



M Y N A HSM

SmartPass Tag Reader Driver for DeltaV Programmable Serial Interface Card

USER MANUAL

Rev. P1.0

September 30, 2002

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1 INTRODUCTION

1.1 Scope

This document is the User Manual for the SmartPass Tag Reader serial communication driver firmware for the Emerson DeltaV Control System; it provides information required to install, configure, and maintain the SmartPass 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 SmartPass Equipment.

The section *Document Format* briefly describes the contents of each section of this manual. *System Specifications* outlines hardware and software requirements for the SmartPass Driver (P1.10) 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 SmartPass Tag Reader Driver.
Downloading Firmware	Describes downloading procedures for the SmartPass Driver firmware on to the DeltaV PSIC.
PSIC Configuration	Describes procedures and guidelines for configuring the DeltaV PSIC.
Driver Communications	Describes SmartPass commands used and DeltaV Registers containing Reader data.
Operational Check	Provides tips and assistance to ensure PSIC is properly setup and configured.
DeltaV - SmartPass Electrical Interface	Describes the electrical interface between DeltaV and the SmartPass Tag Reader. 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 SmartPass Tag Reader Driver:

Table 1: System Specifications

Firmware	SmartPass Driver Firmware (P1.0)
Protocol Compatibility	SmartPass Protocol as defined in the document listed below: <u>AI1620 SmartPass System Guide, Chap6 and 7</u>
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 PSIC Hardware PN: 12P0914X012 FRSI DeltaV M3, M5, MD or Series 2 MD Controller, Power Supply and 2 wide controller carrier FRSI 8 wide I/O card carrier SmartPass 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 SmartPass Tag Reader protocol before operation.

The RS-232 communication settings must be configured properly to ensure accurate communication between the PSIC and SmartPass devices. RS-422/485 may be used if the SmartPass devices support this electrical standard. Note that multi-dropped SmartPass devices are not supported at this time.

This driver functions as a master only. On power-up, the PSIC sends commands to the SmartPass device to configure it. These commands are:

1. Enter Command Mode;
2. Set Echo off;
3. Enter Data Inquiry Mode;
4. Enable Buffer Control Mode;
5. Set Reader ID;
6. Set Tag Translation On;
7. Set Time and Date Append off; and
8. Enter Data Mode.

The successful completion of these commands indicates that the PSIC is not initialized and ready for Tag data I/O.

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

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

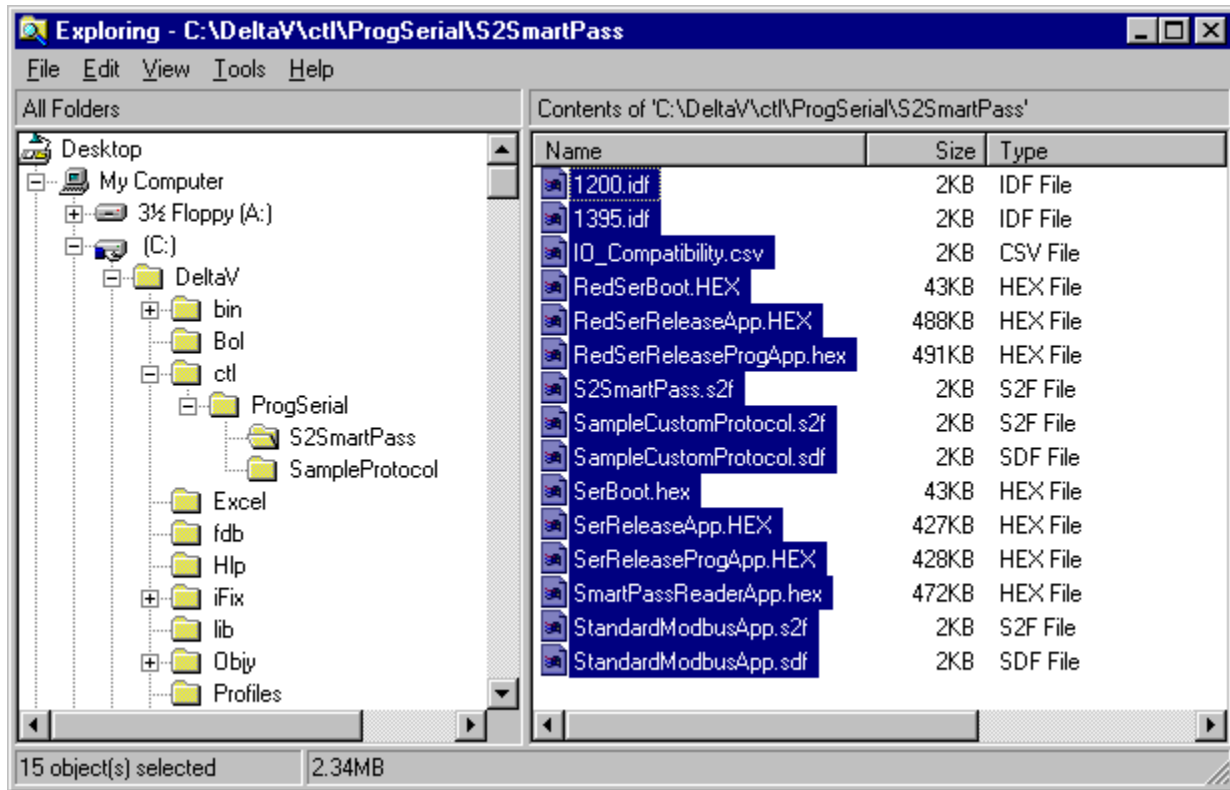


3 Downloading the firmware

The driver software comprises 15 files, distributed on a mini-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\S2SmartPass

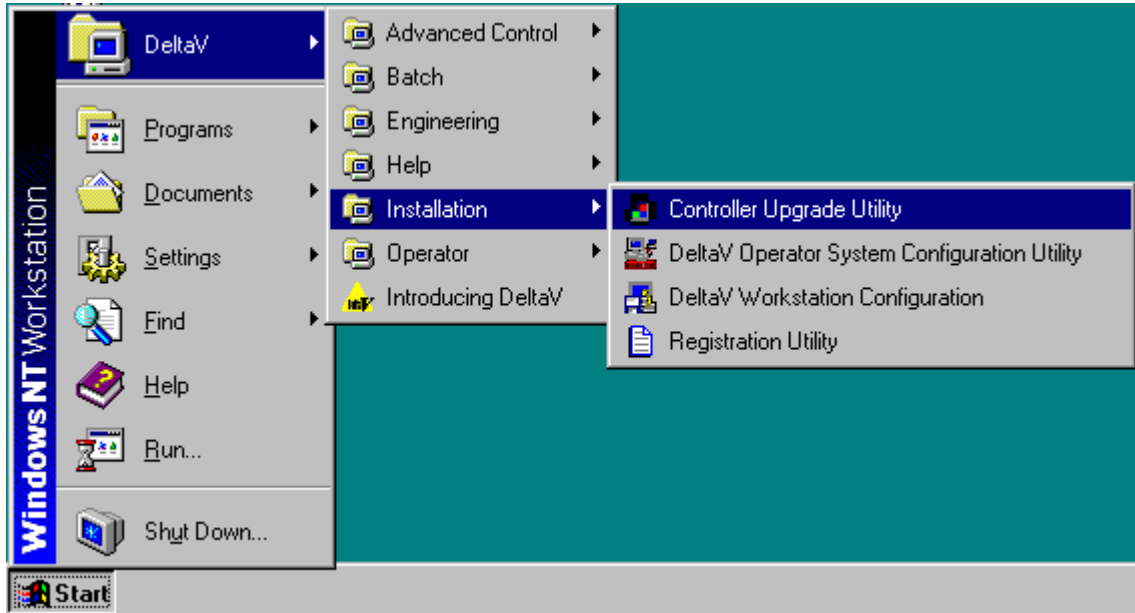
The following shows a completed copy operation:



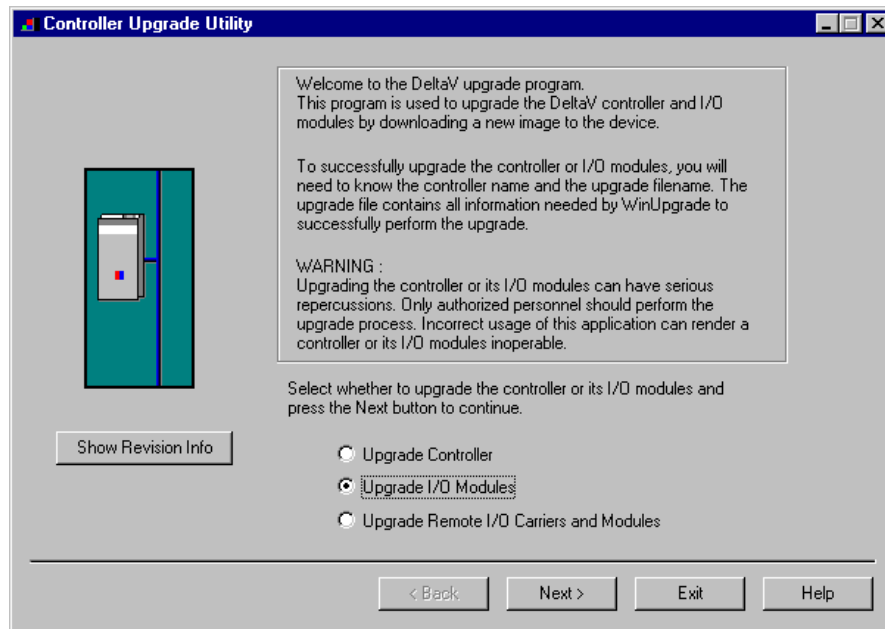
After copy completion, you are ready to program (or upgrade) the Programmable Serial Card with the supplied custom driver software. The steps are as follows:



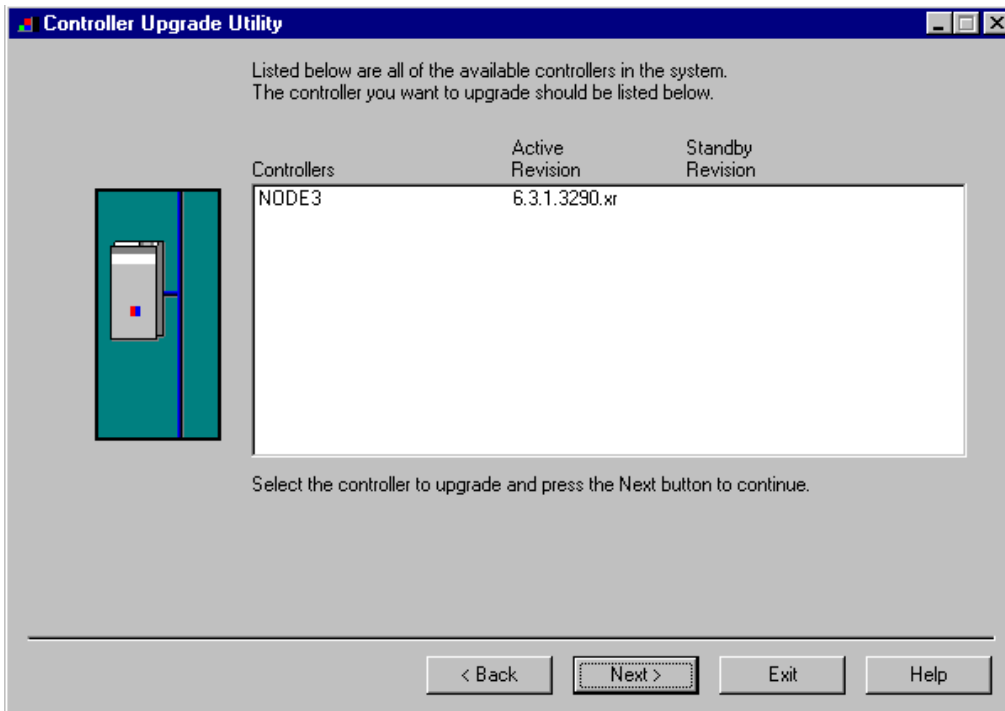
1. Click on the Start button and select DeltaV, Installation, Controller Upgrade Utility as shown below.



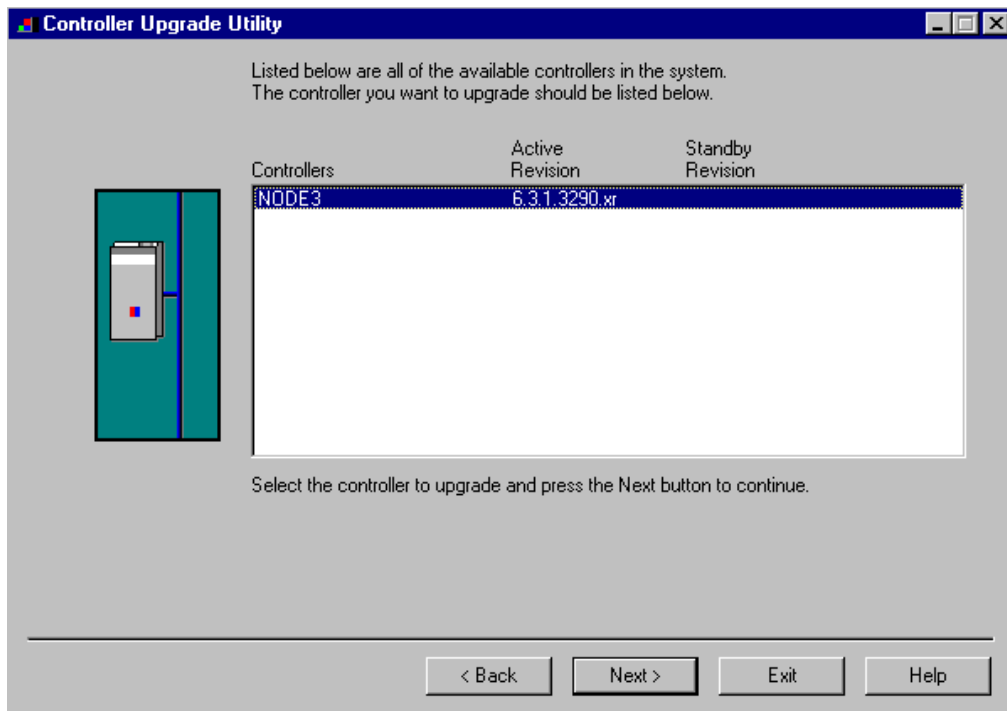
The following dialog will appear:



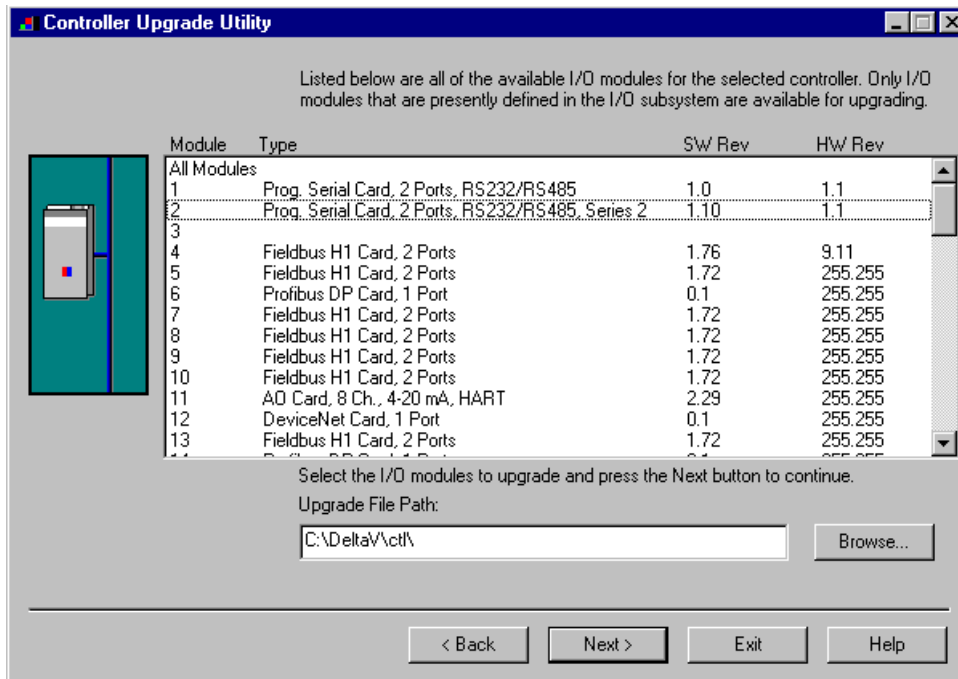
Click on the Upgrade I/O Modules radio button as shown, and then click Next.



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.

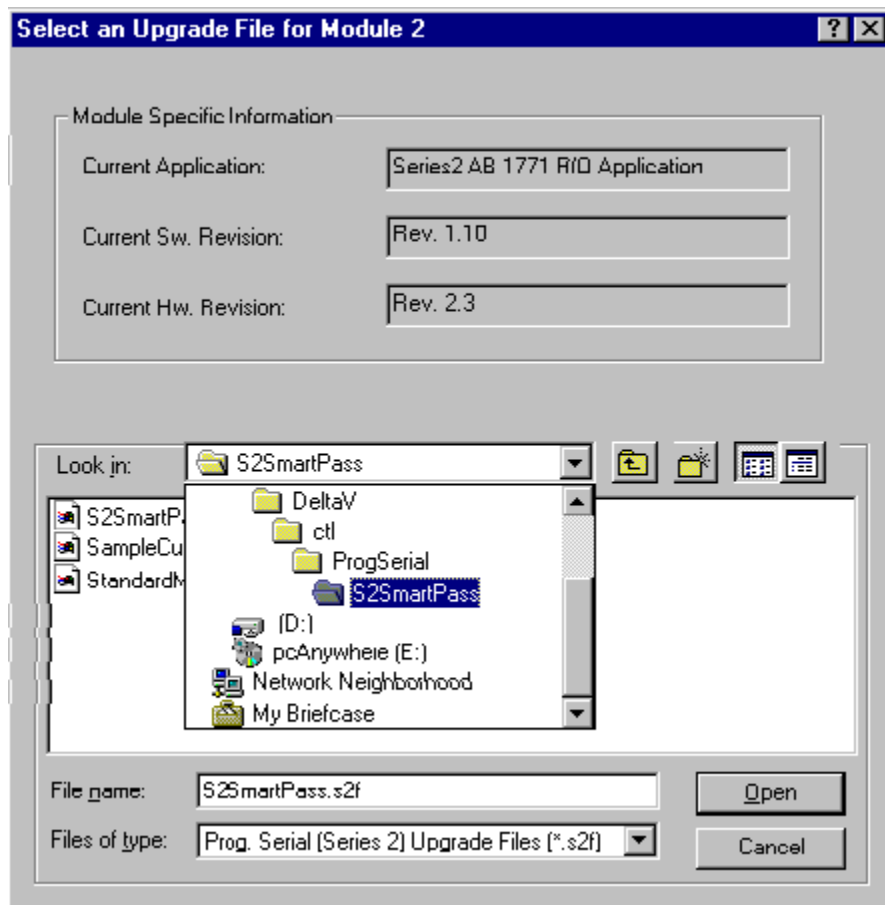


From this dialog, select the Programmable Serial Card I/O Module in the list. For example, we will select I/O Module 2. This will give you the following dialog, from which you will select the file path to where the driver software is located. This will be:

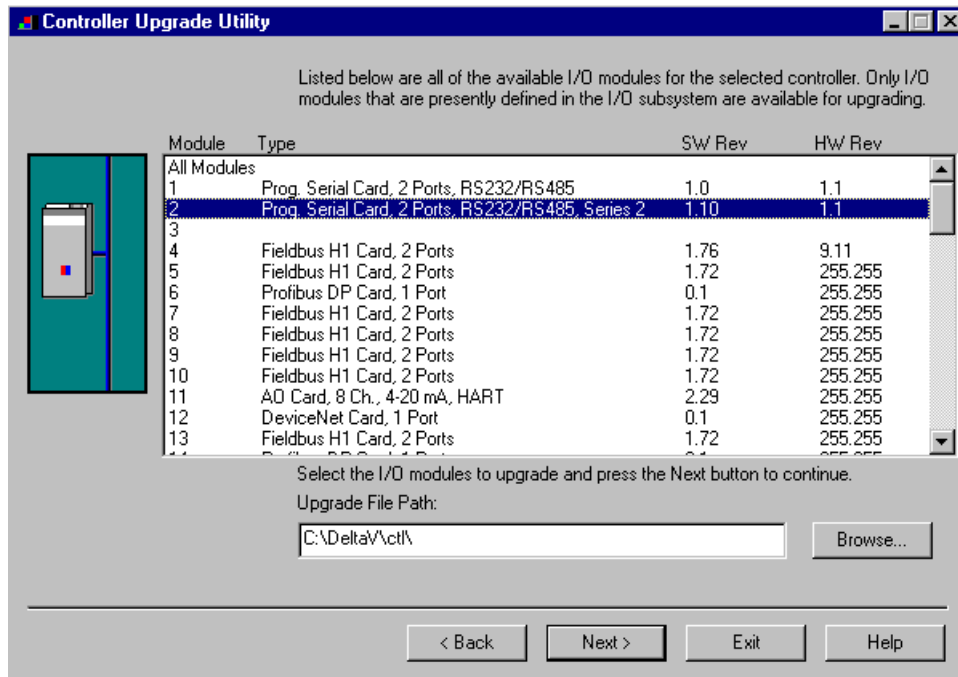
\\Delta\Vct\ProgSerial\S2Smartpass

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

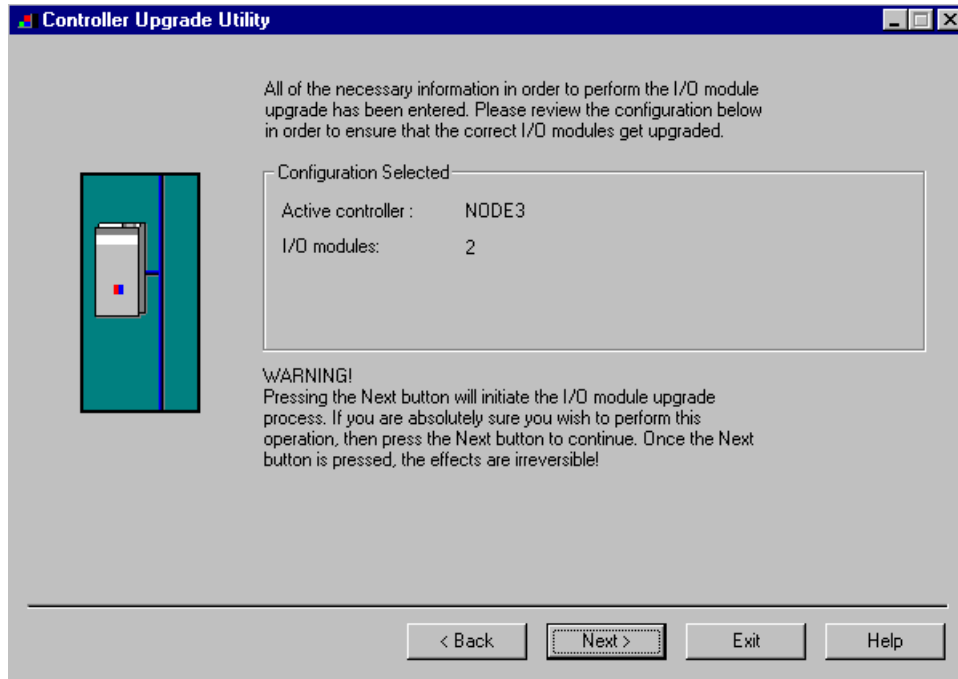
S2SmartPass.S2F



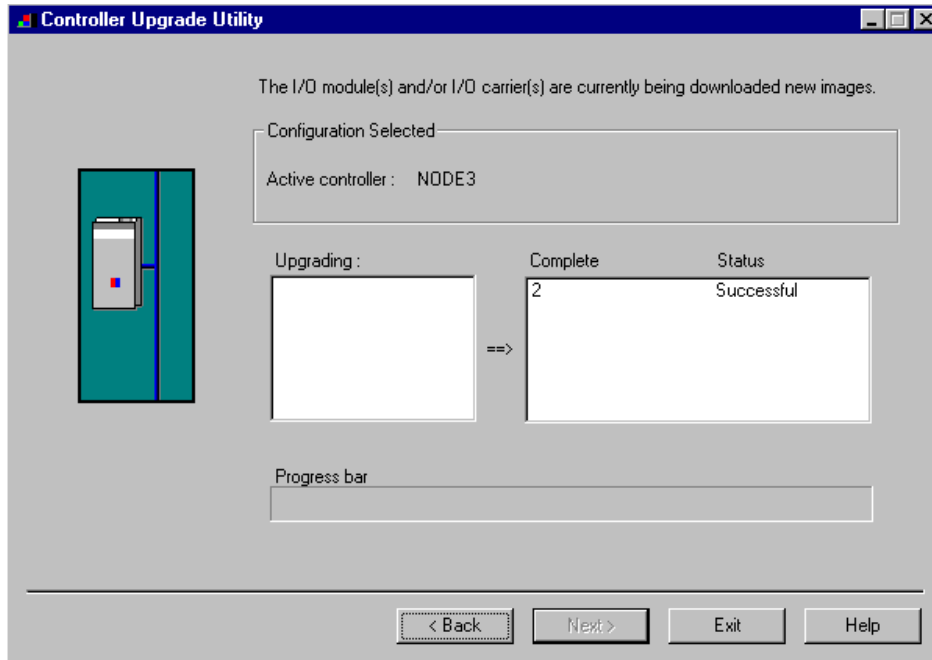
After selecting the .S2F file, Click on Open. This dialog will close and you will be back to the following:



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 and the SmartPass Tag Reader to obtain proper communication.

4.1 Device And Dataset Configuration

The following paragraphs discuss some attributes in the device and dataset configuration:

4.1.1 Device Address:

Configure the device address to uniquely identify a SmartPass Tag reader. When the PSIC sends a Set Id command to the attached Reader, this is the Id which will be sent.

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.

4.1.3 DeltaV Data Type:

Each SmartPass Tag Reader will use a minimum of 2 datasets. Dataset 1 will always be of type 8 bit UINT w/ status or 16 bit UINT w/Status. Datasets 2-16 will always be of type String w/Status.

4.1.4 DeviceDataType

Device Data Type should be configured as 0 for both datasets.

4.1.5 Data Start Address and Number of Values

The Data Start Address of all datasets will be 0.
The Number of Values for Dataset 1 will be 10. The number of values for all remaining datasets will be 100.



4.1.6 Special Data 1-5

Under the Special data tab, only Datasets 2-16 use the Special data 1 field.
The following values can be used:

Field Value	Usage
0	This value indicates that the dataset is used to read and store Tag information from the Reader. This is the default setting.
1	This value indicates that the dataset is used to read and store the Model information from the reader.
2	This value indicates that the dataset is used to read and store the configuration string from the reader.
3	This value indicates that the dataset is used to read and store the power fail bit information from the reader.
4	This value indicates that the dataset is used to read and store the Reader ID string from the reader.



4.2 Dataset Configuration Display

To have the Programmable Serial Card communicate with the Weigh Scale, follow these steps:

1. In DeltaV, configure the serial card. This will create a Programmable Serial Card and define 2 ports under it, P01 and P02. Do not select I/O Redundancy.

Add card [?] [X]

Object type: Card [OK]

Modified: -- [Cancel]

Modified by: --

Description:
SmartPass Tag Reader Interface

I/O Card

Card class :
Serial Cards

Card type :
2 Ports, Programmable, RS232/RS485

Card series :
Series 2

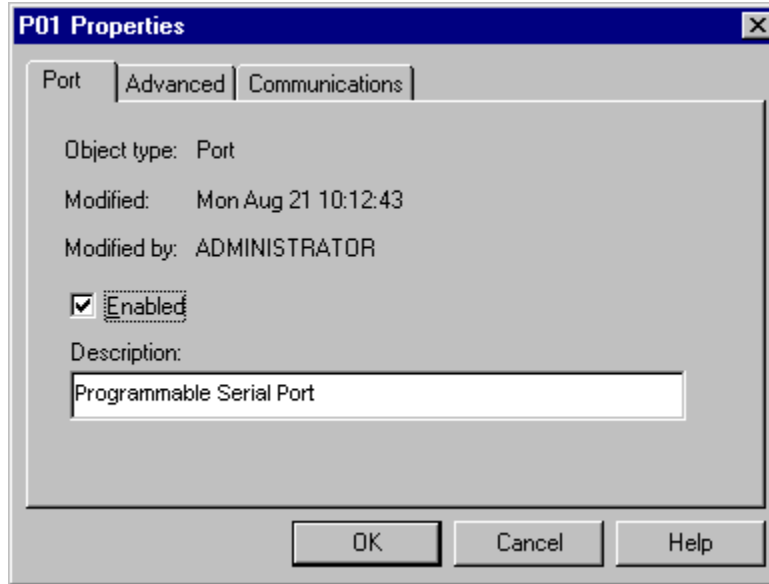
Features:
Basic Functionality
+ Redundancy

I/O Redundancy:
 Card is redundant

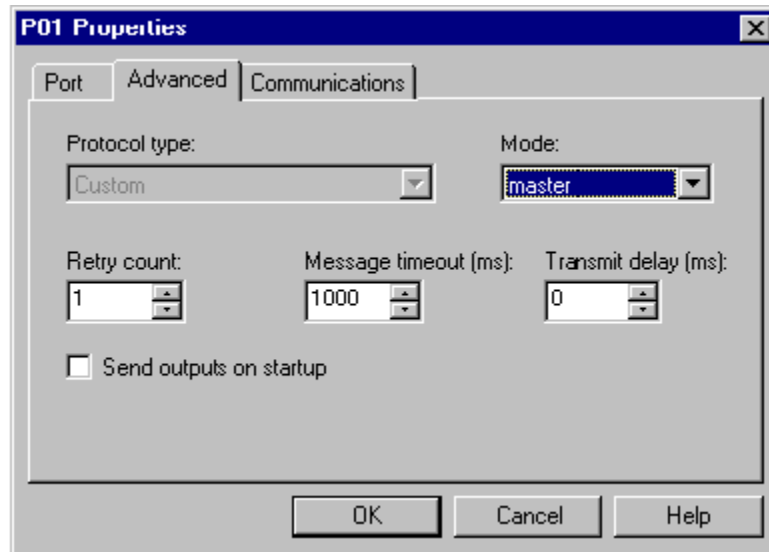
Slot position:
02



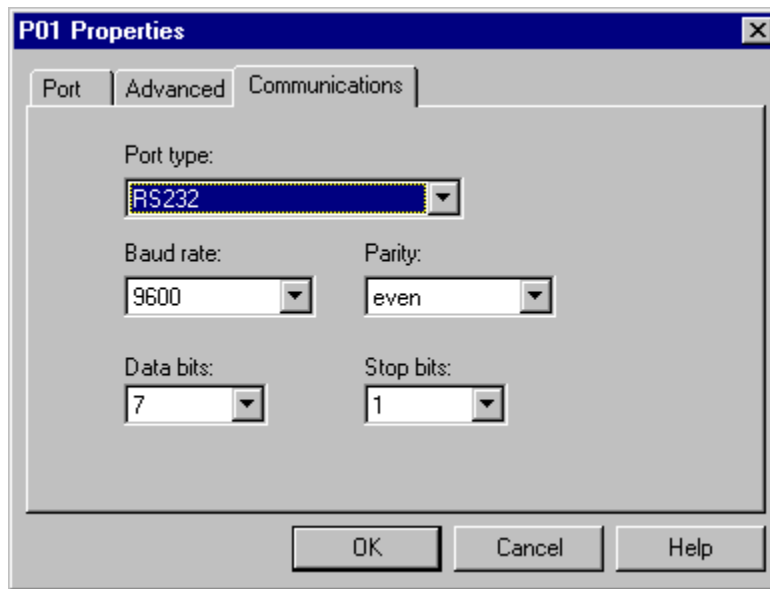
2. Right mouse click on Port 1. The following dialog will appear.



3. Click on the Enabled checkbox to enable the Port. Next select the Advanced tab. The following dialog will appear.

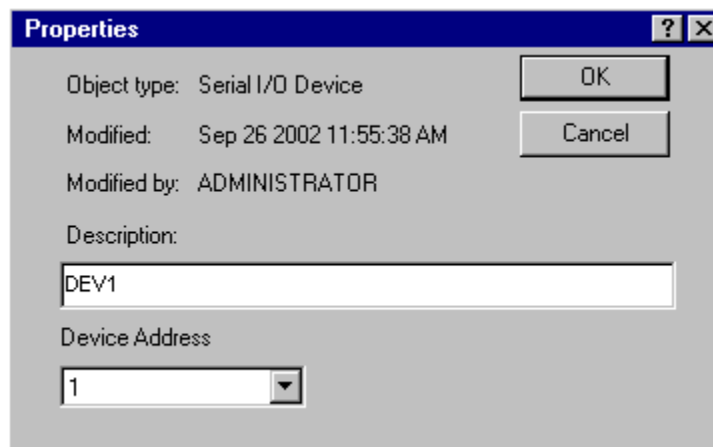


4. In this dialog, select communications parameters as shown. The DeltaV Serial port will be Master or Slave. In this example, the port is configured as Master. Next click the Communications tab. The following dialog will appear.



5. Specify the Port type. The Port type will be RS-232 or RS-422/485 depending on the Tag Reader. The Baud Rate, Parity, Data bits and Stop bits parameters must match the Tag Reader configuration. Select the appropriate parameters and then click OK

6. Configure a Serial Device under the Port by doing a Right Mouse click and selecting New Serial Device. The following dialog will appear:

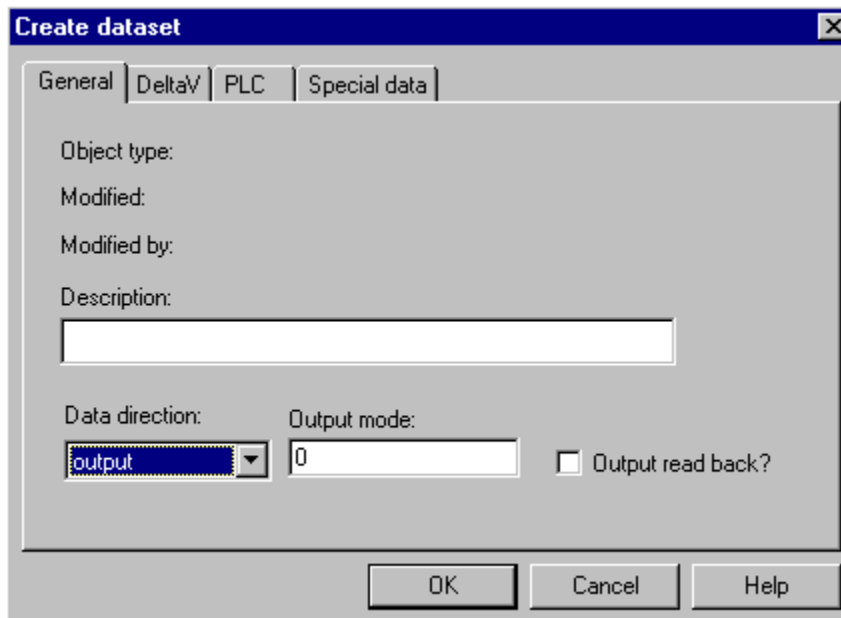


7. Specify the device address and description. Then click OK. This will add the serial device. Only one device per port is supported.

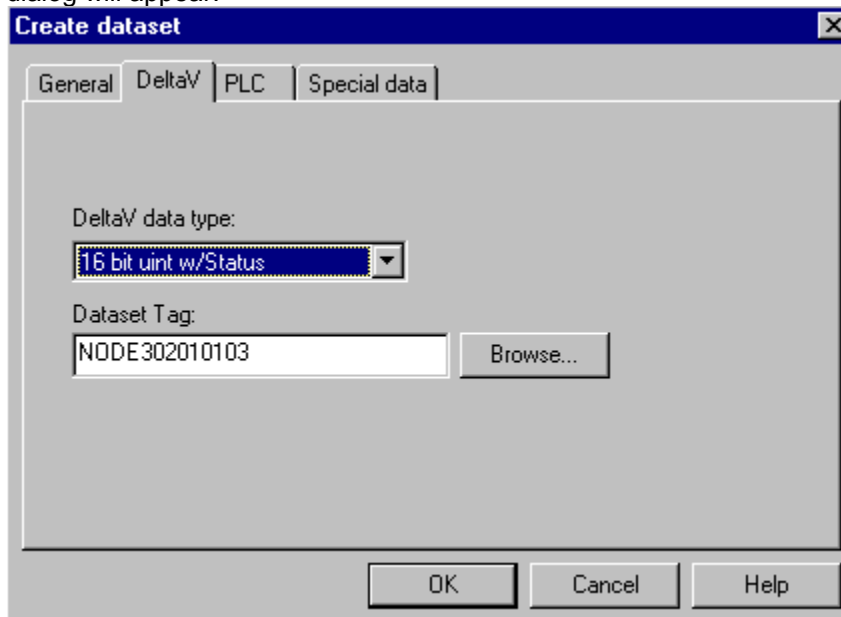


8. Next, configure datasets in the Serial Device. For this application, each device must have a minimum of 2 datasets.

To add a new dataset, right mouse click on the Serial Device and select New dataset. The following dialog will appear.



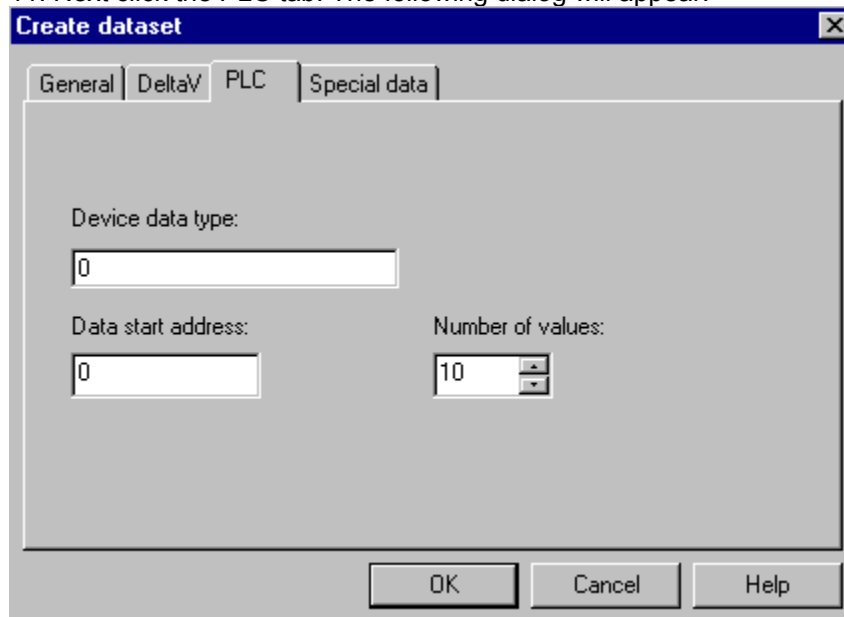
9. Configure the data direction to be output. Next click on the DeltaV tab. The following dialog will appear.



10. In this dialog, configure the data type needed for DeltaV. You can see the available types by clicking on the drop down list. Remember for this application, the dataset 1data type is 16 bit UINT.



11. Next click the PLC tab. The following dialog will appear.



Select the parameters as shown above.

For dataset 2, select the parameters as shown in the following 3 dialogs.





Create dataset

General | DeltaV | PLC | Special data

Device data type:

Data start address: Number of values:

OK Cancel Help

Create dataset

General | DeltaV | PLC | Special data

Special data 1

Special data 2

Special data 3

Special data 4

Special data 5

OK Cancel Help

The Special Data 1 field should be configured as described on Page 15.



4.3.1 Serial Driver Communications

This driver functions as a master only. On power-up, the PSIC sends commands to the SmartPass device to configure it. These commands are:

1. Enter Command Mode;
2. Enter ECP Mode;
3. Enable Buffer Control Mode;
4. Set Reader ID; and
5. Enter Data Mode

Once the SmartPass Reader is in Data Mode, the PSIC is considered to be initialized. At this time, the first batch of tags is read from the Reader. A batch may be one tag, or as many as 15 tags. This depends on the number of datasets configured with Special Data 1 as 0. After the first batch has been read, the PSIC will not read any more data. The next batch will be read only when the system (or user) writes a 1 into the command register. The command register is R1 in Dataset 1. The register usage of Dataset 1 is as follows:

Dataset 1 Assignments

Data Name	Assigned Register	Type
Command	R1	Read/Write
Time – Hour	R2	Write
Time – Minutes	R3	Write
Time – Seconds	R4	Write
Date – Month	R5	Write
Date – Month	R6	Write
Date – Month	R7	Write
Command Status	R10	Read

The following commands are supported.

Switch to Command Mode Commands

Command	Notes
Reader Cmd: 01 PSIC Cmd: 6	Switch to Command Mode. This allows the reader to accept commands from the DeltaV controller via PSIC. While in command mode no tag IDs will be transmitted. The IDs will be buffered for transmission upon DeltaV request.
Error 04	Reader message indicating buffer of IDs at 75%.
Error 02	Reader message indicating buffer of IDs at 100%.



Transmit Buffer Entry Commands

Command	Notes
Reader Cmd: 06 PSIC Cmd: 7	The 06 command allows the PSIC to begin receiving any buffered IDs
Done	Reader response when all buffered IDs have been transmitted.
Error	Reader response if buffer control mode not enabled.
Message	READER indicates IDs or reports exist in buffer.

Set Time Commands

Command	Notes
Reader Cmd: 20HH:MM:SS PSIC Cmd: 8	PSIC sets the time stamp for Reader where: HH = hours (00 to 23) MM = minutes (00 to 59) SS = seconds (00 to 59) Hundredths register set to zero.
Done	Reader response to request
Error	Reader response to request.

Set Date Commands

Command	Notes
Reader Cmd: 21MM/DD/YY PSIC Cmd: 9	PSIC sets the Date stamp for Reader where: MM = month (01 to 12) DD = day (01 to 31) YY = last two digits of year (00 to 99).
Done	Reader response to request
Error	Reader response to request.

Append Time and Date Selection Commands

Command	Notes
Reader Cmd: 30N PSIC Cmd: 10	PSIC requests that time and date be appended to tag ID data.
Done	Reader response to request
Error	Reader responds indicating that ID data exists in buffer and command will only be accepted when buffer is empty.



Transmit All ID Codes Commands

Command	Notes
Reader Cmd: 40 PSIC Cmd: 11	PSIC requests that all IDs be transmitted without regard for uniqueness. NOTE: This command is for diagnostic purposes only. The tag buffer must be empty before the Reader will accept this command.
Done	Reader response to request
Error	Reader responds indicating that ID data exists in buffer and command will only be accepted when buffer is empty.

Select Unique ID Code Criteria Commands

Command	Notes
Reader Cmd: 410N PSIC Cmd: 12	PSIC requests Reader to buffer and transmit ID codes according to the following test: an ID is buffered if, in the time interval since the new ID was last received, previously decoded IDs have changed value at least N+1 times, or the uniqueness timeout (2 min.) has occurred.
Done	Reader response to request

Buffer All ID Codes Commands

Command	Notes
Reader Cmd: 43 PSIC Cmd: 13	PSIC requests that all IDs be buffered without regard for uniqueness. NOTE: This command is for diagnostic purposes only.
Done	Reader response to request

Disable Tag Translation Mode Commands

Command	Notes
Reader Cmd: 452 PSIC Cmd: 14	PSIC requests that all incoming full-frame tags will be directly converted to ASCII. They will not be translated from AAR or ATA format.
Done	Reader response to request

Enable Tag Translation Mode Commands

Command	Notes
Reader Cmd: 453 PSIC Cmd 15	PSIC requests that all incoming full-frame tags will be translated from AAR or ATA format to ASCII. Reader will not attempt to translate data from half-frame or dual-frame tags.
Done	Reader response to request



Display Software Version Commands

Command	Notes
Reader Cmd: 505 PSIC Cmd: 16	PSIC requests the reader model number, software version information, and assigned serial number.
Model SP2-ACC Ver X.XXD SNYYYYYY	Reader response to request where: X.XXD is the version number YYYYYY is the serial number expressed in decimal digits (0-9) with the first two digits representing year.



4.4 Steps for User Commands

1. To send a command to the Reader, simply write the command number into DS1, R1.
2. The command execution will begin. The driver will determine if the command is valid. If an invalid command is found, the command register will be set to 0 and the command status will have the value 254.
3. If no errors are found, the driver will format the command and send it to the Reader.
4. If the command completes successfully, the command status will be set to 0 and the command register will be set to the command number plus 100.
5. If the Reader returns a Nak, the command status will be set to 255.



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 SmartPass 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 SmartPass 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 match the SmartPass 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 SmartPass Tag Reader and the PSIC. For input data, the values should be changed in the SmartPass 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 SmartPass 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 that 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 - SmartPass Electrical Interface

The electrical interface between DeltaV and the SmartPass devices conforms to the RS-232 protocol. The RS-232 cable connecting SmartPass and the DeltaV PSIC should not exceed 50 feet as specified by the EIA standard for RS-232 protocol. Section 6.1 shows the pin assignments for the PSIC serial terminal block for RS-232 protocol.

6.1 RS-232 Pin Assignments for DeltaV PSIC

Terminal Number	Signal Description
1	Port 1 - Isolated Ground (GND)
2	Unused
3	Port 1 - Transmit Data (TXD)
4	Unused
5	Port 1 - Receive Data (RXD)
6	Unused
7	Port 1 - Data Terminal Ready (DTR)
8	Port 1 - Dataset Ready (DSR)
9	Port 2 - Isolated Ground (GND)
10	Unused
11	Port 2 - Transmit Data (TXD)
12	Unused
13	Port 2 - Receive Data (RXD)
14	Unused
15	Port 2 - Data Terminal Ready (DTR)
16	Port 2 - Dataset Ready (DSR)

6.2 Wiring Connections for RS-232 Communications

Five terminals need to be connected between the PSIC and the SmartPass port. Pins 3 (TXD) and 5 (RXD) need to be crossed so that the SmartPass TXD is connected to PSIC RXD, and the SmartPass RXD is connected to PSIC TXD. Pins 7 (DTR) and 8 (DSR) also need to be crossed in the same manner between the PSIC and the SmartPass.



7 Technical Support

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

For Product functionality questions, ask for the people in the following order:

1. Nobin William
2. Martin Berutti

For Commercial issues, ask for people in the following order:

1. Martin Berutti
2. Jane Wagner

For all other driver and related questions, ask for Nobin William.

You can also send us your questions via e-mail. Our addresses are:
support@mynah.com

Thank you for using DeltaV.