DeviceNet Router/B User Manual A-DNTR/B

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Revision History

Revision	Date	Comment
1.0	26 October 2022	Initial document
1.1	17 Jan 2023	Update support contact details
1.2	25 Jan 2023	Minor wording update
1.3	13 Oct 2023	Corrected the maximum supported DeviceNet explicit device count (was 62 and should have been 63). Corrected the Input / Output Data Max (as a DeviceNet Target) in the specifications to 128 bytes (from 256 bytes).
1.4	8 November 2023	Added ATEX Conformance Mark Added UKCA Conformance Mark
1.5	27 November 2023	Updated EtherNet/IP connection configuration Updated DeviceNet Scanner device configuration
1.6	20 December 2023	Added PCCC specification

1. PREFACE

1.1. INTRODUCTION TO THE DEVICENET ROUTER

This manual describes the installation, operation, and diagnostics of the Aparian DeviceNet Router Series B module. The DeviceNet Router/B, (hereafter referred to as the **module**) provides intelligent data routing between either EtherNet/IP or Modbus TCP/RTU and a DeviceNet network. This allows the user to integrate DeviceNet devices into a Rockwell Logix platform (e.g., ControlLogix or CompactLogix) or any Modbus Client or Server device with minimal effort.

The module can be configured to be either a DeviceNet Scanner or a DeviceNet Device allowing the user to not only integrate DeviceNet devices into a Logix or Modbus system, but to also allow the user to use EtherNet/IP or Modbus devices in an existing DeviceNet network (by using the DeviceNet Router/B in device mode).

DeviceNet Mode:

DeviceNet Scanner

When the module operates as a DeviceNet Scanner, it can connect to a maximum of 63 DeviceNet Devices. The input and output data from each DeviceNet Device can be mapped to any of the operating interfaces (EtherNet/IP Target, Modbus Server, Modbus Client, or EtherNet/IP Originator).

DeviceNet Device

When the module is configured to be a DeviceNet Device, it will allow the module to have input and output data sizes of up to 128 bytes.

Primary Interface:

The module can use one of five interface modes:

PCCC Client

The DeviceNet Router is able to asynchronously exchange data between a DeviceNet polling master (scanner) and an Ethernet PCCC device. The sizes of the DeviceNet's produced and consumed data are independently configurable from 0 to 128 bytes each.

The consumed (DeviceNet) data can then be mapped to a PLC5 type address file, e.g. N33, and then read by an Ethernet device e.g. a PanelView. Similarly, the produced data (DeviceNet) can also be mapped to a PLC5 type address file, to which an Ethernet device could write.

EtherNet/IP Target

As a EtherNet/IP target, the module can use one of two methods to read and write data to and from the DeviceNet network:

• EtherNet/IP Class 1 connection

Here a remote EtherNet/IP device (e.g. a Logix controller) establishes a number of Class 1 connections to the module. DeviceNet data can be mapped into two separate input and output class 1 cyclic connections to the Logix controller (allowing up to 1KB input and 1KB output to be exchanged at the requested packet interval – RPI).

EtherNet/IP Originator

As an EtherNet/IP originator, the module can use one of two methods to read and write data to and from the DeviceNet network:

• EtherNet/IP Explicit Messaging

This allows the DeviceNet Scanner or Devices to exchange data with up to 10 EtherNet/IP devices. The module can use either Class 3 or Unconnected Messaging (UCMM) to Get and Set data in the remote EtherNet/IP devices.

• Direct-To-Tag technology

This allows the DeviceNet Scanner or Devices to exchange data with a Logix controller without the need to write any application code (e.g. ladder) in Studio 5000. The DeviceNet data is directly read from, or written to, Logix tags.

• EtherNet/IP Class 1 connection

DeviceNet data (from either DeviceNet Scanner or Devices) can be mapped to a maximum of 10 EtherNet/IP devices using input and output class 1 cyclic connections. This will allow the DeviceNet Router/B to "own" the EtherNet/IP target device and exchange DeviceNet data using the EtherNet/IP device's input and output assemblies.

Modbus Server

The diagnostics and DeviceNet data (from either DeviceNet Scanner or Devices) will be written to, or read from, the module's internal Modbus Registers (Holding or Input Registers). These registers can be accessed by a remote Modbus Client using either Modbus TCP, Modbus RTU232, or Modbus RTU485.

Modbus Client

The diagnostics and DeviceNet data (from either DeviceNet Scanner or Devices) will be written to, or read from, the module's internal Modbus Registers (Holding or Input Registers). The Modbus Auxiliary Map can then be used to configure the Modbus data exchange between multiple remote Modbus Server devices and the module's internal Modbus registers. The Modbus communication can be via Modbus TCP, Modbus RTU232, or Modbus RTU485.

The module and Slate will allow the user to parameterize each DeviceNet Device according to the parameters provided in the DeviceNet Device EDS file. These parameters can be saved in the DeviceNet Device's non-volatile memory.

The DeviceNet Router/B is configured using the Aparian Slate application. This program can be downloaded from <u>www.aparian.com</u> free of charge.



Figure 1.1. – Typical DeviceNet Scanner architecture using the DeviceNet Router/B



Figure 1.2. – Typical DeviceNet Device architecture using the DeviceNet Router

The module also provides a range of statistics, DeviceNet and Modbus packet capture functions, and internal Modbus and Data table reads to simplify the diagnostic process for remote diagnosis.

The module has two Ethernet ports and supports Device-Level-Ring (DLR) architectures.

A built-in webserver provides detailed diagnostics of system configuration and operation, including the display of DeviceNet operation and communication statistics, without the need for any additional software.

1.2. FEATURES

- Module can operate as a DeviceNet Scanner or Device.
- DeviceNet Scanner mode can configure and operate with up to 63 DeviceNet Devices with up to 256 bytes input and 256 bytes output per DeviceNet IO Device.
- DeviceNet Device mode can exchange up to 256 bytes of input and 256 bytes of output data with a DeviceNet Scanner.
- Supports DeviceNet Passthrough Messaging
- Supported DeviceNet Explicit Messaging
- Module has various Primary Interfaces:
 - PCCC Client for connecting new Ethernet only PanelViews to an existing DeviceNet network.
 - EtherNet/IP Target (Class 1 connection)
 - Modbus Server (TCP, RTU232, and RTU485)
 - Modbus Client (TCP, RTU232, and RTU485)
 - EtherNet/IP Originator (Class 1 connection with up to 10 EtherNet/IP devices and Explicit Messaging, including Direct-To-Tag Logix tag access, with up to 10 EtherNet/IP devices).
- Slate software provides a DeviceNet and Modbus packet capture utility for better diagnosis of issues.
- Supports all DeviceNet Baud Rates (125k, 250k, 500k).
- Dual Ethernet ports which support Device-Level-Ring (DLR).
- Network Time Protocol (NTP) supported for external time synchronization.
- Small form factor DIN rail mounted.

1.3. ARCHITECTURE

The figures below provide an example of the typical network setup for connecting DeviceNet (device or scanner) to either EtherNet/IP or Modbus TCP/RTU232/RTU485.



Figure 1.3. – Example of connecting DeviceNet Devices to a Logix Controller



Figure 1.4. - Example of connecting DeviceNet Devices to a Modbus TCP Client or Server



Figure 1.5. - Example of connecting DeviceNet Devices to a Modbus RTU Client or Server



Figure 1.6. – Modbus TCP Device (Client or Server) operating as a DeviceNet Device







Figure 1.8. – Logix Controller operating as a DeviceNet Device via the DeviceNet Router



Figure 1.9. – EtherNet/IP Drive and Smart Overload operating as a DeviceNet Device



Figure 1.10. - Example of a typical network setup in PCCC Client Mode

1.4. ADDITIONAL INFORMATION

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

Resource	Link
Slate Installation	http://www.aparian.com/software/slate
DeviceNet Router/B User Manual DeviceNet Router/B Datasheet Example Code & UDTs	http://www.aparian.com/products/devicenetrouterb
Ethernet wiring standard	www.cisco.com/c/en/us/td/docs/video/cds/cde/cde205_220_420/ins tallation/guide/cde205_220_420_hig/Connectors.html
DeviceNet	http://www.odva.org

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 the user can use either of the following:

Resource	Link			
Contact Us web link	https://www.prosoft-technology.com/Services-Support/Customer-Support			
Support email	support@prosoft-technology.com			

Table 1.2. – Support Details

2. INSTALLATION

2.1. MODULE LAYOUT

The module has two ports at the bottom of the enclosure, two Ethernet ports on the angled front, and one port at the front as shown in the figure below. The ports at the bottom are used for RS232 and RS485 serial communication, and power. The power port uses a three-way connector which is used for the DC power supply positive and negative (ground) voltage as well as the earth connection.

The port on the front of the module is the CAN port and can also be used to power the module.



NOTE: The module allows the user to provide power on both bottom and front power connectors and can be used for power supply redundancy.

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



Figure 2.1 – DeviceNet Router/B side and front view

The module also supports an SD Card for disaster recovery which can be used to automatically update the configuration and/or firmware of a new module.

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



Figure 2.2 – DeviceNet Router/B top view

The module provides four DIP switches at the top of the enclosure as shown in the top view figure above.

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

Table 2.1 - DIP Switch Settings

2.1. MODULE MOUNTING



NOTE: This module is an open-type device and is meant to be installed in an enclosure suitable for the environment such that the equipment is only accessible with the use of a tool.

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



Figure 2.4 - DIN rail mouting

2.2. BOTTOM POWER

A three-way power connector is used to connect Power+, Power– (GND), and earth. The module requires an input voltage of 10 - 32Vdc. **Refer** to the technical specifications section in this document.



NOTE: The module allows the user to provide power on both bottom and front power connectors and can be used for power supply redundancy.



Figure 2.5 - Power connector

2.3. RS232/RS485 PORT

The nine-way connector is used to connect the RS232 and RS485 conductors for serial communication. The shield terminal can be used for shielded cable in high noise environments.



Figure 2.6 - RS232/RS485 connector

The RS485 port provides the standard A and B conductors. The RS232 port provides the standard communication conductors (RX, TX, and GND) as well as hardware handshaking lines for legacy systems (RTS – Request to Send, CTS – Clear to Send).



NOTE: The shield of the RS232/RS485 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/RS485 communication.



NOTE: 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 DeviceNet Router module, and not to the other DeviceNet device.

2.4. RS485 TERMINATION

All RS485 networks need to be terminated at the extremities (start and end point) of the communication conductor. The termination for the RS485 network can be enabled/disabled via the module configuration. Enabling the termination will connect an internal 125 Ohm resistor between the positive (B+) and negative (A-) conductors of the RS485 network.

2.5. ETHERNET PORTS

The Ethernet connectors should be wired according to industry standards. **Refer** to the additional information section in this document for further details. The module has an embedded switch connecting the two Ethernet ports.

2.6. CAN AND FRONT POWER

A five-way CAN connector is used to connect the DeviceNet CAN bus network as well as the Power+, Power– (GND), and earth. The module requires an input voltage of 10 - 32Vdc. **Refer** to the technical specifications section in this document.



NOTE: The module allows the user to provide power on both bottom and front power connectors and can be used for power redundancy.



Figure 2.7 – CAN and Power connector

3. SETUP

3.1. INSTALL CONFIGURATION SOFTWARE

All the network setup and configuration of the module is achieved by means of the Aparian Slate device configuration environment. This software can be downloaded from http://www.aparian.com/software/slate.

S Aparian-Slate	_	×
File Device Tools Window Help		
······································		

Figure 3.1. - Aparian Slate Environment

3.2. NETWORK PARAMETERS

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

Within the Slate environment, the DHCP server can be found under the Tools menu.



Figure 3.2. - Selecting DHCP Server

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

DHCP Server							- O ×
Port Info							
MAC Address	Vendor	Requests	Elapsed	Assigned IP	Assign	Status	Identity
00:60:35:36:B7:7F	Aparian	3	4		Assign	Discover	
Running - Active Local	IP addresses: 7 of 7						

Figure 3.3. - DHCP Server

i

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

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

DHCP Server							
Port Info							
MAC Address	Vendor	Requests	Elapsed	Assigned IP	Assign	Status	Identity
00:60:35:36:B7:7F	Aparian	81	3		Assign	Discover	
	S	Assign IP Address IP Address 192 . 168 IV Enable S	ess for MAG	C : 00:60:35:36:B	7:7F — Recent 192.168.1.204 192.168.1.200 192.168.1.195 192.168.1.145 192.168.1.146 192.168.1.164		
			Ok	(Cancel		
Running - Active Local IF	addresses: 7 of						

Figure 3.4. - Assigning IP Address

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

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

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

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

Į	DHCP Server							- • •
	Port Info							
	MAC Address	Vendor	Requests	Elapsed	Assigned IP	Assign	Status	Identity
	00:60:35:36:B7:7F	Aparian	96	4	192.168.1.147	Assign	Set Static	DeviceNet Router/B
	Pupping Activation	cal ID addrassas: 7 of 7						
	Kunning - Active Loo	callip addresses: 7 01 7						

Figure 3.5. - Successful IP address assignment

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

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



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.

If the module's DIP switch 2 is in the On position during the address assignment, the user will be warned by the following message.



Figure 3.6. - Force DHCP warning

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 Slate's Application Settings, in the DHCP Server tab.

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

The Target Browser can be accessed under the Tools menu.



Figure 3.7. - Selecting the Target Browser

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

K	Target Bi	rowser	
ł	*# O		Done
		192.168.1.146 : CANopen Router/B	^
		192.168.1.147 : DeviceNet Router/B	
		192.168.1.149 : PMEPXM0100	
		192.168.1.159 : PLX51-PBM	
		192.168.1.168 : ControlNet Router	

Figure 3.8. - Target Browser

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

Target Browser										
*¥ 0			Done							
	192.168.1.146 : CANopen Router/B		^							
	192.168.1.147 : DeviceNet Router/E	Select								
	192.168.1.149 : PMEPXM0100	Scan								
	192.168.1.159 : PLX51-PBM	Add Child Node Properties								
.	192.168.1.168 : ControlNet Router	Port Configuration								
	192.168.1.170 : PLX51-PBS	Reset Module +]							
	192.168.1.172 : PLX51-PBS									

Figure 3.9. - Selecting Port Configuration

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

S Ethernet Port Configuration		- 🗆 X
Port Configuration Interface Statistics Media Statistics		
Network Configuration Type Dynamic Method DHCP Image: Static Static Static Static Static Static IP Address 192 168 1 147 Subnet Mask 255 255 0 0 0 0 Default Gateway 0 0 0 0 0 0 0 Primary NS 0 0 0 0 0 0 0 0 Domain Name	Port 1 Negotiation Auto ~ Port Speed Duplex Half Duplex ~ General MAC Address 0	Port 2 Negotiation Auto ~ Port Speed 100 ~ Duplex Full Duplex ~
Host Name Ok Refresh	TCP Inactivity Timeor	ut 120 (s)

Figure 3.10. - Port Configuration

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

3.3. CREATING A NEW PROJECT

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

5 Ap	oarian-Slate				
File	Device	Тоо	ls	Window	Help
° 🗆	New		î l	- 5	운 🕸
-	Open				
\boxtimes	Close	-1			
Ш	Save				
	Save As	-1			
	Recent	۶			
	Exit	1			
_		-1			

Figure 3.11. - Creating a new project

A Slate project will be created, showing the Project Explorer tree view. To save the project use the Save option under the File menu.

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



Figure 3.12. - Adding a new device

In the Add New Device window select the DeviceNet Router/B and click the Ok button.

mage	Device Name 🔺	Description						
1	DeviceNet Router	DeviceNet to AB-Ethernet PCCC Module						
	DeviceNet Router/B	DeviceNet Communication Module - Series B						
Lee	DF1 Router	DF1 to Logix Communication Module						
l.	DH485 Router	DH485 to Logix Communication Module						
	DH485 Router/B	DH485 to Logix Communication Module - Series B						
L	DHCP Manager	Managed DHCP Module						
I	DNP3 Router	DNP3 to Logix Communication Module						

Figure 3.13 – Selecting a new DeviceNet Router

The device will appear in the Project Explorer tree as shown below, and its configuration window opened. The device configuration window can be reopened by either double clicking the module in the Project Explorer tree or right-clicking the module and selecting *Configuration*.

S DNR01 - Configuratio	on									
General DeviceNet De	eviceNet Devices	DeviceNet Map	PLC5 Map	EtherNet/IP Devices	EtherNet/IP Map	Modbus	Modbus Auxiliary Map	Internal Map	Advanced	Monitoring
Instance Name	DNR01									
Description										
IP Address	0	0_0_	0	Major Revi	sion	1	\sim			
Ethernet Mode	EtherNet/IP Ta	rget	\sim	EtherNet/I	^o Connections	1	\sim			
DeviceNet Mode	Target		\sim							
			Ok	Apply	Cancel	He	lp			

Figure 3.14. – DeviceNet Router/B configuration

Refer to the additional information section in this document for Slate's installation and operation documentation.

3.4. GENERAL PARAMETERS

The DeviceNet parameters will be configured by Slate. When downloading this configuration into the module it will be saved in non-volatile memory that persists when the module is powered down.



NOTE: When a firmware upgrade is performed the module will clear all the module configuration stored in non-volatile storage.

The general configuration is shown in the figure below. The DeviceNet Router/B general configuration window is opened by either double clicking on the module in the tree or right-clicking the module and selecting **Configuration**.

🗴 DNR01 - Configurati	on									
General DeviceNet E	DeviceNet Devices	DeviceNet Map	PLC5 Map	EtherNet/IP Devices	EtherNet/IP Map	Modbus	Modbus Auxiliary Map	Internal Map	Advanced	Monitoring
Instance Name	DNR01									
Description	DeviceNet Den	10								
IP Address	192 . 1	68 . 1 .	147	Major Revi	sion	1	\checkmark			
Primary Interface	EtherNet/IP Tar	rget	\sim	EtherNet/If	^o Connections	1	\sim			
DeviceNet Mode	Target		\sim							
				Ok Ap	ply C	ancel				

Figure 3.15 - General Configuration

The general configuration consists of the following parameters:

Parameter	Description
Instance Name	This parameter is a user defined name to identify between various DeviceNet Routers.
Description	This parameter is used to provide a more detailed description of the application for the module.
Major Revision	The major revision of the module
EtherNet/IP Connections	The number of connections the module will use when operating as an EtherNet/IP target.
IP Address	The IP address of the target module. The user can use the target browse button to launch the target browser to the select the DeviceNet Router/B on the network.
Primary Interface	PCCC Client

This will allow the module to emulate a PLC5, providing an interface for Ethernet-
only PanelViews and other legacy devices to a DeviceNet network. NOTE: In this
mode the DeviceNet mode will be forced to target.

EtherNet/IP Target

A Logix controller can own the DeviceNet Router/B over EtherNet/IP using up to 4 class 1 connections.

Modbus Server

A Modbus Client can read and write data to the module which can then be mapped to one or more DeviceNet devices. The module can operate as a Modbus Server on Ethernet TCP, RTU232, and RTU485

Modbus Client

A module can read and write data from various Modbus devices which can then be mapped to one or more DeviceNet devices. The module can operate as a Modbus Client on Ethernet TCP, RTU232, and RTU485

EtherNet/IP Originator

As an EtherNet/IP originator, the module can use two methods to read and write data to and from an EtherNet/IP device (IO):

EtherNet/IP Class 1 Connection

The DeviceNet Router/B can own EtherNet/IP IO by using the Slate software to configure the IO connections.

EtherNet/IP Explicit Messaging

The DeviceNet Router/B can exchange data with up to 10 EtherNet/IP devices using explicit messaging.

	Target A Logix controller can own the DeviceNet Router/B over DeviceNet using a cyclic DeviceNet connection (e.g. via a 1756-DNB)
DeviceNet Mode	 Scanner As a DeviceNet originator, the module can use two methods to exchange data with one or more DeviceNet devices: <u>Cyclic DeviceNet</u> The DeviceNet Router/B can own DeviceNet IO by using the Slate software to configure the IO connections and schedule the DeviceNet network. <u>DeviceNet Explicit Messaging</u> This DeviceNet Router/B can exchange data with up to 10 DeviceNet devices using explicit messaging over DeviceNet.
	Listen-Only In this mode the DeviceNet Router/B will only listen to the DeviceNet network allowing the user to capture the DeviceNet network traffic without affecting the current operation.

Table 3.1 - General configuration parameters

3.5. DEVICENET CONFIGURATION

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

S DNR01 -	- Configurati	on										• • •
General	DeviceNet D	DeviceNe	et Devices	DeviceNet Map	PLC5 Map	EtherNet/IP Devices	EtherNet/IP Map	Modbus	Modbus Auxiliary Map	Internal Map	Advanced	Monitoring
Devi	ceNet											
N	ode Address		1	\sim		V Bus-	Off Auto Recover					
В	AUD	[125k	\sim		Enat	le Bus Terminato	r (120 ohr	m)			
м	lessage Time	out [100	[10-1000]	ms							
D)eviceNet Tar	rget										
	Produced S	ize [64	[0-128] by	tes							
	Consumed S	Size [64	[0-128] by	tes							
					Ok	Apply	Cancel	He	lp			

Figure 3.16 - General Configuration

The DeviceNet configuration consists of the following parameters:

Parameter	Description	
Node Address	This is the node address of the DeviceNet Router/B on the DeviceNet network.	
BAUD Rate	 The DeviceNet bus BAUD rate. The following options are available: 125k 250k 500k 	
Message Timeout	This is the DeviceNet message timeout which specifies how long the DeviceNet Router/B will wait for a response from a DeviceNet node before the response will be seen as a failed no-response.	
Produced Size	When operating as a DeviceNet Target, this is the number of bytes that the DeviceNet Router/B will produce to the DeviceNet originator (i.e., the input assembly in Logix).	
Consumed Size	When operating as a DeviceNet Target, this is the number of bytes that the DeviceNet Router/B will consume from the DeviceNet originator (i.e., the output assembly in Logix).	
Bus Off Auto Recover	Enable or Disable automatic DeviceNet network recovery when the module has detected that the CAN bus network is off.	

Enable Bus Terminator	Enables or disables the internal 120 Ohm terminator on the CAN bus network. The CAN bus network must be terminated at the two extremities of the network (i.e., the start and end of the network).
-----------------------	--

Table 3.2 - General configuration parameters

The module can operate as either a DeviceNet Target or a DeviceNet Scanner. The below sections will provide more information regarding these operational modes.

3.5.1. TARGET

A Logix controller can exchange data with the DeviceNet Router/B over DeviceNet using a cyclic DeviceNet connection when the DeviceNet Router/B is operating as a DeviceNet target. This will allow the DeviceNet Router/B to exchange data with the Logix controller using the input and output assembly of the DeviceNet bridge (e.g., 1756-DNB) where the DeviceNet Router/B data has been mapped. Data from EtherNet/IP or Modbus devices can be mapped to the Logix controller over DeviceNet.

The user will need to add the DeviceNet Router/B to the Logix IO tree under a DeviceNet bridge (e.g. 1756-DNB). After the module has been added, the DeviceNet connection will need to be scheduled with RSNetworx for DeviceNet.

3.5.1.1. DEVICENET CONFIGURATION – RSNETWORX

The DeviceNet IO messaging scheduling is typically configured using **RSNetworx for DeviceNet** and is required when the module is operating as a DeviceNet target.

Open RSNetWorx, create a new project and browse to the DeviceNet network. The software will scan the network for all the devices. Additional devices can be added (offline) if required.





To schedule the master (scanner) module (e.g. 1771-SDN, 1756-DNB) right-click on the scanner module and select *Properties*.

Select the *Scanlist* tab. The DeviceNet Router/B should be shown in the Available Devices (left) list box. Use the ">" (add) button to add it to the Scanlist (right).

1756-DNB	<u>? ×</u>			
General Module Scanlist Input Output ADR Summary				
Available Devices:	Scanlist:			
03, DeviceNet Router/B	> < >> <			
Automap on Add	Node Active			
Upload from Scanner	Electronic Key:			
Download to Scanner	Vendor			
Edit I/O Parameters	Major Revision Minor □ or higher			
OK	Cancel Apply Help			

Figure 3.18 – Add device to Scanlist



NOTE: When the DeviceNet Router/B is added to the Scanlist, a dialog may appear, warning of no I/O Data. This is normal, because the DeviceNet Router's I/O data sizes are dynamically configured, and thus are not fixed in the EDS file.

Scanner Configuration Applet		
WARNING: Node '03, DeviceNet Router/B' does not contain any I/O data!		
To supply I/O data for this device, click Edit I/O Parameters and then specify the I/O type(s) and size(s)		
If this is a bridge device, associate this file to the scanner side of the device to obtain I/O data.		
ОК		

Figure 3.19 – I/O Data Warning

The DeviceNet Router/B will now appear in the Scanlist.

🎇 1756-DNB 💽				
General Module Scanlist Input Output ADR Summary				
Available Devices:	Scanlist:			
Automap on Add Upload from Scanner Download to Scanner Edit 1/0 Parameters	 ✓ Node Active Electronic Key: ✓ Device Type ✓ Vendor ✓ Vendor ✓ Product Code Major Revision ✓ Minor or higher 			
ОК С	ancel Apply Help			

Figure 3.20 – Updated Scanlist

To configure the I/O data sizes, click on the *Edit I/O Parameters* button near the bottom of the *Scanlist* tab. The *Edit I/O Parameters* dialog will appear. The DeviceNet Router/B supports either *Polled* or *Change of State* (COS) data exchanges.



NOTE: Only one mode should be selected. Do not select both polled and Change of State.

A. POLLED METHOD

To schedule the data transfer using the polling method, select the Polled option.

dit I/O Parameters : A07, DeviceNet Router			
<u>S</u> trobed:	Change of State / Cyclic		
Input Size: 🚺 📑 Bytes	Change of State C Cyclic		
Use Output Bit:	Input Size:		
Polled:	Output Size: 🛛 📑 Bytes		
I <u>n</u> put Size: 16 📑 Bytes	Heart <u>b</u> eat Rate: 250 🚍 msec		
<u>O</u> utput Size: 120 Bytes	Advanced		
Poll <u>R</u> ate: Every Scan 💌			
Cancel Restore I/O Sizes			


The Input and Output sizes are specified in bytes, and should match the DeviceNet Router's configuration, as described the previous chapter.

Edit 1/D Parameters : 03, DeviceNet Router/B Image: Change of State / Cyclic Image: Change of State / Cyclic Image: Change of State / Cyclic Image: Change of State / Cyclic Image: Cyclic Image: Cyclic Image: Cyclic <t< th=""><th></th><th>DNR01B - Configuration</th></t<>		DNR01B - Configuration
Edit 1/0 Parameters : 03, DeviceNet Router/B ? Strobed: Change of State / Cyclic Input Size: Change of State Cyclic Input Size: Bytes Use Output Bit: Input Size: Uput Size: Bytes Utput Size: Bytes Utput Size: Bytes Utput Size: Bytes Utput Size: Bytes DeviceNet Target DeviceNet Size I6 Output Size: Advenced		General DeviceNet DeviceNetDevices DeviceNetMap PLC5 Map Ethe
Strobed: Change of State / Cyclic Input Size: Imput Size: V Polled: Imput Size: Dutput Size: Imput Size: Input Size: Imput Size: Imput Size:<	Edit 1/0 Parameters : 03, DeviceNet Router/B	DeviceNet
Input Size: Imput Size:	Change of State / Cyclic	Node Address 3 ~
Imput Size: Impu	Input Size: Use Output Bit: Use Output Bit: Input Size: Use Output Bit: Input Size:	BAUD 125k ~
Input Size: 16 Bytes Heartbest Fleter. 250 Insec Output Size: 120 Bytes Advanced Produced Size 16 [0-128] bytes	✓ Polled: ✓ Dutput Size: ✓ ✓	Message Timeout 100 [10-1000] ms
Output Size 120 Here Advanced Produced Size 16 [0-128] bytes	Input Size: 16 Bytes Heartbear Rete: 250 msec	DeviceNet Target
Poll Rate: Every Scan	Output Size 120 🚔 Bytes Advanced	Produced Size 16 [0-128] bytes
Consumed Size [0-128] bytes	Poll Rate: Every Scan	Consumed Size 120 [0-128] bytes
OK Cancel Restore I/O Sizes	OK Cancel Restore I/O Sizes	

Figure 3.22 – Configuring Polled I/O Sizes

Once configured, click the Ok button.



NOTE: A dialog may again appear, warning that the configured size does not match that of the EDS file. This warning can be ignored.

B. CHANGE OF STATE METHOD

To schedule the data transfer using the *Change of State* method, select the "*Change of State* / *Cyclic*" option.

Edit I/O Parameters : 03, DeviceNet	Router/B ?X								
Strobed:	Change of State / Cyclic								
Input Size: 0 🔄 Bytes	Change of State C Cyclic								
Use Output Bit: 🗖	Input Size: 16 💌 Bytes								
Polled:	Output Size: 120 📑 Bytes								
Input Size: 🛛 🔄 Bytes	Heartbeat Rate: 5000 📑 msec								
Output Size: 0 🚊 Bytes	Advanced								
Poll Rate: Every Scan 💌									
OK Cancel Restore I/O Sizes									

Figure 3.23 – Change of State Configuration

As with the polled configuration, the Input and Output sizes are specified in bytes, and should match the DeviceNet Router's configuration, as described earlier in this chapter. Once configured, click the Ok button.



NOTE: A dialog may again appear, warning that the configured size does not match that of the EDS file. This warning can be ignored.

C. INPUT AND OUTPUT MAPPING

The scanner module typically transfers a large block of data to the host controller (PLC / PAC). The Input and Output mapping allows the user to specify where in this block the DeviceNet Router's data will appear. To map the Input data, select the *Input* tab.

1771-SDN Scanner Module	<u>? ×</u>
General Module Scanlist Input Output ADR S	ummary
Node <u>A</u> Type Size Map	AutoMap
ACC, DEVICEN FOILED TO INC	
	Unmap
	Adupped
	Auvanceu
	Options
Memory: Block Xfer 62 💌 Start Word: 0	-
Bite 15-0 15 14 13 12 11 10 9 8 7 6 5 4	32104
N9:1	
N9:2	
N9:3	
N9:4	
N9:5	
N9.5	
N0.0	
N9.9	_
,	
OK Cancel Apply	Help

Figure 3.24 – Input Mapping

Select the *DeviceNet Router/B* in the "Node" items and click on the *Advanced* button. The *Advanced Mapping* dialog will appear.

Ad	vance	d Mapp	oing : AO:	3, Devic	eNet Rout	er/B	<u>?</u> ×
	Мар	Messa	ige	Offset	Memory	Offset	Bit Lengtł
	1	<not m<="" td=""><td>napped></td><td></td><td></td><td></td><td></td></not>	napped>				
	2	<not m<="" td=""><td>napped></td><td></td><td></td><td></td><td></td></not>	napped>				
	3	<not m<="" td=""><td>napped></td><td></td><td></td><td></td><td></td></not>	napped>				
	4	<not m<="" td=""><td>happed></td><td></td><td></td><td></td><td></td></not>	happed>				
	– Map F	rom: —			- Map To:		
	Mess	sage:	Polled	•	Memory:	Block X	fer 60 💌
	Byte:		0 .		Word:	0	3
	Bitt		0 .		Bit:	0	-
		Apply N	1apping		Bit Length:	128	
		Delete I	Mapping		Close		Help

Figure 3.25 – Advanced Mapping – Input

Depending on the previously selected exchange method, the "Map From" Message, will either be **Polled** or **COS**. In the "Map To" group box, enter the appropriate **Memory** (Xfer block), **Word** and **Bit** Offset. Not that the mapping **Length** is in bits. In this example, we enter 128 (16 bytes * 8).

Click the *Apply Mapping* to accept the configuration. The configured mapping will be illustrated in the lower section of the Input tab.

1771-SDN S	canner Module ?>
General Modu	ule Scanlist Input Output ADR Summary
Node	∠ Type Size Map AutoMap
	Unmap
	Advanced
•	Dptions
Memory:	Block Xfer 60 💌 Start Word: 0 🔹
Bits 15 - 0	15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0 🔺
N9:123	A03. DeviceNet Router/B
N9:124	A03, DeviceNet Router/B
N9:125	A03, DeviceNet Router/B
N9:126	A03, DeviceNet Router/B
N9:127	A03, DeviceNet Router/B
N9:128	A03, DeviceNet Router/B
N9:129	A03, DeviceNet Router/B
N9:130	AU3, DeviceNet Router/B
TN3:131	
	OK Cancel Apply Help

Figure 3.26 – Mapped Input Data

The output data is mapped in a similar method, by selecting the *Advanced* button on the *Output* tab.

1771-SDN Scan	ner Module		? ×
General Module	Scanlist Input Outpu	ut ADR Su	mmary
Node	iceNet Router/R. Polled	Size Ma	AutoMap
AUS, DEV	icenet houten/bill Folied	120 NU	
			Unmap
			Advanced
			Options
•		•	
Memory: Blog	x Xfer 62 ▼ Start 1	Word: 0	_
Bits 15 - 0 15	14 13 12 11 10 9 8	7 6 5 4 3	3210
N10:1			
N10:2			
N10:4			
N10:5			
N10:6			
N10:7			
N10:8			
I N10:9			
	OK Cancel	Apply	Help

Figure 3.27 – Output Mapping

Ad	vanc	ed Map	ping : AO:	3, Devi	eNet Route	er/B	<u>?</u> ×
	Мар	Mess	age	Offset	Memory	Offset	Bit Lengtł
	1	< not	mapped>				
	2	<not< th=""><th>mapped></th><th></th><th></th><th></th><th></th></not<>	mapped>				
	3	<not< th=""><th>mapped> manned></th><th></th><th></th><th></th><th></th></not<>	mapped> manned>				
	•		inspires,				
	-Мар	To:			– Map From: -		
	Me	ssage:	Polled	•	Memory:	Block	<fer 60="" th="" 💌<=""></fer>
	Byl	te:	0 .		Word:	0	-
	Bit		0 .		Bit:	0	-
		Apply	Mapping		Bit Length:	960	-
		Delete	Mapping		Close		Help

Figure 3.28 – Advanced Mapping – Output

Depending on the previously selected exchange method, the "Map To" Message, will either be **Polled** or **COS**. In the "Map From" group box, enter the appropriate **Memory** (Xfer block),

Word and *Bit* Offset. Not that the mapping *Length* is in bits. In this example we enter 960 (120 bytes * 8).

Click the *Apply Mapping* to accept the configuration. The configured mapping will be illustrated in the lower section of the Output tab.

1771-SDN 5	canner Module	? ×
General Mod	ule Scanlist Input Output ADR Su	immary
Node	∠ Type Size Ma	AutoMap
📒 A03,	DeviceNet Router/B Polled 120 N10	
		Unmap
		Advanced
		Options
Memoru	Block Xfer 60 💌 Start Word: 🕕	=
includy. [⊒
Bits 15 - 0	15 14 13 12 11 10 9 8 7 6 5 4 3	3 2 1 0 🔺
N10:123	A03, DeviceNet Router/B	
N10:124	A03, DeviceNet Router/B	
N10:125	A03, DeviceNet Router/B	
N10:126	A03, DeviceNet Router/B	
N10:127	AU3, DeviceNet Houter/B	
N10:128	AU3, DeviceNet Router/B	
N10:129	AU3, DeviceNet Router/B	
N10.130	AU3, DeviceNet Router/B	
1 1410.131		
	OK Cancel Apply	Help

Figure 3.29 – Mapped Output Data

Once the mapping has been configured, select the Ok button on the scanner configuration dialog. The user will then be prompted to download the configuration changes to the scanner. Select the **Yes** option.



Figure 3.30 – Scanner Configuration Download Prompt

3.5.1.2. INTERNAL DATA SPACE MAPPING

When the module is operating as a DeviceNet Target, the data from the originator device (e.g. Logix Controller) can be mapped to the Ethernet interface using the Internal Map. The Internal

Map configuration window is opened by either double clicking on the module in the tree or right-clicking the module and selecting *Configuration* and selecting the *Internal Map* tab.

```
A. IDS COPY – DEVICENET TARGET SOURCE
```

When copying data from a connection originator (e.g. the output assembly of the 1756-DNB or 1771-SDN) to the Ethernet interface, the source type needs to be DNet Target.

	Configuration												- 🗆 🗾
General De	eviceNet DeviceNe	et Devices DeviceNet	Map PLC5 Map	EtherNet	IP Devices	EtherNet/IP Map Mod	lbus Modbus Auxiliary	Map Internal	Map Advance	ed Monitoring			
Internal I	Map (max. of 200 it	ems.)										Rec	commend
	Source Type	Source Instance	Source Sub-Tag	Source Offset	Source Bit Offset	Destination Type	Destination Instance	Destination Sub-Tag	Destination Offset	Destination Bit Offset	Count	Copy Function	Reformat
► 1 D	DNet Target 🛛 🗸	Connection 0 V		0		~			0		1	Byte t V	None V
•	~					~						~	

Figure 3.31 – IDS Copy – DeviceNet Target Source Type

The source instance will be the connection number, which in this case is always *Connection 0*. The Source Offset is the offset of the consumed data from the DeviceNet originator (e.g., 1756-DNB) from where the data must be copied. The Count is the number of **bytes** that will be copied.

See the Internal Data Space Mapping section for more information regarding the operation.

B. IDS COPY – DEVICENET TARGET DESTINATION

When copying data from the Ethernet interface to the DeviceNet Target input assembly, the destination type needs to be DNet Target.

ONR	.01 -	 Configuration 																			
ener	al	DeviceNet Device	Ne	et Devices Device	Ne	et Map PLC5 I	Map	p EtherNet/	IP Devices	EtherNet/IP Map Mo	bd	Ibus Modbus Auxilia	iry N	lap Internal M	Map Advance	ed Monitoring					
Inte	ema	al Map (max. of 20	0 it	tems.)																Recommend	
		Source Type		Source Instance		Source Sub-Tag	Ι	Source Offset	Source Bit Offset	Destination Type		Destination Instance	0	estination Sub-Tag	Destination Offset	Destination Bit Offset	Count	Copy Functio	on	Reformat	
	1	DNet Target	~	Connection 0	~			0		EIP Originator	ŕ	1794-OW8 🗸	Da	ta 🗸	0		1	Byte to Byte	\sim	None	
	2	EIP Originator	\sim	1794-IB8	~	Data	~	0		~	-				0		1	Byte to Byte	\sim	None	
•			~							Internal EIP Target EIP Originator MB Register DNet Target DNet Scanner									~		_

Figure 3.32 – IDS Copy – DeviceNet Target Destination Type

The destination instance will be the connection number, which in this case is always *Connection 0*. The Destination Offset is the offset of the produced data to the DeviceNet originator (e.g., 1756-DNB) from where the data must be copied. The Count is the number of **bytes** that will be copied.

3.5.2. SCANNER

The DeviceNet Router/B can operate as a DeviceNet connection originator (i.e., Scanner) for cyclic (Class 1) or explicit UCMM data exchange. The explicit messaging can be setup in the *DeviceNet Devices* and *DeviceNet Map* in the Master configuration while the cyclic DeviceNet Scanner connections are added to the *DeviceNet Connections* node under the module in the Slate project tree.

3.5.2.1. DEVICENET CYCLIC DEVICE CONNECTIONS

The DeviceNet Router/B can establish up to **63** cyclic DeviceNet connections to DeviceNet IO devices. Before the connection can be setup to the DeviceNet IO, the DeviceNet device EDS file must be loaded into the DeviceNet EDS catalog in the Slate software.

A. UPDATE DEVICENET EDS CATALOG

The user can add DeviceNet EDS files in one of two ways. The first is by using the **Tools** menu in the Slate software and selecting the **DeviceNet EDS File Management** option.



Figure 3.33 – Launching the DeviceNet EDS File Management

Next the user must select the *Add EDS File/s* option from the EDS Files tab in the DeviceNet EDS File Manager window. Next, the user must select the EDS file to be added. The EDS file will then be added to the DeviceNet EDS catalog in Slate.

S Device	Net EDS File Manager								×		
Catalog	EDS Files Help										
Filtor	 Add EDS File/s 										
Vendo	o 🗊 View File	Product Name		Catalog		Cla	Class				
(All)	X Delete	*			*		*	Reset			
		1							_		
	Vendor	Product Name	Catalog	Vendor Id	Device Type	Product Code	Revision	Filename	^		
Allen	n-Bradley	1794 - 8 Point Relay Output, Si	1794-OW8/A	1	7	37	1.001	0001000700250100.eds			
Allen	n-Bradley Company, Inc.	DSA 4/2 100-DNY42R 22.5 mm	100-DNY42R	1	7	1062	4.005	DSA-100-DNY42R.eds			
Allen	n-Bradley Company, Inc.	DSA 4/2 100-DNY42R 5.001	100-DNY42R	1	7	1062	5.001	DSA Rev 5 000100070426050			
Allen	n-Bradley Company, Inc.	DSA 4/2 100-DNY42R 5.001	100-DNY42R	1	7	1062	5.001	0001000704260500.eds			
Allen	n-Bradley	1794 - 12 Channel Analog Out	1794-OE12/A	1	10	112	1.001	0001000A00700100.eds			
Allen	n-Bradley	1794 - 16 Point 24V DC Input,	1794-IB16/A	1	7	34	1.001	0001000700220100.eds	\mathbf{v}		
Displaying	12 of 12 items.										

Figure 3.34 – Adding DeviceNet EDS file

Select an EDS File					· · · · · · · · · · · · · · · · · · ·
\leftarrow \rightarrow \checkmark \uparrow \blacksquare \rightarrow This	<pre>FC > Downloads > EDS_Files_for_1794-FlexIO ></pre>	Other		~	O Search Other
Organize New folder					= - 🔟 🤅
🧢 This PC	^ Name	Date modified	Туре	Size	
🧊 3D Objects	20001000A001A0100.eds	2023/01/09 08:14	EDS File	35 KB	
Desktop	W 0001000A001A0200.eds	2023/01/09 08:14	EDS File	35 KB	
Documents	W 0001000A001B0100.eds	2023/01/09 08:14	EDS File	213 KB	
	W 0001000A001B0200.eds	2023/01/09 08:14	EDS File	217 KB	
Music	W 0001000A001C0100.eds	2023/01/09 08:14	EDS File	247 KB	
	W 0001000A001C0200.eds	2023/01/09 08:14	EDS File	251 KB	
Pictures	W 0001000A001D0100.eds	2023/01/09 08:14	EDS File	99 KB	
Videos	W 0001000A001E0100.eds	2023/01/09 08:14	EDS File	59 KB	
🔩 OS (C:)	W 0001000A001F0100.eds	2023/01/09 08:14	EDS File	136 KB	
Network	W 0001000A006F0100.eds	2023/01/09 08:14	EDS File	42 KB	
	W 0001000A00180100.eds	2023/01/09 08:14	EDS File	39 KB	
	✓ W 0001000A00180200.eds	2023/01/09 08:14	EDS File	39 KB	
File name	e: 0001000A001E0100.eds				✓ Electronic Data Sheet (*.EDS) ✓
					Open Cancel

Figure 3.35 – Selecting DeviceNet EDS file

talog EDS Filos Holp							
talog EDS Files Help							
ilter							
Vendor Name	Product Name		Catalog		CI	ass	
				*		*	Deast
(All)	~						Reset
Vendor	Product Name	Catalog	Vendor	Device	Product	Revision	Filename
Vendor	Tiodactivanie	Catalog	ld	Туре	Code	Trevision	T liendine
Allen-Bradley Company, Inc.	DSA 4/2 100-DNY42R 5.001	100-DNY42R	1	7	1062	5.001	0001000704260500.eds
Allen-Bradley	1794 - 4 Channel 24V DC Isola	1794-IF4I/A				1.001	0001000A001E0100.eds
Allen-Bradley	1794 - 12 Channel Analog Out	1794-OE12/A	1	10	112	1.001	0001000A00700100.eds
Allen-Bradley	Allen-Bradley 1794 - 16 Point 24V DC Input,		1	7	34	1.001	0001000700220100.eds
Allen-Bradley 1794 - 10 Input/6 Output 24V		1794-IB10XOB6/A	1	7	41	1.001	0001000700290100.eds
Rockwell Automation - Allen-Br	193-EC2P	1	3	30	3.001	E3 Overload - 00010003001E0	

Figure 3.36 – DeviceNet EDS file added

Alternatively the user can add the DeviceNet EDS file when adding a DeviceNet IO device to the *DeviceNet Connections* IO tree in Slate.

S Aparian-Slate - DNTRB Der	mo
File Device Tools Wir	ndow Help
ै 🕤 🖬 🗎 👗 🗗 👘 🕂 👘	🗉 🤮 🚸
Project Explorer	
□ ♣ DNTRB Demo □ ■ ■ DNR01 (DeviceNet I □ ■ ₽ Configuration	Router/B)
DeviceNet Connecti	ions
	 Add DeviceNet Device
	Paste Special

Figure 3.37 – DeviceNet Connection Add

5 DeviceNet EDS File Select							_		×
Catalog EDS Files Help									
Filter Vendo (All) View File Delete	Product Name	Catalog		*	Cla	DeviceN	let Re	eset	
Vendor	Product Name	Catalog	Vendor Id	Device Type	Product Code	Revision	Filenam	e	
Allon-Bredlov Company Inc	DSA 4/2 100-DNV42D 5 001	100-DNV/20	1	7	1062	5.001	000100070426050	Do de	

Figure 3.38 – Adding DeviceNet EDS file

B. ADDING DEVICENET IO DEVICE - DISCOVERY

The DeviceNet Router/B can scan the DeviceNet network to discover DeviceNet devices. This is done by going online with the module in Slate, and selecting the *DeviceNet Discovery* tab.

📕 DN	R01 - Stat	JS							- • •
Gene	eral Devic	eNet Statistics	DeviceNe	t Discovery	DeviceNet Exp	licit DeviceNe	t Map EtherNet/IP Originator CIP Statisti	cs Ethernet Clients TCP / ARP	
	Sca	ı							
	Node	Vendor	Device Type	Product Code	Revision	Serial Number	Product Name	EDS File	Project Status

Figure 3.39 – DeviceNet Discovery

After the *Scan* button is pressed, the module will start scanning the DeviceNet network for devices. If a device has been found it will be listed in the window and indicate the status of the device.

Scan								
Node	Vendor	Device Type	Product Code	Revision	Serial Number	Product Name	EDS File	Project Status
4	1	3	40	4.002	1A26958D	E3 EC3 (5-25A)	E3 Plus - 0001000300280400.eds	Unconfigured
6	1	7	1062	5.002	1A27F727	DSA 4-in/2-out		EDS Unavailable
0		,	1002	0.002				

If a matching EDS file was found for the DeviceNet device found, then it will be listed and the user can add the device to the *DeviceNet Connections* IO tree.

R01 - Stat	tus									- 0
ieneral DeviceNetStatistics DeviceNetDiscovery DeviceNetExplicit DeviceNetMap EtherNet/IP Originator CIP Statistics EthernetClients TCP / ARP										
Scan										
Node	Vendor	Device Type	Product Code	Revision	Serial Number	Product Name		EDS File		Project Status
4	1	3	40	4.002	1A26958D	E3 EC3 (5-25A)	F3 F	lus - 0001000300280400 e	ds	Unconfigured
6	1	7	1062	5.002	1A27F727	DSA 4-in/2-out	+	Add Device		EDS Unavailable
						^	s	Set Node Address		
							1. T	Set BAUD		
							+-	Add All Devices		
							_			

Figure 3.41 – DeviceNet Discovery – Add device

From here the user can follow the DeviceNet IO device Setup.

C. ADDING DEVICENET IO DEVICE - MANUAL

A cyclic connection can be added to the *DeviceNet Connections* tree by right-clicking on the tree in Slate and selecting *Add DeviceNet Connection*.

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Project Explorer	
DNTRB Demo	Router/B)
DeviceNet Connecti	ions
	 Add DeviceNet Device
	🗗 Paste Special

Figure 3.42 – Adding DeviceNet Cyclic IO Device Connection

Next the user will need to select the DeviceNet EDS file for the DeviceNet IO device.



NOTE: Only devices with direct connections (i.e., non-proxied devices) will be allowed to be added directly to the DeviceNet Connections tree. Devices that use proxied connections (e.g., 1794 Flex IO via the 1794 Flex adapter) will need to be added under the adapter.

From here the user can follow the DeviceNet IO device Setup.

D. DEVICENET IO DEVICE SETUP

The user will need to setup the connection parameters for the cyclic DeviceNet communication with the DeviceNet IO device.

S DNR01 - Cyclic Connection - 00 - a100DNY42R	
General Parameters	
General	
Instance	Connection Details
Device Name a100DNY42R	Data Exchange Method Polled ~
Node Address 0 ~ Inhibit Connection	Interface Fail Action Continue ~
C Decorate Data	Controller Program Action Continue ~
EDS File DSA Rev 5 0001000704260500.eds	Electronic Keying Disabled V
View EDS	RPI / COS Heartbeat 100 (ms)
Identity	COS Inhibit Time 100 (ms)
Vendor ID 1 Major Revision 5	Size Connection
Device Type 7 Minor Revision 1	Input Transfer (T=>O) 1 (bytes) 1 ~
Product Code 1062	Output Transfer (O=>T) 1 (bytes) 1 ~
Ok	Apply Cancel

Figure 3.43 – IO Device Cyclic DeviceNet Connection Parameters

Parameter	Description					
Device Name						
Device Name	The configurable instance name for the device to be added.					
Node Address	The DeviceNet node address of the DeviceNet IO device.					
Inhibit Connection	When selected, this option disables the cyclic connection and data exchange between the DeviceNet Router and this device.					
	Used in the Logix L5X code generation.					
Decorate Data	When checked, the device's EDS file content will be used to create a device specific UDT structure.					
	When unchecked, the device data will be appear as a SINT array.					
EDS File	The EDS file used for the connection parameters.					
Identity						
Vendor ID	The Vendor ID extracted from the EDS File.					
Device Type	The Device Type extracted from the EDS File.					
Product Code	The Product Code extracted from the EDS File.					
Major Revision	The Major Revision extracted from the EDS File.					
Minor Revision	The Minor Revision extracted from the EDS File.					
Connection Detail						
Data Exchange Method	The cyclic connection can be setup to communicate with the DeviceNet IO device in one of two ways:					
	Polled					
	When the connection has been setup for polled communication, then data will be exchanged between the DeviceNet Router/B and the DeviceNet IO device at the configured RPI.					
	Change of State					
	When the connection has been setup for Change of State (COS) communication, the data will only be exchanged between the DeviceNet Router/B and the DeviceNet IO device when there is a change in the data, thus reducing the traffic on the DeviceNet network.					
	The COS Heartbeat parameter is required to keep the connection alive, should the data not change for an extended period.					
	The COS Inhibit Time parameter is used to limit the data exchange rate to avoid flooding the DeviceNet network when the data from either the DeviceNet Router/B or DeviceNet IO device is changing at a rapid rate.					
Interface Fail Action	When the Ethernet interface communication has failed, the Cyclic DeviceNet IO can be configured to either keep the connection running as is, change the connection status to program mode, or force the connection offline. This will allow the DeviceNet IO to go into a pre-determined state when the					

	communication to the controller (i.e., connection originator on EtherNet/IP) is lost.
Controller Program Action	When the module is configured as a EtherNet/IP Target and the Logix controller goes into a PROG state, the Cyclic DeviceNet IO can be configured to either keep the connection running as is, change the connection status to program mode, or force the connection offline. This will allow the DeviceNet IO to go into a pre-determined state when the EtherNet/IP controller enters Program mode.
Electronic Keying	Electronic Keying can be used to ensure that the target device is the correct device type.
	Disabled
	Keying is not enabled, and no key information will be sent in the connection establishment.
	Compatible
	Keying has been enabled with compatibility enabled. This will allow devices with older firmware to also establish a connection.
	Exact
	Keying has been enabled and the exact device with specific firmware revision will allow the establishment of the connection.
RPI / COS Heartbeat	RPI (when Data Exchange Method is Polled)
	The requested packet interval (RPI) is the rate in milliseconds at which the data will be exchanged between the originator and the target device.
	COS Heartbeat (when Data Exchange Method is Change of State)
	The rate of exchange required to keep the connection alive should there have been no change in data.
COS Inhibit Time	NOTE: Only relevant when Data Exchange Method is Change of State
	The COS Inhibit Time parameter is used to limit the data exchange rate to avoid flooding the DeviceNet network when the data from either the DeviceNet Router/B or DeviceNet IO device is changing at a rapid rate.
Input Size (T=>O)	The size of the data (in bytes) that the DeviceNet IO device will produce.
Output Size (O=>T)	The size of the data (in bytes) that the DeviceNet IO device will consume.

Table 3.3 – Cyclic DeviceNet Connection Parameters

Each DeviceNet IO device can also have device specific parameters that can be modified as required. The user can access this by selecting the *Parameters* tab in the configuration window.



NOTE: To modify or read the parameters from a DeviceNet device, the user will need to be online with the DeviceNet Router/B in Slate.

Group	(All) V Auto Upda	te					
ID	Parameter Name	Stored	Stored Value	Live Value	Units	Access	^
1	Hdw In States					ro	
2	Hdw Out States					ro	
3	I/O Fault Status					ro	
4	Network Inputs					ro	
5	Network Outputs					ro	
6	Module Status					ro	
7	Fn Blocks 1-16					ro	
8	Fn Blocks 17-32					ro	
9	Fn Blocks 33-42					ro	
10	Autobaud Enable		Enable	\sim		rw	
11	Off-to-On Delay		2000		us	rw	
12	On-to-Off Delay		2000		us	rw	
13	Consumed IO Assembly		32			rw	
14	Produced IO Assembly		105			rw	
15	Produced Assy Word 0		1			rw	
16	Produced Assy Word 1		3			rw	~
input sig 000:\t1 n	nal must be fully present for this delay period\nbefore the DSA rep. iillisecond delay\n2000.\t2 millisecond delay\n4000.\t4 millisecond	orts an ON state delay\n8000:\t8	e. The value must be s millisecond delay\n16	et\nin units of microseconds.\nVa 6000:\t16 millisecond delay	alid values are:\n0:\	tNo delay	



Parameter	Description				
Parameter Name	The name of the Parameter.				
Stored	Option to store the value that has been changed in the project configuration. This will allow a user to retrieve the parameter values configured when uploading a project from the DeviceNet Router/B.				
	See the operation section for more information regarding the DeviceNet IO device parameterization.				
	The value that was stored for the specific parameter.				
Stored Value	See the operation section for more information regarding the DeviceNet device parameterization.				
	The current parameter value in the DeviceNet device.				
Live Value	See the operation section for more information regarding the DeviceNet IO device parameterization.				
Units	The engineering unit for the parameter value.				
Accoss	ro – The parameter is read-only.				
ALLESS	rw – The user can read or write the parameter value.				

Table 3.4 – Cyclic DeviceNet Parameters

E. ADDING DEVICENET FLEX IO

Flex (1794) IO modules can be added to the DeviceNet Router module using the 1794-ADN (DeviceNet Flex I/O Adapter).



NOTE: Before starting this process ensure that all the necessary EDS files (adapter and IO module) have been added.

The addition of the 1794-ADN under the *DeviceNet Connections* is no different to that of any other module, that is, by right-clicking on the *DeviceNet Connections* tree and selecting the *Add DeviceNet Connection* option.



Figure 3.45 – Adding DeviceNet Flex Adapter Connection

In the DeviceNet EDS Selector window, select the **1794-ADN** EDS file.

/endorName /All)	Product Name	Catalog	*		Class				
Vendor	Product Name	Catalog	Vendor Device P		Product	Revision	Filename		
Allen-Bradley	1794 - 10 Input/6 Output 24V	1794-IB10X0B6/A	1	Type 7	0001000700290100 eds				
	1794 - 16 Point 24V DC Input	1794-IB16/A		7	34	1.001	0001000700220100.eds		
Aparian	DeviceNet Router/B	A-DNTR/B	1370	12	139	1.001	055A000C008B0100.eds		
Rockwell Automation - Allen-B	E3 Plus 0.4-2A	193-EC2P	1	3	30	3.001	E3 Overload - 00010003001E.		
Rockwell Automation / Allen-Br	PowerFlex 70 200V 25.0A		1	122	2608	2.001	PowerFlex70.eds		
Rockwell Automation/Allen-Bra	. 1794-ADN DeviceNet Flex I/O	1794-ADN/B	1	12	1	2.001	0001000C00010200.eds		
Rockwell Automation/Allen-Bra	E3 5-25A	193/592-EC1C	1	3	7	2.001	E3 Overload - 000100030007		
Rockwell Automation/Allen-Bra	E3 EC3 5-25A	193/592-EC3C	1	3	40	4.001	E3 Plus - 0001000300280400		

Figure 3.46 – Select the DeviceNet Flex I/O Adapter

Configure the correct DeviceNet node address etc., as described in the previous section, and press **Ok**. The 1794-ADN will then be added to the tree.

To add a Flex IO module, right-click on the 1794-Adapter and select the *Add Sub-Module* option.

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Project Explorer 👻 🕈 🖌								
Configuration Solution Solution	Status Rename Duplicate Copy							
X	Delete							
	Add Sub-Module							
	Download Adapter Configuration							

Figure 3.47 – Add Sub-Modules

The DeviceNet EDS Selector window will open with only the 1794 DeviceNet IO modules enabled.

/endor Name	Product Name	•	Catalog			Class	
(All)	~	*		*		*17	94* Reset
Vendor	Product Name	Catalog	Vendor Id	Device Product Type Code		Revision	Filename
Allen-Bradley	1794 - 12 Channel Analog Ou	1794-OE12/A	1	10	112	1.001	0001000A00700100.eds
Allen-Bradley	1794 - 4 Channel 24V DC Isol	1794-IF4I/A	1	1 10		1.001	0001000A001E0100.eds
Allen-Bradley	1794 - 10 Input/6 Output 24V	1794-IB10XOB6/A	1	7	41	1.001	0001000700290100.eds
Allen-Bradley	1794 - 16 Point 24V DC Input,	1794-IB16/A			34	1.001	0001000700220100.eds
Rockwell Automation - Allen-B	E3 Plus 0.4-2A						

Figure 3.48 – Select the DeviceNet Flex IO Module

Select the Flex IO module to match the hardware. The configuration window for the Flex IO module is slightly different to a normal (direct) connection, for example, the *Node* number is replaced with a *Slot* number. Ensure that the *Slot* number is configured correctly.

General Parameters Advanced			
Instance	Connection Details		
Device Name a1794IB16A	Data Exchange Method	Polled ~	
Slot 0 ~	Interface Fail Action	Continue \lor	
✓ Decorate Data	Controller Program Action	Continue \lor	
EDS File 0001000700220100.eds	Electronic Keying	Disabled \sim	
View FDS	RPI / COS Heartbeat	100 (ms)	
Identity	COS Inhibit Time	100 (ms)	
Vendor ID 1 Major Revision 1		Size	Connection
Device Type 7 Minor Revision 1	Input Transfer (T=>O)	0 (bytes)	1 ~
Product Code 34	Output Transfer (O=>T)	0 (bytes)	1 ~
	and a second		

Figure 3.49 – DeviceNet Flex IO Module configuration

The *Parameters* tab can be used to configure the Flex IO module.

DNR01 - Class 1 Connection - 05.00 - a1794IB16A										
Ger	neral	Parar	Advanced							
	Gro	oup	(All) Auto Update							
Γ		ID	Parameter Name	Stored Value		Units	Access			
		1	Points 0-11 Input Filter Time	On->Off/Off->On= 0.256 ms	\sim		rw			
		2	Points 12-15 Input Filter Time	On->Off/Off->On= 8 ms	\sim		rw			
		3	Counter Enable/Disable	Enabled	\sim		rw			
		4	Filter Enable/Disable	Enabled		rw				

Figure 3.50 – DeviceNet Flex IO Parameter configuration



NOTE: The "Store" option is not shown because all of these parameters are automatically stored in the project.

The Flex IO module's configuration includes an *Advanced* tab, which allows the Proxied parameters to be configured. In most cases the default values, which are derived from the EDS file), can be used.

DNR01 - Class 1 Connection - 05.00 - a1794IB16A		
General Parameters Advanced		
Proxied Assemblies	Proxied Parameters	
Input Size 1 v (words)	Program Mode Action Reset to Zero	\sim
Status Size 1 v (words)	Comm. Fault Action Reset to Zero	~
Output Size 0 v (words)	Module Fault Zero Inputs	\sim
Config. Size 1 (words)	External ID 81 02	
	Ok Apply Cancel	



Parameter	Description								
Proxied Assemblies									
Input Size	The size of the Input assembly in words (16bit)								
Status Size	The size of the Status assembly in words (16bit)								
Output Size	The size of the Output assembly in words (16bit)								
Config. Size	The size of the Configuration assembly in words (16bit)								
Proxied Parameters									
	The action to be taken by the IO module when the DeviceNet Connection originator (controller) enters Program mode:								
Program Mode Action	Reset to Zero: Outputs are set to off								
	Hold Outputs in Last State: Outputs do not change.								
	Use Safe State Outputs: Outputs are set to safe state values.								
	The action to be taken by the IO module when the DeviceNet connection to the Adapter is interrupted:								
Comm. Fault Action	Reset to Zero: Outputs are set to off								
	Hold Outputs in Last State: Outputs do not change.								
	Use Safe State Outputs: Outputs are set to safe state values.								
Mandada Faada	The action to be taken by the IO adapter in the event of the IO module faulting, or not being available:								
Module Fault	Zero Inputs: Inputs are set to off								
	Hold Inputs in Last State: Inputs do not change.								
External ID	The unique ID indicating the Flex IO module. This field is read only.								

Table 3.5 – Advanced Configuration

After the Flex IO module's configuration has been accepted, the parent Flex adapter's (1794-ADN) connection sizes will be automatically readjusted to accommodate the Flex IO modules.

This process must be repeated to add all the required Flex IO modules. The Flex IO modules will be shown in the project tree under the Flex Adapter.



Figure 3.52 – DeviceNet Flex IO Adapter and Sub-Modules

Once the configuration has been downloaded to the DeviceNet Router, the Flex IO adapter's configuration must be downloaded.

Before the adapter configuration can be downloaded, the connection must be inhibited. To do this open the 1794-ADN configuration, check the Inhibit Connection option. This change will trigger another download to the DeviceNet Router.

DNR01 - Cyclic Connect	tion - 05 - A1794AD	NB
General Parameters		
General		
Instance		
Device Name		A1794ADNB
Node Address	5 ~	✓ Inhibit Connection
		Decorate Data
EDS File	0001000C000102	00.eds

Figure 3.53 – DeviceNet Flex IO Adapter - Inhibit Connection

Once complete, right-click on the 1794-ADN adapter and select the **Download Adapter Configuration** option.



Figure 3.54 – DeviceNet Flex IO Adapter – Download Configuration

Once the download has completed, the *Inhibit Connection* can be unchecked, and the configuration redownloaded to the DeviceNet Router.

3.5.2.2. DEVICENET EXPLICIT MESSAGE DEVICE CONNECTIONS

Up to 63 DeviceNet devices can be added for explicit unscheduled messaging. The user will need to add each device as explained in the DeviceNet Devices section below. Once the DeviceNet devices have been added the user can then configure the required mapping for the DeviceNet Explicit messaging as shown in DeviceNet Map section below.

A. DEVICENET DEVICES

This tab is enabled when the DeviceNet Mode is set to DeviceNet Scanner.

The DeviceNet Devices configuration is shown in the figure below. Up to 63 DeviceNet devices can be configured with up to 200 DeviceNet mapped items allowing for explicit Unscheduled Unconnected Messaging (UCMM) to any of the 63 configured devices. The data from each DeviceNet device is written to, or read from, an Internal Data Space with a size of 100Kbytes. See the *Explicit DeviceNet Messaging* section for more details.

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



NOTE: A EDS file can be selected for the specific device in the Explicit Devices which will allow the user to select the specific parameters to be accessed in

the *DeviceNet Map* from a drop down list without having to manually entering the message parameters.

S DI	NR01 -	Configura	tion											
Ge	neral [DeviceNet	DeviceNet Devices	DeviceNet Map	PLC5 Map	EtherNet/IP	Devices	EtherNet/IP Ma	p Modbus	Modbus Auxilia	ary Map	Internal Map	Advanced	Monitoring
	Explicit	t DeviceNe	t Device Settings											
	Sc	can Class A	500	ms Scan	Class C	2000	ms							
	Sc	can Class B	1000	ms Scan	Class D	5000	ms							
	Ex	plicit Devic	eNet Devices (max.	of 63 items.)										
		Node Device Name					DS File		Browse	Timeout	Retry	Count C	Offset	
	►	3		MyDSA	000	1000704260)500.eds			100	:	3	0	
	*	•												
						Ok	Ap	oply	Cancel					

Figure 3.55 – DeviceNet Device configuration

The DeviceNet Devices configuration consists of the following parameters:

Parameter	Description						
Scan Class A, B, C, D	The configurable update rates (in milliseconds) for each Scan Class in the DeviceNe Map.						
Device List (per device)							
Node	The DeviceNet node number of the target DeviceNet device.						
Device Name	The user assigned instance name for the specific device.						
EDS File	The EDS file which can optionally be added. The user can browse the DeviceNet El catalog by clicking the Browse button next to the EDS File textbox.						
Timeout	The amount of time (in milliseconds) the module will wait for a response from the target DeviceNet device.						
Retry Count	The number of message retries before the target DeviceNet device is considered offline.						
Comm Status Offset	This is the offset in the Internal Data Space (used to map DeviceNet device data) which provides the communication status of each DeviceNet device. The Communication Status is as shown below:						
	Bit 1 to 7 – Reserved.						

Table 3.6 – DeviceNet Devices - Configuration Parameters

B. DEVICENET MAP

This tab is enabled when the DeviceNet Mode is set to *DeviceNet Scanner*.

The DeviceNet Map configuration is shown in the figure below. Up to 200 DeviceNet mapped items (UCMM messages) can be configured to any of the 63 pre-configured DeviceNet devices. The data from each DeviceNet device is written to, or read from, the Internal Data Space with a size of 100Kbytes. See the *Explicit DeviceNet Messaging* section for more details.

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

5 DNI	R01 - C	Configurati	on																					[
Gene	ral D	eviceNet E	Device	eNet Devices	evice	Net Ma	PL	.C5 Map Eth	erNet	/IP Devices	EtherNet	/IP Map Mo	odbus Mo	dbus Auxilia	ry M	ap Interna	Map Adv	anced Mor	nitoring						
Ex	plicit D	eviceNet M	lap (n	nax. of 200 item	s.)																				
		Device		Parameter		Sc	an	Function	n	Service	Class	Instance	Attribute	DNet Da Type	ta	Input Offset	Get Length	Output Offset	Set Length	Scale	Multiplier	Offset	Map D Type	ata a	Static Value
+	1	MyDSA	~	Id-Vendor		A	~	Get	~	0x00	0x0001	1	1	INT	\sim	4	2	0	0		1	0	INT	~	0
	2	MyDSA	~	I/O Fault Sta		A	~	Get	~	0x00	0x0004	182	3	WORD	\sim	12	2	0	0		1	0	INT	~	0
			~				~		~						\sim									\sim	
												Ok	A	pply		Cancel									

Figure 3.56 – DeviceNet Map configuration

The DeviceNet Map configuration consists of the following parameters:

Parameter	Description
Device	The device instance name configured in the previous DeviceNet Devices tab. The selected device will be used for executing the communication function.
Parameter	If the EDS file has been added for the selected DeviceNet device, then the user can browse the parameters of the device (by clicking the button next to the Parameter textbox) and selecting the required parameter. The message parameters (Class, Instance, Attribute, DataType, Scale, etc.) will automatically be populated once the parameter has been selected.
	The user can select Scan Class A , B , C or D (which was configured in the DeviceNet Devices tab). The specific mapped item will then be executed at that configured scan class rate.
Scan	The user can also select the S class which means that the mapped item will only execute once when communication to the target device is established. If the target device goes offline, then the mapped items with this class will be re-armed, and resent when communication is re-established.
Function	The user can select one of four functions. Get

	The module will read data from the target DeviceNet device by using the Get Single Attribute CIP function. The received data will be placed into the Internal Data Space at the <i>Input Offset</i> location configured in this tab.
	Set The module will write data to the target DeviceNet device by using the Set Single Attribute CIP function. The data to be written will be retrieved from the Internal Data Space at the Output Offset location configured in this tab.
	Set Static
	Similar to the Set function above, but the data to be written will be fixed (equal to the <i>Static Value</i>) parameter in this configuration window. This function will typically be used with the single (S) Scan class which means the DeviceNet Router/B module can be configured to write the fixed value only once when the target device communication has been established.
	Custom
	This function allows the user to use a custom Service to write and read data in the same transaction. The user will need to ensure the custom service is supported by the target device.
Service	The custom CIP service/function which is only available when the <i>Custom</i> function has been selected.
Class, Instance, Attribute	The CIP class, instance, and attribute of the request message to be sent.
DNet Data Type	The data type of the DeviceNet parameter to be read or written.
Input Offset	The location in the Internal Data Space where the received data will be written. This will only be available for <i>Get</i> and <i>Custom</i> functions.
Get Length	The length of the data to be received. If the number of bytes received is more than the Get Length, then the data will not be written to the Internal Data Space.
	This will only be available for <i>Get</i> and <i>Custom</i> functions.
Output Offset	The location in the Internal Data Space from where the data to be written to the target device will be read.
	This will only be available for Set and Custom functions.
Set Length	The length of the data to be written. This will only be available for <i>Set</i> and <i>Custom</i> functions.
Scale	Certain DeviceNet parameters are scaled. These parameters will need to be adjusted when accessing the parameter to ensure the correct value is written to the DeviceNet IO device or read from the DeviceNet IO device. NOTE: When a DeviceNet parameter is selected from the EDS parameters list and a
	parameter is scaled, then the scaling will be automatically updated in the mapping.
Multiplier	The multiply scaling value.

	NOTE: When a DeviceNet parameter is selected from the EDS parameters list and a parameter is scaled, then the multiplier will be automatically updated in the mapping.
Offset	The offset scaling value. NOTE: When a DeviceNet parameter is selected from the EDS parameters list and a parameter is scaled, then the offset will be automatically updated in the mapping.
Map Data Type	The data type which the parameter value to which the parameter value will be converted. For example, if the DNet Data Type is a 16-bit WORD and the Map Data Type is a REAL, then the 16-bit value will be converted into a REAL value before updating (and vice versa).
Statia Value	The value to be written to the target device when the <i>Set Static</i> function has been selected.
Static value	Note : When using the SINT Array data type, the values must be entered as space- delimited hex values. For example: 05 34 2E A1

Table 3.7 – DeviceNet Map configuration parameters

3.5.2.3. INTERNAL DATA SPACE MAPPING

When the module is operating as a DeviceNet Scanner, the data from the DeviceNet IO devices can be mapped to the Ethernet interface using the Internal Map. The Internal Map configuration window is opened by either double clicking on the module in the tree or right-clicking the module and selecting *Configuration* and selecting the *Internal Map* tab.

A. IDS COPY – DEVICENET ORIGINATOR SOURCE

When copying data from a DeviceNet IO to the Primary Interface, the source type needs to be DNet Scanner.

NR01 ·	- Configuration DeviceNet DeviceN	etDevices DeviceNe	et Map PLC5 Ma	ap EtherNet	/IP Devices	EtherNet/IP Map Mod	bus Modbus Auxilia	ary Map Internal	Map Advanc	ed Monitoring	1		
Intern	al Map (max. of 200 i	tems.)								_		Rec	ommend
	Source Type	Source Instance	Source Sub-Tag	Source Offset	Source Bit Offset	Destination Type	Destination Instance	Destination Sub-Tag	Destination Offset	Destination Bit Offset	Count	Copy Function	Reformat
*	~					~						~	
	Internal EIP Target EIP Originator MB Register DNet Target <u>DNet Scanner</u> System				^								

Figure 3.57 – IDS Copy – DeviceNet Scanner Source Type

The source instance will be one of the DeviceNet IO devices added to the DeviceNet IO tree in Slate.

Project Explorer ······ + # ×															
⊖ Å DNTRB Demo ⊖ I DNR01 (DeviceNet Router/B)	S D	NR01 -	 Configuration 												- 🗆 🗙
Configuration DeviceNet Connections	Ge	neral	DeviceNet DeviceN	et Devices DeviceN	et Map PLC5 Ma	ap EtherNet	IP Devices	EtherNet/IP Map Mod	dbus Modbus Auxilia	ry Map Internal	Map Advance	ed Monitoring			
		Interna	al Map (max. of 200 i	tems.)										Re	commend
			Source Type	Source Instance	Source Sub-Tag	Source Offset	Source Bit Offset	Destination Type	Destination Instance	Destination Sub-Tag	Destination Offset	Destination Bit Offset	Count	Copy Function	Reformat
		► 1	DNet Scanner V	DSA42100DNY4: ~	Data 🗸	0		~			0		1	Byte t V	None ~
		•	~	DSA42100DNY42R5				~						~	
				EJEGJSZSA											

Figure 3.58 – IDS Copy – DeviceNet Scanner Source Instance

The Source Offset is the offset in the selected DeviceNet device Cyclic **Input** Assembly (data being produced by the DeviceNet IO device). The Count is the number of **bytes** that will be copied. See the Internal Data Space Mapping section for more information regarding the operation.

The user can select to copy either the Data, or the Status, from DeviceNet connection.

S	D	NR	01	- Configura	tion								
	Ge	ener	al	DeviceNet	Devic	:eN	et Devices	Devic	eN∉	et Map	PLC	5 Ma	p Etł
	Internal Map (max. of 200 items.)												
				Source	Туре		Source I	nstanc	e	So Sub	urce p-Tag	J	Sou Off
		►	1	DNet Scar	nner	\sim	DSA42100)D	\sim	Data		\sim	(
		*				\sim				Data Status			

Figure 3.59 – IDS Copy – DeviceNet Originator Status

When selecting the status, the format of the Status information is shown below:

Parameter	Data Type	Description
		Bit 0 – Online
DeviceNet Scanner Connection Status	DINT	Bit 1 – Cyclic Data Exchange Ok
		Bit 2 – Device Mismatch
Node	SINT	The target DeviceNet device Node number.
Reserved	SINT	Reserved for future use.
Cyclic Communication Timeout Count	DINT	Number of times the cyclic connection has gone offline.
Cyclic Communication Tx Count	DINT	Number of cyclic connection bytes sent.
Cyclic Communication Rx Count	DINT	Number of cyclic connection byte received.

Table 3.8 – DeviceNet Scanner Connection Status

B. IDS COPY – DEVICENET TARGET DESTINATION

When copying data from the Primary Interface to a DeviceNet IO device's **Output** Assembly, the destination type needs to be DNet Scanner.

nei	al	- DeviceNet Device	eNe	et Devices DeviceN	let Map PLC5 Ma	ap EtherNet	/IP Devices	EtherNet/IP Map Mo	dbus Modbus Auxilia	ry Map Interna	Map Advance	ed Monitoring					
Int	lerni	al Map (max. of 20	0 it	tems.)										I	Reco	mmenc	d
		Source Type		Source Instance	Source Sub-Tag	Source Offset	Source Bit Offset	Destination Type	Destination Instance	Destination Sub-Tag	Destination Offset	Destination Bit Offset	Count	Copy Function		Reform	nat
	1	DNet Scanner	~	DSA42100D ~	Data ~	0		EIP Target V	Connection 0 V		100		1	Byte t	~ N	one	
	2	EIP Target	~	Connection 0 V		20		~			0		1	Byte t	~ N	one	Т
•			~					Internal EIP Target EIP Originator MB Register DNet Target DNet Scanner							~		

Figure 3.60 – IDS Copy – DeviceNet Scanner Destination Type

The destination instance will be one of the DeviceNet IO devices added to the DeviceNet IO tree in Slate.

Project Explorer		1 - Configuration												- -	×
Configuration DeviceNet Connections d+ DeviceNet Connections 05 - F3FC3555a	Genera	DeviceNet Device	Net Devices DeviceN I items.)	let Map PLC5 Ma	ap EtherNet	IP Devices	EtherNet/IP Map M	lodbus Modbus Auxilia	ny Map Internal	Map Advanc	ed Monitoring		R	ecommend	1
00 20200201	I E	Source Type	Source Instance	Source Sub-Tag	Source Offset	Source Bit Offset	Destination Type	Destination Instance	Destination Sub-Tag	Destination Offset	Destination Bit Offset	Count	Copy Function	Reform	not
		DNet Scanner	DSA42100D \viewspace	Data ~	0		EIP Target	Connection 0		100		1	Byte t	None	~
	• · ·	EIP Target	Connection 0		20		DNet Scanner	DSA42100DNY4: ~	Data ~	0		1	Byte t	None	~
	•		/				,	DSA42100DNY42R5 E3EC3525A						·	

Figure 3.61 – IDS Copy – DeviceNet Scanner Destination Instance

The Destination Offset is the offset in the selected DeviceNet device Cyclic **Output** Assembly (data being consumed by the DeviceNet IO device). The Count is the number of **bytes** that will be copied. See the Internal Data Space Mapping section for more information regarding the operation.

3.6. PRIMARY INTERFACE

The DeviceNet Router/B module supports five different modes for the Primary Interface.

3.6.1. PCCC CLIENT

The module will enable Ethernet PCCC (AB-ETH) communication that allows the module to emulate a PLC5 providing an interface for PanelViews and other legacy devices over DeviceNet.



NOTE: When the PCCC Client mode is selected, the DeviceNet Mode will automatically be set to Target.

The PCCC IP Address (the IP Address used to emulate a PLC5 controller) will need to be configured to allow the legacy device to communicate with the DeviceNet Router/B using the PCCC Ethernet protocol.

This IP address will be seen as the IP address of the PLC5 controller that the DeviceNet Router/B is emulating. Therefore, there will be two IP addresses on the network when in PLC5 Emulation mode. One for the actual target module and one for the emulated PLC5 controller.



NOTE: These two IP addresses must <u>not</u> be the same.

NOTE: The legacy device will need to use the PCCC IP Address as the target IP address and **not** the module IP address.

S DNR01	- Configuration										- C ×
General	DeviceNet Dev	ceNet Devices DeviceNet Map	PLC5 Map Ether	Net/IP Devices	EtherNet/IP Map	Modbus	Modbus Auxiliary Map	Internal Map	Advanced	Monitoring	
PLC	С5 Мар										
	PCCC IP Address	; 192 . 168 . 1	. 148								
	Produced File	N 10									
	Consumed File	N 11									
	Diagnostic File	N 7									
				Ok	Apply	Can	cel Help				

Figure 3.62 – PCCC Client Mode – IP Address Configuration

Parameter	Description
PCCC IP Address	The IP Address used to emulate a PLC5 controller. This IP address will be seen as the IP address of the PLC5 controller that the DeviceNet Router/B is emulating. Therefore, there will be two IP addresses on the network when in PLC5 Emulation mode. One for the actual target module and one for the emulated PLC5 controller.
Produced File	The "PLC5" data file emulation to be used for the DeviceNet produced data.
Consumed File	The "PLC5" data file emulation to be used for the DeviceNet consumed data.
Diagnostic File	The "PLC5" data file emulation to be used to expose the module's diagnostic data.

Table 3.3 – DeviceNet configuration parameters

3.6.1.1. FTVIEW CONFIGURATION

The DeviceNet Router/B can be interfaced directly to FTView using PCCC (PLC5 Ethernet emulation). This is illustrated in the following example where a PanelView is configured to read data from the DeviceNet Router/B.

Using FTView Studio (Machine Edition) create a new project.



Figure 3.63 - FTView project

A. COMMUNICATION

To configure the communication link to the DeviceNet Router/B, select the **Communication Setup** under the **RSLinx Enterprise** section. If the RSLinx Enterprise heading does not appear, then it should be added by right-clicking on the project and selecting **Add New Server**.





The *Communication Setup* dialog will open. Under the *Device Shortcuts* group box, click on the *Add* button to create a new shortcut. Rename the shortcut as required. In this example the shortcut is renamed to "DNR".

© Communication 9	5etup - RNA://\$Local/PV1/RSLinx Ente	erprise		
Device Shortcuts		Design (Local)	Runtime (Target)	
Add Remove	Apply			Copy from Design to Runtime
* DNR		RSLinx	Enterprise, VM-DB6CDF251 19-A17, Backplane erNet, Ethernet Not Browsing	902
Offline Tag File				Browse
Shortcut Type	Processor			

Figure 3.65 – Adding Device Shortcut

With the newly created device shortcut selected, right-click on the *Ethernet* network and select the *Add Device* option.

B Communication S	etup - RNA://\$Local/P¥1/RSLinx Ente	erprise		
Device Shortcuts		Design (Local)	Runtime (Target)	
Add Remove	Apply			Copy from Design to Runtime
DNR		E RSLinx	Enterprise, VM-DB6CDF25190	2]
		Eth	9-A17, Backplane erN	
			Add Device Delete	
			Delete Children	
			Show All Devices	
			Properties	
		Mode: Online	Not Browsing	
Offline Tag File				Browse
Shortcut Type	Processor			
				OK Cancel Verify Help

Figure 3.66 – Adding Ethernet Device

The *Add Device* dialog will open. Under the *Ethernet PLC devices* section, select the *1785-L40E PLC-5/40 Processor with an Ethernet interface* option.



NOTE: The DeviceNet Router/B supports a PLC5 emulation mode, allowing it to be accessible by RSLinx Enterprise.



Figure 3.67 – Ethernet Device Selection

In the *Device Properties* page, enter the DeviceNet Router's IP address, and then click on the Ok button.



NOTE: The user will need to enter the PLC5 emulation IP address for the PLC5 shown below, and not the DeviceNet Router's primary (EtherNet/IP) IP address.

Device Properties	X
General	
Name PLC-5/40 Processor with an E	
Address 192 . 168 . 1 . 180	
OK Cancel Apply Help	

Figure 3.68 – Device Properties

At the top of the *Communication Setup* dialog, select the *Copy from Design to Runtime* button. As the name implies, this copies the configuration to be used by the PanelView at runtime. Select the *Ok* button to close the *Communication Setup* dialog.

B. ANIMATION

Once the communication has been correctly configured, objects can be linked to the DeviceNet Router/B data points. Create a new graphic Display by right-clicking on the **Display** item, under the **Graphics** section.



Figure 3.69 – Adding a Graphical Display

A blank Display dialog will be created. To display a number, select the *Numeric Display* object, from either the toolbar or from the *Numeric and String* menu, located under in *Objects* menu.

🛃 Untitled - /P¥1// (Display)						_D×
	Numeric Displa	ay Pr	operties		X	1
	General Con	nmon	Connections			
NINININI	Name		Tag / Expression	Tag	Exprn	
	Value	←		••••	•••	
	Polarity	←		•••	•••	

Figure 3.70 – Numeric Display Connections

The Numeric Display can now be linked to a DeviceNet Router/B data point using the *Connections* tab. Select the *Tag* (...) button adjacent to the *Value* item. The FTView Tag Browser dialog will open. To view all the available data points, select the *Refresh All Folders* button.

í

NOTE: The DeviceNet Router/B must be online for the tag browsing option to work.

Tag Browser				? ×
Select Tag				
Folders	Contents of V::DNR/	Online/N33'		
■ ■ ● DNR ■ ● Diagnostics ■ ● Online ■ ● N31 ■ ● N77 ● ● System	Name N33:0 N33:1 N33:10 N33:11 N33:11 N33:12 N33:13 N33:13	Access Rights ReadWrite ReadWrite ReadWrite ReadWrite ReadWrite ReadWrite	Description	
Refresh All Folders Tag filter:	N33:14 N33:15 N33:16	ReadWrite ReadWrite DeadWrite		•
Selected Tag				
[DNR]N33				
Home area: /				
		ОК	Cancel	Help

Figure 3.71 – Browsing Data Points

The data files, as configured in the DeviceNet Router's PLC5 Map tab, will appear under the **Online** section. Select the required data point to be connected to the Numeric Display. In this example, N31 and N33 represent the Input and Output data respectively and N77 represents the diagnostic data.

C. DIAGNOSTIC DATA

Various diagnostic items can be displayed in the FTView using the Diagnostic File. The diagnostic file number (e.g. N77) is configured in the DeviceNet Router's PLC5 Map tab. The meaning of each diagnostic data point is tabulated below.

Offset	Group	Description
		DeviceNet Polling Status
0		Bit 0 – Connection Active - Poll
0		Bit 1 – Connection Standby
		Bit 2 – Connection Active - COS
1		Rx Can Packet Count
2	ţ	Tx Can Packet Count
3	eNe	CAN CRC Errors
4	ivic	CAN Bit Errors
5	De	Can Stuff Errors
6		UCCM Connection Open
7		UCCM Connection Close
8		IO Connections
9		Poll Commands
10		Fragment Ack Errors

11		Explicit Fragment Error
12		Poll Fragment Error
13		Explicit Client Not Found
14		Duplicate Node Detected
15		PCCC Connection Requests
16		PCCC Read Requests
17	net	PCCC Write Requests
18	Jeri	PCCC Unsupported Command
19	Etl	PCCC Unsupported FNC Code
20	ÿ	PCCC Client Not Found
21	DO	PCCC Client Max Reached
22		PCCC File Not Found
23		Current Connections
24	Module	DeviceNet Router/B Internal Temperature

Table 3.9 -	Diagnostic	File
-------------	------------	------

3.6.2. ETHERNET/IP TARGET

A controller (e.g. Logix controller) can own the DeviceNet Router/B over EtherNet/IP using up to 4 Class 1 EtherNet/IP connections when the Primary Interface is set to EtherNet/IP target. This will allow the DeviceNet Router/B to exchange data with the controller using the input and output assembly of the Class 1 EtherNet/IP connections. Data from DeviceNet devices can be mapped to the Logix controller over EtherNet/IP.

The user will need to add the DeviceNet Router/B to the Logix IO tree under a EtherNet/IP bridge (e.g. 1756-EN2TR) or Ethernet Logix controller (e.g. 1756-L85E).

3.6.2.1. STUDIO / LOGIX 5000 CONFIGURATION A. ADD MODULE TO ETHERNET/IP I/O CONFIGURATION

The DeviceNet Router/B 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).



NOTE: Logix version 21 and newer supports EDS AOPs.

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

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



Figure 3.72 – EDS file upload from DeviceNet Router/B

Alternatively, the EDS file can be downloaded from the product web page at <u>www.aparian.com</u> and registered manually using the EDS Hardware Installation Tool shortcut under the Tools menu in Studio 5000.

💰 Logix Designer - D	ONTRB_Demo [1756-L75	32.11]							
FILE EDIT VIEW	V SEARCH	LOGIC	COMMU	NICATI	ONS	TOC	DLS	WINDOW	HELP	
🏠 😩 💾 🖶	¥ 🗋 🕄	26					Opt	ions		
■ RUN ■ OK	`∥́ Р	ath: AB_ET	HIP-1\192.	168.1.6	\Backp	6	Secu Doc	urity cumentation	Language	s
Energy Storage I/O	Offline		No Forces		- ▶_ 1		Imp	ort		•
Controller Organizer				• Ф	×		Expo	ort		•
o "						9	EDS	Hardware Ir	stallation	Tool
Controller DNTRB_Demo										
Controller Tags			Motion			•				
Controller Fault Handler				Mor	nitor Equipm	ent Phase	s			
Power-Up Handler				Dhug In Managar						
🔺 🗐 Tasks							FIUG	y-m wanage		
A C MainTask				Custom Tools						
🔺 🔓 MainPro	ogram									
Para	ameters and L	ocal Tags				194	Con	troiflash		

Figure 3.73 - EDS Hardware Installation Utility

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



Figure 3.74 – Adding a module

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

aparian	Clear Filters		Show Filters
Catalog Number	Description	Vendor	Category
A-CANOR/B	CANopen Router/B	Aparian Inc.	Communications Adapter
A-DNTR/B	DeviceNet Router/B	Aparian Inc.	Communications Adapter
A-DVS	DV Scanner	Aparian Inc.	Communications Adapter
A-FFL/B	FF Link/B	Aparian Inc.	Communications Adapter
A-MBR/B	Modbus Router/B	Aparian Inc.	Communications Adapter
A-PAL/B	PA Link/B	Aparian Inc.	Communications Adapter
A-TSM	Time Sync	Aparian Inc.	Communications Adapter

Figure 3.75 – Selecting the module

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

New Module			×
General*	General		
- Connection - Module Info - Internet Protocol - Port Configuration	Type: Vendor: Parent Name: Description: Description: Revision: Electronic Key Connections:	A-DNTR/B DeviceNet Router/B Aparian Inc: Eth DNR01	
Status: Creating		OK Cancel He	lp

Figure 3.76 – Module instantiation

The DeviceNet Router/B supports up to 4 class 1 EtherNet/IP connections. The user will need to ensure that the number of connections configured in the General tab of the module configuration matches the selected connection count in Logix.

New Module			×
General*	General		_
Connection Module Info Internet Protocol Port Configuration	Type: Vendor: Parent Name: Description:	A-DNTR/B DeviceNet Router/B Aparian Inc. Eth DNR01 Private Network: 192 168.1. 147 IP Address: Host Name:	
Status: Cracting	Module Defin Revision: Electronic Ke Connections:	ition 1.001 ying: Compatible Module VO Connection Change	

Figure 3.77 – Change number of IO Connections
Next the user will need to select the number of connections required.

Module Definit	ion							×
Revision:	1	\sim	0	01 🜲				
Electronic Keying:	Con	npatible	Module			\sim		
Connections:								
Name			Size		Tag S	uffix		
I/O Connection		Input: Output	500 496	SINT	1	DNTRB01 DNTRB01	l:l1 l:01	
	~							
I/O Connection 2 I/O Connection 3 I/O Connection 4								
			(ОК	Car	icel	H	lelp

Figure 3.78 – Selection of IO Connections

Now the DeviceNet Router/B module will be in the Logix IO tree.



Figure 3.79 – Logix IO tree

The Module Defined Data Types will automatically be created during the instantiation process. These module defined tags will need to be copied to and from meaningful structures.

B. LOGIX MAPPING

Slate will generate the required UDTs and Routines (based on the Internal Map) to map the required DeviceNet input and output data. The user will need to select the *Recommend* button in the Internal Mapping to auto populate the Internal Mapping which can then be used to generate the L5X file for Logix mapping, routines, and UDTs

5	DNR01	- Configuration												- 🗆 🗙
	General	DeviceNet DeviceN	let Devices DeviceNe	et Map PLC5 Ma	p EtherNet	/IP Devices	EtherNet/IP Map Mo	dbus Modbus Auxiliary	Map Internal	Map Advanc	ed Monitoring			
	Interr	nal Map (max. of 200	items.)										Red	ommend
		Source Type	Source Instance	Source	Source	Source Bit	Destination Type	Destination	Destination	Destination	Destination Bit Offect	Count	Copy	Reformat
	ba .	~		Sub Tug	Oliset	Oliset	~	instance	Sub Tug	Oliset	Dir Oliser		~ ~	

Figure 3.80 – Internal Mapping Recommend

S DeviceNet Auto-Map Options	×
Auto-Map Options	
System Status	
Device Status	
Modbus HR Start 1000	
Ok Cancel]

Figure 3.81 – Auto Map Options popup

eral	DeviceNet Devi	ceN	et Devices Devic	eN	et Map PLC	5 Ma	ap EtherNet	/IP Devices	EtherNet/IP Map	Мо	dbus Modbus Au	ixilia	ry Map Internal I	Map Advance	ed Monitoring				
Inter	nal Map (max. of 2	200 i	tems.)														Re	commen	d
	Source Type	•	Source Instanc	e	Source Sub-Tag	,	Source Offset	Source Bit Offset	Destination Ty	ре	Destination Instance		Destination Sub-Tag	Destination Offset	Destination Bit Offset	Count	Copy Function	Refor	mat
1	System	~			Status	\sim	0		EIP Target	~	Connection 0	~		0		16	Byte t V	None	
2	DNet Scanner	~	DSA42100D	\sim	Status	\sim	0		EIP Target	~	Connection 0	\sim		16		4	Byte t V	None	П
3	DNet Scanner	~	DSA42100D	~	Data	~	0		EIP Target	~	Connection 0	~		20		1	Byte t ~	None	Т
4	EIP Target	~	Connection 0	\sim			0		DNet Scanner	~	DSA42100D	\sim	Data 🗸	0		1	Byte t V	None	П
5	DNet Scanner	~	E3EC3525A	\sim	Status	\sim	0		EIP Target	~	Connection 0	\sim		21		4	Byte t V	None	П
6	DNet Scanner	~	E3EC3525A	~	Data	\sim	0		EIP Target	~	Connection 0	~		25		8	Byte t ~	None	Т
7	EIP Target	~	Connection 0	~			1		DNet Scanner	~	E3EC3525A	~	Data ~	0		1	Byte t V	None	T
		~								~							~		

Figure 3.82 – Internal Mapping Auto Populated

The user can then generate the required Logix and UDTs by right-clicking on the module in Slate and selecting the *Generate Logix L5X* option.



Figure 3.83 – Selecting Generate Logix L5X

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

Select a Logix XML	L Import/Export File					×
← → • ↑ 📕	> This PC > Documents > Aparian >			~	ර 🔎 Search Apa	rian
Organize 👻 Nev	<i>w</i> folder					= • ?
	^ Name	Date modified	Туре	Size		1
3D Objects						
E. Desktop						
Documents						
🖶 Downloads						
Music						
Pictures						
Videos						
😍 OS (C:)						
Motwork	×					`
File name:	DNR01.L5X					~
Save as type:	Logix XML File (*.L5X)					~
 Hide Folders 					Save	Cancel

Figure 3.84 – Selecting the Logix L5X file name

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

Controller Organizer		•	д Х				
J =							
 Controller DNTRB_Demo Controller Tags Controller Fault Handler Power-Up Handler Tasks MainTask 				-			
Parameters and Lo		Add		•		New Routine	
🛍 MainRoutine	፠	Cut		Ctrl+X	Q	New Local Tag	Ctrl+W
Unscheduled	ŋ	Сору		Ctrl+C		New Parameter	
 Motion Groups Ungrouped Axes 	Ô	Paste		Ctrl+V		Import Routine	
Assets		Delete		Delete			
Logical Model		Verify					
I/O Configuration I/O Configuration I/O Configuration I/O Configuration		Cross Reference		Ctrl+E			
[] [0] 1756-L75 DNTRB_I		Browse Logic		Ctrl+L			
[1] 1756-EN2TR Eth		Find in Logical Or	rganiz	er			
▲ 盐 Ethernet 1756-EN2TR Et		Online Edits		•			
🚺 A-DNR/B DNR(Print		×			
		Export Program					
		Properties	Alt	+Enter			

Figure 3.85 – Importing the L5X file into Studio 5000

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

The import will create the following:

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

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

0	JSR Boutine Name	DND01Map	
0	Routine Name	ычко пиар	

Figure 3.86 – Calling the mapping routine



Figure 3.87 – Imported Logix Objects

A number of DeviceNet Router/B specific (UDT) tags are created.

The System tag displays the status and diagnostics information of the DeviceNet Router/B.

▲ DNR01In	{}	{}	DNR01In635A
 DNR01In.SystemStatus 	{}	{}	DNetSystemStatus
DNR01In.SystemStatus.ConfigValid	0	Decimal	BOOL
DNR01In.SystemStatus.EIPOriginatorCommsOk	0	Decimal	BOOL
DNR01In.SystemStatus.ModbusOnline	0	Decimal	BOOL
DNR01In.SystemStatus.DnetOriginatorCommsOk	0	Decimal	BOOL
DNR01In.SystemStatus.EIPOwned	0	Decimal	BOOL
DNR01In.SystemStatus.DNetOwned	0	Decimal	BOOL
DNR01In.SystemStatus.PowerMainConnector	0	Decimal	BOOL
DNR01In.SystemStatus.PowerCANConnector	0	Decimal	BOOL
DNR01In.SystemStatus.DuplicateNodeNumber	0	Decimal	BOOL
DNR01In.SystemStatus.NTPOk	0	Decimal	BOOL
DNR01In.SystemStatus.ConfigCRC	16#0000	Hex	INT
DNR01In.SystemStatus.ActualBAUD	0	Decimal	SINT
DNR01In.SystemStatus.ActualNode	0	Decimal	SINT
DNR01In.SystemStatus.DNetTargetPollActive	0	Decimal	BOOL
DNR01In.SystemStatus.DNetTargetNullPoll	0	Decimal	BOOL
DNR01In.SystemStatus.DNetTargetCOSActive	0	Decimal	BOOL



There is also a tag created for each configured DeviceNet IO device using cyclic communication. The structure of which comprises the following:

- Input Status Status related to DeviceNet IO device
- Input Data As specified in the DeviceNet IO configuration and internal mapping
- Output Data As specified in the DeviceNet IO and internal mapping

DNR01In	{}	{}		DNR01In635A
DNR01In.SystemStatus	{}	{}		DNetSystemStatus
 DNR01In.DSA42100DNY42R50Status 	{}	{}		DNetDeviceStatus
DNR01In.DSA42100DNY42R50Status.Online	0		Decimal	BOOL
DNR011n.DSA42100DNY42R50Status.DataExchangeActive	0		Decimal	BOOL
DNR01In.DSA42100DNY42R50Status.DeviceMismatch	0		Decimal	BOOL
DNR01In.DSA42100DNY42R50Status.Node	0		Decimal	SINT
DNR01In.DSA42100DNY42R50Data	{}	{}	Decimal	SINT[1]
 DNR01In.DSA42100DNY42R50Data DNR01In.DSA42100DNY42R50Data[0] 	{} 0	{}	Decimal Decimal	SINT[1] SINT
 DNR01In.DSA42100DNY42R50Data DNR01In.DSA42100DNY42R50Data[0] DNR01In.E3EC3525AStatus 	{} 0 {}	{} {}	Decimal Decimal	SINT[1] SINT DNetDeviceStatus
DNR01In.DSA42100DNY42R50Data DNR01In.DSA42100DNY42R50Data[0] DNR01In.E3EC3525AStatus DNR01In.E3EC3525AData	() 0 ()	{} {} {}	Decimal Decimal Decimal	SINT[1] SINT DNetDeviceStatus SINT[8]
DNR01In.DSA42100DNY42R50Data DNR01In.DSA42100DNY42R50Data[0] DNR01In.E3EC3525AStatus DNR01In.E3EC3525AData DNR01Out	() 0 () ()	{} {} {}	Decimal Decimal Decimal	SINT[1] SINT DNetDeviceStatus SINT[8] DNR01Out635A
 DNR01In.DSA42100DNY42R50Data DNR01In.DSA42100DNY42R50Data[0] DNR01In.E3EC3525AStatus DNR01In.E3EC3525AData DNR01Out DNR01Out DNR01Out.DSA42100DNY42R50Data 	() 0 () () ()	{} {} {} {}	Decimal Decimal Decimal Decimal	SINT[1] SINT DNetDeviceStatus SINT[8] DNR01Out635A SINT[1]

Figure 3.89 – DeviceNet IO Device-Specific tags



NOTE: The Logix tags for the data being produced and consumed by the DeviceNet IO device will be SINT arrays with a size matching the connection sizes when the Decorate Data option has been unchecked. Device specific UDTs will be created when this option has been checked. With some devices, it may be useful to copy this data into application specific,

or device specific, UDTs for better context.

3.6.2.2. INTERNAL DATA SPACE MAPPING

When the module is operating as an EtherNet/IP Target, the data from the originator device (e.g. Logix Controller) can be mapped to the DeviceNet interface using the Internal Map. The Internal Map configuration window is opened by either double clicking on the module in the tree or right-clicking the module and selecting *Configuration* and selecting the *Internal Map* tab.

A. IDS COPY – ETHERNET/IP TARGET SOURCE

When copying data from a connection originator (e.g. the output assembly from the Logix Controller) to the DeviceNet interface, the source type needs to be EIP Target.

DNR01	- Configuration												
General	DeviceNet DeviceNet	et Devices DeviceNe	et Map PLC5 Ma	p EtherNet	/IP Devices E	EtherNet/IP Map Mod	bus Modbus Auxili	ary Map Internal	Map Advanc	ed Monitoring			
Interr	nal Map (max. of 200 i	tems.)											Recommend
	Source Type	Source Instance	Source Sub-Tag	Source Offset	Source Bit Offset	Destination Type	Destination Instance	Destination Sub-Tag	Destination Offset	Destination Bit Offset	Count	Copy Function	Reformat
) H	~					~						~	
	Internal EIP Target												
	EIP Originator MB Register												
	DNet Target DNet Scanner												
	System												

Figure 3.90 – IDS Copy – EtherNet/IP Target Source Type

The source instance will be the connection number, which can be connection 0 to 3, based on the number of connections configured. The Source Offset is the offset in the EtherNet/IP output assembly from where the data must be copied. The Count is the number of **bytes** that will be copied.

See the Internal Data Space Mapping section for more information regarding the operation.

B. IDS COPY – ETHERNET/IP TARGET DESTINATION

When copying data from the DeviceNet interface to the EtherNet/IP Target input assembly, the destination type needs to be EIP Target.

neral	DeviceNet Device	Net Devices DeviceN	et Map PLC5 Map	EtherNet/	IP Devices	EtherNet/IP Map Mo	dbus Modbus Auxilia	ry Map Internal	Map Advance	ed Monitoring				
Interr	nal Map (max. of 200	items.)												Recommend
	Source Type	Source Instance	Source Sub-Tag	Source Offset	Source Bit Offset	Destination Type	Destination Instance	Destination Sub-Tag	Destination Offset	Destination Bit Offset	Count	Copy Function	n	Reformat
1	EIP Target	Connection 0 V		0		DNet Scanner V	DSA42100D ~	Data 🗸	0		1	Byte to Byte	~	None
2	DNet Scanner	/ DSA42100D /	Data 🗸	0		~			0		1	Byte to Byte	~	None
	×	1				Internal							~	
						EIP Target EIP Originator MB Register DNet Target DNet Scanner								

Figure 3.91 – IDS Copy – EtherNet/IP Target Destination Type

The destination instance will be the connection number, which can be connection 0 to 3, based on the number of connections configured. The Destination Offset is the offset of the EtherNet/IP input assembly from where the data must be copied. The Count is the number of **bytes** that will be copied.

3.6.3. MODBUS SERVER

The DeviceNet Router/B can operate as a Modbus Server for Modbus TCP, RTU232, and RTU485. A Modbus Client can read and write to the full Modbus Register range in the DeviceNet Router/B. The DeviceNet Router/B can operate as a Modbus Server for Modbus TCP, Modbus RTU232, and Modbus RTU485 simultaneously. The user will need to configure the relevant Modbus Parameters as shown below.

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

S DNR01 - Configuratio	in									
General DeviceNet De	eviceNet Devices	DeviceNet Map	PLC5 Map	EtherNet/IP Devic	ces EtherNet/IP Map	Modbus Mo	dbus Auxiliary Map	Internal Map	Advanced	Monitoring
Modbus Settings					RS232 Port					
Local Node	2 ~	,			BAUD Rate	e 19200	 ✓ (kbit/s) 			
TCP Port	502	(0 implies de	fault port 50	2)	Parity	None	\sim			
Update Rate	1000	(ms)			RS485 Port					
Retry Limit	3				BAUD Rate	9 19200	✓ (kbit/s)			
Response Timeo	ut 1000	(ms)			Parity	None	\sim			
Inactivity Timeout	t 2000	(ms)				Termin	nate RS485			
Base Offset Type	Modbus (Ba	se 0) 🗸 🗸								
			Ok	Apply	Cancel	Help				

Figure 3.92 – Modbus Configuration

The Modbus Communication	n configuration consists	of the following parameters:
--------------------------	--------------------------	------------------------------

Parameter	Description
Local Node	The Modbus Node address assigned to the DeviceNet Router/B.
TCP Port	The TCP port to be used for the Modbus communication. By default, the module will use the standard TCP port 502.
Update Rate	The period (in milliseconds) between Client requests to the target Modbus device.
	(Modbus Client mode only)
Retry Limit	The number of successive Modbus request retries before the request is set to have failed.
	(Modbus Client mode only)
Response Timeout	The time (in milliseconds) the module will wait for a valid Modbus response. (Modbus Client mode only)
Inactivity Timeout	The amount of time during which no Modbus requests have been received before the DeviceNet Router/B indicates that the connection to the Modbus Client is no longer active. (Modbus Server mode only)
Pasa Offsat Tupa	Modbus (Paso 0)
base Oliset Type	Conventional Modbus addressing where the first address is 0
	Conventional would addressing where the first address is 0.

	PLC (Base 1)
	PLC addressing, where the first address is 1.
	RS232 Port
BAUD Rate	The RS232 serial port's BAUD rate. (Modbus RTU232)
Parity	The RS232 serial port's Parity configuration. (Modbus RTU232)
	RS485 Port
BAUD Rate	The RS485 serial port's BAUD rate. (Modbus RTU485)
Parity	The RS485 serial port's Parity configuration. (Modbus RTU485)
Terminate RS485	Enables the on-board 125 Ω RS485 terminating resistor.

Table 3.10 – Modbus parameters

The Modbus Node Number will need to be configured in the parameters above to allow a Modbus Client to access the DeviceNet Router/B as a Modbus Server device.

3.6.3.1. INTERNAL DATA SPACE MAPPING

When the module is operating as a Modbus Server, the data from the Modbus Registers (used to exchange data with the Modbus Client) can be mapped to the DeviceNet interface using the Internal Map. The Internal Map configuration window is opened by either double clicking on the module in the tree or right-clicking the module and selecting *Configuration* and selecting the *Internal Map* tab.



NOTE: The user can select the *Recommend* button in the Internal Map to auto map the DeviceNet parameters to recommended Modbus Registers.

internal	DeviceNet DeviceNe	t Devices DeviceNe	t Map PLC5 Map	EtherNet	/IP Devices	EtherNet/IP Map	Maallaura				
Internal	I Map (max. of 200 ite	ems.)				anionite the map	woodbus	Modbus Auxiliar	y Map Internal	Map Advance	ed Monitoring
þa -	Course Turne									R	ecommend
ba .	Source Type	Source Instance	Source Sub-Tag	Source Offset	Source Bit Offset	Destination Typ	pe C	Destination Instance	Destination Sub-Tag	Destination Offset	Destination Bit Offset
	~		_				\sim				
<											>
			Ok	Ap	vla	Cancel	Heli	D			

Figure 3.93 – Modbus Server – Internal Mapping Recommend

	Source Type	e	Source Instan	ce	Source Sub-Ta	e ag	Source Offset	Source Bit Offset	Destination Typ	e	Destination Instance		Destination Sub-Tag	Destination Offset	Destination Bit Offset	Count	Copy Function	n	Reformat
1	System	~			Status	\sim	0		MB Register	\sim	HR	~		1000		16	Byte to Byte	\sim	None
2	DNet Scanner	~	DSA42100D	\sim	Status	~	0		MB Register	~	HR	~		1008		4	Byte to Byte	\sim	None
3	DNet Scanner	~	DSA42100D	\sim	Data	\sim	0		MB Register	\sim	HR	\sim		1010		1	Byte to Byte	\sim	None
4	MB Register	~	HR	\sim			1011		DNet Scanner	~	DSA42100D	~	Data ~	0		1	Byte to Byte	\sim	None
5	DNet Scanner	~	E3EC3525A	~	Status	~	0		MB Register	\sim	HR	~		1012		4	Byte to Byte	\sim	None
6	DNet Scanner	~	E3EC3525A	~	Data	~	0		MB Register	~	HR	~		1014		8	Byte to Byte	~	None
7	MB Register	~	HR	~			1018		DNet Scanner	\sim	E3EC3525A	~	Data ~	0		1	Byte to Byte	\sim	None
		~								\sim								\sim	
•		~								~								~	

Figure 3.94 – Modbus Server – Internal Mapping Updated

A. IDS COPY – MODBUS SOURCE

When copying Modbus data to the DeviceNet interface, the source type needs to be MB Register.

DNR01	- Configuration												
General	DeviceNet DeviceNet	et Devices DeviceNe	et Map PLC5 Ma	p EtherNet	IP Devices	EtherNet/IP Map Mod	Ibus Modbus Auxili	ary Map Internal	Map Advanc	ed Monitoring			
Interr	al Map (max. of 200 i	tems.)											Recommend
	Source Type	Source Instance	Source Sub-Tag	Source Offset	Source Bit Offset	Destination Type	Destination Instance	Destination Sub-Tag	Destination Offset	Destination Bit Offset	Count	Copy Function	Reformat
b #	~					~						~	
	Internal FIP Target	1											
	EIP Originator												
	MB Register DNet Target												
	DNet Scanner												
	System												

Figure 3.95 – IDS Copy - Modbus Source Type

The source instance will be the Modbus register type required.

NR	.01 -	- Configuration													- 0
ner	ral	DeviceNet Devi	iceN	et Devices DeviceN	et Map PLC5 Ma	p EtherNet	/IP Devices	EtherNet/IP Map Mod	Ibus Modbus Auxili	ary Map Internal	Map Advance	ed Monitoring			
Int	terna	al Map (max. of 2	200 i	tems.)											Recommend
		Source Type	ə	Source Instance	Source Sub-Tag	Source Offset	Source Bit Offset	Destination Type	Destination Instance	Destination Sub-Tag	Destination Offset	Destination Bit Offset	Count	Copy Function	Reformat
	1	MB Register	~	cs ~		0		~			0		1	Byte to Byte	None
			~	CS				~						~	
				IR											
				HR											

Figure 3.96 – IDS Copy - Modbus Source Instance

The Source Offset is the Modbus Register offset from where the data must be copied. The Count is the number of **bytes** that will be copied. See the Internal Data Space Mapping section for more information regarding the operation.

B. IDS COPY – MODBUS DESTINATION

When copying data from the DeviceNet interface to a Modbus Register, the destination type needs to be MB Register.

Inte	me	Man (max_of 2	200 i	tems)												Recommend
		Source Type	9	Source Instance	Source Sub-Tag	Source Offset	Source Bit Offset	Destination Type	Destination Instance	Destination Sub-Tag	Destination Offset	Destination Bit Offset	Count	Copy Functi	ion	Reformat
	1	MB Register	\sim	CS ~		0		DNet Scanner V	DSA42100D	✓ Data	0		1	Byte to Byte	\sim	None
	2	DNet Scanner	~	DSA42100D ~	/ Data /	0		~			0		1	Byte to Byte	~	None
			~					Internal							~	
								EIP Target EIP Originator MB Register DNet Target DNet Scanner								

Figure 3.97 – IDS Copy - Modbus Destination Type

The destination instance will be the Modbus register type required.

DNR	101 -	Configuration																	- 0	
Gener	ral	DeviceNet Devi	ceN	et Devices Devic	eNe	et Map PLC5 Ma	p EtherNet	/IP Devices	EtherNet/IP Map	Mo	dbus Modbus Auxili	liar	y Map Internal I	Map Advance	ed Monitoring					
Int	terna	al Map (max. of 2	00 i	tems.)														[Recommend	
		Source Type		Source Instanc	e	Source Sub-Tag	Source Offset	Source Bit Offset	Destination Typ	ре	Destination Instance		Destination Sub-Tag	Destination Offset	Destination Bit Offset	Count	Copy Functi	on	Reformat	
	1	MB Register	\sim	CS	\sim		0		DNet Scanner	\sim	DSA42100D \	~	Data 🗸	0		1	Byte to Byte	~	None	\sim
۶.	2	DNet Scanner	\sim	DSA42100D	\sim	Data 🗸	0		MB Register	\sim	CS 💉	~		0		1	Byte to Byte	~	None	~
			\sim							\sim	CS							~		
											IS IR									
											HR									

Figure 3.98 – IDS Copy - Modbus Destination Instance

The Destination Offset is the Modbus Register offset to where the data must be copied. The Count is the number of **bytes** that will be copied. See the Internal Data Space Mapping section for more information regarding the operation.

3.6.4. MODBUS CLIENT

The DeviceNet Router/B can operate as a Modbus Client for Modbus TCP, RTU232, and RTU485. The user will need to configure the relevant Modbus Parameters as shown below followed by the configuration of the Modbus Auxiliary Map. This map will allow the user to configure various read and write functions to external Modbus Registers, to and from the internal Modbus registers.

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

Modbus Settinas				RS232 Port				
Local Node	2 ~			BAUD Rate	19200 ~	(kbit/s)		
TCP Port	502	(0 implies default port 5	02)	Parity	None ~			
Update Rate	1000	(ms)		RS485 Port				
Retry Limit	3			BAUD Rate	19200 ~	(kbit/s)		
Response Timeout	1000	(ms)		Parity	None \vee			
Inactivity Timeout	2000	(ms)			Terminate F	RS485		
Base Offset Type	Modbus (Base	0) ~						

Figure 3.99 – Modbus Configuration

The Modbus Communication configuration consists of the following parameters:

Parameter	Description
Local Node	The Modbus Node address assigned to the DeviceNet Router/B.
TCP Port	The TCP port to be used for the Modbus communication. By default the module will use the standard TCP port 502.
Update Rate	The period (in milliseconds) between Client requests to the target Modbus device.
	(Modbus Client mode only)
Retry Limit	The number of successive Modbus request retries before the request is set to have failed.
	(Modbus Client mode only)
Response Timeout	The time (in milliseconds) the module will wait for a valid Modbus response.
	(Modbus Client mode only)
Inactivity Timeout	The amount of time during which no Modbus requests have been received before the DeviceNet Router/B indicates that the connection to the Modbus Client is no longer active.
	(Modbus Server mode only)
Base Offset Type	Modbus (Base 0)
	Conventional Modbus addressing where the first address is 0.
	PLC (Base 1)
	PLC addressing, where the first address is 1.

RS232 Port							
BAUD Rate	The RS232 serial port's BAUD rate . (Modbus RTU232)						
Parity	The RS232 serial port's Parity configuration. (Modbus RTU232)						
RS485 Port							
BAUD Rate	The RS485 serial port's BAUD rate . (Modbus RTU485)						
Parity	The RS485 serial port's Parity configuration. (Modbus RTU485)						
Terminate RS485	Enables the on-board 125 Ω RS485 terminating resistor.						

Table 3.11 – Modbus parameters

3.6.4.1. MODBUS AUXILIARY MAP

The Modbus Auxiliary Map configuration is shown in the figure below. The Modbus configuration is only applicable when the module has a Modbus Client operating interface. Up to 100 mapping items can be configured while communicating to up to 20 Modbus TCP Server devices.

The Modbus Aux Map will be executed in a sequential manner and a mapped item will be executed at the *Update Rate* in the Modbus parameters. That is, the *Update Rate* is the time between two successive mapped item executions.

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

General DeviceNet Dev Modbus Auxiliary Map Port 1 RS232 ↓ 2 TCP ↓ ► ↓	wiceNet Devices p (max. of 100 ite Modbus Funct Read Write	DeviceNet Ma ems.) tion Registe > HR > HR	p PLC5 M r Type	Map EtherNet/IP Local Reg. 1000	Devices Eth Count 10	erNet/IP Map Modbu Remote Reg.	s Modbus Auxiliary Map Internal Map Advan	ced Monitorin	ig Reformat	
Modbus Auxiliary Map Port 1 RS232 2 TCP	y (max. of 100 ite Modbus Funct Read Write	tion Registe	r Type	Local Reg. 1000	Count 10	Remote Reg.	IP Address	Node	Reformat	
Port 1 RS232 ∨ 2 TCP ∨ ▶* ✓ ∨	Modbus Funct Read Write	tion Registe	r Type V V	Local Reg. 1000	Count 10	Remote Reg.	IP Address	Node	Reformat	
1 RS232 ∨ 2 TCP ∨ ▶★ ∽	Read Write	 ✓ HR ✓ HR ✓ HR 	~	1000	10	1000				
2 TCP ~	Write	× HR	~			1000		5	None	\sim
Þ# 🖉	,	~		2000	5	2000	192.168.1.200	6	None	~
			\sim							~

Figure 3.100 – Modbus Auxiliary Map Configuration

The Modbus Auxiliary Map configuration consists of the following parameters:

Parameter	Description
Port	The external port to be used:
	TCP – Modbus TCP (Ethernet)
	RS232 – Modbus RTU232
	RS485 – Modbus RTU485
Modbus Function	This is the Modbus function that is sent to the Modbus Server.
	Read – Read a Modbus Register (e.g. HR, IR, CS, or IS) from a Modbus Server.
	Write – Write a Modbus Register (e.g. HR or CS) to a Modbus Server.
Register Type	Modbus Register Type:
	CS – Coil Status
	IS – Input Status
	IR – Input Register
	HR – Holding Register
Local Reg.	The local (internal) DeviceNet Router/B Modbus register address.
Count	The number of Modbus elements to read or write.
Remote Reg.	The remote Server Modbus address register.
IP Address	The IP address of the remote Modbus Server.
Node	The Modbus Node address of the remote Modbus Server.
Reformat	Used to specify how the data is formatted before writing to, or after reading from, the Modbus Server.
	None – No reformatting applied. (AA BB CC DD).
	BB AA – 16bit Byte swap
	BB AA DD CC – 32bit Byte Pair Swap
	CC DD AA BB – Word Swap
	DD CC BB AA – Word and Byte Pair Swap

Table 3.12 – Modbus Auxiliary Map parameters

3.6.4.2. INTERNAL DATA SPACE MAPPING

When the module is operating as a Modbus Client, the data from the Modbus Registers (used to exchange data with various Modbus Servers) can be mapped to the DeviceNet interface using the Internal Map. The Internal Map configuration window is opened by either double clicking on the module in the tree or right-clicking the module and selecting **Configuration** and selecting the **Internal Map** tab.



NOTE: The user can select the *Recommend* button in the Internal Map to auto map the DeviceNet parameters to recommended Modbus Registers.

S DNR01	- Configuration	ı									(- • ×
General	DeviceNet Dev	viceNe	et Devices	DeviceNet	t Map PLC5 Ma	ap EtherNet	/IP Devices	EtherNet/IP Map	Nodbus Modbus Au	xiliary Map Internal	Map Advanc	ed Monitoring
Inter	nal Map (max. of	200 it	ems.)								F	lecommend
	Source Typ	ре	Source In	nstance	Source Sub-Tag	Source Offset	Source Bit Offset	Destination Type	e Destination Instance	Destination Sub-Tag	Destination Offset	Destination Bit Offset
) w		\sim							~			
<												>
					Ok	Ap	ply	Cancel	Help			

Figure 3.101 – Modbus Server – Internal Mapping Recommend

Reformat
None
None

Figure 3.102 – Modbus Server – Internal Mapping Updated

A. IDS COPY – MODBUS SOURCE

When copying Modbus data to the DeviceNet interface, the source type needs to be MB Register.

DNR01	- Configuration												
General	DeviceNet DeviceNet	et Devices DeviceNe	et Map PLC5 Ma	ap EtherNet	/IP Devices	EtherNet/IP Map Modt	ous Modbus Auxili	ary Map Internal	Map Advanc	ed Monitoring			
Inter	nal Map (max. of 200 if	tems.)											Recommend
	Source Type	Source Instance	Source Sub-Tag	Source Offset	Source Bit Offset	Destination Type	Destination Instance	Destination Sub-Tag	Destination Offset	Destination Bit Offset	Count	Copy Function	Reformat
F #	~					~						~	
	Internal EIP Target EIP Originator MB Register DNet Target DNet Scanner System												

Figure 3.103 – IDS Copy - Modbus Source Type

The source instance will be the Modbus register type required.

DN	R01 ·	- Configuration														
Gene	eral	DeviceNet Devi	iceN	et Devices DeviceNe	et Map PLC5 Ma	p EtherNet	IP Devices	EtherNet/IP Map Mo	dbus Modbus Auxili	ary Map Internal	Map Advance	ed Monitoring				
In	ntern	al Map (max. of 2	200 i	tems.)										[Recommend	J
		Source Type		Source Instance	Source Sub-Tag	Source Offset	Source Source Bit Offset Offset Destination		Destination Instance	Destination Sub-Tag	Destination Offset	Destination Offset Bit Offset		Copy Function	tion Reformat	
۲	1	MB Register	\sim	CS ~		0		~			0		1	Byte to Byte	None	\sim
٠			~	CS	1			~						~		
				IS IR												
				HR												

Figure 3.104 – IDS Copy - Modbus Source Instance

The Source Offset is the Modbus Register offset from where the data must be copied. The Count is the number of **bytes** that will be copied. See the Internal Data Space Mapping section for more information regarding the operation.

B. IDS COPY - MODBUS DESTINATION

When copying data from the DeviceNet interface to a Modbus Register, the destination type needs to be MB Register.

ner	ral	DeviceNet Devi	ceN	let Devices Device	Net	t Map PLC5 Ma	p EtherNet	IP Devices	EtherNet/IP Map Mo	dbus Modbus Auxilia	ry Map Internal	Map Advance	ed Monitoring				
Int	terna	al Map (max. of 2	00 i	items.)													Recommend
		Source Type	,	Source Instance		Source Sub-Tag	Source Offset	Source Bit Offset	Destination Type	Destination Instance	Destination Sub-Tag	Destination Offset	Destination Bit Offset	Count	Copy Functio	on	Reformat
	1	MB Register	\sim	CS	/		0		DNet Scanner V	DSA42100D ~	Data 🗸	0		1	Byte to Byte	\sim	None
	2	DNet Scanner	\sim	DSA42100D	- 1	Data 🗸	0		~			0		1	Byte to Byte	\sim	None
,			~						Internal EIP Target EIP Originator MB Register DNet Target DNet Scanner							~	

Figure 3.105 – IDS Copy - Modbus Destination Type

The destination instance will be the Modbus register type required.

NR01	- Configurat	tion																		
eneral	DeviceNet	DeviceN	et Devices	DeviceN	et Map	PLC5 Map	EtherNet	IP Devices	EtherNet/IP Map	Mod	Ibus Modbus Auxi	iliary	Map Internal	Map Advance	ed Monitoring					
Interr	nal Map (max	. of 200 i	tems.)																Recommend	
	Source	Туре	Source In	nstance	So Sub	urce o-Tag	Source Offset	Source Bit Offset	Destination Typ	e	Destination Instance		Destination Sub-Tag	Destination Offset	Destination Bit Offset	Count	Copy Function	on	Reformat	
1	MB Registe	er 🗸 🗸	CS	~			0		DNet Scanner	\sim	DSA42100D	~ D	ata 🗸	0		1	Byte to Byte	\sim	None	~
▶ 2	DNet Scan	ner 🗸	DSA42100	D ~	Data	~	0		MB Register	~	CS	~		0		1	Byte to Byte	~	None	~
		~								\sim	CS							\sim		
											IS IR									
											HR									

Figure 3.106 – IDS Copy - Modbus Destination Instance

The Destination Offset is the Modbus Register offset to where the data must be copied. The Count is the number of **bytes** that will be copied. See the Internal Data Space Mapping section for more information regarding the operation.

3.6.5. ETHERNET/IP ORIGINATOR

The DeviceNet Router/B can operate as an EtherNet/IP connection originator for cyclic (Class 1) or explicit (Class 3 or UCMM) data exchange. The explicit messaging can be setup in the *EtherNet/IP Devices* and *EtherNet/IP Map* in the Master configuration while the cyclic class 1 connections are added to the *EtherNet/IP Connections* node under the module in the Slate project tree.

3.6.5.1. ETHERNET/IP CLASS 1 DEVICE CONNECTIONS

The DeviceNet Router/B can establish up to 10 cyclic Class 1 EtherNet/IP connections to EtherNet/IP devices. This can be done by either manually entering the connection data into the Connection Parameter window, or by importing the configuration from one or more of the following sources:

- Online Logix Controller
- Logix Controller L5X
- EDS File
- Connection Library

A. MANUAL CONFIGURATION

A class 1 connection can be added to the *EtherNet/IP Connections* tree by right-clicking on the tree in Slate and selecting *Add EtherNet/IP Connection*.



Figure 3.107 – Adding EtherNet/IP Class 1 Connection

Next the user will need to enter the connection parameters for the Class 1 connection.

Connection Name		Co	ommunication Status (Offset 0	Interface Fail Action Co	ntinue ~
Connection Details						
General			Electronic Keying)	Advanced	
Path			Keying	Disabled \sim	Tick Time	32 ms \sim
RPI	100	(ms)	Vendor ID	0	Time-Out Ticks	156
	Instance	Size (bytes)	Device Type	0	Time-Out Multiplier	x4 ~
Input (T=>O)	0	0	Product Code	0	Time-Out	4992 ms
Output (O=>T)	0	0	Major Revision	0	Transport Trigger Direction	Server ~
Configuration	0	0	Minor Revision	0		
Configuration						
						< ~ >

Figure 3.108 – EtherNet/IP Class 1 Connection Parameters



NOTE: It is recommended that the user not change the values in the *Advanced* frame of the connection parameters.

Parameter	Description					
Connection Name	The instance name given to the Class 1 Connection.					
Interface Fail Action	When the DeviceNet communication has failed, the EtherNet/IP IO can be configured to either keep the connection running as is, change the connection status to program mode, or force the connection offline. This will allow the EtherNet/IP device to go into a pre-determined state when the communication to the controller (i.e., connection originator on DeviceNet) is lost.					

General	
Path	The path to the target device.
	If the device is an Ethernet device, then this will just be the IP address of the module.
	If the device is, for example, a module in a backplane or via an adapter, then the user will need to enter the IP address of the bridge or adapter followed by the backplane port (for example 1) and the slot number of the device. Each item is separated by a comma.
	As an example, to connect to an Allen-Bradley Flex module (via the Flex Adapter at IP address 192.168.1.100) that is in slot 2 of the Flex backplane, the user will need to enter the following path: 192.168.1.100,1,2 (IP address, port (backplane), slot).
RPI	The requested packet interval (RPI) is the rate in milliseconds at which the data will be sent from the originator to the target and vice versa.
Input (T=>O) – Instance	The instance of the input assembly.
Input (T=>O) – Size (bytes)	The size in bytes of the input assembly.
Output (O=>T) – Instance	The instance of the output assembly.
Output (O=>T) – Size (bytes)	The size in bytes of the output assembly.
Configuration – Instance	The instance of the configuration assembly.
Configuration – Size (bytes)	The size in bytes of the configuration assembly.
	NOTE: This is a read-only value and will be equal to the number of bytes entered into the configuration window below.
Electronic Keying	
Keying	Electronic Keying can be used to ensure that the target device is the correct device type.
	Disabled
	Keying is not enabled, and no key information will be sent in the connection establishment.
	Compatible
	Keying has been enabled with compatibility enabled. This will allow devices with older firmware to also establish a connection.
	Exact
	Keying has been enabled and the exact device with specific firmware revision will allow the establishment of the connection.
Vendor ID	The Vendor ID of the target device.
Device Type	The Device Type of the target device.
Product Code	The Product Code of the target device.
Major Revision	The Major Revision of the target device.
Minor Revision	The Minor Revision of the target device.

Advanced (Note: Changing these values is not recommended)									
Tick Time	For unconnected messages, this is the time for each tick to calculate the unconnected Time-Out time.								
Time-Out Ticks	The number of ticks before the unconnected message is set for timeout.								
Time-Out Multiplier	This is the multiplier of the RPI to define the connection timeout time.								
Time-Out	The unconnected message timeout time (read-only)								
Transport Trigger Direction	The Transport Trigger direction; Server or Client.								
Configuration									
Data	The configuration data that is sent with the forward open connection establishment. The data will need to be entered as a space-delimited, hexadecimal string. For example: OA OD 12 EE								
	The configuration size will increase by one each time a byte is added to the configuration.								

Table 3.13 – EtherNet/IP Class 1 Connection Parameters

B. IMPORT FROM ONLINE CONTROLLER

Here the EtherNet/IP connection parameters are imported directly from an online Logix controller.

PREPARATION

Before the connection information can be imported, some preparation is required using Studio5000 and a Logix controller:

- 1. In Studio5000 create a new project and add the required EtherNet/IP device in the IO tree. If the device's profile supports configuration, then configure the device as required.
- 2. Download the project to a Logix controller.



NOTE: When instantiating modules in Studio5000 do <u>not</u> make use of the "Rack Optimization" communication format.



NOTE: Some versions Logix (V32+) do not support the reading of the module's configuration. Where possible use an earlier version (e.g. V24).



NOTE: It is possible that not all the connection information will be imported as it may not be available due to the type of device and Logix version.

IMPORT CONNECTION PARAMETERS

The connection parameters can be imported from the Logix controller by selecting the *Import from Online Controller* option located under the *Import* menu of the Class 1 Connection form.

I	MyModule - Class 1 Connection - ()								
	→]	mport	[+ Export	Tools					
	i	Import	t from Online	Controller					
ľ	ð	Import	t Controller L	5X					
	EDS	Import	t EDS File						
	1	Import	t Connection	Library					

Figure 3.109 – Import from Online Controller

The Import Connection Parameters form will open.



Figure 3.110 – Import Connection Parameters – Controller Path

Enter the path to the Logix controller. This can be either entered manually, or the Browse button "...", can be selected to launch the Target Browser, where the Logix controller can be selected.

Once the Logix controller path has been selected, all the device configuration tags and device connections will be read from the controller and displayed in the Configuration Tag grid and Connection grid respectively.

ontrolle	ler Path	192.168.1.6,1,4						Refre	sh Controller			
lect Co	onfiguratio	n Tag										
		Tag Name	•		Tag Ty	pe		Length				
1		FlexACN:1:	С		AB:1794_D	0:2:8C		36				
2		FlexACN:0:	с		AB:1794_IB	16:C:0		34				
		ElevEth:0:0	~		AB-1704 IB	16.0.0						
3		TIEAL (11.0.)	5		AD. 1794_ID	10.0.0						
lect Co	onnection -		-		<u>нь. 1734_</u> ю	16.0.0						
lect Cc	onnection -	Device	Product Code	RPI (ms)	O->T Instance	O->T Size	T->O Instance	T->O Size		Path		
lect Cc	onnection - Vendor 1	Device Type 7	Product Code 37	RPI (ms)	O->T Instance	O->T Size 2	T->O Instance 2	T->O Size 6	1,7,2,3,1,1	Path		
lect Co	onnection - Vendor 1 1	Device Type 7 12	Product Code 37 36	RPI (ms) 50 100	O->T Instance 1 1	0->T Size 2 16	T->O Instance 2 2	T->O Size 6 20	1,7,2,3,1,1 1,7,2,3	Path		
lect Co	Vendor	Device Type 7 12 7	Product Code 37 36 34	RPI (ms) 50 100 500	O->T Instance 1 1 6	O->T Size 2 16 0	T->O Instance 2 2 2	T->O Size 6 20 8	1,7,2,3,1,1 1,7,2,3 1,6,2,192.1	Path 68.1.17,1,0		
lect Co 1 2 3 4	Vendor 1 1 1 1 1	Device Type 7 12 7 7	Product Code 37 36 34 34	RPI (ms) 50 100 500 50	O->T Instance 1 1 6 6	O->T Size 2 16 0	T->O Instance 2 2 2 2 2	T->O Size 6 20 8 8	1,7,2,3,1,1 1,7,2,3 1,6,2,192,1 1,7,2,3,1,0	Path 68.1.17,1,0		
lect Co	Vendor 1 1 1 1	Device Type 7 12 7 7	Product Code 37 36 34 34	RPI (ms) 50 100 500 50	O->T Instance 1 1 6 6	O->T Size 2 16 0	T->O Instance 2 2 2 2 2	T->O Size 6 20 8 8	1,7,2,3,1,1 1,7,2,3 1,6,2,192,1 1,7,2,3,1,0	Path 68.1.17,1,0		

Figure 3.111 – Import Connection Parameters – Select Connection

In order to import all the necessary connection information, the user will need to select both the appropriate *Configuration Tag*, and the matching *Connection*.

The new connection's configuration data is derived from the selected *Configuration Tag*, when the new connection's parameters are derived from the selected *Connection*.

Once the appropriate selections have been made, press **Ok**. The imported data will be populated into the Connection form.

The user can then modify the *Connection Name*, *Path* and *RPI* as required.

Here the EtherNet/IP connection parameters are imported from a Logix controller's L5X file.

PREPARATION

Before the connection information can be imported some preparation is required using Studio5000:

- 1. In Studio5000 create a new project and add the required EtherNet/IP device in the IO tree. If the device's profile supports configuration, then configure the device as required.
- 2. Save the Studio5000 project as an L5X file.



NOTE: When instantiating modules in Studio5000 do not make use of the "Rack Optimization" communication format.



NOTE: It is possible that not all the connection information will be imported as it may not be available in the L5X file due to the type of device and Logix version.

IMPORT L5X FILE

The connection parameters can be imported from the L5X file by selecting the *Import Controller L5X* option located under the *Import* menu of the Class 1 Connection form.



Figure 3.112 – Import from Controller L5X

The Import Connection Parameters form will open.

5 Import L5X Device Configuration – 🗆 X									
Logix Designer L5X	File				Refres	sh Configuration			
Select Module	Name	Catalog	Vendor	Device Type	Product Code	ConfigSize			

Figure 3.113 – Import L5X Device Configuration – Select L5X

Click on the Browse ("...") button to select the previously generated L5X file.

The modules found in the selected L5X file will then be displayed in the Module List.

5 Import Logix D L5X Fi	t L5X Device Configuration Designer L5X File Ile C\Temp\Connection Import Ex	ample L5X			Refree	- Configuration	×
Select	Name	Catalog	Vendor	Device Type	Product Code	ConfigSize	
1	Local.Local	1756-L85E	1	14	168	0	1
2	Local.eth0	1756-EN2TR	1	12	200	0	
3	eth0.Flex5000	5094-AEN2TRXT/A	1	12	323	0	1
▶ 4	Flex5000.IB16	5094-IB16XT/A	1	7	412	64	
5	Flex5000.IF8	5094-IF8XT/A	1	115	325	384	
6	Flex5000.OB16	5094-OB16XT/A	1	7	413	64	1
7	Flex5000.HSC	5094-HSC/A	1	109	93	112	
		Ok	Cancel				

Figure 3.114 – Import L5X Device Configuration

Select the required module and click **O***k*. The imported data will be populated into the Connection form.

The user can then modify the *Connection Name*, *Path* and *RPI* as required.

D. IMPORT EDS FILE

The connection parameters can be imported from a suitable EDS file. Typically, this approach is preferred for devices that do not require configuration data.

To import the connection parameters from a device EDS file, select the *Import EDS File* option located under the *Import* menu of the Class 1 Connection form.



Figure 3.115 – Import EDS File

A File Open dialog will open allowing the user to select the EDS file.

5 Select an Electronic Data Sheet -	EDS File			×
\leftarrow \rightarrow \checkmark \uparrow] > This PC >	~ Ū			
Organize 🝷 New folder				::: •
🕹 Quick access	Name	Date modified	Туре	Size
Aparian	055A000C006D0100.eds	2023/01/06 06:54	EDS File	35 KB
 OneDrive - Personal 				
This PC				
🧼 Network				
File name: 055	A000C006D0100.eds	~	Electronic Data Sheet - EDS File $ imes $	
				Open Cancel

Figure 3.116 – Browse to EDS File

The selected EDS file will be imported, and a summary of the connections displayed. The user will need to select one of the IO connections.

S Import EDS File Connection ×											
EDS Flle											
File: C:\Temp\055A000C006D0100.eds											
Vendor: Aparian											
Product	Modbus Router/B (A-MBR/B)										
Select Co	nnection		0->T		T->0		Config				
	Name	RPI (ms)	Instance	O->T Size	Instance	T->O Size	Instance				
▶ 1	I/O Connection	500	101	4	111	136	102				
Ok Cancel											

Figure 3.117 – Select Connection

The selected connection within the EDS file will be used to populate the Connection parameters.

The user can then modify the *Connection Name*, *Path* and *RPI* as required.

E. IMPORT CONNECTION LIBRARY

The connection parameters can be imported from a previously created Connection Library (.EIPCNX) file.



NOTE: Please contact support to receive a pack of the latest Connection Library files, for commonly used devices.

To import the connection parameters from a Library file, select the *Import Connection Library File* option located under the *Import* menu of the Class 1 Connection form.



Figure 3.118 – Import Connection Library File

A File Open dialog will open allowing the user to select the Library (.EIPCNX) file. The selected Library file will be used to populate the Connection parameters.

The user can then modify the *Connection Name*, *Path* and *RPI* as required.

EXPORT LIBRARY FILE

In order to create a Library file for future use, select the *Export Connection Library* option located under the *Export* menu.

5 a5094OF8	3	
→] Import	[+ Export	Tools
Connor	🖵 Export	Connection Library
Connec	aon name	0001010

Figure 3.119 – Export Connection Library File

3.6.5.2. ETHERNET/IP EXPLICIT MESSAGE DEVICE CONNECTIONS

Up to 10 EtherNet/IP devices can be added for explicit messaging. The user will need to add each device as explained in the EtherNet/IP Devices section below. Once the EtherNet/IP devices have been added the user can then configure the required mapping for the EtherNet/IP Explicit messaging as shown in EtherNet/IP Map section below.

A. ETHERNET/IP DEVICES

This tab is enabled when the Primary Interface is set to *EtherNet/IP Originator*.

The EtherNet/IP Devices configuration is shown in the figure below. Up to 10 EtherNet/IP devices can be configured with up to 50 EtherNet/IP mapped items allowing for either explicit EtherNet/IP Class 3 or Unconnected Messaging (UCMM) to any of the 10 configured devices. The data from each EtherNet/IP device is written to, or read from, an Internal Data Space with a size of 100Kbytes. See the *Explicit EtherNet/IP Messaging* section for more details.

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

5 DNR01 - Configu	ration											
General DeviceNe	t DeviceNetDe	vices DeviceNet M	1ap PLC5 Map	EtherNet/IP D	evices	EtherNet/	IP Map	Modbus M	Nodbus Auxiliary Map	Internal Map	Advanced	Monitoring
Explicit EtherNe	et/IP Device Sett	ings										
Scan Class	A 500	ms Se	can Class C	2000	ms							
Scan Class	B 1000	ms So	can Class D	5000	ms							
Explicit Ethe	erNet/IP Devices	(max. of 10 items.)									
De	evice Name	Message Type	•	CIP Path			Browse	Time	out Retry Coun	t Stat	tus IDS	
Po	werFlex700	UCMM	✓ 192.168.1.	100				100	0 3	2	000	_
**			\sim									
			Ok	Apply		Cance	H	Help				
		L		. 444.7		541100						

Figure 3.120 – EtherNet/IP Devices - Configuration

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

Description
The configurable update rates (in milliseconds) for each scan class in the EtherNet/IP Map.
e)
The user assigned instance name for the specific device.
The module can use either Class 3 or Unconnected Messaging when communicating to the target EtherNet/IP device.
The CIP Path to the target device. This can either be entered manually or the user can browse to them by clicking the Browse button. The Target Browser will open and automatically scan for all available EtherNet/IP devices.
If the Ethernet/IP module is a bridge module, it can be expanded by right-clicking on the module and selecting the Scan option.
The required EtherNet/IP device can then be chosen by selecting it and clicking the Ok button, or by double-clicking on the target module.
The amount of time (in milliseconds) the module will wait for a response from the target EtherNet/IP device.
The number of message retries before the target EtherNet/IP device is considered offline.
This is the offset in the Internal Data Space (used to map EtherNet/IP device data) which provides the communication status of each EtherNet/IP device. The Communication Status is as shown below: Bit 0 - (1:Device Online, 0:Device Offline) Bit 1 to 7 – Recorved

Table 3.14 – EtherNet/IP Devices configuration parameters

B. ETHERNET/IP MAP

This tab is enabled when the Primary Interface is set to *EtherNet/IP Originator*.

The EtherNet/IP Map configuration is shown in the figure below. Up to 50 EtherNet/IP mapped items, either explicit EtherNet/IP Class 3 or Unconnected Messaging (UCMM) to any of the 10 pre-configured devices can be configured. The data from each EtherNet/IP device is written to or read from Internal Data Space with a size of 100Kbytes. See the *Explicit EtherNet/IP Messaging* section for more details.

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

JINKUT	- Configurati	ion															
eneral	DeviceNet [DeviceN	etDevices	Device	NetN	Nap F	PLC5 Map	EtherNe	t/IP Devices	EtherNet/I	P Map Mo	odbus Mod	bus Auxiliar	y Map Inter	rnal Map Advan	ced Monitoring	
Explic	it EtherNet/IP	Map (m	ax. of 50 ite	ems.)													
	Device		Function		Scan	s	Service	Class	Instance	Attribute	Input Offset	Get Length	Output Offset	Set Length	Data Type	Tag / Static Value	
1	PowerFlex70	0 ~	Get	\sim	A	~		1	1	1	4	2					
*		\sim		\sim		\sim									~		

Figure 3.121 – EtherNet/IP Map configuration

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

Parameter	Description
Device	The device instance name configured in the previous EtherNet/IP Devices tab.
	The selected device will be used for executing the communication function.
	The user can select one of four functions.
	Get
	The module will read data from the target EtherNet/IP device by using the Get Single Attribute CIP function. The received data will be placed into the Internal Data Space at the <i>Input Offset</i> location configured in this tab.
	Set
Function	The module will write data to the target EtherNet/IP device by using the Set Single Attribute CIP function. The data to be written will be retrieved from the Internal Data Space at the Output Offset location configured in this tab.
	Set Static
	Similar to the Set function above, but the data to be written will be fixed (equal to the <i>Static Value</i>) parameter in this configuration window. This function will typically be used with the single (S) Scan class which means the DeviceNet Router/B module can be setup to write the fixed value only once when the target device communication has been established.
	Custom

	This function allows the user to use a custom Service to write and read data in the same transaction. The user will need to see which custom services that target device supports in that device's user manual.
	Read Tag When using a Logix controller as a EtherNet/IP Device, the DeviceNet Router/B module can read a Logix tag from the target Logix controller using Class 3 or UCMM messaging. The value from the tag will be saved at the configured Input Offset.
	Write Tag
	When using a Logix controller as a EtherNet/IP Device, the DeviceNet Router/B module can write to Logix tag from the target Logix controller using Class 3 or UCMM messaging. The value from the tag will be read from the configured Output Offset.
	The user can select Scan Class A , B , C or D (which was configured in the EtherNet/IP Devices tab). The specific mapped item will then be executed at that configured scan class rate.
Scan	The user can also select the S class which means that the mapped item will only execute once when communication to the target device is established. If the target device goes offline, then the mapped items with this class will be re-armed, and resent when communication is re-established.
Service	The custom CIP service/function which is only available when the <i>Custom</i> function has been selected.
Class, Instance, Attribute	The CIP class, instance, and attribute of the request message to be sent.
Input Offset	The location in the Internal Data Space where the received data will be written. This will only be available for <i>Get</i> and <i>Custom</i> functions.
	The length of the data to be received. If the number of bytes received is more than the Get Length, then the data will not be written to the Internal Data Space.
Get Length	NOTE: When the function is Logix Read, then the Get Length will be the number of elements of the configured data type and not the byte count.
	This will only be available for <i>Get</i> and <i>Custom</i> functions.
Output Offset	The location in the Internal Data Space from where the data to be written to the target device will be read.
	This will only be available for Set and Custom functions.
	The length of the data to be written.
Set Length	NOTE: When the function is Logix Write, then the Set Length will be the number of elements of the configured data type and not the byte count.

	This will only be available for <i>Set</i> and <i>Custom</i> functions.
Data Type	The data type of the Static Value.
	This will only be available for <i>Set Static</i> function.
Tag / Static Value	The value to be written to the target device when the <i>Set Static</i> function has been selected.
Tag / Static Value	Note : When using the SINT Array data type, the values must be entered as space- delimited hex values. For example: 05 34 2E A1

Table 3.15 – EtherNet/IP Map configuration parameters

3.6.5.3. INTERNAL DATA SPACE MAPPING

When the module is operating as a EtherNet/IP Originator, the data from the EtherNet/IP IO devices can be mapped to the DeviceNet interface using the Internal Map. The Internal Map configuration window is opened by either double clicking on the module in the tree or right-clicking the module and selecting *Configuration* and selecting the *Internal Map* tab.

A. IDS COPY – ETHERNET/IP ORIGINATOR SOURCE

When copying data from a EtherNet/IP IO to the DeviceNet interface, the source type needs to be EIP Originator.

DNR01	- Configuration										
General	DeviceNet DeviceNet	et Devices DeviceNet	et Map PLC5 Map	EtherNet	/IP Devices	EtherNet/IP Map M	odbus Modbus Auxilia	ry Map Internal	Map Advanc	ed Monitoring	
Intern	nal Map (max. of 200 it	ems.)								Rec	ommend
	Source Type	Source Instance	Source Sub-Tag	Source Offset	Source Bit Offset	Destination Type	Destination Instance	Destination Sub-Tag	Destination Offset	Destination Bit Offset	Count
b #	~					×	1				
	Internal EIP Target MB Register DNet Target DNet Scanner System										

Figure 3.122 – IDS Copy – EtherNet/IP Originator Source Type

The source instance will be one of the EtherNet/IP IO devices added to the EtherNet/IP IO tree in Slate.

Project Explorer	5	DNR01	- Configuration												- • •
DNR01 (DeviceNet Router/B)	(General	DeviceNet Device	NetDevices Device	Net Map PLC5 M	ap EtherNe	(IP Devices	EtherNet/IP Map Mod	dbus Modbus Auxilia	iry Map Internal	Map Advanc	ed Monitoring			
EtherNet/IP Connections PF700 (192.168.1.100)		Interr	nal Map (max. of 20) items.)											Recommend
1794-IB8 (192.168.1.101.1.0)			Source Type	Source Instance	Source Sub-Tag	Source Offset	Source Bit Offset	Destination Type	Destination Instance	Destination Sub-Tag	Destination Offset	Destination Bit Offset	Count	Copy Function	Reformat
		▶ 1	EIP Originator	< PF700	Data 🗸	0		~			0		1	Byte to V	None ~
		•		PF700 1794-IB8				~						~	



The Source Offset is the offset in the selected EtherNet/IP device Class 1 **Input** Assembly. The Count is the number of **bytes** that will be copied. See the Internal Data Space Mapping section for more information regarding the operation.

ŝ	5 C	NR	R01	- Configura	tion								
	Ge	enei	ral	DeviceNet	Devic	:eN	et Devices	Devic	eNe	et Map	PLC5	Мар	EtherN
		Int	tern	al Map (ma	x. of 2	00 i	tems.)						
				Source	Туре		Source I	nstanc	е	So Sub	urce o-Tag		Source Offset
		۲	1	EIP Origina	ator	\sim	1794-OW	8	\sim	Status		\sim	0
		*				\sim				Data Status			

The user can select to copy either the Data, or Status, from the EtherNet/IP connection.

Figure 3.124 – IDS Copy – EtherNet/IP Originator Status

When selecting the Status, the format of the Status information is shown below:

Parameter	Data Type	Description
EtherNet/IP Originator Connection Status	DINT	Bit 0 – Connection Ok

Table 3.16 – EtherNet/IP Originator Connection Status

B. IDS COPY – ETHERNET/IP TARGET DESTINATION

When copying data from the DeviceNet interface to a EtherNet/IP IO device **Output** Assembly, the destination type needs to be EIP Originator.

Int	tern	al Map (max. of 20	0 it	items.)			ip Etherniet	IP Devices I	EtherNet/IP Map	Mo	dbus Modbus Auxiliai	iry	y Map Internal I	Map Advance	ed Monitoring			F	Recomment	d
		Source Type		Source Instance	•	Source Sub-Tag	Source Offset	Source Bit Offset	Destination Typ	pe	Destination Instance		Destination Sub-Tag	Destination Offset	Destination Bit Offset	Count	Copy Function		Reform	at
	1	EIP Originator	~	PF700	~	Data 🗸	0		DNet Target	\sim	Connection 0 V	Γ		0		1	Byte to	\sim	None	`
Þ	2	DNet Target	\sim	Connection 0	~		0			\sim		Γ		0		1	Byte to	\sim	None	T
•			~						Internal EIP Target EIP Originator MB Register DNet Target DNet Scanner									~		_

Figure 3.125 – IDS Copy – EtherNet/IP Originator Destination Type

The destination instance will be one of the EtherNet/IP IO devices added to the EtherNet/IP IO tree in Slate.

Project Explorer	S DI	NR01 -	Configuration																	×
DNR01 (DeviceNet Router/B)	Ge	neral	DeviceNet Devic	:eNe	etDevices Device	Net Map PLC5 Ma	p EtherNet	VIP Devices	EtherNet/IP Map Mo	dt	bus Modbus Auxilia	iry 1	Map Internal	Map Advanc	ed Monitoring					
EtherNet/IP Connections PF700 (192.168.1.100)		Interne	al Map (max. of 20	00 it	tems.)												1	R	ecommend	1 //
1794-IB8 (192.168.1.101.1.0)	ſ		Source Type		Source Instance	Source Sub-Tag	Source Offset	Source Bit Offset	Destination Type		Destination Instance	1	Destination Sub-Tag	Destination Offset	Destination Bit Offset	Count	Copy Function		Reformat	
		1	EIP Originator	\sim	PF700	∨ Data ∨	0		DNet Target V	0	Connection 0 V			0		1	Byte to	\sim	None ~	9
		▶ 2	DNet Target	\sim	Connection 0	~	0		EIP Originator V	1	PF700 ~	D	sta 🗸	0		1	Byte to	~ 1	None ~	-
		•		\sim					~	1	PF700 1794-IB8							\sim		

Figure 3.126 – IDS Copy – EtherNet/IP Originator Destination Instance

The Destination Offset is the offset in the selected EtherNet/IP device Class 1 **Output** Assembly. The Count is the number of **bytes** that will be copied. See the Internal Data Space Mapping section for more information regarding the operation.

3.7. INTERNAL DATA SPACE MAP

The internal data map is used to exchange data from the Ethernet interface to the DeviceNet interface and vice versa. Up to 200 items can be mapped. The Internal Map configuration window is opened by either double clicking on the module in the tree, or right-clicking the module and selecting *Configuration* and selecting the *Internal Map* tab.

The Count is the number of bytes that will be copied from the source to the destination. There are four different Copy Functions that can be used.

Function	Description
Byte to Byte	Each byte from the source will be directly copied to each byte in the destination.
Byte to Bit	Each byte from the source will be copied to each bit in the destination. If a value greater than zero is read from the source byte then a 1 will be written to the destination bit address. If a value of zero is read from the source byte then a 0 will be written to the destination bit address. The destination offset will be the bit offset and the destination address will be incremented by one bit each time.
Bit to Bit	Each bit from the source will be directly copied to each bit in the destination.
Bit to Byte	Each bit from the source will be copied to each byte in the destination. If a value of one is read from the source bit then a 1 will be written to the destination byte address. If a value of zero is read from the source bit then a 0 will be written to the destination byte address. The source offset will be the bit offset and the source address will be incremented by one bit each time.

Table 3.17 – Internal Map Copy functions

The data in the destination source can also be reformatted. The reformat option provides five different reformat options.

NOTE: The reformat option is only available for *Byte to Byte* Copy Functions.

Function	Description
None	No reformatting applied (AA BB CC DD)
BB AA	16bit Byte swap
BB AA DD CC	32bit Byte Pair Swap
CC DD AA BB	Word Swap
DD CC BB AA	Word and Byte Pair Swap

Table 3.18 – Internal Map Reformat Options

3.7.1. COPY FROM

One of seven sources can be selected to copy from: Internal, EIP Target, EIP Originator, DNet Target, DNet Scanner, and System.

DNR01	- Configuration	- Device Device N	Mar DI CE M		ID Devices 1		han Africa Annili	an Mar Internal	Map Advance				- 0
Intern	al Map (max. of 200 in	tems.)	атмар РСС5 ма	ap Ethenvel	/IP Devices t	zinenve≬iP map modi	dus moddus Auxilia	ary map internal	Map Advanc	ea monitoring		F	Recommend
	Source Type	Source Instance	Source Sub-Tag	Source Offset	Source Bit Offset	Destination Type	Destination Instance	Destination Sub-Tag	Destination Offset	Destination Bit Offset	Count	Copy Function	Reformat
b #	~					~						~	
	Internal EIP Target EIP Originator MB Register DNet Target DNet Scanner System												





When copying data from the internal data space (IDS), the source type needs to be Internal.

NR01	- Configuration	at Davisas	t Map RI CE M	- EthorNot	/IP Dovisor	EthorNov/IP Mon Mod	hue Modhue Auvili	an Man Internal	Man Advance	od Monitoring			- 0
ntern	nal Map (max. of 200 i	tems.)	ermap PEGS M	ap Cilienter	In Devices 1		bus Moubus Auxin	ary map	Auvance	eu montoning		F	Recommend
	Source Type	Source Instance	Source Sub-Tag	Source Offset	Source Bit Offset	Destination Type	Destination Instance	Destination Sub-Tag	Destination Offset	Destination Bit Offset	Count	Copy Function	Reformat
,	~					×						~	
	Internal EIP Target EIP Originator MB Register DNet Target DNet Scanner System												

Figure 3.128 – IDS Copy – Internal Source Type

The source instance is Not Applicable for the internal data space. The Source Offset is the offset in the *Internal Data Space (IDS)* which has a max of 100,000 bytes. The Count is the number of **bytes** that will be copied.

3.7.1.2. EIP TARGET

When copying data from a connection originator (e.g. the output assembly from the Logix Controller) to the DeviceNet interface, the source type needs to be EIP Target.

ONR01	- Configuration												
eneral	DeviceNet DeviceN	et Devices DeviceNe	et Map PLC5 M	ap EtherNet	/IP Devices	EtherNet/IP Map Mod	Ibus Modbus Auxilia	ary Map Internal	Map Advanc	ed Monitoring			
Intern	al Map (max. of 200 i	tems.)										F	ecommend
	Source Type	Source Instance	Source Sub-Tag	Source Offset	Source Bit Offset	Destination Type	Destination Instance	Destination Sub-Tag	Destination Offset	Destination Bit Offset	Count	Copy Function	Reformat
b #	~					~						~	
	Internal EID Torget												
	EIP Originator												
	MB Register												
	DNet Target												
	System												
	-/												

Figure 3.129 – IDS Copy – EtherNet/IP Target Source Type

The source instance will be the connection number, which can be connection 0 to 3, based on the number of connections configured. The Source Offset is the offset in the *Mapped Data* section of the EtherNet/IP output assembly from where the data must be copied. The Count is the number of **bytes** that will be copied.

3.7.1.3. EIP ORIGINATOR

When copying data from a EtherNet/IP IO to the DeviceNet interface, the source type needs to be EIP Originator.

DNR01	- Configuration										- 🗆 🗙
General	DeviceNet DeviceNet	et Devices DeviceNe	et Map PLC5 Ma	ap EtherNet	/IP Devices	EtherNet/IP Map Mod	bus Modbus Auxilia	ry Map Internal	Map Advanc	ed Monitoring	
Intern	al Map (max. of 200 it	ems.)								Rec	ommend
	Source Type	Source Instance	Source Sub-Tag	Source Offset	Source Bit Offset	Destination Type	Destination Instance	Destination Sub-Tag	Destination Offset	Destination Bit Offset	Count
**	~					~					
	Internal EIP Target EIP Originator MB Register DNet Target DNet Scanner System										

Figure 3.130 – IDS Copy – EtherNet/IP Originator Source Type

The source instance will be one of the EtherNet/IP IO devices added to the EtherNet/IP IO tree in Slate.

Project Explorer	5	DNR01	- Configuration													
DNR01 (DeviceNet Router/B)	C	eneral DeviceNet DeviceNetDevices DeviceNetMap PLC5 Map EtherNet/IP Devices EtherNet/IP Map Modbus Modbus Auxiliary Map Internal Map Advanced Monitoring														
 EtherNet/IP Connections PF700 (192.168.1.100) 1704 IP8 (100.168.1.101.1.0) 		Internal Map (max. of 200 items.)												Recommend		
······································			Source Type	Source Instance	Source Sub-Tag	Source Offset	Source Bit Offset	Destination Type	Destination Instance	Destination Sub-Tag	Destination Offset	Destination Bit Offset	Count	Copy Function	Reformat	
		► 1	EIP Originator	PF700 ~	Data 🗸	0		~			0		1	Byte to ~	None ~	
		•		1794-IB8]			v								



The Source Offset is the offset in the selected EtherNet/IP device Class 1 **Input** Assembly. The Count is the number of **bytes** that will be copied.

5	5 0	ONF	R01	- Configura	tion									
	Ge	ene	ral	DeviceNet	Devic	eN	et Devices	Devic	eNe	et Map	PLC5	Мар	EtherN	
		Internal Map (max. of 200 items.)												
				Source	Туре		Source I	Source Sub-Tag			Source Offset			
		•	1	EIP Origina	ator	\sim	1794-OW	8	\sim	Status		~	0	
						\sim				Data Status				

The user can select to copy the data from the EtherNet/IP connection or the status.

Figure 3.132 – IDS Copy – EtherNet/IP Originator Status

When selecting the status the format of the Status information is shown below:

Parameter	Data Type	Description
EtherNet/IP Originator Connection Status	DINT	Bit 0 – Connection Ok

Table 3.19 – EtherNet/IP Originator Connection Status

3.7.1.4. MODBUS REGISTER

When copying Modbus data to the DeviceNet interface, the source type needs to be MB Register.

NR01	- Configuration												- 0
neral	DeviceNet DeviceNet	et Devices DeviceNe	et Map PLC5 Ma	ap EtherNet	/IP Devices	EtherNet/IP Map Mode	ous Modbus Auxili	ary Map Internal	Map Advanc	ed Monitoring	1		
Intern	al Map (max. of 200 it	tems.)											Recommend
	Source Type	Source Instance	Source Sub-Tag	Source Offset	Source Bit Offset	Destination Type	Destination Instance	Destination Sub-Tag	Destination Offset	Destination Bit Offset	Count	Copy Function	Reformat
,	~					~						~	
	Internal EIP Target EIP Originator MB Register DNet Target DNet Scanner System												



The source instance will be the Modbus register type required.
5	DNR01	I - Configura	tion													×
G	eneral	DeviceNet	Device	Net Devices DeviceN	let Map PLC5 Ma	ap EtherNet	/IP Devices	EtherNet/IP Map Mo	dbus Modbus Auxili	ary Map Internal	Map Advanc	ed Monitoring				
	Inter	nal Map (max	. of 200	items.)											Recommend	
	General DeviceNet DeviceNetDevices DeviceNetMap PLC5 Map EtherNet/IP Devices EtherNet/IP Map Modbus Modbus															
	► 1	MB Registe	er 🖄	CS ~		0		~			0		1	Byte to Byte	None	\sim
	•		×	CS				~						~		
				IR HR												_

Figure 3.134 – IDS Copy - Modbus Source Instance

The Source Offset is the Modbus Register offset from where the data must be copied. The Count is the number of **bytes** that will be copied.

3.7.1.5. DNET TARGET

When copying data from a connection originator (e.g. the output assembly of the 1756-DNB) to the Ethernet interface, the source type needs to be DNet Target.

ONR01	- Configuration												_ 0
eneral	DeviceNet DeviceN	let Devices DeviceNe	t Map PLC5 Ma	ap EtherNet	/IP Devices	EtherNet/IP Map Mod	bus Modbus Auxilia	ry Map Internal	Map Advanc	ed Monitoring			
Intern	al Map (max. of 200 i	items.)										Re	commend
			Source	Source	Source Bit		Destination	Destination	Destination	Destination	-	Copy	
	Source Type	Source Instance	Source Sub-Tag	Source Offset	Source Bit Offset	Destination Type	Destination Instance	Destination Sub-Tag	Destination Offset	Destination Bit Offset	Count	Copy Function	Reformat
▶ 1	Source Type DNet Target V	Source Instance Connection 0 ~	Source Sub-Tag	Source Offset 0	Source Bit Offset	Destination Type	Destination Instance	Destination Sub-Tag	Destination Offset 0	Destination Bit Offset	Count 1	Copy Function Byte t ~	Reformat

Figure 3.135 – IDS Copy – DeviceNet Target Source Type

The source instance will be the connection number, which in this case is always *Connection 0*. The Source Offset is the offset of the consumed data from the DeviceNet originator (e.g., 1756-DNB) from where the data must be copied. The Count is the number of **bytes** that will be copied.

3.7.1.6. DNET SCANNER

When copying data from a DeviceNet IO to the Ethernet interface, the source type needs to be DNet Scanner.

5	DNR01	- Configuration												· • ×
C	eneral	DeviceNet DeviceN	et Devices DeviceN	et Map PLC5 Ma	ap EtherNet	/IP Devices	EtherNet/IP Map Mod	bus Modbus Auxili	ary Map Internal	Map Advanc	ed Monitoring			
	Intern	al Map (max. of 200 i	tems.)										Reco	ommend
		Source Type	Source Instance	Source Sub-Tag	Source Offset	Source Bit Offset	Destination Type	Destination Instance	Destination Sub-Tag	Destination Offset	Destination Bit Offset	Count	Copy Function	Reformat
	b #	~					~						~	
		Internal EIP Target EIP Originator MB Register DNet Target DNet Scanner System												



Setup

The source instance will be one of the DeviceNet IO devices added to the DeviceNet IO tree in Slate.

Project Explorer		01 - Configuration											[- 0	×
Configuration Concernation Con	Gener	al DeviceNet DeviceNet and DeviceNet	let Devices DeviceN	et Map PLC5 M	ap EtherNet	/IP Devices	EtherNet/IP Map Mo	dbus Modbus Auxilia	ry Map Internal	Map Advanc	ed Monitoring		R	ecommend	
05 25200208		Source Type	Source Instance	Source Sub-Tag	Source Offset	Source Bit Offset	Destination Type	Destination Instance	Destination Sub-Tag	Destination Offset	Destination Bit Offset	Count	Copy Function	Reformat	t
		1 DNet Scanner V	DSA42100DNY4; ~	Data ~	0		~			0		1	Byte t V	None	~
	•	~	DSA42100DNY42R5 E3EC3525A				~						~	·	

Figure 3.137 – IDS Copy – DeviceNet Scanner Source Instance

The Source Offset is the offset in the selected DeviceNet device Cyclic **Input** Assembly (data being produced by the DeviceNet IO device). The Count is the number of **bytes** that will be copied. See the Internal Data Space Mapping section for more information regarding the operation.

The user can select to copy the data from the EtherNet/IP connection or the status.

DNR01	- Configura	ation								
General	DeviceNet	Device	N	et Devices	Devic	eN∉	et Map	PLC5	Ma	p Et
Inter	nal Map (ma	x. of 200	D it	tems.)						
	Source	е Туре		Source I	nstanc	e	So Sub	urce o-Tag		Sou Off
▶ 1	DNet Scar	ner	\sim	DSA42100)D	\sim	Data		\sim	(
		,	~				Data Status			
	General Inter	DNR01 - Configura General DeviceNet Internal Map (ma Source 1 DNet Scar	DNR01 - Configuration General DeviceNet Device Internal Map (max. of 200 Source Type 1 DNet Scanner	DNR01 - Configuration General DeviceNet DeviceN Internal Map (max. of 200 i Source Type 1 DNet Scanner ~ •	DNR01 - Configuration General DeviceNet DeviceNet DeviceNet Internal Map Source Type Source Type 1 DNet Source Source Source Source	DNR01 - Configuration General DeviceNet DeviceNet Device Internal Map (max. of 200 items.) Source Type Source Instance 1 DNet Scanner V DSA42100D	DNR01 - Configuration General DeviceNet DeviceNet DeviceNet Internal Map (max. of 200 items.) Source Type Source Instance + 1 DNet Scanner > DSA42100D >	DNR01 - Configuration General DeviceNet DeviceNet Devices DeviceNet Map Internal Map (max. of 200 items.) Source Type Source Instance Soute 1 DNet Scanner V DSA42100D V Data • • • Data Status	DNR01 - Configuration General DeviceNet DeviceNet Devices DeviceNet Map PLC5 Internal Map (max. of 200 items.) Source Type Source Instance Source Sub-Tag 1 DNet Scanner V Data • • Data • • Data	DNR01 - Configuration General DeviceNet DeviceNet Devices DeviceNet Map PLC5 Ma Internal Map (max. of 200 items.) Source Type Source Instance Source Sub-Tag 1 DNet Scanner V Data • • Data

Figure 3.138 – IDS Copy – EtherNet/IP Originator Status

When selecting the Status, the format of the Status information is shown below:

Parameter	Data Type	Description
		Bit 0 – Online
DeviceNet Scanner Connection Status	DINT	Bit 1 – Cyclic Data Exchange Ok
		Bit 2 – Device Mismatch
Node	SINT	The target DeviceNet device Node number.
Reserved	SINT	Reserved for future use.
Cyclic Communication Timeout Count	DINT	Number of times the cyclic connection has gone offline.
Cyclic Communication Tx Count	DINT	Number of cyclic connection bytes sent.
Cyclic Communication Rx Count	DINT	Number of cyclic connection byte received.

Table 3.20 – DeviceNet Scanner Connection Status

3.7.1.7. SYSTEM

When copying system information, the source type needs to be System.

5 DNR0	1 - Configuration												- 0
Genera	I DeviceNet DeviceN	let Devices DeviceNe	et Map PLC5 Ma	p EtherNet	/IP Devices	EtherNet/IP Map Modi	bus Modbus Auxilia	ary Map Internal	Map Advanc	ed Monitoring			
Inte	rnal Map (max. of 200 i	items.)											Recommend
	Source Type	Source Instance	Source Sub-Tag	Source Offset	Source Bit Offset	Destination Type	Destination Instance	Destination Sub-Tag	Destination Offset	Destination Bit Offset	Count	Copy Function	Reformat
b.e	~					~						~	
	Internal EIP Target EIP Originator MB Register DNet Target DNet Scanner System												



The module's System information has the following format.

Parameter	Data Type	Description
		Module Status.
		Bit 0 – Module Config Valid
		Bit 1 – EtherNet/IP Originator Comms Ok
		Bit 2 – Modbus Comms Ok
	atus INT Bit 2 – Moo Bit 3 – Devi Bit 4 – Ethe Bit 5 – Devi Bit 6 – Pow Bit 7 – Pow Bit 8 – Dup Bit 9 – NTP	Bit 3 – DeviceNet Scanner Comms Ok
Status	INT	Bit 4 – EtherNet/IP Target Comms Ok
	tus INT Bit 2 – Mo Bit 3 – Dev Bit 3 – Dev Bit 5 – Dev Bit 6 – Pov Bit 7 – Pov Bit 8 – Duy Bit 9 – NTF	Bit 5 – DeviceNet Target Comms Ok
Bit 1 – EtherNet/IP Or Bit 2 – Modbus Comm Bit 3 – DeviceNet Scar Bit 4 – EtherNet/IP Ta Bit 5 – DeviceNet Targ Bit 6 – Power is conne Bit 7 – Power is conne Bit 8 – Duplicate Node Bit 9 – NTP Ok ConfigCRC INT The module configuration Actual BAUD SINT	Bit 6 – Power is connected to the bottom connector	
	Bit 7 – Power is connected to the front connector.	
	Bit 8 – Duplicate Node Number	
	Bit 9 – NTP Ok	
	The module configuration signature.	
		Current BAUD rate.
Bit 1 – EtherNet/IP Originator Comms Ok Bit 2 – Modbus Comms Ok Bit 3 – DeviceNet Scanner Comms Ok Bit 3 – DeviceNet Scanner Comms Ok Bit 4 – EtherNet/IP Target Comms Ok Bit 5 – DeviceNet Target Comms Ok Bit 6 – Power is connected to the bottom connector Bit 7 – Power is connected to the front connector. Bit 8 – Duplicate Node Number Bit 9 – NTP Ok ConfigCRC INT The module configuration signature. Current BAUD SINT	0 — 125К	
Actual BAOD	SINT	1 – 250К
		2 — 500К
Actual Node	SINT	Current DeviceNet node number
		Module status when operating as a DeviceNet Target.
DovicoNot Target Status		Bit 0 – DeviceNet Poll Connection Active
Devicence l'arget status		Bit 1 – DeviceNet NULL Connection Active
		Bit 2 – DeviceNet Change-Of-State (COS) Connection Active
Reserved	SINT[6]	Reserved for future use.

Table 3.21 – System Information Format

3.7.2. Сору То

One of six destinations can be selected to copy to: Internal, EIP Target, EIP Originator, DNet Target, and DNet Scanner.

NR01	- Configuration												- 0
eneral	DeviceNet DeviceNet	et Devices DeviceNe	et Map PLC5 Ma	p EtherNet	/IP Devices	EtherNet/IP Map Modb	us Modbus Auxili	ary Map Internal	Map Advanc	ed Monitoring			
Intern	al Map (max. of 200 it	tems.)											Recommend
	Source Type	Source Instance	Source Sub-Tag	Source Offset	Source Bit Offset	Destination Type	Destination Instance	Destination Sub-Tag	Destination Offset	Destination Bit Offset	Count	Copy Function	Reformat
*	~					~						~	
						Internal EIP Target EIP Originator MB Register DNet Target DNet Scanner							

Figure 3.140 – Internal Map – Destination Type

3.7.2.1. INTERNAL

When copying data to the internal data space (IDS), the destination type needs to be Internal.

DNR01	- Configuration												
General	DeviceNet DeviceN	et Devices DeviceNe	et Map PLC5 Ma	ap EtherNet	/IP Devices	EtherNet/IP Map Mod	bus Modbus Auxilia	ary Map Internal	Map Advanc	ed Monitoring			
Intern	al Map (max. of 200 i	tems.)										1	Recommend
	Source Type	Source Instance	Source Sub-Tag	Source Offset	Source Bit Offset	Destination Type	Destination Instance	Destination Sub-Tag	Destination Offset	Destination Bit Offset	Count	Copy Function	Reformat
F #	~					~						~	
						Internal EIP Target EIP Originator MB Register DNet Target DNet Scanner							

Figure 3.141 – IDS Copy – Internal Source Type

The destination instance is Not Applicable for the internal data space. The Destination Offset is the offset in the *Internal Data Space (IDS)* which has a max of 100,000 bytes. The Count is the number of **bytes** that will be copied.

3.7.2.2. EIP TARGET

When copying data from the DeviceNet interface to the EtherNet/IP Target input assembly, the destination type needs to be EIP Target.

ONRO	01 -	- Configuration															
enera	al I	DeviceNet Devic	ceN	et Devices DeviceN	Net Map PLC5 Ma	p EtherNet	/IP Devices	EtherNet/IP Map Mo	dbus Modbus Auxilia	ry Map Internal	Map Advance	ed Monitoring					
Inte	ərna	al Map (max. of 20	00 it	tems.)												Recommend	
		Source Type		Source Instance	Source Sub-Tag	Source Offset	Source Bit Offset	Destination Type	Destination Instance	Destination Sub-Tag	Destination Offset	Destination Bit Offset	Count	Copy Function		Reformat	
	1	- Configuration DeviceNet DeviceNetDevices DeviceNetMap PLCS Map EtherNet/IP Devices EtherNet/IP Map Modbus Auxiliary Map Internal Map Advanced Monitoring nat Map (max. of 200 items.) Source Type Source Instance Source Source Bit Offset Offset Destination Type Destination Destination Destination Offset Count Copy Function Reformat EIP Target Connection 0 ~ 0 DNet Scanner DSA42100D Deta 0 1 Byte to Byte ~ None ~ Net Scanner DSA42100D Data 0 1 Byte to Byte ~ None ~ EIP Target Distance Distance Distance 0 1 Byte to Byte ~ None ~ Net Scanner DSA42100D Data 0 1 Byte to Byte ~ None ~ EIP Target Distance Distance															
۲.	ARD1 - Configuration I EIP Target V Connection 0 × 0 0 I EIP Target V CONNECTION I EIP Target V V V V V V V V V V V V V V V V V V V																
•			~					Internal EIP Target EIP Originator MB Register DNet Target DNet Scanner							~		

Figure 3.142 – IDS Copy – EtherNet/IP Target Destination Type

The destination instance will be the connection number, which can be connection 0 to 3, based on the number of connections configured. The Destination Offset is the offset of the EtherNet/IP input assembly from where the data must be copied. The Count is the number of **bytes** that will be copied.

3.7.2.3. EIP ORIGINATOR

When copying data from the DeviceNet interface to a EtherNet/IP IO device **Output** Assembly, the destination type needs to be EIP Originator.

nera	d I	DeviceNet Devic	eN	etDevices Device	N	et Map PLC5 Ma	p EtherNet	IP Devices	EtherNet/IP Map	Мо	dbus Modbus Auxilia	aŋ	y Map Internal I	Map Advance	ed Monitoring					
Inte	erna	al Map (max. of 20	00 i	tems.)														F	Recommen	d
		Source Type		Source Instance		Source Sub-Tag	Source Offset	Source Bit Offset	Destination Ty	pe	Destination Instance		Destination Sub-Tag	Destination Offset	Destination Bit Offset	Count	Copy Function		Reform	at
1	1	EIP Originator	\sim	PF700	~	Data 🗸	0		DNet Target	\sim	Connection 0 V			0		1	Byte to	\sim	None	``
2	2	DNet Target	\sim	Connection 0	~		0			\sim		Τ		0		1	Byte to	\sim	None	
•			\sim						Internal EIP Target									\sim		_
									EIP Originator MB Register											
									DNet Target											

Figure 3.143 – IDS Copy – EtherNet/IP Originator Destination Type

The destination instance will be one of the EtherNet/IP IO devices added to the EtherNet/IP IO tree in Slate.

Project Explorer	5	DNRO	1 - C	Configuration																	[- 0	×
DNR01 (DeviceNet Router/B)	C	General	De	eviceNet Devic	:eN	et Devices Device!	Net	Map PLC5 Ma	p EtherNet	/IP Devices	EtherNet/IP	Мар	Mod	dbus Modbus Auxilia	ary Ma	ap Interna	Map Advanc	ed Monitoring	1				
EtherNet/IP Connections PF700 (192.168.1.100)		Inter	rnal I	Map (max. of 2	00 it	tems.)															R	ecommend	
1794-IB8 (192.168.1.101.1.0)				Source Type		Source Instance		Source Sub-Tag	Source Offset	Source Bit Offset	Destinat	on Typ	pe	Destination Instance	De	estination Sub-Tag	Destination Offset	Destination Bit Offset	Count	Copy Function	,	Reformat	
		1	E	IP Originator	\sim	PF700	~ D	lata 🗸	0		DNet Tar	et	\sim	Connection 0 V			0		1	Byte to	\sim	None	\sim
		▶ 2	2 D	Net Target	\sim	Connection 0	~		0		EIP Origin	ator	\sim	PF700 ~	Dat	a ~	0		1	Byte to	\sim	None	\sim
					\sim								\sim	PF700							\sim		
														1794-188									

Figure 3.144 – IDS Copy – EtherNet/IP Originator Destination Instance

The Destination Offset is the offset in the selected EtherNet/IP device Class 1 **Output** Assembly. The Count is the number of **bytes** that will be copied.

3.7.2.4. MODBUS REGISTER

When copying data from the DeviceNet interface to a Modbus Register, the destination type needs to be MB Register.

nera Inte	erna	DeviceNet Dev al Map (max. of 2	iceN 200 i	et Devices ∣ DeviceN tems.)	let Map PLC5 Ma	p EtherNet	IP Devices I	EtherNet/IP Map Mo	dbus Modbus Auxili	ary Map Internal	Map Advanc	ed Monitoring				Recommend
		Source Type	э	Source Instance	Source Sub-Tag	Source Offset	Source Bit Offset	Destination Type	Destination Instance	Destination Sub-Tag	Destination Offset	Destination Bit Offset	Count	Copy Functic	on	Reformat
	1	MB Register	\sim	CS ~		0		DNet Scanner V	DSA42100D >	/ Data //	0		1	Byte to Byte	\sim	None
	2	DNet Scanner	~	DSA42100D ~	Data ~	0		~	1		0		1	Byte to Byte	~	None
•			~					Internal EIP Target EIP Originator MB Register DNet Target DNet Scanner							~	

Figure 3.145 – IDS Copy - Modbus Destination Type

The destination instance will be the Modbus register type required.

DNR0	1 - 1	Configuration																		
ieneral	D	eviceNet Devi	ceN	etDevices Devic	eN	et Map PLC5 Ma	p EtherNet	/IP Devices	EtherNet/IP Map	Mod	dbus Modbus Auxili	iary	Map Internal	Map Advance	ed Monitoring					
Inter	rnal	I Map (max. of 2	:00 i	tems.)															Recommend	
		Source Type	•	Source Instanc	e	Source Sub-Tag	Source Offset	Source Bit Offset	Destination Typ	e	Destination Instance		Destination Sub-Tag	Destination Offset	Destination Bit Offset	Count	Copy Function	n	Reformat	
1	1	MB Register	\sim	CS	\sim		0		DNet Scanner	\sim	DSA42100D ~	/ [)ata 🗸 🗸	0		1	Byte to Byte	\sim	None	\sim
▶ 2	2	DNet Scanner	~	DSA42100D	\sim	Data 🗸	0		MB Register	\sim	cs ~	7		0		1	Byte to Byte	~	None	\sim
			\sim							\sim	CS							\sim		_
											IS IR									
											HR									

Figure 3.146 – IDS Copy - Modbus Destination Instance

The Destination Offset is the Modbus Register offset to where the data must be copied. The Count is the number of **bytes** that will be copied. See the Internal Data Space Mapping section for more information regarding the operation.

3.7.2.5. DNET TARGET

When copying data from the Ethernet interface to the DeviceNet Target input assembly, the destination type needs to be DNet Target.

5	DN	R01	- Configuration													- 💌
(Gene	eral	DeviceNet DeviceN	let Devices DeviceN	et Map PLC5 Ma	p EtherNet	/IP Devices	EtherNet/IP Map Mo	dbus Modbus Auxilia	ry Map Internal	Map Advanc	ed Monitoring				
	In	ntern	al Map (max. of 200 i	items.)											Recommer	nd
			Source Type	Source Instance	Source Sub-Tag	Source Offset	Source Bit Offset	Destination Type	Destination Instance	Destination Sub-Tag	Destination Offset	Destination Bit Offset	Count	Copy Functio	n Reforma	at
		1	DNet Target V	Connection 0 V		0		EIP Originator	1794-OW8 ~	Data 🗸	0		1	Byte to Byte	V None	\sim
	Þ	2	EIP Originator V	1794-IB8 ×	Data 🗸	0		~			0		1	Byte to Byte	V None	~
	٠	2 El ^P Organator V 1794-IB8 V Data V 0						Internal EIP Target EIP Originator MB Register DNet Target DNet Scanner							~	



The destination instance will be the connection number, which in this case is always *Connection 0*. The Destination Offset is the offset of the produced data to the DeviceNet originator (e.g., 1756-DNB) from where the data must be copied. The Count is the number of **bytes** that will be copied.

3.7.2.6. DNET SCANNER

When copying data from the Ethernet interface to a DeviceNet IO device **Output** Assembly, the destination type needs to be DNet Scanner.

enera	1 0	Configuration	:eN	et Devices DeviceN	et Map PLC5 Ma	p EtherNet/	IP Devices	EtherNet/IP Map Mod	dbus Modbus Auxilia	ary Map Interna	Map Advanc	ed Monitoring				
Inte	ma	I Map (max. of 20	00 i	tems.)										F	Recomme	nd
		Source Type		Source Instance	Source Sub-Tag	Source Offset	Source Bit Offset	Destination Type	Destination Instance	Destination Sub-Tag	Destination Offset	Destination Bit Offset	Count	Copy Function	Refo	mat
1	1	DNet Scanner	\sim	DSA42100D ~	Data 🗸	0		EIP Target V	Connection 0 V		100		1	Byte t	None	
1	2	EIP Target	\sim	Connection 0 V		20		~			0		1	Byte t	None	
•		Ele Target V connection U V 2U						Internal EIP Target EIP Originator MB Register DNet Target DNet Scanner						,	~	

Figure 3.148 – IDS Copy – DeviceNet Scanner Destination Type

The destination instance will be one of the DeviceNet IO devices added to the DeviceNet IO tree in Slate.

Project Explorer		01 - Configuration												- () <mark>×</mark>
Configuration DeviceNet Connections 04 - DSA42100DNY42R50 05 - E3EC3525A	Gener	al DeviceNet Device	eNet Devices DeviceN 0 items.)	let Map PLC5 M	ap EtherNet	IP Devices	EtherNet/IP Map N	Nodbus Modbus Auxili	ary Map Internal	Map Advanc	ed Monitoring		F	ecommer	ıd
		Source Type	Source Instance	Source Sub-Tag	Source Offset	Source Bit Offset	Destination Type	Destination Instance	Destination Sub-Tag	Destination Offset	Destination Bit Offset	Count	Copy Function	Refor	mat
		1 DNet Scanner	DSA42100D	Data ~	0		EIP Target	Connection 0 ~		100		1	Byte t	None	~
	•	2 EIP Target	Connection 0 ~		20		DNet Scanner	DSA42100DNY4; ~	Data ~	0		1	Byte t	None	~
	•		~					DSA42100DNY42R E3EC3525A						/	

Figure 3.149 – IDS Copy – DeviceNet Scanner Destination Instance

The Destination Offset is the offset in the selected DeviceNet device Cyclic **Output** Assembly (data being consumed by the DeviceNet IO device). The Count is the number of **bytes** that will be copied. See the Internal Data Space Mapping section for more information regarding the operation.



NOTE: For more information regarding the specific Internal Map operation for specific interfaces, see the setup and configuration sections for the various DeviceNet and Primary Interfaces.

3.8. ADVANCED

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

S DNR01	- Configura	tion									
General	DeviceNet	DeviceNet Devices	DeviceNet Map	PLC5 Map	EtherNet/IP Devices	EtherNet/IP Map	Modbus	Modbus Auxiliary Map	Internal Map	Advanced	Monitoring
Tim	e Synchroniz	zation									
	VNTP Ena	ble									
	NTP - Netv	vork Time Protocol									
	Server I	P Address	192 _	168 .	1 _ 236						
	Update	Interval	60	(s)							
				Ok	Apply	Cancol	Ho				
				UK	Арріу	Cancer	пе	אוי			

Figure 3.150 – Advanced configuration

The Advanced configuration consists of the following parameters:

Parameter	Description
NTP Enable	The DeviceNet Router/B 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 DeviceNet Router/B will request time from the NTP Server.

Table 3.22 – Advanced configuration parameters

3.9. MONITORING

The Monitoring configuration will allow a user to send DeviceNet packet captures and statistics to a remote target (server) using Ethernet UDP communication to a configurable UDP port.

DNR01 - Con	figuration									
General Devic	eNet DeviceNetDevices	DeviceNet Map	PLC5 Map	EtherNet/IP Devices	EtherNet/IP Map	Modbus	Modbus Auxiliary Map	Internal Map	Advanced	Monitoring
Monitoring	Packet Captures	512 (b	/tes) [<140(0						
✓ Send	Statistics Report Interval	1000 (s)	I							
IP Ad	dress 192 . Port 60	168 <u>1</u>	. 200							
			Ok	Apply	Cancel	He	lp			

Figure 3.151 – Monitoring configuration

The Monitoring configuration consists of the following parameters:

Parameter	Description
Send Packet Captures	When enabled, the DeviceNet Router/B module will send the DeviceNet packet capture data to the Destination Server once the <i>Max Packet Size</i> has been reached.
Max Packet Size	When <i>Send Packet Captures</i> is enabled, then this parameter will determine what is the send trigger size. Once the DeviceNet packet capture buffer size reaches this parameter, then the UDP packet will be sent.
Send Statistics	When enabled, the DeviceNet Router/B module will send DeviceNet Statistics to the Destination Server at the <i>Report Interval</i> .
Report Interval	This is the rate at which the DeviceNet statistics will be sent to the Destination Server.
Destination Server	
IP Address	Destination Server IP address.
UDP Port	Destination Server UDP port.

Table 3.23 – Monitoring configuration parameters

The format of the DeviceNet Packet Capture that will be sent is shown below.

Parameter	Data Type	Length	Description
Start Flag	DINT	4	0xAABBCCDD

Packet Type	SINT	1	Fixed to 1 – Packet Capture								
Packet Count	INT	2	Number of packets in the payload								
Timestamp Date/Time											
Year	INT	2	Year when this UDP packet was sent								
Month	SINT	1	Month when this UDP packet was sent								
Day	SINT	1	Day when this UDP packet was sent								
Hour	SINT	1	Hour when this UDP packet was sent								
Minute	SINT	1	Minute when this UDP packet was sent								
Seconds	SINT	1	Seconds when this UDP packet was sent								
Milliseconds	INT	2	Milliseconds when this UDP packet was sent								
Packets x Packet Count											
Packet Data	SINT[10]	10	The raw DeviceNet Packet data								

Table 3.24 – DeviceNet Packet Capture format

The format of the DeviceNet Statistics Packet that will be sent is shown below.

Parameter	Data Type	Length	Description					
Start Flag	DINT	4	0xAABBCCDD					
Packet Type	SINT	1	Fixed to 2 – Real Time Statistics					
Report ID	INT	2	Increased each time a report is sent					
General (CAN Bus) Statistics								
Rx CAN Packet Count	INT	2	Received CAN message count.					
Tx CAN Packet Count	INT	2	Transmitted CAN message count.					
CAN CRC Errors	INT	2	CAN CRC failed message count.					
CAN Bit Errors	INT	2	CAN Bit error count.					
Can Stuff Errors	INT	2	CAN Stuff error count.					
Bus Off	INT	2	The number of times the CAN receiver has detected the Bus Off state.					
Ack Error	INT	2	The number of times the CAN message was no acknowledged.					
Format Error	INT	2	The number of times a fixed format part of the received frame has the wrong format.					
DeviceNet (Node Specific) Statistics								

Node 0 - Statistics	[NodeStats]	16	DeviceNet Node 0 Statistics
PacketTx	INT	2	Transmitted CAN message count.
PacketRx	INT	2	Received CAN message count.
IOPollRequests	INT	2	Number IO Polls that have been sent to the node
IOPollResponses	INT	2	Number IO Polls that the node has sent
ConnectionEstablishRequest	INT	2	Number of Connection Establishments sent to the node
ConnectionEstablishResponse	INT	2	Number of Connection Responses sent by the node
ExplicitRequests	INT	2	Number Explicit Message Requests that have been sent to the node
ExplicitRexponses	INT	2	Number Explicit Message Requests that the node has sent
Node 1 - Statistics	[NodeStats]	16	DeviceNet Node 1 Statistics
Node 2 - Statistics	[NodeStats]	16	DeviceNet Node 2 Statistics
Node 3 - Statistics	[NodeStats]	16	DeviceNet Node 3 Statistics
Node 62 - Statistics	[NodeStats]	16	DeviceNet Node 62 Statistics
Node 63 - Statistics	[NodeStats]	16	DeviceNet Node 63 Statistics

3.10. MODULE DOWNLOAD

Once the DeviceNet Router configuration has been completed, it must be downloaded to the module. Before downloading the *Connection Path* of the module should be set. This path will automatically default to the IP address of the module, as set in the module configuration. It can however be modified, if the DeviceNet Router is not on a local network.

The connection path can be set by right-clicking on the module and selecting the *Connection Path* option.

S Aparian-Slate - DNTRB D	emo*
File Device Tools W	indow Help
*a∰ ¥∂@ +	
Project Explorer	
🖃 💩 DNTRB Demo	
DNR01 (DeviceNet	Configuration
EtherNet/IP Conne	Connection Path
PF700 (192.168	I Go Online
I 1734100(132.1	Download
	1 Upload
	Verify Configuration
	🗗 Сору
	[+ Export
	X Delete
	Generate Logix LSX

Figure 3.152 - Selecting Connection Path

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

S DNR01 - Conne	ction Path		
Connection Path 192.168.1.147	Ok	Cancel	Browse

Figure 3.153 - Connection Path

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

S Aparian-Slate - DNTRB Demo	0*
File Device Tools Wind	ow Help
Project Explorer □	nuter/R)
Configuration EtherNet/IP Connectic PF700 (192.168.1.1	 Configuration Connection Path
☐ 1794-IB8 (192.168.1	Go Online Download
	Upload Verify Configuration
	D Copy F Export
	 Delete Generate Logix L5X

Figure 3.154 - Selecting Download

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



Figure 3.155 - Successful download

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



Figure 3.156 - Module online

4. DEVICE FIRMWARE UPDATE

The DeviceNet Router/B module supports in-field firmware upgrading. The latest firmware for the module can be downloaded from the Aparian website **www.aparian.com**. The firmware is digitally signed, so only the correct firmware can be used.

To firmware upgrade the module, follow the steps below:

• From the *Tools* menu in Slate, select the *DeviceFlash* utility.



Figure 4.1 – Select DeviceFlash utility from Slate

• When the utility opens, the user will be prompted to select the binary file to be used to firmware upgrade the module.

Select a Device Flash Fi	ile								×
← → ~ ↑ 📕 > 1	This PC > Doc	uments > Aparian			~	Ö			
Organize 🔹 New fold	der						•== •== •		?
🧢 This PC	^	Name	Date modified	Туре	Size				
🧊 3D Objects		DND_DNR_1001001.afb	2023/01/09 12:50	AFB File	557 KB				
📃 Desktop									
Documents									
🖊 Downloads									
👌 Music									
E Pictures									
🚪 Videos									
🔩 OS (C:)									
🔮 Network									
	~								
File na	ame: DND_DN	IR_1001001.afb				~	Device Flash (*.afb) Open	Cance	~ !I



• After selecting the file, the user will be prompted to select the device to firmware upgrade on the local network.

5	Target I	Browser –	×
•	Ø		Done
		192.168.1.41 : BMEP584040	^
		192.168.1.42 : BMEP584040	
		192.168.1.146 : CANopen Router/B	
		192.168.1.147 : DeviceNet Router/B	
		192.168.1.149 : PMEPXM0100	
		192.168.1.159 : PLX51-PBM	
	.	192.168.1.168 : ControlNet Router	
		192.168.1.170 : PLX51-PBS	
		192.168.1.172 : PLX51-PBS	
	÷	192.168.1.180 : PA Link/B	
	÷	192.168.1.184 : FF Link/B	
	5	400 400 4 400 - 5140	~
		Ok Cancel	

Figure 4.3 – Select the device to be updated

• After the device selection the user will be prompted if the device flash must start. The firmware update will take less than 2 minutes to complete.

5	Device Flash			
	File Tools			
Ð				
	D		T (D)	
	Parameter	Source File	Target Device	
	Path	DND_DNR_1001001	192.168.1.147	
	Product	DeviceNet Router/B	DeviceNet Router/B	
	Vendor	1370	1370	
	Device Type	12	12	
	Product Code	139	139	
	Revision	1.001	1.001	~
		Flash	Cancel	
S	ending Chunk 40	7		

Figure 4.4 – Firmware update busy

• Once the firmware update has successfully completed, the Target Device textboxes will display green.

5	Device Flash			
ł	ile Tools			
1	e 4			
[Parameter	Source File	Target Device	^
	Path	DND_DNR_1001001	192.168.1.147	
	Product	DeviceNet Router/B	DeviceNet Router/B	
	Vendor	1370	1370	
	Device Type	12	12	
	Product Code	139	139	
	Revision	1.001	1.001.001	\sim
		Flash	Cancel	
С	omplete			

Figure 4.5 – Firmware update successfully completed.



NOTE: If for any reason the firmware update failed (e.g. power down during the update), then the module will revert back to the bootloader. The user can then simply reflash the module again to update it to the latest application firmware.

5. OPERATION

5.1. DEVICENET TARGET

A Logix controller can own the DeviceNet Router/B over DeviceNet using a cyclic DeviceNet connection when the module is operating as a DeviceNet target. This will allow the DeviceNet Router/B to exchange data with the Logix controller using the input and output assembly of the DeviceNet Scanner module (e.g., 1756-DNB) to which has mapped the produced and consumed data of the DeviceNet Router/B module.

The module will produce the number of bytes configured in the DeviceNet configuration (in Slate) and consume the number of bytes configured.

🕄 DNR01 - Configur	ation					
General DeviceNet	DeviceN	let Devices	Devic	eNet Map	PLC5 Map	EtherNet/I
DeviceNet						
Node Addre	SS	1		\sim		
BAUD		125k		\sim		
Message Ti	meout	100		[10-1000]	ms	
DeviceNet	Target					
Produce	d Size	48		0-128] by	tes	
Consume	ed Size	32		0-128] by	tes	

Figure 5.1 – DeviceNet Target Produce and Consume size

Using the module's internal mapping, the user can copy data to the DeviceNet Target produce array or copy data from the DeviceNet Target consume array. This will allow the exchange of devices on the Ethernet or Serial interface (e.g., EtherNet/IP, Modbus, etc) to exchange data with the DeviceNet Bridge which in turn can be accessed by a Logix or PLC5 controller.

In the example below, the DeviceNet Router/B module is connected to two 1794 Flex modules via an EtherNet/IP adapter. The module is also connected to a 1756-DNB Scanner which will map 48 bytes of the module DeviceNet produced data to the 1756-DNB input assembly and 32 bytes of the module DeviceNet consume data to the 1756-DNB output assembly.

The data from the Logix controller that has been copied to the output assembly of the 1756-DNB (where the DeviceNet Router/B has been mapped) will be sent to the DeviceNet Router/B via the cyclic consumed DeviceNet connection. This data will then be copied to the output assembly of the Flex 1794-OW8 using the internal mapping which is communicated to the 1794-OW8 using the Class 1 EtherNet/IP connection.



Figure 5.2 – Internal Mapping from DeviceNet Scanner to EtherNet/IP Originator

The data from the 1794-IB10xOB6 is exchanged with the DeviceNet Router/B using the input assembly of its class 1 EtherNet/IP connection. This data is then copied to the DeviceNet Router/B DeviceNet produce buffer which is exchanged with the DeviceNet Scanner (1756-DNB). The Logix controller can then access this data from the 1756-DNB input assembly where the data from the DeviceNet Router/B has been mapped.



Figure 5.3 – Internal Mapping from EtherNet/IP Originator to DeviceNet Scanner

5.2. DEVICENET SCANNER

The DeviceNet Router/B module can operate as a DeviceNet connection originator. In this mode the module can exchange data from the Primary Interface with DeviceNet IO devices using either the produced and consumed images of the cyclic DeviceNet IO connection or using an explicit (unscheduled UCMM) DeviceNet message to read or write data.

5.2.1. CYCLIC DEVICENET CONNECTIONS

In the example below, the DeviceNet Router/B is owned by a Logix controller over EtherNet/IP while the DeviceNet Router/B is owning some DeviceNet IO. The data from the Logix controller is exchanged with the DeviceNet IO.

Once the DeviceNet Cyclic connections are configured and established then any Internal Map copying to a DeviceNet IO device will be written to the output assembly of selected DeviceNet device (Originator to Target). In the Internal Map the user will specify which device instance is the target and at what offset the data must be written in the output assembly.



Figure 5.4 – Internal Mapping from EtherNet/IP to DeviceNet Originator

Any Internal Map copying from a DeviceNet IO device will be read from the input assembly of selected DeviceNet device (Target to Originator). In the Internal Map the user will specify which device instance is the target and at what offset the data must be read from the input assembly.





5.2.1.1. CONNECTION STATUS

The user can select to copy the data from the EtherNet/IP connection or the status.

ć	S DNR01 - Configuration												
	Ge	ener	al	DeviceNet DeviceNetDevices DeviceNetMap PLC5 Ma							Maj	p Etł	
	Internal Map (max. of 200 items.)												
				Source Type			Source Instance			So Sub	urce o-Tag		Sou Ofi
		۲	1	DNet Scan	ner	\sim	DSA42100)D	\sim	Data		\sim	(
		*				\sim				Data Status			

Figure 5.6 – IDS Copy – EtherNet/IP Originator Status

Parameter	Data Type	Description
		Bit 0 – Online
DeviceNet Scanner Connection Status	DINT	Bit 1 – Cyclic Data Exchange Ok
		Bit 2 – Device Mismatch
Node	SINT	The target DeviceNet device Node number.
Reserved	SINT	Reserved for future use.
Cyclic Communication Timeout Count	DINT	Number of times the cyclic connection has gone offline.
Cyclic Communication Tx Count	DINT	Number of cyclic connection bytes sent.
Cyclic Communication Rx Count	DINT	Number of cyclic connection byte received.

When selecting the Status, the format of the Status information is shown below:

Table 5.1 – DeviceNet Scanner Connection Status

5.2.1.2. CONFIGURING AND MONITORING PARAMETERS

The device's parameters can be monitored and configured using the *Parameters* tab of the DeviceNet Cyclic Connection window.

Group	Overload Setup	uto Update					
ID	Parameter Name	Stored	Stored Value	Live Value		Units	Access
27	Single/Three Ph		Three Phase V	Three Phase			rw
28	FLA Setting		5.00	6.70	•	Amps	rw
29	Trip Class		10	10			rw
30	OL/PTC ResetMode		Manual 🗸	Manual			rw
31	OL Reset Level		75	75		%TCU	rw
ngle Pha	se = L1 & L2						^

Figure 5.7 – Parameters

A number of functions can be performed on a parameter by right-clicking on it, which exposes the parameter context menu.

ID		Parar	neter Name
27	Single/Three Ph		
28	FLA Setting		
29	Trip Class	1	Read
30	OL/PTC ResetMo	_	Upload
31	OL Reset Level	Į.	Write
		⁴]	Revert to Default
		tt.	Read All
		⁼t†	Upload All
		44	Write All Stored
		:	Device Commands

Figure 5.8 – Parameter Functions Menu

The parameter functions are follows:

Function	Description
Read	Reads the selected parameter from the device and displays it in the <i>Live Value</i> field.
	Note: This has no effect on the configuration.
	Reads the selected parameter from the device and copies the value to the <i>Stored Value</i> field.
Ορισαά	Note: This has no effect on the configuration unless the <i>Stored</i> option is checked.
Write	Writes the value from the <i>Stored Value</i> field to the device.
Revert to Default	Reverts the value in the <i>Stored Value</i> field to the default value contained in the EDS file.
Read All	Reads all the parameters from the device and displays them in the corresponding <i>Live Value</i> field.
	Note: This has no effect on the configuration.
	Uploads all the parameters. That is, reads all the parameters from the device and copies them to the corresponding <i>Stored Value</i> field.
	Note: This has no effect on the configuration unless the <i>Stored</i> option is checked.
Write All Stored	Writes the value from the <i>Stored Value</i> field to the device for all parameters that have the <i>Stored</i> option checked.
Device Commands	The following Device Commands can be sent to the device.
	<i>Note</i> : Many devices do not support these functions.
Save All to NV	Commands the device to transfer all its current parameter values to non-volatile storage.

Restore All from NV	Commands the device to overwrite all its current parameter values with those in non-volatile storage.
Reset All Values from Default	Commands the device to overwrite all its current parameter values with the system default values.

Table 5.2 – DeviceNet Parameter Functions

The column adjacent to the *Live Value* displays an icon which represents the status of the last action performed. The status icons are as follows:

lcon/s	Description
	Read Successful. Each time a read is successful the icon is updated to the next in the series.
•	Read Failed.
\	Write Successful.
0	Write Failed.

Table 5.3 – DeviceNet Parameter Status Icons

By selecting the *Auto Update* option, all the visible Parameters will be read up from the device and displayed in the *Live Value* column. Note that this will not affect the *Stored Value* of each parameter.

S D	NR	01 - Cycl	ic Connection - 04 - a193592EC3C		
Ge	nera	al Paran	neters		
	G	àroup	Overload Setup 🗸 🗸	uto Update	
		ID	Parameter Name	Stored	Stored Value
		27	Single/Three Ph		Three Phase 🛛 🗠
		27 28	Single/Three Ph FLA Setting		Three Phase ∨ 5.00

Figure 5.9 – Parameter Auto Update

5.2.2. EXPLICIT MESSAGING

When using the DeviceNet Explicit Messaging, the user can configure up to 63 DeviceNet devices which will be used for the Explicit Messaging. This configuration is located in the

DeviceNet Devices tab. Following this, the DeviceNet Map of explicit messages needs to be configured. The Explicit Messaging uses the internal data space (IDS) which is size where data can be stored for exchanges between the explicit DeviceNet devices and the Ethernet network.

The Input and Output IDS Offset is where the Explicit DeviceNet device data will be read from or written to. The data in the IDS can then, in turn, be copied to or from, the Primary Interface using the Internal Map in the configuration.

In the example below, the DeviceNet Router/B is receiving data from a Logix controller on EtherNet/IP, copying 2 bytes from the Class 1 EtherNet/IP Output assembly to the Internal Data Space at address 5030.

S DN	IR01 -	Configuration														_ 0	
Gen	eral I	DeviceNet DeviceN	let Devices DeviceNe	et Map PLC5 Map	EtherNet	/IP Devices	EtherNet/IP Map	Mod	bus Modbus Auxiliary N	lap Internal	Map Advance	ed Monitoring	I				
	nterna	al Map (max. of 200	items.)													Recommend	t
		Source Type	Source Instance	Source Sub-Tag	Source Offset	Source Bit Offset	Destination Ty	/pe	Destination Destination	estination Sub-Tag	Destination Offset	Destination Bit Offset	Count	Copy Function	n	Reformat	
	1	EIP Target V	Connection 0 V		0		Internal	\sim			5030		2	Byte to Byte	~	None	\sim
Þ	*	~						~							~		

Figure 5.10 – Internal Mapping from EtherNet/IP to IDS

The DeviceNet Router/B then uses the data from the EtherNet/IP Output assembly (which was copied to IDS offset 5030) to execute a Set Single Attribute to a target DeviceNet device using explicit messaging.

DNR	01 -	Configuratio	on																				- (
Gener	al C	DeviceNet D	evice	eNet Devices)eviceN	let Map	PLO	C5 Map Eth	nerNet	/IP Devices	EtherNet	IP Map Mo	odbus Moo	dbus Auxilia	ry M	ap Internal	Map Adva	anced Mor	itoring					
Exp	licit (DeviceNet Ma	ap (n	nax. of 50 items.	.)																			
		Device		Parameter		Sca	in	Function	n	Service	Class	Instance	Attribute	DNet Da Type	ta	Input Offset	Get Length	Output Offset	Set Length	Scale	Multiplier	Offset	Map Data Type	Stat
1	1	MyDSA	~			Α	~	Get	~	0x00	0x0001	1	1	INT	~	4	2	0	0		1	1	INT S	~
2	2	MyDSA	\sim	I/O Fault Sta		Α	\sim	Get	\sim	0x00	0x0004	182	3	WORD	\sim	12	2	0	0		1	0	INT	~
3	3	MyDSA	~	Off-to-On D		Α	~	Set	~		0x001D	1	6	UINT	\sim	5030	2				1	0	INT 🕚	~
b #			~				\sim		~						\sim								,	~

Figure 5.11 – Explicit Messaging – Set Function from IDS to DeviceNet device

In the next example below, the DeviceNet Router/B is receiving data from a DeviceNet device using a Get Explicit Unscheduled DeviceNet message and saving the data at IDS offset 6070.

NR01	- Configuration	on																					
neral	DeviceNet D	evice	eNet Devices)eviceN	let Map	PL	C5 Map Eth	erNe	t/IP Devices	EtherNet	/IP Map Mo	odbus Moo	dbus Auxilia	iry M	ap Interna	Map Adva	anced Mo	nitoring					
xplici	t DeviceNet M	ap (n	nax of 50 items)																			
				·																			
													001.00			.	.	.					
	Device		Parameter		Sca	in	Function	n	Service	Class	Instance	Attribute	DNet Da Type	ata	Input Offset	Get Length	Output Offset	Set Length	Scale	Multiplier	Offset	Map Da Type	ata e
1	Device MyDSA	~	Parameter		Sca A	in V	Function Get	n ~	Service 0x00	Class 0x0001	Instance	Attribute	DNet Da Type	ata V	Input Offset 6070	Get Length 2	Output Offset 0	Set Length 0	Scale	Multiplier 1	Offset	Map Da Type INT	ata e
1	Device MyDSA MyDSA	~ ~	Parameter		Sca A A	in ~ ~	Functior Get Get	n ~ ~	Service 0x00 0x00	Class 0x0001 0x0004	Instance 1 182	Attribute 1 3	DNet Da Type INT WORD	ata ~	Input Offset 6070 12	Get Length 2 2	Output Offset 0	Set Length 0	Scale	Multiplier 1 1	Offset 1 0	Map Da Type INT INT	ata > ~
1 2 3	Device MyDSA MyDSA MyDSA	> > >	Parameter I/O Fault Sta Off-to-On D		Sca A A A	in ~ ~	Function Get Get Set	n	Service 0x00 0x00	Class 0x0001 0x0004 0x001D	Instance 1 182 1	Attribute 1 3 6	DNet Da Type INT WORD UINT	ata ~ ~	Input Offset 6070 12 5030	Get Length 2 2 2	Output Offset 0 0	Set Length 0	Scale	Multiplier 1 1 1	Offset 1 0 0	Map Da Type INT INT INT	ata × × ×

Figure 5.12 – Explicit Messaging – Get Function from DeviceNet device to IDS

The DeviceNet Router/B will then map the received data at IDS offset 6070 to the EtherNet/IP Input Assembly being sent back to the Logix controller.

DNF	R01 ·	- Configuration															
Gene	ral	DeviceNet DeviceN	let Devices DeviceNe	et Map PLC5 Ma	EtherNet	/IP Devices	EtherNet/IP Map	Mod	dbus Modbus Auxilia	ry Map Internal	Map Advanc	ed Monitoring					
In	tern	al Map (max. of 200	items.)													Recommend	
		Source Type	Source Instance	Source Sub-Tag	Source Offset	Source Bit Offset	Destination Typ	e	Destination Instance	Destination Sub-Tag	Destination Offset	Destination Bit Offset	Count	Copy Function		Reformat	
	1	EIP Target V	Connection 0 V		0		Internal	\sim			5030		2	Byte to Byte	\sim	None	\sim
	2	Internal ~			6070		EIP Target	\sim	Connection 0 ~		50		2	Byte to Byte	\sim	None	\sim
3.0		~						\sim							\sim		

Figure 5.13 – Explicit Messaging – Internal Mapping from IDS to EtherNet/IP

5.2.3. DEVICE NODE ADDRESS AND BAUD RATE ASSIGNMENT

The DeviceNet Router/B can scan the DeviceNet network to discover DeviceNet devices. This is done by going online with the module in Slate, and selecting the **DeviceNet Discovery** tab.

ONR01 - Staf	us							
eneral Devic	eNet Statistics	DeviceNet	Discovery	DeviceNet Exp	olicit DeviceNe	t Map EtherNet/IP Originator CIP Statistic	ts Ethernet Clients TCP / ARP	
Sca	n							
Node	Vendor	Device Type	Product Code	Revision	Serial Number	Product Name	EDS File	Project Status

Figure 5.14 – DeviceNet Discovery

Once the *Scan* button is pressed, the module will start scanning the DeviceNet network for devices. If a device has been found it will be listed in the window and indicate the status of the device.

Sca	n								
Node	Vendor	Device Type	Product Code	Revision	Serial Number	Product Name	EDS File	Project Status	
4			40	4.002	1A26958D	E3 EC3 (5-25A)	E3 Plus - 0001000300280400.eds	Unconfigured	
6	1	7	1062	5.002	1A27F727	DSA 4-in/2-out		EDS Unavailable	



For devices supporting this feature, the DeviceNet node number and/or DeviceNet Baud rate can be change for the selected DeviceNet device.

IR01 - Stat	us									-	
aneral DeviceNet Statistics UeviceNet Discovery DeviceNet Explicit DeviceNet Map EtherNet/IP Originator CIP Statistics Ethernet Clients TCP / ARP											
Scar	n										
Node	Vendor	Device Type	Product Code	Revision	Serial Number	Product Name			EDS File	Project Status	
4	1	3	40	4.002	1A26958D	E3 EC3 (5-25A)	E3 Plu		Add Davisa	Unconfigured	
6	1	7	1062	5.002	1A27F727	DSA 4-in/2-out		•	Add Device	EDS Unavailable	
								۶	Set Node Address		
								លា	Set BAUD		
								+•	Add All Devices	Ī	
								_		*	

Figure 5.16 – DeviceNet Discovery – Set Node Address and BAUD

5.3. ETHERNET/IP TARGET

A controller (e.g. Logix controller) can own the DeviceNet Router/B over EtherNet/IP using up to 4 Class 1 EtherNet/IP connections when the DeviceNet Router/B is operating as an EtherNet/IP target. This will allow the DeviceNet Router/B to exchange data with the controller using the input and output assembly of the Class 1 EtherNet/IP connection.



NOTE: When using EtherNet/IP Target, it is recommended to use the *Recommend* button in the Internal Map configuration. This will automatically map and reformat all the required data in the Internal Map.

5.3.1. CLASS 1 ASSEMBLY MAPPING

When the module operates in a Logix "owned" mode the Logix controller will establish a class 1 cyclic communication connection to the DeviceNet Router/B. Up to four input and output assemblies are exchanged at a fix interval (RPI).



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

Once the generate L5X file has been imported (which will match the Internal Mapping in the configuration), the user will be able to use the tags generated for the specific DeviceNet Router/B. The data of the various tags (System Status, Device Status, etc.) will be in the format as shown in section 5.8.

DNR01In	{}	{}	DNR01In635A
 DNR01In.SystemStatus 	{}	{}	DNetSystemStatus
DNR01In.SystemStatus.ConfigValid	0	Decim	BOOL
DNR01In.SystemStatus.EIPOriginatorCommsOk	0	Decim	BOOL
DNR01In.SystemStatus.ModbusOnline	0	Decim	BOOL
DNR01In.SystemStatus.DnetOriginatorCommsOk	0	Decim	BOOL
DNR01In.SystemStatus.EIPOwned	0	Decim	BOOL
DNR01In.SystemStatus.DNetOwned	0	Decim	BOOL
DNR01In.SystemStatus.PowerMainConnector	0	Decim	BOOL
DNR01In.SystemStatus.PowerCANConnector	0	Decim	BOOL
DNR01In.SystemStatus.DuplicateNodeNumber	0	Decim	BOOL
DNR01In.SystemStatus.NTPOk	0	Decim	BOOL
DNR01In.SystemStatus.ConfigCRC	16#0000	Hex	INT
DNR01In.SystemStatus.ActualBAUD	0	Decim	al SINT
DNR01In.SystemStatus.ActualNode	0	Decim	al SINT
DNR01In.SystemStatus.DNetTargetPollActive	0	Decim	BOOL
DNR01In.SystemStatus.DNetTargetNullPoll	0	Decim	BOOL
DNR01In.SystemStatus.DNetTargetCOSActive	0	Decim	BOOL

Figure 5.17 – Logix System Status Tag

DNR01In.DSA42100DNY42R50Status	{} {.	.}	DNetDeviceStatus
DNR01In.DSA42100DNY42R50Status.Online	0	Decimal	BOOL
DNR011n.DSA42100DNY42R50Status.DataExchangeActive	0	Decimal	BOOL
DNR01In.DSA42100DNY42R50Status.DeviceMismatch	0	Decimal	BOOL
DNR01In.DSA42100DNY42R50Status.Node	0	Decimal	SINT

Figure 5.18 – Logix D	Device	Status	Tag
-----------------------	--------	--------	-----

5.3.2. EXPLICIT MESSAGING

The DeviceNet Router/B allows the user to read or write data from and to the DeviceNet IO devices using explicit EtherNet/IP CIP messages. The required parameters for DeviceNet data extraction from a DeviceNet IO device are listed below.

5.3.2.1. DEVICENET PASSTHROUGH

A. CIP MESSAGE

Parameter	Description
Service Code	0х6В (Нех)
Class	0x436 (Hex)
Instance	1
Attribute	N/A

Request	Data	Length
nequest	Dutu	

16 - 512

Table 5.4 – DeviceNet Passthrough Message

B. REQUEST DATA

Parameter	Data Type	Description			
Node SINT		The Node Address of the target DeviceNet device			
Reserved SINT		Reserved for future use			
Reserved INT		Reserved for future use			
Reserved IN		Reserved for future use			
CIP Service	INT	CIP service for the target DeviceNet device request.			
CIP Class	INT	CIP Class for the target DeviceNet device request.			
CIP Instance	INT	CIP Instance for the target DeviceNet device request.			
CIP Attribute	INT	CIP Attribute for the target DeviceNet device request.			
CIP Data Size	INT	The length of the CIP data payload to follow below.			
CIP Data	SINT[]	The CIP data payload. Max 256 bytes.			

Table 5.5 – DeviceNet Passthrough Request

C. RESPONSE DATA

Parameter	Data Type	Description
Response Status	INT	This is the status of the request. 0 – Success 1 – Timeout
CIP Service Response	SINT	CIP response service from the target DeviceNet device. If a CIP response service of 0x94 is received, then the target DeviceNet device returned an error. The error information will be in the DeviceNet Message Status.
DeviceNet Message Status	SINT	DeviceNet Message status. This value will be zero if the message was successful or provide the error information if the DeviceNet device returned an error. See the CIP Response Status Codes in the appendix
CIP Data Response Size	INT	The size of the CIP response data to follow.

Reserved	INT	Reserved for future use.
CIP Response Data	SINT[]	The CIP response data from the target DeviceNet device.

Table 5.6 – DeviceNet Passthrough Response

5.4. ETHERNET/IP ORIGINATOR

The DeviceNet Router/B module can operate as an EtherNet/IP originator. In this mode the module can exchange data from the DeviceNet network with EtherNet/IP devices using either the input and output assemblies of the Class 1 EtherNet/IP connection to the device or using explicit (Class 3 or UCMM) EtherNet/IP messages.

5.4.1. ETHERNET/IP CLASS 1 CONNECTIONS

In the example below, the DeviceNet Router/B is owned by a Logix controller over DeviceNet while the DeviceNet Router/B is owning some EtherNet/IP IO. The data from the Logix controller is exchanged with those of the EtherNet/IP IO.

Once the EtherNet/IP Class 1 connections are setup and established then any Internal Map copying to an EtherNet/IP device will be written to the output assembly of the selected EtherNet/IP device (Originator to Target). In the Internal Map the user will specify which device instance is the target and at what offset the data must be written in the output assembly.



Figure 5.19 – Internal Mapping from DeviceNet to EtherNet/IP Originator

Any Internal Map copying from an EtherNet/IP device will be read from the input assembly of selected EtherNet/IP device (Target to Originator). In the Internal Map the user will specify which device instance is the target and at what offset the data must be read from the input assembly.



Project Explorer + # X	151 0	INR01	- Configuration															•
DNR01 (DeviceNet Router/B)	Ge	eneral	DeviceNet Devic	eN	et Devices DeviceN	let Map PLC5 Ma	ap EtherNet	/IP Devices	EtherNet/IP Map	Noc	Ibus Modbus Auxili	ary Map Internal	Map Advanc	ed Monitoring				
EtherNet/IP Connections 1794-OW8 (192.168.1.113.1.0)		Inter	nal Map (max. of 20	00 it	tems.)												Recomm	end
1794-IB10xOB6 (192.168.1.113.1.1)			Source Type		Source Instance	Source Sub-Tag	Source Offset	Source Bit Offset	Destination Typ	e	Destination Instance	Destination Sub-Tag	Destination Offset	Destination Bit Offset	Count	Copy Function	n Refo	mat
		► 1	DNet Target	\sim	Connection 0 ~		0		EIP Originator	\sim	1794-OW8	/ Data //	0		1	Byte to B	~ None	~
		2	EIP Originator	~	1794-IB10x0 ~	Data ~	4		DNet Target	\sim	Connection 0	1	0		1	Byte to B	V None	~
		•		\sim						\sim							~	

Figure 5.20 – Internal Mapping from EtherNet/IP Originator to DeviceNet

5.4.1.1. CONNECTION STATUS

The user can select to copy the data from the EtherNet/IP connection or the status.



Figure 5.21 – IDS Copy – EtherNet/IP Originator Status

Parameter	Data Type	Description			
EtherNet/IP Originator Connection Status	DINT	Bit 0 – Connection Ok			

When selecting the status the format of the Status information is shown below:

Table 5.7 – EtherNet/IP Originator Connection Status

5.4.2. EXPLICIT MESSAGING

When using the EtherNet/IP Explicit Messaging, the user can configure up to 10 EtherNet/IP devices which will be used for the Explicit Messaging. This configuration is located in the *EtherNet/IP Devices* tab. Following this, the EtherNet/IP Map of explicit messages needs to be configured. The Explicit Messaging uses the internal data space (IDS) where data can be stored for exchanges between the explicit EtherNet/IP devices and the DeviceNet network.

The Input and Output IDS Offset is where the Explicit EtherNet/IP device data will be read from, or written to. The data in the IDS can then, in turn, be copied to or from the DeviceNet network using the Internal Map in the configuration.

In the below example, the DeviceNet Router/B is receiving data from a Logix controller on DeviceNet, copying 4 bytes from the Cyclic DeviceNet Output assembly to the Internal Data Space at address 4080.

DNR01	- Configuration													
General	DeviceNet DeviceN	let Devices DeviceNe	et Map PLC5 Map	EtherNet/	IP Devices	EtherNet/IP Map	Modbus	Modbus Auxiliary N	Nap Internal N	lap Advanc	ed Monitoring			
Interr	nal Map (max. of 200	items.)												Recommend
		,	Source	Source	Source Bit			Destination [Destination	Destination	Destination			
	Source Type	Source Instance	Sub-Tag	Offset	Offset	Destination Ty	pe	Instance	Sub-Tag	Offset	Bit Offset	Count	Copy Function	Reformat
	DN IT I	Connection 0		0		Internal	\sim			4080		4	Byte to B	None
1	DNet Target V	Connection 0		•									-,	

Figure 5.22 – Internal Mapping from DeviceNet to IDS

The DeviceNet Router/B then uses the data from the DeviceNet Output assembly (which was copied to IDS offset 4080) to execute a Set Single Attribute to a target EtherNet/IP device using explicit messaging.

5	DNR01	- Configuration														- D ×
(General	DeviceNet Device	Net Devices	Dev	iceNet Map	PLC5 Mag	EtherNe	t/IP Devices	EtherNet/I	P Map Mo	dbus Mod	bus Auxilian	y Map Inter	nal Map Advar	nced Monitoring	
	Explic	it EtherNet/IP Map (max. of 50 ite	ms.)												
		Device	Function		Scan	Service	Class	Instance	Attribute	Input Offset	Get Length	Output Offset	Set Length	Data Type	Tag / Static Value	
	1	PowerFlex700 V	Set	\sim	A 🗸		1	1	5			4080	2			
) H	~		\sim	~									~		

Figure 5.23 – Explicit Messaging – Set Function from IDS to EtherNet/IP device

In the next example below, the DeviceNet Router/B is receiving data from an EtherNet/IP device using a Get Explicit EtherNet/IP message and saving the data at IDS offset 4040.

DNR01 -	Configuration															- •
General I	DeviceNet Dev	viceNe	t Devices	Dev	riceNet Ma	p PLC5 Map	EtherNe	t/IP Devices	EtherNet/I	IP Map Mo	odbus Mod	bus Auxiliar	y Map Inte	rnal Map Advan	ced Monitoring	
Explicit	EtherNet/IP Ma	ip (ma	x. of 50 ite	ems.)												
	Device		Function	1	Scan	Service	Class	Instance	Attribute	Input Offset	Get Length	Output Offset	Set Length	Data Type	Tag / Static Value	
1	PowerFlex700	~	Set	\sim	A ~		1	1	5			4080	2			
2	PowerFlex700	~	Get	~	~		1	1	1	4040	2					
) N		~		\sim	~									~		

Figure 5.24 – Explicit Messaging – Get Function from EtherNet/IP device to IDS

The DeviceNet Router/B will then map the received data at IDS offset 4040 to the DeviceNet Input Assembly being sent back to the Logix controller.

DNRO	I - Configuration													- (
General	DeviceNet Device	Net Devices DeviceNe	et Map PLC5 Ma	ap EtherNet	/IP Devices	EtherNet/IP Map N	odbus Modbus Auxilia	ry Map Internal	Map Advanc	ed Monitoring					
Inter	nal Map (max. of 200	items.)											R	ecommer	nd
	Source Type	Source Instance	Source Sub-Tag	Source Offset	Source Bit Offset	Destination Type	Destination Instance	Destination Sub-Tag	Destination Offset	Destination Bit Offset	Count	Copy Functi	on	Reform	nat
1	DNet Target	Connection 0 V		0		Internal	~		4080		4	Byte to B	~ N	lone	~
2	Internal >			4040		DNet Target	Connection 0		0		2	Byte to B	~ N	lone	~
be .	~ ~	·					~						\sim		

Figure 5.25 – Explicit Messaging – Internal Mapping from IDS to DeviceNet

5.5. MODBUS CLIENT

When the DeviceNet Router/B has the Primary Interface set to Modbus Client, then the DeviceNet data can be mapped to and from configurable internal Modbus Registers using the Internal Map.

The internal Modbus Registers are then asynchronously exchanged with Modbus devices as configured in the Modbus Auxiliary Map. In this mapping the user can exchange (read or write) data between the internal Modbus Registers and a remote Modbus device on Modbus TCP, RTU232, or RTU485.

In the example below the DeviceNet Router/B with the Primary Interface set to Modbus Client will read multiple Modbus Holding Registers from a Modbus Server device and then map the received data to a DeviceNet Input assembly where the module DeviceNet Mode is set to Target.



Figure 5.26 – Modbus Client to DeviceNet operation

For this example the user will configure the Modbus Auxiliary Map to read data from a Modbus Server device on Ethernet. The DeviceNet Router/B will request data from Modbus Holding Register 4000 (from the external Modbus Server) and write it to the module's internal Modbus Holding Register 3000.

DNR01	- Configura	ation												- •
General	DeviceNet	Dev	viceNet Devices	Dev	iceNetMap Pl	LC5	Map EtherNet/IP	Devices Et	herNet/IP Map Mod	Modbus Auxiliary Map Interr	nal Map Advanced	Monitor	ing	
Modb	us Auxiliary	Мар	(max. of 100 ite	ms.)										
Modb	us Auxiliary Port	Мар	(max. of 100 ite Modbus Func	ms.) tion	Register Typ)e	Local Reg.	Count	Remote Reg.	IP Address	1	lode	Reformat	
Modb	Port TCP	Map ~	(max. of 100 ite Modbus Funct Read	ms.) tion	Register Typ HR	e v	Local Reg. 3000	Count 10	Remote Reg. 4000	IP Address 192.168.1.212	1	Node 5	Reformat None	~
Modb	Port TCP	Мар ~ ~	(max. of 100 ite Modbus Func Read	tion	Register Typ HR)e ~ ~	Local Reg. 3000	Count 10	Remote Reg. 4000	IP Address 192.168.1.212	<u> </u>	Node 5	Reformat None	~

Figure 5.27 – Modbus Client Aux Mapping

Next the data saved in the internal Modbus Register at MB Holding Register 3000 is mapped to the DeviceNet Cyclic Target connection input assembly with offset 50.

DNR01	- Configuration																		
General	DeviceNet Dev	viceN	et Devices Devi	eNe	t Map PLC5 Ma	p EtherNet/	IP Devices	EtherNet/IP Map	Мо	dbus Modbus Auxilia	ary	Map Internal I	Map Advance	ed Monitoring					
Interr	nal Map (max. of	200 i	tems.)															Recommen	nd
	Source Typ	e	Source Instan	e	Source Sub-Tag	Source Offset	Source Bit Offset	Destination Typ	e	Destination Instance		Destination Sub-Tag	Destination Offset	Destination Bit Offset	Count	Copy Functi	on	Reform	iat
1	MB Register	\sim	HR	\sim		3000		DNet Target	\sim	Connection 0 V	1		50		20	Byte to B	\sim	None	\sim
b #		~							\sim								\sim		
										_									





NOTE: The user will need to ensure that when writing to the DeviceNet Router/B Modbus Holding Registers that the registers holding data from the device are not inadvertently overwritten.

5.6. MODBUS SERVER

When the DeviceNet Router/B has the Primary Interface set to Modbus Server, then the DeviceNet data can be mapped to and from configurable internal Modbus Registers and offsets using the Internal Map.

The internal Modbus Registers can then be asynchronously exchanged with a remote Modbus Client on Modbus TCP, RTU232, or RTU485. The remote Modbus Client can read or write to the configured Modbus addresses to access the DeviceNet data that has been mapped to the Modbus Registers.

In the example below the DeviceNet Router/B, with the Primary Interface set to Modbus Server, will have multiple Modbus Holding Registers written from a Modbus TCP Client and then map the received data to DeviceNet IO that is owned with a cyclic DeviceNet connection (when DeviceNet mode is Originator).



Figure 5.29 – Modbus TCP Client to DeviceNet IO operation
For this example the remote Modbus TCP Client will write data to Modbus Holding Register 4000 in the DeviceNet Router/B. The DeviceNet Router/B will map the received Modbus data (at Holding Register 4000) to the output assembly of DeviceNet IO (DSA) being owned (using cyclic DeviceNet) by the DeviceNet Router/B.

S DNR	R01 ·	- Configurat	tion																	- (
Gener	ral	DeviceNet	Devi	ceNe	tDevices	DeviceNe	et Map	PLC5 Map	EtherNet	IP Devices	EtherNet/IP Map M	odbus	Modbus Au	kiliar	y Map Internal	Map Advance	ed Monitoring				
Int	tern	al Map (max	. of 2	200 ite	ems.)														R	ecomme	nd
		Source	Туре	,	Source In	nstance	Sc Sul	ource p-Tag	Source Offset	Source Bit Offset	Destination Type	0	estination Instance		Destination Sub-Tag	Destination Offset	Destination Bit Offset	Count	Copy Function	Refo	rmat
	1	MB Registe	er	\sim	HR	~			4000		DNet Scanner	DSA	2100D	\sim	Data 🗸	0		2	Byte t	None	\sim
) H				\sim							×	1							×	/	

Figure 5.30 – Internal Mapping from Modbus Register to DeviceNet IO



NOTE: The user will need to ensure that when writing to the Control Router Modbus Holding Registers that the registers holding data from the device are not inadvertently overwritten.

5.7. FTVIEW / PANELVIEW INTERFACING

The DeviceNet Router/B can interface an Ethernet-only PanelView with a Logix controller over DeviceNet. The data being exchanged can then be accessed from a PanelView HMI by using PLC5 emulation.

This DeviceNet Router/B is scheduled using RSNetWorx for DeviceNet (see section *DeviceNet Configuration – RSNetWorx* for a detailed explanation on how to schedule the DeviceNet Router/B over a DeviceNet network).

The PLC5 Produced and Consumed File numbers are configured in the *PLC5Map* tab in the Slate configuration.

S	D	NR0	1 - Configura	ition										
	Ger	nera	DeviceNet	DeviceN	et C	Devices	De	viceN	vet Ma	ър	PLC	5 Map	Ether	Neț
		PL	С5 Мар											
			PCCC IP Ad	ldress		192	. 1	68		1		148		
		ſ	Produced F	ile	N	10		1						
			Consumed	File	N	11								
			Diagnostic	File	N	7								



In the configuration example above, the data being read from PLC File N11 will be the data received from the DeviceNet Scanner module (e.g., 1756-DNB output assembly) while the data being written to PLC File N10 is the data that will be sent to the DeviceNet Scanner module (e.g., 1756-DNB input assembly).

5.7.1. PANELVIEW READING DATA FROM LOGIX

Using the example configuration in the image above, the PanelView will read N11. The data being written from the Logix Controller to the Output Assembly of the 1756-DNB (which has the DeviceNet Router/B mapped) will be copied to file N11. Below is a diagram of the PanelView reading data from the Logix Controller over cyclic DeviceNet using the PLC5 emulation.



Figure 5.32 – PanelView reading Logix data over Cyclic DeviceNet

5.7.2. PANELVIEW WRITING DATA TO LOGIX

The PanelView will write to N10 when sending values to Logix. The data being read by the Logix Controller from the Input Assembly of the 1756-DNB which will be copied from file N10. Below is a diagram of the PanelView writing data to the Logix Controller over Cyclic DeviceNet using the PLC5 emulation.



Figure 5.33 – PanelView writing Logix data over Cyclic DeviceNet

5.7.3. PANELVIEW READING DIAGNOSTIC DATA FROM DEVICENET ROUTER

The PanelView will read N7 when accessing diagnostics information from the DeviceNet Router/B. The data will be read similar to the above section where the PanelView will read the Logix data using the PLC5 driver emulation.

Offset	Group	Description
	et	DeviceNet Polling Status
0	eN	Bit 0 – Connection Active - Poll
0	evic	Bit 1 – Connection Standby
	Ď	Bit 2 – Connection Active - COS

1		Rx Can Packet Count
2		Tx Can Packet Count
3		CAN CRC Errors
4		CAN Bit Errors
5		Can Stuff Errors
6		UCCM Connection Open
7		UCCM Connection Close
8		IO Connections
9		Poll Commands
10		Fragment Ack Errors
11		Explicit Fragment Error
12		Poll Fragment Error
13		Explicit Client Not Found
14		Duplicate Node Detected
15		PCCC Connection Requests
16		PCCC Read Requests
17	net	PCCC Write Requests
18	her	PCCC Unsupported Command
19	- Etl	PCCC Unsupported FNC Code
20	Ċ C	PCCC Client Not Found
21	ΡC	PCCC Client Max Reached
22		PCCC File Not Found
23		Current Connections
24	Module	DeviceNet Router/B Internal Temperature

Table 5.8 - Diagnostic File

5.8. INTERNAL MAP DATA FORMATS

The following tables describe the raw format of the data structures that can be mapped in the Internal Map table configuration.



NOTE: When using EtherNet/IP Target, Modbus Server, or Modbus Client, it is recommended to use the Recommended Mapping feature in the internal mapping. This will automatically map all the required data in the Internal Map.

5.8.1. System Status

When copying system information, the source type needs to be System.

5 DN	IR01	- Configuration												- I X
Gen	eral	DeviceNet DeviceN	et Devices DeviceN	et Map PLC5 Ma	ap EtherNet	/IP Devices	EtherNet/IP Map Mod	Ibus Modbus Auxilia	ry Map Internal	Map Advanc	ed Monitoring			
	Intern	al Map (max. of 200 i	tems.)											Recommend
		Source Type	Source Instance	Source Sub-Tag	Source Offset	Source Bit Offset	Destination Type	Destination Instance	Destination Sub-Tag	Destination Offset	Destination Bit Offset	Count	Copy Function	Reformat
Þ	*	~					~						~	
		Internal EIP Target EIP Originator MB Register DNet Target DNet Scanner <mark>System</mark>												

Figure 5.34 – IDS Copy – System Information

The module's system information has the following format.

Parameter	Data Type	Description
		Module Status.
		Bit 0 – Module Config Valid
		Bit 1 – EtherNet/IP Originator Comms Ok
		Bit 2 – Modbus Comms Ok
		Bit 3 – DeviceNet Scanner Comms Ok
Status	INT	Bit 4 – EtherNet/IP Target Comms Ok
		Bit 5 – DeviceNet Target Comms Ok
		Bit 6 – Power is connected to the bottom connector
		Bit 7 – Power is connected to the front connector.
		Bit 8 – Duplicate Node Number
		Bit 9 – NTP Ok
ConfigCRC	INT	The module configuration signature.
		Current BAUD rate.
Actual DALID	CINT	0 — 125К
Actual BAOD	SINT	1 — 250К
		2 — 500К
Actual Node	SINT	Current DeviceNet node number
		Module status when operating as a DeviceNet Target.
DeviceNet Target Status	INIT	Bit 0 – DeviceNet Poll Connection Active
Devicemen Targer Status		Bit 1 – DeviceNet NULL Connection Active
		Bit 2 – DeviceNet Change-Of-State (COS) Connection Active
Reserved	SINT[6]	Reserved for future use.

Table 5.9 – System Information Format

5.8.2. DEVICENET IO DEVICE STATUS

The user can select to copy the Data, or the Status from the EtherNet/IP connection.

ŝ	D	NR01	- Configura	ation								
	Ge	neral	DeviceNet	Devic	eN	et Devices	Devic	eNe	et Map	PLC5	Map	Et
		Internal Map (max. of 200 items.)										
			Source	е Туре	е	So Sub	urce o-Tag		Sou Ofi			
		▶ 1	DNet Scar	nner	\sim	DSA42100)D	\sim	Data		\sim	(
		*				Data						
									อเลเมร			

Figure 5.35 – IDS Copy – EtherNet/IP Originator Status

When selecting the status the format of the Status information is shown below:

Parameter	Data Type	Description
		Bit 0 – Online
DeviceNet Scanner Connection Status	DINT	Bit 1 – Cyclic Data Exchange Ok
		Bit 2 – Device Mismatch
Node	SINT	The target DeviceNet device Node number.
Reserved	SINT	Reserved for future use.
Cyclic Communication Timeout Count	DINT	Number of times the cyclic connection has gone offline.
Cyclic Communication Tx Count	DINT	Number of cyclic connection bytes sent.
Cyclic Communication Rx Count	DINT	Number of cyclic connection byte received.

Table 5.10 – DeviceNet Scanner Connection Status

5.8.1. ETHERNET/IP IO DEVICE STATUS

The user can select to copy the Data, or Status, from the EtherNet/IP connection.

5	D	NR	01 -	- Configura	tion								
	Ge	ener	al	DeviceNet	Devic	:eN	et Devices	Devic	eNe	et Map	PLC!	5 Map	EtherN
	Internal Map (max. of 200 items.)												
				Source	Туре		Source I	nstanc	e	Source Sub-Tag			Source Offset
		•	1	EIP Origina	ator	\sim	1794-OW	3	\sim	Status		\sim	0
		*				\sim				Data Status			

Figure 5.36 – IDS Copy – EtherNet/IP Originator Status

When selecting the Status, the format of the Status information is shown below:

Parameter	Data Type	Description
EtherNet/IP Originator Connection Status	DINT	Bit 0 – Connection Ok

Table 5.11 – EtherNet/IP Originator Connection Status

6. DIAGNOSTICS

6.1. LEDS

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



Figure 6.1 – DeviceNet Router/B front view

LED	Description
Ok	The module LED will provide information regarding the system-level operation of the module.
	If the LED is red , then the module is not operating correctly. For example, if the module application firmware has been corrupted or there is a hardware fault the module will have a red Module LED.
	If the LED is green (flashing), then the module has booted and is running correctly without any application configuration loaded.

	If the LED is green (solid), then the module has booted and is running correctly with application configuration loaded.
А / В	The Ethernet LED will light up when an Ethernet link has been detected (by plugging in a connected Ethernet cable). The LED will flash every time traffic was detected.
	This module has two Ethernet ports A and B. Each LEDs represents each specific port.
Act	The Act LED indicates if the module is operating as a DeviceNet target or DeviceNet Scanner.
	Solid Green – The local DeviceNet Router/B is operating as a DeviceNet Scanner.
	Off - The local DeviceNet Router/B is operating as a DeviceNet Target.
DN	The DeviceNet LED indicates the activity on the DeviceNet network.
	Flashing Red – A corrupted or incorrect DeviceNet packet was received.
	Flashing Green – A valid DeviceNet packet was received.
	Off – No DeviceNet packets are being received.
Aux	The Aux LED will flash each time there was activity on any of the primary interfaces.
	Flashing Red – A corrupted or incorrect packet was received on one of the Primary Interfaces (EtherNet/IP, Modbus TCP/RTU232/RTU485).
	<u>Flashing Green</u> – A valid packet was received on one of the Primary Interfaces (EtherNet/IP, Modbus TCP/RTU232/RTU485).
	<u>Off</u> – No activity.

Table 6.1 - Module LED operation

6.2. MODULE STATUS MONITORING IN SLATE

The DeviceNet Router provides various statistics which can assist with module operation, maintenance, and fault finding. The statistics can be accessed in full by Slate or using the web server in the module.

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



Figure 6.2 - Selecting to Go Online

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



Figure 6.3 - Selecting online Status

The Status monitoring window can be opened by either double-clicking on the *Status* item in the Project Explorer tree, or by right-clicking on the module and selecting *Status*. The status window contains multiple tabs to display the current status of the module.

6.2.1. GENERAL

neral DeviceNet Statistics	DeviceNetDiscovery	DeviceNet Explicit DeviceNet Map E	EtherNet/IP Originator CIP Statist	ics Ethernet Clients TCP / ARP
EtherNet/IP Owned	Owned	MAC Address	00:60:35:29:4D:E0	Power
EtherNet Originator	n/a	Firmware	1.001.001	Main Connector Ok
Modbus Status	n/a	Up Time	0d - 00:51:00	DNet Connector Ok
DeviceNet Owned	n/a	Temperature	40.3 °C	<u>DIP Switches</u>
DeviceNet Target	n/a	Processor Scan	21.0 us	SW1 - Safe Mode Off
DeviceNet Scanner	Ok	Ethernet Port 1	Down	SW2 - Force DHCP Off
		Ethernet Port 2	Up	SW3 - Lock Config. Off
DeviceNet Node	1	Ethernet DLR	Linear	SW4 - Fixed IP Address Off
DeviceNet BAUD	125k	NTP Status	Locked	(Updated only on boot up.)
DeviceNet State	Ok	SD Card	None	

The General tab displays the general status for the local DeviceNet Router/B module.

Figure 6.4 - Status monitoring – General

The General tab displays the following general parameters:

Parameter	Description
EtherNet/IP Owned	When the module is configured as an EtherNet/IP Target, this will indicate if the module is owned by an EtherNet/IP connection originator.
EtherNet/IP Originator	When the module is configured as an EtherNet/IP Originator, this will show if all the Class 1 and Explicit Message connections to EtherNet/IP target devices are established and returning valid data.
Modbus Status	When the module is operating as a Modbus Server , this parameter will indicate that the module has received a valid Modbus request within the Modbus inactivity time.
	When the module is operating as a Modbus Client , this parameter will indicate that all the mapping items in the Modbus Auxiliary Map are executing correctly.

DeviceNet Owned	When the module is configured as a DeviceNet Target, this will indicate if the module is owned by a DeviceNet connection originator.
DeviceNet Target	When the module is configured as a DeviceNet Target, this will show the remote scanner's connection state:
	Not Connected
	Poll (Null): Connected (e.g. remote in Program mode)
	Poll Active: Connected - Active Polling
	COS Active: Connected – Change of State
DeviceNet Scanner	When the module is configured as a DeviceNet Scanner, this will show if all the Cyclic and Unscheduled Explicit Message connections to DeviceNet target devices are established and returning valid data.
DeviceNet Node	The current DeviceNet node number.
DeviceNet BAUD	The BAUD rate of the DeviceNet network.
	125k
	250k
	500k
DeviceNet State	Indicates whether or not a Duplicate DeviceNet node has been detected.
MAC Address	Displays the module's unique Ethernet MAC address.
Firmware	The version of the module's firmware.
Up Time	Indicates the elapsed time since the module was powered-up.
Temperature	The internal temperature of the module.
Processor Scan	The amount of time (microseconds) taken by the module's processor in the last scan.
Ethernet Port 1/2	This is the status of each Ethernet port.
	Down
	The Ethernet connector has not been successfully connected to an Ethernet network.
	Up
	The Ethernet connector has successfully connected to an Ethernet network.
	Mirror Enabled
	The Ethernet port is mirroring the traffic on the other Ethernet
	port.
Ethernet DLR (Device Level Ring)	The status of the Ethernet DLR.
	Disabled
	Device Level Ring functionality has been disabled.

	Linear
	The DLR functionality has been enabled and the Ethernet network architecture is linear.
	Ring – Fault
	The DLR functionality has been enabled and the Ethernet network architecture is ring, but there is a fault with the network.
	Ring – Ok
	The DLR functionality has been enabled and the Ethernet network architecture is ring and is operating as expected.
NTP Status	The status of the local NTP Client.
	Disabled
	The NTP time synchronization has been disabled.
	Locked
	NTP time synchronization has been enabled and the module has locked onto the target time server.
	Not Locked
	NTP time synchronization has been enabled and the module has not locked onto the target time server.
SD Card	Indicates if a SD Card is present or not.
Power	Indication from which port the module is receiving power.
	Main Connector
	The power is present at the bottom connector.
	CAN Connector
	The power is present at the CAN connector.
DIP Switch Position	The status of the DIP switches when the module booted.
	NOTE : This status will not change if the DIP switches are altered when the module is running.

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

6.2.2. DEVICENET STATISTICS

The DeviceNet Statistics tab displays the statistics associated with the DeviceNet communication network.

eneral DeviceNet Statistics Device	Net Discovery	DeviceNet Explicit	DeviceNet Map	EtherNet/IP Explicit	EtherNet/IP Map	EtherNet/IP Orig	
DeviceNet Statistics					Cle	ear Counters	
Counter	١	Value		Counter		Value	
Rx CAN Packet Count		396	UCCM C	Connection Open		0	
Tx CAN Packet Count		442	UCCM Connection Close			0	
CAN CRC Errors		0	IO Conr	nections		0	
CAN Bit Errors		0	Poll Cor	nmands		0	
CAN Stuff Errors		0	Fragme	nt Ack Errors		0	
Bus Off		0	Expilict	Fragment Error		0	
Ack Error		0	Poll Fra	gment Error		0	
Format Error		0	Explicit	Client Not Found		0	
			Duplica	te Node Detected		0	

Statistic	Description
Rx CAN Packet Count	The number of DeviceNet packets received.
Tx CAN Packet Count	The number of DeviceNet packets sent.
CAN CRC Errors	The number of received packets where the packet checksum does not match the calculated packet checksum.
	This implies one or more bits in the frame have been corrupted. May indicate an intermittent CAN cable connection or induced electrical noise.
CAN Bit Errors	The number of transmitted bits where the transmitted bit state does not match the instantaneous read-back state.
	This may indicate that another device is transmitting at the same time, or one of the CAN lines shorted to power, shorted together, or incorrectly termination.
CAN Stuff Errors	The number of frames received where the required inserted (opposite) bit was not received after 5 identical bits.
	This may be an indication of bus noise, bad physical cable connection, or a faulty device.
Bus Off	The number of Bus-Off Events.
	A node will enter the Bus-Off state when the transmit Error Count exceeds a certain threshold (typically 125).
	This may indicate a cable break or loss of power causing the Scanner to enter the Bus-Off state.

Ack Error	The number of transmitted bits that are not read-back and acknowledged by at least one other node.			
	Typically seen when the device is alone on the bus, and there is no other node to acknowledge the frame.			
Format Error	The number of received frames where the fixed format part of a received frame is invalid, or the Frame structure is non-standard. (Frame size/type start delimiter etc.)			
	May indicate an intermittent CAN cable connection, induced electrical noise or a node present with an incorrect BAUD rate.			
UCCM Connection Open	The number of Unconnected Connection allocations received.			
UCCM Connection Close	The number of Unconnected Connection releases received.			
IO Connections	The number of concurrent IO connections.			
Poll Commands	The number of Poll commands sent / received.			
Fragment Ack Errors	The number of fragmented multi-packet acknowledge errors.			
Explicit Fragment Error	The number of fragmented multi-packet count errors for expl messages.			
Poll Fragment Error	The number of fragmented multi-packet count errors for poll messages.			
Explicit Client Not Found	The number of times a request has been received with no connection allocated.			
Duplicate Node Detected	The number of times a duplicate node was detected.			

Table 6.3 – DeviceNet statistics

6.2.3. DEVICENET EXPLICIT

The DeviceNet Explicit Statistics tab displays the statistics associated with DeviceNet Device unscheduled explicit mapping.



NOTE: This tab is only applicable when the module has the DeviceNet mode set to Scanner.

xplicit DeviceNet Statistics	Clear Counters	Explicit DeviceNet Devices			
Counter	Value	Device	Node	Status	
Read Successes	17	MyDSA	6	Online	
Write Successes	0				
Transaction Failures	0				
Transaction Timeouts	0				
Callback Id Mismatches	0				
Range Overruns	0				
Length Overruns	0				

Figure 6.6 - Status monitoring – DeviceNet Explicit Statistics

Statistic	Description
Read Successes	The number of successful reads from the target DeviceNet device.
Write Successes	The number of successful writes to the target DeviceNet device.
Transaction Failures	The number of failed reads/writes to the target DeviceNet device (e.g. error response).
Transaction Timeouts	The number of times the target DeviceNet device failed to respond.
Callback Id Mismatches	The DeviceNet Unscheduled UCMM response does not match the request.
Range Overruns	The number of times the returned data amount runs over the max Internal Data Space.
Length Overruns	The number of times the returned data is greater than the configured Get Length.

Table 6.4 – DeviceNet Explicit Statistics

6.2.4. DEVICENET MAP

The DeviceNet Map tab displays the success counts for each DeviceNet device mapped item.



NOTE: This tab is only relevant when the module has the DeviceNet mode set to Scanner.

VR01 - Status							- 0
eral DeviceNet Statistics DeviceNet Discover	/ DeviceNet Explicit DeviceNet	Map EtherNet/	IP Originator CIP	Statistics Ether	net Clients TCF	P/ARP	
lap Succes Counts						Clear Counters	
Device	Function	Scan	Class	Instance	Attrib.	Successes	
MyDSA	Get	Α	0x0004	185	3	532	

Figure 6.7 - Status monitoring – DeviceNet Map

Each time a mapped item is executed successfully its associated count will increase. The count cell will momentarily be highlighted green following a successful transaction.

6.2.5. PCCC STATISTICS

The PCCC tab displays the Ethernet PCCC statistics.

í

NOTE: This tab is only applicable when the module has the Primary Interface set to PCCC Client.

rai Devicemet Statistics Devicemet	scovery Enerveyin Originator CIP Statistics 1000 statistics Ellemet Clients 10P / ARP	
CCC Statistics	Clear Counters	
Counter	Value	
PCCC Connection Requests	0	
PCCC Read Requests	0	
PCCC Write Requests	0	
PCCC Unsupported Cmd	0	
PCCC Unsupported Fnc	0	
PCCC Client Not Found	0	
PCCC Client Max Reached	0	
PCCC File Not Found	0	
Current Connections	0	



Statistic	Description
PCCC Connection Requests	The number of PCCC connection establishment requests received.
PCCC Read Requests	The number of Read requests received.
PCCC Write Requests	The number of Write requests received.
PCCC Unsupported Cmd	The number of requests rejected due to an unsupported command.
PCCC Unsupported Fnc	The number of requests rejected due to an unsupported function code.
PCCC Client Not Found	The number of requests rejected due to no matching connection.
PCCC Client Max Reached	The number of connection request rejections due to maximum connection count reached.
PCCC File Not Found	The number of requests rejected due to an unsupported PLC file number.
Current Connections	The current number of active connections.

Table 6.5 – PCCC statistics

6.2.6. ETHERNET/IP EXPLICIT

The EtherNet/IP Explicit Statistics tab displays the statistics associated with EtherNet/IP Device explicit mapping.



NOTE: This tab is only applicable when the module has the Primary Interface set to EtherNet/IP Originator.

xplicit EtherNet/IP Statistics	Clear Counters	Explicit EtherNet/IP Devices		
Counter	Value	Device	Path	Status
Read Successes	15	PLX51-HART-4I	192.168.1.190	Online
Write Successes	0	L75	192.168.1.7,1,0	Online
Transaction Failures	0			
Transaction Timeouts	0			
Callback Id Mismatches	0			
Range Overruns	0			
Length Overruns	0			
Incorrect CIP Data Type	0			
Incorrect CIP Tagld	0			
CIP Tag Read Successes	0			
CIP Tag Write Successes	15			

Figure 6.9 - Status monitoring – EtherNet/IP Explicit

Statistic	Description
Read Successes	The number of successful reads from the target EtherNet/IP device.
Write Successes	The number of successful write to the target EtherNet/IP device.
Transaction Failures	The number of failed reads/writes to the target EtherNet/IP device (e.g. error response).
Transaction Timeouts	The number of times the target EtherNet/IP device failed to respond.
Callback Id Mismatches	The EtherNet/IP UCMM or Class 3 response does not match the request.
Range Overruns	The number of times the returned data amount runs over the max Internal Data Space.
Length Overruns	The number of times the returned data is greater than the configured get length.
Incorrect CIP Data Type	When the Explicit Message Function is a Tag Read/Write, this statistic will increase when the incorrect CIP data type was returned in the response.
Incorrect CIP Tag Id	When the Explicit Message Function is a Tag Read/Write, this statistic will increase when the incorrect CIP UDT tag ID was returned in the response.
CIP Tag Read Successes	When the Explicit Message Function is a Tag Read, this statistic will increase when there was a successful Logix Tag Read.

CIP Tag Write Successes	When the Explicit Message Function is a Tag Write, this statistic will increase
Cir Tag Write Successes	when there was a successful Logix Tag Write.

Table 6.6 – EtherNet/IP Explicit Statistics

6.2.7. ETHERNET/IP MAP

The EtherNet/IP Map tab displays the success counts for each EtherNet/IP device mapped item.



NOTE: This tab is only applicable when the module has the Primary Interface set to EtherNet/IP Originator.

eral									
orun	DeviceNet Statistics DeviceNet Discovery	EtherNet/IP Explicit Et	therNet/IP Map	EtherNet/IP Origin	ator Logi	ix CIP Statistics	Ethernet Clients	TCP / ARP	
Мар	Succes Counts						[Clear Counters]
	Device	Function		Scan (Class	Instance	Attrib.	Successes	
	PLX51-HART-4I	Get		A 0>	:0001	1	1	511	
	L75	ReadTag		A 0>	0000	0	0	511	

Figure 6.10 - Status monitoring – EtherNet/IP Map

Each time a mapped item is executed successfully its associated count will increase. The count cell will momentarily be highlighted green following a successful transaction.

6.2.8. ETHERNET/IP ORIGINATOR

The EtherNet/IP Originator tab displays the EtherNet/IP Class 1 connection status and statistics for each configured EtherNet/IP device.



NOTE: This tab is only applicable when the module has the Primary Interface set to EtherNet/IP Originator.

		Luteriveyir Explicit	спениейс мар	Eulenveçir ol	Igiliator Logix	OF Statistics Ethemet Clients	TCP / ARP
erNet/IP Originator							Clear Counters
Name	Fwd Open	Fwd Close	Timeout	Tx Count	Rx Count	Status	
1794-OW8 (192.168.1.11	3,1,1) 1	0	0	87	87	Connected	
794-IB10xOB6 (192.168.	1.11 1	0	0	87	87	Connected	

Figure 6.11 - Status monitoring – EtherNet/IP Originator

Statistic	Description						
Status	The current connection status of the module.						
	Connected						
	The device is connected and exchanging data using Class 1 cyclic communication.						
	Offline						
	The device it offline and not connected						
	Various response faults						
	If the connection parameters entered are not correct, then generally the target device will reply with the specific reason for the connection reject, for example:						
	Ownership Conflict						
	Connection In Use Or Duplicate Forward Open						

Class 1 Originator Statistics

Forward Open Count	The number of Class 1 Forward Open (connection establishment) messages sent to this device.
Forward Close Count	The number of Class 1 Forward Close (connection termination) messages sent or received from this device.
Connection Timeouts	The number of this connection was closed due to timeouts.

Tx Count	Number of Class 1 messages sent to the specific target device.
Rx Count	Number of Class 1 messages received from the specific target device.

Table 6.7 – EtherNet/IP Class 1 status and statistics

6.2.9. LOGIX

The Logix tab displays the Logix statistics for the explicit EtherNet/IP Tag Read/Write message instructions.



NOTE: This tab is only relevant when the module has the Primary Interface set to EtherNet/IP Originator and Logix Tag Read/Write functions are being used in the EtherNet/IP Explicit Message Map.

DNR01 - Status									- • ×
General DeviceNet Statistics	DeviceNet Discovery	EtherNet/IP Explicit	EtherNet/IP Map	EtherNet/IP Originator	Logix	CIP Statistics	Ethernet Clients	TCP / ARP	
Logix Statistics	Clear Co	ounters							
Counter	Va	alue							
Current Connections		0							
Connection Failures		0							
Tag Not Exist Errors		0							
Privilege Violations		0							
Tag Reads		156							
Tag Writes		0							
ENIP Retries		112							
ENIP Failures		15							
General Access Errors		0							

Figure 6.12 - Status monitoring – Logix Statistics

Parameter	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 tag read and tag write transactions that failed due to the destination tag not existing.
Privilege Violations	The number of tag read and tag write transactions that failed due to a privilege violation error.
	Note: This may be caused by the <i>External Access</i> property of the Logix tag being set to either <i>None</i> or <i>Read Only</i> .

Tag Reads	The number of tag read transactions executed by the DeviceNet Router/B module.
Tag Writes	The number of tag write transactions executed by the DeviceNet Router/B module.
ENIP Retries	This count increases when no response is received from the Logix Controller within the ENIP timeout.
ENIP Failures	This count increases when the ENIP Retry Limit is reached and no response has been received from the Logix Controller.
Tag Access General Error	This count increases when a tag cannot be accessed for any other reason not reported above.

Table 6.8 – Logix Statistics Tab

6.2.10. Modbus

The Modbus tab displays the Modbus statistics for the Modbus Read and Write Message Exchanges when the module is a Modbus TCP Server or Modbus TCP Client.



NOTE: The Modbus statistics tab is only displayed if the module has the primary interface set to Modbus TCP Client or Modbus TCP Server.

	tics DeviceNet Discovery	EtherNet/IP Originator	CIP Statistics	Modbus E	thernet Clients	TCP / ARP		
Modbus Statistics					[Clear Counters]	
Coun	ter V	alue		Counter		Value		
Tx Packet Count		0	Illegal Fund	ction		0]	
Rx Packet Count		0	Illegal Data	Address		0		
Checksum Errors		0	Illegal Data	Value		0]	
Parity Errors		0	Slave Devi	ce Failure		0]	
Timeout Errors		0	Acknowled	ge - Repons	e Delay	0		
Data Too Large		0	Slave Devi	ce Busy		0		
Map Item Not Found	t k	0	Negative A	cknowledge		0		
Node Mismatch		0	Memory Pa	arity Error		0		
Data Alignment Erro	ors	0						

Figure 6.13. - Status monitoring – Modbus Statistics

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

The Modbus tab displays the following parameters:

Table 6.9 - Modbus Statistics Tab

6.2.11. CIP STATISTICS

The CIP tab displays the Ethernet CIP statistics.

eral DeviceNet Statistics DeviceNet Dis	scovery EtherNet/IP Explic	t EtherNet/IP Map	EtherNet/IP Originator	Logix	CIP Statistics	Ethernet Clients	TCP / ARP	
CIP Statistics	Clear Counters							
Counter	Value							
Class 1 Timeout Count	4							
Class 3 Timeout Count	1							
Class 1 Fwd Open Count	4							
Class 3 Fwd Open Count	0							
Class 1 Fwd Close Count	0							
Class 3 Fwd Close Count	0							
Class 1 Connection Count	0							
Class 3 Connection Count	0							

Figure 6.14 - Status monitoring – CIP Statistics

Statistic	Description
Class 1 Timeout Count	The number of Class 1 connections closed due to Timeouts.
Class 3 Timeout Count	The number of Class 3 connections closed due to Timeouts.
Class 1 Forward Open Count	The number of Class 1 Forward Open (connection establishment) messages sent.
Class 3 Forward Open Count	The number of Class 3 Forward Open (connection establishment) messages sent.
Class 1 Forward Close Count	The number of Class 1 Forward Close (connection termination) messages sent.
Class 3 Forward Close Count	The number of Class 3 Forward Close (connection termination) messages sent.
Class 1 Connection Count	The current number of active Class 1 connections.
Class 3 Connection Count	The current number of active Class 3 connections.

Table 6.10 – Mapped Item statistics

6.2.12. ETHERNET CLIENTS

The Ethernet Clients tab displays details of the Ethernet and EtherNet/IP clients connected to the DeviceNet Router/B.

NKOT - Status								
neral DeviceNet Statistics DeviceNet Discover	/ EtherNet/IP Explicit	EtherNet/IP Map	EtherNet/IP Originator	Logix	CIP Statistics	Ethernet Clients	TCP / ARP	
Ethernet Client Counts		EtherNet/IP Table	e					
Туре	Count	IP Address	Sessi	on Hand	dle			
ARP Clients	5	192.168.1.7		320006				
TCP Clients	5	192.168.1.113		0				
EtherNet/IP Clients	4	192.168.1.113		0				
		192.168.1.190	33	34B00A[D			

Figure 6.15 – Status monitoring – Ethernet Client Statistics

6.2.13. TCP/ARP

The TCP/ARP tab displays details of the internal Ethernet ARP and TCP lists of the DeviceNet Router/B.

eral DeviceNet Statistics	DeviceNet Discovery	EtherNet/IP Explicit	EtherNet/IP Map	EtherNet/IP Origin	nator Logix (CIP Statistics	Ethernet Clients	TCP / ARP	
ARP Table		TCP Table							
MAC Address	IP Address	MAC Add	ress Re	emote Port	Local Port				
00:1D:9C:C4:2D:02	192.168.1.6	00:1D:9C:0	4:2D:02	64900	44818	3			
B4:45:06:0E:F9:60	192.168.1.218	B4:45:06:0	E:F9:60	59424	44818	3			
00:60:35:20:06:08	192.168.1.235	00:1D:9C:0	4:2D:02	44818	60042	2			
00:60:35:25:A7:BF	192.168.1.190	00:1D:9C:0	D:2F:D8	44818	61484	4			
00:1D:9C:CD:2F:D8	192.168.1.7	00:60:35:2	5:A7:BF	44818	37134	4			

Figure 6.16 – Status monitoring – Ethernet TCP / ARP Statistics

6.3. TARGET DEVICE STATUS MONITORING IN SLATE

The DeviceNet Router/B can also provide individual statistics and status for each for each of the EtherNet/IP Class 1 or DeviceNet Cyclic IO devices when the Primary Interface is *EtherNet/IP Originator* or the DeviceNet Mode is *DeviceNet Originator*.

6.3.1. ETHERNET/IP

When online with the module in Slate, right-click on the desired EtherNet/IP device under the *EtherNet/IP Connections* tree in Slate and select *Status*.

S Aparian-Slate - ControlNet Router	Demo	53*
File Device Tools Window	Help	
📩 🖬 🗎 🗶 🗗 🗂 🕂 📳 🔟	ያ 🕸	
Project Explorer		- 7 ×
ControlNet Router Demo3 CNR01EIP (ControlNet Router Configuration Ethernet Port Config Status Event Viewer EtherNet/IP Connections PF755 (192.168.1.112)	ıter)	
FlexOW8 (192.168.1.113,	۶ (Configuration
	n S	Status
	⊫ F	Rename
	<u>1</u>	Duplicate
	×	Delete

Figure 6.17 – EtherNet/IP Device Status – Status selection

6.3.1.1. GENERAL

The General Status for the EtherNet/IP device shows the connection statistics and parameters associated with the EtherNet/IP Class 1 connection.

neral Input Data Output Data		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	
Connection Status		Connected	
Class 1 Originator Statistics	Clear Counters	Connection Details	
Counter	Value	Serial Number	0x0000A6A9
Forward Open Count	1		
Forward Close Count	0	O => T Connection Id	0x008F0081
Connection Timeouts	0		
Tx Count	1 168	T => O Connection Id	0x4CC8C66D
Rx Count	1 164		

Figure 6.18 – EtherNet/IP Device Status – General Status

Statistic	Description
Connection Status	The current connection status of the module.
	Connected
	The device is connected and exchanging data using Class 1 cyclic communication.
	Offline
	The device it offline and not connected
	Various response faults
	If the connection parameters entered are not correct, then generally the target device will reply with the specific reason for the connection reject, for example:
	Connection Status Invalid Originator To Target Size

Class 1 Originator Statisti	cs
Forward Open Count	The number of Class 1 Forward Open (connection establishment) messages sent to this device.
Forward Close Count	The number of Class 1 Forward Close (connection termination) messages sent or received from this device.

Connection Timeouts	The number of this connection was closed due to timeouts.
Tx Count	Number of Class 1 messages sent to the specific target device.
Rx Count	Number of Class 1 messages received from the specific target device.
Connection Details	
Serial Number	The active connection's serial number.
O -> T Connection Id	The active connection Originator to Target Connection Id.
T -> O Connection Id	The active connection Target to Originator Connection Id.

Table 6.11 – EtherNet/IP Class 1 Device status and statistics

6.3.1.2. INPUT DATA

The Input Data for the EtherNet/IP device shows the Input Assembly associated with the EtherNet/IP Class 1 connection.

	value (Dec)	Value (Hex)
0	0	0x00
1	0	0x00
2	0	0x00
3	0	0x00
4	0	0x00
5	0	0x00
6	0	0x00
7	0	0x00

Figure 6.19 – EtherNet/IP Device Status – Input Data

6.3.1.3. OUTPUT DATA

The Output Data for the EtherNet/IP device shows the Output Assembly associated with the EtherNet/IP Class 1 connection.

Diagnostics

Register Value (Dec) Value (Hex) 0 0 0x00 1 0 0x00 2 0 0x00 3 0 0x00 4 0 0x00 5 0 0x00 6 0 0x00 7 0 0x00	DNR01 - Class 1 Ethe	erNet/IP Connection - 179	4-OW8 (192.168.1.113,	1,1) Status	
RegisterValue (Dec)Value (Hex)000x00100x00200x00300x00400x00500x00600x00700x00	ieneral Input Data 0	utput Data			
0 0 0x00 1 0 0x00 2 0 0x00 3 0 0x00 4 0 0x00 5 0 0x00 6 0 0x00 7 0 0x00	Register	Value (Dec)	Value (Hex)		
1 0 0x00 2 0 0x00 3 0 0x00 4 0 0x00 5 0 0x00 6 0 0x00 7 0 0x00	0	0	0x00		
2 0 0x00 3 0 0x00 4 0 0x00 5 0 0x00 6 0 0x00 7 0 0x00	1	0	0x00		
3 0 0x00 4 0 0x00 5 0 0x00 6 0 0x00 7 0 0x00	2	0	0x00		
4 0 0x00 5 0 0x00 6 0 0x00 7 0 0x00	3	0	0x00		
5 0 0x00 6 0 0x00 7 0 0x00	4	0	0x00		
6 0 0x00 7 0 0x00	5	0	0x00		
7 0 0x00	6	0	0x00		
	7	0	0x00		

Figure 6.20 – EtherNet/IP Device Status – Output Data

6.3.2. DEVICENET

When online with the module in Slate, right-click on the desired DeviceNet device under the *DeviceNet Connections* tree in Slate and select *Status*.



Figure 6.21 – DeviceNet Device Status – Status selection

6.3.2.1. GENERAL

The General Status for the DeviceNet device shows the connection statistics and parameters associated with the DeviceNet Cyclic connection.

Connection Status	Connecte	ed - Data Exchange Ok		
Class 1 Originator Statistics		Connection Details		
	Clear Counters			
Counter	Value	Node	0x4	
Connection Timeouts	0			
Tx Count	6 002	Online	Online	
Rx Count	6 002			
		Data Exchange	Ok	
		Device Id	Match	

Figure 6.22 – DeviceNet Device Status – General Status

Statistic	Description		
Connection Status	The current connection status of the module.		
	Connected		
	The device is connected and exchanging data using Cyclic communication.		
	Offline		
	The device it offline and not connected		
	Various response faults		
	If the connection parameters entered are not correct, then generally the target device will reply with the specific reason for the connection reject, for example:		
	Connection Status Invalid Originator To Target Size		

Class 1 Originator Statistics

Connection Timeouts	The number of this connection was closed due to timeouts.
Tx Count	Number of Cyclic messages sent to the specific target device.
Rx Count	Number of Cyclic messages received from the specific target device.

Connection Details				
Node	The node number of the DeviceNet cyclic device.			
Online	Indicates if the DeviceNet device is online.			
Data Exchange	Indicates if the DeviceNet device is exchanging data with the DeviceNet Router/B.			
Device Id	Indicates if the actual DeviceNet device matches configured device.			

Table 6.12 – DeviceNet Cyclic Device status and statistics

6.3.2.2. INPUT DATA

The Input Data for the DeviceNet device shows the Input Assembly associated with the DeviceNet Cyclic connection.

ONR01 - Class 1 Devi	ceNet Connection - 04 - a	a193592EC3C Status	
eneral Input Data O	itnut Data		
	aput Data		
Register	Value (Dec)	Value (Hex)	
0	17	0x11	
1	0	0x00	
2	0	0x00	
3	0	0x00	
4	0	0x00	
5	0	0x00	
6	0	0x00	
7	0	0x00	

Figure 6.23 – DeviceNet Device Status – Input Data

6.3.2.3. OUTPUT DATA

The Output Data for the DeviceNet device shows the Output Assembly associated with the DeviceNet Cyclic connection.

	ONR01 - Class 1 Dev	viceNet Connection - 04 -	a193592EC3C Status	- • ×
G	eneral Input Data 0	Output Data		
	····· · · · · · · · · · · · · · · · ·			
	Register	Value (Dec)	Value (Hex)	
	0	0	0x00	

Figure 6.24 – DeviceNet Device Status – Output Data

6.4. MODULE EVENT LOG

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



Figure 6.25 - Selecting the module Event Log

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

50	0NR01 - Ev	vent Viewer			X
: "	🗢 🗙				
	Uploaded	d 80 records.		Filter (All)	/
	Index 👻	Time	Up Time	Event	^
	79	0000/00/00 00:00:00.000	0d - 01:31:57	DNET Comms Ok	
	78	0000/00/00 00:00:00.000	0d - 01:31:54	DNET Comms Failed	
	77	0000/00/00 00:00:00.000	0d - 01:31:53	DNET Comms Failed	
	76	0000/00/00 00:00:00.000	0d - 01:31:52	Config valid	
	75	0000/00/00 00:00:00.000	0d - 01:30:41	Modbus Comms Failed	
	74	0000/00/00 00:00:00.000	0d - 01:30:41	Config valid	
	73	0000/00/00 00:00:00.000	0d - 01:30:40	Modbus Comms Failed	
	72	0000/00/00 00:00:00.000	0d - 01:25:20	EIP Comms Ok	
	71	0000/00/00 00:00:00.000	0d - 01:25:07	EIP Comms Failed	
	70	0000/00/00 00:00:00.000	0d - 01:25:07	Config valid	
	69	0000/00/00 00:00:00.000	0d - 01:25:01	EIP Comms Failed	
	68	0000/00/00 00:00:00.000	0d - 01:25:01	Config valid	
	67	0000/00/00 00:00:00.000	0d - 01:19:04	Connection Id not found in class	
	66	0000/00/00 00:00:00.000	0d - 01:10:50	EIP Comms Failed	
	65	0000/00/00 00:00:00.000	0d - 01:10:48	EIP Comms Failed	
	64	0000/00/00 00:00:00.000	0d - 01:10:48	Config valid	
	63	0000/00/00 00:00:00.000	0d - 01:08:07	EIP Comms Failed	
	62	0000/00/00 00:00:00.000	0d - 01:08:06	EIP Comms Failed	\sim

Figure 6.26 - Module Event Log

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

6.5. WEB SERVER

The DeviceNet Router provides a web server allowing a user without Slate to view various diagnostics of the module. This includes Ethernet parameters, system event log, advanced diagnostics, and application diagnostics (DeviceNet diagnostics).



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

→ C A Not Module: Device!	secure 192.168.1.147 Net Router/B Serial: 35294DE0	G 🖻 Firmware Rev: 1.001.001	
Overview	Device Name	DeviceNet Router/B	
Ethernet	Serial number	35294DE0	
Event Logs	Firmware Revision	1.001.001	
Diagnostics	Vendor Id	1370	
Application	Product Type	12	
	Product Code	139	
	Uptime	1h 39m 59s	
	Date	2023/01/10	
	Time	13:32:23	
	Temperature	40.7339°C	
	Hardware MAC	00:60:35:29:4D:E0	
	System MAC	00:60:35:29:4D:E0	
	Switches at Startup	0:0:0:0	
	Switches Now	0:0:0:0	
	Ethernet Port 1	Link down Port Mirror Disabled	

Figure 6.27 – Web interface

6.6. DEVICENET PACKET CAPTURE

The module provides the capability to capture the DeviceNet traffic for analysis. This will allow the user and a remote support team to resolve any possible issues on site. To invoke the capture of the module, double-click on the DeviceNet Packet Capture item in the Project Explorer tree.



Figure 6.28 - Selecting Modbus Packet Capture

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



Figure 6.29 – Modbus packet capture

To display the captured DeviceNet packets, the capture process must first be stopped, by pressing the Stop button.
🕽 DNR01 - DeviceNet Packet Capture											
	D										
Index	▲ Time	Status	Dirn	MacID	Group	MsgID	GroupFunction	AltMac	Description	Data	^
95363	0d - 01:51:18.470	Ok	Tx	6	Group2	5	IO Poll Cmd			00	
95364	0d - 01:51:18.470	Ok	Rx	6	Group1	15	IO Poll Resp			00	
95365	0d - 01:51:18.490	Ok	Tx	6	Group2	4	Mstr Unc Ex	1	GetSingleAttribute ClassID=0x4 InstanceID=953	01 0E 04 00 B9 03	
95366	0d - 01:51:18.490	Ok	Rx	6	Group2	3	Slave Unc E			01 8E 03 00	
95367	0d - 01:51:18.490	Ok	Tx	4	Group2	5	IO Poll Cmd			00	
95368	0d - 01:51:18.490	Ok	Rx	4	Group1	15	IO Poll Resp			11 00 00 00 00 00 00 00 00	
95369	0d - 01:51:18.570	Ok	Tx	6	Group2	5	IO Poll Cmd			00	
95370	0d - 01:51:18.570	Ok	Rx	6	Group1	15	IO Poll Resp			00	
95371	0d - 01:51:18.590	Ok	Tx	4	Group2	5	IO Poll Cmd			00	
95372	0d - 01:51:18.590	Ok	Rx	4	Group1	15	IO Poll Resp			11 00 00 00 00 00 00 00 00	
95373	0d - 01:51:18.670	Ok	Тх	6	Group2	5	IO Poll Cmd			00	
95374	0d - 01:51:18.680	Ok	Rx	6	Group1	15	IO Poll Resp			00	
95375	0d - 01:51:18.690	Ok	Tx	4	Group2	5	IO Poll Cmd			00	\sim
Stopped	Packets : 186										

Figure 6.30 – DeviceNet Packet Capture complete

The captured DeviceNet packets are tabulated as follows:

Statistic	Description
Index	The packet index, incremented for each packet sent or received.
Time	The elapsed time since the module powered up.
Status	The status of the packet. Received packets are checked for valid DeviceNet constructs and valid checksums.
Dirn	The direction of the packet, either transmitted (Tx) or received (Rx).
MacID	The DeviceNet MAC ID (0-63) of the packet. This is usually the source MAC, but with IO connection data can be the destination MAC.
Group	The message group number. Either Group 1,2,3 or 4.
MsgID	The Message ID is used to identify a message within a particular group. Can be used to indicate specific types of messages, or specific (previously established) connections.
Group Function	The Group Function. Certain Group and Message ID combination have specific meanings which are displayed here.
Alt MAC	The alternate MAC, depending on the type of message. This is usually the destination MAC ID.
Description	A brief description of the packet.
Data	The raw packet data.

Table 6.13 – DeviceNet Packet Capture fields

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



Figure 6.31 - Selecting the DeviceNet Packet Capture Viewer

6.7. MODBUS PACKET CAPTURE

The module provides the capability to capture the Modbus traffic for analysis. This will allow the user and a remote support team to resolve any possible issues on site. To invoke the capture of the module, double-click on the Modbus Packet Capture item in the Project Explorer tree.



Figure 6.32 - Selecting Modbus Packet Capture

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

5 DNR01 -	DNR01 - Modbus Packet Capture						
	0 7						
Index	▲ Time	Status	Port	Dirn	Node	Description	Data
	Press STOP to	o view resul	ts.				
Capturing	Packets: 4						

Figure 6.33 – Modbus packet capture

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

× 🔴 🖸	Ŧ							
Index 🔺	Time	Status	Port	Dirn	Node	Description	Data	
	0d - 01:59:21.280	Ok	TCP	Tx	5	Read HoldingReg - Address 4000,	05 03 0F A0 00 0A	
6	0d - 01:59:22.280	Ok	TCP	Tx	5	Read HoldingReg - Address 4000,	05 03 0F A0 00 0A	
7	0d - 01:59:23.280	Ok	TCP	Tx	5	Read HoldingReg - Address 4000,	05 03 0F A0 00 0A	
8	0d - 01:59:24.280	Ok	TCP	Tx	5	Read HoldingReg - Address 4000,	05 03 0F A0 00 0A	
9	0d - 01:59:25.280	Ok	TCP	Tx	5	Read HoldingReg - Address 4000,	05 03 0F A0 00 0A	
10	0d - 01:59:26.280	Ok	TCP	Tx	5	Read HoldingReg - Address 4000,	05 03 0F A0 00 0A	
11	0d - 01:59:27.280	Ok	TCP	Tx	5	Read HoldingReg - Address 4000,	05 03 0F A0 00 0A	
12	0d - 01:59:28.280	Ok	TCP	Tx	5	Read HoldingReg - Address 4000,	05 03 0F A0 00 0A	
13	0d - 01:59:29.280	Ok	TCP	Tx	5	Read HoldingReg - Address 4000,	05 03 0F A0 00 0A	
14	0d - 01:59:30.280	Ok	TCP	Tx	5	Read HoldingReg - Address 4000,	05 03 0F A0 00 0A	
15	0d - 01:59:31.280	Ok	TCP	Tx	5	Read HoldingReg - Address 4000,	05 03 0F A0 00 0A	
16	0d - 01:59:32.280	Ok	TCP	Tx	5	Read HoldingReg - Address 4000,	05 03 0F A0 00 0A	
17	0d - 01:59:33.280	Ok	TCP	Tx	5	Read HoldingReg - Address 4000	05 03 0F A0 00 0A	

Figure 6.34 – Modbus Packet Capture complete

The captured Modbus packets are tabulated as follows:

Statistic	Description
Index	The packet index, incremented for each packet sent or received.
Time	The elapsed time since the module powered up.
Status	The status of the packet. Received packets are checked for valid Modbus constructs and valid checksums.
Port	Port on where the data was sent or received (TCP, RTU232, RTU485)
Dirn	The direction of the packet, either transmitted (Tx) or received (Rx).
Node	The Source Node address for the packet
Description	Description of the packet that was received.
Data	The raw packet data.

Table 6.14 – Modbus Packet Capture fields

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



Figure 6.35 - Selecting the Modbus Packet Capture Viewer

6.8. MODULE STATUS REPORT

For assisting with support Slate can generate a status report for the module which is a word document that can be emailed to support. To generate this report the user can right-click on the module (when online in Slate) and select *Generate Status Report*.



Figure 6.36 – Module Status Report

7. TECHNICAL SPECIFICATIONS

7.1. DIMENSIONS

Below are the enclosure dimensions as well as the required DIN rail dimensions. All dimensions are in millimetres.



Figure 7.1 – DeviceNet Router/B enclosure dimensions



Figure 7.2 - Required DIN dimensions

7.2. ELECTRICAL

Specification	Rating
Power requirements	Input: 10 – 32V DC
Power consumption	2.2 W (Max.)
	Current: 180 mA @ 10 V
	Current: 85 mA @ 24 V
Connector	3-way terminal
Conductors	24 – 18 AWG
Enclosure rating	IP20, NEMA/UL Open Type
Temperature	-20 – 70 °C
Earth connection	Yes, terminal based
Emissions	IEC61000-6-4
ESD Immunity	EN 61000-4-2
Radiated RF Immunity	IEC 61000-4-3
EFT/B Immunity	EFT: IEC 61000-4-4
Surge Immunity	Surge: IEC 61000-4-5
Conducted RF Immunity	IEC 61000-4-6

Table 7.1 - Electrical specification

7.3. ETHERNET

Specification	Rating
Connector	RJ45
Conductors	CAT5 STP/UTP
ARP connections	Max 100
TCP connections	Max 100
CIP connections	Max 15
Communication rate	10/100Mbps
Duplex mode	Full/Half
Auto-MDIX support	Yes

Embedded switch	Yes, 2 x Ethernet ports
Device Level Ring (DLR)	Supported
Network Time Protocol (NTP)	Supported

Table 7.2 - Ethernet specification

7.4. SERIAL PORT (RS232)

Specification	Rating
RS232 Connector	9-way terminal (shared with RS485)
RS232 Conductor	24 – 18 AWG
Electrical Isolation	1000 Vdc
BAUD	1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200
Parity	None, Even, Odd
Data bits	8
Stop bits	1

Table 7.3 - RS232 Serial Port specification

7.5. SERIAL PORT (RS485)

Specification	Rating
RS485 Connector	9-way terminal (shared with RS485)
RS485 Conductor	24 – 18 AWG
Electrical Isolation	1500 Vrms for 1 minute.
BAUD	1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200
Parity	None, Even, Odd
Data bits	8
Stop bits	1

Table 7.4 - RS485 Serial Port specification

Specification	Rating
Connector	5-way terminal, 5.08mm pitch.
Modes	DeviceNet Scanner
	DeviceNet Target
Passthrough Messaging	Supported
Supported Baud Rates	125k
	250k
	500k
DeviceNet Terminator	120 Ω - Software Enabled

7.6. DEVICENET

Table 7.5 – DeviceNet specification

7.7. DEVICENET SCANNER

Specification	Rating
DeviceNet Device Count	63
Set Target Device Node	Supported
Set Target Device BAUD	Supported
Device Discovery	Supported
Explicit Messaging	Supported
Connections Supported	Polled
	Change of State (COS)

Table 7.6 – DeviceNet Scanner specification

7.8. DEVICENET TARGET

Specification	Rating
Connections Supported	Polled
	Change of State (COS)
Input / Output Data Max	128 bytes input
	128 bytes output

Table 7.7 – DeviceNet Device specification

7.9. PCCC

Specification	Rating
Max PCCC Connections	20
Max PCCC Payload	1000 bytes

Table 7.8 – PCCC specification

7.10. ETHERNET/IP TARGET

Specification	Rating
Class 1 Cyclic connection count	4
Logix Direct-to-Tag Supported	Yes

Table 7.9 – EtherNet/IP Target specification

7.11. ETHERNET/IP ORIGINATOR

Specification	Rating
Class 1 Cyclic Connections Supported	Yes
Class 3 / UCMM Connections Supported	Yes
Class 1 Connection Count	10
Class 3 / UCMM Target Device Count	10
Class 3 / UCMM Mapping Count	50

Table 7.10 – EtherNet/IP Originator specification

7.12. MODBUS CLIENT

Specification	Rating
Modes Supported	Modbus TCP, Modbus RTU232, Modbus RTU485
Modbus RTU485 Termination	125 Ω - Software Enabled
Max. Modbus Server Devices	20
Max. Modbus Mapping	100

Mapping Ranges	Holding Register 0 – 65535
	Input Register 0 – 65535
	Input Status 0 – 65535
	Coil Status 0 – 65535
Base Offset	Modbus (Base 0)
	PLC (Base 1)
Configurable Modbus TCP Port	Yes
Data Reformatting Supported	BB AA
	BB AA DD CC
	CC DD AA BB
	DD CC BB AA

Table 7.11 – Modbus Client specification

7.13. MODBUS SERVER

Specification	Rating
Modes Supported	Modbus TCP, Modbus RTU232, Modbus RTU485 (simultaneous)
Modbus RTU485 Termination	Software set
Mapping Ranges	Holding Register 0 – 65535
	Input Register 0 – 65535
	Input Status 0 – 65535
	Coil Status 0 – 65535
Base Offset	Modbus (Base 0)
	PLC (Base 1)
Configurable Modbus TCP Port	Yes

Table 7.12 – Modbus Server specification

7.14. CERTIFICATIONS

Certification	Mark
CE Mark	CE

RoHS2 Compliant	RoHS ₂
UL Mark File: E494895	CLASS 1, DIV 2, GROUPS A, B, C, D
UKCA	UK CA
ATEX	×3>
	II 3 G Ex ec IIC T5 -25°C \leq Ta \leq 70 °C

Table 7.13 – Certifications

8. CIP RESPONSE STATUS CODES

General Status Code	Name
0x00	Sucess
0x01	Communications Related Problem
0x02	Resource unavailable
0x03	Invalid parameter value
0x04	Path segment error
0x05	Path destination unknown
0x06	Partial transfer
0x07	Connection lost
0x08	Service not supported
0x09	Invalid attribute value
0x0A	Attribute list error
0x0B	Already in requested mode/state
0x0C	Object state conflict
0x0D	Object already exists
0x0E	Attribute not settable
0x0F	Privilege violation
0x10	Device state conflict
0x11	Reply data too large
0x12	Fragmentation of a primitive value
0x13	Not enough data
0x14	Attribute not supported
0x15	Too much data
0x16	Object instance does not exist
0x17	Service fragmentation out of sequence
0x18	No stored attribute data
0x19	Store operation failure
0x1A	Routing failure, request packet too large
0x1B	Routing failure, response packet too large

0x1C	Missing attribute list entry Data
0x1D	Invalid attribute value list
0x1E	Embedded service error
0x1F	Vendor specific error
0x20	Invalid parameter
0x21	Write-once value or medium already written
0x22	Invalid Reply Received
0x23	Buffer Overflow
0x24	Message Format Error
0x25	Key Failure in path
0x26	Path Size Invalid
0x26 0x27	Path Size Invalid Unexpected attribute in list
0x26 0x27 0x28	Path Size Invalid Unexpected attribute in list Invalid Member ID
0x26 0x27 0x28 0x29	Path Size Invalid Unexpected attribute in list Invalid Member ID Member not settable
0x26 0x27 0x28 0x29 0x2A	Path Size InvalidUnexpected attribute in listInvalid Member IDMember not settableGroup 2 only server general failure
0x26 0x27 0x28 0x29 0x2A 0x2A 0x2B	Path Size InvalidUnexpected attribute in listInvalid Member IDMember not settableGroup 2 only server general failureUnknown Modbus Error
0x26 0x27 0x28 0x29 0x2A 0x2A 0x2B 0x2C	Path Size InvalidUnexpected attribute in listInvalid Member IDMember not settableGroup 2 only server general failureUnknown Modbus ErrorAttribute not gettable
0x26 0x27 0x28 0x29 0x2A 0x2A 0x2B 0x2C 0x2D	Path Size InvalidUnexpected attribute in listInvalid Member IDMember not settableGroup 2 only server general failureUnknown Modbus ErrorAttribute not gettableInstance Not Deletable
0x26 0x27 0x28 0x29 0x2A 0x2A 0x2B 0x2C 0x2D 0x2D 0x2E	Path Size InvalidUnexpected attribute in listInvalid Member IDMember not settableGroup 2 only server general failureUnknown Modbus ErrorAttribute not gettableInstance Not DeletableService Not Supported for Specified Path

Table 8.1 – CIP Response Codes

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