



M Y N A H™

**Allen Bradley Guard PLC Driver for DeltaV
Programmable Serial Interface Card
Series 2**

USER MANUAL

Rev. P1.11

September 20, 2006

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1 INTRODUCTION

1.1 Scope

This document is the User Manual for the Allen Bradley Guard PLC serial communication driver firmware for the Emerson DeltaV Control System; it provides information required to install, configure, and maintain the Allen Bradley driver firmware on the DeltaV Series 2 Programmable Serial Interface Card (PSIC). The reader should be familiar with Emerson's DeltaV controller system and the Allen Bradley Equipment.

The section *Document Format* briefly describes the contents of each section of this manual. *System Specifications* outlines hardware and software requirements for the Allen Bradley Guard PLC Driver (P1.11) firmware. *Related Documents* lists other documents used to prepare this manual.

1.2 Document Format

This document is organized as follows:

Introduction	Describes the scope and purpose of this document.
Theory of Operation	Provides a general functional overview of the Allen Bradley Guard PLC Driver.
Downloading Firmware	Describes downloading procedures for the Allen Bradley Guard PLC Driver firmware on to the DeltaV PSIC.
PSIC Configuration	Describes procedures and guidelines for configuring the DeltaV PSIC.
Operational Check	Provides tips and assistance to ensure PSIC is properly setup and configured.
DeltaV - Mettler Toledo Electrical Interface	Describes the electrical interface between DeltaV and the Allen Bradley Guard PLC. Also describes the pin assignments for RS-232 communications.
Technical Support	Describes who to call if you need assistance.



1.3 System Specifications

The following table lists the minimum hardware requirements for the Allen Bradley Guard PLC Driver:

Table 1: System Specifications

Firmware	Allen Bradley Guard PLC Driver Firmware (P1.11)
Protocol Compatibility	Allen Bradley Protocol as defined in the document: Guard PLC 2000 Controller, Catalog number 1755-L1, Publication 1755-IN002B-EN-P
Software Requirements	DeltaV System Software (Release 4.2 or later) installed on a hardware-appropriate Windows NT workstation configured as a ProPlus for DeltaV Serial Interface Port License (VE4102)
Minimum Hardware Requirements	FRSI DeltaV Serial Interface Series 2, Hardware PN: 12P2506X022 FRSI DeltaV M3, M5, MD or Series 2 MD Controller, Power Supply and 2 wide controller carrier FRSI 8 wide I/O card carrier Allen Bradley Guard PLC devices



2 THEORY OF OPERATION

As part of the serial interface port license, a standard Modbus protocol is installed on the DeltaV PSIC prior to customization. The PSIC needs to be flash upgraded from the Modbus protocol to the Allen Bradley protocol before operation.

The RS-232 communication settings must be configured properly to ensure accurate communication between the PSIC and Allen Bradley Guard PLC devices. RS-422/485 may be used if the Allen Bradley devices support this electrical standard.

This driver functions as a master only, with data read from the PLC. The PLC does not accept any data write commands. In master mode, the PSIC continuously sends read commands to the connected PLC devices. The received responses are reported to DeltaV via dataset registers.

In general, the primary functions of the driver are listed below:

- Performs data read and message handling between DeltaV and Allen Bradley devices.
- Checks validity of messages received from the Allen Bradley devices.
- Processes reply information and updates the corresponding dataset registers
- Update dataset register status and data block status to indicate the communication state.

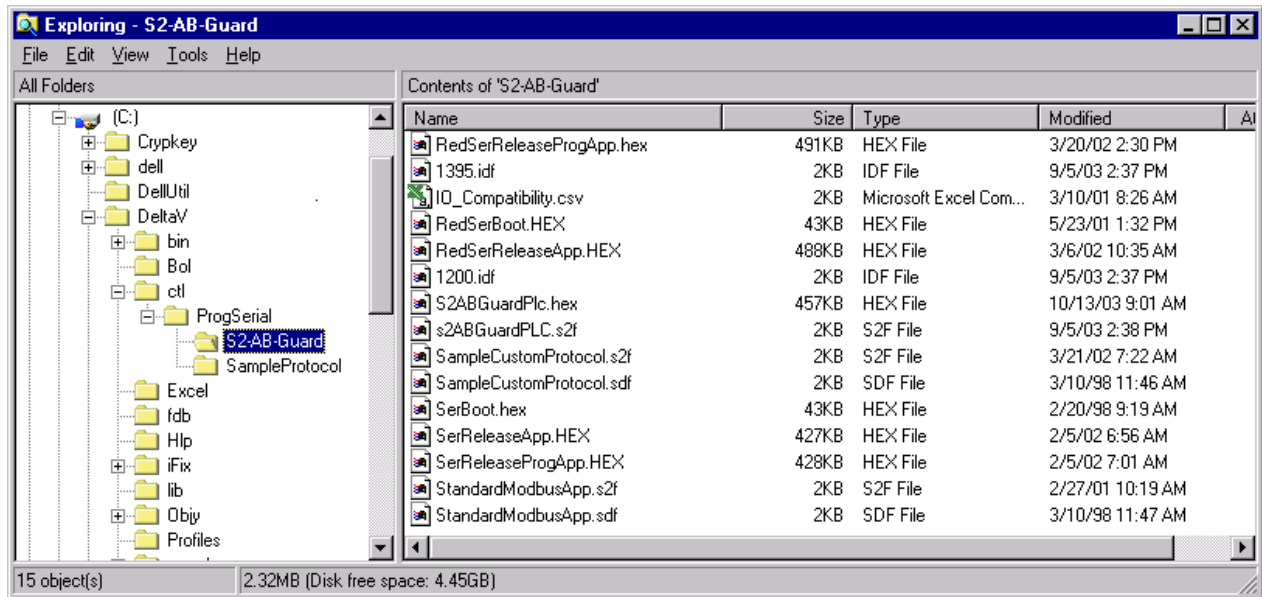


3 Downloading the firmware

The driver software comprises 15 files, distributed on a CD. These files must be copied to the DeltaV directory (you must create the directory first) on your ProPlus Workstation. The path is:

\\DeltaV\ctl\ProgSerial\S2-AB-Guard

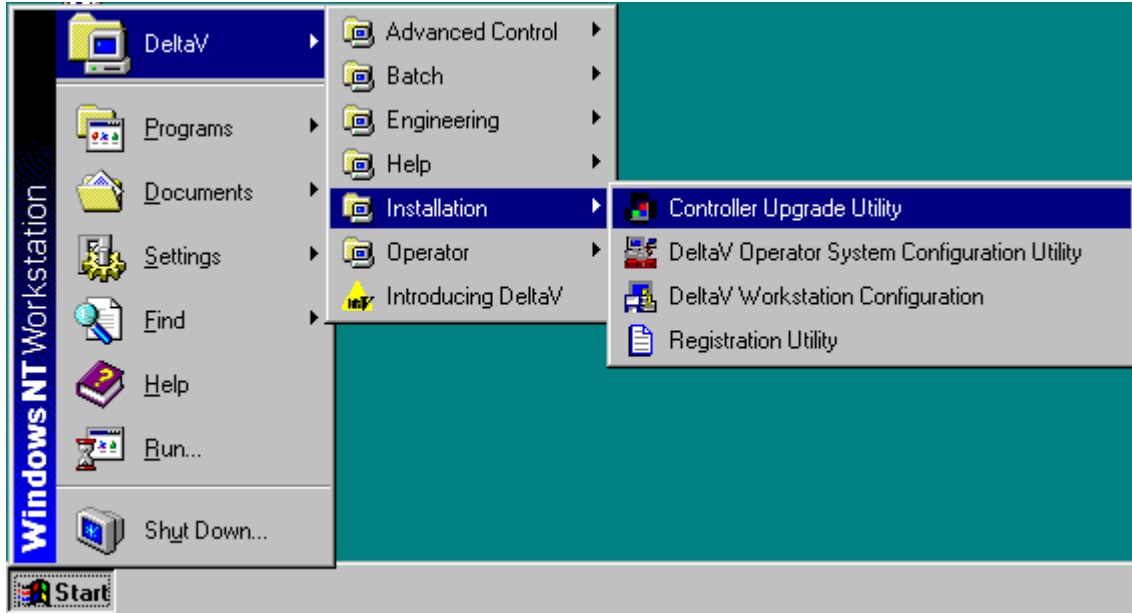
The following shows a completed copy operation:



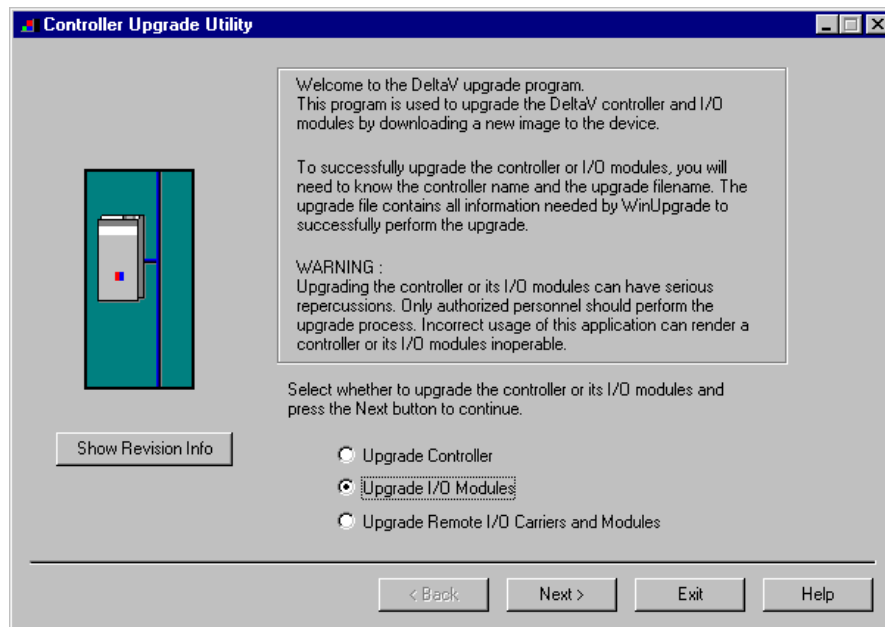
After copy completion, you are ready to program (or upgrade) the Programmable Serial Card with the supplied custom driver software. The steps are as follows:



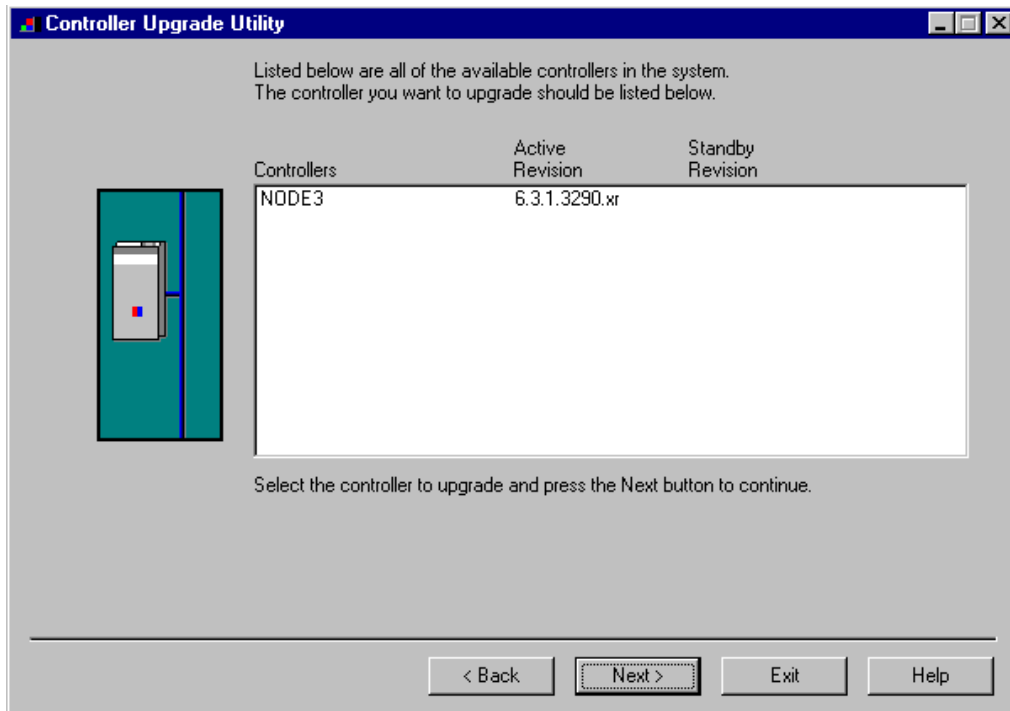
1. Click on the Start button and select DeltaV, Installation, Controller Upgrade Utility as shown below.



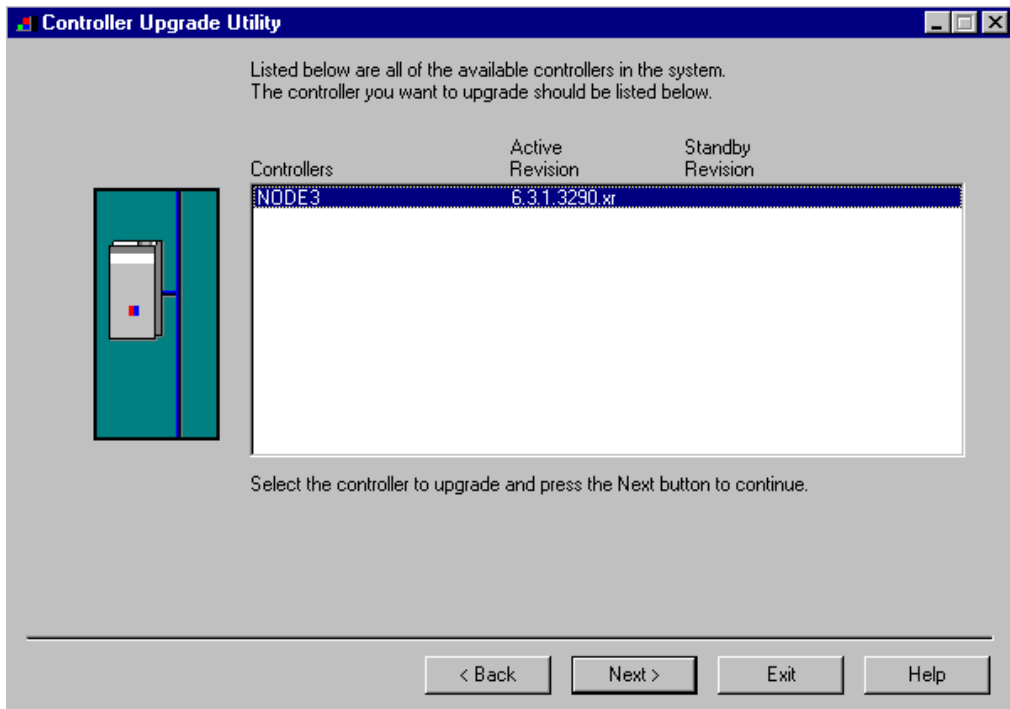
The following dialog will appear:



Click on the Upgrade I/O Modules radio button as shown, and then click Next.

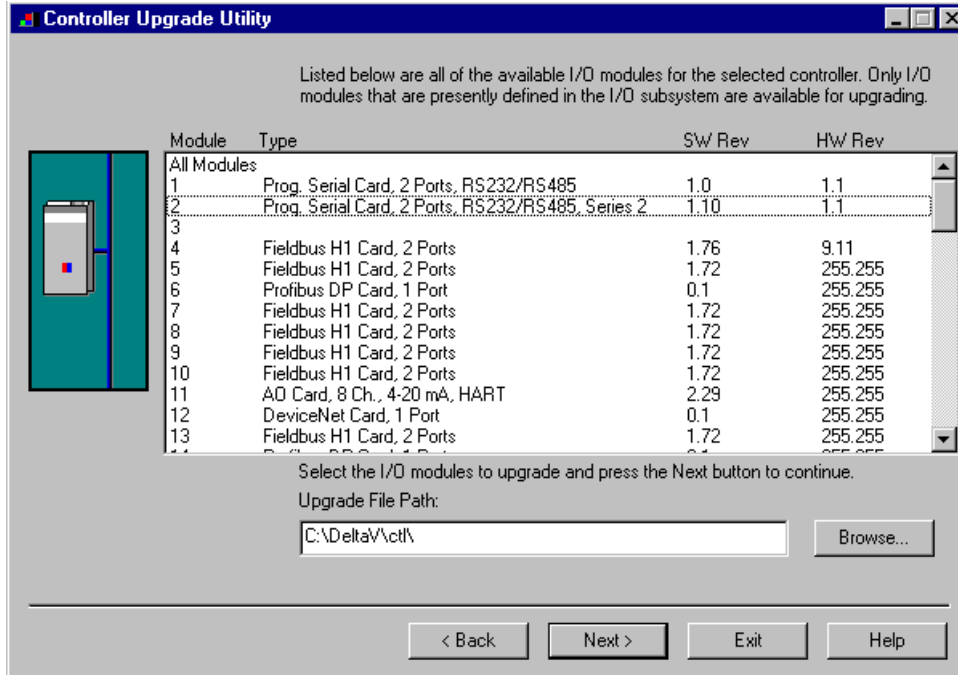


The above dialog will appear, listing all the available Controllers in your network. From this dialog, select the appropriate Controller and then Click Next as shown below.





After you Click Next, the following dialog will appear, listing all the I/O modules in your selected Controller. The shown list of I/O modules is an example only. Your list will be different.

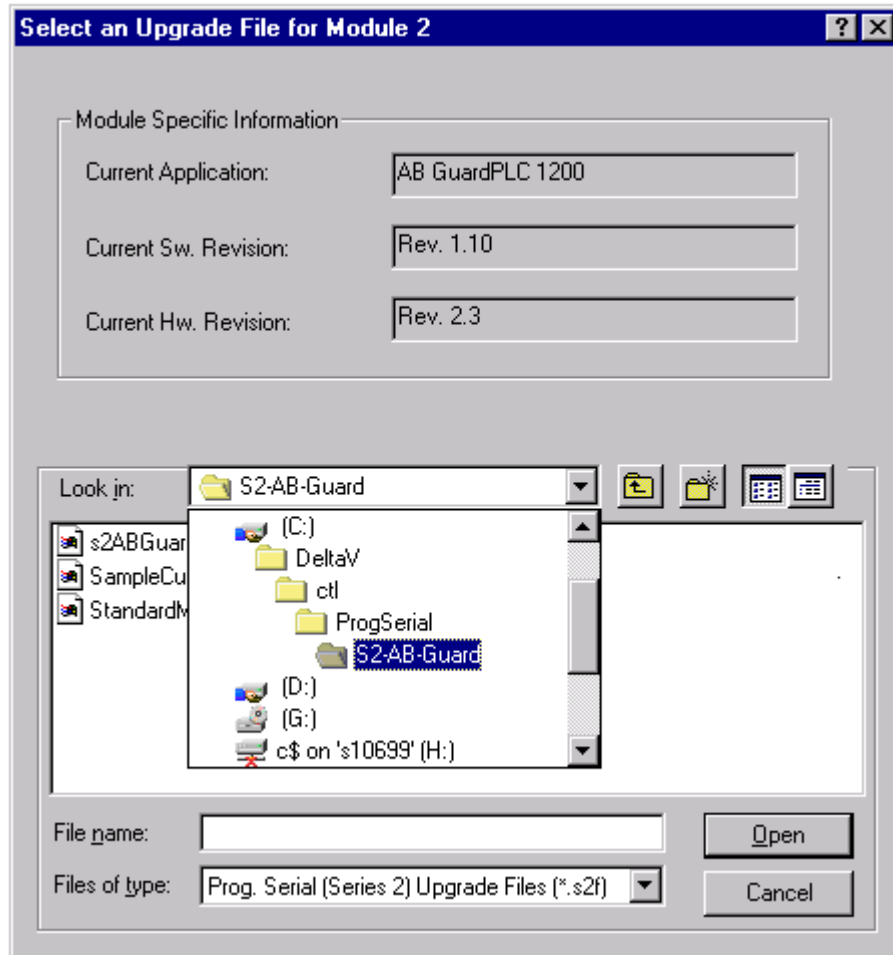


From this dialog, select the Programmable Serial Card I/O Module in the list. For example, we will select I/O Module 2. This will give you the following dialog, from which you will select the file path to where the driver software is located. This will be:

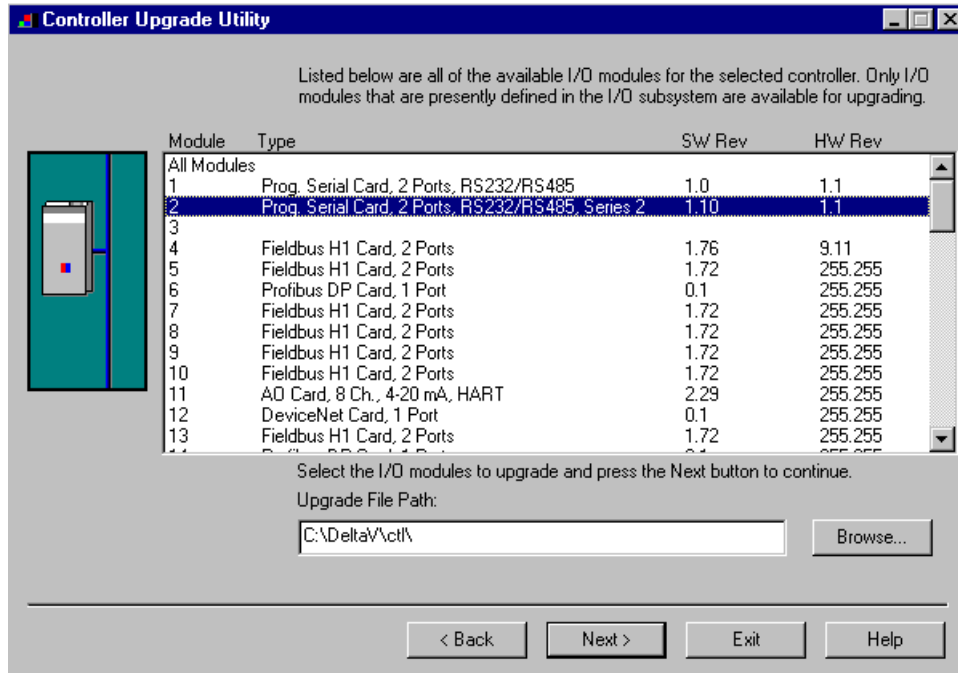
\\Delta\Vct\ProgSerial\S2-AB-Guard

Once you are in the specified directory, you will need to select the following file:

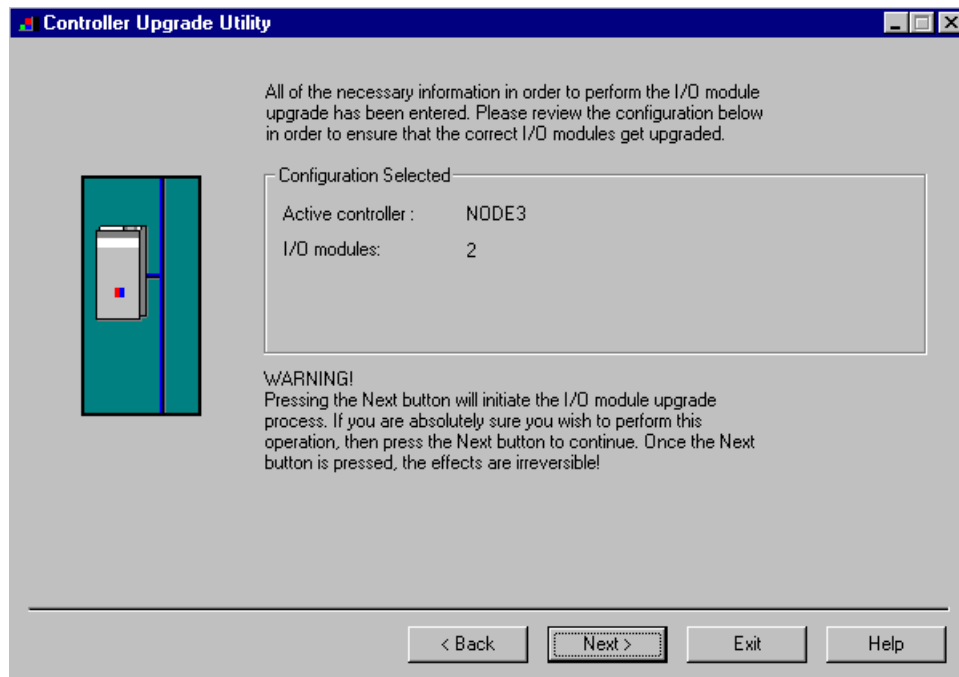
S2ABGUARDPLC.s2f



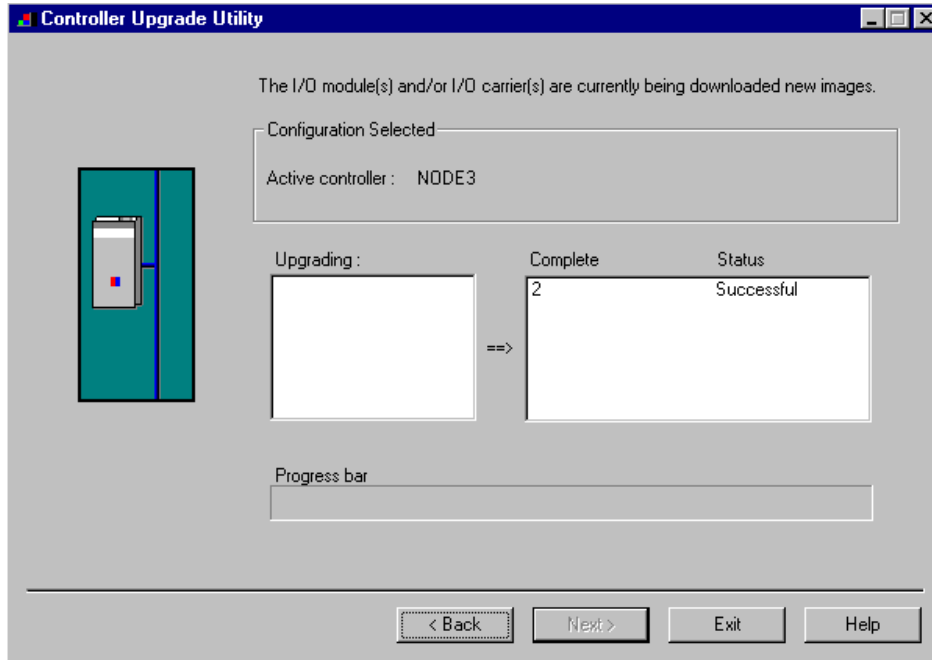
After selecting the .S2F file, Click on Open. This dialog will close and you will be back to the following:



In this dialog, Click Next again. You will get the following dialog, confirming the Controller and I/O Module to program.



Click Next and the I/O Module upgrade process will begin. After completion, you will receive the following dialog, indicating success.



This completes the I/O Module upgrade process.



4 CONFIGURATION INFORMATION

This section describes the steps necessary to configure the DeltaV PSIC to obtain proper communication.

4.1 Device And Dataset Configuration

Each PSIC has 2 ports with 16 datasets under each port. Consequently, each PSIC can communicate with a maximum of 2 AB Guard PLC's.

The following paragraphs discuss the device and dataset configuration attributes:

4.1.1 Device Address:

You can configure a maximum of 1 device under each PSIC port, representing a PLC connected to that port. The device address is the PLC address to which the PSIC port is connected. The PLC address must be between 1-98. Address 99, although valid for a PLC, is fixed as the PSIC address and cannot be used to address a PLC.

4.1.2 Output Mode:

Two output modes are available in the DeltaV PSIC: block output (0) and single output (1). This value is a don't care for the driver. Leave this value at its default setting of 0.

4.1.3 DeltaV Data Type:

DeltaV data type can be configured based on the PLC values being read. The following table correlates DeltaV and PLC value types.

DeltaV Type	PLC Type
Boolean w/ status Discrete w/ status	BOOL
8-bit signed w/ status	SINT
16-bit signed w/ status	INT
32-bit signed w/ status	DINT
8-bit unsigned w/ status	USINT
16-bit unsigned w/ status	UINT
32-bit unsigned w/ status	UDINT

4.1.4 DeviceDataType

This value is not used. Leave it as 0.

4.1.5 Data Start Address and Number of Values

Configure the Start Address for each dataset corresponding to the PLC register location where you want to start reading. The maximum number of values in a dataset is 100. The driver will read from the PLC the configured number of values, starting at the start address. For example, if the start address is 1000, and the number of values is 100, then the PLC registers read will be 1000 – 1100.

Note: In some cases, the actual number of values, which may be read, is less than 100. This is because the maximum buffer size in the PSIC is 512 characters. The message protocol sends data as ASCII characters. There is an 18-character overhead in each message, leaving room for 494 data characters. Each data value may take from 1 to 8 characters, depending on the value. Furthermore, each value is separated by the / character. For example, when reading UINT values, the maximum value size is 5 characters (0-65535). Assuming 6 characters (including the /), each message can accommodate 82 UINT values. This will give us $18 + 492 = 512$ total characters.

While configuring the number of values, you must evaluate whether the worst-case message size will fit in the 512-character buffer.

4.1.6 Special Data 1-5

These values are not used.



5 Operational Check

5.1 Scope

The following sections provide some assistance to ensure the interface is working properly.

5.2 Verify Hardware and Software Version Number

The user can verify that the Allen Bradley Guard PLC driver has been installed using the DeltaV Diagnostics tool. The Diagnostics tool will show the Hardware Revision No. (HwRev) and the Software Revision No. (SwRev).

To begin the DeltaV Diagnostic tool select Start-> DeltaV-> Operator-> Diagnostics. In the Diagnostics tool expand the Controller, I/O and then double click on the Programmable Serial Interface Card that has the Allen Bradley Guard driver installed.

The following information will be displayed:

:	:	:
HwRev	Hardware Revision	1.1 (or later)
SwRev	Software Revision	P1.0 (or later)

5.3 Verify Configuration

- Verify port configuration: The serial port must be enabled. User needs to make sure communication settings such as baud rate, parity, and number of data bits matches the Allen Bradley Guard PLC device settings.
- Verify dataset configuration: The datasets configured must be as shown above.

5.4 Verify I/O Communication With Control Studio

User can create I/O modules in the control studio to verify correct values are read from the Allen Bradley Guard PLC and the PSIC. For input data, the values should be changed in the Allen Bradley and verified that the new data are correctly reported.

5.5 Using Diagnostics

- Verify PSIC communication: Select the PSIC on Diagnostics and press the right mouse button. Select Display Real-Time Statistics from the drop down menu. If the Programmable Serial Interface Card is functioning then the user will see the Valid Responses counter and the Async and/or Sync Transactions counters incrementing. There will not be any error counting up.



- Verify port statistics: Select the Port on the Programmable Serial Interface Card and press the right mouse button. Then select Display Port Statistics from the drop down menu. Verify that the port communications statistics are being displayed properly and are counting as expected for the Allen Bradley protocol's functionality.
- Verify dataset values: Select a dataset and press the right mouse button. Select View Dataset Registers from the Drop down window. Verify the dataset values are displayed as expected.

5.6 LED Indication

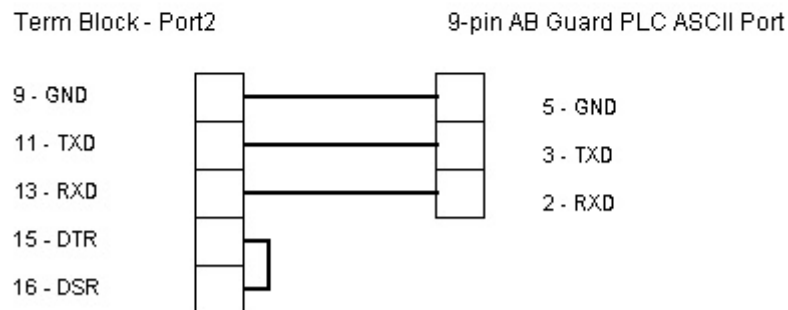
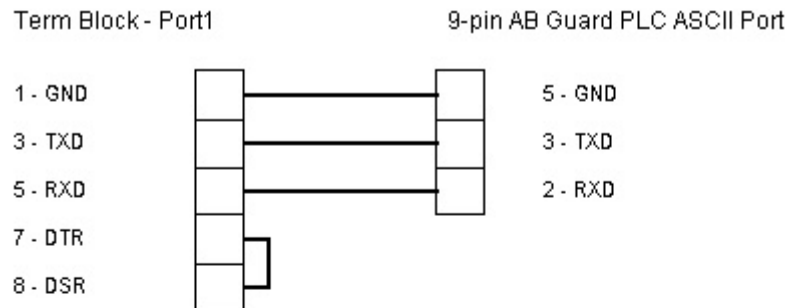
The Yellow LED for the port should be on solid when all communications on that port are valid. The Yellow LED should be blinking if there is some valid communications and some communications with errors on that port. The Yellow LED should be OFF if there are no valid communications on that port.



6 DeltaV - Allen Bradley PLC Electrical Interface

The electrical interface between DeltaV and the Allen Bradley devices conforms to the RS-232 protocol. The RS-232 cable connecting Allen Bradley and the DeltaV PSIC should not exceed 50 feet as specified by the EIA standard for RS-232 protocol.

The following diagrams show the cable pin out between the PLC and the PSIC. Note that, if required, RxD and TxD may be swapped at the PSIC termination block to accommodate NULL cable issues.





7 Technical Support

For technical support or to report a defect, please call MYNAH Technologies at (636) 681-1555. If a defect is discovered, please document it in as much detail as possible and then fax or email your report to us at (636) 681-1660 or to support@mynah.com.

You can also send us your questions via e-mail. Our address is:

support@mynah.com

Thank you for using DeltaV.

8 Revision History

Revision	Checked	Description
1.10	Oct 12, 03 NFW	Initial Release
1.11	Sept 20, 06 NFW	<ol style="list-style-type: none">1. Updated toolkit to v2.22. Corrected dual port communication defect. When both ports were active, the "Invalid Byte Count" error message was intermittently asserted.