

Packet Reference Manual

{F,1,A,R,E,200,200,"FMT-1" ;
B,1,12,F,99,47,1,2,65,5,L,0 ;
C,74,36,0,1,1,1,B,L,0,0,"Fishing Tackle" ;
C,54,71,0,1,1,1,B,L,0,0,"\$40.00" ; }

{B,1,N,1 ;
1,"12345678901" ; }



123456 78901
Fishing Tackle
\$40.00



123456 78901
Fishing Tackle
\$40.00



123456 78901
Fishing Tackle
\$40.00



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Fishing Tackl
\$40.00

**Monarch®
Printers**

- ◆ 9412™
- ◆ 9413™
- ◆ 9414™

**Monarch®
PAXAR**

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GETTING STARTED

1

Before you read this manual, review the printer information in the *Equipment Manual*. This manual provides the necessary information to design, write and print a Monarch® Printer Control Language II (MPCLII) format. The following printers support this type of format:

- ◆ 9412™ (V. 1.0 or greater)
- ◆ 9413™ (V. 1.0 or greater)
- ◆ 9414™ (V. 1.0 or greater)

About This Manual

You do not need to be a programmer to use this manual, but you must be familiar with creating text files and executing basic MS-DOS® commands.

This chapter

- ◆ describes the significant differences between the printers.
- ◆ creates a sample MPCLII packet.
- ◆ shows how to download a sample packet.
- ◆ gives a list of daily procedures for operators.

This features table gives an overview of each printer's features. While these printers are very similar, some differences in operation and available options exist.

Feature	9412	9413	9414
Maximum print speed	2.0 ips	2.0 ips	2.5 ips
Maximum print area	2 in. x 6 in.	4 in. x 4 in.	4 in. x 6 in.
Location of Print Area	Center	Center	Center
Supply Width	1.2 in. x 2.36 in.	1.2 in. x 4.25 in.	1.2 in. x 4.25 in.
Supply Length	.38 in. x 6 in.	.38 in. x 4.0 in.	.38 in. x 6.0 in.
Power Up Mode	Online	Online	Online
Feed Mode	Continuous/ On-Demand	Continuous/ On-Demand	Continuous/ On-Demand
Ribbon	Yes	Yes	No (direct only)
Supplies	Tags or Labels	Tags or Labels	Tags or Labels
Field Number Range	0-999	0-999	0-999
Batch Separator	Yes	No	Yes
2D bar codes	Yes	Yes	Yes
Memory	128K battery- backed RAM	128K battery- backed RAM	512K Flash
Parallel Port	Yes	Yes	Yes

You can create larger images or store formats if you purchase additional memory. See "Defining Text Fields" in Chapter 4 for a list of available fonts for your printer. See Chapter 5, "Defining Field Options," for a list of available Options for your printer.

Before You Begin

1. Connect the printer to the host. Refer to your *Equipment Manual* for more information.
2. Load supplies in the printer. Refer to your *Equipment Manual* for more information.
3. Turn on the printer.
4. Set the communication parameters and configure the printer. The communication parameters at the printer must match those at the host. See Chapter 3, "Configuring the Printer," for more information.
5. Design your format. See "Starting with a Design" in Chapter 2 for more information.
6. Download your format to the printer. See Chapter 6, "Printing," for more information.

Creating an MPCLII Format Packet

A *format* defines which fields appear and where the fields are printed on the label. The printer requires this information in a special form, using Monarch Printer Control Language II (MPCL). This section describes how to create a sample MPCLII format packet.

Make sure supplies are loaded, the printer is connected to the host and is ready to receive data. Refer your *Equipment Manual* for more information.

For detailed information about the format header, text, constant text, and bar code fields, see Chapter 4, "Defining Fields." For information about batch packets, see Chapter 6, "Printing."

1. Type the following format header, in any text editor:

```
{F 25 A R M 508 508 "FMT-25" |
```

2. Type the following constant text field:

```
C 250 80 0 1 2 1 W C 0 0 "MONARCH MARKING" 0 |
```

3. Type the following bar code field:

```
B 1 1 2 F 1 1 0 1 1 5 1 2 1 2 0 5 L 0 |
```

4. Type the following text field:

```
T 2 1 B 7 V 3 0 3 0 1 1 1 1 1 B C 0 0 0 | }
```

You have created a format packet for your MPCLII printer. Now, a batch packet must be created before you can print the format.

5. Type the following batch header, after the text field line:

```
{B 25 N 1 |
```

6. Type the following bar code data:

```
1 "12345678901" |
```

7. Type the following text field data:

```
2 "DAYTON OHIO" | }
```

8. Save your file as SAMPLE.FMT.

9. Type MODE COM1:9600,N,8,1 at the DOS prompt if you are using serial communications. This sets the communication parameters at your host. These communication parameters must match those at your printer. See "Setting Communication Parameters," "Using Parallel Communications" in Chapter 3, or your host's documentation for more information.

10. Type COPY SAMPLE.FMT COM1. The following 2 inch by 2 inch label prints:

```
{F,25,A,R,M,508,508,"Fmt 25" |
C,250,80,0,1,2,1,W,C,0,0,"MONARCH MARKING",0 |
B,1,1,2,F,1,10,1,15,1,2,1,20,5,L,0 |
T,2,1,8,V,30,30,1,1,1,1,1,B,C,0,0,0 }
```

Sample Batch Packet

```
{B,25,N,1 |
1,"12345678901" |
2,"DAYTON, OHIO" | }
```

See Chapter 2, "Designing a Format" to design your format and Chapter 4, "Defining Fields" to create text, bar code, and line fields.



Daily Startup Procedures

You may want to design a checklist for operators to follow each day. Here are a few suggested items: Turn on the printer and host, make sure ribbon and supplies are loaded, make sure communication parameters are set, and download packets from the host to the printer.

You may want to keep records of supplies that have been printed. A good way to do this is to design a print log for operators to complete at the end of the day. Here are some suggestions for types of information to include in a print log: date, operator's name, format name, supply size, quantity printed, evaluation of print quality, and problems/comments.

Keep backup copies of your format, batch data, and check digit packets.

DESIGNING A FORMAT

2

This chapter describes how to

- ◆ determine what kind of information to use in your format.
- ◆ use the Supply Layout Grid and Format Worksheet.
- ◆ categorize data into field types.
- ◆ select fonts to use in your format.

Starting with a Design

Before you create a format packet, you must design your label. There are several steps to designing a custom label:

1. Decide which fields should appear on your label. See "Determining Format Contents" for more information.
2. Determine your label size. Labels are available from Monarch in a wide variety of sizes. Your application and the amount of data you need to print determines the supply size. Contact your Account Manager or Technical Support for more information.
3. Draw a rough sketch of your label. You may want to draw several variations to see what works best. See "Drawing Rough Sketches" for more information.
4. Identify the field types that appear on your label. See "Considering Field Types" for more information.
5. Decide which fonts you want to use. See "Considering Fonts" for more information.
6. Fill out your Format Worksheet. See "Using the Format Worksheet" for more information.

At this point, you are ready to send your design to the printer. To do this:

7. Create a format packet, based on how you filled out your worksheet. See Chapter 4, "Defining Fields," for more information.
8. Download your format packet to the printer. See Chapter 6, "Printing," for more information.

Determining Format Contents

Before you lay out your format, you need to make a few decisions. For example:

- ◆ How large is your supply?
- ◆ Which fonts do you want to use?
- ◆ Do you want to include a bar code?

Determining the Print Area

The "bottom" is the edge that exits the printer first. The 0,0 point is at the bottom left corner of the label. For these printers, the print area is in the center of the label. Check the table to determine the maximum print area.

Printer	Unit of Measure	Maximum Supply Size (Width x Length)	Maximum Print Area (Width x Length)
9412	English (1/100")	236 x 600	200 x 600
	Metric (1/10mm)	599 x 1524	508 x 1524
	Dots (1/203 dots)	479 x 1218	406 x 1218
9413	English	425 x 400	400 x 400
	Metric	1080 x 1016	1016 x 1016
	Dots	863 x 812	812 x 812
9414	English	425 x 600	400 x 600
	Metric	1080 x 1524	1016 x 1524
	Dots	863 x 1218	812 x 1218

Use the following formulas to convert inches to dots and metric:

$$\text{Dots} = \text{inches} \times 203$$

$$\text{Metric (1/10mm)} = \text{inches} \times 254$$

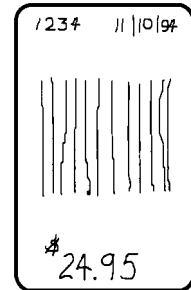
$$\text{English (1/100 inch)} = 100 \times (\text{dots}/203)$$

$$\text{Dots} = \text{Metric (1/10 mm)} \times 799/1000$$

Drawing Rough Sketches

After you decide what information you want to print, sketch how you want the information to appear on the label. Note any areas that are preprinted on the label, such as a logo.

As soon as you know what information to include on the label and you have a rough sketch, you can use a supply layout grid to help you layout and size your label. If you do not want to use a grid, go to "Considering Field Types" to choose what information you want on your label.



Using Supply Layout Grids

A supply layout grid contains measurement markers. These markers help you accurately position information on your label.

Decide whether you want to design formats using English, Metric, or Dot measurements. Choose from the following grids:

◆ English

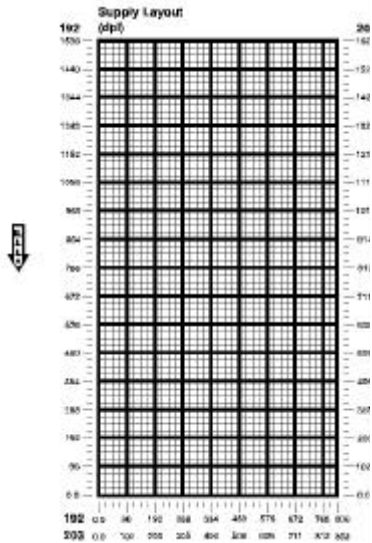
The English grid, shown to the right, is measured in 1/100 inches.

◆ Metric

The Metric grid is measured in 1/10 millimeters (mm).

◆ Graphic

The printer uses dots to print images on a label. The printhead has 203 dots per inch (DPI).



Choose English or Metric units when designing formats to use with different printers. English or Metric units allow more direct use of formats on printers with different density printheads.

If you want to use supply layout grids, a copy of each is in Appendix D, "Format Design Tools."

Considering Field Types

After you select a supply size, the next step in designing a format is to decide what information you want to print on the label. For example, you may want to print your company name, price of an item, and a bar code that combines information from other places. Everything you want to print falls into one of the following categories.

Field Type	Description	Examples
Text	Contains letters, numbers, or symbols you want to print.	item number, item description, department number, price, date
Bar Code	Used for printing bar codes that can be scanned.	item or serial numbers, zip codes, information you don't want to have visible to customers
Constant Text	Prints fixed characters that do not change.	company name, company address
Line or Box	Highlights or separates items.	line marking out the regular price, border around the supply
Non-Printable Text	Holds data for later use, such as for merging into another field. The printer does not print non-printable text fields.	city, state, and zip code to be included in a bar code

All of the above field types are discussed in Chapter 4.

Considering Fonts

When working with fonts, you have three considerations:

- ◆ font appearance
- ◆ font size
- ◆ font spacing (monospaced or proportional)

See Appendix B, "Fonts," for samples of each font.

Using the Format Worksheet

The Format Worksheet is divided into sections that list the field types. Each section has boxes to fill in with parameters that define your format. A format worksheet is included in Appendix D, "Format Design Tools."

Filling in the Format Worksheet

Decide what type of field to use on your label.

1. Make a copy of the Format Worksheet.
2. Define the Format Header.
3. Define all non-printable text fields before you define the ones you want to print. See "Defining Non-printable Text Fields" in Chapter 4 for more information.
4. Define options as you require them. See Chapter 5, "Defining Field Options" for more information.

CONFIGURING THE PRINTER

3

This chapter discusses how to

- ◆ set communication parameters.
- ◆ upload the printer's configuration or font information.
- ◆ configure the printer using online configuration packets.
- ◆ use immediate commands to control the printer's operation at any time.

Setting Communication Parameters

Use the following information for serial communications. See "Using Parallel Communications" for information about parallel communications.

The communication parameters at the printer must match those at the host, or you will not be able to communicate.

You can use the communication settings packet to set communication parameters for your printer.

On MS-DOS computers, you can use the MODE command to set communication values on your PC.

For example

```
MODE COM1:9600,N,8,1
```

This command sets your host to these communication values:

- ◆ a baud rate of 9600
- ◆ no parity
- ◆ 8 bit word length
- ◆ 1 stop bit

Using Parallel Communications

If your printer supports parallel communications, the parallel port is Centronics®-compatible. The communication settings are automatically configured for you. There are no operator settings required.

Using MPCLII Conventions

Here are some guidelines to follow when using MPCLII.

MPCLII Punctuation

Use the following symbols when creating MPCLII packets:

{	start of header
}	end of header
|	field separator
,	parameter separator
"ABC"	Quotation marks enclose character strings. Empty quotes ("") identify null strings or unused fields.
'comment'	Grave accents enclose comments. Any data enclosed in grave accents is ignored. Do not embed comments within a quoted string. Grave accents are also used to reject mainframe data.

These MPCL characters are the default. See "Defining the Control Characters Packet" to change these characters.

Standard Syntax Guidelines

When creating MPCLII packets:

- ◆ Begin each packet with a **start of header** (**{**).
- ◆ End each packet with an **end of header** (**}**).

- ◆ Define no more than **1000** fields in a format. Each **|** indicates one field. However, options are not counted as fields. The actual number of fields a format can have may be less, because the number of fields is limited by the available memory.
- ◆ The field number **0** to **999** must be unique. Monarch recommends starting at 1, instead of 0.
- ◆ Do not use a field number more than once per format.
- ◆ Define all fields in the order you want to image/print them. The printer does not print in field number order.
- ◆ Separate all parameters with a **Parameter Separator** (,).
- ◆ End each field with a **Field Separator** (|).
- ◆ Enter all information in CAPITAL letters, except words or phrases within quotation marks.
- ◆ Include all field parameters unless documented as optional.
- ◆ Define non-printable text fields before the field to which they apply.
- ◆ Define options immediately after the field to which they apply.
- ◆ Multiple options can be used with most fields. Options can be used in any combination except as noted with each definition.
- ◆ Keep in mind that proportionally spaced fonts need wider fields than monospaced fonts. For variable field data, use a letter "W" to determine the maximum field size.
- ◆ Do not place a new line (return) or any other non-printing character in a character string. However, a carriage return or line break after each **|** makes your formats easier to read.
 - T,1,20,V,30,30,1,1,1,1,B,C,0,0,0|
 - T,2,10,V,50,30,1,1,1,1,B,C,0,0,0|
- ◆ Spaces are ignored, except within character strings.
- ◆ Indenting options improves readability of your formats.
 - T,1,18,V,30,30,1,1,1,1,B,C,0,0,0|
 - R,42,1|
- ◆ Use a tilde (~) followed by a 3-digit ASCII code in a quoted string to send function codes or extended characters.

You can modify formats and fields with the optional entry method. See "Optional Entry Method" in Chapter 6 for more information.

Using Online Configuration Packets

Use online configuration packets to change the printer settings. You can send an individual packet or a packet that contains all seven online configuration packets. You can supply all parameters for each packet. Leave the parameters blank that you do not need to change. For example,

{I,A,,,1 | } prints a slashed zero and uses the last sent *online* System Setup parameters.

Make a copy of the online configuration worksheet in Appendix D, "Format Design Tools," and save the original. Packets A-M are listed on the worksheet.

When you turn off the printer, all the information in the online configuration packets is saved and used when the printer is turned back on. After you change printer configurations, you must resend the format or batch to the printer before the changes take effect.

Configuration Packet Header

Always include an I, immediately after the left bracket { and before the packet identifier (A, B, C, etc.). The I parameter identifies the data stream as a configuration packet.

Include the I parameter with each packet if you are sending them individually. Include it only at the beginning of a data stream if you are sending multiple packets.

This is the syntax to use when you create online configuration packets:

Syntax

```
{I,1 to 7 optional packet      Start of Header, Configuration Header
A, parameter 1...parameter 5 | System Setup
B, parameter 1...parameter 5 | Supply Setup
C, parameter 1...parameter 5 | Print Control
D, parameter 1...parameter 3 | Monetary Formatting
E, parameter 1...parameter 9 | Control Characters
F, parameter 1...parameter 5 | Communication Settings
M, parameter 1...parameter 4 | } Memory Configuration, End of Header
```

Syntax for single packet

```
{                                Start of Header
I                                Configuration Packet Identifier
A, parameter 1...parameter 5 | System Setup
}                                End of Header
```

You can also add a configuration to non-volatile RAM or specify units for supply, print, and margin positions. If you use the optional parameters with the I packet, any online configuration packets following the split vertical bar (|) must specify distances using the selected units.

Syntax {header, ID#, action, device |}

1. *header* Constant I
2. *ID#* ID. Use **0**.
3. *action* Action. Options:
 - A** Add configuration
 - U** Upload User Configuration
4. *device* Storage Device. Options:
 - F** Flash (9414 only)
 - N** Non-volatile RAM (9412/9413 default)
 - R** RAM (9414 default)
5. *units* Units (optional parameter). Options:
 - E** English
 - M** Metric
 - G** Dots

Example {I,0,A,N,E |
 C,0,25,0,0,0 | }

Adds a configuration to non-volatile RAM and specifies English units. It also uses the default contrast, moves print 0.25 inches closer to the bottom of the supply and does not change the margin adjustment, prints at the default print speed, and uses the default printhead width.

If you do not use the optional parameters, the syntax for the online configuration packets does not change. For example,

 {I,C,0,50,0,0,0 | }

uses the default contrast, moves print 50 dots (0.25 inches) closer to the bottom of the supply and does not change the margin adjustment, prints at the default print speed, and uses the default printhead width.

Example {I,0,U,N | }

Uploads the printer configuration from non-volatile RAM and returns the following to the host.

```
A,0,0,0,0 |  
B,1,0,0,0,0,0 |  
C,0,0,0,0,0 |  
D,1,0,2 |  
E,"~123~044~034~124~125~126","~013~010","" |  
F,3,1,0,0,1 |  
M,R,0,0,N,2424,0 |  
M,R,N,20 |  
M,T,N,10 |  
M,I,N,1259 |  
M,D,N,975 |  
M,F,N,160 |  
M,V,N,0 | }
```

The parameters for each packet (**A-M**) are displayed. In the first line that begins with **M**, 0 is the total volatile memory available, 0 is the memory used in volatile RAM. 2424 is the total non-volatile memory available, 0 is the memory used in non-volatile RAM. The remaining lines beginning with **M** list the buffer sizes in 1/10K for the Receive, Transmit, Image, Downloadable Fonts, Formats, and Scalable Fonts Buffers.

The scalable font is not available
for these printers.

Configuration Syntax Guidelines

When creating a printer configuration packet:

- ◆ Follow the "Standard Syntax Guidelines" listed at the beginning of this chapter.
- ◆ Begin a packet with the configuration header (I).
- ◆ Download multiple configuration packets within one packet or download a single configuration packet.
- ◆ Include the first five ANSI codes, at a minimum, in the control characters packet.
- ◆ If you change any of the online configuration packets, resend the format packet to the printer, so the configuration changes take effect.
- ◆ Make sure the communication settings at the host match those at the printer.

Defining the System Setup Packet

Use the system setup packet (A) to select the power up mode, display language, print separators between batches, print a "slashed zero," and select the symbol set.

Syntax {I,A,powup_mode, language, sep_on, slash_zero, symbol_set |}

A1. A System Setup Packet

A2. *powup_mode* Online Mode. Must use 0.

A3. *language* Display Language. Must use 0.

A4. *sep_on* Batch Separators. Options:
 0 Does not print a separator (default for all printers).
 1 Prints a separator.

A5. *slash_zero* Slash Zero. Options:
 0 Print a standard zero (default for all printers).
 1 Print a zero with a slash through it.

A6. *symbol_set* Symbol Set. Options:
 0 Internal/ Monarch (default for all printers)
 1 ANSI
 2 Code Page 437
 3 Code Page 850

Example {I,A,0,0,1,1,0 | }

Powers up the printer in the online mode, displays prompts in English, prints a separator after each batch, prints zeros with slashes through them, and uses the internal symbol set.

Defining the Supply Setup Packet

Use the supply setup packet (B) to select supply type, ribbon, feed mode, supply position, and cut position.

Syntax {I,B, supply_type , ribbon_on , feed_mode ,
supply_posn , cut_posn }

B1. B Supply Setup Packet

B2. supply_type Supply Type. Options:
 0 Black mark stock
 1 Die Cut/aperture stock (default for all printers)
 2 Non-indexed stock

To use black mark supplies, send this packet {I,B,0,,,, }. Turn off the printer. Turn the printer on while holding the FEED button. Release when the supply starts to advance. After the printer prints a test label, press the FEED button again to exit Data Dump mode. Turn off the printer and then, turn it back on. The printer is ready for black mark operation.

B3. ribbon_on Ribbon. Options:
 0 Ribbon not installed (9414 default)
 1 Ribbon installed (9412/9413 default)

NOTE: The 9414 printer does not support a ribbon.

B4. feed_mode Feed Mode. Options:
 0 Continuous operation (default for all printers)
 1 On-demand mode

For the 9412/9413 printers, you must have the on-demand sensor installed to use on-demand mode. Also, the feed mode is determined by the presence of the on-demand sensor, not from this parameter. If the on-demand sensor is open, you are using on-demand mode. If the on-demand sensor is closed, you are using continuous mode. There is a switch on the 9414 printer for on-demand mode. Refer to your *Equipment Manual* for more information.

B5. supply_posn **-300 to 300** in 1/203 inch. 0 is the default for all printers. Adjusts the machine to print at the vertical 0,0 point on the supply. This adjustment accounts for mechanical tolerances from machine to machine. The supply position adjustment only needs to be made on the initial machine setup.

You can't change the supply position while the printer is active. Changing the supply position will affect the print position.

B6. cut_posn **-99 to 99** in 1/203 inch. Use **0** for these printers.

Example { I, B, 0, 0, 1, 10, 0 | }

Indicates black mark and thermal direct stock has been loaded, causes the printer to operate in on-demand mode and feeds the supply approximately .05 inches up before printing the format on each label (10/203 inches).

Defining the Print Control Packet

Use the print control packet (C) to set the contrast, print, and margin adjustment, print speed, and printhead width.

Syntax { I, C, contrast, print_adj, margin_adjust, speed_adj, ph_width | }

C1. C Print Control Packet

C2. contrast **-390 to 156**. 0 is the default for all printers.

C3. print_adj **-99 to 99** in 1/203 inch. 0 is the default for all printers. Adjusts where data prints vertically on the supply. Increase the print position to move print up, decrease to move print down.

C4. margin_adj **-99 to 99** in 1/203 inch. 0 is the default for all printers. Adjusts where data prints horizontally on the supply. Increase the margin position to move print to the right, decrease to move print to the left. Margin and print position are format adjustments. They will not affect the supply position.

C5. speed_adj Print speed. Use **0** for these printers.

C6. ph_width Width of the printhead in dots. Use **0** for these printers.

Example { I, C, 0, -20, -10, 0, 0 | }

Uses the default contrast, moves print 0.1 inch closer to the bottom of the supply (20/203 inches) and .05 inch to the left on the supply (10/203 inches), prints at two inches per second, and uses the default printhead width.

Defining the Monetary Formatting Packet

The monetary formatting packet (D) selects the monetary symbols to print for a price field. Use the monetary formatting packet to select primary and secondary monetary symbols, and designate the number of digits to appear at the right of a decimal.

Syntax {I,D,cur_sym,secondary,decimals | }

D1. D Monetary Formatting Packet

D2. cur_sym Currency Symbol. Options:

- 0** No symbol
- 1** USA (\$, Dollar- default for all printers)
- 2** UK (£, Pound)
- 3** Japan (¥, Yen)
- 4** Germany (₹, Deutsche Mark)
- 5** France (F, Franc)
- 6** Spain (P, Peseta)
- 7** Italy (L., Lira)
- 8** Sweden (Kr, Krona)
- 9** Finland (₯, Markka)
- 10** Austria (₯, Shilling)
- 11** India (Rs, Rupee)
- 12** Russian (₯, Ruble)
- 13** Korean (₩ Won)
- 14** Thai (฿, Baht)
- 15** Chinese (¥, Yuan)

NOTE: To use these symbols, select the internal symbol set.

D3. secondary Secondary Sign. Options:

- 0** No secondary sign (default for all printers)
- 1** Print secondary sign

NOTE: Secondary symbols only print if you designate at least one decimal place.

D4. decimals Number of digits to the right of the decimal. Options:

- 0** No digits
- 1** One digit
- 2** Two digits (default for all printers)
- 3** Three digits

Example {I,D,1,1,2 | }

Prints the dollar sign, uses a secondary symbol, and places two digits to the right of the decimal.

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.

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.

—————
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. E 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)
	~125	End of header	}	(right bracket)
	~126	Data escape character (optional)	~~	(double tilde)
def. ch.		Immediate command character (optional). Up to any 3 digits in the 0 to 255 decimal range. The tilde (~) must be used with decimal characters. 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 3 digits in the 0 to 255 decimal range. The tilde (~) must be used with decimal characters. The default is "013". Sending "" disables this sequence.
- E4. "string 2"* Terminator for job requests and data uploads. Up to any 3 digits in the 0 to 255 decimal range. The tilde (~) must be used with decimal characters. 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. Monarch recommends 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.

You must send the control characters packet to enable the immediate commands. An immediate command will execute immediately, even if it is embedded within quotation marks, and all data following the command in the string will be ignored.

Example {I,E,"~123~063~034~124~125~126~094" | }

Changes the parameter separator character from , to ?. The other control characters remain unchanged. It also enables the immediate commands by defining the ^ symbol as the command identifier.

Resetting Control Characters

You can change the characters in the previous example back to their original settings by downloading this packet:

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

Notice that the parameter separator is ? in this packet. This is the parameter separator that was set before this packet. Once the packet is received by the printer, the new parameter separator (a comma, in this case) is valid.

Be careful when using this feature. If you forget what the control characters were changed to, print a test label. The test label lists the current control characters. See "Printing a Test Label," in Chapter 8 for more information.

Defining the Communication Settings Packet

Use the communication settings packet (F) to set the baud rate, word length, stop bits, parity, and flow control for serial communications. To set parallel communications, see "Using Parallel Communications." Changing the communication settings takes approximately two seconds. Communications sent during this interval will be lost. Make sure the host communication values match the values on the printer.

Syntax {*I*,*F*,*baud*,*word_length*,*stop_bits*,*parity*,
 flow_control | }

F1. F Communication Settings Packet

F2. baud Baud Rate. Options:
 0 1200 **3** 9600 (default for all printers)
 1 2400 **4** 19200
 2 4800 **5** 38400

F3. word_length Word Length. Options:
 0 7-bit word length
 1 8-bit word length (default for all printers)

F4. stop_bits Stop Bits. Options:
 0 1-stop bit (default for all printers)
 1 2-stop bits

F5. parity Parity. Options:
 0 None (default for all printers)
 1 ODD parity
 2 EVEN parity

F6. flow_control Flow Control. Options:
 0 None **2** (CTS)
 1 DTR (default **3** XON/XOFF
 for all printers)

NOTE: If you use the DOS COPY command to download your formats, set "Flow Control" to **DTR** (not XON/XOFF).

Example { I , F , 3 , 1 , 0 , 0 , 1 ! } }

Uses 9600 baud, an 8-bit word length, one stop bit, no parity, and the DTR mode.

Defining the Memory Configuration Packet

Use the memory configuration packet (M) to customize the size of your printer's buffers, which gives you greater flexibility in your formats.

Memory must be allocated in 1/2K increments. The memory configuration packet does not accept decimals, so enter whole numbers. Multiply the amount to reallocate (in K) by 10. For example,

To reallocate (in K)	Enter this amount
1	10
1.5	15
2	20
2.5	25
32	320
153	1530
229.5	2295

Each buffer's allocated memory remains in effect until that buffer is reallocated. For this reason, you may want to reallocate all the buffers when reallocating any buffer. If you reallocate more memory than you have available, you will receive an error.

Syntax { I , M , buffer , device , buffer_size ! } }

M1. M Memory Configuration Packet

M2. buffer Buffer type:

- D** Downloadable Fonts
- F** Format
- I** Image
- R** Receive
- T** Transmit
- V** Scalable (vector) Fonts

NOTE: The scalable font is not available for these printers.

M3. device Storage type. Options:

- N** Non-volatile RAM (9412/9413 only)
- R** Volatile RAM (9414 only)

M4. buffer size Buffer size in 1/10K ranges. See the following table for ranges.

Example { I, M, I, R, 1530 | }

Stores the image buffer in volatile RAM and allocates 153K for it.

The following table lists the configured buffer sizes and min-max values for your printer.

Buffer	Type	9412	9413/9414
Transmit	Non-Volatile	1K (.5K- 4K)	1K (.5K- 4K)
Receive	Non-Volatile	2K (2K- 64K)	2K (2K- 64K)
Image	Non-Volatile	67K (38.5K- 512K)	83K (38.5K- 512K)
Downloadable Fonts	Non-Volatile	10K (8K- 512K)	10K (8K- 512K)
Scalable Fonts	NA	NA	NA
Formats (Formats and Batches)	Non-Volatile	16K (16K- 512K)	16K (16K- 512K)
Internal	NA	cannot reallocate	cannot reallocate

The transmit and receive buffers are fixed and cannot be reallocated. The printer's configuration is stored in non-volatile RAM and retained when you turn off the printer.

Checking Current Buffer Sizes

Send a configuration upload packet to check the sizes of your current buffers. See "Using Configuration Upload Packet" for more information. After you check your current buffer sizes you can begin reallocating memory.

If you want to increase your image buffer and you will not be using scalable fonts, add that memory into your image buffer.

<i>Example</i>	{ I, M, R, N, 20 |	Receive buffer	2K
	M, T, N, 10 |	Transmit buffer	1K
	M, D, N, 80 |	Downloadable fonts	8K
	M, V, N, 160 |	Scalable fonts buffer	16K
	M, I, N, 3200 | }	Image buffer	320K

Make sure memory is available before adding memory to a buffer. In the above example, if the image buffer (M,I,N,3200) was defined before the downloadable fonts and scalable fonts buffers (M,D,N,80 and M,V,N,160) were defined, an error would have occurred.

About Memory Buffers

Transmit Buffer Used to send ENQ, job, and upload responses. This buffer must be allocated as non-volatile (**N**) RAM.

Receive Buffer Used to save data received from the host before it is processed by the printer. Changing this buffer size affects the amount of data the printer can receive without using flow control. This buffer must be allocated as non-volatile (**N**) RAM.

Image Buffer

Used to image the current format. You can create an image up to 16 inches long by reallocating memory. The Image Buffer is cleared after a printer reset, even if it is stored in non-volatile RAM.

Use the formula below to calculate the required image buffer size.

$$22K \times Length$$

Length is the length of your label in inches.

Example

22K x 6 = 132K (Multiply by 10.)

132K x 10 = 1320

Enter 1320 for your Image buffer.

Format Buffer

Used to store formats and batch data. Use the following formula to calculate the required format buffer size:

$$Linecount \times 50/1024$$

Linecount is the number of lines in your format packet including the format header and all the options.

The result of the above calculation is in kilobytes.

Downloadable Fonts Buffer

Used to store downloaded soft (bitmapped) fonts. To determine the size of your downloadable fonts, send a font packet. See "Using the Font Packet" for more information.

Scalable (Vector) Fonts Buffer

Used to image the scalable font characters. Increasing this buffer size allows more characters to be saved in cache memory, so the characters do not have to be re-built the next time they are printed. Scalable fonts are not available for these printers, use **0**.

Buffer Worksheet

Make copies of this page to use as a buffer worksheet.

	HEADER	BUFFER	DEVICE	BUFFER SIZE
DOWN LOADABLE FONTS BUFFER	M	D	N	
FORMAT BUFFER	M	F	N	
IMAGE BUFFER	M	I	N	
RECEIVE BUFFER	M	R	N	
TRANSMIT BUFFER	M	T	N	
SCALABLE FONTS BUFFER	M	V	N	0

Buffer Allocation Considerations

Keep these items in mind when allocating memory.

- ◆ Do not allocate more memory than what is available.
- ◆ Free memory from one buffer *before* you add it to another buffer.
- ◆ Reallocate all the buffers if you need to reallocate any buffer.
- ◆ Send all buffer (re)allocations in one packet. The printer evaluates each individual buffer allocation separately. If one buffer allocation is invalid, the entire packet is invalid. For example, if you send

```
{I,M,R,N,20 |  
M,T,N,60 |  
... }
```

the printer ignores the entire packet, because the second line allocates 6K for the transmit buffer, and 4K is the maximum for that buffer. If you define a buffer size that exceeds the maximum value, an error occurs. However, no information is lost.

- ◆ Whenever the printer accepts a memory configuration packet, it takes effect immediately, causing a printer reset. Any information contained in the buffers is lost. Resend your formats, batches, graphics, or fonts to the printer.
- ◆ If you remap your image buffer, make sure the length and width specified in your format header are not too large for the current image buffer. In other words, if you remap for a 4 x 4 inch label, you cannot print a 4 x 6 inch label without receiving an error, until you change your format header or increase your image buffer.

Using Immediate Commands

Immediate commands affect printer operation as soon as the printer receives them, even if they are included within a packet or used inside quotation marks.

You can use immediate commands to change immediate command or status polling control characters, reset the printer, or cancel and repeat batches.

Enabling Immediate Commands

When the printer is first turned on, these commands are not available. To use 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 and therefore not lost after you turn off the printer. Once the immediate command control character is defined, the immediate commands are enabled.

Sending Immediate 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.
—————

Example ^CB

Immediately cancels the batch currently printing. This example assumes that the defined immediate command control character is the caret (^).

Command	Parameter
^CA	Cancels all the batches in the queue.
^CB	Cancels only the current batch being printed.
^DD or ^DCd	Disables the MPCL data escape character (the tilde) and inhibits MPCL from acting on ANY data escape sequence from the host. Sets the MPCL data escape character to the ASCII value given by the d parameter. The value can be any ASCII character.
^EA	Aborts an error condition. May need to be sent multiple times. Use ^RB to reprint batch. CAUTION: Command causes the current batch to stop and the condition that caused the error to remain uncorrected.
^ER	Resets the error. This command is the same as pressing FEED to acknowledge an error. Normal operation will resume.
^FD	Feeds a label when printer is idle . Simulates the operation of pressing FEED and dispenses the next label if printer is in the on-demand mode. NOTE: Printer ignores this command if printing.
^ID or ^ICd	Disables the Immediate Command feature by turning off the Immediate Command escape character. Sets the Immediate Command escape character to the ASCII value given by the d parameter. The value can be any ASCII character.
^MC	Returns the customer ID or RPQ version to the host. (00 to 99)
^MI	Returns the customer ID or RPQ revision level to the host. (00 to 99)
^MM	Returns the model number to the host. 12=9412, 13=9413, 14=9414
^MP	Returns the prototype number to the host. (00 to 99)
^MR	Returns the revision number to the host. (00 to 99)
^MV	Returns the version number to the host. (00 to 99)
^PR	Resets the printer. This command takes five seconds to complete and then the printer is ready to receive data. It has the same effect as turning off and then turning on the printer. NOTE: Command should be used only when the printer is not printing.
^RB	Repeats the last printed batch, printing the same number of labels as specified in the original batch. NOTE: Printer ignores this command if printing. This command does not work if batch separators are being used.
^RS	Resynchronizes supply when supply roll is changed. NOTE: Printer ignores this command if printing.
^SD or ^SCd	Disables the status polling feature by turning off the status polling control character. Sets the status polling control character to the ASCII value given by the d parameter. The value of d can be any ASCII character.
^TP	Prints a test label set. NOTE: Printer ignores this command if printing.

The table represents the defined immediate command control character as ^ and the defined status polling control character as d. You may define these characters to suit your needs.

To use the immediate command control character or the status polling character within your data, use the tilde sequence.

Clearing Packets from Memory

You may want to remove packets from the printer to increase memory storage capacity or if the formats/fonts are no longer needed. In some cases, turning the printer off may clear the packets from memory. If not, send a format clear packet.

Syntax {header,packet#,action,device| }

1. *header* Identifies the packet. Options:
- A** Check Digit Scheme
 - B** Batch
 - F** Format
 - W** Font
2. *packet#* Identification number of the packet to clear (**1-999**) or font number (**0-9999**). 0 is for all fonts.
3. *action* Enter **C** to clear the packet.
4. *device* Storage device. Options:
- N** Non-volatile RAM
 - R** Volatile RAM

Example {F,1,C,R| }

Clears Format #1 from volatile RAM.

Using the Font Packet

You can use a font packet to add or clear downloaded fonts from memory, upload your font buffer, or upload the cell size information for a particular font. The font packet is useful when you are downloading fonts. If you are using downloaded fonts, the font number and the number of bytes each downloaded font uses is listed.

This packet *does not* list the number of bytes the standard printer fonts use.

Syntax {W,font#,action,device | }

W1. W Writable Font Header.

W2. font# Font number from **0-32000**.
0 is for all fonts. 1 - 5 digits is the font number.
Example: 11 is the standard printer font,
CG Triumvirate™.

W3. action Action. Options:

- A** Adds the specified font.
- C** Clears all or specified fonts, except ones in ROM.
- H** Uploads font size information.

W4. device Device. Options:

- F** Flash (9414 only)
- N** Non-volatile RAM (9412/9413 default)
- R** Volatile RAM (9414 default)

If you are creating fonts, you need to have font data included with this packet. Software is available to create the font data and packet. Call Technical Support for more information.

Example {W,0,M,R | }

Selects all fonts and checks the memory usage in RAM. The printer returns the following to the host:

```
{W,0,M,R |  
Number of bytes free, Number of bytes used | }
```

Example {W,0,H,N | }

Selects all fonts and uploads the font size information for any downloaded fonts in Non-volatile RAM.

The printer returns the following to the host:

```

Font Style {W,0,H,N |
           0,1,0,"Standard",0,0,0,14,22,14,22,3 |
           0,2,0,"Reduced",0,0,0,7,14,7,14,1 |
Type       0,3,0,"Bold",0,0,0,24,34,24,34,3 |
           0,4,0,"OCRA",0,0,0,13,24,13,24,3 |
           0,5,0,"HR1",0,0,0,12,20,12,20,2 |
           0,6,0,"HR2",0,0,0,10,16,10,16,1 |
           0,10,1,"CGTriBd9",1,0,7,25,31,10,15,0 |
Symbol Set 0,10,437,"CGTriBd9",1,0,7,25,31,10,15,0 |
           0,10,850,"CGTriBd9",1,0,7,25,31,10,15,0 |
Cell Width 0,11,1,"CGTriumv6",1,0,5,17,21,5,10,0 |
           0,11,437,"CGTriumv6",1,0,5,17,21,5,10,0 |
           0,11,850,"CGTriumv6",1,0,5,17,21,5,10,0 |

```

- Spacing** Monospaced (0) or proportional (1).
- Type** Bitmapped (0) or scalable (1).
- Baseline** Bottom of the font.
- Cell Width** Horizontal number of dots to contain the widest character.
- Cell Height** Vertical number of dots to contain the tallest character.
- Nominal Width** Average width for lower-case letters.
- Nominal Height** Average height for lower-case letters.
- Inter-Character Gap** Default spacing between characters in monospaced fonts.

DEFINING FIELDS

This chapter provides a reference for defining

- ◆ the format header
- ◆ text, constant text fields, and non-printable text fields
- ◆ bar code fields
- ◆ line and box fields.

Defining the Format Header

A Format Header begins a format file.

Syntax {F, format#, action, device, measure, length, width, "name" }

F1. F Format Header.

F2. format# Unique number from **0-999** to identify the format.

F3. action Enter **A** to add a new format to the printer.

F4. device Format storage device. Options:
F Flash (9414 only)
N Non-volatile RAM (9412/9413 default)
R RAM (9414 default)

F5. measure Unit of measure. Options:
E English, measured in 1/100 inches
M Metric, measured in 1/10 mm
G Graphic, measured in dots

The following table lists the values for the specified parameters. English measurements are used throughout the rest of the chapter.

Printer	Unit of Measure	Supply Length	Supply Width	Row or End Row	Column or End Column
9412 Maximum print area: 2"x6"	English	38-600	120-200	0-599	0-199
	Metric	97-1524	305-508	0-1523	0-507
	Dots	77-1218	244-406	0-1217	0-405
9413 Maximum print area: 4"x4"	English	38-400	120-400	0-399	0-399
	Metric	97-1016	305-1016	0-1015	0-1015
	Dots	77-812	244-812	0-811	0-811
9414 Maximum print area: 4"x6"	English	38-600	120-400	0-599	0-399
	Metric	97-1524	305-1016	0-1523	0-1015
	Dots	7-1218	244-812	0-1217	0-811

F6. length Supply length, top to bottom, in selected units.

9412/9414 ranges: **9413** range:
English **38 - 600** English **38 - 400**

- F7. width* Supply width, from left to right, in selected units.
9412 range: **9413/9414** ranges:
 English **120 - 200** English **120- 400**
- F8. "name"* Format name (optional), **0-8** characters, enclose within quotation marks.

Example {F,1,A,R,E,300,200,"TEXTILES" }

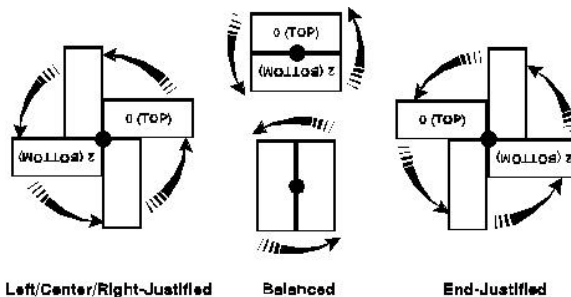
Adds Format 1 ("TEXTILES") to the printer. It uses a three inch long by two inch wide label.

Defining Text Fields

Create a separate definition for each text field. If text falls on two lines, each line of text requires a separate definition.

Syntax T,field#,# of char,fix/var,row,column, gap,font,hgt mag,wid mag,color,alignment, char rot,field rot,sym set!

- T1. T* Text Field.
- T2. field#* Unique number from **0-999** to identify this field.
- T3. # of char* Maximum number of printed characters is **0-2710** in the field.
- T4. fix/var* Fixed or variable length field. Options:
F Fixed length
V Variable length
- T5. row* For monospaced fonts, distance from bottom of print area to the pivot point. The pivot point varies depending on how text is justified. For proportionally spaced fonts, distance from bottom of print area to baseline of characters in field.



9412/9414 ranges:

English **0 - 599**

9413 range:

English **0 - 399**



T6. column

Distance from the left edge of the print area to the pivot point to find the column location.

9412 range:

English **0 - 199**

9413/9414 ranges:

English **0 - 399**



See "Defining the Format Header" for the table of metric and dot values.

T7. gap

Number of dots between characters (203 dots per inch).
Range: **0-99**.

NOTE: For monospaced fonts, the additional spacing is added to the existing inter-character gap. This is also true for proportionally spaced fonts, but remember that the inter-character gap varies with character combinations.

Any number other than **0** or the default number affects your field width. Default spacing:

Standard	3 dots
Reduced	1 dot
Bold	3 dots
OCRA-like	3 dots
CG Triumvirate Bold	varies with each letter
CG Triumvirate	varies with each letter

T8. font

Style of font. Options:

1	Standard	10	CG Triumvirate Bold
2	Reduced	11	CG Triumvirate
3	Bold		
4	OCRA-like		

Or a valid downloaded font selector number.

T9. hgt mag Height magnifier, **1-7** (times). Use a magnifier of **1** with proportionally spaced fonts, because characters lose smoothness at higher magnifications.

T10. wid mag Width magnifier, **1-7** (times). Proportionally spaced fonts do not have a set width. To estimate the size of your field, use the letter "W" for the widest field or an "L" for an average width field. Find your selected font and the desired width in Appendix B, "Fonts."

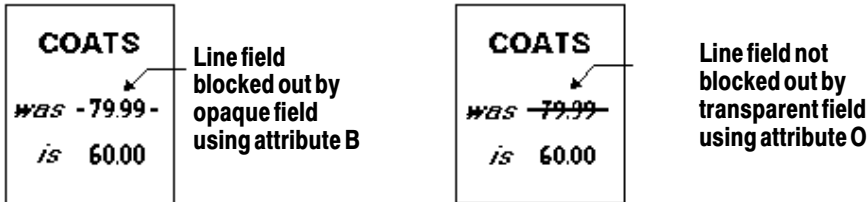
T11. color Options for standard printer fonts:

- B** Opaque, Normal, Black, Normal
- D** Opaque, Normal, White, Normal
- O** Transparent, Normal, Black, Normal
- R** Opaque, Normal, White, Normal
- W** Opaque, Normal, White, Normal

There are two types of field color overlay attributes:

Transparent The overlay field (text or constant text) does not block out (or "erase") existing fields.

Opaque The overlay field blocks out (or "erases") existing fields.



Field placement in the packet is an important consideration when using field color attributes, because fields are imaged in the order they are received. If a line field is defined before the overlay (text or constant text) field, the line field is blocked out by the overlay field, depending on the overlay field's color attribute. If a line field is defined after the overlay field, the line field is not blocked out by the overlay field, regardless of the overlay field's color attribute.

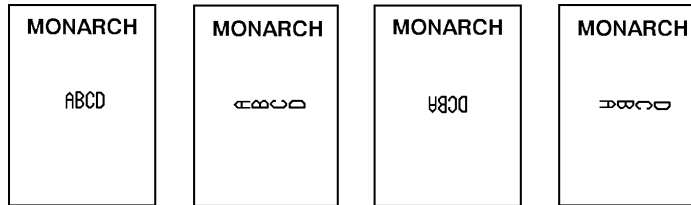
T12. alignment Options:

- L** Align on left side of field.
- C** Center text within field (monospaced fonts only)
- R** Align on right side of field (monospaced fonts only)
- B** Align at midpoint of field
- E** Align at endpoint of the field

Use **L**, **B**, or **E** for any font.

T13. char rot Character rotation. The field or supply does not rotate, only the characters do. Options:

- 0** Top of character points to top of field
- 1** Top of character points to left of field
- 2** Top of character points to bottom of field
- 3** Top of character points to right of field



T14. field rot Field rotation. Field rotation rotates the whole field, not just the characters. Rotation is affected by the pivot point, which varies depending on how text is justified. Lower left corner of field is the pivot point. 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

T15. sym set Symbol set. Options:

- 0** Internal Symbol Set
- 1** ANSI Symbol Set
- 437** DOS Code Page 437 (Domestic)
- 850** DOS Code Page 850 (International)

NOTE: The CG Triumvirate fonts support only the ANSI and DOS Code Page Symbol Sets. Refer to Appendix C, "Symbol Sets/ Code Pages" for more information.

Example T,2,10,V,250,50,0,1,1,1,B,C,0,0,0 !

Defines a text field (field #2) with a variable length of up to 10 characters. The field begins at row 250, column 50. There is no additional gap between characters, and the Standard font is used without any additional magnification. The printing is black on white and centered. No field or character rotation is used. The internal symbol set is used.

Defining Bar Code Fields

Each bar code field requires a separate definition.

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 **0-999** to identify this field.
- B3. # of char* Maximum number of characters. If the bar code uses a check digit, allow an extra character for the check digit. The actual maximum number of characters is limited by the size of the label and bar code density. Range: **0-2710**.
- B4. fix/var* Fixed (**F**) or variable (**V**) length field.

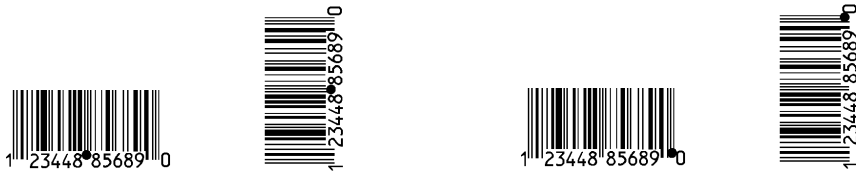
Bar Code	Number of Characters	Fixed/Variable
UPCA	12	F
UPCA+2	14	F
UPCA+5	17	F
UPCE	7	F
UPCE+2	9	F
UPCE+5	12	F
EAN8	8	F
EAN8+2	10	F
EAN8+5	13	F
EAN13	13	F
EAN13+2	15	F

EAN13+5	18	F
POSTNET	9 or 11	F
Interleaved 2 of 5	0 to 2710	V
Code 39 or MOD43	0 to 2710	V
Codabar (NW7)	depends on application	V
Code 128	0 to 2710	V
Code 93	0 to 2710	V
PDF417	0 to 2710	V
MaxiCode	15 to 99	V

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. Pivot points:



Left/Center/Right-Justified Fields



Balanced Fields

End-Justified Fields

Remember to include text or numbers that may appear with the bar code for the row measurement.

9412/9414 ranges:

English **0 - 599**

9413 range:

English **0 - 399**



B6. column

Distance from the lower left edge of the print area to the pivot point.

9412 range:

English **0 - 199**

9413/9414 ranges:

English **0 - 399**



See "Defining the Format Header" for the table of metric and dot values.

NOTE: Allow a minimum of **1/10** inch between the scan edge of bar code and label edges or other data.

B7. font

Bar code. Options:

- 1** UPCA
- 2** UPCE
- 3** Interleaved 2 of 5
- 4** Code 39 (no check digit)
- 5** Codabar
- 6** EAN8
- 7** EAN13
- 8** Code 128
- 10** UPCA +2
- 11** UPCA +5
- 12** UPCE +2
- 13** UPCE +5
- 14** EAN8 +2
- 15** EAN8 +5
- 16** EAN13 +2
- 17** EAN13 +5
- 22** POSTNET
- 23** Code 93
- 32** PDF417
- 33** MaxiCode
- 40** Code 39 (MOD 43 check digit)

NOTE: For more information about the MaxiCode bar code, see Appendix A, "Samples."

B8. density

Bar code density. Use the following table for the bar code density.

Bar code Type	Density Selector	Density (% or cpi)	Narrow Element (dots/mils)	Narrow to Wide Ratio	Data Length	Appearance Codes Available	Char Set
UPCA +2/+5	2 4	76% 114%	2/9.9 3/14.8	1.0:1	11 or 12 14/17	1, 5, 6, 7 or 8	0 to 9
UPCE +2/+5	2 4	76% 114%	2/9.9 3/14.8	1.0:1	6 or 7 9/12	1, 5, 6, 7 or 8	0 to 9
EAN8 +2/+5	2 4	76% 114%	2/9.9 3/14.8	1.0:1	7 or 8 10/13	1, 5, 6, 7 or 8	0 to 9
EAN13+2/+5	2 4	76% 114%	2/9.9 3/14.8	1.0:1	12 or 13 15/18	1, 5, 6, 7 or 8	0 to 9
Interleaved 2 of 5	1 2 3 4 5 6 7 8 9 10 11 12 13	1.1 2.1 3.2 4.2 5.6 6.3 7.5 8.8 9.6 11.2 11.0 12.7 14.5	21/103.4 12/59.1 7/34.5 6/29.6 4/19.7 4/19.7 3/14.8 3/14.8 3/14.8 2/9.9 2/9.9 2/9.9 2/9.9	1:3.0 1:2.5 1:3.0 1:2.5 1:3.0 1:2.5 1:3.0 1:2.3 1:2.0 1:3.0 1:3.0 1:2.5 1:2.0	0 to 2710	8	0 to 9
Code 39 or MOD43 (Extended Code 39)	1 2 3 4 6 7 11 12 20	1.4 1.7 3.5 4.2 6.3 7.0 3.9 12.7 3.0	10/49.3 8/39.4 4/19.7 3/14.8 2/9.9 2/9.9 4/19.7 1/4.9 5/24.6	1:2.5 1:2.5 1:2.5 1:3.0 1:3.0 1:2.5 1:2.0 1:3.0 1:2.2	0 to 2710	8	SPACE \$%*+-./ 0 to 9 A to Z
Codabar (NW7)	2 3 4 5 7 8 9	2.1 3.0 4.6 5.1 8.4 9.2 10.1	8/39.4 6/29.6 4/19.7 4/19.7 2/9.9 2/9.9 2/9.9	1:3.0 1:2.5 1:2.5 1:2.0 1:3.0 1:2.5 1:2.0	0 to 2710	8	\$+-./ 0 to 9 a to d
Code 128	20 4 6 8	3.5/7.0 4.4/8.7 5.8/11.7 8.7/17.5	5/24.6 4/19.7 3/14.8 2/9.9	N/A	0 to 2710	8	00H to 7FH

NOTE: The start (*) and stop (+) characters are automatically added for Code 39. Code 39, density 12 produces a one-dot narrow bar. This density is for special U.S.P.S. ACT-tag applications only. Synthetic supplies are recommended to produce scannable bar codes.

Bar code Type	Density Selector	Density (% or cpi)	Narrow Element (dots/mils)	Narrow to Wide Ratio	Data Length	Appearance Codes Available	Char Set
CODE 93	3	3.7	6/29.6	N/A	0 to 2710	8	00H to 7FH
	4	4.5	5/24.6				
	5	5.6	4/19.7				
	7	7.5	3/14.8				
	10	11.2	2/9.9				

Bar code Type	Density Selector	Density (% or cpi)	Narrow Element (dots/mils)	Narrow to Wide Ratio	Data Length	Appearance Codes Available	Char Set
POSTNET	0 (fixed at 4.3 cpi)	24/118.2	10/49.3	4/19.7 (5 dot gap)	0,5,6,9 or 11	8	0 to 9
Maxicode	7	N/A	N/A	N/A	15 to 99	8	00H to FFH

Bar code Type	Density Selector	Element Width (dot/mils)	Row Height (dots/mils)	Aspect Ratio	Data Length	Appearance Codes Available	Char Set
PDF417	1	2/9.8	2/9.8	1:1	0 to 2709	8	00H to FFH
	2	2/9.8	4/19.7	1:2			
	3	2/9.8	6/29.6	1:3			
	4	3/14.8	3/14.8	1:1			
	5	3/14.8	6/29.6	1:2			
	6	3/14.8	9/44.3	1:3			
	7	4/19.7	4/19.7	1:1			
	8	4/19.7	8/39.4	1:2			
	9	4/19.7	12/59.1	1:3			

NOTE: Values in bold indicate the default.

B9. height Bar code height in 1/100 inches, 1/10 mm, or dots. Minimum values:

English **20**
Metric **51**
Dots **40**

NOTE: POSTNET, PDF417, and MaxiCode bar codes have a fixed height. Always use **0** for these bar codes.

B10. text Appearance of text with bar code. For UPC and EAN only use **0-7**. For all others, use **8**. Options:

- 0** Default
- 1** No check digit or number system
- 5** Number system at bottom, no check digit
- 6** Check digit at bottom, no number system
- 7** Check digit and number system at bottom
- 8** No text, bar code only

B11. alignment Choose **L**, **R**, **C**, **B** or **E** to align the bar code data correctly in the field. **B** centers variable width bar codes, which may not allow pad-character centering (Code 128, Code 39, etc.) **E** right justifies variable width bar codes. **C** centers the bar code data in the field. **R** right justifies the bar code data in the field. MaxiCode must use **L**.

NOTE: All alignments are not supported for each bar code type.

B12. field rot Field rotation. Field rotation rotates the whole field, not just the characters. Rotation is affected by the pivot point, which varies depending on how text is justified. Lower left corner of field is the pivot point. Options:

- 0** Top of field points to top of supply (Use for MaxiCode)
- 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, 12, V, 150, 40, 1, 2, 80, 7, L, 0 |`

Defines a bar code field (field #3) with 12 characters of variable length starting at row 150, column 40. A UPCA bar code with a density of 2 and a height of 80 is used. The check digit and number system are shown at the bottom. The bar code is left aligned without any field rotation.

Defining Non-Printable Text Fields

Non-printable text fields allow you to enter data without printing it in its entered form. Typically, non-printable fields "hold" data that later combines with other fields to form a merged field. Define non-printable text fields before you define the field where the information prints.

When you copy this field into another field, the maximum number of characters for the final field is **2710** (or **0-100** for 9403). Allow only as many characters as you need, because extra characters use up space. Also, if you are copying into a bar code field, the maximum number of characters in the destination bar code is determined by the bar code specification (UPCA-12, EAN-13, etc.). You need to apply field options to manipulate the text entered in this field. For example, you may want to copy data from this field into another field. See "Option 4 Copy Data" in Chapter 5 for more information.

In the following example, data is entered into four non-printable fields and merged to form field 5, and is then printed as a bar code. See "Merging Fields" in Chapter 5 for more information.

Field	Data	Field Type
1	20374	Non-printable
2	339	Non-printable
3	8	Non-printable
4	15	Non-printable
5	20374339815	Bar Code

Each non-printable text field requires a separate definition.

Syntax D,field#,# of char |

D1. D Non-Printable Text Field.

D2. field# Unique number from **0-999** assigned to this field.

Maximum number of characters in this field: **0-2710**.

D,4,20 |

Defines a non-printable text field (field #4) with a maximum of 20 characters.

Defining Constant Text Fields

A constant text field is a set of fixed characters that prints on all labels. Define each constant text field separately. This field is not assigned a field number, but is counted as a field (keep this in mind, as the printer allows a maximum of **1000** fields). The characters in this field cannot be changed by batch data. Field options do not apply to constant text fields.

Determine the height and the maximum width of the characters, using the tables in Appendix B, "Fonts." If you're using proportionally spaced fonts, use the average size of the characters. Mark the pivot point of your field. This will vary, depending on how your field is justified.

Syntax `C, row, column, gap, font, hgt mag,
 wid mag, color, alignment, char rot,
 field rot, "fixed char", sym set!`

C1. C Constant Text Field.

C2. row For monospaced fonts, distance from bottom of print area to the pivot point. For proportionally spaced fonts, distance from bottom of print area to baseline of characters in the field. (Bottom exits the printer first.)

9412/9414 ranges:	9413 range:
English 0 - 599	English 0 - 399

C3. column Distance from the lower left edge of the print area to the pivot point.

9412 range:	9413/9414 ranges:
English 0 - 199	English 0 - 399

See "Defining the Format Header" for the table of metric and dot values.

C4. gap Number of dots between characters. Range: **0-99**.

Any number other than **0** or the default number affects your field width. Default spacing:

Standard	3 dots
Reduced	1 dot
Bold	3 dots
OCRA-like	3 dots
CG Triumvirate Bold	varies with each letter
CG Triumvirate	varies with each letter

C5. font Style of font. Options:

1 Standard	10 CG Triumvirate Bold
2 Reduced	11 CG Triumvirate
3 Bold	
4 OCRA-like	

or a valid downloaded font selector number.

C6. hgt mag Height magnifier, **1-7** (times). Use a magnifier of **1** with proportionally spaced fonts, because characters lose smoothness at higher magnifications.

C7. wid mag Width magnifier, **1-7** (times) Proportionally spaced fonts do not have a set width. To estimate the size of your field, use the letter "W" for the widest field or an "L" for an average width field.

C8. color Options for standard printer fonts:

B	Opaque, Normal, Black, Normal
D	Opaque, Normal, White, Normal
O	Transparent, Normal, Black, Normal
R	Opaque, Normal, White, Normal
W	Opaque, Normal, White, Normal

There are two types of field color overlay attributes:

Transparent The overlay field (text or constant text) does not block out (or "erase") existing fields.

Opaque The overlay field blocks out (or "erases") existing fields.

Field placement in the packet is an important consideration when using field color attributes, because fields are imaged in the order they are received. If a line field is defined before the overlay (text or constant text) field, the line field is blocked out by the overlay field, depending on the overlay field's color attribute. If a line field is defined after the overlay field, the line field is not blocked out by the overlay field, regardless of the overlay field's color attribute.

- C9. alignment* Alignment of constant text in the field. Options:
- L** Align on left side of field.
 - B** Align at midpoint of field
 - E** Align at end of field.
- C10. char rot* Character rotation. Options:
- 0** Top of character points to top of field
 - 1** Top of character points to left of field
 - 2** Top of character points to bottom of field
 - 3** Top of character points to right of field
- C11. field rot* Field rotation. Lower left corner of field is the pivot point. Options:
- 0** Top of overlay points to top of supply
 - 1** Top of overlay points to left of supply
 - 2** Top of overlay points to bottom of supply
 - 3** Top of overlay points to right of supply
- NOTE:** Rotation is affected by the pivot point, which varies depending on how text is justified.
- C12. "fixed char"* Fixed characters to appear in the field. Maximum **2710** characters. Enclose in quotation marks.
- C13. sym set* Symbol set. Options:
- 0** Internal Symbol Set
 - 1** ANSI Symbol Set
 - 437** DOS Code Page 437 (Domestic)
 - 850** DOS Code Page 850 (Multilingual)
- NOTE:** The CG Triumvirate fonts support only the ANSI and DOS Code Page Symbol Sets. See Appendix C, "Symbol Sets/ Code Pages," for more information.

Example `C,30,10,0,1,1,1,B,L,0,0,"MADE IN USA",0 |`

Defines a constant text field starting at row 30, column 10. It does not have any additional inter-character gap. The Standard font is used without any additional magnification. The printing is black on white and left justified. No field or character rotation is used. "MADE IN USA" is printed in this field. The internal symbol set is used.

Defining Line Fields

Use lines to form borders and mark out original prices. Define each line separately. This field is not assigned a field number, but is counted as a field (keep this in mind, as the printer allows a maximum of **1000** fields per format). You can define any line length and a thickness up to 99 dots, as long as the solid black print does not exceed 30 percent of any given square inch of the label.

Line Types

You can create horizontal and vertical lines. There are two ways to define lines.

Segments You choose the starting point and ending point.

Vectors You choose the starting point, the angle, and the length of the line.

Syntax `L,type,row,column,angle/end row,length/
end col,thickness,"pattern" |`

L1. L Line Field.

L2. type Type of line. Only vertical and horizontal lines are supported. Options:

S Segment. You choose the starting point and ending point.

V Vector. You choose the starting point, angle, and length.

L3. row Distance from bottom of print area to the starting point.

9412/9414 ranges:

English **0 - 599**

9413 range:

English **0 - 399**



L4. column Distance from left edge of the print area to line origin.

9412 range:

English **0 - 199**

9413/9414 ranges:

English **0 - 399**



See "Defining the Format Header" for the table of metric and dot values.

*L5. angle/
end row*

If Using Segments

Row location of ending point. Measure from bottom of print area. Ranges same as *row* above. On horizontal lines, this value must match item **L3**.

If Using Vectors

Angle of line. Options: **0**, **90**, **180**, or **270**.



*L6. length/
end col*

If Using Segments

Column location of end point. Measure from left edge of print area. Ranges same as *column* above. On vertical lines, this value must match parameter **L4**.

If Using Vectors

Length of the line in selected units.

Ranges for horizontal lines with 9412:

English **0 - 200**



Ranges for horizontal lines with 9413/9414:

English **0 - 400**

Ranges for vertical lines with 9412/9414:

English **0 - 600**

Ranges for vertical lines with 9413:

English **0 - 400**

L7. thickness Using the chart below for reference, write the desired line thickness (**1 to 99**) in box **L7**. Measured in dots.

Dots	Thickness
1	
10	
24	
48	
96	

NOTE: Line thickness fills upward on horizontal lines, or to the right on vertical lines.

L8. "pattern" Line pattern. Enter "".

Example `L,S,110,30,110,150,10,"" |`

Defines a horizontal line field as a segment starting at row 110, column 30 and ending at row 110, column 150. The line thickness is 10 dots.

Defining Box Fields

Use boxes to form borders or highlight items of interest. Define each box field separately. This field is not assigned a field number, but is counted as a field (keep this in mind, as the printer allows a maximum of **1000** fields). You can define any line length and a thickness up to 99 dots, as long as the solid black print does not exceed 30 percent of any given square inch of the label.

Syntax `Q, row, column, end row, end col, thickness, "pattern" |`

Q1. Q Box (**Q**uadrilateral) Field.

Q2. row Distance from bottom of print area to lower left corner of box.

9412/9414 ranges:

English **0 - 599**

9413 range:

English **0 - 399**



Q3. column Distance from left edge of print area to lower left corner of box.

9412 range:

English **0 - 199**

9413/9414 ranges:

English **0 - 399**

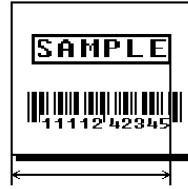


See "Defining the Format Header" for the table of metric and dot values.

Q4. end row Distance from bottom of print area to upper right corner of box. Ranges same as *row*.



Q5. end col Distance from left edge of print area to upper right corner of box. Ranges same as *column*.



Q6. thickness Using the chart below for reference, write the desired line thickness (1 to 99) in box **Q6**. Measure in dots.

Dots	Thickness
1	
10	
24	
48	
96	

NOTE: Boxes fill inward, so make sure your boxes do not overwrite other fields.

Q7. "pattern" Line pattern. Enter "".

Example Q, 240, 30, 270, 150, 3, "" |

Defines a box field starting at row 240, column 30. It ends at row 270, column 150. It has a thickness of 3 dots.

DEFINING FIELD OPTIONS

5

This chapter provides a reference for defining

- ◆ field options in formats.
- ◆ check digit packets.

Applying Field Options

Field options further define text, bar code, and non-printable text fields. The text, constant text, or bar code field must be previously defined *before* you can apply any field option to it. Define options immediately after the field to which they apply.

Combining Field Options

You can use more than one option with most fields. For example, you can use Option 4 to copy data from another field, and then use Option 30 to pad the field. When you use multiple options for the same field, you must place the options in the order you want to apply them to your format.

Restrictions

Some options cannot be used together. For example, incrementing (Option 60) and price field (Option 42) options cannot be applied to the same field. Refer to the following sections addressing individual options for specific combinations to avoid.

Option 4 (copy a field) is the only option that can be repeated for a single field.

Example R,1,3,1,3,1,1 |

Syntax R,option#,parameter...parameter |

R1. R Indicates field option header.

R2. option# Option number (supported on all printers):

1	Define fixed characters
4	Copy data from previous field
30	Pad data to left or right with specified character
31	Generate check digit
42	Format as a price field
50	Define bar code densities
51	Define security and truncation of PDF417 bar codes
52	Define width or length of PDF417 bar codes
60	Define incrementing or decrementing field
61	Reimage fields

R3. parameter(s) Varies per option. See the following option descriptions.

Option 1 (Fixed Data)

Fixed data is information (a company name or store number) you want to print on all labels. You can define fixed characters for an entire field or for part of a field.

Syntax R,1,"fixed char" |

R1. R Option Header.

R2. 1 Option 1.

R3. fixed char Characters to insert. Enclose in quotation marks. If you are defining fixed characters for part of a field, place underscores (`_`) in non-fixed positions. Any spaces in the phrase are fixed characters. Range: **0 - 2710**.

NOTE: Underscore characters are stripped out and the data is compressed if no data is supplied by the batch and the field length is variable.

Example R,1,"_ _ _%\$_ _ _ _" |

Uses fixed characters (%\$) in positions four and five. The other positions are variable.

Example R,1,"MONARCH" |

"MONARCH" appears as a fixed field in this example.

To fill in the non-fixed portion of the field, see "Defining Batch Data Fields" in Chapter 6. As an alternative, you can apply Option 4 to copy data into the non-fixed character positions.

Option 4 (Copy Data)

You can create a field that uses data from another field. This is useful for creating merged fields or sub-fields. You can copy the information from multiple fields into one field by applying the copy procedure more than once. Copy data is the only option you can apply to a field more than once.

The maximum number of characters defined in box **T3** or **B3** must allow for the number of characters you will place in the field, including any price, check digit, or fixed characters inserted by the printer. The maximum number of characters in the destination field (including copied data) cannot exceed **2710** or the maximum number of characters permitted by the **bar code**.

When copying from more than one field, copy
into the destination field from left to right.

<i>Syntax</i>	<code>R,4,src fld,src start,# to copy,dest start,copy code!</code>				
<i>R1. R</i>	Field Option Header.				
<i>R2. 4</i>	Option 4.				
<i>R3. src fld</i>	Field number from which data is copied. Range: 0 - 999 .				
<i>R4. src start</i>	Position number in the source field of the first character to be copied. Character positions are numbered 1 to 2710 , starting from the left.				
<i>R5. # to copy</i>	Number of characters to copy. Range: 1 - 2710 .				
<i>R6. dest start</i>	Position number where copied characters are to begin printing in the destination field. Range: 1 - 2710 .				
<i>R7. copy code</i>	Copy Method. <table><tr><td>1</td><td>Copy field as is (including price symbols, pad characters, check digits, etc.).</td></tr><tr><td>2</td><td>Copy unformatted data (without price characters, pad characters, etc.).</td></tr></table>	1	Copy field as is (including price symbols, pad characters, check digits, etc.).	2	Copy unformatted data (without price characters, pad characters, etc.).
1	Copy field as is (including price symbols, pad characters, check digits, etc.).				
2	Copy unformatted data (without price characters, pad characters, etc.).				

Example R,4,3,1,3,1,1 †

Copies data from field #3, starting at the first position and copying three characters. In the destination field, the information is placed in position 1 and copied as formatted data.

Merging Fields

You can copy data to merge the contents of fields. Use the copy data option as many times as necessary to copy all the appropriate fields into the merged field.

In the following example, two text and two non-printable fields are shown. Data from these fields is merged to form field 5 and is then printed as a bar code.

Field	Data	Field Type
1	203	Non-printable
2	339	Non-printable
3	8	Text
4	BLUE	Text
5	2033398BLUE	Bar Code

To create this sequence:

1. Define fields 1, 2, 3, and 4.
2. Define field 5 as a bar code. Allow enough characters in the bar code field to hold all the copied characters.
3. Apply Option 4 to field 5 once for every source field.

Sub-Fields

You can copy a segment of data from one field into a new location, called a sub-field. For example, extract part of the data in a bar code and display it in text form in a sub-field. Then, use the copy data option.

Option 30 (Padding Data)

You can add characters to one side of a field to "pad" the field. Padding allows you to fill in the remaining spaces when the entered data does not fill an entire field.

If a variable length field is not completely filled with batch data, this option fills the remaining positions in the field with the character designated by Option 30.

Syntax R,30,L/R,"character" |

R1. R Option Header.

R2. 30 Option **30**.

R3. L/R Indicates type of padding

L Pad field on left side

R Pad field on right side

R4. "character" Pad character must be within the **0 - 255** decimal range and enclosed inside quotation marks.

NOTE: Do not use on fixed length fields.

Example R,30,L,"X" |

Pads data with an "X" on the left side of the field.

Sample Use for Padding

If you have a variable length bar code that you want to occupy a fixed amount of space on the supply, use pad characters. If the maximum number of characters in the bar code is 15, but the batch record only has 10 characters, the padding option fills the remainder of the field with pad characters.

Option 31 (Calculate Check Digit)

The printer generates a check digit if you apply Option 31 to the field. You cannot use this option if the field contains a UPC, EAN, or Code 39 (with the MOD43 check digit) bar code.

Syntax R,31,gen/ver,check digit #|

R1. R Option Header.

R2. 31 Option **31**.

R3. gen/ver Enter **G** to generate a check digit.

R4. check digit # Specifies a check digit scheme. Enter a number that identifies a check digit scheme that has been defined. For more information, see "Using Check Digits." Range: **1 - 10**.

Example R,31,G,5 |

Generates a check digit using the previously defined check digit scheme 5.

Option 42 (Price Field)

You can apply options that will insert monetary symbols automatically. Do not use this option with Option 31 (define a check digit) or Option 60 (increment or decrement a field). This option is not recommended for bar codes. When determining the maximum number of characters, add the maximum number of digits and the monetary symbols.

Syntax R,42,appearance code|

R1. R Option Header.

R2. 42 Option **42**.

R3. appearance code Enter **1** to print price field in standard notation, as defined by country setting.

Use the monetary formatting packet to select monetary notations and symbols by country setting. See "Defining the Monetary Formatting Packet" for more information. See Appendix C, "[Symbol Sets/Code Pages](#)," to make sure the monetary symbol you want to use is printable in the font selected for this field. For monetary symbols other than the dollar sign, use the internal symbol set.

Example R,42,1|

Uses a price field that prints the monetary symbol and notations as defined in the monetary formatting packet.

Option 50 (Bar Code Density)

You can apply this option to bar code fields when you want to create custom densities. When you apply this option, it overrides the density value in the bar code field.

When using this option, set the density parameter in your bar code field to the default value. You can only use this option once for each bar code field. This option overrides the density selected in the bar code field.

Bar codes produced using Option 50 may not be scannable. The additional character gap, narrow space, and wide space parameters are valid **only** with Code 39 and Codabar. If these parameters are specified for any other bar codes, they will be ignored by the printer. Do not use Option 50 with fixed density bar codes.

Syntax `R,50,narrow,wide,gap,nar_space,wide_space|`

R1. R Option Header.

R2. 50 Option **50**.

R3. narrow Dot width of the narrow element. Range: **1-99**.

R4. wide Dot width of the wide element. Range: **1-99**.

R5. gap Additional dot space between characters. Enter a value of **1** to **99**. (Code 39 and Codabar only.)

R6. nar_space Additional dot width of the narrow bar code space. (Code 39 and Codabar only). Range: **1- 99**.

R7. wide_space Additional dot width of the wide bar code space. (Code 39 and Codabar only). Range: **1- 99**.

Example `R,50,4,8,4,4,8|`

Creates a custom bar code density with a narrow element of 4 dots, a wide element of 8 dots, a gap of 4 dots, 4 additional dot widths for the narrow bar code space, and 8 additional dot widths for the wide bar code space (if this is a Code 39 or Codabar bar code).

Option 51 (PDF417 Security/Truncation)

You can define a security level and choose whether or not to truncate a PDF417 bar code. Higher security levels add data to a bar code, improving scan reliability. Some damaged bar codes may still be scannable if the security level is high enough. You can use this option to create standard PDF417 bar codes or use the truncated option to create a narrower bar code. This option can appear only once per PDF417 field, in any order, following the bar code field.

As the security level is increased, so is the size of your PDF417 bar code. For each level increased, the bar code will double in size.

Syntax `R,51,security,stand/default |`

R1. R Option Header.

R2. 51 Indicates Option **51**.

R3. security Security level ranges from **0-8** (**0** is the default).

Higher security levels add data to a bar code, improving scan reliability. Some damaged bar codes may still be scannable if the security level is high enough.

R4. stand/def Truncation selector. Valid values:

S (default) a standard PDF417 bar code
T truncated

Example `R,51,2,S |`

Defines a security level of 2 for a standard PDF417 bar code.

Option 52 (PDF417 Width/Length)

This option defines the image width or length of a PDF417 bar code. If you define a fixed number of columns (width), the bar code expands in length. If you define a fixed number of rows (length), the bar code expands in width.

Column value does not include start/stop or left/right indicator columns.

If this option does not immediately follow the PDF417 bar code field, the default settings are used. You can only use this option once per PDF417 bar code field.

Syntax `R,52,row/column,dimension!`

R1. R Option Header.

R2. 52 Indicates Option **52**.

R3. row/column Indicates if you are defining the number of rows or columns.

R Row
C Column

If you specify rows, the bar code expands in columns, or vice versa.

R4. dimension The number of rows or columns defined for the bar code. The default is **4**. Valid values:

3-90 for rows
1-30 for columns

Example `R,52,C,10!`

Defines the column width of 10, which expands the PDF417 bar code length by 10.

Option 60 (Incrementing/Decrementing Fields)

You may have an application, such as serial numbers, in which you need a numeric field to increment (increase in value) or decrement (decrease in value) on successive tickets within a single batch. Incrementing or decrementing can be applied to **numeric** data only. If you have a field that includes letters and digits, apply incrementing or decrementing to only the portion of the field that contains digits.

Syntax `R,60,I/D,amount,l pos,r pos!`

R1. R Option Header.

R2. 60 Option **60**.

R3. I/D **I** incrementing field
 D decrementing field

R4. amount Amount to increase or decrease. Range: **0 - 999**.

R5. l pos Leftmost position in inc/dec portion of field. If this value is not entered, the default value **1** is used. Range: **0 - 2710**.

R6. r pos Rightmost position in inc/dec portion of field. If this value is not used, the entire field length is used as the default. Range: **0 - 2710**.

Example `R,60,I,5,1,6!`

Increments a field by 5 each time the field is printed. The field increments beginning with the first left position and ending with the sixth position.

Fixing the First Number in the Incrementing Sequence

There are two ways to enter the first number in the incrementing sequence. You can use batch data or use Option 1 to define the first number as a fixed character. The first number in the sequence must contain the same amount of digits as the highest number to be counted. For example, to count the numbers **1** to **999**, the first number in the sequence must be entered as **001**.

Option 61 (Reimage Field)

This option redraws (reimages) a constant field when you have a constant field next to a variable field on your label. It can be used on text, constant text, bar code, line, or box fields.

These printers do not redraw an area if the field data does not change. When a field changes, that area is cleared and the new field data is imaged. However, the new field data may require a larger area than the previous field did. In some cases, neighboring fields that do not change (constant fields) may be covered with white space from the changing field's (variable fields) area. Use this option to reimage the constant field, or it may appear broken.

The most common use for this option is with incrementing fields on your label, because they may cover a constant field.

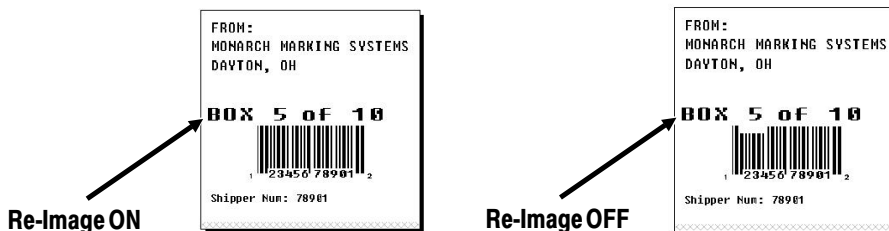
Syntax R, 61 |

R1. R Option Header.

R2. 61 Option 61.

Example R, 61 |

Reimages the constant field that appears next to a variable field.



In the above example, Option 61 was applied to the bar code field to keep the incrementing field (Box #) from blocking out the bar code field.

Using Check Digits

Check digits are typically used to ensure that a text or bar code field scans correctly. If you apply Option 31, the printer calculates a check digit. A check digit scheme determines how the printer calculates a check digit. When you define a check digit scheme, you assign a number to identify it. This number is later entered in box **R4** when you apply Option 31 to a field. You can use check digits with text or bar code fields. Check digit calculations are performed on *numeric* data only.

Do not use check digits with price fields. Do not define a check digit scheme for these bar codes, because they have predefined check digits: UPC, EAN, Code 39 (with the MOD43 check digit), and Code 93.

Syntax {A,selector,action,device,modulus,
 fld_length,D/P,"weights" | }

A1. A Check Digit Header.

Assign a number from **1-10** to this check digit formula.

A3. action Adds a check digit scheme. Enter **A**.

A4. device Storage device. Options:

F Flash (9414 only)
N Non-volatile RAM (9412/9413 default)
R RAM (9414 default)

NOTE: To clear a check digit packet from memory, see "Clearing Packets from Memory" in Chapter 3.

A5. modulus Number from **2-11**. The modulus is used to divide the sum of products or the sum of digits.

A6. fld_length The maximum number of characters the field will contain.
Range: **0 - 2710**.

A7. D/P Algorithm. The algorithm determines how the check digit is calculated. Options:

D sum of digits
P sum of products

A8. "weights" String of digits used for calculation. A weight string is a group of two or more numbers that is applied to a field. The number of digits in this string should equal the number in *fld_length*. Enclose in quotation marks. Range: **0 - 2710**.

Example {A,1,A,R,10,5,P,"65432" | }

Adds check digit scheme number 1 to the printer's memory. The modulus is 10, the maximum number of characters in the field is 5. The check digit is calculated by using the Sum of Products and the string of digits used in the calculation is "65432."

Sum of Products Calculation

This is an example of how the printer uses Sum of Products to calculate a check digit for this data:

5 2 3 2 4 5 2 1 9

1. Weights are applied to each digit, starting with the last digit in the weight string. They are applied right to left, beginning at the right-most position of the field. Remember, a weight string must contain at least two different numbers. This example has a weight string of **1,2,3,4**.

field: 5 2 3 2 4 5 2 1 9

weight string: 4 1 2 3 4 1 2 3 4

2. Each digit in the field is multiplied by the weight assigned to it:

field: 5 2 3 2 4 5 2 1 9

weight string: 4 1 2 3 4 1 2 3 4

products: 20 2 6 6 16 5 4 3 36

3. Next, the product of each digit is added together. This is the sum of the products.

$$20 + 2 + 6 + 6 + 16 + 5 + 4 + 3 + 36 = 98$$

4. Divide the sum of the products by the modulus (**10** in this case), only to the whole number. The balance is called the remainder.

$$\begin{array}{r} 9 \\ 10 \overline{)98} \\ \underline{90} \\ 8 \end{array}$$

5. Subtract the remainder from the modulus.

The result becomes the check digit. In this case, the check digit is **2**.

$$10 - 8 = 2$$

Sum of Digits Calculation

This is an example of how the printer uses Sum of Digits to calculate a check digit for this data:

5 2 3 2 4 5 2 1 9

1. Weights are applied to each digit, starting with the last digit in the weight string. They are applied right to left, beginning at the right-most position of the field. Remember, a weight string must contain at least two different numbers. This example has a weight string of **1,2,3,4**.

field: 5 2 3 2 4 5 2 1 9

weight string: 4 1 2 3 4 1 2 3 4

2. Each digit in the field is multiplied by the weight assigned to it:

field: 5 2 3 2 4 5 2 1 9

weight string: 4 1 2 3 4 1 2 3 4

products: 20 2 6 6 16 5 4 3 36

3. Next, the digits of the products are added together. Two-digit products are treated as two separate digits.
This is the sum of the digits.

$$2 + 0 + 2 + 6 + 6 + 1 + 6 + 5 + 4 + 3 + 3 + 6 = 44$$

4. Divide the sum of the digits by the modulus (**10** in this case), only to the whole number. The balance is called the remainder.

$$\begin{array}{r} 4 \\ 10 \overline{)44} \\ \underline{40} \\ 4 \end{array}$$

5. Subtract the remainder from the modulus.

The result becomes the check digit. In this case, the check digit is **6**.

$$10 - 4 = 6$$

PRINTING

6

This chapter describes how to

- ◆ download files to the printer.
- ◆ define the batch header, batch control, and batch data files.
- ◆ modify formats
- ◆ create DOS batch files.

Turn on the printer and make sure it is ready to receive data before you download. See your host's documentation or System Administrator for information on ways to download.

When downloading, send your packets in this order:

1. Memory configuration packet (M)
2. Configuration packets (A-F)
3. Any of the following:
 - ◆ Check digit packets (see Chapter 5)
 - ◆ Format packets (see Chapter 4)
4. Batch data (see "Defining the Batch Header")

To download from a PC:

1. Check that the PC and the printer are connected.
2. Check that communications have been established between the PC and the printer.
3. Send the communication settings packet to select the printer's communication settings. See "Defining the Communication Settings Packet" in Chapter 3 for more information (only used for serial communication). If you change the printer's communication settings, make sure they match those at the host before sending any packets to the printer.
4. Type this command at the DOS prompt:

`COPY LABEL1.FMT COM1` Transmits a file called "LABEL1.FMT" to COM1.

`COPY LABEL1.BCH COM1` Transmits a batch called "LABEL1.BCH" to COM1.

If you use the COPY command to download your formats, set flow control to **DTR** (not XON/XOFF). Also, do not use the MS-DOS prompt from inside Windows, because you will get a framing error.

Defining the Batch Header

A batch header begins the file. It tells which format the batch uses and how many labels to print. To record batch data, make a copy of the worksheet in Appendix D, "Format Design Tools."

A batch packet contains three parts:

batch header identifies the format and how many labels to print.

batch control defines the print job.

batch data (optional) defines the actual information printed on the label.

Syntax {B,format#,N/U,quantity!

B1. B Batch Header.

B2. format# Format number: **0-999** to use.

B3. N/U Controls how image is generated.

N New. Erase image and re-image all fields using online data. Any missing fields will be blank.

U Update last image with 1 or more fields. All other fields remain the same as the last queued batch.

B4. quantity Quantity to print (**0-32000**).

NOTE: Using **0** pre-images the field to reduce the imaging time for labels. See "Batch Quantity Zero Method" for more information.

Example {B,1,N,1 !

Defines a batch header that uses format #1 and reimages all fields using the online data. One label is printed with this batch.

Defining the Batch Control Field

The batch header must precede this field. The batch control field defines the print job and applies only to the batch that immediately follows.

Syntax `E, feed_mode, batch_sep, print_mult, multi_part |`

E1. E Batch Control Field.

E2. feed_mode Feed Mode. Options:
 0 Continuous Feed (default)
 1 On-demand

For the 9412/9413 printers, you must have the on-demand sensor installed to use on-demand mode. Also, the feed mode is determined by the presence of the on-demand sensor, not from this parameter. If the on-demand sensor is open, you are using on-demand mode. If the on-demand sensor is closed, you are using continuous mode. There is a switch on the 9414 printer for on-demand mode. Refer to your *Equipment Manual* for more information.

E3. batch_sep Batch Separator (striped label in between batches). Options:
 0 Does not print a separator (default)
 1 Prints a separator

E4. print_mult Number of tags with the same image. Range: **1** to **999**

E5. multi_part Number of identical parts on one tag. Range: **1** to **5**

Example `E, 0, 1, 4, 2 |`

Defines a batch control field. Continuous feed mode is used and a separator prints between batches. Four tags have the same image and there are two identical parts on one tag.

Defining Batch Data Fields

Batch data is the actual information printed on the supply. Batch data fills in the format's text, bar code, and non-printable text fields.

Batch data fields should be sent in field number order. Use continuation fields for large amounts of data. If you are using **N** (New) in the batch header, you must list all fields with your data in sequence. If you are using **U**, you need to list only those fields and data that changes from the last printed batch.

Syntax field#,"data string"|
 C,"continuation" |

field# Identifies the text, bar code, or non-printable text field in which to insert the following data. Range: **0 - 999**.

"data string" Provides the actual information to appear in fields. Enclose in quotation marks. Range: **0 - 2710**.

C Identifies information to be appended to the data string. (This parameter is optional.)

"continuation" Provides the actual information to be added to the batch packet. Enclose in quotation marks. Use this option to break up longer fields. (This parameter is optional.)

Example 1,"Size 12" |
 2,"" |
 3,"Blue" |
 C,"and this would be appended." |

Defines a batch data field. "Size 12" prints in field #1, a blank line appears in field #2, "Blue and this would be appended" prints in field #3.

Using Special Characters in Batch Data

There are two ways to specify special characters in batch data:

- ◆ Place a tilde (~) before the character
- ◆ Use a tilde with the decimal ASCII equivalent

For example, you can use ~" or ~034 to print the " character in your batch data. Use ~~ to print the ~ character in your batch data; otherwise, the tilde character is ignored. You can also use ~XXX where XXX is the decimal equivalent of an unprintable character.

Sample Batch Data with Special Characters

{B,1,N,1}	Decimal Character	What Prints
1,"123~034456789" }	~034 is "	123"456789
2,"~094983~126LG4451" }	~094 is ^ ~126 is ~	^983~LG4451

Merged or Sub-Fields

If a field is completely filled by data copied from other fields, use quotation marks without spaces between them for the "*data string*" parameter.

Incrementing Fields

In incrementing fields, the first number in the sequence must contain the same number of digits as the highest number to be counted. For example, to increment the numbers in a field from 1 to 999, enter the starting number in the batch as 001.

Downloading Methods

Depending on your application, you can download the format and batch data using one of three methods: sequential method, batch method, batch quantity zero method.

Sequential Method

Using the sequential method, you send all your format and batch data at one time. Use this method when your application does not require operator intervention to input data. All data is sent down at one time, and the printer then images each field. As soon as the last field is imaged, your labels begin to print.

Example {Format}
 {Batch Packet}

Batch Method

This is similar to the sequential method, but it is used when you want to send multiple batches. All data for the first batch is sent at one time, and the printer then images each field. As soon as the last field for the first batch is imaged, labels begin to print. This process is repeated for each subsequent batch.

Example {Format}
 {Batch Packet}
 {Batch Packet}

Batch Quantity Zero Method

You may use the batch quantity zero method when your application requires operator intervention to enter data. While the operator is entering data, the previous field is sent with a batch quantity of zero. The printer images the field, but does not print it. After the operator enters the data for the last field, the batch quantity can be specified. The last remaining field is imaged, and the label prints almost immediately. To use the batch quantity zero method:

1. Send the format and a batch header in one file. The first time you send the batch header, use the parameter **N** (new batch), and the parameter **0** for (zero quantity). This ensures the label is properly positioned.

The printer images constant text, line, and box fields, but does not print them.

2. Input data for each field, and send it with a batch header using the parameter **U** (batch update) and a quantity of zero. When the printer receives the data, it immediately images the field, but does not print it.

At this time, the printer is imaging all associated fields, including fields that copy from other fields.

3. Repeat step 2 for each field except the last one.
4. For the last field, input data and send a batch header with the quantity of labels you want printed. When the printer receives input for the last field, it immediately prints the labels. See "Reducing Imaging Time" in Chapter 10 for an example using the batch quantity zero method.

Modifying Formats

The optional entry method is a quick way to modify your format fields, check digit fields, and configuration packets.

Optional Entry Method

This method enables you to reset only the parameters you want to change. Commas act as placeholders for unchanged parameters. The optional entry method reduces file size and increases the speed at which files are sent to the printer.

Creating DOS Batch Files for Downloading

If you are downloading from an MS-DOS system, you can create batch files to set communication values and download formats. It is a good idea to create a subdirectory to hold your format files.

Here is a DOS batch file that sets a serial port, changes to a subdirectory, and downloads a check digit file, format file, and batch data file.

```
MODE COM1: 9600,N,8,1,P
CD\MONARCH
COPY LABEL1.CDS COM1
COPY LABEL1.FMT COM1
COPY LABEL1.BCH COM1
```

Refer to your DOS manual for more information on creating batch files.

STATUS POLLING

This chapter explains how to use status polling.

There are two types of Status Polling:

- ◆ Inquiry Request--information about the readiness of the printer.
- ◆ Job Request--information about the current (or last received) job downloaded to the printer.

Inquiry Request (ENQ)

An ENQ character acts as a request for printer status information. You can send an ENQ in front of, in the middle of, or immediately following any packet downloaded to the printer. An ENQ is a command that can be executed as part of a packet or sent on its own (using a communications program). An ENQ is processed immediately. The ENQ character is user defined.

The ENQ character does not appear as a visible character; however, we are representing the ENQ character as ENQ .

Inquiry Response

Printer status is returned to the host in a 3-byte (3-character) sequence. The first byte is the non-printable user-defined ENQ character, which is not visible on the response. The second and third bytes are printer status codes. See the ENQ Reference Tables for the meaning of bytes 2 and 3.

Example: ENQ AB

The status codes (A and B in this case) are ASCII equivalents to the hexadecimal bits that represent the various types of status responses. This response indicates that the printer is online (Character A) and that there is a stock fault (Character B).

Example: ENQ ??

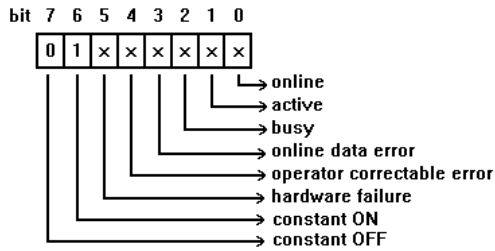
Indicates that this is the first ENQ response since the printer was turned on. Send another ENQ immediately to receive the printer's status.

Example: ENQ @@

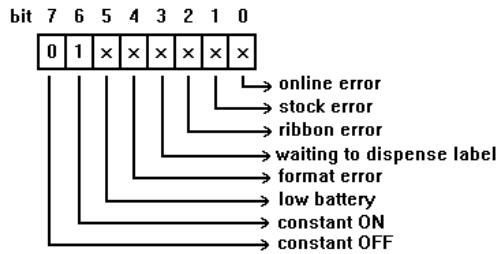
Indicates the printer is offline.

The following graphics can be used as a quick reference for the Status of Byte #2 and Byte #3. Byte #1 is the non-printable user-defined ENQ character.

Status Byte #2



Status Byte #3



ENQ Reference Table - Byte #2

Char	Const. OFF	Const. ON	Comp. Failure	Corr. Error	Online Data Error	Busy	Active	Online
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
@	0	1	0	0	0	0	0	0
A	0	1	0	0	0	0	0	1
B	0	1	0	0	0	0	1	0
C	0	1	0	0	0	0	1	1
D	0	1	0	0	0	1	0	0
E	0	1	0	0	0	1	0	1
F	0	1	0	0	0	1	1	0
G	0	1	0	0	0	1	1	1
H	0	1	0	0	1	0	0	0
I	0	1	0	0	1	0	0	1
J	0	1	0	0	1	0	1	0
K	0	1	0	0	1	0	1	1
L	0	1	0	0	1	1	0	0
M	0	1	0	0	1	1	0	1
N	0	1	0	0	1	1	1	0
O	0	1	0	0	1	1	1	1
P	0	1	0	1	0	0	0	0
Q	0	1	0	1	0	0	0	1
R	0	1	0	1	0	0	1	0
S	0	1	0	1	0	0	1	1
T	0	1	0	1	0	1	0	0
U	0	1	0	1	0	1	0	1
V	0	1	0	1	0	1	1	0
W	0	1	0	1	0	1	1	1
1	0	1	0	1	1	0	0	0
Y	0	1	0	1	1	0	0	1
Z	0	1	0	1	1	0	1	0
[	0	1	0	1	1	0	1	1
\	0	1	0	1	1	1	0	0
]	0	1	0	1	1	1	0	1
^	0	1	0	1	1	1	1	0
_	0	1	0	1	1	1	1	1
'	0	1	1	0	0	0	0	0

A "1" indicates the bit is turned on. A "0" indicates the bit is off.

ENQ Reference Table - Byte #2 (continued)

Char	Const. OFF	Const. ON	Comp. Failure	Corr. Error	Online Data Error	Busy	Active	Online
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
a	0	1	1	0	0	0	0	1
b	0	1	0	1	0	0	0	1
c	0	1	1	1	0	0	0	1
d	0	1	0	0	1	0	0	1
e	0	1	1	0	1	0	0	1
f	0	1	0	1	1	0	0	1
g	0	1	1	1	1	0	0	1
h	0	1	0	0	0	1	0	1
i	0	1	1	0	0	1	0	1
j	0	1	0	1	0	1	0	1
k	0	1	1	1	0	1	0	1
l	0	1	0	0	1	1	0	1
m	0	1	1	0	0	1	0	1
n	0	1	0	1	1	1	0	1
o	0	1	1	1	1	1	0	1
p	0	1	0	0	0	0	1	1
q	0	1	1	0	0	0	1	1
r	0	1	0	1	0	0	1	1
s	0	1	1	1	0	0	1	1
t	0	1	0	0	1	0	1	1
u	0	1	1	0	1	0	1	1
v	0	1	0	1	1	0	1	1
w	0	1	1	1	1	0	1	1
1	0	1	0	0	0	1	1	1
y	0	1	1	0	0	1	1	1
z	0	1	0	1	0	1	1	1
{	0	1	1	1	0	1	1	1
|	0	1	0	0	1	1	1	1
}	0	1	1	0	1	1	1	1
~	0	1	0	1	1	1	1	1
Dec 127	0	1	1	1	1	1	1	1

A "1" indicates the bit is turned on. A "0" indicates the bit is off.

ENQ Reference Table - Byte #3

Char	Const. OFF	Const. ON	Low Battery	Format Error	Waiting to Dispense Label	Ribbon Fault	Stock Fault	Online Error
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
@	0	1	0	0	0	0	0	0
A	0	1	0	0	0	0	0	1
B	0	1	0	0	0	0	1	0
C	0	1	0	0	0	0	1	1
D	0	1	0	0	0	1	0	0
E	0	1	0	0	0	1	0	1
F	0	1	0	0	0	1	1	0
G	0	1	0	0	0	1	1	1
H	0	1	0	0	1	0	0	0
I	0	1	0	0	1	0	0	1
J	0	1	0	0	1	0	1	0
K	0	1	0	0	1	0	1	1
L	0	1	0	0	1	1	0	0
M	0	1	0	1	1	0	0	1
N	0	1	0	0	1	1	1	0
O	0	1	0	0	1	1	1	1
P	0	1	0	1	0	0	0	0
Q	0	1	0	1	0	0	0	1
R	0	1	0	1	0	0	1	0
S	0	1	0	1	0	0	1	1
T	0	1	0	1	0	1	0	0
U	0	1	0	1	0	1	0	1
V	0	1	0	1	0	1	1	0
W	0	1	0	1	0	1	1	1
X	0	1	0	1	1	0	0	0
Y	0	1	0	1	1	0	0	1
Z	0	1	0	1	1	0	1	0
[	0	1	0	1	1	0	1	1
\	0	1	0	1	1	1	0	0
]	0	1	0	1	1	1	0	1
^	0	1	0	1	1	1	1	0
_	0	1	0	1	1	1	1	1
`	0	1	1	0	0	0	0	0

A "1" indicates the bit is turned on. A "0" indicates the bit is off.

ENQ Reference Table - Byte #3 (continued)

Char	Const. OFF	Const. ON	Low Battery	Format Error	Waiting to Dispense Label	Ribbon Fault	Stock Fault	Online Error
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
a	0	1	1	0	0	0	0	1
b	0	1	1	0	0	0	1	0
c	0	1	1	0	0	0	1	1
d	0	1	1	0	0	1	0	0
e	0	1	1	0	0	1	0	1
f	0	1	1	0	0	1	1	0
g	0	1	1	0	0	1	1	1
h	0	1	1	0	1	0	0	0
i	0	1	1	0	1	0	0	1
j	0	1	1	0	1	0	1	0
k	0	1	1	0	1	0	1	1
l	0	1	0	1	0	1	1	0
m	0	1	1	1	1	0	0	1
n	0	1	1	0	1	1	1	0
o	0	1	1	0	1	1	1	1
p	0	1	1	1	0	0	0	0
q	0	1	1	1	0	0	0	1
r	0	1	1	1	0	0	1	0
s	0	1	1	1	0	0	1	1
t	0	1	1	1	0	1	0	0
u	0	1	1	1	0	1	0	1
v	0	1	1	1	0	1	1	0
w	0	1	1	1	0	1	1	1
1	0	1	1	1	1	0	0	0
y	0	1	1	1	1	0	0	1
z	0	1	1	1	1	0	1	0
{	0	1	1	1	1	0	1	1
|	0	1	1	1	1	1	0	0
}	0	1	1	1	1	1	0	1
~	0	1	1	1	1	1	1	0
Dec 127	0	1	1	1	1	1	1	1

A "1" indicates the bit is turned on. A "0" indicates the bit is off.

Job Request

A Job Request returns status information about the most recently processed print job. You can send a job request after an ENQ or batch. You can send two levels of Job Requests:

- ◆ Numeric Error Codes Only (0, 1, or 2)
- ◆ Verbose (3 or 4)

Syntax {J, #}

Field Type	Valid Options	Description
Identifier	J	Job Status Request
request#	0 1 2 3 4	Returns ASCII coded strings or numeric error codes Returns error number Returns number of labels printed in batch

Example {J, 3}

The job response may not be immediate. If the printer has an error (out of supplies, ribbon problem, etc.), is in pause mode, or has insufficient memory, correct the problem and then resend the job request. If the problem is not corrected, no response is returned. If a formatting error has occurred, the job request will return the status. The printer must first interpret the format and batch data before returning the response.

To clear an error, press the FEED button. An ENQ can also clear errors numbered less than 500. Once the error is corrected, a job request can be sent. The printer cannot accept another job request until the error is resolved.

Job Response

The Job Response varies, depending on the type of request sent to the printer. The following syntax is the response for a Job 0, 1, or 2 request.

Syntax {J, Status1, Status2, "FMT-1", "BCH-2" }

Status1 These errors stop the print job. Examples include out of stock, supply faults, or data formatting errors. These errors are numbered less than 24 on the "Job Status 0, 1, 2 Response Table," later in this chapter.

Status2 These are errors in the syntax of the MPCL data stream. Printing does not stop, but the information may not print properly. These errors are numbered greater than 24 on the "Job Status 0, 1, 2 Response Table," later in this chapter.

FMT-1/BCH-2 The format or batch number is returned.

Here is an example of a response returned to a J 0, 1, 2 request:

```
{J, 8, 0, "FMT-1", "BCH-2" }
```

Indicates that a portion of the format extends off the tag in format 1, batch 2. Refer to the "Job Status 0, 1, 2 Response Table" later in this chapter for brief explanations for J, 0, 1, 2 requests. In the above example, refer to error 8 for an explanation.

Status2 C- Field Number	represents the field number within each packet. The packet header is the first field and each subsequent field is indicated by the field separator.
Status2 D- Parameter	represents the parameter within the field that the error occurred. The numbering begins after the field identifier.
Status2 E- Error Number	is the error that coincides with the error numbers presented in Chapter 9, "Errors."
"FMT-1/BCH-2"	The format or batch number is returned.

—————
If more than one error occurred then only the most serious error will be acknowledged.
—————

{ J , " " , " F , B , 4 , 6 , 33 " , " FMT-1 " , " BCH-2 " }

Indicates that an error occurred on a bar code (**B**) field within a format (**F**) packet. The bar code field is the fourth (**4**) field in the packet. The error occurred in the sixth (**6**) parameter of the field. Error number **33** means the bar code density is invalid.

To clear an error, press the FEED button. An ENQ can also clear errors numbered less than 500. Once the error is corrected, a job request can be sent. The printer cannot accept another job request until the error is resolved.

The following syntax is the response for a Job 4 request.

Syntax {J,printed,total,"FMT-1","BCH-2" }

printed the number of tags or labels already printed in the batch.

total the total number of tags or labels to be printed in the current batch.

"FMT-1/BCH-2" The format or batch number is returned.

Example {J,8,25,"FMT-3","Bch-2" }

8 out of **25** tags or labels have been printed from format number **3**.

Use a Job Request 4 when printing in the on-demand mode with a large number of tags or labels from a single batch. A Job Request 4 may not be accurate if tags or labels are printed in continuous mode, because of the response time involved. A Job Request 4 is not useful in single ticket batches (printing 1 of 1) or multiple single ticket batches.

A batch has to be printing when you send the job request. You cannot use this job request on batches printing formats with incrementing fields.

Job Status 0, 1, 2 Response Table (Status 1 Codes)

Number	Meaning
0	No error
1	Stacker fault
2	Supply problem
4	Hot printhead
5	Printhead open
6	Insufficient memory
7	Ribbon problem
8	Field ## extends off tag
9	Field ## has a bad font/bar code
10	Field ## contains invalid data
11	Field ## has a graphic missing
12	Invalid communication channel
13	Invalid file type
14	All communication channels are busy
15	Receive overrun error
16	Receive parity error
17	Receive framing error
18	Receive buffer full
19	Label waiting
21	Bad dots (verifier detected a failure)
23	Low battery
24	Memory configuration packet error

Numbers 25 through 50 are
not currently in use.

Job Status 0, 1, 2 Response Table (Status 2 Codes)

Number	Meaning
51	Invalid command
52	Invalid separator value
53	Graphic not found
54	Format for batch not found
55	Quantity/Multiples out-of-range
56	Name descriptor too long
57	Invalid cut value
58	Invalid number-of-parts value
59	Invalid orientation value
60	Invalid thickness value
61	Invalid text field
62	Invalid bar code field
63	Data string too long
64	Invalid data field
65	Row greater than stock length
66	Row greater than format length
67	Column greater than printhead width
68	Column greater than format width
69	Invalid label length
70	Invalid label width
71	Invalid increment/decrement value
72	Identifier out-of-range
73	No field to create format
74	Stop location of a line is out of range
75	Syntax error
80	Can't use offline format for online batch
81	Can't queue graphic batch
82	Can't store online format
83	Can't queue online batch
84	Can't queue online clear command

DIAGNOSTICS

8

This chapter explains how to

- ◆ print a test label.
- ◆ reset the printer.
- ◆ call Technical Support.

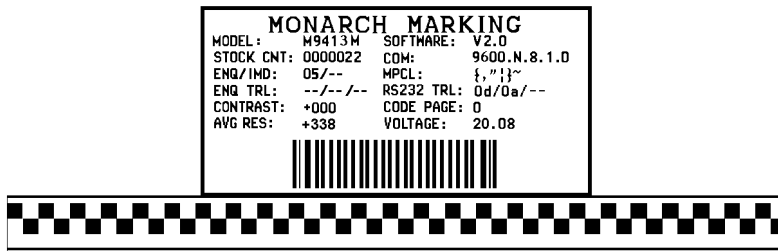
Before you call Technical Support, print a test label. The label contains information to help Technical Support diagnose mechanical and setup problems.

Printing a Test Label

To print the test labels:

1. Turn the printer off.
2. Press and hold the FEED button while turning the printer on.
3. Release the FEED button when the printer starts advancing lines.

Several labels may advance including a diagnostic label.



The test label shows the model number, software version, total number of inches printed, voltage, print contrast, printhead resistance, code page, MPCL control characters, ENQ and RS232 characters.

4. Press the FEED button to exit Data Dump Mode. The indicator light should be GREEN.

Using Data Dump

After printing a test label, these printers are in "data dump mode."
To use data dump mode:

1. Turn off the printer.
2. Press and hold the FEED button while turning on the printer.
3. Release the FEED button when the printer starts advancing lines.

A test label prints.

Your printer is now in data dump mode.

4. Download the data stream you wish to "dump" (print out on a label).
5. The data stream prints out automatically when there is enough data to fill a label. Press the FEED button to print any remaining data on another label.

```
,"06/11/94" p}0 10
D AD
1111" p o2,"G1111111" p03,"Smith" p04, "12345678" p05
3,"CHECKER ID: " p}0{B,1,N,1 p01,"G1111111
D D
200,100,0,1,2,1,B,L,0,3 pOC,330,20,0,1,1,1,B,L,0,
D
0,100,0,1,1,1,B,L,0,3,"DATE RECEIVED:" p OT,5,8,V,
D
"VIN #:" p OT,4,17,V,260,130,0,1,2,B,L,0,3 pOC,33
D D
,160,0,1,2,1,B,L,0,3 pOC,330,130,0,1,1,1,B,L,0,3,
D
C,330,160,0,1,1,1,B,L,0,3,"OWNER:" p OT,3,15,F,260
D
,3,3,2,B,L,0,3 p08,2,9,V,330,220,4,11,080,8,L,3 p0
D D
{F,1,A,R,E,400,400,"WINDSHIE" p OT,1,9,V,310,340,0
D
```

Download another data stream to dump or press the FEED button to exit data dump mode.

Troubleshooting Information

If you experience problems using your printer, refer to this section.

If You Receive an Error Message

If an error message appears from an ENQ, see Chapter 9, "Errors," for more details. Any time you receive a message that is not described in this manual, or the recommended action does not solve the problem, call Technical Support. Some errors are the result of communication problems. In this case, reset your printer and reboot your computer. For more information, refer to "If the PC and Printer Aren't Communicating." If you change any of the online configuration packets, resend the format packet to the printer, so the configuration changes take effect.

If the PC and Printer Aren't Communicating

If your PC is having trouble communicating with your printer, follow these steps:

- ◆ Make sure you are using the correct printer cable.
- ◆ Make sure the cable is plugged into the correct port on the computer.
- ◆ Compare your printer's communications settings (especially flow control) with the settings on your PC. Your printer and PC communications should match. Print a test label to identify the printer's communication settings.
- ◆ Make sure the printer is online (ready to receive data).

If all of the above are correct, reset your printer. Try the function again. If you still can't establish communications, call Technical Support.

Resetting Printers

Sometimes, the printer receives mixed signals and loses its ability to communicate. If this happens, reset the printer and attempt communication again. To reset the printer, turn off the printer, wait two seconds, and turn it back on.

Calling Technical Support

Technical support representatives are available Monday through Friday during regular business hours. Follow these steps before you call:

1. Make sure your PC and printer are properly connected.
2. Record any error messages that occurred.
3. Try to recreate the problem, if you can.
4. Check your port settings. Your problem may be corrected simply by changing the communication settings.
5. List any changes that have recently been made to the system. Try to record what you did when the problem occurred.
6. Reset your printer. For information on resetting your printer, see "Resetting Printers."
7. Reboot your computer. Refer to your computer documentation for specific instructions.
8. Print a test label, see "Printing a Test Label."

If these steps do not solve the problem, call Technical Support.

Have the following information ready before you call:

- ◆ computer brand name and model
- ◆ version of DOS
- ◆ Monarch printer model
- ◆ other peripheral devices on your system

- ◆ support agreement, contract number, or invoice information
- ◆ customer number
- ◆ printer serial number

ERRORS

9

This chapter provides explanations of your printer's errors. The errors are classified by type and are listed in order.

If you have trouble loading supplies or performing maintenance, refer to your *Equipment Manual*.

Some errors numbered 400-438 and 500-574 are internal software errors. Errors numbered 703-758 are supply errors. Follow the directions provided with the error description to correct the problem. Errors numbered 900-999 are Hard Printer Failures. If you cannot clear an error, turn off the printer, wait several seconds and then turn on the printer. Call Technical Support if you receive any error message not listed in this chapter.

To clear a data error, press the FEED button. If a formatting error occurs, the label prints; but data may be missing. Correct the format or batch and resend them to the printer.

Data Errors

Errors 001 to 499 are data errors. These errors are returned in response to a **J,3** request. See Chapter 7, "[Status Polling](#)," for more information. A data error indicates that incorrect data was received from the host, causing the printer to ignore the entire print job. After checking the packet and correcting the problem, transmit the print job again.

The following is a list of data errors. These errors occur because data in the format, batch, check digit, or font packet is invalid.

Error Code	Description
001	Packet ID number must be 1 to 999 .
002	Name must be 1 to 8 characters inside quotes or a printer-assigned name ("").
003	Action must be A (add) or C (clear).
004	Supply length is invalid. See " Defining the Format Header " in Chapter 4 for valid lengths.
005	Supply width is invalid. See " Defining the Format Header " in Chapter 4 for valid widths.
006	Storage device must be N (non-volatile RAM).
007	Unit of measure must be E (English), M (Metric), or G (Dots). See " Defining the Format Header " in Chapter 4 for information.
010	Field ID number is outside the range 0 to 999 .
011	Field length exceeds 2710 .
012	Row field position is greater than the maximum stock dimension. See " Defining Text Fields " in Chapter 4 for valid row lengths.

- 013 Column field position is greater than the maximum stock dimension. See "[Defining Text Fields](#)" in Chapter 4 for valid column widths.
- 014 Font style must be **1**, **2**, **3**, **4**, **10**, or **11**. See "[Defining Text Fields](#)" in Chapter 4 or Appendix B, "Fonts," for more information.
- 015 Character rotation must be **0** (0 degree), **1** (90 degree), **2** (180 degree), or **3** (270 degree). See "[Defining Text Fields](#)" in Chapter 4 for information.
- 016 Field rotation must be **0** (0 degree), **1** (90 degree), **2** (180 degree), or **3** (270 degree). See "[Defining Text Fields](#)" in Chapter 4 for information.
- 017 Field restriction must be **V** (variable) or **F** (fixed).
- 018 Code page selection defined in the field must be **0** (Internal), **1** (ANSI), **2** (DOS 437), or **3** (DOS 850).
- 020 Vertical magnification must be **1** to **7**.
- 021 Horizontal magnification must be **1** to **7**.
- 022 Color must be **B**, **D**, **O**, **R**, or **W**. See "[Defining Text Fields](#)" in Chapter 4 for more information.
- 023 Intercharacter gap must be **0** to **99** dots.
- 024 Field justification must be **B** (balanced), **C** (centered), **E** (end), **L** (left), or **R** (right). See "[Defining Text Fields](#)" in Chapter 4 for more information.
- 025 String length is outside the range **0** to **2710**.

- 030 Bar code height must be at least **20** (English), **51** (Metric), **40** (Dots), or is not within the supply dimensions.
- 031 Human readable option must be
- 0** default
 - 1** no CD or NS
 - 5** NS at bottom, no CD
 - 6** CD at bottom, no NS
 - 7** CD and NS at bottom
 - 8** no text
- 032 Bar code type is invalid. See ["Defining Bar Code Fields"](#) in Chapter 4 for valid options.
- 033 Bar code density is invalid. See ["Defining Bar Code Fields"](#) in Chapter 4 for the bar code density chart.
- 040 Line thickness must be **0** to **99** dots.
- 041 Line direction must be **0**, **90**, **180**, or **270**.
- 042 End row is invalid. Line segment or box end row is defined outside of printable area.
- 043 End column is invalid. Line segment or box end column is defined outside of printable area.
- 044 Dot pattern for line or box must be "".
- 045 Line length is defined beyond the maximum length. See ["Defining Line Fields"](#) in Chapter 4 for valid lengths.
- 046 Line type must be **S** (segment) or **V** (vector).
- 051 Imaging mode in the graphic header must be **0**.
- 101 The format referenced by batch is not in memory.
- 102 Print quantity is outside the range **0** to **32000**.

- 104 Batch mode must be **N** (new) or **U** (update).
- 105 Batch separator must be **0** (Off), **1** (On), **2** (Double) in the batch control field.
- 106 Print multiple is outside the range **1** to **999**.
- 107 Cut multiple is outside the range **0** to **999**. Not valid for these printers.
- 108 Multiple part supply is outside the range **1** to **5**.
- 109 Reserved for knife usage. Not valid for these printers.
- 200 Option number must be **1, 4, 30, 31, 42, 50, 51, 52, 60,** or **61**.
- 201 Copy length is outside the range **0** to **2710**.
- 202 Copy start position must be **1** to **2710**.
- 203 Destination start position must be **1** to **2710**.
- 204 Source field must be **0** to **999**.
- 205 Copy type must be **1** (copy after rules) or **2** (copy before rules).
- 206 Increment/Decrement selection must be **I** (increment) or **D** (decrement).
- 207 Incrementing start position must be **0** to **2710**.
- 208 Incrementing end position must be **0** to **2710**.
- 209 The incrementing amount must be **0** to **999**.
- 210 Security value for a PDF417 bar code must be **0** to **8**.
Correct the value and resend the format to the printer.
- 211 Narrow element value is less than **1** or greater than **99**.
Correct the value and resend the format to the printer.

- 212 Wide element value is less than **1** or greater than **99**.
Correct the value and resend the format to the printer.
- 213 Dimension must be **1** to **30** for a column or **3** to **90** for a
row on a PDF417 bar code.
- 214 Truncation code must be **S** (standard) or **T** (truncated
bar code).
- 215 Aspect code must be **C** (columns) or **R** (rows).
- 216 Option definition must be **S** (set) or **T** (template).
- 217 Input device device must be **D** (Default), **H** (Host), **K**
(Keyboard), **N** (None), or **S** (Scanner).
- 218 Pad direction must be **L** (from left) or **R** (from right).
- 219 Pad character is outside the range **0** to **255**.
- 220 Check digit selection must be **G** to generate check digit.
- 221 Primary or secondary price format is outside the range
1 to **15**.
- 222 Data type restriction is outside the range of **1** to **6**.
- 223 Option is not valid for the field.
- 224 Bar code Intercharacter gap must be **0** to **99** dots.
(This is also known as the additional character gap
when using Option 50, Defining Bar Code Densities.)
- 251 Power up mode must be **0** (online).
- 252 Language selection must be **0** (English).
- 253 Batch separator code must be **0** (off), **1** (on), or **2**
(Double) in the System Setup Packet.
- 254 Slash zero selection must be **0** (standard zero) or **1**
(slash zero).

- 255 Supply type must be **0** (black mark), **1** (die cut), or **2** (non-indexed).
- 256 Ribbon selection must be **0** (direct) or **1** (transfer).
- 257 Feed mode must be **0** (continuous) or **1** (on-demand).
- 258 Supply position is outside the range. See ["Defining the Supply Setup Packet"](#) in Chapter 3 for more information.
- 259 Contrast adjustment must be **-390** to **156** dots.
- 260 Print adjustment must be **-99** to **99** dots.
- 261 Margin adjustment must be **-99** to **99** dots.
- 262 Speed adjustment must be **0** (default) or **20** (2.0 IPS).
- 263 Primary monetary symbol is invalid. See ["Defining the Monetary Formatting Packet"](#) in Chapter 3 for more information.
- 264 Secondary symbol selection must be **0** (none) or **1** (print secondary sign).
- 265 Monetary decimal places must be **0** to **3**.
- 266 Character string length in the control characters packet must be **5** (MPCL control characters) or **7** (ENQ/IMD command character).
- 267 Baud rate selection must be **0** (1200), **1** (2400), **2** (4800), **3** (9600), **4** (19200), or **5** (38400). Resend the communication settings packet or check the DIP switch settings.
- 268 Word length selection must be **0** (7 bits), or **1** (8 bits). Resend the communication settings packet or check the DIP switch settings.

- 269 Stop bits selection must be **0** (1 bit), or **1** (2 bits). Resend the communication settings packet or check the DIP switch settings.
- 270 Parity selection must be **0** (none), **1** (odd), or **2** (even). Resend the communication settings packet or check the DIP switch settings.
- 271 Flow control selection must be **0** (none), **1** (DTR), **2** (CTS/RTS), or **3** (XON/XOFF). Resend the communication settings packet or check the DIP switch settings.
- 272 Internal code page selection must be **0** (Internal), **1** (ANSI), **2** (DOS 437), or **3** (DOS 850).
- 273 Cut adjustment must be **-300** to **300** dots.
- 282 RS232 Trailer string is too long. Use a maximum of **3** characters.
- 283 ENQ Trailer string is too long. Use a maximum of **3** characters.
- 284 The buffer type must be **T** (Transmit), **R** (Receive), **I** (Image), **F** (Format), or **D** (Downloadable Fonts).
- 285 The storage device type in the memory configuration packet must be **N** (non-volatile RAM).
- 286 The buffer size is invalid.
- 287 The printhead width must be **0**.
- 288 The battery voltage must be **0** (15-volt battery) or **1** (12-volt battery).
- 289 The printer address specified in the communication settings packet must use *exactly* six characters.

- 290 Action must be **0** (disable) or **1** (enable) for the backfeed control packet or the printer is active.
- 291 Dispense position must be **50** to **200** dots and the backfeed distance is greater than the dispense position or the printer is active.
- 292 Backfeed distance must be **10** to **200** dots or the printer is active.
- 310 Check digit scheme number must be **1** to **10**.
- 311 Modulus must be **2** to **11**.
- 314 Check digit algorithm must be **D** (sum of digits) or **P** (sum of products).
- 325 Duplicating direction must be **0** (insert after) or **1** (insert before) in duplicate fields for graphics.
- 327 Amount of row adjustment must be **0** to **999** (**0** to **99** for 9403) dots in duplicate fields for graphics.
- 328 Duplicate count must be **0** to **999** (**0** to **99** for 9403).
- 340 Bitmap line encoding must be **H** (hex) or **R** (run length).
- 350 Font selector must be **1** to **9999**.
- 351 Font data length must be **68** to **16384**.
- 352 Insufficient font memory is available for the downloaded font.
- 380 Job request is outside the range **0** to **4**.
- 400 The character immediately following { is invalid.
- 402 Field separator is not in the expected location.
- 403 Field separator was not found.

- 404 The number or string that is currently being processed is too long.
- 405 Too many fields exist in the format. You cannot have more than **1000** fields in the format. Lines, boxes, and constant text fields count as fields.
- 409 The printer memory is full. Delete unnecessary formats or graphics from memory. If you are using a graphic file that is very large, consider using another mapping method (such as run length encoding) to reduce the required memory.

Communication Failures

Errors 410 to 413 are usually caused by a hardware failure, by an incorrect SETUP option or by the host ignoring flow control (XON/OFF, CTS/RTS or DTR). Communication settings:

Baud rate	1200, 2400, 4800, 9600, 19200, 38400
Word length	7 or 8
Stop bits	1 or 2
Parity	Odd, Even, None
Flow control	None, XON/XOFF, DTR, CTS

- 410 Parity on the printer does not match the parity on the host. Check the parity setting under SETUP options.
- 411 Framing error. The printer cannot communicate with the host. Make sure the host is turned on, communication cables are connected correctly, port settings are correct, and communications are active. Check the baud rate, word length, and stop bits to make sure they match those at the host. Do not toggle between Microsoft® Windows® and MS-DOS, while using the COPY command, or you will receive a framing error. Exit Windows **before** using the COPY command. Re-transmit the data.

- 412 There is a problem with flow control between the printer and the host. Make sure the printer and the host flow control settings match (both are DTR or both are XON/XOFF). If the error persists, call Technical Support.
- 413 Online receive queue is full. Check your printer's XON/XOFF or DTR SETUP values to be sure there isn't a flow control problem.
- 414 The internal keyboard buffer is full or you need a new keypad. Call Technical Support.
- 415 The buffer size you defined exceeds the total available in your machine.
- 416 Flash/PC board error. Call Technical Support.
- 417 Flash memory is full. Clear flash through the 9403 printer's menu. Resend the format, graphic, and check digit packets. If the error reappears, call Technical Support.
- 427 Format name is invalid. Valid name is **1 - 8** characters inside quotes or "" for a printer-assigned name. Press the FEED button and try to continue. If the error reappears, call Technical Support.
- 428 Batch name is invalid or graphic not found. Press the FEED button and try to continue. If the error reappears, call Technical Support.
- 429 A field number appears more than once in a format.
- 430 The format uses a graphic file that cannot be found.
- 433 The batch references a field number that does not exist in the format.
- 497 An error occurred during the loop back test on the parallel port. Call Service.

499 An error occurred during the loop back test on the serial port. Call Service.

Data Formatting Failures

Formatting errors indicate that a field will print incorrectly. After you have checked the data stream and corrected the data, retransmit the format and batch.

—————
For errors 571-619, the batch will still print, but the field, font, bar code, or density may be incomplete, missing or contain incorrect data.
—————

- 571 UPC or EAN bar code data length is invalid. The bar code data length in the batch does not fit the format.
- 572 A copy field, padded field, or incrementing field length is invalid. The field length in the batch does not fit the format or the field contains blanks. Or, the fixed length field does not contain the specified number of characters.
- 573 Price field length is invalid. The price field length in the batch does not fit the format or the field contains blanks.
- 574 No CD scheme or room for CD. The CD scheme in the batch does not fit the format or the field contains blanks.
- 575 The graphic included in your format could not be found.
- 611 Font, bar code or density is invalid. The font, bar code or density in the batch does not fit the format.
- 612 The data in this line of the batch is either missing or does not match the format.
- 613 Reference point off tag.

- 614 Portion of field off tag. There may be an invalid character in the packet. Make sure you did not enter **O** for **Ø**.
- 615 Bar code width is greater than 16 inches or the number of keywords for your PDF 417 bar code exceeds **928**. Decrease the density or shorten the amount of data to print the bar code.
- 616 Dot shifting failed. A bad dot falls on a bar code that cannot be shifted. Call Technical Support.
- 618 Magnification must be **1** to **7**.
- 619 The JIS (16-bit) code for Kanji is invalid.

Machine Faults

Errors 700 to 793 occur when there is a problem with the printer.

- 703 The printer sensed a calibration of different-sized black marks. Make sure the correct supply is loaded.
- 704 Printer has not sensed a supply mark within the specified number of inches or out of supplies. Check the
- ◆ supply tracking
 - ◆ supply marks
 - ◆ black mark sensor position
 - ◆ supply roll for binding.
- Press the FEED button. If the error continues to appear, change the supply.
- 750 Printhead is overheated. Turn off the printer to let the printhead cool. If the error persists, call Technical Support.
- 751 Printer did not sense a black mark when expected.

For errors 751-753, Check the

- ◆ supply tracking
- ◆ supply marks
- ◆ black mark sensor position
- ◆ supply roll for binding.

Press the FEED button and try to continue printing. If the error continues to appear, change the supply.

- 752 Printer sensed a mark in the wrong place.
- 753 Printer sensed a mark that is too long.
- 754 Printer has a ribbon problem. Check the ribbon for a jam or remove any slack by turning the take-up reel clockwise. Load a new ribbon.
- 755 Printhead is open. Close the printhead before continuing. If the error persists, call Technical Support.
- 756 The printer is out of supplies. Load supplies.
- 757 Load supplies. The calibrated supply length differs by plus or minus .25 inches from the format. Press the FEED button to print on the current supply or load new supply and press the FEED button.
- 758 Check supply. Either the supply is not seen or the on-demand sensor is broken. Check for a label jam. Clear the supply path or reload supplies. This error may occur if you remove a label too quickly in on-demand mode. The printer does not recalibrate after this error.
- 759 Knife is not moving. Call Technical Support.
- 760 Knife jam. Call Technical Support.

- 761 The stacker is full or jammed. Empty the stacker or clear the jam before continuing. The printer does not recalibrate after this error.
- 762 Low battery. Recharge the battery.
- 763 Waiting to dispense label. Press the FEED button.
- 764 Verifier failure. Check the verifier by referring to your verifier's manual. The printer does not recalibrate after this error. Call Technical Support.
- 765 The printhead has less than four bad dots. The printer can shift bar code fields to avoid bad dots.
- 768 Printhead has more than 10 bad dots or is not connected. Make sure the printhead is connected and call Technical Support.
- 770 The print motor is not ready. Call Technical Support.
- 771 The format specified by the application was not found. Reload your application and format, and try again. If the problem continues, call Technical Support.
- 790 Wait until the printer is idle (no batch waiting to print or not receiving data) before you send any packets. This error may occur when you try to print a test label if the printer is busy.
- 791 The printer has an error pending. Turn off the printer. Wait 15 seconds and turn it back on. Resend the packets. If the problem continues, call Technical Support.
- 792 The printer is not initialized. Call Technical Support.
- 793 The printer job queue is full. Turn off the printer. Wait 15 seconds and turn it back on. Resend the packets. If the problem continues, call Technical Support.

900	RAM test failure.
901	ROM/EPROM checksum failure.
902	Software timer failure.
903	Software interrupt failure.
905	Illegal interrupt.
906	Non-maskable interrupt.
907	Low RAM error.
908	Non Volatile RAM checksum failure.
909	RAM corrupted.
910	Warm restart.
911	Version string mismatch.

Errors numbered 900-911 occur when you turn on the printer. They may indicate a circuit board failure. Errors numbered 930-940 are errors that may occur during the loading of flash memory. Errors numbered 950-999 indicate a circuit board failure. Call Technical Support if you receive any of these messages.

SAMPLES



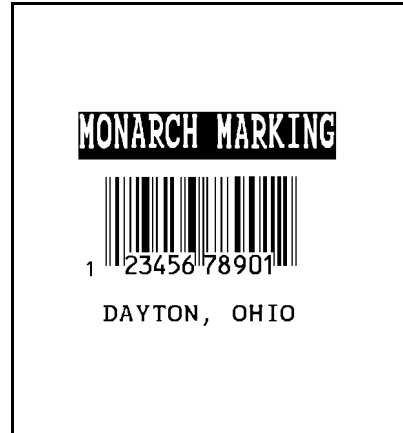
This appendix contains sample formats. You can customize any of these formats to meet your needs.

Sample UPCA Format Packet

```
{F,25,A,R,M,508,508,"Fmt 25" |  
C,250,80,0,1,2,1,W,C,0,0,"MONARCH MARKING" |  
B,1,12,F,110,115,1,2,120,5,L,0 |  
T,2,18,V,30,30,1,1,1,1,B,C,0,0 | }
```

Sample Batch Packet

```
{B,25,N,1 |  
1,"12345678901" |  
2,"DAYTON, OHIO" | }
```



Sample MaxiCode Packets

MaxiCode is a two-dimensional bar code developed by UPS (United Parcel Service, Inc.). Data must be defined in a specific way for UPS. Refer to the *Guide to Bar Coding with UPS* or the *AIM MaxiCode Specification* for more details about data requirements.

Use this updated format and batch packet with the following firmware:

- ◆ 9412 1.0 or greater supports Mode 0
- ◆ 9413 1.0 or greater supports Mode 0
- ◆ 9414 1.0 or greater supports Mode 0, 2, and 3

Mode	Description
0	Obsolete
2	Structured Message
3	Structured Message

You can select which mode to use in the bar code field or allow the printer to auto-select the mode (0, 2, or 3) based on your data. See "Defining a Bar Code Field" for more information. MaxiCode automatically pads data with the "!" character.

MaxiCode does not support
the NULL character.

Modes 2 and 3 are defined by the way the postal code, class of service, and country code fields are arranged. (The postal code, class of service, and country code are required fields.) Begin with the message header, then the primary data (15 characters), followed by the secondary message (up to 78 characters). Or, begin with the primary data, then the message header, followed by the secondary data. If the postal code data characters are all numeric then the MaxiCode symbol is set to Mode 2. If the characters are alphanumeric, or only contain ASCII characters 65 to 90, then the MaxiCode symbol is set to Mode 3.

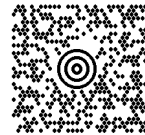
If you receive an error 612, check your MaxiCode data. You may have not correctly structured or left out one of the three required fields (postal code, class of service, and country code) or the "~029" character.

Mode 0 (Obsolete) Sample

```
{F,1,A,R,E,0600,0400,"MAXICODE" |
B,1,99,V,050,150,33,7,0,8,L,0 | }
{B,1,N,1 |
1,"450660000" |

C,"001" |
C,"840" |
C,"[]~030" |
C,"01~02996" |
C,"1Z12345678~029" |
C,"UPSN~029" |
C,"12345A~029" |
C,"070~029" |
C,"~029" |
C,"1/1~029" |
C,"15~029" |
C,"Y~029" |
C,"60 SADDLEBROOK CT.~029" |
C,"DAYTON~029" |
C,"OH~030" p
C,"~004" | }
```

MaxiCode bar code (33)
Batch header
Postal code- zip code
(This field determines Mode)
Country code
Class of service
Message header
Transportation header
Tracking number
Origin carrier SCAC
UPS shipper number
Julian day of pickup
Shipment ID
Package count
Weight (lb.)
Address validation
Street address
City
State
EOT

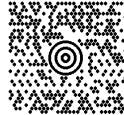


Mode 2 Sample

```
{F,1,A,R,E,400,400,"MAXI_M2" |  
B,1,99,V,040,140,33,7,0,8,L,0 | }  
{B,1,N,1 |  
1,"[ ]>~030" |  
C,"01~02996" |  
C,"068100000~029" |  
  
C,"840~029" |  
C,"001~029" |  
C,"1Z12345675~029" |  
C,"UPSN~029" |  
C,"12345E~029" |  
C,"089~029" |  
C,"~029" |  
C,"1/1~029" |  
C,"10~029" |  
C,"Y~029" |  
C,"~029" |  
C,"~029" p  
C,"CT~030" p  
C,"~004" | }
```

MaxiCode bar-code (33)

Message header
Transportation header
Postal Code
(This field determines Mode)
Country code
Class of service
Tracking number
Origin carrier SCAC
UPS shipper number
Julian day of pickup
Shipment ID
Package count
Weight (lb.)
Address validation
Street address
City
State
EOT



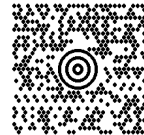
Mode 3 Sample

```
{F,1,A,R,E,400,400,"MAXI_M3" |
B,1,99,V,040,140,33,7,0,8,L,0 | }
{B,1,N,1 |
1,"[>~030" |
C,"01~02996" |
C,"M5E1G45~029" |

C,"124~029" |
C,"066~029" |
C,"1Z12345679~029" |
C,"UPSN~029" |
C,"12345E~029" |
C,"089~029" |
C,"~029" |
C,"1/1~029" |
C,"10~029" |
C,"Y~029" |
C,"~029" |
C,"TORONTO~029" |
C,"ON~030" |
C,"~004" | }
```

MaxiCode bar-code (33)

Message header
Transportation header
Postal Code
(This field determines Mode)
Country code
Class of service
Tracking number
Origin carrier SCAC
UPS shipper number
Julian day of pickup
Shipment ID
Package count
Weight (lb.)
Address validation
Street address
City
State
EOT



Sample Compliance Packet

```
{F,1,A,R,E,600,400,"RDCI" |
L,V,500,115,90,85,3 |
L,V,298,245,90,102,3 |
L,V,500,2,0,390,3 |
L,V,400,2,0,390,3 |
L,V,298,2,0,390,3 |
L,V,200,2,0,390,5 |
C,568,8,0,2,2,2,B,L,0,0,"FROM:",0 |
C,568,125,0,2,2,2,B,L,0,0,"CARRIER:",0 |
C,529,124,0,2,2,2,B,L,0,0,"PRO NUMBER:",0 |
C,511,125,0,2,2,2,B,L,0,0,"B/L NUMBER:",0 |
C,472,8,0,2,2,2,B,L,0,0,"TO:",0 |
C,387,8,0,2,1,1,B,L,0,0,"(420) SHIP TO POSTAL CODE",0 |
C,391,250,0,2,1,1,B,L,0,0,"APPOINTMENT NUMBER:",0 |
C,358,250,0,2,1,1,B,L,0,0,"ORDER TYPE:",0 |
C,327,250,0,2,1,1,B,L,0,0,"ITEM:",0 |
C,190,8,0,2,1,1,B,L,0,0,"UPC SHIPPING CONTAINER CODE",0 |
C,557,6,0,2,1,1,B,L,0,0,"MONARCH",0 |
C,547,6,0,2,1,1,B,L,0,0,"170 MONARCH LANE",0 |
C,537,6,0,2,1,1,B,L,0,0,"P.O. BOX 608",0 |
C,527,6,0,2,1,1,B,L,0,0,"DAYTON, OHIO 45401",0 |
C,462,313,0,2,4,3,B,L,0,0,"#",0 |
T,1,15,V,529,220,0,2,2,2,B,L,0,0,0 |
T,2,15,V,511,220,0,2,2,2,B,L,0,0,0 |
B,3,13,V,311,28,8,4,50,8,L,0 |
B,4,14,V,17,60,50,5,130,8,L,0 |
T,5,30,V,161,080,0,3,1,1,B,L,0,0,0 |
T,6,15,V,467,40,4,1,2,2,B,L,0,0,0 |
T,7,10,V,462,330,6,2,4,3,B,L,0,0,0 |
T,8,20,V,549,124,0,2,2,2,B,L,0,0,0 |
T,9,30,V,446,40,4,2,2,2,B,L,0,0,0 |
T,10,30,V,426,40,4,2,2,2,B,L,0,0,0 |
T,11,30,V,406,40,4,2,2,2,B,L,0,0,0 |
T,12,20,V,368,255,0,2,3,2,B,L,0,0,0 |
T,13,5,V,335,270,0,2,3,2,B,L,0,0,0 |
T,14,15,V,304,270,0,2,3,2,B,L,0,0,0 |
T,15,15,V,366,65,0,2,2,2,B,L,0,0,0 |
R,1,"(420) " |
T,16,27,V,270,10,0,3,1,1,B,C,0,0,0 |
T,17,27,V,240,10,0,3,1,1,B,C,0,0,0 |
R,1,"WELCOMES GUEST # " |
T,18,27,V,210,10,0,3,1,1,B,C,0,0,0 | }
```

Sample Batch Packet

```
{B,1,N,1 |  
1,"1234567890" |  
2,"0987654321" |  
3,"~42032678" |  
4,"10028028662854" |  
5,"1 00 28028 66285 4" |  
6,"RODGER DIST CTR" |  
7,"8292" |  
8,"BROADWAY" |  
9,"555 WEST OAK AVE." |  
10,"DAYTON, OH 45401-0608" |  
11,"" |  
12,"08292 123456-123" |  
13,"AR" |  
14,"999-999999-99" |  
15,"32678" |  
16,"WYSIWYG" |  
17,"99999" |  
18,"TO A PRODUCT DEMO" | }
```

FROM:

MONARCH
170 MONARCH LANE
P.O. BOX 608
DAYTON, OHIO 45401

CARRIER:

BROADWAY

PRO NUMBER: 1234567890

B/L NUMBER: 0987654321

TO: RODGER DIST CTR #8292

555 NEST OAK AVE.

DAYTON, OH 45401-0608

<420> SHIP TO POSTAL CODE

(420)32678



APPOINTMENT NUMBER:

08292 123456-123

ORDER TYPE:

AR

ITEM:

999-999999-99

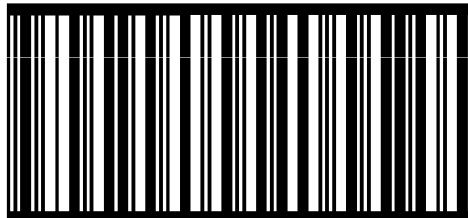
WYSIWYG

WELCOMES GUEST #99999

TO A PRODUCT DEMO

UPC SHIPPING CONTAINER CODE

1 00 28028 66285 4



Sample Format Packet

```
{F,5,A,R,G,576,768,"1HDREC1" |
L,S,19,39,499,39,38,"" |
L,S,19,93,499,93,15,"" |
L,S,19,124,499,124,15,"" |
L,S,19,155,499,155,38,"" |
C,461,232,0,1,1,1,B,L,0,0,"PO NUMBER    ",1 |
C,426,232,0,1,1,1,B,L,0,0,"STORE          " |
C,391,232,0,1,1,1,B,L,0,0,"CTNS SHOPPED" |
C,357,232,0,1,1,1,B,L,0,0,"CTNS RECVD   " |
C,320,232,0,1,1,1,B,L,0,0,"CARRIER      " |
C,259,232,0,1,1,1,B,L,0,0,"FRT BILL #   " |
C,196,232,0,1,1,1,B,L,0,0,"FRT TERMS    " |
C,159,232,0,1,1,1,B,L,0,0,"KEYREC#      " |
C,125,232,0,1,1,1,B,L,0,0,"FRT CLAIM #  " |
C,090,232,0,1,1,1,B,L,0,0,"RECVD BY     " |
C,056,232,0,1,1,1,B,L,0,0,"DATE RECVD   " |
C,461,445,0,1,1,1,B,L,0,0,": " |
C,426,445,0,1,1,1,B,L,0,0,": " |
C,391,445,0,1,1,1,B,L,0,0,": " |
C,357,445,0,1,1,1,B,L,0,0,": " |
C,320,445,0,1,1,1,B,L,0,0,": " |
C,259,445,0,1,1,1,B,L,0,0,": " |
C,196,445,0,1,1,1,B,L,0,0,": " |
C,159,445,0,1,1,1,B,L,0,0,": " |
C,125,445,0,1,1,1,B,L,0,0,": " |
C,090,445,0,1,1,1,B,L,0,0,": " |
C,056,445,0,1,1,1,B,L,0,0,": " |
T,01,08,V,461,458,0,1,1,1,B,L,0,0 |
T,02,08,V,426,458,0,1,1,1,B,L,0,0 |
T,03,08,V,391,458,0,1,1,1,B,L,0,0 |
T,04,08,V,357,458,0,1,1,1,B,L,0,0 |
T,05,18,V,290,289,0,1,1,1,B,R,0,0 |
T,06,12,V,230,395,0,1,1,1,B,R,0,0 |
T,07,08,V,196,458,0,1,1,1,B,L,0,0 |
T,08,08,V,159,458,0,1,1,1,B,L,0,0 |
T,09,08,V,125,458,0,1,1,1,B,L,0,0 |
T,10,08,V,090,458,0,1,1,1,B,L,0,0 |
T,11,08,V,056,458,0,1,1,1,B,L,0,0 |
T,12,11,V,259,762,0,1,2,2,B,B,0,1 |
R,1,"*_____*" |
B,13,09,V,259,720,4,4,145,8,B,1 |
R,4,12,2,9,1,1 |
R,50,3,8 | }
```


Sample Zero Batch Packet

```
{B,5,N,0 | }  
{B,5,U,1 | }  
1,"6005710" |  
2,"106" |  
3,"3" |  
4,"3" |  
5,"ALLIED FREIGHT1234" |  
6,"123456789012" |  
7,"P" |  
8,"10650337" |  
9,"0" |  
10,"VIC" |  
11,"1/6/94" |  
12,"106503378" | }
```

	PO NUMBER	: 6005710	 *106503378*
	STORE	: 106	
	CTNS SHOPPED	: 3	
	CTNS RECVD	: 3	
	CARRIER	:	
	ALLIED FREIGHT1234		
	FRT BILL #	:	
	123456789012		
	FRT TERMS	: P	
	KEYREC#	: 10650337	
	FRT CLAIM #	: 0	
	RECVD BY	: VIC	
DATE RECVD	: 1/6/94		

FONT S



This appendix contains information you need to work with fonts.

Standard Fonts

Your printer comes with these fonts loaded in ROM:

Number	Font Size and Appearance	Type of Spacing	# of Dots Between Characters
1	Standard	Monospaced	3
2	Reduced	Monospaced	1
3	Bold	Monospaced	3
4	OCRA-like	Monospaced	3
10	CG Triumvirate Bold (9 pt.)	Proportional	varies w/ each letter
11	CG Triumvirate (6 pt.)	Proportional	varies w/ each letter

The CG Triumvirate fonts support only the ANSI and DOS Code Page Symbol Sets. The CG Triumvirate fonts print a slashed zero when using the ANSI symbol set. See the following pages for illustrations of these fonts.

These samples were printed using the Internal Symbol set.

Standard Font

Reduced Font

ABCDEFGHIJKLM
NOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
nopqrstuvwxyz
0123456789:;<=>?
!"#\$%&'()*+,-./
[\]^_`{|}~Çüéääåä
çëèéíîïËÄÊæÆðóòó
ùÿÖÜÇŔřfaíóúñÑ ñ ñ ;
--½¼; <>øαβ@TM--
\$£¥ℳ℔ℕℙℒ℔ℕℙℒ℔ℕℙ

ABCDEFGHIJKLM
NOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
nopqrstuvwxyz
0123456789:;<=>?
!"#\$%&'()*+,-./
[\]^_`{|}~Çüéääåä
çëèéíîïËÄÊæÆðóòó
ùÿÖÜÇŔřfaíóúñÑ ñ ñ ;
--½¼; <>øαβ _
\$£¥ℳ℔ℕℙℒ℔ℕℙℒ℔ℕℙ

ABCDEFGHIJKLM
NOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
nopqrstuvwxyz
0123456789:;<=>?
!"#\$%&'()*+,-./
[\]^_`{|}~Çüéääåä
çëèéíîïËÄÊæÆðóòó
ùÿÖÜÇŔřfaíóúñÑ ñ ñ ;
--½¼; <>øαβ@TM--
\$£¥ℳ℔ℕℙℒ℔ℕℙℒ℔ℕℙ

ABCDEFGHIJKLM
NOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
nopqrstuvwxyz
0123456789:;<=>?
!"#\$%&'()*+,-./
[\]^_`{|}~Çüéääåä
çëèéíîïËÄÊæÆðóòó
ùÿÖÜÇŔřfaíóúñÑ ñ ñ ;
--½¼; <>øαβ _
\$£¥ℳ℔ℕℙℒ℔ℕℙℒ℔ℕℙ

Bold Font

OCRA-like Font

ABCDEFGHIJKLM
NOPQRSTUVWXYZ
0123456789@½
!"#\$%&'()*+,-
[\]^_`{|}~Çüéääåä
çëèéíîïËÄÊæÆðóòó
ùÿÖÜÇŔřfaíóúñÑ ñ ñ ;
--½¼; <>øαβ@TM--
\$£¥ℳ℔ℕℙℒ℔ℕℙℒ℔ℕℙ

ABCDEFGHIJKLM
NOPQRSTUVWXYZ
0123456789@
!"#\$%&'()*+,-./<>R&B¥
\$£¥ℳ℔ℕℙℒ℔ℕℙℒ℔ℕℙ




ABCDEFGHIJKLM
NOPQRSTUVWXYZ
0123456789@½
!"#\$%&'()*+,-
[\]^_`{|}~Çüéääåä
çëèéíîïËÄÊæÆðóòó
ùÿÖÜÇŔřfaíóúñÑ ñ ñ ;
--½¼; <>øαβ@TM--
\$£¥ℳ℔ℕℙℒ℔ℕℙℒ℔ℕℙ

ABCDEFGHIJKLM
NOPQRSTUVWXYZ
0123456789@
!"#\$%&'()*+,-./<>R&B¥
\$£¥ℳ℔ℕℙℒ℔ℕℙℒ℔ℕℙ

Monospaced Font Magnification

Monospaced characters occupy the same amount of space within a magnification. Use monospaced fonts for price fields and data you want to list in a column. Decide how wide and tall you want the characters to appear on the labels. The following two tables show the width and height of each of the monospaced fonts after magnification.

This table includes the default (3 dots for Standard, 1 dot for Reduced, 3 dots for Bold) spacing.

Width Mag.		Standard		Reduced		Bold	
Units		Character Width	Sample	Character Width	Sample	Character Width	Sample
1x	1/100 in.	8.37		3.9		13.3	
	1/10 mm	21.26		9.9		33.78	
	Dots	17	A	8	A	27	A
7x	1/100 in.	49.75		24.63		84.24	
	1/10 mm	126.37		62.56		214	
	Dots	101		50		171	

Only the 1x width can be scanned with the OCRA-like font. Using a printhead with 203 dpi, the character widths are as follows: 7.9 (English), 20.1 (Metric), and 16 (Dots).

To calculate other font widths, multiply the font dots (14 dots for Standard, 7 dots for Reduced, 24 dots for Bold) by the magnification and add the default spacing (3 dots for Standard, 1 dot for Reduced, 3 dots for Bold) between characters.

Example

14 (Standard font dots) x 5 (magnification) = 70 + 3 (default spacing between characters). There are 73 dots in the Standard font at 5x.

Height Magnification

1x

7x

Standard

A



1/100 in.	10.8	75.9
1/10 mm	27.4	192.8
dots	22	154

Reduced

A



1/100 in.	6.9	48.28
1/10 mm	17.5	122.6
dots	14	98

Bold

A



1/100 in.	16.7	117.24
1/10 mm	42.4	297.8
dots	34	238

OCRA-like (1x only)




1/100 in.	11.8
1/10 mm	30
dots	24

A

Proportional Font Magnification

Each character in a proportionally spaced font is a different height and width. You may be able to place more characters on a line using proportionally spaced fonts. You may want to experiment with these fonts and adjust field measurements in your format as needed. The following tables provide height and width magnification of sample characters.

CG Triumvirate Bold (9 pt.)

Width Mag.		Minimum	Average	Maximum
1x	1/100 in.	1.48	6.4	10.8
	1/10 mm	3.76	16.26	27.4
	Dots	3 i	13 L	22 W
7x	1/100 in.	10.3	44.8	75.9
	1/10 mm	26.2	114	192.8
	203 Dots	21 	91 	154 

To calculate other font widths, multiply the font dots (3 dots for Minimum, 13 dots for Average, 22 dots for Maximum) by the magnification.

Example

13 (Average font dots) x 5 (magnification) = 65 dots in an average letter of the CG Triumvirate Bold font at 5x.

CG Triumvirate (6 pt.)

Width Mag.		Minimum	Average	Maximum
1x	1/100 in.	.99	2.96	5.9
	1/10 mm	2.51	7.52	15
	Dots	2 i	6 L	12 W
7x	1/100 in.	6.9	20.7	41.4
	1/10 mm	17.5	52.6	105.2
	Dots	14 ■	42 ■	84 ■■■■■

Height Magnification

1x

7x



CG Triumvirate Bold

W

1/100 in.	8.87	68
1/10 mm	22.5	172.7
dots	18	138



CG Triumvirate

w

1/100 in.	5.9	41.38
1/10 mm	14.99	105.1
dots	12	84

SYMBOL SETS/CODE PAGES



This appendix contains a listing of the symbol sets, code pages, and extended character sets the printer supports. The standard, reduced, bold, and OCRA fonts only use the Internal Symbol Set.

Supported Symbol Sets and Code Pages

The printers support these symbol sets and code pages: Internal, ANSI, Bold, OCRA Character Set, DOS Code Page 437 and 850.

Selecting a Symbol Set or Code Page

The printer defaults to the internal symbol set. See "Defining Text Fields" in Chapter 4 to change the symbol set. The standard, reduced, bold, and OCRA Fonts only use the Internal Symbol Set.

Selecting the Internal Symbol Set

Use this symbol set when you want to use the international monetary symbols, create formats that may be used on other MPCLII printers, or print the trademark (™) symbol.

The CG Triumvirate fonts support only the ANSI and DOS Code Page Symbol Sets. These fonts print a slashed zero when using the ANSI symbol set.

Selecting the ANSI Symbol Set

Use ANSI when you want to use proportionally spaced fonts.

Selecting the 437 or 850 Code Page

These code pages provide extended and international characters and use proportionally spaced fonts.

Using Code 128 Function Codes

This table lists the characters for Bar Code 128 function codes. These functions are used with scanners.

Code	Function Code
~201	F1
~202	F2
~203	F3
~204	F4

Entering Extended Characters

When using extended characters in your batch data file, type a tilde in front of the three-digit code. For example, if you want to include the character Ä in a text field using the Internal Symbol Set, type:

1, "~142" |

ANSI Symbol Set

These are the printable characters using the ANSI Symbol set.

240	ð	ñ	ò	ó	ô	õ	ö	÷	ø	ù	ú	û	ü	ý	þ	ÿ
224	à	á	â	ã	ä	å	æ	ç	è	é	ê	ë	ì	í	î	ï
208	Ð	Ñ	Ò	Ó	Ô	Õ	Ö	×	Ø	Ù	Ú	Û	Ü	Ý	Þ	ß
192	À	Á	Â	Ã	Ä	Å	Æ	Ç	È	É	Ê	Ë	Ì	Í	Î	Ï
176	°	±	²	³	´	µ	¶	·	¸	¹	º	»	¼	½	¾	¿
160	¡	¢	£	¤	¥	¦	§	¨	©	ª	«	¬	­	®	¯	
144	‘	’														
128																
112	p	q	r	s	t	u	v	w	x	y	z	{	|	}	~	⌘
96	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
80	P	Q	R	S	T	U	V	W	X	Y	Z	[\]	^	_
64	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
48	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
32	!	"	#	\$	%	&	'	()	*	+	,	-	.	/	
16																
0																
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

Code Page 437

These are the printable characters using Code Page 437.

0		32		64	Q	96	`	128	Ç	160	á	192	L	224	α
1	Ⓜ	33	!	65	A	97	a	129	ü	161	í	193	l	225	β
2	Ⓢ	34	"	66	B	98	b	130	é	162	ó	194	T	226	Γ
3	♥	35	#	67	C	99	c	131	â	163	ú	195	†	227	Π
4	♦	36	\$	68	D	100	d	132	ä	164	ñ	196	—	228	Σ
5	♣	37	%	69	E	101	e	133	à	165	ñ	197	†	229	σ
6	♠	38	&	70	F	102	f	134	ã	166	±	198	†	230	μ
7	•	39	'	71	G	103	g	135	ç	167	•	199	||	231	Υ
8	■	40	(	72	H	104	h	136	ê	168	¿	200	||	232	Ξ
9	◊	41	)	73	I	105	i	137	ë	169	ƒ	201	||	233	Θ
10	▣	42	*	74	J	106	j	138	è	170	ƒ	202	||	234	Ω
11	♠	43	+	75	K	107	k	139	í	171	½	203	||	235	δ
12	♀	44	,	76	L	108	l	140	î	172	¾	204	||	236	ω
13	♂	45	_	77	M	109	m	141	ì	173	•	205	=	237	φ
14	♁	46	.	78	N	110	n	142	ñ	174	«	206	||	238	€
15	✳	47	/	79	O	111	o	143	ñ	175	»	207	±	239	Π
16	▶	48	0	80	P	112	p	144	é	176	|||||	208	||	240	≡
17	◀	49	1	81	Q	113	q	145	æ	177	|||||	209	T	241	±
18	‡	50	2	82	R	114	r	146	ff	178	|||||	210	||	242	≥
19	!!	51	3	83	S	115	s	147	ô	179	|	211	||	243	≤
20	¶	52	4	84	T	116	t	148	ö	180	†	212	||	244	†
21	§	53	5	85	U	117	u	149	ò	181	†	213	||	245	J
22	—	54	6	86	V	118	v	150	û	182	||	214	||	246	÷
23	£	55	7	87	W	119	w	151	ù	183	||	215	||	247	≈
24	†	56	8	88	X	120	x	152	ÿ	184	†	216	†	248	•
25	↓	57	9	89	Y	121	y	153	ÿ	185	||	217	J	249	·
26	→	58	:	90	Z	122	z	154	ÿ	186	||	218	||	250	·
27	←	59	;	91	[	123	{	155	ç	187	||	219	■	251	J
28	↳	60	<	92	\	124	|	156	£	188	||	220	■	252	||
29	↔	61	=	93	]	125	}	157	¥	189	||	221	■	253	z
30	▲	62	>	94	^	126	~	158	℞	190	||	222	■	254	■
31	▼	63	?	95	_	127	△	159	f	191	||	223	■	255	

Code Page 850

These are the printable characters using Code Page 850.

0		32		64	Ⓔ	96	`	128	Ç	160	á	192	Ł	224	ó
1	Ⓜ	33	?	65	Ⓐ	97	a	129	ü	161	í	193	ł	225	ß
2	Ⓝ	34	"	66	Ⓑ	98	b	130	é	162	ó	194	Ł	226	ô
3	♥	35	#	67	Ⓒ	99	c	131	â	163	ú	195	ł	227	ò
4	♦	36	§	68	Ⓓ	100	d	132	ä	164	ñ	196	—	228	õ
5	♣	37	%	69	Ⓔ	101	e	133	à	165	ñ	197	†	229	ö
6	♠	38	&	70	Ⓕ	102	f	134	ã	166	ã	198	‡	230	µ
7	•	39	'	71	Ⓖ	103	g	135	ś	167	ë	199	‰	231	þ
8	☒	40	(	72	Ⓖ	104	h	136	ê	168	ł	200	„	232	þ
9	◊	41	)	73	Ⓖ	105	i	137	ë	169	Ⓜ	201	ł	233	ú
10	◌	42	*	74	Ⓖ	106	j	138	è	170	ı	202	„	234	û
11	ø	43	+	75	Ⓖ	107	k	139	ı	171	½	203	ı	235	ù
12	♀	44	,	76	Ⓖ	108	l	140	î	172	¼	204	ı	236	ý
13	♂	45	_	77	Ⓖ	109	m	141	ì	173	ı	205	=	237	ÿ
14	♂	46	.	78	Ⓖ	110	n	142	ñ	174	«	206	ı	238	˘
15	*	47	/	79	Ⓖ	111	o	143	ñ	175	»	207	ı	239	˙
16	▶	48	0	80	Ⓖ	112	p	144	é	176	Ⓜ	208	ø	240	-
17	◀	49	1	81	Ⓖ	113	q	145	æ	177	Ⓜ	209	ø	241	±
18	‡	50	2	82	Ⓖ	114	r	146	ff	178	Ⓜ	210	ê	242	=
19	!!	51	3	83	Ⓖ	115	s	147	ô	179	|	211	ë	243	¼
20	¶	52	4	84	Ⓖ	116	t	148	ü	180	†	212	è	244	¶
21	§	53	5	85	Ⓖ	117	u	149	ò	181	á	213	ı	245	§
22	—	54	6	86	Ⓖ	118	v	150	û	182	â	214	ı	246	÷
23	‡	55	7	87	Ⓖ	119	w	151	ù	183	à	215	ı	247	˘
24	↑	56	8	88	Ⓖ	120	x	152	ÿ	184	Ⓜ	216	ı	248	°
25	↓	57	9	89	Ⓖ	121	y	153	ö	185	ı	217	ı	249	°
26	→	58	:	90	Ⓖ	122	z	154	ü	186	ı	218	ı	250	˙
27	←	59	;	91	[	123	{	155	ø	187	ı	219	ı	251	ı
28	↳	60	<	92	\	124	|	156	ı	188	ı	220	ı	252	ı
29	↔	61	=	93	]	125	}	157	ø	189	ı	221	ı	253	ı
30	▲	62	>	94	^	126	~	158	×	190	ı	222	ı	254	ı
31	▼	63	?	95	_	127	△	159	f	191	ı	223	ı	255	ı

ASCII to Hexadecimal Conversion Chart

Use the chart below to translate the characters printed on your test label. The chart lists ASCII characters and their hexadecimal and decimal equivalents.

Char.	Hex	Decimal	Char.	Hex	Decimal
NUL	00	0	DC2	12	18
SOH	01	1	DC3	13	19
STX	02	2	DC4	14	20
ETX	03	3	NAK	15	21
EOT	04	4	SYN	16	22
ENQ	05	5	ETB	17	23
ACK	06	6	CAN	18	24
BEL	07	7	EM	19	25
Backspace	08	8	SUB	1A	26
Tab	09	9	Escape	1B	27
linefeed	0A	10	cursor right	1C	28
home	0B	11	cursor left	1D	29
form feed	0C	12	cursor up	1E	30
carriage return	0D	13	cursor down	1F	31
SO	0E	14	space	20	32
SI	0F	15	!	21	33
DLE	10	16	"	22	34
DC1	11	17	#	23	35

ASCII to Hexadecimal Conversion Chart (continued)

Char.	Hex	Decimal	Char.	Hex	Decimal
\$	24	36	;	3B	59
%	25	37	<	3C	60
&	26	38	=	3D	61
'	27	39	>	3E	62
(	28	40	?	3F	63
)	29	41	@	40	64
*	2A	42	A	41	65
+	2B	43	B	42	66
,	2C	44	C	43	67
-	2D	45	D	44	68
.	2E	46	E	45	69
/	2F	47	F	46	70
0	30	48	G	47	71
1	31	49	H	48	72
2	32	50	I	49	73
3	33	51	J	4A	74
4	34	52	K	4B	75
5	35	53	L	4C	76
6	36	54	M	4D	77
7	37	55	N	4E	78
8	38	56	O	4F	79
9	39	57	P	50	80
:	3A	58	Q	51	81

ASCII to Hexadecimal Conversion Chart (continued)

Char.	Hex	Decimal	Char.	Hex	Decimal
R	52	82	i	69	105
S	53	83	j	6A	106
T	54	84	k	6B	107
U	55	85	l	6C	108
V	56	86	m	6D	109
W	57	87	n	6E	110
X	58	88	o	6F	111
Y	59	89	p	70	112
Z	5A	90	q	71	113
[	5B	91	r	72	114
\	5C	92	s	73	115
]	5D	93	t	74	116
^	5E	94	u	75	117
_	5F	95	v	76	118
'	60	96	w	77	119
a	61	97	x	78	120
b	62	98	y	79	121
c	63	99	z	7A	122
d	64	100	{	7B	123
e	65	101	|	7C	124
f	66	102	}	7D	125
g	67	103	~	7E	126
h	68	104	delete	7F	127

FORMAT DESIGN TOOLS



Use copies of these worksheets and grids to create your formats. You may want to keep copies of the completed forms for your records:

- ◆ Online Configuration Worksheet
- ◆ Batch Worksheet
- ◆ Check Digit Worksheet
- ◆ Supply Layout Grids (Inches, Metric, Dots)
- ◆ Format Worksheet
- ◆ Format Sample Worksheet

Online Configuration Worksheet

ONLINE HEADER

—	HEADER
----------	--------

SYSTEM SETUP

A	HEADER
	POWERUP MODE
	LANGUAGE
	SEPARATOR
	SLASH ZERO
	SYMBOL SET

SUPPLY SETUP

B	HEADER
	SUPPLY TYPE
	RIBBON ON
	FEED MODE
	SUPPLY POSN
	CUT POSN

PRINT CONTROL

C	HEADER
	CONTRAST
	PRINT ADJUST
	MARGIN ADJUST
	SPEED ADJUST
O	PRINTHD WIDTH

MONETARY FORMATTING

D	HEADER
	CURRENCY SYMBOL
	SECONDARY
	DECIMALS

CONTROL CHARACTERS

M	HEADER
	START OF HEADER
	PARAMETER SEPARATOR
	CHAR. STRING
	FIELD SEPARATOR
	END OF TRANSMISSION
	DATA ESCAPE
	IMMED. COMMAND
	STATUS REQUEST
	JOB REQUEST

COMMUNICATION SETUP

N	HEADER
	BAUD
	WORD LENGTH
	STOP BITS
	PARITY
	FLOW CONTROL

BACK FEED CONTROL

	HEADER
	ACTION
	DISPENSE POSITION
	BACK FEED DISTANCE

Back feed control packet is not supported on these printers.

BUFFER ALLOCATION

M	HEADER
	BUFFER
	DEVICE
	BUFFER SIZE

GLOSSARY

Batch Data 2,"Monarch" |	Defines the actual information (as fields within { }) printed on the label.
Batch Control E,0,1,4,2 |	Defines the print job (as a field).
Batch Header {B,1,N,1}	First line of a batch, immediately following (f). Identifies the format and batch quantity.
Batch Packet {B,1,N,1 | 2,"Monarch" | }	Contains a batch header and the batch data. Enclosed within { }.
Bitmapped Fonts	Reside in the printer's RAM or in a ROM chip. If you change the point size, you have changed the font. Magnifying these fonts causes some jaggedness to occur.
Buffer	Storage area in the printer's memory that holds specific data (images, formats, etc).
Field	Can be text, bar codes, lines, boxes, constant, or non-printable text. It is the result of a field definition.
Field Definition	Any string of parameters that pertain to one field. A field definition begins with a field identifier (such as T , B , C , etc.). T,1,10,V,250,50,0,1,1,1,B,C,0 |
Field Parameters	Parameters that apply to a field and are separated by commas. (In the above example, B is a field element for Black print on a white background.)
Format	Layout or design for your printed label.

Format Header First line of a format, immediately following the start of packet (`{f}`). A format header must begin with **F**, followed by various header elements.

```
{F,1,A,R,E,600,400,"Fmt-1" |
```

Monospaced Fonts All characters have the same width and are easy to center justify. (Standard, bold, and reduced are monospaced.)

Non-volatile RAM (NVRAM) Contains information that is **SAVED** on power-down.

Option Any line within a format that applies special formatting to a field. This line always begins with **R** and must immediately follow the field it applies to.
R,4,6,1,3,1 |

Packet Any string of characters within (`{ }`).
{B,1,N,1 |
2,"Monarch" | }

Pre-image A way to optimize the printer, because it images the fields while data is collected. After the last field is imaged, the label prints almost immediately.

Proportionally Spaced Fonts All characters have different widths and are difficult to center justify (CG Triumvirate fonts).

Volatile RAM Contains information that is **LOST** on power-down.

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