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PLX51-DF1-ENI

DF1 Router
Honeywell PLC Gateway (PLCG) Setup

TECHNICAL NOTE

CONTENTS

1. PREFACE

1.1. PURPOSE OF THIS DOCUMENT

This document assists you in the in the configuration of a Honeywell PLC Gateway module to communicate with Logix/PLC-5/SLC via the PLX51-DF1-ENI.

1.2. ADDITIONAL INFORMATION

The following resources contain additional information that can assist you with the module installation and operation.

Resource	Link
PLX50 Configuration Utility Software	www.prosoft-technology.com
PLX51-DF1-ENI User Manual PLX51-DF1-ENI Datasheet Example Code & UDTs	www.prosoft-technology.com
Ethernet wiring standard	www.cisco.com/c/en/us/td/docs/video/cds/cde/cde205_220_420/installation/guide/cde205_220_420_hig/Connectors.html
CIP Routing	The CIP Networks Library, Volume 1, Appendix C:Data Management
Map PLC/SLC messages	SLC to CompactLogix Migration Guide: Chapter 3 – Map PLC/SLC Messages (1769-ap001_-en-p.pdf) EtherNet/IP Network Configuration: Chapter 5 – Mapping Tags (enet-um001_-en-p.pdf)

TABLE 1 - ADDITIONAL INFORMATION

2. APPLICATION DESCRIPTION

The ProSoft PLX51-DF1-ENI can be used to enable the Honeywell PLC Gateway (PLCG) to exchange data with Logix, SLC, and PLC-5 controllers. The diagram below is an example of a typical network setup.
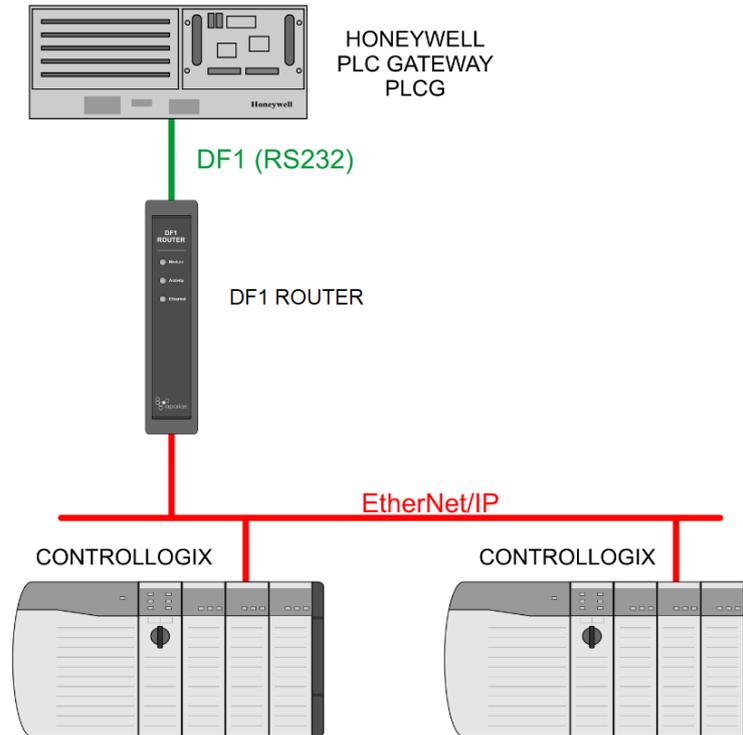

FIGURE 1 - EXAMPLE OF A TYPICAL NETWORK SETUP

The Honeywell PLCG can also be setup for redundant communication as described in the Honeywell PLCG setup.
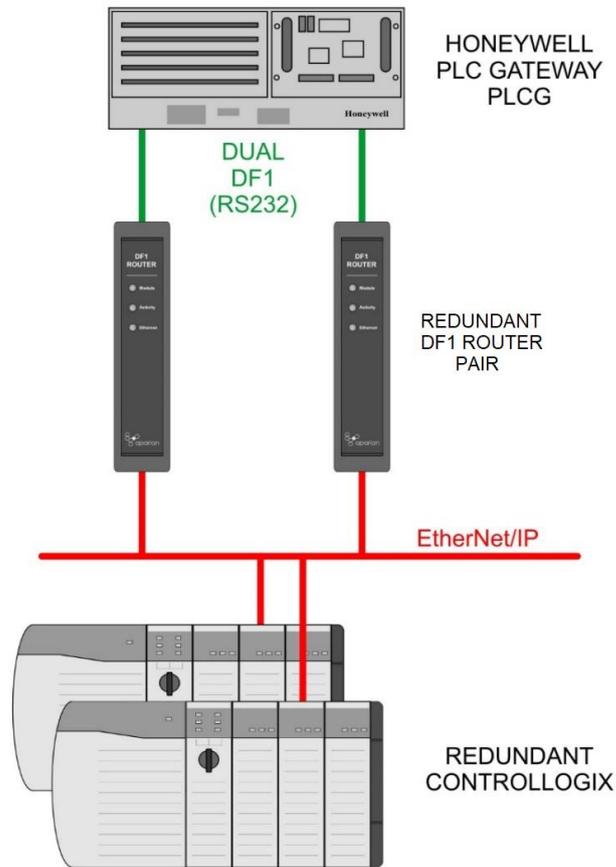

FIGURE 2 - EXAMPLE OF A REDUNDANT NETWORK SETUP

The Honeywell PLCG requests data by sending a DF1 message request (over RS232) to the PLX51-DF1-ENI. The PLX51-DF1-ENI then converts this message to the required format and relay it to the configured Logix, SLC, or PLC-5 controller.

3.   SETUP

The following sections describe the installation and configuration of the required devices in the network.

3.1. SERIAL CABLE WIRING

The serial cable pinout is shown in the figure below:
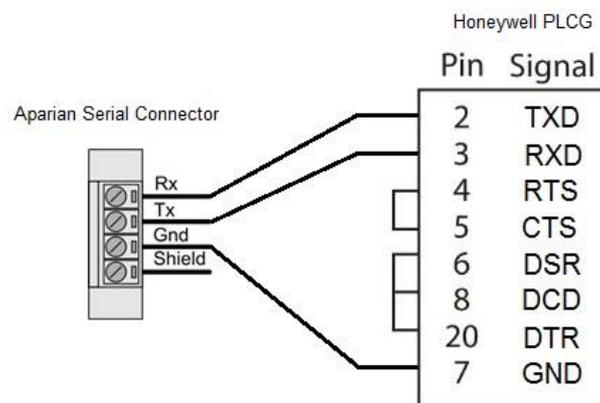
FIGURE 3 – SERIAL CABLE PINOUT

3.2. PLX51-DF1-ENI SETUP

3.2.1. MAPPING

The PLX51-DF1-ENI must be configured in either Bridge mode or DF1 Slave mode. In Bridge mode, the Logix PLC mapping is used to route the PLC-2 emulated messages to Logix Tags. In DF1 Slave mode, the PLX51-DF1-ENI maps the PLC-2 emulated messages directly to Logix Tags.

3.2.1.1. BRIDGE MODE

In Bridge mode, the PLX51-DF1-ENI redirects a DF1 PCCC message to a Logix controller at a preconfigured path. In this mode, the module relies on the Logix controller to map the DF1 request to the preconfigured Logix tag.

The Bridge map configuration is a two-step process. First, the PLX51-DF1-ENI must be configured to route specific DF1 addresses to a controller path. The second step is to map the DF1 addresses to Logix tags using RSLogix 5000.

Open the Bridge map configuration window by double clicking on the module in the tree, or right-clicking the module and selecting *Configuration.*

Once in the configuration window, select the Bridge tab. The Bridge configuration is shown in the figure below.
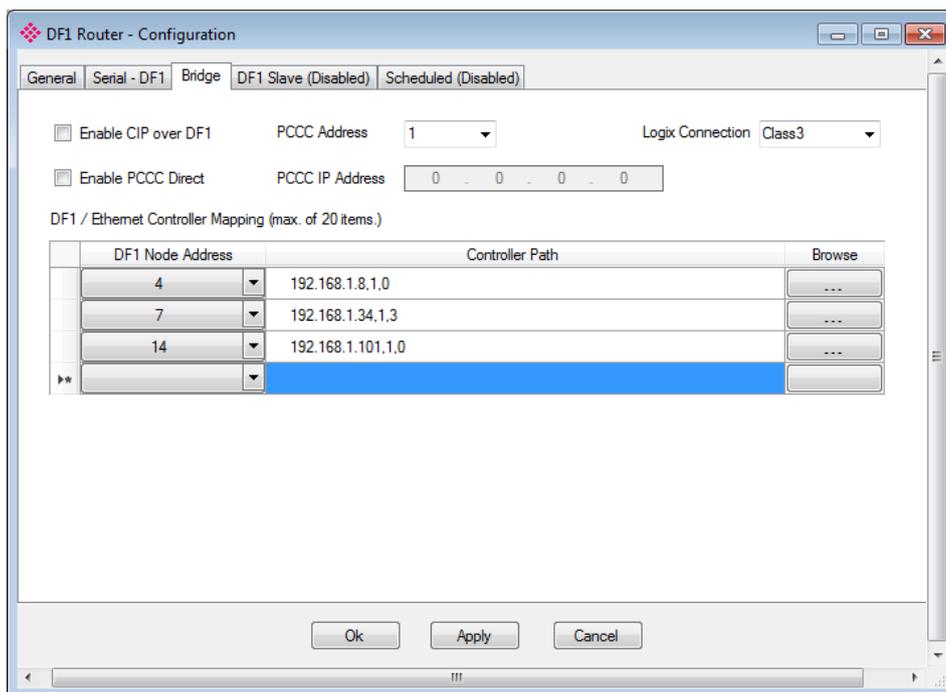

FIGURE 4 - BRIDGE CONFIGURATION

The module can emulate more than one destination DF1 Node Address, and thus route multiple messages to different Logix controllers. It is important to enter the correct DF1 Node address in each mapping record.

When using PCCC messaging, the connection class can be configured by selecting either Class 3 or Unconnected (UCMM) messaging. These options are located in the Connection drop-down box in the Bridge tab.

The Logix controller paths can either be entered manually or you can browse to them by clicking the Browse button. The Target Browser requires the controller to be available on the network. The Target Browser opens and automatically scans for all 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.
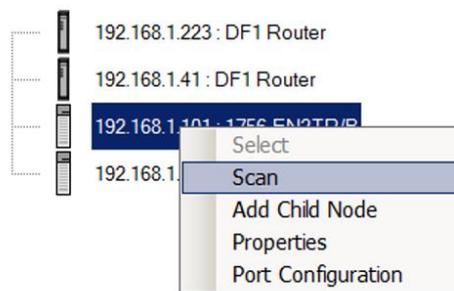

FIGURE 5 - SCANNING NODE IN THE TARGET BROWSER
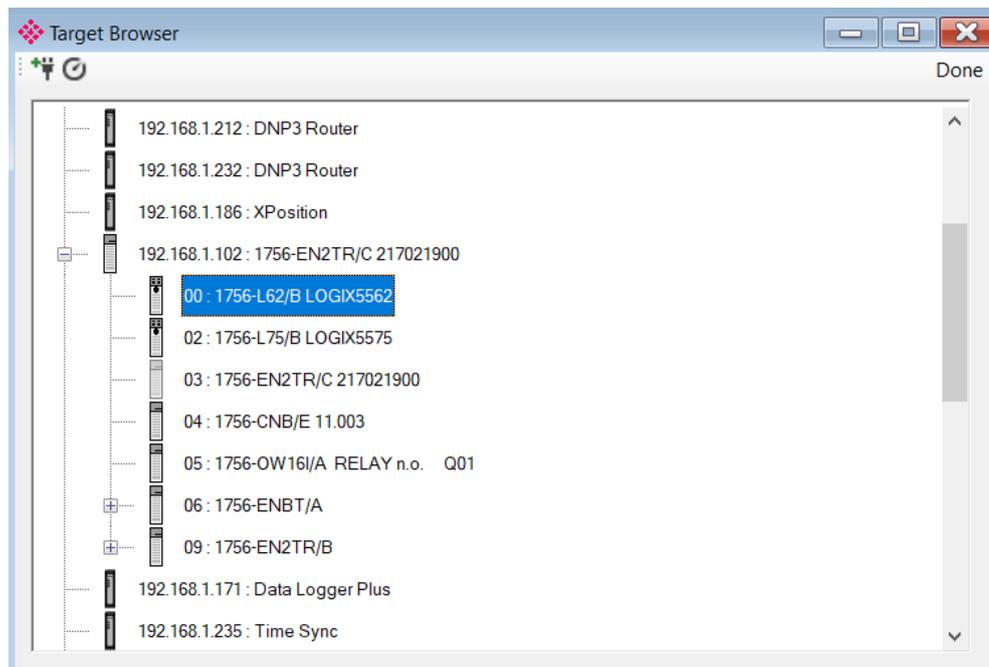
FIGURE 6 - TARGET BROWSER SELECTION

The required Logix controller can then be chosen by selecting it and clicking the Ok button, or by double-clicking on the controller module.

A maximum number of 20 controller mapping entries can be added.

The DF1 message initiator (e.g. DCS gateway) sends a read or write request to a specific DF1 address on RS232. You must configure the PLX51-DF1-ENI to route the message destined for a specific DF1 address to a Logix controller. This allows the correct Logix controller to map the request to the Logix PLC/SLC mapped tag. For each route map you must enter two parameters as described in the table below.

Parameter	Description
DF1 Node Address	This parameter is one of the destination addresses that the PLX51-DF1-ENI will accept. When the DF1 message initiator sends a message to a specific DF1 node address that has been configured in the module, it will be accepted and routed to the paired Controller Path. This is the destination node address of the message, and not the source address of the DF1 device.
Controller Path	The Ethernet/CIP path to the end device (e.g. Logix controller). Refer to the additional information section in this document for references to details routed CIP path information. For example: If the controller (slot 0) is in a chassis with an Ethernet bridge (IP address 192.168.1.20) connected to the local network you would follow the format; *Ethernet bridge IP address, chassis backplane port, module slot etc.* 192.168.1.20,1,0 For PLC5 and SLC500/MicroLogix devices, the path should contain only the device's IP address.
Enable CIP over DF1	This feature enables the PLX51-DF1-ENI to support CIP serial, allowing you to program ControlLogix/CompactLogix controllers via the Serial Port. **Note:** You will not be able to communicate over PCCC Direct and CIP at the same time. If CIP over DF1 is enabled, the software automatically disables the PCCC Direct option.
Enable PCCC Direct	The PCCC Direct option allows the PLX51-DF1-ENI to support the PCCC protocol on a separate IP address. The PCCC protocol will allow the DF1 Router to emulate a legacy controller (eg. SLC5/03) as if it is directly connected to the Ethernet network.
PCCC Address	The PCCC Address allows the user to force the destination address of the DF1 message that is routed via the PCCC protocol or the CIP embedded PCCC message. This is useful when using certain RSLinx Enterprise drivers in FTView which does not allow the user to choose the destination DF1 Node address.
PCCC IP Address	The IP address of the supported PCCC Protocol.
Logix Connection	The connection class used by the mapped items to the Logix controller.

TABLE 1 - BRIDGE PARAMETERS

Below are two examples of how DF1 messages are routed to the Logix controller.
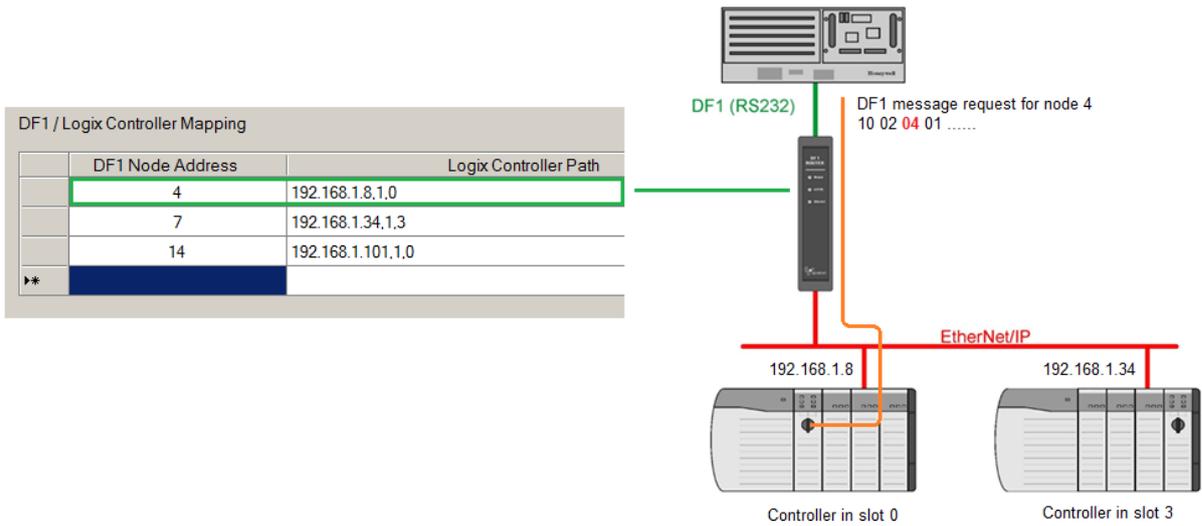
FIGURE 6 – EXAMPLE 7 – BRIDGE ROUTING MAP – NODE 4
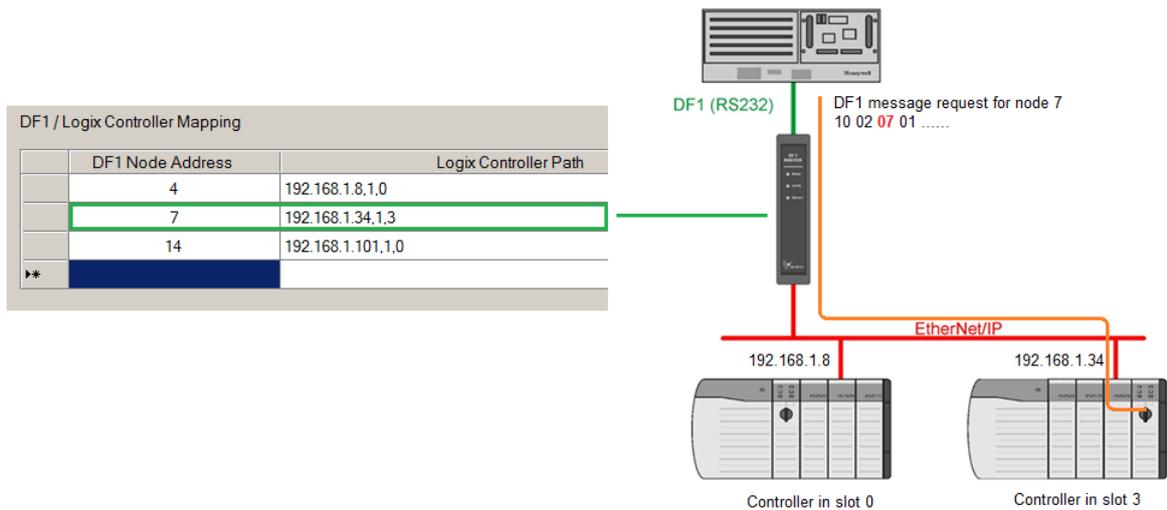
FIGURE 7 – EXAMPLE 8 – BRIDGE ROUTING MAP – NODE 7

3.2.1.2.   DF1 SLAVE MODE

The DF1 Slave routing mode allows mapping of virtual Data Files to Logix tags across multiple controllers. This is similar to the Bridge mode except the mapping of data files to Logix tags is no longer managed in Logix, but in the PLX51-DF1-ENI itself.
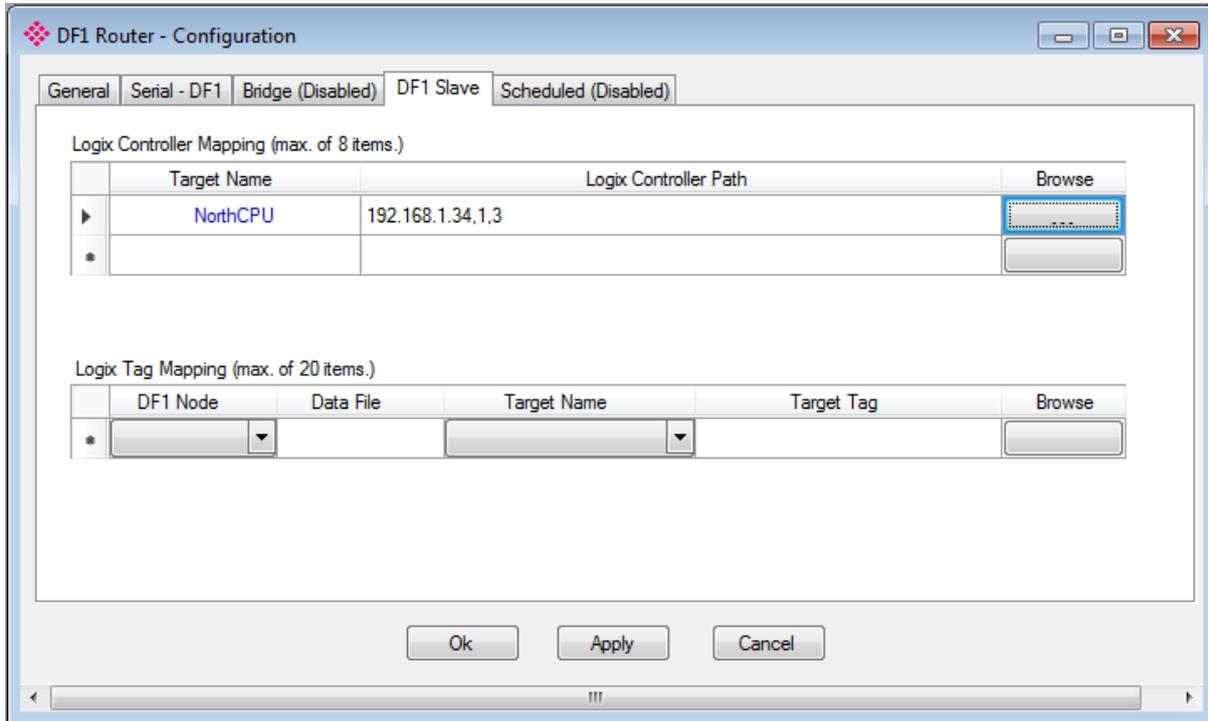
FIGURE 9 - DF1 SLAVE MODE CONFIGURATION

The DF1 Slave mode is configured in two steps. First, you must create a Target Name (CIP path to the destination Logix controller) which will be used to link the DF1 Node Number to the destination Logix tag.

The Logix controller paths can either be entered manually or you can browse to them by clicking the Browse button. The Target Browser opens and automatically scans 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.
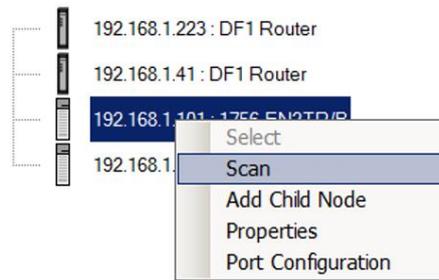

FIGURE 10 - SCANNING NODE IN THE TARGET BROWSER
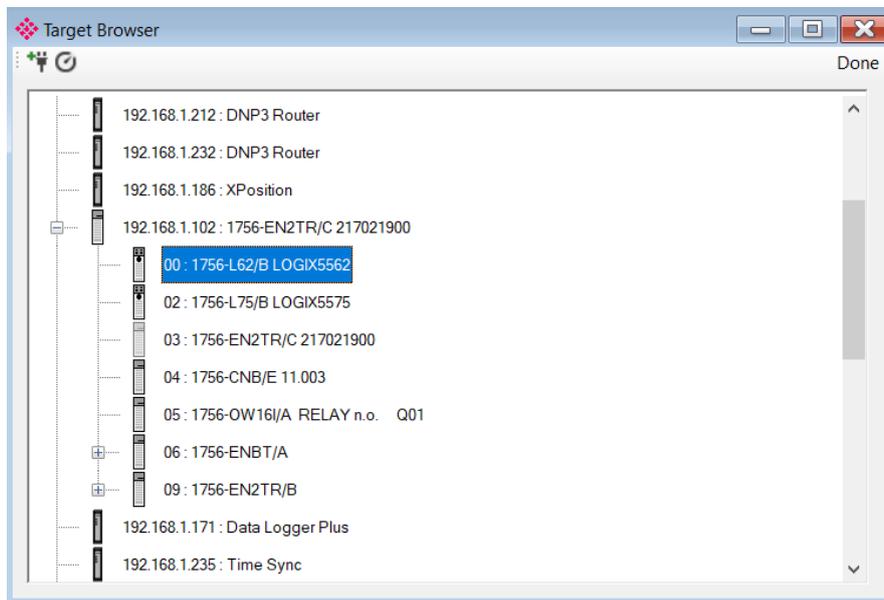
FIGURE 11 - TARGET BROWSER SELECTION

The required Logix controller can be chosen by selecting it and clicking the Ok button, or by double-clicking on the controller module.

A maximum number of 8 controller mapping entries can be added.

The second part is to configure the link between a DF1 node to a Logix tag.

⚠️ **NOTE**: When using PLC-2 messages (used by Honeywell PLCG & EPLCG), there are no data files. You must enter **PLC2** in the space of the data file as shown below. Only the DF1 Node address will be used to link the selected Target Tag to the incoming PLC2 DF1 message.
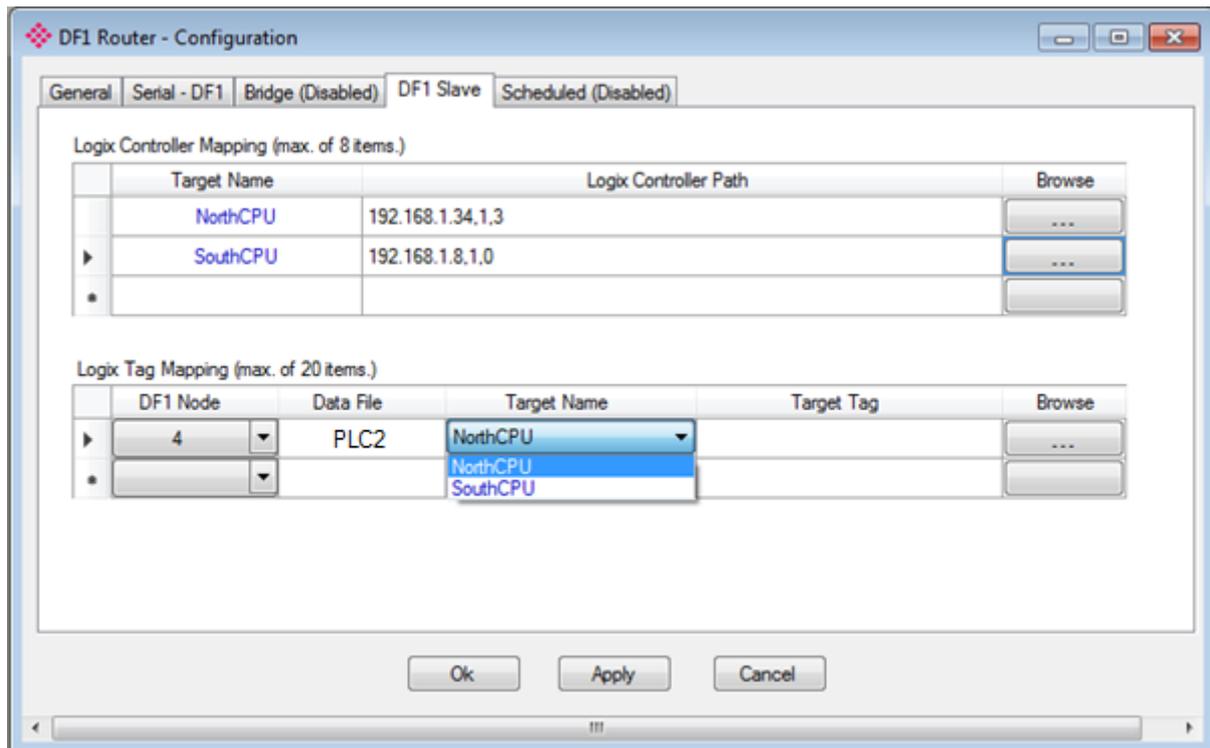
FIGURE 12 – DF1 SLAVE MAPPING

The module can emulate more than one destination DF1 Node Address, and route multiple messages to different Logix controllers. It is important to enter the correct associate DF1 Node address in each mapping record.

Below is an example of the target tag selection. The Target Tag can be either entered manually or selected using the Tag Browser in the PLX50 Configuration Utility. The Tag Browser requires the controller to be available on the network.

To browse to the tag, click on the Browse button. The Tag Browser opens and scans all the tags inside of that controller. If the controller has been recently scanned in this PLX50 Configuration Utility session, then a cached version of the tags is displayed. A rescan of the tags can be triggered by selecting the Refresh button in the Tag Browser's toolbar.

All of the non-array tags are disabled, guiding you to select a suitable tag.

NOTE: When mapping PLC2 messaging is used, only INT datatypes will be supported. The Target Tag must be an array of INTs.
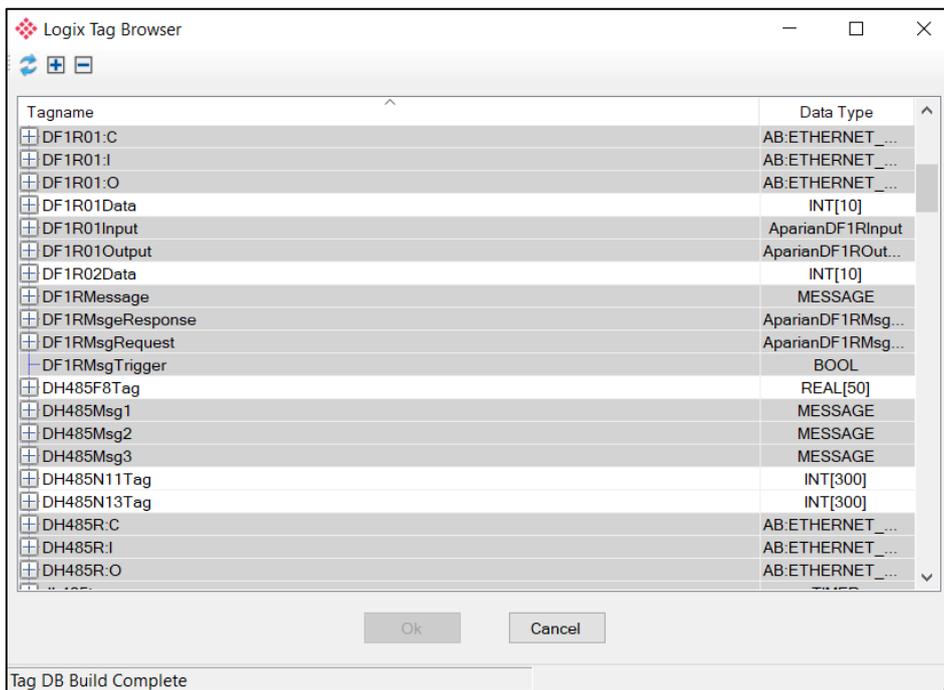
FIGURE 13 – TAG BROWSER TAG SELECTION

The two figures below show an example of how DF1 messages are routed to the Logix tags using the DF1 Slave Map mode.

NOTE: It is your responsibility to ensure that the Logix tag array datatype and size matches to that of the PLC2 DF1 request. Failing to do this can result in communication faults.
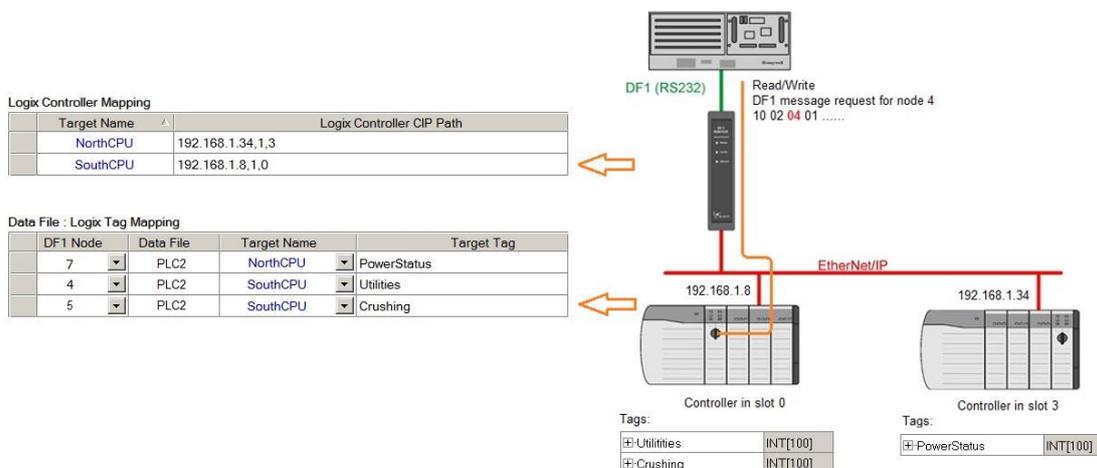
FIGURE 14 - DF1 SLAVE MODE CONFIGURATION IN PLX50 CONFIGURATION UTILITY

3.2.2. SERIAL PARAMETERS

The serial parameters must be setup as shown in the figure below:
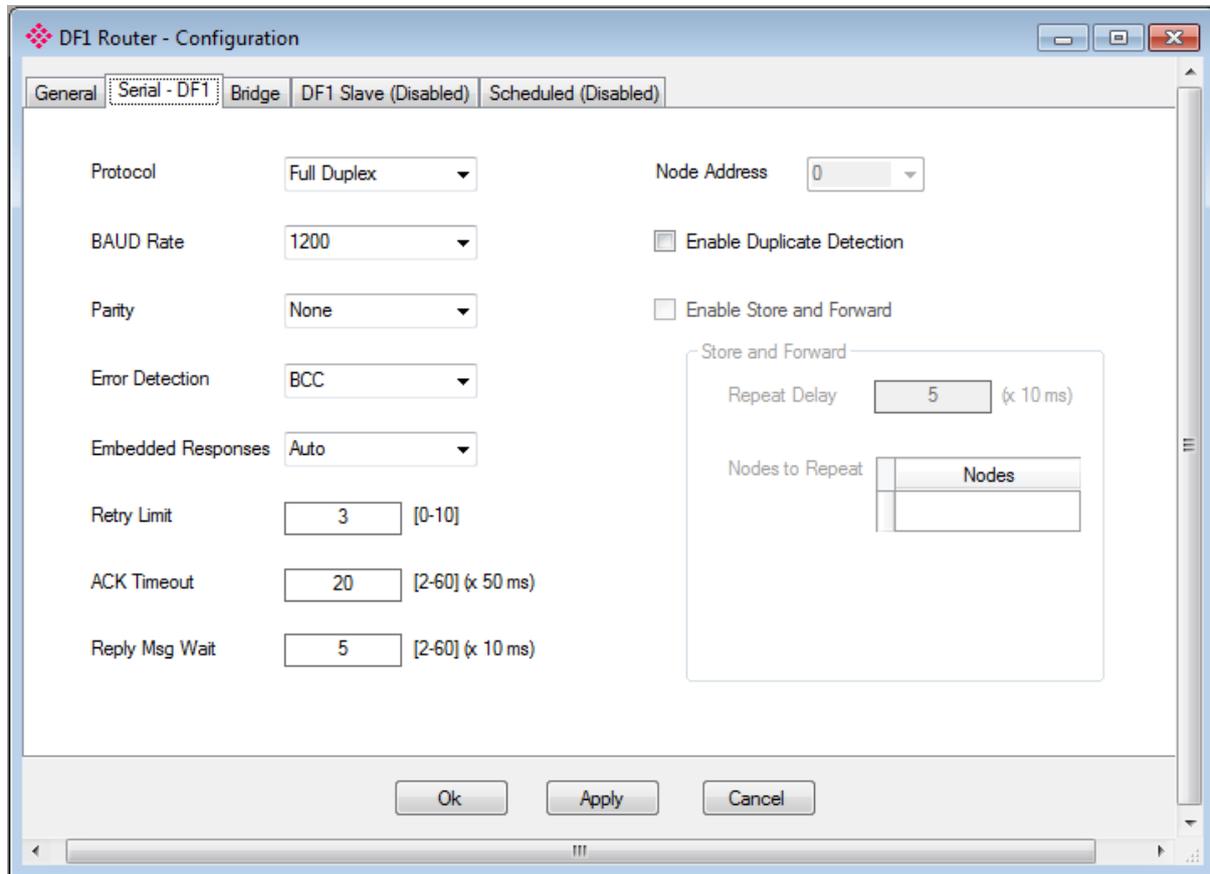
FIGURE 15 – DF1 SERIAL SETTINGS FOR HONEYWELL PLCG

Refer to the user manual for a detailed description of each parameter.

3.3. LOGIX SETUP

When the PLX51-DF1-ENI is set up in Bridge mode, you will need to map the PLC2 messages to a Logix Tag using the Map PLC/SLC Messages function. When the PLX51-DF1-ENI is set up in DF1 Slave mode, no Logix configuration is required.
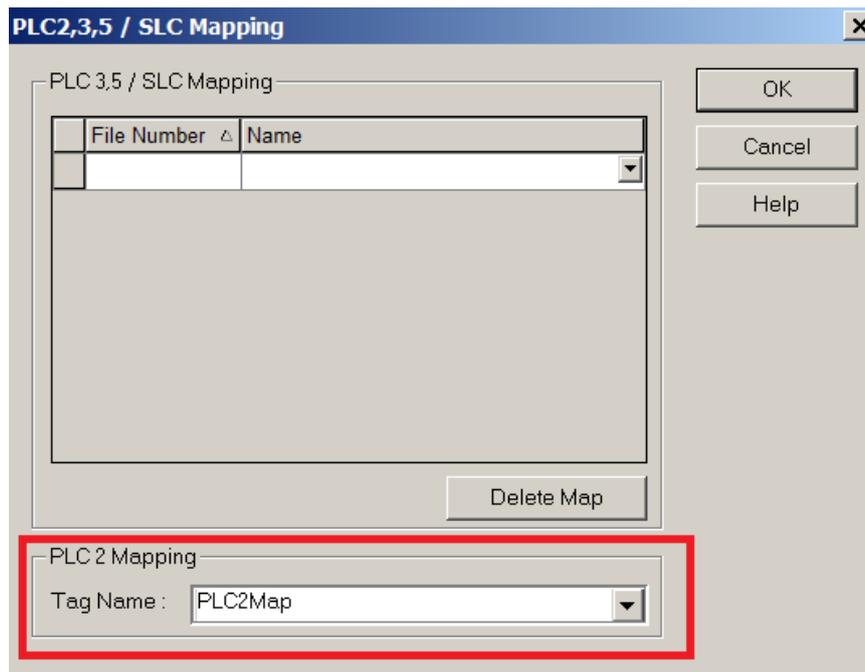
FIGURE 16 – LOGIX PLC/SLC MAPPING

3.4. HONEYWELL PLCG SETUP

The Honeywell PLCG can be set up for either non-redundant or redundant communications.

3.4.1. JUMPER CONFIGURATION

⚠️ **NOTE:** The TS1 pinning defines the board revision level to the system and has no impact on the operation of the system.

Jumper TS1

Position	Jumper Setting	Description
1	OUT	
2	OUT	
3	IN	
4	IN	
5	IN	
6	OUT	
7	IN	
8	IN	

TABLE 2 – JUMPER TS1

Jumper TS2

| Position	Jumper Setting	Description
1	IN	Port 2 Parity = Odd
2	OUT	Port 2 Baud Rate = 19.2K
3	OUT	
4	OUT	
5	IN	Port 1 Parity = Odd
6	OUT	Port 1 Baud Rate = 19.2K
7	OUT	
8	OUT	

TABLE 3 – JUMPER TS2

Jumper TS3

Position	Jumper Setting	Description
1	OUT	Non-Redundant EPLCGs. Change to IN when redundant PLCG communication is required.
2	IN	Non-Redundant Communications Enabled. Change to OUT when redundant PLCG communication is required.
3	OUT	Reduced Communications Rate (optional)
4	OUT	
5	IN	Required
6	IN	Required
7	IN	Required
8	IN	Required

TABLE 4 – JUMPER TS3

3.4.2. LCN Hiway "DHP" Box Configuration

Below is an example EB file configuration for the Hiway DHP Box (non-redundant). In this example, it is connected to Hiway 6, Box 8 with a PLC-5 address of 2.

Parameter	Selection	Description
HWYNUM	06	HIWAY emulated by EPLCG
BOXNUM	08	HIWAY BOX address being configured
BOXTYPE	DHP	HIWAY box type being configured
BOXASSN	THISHG	
LOADDEST	HG_HIWAY	
BOXSIZE	EXTENDED	
BOXPROT	ALLENBRD	Box communications protocol is Allen Bradley DF1
PC1TYPE	APLC	PLC Type
PC1PORT	1	PLCG Port Nbr (Index)
PC1PORTA	2	Port – PLC Address.
PC1ALIVE	0	"Keep Alive" not configured
PC1ALVBT	0	

TABLE 5 – EXAMPLE CONFIGURATION FOR HIWAY DHP BOX (NON-REDUNDANT)

For redundant communication, the following parameters must be configured in addition to those in table 5.

Parameter	Selection	Description
PC2TYPE	APLC	PLC Type
PC2PORT	2	PLCG Port Nbr (Index)
PC2PORTA	2	Port – PLC Address.
PC2ALIVE	0	"Keep Alive" not configured
PC2ALVBT	0	

TABLE 6 – EXAMPLE CONFIGURATION FOR HIWAY DHP BOX (REDUNDANT)

All other PLCxTYPE (where x is 3 to 8) parameters must be set to NOTCONFIG. In non-redundant mode, PLC2TYPE will also be set to NOTCONFIG.

4. REFERENCES

DeWitt, K. (2005). *ControlLogix with a 1770-KFC15 to Honeywell EPLCG Serial Interface.*

Gibson, D., & DeWitt, K. (2013). *ControlLogix and 1770-KFC15 to Honeywell SI (Serial Interface) Connection and Testing.*

5. SUPPORT, SERVICE & WARRANTY

5.1. CONTACTING TECHNICAL SUPPORT

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

1. Product Version Number
2. System architecture
3. Network details

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

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

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