet Connection Counts

Table 5.9 -	CIP	Statistics
-------------	-----	------------

Statistic	Description
ARP Clients	Number of active clients in the ARP table
TCP Clients	Number of active connections in the TCP client table
EtherNet/IP Clients	Number of active connections in the ENIP client table
	Table 5.10 – EtherNet/IP Table
Statistic	Description
IP Address	IP address of the client in the ENIP client table

Session handle in the ENIP client table

Session Handle

5.2.8 TCP/ARP Tab

The *TCP / ARP* tab lists the ARP and TCP/IP information associated with the known MAC addresses in the network. Parameters include the *IP Address*, *Remote Port* number, and *Local Port* number.

norai	Statistics	Tag Status	Recent Records	Recor	rd Management	CIP Statistics	Ethernet Clients	TCP / ARP
ARP T	able				TCP Table			
MA	AC Address	6	IP Address		MAC Ad	dress	Remote Port	Local Port
00:1	ID:9C:C4:2	D:02	192.168.1.129		00:1D:9C:	:C4:2D:02	44818	29504
F8:0	CA:B8:39:1	D:E4	192.168.1.221		F8:CA:B8:	:39:1D:E4	23376	44818
00:1	D:9C:CD:2	F:D8	192.168.1.102		00:1D:9C:	CD:2F:D8	57866	44818
F8:0	CA:B8:39:1	D:E4	192.168.1.222					
30:0	E:D5:CD:5	B:FF	192.168.1.50					
			102.100.1.00					
			102.100.1100					

Figure 5.11 – TCP and ARP Table Entries

е
6

Statistic Description						
MAC Address	MAC address of the client in the ARP Table					
IP Address IP address of the client in the ARP Table						
	Table 5.12 – TCP Table					
Statistic Description						
MAC Address MAC address of the client in the TCP Table						
Remote Port	Remote TCP port of the client in the TCP Table					
Local Port	Local TCP port of the client in the TCP Table					

5.3 DF1 Packet Capture

The PLX51-DL-232 provides the capability to capture the DF1 traffic for analysis.

1 To begin the packet capture of the PLX51-DL-232, double-click on the *DF1 Packet Capture* selection in the Project Explorer tree.

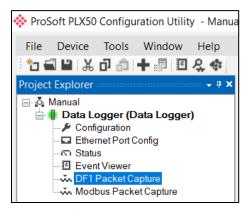


Figure 5.12 - Selecting DF1 Packet Capture

2 The *DF1 Packet Capture* window opens and automatically starts capturing all DF1 packets.

Note: The PLX51-DL-232 keeps a circular buffer of the last twenty DF1 packets. Thus, there may be up to 20 packets in the capture that were received / sent before the capture was initiated.

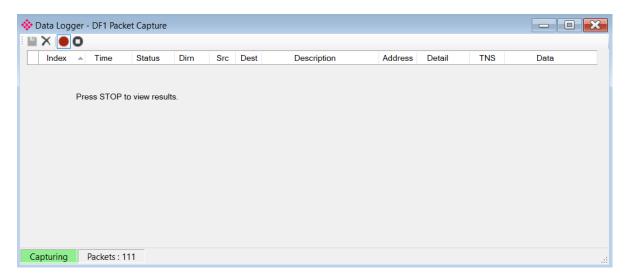


Figure 5.13 - DF1 packet capture

3 To display the captured DF1 packets, the capture process must first be stopped by pressing the **STOP** button.

Index	 Time 	Status	Dirn	Src	Dest	Description	Address	Detail	TNS	Data
39686	0d - 00:31:57.750	Ok	Rx	40	2	TypedRead	0:8:40	Offset=0 T	7C21	10 02 0
39687	0d - 00:31:57.750	Ok	Tx			ACK				10 06
39688	0d - 00:31:57.760	Ok	Tx	2	40	Reply		Success	7C21	10 02 2
39689	0d - 00:31:57.830	Ok	Rx			ACK				10 06
39690	0d - 00:31:57.870	Ok	Rx	40	3	UnprotectedRead	16	Size=100	7C44	10 02 0
39691	0d - 00:31:57.870	Ok	Тх			ACK				10 06
39692	0d - 00:31:57.870	Ok	Tx	3	40	ReplyUnprotectedRead		Success	7C44	10 02 2
39693	0d - 00:31:57.880	Ok	Rx			ACK				10 06
39694	0d - 00:31:57.980	Ok	Rx	40	1	TypedWrite	0:11:0	Offset=0 T	7C62	10 02 0
39695	0d - 00:31:57.980	Ok	Tx			ACK				10 06
39696	0d - 00:31:57.980	Ok	Rx			ACK				10 06
39697	0d - 00:31:57.980	Ok	Тх	1	40	Reply		Success	7C62	10 02 2
39698	0d - 00:31:58.000	Ok	Rx	40	2	TypedRead	0:8:40	Offset=0 T	7083	10 02 0

Figure 5.14 - DF1 Packet Capture complete

The captured DF1 packets are listed as follows:

Statistic	Description
Index	The packet index, incremented for each packet sent or received.
Time	The elapsed time since the PLX51-DL-232 was powered up.
Status	The status of the packet. Received packets are checked for valid DF1 constructs and valid checksums.
Dirn	The direction of the packet, either transmitted (Tx) or received (Rx).
Src	DF1 node address of the message source.
Dest	DF1 node address of the message destination.
Description	Brief description of the packet, usually the command.
Address	The string representing a PLC data address, where applicable.
Detail	Additional details associated with command.
TNS	Transaction number. Used to match request and reply messages.
Data	The packet's raw data displayed in space delimited hex.

4 The packet capture can be saved to a file for further analysis by selecting the **SAVE** button on the toolbar.

5 Previously saved DF1 Packet Capture files can be viewed by selecting the *DF1 Packet Capture Viewer* option in the *Tools* menu.

🔅 ProSoft PLX50	Cont	figuration Utility - Manual*		
File Device	Тос	ls Window Help		
1 🔁 🖬 🖌	ę.	Target Browser		
Project Explorer	4 €;	DHCP Server		
🖃 🖧 Manual	4	Event Viewer		
⊡¶ DF1 Me	7	DeviceFlash		
Ether		Packet Capture Viewers	► vĩa	DF1 Packet Capture Viewer
Even		Add GSD File	ų.	DH485 Packet Capture Viewer
		Rebuild GSD Catalog	ų.	Modbus Packet Capture Viewer
	۶	Application Settings		

Figure 5.15 - Selecting the DF1 Packet Capture Viewer

5.4 Modbus Packet Capture

The PLX51-DL-232 provides the capability to capture the Modbus traffic for analysis.

1 To begin the capture of the PLX51-DL-232, double-click on the *Modbus Packet Capture* selection in the Project Explorer tree.

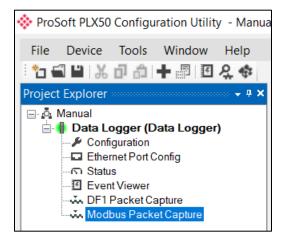


Figure 5.16 - Selecting Modbus Packet Capture

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

🚸 D	ata Log	ger Pl	us - Modk	ous Packet (Capture					- 0 ×
	×	0								
	Index		Time	Status	Dirn	Node	Description		Data	
		Pres	s STOP to	view result	S.					
Ca	pturing	P	ackets : 45	i						

Figure 5.17 – Modbus packet capture

3 To display the captured Modbus packets, the capture process must first be stopped by pressing the **STOP** button.

2814 13d - 16:50:25:780 Ok Rx 7 Read HoldingReg - DataSize 2 07 03 02 00 28 30 5 2814 13d - 16:50:25:780 Ok Tx 7 Read HoldingReg - DataSize 2 07 03 02 00 28 30 5 2814 13d - 16:50:25:780 Ok Tx 7 Read HoldingReg - DataSize 2 07 03 02 00 28 30 5 2814 13d - 16:50:25:800 Ok Rx 7 Read HoldingReg - DataSize 2 07 03 02 00 28 30 5 2814 13d - 16:50:25:800 Ok Tx 7 Read HoldingReg - DataSize 2 07 03 02 00 28 30 5 2814 13d - 16:50:25:810 Ok Tx 7 Read HoldingReg - DataSize 2 07 03 00 15 00 01 9 2814 13d - 16:50:25:810 Ok Rx 7 Read HoldingReg - DataSize 2 07 03 02 03 00 30 08 2814 13d - 16:50:25:810 Ok Tx 7 Read Discrete Inputs - Address 1, Cou 07 02 00 01 00 01 E 2814 13d - 16:50:25:830 Ok Rx 7 Read Discrete Inputs - DataSize 1 07 02 01 01 60 CO		Data	Description	Node	Dim	Status	Time	Index +
2814 13d - 16:50:25:780 Ok Tx 7 Read HoldingReg - Address 11, Count 1 07 03 00 0B 00 01 F 2814 13d - 16:50:25:800 Ok Rx 7 Read HoldingReg - DataSize 2 07 03 02 00 28 30 5 2814 13d - 16:50:25:800 Ok Tx 7 Read HoldingReg - DataSize 2 07 03 00 15 00 01 9 2814 13d - 16:50:25:810 Ok Tx 7 Read HoldingReg - DataSize 2 07 03 02 03 00 30 B 2814 13d - 16:50:25:810 Ok Rx 7 Read HoldingReg - DataSize 2 07 03 02 00 20 00 00 01 9 2814 13d - 16:50:25:810 Ok Rx 7 Read HoldingReg - DataSize 2 07 03 02 00 01 00 01 9 2814 13d - 16:50:25:810 Ok Tx 7 Read Discrete Inputs - Address 1, Cou 07 02 00 01 00 01 F 2814 13d - 16:50:25:830 Ok Rx 7 Read Discrete Inputs - DataSize 1 07 02 01 01 60 C0	5 AE	07 03 00 0B 00 01 F5 AE	Read HoldingReg - Address 11, Count 1	7	Tx	Ok	13d - 16:50:25.770	2814
2814 13d - 16:50:25:800 Ok Rx 7 Read HoldingReg - DataSize 2 07 03 02 00 28 30 5 2814 13d - 16:50:25:800 Ok Tx 7 Read HoldingReg - DataSize 2 07 03 02 00 28 30 5 2814 13d - 16:50:25:800 Ok Tx 7 Read HoldingReg - Address 21, Count 1 07 03 00 15 00 01 9 2814 13d - 16:50:25:810 Ok Rx 7 Read HoldingReg - DataSize 2 07 03 02 00 20 30 03 08 2814 13d - 16:50:25:810 Ok Tx 7 Read Discrete Inputs - Address 1, Cou 07 02 00 01 00 01 E 2814 13d - 16:50:25:830 Ok Rx 7 Read Discrete Inputs - Address 1, Cou 07 02 01 01 60 CO	iA	07 03 02 00 28 30 5A	Read HoldingReg - DataSize 2	7	Rx	Ok	13d - 16:50:25.780	2814
2814 13d - 16:50:25:800 Ok Tx 7 Read HoldingReg - Address 21, Count 1 07 03 00 15 00 01 9 2814 13d - 16:50:25:810 Ok Rx 7 Read HoldingReg - DataSize 2 07 03 02 03 00 30 B 2814 13d - 16:50:25:810 Ok Tx 7 Read HoldingReg - DataSize 2 07 03 02 03 00 30 B 2814 13d - 16:50:25:810 Ok Tx 7 Read Discrete Inputs - Address 1, Cou 07 02 00 01 00 01 E 2814 13d - 16:50:25:830 Ok Rx 7 Read Discrete Inputs - DataSize 1 07 02 01 01 60 CO	5 AE	07 03 00 0B 00 01 F5 AE	Read HoldingReg - Address 11, Count 1	7	Tx	Ok	13d - 16:50:25.780	2814
2814 13d - 16:50:25:810 Ok Rx 7 Read HoldingReg - DataSize 2 07 03 02 03 00 30 B 2814 13d - 16:50:25:810 Ok Tx 7 Read HoldingReg - DataSize 2 07 03 02 03 00 30 B 2814 13d - 16:50:25:810 Ok Tx 7 Read Discrete Inputs - Address 1, Cou 07 02 00 01 00 01 E 2814 13d - 16:50:25:830 Ok Rx 7 Read Discrete Inputs - DataSize 1 07 02 01 01 60 C0	A	07 03 02 00 28 30 5A	Read HoldingReg - DataSize 2	7	Rx	Ok	13d - 16:50:25.800	2814
2814 13d - 16:50:25:810 Ok Tx 7 Read Discrete Inputs - Address 1, Cou 07 02 00 01 00 01 E 2814 13d - 16:50:25:830 Ok Rx 7 Read Discrete Inputs - DataSize 1 07 02 01 01 00 01 E	15 A8	07 03 00 15 00 01 95 A8	Read HoldingReg - Address 21, Count 1	7	Tx	Ok	13d - 16:50:25.800	2814
2814 13d - 16:50:25:830 Ok Rx 7 Read Discrete Inputs - DataSize 1 07 02 01 01 60 C0	14	07 03 02 03 00 30 B4	Read HoldingReg - DataSize 2	7	Rx	Ok	13d - 16:50:25.810	2814
	8 6C	07 02 00 01 00 01 E8 6C	Read Discrete Inputs - Address 1, Cou	7	Tx	Ok	13d - 16:50:25.810	2814
2814 13d - 16:50:25.830 Ok Tx 7 Read HoldingReg - Address 0, Count 2 07 03 00 00 00 02 C		07 02 01 01 60 C0	Read Discrete Inputs - DataSize 1	7	Rx	Ok	13d - 16:50:25.830	2814
	24 6D	07 03 00 00 00 02 C4 6D	Read HoldingReg - Address 0, Count 2	7	Tx	Ok	13d - 16:50:25.830	2814
2814 13d - 16:50:25.840 Ok Rx 7 Read HoldingReg - DataSize 4 07 03 04 00 00 42 4	8 AC A5	07 03 04 00 00 42 48 AC A5	Read HoldingReg - DataSize 4	7	Rx	Ok	13d - 16:50:25.840	2814
2814 13d - 16:50:25.840 Ok Tx 7 Read HoldingReg - Address 200, Cou 07 03 00 C8 00 02 4	45 93	07 03 00 C8 00 02 45 93	Read HoldingReg - Address 200, Cou	7	Tx	Ok	13d - 16:50:25.840	2814
2814 13d - 16:50:25.860 Ok Rx 7 Read HoldingReg - DataSize 4 07 03 04 D6 87 00 1	12 94 5F	07 03 04 D6 87 00 12 94 5F	Read HoldingReg - DataSize 4	7	Rx	Ok	13d - 16:50:25.860	2814

Figure 5.18 – Modbus Packet Capture complete

The captured Modbus packets are tabulated as follows:

Table 5.14 - M	odbus Packet	Capture fields

Statistic	Description
Index	The packet index, incremented for each packet sent or received.
Time	The elapsed time since the PLX51-DL-232 was powered up.
Status	The status of the packet. Received packets are checked for valid Modbus constructs and valid checksums.
Dirn	The direction of the packet, either transmitted (Tx) or received (Rx).
Node	Modbus node address of the message destination.
Description	A brief description of the packet, showing the function and register range if applicable.
Data	The raw packet data.

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

🔅 ProS	oft PLX50	Con	figuration Utility - Manual*			
File	Device	Тос	ols Window Help			
: 🎦 🕤	1 1 X	ę,	Target Browser			
Project	Explorer	47.	DHCP Server			
		4	Event Viewer			
<u> </u>	Data Lo	7	DeviceFlash	J.		
	Ether	йл.	Packet Capture Viewers	ب ا	ί.	DF1 Packet Capture Viewer
	Even		Add GSD File	3	ς.,	DH485 Packet Capture Viewer
	- Mode		Rebuild GSD Catalog	J	ί.	Modbus Packet Capture Viewer
		×	Application Settings			
		_		_		

Figure 5.19 - Selecting the Modbus Packet Capture Viewer

5.5 Module Event Log

The PLX51-DL-232 logs various diagnostic records to an internal event log. These logs are stored in non-volatile memory and can be displayed in the PLX50 Configuration Utility or the web server.

To view them in the PLX50 Configuration Utility, select the *Event Viewer* option in the Project Explorer tree.

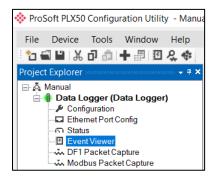


Figure 5.20 - Selecting the PLX51-DL-232 Event Log

- 6 The *Event Log* window opens and automatically reads all the events from the PLX51-DL-232.
- 7 The log entries are listed with the latest record at the top. Custom sorting is achieved by double-clicking on the column headings.

2 X			
Uploade	d 77 records.		Filter (All)
Index -	Time	Up Time	Event
76	2017/08/16 15:54:13	0d - 00:23:09	Could not find callback id
75	2017/08/16 15:54:13	0d - 00:23:09	Application Config Valid
74	2017/08/16 15:49:06	0d - 00:18:40	Application Config Valid
73	2017/08/16 15:45:31	0d - 00:14:46	System date and time updated
72	2017/08/16 15:45:27	0d - 00:14:42	Could not find callback id
71	2017/08/16 15:45:27	0d - 00:14:42	Application Config Valid
70	2017/08/16 15:30:16	0d - 00:01:25	Parameters updated
69	2017/08/16 15:30:16	0d - 00:01:24	Parameters updated
68	2017/08/16 15:30:16	0d - 00:01:24	Could not find callback id
67	2017/08/16 15:30:16	0d - 00:01:24	Could not find callback id
66	2017/08/16 15:30:16	0d - 00:01:24	Could not find callback id
65	2017/08/16 15:30:16	0d - 00:01:24	Could not find callback id
64	2017/08/16 15:29:24	0d - 00:00:39	Parameters updated
63	2017/08/16 15:29:24	0d - 00:00:39	Parameters updated
62	2017/08/16 15:28:41	0d - 00:00:02	Ethernet link up
61	2017/08/16 15:28:41	0d - 00:00:02	Application code running
60	2017/08/16 15:28:40	0d - 00:00:00	Application Config Valid

Figure 5.21 – Module Event Log

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

5.6 Web Server

The PLX51-DL-232 provides a web server allowing you to view various diagnostics of the PLX51-DL-232 without the PLX50 Configuration Utility or RSLogix 5000. This includes Ethernet parameters, system event log, advanced diagnostics, and application diagnostics (DF1 diagnostics).

Note: The web server is read-only, no parameters or configuration can be altered from the web interface.

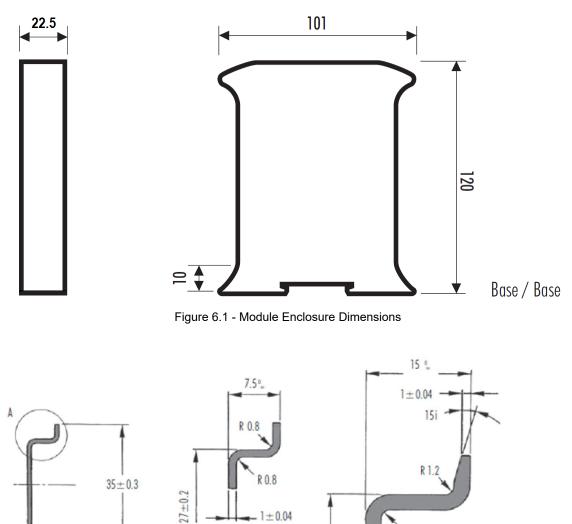
🔅 ProSoft 🛛 🗙			
\rightarrow C (i) 192.168.1.17	70		☆
Module: Data Lo	ogger Serial: 8DF0D702 Firm	ware Rev: 1.1	ProSoft
Overview	Device Name	Data Logger	
Ethernet	Serial number	8DF0D702	
EventLogs	Firmware Revision	1.1	
Diagnostics Application	Module Status	Configured and Owned	
	Vendor Id	309	
	Product Type	12	
	Product Code	5203	
	Uptime	24m 46s	
	Date	2017/08/16	
	Time	15:56:05	
	Switches	0:0:0:0	
	Temperature	37.6383°C	
	Copyright 2017	ProSoft Technology Inc. All rights reserved	

Figure 5.22 - Web interface

Technical Specifications 6

6.1 **Dimensions**

Below are the PLX51-DL-232 enclosure and DIN rail dimensions. All dimensions are in millimeters.



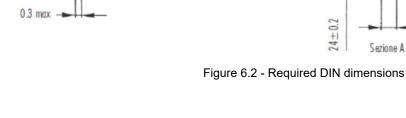
Sezione A / Section A

 24 ± 0.2

R 1.2

Sezione A / Section A

2,2 min. fino a / To 2,5 max



6.2 Electrical

Table 6.1 - Electrical specification

Specification	Rating
Power requirements	Input: 10 to 28V DC, (70 mA @ 24 VDC)
Power consumption	1.7 W
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

6.3 Ethernet

Table 6.2 - Ethernet specification

Specification	Rating
Connector	RJ45
Conductors	CAT5 STP/UTP
ARP connections	Max 20
TCP connections	Max 20
CIP connections	Max 10
Communication rate	10/100 Mbps
Duplex mode	Full/Half
Auto-MDIX support	Yes

6.4 Data Cache

Table 6.3 – Data Cache specification

Specification	Rating
Max Record Count	16,777,216
Maximum tag count	200
Log criteria supported	Delta change Heart beat Tag Triggers
Minimum Log Interval	50 ms
Data Types Supported	BOOL, SINT, INT, DINT, or REAL
Cached Records Non- Volatile	Yes
Log triggers supported	Yes
Data Sources	Logix Tags DF1 Files Modbus (RTU and TCP/IP) registers

6.5 Serial Port

Table 6.4 – Serial Port specification

Specification	Rating
Connector	4-way terminal
Conductor	24 to 18 AWG
Isolation voltage	2.5 kV
BAUD	1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200
Parity	None, Even, Odd

6.6 DF1

Table 6.5 - DF1 specification

Specification	Rating
Duplex	Full/Half
Error detection	CRC, BCC
Embedded response	Auto, On

6.7 Modbus

Table 6.6 - Modbus specification	
Specification	Rating
Supported Darts	Modbus RTU
Supported Ports	Modbus TCP/IP
	Read Coils (Function Code 1)
Functions Supported	Read Discrete Inputs (Function Code 2)
Functions Supported	Read Holding Register (Function Code 3)
	Read Input Register (Function Code 4)

7 Support, Service & Warranty

7.1 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 interfaced serial, Ethernet or Fieldbus devices

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

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

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

7.2 Warranty Information

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