

PROGRAMMER'S ADDENDUM

This addendum describes the software changes available in version 2.8 of the Monarch® 9825® printer and version 5.5 of the Monarch® 9855® and 9860™ printers. This addendum contains information about

- ◆ printing HF (High Frequency) RFID tags (9855 only).
- ◆ using the verifier upload immediate commands.
- ◆ defining an Aztec two-dimensional bar code symbology.
- ◆ programming the AFI field for UHF tags (9855 only).

Note: Information in this document supercedes information in previous versions. Check our Web site (www.paxar.com) for the latest documentation and release information.

Audience

This addendum is for the System Administrator, who designs and prints Monarch® Printer Control Language II (MPCLII) formats.

Printing HF RFID Tags (9855 only)

For more information about HF RFID tags, refer to the *HF Setup Guide and Supply Chart* or the *HF Application Notes*, available on our Web site.

Using the Verifier Upload Immediate Commands

The Monarch® 938™ Verifier saves data from each bar code it scans. Use immediate commands to upload the following data from the verifier:

- ◆ Scan grade
- ◆ Bar code data

Immediate commands affect printer operation as soon as the printer receives them, even if they are included within a packet or within quotation marks. Any data following an immediate command within quotation marks is ignored.

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To enable these commands, you must first send the control characters packet and define the immediate command control character. The immediate command control character is saved in non-volatile RAM so it is saved when you turn off the printer. Once the immediate command control character is defined, the immediate commands are enabled.

Defining the Control Characters Packet

Use the control characters packet (E) to change the MPCLII control characters, enable and disable the immediate commands, and change the default terminator character for job requests and ENQ's (inquiry requests).

Changes take effect with the first character following the end of header character } of the configuration packet. Each control character must be unique and cannot appear anywhere else in your packet, except within quotation marks. You can customize the trailer characters to work with your host.

Note: Wait two seconds for the new characters to take effect before sending packets using the new characters.

Use the following syntax for the control characters packet. Notice all but the first parameter are within quotation marks.

Syntax {I,E,"ANSI_cd","string1","string2" | }

E1.	<i>E</i>	Control Characters Packet		
E2.	"ANSI_cd"	~123	Start of header	{ (left bracket)
		~044	Parameter separator	, (comma)
		~034	Quoted strings	" (quotes)
		~124	Field separator	(pipe sign- use hex 7C)
		~125	End of header	} (right bracket)
		~126	Data escape character (optional)	~~ (double tilde)
		def. ch.	Immediate command character (optional).	

Up to any three characters in the **0-255** decimal range. The character must be defined before this command can be used. The caret (~094) is normally used.

Note: "ANSI_cd" includes seven separate parameters. The first five parameters are required. The other parameters are optional.

E3. "*string 1*" Terminator for status requests and ENQ requests. Up to any three characters in the **0-255** decimal range. The default is "013". Sending "" disables this sequence.

E4. "*string 2*" Terminator for job requests and data uploads. Up to any three characters in the **0-255** decimal range. The default is none. Sending "" disables this sequence.

After you change these parameters, all packets, including any future configuration packets, must use the new control characters. We recommend using the tilde and ASCII character code sequence when sending this packet multiple times. Also, set the packet delimiters to characters within the 21 hex to 7E hex range.

Example {I,E,"~123~044~034~124~125~126~094" | }

This does not change the control characters, but it enables the immediate commands by defining the caret symbol (~094) as the command identifier.

Sending Verifier Upload Commands

Immediate commands consist of a three- or four-character sequence you can send in a packet or embed in your application. Each command must be sent separately.

Syntax control character_immediate command

The printer can accept only one immediate command at a time. Sending a command before the previous one is completed can result in an error.

Command	Description
^VLE	Enables verifier data logging.
^VLD	Disables verifier data logging (default when the printer is reset).
^VLU	Uploads the log file to the last port that received host data (serial, parallel, USB, or Ethernet). Repeat this command until data is successfully uploaded. Data can be cleared after it has been uploaded.
^VLC	Only clears the data that has been uploaded, not all the logged data. Data is cleared with this command after a successful upload. We recommend clearing the log file after uploading.

Example ^VLE

Enables logging of scanned data from the verifier.

To prevent a loss of scanned data, we recommend uploading the data daily. The maximum number of scans depends on the bar code data length and memory. Generally, the printer can hold up to 7,000 scans. However, the scanned data is saved in RAM, so it is cleared when you turn off the printer or experience a power loss.

Note: After the maximum number of scans is reached, no error is generated and subsequent scanned data is not logged.

The following examples use the caret (^) as the defined immediate command control character and the other control characters { , " | } remain unchanged.

Example

^VLE	Starts a log file
1000 scans	verifier scans 1000 bar codes
^VLU	uploads 1000 scans
^VLU	uploads the same 1000 scans again
500 scans	verifier scans 500 bar codes
^VLU	uploads 1500 scans (first 1000 scans sent again, plus 500 scans)
^VLC	clears all 1500 scans

Example

^VLE	Starts a log file
1000 scans	verifier scans 1000 bar codes
^VLU	uploads 1000 scans
500 scans	verifier scans 500 bar codes
^VLC	clears the uploaded 1000 scans, but not the 500 non-uploaded scans
^VLU	uploads 500 scans
^VLC	clears 500 scans

Example

^VLE	Starts a log file
50 scans	verifier scans 50 bar codes
100 scans	verifier scans 100 bar codes
^VLU	uploads 150 scans
^VLC	clears 150 scans
^VLD	disables logging of the verifier's data

Sample Log File

A log file contains the bar code scan grade (numeric) and bar code data as shown below:

```
          { 3.5,123456789012 |
          3.0,876543212345 |
Scan Grade → 2.4,028028111195 ← Bar Code Data
          3.2,028028111155 |
          2.8,222222222222 | }
```

The numeric scan grade is from 0.0 to 4.0 and a comma separates the scan grade from the bar code data.

Converting the Numeric Scan Grade to a Letter Grade

Use this chart to convert the numeric scan grade to its letter grade equivalent.

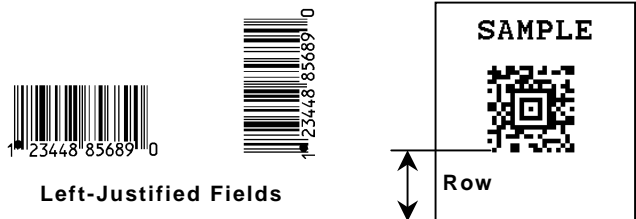
3.5 ≤	A	≤ 4.0
2.5 ≤	B	< 3.5
1.5 ≤	C	< 2.5
0.5 ≤	D	< 1.5
	F	< 0.5

Defining an Aztec 2D Symbology

Aztec is a two-dimensional bar code symbology consisting of square modules arranged around a square bulls eye pattern. For more information about the Aztec bar code, refer to the *ANSI/AIM BC13 ISS - Aztec Code Specification* from AIM Global.

Syntax `B,field#, # of char,fix/var,row,column,font,density,height,text,alignment,field rot!`

- B1. *B* Bar Code Field.
- B2. *field#* Unique number from **1-999** to identify this field.
- B3. *# of char* Maximum number of characters. The actual maximum number of characters is limited by the size of the label and bar code density. Range: **0-2710**. The default is 30.
- B4. *fix/var* Fixed (**F**) or variable (**V**) length field.
- B5. *row* Distance from bottom of the print area to the pivot point of the field. The pivot point varies, depending on how the field is justified.
To easily identify the pivot points (marked with a circle), a linear bar code is shown:



Printer	Unit of Measure	Row or End Row	Column or End Column
9855/ 9860	English (1/100 inch) Metric (1/10 mm) 203 dpi Dots	0-1599 0-4061 0-3246	0-399 0-1013 0-810
9855/ 9860	English (1/100 inch) Metric (1/10 mm) 300 dpi Dots	0-1199 0-3045 0-3597	0-399 0-1013 0-1197

- B6. *column* Distance from the lower left edge of the print area to the pivot point. Use the previous table for values. Allow a minimum of 1/10 inch between the scan edge of bar code and label edges or other data.
- B7. *font* Bar code type. Use **37**.
- B8. *density* Bar code density. The default is **2**. Select the density from the following table.



Bar Code Type	Density Selector	203 dpi Element Size (dots/mils)	300 dpi Element Size (dots/mils)	Data Length	Char Set
Aztec	2	0.0099	0.010	0-2710	00H to FFH
	3	0.0148	0.0133		
	4	0.0197	0.0167		
	5	0.0247	0.0233		
	6	0.0296	0.0266		
	7	0.0345	0.0333		
	8	0.0394	0.0366		
	9	0.0444	0.0433		
	10	0.0493	0.0466		
	11	0.0542	0.0533		
	12	0.0592	0.0566		
	13	0.0641	0.0633		
	14	0.069	0.0666		
	15	0.074	0.0733		

- B9. *height* Bar code height, in 1/100 inches, 1/10 mm, or dots. Use **0**.
- B10. *text* Appearance of text with bar code. Options:
0 Default
8 No text, bar code only
- B11. *alignment* Alignment of bar code data in the field. Use **L** (left).

- B12. *field rot* Field rotation. Field rotation rotates the whole field. Rotation is affected by the pivot point, which varies depending on how text is justified. The lower left corner of the field is the pivot point. The default is 0. Options:
- 0 Top of field points to top of supply
 - 1 Top of field points to left of supply
 - 2 Top of field points to bottom of supply
 - 3 Top of field points to right of supply

Example `B,3,2000,V,50,40,37,7,0,0,L,0|`

Defines a bar code field (field #3) with up to 2000 characters of variable length starting at row 50, column 40. The Aztec bar code uses a density of 7 (0.0345 element size). No text is shown with the bar code. The bar code is left-aligned with no field rotation.

```
{F,1,A,R,G,3000,832,"TEST"|
B,1,2000,V,50,300,37,7,0,0,L,0|
R,53,0,0,0,1,""}
{B,1,N,1|
1,"Monarch Brand Printers"|}
```



Defining Option 53 (Optional Aztec Bar Code Settings)

You can use Option 53 to set the error control level, enable ECI data, enable a menu symbol, and add appended data to an Aztec bar code.

Note: Typically, these settings are not used. When using Option 53, the printer may take longer to image the bar code and require more time to print the format.

Syntax `R,53,error_ctrl,ECI,menu_sym,str_append,"string"!`

- R1. *R* Option Header.
- R2. *53* Option 53.
- R3. *error_ctrl* Error control level. Some damaged bar codes may still be scannable if the error control level is high enough.
Options:
 - 0 Default level
 - 1-99
 - 101-104
 - 201-232
 - 300
- R4. *ECI* Sets the ECI Data flag. The default is 0. Options:
 - 0 Disable
 - 1 Enable
- R5. *menu_sym* Sets the Menu Symbol flag. The default is 0. Options:
 - 0 Disable
 - 1 Enable

- | | |
|-----------------------|--|
| R6. <i>str_append</i> | Structured append information. Range: 1-26 . The default is 1. |
| R7. <i>"string"</i> | String to append. Range: 0-24 . The default is "". Must be enclosed in quotation marks. |

Example `R,53,0,0,0,1,"" |`

Uses option 53 to set the error control to 0, disables the ECI data and menu symbol flags, and does not append any data to the bar code.

Programming the AFI Field for UHF RFID Tags (9855 only)

Use Option 64 to program the AFI memory in the EPC memory bank (field) for UHF RFID tags. Unlike the AFI field for HF tags, currently, the AFI field cannot be locked for UHF tags.

Note: Do not apply a lock to the EPC memory bank since the AFI memory is part of the EPC memory bank. If the EPC memory bank is locked, the AFI memory cannot be programmed (the printer errors). For more information about using EPC data or locking fields, refer to the *Multi-Protocol Application Notes* (available on our Web site).

Syntax `R,64,field,"code",lock |`

- | | |
|-------------------|---|
| R1. <i>R</i> | Option Header. |
| R2. <i>64</i> | Option 64. |
| R3. <i>field</i> | Memory field to program. Use A (AFI). |
| R4. <i>"code"</i> | Byte code. This is an 8-bit (1 byte) character to program, enclosed within quotation marks. Range: 0-255 . Use the ASCII character or the tilde followed by the equivalent three-character decimal value. For example, the letter "A" can be entered as "A" or "~041". |
| R5. <i>lock</i> | Lock code. Use 0 (no lock). |

Example `X,5,16,0,0 |`
`R,64,A,"A",0 |`

Programs the character "A" into the **AFI** memory field. The data is not locked (**0**).

Example `X,5,16,0,0 |`
`R,64,A,"~046",0 |`

Programs the character "F" into the **AFI** memory field. The data is not locked (**0**).