MAGUIRE PRODUCTS, INC.
11 Crozerville Road
Aston, PA 19014
tel: 610-459-4300
fax: 610-459-2700
www.maguire.com

BAR CODE DOCUMENTATION

Communications Between Maguire MLAN equipment and a Bar Code Scanner

BAR CODE COMMUNICATIONS
using the MLAN Protocol

Contents

I. Overview

The purpose of this document is to demonstrate how a bar code scanner can be used to communicate with Maguire equipment, such as the Weigh Scale Blender (WSB), using the Maguire Local Area Network (MLAN) Protocol.

The Weigh Scale Blender communicates at a baud rate of 1200 bps, with 8 data bits, no parity, and one stop bit (1200,8,n,1). When selecting a bar code scanner be sure to choose one that can be configured to these specifications. In addition, the scanner must have an RS-232 plug.

MLAN commands are transmitted as bytes of data; therefore, to encode MLAN commands into a bar code requires a bar code symbology which utilizes the full 256 character ASCII set. The bar code symbology used here to test communications is PDF417. PDF417, in addition to handling the full ASCII set, is capable of encoding messages up to 1108 bytes,1850 text characters, or 2710 digits.

A special MLAN cable needs to be used in conjunction with a null modem for a bar code scanner to communicate with all Maguire equipment. The cable converts RS-232 to MLAN. *(Note: The null modem could be hardwired right into the MLAN cable; however, it is not shown this way in the table below.)*

MLAN cable

WSB DB9 Connector	**Scanner Connector**	
Pin #	**DB9**	**DB25**
3	3	2
2	2	3
5	5	7 and 1
	6,7,8 tied together	4,5,6 tied together

The Weigh Scale Blender provides no power through its communications port; therefore, the scanner must have its own power supply.

II. The Bar Code Scanner

For testing purposes a **Scanteam 3400PDF** manufactured by **Welch Allyn**[†] was used. The bar code symbology used to test communications was PDF417. PDF417 is capable of encoding messages up to 1108 bytes,1850 text characters, or 2710 digits.

The bar code scanner was internally programmed for communication with MLAN using Welch Allyn's easy-to-use programming menu. (Note: Bar code scanners may vary from manufacturer to manufacturer so follow the manufacturers' instructions when programming the internal settings for your particular bar code scanner.) Indicated below are the **Scanteam 3400PDF**'s settings which were changed. For further information regarding these settings refer to **Scanteam 3400PDF**'s manual.

Beeper Default
RS-232 1200,8,N,1 ("No Read" Notification - No)
Wand Emulation Default
Trigger Default
Prefix/Suffix No prefix, No suffix (To clear suffix, NUL (00) was used.)
Code Selection I Default
Code Selection II Default
Code Selection III Default
Disable All Symbologies Not used

[†] Welch Allyn, 4619 Jordan Rd, Skaneateles Falls, NY 13153, Tel: (315)-685-8945

III. Creating Bar Codes

The following examples are provided to show how to create bar codes. In order to create a bar code that can be read by the WSB the command format **must** be followed in the same order as outlined in APPENDIX A of the MLAN Protocol Manual. Also, keep in mind that the bar code scanner is a one way device and can only send commands--it can not receive data. Thus, all commands that ask for data in return most likely will not work correctly with the bar code scanner.

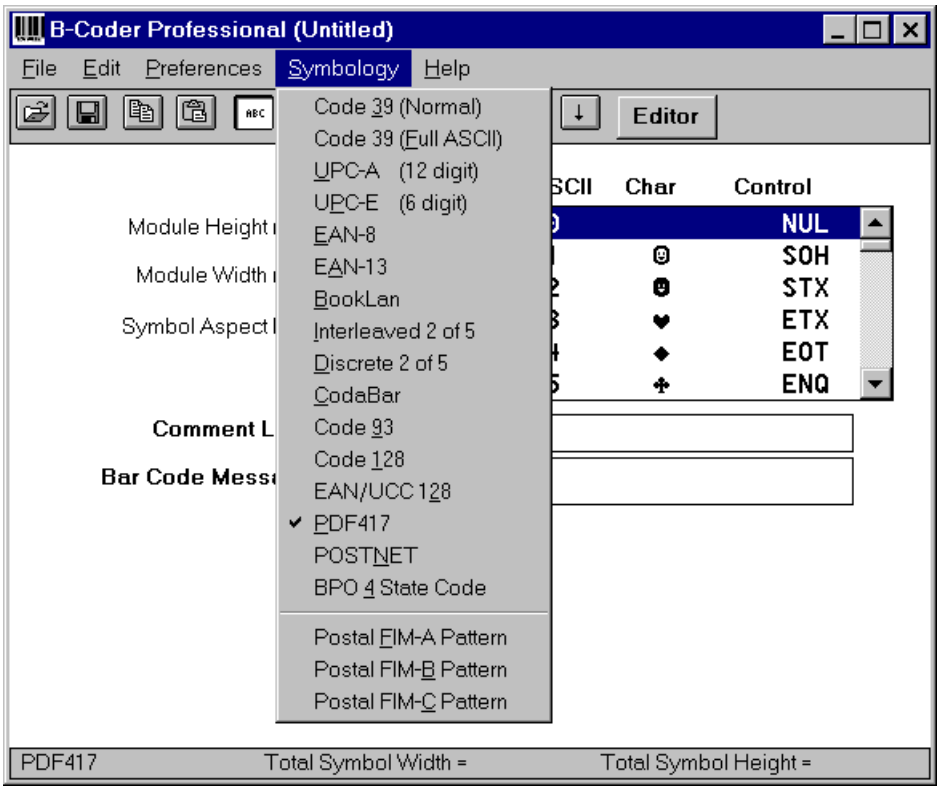
In addition to needing a bar code scanner, you will also need a means for creating the bar codes. That is, some type of software for printing out bar codes. The bar code printing software used to print out the codes in this manual was **B-Coder for Windows**[‡] by T.A.L. Technologies, Inc. The following outline will help to guide you through the process of creating bar codes using B-Coder for Windows.

A small utility program is available (mlancmd.exe) to help in the process of entering the data to create the bar codes. This utility will guide you through the process of entering in the data in the proper order as well as calculating the checksum. You will be asked a series of questions to assist you in generating the correct MLAN command. The program will provide you with the field values and checksum in the order that they should be entered into the bar code printing program. When entering these field values into B-Coder for Windows you will not enter them directly into the “Bar Code Message” field. Instead you will use the ASCII chart by scrolling to the appropriate ASCII numerical value and double-clicking on it. The program will then convert the number into the ASCII character and insert it into the Bar Code Message field. All settings should be entered into the software in the order that they are listed in the MLAN Protocol Manual.

The following examples will help to outline the method used to create bar codes.

When using B-Coder for Windows you will want to choose from the menu the bar code symbology. In that menu choose PDF417.

[‡] T.A.L. Technologies, 2027 Wallace St., Philadelphia, PA, 19130, Tel: (215)-763-7904



Example 1 - Set Parameter

The first example is used to demonstrate how to set a single parameter, in this case setting the DS1 parameter. The DS1 parameter is used to enter the weight of the dispense (for use with Weigh Scale Dispense systems). This parameter overrides any value that may appear on the top thumbwheel.

Command Format

Reference the Set Parameter command in the MLAN Protocol manual for a complete description on the command's format.

Field #	Name	Setting
1	Address	1
2	Response Code	68
3	Parameter I.D.	DS1 (ASCII)*
4	Parameter Value (2 bytes)	100
5	Checksum	49

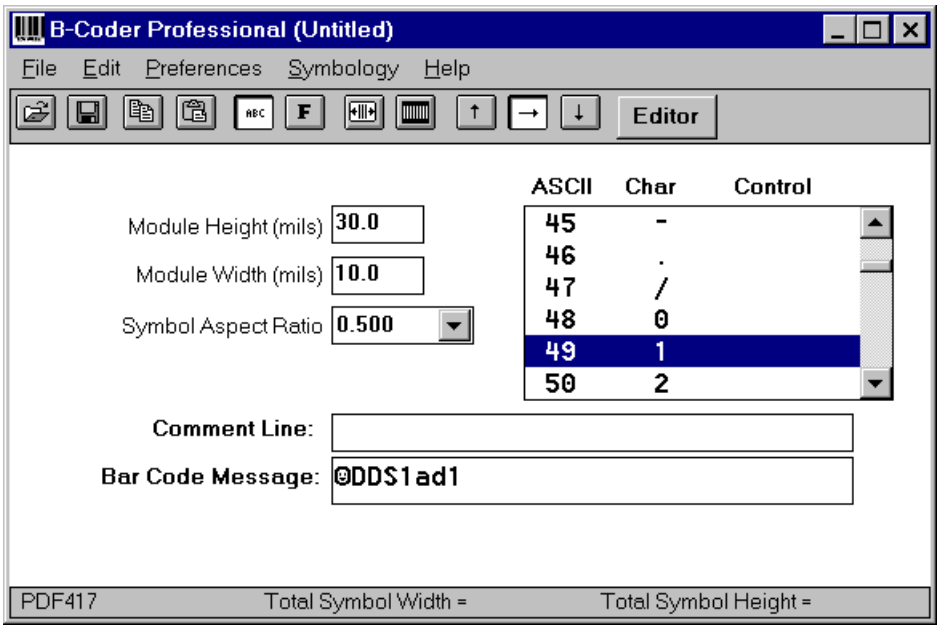
*The ASCII value for D is 68, S is 83, and 1 is 49.

When entering the command format into the bar code program choose the ASCII value from the left column by scrolling to the appropriate numerical value and double-clicking on the value. This in turn will convert and enter the ASCII character into the "Bar Code Message" field.

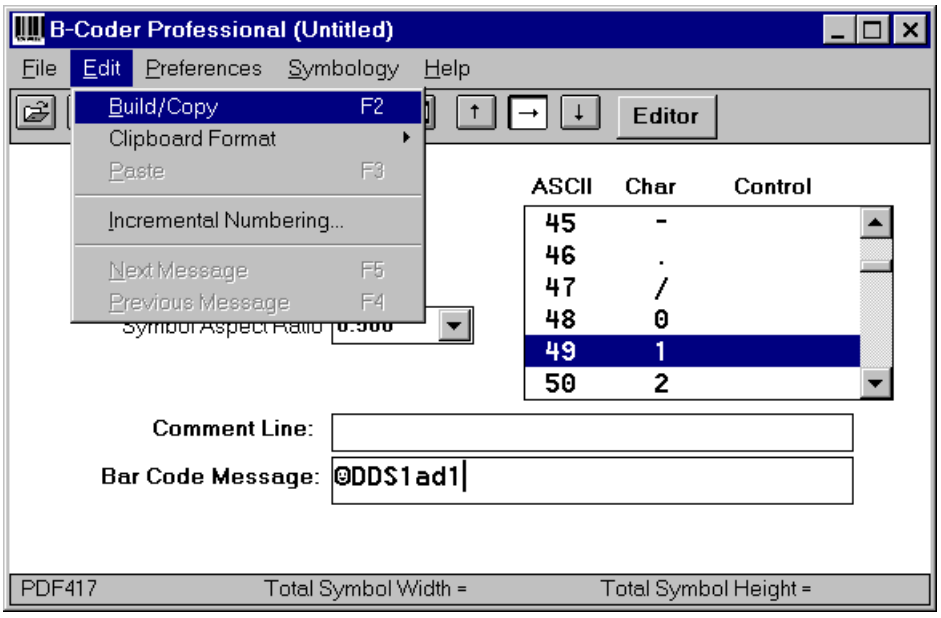
To calculate the checksum you may follow this procedure:

- Add up all ASCII values
- Divide the total by 256
- subtract the whole number (leaving only what is to the right of the decimal point.
- Multiply by 256
- Subtract 255
- What is left is a negative number. Disregard the minus sign. This number is your checksum.

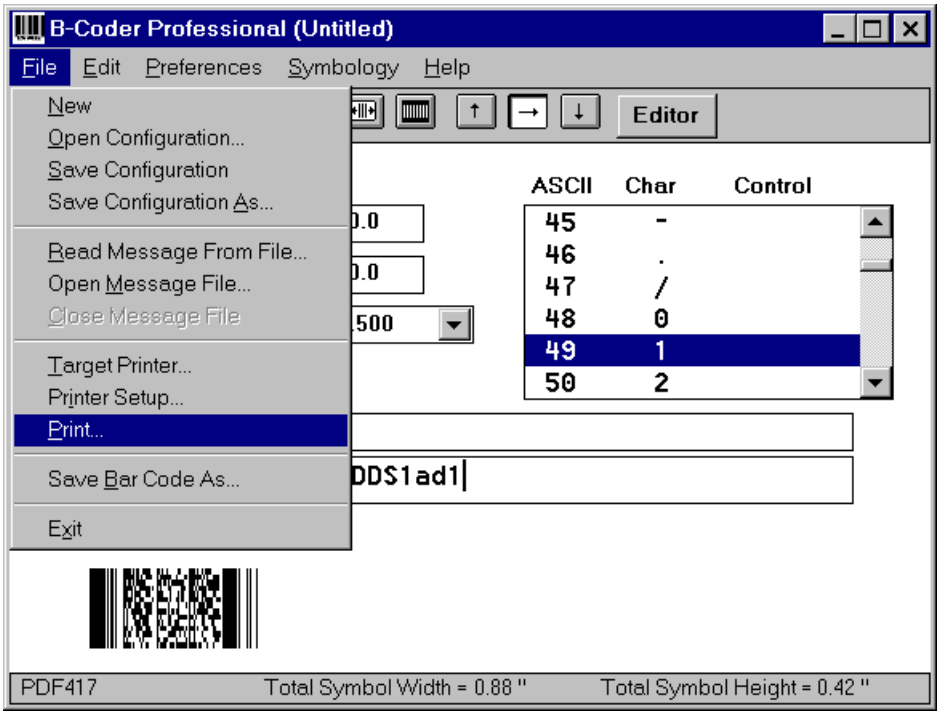
Notes: The Comment Line is for visual purposes only and has no effect on the bar code itself. Also, the Module Height and Module Width will effect the size of the bar code when printing. These parameters may need some adjusting based on your particular bar code scanner and the printer quality.



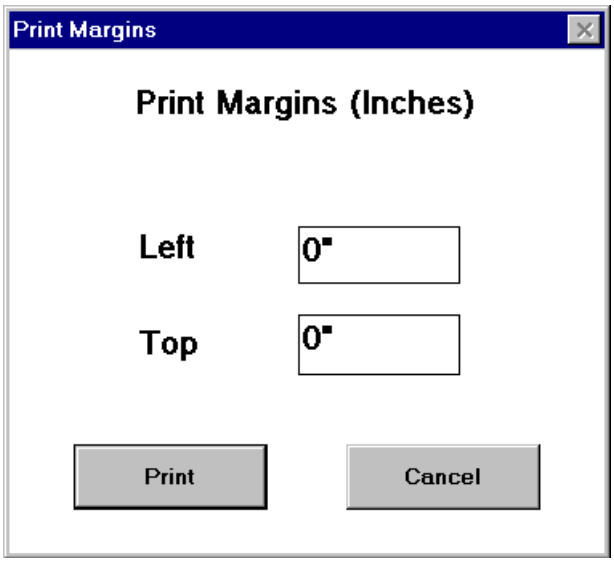
Next you will want to build the bar code. From the menu choose edit and build/copy. You will now have a bar code that is ready to be printed and tested.



After building the bar code you may choose from the file menu to print out the bar code to test or as a final copy.



When choosing to print, you will be prompted to set margins for your bar code. This is to help your printer align the bar code with the material to be printed on.



Example 2 - Send Settings

The second example illustrates how a bar code can be created for the purpose of setting mix percentages, component types, work order #, and operator #.

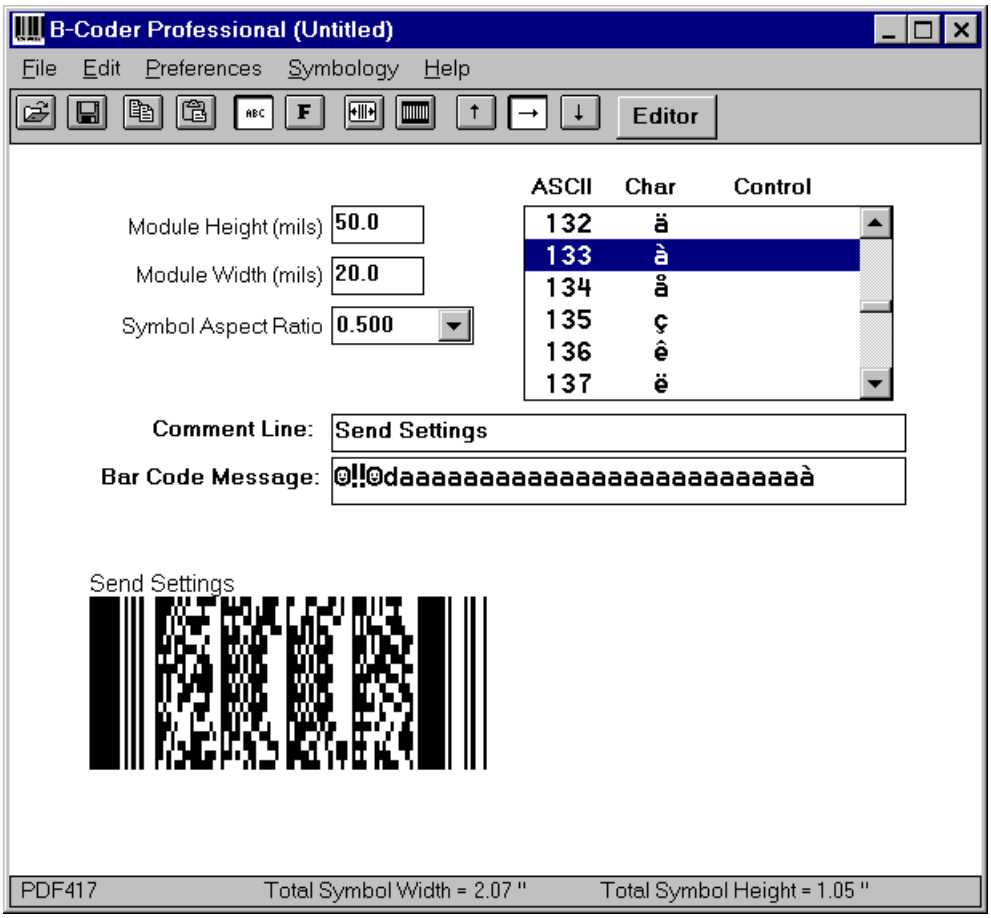
Reference the Send Settings command in the MLAN Protocol manual for a complete description on the command's format.

Command Format

Field #	Name	Setting
1	Address	1
2	Command code	19
3	Type Hopper 1	1
4	Setting Hopper 1	1
5	Type Hopper 2	0
6	Setting Hopper 2	0
7	Type Hopper 3	0
8	Setting Hopper 3	0
9	Type Hopper 4	0
10	Setting Hopper 4	0
11	Type Hopper 5	0
12	Setting Hopper 5	0
13	Type Hopper 6	0
14	Setting Hopper 6	0
15	Type Hopper 7	0
16	Setting Hopper 7	0
17	Type Hopper 8	0
18	Setting Hopper 8	0
19	Type Hopper 9	0
20	Setting Hopper 9	0
21	Type Hopper 10	0
22	Setting Hopper 10	0
23	Type Hopper 11	0
24	Setting Hopper 11	0
25	Type Hopper 12	0
26	Setting Hopper 12	0
27	Recipe	0
28	Work Order	0
29	Operator	0
30	Checksum	133

Entered into the bar code printing program was the following:

1, 19, 1, 100, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 133



Example 3 - Set Tag (Operator #)

The following two bar codes set operator numbers. See the Set Tag command in the MLAN Protocol manual for a complete description.

Weigh Scale Blender #1 Set Operator # to 100

The PDF417 bar code above sets the operator number of WSB #1 to operator #100.

The bar code message was formatted as the following:

Address	1
Response Code	90
Parameter I.D.	79
	80
	0
	0
	0
Parameter Value	100
Checksum	161

Weigh Scale Blender #3 Set Operator # to 40

The PDF417 bar code above sets the operator number of WSB #3 to operator #40.

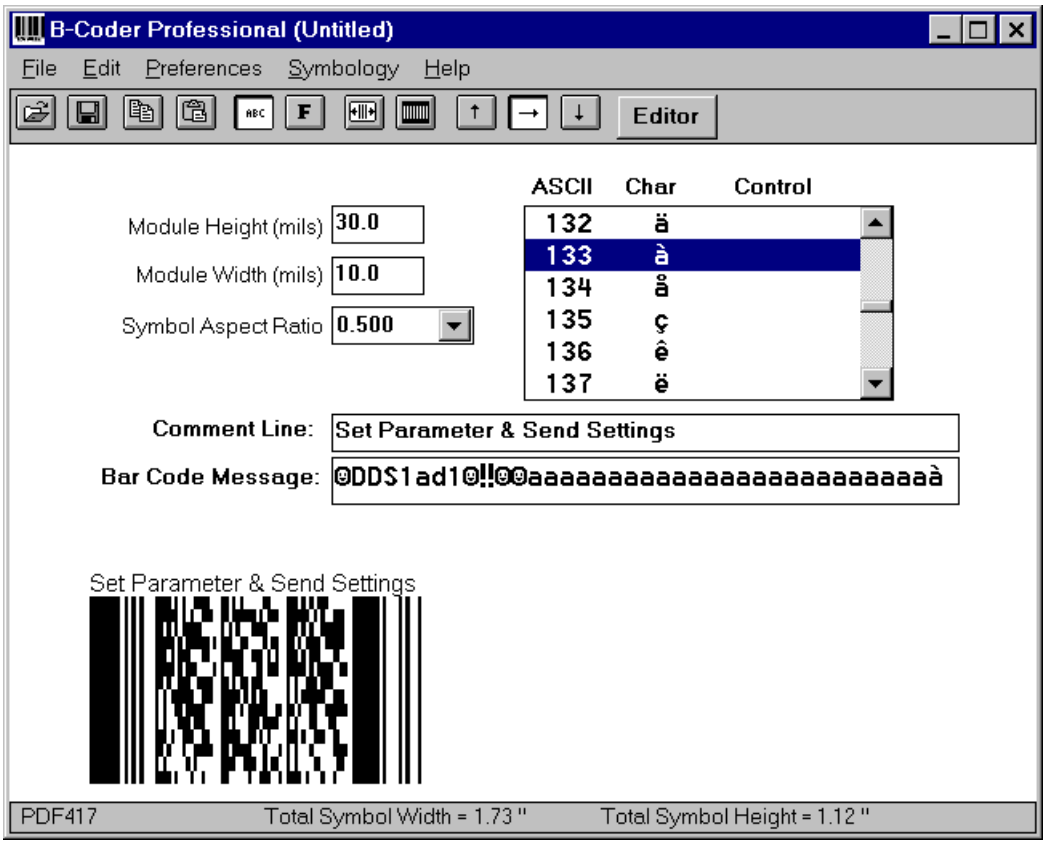
The bar code message was formatted as the following:

Address	3
Response code	90
Parameter I.D.	79
	80
	0
	0
	0
Parameter Value	40
Checksum	219

Depending on the model and manufacturer of the bar coder it was found that the size and clarity of the printed bar code determined whether the bar coder could read the bar code or not. It is recommended that test examples be printed out and checked to determine the proper size and clarity or the bar codes for optimum readability.

VII. Multiple Commands in a Single Bar Code

In many cases it would be beneficial for two or more commands to be encoded in a single bar code. For instance if the first two examples (shown above) were to be put into one bar code, you would simply enter the commands one after the other. As in the previous examples you would double-click on the numerical values of the command which in turn converts it to ASCII and inserts it into the “Bar Code Message” field. After entering in all of the numbers of one command you would continue with the numbers of the next command to be sent.


B-Coder Professional (Untitled)
File Edit Preferences Symbology Help
Editor
ASCII Char Control
Module Height (mils) 30.0
Module Width (mils) 10.0
Symbol Aspect Ratio 0.500
132 ä
133 à
134 å
135 ç
136 ê
137 ë
Comment Line: Set Parameter & Send Settings
Bar Code Message: ☺DDS1ad1☺‼☺☺aaaaaaaaaaaaaaaaaaaaaaaaaà
Set Parameter & Send Settings
PDF417 Total Symbol Width = 1.73 " Total Symbol Height = 1.12 "