



Allen-Bradley

PowerFlex™
Communications

Serial Converter Module

**22-SCM-232
FRN 1.xxx**

User Manual

**Rockwell
Automation**

Important User Information

Because of the variety of uses for the products described in this publication, those responsible for the application and use of this control equipment must satisfy themselves that all necessary steps have been taken to assure that each application and use meets all performance and safety requirements, including any applicable laws, regulations, codes and standards.

The illustrations, charts, sample programs and layout examples shown in this guide are intended solely for purposes of example. Since there are many variables and requirements associated with any particular installation, Allen-Bradley does not assume responsibility or liability (to include intellectual property liability) for actual use based upon the examples shown in this publication.

Allen-Bradley publication SGI-1.1, *Safety Guidelines for the Application, Installation and Maintenance of Solid-State Control* (available from your local Allen-Bradley office or online at <http://www.ab.com/manuals/gi>), describes some important differences between solid-state equipment and electromechanical devices that should be taken into consideration when applying products such as those described in this publication.

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Throughout this manual we use notes to make you aware of safety considerations:



ATTENTION: Identifies information about practices or circumstances that can lead to personal injury or death, property damage or economic loss.

Attention statements help you to:

- identify a hazard
- avoid a hazard
- recognize the consequences

Important: Identifies information that is critical for successful application and understanding of the product.



TIP: Identifies information that is helpful, but not necessary, in completing a task.

Summary of Changes

This is the first release of the 22-SCM-232 and manual. There are no changes.

Notes:

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About This Manual

Read this preface to become familiar with the rest of the manual.

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Related Documentation

For Information On:	Refer to:	Publication
DF1 Protocol	<i>DF1 Protocol and Command Set Reference manual</i>	1770-6.5.16
DriveExplorer™	<i>DriveExplorer Getting Results Manual</i> Online help (installed with the software)	9306-GR00 1B-EN-E
DriveTools 2000™	http://www.ab.com/drives/drivetools_2000	

Documentation can be obtained online at <http://www.ab.com/manuals>

Conventions Used in this Manual

The following conventions are used throughout this manual:

- Parameter names follow the format **Parameter xxx - [*]**. The xxx represents the parameter number. The * represents the parameter name. For example, **Parameter 01 - [Adapter Cfg]**.
- Menu commands are shown in bold type face and follow the format **Menu > Command**. For example, if you read “Select **File > Open**,” you should click the **File** menu and then click the **Open** command.
- The firmware release is displayed as FRN X.xxx. The “FRN” is the Firmware Release Number. The “X” represents the Major Release Number. The “xxx” represents the Minor Release Number.

Rockwell Automation Support

Rockwell Automation offers support services worldwide, with over 75 sales/support offices, over 500 authorized distributors, and over 250 authorized systems integrators located through the United States alone. In addition, Rockwell Automation representatives are in every major country in the world.

Local Support

Contact your local Rockwell Automation representative for:

- Sales and order support.
- Technical training.
- Warranty support.
- Support service agreements.

Technical Assistance

If you need to contact Rockwell Automation for technical assistance, please review the information in [Chapter 4, Troubleshooting](#) first. If you still have questions, then contact your local Rockwell Automation representative.

U.S. Allen-Bradley Drives Technical Support:

E-mail: support@drives.ra.rockwell.com

Tel: (1) 262.512.8176

Fax: (1) 262.512.2222

Online: <http://www.ab.com/support/abdrives>

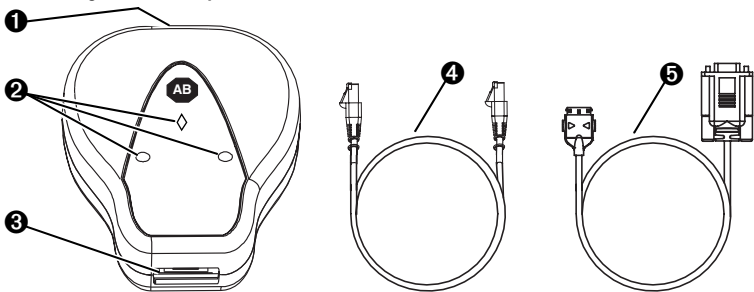
Getting Started

The 22-SCM-232 serial converter provides an electronic communications interface between a computer and any Allen-Bradley product implementing DSI. It uses the full-duplex, RS-232 DF1 protocol.

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Components

Figure 1.1 Components of the Serial Converter



#	Part	Description
❶	DSI Connection	Standard RJ45 connector. The 22-RJ45CBL-C20 cable is plugged into this connector.
❷	Status Indicators	LEDs that indicate module operation, data is being received from and sent to the computer. Refer to Chapter 4, Troubleshooting , for more information.
❸	RS-232 Serial Port	Locking low profile connector. The 1203-SFC serial cable is plugged into this connector.
❹	22-RJ45CBL-C20 Cable	DSI cable (2 m) with male-to-male RJ45 connectors.
❺	1203-SFC Serial Cable	Serial cable (2 m) with a locking low profile connector to connect to the serial converter and a 9-pin sub-miniature D female connector to connect to a computer.
Not Shown	DriveExplorer Lite CD-ROM	CD including DriveExplorer Lite software and documentation.

Features

Features of the serial converter include the following:

- Three status indicators (LEDs) report the operating status of the module.
- DF1 serial baud rates of 9600 bps, 19.2Kbps, and 38.4Kbps are supported. 9600 bps is the factory default.
- The serial converter can connect to products implementing DSI such as PowerFlex™ 4 drives.
- The serial converter receives power from the DSI host product. An outside power source is not needed.
- DriveExplorer (version 3.01 or higher), DriveTools 2000 (version 1.01 or higher), or terminal emulation software can be used to configure a serial converter.

Compatible Products

The serial converter can be used with Allen-Bradley products that implement DSI.

DSI products include the following:

Product

PowerFlex™ 4 Drive

Required Equipment

Equipment Shipped with the Serial Converter

When you unpack the serial converter, verify that the package includes:

- One DSI to RS-232 Serial converter
- One 1203-SFC serial cable
- One 22-RJ45CBL-C20 cable
- One DriveExplorer Lite CD
- This manual

User-Supplied Equipment

To configure the serial converter, you must use one of the following:

- DriveExplorer software
DSI products require DriveExplorer (version 3.01 or higher).
- DriveTools 2000 software (version 1.01 or higher).
- Terminal emulation software such as HyperTerminal.
- VT-100 compatible terminal.

Safety Precautions

Please read the following safety precautions carefully.



ATTENTION: Risk of injury or equipment damage exists. Only personnel familiar with drive and power products and the associated machinery should plan or implement the installation, start-up, configuration, and subsequent maintenance of the product using a serial converter. Failure to comply may result in injury and/or equipment damage.



ATTENTION: Risk of injury or equipment damage exists. If the serial converter is transmitting control I/O to the product (indicated by a solid green diamond LED), the product may fault when you remove or reset the serial converter. Determine how your product will respond before removing or resetting a connected serial converter.



ATTENTION: Risk of injury or equipment damage exists. **Parameter 04 - [Comm Flt Action]** lets you determine the action of the serial converter and connected product if DF1 serial communications are disrupted. By default, this parameter faults the product. You can set this parameter so that the product continues to run. Precautions should be taken to ensure that the setting of this parameter does not create a risk of injury or equipment damage.

Quick Start

This section is designed to help experienced users configure or set up the serial converter. If you are unsure how to complete a step, refer to the referenced chapter.

Step	Action	Refer to
1	Review the safety precautions for the serial converter.	Throughout This Manual
2	Install the serial converter. Connect a 22-RJ45CBL-C20 cable to the serial converter and the DSI Host. Then, connect a 1203-SFC serial cable to the serial converter and a computer. Make sure that power has been applied to the DSI Host.	Chapter 2, Installing the Serial Converter
3	Configure the serial converter parameters. Use one of the following to configure parameters in the serial converter: <ul style="list-style-type: none"> • DriveExplorer (v3.01 or higher) • DriveTools 2000 (v1.01 or higher) • Terminal emulation software • VT-100 compatible terminal 	Chapter 3, Configuring the Serial Converter

Figure 1.2 Example Serial Connection to a Personal Computer

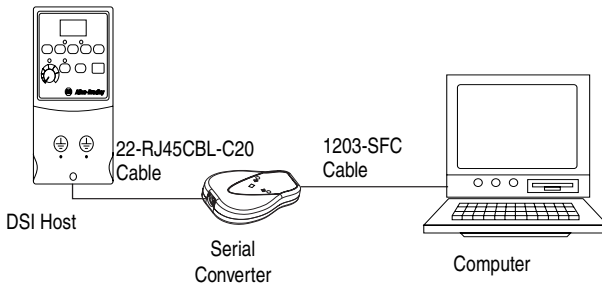
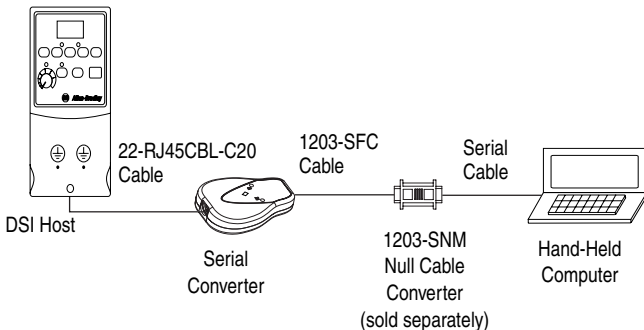
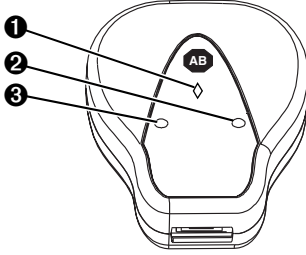


Figure 1.3 Example Serial Connection to a Hand-Held Computer



Modes of Operation

Figure 1.4 Status Indicators on the Serial Converter



The serial converter reports its status using status indicators (Figure 1.4). The following table describes the state of the status indicators under normal operation:

#	Status Indicator	State	Description
❶	Diamond	Flashing Green	Serial converter is connected to a product implementing DSI.
		Solid Green	Serial converter is or was receiving control I/O. Removing or resetting the serial converter may cause a serial fault in the product.
		Off	No power or Flash operation in progress.
❷	TX	Off	Not transmitting data.
		Flashing Green	Transmitting data.
❸	RX	Off	Not receiving data.
		Flashing Green	Receiving data.

If the diamond status indicator is red, there is a problem. Refer to [Chapter 4, Troubleshooting](#).

Installing the Serial Converter

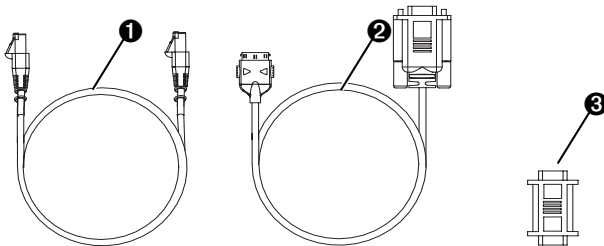
Chapter 2 provides instructions for installing and removing the serial converter.

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Removing the Serial Converter	2-3

Selecting Cables

The following cables are all you should need to connect the serial converter to a product and a computer.

Figure 2.1 Cables



Number	Description	Catalog Number
❶	DSI cable to connect the serial converter to a drive.	22-RJ45CBL-C20
❷	Serial cable to connect the serial converter to the computer.	1203-SFC
❸	If you are connecting the serial converter to an H/PC (Hand-Held PC), you must use a null modem cable with two male 9-pin sub-miniature D connectors. These must be purchased separately.	1203-SNM (sold separately)

Important: To provide proper termination of the serial cable shield, the chassis of the computer should be properly grounded. If it is not possible or practical to ground this, then a ground wire

should be connected to the serial cable shield at the shell of the 9-pin sub-miniature D connector.

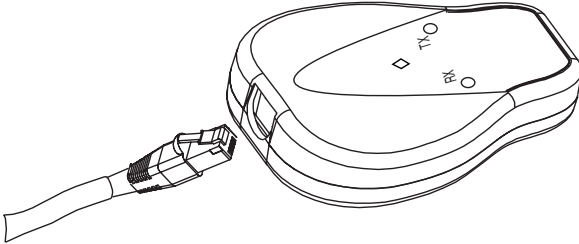
Important: The DSI cable shield must be properly grounded in order to provide EMC protection. On the PowerFlex 4 drive that means that Pin 16 of the drive control terminal block must be connected to the drive earth ground terminal.

Installing the Serial Converter

Important: Module **must not** be installed in an area where the ambient atmosphere contains volatile or corrosive gas, vapors or dust. If the module is not going to be installed for a period of time, it must be stored in an area where it will not be exposed to a corrosive atmosphere.

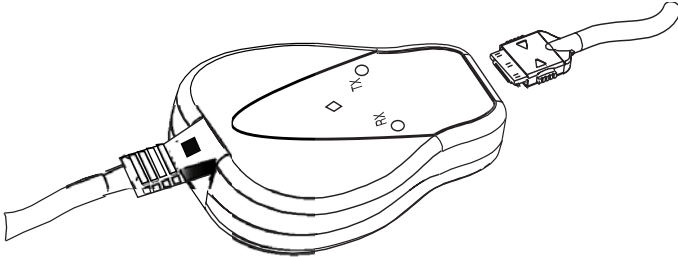
1. Connect the serial converter to the product using the 22-RJ45CBL-C20 cable.

Figure 2.2 Connecting a 22-RJ45CBL-C20 Cable to the Serial Converter



2. Connect the converter to the computer using the 1203-SFC cable.

Figure 2.3 Connecting a 1203-SFC Cable to the Serial Converter



3. Verify that power is applied to the DSI Host. The serial converter receives power from the DSI Host, so it must be powered before the serial converter will operate.

The diamond light on the serial converter flashes green to indicate that the serial converter is properly installed and receiving power. If it is not green, refer to [Chapter 4, Troubleshooting](#).

Removing the Serial Converter



ATTENTION: Risk of injury or equipment damage exists. If the serial converter is transmitting control I/O to the product (indicated by a solid green diamond LED), the product may fault when you remove or reset the serial converter. Determine how your product will respond before removing or resetting a connected serial converter.

-
1. Disconnect the 22-RJ45CBL-C20 cable from the DSI Host and then from the converter. To disconnect it, press on cable latch and then pull it out.
 2. Disconnect the 1203-SFC serial cable from the serial converter and then the computer.

Notes:

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Notes:

Configuring the Serial Converter

Chapter 3 provides information about configuring the serial converter.

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For a list of parameters, refer to [Appendix B, Serial Converter Parameters](#). For definitions of terms in this chapter, refer to the [Glossary](#).

Configuration Tools

The serial converter stores parameters and other information in its own Non-Volatile Storage (NVS). You must, therefore, access the serial converter to view and edit its parameters. The following table lists tools that you can use to access the serial converter and edit its parameters.

Tool	Refer To
DriveExplorer software (version 3.01 or higher)	page 3-2 in this manual
DriveTools 2000 software (version 1.01 or higher)	http://www.ab.com/drives/drivetools_2000
Terminal emulation software	page 3-3 in this manual
VT100-compatible terminal	Documentation for the terminal

Important: The RS-485 serial port on DSI products, such as PowerFlex 4 drives, does not need to be configured prior to using the serial converter. DSI communications are configured automatically.

Using DriveExplorer

With DriveExplorer software, you can edit parameters in both the serial converter and the connected DSI Host. On PowerFlex 4 drives (or other DSI products), you can also edit parameters in any of the attached peripherals. DriveExplorer Lite is shipped with the serial converter and is a free, limited-feature version of DriveExplorer.

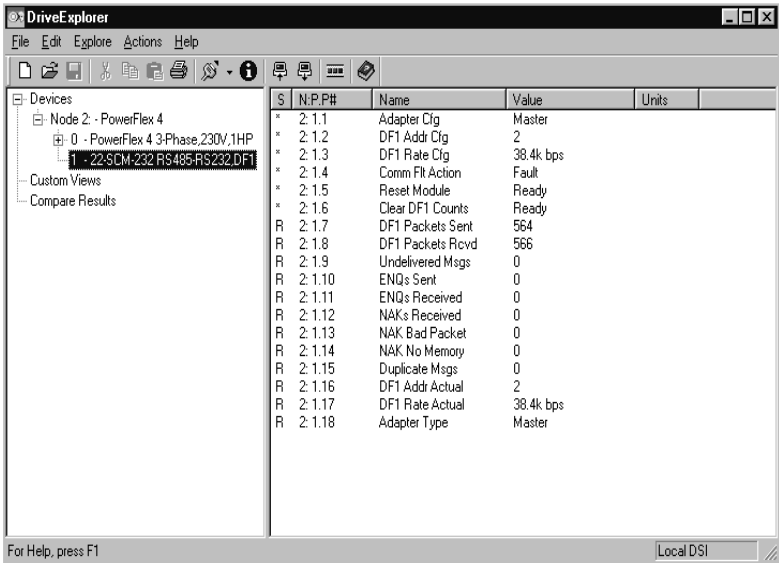
Important: Pr. 1 [Adapter Cfg] must be set to “Auto” (default) for DriveExplorer to operate. HyperTerminal can be used if Pr. 1 [Adapter Cfg] needs to be changed (See [Using Terminal Emulation Software](#)).

DriveExplorer Lite Quick Start

This section is designed to help users start using DriveExplorer Lite. If you are unsure how to complete a step, refer to the online help (select **Help > Help Topics**) or the *DriveExplorer Getting Results Manual*, Publication 9306-5.2, which is included on the CD.

Step	
1	Select Explore > Configure Communication . Select the communications port and baud rate that you are using. Select either checksum and accept the default time for the time-out.
2	Select Explore > Connect > Local . A node eventually appears under Devices.
3	In the left pane, click the + signs to expand the tree. Click the product or serial converter to display parameters in the right pane. Double-click a parameter to edit it.

Figure 3.1 DriveExplorer



Using Terminal Emulation Software

This section provides detailed instructions on how to use terminal emulation software to access the serial converter so that you can view and edit serial converter parameters or view the serial converter event queue.

A variety of terminal emulation programs can be used to establish a serial connection between a computer and the serial converter. The following instructions describe how to establish the initial serial connection to the serial converter using a computer running HyperTerminal—terminal emulation software provided with most Windows 95/98/NT 4.0/2000/XP operating systems.

Important: The following instructions use screen captures from Windows 95 HyperTerminal. If you are using a different operating system the screens may differ.

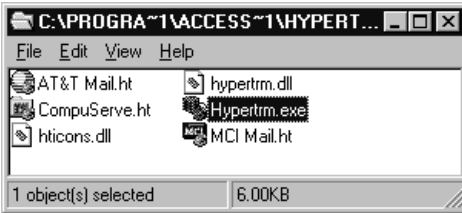
To use HyperTerminal to access the serial converter

1. Verify that the serial converter is installed correctly. Refer to [Chapter 2, Installing the Serial Converter](#).

- On the Windows 95 desktop, click the **Start** button, and then select **Programs > Accessories > HyperTerminal** to display the HyperTerminal dialog box (Refer to). Your dialog box may look slightly different.

On the Windows NT desktop, click the **Start** button, and then select **Programs > Accessories > HyperTerminal** to display the Connection dialog box (Refer to [Figure 3.2](#)). Then, go to step 4.

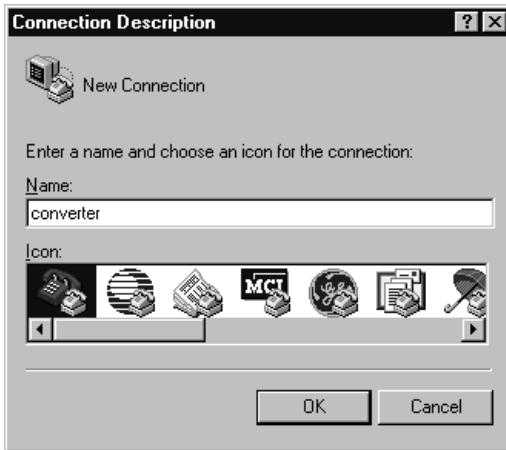
HyperTerminal Dialog Box in List View



- Double-click **Hypertrm.exe**.

The Connection Description dialog box appears in the HyperTerminal workspace.

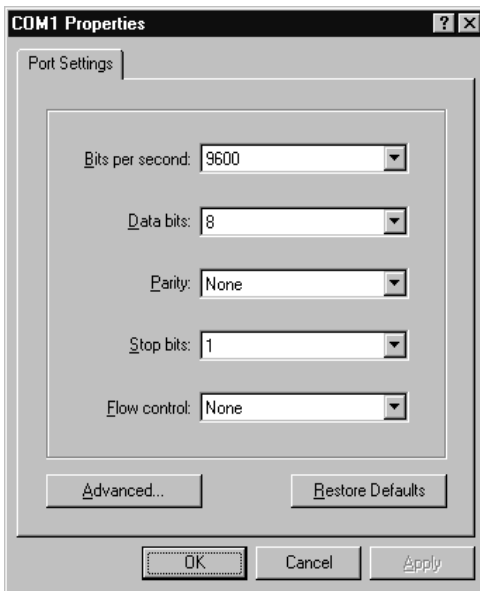
Figure 3.2 Connection Dialog Box



4. In the Name window, type any name (for example, converter), and then select any icon in the Icon box.
5. Click **OK** to display the Phone Number dialog box.
6. In the Connect Using window, select the communications port that you intend to use (usually COM1 or COM2).
7. Click **OK** to display the Properties dialog box.
8. Select the settings shown in [Figure 3.3](#).

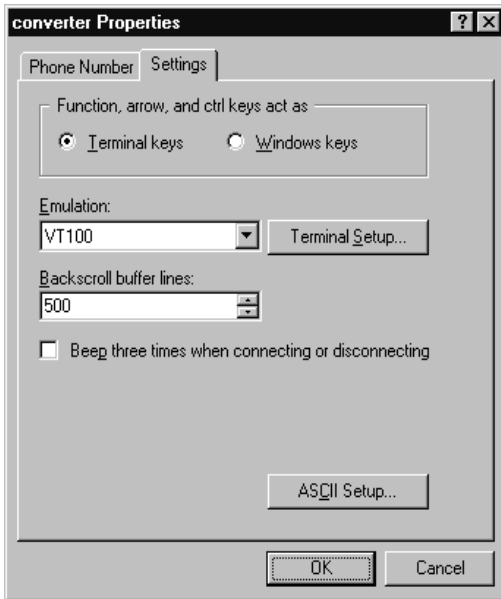
Important: If you have previously set **Parameter 03 - [DF1 Rate Cfg]** to 19.2K or 38.4K, select that value in the **Bits** per second window.

Figure 3.3 Properties Dialog Box



9. Click **OK**. A blank HyperTerminal workspace appears.
10. Select **File > Properties** to display the Properties dialog box.
11. Click the **Settings** tab. See [Figure 3.4](#).
12. Under Function, arrow, and ctrl keys act as, select **Terminal keys**.
13. In the Emulation window, select **VT100**.

Figure 3.4 Properties Dialog Box



14. Click **OK** to display the HyperTerminal workspace.



TIP: Select **File > Save** to save the HyperTerminal configuration that you just created. In future connections, you can select the saved configuration and quickly connect to the serial converter.

15. Press the **Enter** key until the main menu appears.

Figure 3.5 Main Menu

```

Main Menu - Enter Number for Selection
1> Display Setup Parameters
2> Display Event Queue
3> Flash Upgrade

```

What do you want to do?	Page
Edit the serial port rate, or fault action	3-7 through 3-9
View the event queue	4-3
View DF1 data	4-5
Update the firmware	C-1

If no text or meaningless text appears instead of the Main Menu, adjust the baud rate in your software. Refer to [Chapter 4, Troubleshooting Potential Problems](#) for detailed instructions.

To navigate in the terminal emulation software

Key	Description
<input type="text" value="0"/> .. <input type="text" value="9"/>	In the main menu, keys 1 – 3 select a menu option. In the parameter screen, keys 0 – 9 enter a value.
<input type="text" value="Esc"/>	Display the main menu or abort changes to a parameter.
<input type="text" value="↑"/> OR <input type="text" value="↓"/>	Scroll through parameters or events.
<input type="text" value="→"/> OR <input type="text" value="←"/>	Scroll through the values for a parameter.
<input type="text" value="Enter"/>	Save a value for a parameter.

Setting the RS-232 Serial Port Rate

The serial port rate, sometimes called baud rate or DF1 rate, is the speed at which the computer and serial converter communicate over RS-232. You can select a serial port rate of 9600, 19.2K, or 38.4K. The factory-default serial port rate is 9600.

Important: If you change the serial port rate in the serial converter, you must set your software to use the same serial port rate. The serial converter must be reset or power cycled before baud rate changes take affect.

To set the serial port rate

1. Set **Parameter 03 - [DF1 Rate Cfg]** to the desired rate.

Figure 3.6 DF1 Rate Cfg Parameter in HyperTerminal

Press the UP ARROW or DOWN ARROW key to scroll through the parameter list. Press the LEFT ARROW or RIGHT ARROW key to modify parameter values. Press the ENTER key to save a new value.

```
3> DF1 Rate Cfg = 9600
```

2. Reset the serial converter. Refer to [Resetting the Serial Converter](#) in this chapter.
3. Set the serial port rate in your software to match the new serial port rate in the serial converter.

Setting the Fault Action

By default, when DF1 serial communications are disrupted (e.g., a serial cable is disconnected) and control I/O is being transmitted, the serial converter and connected product respond by faulting. You can set the following actions:

Action	Description
Fault	The product will fault. (Default)
Stop	The product will stop and not fault (DSI host products only).
Zero data	The product is sent 0 for output data after a communications disruption. This does not command a stop.
Hold last	The product continues in its present state after a communications disruption.



ATTENTION: Risk of injury or equipment damage exists.

Parameter 04 - [Comm Flt Action] lets you determine the action of the serial converter and connected product if communications are disrupted. By default, this parameter faults the product. You can set this parameter so that the product continues to run. Precautions should be taken to ensure that the setting of this parameter does not create a risk of injury or equipment damage.

To change the fault action

- Set the value of **Parameter 04 - [Comm Flt Action]** to the desired fault action.

Figure 3.7 Comm Flt Action Parameter in HyperTerminal

Press the UP ARROW or DOWN ARROW key to scroll through the parameter list. Press the LEFT ARROW or RIGHT ARROW key to modify parameter values. Press the ENTER key to save a new value.

```
4> Comm Flt Action = Fault
```

Changes to this parameter take effect immediately. A reset is not required.

Resetting the Serial Converter

After you change some parameters, you must reset the serial converter for the new setting to take effect. You can reset it by removing and then reapplying power or by using **Parameter 05 - [Reset Module]**.



ATTENTION: Risk of injury or equipment damage exists. If the serial converter is transmitting control I/O to the product (indicated by a solid green diamond LED), the product may fault when you remove or reset the serial converter. Determine how your product will respond before removing or resetting a connected serial converter.

To reset the serial converter

- Set **Parameter 05 - [Reset Module]** to either **Reset Module** or **Set Defaults**. “Reset Module” will reset the serial converter. “Set Defaults” will set all parameters in the serial converter to their factory-default values.

Figure 3.8 Reset Module Parameter in HyperTerminal

Press the UP ARROW or DOWN ARROW key to scroll through the parameter list. Press the LEFT ARROW or RIGHT ARROW key to modify parameter values. Press the ENTER key to save a new value.

```
5> Reset Module = Reset Module
```

After you enter the “Reset Module” value, the serial converter will be reset. This parameter will then be reset to “Ready.”

Notes:

Troubleshooting

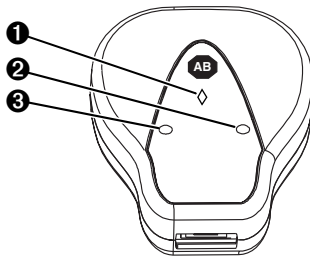
Chapter 4 provides information to troubleshoot the serial converter.

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Understanding the Status Indicators

The serial converter reports its status using status indicators. See [Figure 4.1](#).

Figure 4.1 Status Indicators on the Serial Converter



#	Status Indicator	Description	Refer To
❶	Diamond	Serial converter status	Diamond Status Indicator on page 4-2
❷	TX	Serial converter is transmitting data	TX Status Indicator on page 4-2
❸	RX	Serial converter is receiving data	RX Status Indicator on page 4-2

Diamond Status Indicator



ATTENTION: Risk of injury or equipment damage exists. If the serial converter is transmitting control I/O to the product (indicated by a solid green diamond LED), the product may fault when you remove or reset the serial converter. Determine how your product will respond before removing or resetting a serial converter.

Status	Cause	Corrective Action
Off	Serial converter is not powered or in Flash programming mode.	<ul style="list-style-type: none"> Securely connect cables. Apply power to the product. Wait while Flash is in progress.
Flashing Green	Serial converter is operating and not transmitting control I/O.	<ul style="list-style-type: none"> No Action. Removing or resetting the serial converter will not cause a serial fault in the product.
Solid Green	Serial converter is operating and is or was transmitting control I/O.	<ul style="list-style-type: none"> No Action. Removing or resetting the serial converter may cause a serial fault in the product.
Flashing Red	The product has not acknowledged the serial converter.	<ul style="list-style-type: none"> Securely connect cables. Make sure Pr. 1 [Adapter Cfg] is set to "Auto".
Solid Red	Link Failure.	<ul style="list-style-type: none"> Securely connect cables. Replace the cable. Cycle power to the product.
Orange		<ul style="list-style-type: none"> Contact Rockwell Automation Technical Support.

RX Status Indicator

Status	Cause	Corrective Action
Off	Serial converter is not receiving data.	<ul style="list-style-type: none"> Verify that data is being transmitted by the PC. Securely connect cables. Apply power to the product. Configure the computer software to use the same serial port rate as the serial converter.
Flashing Green	Serial converter is receiving data from the computer.	<ul style="list-style-type: none"> No action.

TX Status Indicator

Status	Cause	Corrective Action
Off	Serial converter is not transmitting data.	<ul style="list-style-type: none"> Verify that data is being transmitted. Securely connect cables. Apply power to the product.
Flashing Green	Serial converter is transmitting data to the computer.	<ul style="list-style-type: none"> No action.

Module Diagnostic Items

The following diagnostic items can be accessed using DriveExplorer (version 3.01 or higher).

No.	Name	Description
1	Field Flash Cnt	Number of Field Flashes Recorded.
2	Adapter Events	The number of events in the event queue.
3	Reference	Host's Reference Command.
4	Common Logic Cmd	Host's Common Logic Command.
5	Common Logic Sts	Host's Common Logic Status.
6	Feedback	Host's Feedback Status.

Viewing and Clearing the Event Queue

It is normal for the event queue in the serial converter to contain events. If you encounter unexpected communication problems, you can access the event queue and view the most recent events.

To view the event queue

1. Access the event queue using a configuration tool. Refer to [Configuration Tools](#) in [Chapter 3](#).
2. Scroll through events in the event queue. The most recent event can be found at **2R > Event Queue 1**. The “R” stands for Read Only.

Figure 4.2 Example Event Queue in HyperTerminal

```
Press the UP ARROW or DOWN ARROW key to scroll
through the parameter list. Press the LEFT ARROW or
RIGHT ARROW key to modify parameter values. Press
the ENTER key to save a new value.
```

```
2R> Event Queue 1 = Normal Startup
```

Events

Many events in the Event queue occur under normal operation. If you encounter unexpected communications problems, the events may help you or Allen-Bradley personnel troubleshoot the problem. The following events may appear in the event queue:

Table 4.1 DSI Mode

Events	Description
No Event	F0 – No Event Present
Adapter Reset	F1 – Adapter Entered Reset Condition
Slave Detected	F2 – Slave was Detected to be Present by Master
Slave Removed	F3 – Slave was Detected to be Removed by Master
Host Timeout	F4 – Timeout Condition on Msg to Host
Slave Timeout	F5 – Timeout Condition on Msg to Slave
Master Timeout	F6 – Timeout Condition on Msg to Master
Serial Timeout	F7 – Timeout on Serial 232 side (w/Control Enabled)
Control Enabled	F8 – Control Enabled to Host
Control Disabled	F9 – Control Disabled to Host
EEPROM Sum Fit	F10 – Checksum on EEPROM Issue

To clear the event queue

1. Access the event queue using a configuration tool. Refer to [Configuration Tools](#) in [Chapter 3](#).
2. Set the value of **1 > Clr Event Queue** to **Enable**, and then press **Enter** to clear the event queue.

Figure 4.3 Reset Event Queue in HyperTerminal

Press the UP ARROW or DOWN ARROW key to scroll through the parameter list. Press the LEFT ARROW or RIGHT ARROW key to modify parameter values. Press the ENTER key to save a new value.

```
1> Clr Event Queue = Enable
```

Viewing and Clearing DF1 Communication Statistics

If you encounter unexpected communications problems or are creating an application that uses DF1 data, you can view the communications statistics in the serial converter. Parameters 06 through 17 store this data.

In order to view and clear DF1 data, you must access the main menu in the serial converter firmware. Refer to [Configuration Tools](#) in [Chapter 3](#).

To view DF1 data

1. Access the parameters in the serial converter using a configuration tool. Refer to [Configuration Tools](#) in [Chapter 3](#).
2. Scroll through the DF1 parameters. Parameters 06 through 17 contain DF1 data. For a description of each parameter, refer to [Appendix B, Serial Converter Parameters](#).

Figure 4.4 Example Parameter Display in HyperTerminal

```
Press the UP ARROW or DOWN ARROW key to scroll
through the parameter list. Press the LEFT ARROW or
RIGHT ARROW key to modify parameter values. Press
the ENTER key to save a new value.
```

```
7R> DF1 Packets Sent = 0
```

To clear DF1 counters

1. Access the parameters in the serial converter using a configuration tool. Refer to [Configuration Tools](#) in [Chapter 3](#).
2. Set the value of **Parameter 06 - [Clear DF1 Counts]** to **Clear Counts**, and then press **Enter** to clear the DF1 data.

Figure 4.5 Example Parameter Display in HyperTerminal

```
Press the UP ARROW or DOWN ARROW key to scroll
through the parameter list. Press the LEFT ARROW or
RIGHT ARROW key to modify parameter values. Press
the ENTER key to save a new value.
```

```
6> Clear DF1 Counts = Clear Counts
```

Troubleshooting Potential Problems

Description	Action
You are unable to establish a connection between your computer and the serial converter.	<ul style="list-style-type: none"> • If the status indicators are off, connect the cables and apply power to the product. • Configure your software and serial converter to use the same COMM port and serial port rate (baud rate).
After changing the serial port rate, you are no longer able to communicate with the serial converter and connected product. For example, in HyperTerminal, meaningless text appears on the screen when you press Enter. In DriveExplorer, parameter values are not updated.	<p>Reset the serial port rate in the software. Instructions are included here for resetting the serial port rate in HyperTerminal and DriveExplorer. If you are using a different configuration tool, refer to its user manual.</p> <p>HyperTerminal</p> <ol style="list-style-type: none"> 1. Select File > Properties, and then click Configure. 2. Select the new baud rate, and then click OK. 3. Save and close HyperTerminal. 4. Double-click on your HyperTerminal file (*.ht) to restart HyperTerminal. 5. Press Enter until the main menu appears. <p>DriveExplorer</p> <ol style="list-style-type: none"> 1. Select Explore > Configure Communication. 2. Select the new baud rate. DriveExplorer should start updating values again. If it does not, restart DriveExplorer.
You set a new serial port rate, but the serial converter is still using the old serial port rate.	<ul style="list-style-type: none"> • Reset the adapter. Refer to Chapter 3, Configuring the Serial Converter.
No communications to drive.	<ul style="list-style-type: none"> • Verify cable connections • Make sure Pr. 1 [Adapter Cfg] is set to "Auto".

Notes:

Notes:

Specifications

Appendix A provides the specifications for the serial converter.

Topic	Page
Communications	A-1
Electrical	A-1
Mechanical	A-1

Topic	Page
Environmental	A-2
Regulatory Compliance	A-2

Communications

RS-232 side	
Protocol	RS-232 Serial DF1, Full Duplex
Port Rate	9600, 19.2K, or 38.4K
Data Bits	8
Parity	None
Stop Bits	1
Flow Control	None
Error	CRC or BCC (Auto-Detected)
DSI Host side	
Protocol	Drive Serial Interface (DSI)
Data Rates	19.2K

Electrical

Consumption	170mA at + 5V DC The serial converter draws the required power from the connected product. An external power source is not required.
-------------	---

Mechanical

Dimensions	103.5 x 73.4 x 23.6 mm (4.08 x 2.89 x 0.93 in.)
Weight	70.88 g (2.5 oz.)

Environmental

Temperature Operating	0 to +50°C (32 to 122°F)
Storage	-40 to +85°C (-40 to 185°F)
Relative Humidity	5 to 95% non-condensing
Atmosphere	Important: Module must not be installed in an area where the ambient atmosphere contains volatile or corrosive gas, vapors or dust. If the module is not going to be installed for a period of time, it must be stored in an area where it will not be exposed to a corrosive atmosphere.
Vibration Operating	2.5G @5Hz-2KHz
Non-Operating	5G @5Hz-2KHz
Shock Operating	30 G peak acceleration, 11(+/-1)ms pulse width
Non-Operating	50 G peak acceleration, 11(+/-1)ms pulse width

Regulatory Compliance


UL	508C and CUL
CE	EN61800-3
CTick	AS/NZS 2064, Group 1, Class A


Important: In order for this product to be CE and CTick compliant, the shield of the serial cable and DSI cable must be terminated as described on [Page 2-2](#).

Serial Converter Parameters

This chapter presents information about the parameters in the serial converter.

Parameter List

No.	Name and Description	Details
01	<p>[Adapter Cfg] Operation of Adapter on DSI. Leave at "Auto" (setting). "Master" and "Slave" settings are for a future enhancement.</p> <p>Important: Pr. 1 [Adapter Cfg] must be set to "Auto" (default) for DriveExplorer to operate. HyperTerminal can be used if Pr. 1 [Adapter Cfg] needs to be changed (See Using Terminal Emulation Software).</p>	<p>Default: 0 = Auto Values: 0 = Auto 1 = Master 2 = Slave</p>
02	<p>[DF1 Addr Cfg] DF1 node address for the serial converter. This is a decimal value.</p>	<p>Default: 1 Minimum: 0 Maximum: 254 Type: Read/Write Reset Required: Yes</p>
03	<p>[DF1 Rate Cfg] Serial port rate for the RS-232 DF1 serial port on the serial converter.</p> <p>Important: If you change the serial port rate in the serial converter, you must set your software to use the same serial port rate. The serial converter must be reset or power cycled before baud rate changes take affect.</p>	<p>Default: 0 = 9600 Values: 0 = 9600 1 = 19.2K 2 = 38.4K Type: Read/Write Reset Required: Yes</p>
04	<p>[Comm Fit Action] Action that the serial converter and product take if the serial converter detects that DF1 serial communications are disrupted. This setting is effective only if control I/O is transmitted through the serial converter.</p>	<p>Default: 0 = Fault Values: 0 = Fault 1 = Stop 2 = Zero Data 3 = Hold Last Type: Read/Write Reset Required: No</p>
 <p>ATTENTION: Risk of injury or equipment damage exists. Parameter 04 - [Comm Fit Action] lets you determine the action of the serial converter and connected product if communications are disrupted. By default, this parameter faults the product. You can set this parameter so that the product continues to run. Precautions should be taken to ensure that the setting of this parameter does not create a risk of injury or equipment damage.</p>		

No.	Name and Description	Details
05	<p>[Reset Module] Ready No action. Reset Module Resets the serial converter. Set Defaults Restores the serial converter to its factory-default settings.</p> <p>This parameter is a command. It will be set to "Ready" after a "Reset Module" command or "Set Defaults" command has been performed.</p>	<p>Default: 0 = Ready Values: 0 = Ready 1 = Reset</p> <p>Module 2 = Set</p> <p>Defaults Type: Read/Write</p>
<p> ATTENTION: Risk of injury or equipment damage exists. If the serial converter is transmitting control I/O to the product (indicated by a solid green diamond LED), the product may fault when you remove or reset the serial converter. Determine how your product will respond before removing or resetting a connected serial converter.</p>		
06	<p>[Clear DF1 Counts] No action if set to "Ready" Resets the DF1 statistical parameters (numbers 07 – 15) to 0 if set to "Clear Counts." This parameter is a command. It will be reset to "0 = Ready" after a "Clear Counts" command has been performed.</p>	<p>Default: 0 = Ready Values: 0 = Ready 1 = Clear</p> <p>Counts Type: Read/Write Reset Required: No</p>
07	<p>[DF1 Packets Sent] Number of DF1 packets sent by the serial converter. The value of this parameter is normally approximately equal to the value of Parameter 08 - [DF1 Packets Rcvd].</p>	<p>Default: 0 Minimum: 0 Maximum: 4294967295 Type: Read Only</p>
08	<p>[DF1 Packets Rcvd] Number of DF1 packets received by the serial converter. The value of this parameter is normally approximately equal to the value of Parameter 07 - [DF1 Packets Sent].</p>	<p>Default: 0 Minimum: 0 Maximum: 4294967295 Type: Read Only</p>
09	<p>[Undelivered Msgs]⁽¹⁾ Number of DF1 messages that were sent but not acknowledged.</p>	<p>Default: 0 Minimum: 0 Maximum: 65535 Type: Read Only</p>
10	<p>[ENQs Sent]⁽¹⁾ Number of ENQ characters sent by the serial converter.</p>	<p>Default: 0 Minimum: 0 Maximum: 65535 Type: Read Only</p>
11	<p>[ENQs Received]⁽¹⁾ Number of ENQ characters received by the serial converter.</p>	<p>Default: 0 Minimum: 0 Maximum: 65535 Type: Read Only</p>
12	<p>[NAKs Received]⁽¹⁾ Number of NAK characters received by the serial converter.</p>	<p>Default: 0 Minimum: 0 Maximum: 65535 Type: Read Only</p>
13	<p>[NAK Bad Packet]⁽¹⁾ Number of NAKs sent by the serial converter because of corrupt packets (improper protocol messages) as determined by the serial converter.</p>	<p>Default: 0 Minimum: 0 Maximum: 65535 Type: Read Only</p>

(1) This value is normally a low value. If it is continually incrementing and you are having communications problems, use a lower baud rate or replace the 1203-SFC serial cable.

No.	Name and Description	Details
14	[NAK No Memory]⁽¹⁾ Number of NAKs sent by the serial converter because it did not have sufficient memory to buffer the incoming messages. The serial converter runs out of memory if a command has not completed and there is no place to save the new commands.	Default: 0 Minimum: 0 Maximum: 65535 Type: Read Only
15	[Duplicate Msgs]⁽¹⁾ Number of duplicate messages sent to the serial converter. This value contains the total number of consecutive messages received by this device with the same TNS (Transaction Sequence) number.	Default: 0 Minimum: 0 Maximum: 65535 Type: Read Only
16	[DF1 Addr Actual] DF1 address actually used by the serial converter.	Default: 1 Minimum: 0 Maximum: 254 Type: Read Only
17	[DF1 Rate Actual] Serial port rate actually used for the DF1 serial port on the serial converter.	Default: 0 = 9600 Values: 0 = 9600 1 = 19.2K 2 = 38.4K Type: Read Only
18	[Adapter Type] Present Mode of Operation	Default: 0 = Master Values: 0 = Master 1 = Slave

⁽¹⁾ This value is normally a low value. If it is continually incrementing and you are having communications problems, use a lower baud rate or replace the 1203-SFC serial cable.

Notes:

Flash Updates

Appendix C provides information on updating peripheral product firmware.

Topic	Page
Preparing for a Flash Update	C-1
Performing a Flash Update with HyperTerminal	C-2
Troubleshooting Potential Flash Problems	C-4

Preparing for a Flash Update

Please take the following precautions to ensure a successful Flash:

- Obtain the new firmware version from Rockwell Automation. Save it to the hard drive of the computer. Do not attempt to perform a Flash from a floppy disk or a network.
- Read all instructions supplied with the new firmware file.
- Use a computer running terminal emulation software that supports Xmodem transfers (e.g., HyperTerminal). In this manual, we show how to use HyperTerminal.
- Record parameter values in the device that will be flashed. Updates may reset parameters to their default settings.
- Ensure that the DSI host product (i.e., PowerFlex 4) is stopped.
- Close all programs except the terminal emulation program that you are using to Flash the serial converter.
- If you are using a laptop computer, turn off the FIFO buffers in HyperTerminal. In HyperTerminal, select **File > Properties** to display the Properties dialog box. Click **Configure**, and then click **Advanced**. Ensure that a check mark does not appear next to Use FIFO buffers.

Performing a Flash Update with HyperTerminal

1. In the main menu ([Figure 3.5](#)), press **3** to Update Flash program.

The screen in [Figure C.1](#) will immediately appear.

Figure C.1 Flash Menu

To update the Flash memory, you need a terminal program capable of downloading a binary file using the XMODEM protocol and a Flash update file from Rockwell Automation. When you press 'Y' to signal that you are ready to proceed, the terminal program will start displaying the letter 'C'. This signals the XMODEM protocol that the download may proceed. You then have one minute to start the transfer. Press CTRL-X to cancel an update started by mistake. Are you ready to proceed? (Y/N)



ATTENTION: Risk of injury or equipment damage exists. When you perform a Flash update, the product will fault if it is receiving control I/O from the serial converter. Verify that the product has stopped safely or is receiving control I/O from an alternate source before beginning a Flash update.

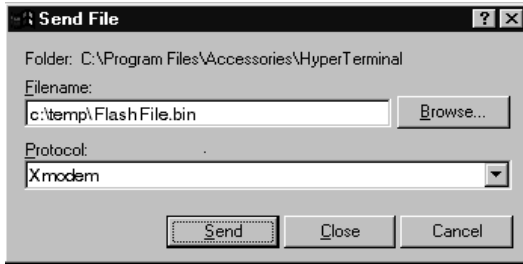


ATTENTION: Risk of equipment damage exists. If you interrupt a flash procedure that is updating boot code, the device may become inoperable. To prevent this damage, follow the instructions provided with the new firmware file and do not interrupt a flash procedure while boot code is being flashed.

2. If the Flash can be completed safely, type **Y**. The letter “C” repeatedly appears. It is the Xmodem prompt and continues to appear until you send a binary file.

Important: Press Ctrl + X to cancel a Flash update procedure.

3. Select **Transfer > Send File** to display the send file dialog box.
4. Click **Browse** and navigate to the Flash file.
5. Double-click the file. Its name appears in the Filename box.
6. In the Protocol box, select Xmodem.

Figure 4.6 Example Send File Dialog Box

7. Click **Send**. A dialog box appears and reports the progress of the download. When it is complete, the message "Operation Complete" appears.

Important: Keep the device powered for 15 seconds after the operation has completed.

8. Press the Enter key to return to the main menu.

Troubleshooting Potential Flash Problems

Description	Corrective Action
<p>"Transfer Cancelled by Remote System" message appears and the Flash is not completed.</p>	<ul style="list-style-type: none"> • Restart HyperTerminal and repeat the Flash procedure. • If you are using Windows NT 4.0, install SP3 or later. Windows NT service packs are available from the Microsoft web site: http://www.microsoft.com. • Download a HyperTerminal Private Edition update from the Hilgraeve web site: http://www.hilgraeve.com. (Please note that there is a license requirement with this software.) Then, perform the Flash procedure again.
<p>The "Xmodem File Send" for dialog box appears, but the Flash file is not transferred.</p>	<ul style="list-style-type: none"> • Verify that you have selected the Xmodem protocol in the Send file dialog box. • Verify that the new file is on your hard disk. Do not attempt to Flash from a floppy disk or a network. • Verify that you are sending the file within 60 seconds of pressing Y to confirm that you want to perform the Flash.
<p>After completing a Flash, you are unable to communicate with the serial converter. For example, meaningless text appears on the HyperTerminal screen.</p>	<ul style="list-style-type: none"> • Set the serial port rate to 9600. If parameters are changed during a Flash update, all parameters are set to their default settings.

A **Application Code**

Code that runs in the adapter after the boot code calls it. It performs the normal operations of the system.

B **BCC**

Block Check Character. An error detection scheme where the 2's complement of the 8-bit sum (modulo-256 arithmetic sum) of all data bytes in a transmission block. It provides a means of checking the accuracy of each message transmission.

Boot Code

Code that runs when the adapter first receives power. It checks basic operations and then calls the application code.

C **CRC**

Cyclic redundancy check. An error detection scheme where all of the characters in a message are treated as a string of bits representing a binary number. This number is divided by a predetermined binary number (a polynomial) and the remainder is appended to the message as a CRC character. A similar operation occurs at the receiving end to prove transmission integrity.

D **DF1 Protocol**

A peer-to-peer link layer protocol that combines features of ANSI X3.28-1976 specification subcategories D1 (data transparency) and F1 (two-way simultaneous transmission with embedded responses).

DF1 Rate

A unit of signaling speed equal to the number of discrete conditions or signal events per second. It is also called "baud rate" or "serial port rate."

DSI (Drive Serial Interface)

An RS-485 interface used for connecting peripherals (operator interfaces, external and internal communications modules) to the DSI Host.

DSI Peripheral

A device that uses the DSI communications interface to communicate with a DSI Product in a peripheral manner.

DSI Product

A device that uses the DSI communications interface to communicate with one or more peripheral devices. For example, a motor drive such as a PowerFlex™ 4 drive is a DSI product. In this manual, a DSI product is also referred to as “product” or “host.”

DriveExplorer

An easy-to-use software application designed for Microsoft Windows 95, Windows 98, Windows NT (4.0 or higher), Windows ME, Windows 2000, Windows XP and selected Windows CE operating systems. To fully utilize DSI products, use DriveExplorer version 3.01 or higher. This application is a tool for monitoring and configuring Allen-Bradley products and adapters. A free version of DriveExplorer Lite is included with the serial converter. Information about DriveExplorer can be accessed at <http://www.ab.com/drives/driveexplorer>.

DriveTools

A software suite designed for Microsoft Windows 95, Windows 98, and Windows NT (4.0 or higher) operating systems. To fully utilize DSI products, use DriveTools 2000 version 1.01 or higher. This software suite provides a family of tools that you can use to program, monitor, control, troubleshoot, and maintain Allen-Bradley products. Information about DriveTools can be accessed at <http://www.ab.com/drives>.

F Flash Update

The process of updating firmware in a device.

H Hold Last

When communications are disrupted (e.g., serial cable is disconnected), the converter and product can respond by holding last state. Hold last state results in the product receiving the last data received via the DF1 connection before the disruption. If the product was in RUN mode and using the Reference from the converter, it will continue to run at the same Reference.

N Non-Volatile Storage (NVS)

NVS is the permanent memory of a device. Devices such as the converter store parameters and other information in NVS so that they are not lost when the device loses power. NVS is sometimes called “EEPROM.”

P PCCC (Programmable Controller Communications Command)

PCCC is the protocol used by some controllers to communicate with devices on a network. Some software products (for example, DriveExplorer and DriveTools 2000) also use PCCC to communicate.

S Serial Converter

The serial converter provides an electronic communications interface between any Allen-Bradley DSI product and a computer with an RS-232 port. This converter uses a full-duplex RS-232 DF1 protocol. The serial converter may also be referred to as “22-SCM-232 converter,” “converter,” “DSI peripheral.”

Status Indicators

Status indicators are LEDs that are used to report the status of a device. There are three status indicators on the converter.

T Type 0/Type 1/Type 2 Control

When transmitting I/O, the adapter can use different types of messages for control. The Type 0, Type 1 and Type 2 events help Allen-Bradley personnel identify the type of messages that an adapter is using.

X Xmodem

Developed by Ward Christensen in 1978, Xmodem is a protocol used to transfer data. You can use the Xmodem protocol to flash the firmware in the serial converter or a device connected to it.

Z **Zero Data**

When communications are disrupted (e.g., serial cable is disconnected), the converter and product can respond with zero data. Zero data results in the product receiving zero as values for command data. If the product was in RUN mode and using the Reference from the converter, it will stay in run mode but at zero Reference.

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