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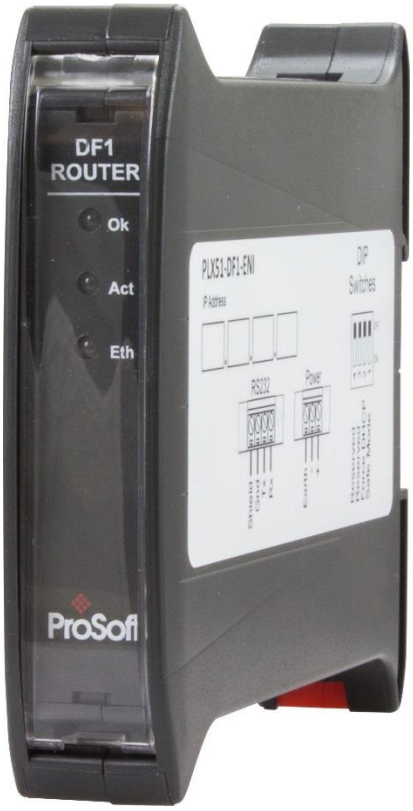

PLX51-DF1-ENI

DF1 Router

Honeywell Serial Interface Setup

December, 2017

TECHNICAL NOTE

CONTENTS

1. PREFACE

1.1. PURPOSE OF THIS DOCUMENT

This document assists you in the setup the Honeywell Serial Interface module to communicate with Logix/PLC-5/SLC via the PLX51-DF1-ENI.

1.2. ADDITIONAL INFORMATION

The following documents 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 TDC 3000 Serial Interface (SI) to exchange data with Logix, SLC, and PLC-5 controllers. Below is an example of a typical network setup.

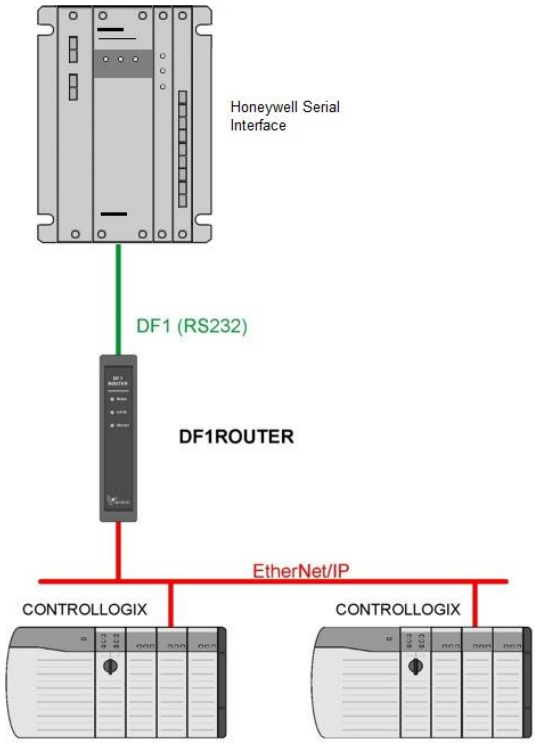

FIGURE 1 - EXAMPLE OF A TYPICAL NETWORK SETUP

When setup correctly, the Honeywell TDC 3000 requests data via the SI, which will send 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:

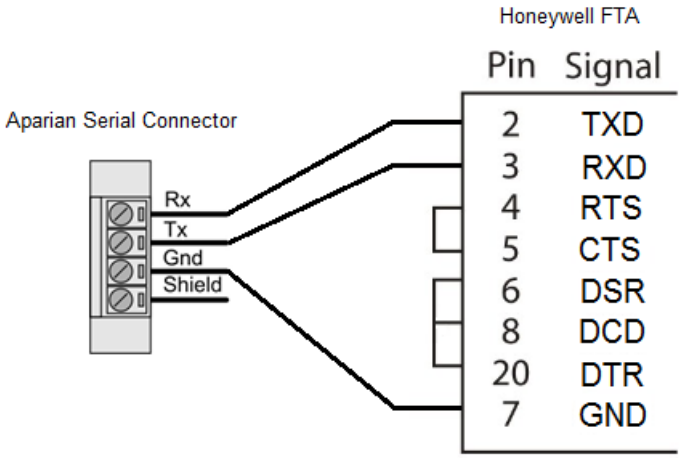

FIGURE 2 – SERIAL CABLE PINOUT

3.2. PLX51-DF1-ENI SETUP

3.2.1. MAPPING

The PLX51-DF1-ENI must be setup in either Bridge mode or DF1 Slave mode. In Bridge mode, the Logix PLC mapping will be used to route the PLC-5 (or PLC-2) emulated messages to Logix Tags. In DF1 Slave mode, the PLX51-DF1-ENI will map the PLC-2 emulated messages directly to Logix Tags.

3.2.1.1. BRIDGE MODE

In Bridge mode, the PLX51-DF1-ENI will redirect a DF1 PCCC message to a Logix controller at a preconfigured path. In this mode, the module will rely 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 map configuration is shown in the figure below.

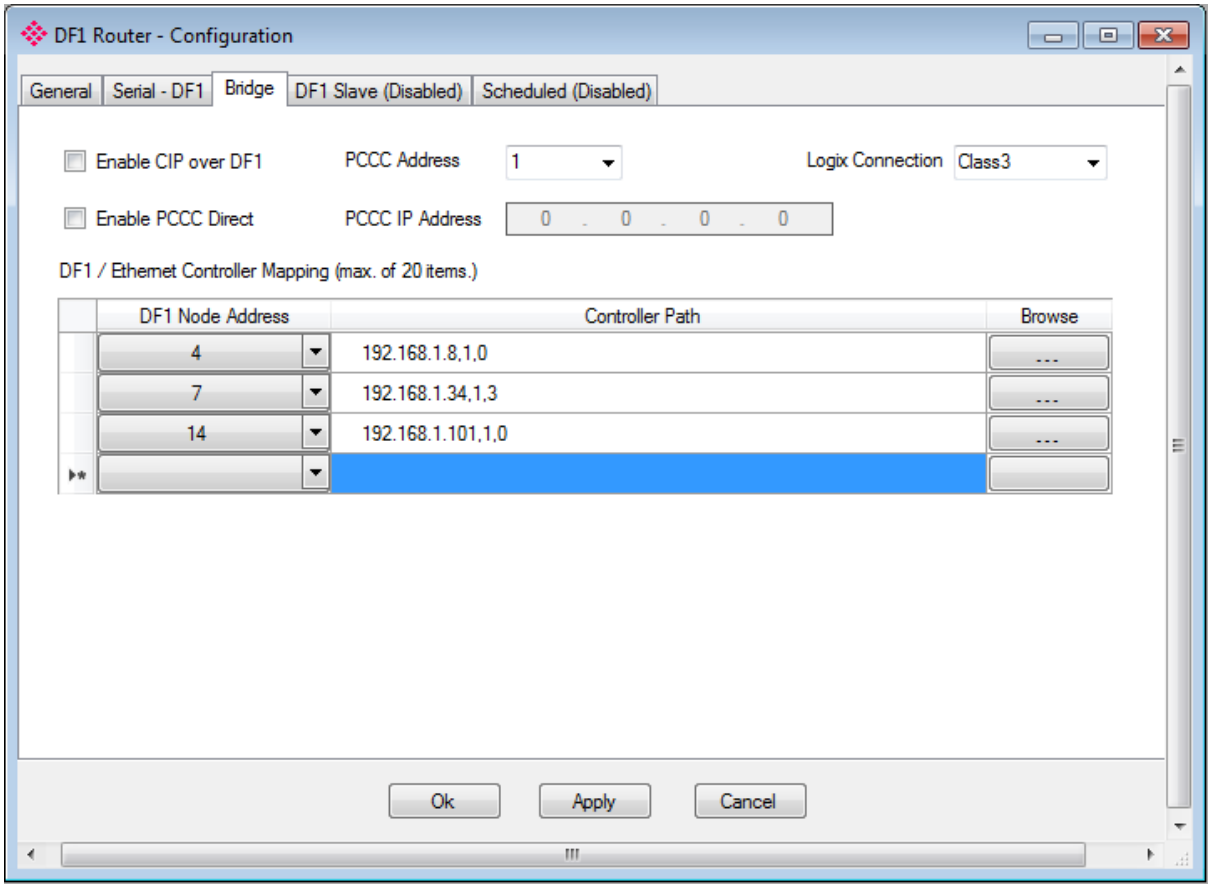

FIGURE 3 - BRIDGE MAP CONFIGURATION

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.

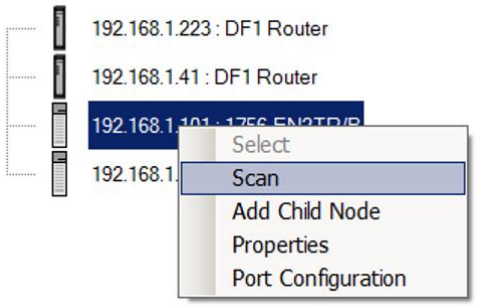

FIGURE 4 - SCANNING NODE IN THE TARGET BROWSER

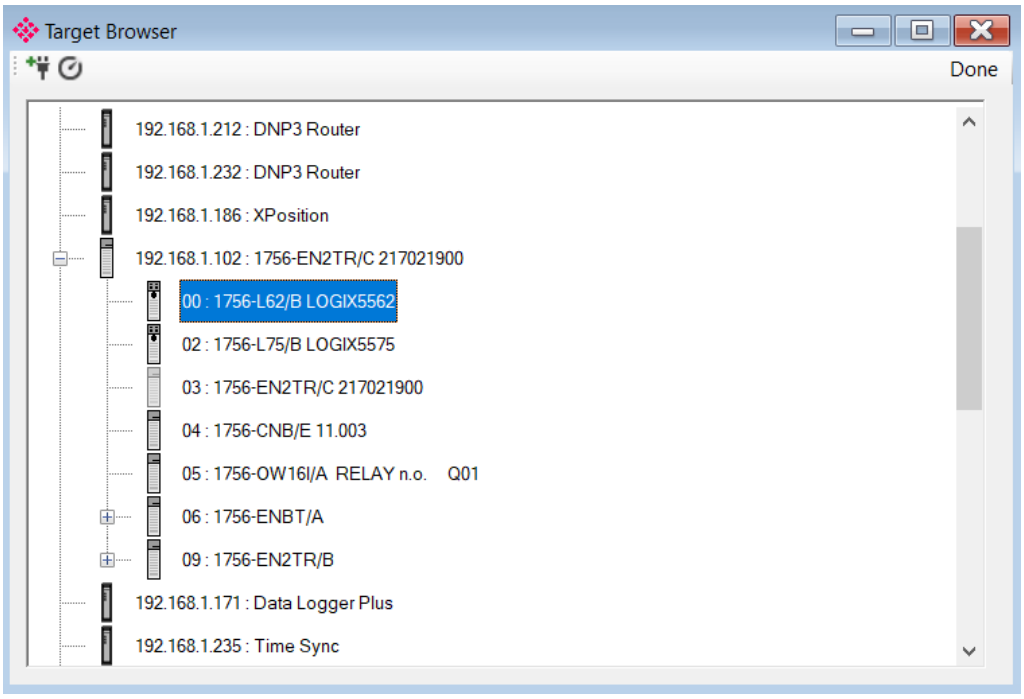

FIGURE 5 - TARGET BROWSER SELECTION

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 MAP PARAMETERS

Below are two examples of how DF1 messages are routed to the Logix controller.

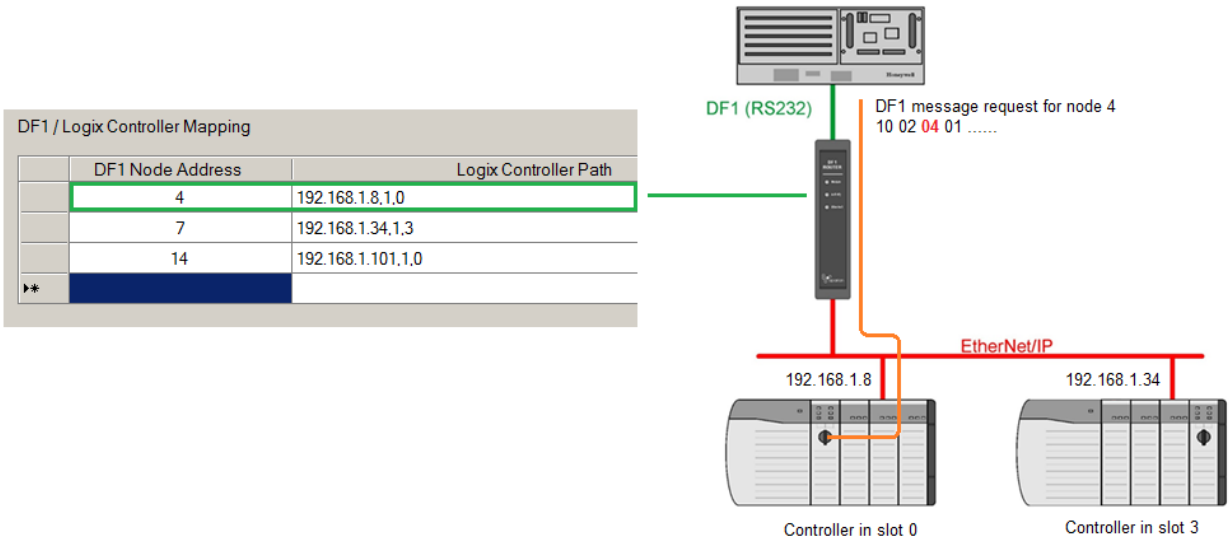

FIGURE 6 – EXAMPLE 1 - BRIDGE ROUTING MAP – NODE 4

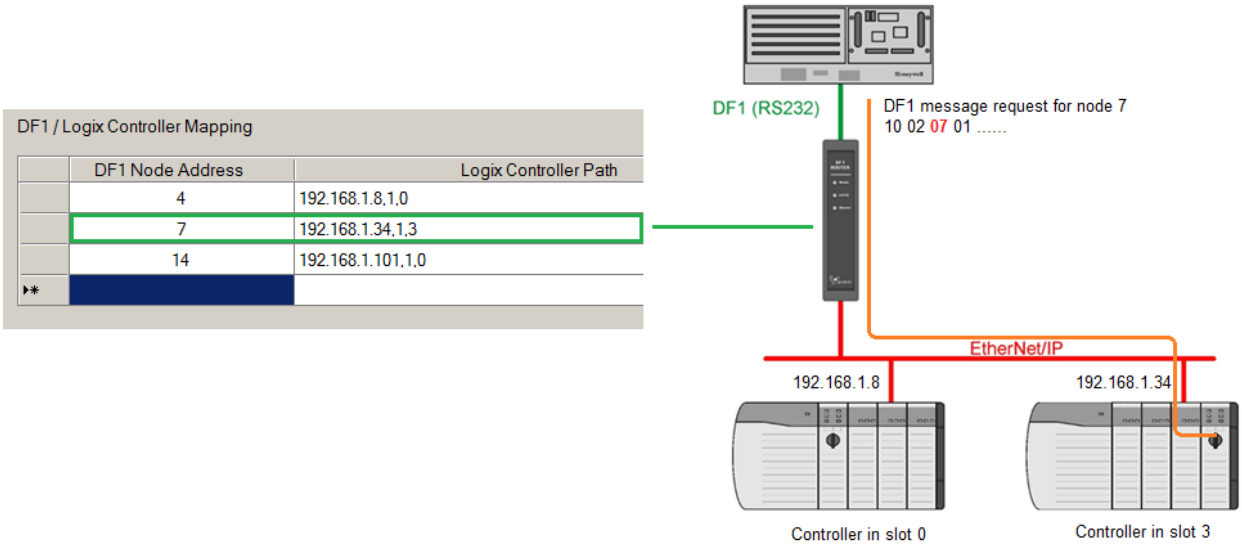

FIGURE 7 – EXAMPLE 2 – BRIDGE ROUTING MAP – NODE 7

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.

The routing of the Node address to Logix controller, as well as DF1 File Number to a Logix tag, is managed by the PLX51-DF1-ENI. In DF1 Slave mode, the PLX51-DF1-ENI operates independently from the Logix controller by directly reading and writing to Logix tags.

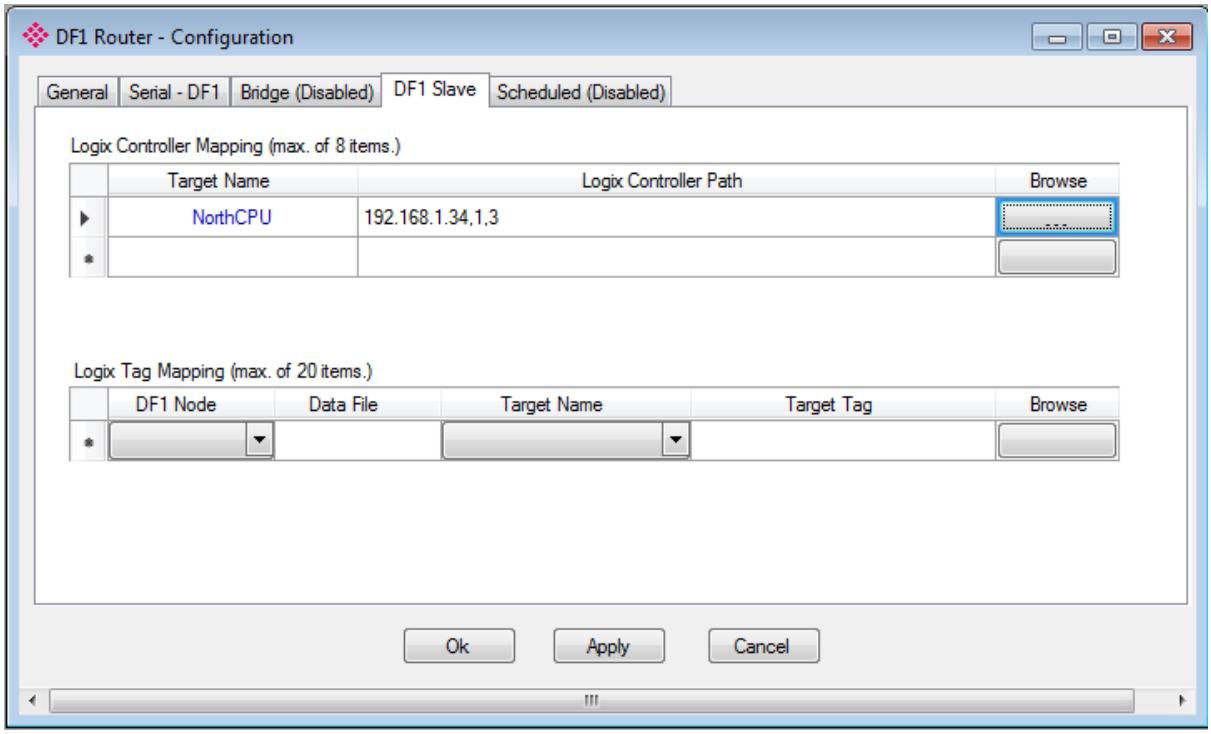

FIGURE 8 - DF1 SLAVE MODE CONFIGURATION

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.

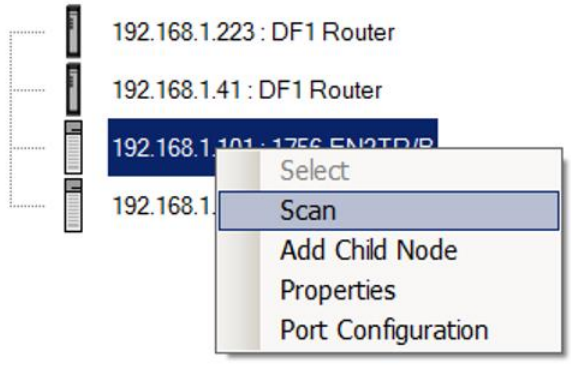

FIGURE 9 - SCANNING NODE IN THE TARGET BROWSER

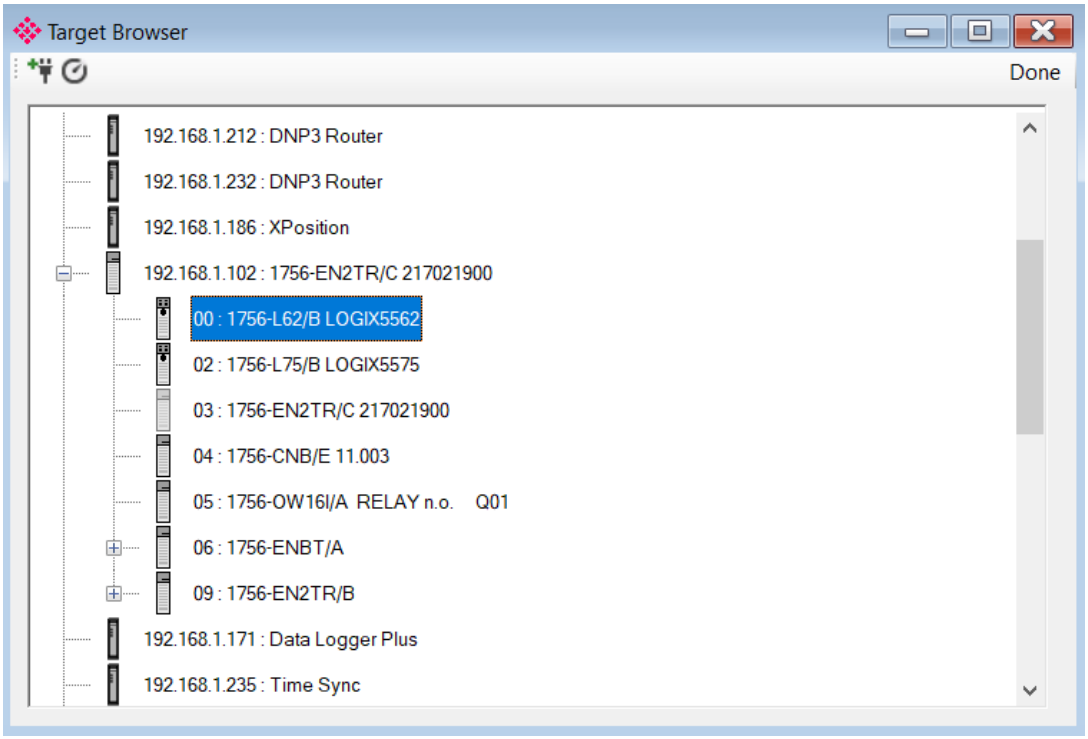

FIGURE 10 - TARGET BROWSER SELECTION

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 and File Number combination to a Logix tag. Only the PLC-2 communication options should be used.

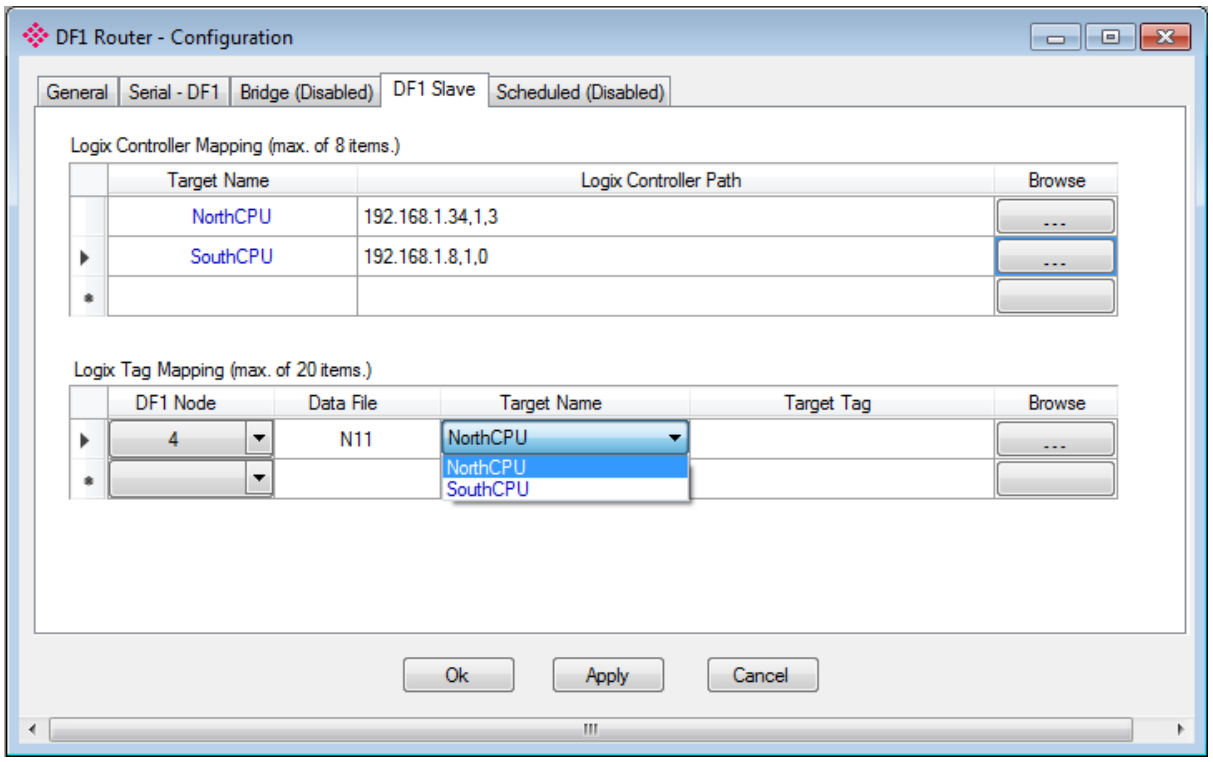

FIGURE 11 – DF1 SLAVE MAPPING

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.

The next column is used to enter the DF1 data file. Enter “PLC2” to indicate the PLC2 type data file.

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 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.

The non-array tags are disabled, guiding you to select a suitable tag.

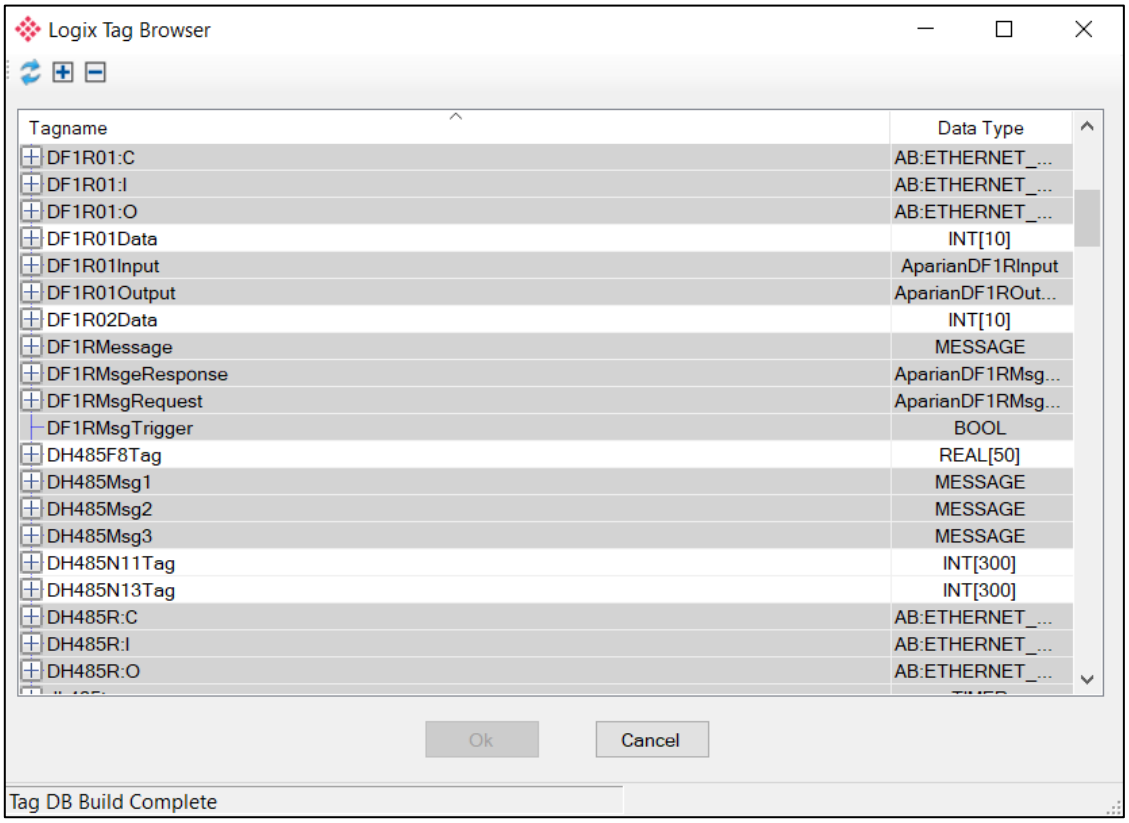

FIGURE 12 – TAG BROWSER TAG SELECTION

NOTE: It is your responsibility to ensure that the Logix tag array datatype and size matches that of the DF1 PLC2 File. Failing to do this can result in communication faults.

3.2.2. Serial Parameters

The serial parameters must be setup as shown in the figure below:

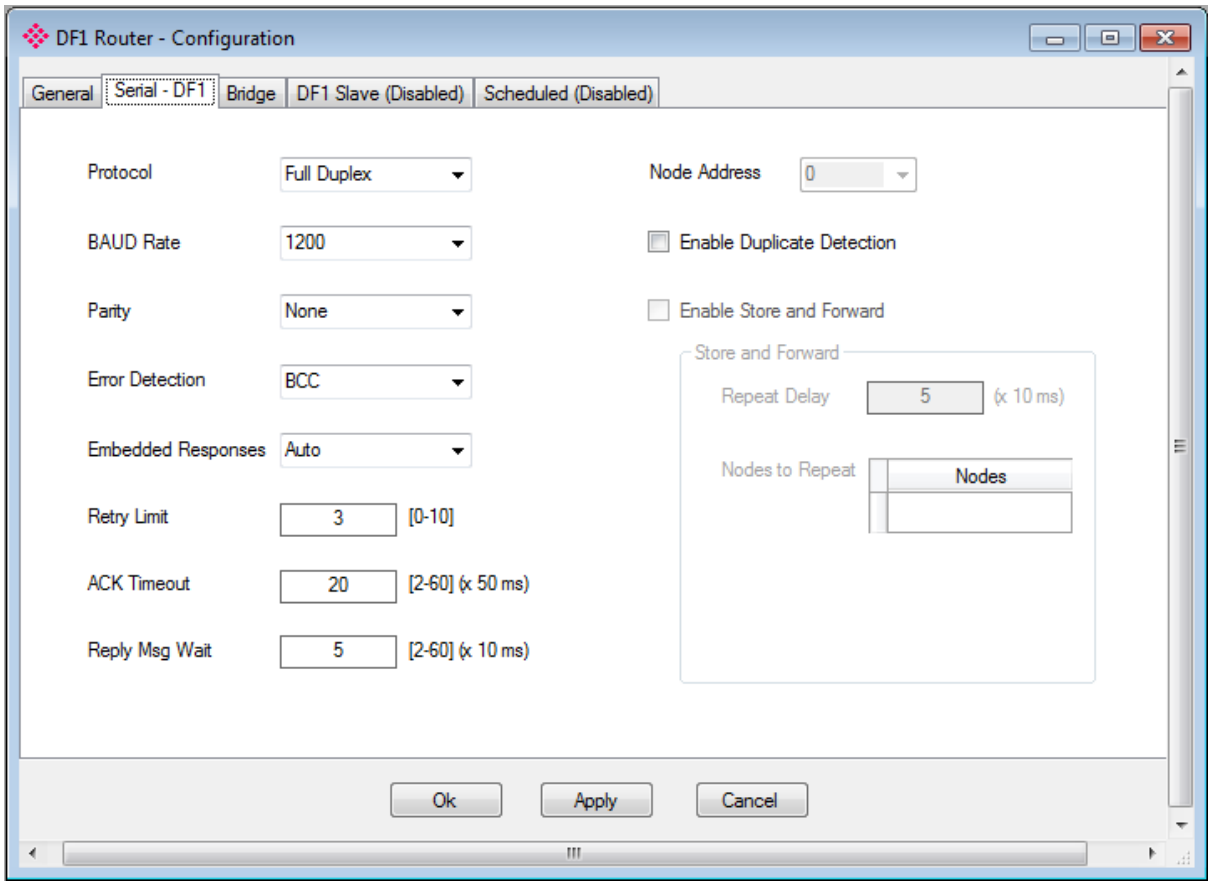

Figure 14 – DF1 serial settings for Honeywell Serial Interface

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 PLC5 messages to a Logix Tag using the Map PLC/SLC Messages function. When the PLX51-DF1-ENI is setup in DF1 Slave mode, no Logix configuration is required.

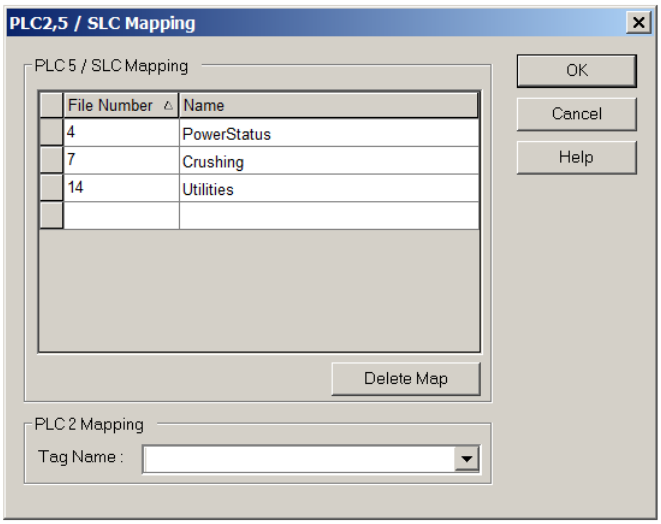

FIGURE 15 – LOGIX PLC/SLC MAPPING

3.4. HONEYWELL SETUP

This section discusses the procedures for setting up the Honeywell system to accept the data from the ControlLogix. For complete set up procedures, please consult a Honeywell Technical Specialist.

All information communicated through the Serial Interface must be communicated through Array tags. Figure 16 below is the first page of 5 in the configuration of a Honeywell Array tag.

The first page of this configuration is specific to the Honeywell system. You must know a valid Honeywell Unit, a Network number (NTWKNUM), and a Node number (NODENUM). The Network and Node number refers to where the actual Honeywell serial interface module resides. It must match the actual hardware configuration. If not, errors will occur and the tag will not be valid.

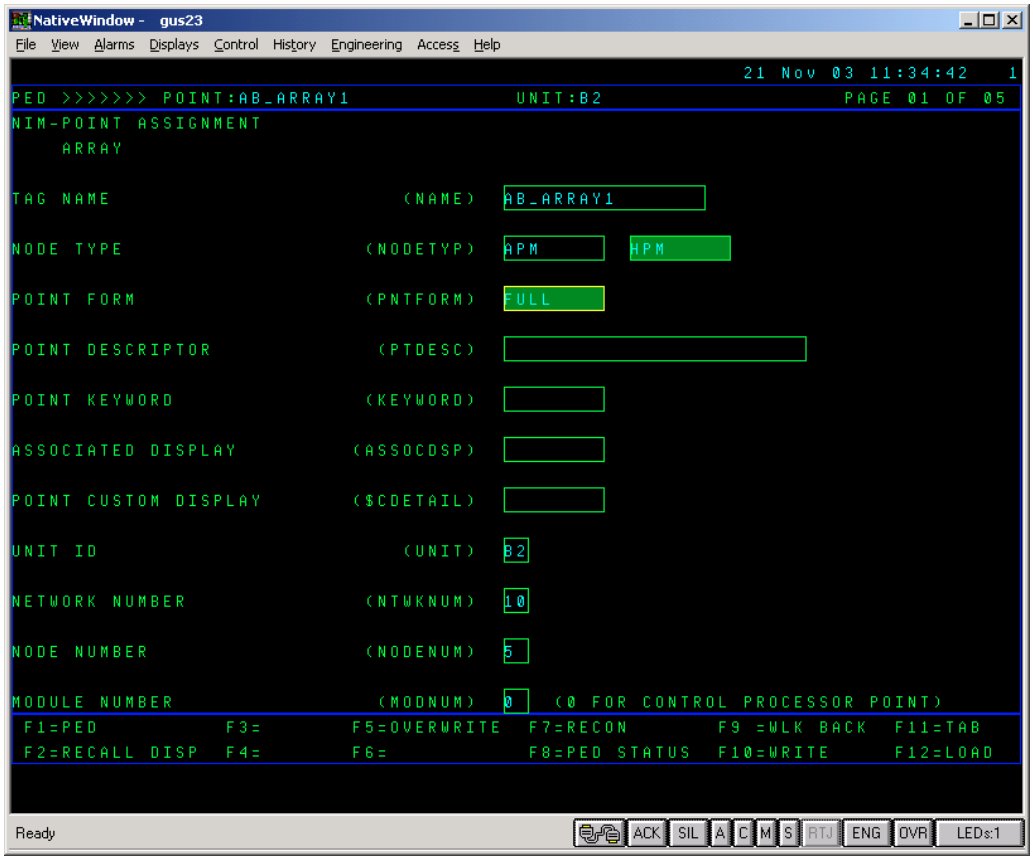

FIGURE 16 – HONEYWELL PAGE 1

Page 2 of the Array tag configuration is shown below in Figure 17. You will only need to configure the Slot Number (SLOTNUM) and the External Data (EXTDATA) type. Within the Honeywell system configuration, there are a limited number of Array tags that can be configured. You must enter an unused slot number. The External Data type refers to the type of data being communicated through this Array tag. This data type must match the data type configured in AB_DATA3 on page 3 of the configuration.

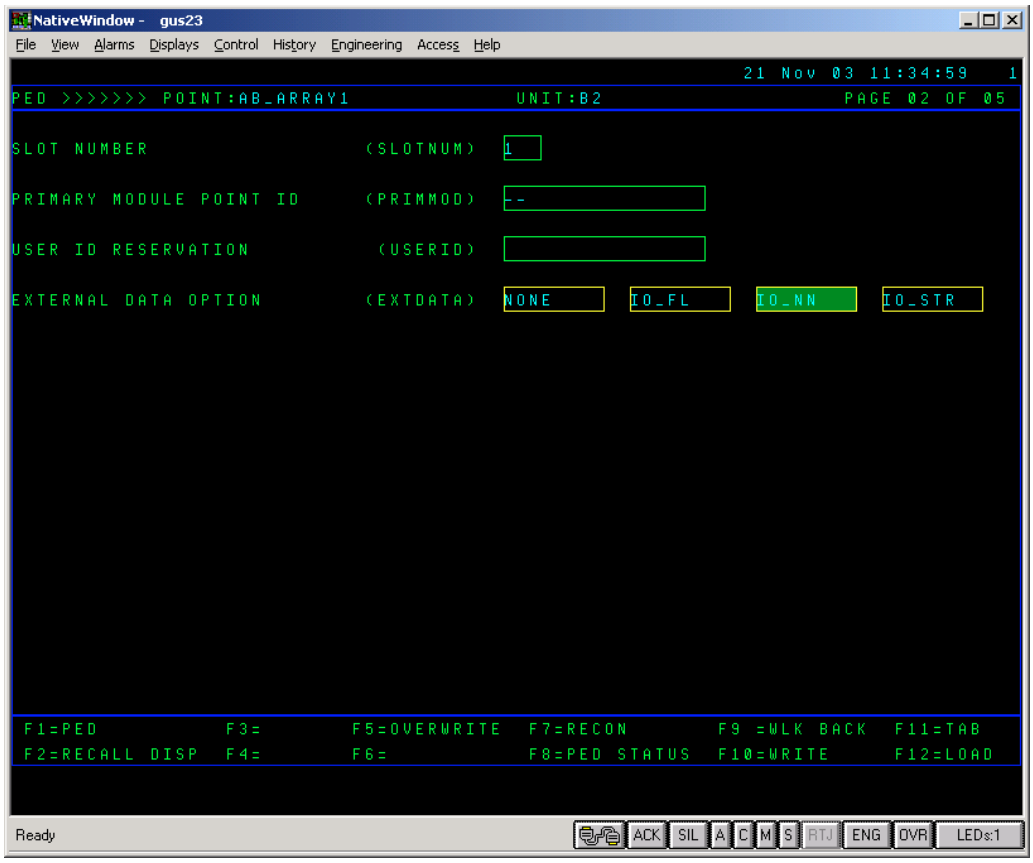

FIGURE 17 – HONEYWELL PAGE 2

Page 3 of the Array tag configuration is shown below in Figure 18. The following parameters must be configured:

IOPNUM – Valid number are 1 to 40. This number represents the slot of the SI module that is placed within the Card Files (Racks) of Honeywell IOP's.

FTANUM – Each SI module can have 2 FTA's connected to different systems. For example, FTA 1 can be an AB interface and FTA 2 can be a Modbus interface. An illustration is shown in Figure 18. The connection identified as Unit 0 refers to FTA 1 and Unit 1 refers to FTA 2.

DEVADDR – This is the destination DF1 Node address that is used by the PLX51-DF1-ENI to route the message. The address is entered in Octal (e.g. 13), whereas in the PLX51-DF1-ENI mapping, it must be configured in Decimal (e.g. 11).

SCANPRI – Enter a value of 'Low'. (Default)

AB_DATA1 – This is the Allen-Bradley PLC family type. Enter a value of '5'. In the ControlLogix configuration above, mapping was done to emulate the PLC-5 file structure. (Valid entries are 2, 3, and 5. Each one of the entries represents the PLC-2, PLC-3, and PLC-5 respectively).

AB_DATA2 – This refers to the file type that was created in the mapping shown in Figure 1. This number is entered in decimal (this parameter and the file number are both in Decimal) and must match the file number done within the mapping.

AB_DATA3 – The Data type of the file being communicated. The data types can be seen in Figure 18 and must match the data type contained in the file configured in AB_DATA2. The file type must also match the EXTDATA parameter.

PLC-5 Data Type	AB_DATA3	Array Type
Output	0	Flag
Input	1	Flag
Status	2	Flag
Bit	3	Flag
Integer	*4,5	Numeric (unsigned 16 bit)
Integer	7	Numeric (signed 16 bit)
Floating Point	8	Numeric (IEEE Single Precision)
ASCII	9	String
*These Allen-Bradley file types are read only and writes to these file types are ignored.		

FIGURE 18 – HONEYWELL DATA TYPES

AB_DATA4 – The frequency (in seconds) at which the Array tag within Honeywell is updated from the ControlLogix data file. The valid range is 0 to 256 seconds, where '0' indicates as fast as possible.

FIGURE 19 – HONEYWELL PAGE 3

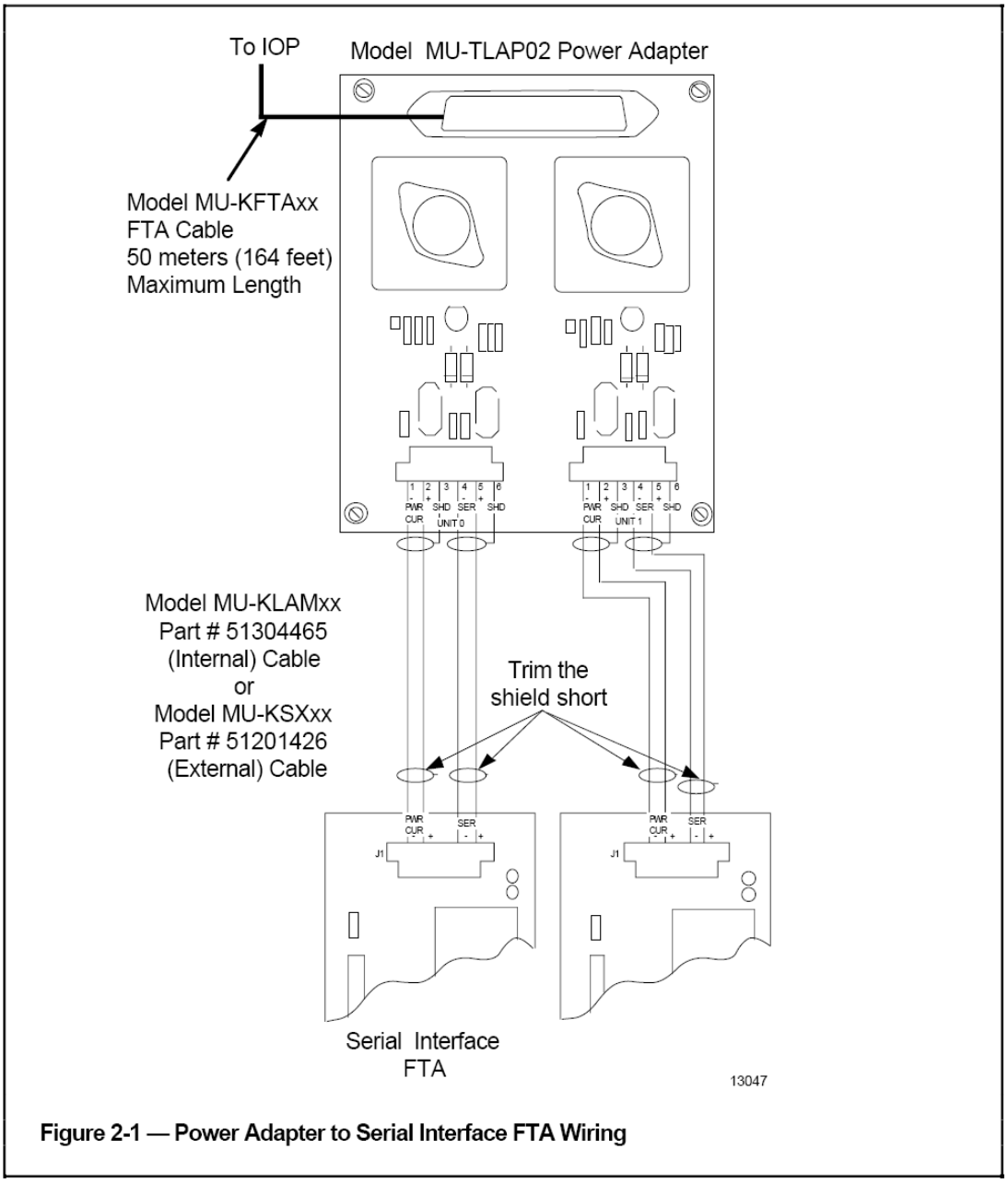

FIGURE 20 – SERIAL INTERFACE FTA CONNECTION

Page 4 of the Array tag configuration is shown below in Figure 21. You will only need to configure the Start Index and the number of Flags or Numerics parameters, depending upon what the Array tag is configured for. The start index is typically '0'. The Flags or Numerics in Honeywell are offset from the Bits and Words in the ControlLogix array. The Flags and Numerics in Honeywell are offset by +1 from the ControlLogix Bits and Words.

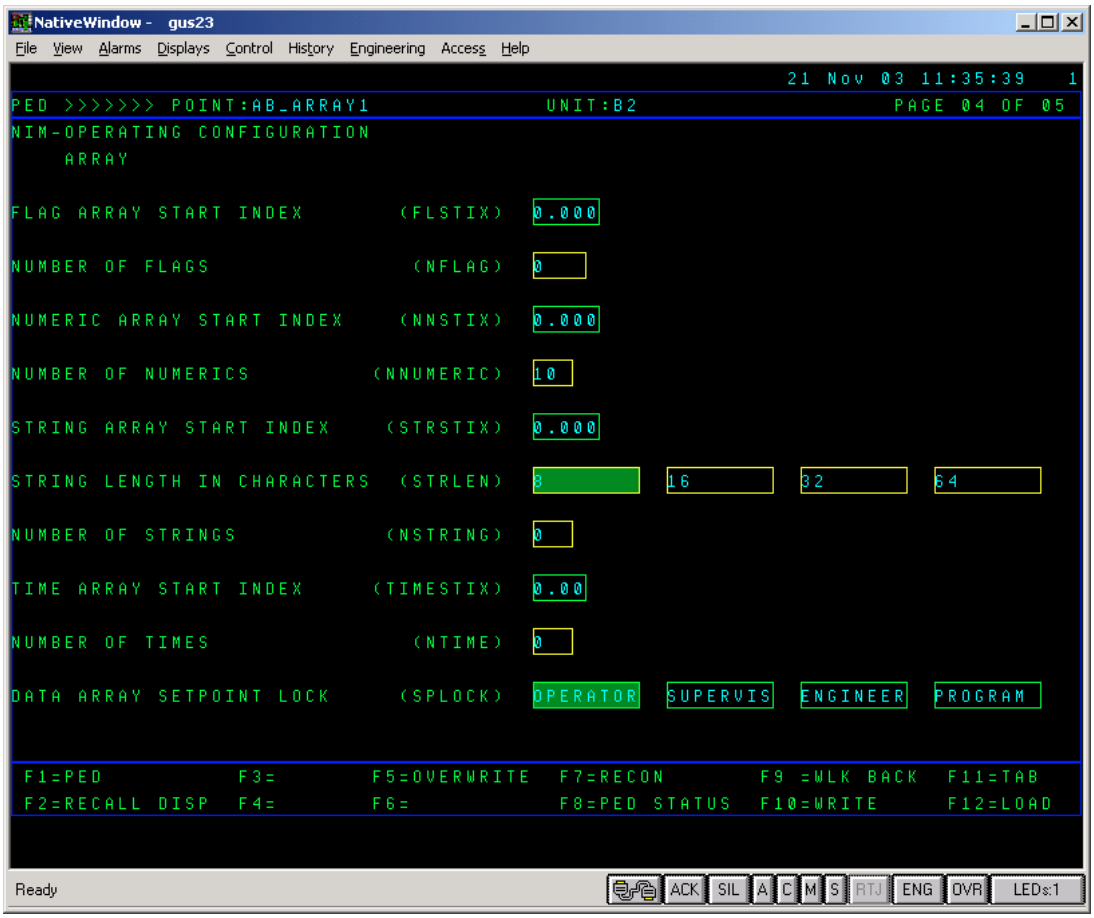

FIGURE 21 – HONEYWELL PAGE 4

Page 5 of the Array tag configuration is shown below in Figure 22. These parameters are required to be entered.

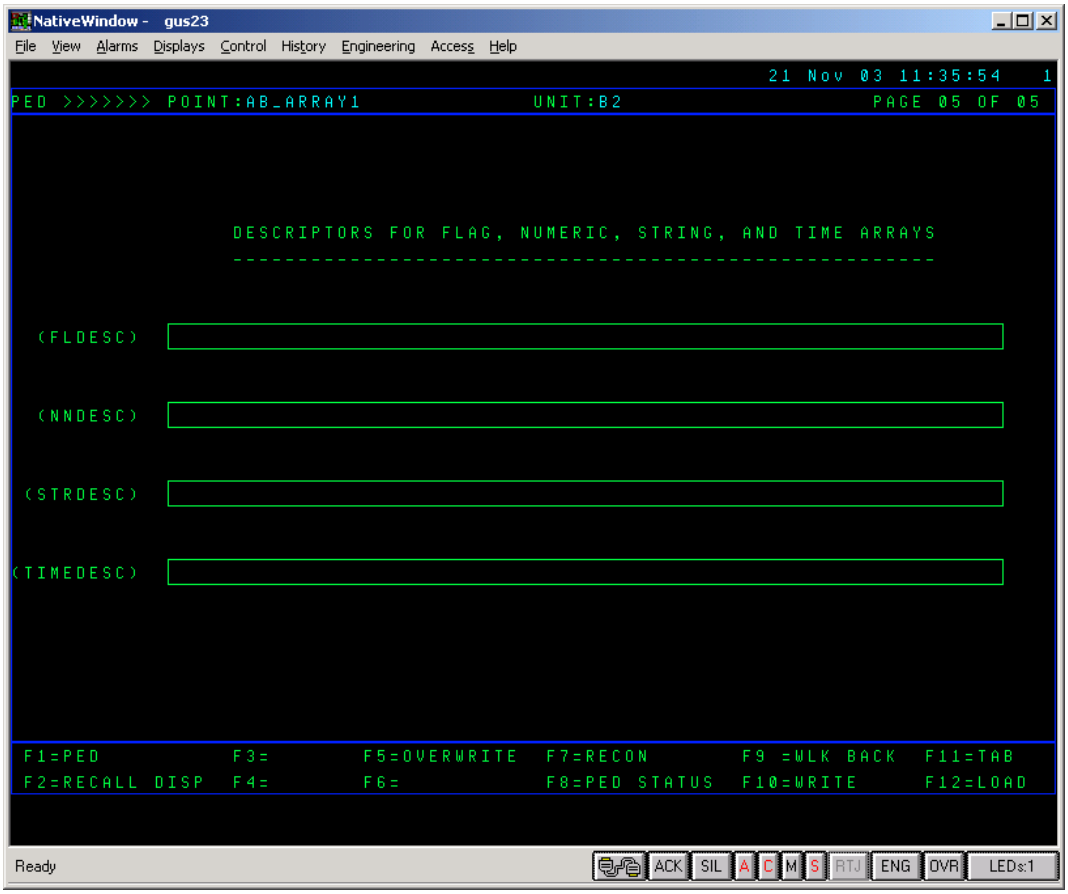

FIGURE 22 – HONEYWELL PAGE 5

Figure 23 and 24 show the actual point detail of the data point AB_Array1 that you will see when the tag is operating in the system.

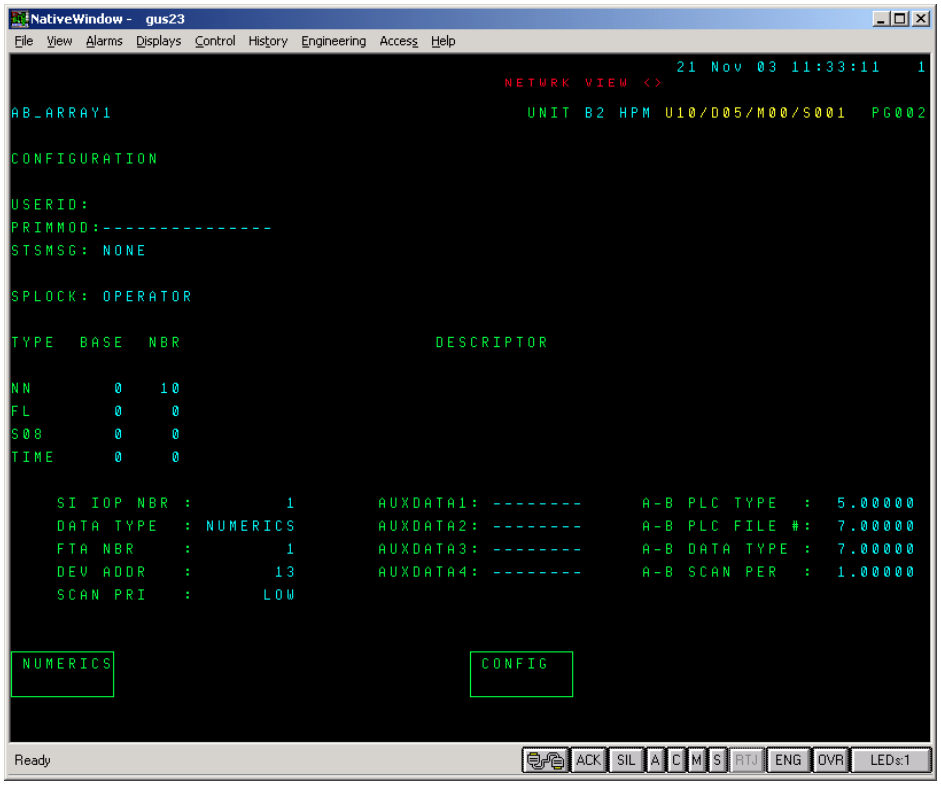

FIGURE 23 – DATA POINT AB_ARRAY1

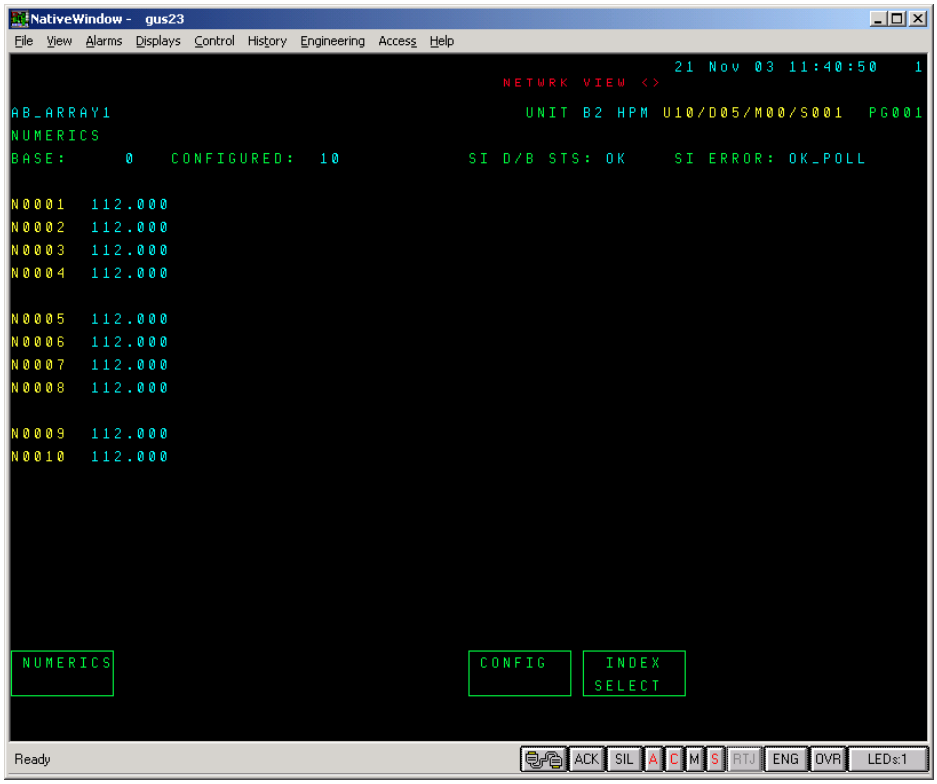

FIGURE 24 – DATA POINT AB_ARRAY1

4. NOTES

4.1. SERIAL INTERFACE ARRAY TAG CONSIDERATIONS

The Array Tag does not contain the data, the data resides in the external ControlLogix processor or other PLC. The SI writes to this external data and reads back the data. This can be seen when a Numeric or flag is changed from Honeywell (from a graphic Figure 24). The data immediately changes within the external device (written on exception). Depending upon what AB_DATA4 (Scan Period) is set to, it may take some time to see the Honeywell information update.

It should also be noted that data must not be continually written to the Honeywell Array tag. Any information written to the tag should be written only when it changes (write on exception). Within Honeywell, if the tag has not changed states, it will be continually written. If an Array Flag or Numeric is used within another tag such as a Logic Block, each time that logic block executes, the Flag or Numeric is written.

The amount of data that can be written from a Serial Interface is approximately 10 writes/second. Note, all Honeywell array tags configured to a Serial Interface contribute to this limit. In the case of having an Array Flag or Numeric in a Logic Block, it is possible to have the Logic Block configured to execute every ¼ second, extreme caution should be used when doing this.

5. REFERENCES

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

6. SUPPORT, SERVICE & WARRANTY

6.1. 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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6.2. WARRANTY INFORMATION

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

Documentation is subject to change without notice.