# ASCII

**ProLinx Standalone**

Generic ASCII Serial Communication Module

**Driver Manual**

July 07, 2008

# Please Read This Notice

Successful application of this module requires a reasonable working knowledge of the ProLinx Module, its connected devices, and the application in which the combination is to be used. For this reason, it is important that those responsible for implementation satisfy themselves that the combination will meet the needs of the application without exposing personnel or equipment to unsafe or inappropriate working conditions.

This manual is provided to assist the user. Every attempt has been made to assure that the information provided is accurate and a true reflection of the product's installation requirements. In order to assure a complete understanding of the operation of the product, the user should read all applicable documentation on the operation of the connected devices.

Under no conditions will ProSoft Technology be responsible or liable for indirect or consequential damages resulting from the use or application of the product.



Information in this manual is subject to change without notice and does not represent a commitment on the part of ProSoft Technology Improvements and/or changes in this manual or the product may be made at any time. These changes will be made periodically to correct technical inaccuracies or typographical errors.

## Important Installation Instructions

Power, input and output wiring must be in accordance with Class I, Division 2 wiring methods - Article 501-4 (b) of the National Electrical Code, NFPA 70 and in accordance with the authority having jurisdiction. The following warnings must be heeded:

**A** WARNING - EXPLOSION HAZARD - SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR CLASS I, DIV. 2;
**B** WARNING - EXPLOSION HAZARD - WHEN IN HAZARDOUS LOCATIONS, TURN OFF POWER BEFORE REPLACING OR WIRING MODULES, and
**C** WARNING - EXPLOSION HAZARD - DO NOT DISCONNECT EQUIPMENT UNLESS POWER HAS BEEN SWITCHED OFF OR THE AREA IS KNOWN TO BE NONHAZARDOUS.
**D** "THIS DEVICE SHALL BE POWERED BY CLASS 2 OUTPUTS ONLY."

### *All ProLinx® Products*

Power, input and output wiring must be in accordance with Class I, Division 2 wiring methods - Article 501-4 (b) of the National Electrical Code, NFPA 70 and in accordance with the authority having jurisdiction. The following warnings must be heeded:

**A** WARNING - EXPLOSION HAZARD - SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR CLASS I, DIV. 2;
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**D** "THIS DEVICE SHALL BE POWERED BY CLASS 2 OUTPUTS ONLY."

### *ProLinx Modules with Ethernet Ports*

Series C ProLinx™ modules with Ethernet ports do **NOT** include the HTML Web Server. The HTML Web Server must be ordered as an option. This option requires a factory-installed hardware addition. The HTML Web Server now supports:

- 8 MB file storage for HTML files and associated graphics files (previously limited to 384K)
- 32K maximum HTML page size (previously limited to 16K)

*To upgrade a previously purchased Series C model:*

Contact your ProSoft Technology distributor to order the upgrade and obtain a Returned Merchandise Authorization (RMA) to return the unit to ProSoft Technology.

*To Order a Series C mode with the -WEB option:*

Add **-WEB** to the standard ProLinx part number. For example, **5201-MNET-MCM-WEB**.

### *ProLinx Plus with Radio*

The following Information and warnings pertaining to the radio must be heeded:

**A** "THIS DEVICE CONTAINS A TRASMITTER MODULE, FCC ID: SDZ-WA-1. PLEASE SEE FCC ID LABEL ON BACK OF DEVICE."

**B** "THIS DEVICE USES AND INTERNAL COMPACT FLASH RADIO MODULE AS THE PRIMARY RADIO COMPONENT. THE COMPACT FLASH RADIO MODULE DOES NOT HAVE AN FXX ID LABE. THE COMPACT FLASH RADIO MODULE HAS NO USER SERVICABLE PARTS."

**C** "THIS DEVICE COMPLIES WITH PART 15 OF THE FCC RULES. OPERATION IS SUBJECT TO THE FOLLOWING TWO CONDITIONS: (1) THIS DEVICE MAY NOT VAUSE HARMFUL INTERFERENCE, AND (2) THIS DEVICE MUST ACCEPT ANY INTERFERENCE RECEIVED, INCLUDING INTERFERENCE THAT MAY CAUSE UNDESIRED OPERATION.

**D** THIS DEVICE AND ANY RADIO ACCESSORY SOLD BY PROSOFT MUST BE INSTALLED BY AN AUTHORIZED PROFESSIONAL INDUSTRIAL RADIO SYSTEM INTEGRATOR. FURTHER, ONLY RADIO ACCESSORIES SOLD BY PROSOFT AND SPECIFICALLY TESTED FOR USE WITH THIS DEVICE MAY BE USED WITH THIS DEVICE.

**E** THE USER OF THIS EQUIPMENT CANNOT BE WITHIN 20 cm. FROM THE RADIATING ELEMENT DEVICE.

**F** CHANGES OR MODIFICATIONS NOT EXPRESSLY APPROVED BY THE PARTY RESPONSIBLE FOR COMPLIANCE COULD VOID THE USER'S AUTHORITY TO OPERATE THE EQUIPMENT.

Industry Canada Requirements:

**A** "THIS DEVICE HAS BEEN DESIGNED TO OPERATE WITH AN ANTENNA HAVING A MAXIMUM GAIN OF 24 dB. AN ANTENNA HAVING A HIGHER GAIN IS STRICTLY PROHIBITED PER REGULATIONS OF INDUSTRY CANADA. THE REQUIRED ANTENNA IMPEDANCE IS 50 OHMS."

### *ProLinx Series C (4000); ProLinx Plus (5000); ProLinx Plus with Radio (6000)*

*Product Installation Warning*

Power, Input and Output (I/O) wiring must be in accordance with Class 1, Division 2 wiring methods, Article 501-4 (b) of the National Electrical Code, NFPA 70 for installation in the U.S., or as specified in Section 18-1J2 of the Canadian Electrical Code for installations in Canada, and in accordance with the authority having jurisdiction.

**A** Warning - Explosion Hazard - Substitution of components may impair suitability for Class 1, Division 2.
**B** Warning - Explosion Hazard - When in Hazardous locations, turn off power before replacing or wiring modules.
**C** Warning - Explosion Hazard - Do not disconnect equipment unless power has been switched off or the area is known to be non-hazardous.

## Your Feedback Please

We always want you to feel that you made the right decision to use our products. If you have suggestions, comments, compliments or complaints about the product, documentation or support, please write or call us.

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# Contents

# 1 Introduction

*In This Chapter*



The ASCII driver permits the ProLinx module to interface any ASCII device to the many protocols and networks available. ASCII devices include barcode scanners, weigh scales, many field instruments, printers, and terminals. The driver supports one to four ports that provide accessibility from one to four independent serial networks.

## 1.1 General Specifications

- **Ports:** One to four ports to receive and/or transmit data
- **Receive buffer size**: 255 bytes
- **Receive termination:** Stream mode, termination character(s), message timeout, inter-character delay, or packet size length
- **Receive database location:** -1=disable receiver, 0 to 3896
- **Transmit buffer size:** 255 bytes
- **Transmit characters with pacing:** 0 to 65535 millisecond delay between each transmitted character
- **Transmit database location:** -1=disable transmitter, 0 to 3896
- **Communication Configuration**
  - **Baud Rate:** 110 to 115,200
  - **Parity:** None, Odd, Even
  - **Data Bits:** 5 to 8
  - **Stop Bits:** 1 or 2
  - **RTS On and Off Timing:** 0 to 65535 milliseconds
  - **Minimum Response Delay:** 0 to 65535 milliseconds
  - **Hardware or Software Handshaking:** RTS/CTS, DTR/DSR, or XON/XOFF

## 1.2 Resources

The *ProLinx Reference Guide* provides general information on all ProLinx modules including installation, editing configuration files, cabling and jumper configurations, troubleshooting, and a wide range of useful information. You should have this manual available when installing and configuring ProLinx modules.

# 2 Functionality

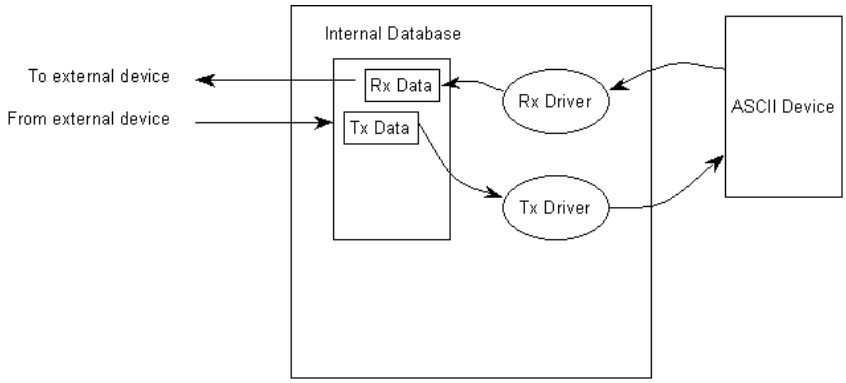
*In This Chapter*



This section describes the functionality of the ASCII driver.

## 2.1 Data Flow

The following illustration shows receive and transmit dataflow of the ASCII driver.




Data received from the ASCII device is accepted by the receive driver and placed in the receive database location configured by the user. The receive driver waits until the user-configured termination condition is recognized while receiving the data before placing the new data into the database.

For example, if the carriage-return character (ASCII 13) is used as the termination condition for a received message, this signals the end of the message. When the receive driver observes this character in the input stream, it takes all received characters and places them in the internal database.

In both receive and transmit operations, a signal is required to determine when new data is received or must be transmitted. The first word in the two data area is used for this purpose. When the value of the first word changes, new data is available. Lets look at a receive example. The sequence number in the receive data block has a value of 0 as set when the module initializes. The ASCII device sends a new data packet and the termination condition is present. The receive driver copies the data into the internal data area, sets the message length in the data area, and finally, sets the new sequence number. Receive and transmit data block structure is discussed in the following topics.

### 2.1.1 Receive Data

Data received by the receive driver is placed in the module's internal database in a fixed format at the location selected by the user. The receiver driver is disabled if the database start location is set to a value of -1. The following table shows the structure of the received data.

| Word Offset | Description |
|---|---|
| 0 | Receive sequence number. This register is incremented by the Module's Receive Driver for each new packet received. |
| 1 | Number of characters transmitted (0 to 255) from last transmit request. |
| 2 | Number of characters (0 to 256) in receive block (3 to 130). |
| 3 to 130 | Received data on port. |

The first word of the data block is used to signal when new receive data is available. Word 1 of the block contains the number of bytes in the last message transmitted on the port. Word 2 contains the number of bytes in the received message data area. Words 3 to 130 contain the data received. If the module is configured to swap the data bytes received, the receive driver will swap the bytes in each word received before placing the data into the data block. Because the data received may contain an odd number of bytes, the length of the message received will be incremented by 1 when an odd number of bytes are received and the swap option is utilized. This is to avoid losing the last byte of data in the message.

### 2.1.2 Transmit Data

Data to transmit by the transmit driver is placed in the module's internal database in a fixed format at the location selected by the user. The transmit driver is disabled if the database start location is set to a value of -1. The following table shows the structure of transmit data.

| Word Offset | Description |
|---|---|
| 0 | Transmit sequence number. This number is incremented by the user's application for each new packet to transmit. |
| 1 | Number of characters received (0 to 256) from last receive request. |
| 2 | Inter-character delay for this message (milliseconds between characters) |
| 3 | Number of characters to transmit on Port (0 to 255) |
| 4 to 131 | Data to transmit on port |

The first word of the data block is used to signal when new transmit data is available. Word 1 of the block may optionally contain the number of characters processed in the last receive message. Word 2 of the message is used to pace the characters during the transmission process. This may be required when interfacing with slow ASCII devices (that is, modems in command mode).

If the word is set to a value other than zero, a time delay corresponding to the number of milliseconds entered will be placed between each character transmitted. If the word is set to zero, the whole data packet will be transmitted as fast as the transmit driver can function. Word 3 of the data block contains the number of bytes present in the transmit data area to send out the ASCII port. Words 4 to 131 contain the actual data to transmit. If the swap option is utilized, the transmit driver will swap each byte in the words received before transmitting them. Care should be taken if an odd number of bytes are sent by the end device when the swap option is used. The last byte of the message may be lost.

# 3 Modes of Operation

*In This Chapter*



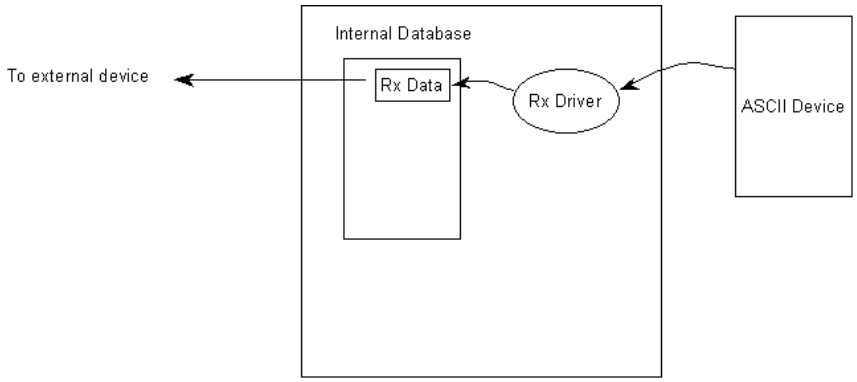
The module can operate in several different modes with each port acting independently. The configuration of each port's driver determines its mode. The following topics describe these modes.

## 3.1 Data Flow

The following topics describe the flow of data between the pieces of hardware (ASCII device and ProLinx Module). Each application port on the module is configured independently to interface with serial communication devices. The sub-sections that follow describe the three possible types of communication devices that can be attached to application ports: receive-only, transmit-only, and transmit-receive mode.

### *3.1.1 Receive-Only Mode*

A port on the module configured to function in receive-only mode is set up to only receive data from some sort of ASCII device. In this mode, the ProLinx module will never transmit data back to the ASCII device. Any data received from the ASCII device is passed from the receiver driver (Rx Driver) to the ProLinx module's internal database (Rx Data). The following illustration shows the flow of data on a port configured for receive-only mode.

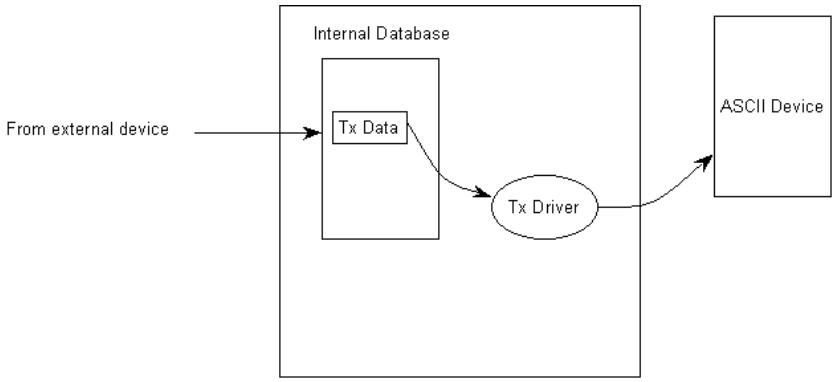


*Configuring the Port for Receive-Only Mode*

In order to set a port for Receive-Only mode, ensure that the **Rx DB Start** parameter in the configuration file contains the starting location of where the data will be stored. The **Tx DB Start** parameter must contain a value of **-1**. This value indicates that the port will not transmit any data.

### *3.1.2 Transmit-Only Mode*

A port on the module configured to function in transmit-only mode is set up to only transmit data from the ProLinx module's internal database (received from an external source) to an ASCII device. When the transmit driver (Tx Driver) recognizes a new write block containing data (data placed in the module's internal database), it transmits this data out to the port. The sequence number used in the block will be different that that of the previous block, and therefore, signals that the packet is fully assembled and ready to send. The following illustration shows data flow for a transmit-only device.

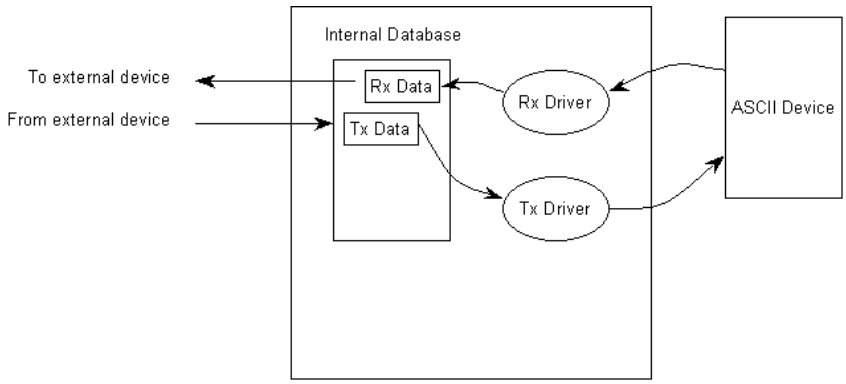



*Configuring a Port for Transmit-Only Mode*

In order to set a port for Transmit-Only mode, ensure that the **Tx DB Start** parameter in the configuration file contains the starting location of where the data will be stored. The **Rx DB Start** parameter must contain a value of **-1**. This value indicates that the port will not receive any data.

### *3.1.3 Transmit-Receive Mode*

A port configured in transmit-receive mode can send and receive data from an ASCII device such as a terminal. This mode functions the same way as transmit-only mode or receive-only mode, but handles both the transmit and receive functions. Data flow to and from an ASCII device is handled by the module's transmit and receive drivers. Data received from the ASCII device is stored in the module's internal database until ready to be sent to an external device. Data received by an external device is also stored in the module's internal database until ready to be transmitted to the ASCII device. The following illustration shows the data flow when the port is configured for transmit-receive mode:




*Configuring a Port for Transmit-Receive Mode*

In order to set a port to both receive data and transmit data to an ASCII device, ensure that the **Rx DB Start** parameter and the **Tx DB Start** parameter both contain values that specify data storage starting locations. A **-1** value in either parameter will disable the particular function that the parameter serves.

## 3.2 Termination of Received Data

When data is received on the application port, the user must define in the configuration when this data will be transferred to the Internal Database within the module. this is known as the termination type for port. When the termination condition is met, the data will be sent from the port's receive buffer (data area of 255 bytes) to the Internal Database. This termination type is set in the bit mapped Type field of the module object. The following illustration shows the bit map used for this parameter.

Termination Type Field

| Bit(s) | 4 to 7 | 3 | 2 | 1 | 0 |
|---|---|---|---|---|---|
| **Bit Value** | - | 8 | 4 | 2 | 1 |
| **Definition** | Reserved | Packet size limit used | Intercharacter delay timeout used | Message timeout used | Termination character(s) used |

If none of the bits are set (Type=0), the port will be configured for stream mode. Any characters received on the port are immediately sent to the processor. The processor must buffer and assemble a packet of information if this mode is selected as required by the application. If the data can be handled by the processor in this mode and it is appropriate for your application, this is the fastest method of communication between the device and the processor.

Any combination of bits is acceptable to the module and should be set to match the device on the specific port. An example of each termination type is given below.

**Termination character(s) used**

**Settings:**
Count = 1 (RTermCnt=1)
Termination on 0x0d (carriage return character) (RTermChar = 0d 00 00 00 …)

**Data Received on port:**

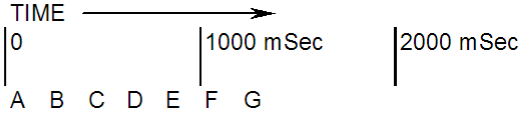
A B C 0x0d D E

**Comment:**
The characters "ABC" will be sent along with the 0x0d character to the controller after the 0x0d character is received. The characters "DE" will not be sent until the 0x0d character is received.

**Message timeout used**

**Settings:**
Message timeout = 1000 mSec (Rtimeout=1000)

**Data Received on port:**

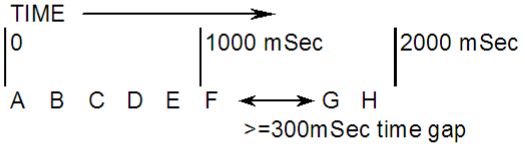



**Comment:**
After the 'A' character is received on the port, the message timeout is started. The characters "ABCDE" will be sent to the controller in one block. The characters "FG" will follow in the second block one second later.

### Intercharacter delay timeout used

**Settings:**
Intercharacter delay timeout = 300 mSec (Rdelay=300)

**Data Received on port:**




**Comment:**
After each character is received, the intercharacter delay timer is reset. The characters "ABCDEF" will be sent to the controller in one block because the delay timer expires. The characters "GH" will follow in the second block when the next time gap is recognized.

### Packet size limit used

**Settings:**
Packet size = 4 (RPacketLen=4)

**Data Received on port:**

A B C D E F G H I J

**Comment:**
The first block sent to the controller will contain the characters "ABCD", and the second block will contain the characters "EFGH". The characters "IJ" will not be sent until two more characters are received on the port.

# 4 ASCII Protocol Configuration

*In This Chapter*



In order for the ASCII driver to function, a minimum amount of configuration data must be transferred to the module from the module's file system. Care must be taken in constructing the module configuration parameters. If the module does not function as expected, examine the configuration file using the Debugger Port on the module. All configuration parameters for the driver are found under the [ASCII Port x] section. The x in the section name will have a value of 0 to 3 corresponding to the appropriate ASCII port.

After setting up the configuration file, download it to the module using ProSoft Configuration Builder.

## 4.1 [ASCII Port 0]

```
[ASCII PORT 0]
Enabled             : Y      #
RS Interface        : 0      #0=RS-232, 1=RS-485, 2=RS-422
Rx DB Start         : 200
Tx DB Start         : 0
Baud Rate           : 19200
Parity              : N      #The coded values are as follows: N=None, O=Odd,
                    # E=Even, M=Mark and S=Space."
Data Bits           : 8      #Valid entries for this field are 5, 6, 7 and 8."
Stop Bits           : 1
RTS On              : 0
RTS Off             : 0
Handshaking         : N      #Handshake code of N, Y, D, X"
Rx Termination Type: 1
Rx Term Count       : 1
Rx Term Chars       : 13 11 12 14 15 16 17 255 255 0 0 0
Rx Packet Length    : 10
Rx Timeout          : 5000
Rx Delay            : 1000
Swap Rx Data Bytes : N
Tx Timeout          : 5000
Tx Minimum Delay    : 0
Swap Tx Data Bytes : N
```

### *4.1.1 Enabled*

Yes or No

This flag specifies if the port on the module will be utilized. If the parameter is set to No, the port will not be used. If the parameter is set to Yes, the port will be used supporting the ASCII protocol.

### 4.1.2 RS Interface

Code 0 to 2

This parameter specifies the RS interface to be utilized when serial ports are used on the serial expansion module (Ports 1 to 3). The codes are as follows:

0=RS-232

1=RS-485

2=RS-422

### 4.1.3 Rx DB Start

-1 or 0 to 3896

This parameter specifies the starting location in the internal database where the received data will be stored. The buffer holds 130 words, however, the first three words of the data area define the sequence number, last write byte count and the Rx message length. If the parameter is set to -1, the port will not receive data. Refer to Receive Data (page 10) for detailed information on Rx data structure.

### 4.1.4 Tx DB Start

-1 or 0 to 3896

This parameter specifies the starting location in the internal database where the transmit data will be stored. The buffer holds 130 words, however, the first three words of the data area define the sequence number, last write byte count and the Rx message length. If the parameter is set to -1, the port will not transmit data. Refer to Transmit Data (page 10) for detailed information on Tx data structure.

### 4.1.5 Baud Rate

Baud Rate Value

This is the baud rate to be used on the port. Enter the baud rate as a value. For example, to select 19K baud, enter 19200. Valid entries for this field include: 110, 150, 300, 600, 1200, 2400, 4800, 9600, 19200, 28800, 38400, 57600 and 115.

### 4.1.6 Parity

None, Odd, Even

This is the Parity code to be used for the port. The coded values are as follows: None, Odd, Even.

### 4.1.7 Data Bits

5 to 8

This parameter sets the number of data bits for each word used by the protocol. Valid entries for this field are 5, 6, 7 and 8.

### 4.1.8 Stop Bits

1 or 2

This parameter sets the number of stop bits to be used with each data value sent. Valid entries for this field are 1 and 2.

### 4.1.9 RTS On

0 to 65535

This parameter sets the RTS presend delay. The value entered represents the number of milliseconds the module will wait after setting the RTS modem line before sending the data.

### 4.1.10 RTS Off

0 to 65535

This parameter specifies the number of milliseconds to delay after sending the data frame before the RTS line is dropped.

### 4.1.11 Handshaking

Handshake code of N, Y, D, X

This parameter specifies the handshaking used on the port. The code values are as follows: N=No hardware or software handshaking, Y=RTS/CTS hardware handshaking, D=DTR/DSR hardware handshaking and X=XON/XOFF software handshaking.

### 4.1.12 Rx Termination Type

Bit coded value of 0 to 15

This parameter specifies the receive termination characteristics for the port. This value is bit mapped as follows: Bit 0 = Termination character(s) used, Bit1=Message timeout used, Bit2=Intercharacter delay timeout used and Bit3=Packet size limit used. If the parameter is set to zero, the port is placed in stream mode.

### 4.1.13 Rx Term Count

0 to 12

This parameter is used if bit 0 of the Type parameter is set. This value (0 to 12) defines the number of termination characters used to define the end of received message.

### 4.1.14 Rx Term Chars

ASCII Characters

This array of 12 characters defines the termination characters at the end of each received message. Each character occupies one position in the array. The number of characters to be used in the array is set in the RTermCnt parameter.

### 4.1.15 Rx Packet Length

0 to 200

This parameter is used if bit 3 is set in the Type parameter. The parameter sets the length of data required to be received on the port before transferring the data to the processor.

### 4.1.16 Rx Timeout

0 to 65535

This parameter is used if bit 1 is set in the Type parameter. The parameter sets the number of milliseconds to wait after the first character is received on the port before automatically sending the data to the processor.

### 4.1.17 Rx Delay

0 to 65535

This parameter is used if bit 2 is set in the Type parameter. The parameter sets the number of milliseconds to wait between each character received on the port before sending the data to the processor.

### 4.1.18 Swap Rx Data Bytes

Yes or No

This parameter is determines if the data received by the module will have the byte order of the data swapped. If the parameter is set to No, no byte swapping will occur. If the parameter is set to Yes, the odd byte will be swapped with the even byte in each word of data received.

### 4.1.19 Tx Timeout

0 to 65535

This parameter specifies the timeout period to transmit a message out the port. A message must be transmitted out the port within the specified timeout period. Message transmission will be aborted if the timeout is exceeded.

### 4.1.20 Tx Minimum Delay

0 to 65535

This parameter specifies the minimum number of milliseconds to delay before transmitting a message out the port. This pre-send delay is applied before the RTS on time. This may be required when communicating with slow devices.

### 4.1.21 Swap Tx Data Bytes

Yes or No

This parameter determines if the data to be transmitted by the module will have the byte order of the data swapped. If the parameter is set to No, no byte swapping will occur. If the parameter is set to Yes, the odd byte will be swapped with the even byte in each word of data received.

# 5 Driver Status Data

Each ASCII port associated with the ASCII driver has an associated status data area. This data is located in the virtual address range of the module. The map data functionality of the module must be used to map this data into the normal data range of the module's database. The following table lists the content of the status data areas associated with each ASCII port driver:

Port 0 Status Data

| Status Register | Description |
|---|---|
| 13000 | Receive State:<br>-1 = Listening for data<br>1 = Receiving Port Data<br>2 = Waiting for Backplane transfer |
| 13001 | Receive character count |
| 13002 | Receive message count |
| 13003 | Transmit State:<br>0 = Waiting for Data to Send<br>1 = RTS On<br>2 = RTS Timeout<br>3 = Sending data<br>4 = Waiting for RTS Off<br>5 = RTS turned off<br>30 = Intercharacter Delay<br>31 = Intercharacter Delay<br>32 = Intercharacter Delay<br>100 = Message Delay before Transmit<br>101 = Message Delay before Transmit |
| 13004 | Transmit character count |
| 13005 | Transmit message count |
| 13006 | Configuration error word |
| 13007 to 13009 | No Valid Data |

Port 1 Status Data

| Status Register | Description |
|---|---|
| 13010 | Receive State:<br>-1 = Listening for data<br>1 = Receiving Port Data<br>2 = Waiting for Backplane transfer |
| 13011 | Receive character count |
| 13012 | Receive message count |

| Status Register | Description |
|---|---|
| 13013 | Transmit State:<br>0 = Waiting for Data to Send<br>1 = RTS On<br>2 = RTS Timeout<br>3 = Sending data<br>4 = Waiting for RTS Off<br>5 = RTS turned off<br>30 = Intercharacter Delay<br>31 = Intercharacter Delay<br>32 = Intercharacter Delay<br>100 = Message Delay before Transmit<br>101 = Message Delay before Transmit |
| 13014 | Transmit character count |
| 13015 | Transmit message count |
| 13016 | Configuration error word |
| 13017 to 13019 | No Valid Data |

Port 2 Status Data

| Status Register | Description |
|---|---|
| 13020 | Receive State:<br>-1 = Listening for data<br>1 = Receiving Port Data<br>2 = Waiting for Backplane transfer |
| 13021 | Receive character count |
| 13022 | Receive message count |
| 13023 | Transmit State:<br>0 = Waiting for Data to Send<br>1 = RTS On<br>2 = RTS Timeout<br>3 = Sending data<br>4 = Waiting for RTS Off<br>5 = RTS turned off<br>30 = Intercharacter Delay<br>31 = Intercharacter Delay<br>32 = Intercharacter Delay<br>100 = Message Delay before Transmit<br>101 = Message Delay before Transmit |
| 13024 | Transmit character count |
| 13025 | Transmit message count |
| 13026 | Configuration error word |
| 13027 to 13029 | No Valid Data |

Port 3 Status Data

| Status Register | Description |
|---|---|
| 13030 | Receive State:<br>-1 = Listening for data<br>1 = Receiving Port Data<br>2 = Waiting for Backplane transfer |
| 13031 | Receive character count |
| 13032 | Receive message count |
| 13033 | Transmit State:<br>0 = Waiting for Data to Send<br>1 = RTS On<br>2 = RTS Timeout<br>3 = Sending data<br>4 = Waiting for RTS Off<br>5 = RTS turned off<br>30 = Intercharacter Delay<br>31 = Intercharacter Delay<br>32 = Intercharacter Delay<br>100 = Message Delay before Transmit<br>101 = Message Delay before Transmit |
| 13034 | Transmit character count |
| 13035 | Transmit message count |
| 13036 | Configuration error word |
| 13037 to 13039 | No Valid Data |

If the module is configured correctly, the configuration error word should have a value of zero. Any other value indicates a configuration error. Use the value in the configuration error word to determine which set of parameters are invalid in the driver configuration area. The following table lists the bits associated with each configuration error in the word:

| Bit | Code | Description |
|---|---|---|
| 0 | 0x0001 | Invalid selection for enabled parameter |
| 1 | 0x0002 | Invalid Rx DB Start parameter |
| 2 | 0x0004 | Invalid Tx DB Start parameter |
| 3 | 0x0008 | Invalid Baud Rate |
| 4 | 0x0010 | Invalid Parity (N, O, E, M or S) |
| 5 | 0x0020 | Invalid Data bits (5 to 8) |
| 6 | 0x0040 | Invalid Stop bits (1 or 2) |
| 7 | 0x0080 | Invalid Handshaking parameter (N, Y, D or X) |
| 8 | 0x0100 | Invalid Rx Termination Type |
| 9 | 0x0200 | Invalid Rx Term Count value |
| 10 | 0x0400 | Invalid Rx Timeout |
| 11 | 0x0800 | Invalid Rx Delay |
| 12 | 0x1000 | Invalid Rx Packet Length |

| Bit | Code | Description |
|---|---|---|
| 13 | 0x2000 | Invalid Tx Timeout |
| 14 | 0x4000 | Invalid RS interface selected (0 to 2) |
| 15 | 0x8000 | |

# 6 LED Indicators

*In This Chapter*



Troubleshooting the operation of the DNP Slave port can be performed using several methods.

The first and quickest is to scan the LEDs on the module to determine the existence and possibly the cause of a problem. This section provides insight into the operation of the Serial Port status LEDs. Information on the module's other LEDs can be found in the *ProLinx Reference Guide*.

## 6.1 Base Module LEDs

| LED | State | Description |
|---|---|---|
| Power | Off | Power is not connected to the power terminals. This LED is hardware driven, so it only requires power to operate. |
| | Green Solid | Power is connected to the power terminals. Verify that the other LEDs for operational and functional status. |
| Fault | Off | Normal operation. |
| | Red Solid | A critical error has occurred. Program executable has failed or has been user-terminated and is no longer running. Press Reset p/b or cycle power to clear error. If not, use the Debug procedures described later in this manual. |
| Cfg | Off | Normal operation. |
| | Amber Solid | The unit is in the configuration mode. The configuration file is being read and the unit is implementing the configuration values and initializing the hardware. This will occur during power cycle, or after pressing the reset button. It also occurs after a cold/warm boot command is received. |
| Err | Off | Normal operation. |
| | Flashing | An error condition has been detected and is occurring. Check configuration. |
| | Solid Red | This condition is indicative of a large number of errors in the application interface communications. The module's error flag is cleared at the start of each command (master/client) or receipt of data (slave/adapter/server). |

## 6.2 LEDs for Port 0 Serial Port

Some ProLinx modules have three extra serial ports. Each of these serial ports has two LEDs indicating status.

| LED | Color | Description |
|---|---|---|
| Port 0 - ACT | Off | No activity on the port. |
| | Green Flash | The port is either actively transmitting or receiving data |
| Port 0 - ERR | Off | Normal state. When off and Port Active led is indicating activity, there are no communication errors |
| | Red On or Flashing | Activity on this led indicates some communication error was detected, either during transmit or receive |

## 6.3 4101 Series LEDs

| LED | State | Description |
|---|---|---|
| Power | Off | Power is not connected to the power terminals. This LED is hardware driven, so it only requires power to operate. |
| | Green Solid | Power is connected to the power terminals. Verify that the other LEDs for operational and functional status. |
| Fault | Off | Normal operation. |
| | Red Solid | The Debug/Configuration mode is active (applies to modules that support pass-through on Debug port - such as DFCM units).<br>If CFG LED is not on, a critical error has occurred. Program executable has failed or has been user-terminated and is no longer running. Press Reset p/b or cycle power to clear error. If not, use the Debug procedures described later in this manual. |
| CFG | Off | Normal operation. |
| | Amber Solid | If Fault LED is on, the Debug/Configuration Mode is active (if the module supports pass-through on the Debug port - such as DFCM units).<br>If the Fault LED is off, the unit is in the configuration mode. The configuration file is being read and the unit is implementing the configuration values and initializing the hardware. This will occur during power cycle, or after pressing reset button. It also occurs after a cold/warm boot command is received. |
| ERR | Off | Normal operation. |
| | Flashing | An error condition has been detected and is occurring. Check configuration. |
| | Solid Red | This condition is indicative of a large number of errors in the application interface communications. The module's error flag is cleared at the start of each command (master/client) or receipt of data (slave/adapter/server). |

# 7 Support, Service & Warranty

*In This Chapter*



ProSoft Technology, Inc. (ProSoft) 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 contents of file
   - Module Operation
   - Configuration/Debug status information
   - LED patterns
2. Information about the processor and user data files as viewed through and LED patterns on the processor.
3. Details about the serial devices interfaced, if any.

## 7.1 Return Material Authorization (RMA) Policies and Conditions

The following RMA Policies and Conditions (collectively, "RMA Policies") apply to any returned Product. These RMA Policies are subject to change by ProSoft without notice. For warranty information, see "Limited Warranty". In the event of any inconsistency between the RMA Policies and the Warranty, the Warranty shall govern.

### *7.1.1 Procedures for Return of Units Under Warranty:*

A Technical Support Engineer must approve the return of Product under ProSoft's Warranty:

a) A replacement module will be shipped and invoiced. A purchase order will be required.
b) Credit for a product under warranty will be issued upon receipt of authorized product by ProSoft at designated location referenced on the Return Material Authorization.

- If a defect is found and is determined to be customer generated, or if the defect is otherwise not covered by ProSoft's Warranty, there will be no credit given. Customer will be contacted and can request module be returned at their expense.

### *7.1.2 Procedures for Return of Units Out of Warranty:*

a) Customer sends unit in for evaluation
b) If no defect is found, Customer will be charged the equivalent of $100 USD, plus freight charges, duties and taxes as applicable. A new purchase order will be required.
c) If unit is repaired, charge to Customer will be 30% of current list price (USD) plus freight charges, duties and taxes as applicable. A new purchase order will be required or authorization to use the purchase order submitted for evaluation fee.

The following is a list of non-repairable units:

- 3150 - All
- 3750
- 3600 - All
- 3700
- 3170 - All
- 3250
- 1560 - Can be repaired, only if defect is the power supply
- 1550 - Can be repaired, only if defect is the power supply
- 3350
- 3300
- 1500 - All

### *7.1.3 All Product Returns:*

a) In order to return a Product for repair, exchange or otherwise, the Customer must obtain a Returned Material Authorization (RMA) number from ProSoft and comply with ProSoft shipping instructions.
b) In the event that the Customer experiences a problem with the Product for any reason, Customer should contact ProSoft Technical Support at one of the telephone numbers listed above (page 37). A Technical Support Engineer will request that you perform several tests in an attempt to isolate the problem. If after completing these tests, the Product is found to be the source of the problem, we will issue an RMA.
c) All returned Products must be shipped freight prepaid, in the original shipping container or equivalent, to the location specified by ProSoft, and be accompanied by proof of purchase and receipt date. The RMA number is to be prominently marked on the outside of the shipping box. Customer agrees to insure the Product or assume the risk of loss or damage in transit. Products shipped to ProSoft using a shipment method other than that specified by ProSoft or shipped without an RMA number will be returned to the Customer, freight collect. Contact ProSoft Technical Support for further information.

d) A 10% restocking fee applies to all warranty credit returns whereby a Customer has an application change, ordered too many, does not need, etc.

### *7.1.4 Purchasing Warranty Extension:*

a) ProSoft's standard warranty period is three (3) years from the date of shipment as detailed in "Limited Warranty (page 33)". The Warranty Period may be extended at the time of equipment purchase for an additional charge, as follows:

- Additional 1 year = 10% of list price
- Additional 2 years = 20% of list price
- Additional 3 years = 30% of list price

## 7.2 LIMITED WARRANTY

This Limited Warranty ("Warranty") governs all sales of hardware, software and other products (collectively, "Product") manufactured and/or offered for sale by ProSoft, and all related services provided by ProSoft, including maintenance, repair, warranty exchange, and service programs (collectively, "Services"). By purchasing or using the Product or Services, the individual or entity purchasing or using the Product or Services ("Customer") agrees to all of the terms and provisions (collectively, the "Terms") of this Limited Warranty. All sales of software or other intellectual property are, in addition, subject to any license agreement accompanying such software or other intellectual property.

### *7.2.1 What Is Covered By This Warranty*

a) *Warranty On New Products*: ProSoft warrants, to the original purchaser, that the Product that is the subject of the sale will (1) conform to and perform in accordance with published specifications prepared, approved and issued by ProSoft, and (2) will be free from defects in material or workmanship; provided these warranties only cover Product that is sold as new. This Warranty expires three years from the date of shipment (the "Warranty Period"). If the Customer discovers within the Warranty Period a failure of the Product to conform to specifications, or a defect in material or workmanship of the Product, the Customer must promptly notify ProSoft by fax, email or telephone. In no event may that notification be received by ProSoft later than 39 months. Within a reasonable time after notification, ProSoft will correct any failure of the Product to conform to specifications or any defect in material or workmanship of the Product, with either new or used replacement parts. Such repair, including both parts and labor, will be performed at ProSoft's expense. All warranty service will be performed at service centers designated by ProSoft.

b) *Warranty On Services*: Materials and labor performed by ProSoft to repair a verified malfunction or defect are warranteed in the terms specified above for new Product, provided said warranty will be for the period remaining on the original new equipment warranty or, if the original warranty is no longer in effect, for a period of 90 days from the date of repair.

### *7.2.2 What Is Not Covered By This Warranty*

a) ProSoft makes no representation or warranty, expressed or implied, that the operation of software purchased from ProSoft will be uninterrupted or error free or that the functions contained in the software will meet or satisfy the purchaser's intended use or requirements; the Customer assumes complete responsibility for decisions made or actions taken based on information obtained using ProSoft software.
b) This Warranty does not cover the failure of the Product to perform specified functions, or any other non-conformance, defects, losses or damages caused by or attributable to any of the following: (i) shipping; (ii) improper installation or other failure of Customer to adhere to ProSoft's specifications or instructions; (iii) unauthorized repair or maintenance; (iv) attachments, equipment, options, parts, software, or user-created programming (including, but not limited to, programs developed with any IEC 61131-3, "C" or any variant of "C" programming languages) not furnished by ProSoft; (v) use of the Product for purposes other than those for which it was designed; (vi) any other abuse, misapplication, neglect or misuse by the Customer; (vii) accident, improper testing or causes external to the Product such as, but not limited to, exposure to extremes of temperature or humidity, power failure or power surges; or (viii) disasters such as fire, flood, earthquake, wind and lightning.
c) The information in this Agreement is subject to change without notice. ProSoft shall not be liable for technical or editorial errors or omissions made herein; nor for incidental or consequential damages resulting from the furnishing, performance or use of this material. The user guide included with your original product purchase from ProSoft contains information protected by copyright. No part of the guide may be duplicated or reproduced in any form without prior written consent from ProSoft.

### *7.2.3 Disclaimer Regarding High Risk Activities*

Product manufactured or supplied by ProSoft is not fault tolerant and is not designed, manufactured or intended for use in hazardous environments requiring fail-safe performance including and without limitation: the operation of nuclear facilities, aircraft navigation of communication systems, air traffic control, direct life support machines or weapons systems in which the failure of the product could lead directly or indirectly to death, personal injury or severe physical or environmental damage (collectively, "high risk activities"). ProSoft specifically disclaims any express or implied warranty of fitness for high risk activities.

### 7.2.4 Limitation of Remedies **

In no event will ProSoft or its Dealer be liable for any special, incidental or consequential damages based on breach of warranty, breach of contract, negligence, strict tort or any other legal theory. Damages that ProSoft or its Dealer will not be responsible for included, but are not limited to: Loss of profits; loss of savings or revenue; loss of use of the product or any associated equipment; loss of data; cost of capital; cost of any substitute equipment, facilities, or services; downtime; the claims of third parties including, customers of the Purchaser; and, injury to property.

** Some areas do not allow time limitations on an implied warranty, or allow the exclusion or limitation of incidental or consequential damages. In such areas, the above limitations may not apply. This Warranty gives you specific legal rights, and you may also have other rights which vary from place to place.

### 7.2.5 Time Limit for Bringing Suit

Any action for breach of warranty must be commenced within 39 months following shipment of the Product.

### 7.2.6 Intellectual Property Indemnity

Buyer shall indemnify and hold harmless ProSoft and its employees from and against all liabilities, losses, claims, costs and expenses (including attorney's fees and expenses) related to any claim, investigation, litigation or proceeding (whether or not ProSoft is a party) which arises or is alleged to arise from Buyer's acts or omissions under these Terms or in any way with respect to the Products. Without limiting the foregoing, Buyer (at its own expense) shall indemnify and hold harmless ProSoft and defend or settle any action brought against such Companies to the extent based on a claim that any Product made to Buyer specifications infringed intellectual property rights of another party. ProSoft makes no warranty that the product is or will be delivered free of any person's claiming of patent, trademark, or similar infringement. The Buyer assumes all risks (including the risk of suit) that the product or any use of the product will infringe existing or subsequently issued patents, trademarks, or copyrights.

a) Any documentation included with Product purchased from ProSoft is protected by copyright and may not be duplicated or reproduced in any form without prior written consent from ProSoft.
b) ProSoft's technical specifications and documentation that are included with the Product are subject to editing and modification without notice.
c) Transfer of title shall not operate to convey to Customer any right to make, or have made, any Product supplied by ProSoft.
d) Customer is granted no right or license to use any software or other intellectual property in any manner or for any purpose not expressly permitted by any license agreement accompanying such software or other intellectual property.

e) Customer agrees that it shall not, and shall not authorize others to, copy software provided by ProSoft (except as expressly permitted in any license agreement accompanying such software); transfer software to a third party separately from the Product; modify, alter, translate, decode, decompile, disassemble, reverse-engineer or otherwise attempt to derive the source code of the software or create derivative works based on the software; export the software or underlying technology in contravention of applicable US and international export laws and regulations; or use the software other than as authorized in connection with use of Product.

f) **Additional Restrictions Relating To Software And Other Intellectual Property**

   In addition to compliance with the Terms of this Warranty, Customers purchasing software or other intellectual property shall comply with any license agreement accompanying such software or other intellectual property. Failure to do so may void this Warranty with respect to such software and/or other intellectual property.

### *7.2.7 Disclaimer of all Other Warranties*

The Warranty set forth in What Is Covered By This Warranty (page 33) are in lieu of all other warranties, express or implied, including but not limited to the implied warranties of merchantability and fitness for a particular purpose.

### *7.2.8 No Other Warranties*

Unless modified in writing and signed by both parties, this Warranty is understood to be the complete and exclusive agreement between the parties, suspending all oral or written prior agreements and all other communications between the parties relating to the subject matter of this Warranty, including statements made by salesperson. No employee of ProSoft or any other party is authorized to make any warranty in addition to those made in this Warranty. The Customer is warned, therefore, to check this Warranty carefully to see that it correctly reflects those terms that are important to the Customer.

### *7.2.9 Allocation of Risks*

This Warranty allocates the risk of product failure between ProSoft and the Customer. This allocation is recognized by both parties and is reflected in the price of the goods. The Customer acknowledges that it has read this Warranty, understands it, and is bound by its Terms.

### *7.2.10 Controlling Law and Severability*

This Warranty shall be governed by and construed in accordance with the laws of the United States and the domestic laws of the State of California, without reference to its conflicts of law provisions. If for any reason a court of competent jurisdiction finds any provisions of this Warranty, or a portion thereof, to be unenforceable, that provision shall be enforced to the maximum extent permissible and the remainder of this Warranty shall remain in full force and effect. Any cause of action with respect to the Product or Services must be instituted in a court of competent jurisdiction in the State of California.

## 7.3 How to Contact Us: Technical Support

| | |
|---|---|
| **Internet** | Web Site: http://www.prosoft-technology.com/support (http://www.prosoft-technology.com/support) |
| | E-mail address: support@prosoft-technology.com (mailto:support@prosoft-technology.com) |

Asia Pacific

+603.7724.2080, support.asia@prosoft-technology.com (mailto:support.asia@prosoft-technology.com)

Languages spoken include: Chinese, English

Europe (location in Toulouse, France)

+33 (0) 5.34.36.87.20, support.EMEA@prosoft-technology.com (mailto:support.emea@prosoft-technology.com)

Languages spoken include: French, English

North America/Latin America (excluding Brasil) (location in California)

+1.661.716.5100, support@prosoft-technology.com (mailto:support@prosoft-technology.com)

Languages spoken include: English, Spanish

*For technical support calls within the United States, an after-*hours *answering system allows pager access to one of our qualified technical and/or application support engineers at any time to answer your questions.*

Brasil (location in Sao Paulo)

+55-11-5084-5178 , eduardo@prosoft-technology.com (mailto:eduardo@prosoft-technology.com)

Languages spoken include: Portuguese, English

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