AdaptaScan Reader to a PLC-5 Using RS-232/ASCII Protocol with the 2760–RB Module and the 2760-SFC1 and -SFC2 Protocol Cartridge

Overview

The AdaptaScan-SN3, -SN5 or -SN8 bar code reader may be configured to communicate with the 2760-RB interface module via “dumb terminal protocol” RS-232, using the 2760-SFC1 or -SFC2 protocol cartridge.

This document includes cable diagrams and configuration information for the AdaptaScan readers. It also includes an example PLC-5 program which is needed to establish communication from the PLC to the 2760-RB.

Hardware Requirements

The following Allen-Bradley *hardware* is needed to use the procedure described in this application note:

- 2755-SN3, -SN5, or -SN8 AdaptaScan™ reader and related manuals.
- 2760-RB interface module in a 1771 rack with a PLC-5® processor
- 2760-SFC1 or –SFC2 protocol cartridge
- Personal computer or VT 100 type terminal to configure the 2760-RB
- Appropriate cables to program the PLC-5 and to configure the 2760-RB interface module and the AdaptaScan reader. Refer to hardware manuals for cable requirements.
- Catalog Number 1784-KT or equivalent card installed in the computer to enable you to program the PLC-5.

Software Requirements

The following Allen-Bradley *software* is needed to use the procedure described in this application note:

- Bulletin 6200 development software for the PLC-5, to run in the personal computer
- Terminal Emulation software for a personal computer, to configure the 2760-RB
- 2755-ASN Windows-Based Offline Program Software to configure the AdaptaScan reader

Related Publications

This document refers to the following publications, which should be available for reference while working through this application note:

Publication Number	Title
1785-XXX	User Manual for your PLC-5
6200-XXX	Programming Manual for your PLC-5
2755-837	AdaptaScan Bar Code Readers Installation Manual
2755-838	AdaptaScan Configuration Software User Manual
2760–ND001	2760–RB User Manual
2760-2.16	2760-SFC1 Protocol Cartridge Manual
2760-2.19	2760-SFC2 Protocol Cartridge Manual

PLC 5 Compatibility

Use the following table as a configuration guideline when using the examples shown in this document.

2760-RB In Use	PLC-5, -15, -25, etc.	New Generation PLC-5 (Series A, Rev. C or above only)
Series A, Rev. G or below	Follow example PLC program as shown on page 9.	Set BT Compatibility Bit S26/4 while in program mode. Use example PLC program shown on page 9.
Series A, Rev H or Above		Add ladder logic using IIN update of RB. BTR must be before 'BTW. Refer to page 10.

Configuration

The 2760-RB configuration example includes sample configuration screens and DIP switch settings needed to establish communication with the AdaptaScan reader via RS-232. Other 2760-RB configuration features not used here are also available. See Publication 2760-ND001.

PLC-5 processor DIP switches

Switch #	1	2	3	4	5	6	7	8
SW-1	on	on	on	on	on	on	on	off
SW-2	off	on	on	on	on	on	on	off
SW-3	on	on	off	off				

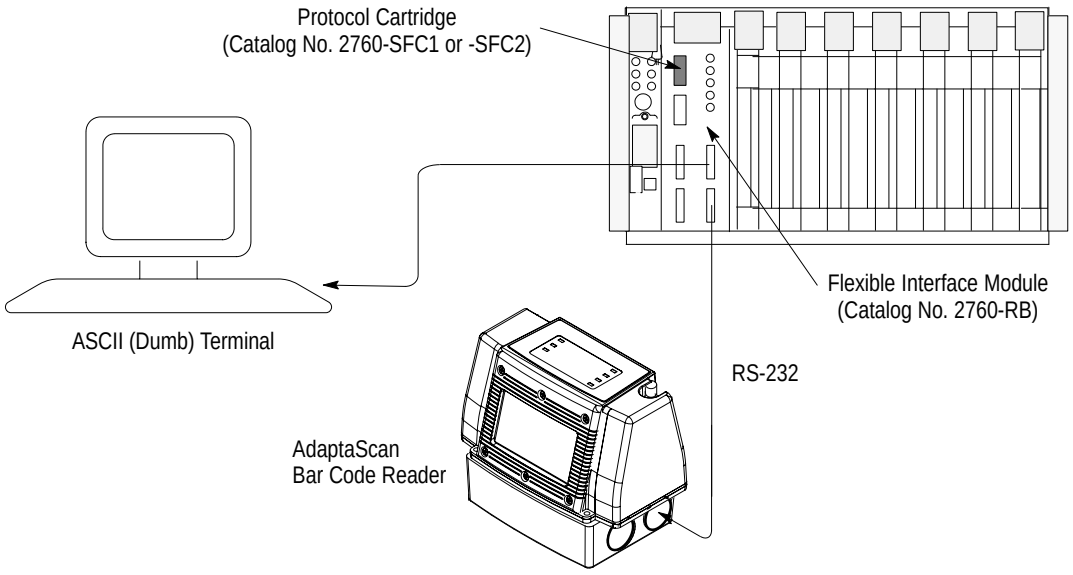
I/O chassis backplane DIP switches

	1	2	3	4	5	6	7	8
	off	off	off	off	off	on	off	off

2760-RB module DIP switches

Switch #	1	2	3	4	5	6	7	8
SW-1	off	off	off	off	off	off	off	off
SW-2	off	off	off	off	off	off	off	off
SW-3	off	off	off	off				
SW-4	off	off	on	off				

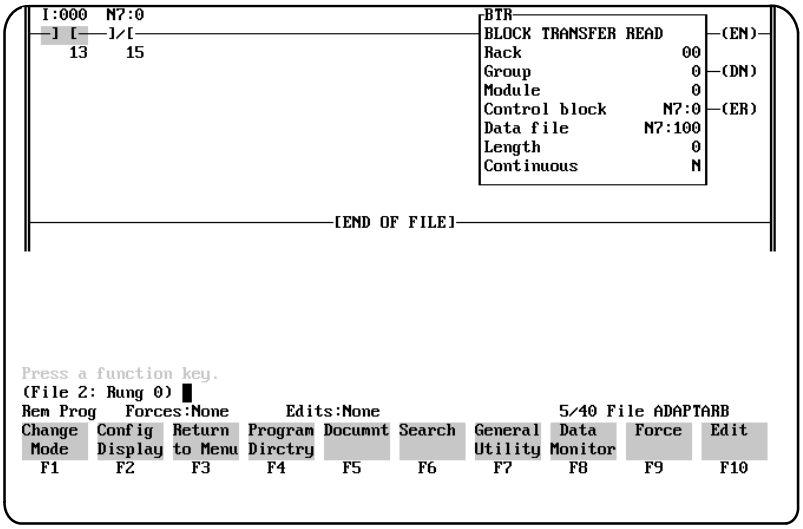
The 2760-RB module is placed in the 1771 chassis in slot 0 next to the PLC. For this application, note that the AdaptaScan reader communicates through port 1 on the 2760-RB. A 1771-ASB module can also be used to communicate with the 2760-RB module over the chassis back plane to Remote I/O.



PLC-5 Program

The sample ladder logic listing below instructs the PLC-5 to:

Rung 2:0 – Read AdaptaScan data from the RB module.



Refer to your PLC-5 user manual for detailed information on using the PLC-5 programming software.

The configuration screens for the 2760-RB should be entered exactly as shown. These parameters then need to be saved.

Both the AdaptaScan reader and the 2760-RB are configured to send and recognize the Carriage Return (Cr), Line Feed (Lf) characters to identify a message. When the 2760–RB senses information entering Port 1, it will look for the Cr, Lf. When it sees these trailers, it will Block transfer read (BTR) the preceding bar code data into the PLC program.

Configuring the 2760-RB

1. Set all 2760-RB module DIP switches to Off.
2. Connect the smart cable to the Configuration port of the 2760-RB and the serial port of the computer.
3. Use the Terminal Emulator to send a “break sequence” to the 2760-RB:
   - **A.** Set the baud rate to 9600, 8 data bits, 1 stop bit, no parity, no flow control, and either COM1 or COM2 depending on the smart cable connection.
   - **B.** Program a function key to send the “break sequence” by using the ^$B command.
   - **C.** Send the break sequence to call up the 2760-RB configuration menu.
4. Select menu item 3: Device port protocol names. Set to:
   PORT1=COPYRIGHT 1989 ALLEN-BRADLEY COMPANY INC.
   2760-SFC2 DT SERIES A REVISION A (YES/NO)=YES
5. Select menu item 21: Identification numbers. Select:
   DUMB TERM. UNSPECIFIED PROTOCOL, 13FH (YES/NO)=YES
6. Select option 11: Configuration parameters. Set to:

   MODEM CONTROL (ENABLE/DISABLE)=DISABLE
   9600 BITS PER SECOND (YES/NO)=YES
   8 BITS NO PARITY (YES/NO)=YES
   XON/XOFF (ENABLE/DISABLE)=DISABLE
   RS232 (YES/NO)=YES
   RECEIVE MATRIXING (ENABLE/DISABLE)=ENABLE
   BYTE SWAPPING (ENABLE/DISABLE)=DISABLE
   BINARY DATA NO CONVERSIONS (YES/NO)=YES
   HDR/TLR ON OUTPUT (ENABLE/DISABLE)=ENABLE
   HEADER BYTE LENGTH (DEC 0...4)= 0
   HEADER DATA[0](HEX 0...FF)=0
   HEADER DATA[1](HEX 0...FF)=0
   HEADER DATA[2](HEX 0...FF)=0
   HEADER DATA[3](HEX 0...FF)=0
   TRAILER BYTE LENGTH (DEC 0...4)=2
   TRAILER DATA[0](HEX 0...FF)=0a
   TRAILER DATA[1](HEX 0...FF)=0d
   TRAILER DATA[2](HEX 0...FF)=0
   TRAILER DATA[3](HEX 0...FF)=0

7. Verify that the 2760-RB is in rack 0, group 0 module 0.
8. Save the above configuration.

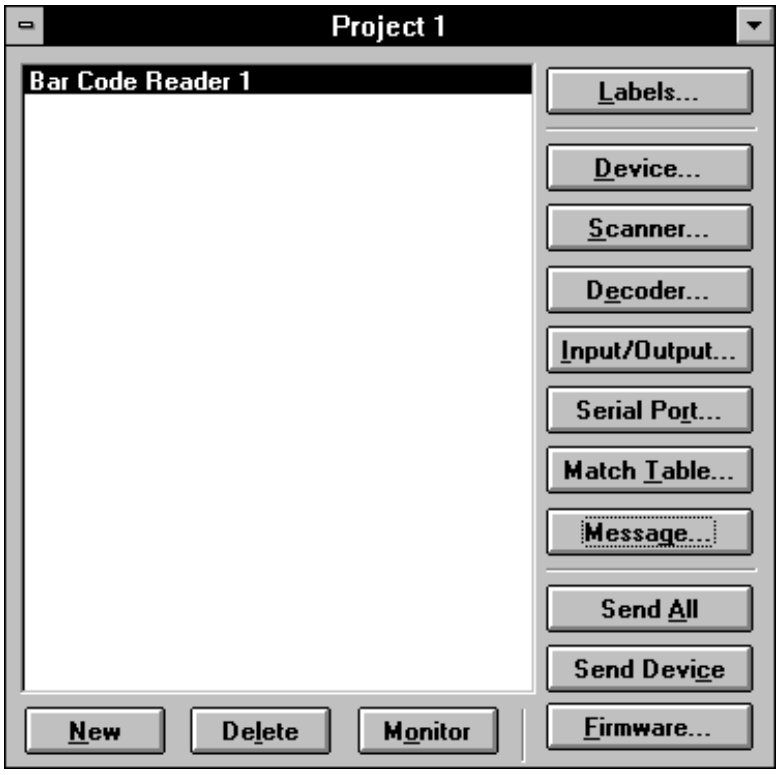
2755-SN3, -SN5, -SN8 AdaptaScan Reader Configuration

The AdaptaScan Offline Programmer configuration shows only the screens needed to establish communication to the 2760-RB module. Other AdaptaScan configuration parameters (selecting a bar code symbology, trigger methods, etc.) are beyond the scope of this document. See the AdaptaScan Configuration Software user manual.

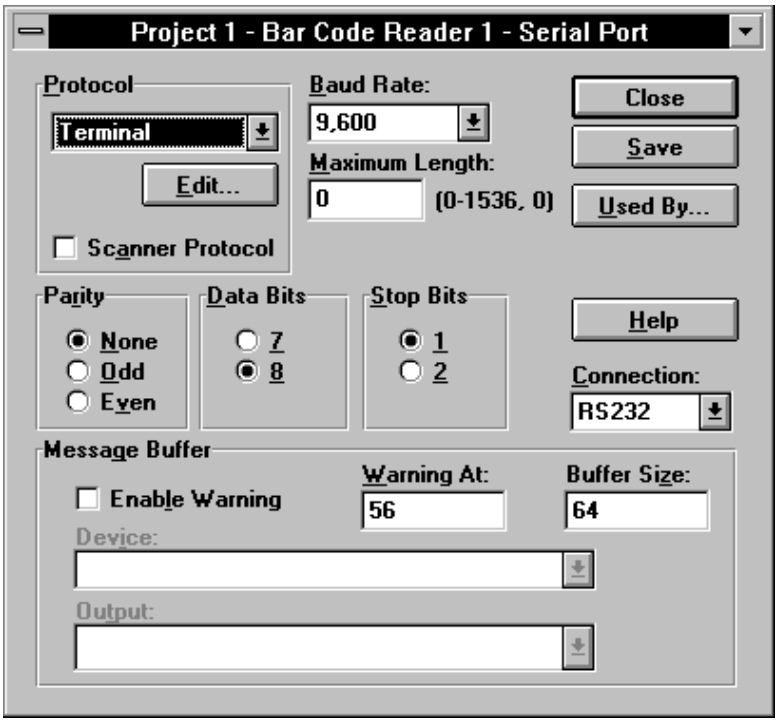
An example configuration for the 2755-SNx AdaptaScan Reader is illustrated below.

Important: The settings illustrated below represent only *part* of the configuration required for the AdaptaScan reader to work in a given application. Refer to the AdaptaScan Configuration Software user's manual for complete details on how to configure the reader for your application.

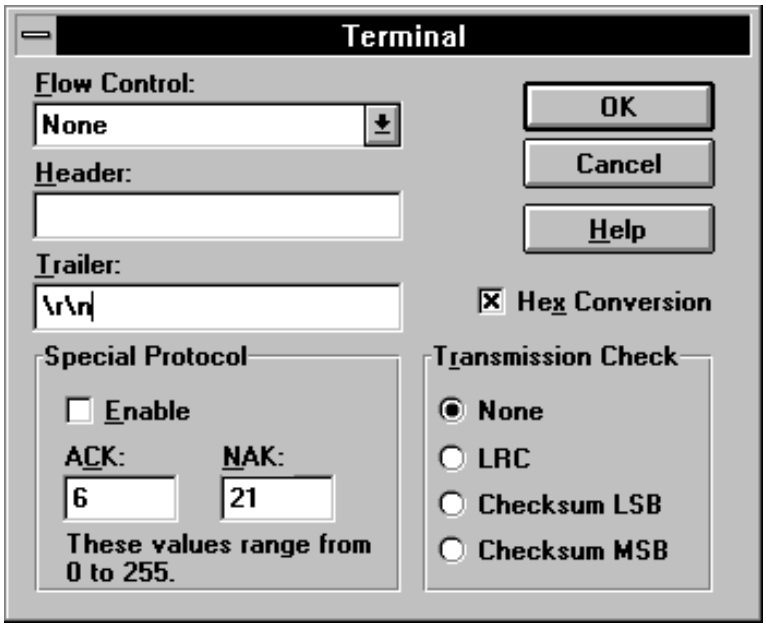
The Project dialog contains all the basic configuration options.



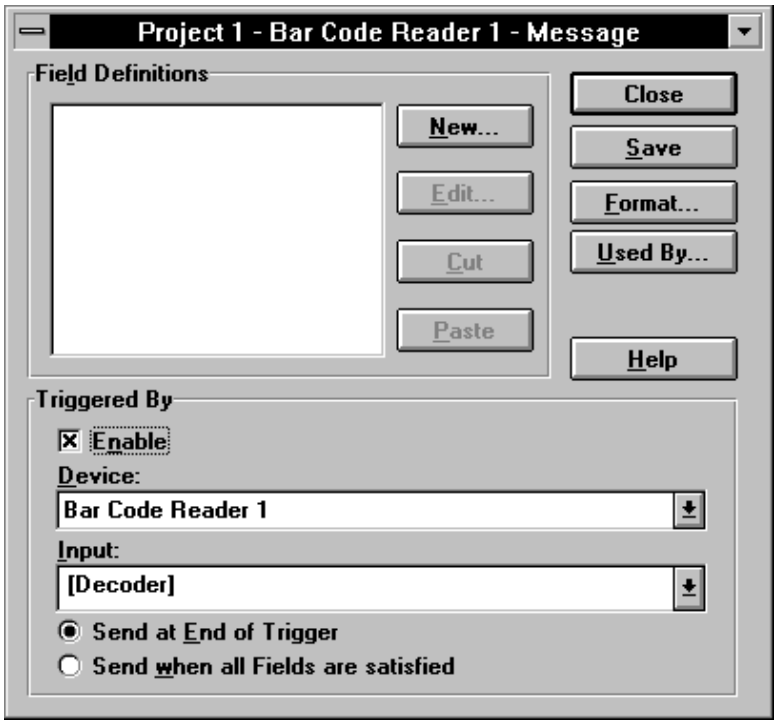
The Serial Port dialog defines communication parameters (RS-232/ RS-485/ RS-422) and protocols (ASCII, DH-485, DF1) for the reader's communication ports. Access it by selecting Serial Port in the Project dialog.



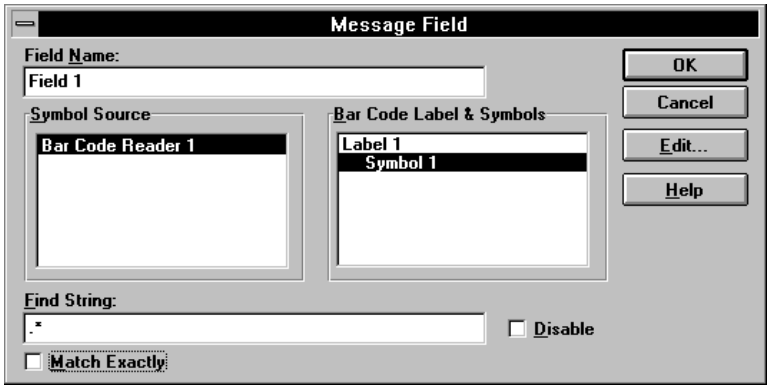
In the Serial Port dialog, choose Terminal in the Protocol box, and select Edit to get this dialog:



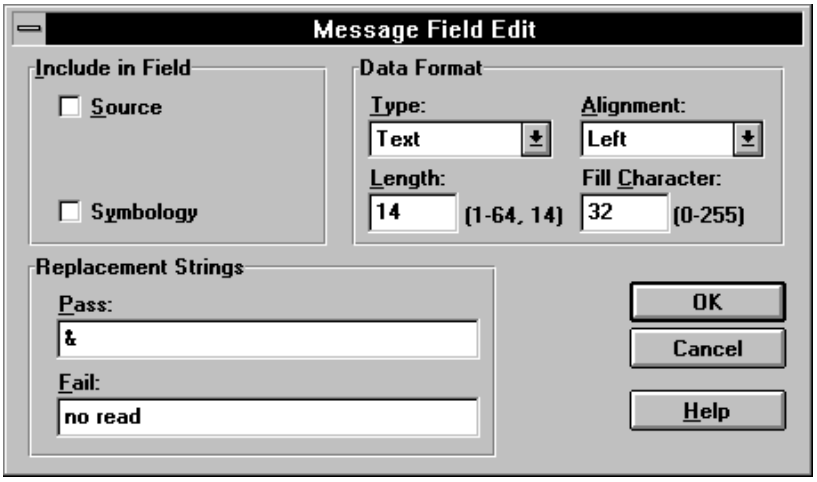
The Message dialogs define the format and content of message data sent to the host by the reader when bar codes are decoded. This dialog is accessed by selecting Message in the Project dialog.



When Edit is selected in the New Message screen, the Message Field dialog appears:



And when Edit is selected in the Message Field screen, this dialog appears:



Sample PLC Program

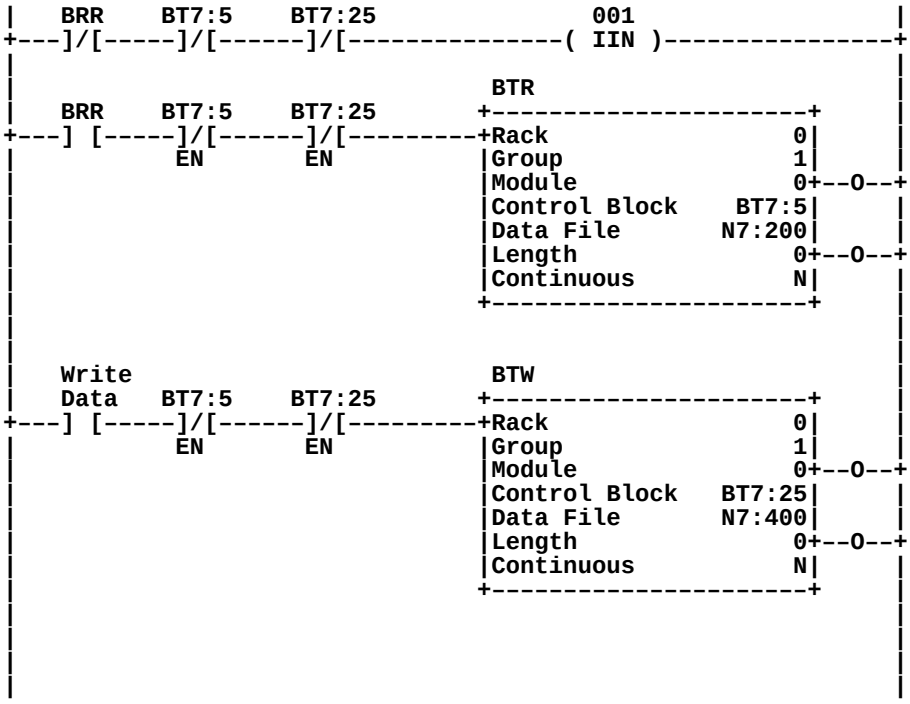
A sample PLC program appropriate for using a PLC 5/15/25 with a 2760 -RB module appears below.

```
|  I:000    N7:0     N7:5       +-----------------------+     |
+---] [-----]/[------]/[--------+Block Transfer Read    +--O--+
|   13      15       15         |Rack                  0|     |
|                               |Group                 1|     |
|                               |Module                0|     |
|                               |Control Block    N7:100+--O--+
|                               |Length                0|     |
|                               |Continuous            N|     |
|                               +-----------------------+     |
|                                                             |
|                                                             |
|   Write                                                     |
|   Data    N7:0     N7:5       +-----------------------+     |
+---] [-----]/[------]/[--------+Block Transfer Write   |     |
|           15       15         |Rack                  0|     |
|                               |Group                 1+--O--+
|                               |Module                0|     |
|                               |Control Block      N7:5|     |
|                               |Data File        N7:200+--O--|
|                               |Length                0|     |
|                               |Continuous            N|     |
|                               +-----------------------+     |
|                                                             |
```

Refer to your PLC-5 Instruction Reference Manual for detailed information on using the PLC-5 programming software.

Using the 2760-RB, Revision H or Above, with the New Generation PLC5

When the 2760-RB, Revision H or above, is used with the New Generation PLC5 processors in a local rack, there is a possibility that the PLC will not see the BRR bit from the 2760-RB. For the PLC5 to see the BTR bit, an odd number of image scans must occur. To ensure that the BTR instruction sees the BRR bit (bit 13) you must place an Immediate Input Instruction addressed to the BRR bit in another rung just before the Block Transfer Read (BTR) rung. This ensures that the BRR bit is seen by the NP-5 processor.



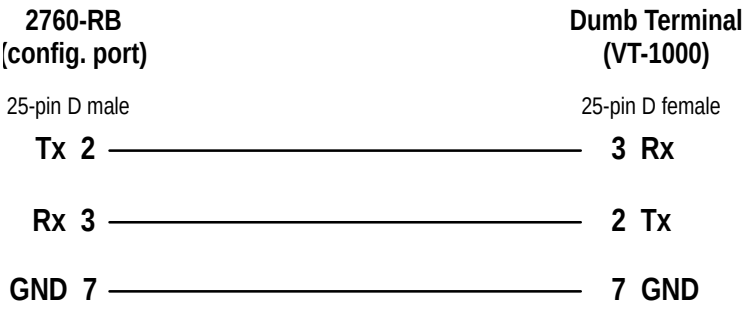
Note: BTR must come before BTW.

Cabling

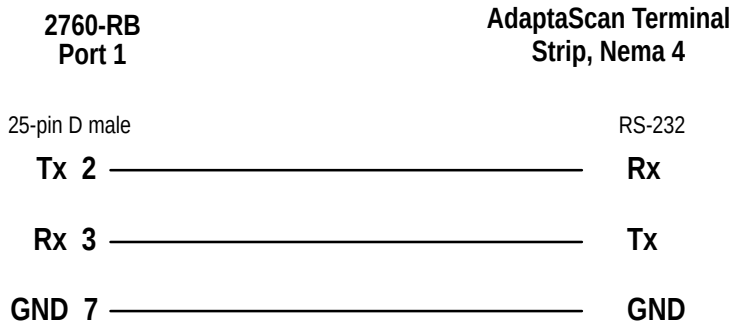
Cable 1 must be constructed to connect a configuration terminal to the 2760-RB Module Configuration port.

Cable 2 must be constructed to connect the RS232/422 port of the Bulletin 2755–SN3, -SN5, or -SN8 AdaptaScan reader wiring base to Port 1 on the 2760-RB. Refer to these cabling diagrams.

Cable 1



Cable 2



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