

Packet Reference Manual

**Monarch®
Printers**

{F,1,A,R,E,600,400,"9800FMT"!
T,1,15,V,190,100,1,1,2,2,B,L,0,0!
C,220,135,0,1,1,1,B,L,0,0,"Ship From:"!
B,2,12,F,250,130,1,2,75,5,L,0! }

{B,1,N,1!
1,"Dayton, Ohio"!
2,"12345678901"! }



Ship From:
Dayton, Ohio



Ship From:
Dayton, Ohio



Ship From:
Dayton, Ohio

- ◆ 9403®
- ◆ 9825™
- ◆ 9850™

PAXAR

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GETTING STARTED

1

Before you read this manual, review the printer information in the *Operator's Handbook* or *Operating Instructions*. 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:

- ◆ 9403® (V. 1.0 or greater)
- ◆ 9825™ (V. 1.0 or greater)
- ◆ 9850™ (V. 1.0 or greater)

If you are designing formats for a Monarch® 1464™ or 1465™ printer applicator, follow the 9850 printer information provided in this manual. However, there are a few differences. See Appendix E, "Printer Differences" for 1464/1465 specific information, along with a description of each printer's features.

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 using basic MS-DOS® commands. This chapter describes how to

- ◆ create and download a sample MPCLII packet.
- ◆ use the Supply Layout Grid and Format Worksheet.
- ◆ categorize data into field types and select fonts to use in your format.

See "Defining Text Fields" in Chapter 3 for a list of available fonts for your printer. See Chapter 4, "Defining Field Options," for a list of available options for your printer.

Before You Begin

1. Connect the printer to the host. Refer to the *Quick Reference or Operator's Handbook* for more information.
2. Load supplies in the printer. Refer to the *Quick Reference or Operator's Handbook* 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 2, "Configuring the Printer," for more information.
5. Design your format. See "Starting with a Design" 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 to the *Quick Reference or Operator's Handbook* for more information.

For detailed information about the format header, text, constant text, and bar code fields, see Chapter 3, "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,250,80,0,1,1,1,W,C,0,0,"MONARCH MARKING:",0 |
```

3. Type the following bar code field:

```
B,1,12,F,110,115,1,2,120,5,L,0 |
```

4. Type the following text field:

```
T,2,18,V,30,30,1,1,1,1,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," in Chapter 2, 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" |  
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" | }
```

See "Starting with a Design" to design your format and Chapter 3, "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, check digit, and graphic packets.

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 3, "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, and do you want to include graphics?

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 the 9403 printer*, the print area begins 0.10 inches from the left edge of the supply. *For the 9800 series 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)
9403	English (1/100 in)	200 x 600	200 x 600
	Metric (1/10mm)	508 x 1524	508 x 1524
	Dots (1/203 dots)	406 x 1218	406 x 1218
9825/ 9850	English	425 x 1750	400 x 1600
	Metric	1080 x 4445	1016 x 4064
	Dots	863 x 3553	812 x 3248
9850 with optional 300 dpi	English	425 x 1750	400 x 1600
	Metric	1080 x 4445	1524 x 4064
	Dots	1275 x 5250	1200 x 4800

When designing formats, keep in mind the following non-print zones for the 9403 printer:

Bottom .035 inches at the beginning of the label.
Left .10 inches from the left edge of the label.

The following non-print zones are *recommended* for the 9800 series printers:

All Supplies .050 inches on either edge of the label.
All Supplies .020 inches at the end of the label.

If using the optional verifier, allow a minimum no-scan zone at the top of the label of 1.3" (33 mm) for speeds 6.0 ips or less; 1.8" (46 mm) for 8.0 ips; and 2.2" (56 mm) for 10.0 ips.

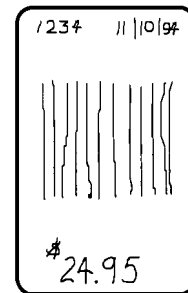
Use the following formulas to convert inches to dots and metric:

Dots = inches x 203 (or 300 dots per inch)
Metric (1/10mm) = inches x 254
English (1/100 inch) = 100 x (dots/203) or (dots/300)
Dots = Metric (1/10 mm) x 799/1000 (or 1181/1000)
300 dpi depends on your printer.

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

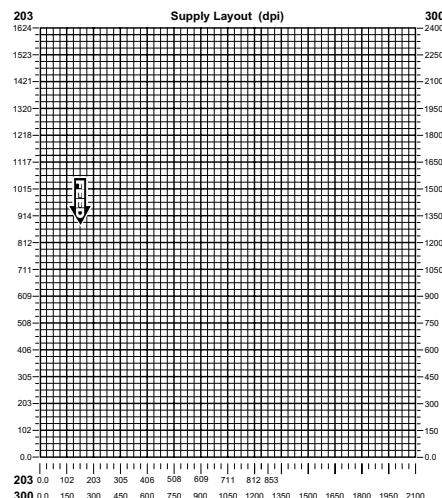
The English grid, shown to the right, is measured in 1/100 inches.

- ◆ 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) or an optional 300 dots per inch printhead depending on your printer.



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
Non-Printable Text	Holds data for use later, 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
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 print without changing.	company name, company address
Line or Box	Highlights or separates items.	line marking out the regular price, border around the supply
Graphic	Contains a bitmap image or a compliance label overlay.	logos

All of the above field types except graphics are discussed in Chapter 3. See Chapter 5, "Creating Graphics," for information on including graphics in your format.

Considering Fonts

When working with fonts, you have three considerations: font appearance, font size (scalable or bitmapped), and font spacing (monospaced or proportional).

The TrueType® scalable font, EFF Swiss Bold™ (font 50) is standard on the 9825 and 9850 printers. It is not available for the 9403 printer. See Appendix B, "Fonts," for samples of each font.

Interchanging Packets

You can use an MPCLII format that was designed for another MPCLII printer on a 9800 series printer. However, the format may appear smaller (fields will be shorter), because most of the 9800 series printers use a 203 dpi printhead. The 9850 printer has an optional 300 dpi printhead.

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 3 for more information.
4. Define options as you require them. See Chapter 4, "Defining Field Options" for more information.

CONFIGURING THE PRINTER

2

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.

Some parameters may not be available on each printer.
See Appendix E, "Printer Differences," for a list of
differences between all the printers.

Setting Communication Parameters

Use the following information if you are using serial communications. See "Using Parallel Communications" for information about parallel communications.

Not all printers have a parallel port.

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: 9600 baud, no parity, an 8 bit word length, 1 stop bit.

Using Parallel Communications

If your printer supports parallel communications, the parallel port is IEEE-1284 or Centronics® mode. You can set which mode to use through the control panel. Refer to the *Quick Reference* or *Operator's Handbook* for control panel information. The communication settings are automatically configured for you. There are no operator settings required.

We recommend waiting at least two seconds (or longer) when switching between the serial and parallel ports to send data, because data may be lost. Be careful when using print spoolers, because data transmission occurs in the background of the operating system. This makes data transmission completion difficult to determine when switching between ports.

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 (Use hex 7C for this character. Depending on the code page selected, this character may appear differently.)
,	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. ENQ and immediate commands are always processed, even if they are included within grave accents. 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 (100 fields for 9403) 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** (**99** for the 9403) 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 parameters for a field 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. When using multiple options on the 9403 printer, remember that options are processed in the order they are received.
- ◆ 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 I`
`R,42,1 I`
- ◆ Use a tilde (~) followed by a 3-digit ASCII code in a quoted string to send function codes or extended characters or send the 8-bit ASCII code.

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 eight 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 I }` 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, batch, or graphic 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

{	Start of Header
I,	Configuration Header
1 to 8 optional packets	
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
G, parameter 1...parameter 4 |	Backfeed Control
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, margin, and cut 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. However, the test labels display the units in dots, even if you entered them in English or Metrics units.

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

1. *header* Constant I.

2. *ID#* ID. Use 0.

3. *action* **A** Add configuration.
 U Upload User Configuration.
4. *device* Storage Device. Options:
 M Memory
 N Nonvolatile RAM
 R Volatile RAM
5. *units* Units. (Optional parameter.) Options:
 E English
 M Metric
 G Dots

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

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 nonvolatile RAM and returns the following to the host.

```
A,0,0,0,0,0,0 |
B,2,1,0,0,0,0 |
C,0,0,0,0,0,0 |
D,1,0,2 |
E,"~123~044~034~124~125~126"," ", "~013~010" |
F,3,1,0,0,1 |
G,0,65,65 |
M,R,8725,1345,N,2535,615 |
M,R,R,300 |
```

```
M,T,R,20 |  
M,I,R,3300 |  
M,D,N,1280 |  
M,F,N,640 |  
M,V,R,3740 |
```

The parameters for each packet (**A-M**) are displayed. In the first line that begins with **M**, 8725 is the total volatile memory available, 1345 is the memory used in volatile RAM. 2535 is the total non-volatile memory available, 615 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.

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.
- ◆ Send configuration packets once per session (each time the printer is turned off and then back on), not with every format or batch packet.

Making Print Adjustments

You can adjust where the printer prints on your supply by adjusting the supply, print, or margin positions. However, keep in mind the following:

- ◆ Supply adjustments across the width of your supply, such as the margin position, are based in dots- either 203 dpi or 300 dpi, depending on your printhead density.
- ◆ Supply adjustments for the length of your supply, such as supply position or print adjustment, are always measured in 1/203 of an inch, regardless of your printhead density.

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. Options:

- 0 online mode (default)
- 1 offline mode (9403/9850)

A3. *language* Display Language. Options

- 0 English (default)
- 1 French
- 2 German
- 3 Spanish

A4. *sep_on* Batch Separators. Options:

- 0 Does not print a separator (default)
- 1 Prints a separator
- 2 Double-length separator- prints 2 tags (9850)

NOTE: Do not use batch separators with continuous (non-indexed) supply. If using a stacker, the batch separator is 3.66 inches long.

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

A6. *symbol_set* Symbol Set. Options:
 0 Internal/ Monarch (default)
 1 ANSI
 2 Code Page 437 (Latin U.S.)
 3 Code Page 850 (Latin 1)
 4 Code Page 1250 (Latin 2)
 5 Code Page 1251 (Cyrillic)
 6 Code Page 1252 (Latin 1)
 7 Code Page 1253 (Greek)
 8 Code Page 1254 (Turkish)
 9 Code Page 1255 (Hebrew)
 10 Code Page 1256 (Arabic)
 11 Code Page 1257 (Baltic)
 12 Code Page 1258 (Vietnamese)
 13 DOS Code Page 852 (Latin 2)
 14 DOS Code Page 855 (Russian)
 15 DOS Code Page 857 (IBM Turkish)
 16 DOS Code Page 860 (MS-DOS Portuguese)
 17 Wingdings
 18 Macintosh
 19 UNICODE
 20 BIG5
 21 GB2312
 22 SJIS (Shift JIS) to SJIS (Code Page 932, Japanese)
 23 GB2312 to GB2312 (Code Page 936, Simplified Chinese)
 24 BIG5 to BIG5 (Code Page 950, Traditional Chinese)
 25 KSC5601 to KSC5601 (Code Page 949, Korean)

NOTE: The CG Triumvirate fonts support only the ANSI and DOS Code Page 437 and 850 Symbol Sets. The scalable font does not support Code Page 1256 (Arabic). See Appendix C for more information. Code pages 852-860 and 1250-1258 may only be used with downloaded TrueType fonts or the scalable. Code Pages 932, 936, and 950 may only be used with downloaded Double-byte fonts. TrueType fonts are designed to be regionally specific; therefore, all code pages may not be supported in a given font.

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 supply
- 1** Die Cut/edge aperture supply (default)
- 2** Continuous (non-indexed) supply (9825/9850)
- 3** Center Aperture supply (9850)
 Must use with printer applicator

NOTE: You must use continuous supply in continuous mode. Do not use continuous supply with extended backfeed or 94x5 emulation. If your aperture supply has holes on the edge, use **1**. If your aperture supply has holes in the center, use **3**.

B3. ribbon_on Ribbon. Options:

- 0** Ribbon not installed (default for 9403)
- 1** Ribbon installed (default for 9825/9850)
- 2** High Energy Ribbon installed (9850)

You must use a print speed of 2.5 IPS with the high energy ribbon. Serial bar codes cannot be printed using the high energy ribbon. Settings for ribbon and supply type must match the supplies loaded in the printer; otherwise, an error occurs. To clear the error, turn off the printer and change the configuration packet. Turn on the printer and resend the packet.

B4. feed_mode Feed Mode. Options:

- 0** Continuous operation (default)
- 1** On-demand mode

B5. supply_posn **-300 to 300** in 1/203 inch. 0 is the default. 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. Adjust the supply position if formats do not start at the 0,0 point on the supply. Increase the supply position to move print up, decrease to move print down on the label. To verify the 0,0 point, print a test label. See "Printing a Test Label" in Chapter 8 for more information.

You can not change the supply position while the printer is active. Changing the supply position will affect the print position, dispense position, and backfeed distance. Once the supply position is set, use the print control packet and backfeed control packet to adjust printing and the dispense position.

B6. cut_posn **-300 to 300** in 1/203 inch. Use **0** for 9403/9825. Adjusts where the tag is cut. The printer adjusts the cut position according to the black marks on the supply. You may need to adjust for aperture supplies. Increase to move the cut up, decrease to move the cut down.

Example {I,B,0,0,1,10,50 | }

Indicates black mark and thermal direct stock has been loaded, causes the printer to operate in on-demand mode, feeds the supply approximately .05 inches up before printing the format on each label (10/203 inches), and feeds the supply .25 inches (50/203 inches) before cutting.

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_adj, speed_adj,ph_width | }

C1. C Print Control Packet

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

C3. print_adj **-99 to 99** in 1/203 inch. 0 is the default. 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 (or 1/300 inch for 9850 printer). 0 is the default. 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, dispense position, or backfeed distance.

C5. speed_adj Print speed in inches per second (ips). Options:

0	Default (formats with serial bar codes automatically print at 2.5 ips)
20	2.0 ips (only speed for 9403)
25	2.5 ips (default for serial bar codes)
40	4.0 ips
60	6.0 ips (default for 9825/9850)
80	8.0 ips (9850)
100	10.0 ips (9850 with 203 dpi)
120	12.0 ips (9850 with 203 dpi)

NOTE: Serial bar codes with an 8-dot narrow element do not automatically print at 2.5 ips. Serial bar codes printed at speeds greater than 2.5 ips may not scan properly. However, the 9850 printer can print 203 dpi serial bar codes with narrow elements of 3 dots (or greater) at 4.0 ips. You must use a print speed of 2.5 ips with the high energy ribbon. See "9850 Special Printing Considerations," in Chapter 6 for more information.

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 six 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

<i>D2. cur_sym</i>	Currency Symbol. Options:
0	No symbol
1	USA (\$, Dollar- default)
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 (g, Shilling)
11	India (Rs, Rupee)
12	Russian (₮, Ruble)
13	Korean (₩, Won)
14	Thai (฿, Baht)
15	Chinese (¥, Yuan)
16	Euro-Dollar (€)

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

<i>D3. secondary</i>	Secondary Sign. Options:
0	No secondary sign (default)
1	Print secondary sign

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

<i>D4. decimals</i>	Number of digits to the right of the decimal. Options:
0	No digits
1	One digit
2	Two digits (default)
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 , (comma)
 separator
 ~034 Quoted strings " (quotes)
 ~124 Field separator | (pipe sign- use hex 7C)
 ~125 End of header } (right bracket)
 ~126 Data escape ~~ (double tilde)
 character (optional)
def. ch. Immediate command character (optional).
 Up to any 3 characters in the 0 to 255 decimal
 range. The character must be defined before this
 command can be used. The caret (~094) is
 normally used.

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

E3. "string 1" Terminator for status requests and ENQ requests. Up to any 3 characters in the 0 to 255 decimal range. The default is "013". Sending "" disables this sequence.

E4. "string 2" Terminator for job requests and data uploads. Up to any 3 characters in the 0 to 255 decimal range. The default is none. Sending "" disables this sequence.

After you change these parameters, all packets, including any future configuration packets, must use the new control characters. 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:

```
{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 and the host is capable of communicating at the speed you select for the printer.

Do not add any characters, such as a carriage return/line feed, in your communication settings packet or communications errors may occur.

Syntax {I,F,baud,word_length,stop_bits,parity,flow_control ! }

F1. F Communication Settings Packet

F2. baud Baud Rate. Options:

0	1200	1	2400
2	4800	3	9600 (default)
4	19200	5	38400
6	57600 (9850)	7	115200 (9850)

NOTE: The 9403 printer does not support 38400 baud or greater.

F3. word_length Word Length. Options:

0	7-bit word length
1	8-bit word length (default)

F4. stop_bits Stop Bits. Options:

0	1-stop bit (default)
1	2-stop bits

F5. parity Parity. Options:

0	None (default)
1	ODD parity
2	EVEN parity

F6. *flow_control* Flow Control. Options:

0	None	2	(CTS)
1	DTR (default)	3	XON/XOFF

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 Backfeed Control Packet

Use the backfeed control packet (G) to enable or disable the backfeed option, set the dispense position and the backfeed distance. Backfeed works by advancing each printed label to the desired dispense position. Once that label is removed, the next label to be printed is backed up underneath the printhead. In continuous mode, only the last label in the batch is advanced to the dispense position. You may need to adjust the dispense position to allow labels to be removed, die cut labels to be removed easily, or to prevent them from falling off.

Extended backfeed is available on the 9850 printer with a knife installed. Extended backfeed feeds a tag far enough out to be cut and backfeeds the next tag to the printhead line. You can not change the backfeed distance while the printer is active.

Extended backfeed eliminates *printed* tags being left between the printhead and knife.
Extended backfeed **does not** work with non-indexed (continuous) supply/mode.

Do not use backfeed (normal or extended) with supplies less than 0.75 inches. We recommend using 0.5-inch gap supplies in peel mode when backfeed *is disabled*.

The 9403 printer does not support the backfeed packet. The dispense position and backfeed distance are optional parameters and do not have to be specified. However, they allow for greater precision when positioning the supply.

Syntax {I,G,action,dis_pos,bkfd_dis | }

G1. G Backfeed Control Packet

G2. action Action. Options:

- 0** disable backfeed (default)
- 1** enable backfeed (use on any printer without a knife)
- 2** enable extended backfeed (use on 9850 printer with a knife installed)

G3. dis_pos Dispense Position. Adjusts the stopping point of the label. **50** to **200** dots (default 65 dots). Use 95 dots for the printer applicator.

G4. bkfd_dis Backfeed Distance. Amount to move label backwards. **10** to **200** dots (default 65 dots). Use 95 dots for the printer applicator. Cannot be greater than the dispense position. The backfeed distance should equal the dispense position. An exception is if you are tearing instead of peeling. Then, the backfeed distance must be 30 dots (.150 inches) less than the dispense position. However, you will have a 30 dot non-print zone on your supply. The 30-dot difference accounts for improper tearing of butt cut supplies, because you do not want any exposed adhesive under the printhead.

Example {I,G,2 | }

Enables *extended* backfeed and cuts any tags remaining between the knife and printhead and moves the supply backwards so the next tag is underneath the printhead. Using cut mode 4, you do not have to press **FEED (FEED/CUT)** to cut the last tag.

Example {I,G,1,50,10 | }

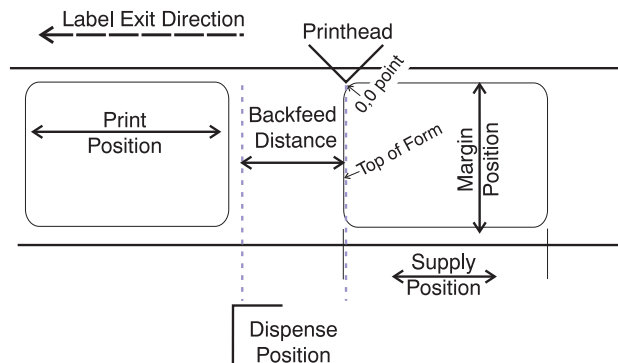
Enables backfeed and sets the dispense position to 0.25 inches (50/203) and the backfeed distance to 0.05 inches (10/203).

Special Considerations When Using Backfeed

Make a note of the following items:

- ◆ Be careful when tearing supplies, because the adhesive can adhere to the printhead or platen roller.
- ◆ Backfeed affects each label in the on-demand mode or the first and last label of the batch in continuous mode.
- ◆ When backfeed is enabled and multiple batches are sent, the printer may not backfeed between each batch.
- ◆ Backfeed should only be used when you need to advance labels to the desired dispense point.
- ◆ Backfeed does not interfere with the supply, print, or margin positions you have set.
- ◆ If the supply inter-label gap is not between .07 inch to .15 inch (14 to 30 dots), you must adjust the dispense position and backfeed distance accordingly.

See the following graphic for a representation of the following adjustments: dispense position, backfeed distance, supply position, print position, and margin position.



Contact Technical Support if you have problems adjusting where the format prints on the supply.

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
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 (9825/9850)

M3. device

Storage type:

N Non-volatile RAM
R Volatile RAM

NOTE: You cannot reallocate flash memory.

M4. buffer size

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

Example

{I,M,I,R,1530 I }

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. The printer's configuration is stored in non-volatile RAM and retained when you turn off the printer. *The maximum value for each buffer is listed; however, the sum of all the buffers cannot exceed the maximum available memory of the printer.*

Buffer	Type	9403	9825*	9850
Transmit	Vol.	1K (.5K- 4K)	2K (.5K- 4K)	2K (.5K- 4K)
Receive	Vol.	8K (2K- 32K)	8K (2K- 64K)	8K (2K- 64K)
Image	Vol.	67K (41.5K- 124K)	330K (41.5K- 640K)	585K (38.5K- 6144K)
Downld. Fonts	NVol.	NA	64K (8K- 640K)	120K (8K- 1024K)
	Vol.	20K (8K- 32K)	NA	NA
Scalable Fonts	Vol.	NA	64K (32K-640K)	384K (0K-1024K)
Formats	NVol.	NA	64K (16K- 640K)	128K (16K- 1024K)
	Vol.	32K (16K- 64K)	NA	NA
Internal	NA	cannot reallocate	cannot reallocate	cannot reallocate

* The 9825 printer does not have non-volatile RAM; however, you can store formats and fonts in flash memory.

Use the following table to see how much memory is available to reallocate.

RAM*	9403	9825	9850
Volatile RAM	256K	1 Meg	8 Meg
Non-volatile RAM	NA	NA	512K

* You cannot reallocate more memory than what is available, or you will receive an error.

Checking Current Buffer Sizes

Send a configuration upload packet to check the sizes of your current buffers. See "Configuration Packet Header" 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, R, 20 |	Receive buffer	2K
	M, T, R, 10 |	Transmit buffer	1K
	M, D, N, 80 |	Downloadable fonts	8K
	M, V, R, 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,R,160) were defined, an error would have occurred.

About Memory Buffers

<i>Transmit Buffer</i>	Used to send ENQ, job, and upload responses. This buffer must be allocated as volatile (R) RAM.
<i>Receive Buffer</i>	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 volatile (R) RAM.
<i>Image Buffer</i>	Used to image the current format. The 9825 and 9850 printers support two 4-inch by 8-inch buffers. You can create an image up to 16 inches long without 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.

$$19.13K \times Length$$

Length is the length of your label in inches.

Example

$19.13K \times 6 = 114.78K$
(Multiply by 10 and round up.)
 $114.78K \times 10 = 1147.8$
 $1147.8 = 1150$
Enter 1150 for your Image buffer.

Format Buffer

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

$$\text{Linecount} \times 50/1024$$

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.

On the 9825 and 9850 printers, formats remain in memory when you turn off the printer.

Downloadable Fonts Buffer

Used to store downloaded soft (bitmapped or TrueType) fonts. To determine the size of your downloadable fonts, send a font packet. For TrueType fonts, the file size, in bytes, is the minimum amount needed in this buffer. See "Using the Font Packet" for more information.

Scalable (Vector) Fonts Buffer

Used to image the scalable or downloaded (TrueType or bitmapped) 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. Use **0** if you are not using scalable/TrueType fonts. This buffer must be allocated as volatile (**R**) RAM. The printer does not print the fonts if there is not enough memory in this buffer to image them. Not all printers support the scalable font.

Buffer Worksheet

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

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

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.

Memory Considerations with Downloaded TrueType Fonts

- ◆ Downloaded TrueType fonts are only available on the 9825 and 9850 printers.
- ◆ The size of the TrueType font file, in bytes, is the minimum amount of memory you must have available in the downloadable fonts buffer.
- ◆ The scalable (vector) fonts buffer is used to image the downloaded fonts (TrueType or bitmapped). If you are using several downloaded TrueType fonts, you may need 100K or more in this buffer. The printer does not print the fonts if there is not enough memory in the scalable (vector) fonts buffer.
- ◆ To use large point sizes (greater than 60 point), you must reconfigure memory and increase the size of the scalable (vector) fonts buffer.
- ◆ Font storage is limited on the 9825 printer, because there is no extended memory available.

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. This command is the same as pressing CLEAR (ESCAPE/CLEAR) to clear an error. 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 (FEED/CUT) to acknowledge an error. Normal operation will resume.
^FD	Feeds a label when printer is idle . Simulates the operation of pressing FEED (FEED/CUT) and dispenses the next label if printer is in the on-demand mode. NOTE: Printer ignores this command if printing.
^FF1	Formats flash memory (either in the 9825/9850 printer or the 9850 optional SIMM board)
^FF2	Returns the amount (in bytes) of the available flash memory.
^GD	Disables conversion of formats designed in 203 dpi density dot units to 300 dpi density.
^GE	Enables the conversion of formats designed in 203 dpi dot units (not English or Metric) to 300 dpi.
^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)
^MD	Returns the printhead dot density to the host. 00 = 203 dpi 01 = 300 dpi
^MI	Returns the customer ID or RPQ revision level to the host. (00 to 99)
^MM	Returns the model number to the host. 11 = M9403 16 = M9850 17 = 9825
^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.

Command	Parameter
^RB	Repeats the last printed batch, printing the same number of labels as specified in the original batch. This command does not work if using batch separators. NOTE: Printer ignores this command if printing.
^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.
^SFa	Loads script with host response (9825/9850)
^SFb	Loads script without host response (9825/9850).
^SFc	Enables script (9825/9850).
^SFd	Disables script (9825/9850).
^SFe	Uploads script version information (9825/9850).
^SFf	Deletes script (9825/9850).
^SFg	Turns on ENQ status polling before it reaches the script (9825/9850).
^SFh	Turns off ENQ status polling before it reaches the script (9825/9850).
^SFi	Turns on immediate commands before it reaches the script (9825/9850).
^SFj	Turns off immediate commands before it reaches the script (9825/9850).
^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/graphics 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
 F Format
 G Graphic (9825 V1.0 or greater)
 W Font
2. *packet#* Identification number of the packet to clear (**1-999**) or font number (**0-9999**). 0 is for all formats, fonts, or graphics.
3. *action* Enter **C** to clear the packet.
4. *device* Storage device. Options:
 N Nonvolatile 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 **0-9999**.
 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.
- M** Uploads font memory usage information.

NOTE: C does not clear (erase) fonts saved in the 9825 or 9850 printer's flash memory or on the optional SIMM board. You must format flash memory to erase fonts from the printer's flash memory or the SIMM board. However, when you format flash memory, ALL fonts saved in the printer's flash memory or SIMM board are deleted.

W4. device

Device. Options:

- F** Flash (9825/9850)
- R** Volatile RAM
- Z** All devices (use for upload).

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,Z | }

Selects all fonts and uploads the font size information for any downloaded fonts.

The printer returns the following to the host:

Font Style	{W, 0, H, Z |	Font Name	
	0, 1, 0, "Standard", 0, 0, 0, 21, 33, 21, 33, 5, 1 |		
Symbol Set	0, 1, 1, "CGTriBd9", 1, 0, 7, 25, 31, 10, 15, 0, 1 |		Spacing
Type	0, 1, 437, "CGTriBd9", 1, 0, 7, 25, 31, 10, 15, 0, 1 |		
	0, 1, 850, "CGTriBd9", 1, 0, 7, 25, 31, 10, 15, 0, 1 |		Baseline
Cell Width	0, 2, 0, "Reduced", 0, 0, 0, 10, 21, 10, 21, 2, 1 |		
	0, 2, 1, "CGTriumv6", 1, 0, 8, 27, 34, 11, 17, 0, 1 |		Cell Height
	0, 2, 437, "CGTriumv6", 1, 0, 8, 27, 34, 11, 17, 0, 1 |		
	0, 2, 850, "CGTriumv6", 1, 0, 8, 27, 34, 11, 17, 0, 1 |		Nominal Width
	0, 3, 0, "Bold", 0, 0, 0, 36, 51, 36, 51, 5, 1 |		Nominal Height
	0, 4, 0, "OCRA", 0, 0, 0, 19, 36, 19, 36, 5, 1 |		
	0, 5, 0, "HR1", 0, 0, 0, 18, 30, 18, 30, 3, 1 |		Inter-Character Gap
	0, 6, 0, "HR2", 0, 0, 0, 26, 24, 26, 24, 2, 1 |		
	0, 10, 0, "CGTriBd9", 1, 0, 10, 37, 45, 15, 22, 0, 1 |		Printhead Density
	0, 10, 1, "CGTriBd9", 1, 0, 10, 37, 45, 15, 22, 0, 1 |		
	0, 10, 437, "CGTriBd9", 1, 0, 10, 37, 45, 15, 22, 0, 1 |		
	0, 10, 850, "CGTriBd9", 1, 0, 10, 37, 45, 15, 22, 0, 1 |		
	0, 11, 0, "CGTriumv6", 1, 0, 6, 21, 26, 8, 13, 0, 1 |		
	0, 11, 1, "CGTriumv6", 1, 0, 6, 21, 26, 8, 13, 0, 1 |		
	0, 11, 437, "CGTriumv6", 1, 0, 6, 21, 26, 8, 13, 0, 1 |		
	0, 15, 0, "CGTriumv7", 1, 0, 9, 33, 40, 13, 22, 0, 1 |		
	0, 15, 1, "CGTriumv7", 1, 0, 9, 33, 40, 13, 22, 0, 1 |		
	0, 15, 437, "CGTriumv7", 1, 0, 9, 33, 40, 13, 22, 0, 1 |		
	0, 15, 850, "CGTriumv7", 1, 0, 9, 33, 40, 13, 22, 0, 1 |		
	0, 16, 0, "CGTriumv9", 1, 0, 12, 44, 54, 17, 28, 0, 1 |		
	0, 16, 1, "CGTriumv9", 1, 0, 12, 44, 54, 17, 28, 0, 1 |		
	0, 16, 437, "CGTriumv9", 1, 0, 12, 44, 54, 17, 28, 0, 1 |		
	0, 16, 850, "CGTriumv9", 1, 0, 12, 44, 54, 17, 28, 0, 1 |		
	0, 17, 0, "CGTriumv11", 1, 0, 15, 54, 66, 22, 35, 0, 1 |		
	0, 17, 1, "CGTriumv11", 1, 0, 15, 54, 66, 22, 35, 0, 1 |		
	0, 17, 437, "CGTriumv11", 1, 0, 15, 54, 66, 22, 35, 0, 1 |		
	0, 17, 850, "CGTriumv11", 1, 0, 15, 54, 66, 22, 35, 0, 1 |		
	0, 18, 0, "CGTriumv15", 1, 0, 19, 73, 88, 30, 46, 0, 1 |		
	0, 18, 1, "CGTriumv15", 1, 0, 19, 73, 88, 30, 46, 0, 1 |		
	0, 18, 437, "CGTriumv15", 1, 0, 19, 73, 88, 30, 46, 0, 1 |		
	0, 18, 850, "CGTriumv15", 1, 0, 19, 73, 88, 30, 46, 0, 1 |		
	0, 510, 0, "CGTriumv7", 1, 0, 9, 33, 40, 13, 22, 0, 1 |		
	0, 510, 1, "CGTriumv7", 1, 0, 9, 33, 40, 13, 22, 0, 1 |		
	0, 510, 437, "CGTriumv7", 1, 0, 9, 33, 40, 13, 22, 0, 1 |		
	0, 510, 850, "CGTriumv7", 1, 0, 9, 33, 40, 13, 22, 0, 1 |		

```

0,511,0,"CGTriumv9",1,0,12,44,54,17,28,0,1 |
0,511,1,"CGTriumv9",1,0,12,44,54,17,28,0,1 |
0,511,437,"CGTriumv9",1,0,12,44,54,17,28,0,1 |
0,511,850,"CGTriumv9",1,0,12,44,54,17,28,0,1 |
0,512,0,"CGTriumv11",1,0,15,54,66,22,35,0,1 |
0,512,1,"CGTriumv11",1,0,15,54,66,22,35,0,1 |
0,512,437,"CGTriumv11",1,0,15,54,66,22,35,0,1 |
0,512,850,"CGTriumv11",1,0,15,54,66,22,35,0,1 |
0,513,0,"CGTriumv15",1,0,19,73,88,30,46,0,1 |
0,513,1,"CGTriumv15",1,0,19,73,88,30,46,0,1 |
0,513,437,"CGTriumv15",1,0,19,73,88,30,46,0,1 |
0,513,850,"CGTriumv15",1,0,19,73,88,30,46,0,1 |
0,70,0,"Paxar15",0,0,10,48,66,34,66,5,1 |
0,71,0,"Paxar18",0,0,13,50,77,41,77,7,1 |
0,72,0,"Nafta15",1,0,6,32,66,32,66,0,1 |
0,73,0,"Nafta18",1,0,8,33,77,33,77,0,1 |
0,50,0,"CGTriBd",1,1,92248,0 | }

```

This example shows the fonts for the 9850 printer. Fonts **510**, **511**, **512**, and **513** are the same as fonts **15**, **16**, **17**, and **18**.

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.

Printhead Density Displays whether a 203 (0) dpi or 300 (1) dpi printhead is used.

The scalable font (font 50) is not available for all printers and it does not display which printhead (203 dpi or 300 dpi) is used.

Using the Flash Upload Packet

Use the flash upload packet to check the contents of flash memory.

You can only use this packet on 9403 Version 2.0 (or greater) printers.

Syntax {header,packet#,action | }

1. *header* Identifies the packet. Options:
- A** Check Digit Scheme
 - F** Format
 - G** Graphic
2. *packet#* Identification number of the packet. Use **0** to upload all packets.
3. *action* Enter **H** to upload flash information.

Example {F,0,H | }

Selects all the formats in flash memory and uploads the information.

The printer returns the following to the host:

```
{1,A,F,E,200,200,"FMT1" |  
5,A,F,E,400,200,"FMT5" | }
```

Format 1 was added to flash memory and uses English units. The supply length was two inches and the supply width was two inches. The format name was "FMT1." Format 5 was added to flash memory and uses English units. The supply length was four inches and the supply width was two inches. The format name was "FMT5."

Example { G , 0 , H | }

Selects all the graphics in flash memory and uploads the information.

The printer returns the following to the host:

```
{10,A,F,G,812,406,"Wire" |  
99,A,F,G,350,406,"Logo" | }
```

Graphic 10 was added to flash memory and uses Graphic units. The supply length was 812 dots and the supply width was 406 dots. The format name was "Wire." Graphic 99 was added to flash memory and uses Graphic units. The supply length was 350 dots and the supply width was 406 dots. The format name was "Logo."

If no packets are stored in flash memory, empty brackets {} are returned to the host.

Flash Considerations

Note the following items when storing formats, graphics, or check digits in flash:

- ◆ Packets with the same number should not be added to flash memory. If two packets with the same number are stored in flash, only the last packet sent can be used. For example, if you send the following packets to flash memory, only the "Textiles" format can be used.

```
{F,10,A,F,E,300,200,"UPC"|  
|}  
{F,10,A,F,E,300,200,"Textiles"|  
|}
```

**Flash
Selector**

- ◆ Clear flash memory if you encounter problems storing packets. Flash must be cleared through the 9403 printer's menu.
- ◆ Individual packets cannot be cleared from flash memory. Clearing flash erases **all** packets stored in flash memory (with "F" selector); however, clearing flash does not erase any packets loaded by Service.
- ◆ Flash cannot be reallocated.

Uploading Format Header Information

You can upload format header information from the formats in memory to check the supply length and width for each format. You can use this packet on the 9825 or 9850 printers, because formats remain in memory when you turn off these printers.

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

F1. header Format Header

F2. format# Format number from 0-999. 0 is for all formats in memory.

F3. action Action. Options:

- A** Adds the specified format
- C** Clears the specified format
- H** Uploads format header information

F4. device Device. Options:

- R** Volatile RAM
- Z** All devices (use for upload)

Example {F,0,H,Z | }

Selects all formats in memory and returns the following:

```
{F,0,H,Z |
Fmt_1,406,406 |
Fmt_10,324,406 |
Fmt_15,812,812 |
Fmt_20,305,609 |
Fmt_25,1218,406 | }
```

Displays the format number, supply length and supply width (in dots) for each format in memory.

Example { F , 1 , H , Z | }

Selects format1 and returns the following to the host:

```
{ F , 1 , H , Z |  
Fmt_1 , 406 , 406 | }
```

Displays the supply length and supply width (in dots) for format1.

DEFINING FIELDS

3

This chapter provides a reference for defining

- ◆ the format header
- ◆ text, constant text, 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# Number from **0-999** (**0-99** for 9403) to identify the format.

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

F4. device Format storage device. Options:
F Flash (9403/9825)
N Non-volatile RAM
R Volatile RAM

F5. measure Unit of measure: **E** (English), **M** (Metric), or **G** (Graphic Dots). See the following table.

Printer	Unit of Measure	Supply Length	Supply Width
9403	English (1/100 inch)	75-600	75-200
	Metric (1/10 mm)	191-1524	191-508
	203 dpi Dots	152-1218	152-406
9825/ 9850	English (1/100 inch)	50-1750	75-400
	Metric (1/10 mm)	127-4445	191-1016
	203 dpi Dots	102-3552	152-812
9850	English (1/100 inch)	32-1200	75-400
	Metric (1/10 mm)	82-3048	191-1016
	300 dpi Dots	65-3600	152-1200

F6. length Supply length in selected units. Measure supply from the top of one black mark to the top of the next black mark. Use the previous table for values.

F7. width Supply width, from left to right, in selected units. Use the previous table for values.

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.

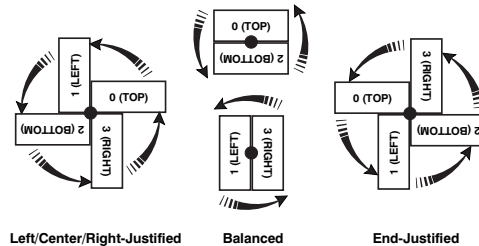
T2. field# Unique number from **0-999** (**0-99** for 9403) to identify this field.

T3. # of char Maximum number of printed characters is **0-2710** (**0-100** for 9403) 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.



Printer	Unit of Measure	Row or End Row	Column or End Column
9403	English (1/100 inch)	0-599	0-199
	Metric (1/10 mm)	0-1523	0-507
	203 dpi Dots	0-1217	0-405
9825/ 9850	English (1/100 inch)	0-1599	0-399
	Metric (1/10 mm)	0-4063	0-1015
	203 dpi Dots	0-3247	0-811
9850	English (1/100 inch)	0-1199	0-399
	Metric (1/10 mm)	0-3047	0-1015
	300 dpi Dots	0-3599	0-1199

T6. column

Distance from the left edge of the print area to the pivot point to find the column location. Use the previous table for values.

T7. gap

Number of dots between characters 203 dpi (or 300 dpi for 9850 printer). 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	15	7 pt. CG Triumvirate
4	OCRA-like	16	9 pt. CG Triumvirate
5	HR1	17	11 pt. CG Triumvirate
6	HR2	18	15 pt. CG Triumvirate
		50	EFF Swiss Bold (TrueType Scalable)

Or a valid downloaded font selector number.

Fonts **5** and **6** are for numeric data only.

The 9403 supports fonts **1, 2, 3, 4, 5, 6, 10,** and **11.**

The CG Triumvirate fonts support only the ANSI and DOS Code Page 437 and 850 Symbol Sets. The scalable font does not support Code Page 1256 (Arabic). See Appendix C for more information.

T9. hgt mag

Height magnifier, **1-7** times (**4-255** for scalable/downloaded TrueType fonts). Use a magnifier of **1** with proportionally spaced fonts, because characters lose smoothness at higher magnifications. See Appendix B, "Fonts," for more information about fonts.

T10. wid mag

Width magnifier, **1-7** times (**4-255** for scalable/downloaded TrueType fonts). 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."

NOTE: To use large point sizes (greater than 60 point), you must reconfigure memory and increase the size of the scalable (vector) fonts buffer.

T11. color

Options for standard printer fonts:

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

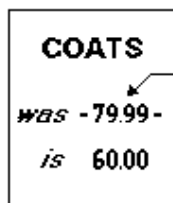
Options for the Scalable Font:

A/N	Transparent, Normal, Black, Bold
B/O	Transparent, Normal, Black, Normal
D/W	Opaque, Normal, White, Normal
E/S	Transparent, Italics, Black, Bold
F/T	Transparent, Italics, Black, Normal

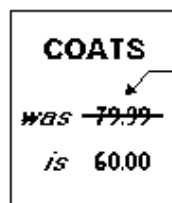
There are two types of field color overlay attributes:

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.



Line field
blocked out by
opaque field
using attribute B



Line field not
blocked out by
transparent field
using attribute O

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.

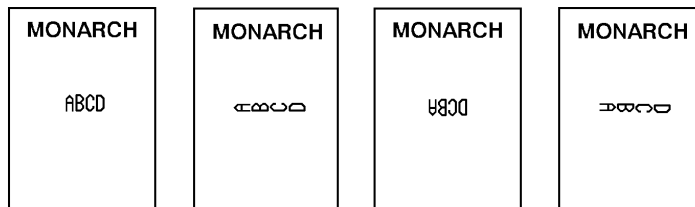
T12. alignment Options:

- 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
(Use for scalable font)
- 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



NOTE: Font 50 and downloaded TrueType fonts do not support character rotation.

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
100	Macintosh
101	Wingdings
102	UNICODE (user input) for particular mapping
103	BIG5 (user input) for UNICODE mapping
104	GB2312 (user input) for UNICODE mapping
105	SJIS (user input) for UNICODE mapping
	Code Page 932 (Japanese Shift-JIS)
106	GB2312 (user input) for GB23212 mapping
	Code Page 936 (Simplified Chinese)
107	BIG5 (user input) for BIG5 mapping
	Code Page 950 (Traditional Chinese)
437	DOS Code Page 437 (Domestic)
850	DOS Code Page 850 (International)
852	DOS Code Page 852 (Latin 2)
855	DOS Code Page 855 (Russian)
857	DOS Code Page 857 (IBM Turkish)
860	DOS Code Page 860 (MS-DOS Portuguese)
1250	Code Page 1250 (Latin 2)
1251	Code Page 1251 (Cyrillic)
1252	Code Page 1252 (Latin 1)
1253	Code Page 1253 (Greek)
1254	Code Page 1254 (Turkish)
1255	Code Page 1255 (Hebrew)
1256	Code Page 1256 (Arabic)
1257	Code Page 1257 (Baltic)
1258	Code Page 1258 (Vietnamese)

The CG Triumvirate fonts support only the ANSI and DOS Code Page 437 and 850 Symbol Sets. The scalable font does not support Code Page 1256 (Arabic). See Appendix C, "Symbol Sets/ Code Pages" for more information. Code pages 852-860 and 1250-1258 may only be used with downloaded TrueType fonts or the scalable font. Code Pages 932, 936, and 950 may only be used with downloaded Double-byte fonts. TrueType fonts are designed to be regionally specific; therefore, all code pages may not be supported in a given font.

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 (0-99 for 9403)** 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 (0-100 for 9403)**. Data Matrix can use up to 2710 numeric characters or 2335 alphanumeric characters. Quick Response (QR Code) can use 299-2710 characters. See Appendix A, "Samples" for more information.
- B4. fix/var** Fixed (**F**) or variable (**V**) length field.

Bar Code	Number of Characters	Fixed or Variable
UPCA	12	F
UPCA+2	14	F
UPCA+5	17	F
UPCA+Price CD	12	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
EAN13+Price CD	13	F
POSTNET	9 or 11	F

Bar Code	Number of Characters	Fixed or Variable
Interleaved 2 of 5 or Interleaved I 2 of 5 with Barrier Bar	0 to 2710	V
Code 39 or MOD43	0 to 2710	V
Codabar (NW7)	depends on application	F or V
Code 128	0 to 2710	V
Code 16K	0 to 2710	V
Code 93	0 to 2710	V
MSI	0 to 14	F or V
PDF417	0 to 2710	V
MaxiCode*	0 to 93 (alphanumeric) 0 to 128 (numeric)	V
Data Matrix*	0 to 2335 (alphanumeric) 0 to 2710 (numeric)	V
Quick Response*	1167 to 2710 (numeric) 707 to 2710 (alphanumeric)	V

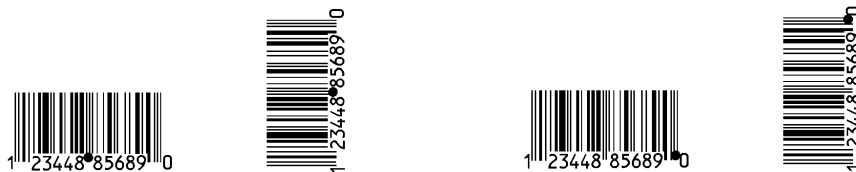
* For the 9403 printer, use the 2D bar codes online. For more information about MaxiCode, Data Matrix, and Quick Response, see Appendix A, "Samples."

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.



Printer	Unit of Measure	Row or End Row	Column or End Column
9403	English (1/100 inch)	0-599	0-199
	Metric (1/10 mm)	0-1523	0-507
	203 dpi Dots	0-1217	0-405
9825/ 9850	English (1/100 inch)	0-1599	0-399
	Metric (1/10 mm)	0-4063	0-1015
	203 dpi Dots	0-3247	0-811
9850	English (1/100 inch)	0-1199	0-399
	Metric (1/10 mm)	0-3047	0-1015
	300 dpi Dots	0-3599	0-1199

B6. column

Distance from the lower left edge of the print area to the pivot point. Use the previous table for values.



NOTE: Allow a minimum of **1/10** inch between the scan edge of bar code and label edges or other data. If using the optional verifier, allow a minimum of 1.3 inches (33 mm) between the bar code and the top of the label. See "Determining the Print Area" in Chapter 1 for more information.

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 |
| 9 | MSI |
| 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 |
| 31 | Code 16K |
| 32 | PDF417 |
| 33 | MaxiCode |
| 35 | Data Matrix (ECC-200) |
| 36 | Quick Response |
| 40 | Code 39 (MOD 43 check digit) |
| 41 | UPCA & Price CD |
| 44 | EAN13 & Price CD |
| 50 | Interleaved 2 of 5 with Barrier Bar |

B8. density

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

203 DPI Barcode Densities

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 Price CD	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 Price CD	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 or I2of5 with Barrier Bar	1	1.1	21/103.4	1:3.0	0 to 2710	8	0 to 9
	2	2.1	12/59.1	1:2.5			
	3	3.2	7/34.5	1:3.0			
	4	4.2	6/29.6	1:2.5			
	5	5.6	4/19.7	1:3.0			
	6	6.3	4/19.7	1:2.5			
	7	7.5	3/14.8	1:3.0			
	8	8.8	3/14.8	1:2.3			
	9	9.6	3/14.8	1:2.0			
	10	11.2	2/9.9	1:3.0			
	11	11.0	2/9.9	1:3.0			
	12	12.7	2/9.9	1:2.5			
	13	14.5	2/9.9	1:2.0			
(Code 39 or MOD43 (Extended Code 39))	1	1.4	10/49.3	1:2.5	0 to 2710	8	SPACE \$%*+-./ 0 to 9 A to Z
	2	1.7	8/39.4	1:2.5			
	3	3.5	4/19.7	1:2.5			
	4	4.2	3/14.8	1:3.0			
	6	6.3	2/9.9	1:3.0			
	7	7.0	2/9.9	1:2.5			
	11	3.9	4/19.7	1:2.0			
	12	12.7	1/4.9	1:3.0			
	20	3.0	5/24.6	1:2.2			
Codabar (NW7)	2	2.1	8/39.4	1:3.0	0 to 26	8	\$+-./ 0 to 9 a to d
	3	3.0	6/29.6	1:2.5			
	4	4.6	4/19.7	1:2.5			
	5	5.1	4/19.7	1:2.0			
	7	8.4	2/9.9	1:3.0			
	8	9.2	2/9.9	1:2.5			
	9	10.1	2/9.9	1:2.0			
Code 128 or Code 16 K	20	3.5/7.0	5/24.6	N/A	0 to 2710	8	00H to 7FH
	4	4.4/8.7	4/19.7				
	6	5.8/11.7	3/14.8				
	8	8.7/17.5	2/9.9				

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 intended for special U.S.P.S. ACT-tag applications only. Synthetic supplies are recommended to produce scannable bar codes.

3-12 Defining Fields

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				
MSI	4	4.2	4/19.7	1:2.0	0 to 14	8	0 to 9
	5	5.6	3/14.8	1:2.0			
	7	7.2	2/9.9	1:2.5			
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	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			

Bar Code Type	Density Selector	Data Length
Quick Response (QR Code) Models 1 and 2	0	Model 1: 0-1167 Numeric; 0-707 Alphanumeric; 0-486 (8-Bit); 0-299 Kanji Model 2: 0-2710 Numeric; Alphanumeric and 8-Bit; 0-1817 Kanji

NOTE: Values in bold indicate the default.

203 DPI Barcode Densities

Bar Code	Size Row x Col.	Density Selector	Max. Data Length Num. X Alphanum.	App Code	Char Set
Data Matrix Square symbols	10 x 10	1	6 x 3	8	00H to FFH
	12 x 12	2	10 x 6		
	14 x 14	3	16 x 10		
	16 x 16	4	24 x 16		
	18 x 18	5	36 x 25		
	20 x 20	6	44 x 31		
	22 x 22	7	60 x 43		
	24 x 24	8	72 x 52		
	26 x 26	9	88 x 64		
	32 x 32	10	124 x 91		
	36 x 36	11	172 x 127		
	40 x 40	12	228 x 169		
	44 x 44	13	288 x 214		
	48 x 48	14	348 x 259		
	52 x 52	15	408 x 304		
	64 x 64	16	560 x 418		
	72 x 72	17	736 x 550		
	80 x 80	18	912 x 682		
	88 x 88	19	1152 x 862		
	96 x 96	20	1392 x 1042		
	104 x 104	21	1632 x 1222		
	120 x 120	22	2100 x 1573		
	132 x 132	23	2608 x 1954		
	144 x 144	24	2710 x 2335		
0 default (bar code size automatically determined by data)					

Bar Code	Size Row x Col.	Density Selector	Max. Data Length Num. X Alphanum.	App Code	Char Set
Data Matrix Rectangular symbols	8 x 18	25	10 x 6	8	00H to FFH
	8 x 32	26	20 x 13		
	12 x 26	27	32 x 22		
	12 x 36	28	44 x 31		
	16 x 36	29	64 x 46		
	16 x 48	30	98 x 72		
0 default (bar code size automatically determined by data)					

NOTE: For the Data Matrix symbol, the 9825 and 9850 printers support printing an X-dimension of 13 mils or greater (3 dots @203 dpi). If you use a denser bar code, make sure the bar code scans in your particular application. Monarch "premium" supplies and increasing the print contrast are recommended for denser bar codes. Depending on your application, additional densities are available.

300 DPI Barcode Densities

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 Price CD	2 4	77% 103%	3/10 4/13.3	1:2.0	11 or 12 14/17	1, 5, 6, 7 or 8	0 to 9
UPCE +2/+5	2 4	77% 103%	3/10 4/13.3	1:2.0	6 or 7 9/12	1, 5, 6, 7 or 8	0 to 9
EAN8 +2/+5	2 4	77% 103%	3/10 4/13.3	1:2.0	7 or 8 10/13	1, 5, 6, 7 or 8	0 to 9
EAN13+2/+5 Price CD	2 4	77% 103%	3/10 4/13.3	1:2.0	12 or 13 15/18	1, 5, 6, 7 or 8	0 to 9
Interleaved 2 of 5 or I2of5 with Barrier Bar	1	1.1	31/103.4	1:3.0	0 to 2710	8	0 to 9
	2	2.1	18/60.1	1:2.5			
	3	3.3	10/33.4	1:3.0			
	4	4.2	9/30.0	1:2.4			
	5	5.6	6/20.0	1:3.0			
	6	6.2	6/20.0	1:2.5			
	7	8.3	4/13.3	1:3.0			
	8	9.4	4/13.3	1:2.5			
	9	9.9	4/13.3	1:2.3			
	10	11.1	3/10.0	1:3.0			
	11	11.1	3/10.0	1:3.0			
	12	13.0	3/10.0	1:2.3			
	13	14.3	3/10.0	1:2.0			
(Code 39 or MOD43 (Extended Code 39)	1	1.4	15/50.0	1:2.5	0 to 2710	8	SPACE \$%*+-./ 0 to 9 A to Z
	2	1.7	12/40/0	1:2.3			
	3	3.4	6/20.0	1:2.5			
	4	4.7	4/13.3	1:3.0			
	6	6.2	3/10.0	1:3.0			
	7	7.1	3/10.0	1:2.3			
	11	3.8	6/20.0	1:2.0			
	12	11.5	2/6.7	1:3.0			
	20	3.1	7/23.4	1:2.3			
Codabar (NW7)	2	2.3	12/40.0	1:3.0	0 to 2710	8	\$+-./ 0 to 9 a to d
	3	3.4	9/30.0	1:2.4			
	4	5.0	6/20.0	1:2.5			
	5	5.6	6/20.0	1:2.0			
	7	9.1	3/10.0	1:3.0			
	8	10.4	3/10.0	1:2.3			
	9	11.1	3/10.0	1:2.0			
Code 128 or Code 16 K	4	4.5	6/20.0	N/A	0 to 2710	8	00H to 7FH
	6	6.8	4/13.3				
	8	9.1	3/10.0				
	20	3.9	7/23.4				

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 intended 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 4 5 7 10	3.7 4.8 5.6 8.3 11.1	9/30.0 7/23.4 6/20.0 4/13.3 3/10.0	N/A	0 to 2710	8	00H to 7FH
MSI	4 5 7	4.2 6.2 7.5	6/20.0 4/13.3 3/10.0	1:2.0 1:2.0 1:2.3	0 to 2710	8	0 to 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 4.2 cpi)	24/118.2	15/50.0	6/20.0 (5 dot gap)	0,5,6,9 or 11	8	0 to 9
MaxiCode	7	N/A	N/A	N/A	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 3 4 5 6 7 8 9	3/10.0 3/10.0 3/10.0 4/13.3 4/13.3 4/13.3 6/20.0 6/20.0 6/20.0	3/10.0 6/20.0 9/30.0 4/13.3 9/30.0 12/40.0 6/20.0 12/40.0 18/60.0	1:1 1:2 1:3 1:1 1:2 1:3 1:1 1:2 1:3	0 to 2709	8	00H to FFH

Bar Code Type	Density Selector	Data Length
Quick Response (QR Code) Models 1 and 2	0	Model 1: 0-1167 Numeric; 0-707 Alphanumeric; 0-486 (8-Bit); 0-299 Kanji Model 2: 0-2710 Numeric; Alphanumeric and 8-Bit; 0-1817 Kanji

NOTE: Values in bold indicate the default.

Bar Code	Size Row x Col.	Density Selector	Max. Data Length Num. X Alphanum.	App Code	Char Set
Data Matrix Square symbols	10 x 10 12 x 12 14 x 14 16 x 16 18 x 18 20 x 20 22 x 22 24 x 24 26 x 26 32 x 32 36 x 36 40 x 40 44 x 44 48 x 48 52 x 52 64 x 64 72 x 72 80 x 80 88 x 88 96 x 96 104 x 104 120 x 120 132 x 132 144 x 144	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24	6 x 3 10 x 6 16 x 10 24 x 16 36 x 25 44 x 31 60 x 43 72 x 52 88 x 64 124 x 91 172 x 127 228 x 169 288 x 214 348 x 259 408 x 304 560 x 418 736 x 550 912 x 682 1152 x 862 1392 x 1042 1632 x 1222 2100 x 1573 2608 x 1954 2710 x 2335	8	00H to FFH
0 default (bar code size automatically determined by data)					

Bar Code	Size Row x Col.	Density Selector	Max. Data Length Num. X Alphanum.	App Code	Char Set
Data Matrix Rectangular symbols	8 x 18 8 x 32 12 x 26 12 x 36 16 x 36 16 x 48	25 26 27 28 29 30	10 x 6 20 x 13 32 x 22 44 x 31 64 x 46 98 x 72	8	00H to FFH
0 default (bar code size automatically determined by data)					

NOTE: For the Data Matrix symbol, the 9825 and 9850 printers support printing an X-dimension of 13 mils or greater (3 dots @203 dpi). If you use a denser bar code, make sure the bar code scans in your particular application. Monarch "premium" supplies and increasing the print contrast are recommended for denser bar codes. Depending on your application, additional densities are available.

B9. height

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

English	19
Metric	48
203 Dots	38
300 Dots	57

POSTNET, PDF417, and MaxiCode bar codes have a fixed height. Always use **0** for these bar codes. For Data Matrix and QR Code, the printer determines the size of the symbol, but the user's scanner determines the functional size (minimum height) of the symbol. Small Data Matrix and QR Codes may not be scannable. The Data Matrix and QR Code's height depends on the number entered for this parameter. For example, if you select 80, the symbol could be smaller than 0.80," but it will not be greater than the amount specified in this parameter. The symbol arranges the data according to rows and columns within the specified height.

NOTE: If using the optional verifier, allow the following minimum bar code heights: 0.35" (English) for 4.0 ips; 0.50" (English) for 6.0 ips; 0.70" (English) for 8.0 ips; 0.95" (English) for 10.0 ips.

B10. text

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

- 0** Default
MaxiCode Mode 0 (obsolete)
QR Code Model 2
- 1** No check digit or number system
QR Code Model 1
- 2** MaxiCode Mode 2 (Numeric Postal Code)
QR Code Model 2
- 3** MaxiCode Mode 3 (Alphanumeric Postal Code)
- 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
MaxiCode (autodetect modes 0, 2, or 3)

NOTE: Data Matrix must use 8.

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. MaxiCode, Data Matrix, and QR Code must use **L**.

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

NOTE: Serial bar codes with an 8-dot narrow element do not automatically print at 2.5 IPS. Serial bar codes printed at speeds greater than 2.5 IPS may not scan properly.

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 4 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 4 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** (**0-99** for 9403) assigned to this field.

D3. # of char Maximum number of characters in this field: **0-2710** or (**0-100** for 9403).

Example 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 or **100** for 9403 printer per format). The characters in this field cannot be changed by batch data. Field options do not apply to constant text fields. 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.)

Printer	Unit of Measure	Row or End Row	Column or End Column
9403	English (1/100 inch)	0-599	0-199
	Metric (1/10 mm)	0-1523	0-507
	203 dpi Dots	0-1217	0-405
9825/ 9850	English (1/100 inch)	0-1599	0-399
	Metric (1/10 mm)	0-4063	0-1015
	203 dpi Dots	0-3247	0-811
9850	English (1/100 inch)	0-1199	0-399
	Metric (1/10 mm)	0-3047	0-1015
	300 dpi Dots	0-3599	0-1199

C3. column Distance from the lower left edge of the print area to the pivot point. Use the previous table for values.

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

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	15	7 pt. CG Triumvirate
4	OCRA-like	16	9 pt. CG Triumvirate
5	HR1	17	11 pt. CG Triumvirate
6	HR2	18	15 pt. CG Triumvirate
		50	EFF Swiss Bold (TrueType Scalable)

Or a valid downloaded font selector number.
 Fonts **5** and **6** are for numeric data only.
 The 9403 supports fonts **1, 2, 3, 4, 5, 6, 10,** and **11**.
 The CG Triumvirate fonts support only the ANSI and DOS
 Code Page 437 and 850 Symbol Sets. See Appendix C for
 more information.

C6. hgt mag Height magnifier, **1-7** times (**4-255** for scalable/downloaded TrueType fonts). Use a magnifier of **1** with proportionally spaced fonts, because characters lose smoothness at higher magnifications. See Appendix B, "Fonts," for more information about fonts.

C7. wid mag Width magnifier, **1-7** times (**4-255** for scalable/downloaded TrueType fonts). 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."

NOTE: To use larger point sizes (greater than 60), you must reconfigure memory and increase the size of the scalable (vector) fonts buffer.

C8. color Options for standard printer fonts:

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

Options for the Scalable Font:

A/N	Transparent, Normal, Black, Bold
B/O	Transparent, Normal, Black, Normal
D/W	Opaque, Normal, White, Normal
E/S	Transparent, Italics, Black, Bold
F/T	Transparent, Italics, Black, 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.

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

C10. char rot Character rotation. Options:

- 0** Top of character points to top of field
(Use for scalable font.)
- 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

NOTE: Font 50 and downloaded TrueType fonts do not support character rotation.

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 (100 for 9403)** characters. Enclose in quotation marks.

C13. sym set Symbol set. Options:

0	Internal Symbol Set
1	ANSI Symbol Set
100	Macintosh
101	Wingdings
102	UNICODE (user input) for particular mapping
103	BIG5 (user input) for UNICODE mapping
104	GB2312 (user input) for UNICODE mapping
105	SJIS (user input) for UNICODE mapping
	Code Page 932 (Japanese Shift-JIS)
106	GB2312 (user input) for GB23212 mapping
	Code Page 936 (Simplified Chinese)
107	BIG5 (user input) for BIG5 mapping
	Code Page 950 (Traditional Chinese)
437	DOS Code Page 437 (Domestic)
850	DOS Code Page 850 (International)
852	DOS Code Page 852 (Latin 2)
855	DOS Code Page 855 (Russian)
857	DOS Code Page 857 (IBM Turkish)
860	DOS Code Page 860 (MS-DOS Portuguese)
1250	Code Page 1250 (Latin 2)
1251	Code Page 1251 (Cyrillic)
1252	Code Page 1252 (Latin 1)
1253	Code Page 1253 (Greek)
1254	Code Page 1254 (Turkish)
1255	Code Page 1255 (Hebrew)
1256	Code Page 1256 (Arabic)
1257	Code Page 1257 (Baltic)
1258	Code Page 1258 (Vietnamese)

The CG Triumvirate fonts support only the ANSI and DOS Code Page 437 and 850 Symbol Sets. The scalable font does not support Code Page 1256 (Arabic). See Appendix C, "Symbol Sets/ Code Pages" for more information. Code pages 852-860 and 1250-1258 may only be used with downloaded TrueType fonts or the scalable font. Code Pages 932, 936, and 950 may only be used with downloaded Double-byte fonts. TrueType fonts are designed to be regionally specific; therefore, all code pages may not be supported in a given font.

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 or **100** for 9403 printer 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. Define lines as

Segments Choose starting point and ending point.

Vectors Choose starting point, angle, and length of 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. Choose starting point and ending point.

V Vector. Choose starting point, angle, and length.

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



Printer	Unit of Measure	Row or End Row	Column or End Column
9403	English (1/100 inch) Metric (1/10 mm) 203 dpi Dots	0-599 0-1523 0-1217	0-199 0-507 0-405
9825/ 9850	English (1/100 inch) Metric (1/10 mm) 203 dpi Dots	0-1599 0-4063 0-3247	0-399 0-1015 0-811
9850	English (1/100 inch) Metric (1/10 mm) 300 dpi Dots	0-1199 0-3047 0-3599	0-399 0-1015 0-1199

L4. column

Distance from left edge of the print area to line origin. Use the previous table for 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**.


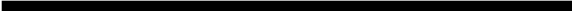



If Using Vectors

Length of the line in selected units. Use the previous table for values.

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

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

Dots	Thickness
1	
10	
24	
48	
96	

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 or **100** for 9403 printer 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.

Syntax

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

Q1. Q

Box (Quadrilateral) Field.

Q2. row

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



Printer	Unit of Measure	Row or End Row	Column or End Column
9403	English (1/100 inch)	0-599	0-199
	Metric (1/10 mm)	0-1523	0-507
	203 dpi Dots	0-1217	0-405
9825/ 9850	English (1/100 inch)	0-1599	0-399
	Metric (1/10 mm)	0-4063	0-1015
	203 dpi Dots	0-3247	0-811
9850	English (1/100 inch)	0-1199	0-399
	Metric (1/10 mm)	0-3047	0-1015
	300 dpi Dots	0-3599	0-1199

Q3. column

Distance from left edge of print area to
lower left corner of box.
Use the previous table for 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**. Measured in dots.

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

Dots	Thickness
1	
10	
24	
48	
96	

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

4

This chapter provides a reference for defining

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

When using multiple options on the 9403 printer,
remember that options are processed in the
order they are received.

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:

- | | |
|---|---------------------------------------|
| 1 | Define fixed characters |
| 2 | Data type restrictions (9403/9850) |
| 3 | Data entry template (9403/9850) |
| 4 | Copy data from previous field |
| 5 | Define data entry sources (9403/9850) |

20	Define data entry prompts (9403/9850)
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** (or **0 - 100** for 9403)

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 2 (Data Type Restrictions)

This option restricts the data type for a particular field. You can use Options 2 or 3 only once per field. Do not use with Option 3 (Data Entry Templates).

Option 2 is only available on the 9403 and 9850 printers. You must use the Monarch™ 917™ keypad with the 9850 printer for offline data entry.

If you do batch entry only in the batch packet, you do not need to apply Options 2 and 3. Use these options only for offline batch entry.

Syntax `R,2,char_code |`

R1. R Option Header.

R2. 2 Option 2.

R3. char code Character type for the field. Options:

1	Numeric only (0..9)
2	Letters only (A..Z,a..z)
3	Symbols only (printable characters other than letters or numbers)
4	Letters and numbers only
5	Numbers and symbols only
6	Letters and symbols only

Spaces are permitted in all categories. You can also use a combination of any two (letter, numbers, or symbols) character types.

A use for this option is a quantity field, where the operator could enter only numeric data.

Example `R,2,2 |`

Restricts the field data to letters only (A-Z or a-z).

Option 3 (Data Entry Templates)

This option provides more specific restrictions than Option 2. This option can be used to select certain letters (such as A through F or the numbers 1 through 4) from a character set. You can also use this option to create a template of allowable characters for a field. Do not use with Option 2 (Data Type Restrictions).

Use this option only for offline batch entry. You can define a template up to 30 characters long, but the printer only displays 16 characters at a time. The character template must contain the same number of characters as the field.

Option 3 is only available on the 9403 and 9850 printers. You must use the 917 keypad with the 9850 printer for offline data entry.

Syntax `R,3,code,chars !`

R1. R Option Header.

R2. 3 Option **3**.

R3. code Data types. Options

S	Defines a specific set of characters for the entire field. The string length does not have to match the field length. Maximum is 30 characters.
T	Creates a template of allowable data types by placing character indicators in each character position. The number of characters in the string must match the length of the field.

NOTE: A sample use for this option is a field on a patient record containing blood type. Acceptable characters would be **A, B, O, +, or -**.

R4. chars Characters to include in a field or a specific template. Must be enclosed within quotation marks. Indicators can be

*	any printable character
#	any digit 0-9
@	any letter a-z, A-Z
-	no user input for this position (for fixed data or copied data)

Example `R,3,S,"ABC1234567890" |`

Restricts the field data to letters **A**, **B**, and **C**, and all digits.

Example `R,3,T,"***#_ _ _" |`

Creates a template that allows any printable character in positions 1, 2, and 3; digits in position 4; and reserves positions 5 through 8 for fixed or copied data.

Example `R,3,T,"####_ _ _" |`

Creates a template that allows digits only in positions 1-4, and reserves positions 5 through 8 for fixed or copied data.

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 field into which data is copied cannot exceed **2710** (or **100** for the 9403 printer) 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.

Syntax `R,4,src fld,src start,# to copy,dest
start,copy code |`

R1. R Field Option Header.

R2. 4 Option **4**.

<i>R3. src fld</i>	Field number from which data is copied. Range: 0 to 999 (or 0 to 99 for 9403)				
<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 (or 1 to 100 for 9403), starting from the left.				
<i>R5. # to copy</i>	Number of characters to copy. Range: 1 to 2710 (or 1 to 100 for 9403).				
<i>R6. dest start</i>	Position number where copied characters are to begin printing in the destination field. Range: 1 to 2710 (or 1 to 100 for 9403).				
<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 5 (Define Data Entry Sources)

Defines how data is entered into a field. If the field holds all fixed characters or copied data only, you can eliminate the operator prompt. Use Option 5 only once per field. You must use the 917 keypad with the 9850 printer for offline data entry.

Option 5 is required for offline data entry on
the 9403 and 9850 printers.

<i>Syntax</i>	R, 5, code |
<i>R1. R</i>	Option Header.
<i>R2. 5</i>	Option 5.
<i>R3. code</i>	Input code for the data in the field. Options: K Keypad N No user input for this field

Example R, 5, K |

Allows data to be entered from the keypad.

Example R, 5, N |

Eliminates the user prompt for this field. Data is either fixed or copied from another source.

Option 20 (Define Data Entry Prompts)

This option defines the operator prompt and it is not recommended on fields filled entirely by fixed characters or copied data. This option must be defined before Option 5, or the prompt will not display during data entry. You must use the Monarch 917 keypad with the 9850 printer for offline data entry.

Option 20 is only available on the 9403 and
9850 printers.

Syntax `R,20,"prompt" |`

R1. R Option Header.

R2. 20 Option **20**.

R3. "prompt" Displays the exact phrase you want to prompt the operator. Must be enclosed within quotations. The prompt should be 15 characters or fewer.

Example `R,20,"Order Number" |`

Displays the prompt "Order Number" for the operator when this field is imaged.

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" |`

<i>R1. R</i>	Option Header.
<i>R2. 30</i>	Option 30 .
<i>R3. L/R</i>	Indicates type of padding L Pad field on left side R Pad field on right side
<i>R4. "character"</i>	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 # |`

<i>R1. R</i>	Option Header.
<i>R2. 31</i>	Option 31 .
<i>R3. gen/ver</i>	Enter G to generate a check digit.
<i>R4. check digit #</i>	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. Code 39, density 12, produces a one-dot narrow bar. This density is intended for special U.S.P.S. ACT-tag applications only. Synthetic supplies are recommended to produce scannable bar codes.

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, 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. Do not use with Option 42 (price field).

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** (**1 - 100** for 9403).

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** (**1 - 100** for 9403).

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.

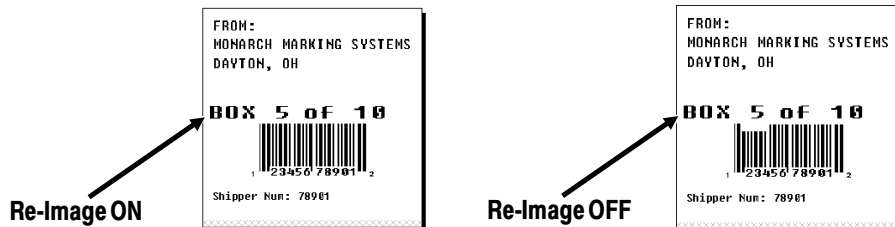
Syntax R, 61 |

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.

A2. selector Assign a number from **1-10** to this check digit formula.

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

A4. device Device. Options:

F Flash (9403/9825)

R Volatile RAM

NOTE: Check digits stored in flash are saved when the printer is turned off.

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 (0 - 100 for 9403)**.

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 (0 - 100 for 9403).

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

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

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

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

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

- 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

- 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

- 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

- 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.

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

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

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

- Subtract the remainder from the modulus.

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

$$10 - 4 = 6$$

CREATING GRAPHICS

5

This chapter provides information on how to

- ◆ map out the graphic image using the hexadecimal (hex) or run length method.
- ◆ create a graphic packet using a graphic header, bitmap, duplicate, next-bitmap, text, constant text, line, and box Fields.
- ◆ place a graphic image into a format.

You can use graphic packets to create compliance labels or bitmapped images. To include a graphic packet within your format, your format **must** contain a graphic field. See "Placing the Graphic in a Format," for more information.

Overview of Compliance Labels

You can create compliance labels by using a graphic packet for the fixed fields and a format packet for the variable fields of your compliance label. The fixed fields of a compliance label are composed of text, lines, or boxes, which are repeated on each label. The variable fields are composed of text, bar codes, and order information, which changes with each label. Using a graphic packet for the fixed fields saves time, because the printer does not have to image all the lines or boxes each time the compliance label is printed.

Also, using a graphic packet for a compliance label reduces the number of fields in your format. Formats have a maximum number of fields per packet (**0-999** or **0-99** for 9403). However, you can bypass that requirement by placing your compliance layout in a graphic packet. When you process your formats, you only need one line in the format packet to reference the graphic packet.

The following example shows how to reference a graphic packet from within a format packet.

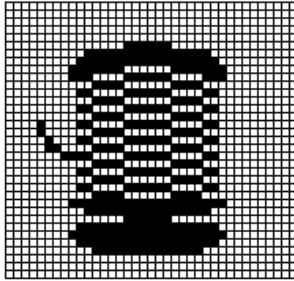
{	start of header
F,1,A,R,E,400,400,"RDCI" |	format header
G,57,0,0,0,0 |	reference to graphic packet
C,40,10,0,2,2,2,B,L,0,0,"To:",0|	constant text field
B,2,13,V,310,30,8,4,50,8,L,0 |	bar code field
}	end of header

Once you have your compliance label format set, all you need to do is add the variable sections (bar codes, addresses, and order information) to the format packet.

To see a sample compliance label graphic packet, see "Sample Compliance Graphic Packet." To see a sample compliance label using a graphic packet within a format, see "Sample Compliance Label."

Overview of Bitmapped Images

A printed image is formed through a series of dots. Each square on the grid below represents a dot on the printhead. The graphic image is created by blackening dots in a specific pattern. You can print varying shades of gray according to the concentration of dots on the image. When the dots are printed together, the end result is a graphic image.



Determining a Method

You can use one of two methods to map out your graphic image:

Hex Method

The dot sequences are segmented into binary numbers, and then converted to hex numbers. A graphic using gray-scaling, several slanted lines, or several vertical lines typically translates more efficiently with hex representation.

Run Length Encoding Method

The dot sequences are segmented into black and white strings within a row. The total count of each white string is converted to a lower-case letter, corresponding to numeric value. The total count of each black string is converted to an uppercase letter, corresponding to numeric value. This method can reduce imaging time for graphics that contain repetitive rows of dots. A graphic with horizontal lines or very few white-to-black borders typically translates more efficiently with run length encoding.

The most efficient encoding method depends on how complicated your graphic image is and whether or not imaging time is a concern. You may want to experiment with both encoding methods to get optimal performance.

Designing Compliance Labels

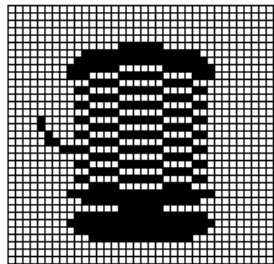
To use a graphic packet to design your compliance label:

1. Decide which fields are fixed (constant text, lines, boxes) and which fields are variable (addresses and shipping information).
2. Design your compliance label as you would any other format.

Designing Bitmapped Images

Once you determine the encoding method to use, you can begin mapping out your graphic image.

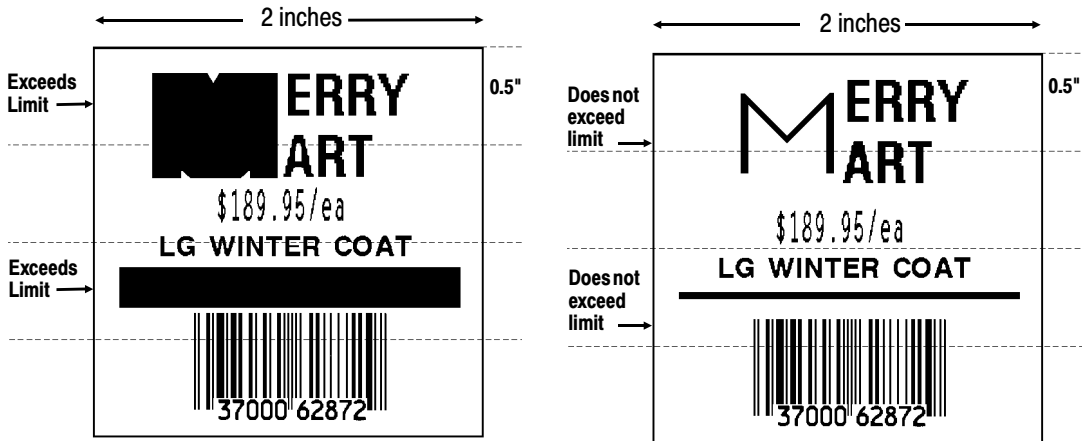
—————
The image that you map must be an upside
down mirror image of the final result.
—————



Special Considerations

Solid black print cannot exceed 30% of any given square inch of the supply. If the black print exceeds this limit, you may lose data or damage the printhead.

In the first label, the large "M" logo and thick black line exceed the allowed black to white print ratio. In the second label, the large "M" logo does not exceed the black to white print ratio.



Using the Hex Method

The following steps explain how to derive a hex character string from a bitmapped graphic.

Each square on the grid represents a dot. A black square indicates the dot is ON, and a white square indicates the dot is OFF. A sequence of binary numbers, called a bit pattern or bitmap, determines what dots are on and off. The numbers "0" and "1" are used for this purpose. The number "1" turns a dot on and "0" turns a dot off.

[illegible][illegible]

3. One row at a time, convert each group of eight binary digits to hex values, using the binary to hex conversion chart found in Appendix C.

starting at position 49 ...

```
00111111 = 3F
11111111 = FF
11111111 = FF
11110000 = F0
```

4. Write the hex values for each row as a continuous string.

row 1, position 49 = 03FFFFFF00000

All hex numbers must be two digits. For example, write hex 0 as 00, or hex E as 0E.

5. Repeat steps 3 through 4 for each row on the grid.
6. Insert the hex values in syntax format.

Using the Run Length Encoding Method

The following steps explain how to derive a run length character string from a bitmapped graphic.

Each square on the grid represents a dot. A black square indicates the dot is ON, and a white square indicates the dot is OFF.

For visual clarity, the following example shows "1" to indicate when a square is ON, and "0" to indicate when a square is OFF. You do not have to convert your dots when using the run length method.

```
(row 1,position 50) Z  
(row 2,position 39) KzI  
(row 3,position 34) EzsF  
(row 4,position 30) DpZoD  
.  
.
```

If the end of the line specifies OFF dots (lower-case letters), the ending lower-case letters can be omitted. For example, uZFu can be written as uZF.

4. Repeat steps 1 through 5 for each row on the grid.
5. Insert the code values in syntax format.

Determining How to Store the Image

Once you have mapped out your graphic image, determine how you want to store it. You have several options:

- ◆ Flash
- ◆ Non-volatile RAM
- ◆ Volatile RAM
- ◆ Temporary Storage

Using Flash

Flash memory is only available on the 9403 and 9825 printers. You can use flash memory when the graphic image is used by several formats, because you only have to send the graphic image once. This eliminates the need to send the graphic image repeatedly. See "Placing the Graphic in a Format," for more information about using the graphic packet in a format.

Graphics stored in flash memory are saved when the printer is turned off. Refer to the *Operator's Handbook* to clear flash memory.

Using Non-volatile RAM

You can save graphics to non-volatile RAM on the 9850 printer. Graphics are saved when you turn off the printer. You can remove graphics from memory if necessary by sending a clear packet. See "Clearing Packets from Memory" in Chapter 2 for more information.

Using Volatile RAM

You should use RAM when the graphic image is used by several formats, because you only have to send the graphic image once. This eliminates the need to send the graphic image repeatedly. See "Placing the Graphic in a Format," for more information about using the graphic packet in a format. Graphics smaller than approximately 1/2 inch by 1/2 inch can be stored in printer RAM and referenced by the graphic ID number.

Graphics are stored in the format buffer and remain there until another graphic packet is sent or the printer is turned off.

Using Temporary Storage

You should use temporary storage when the graphic image is used only in one format or your graphic image is very large. Graphic data in temporary storage is held in the image buffer until the graphic is printed and then it is cleared from memory. Temporary graphics are also cleared from memory when you send a new batch or update batch. You can use the same graphic image multiple times on a format. Send the graphic image to the printer *after* the format to which it applies.

If a graphic is stored in temporary storage, do **not** place a graphic field in the format. This will cause an error. Instead, position the graphic image by using the *row* and *column* locations in the graphic packet header. Image memory (temporary storage) will accept a graphic packet 1218 rows long with 811 dots per row.

Creating a Graphic Packet

Your graphic packet can contain:

- ◆ bitmapped fields (for bitmapped images)
- ◆ constant text fields
- ◆ lines
- ◆ boxes

Images using hex representation or run length encoding are bitmapped images. See "Designing Bitmapped Images," to design your bitmapped image.

Once you design your graphic image, you are ready to define a graphic packet. This packet generates the graphic image you use in a format.

Positioning the Graphic Image

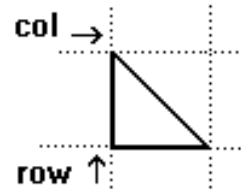
This section explains how to position the graphic image within a graphic packet header, a field of a graphic packet, or within a format.

Within the Graphic Packet Header

When you are using RAM, the *row* and *column* parameters in the graphic header are usually **0,0**, because placement is controlled by the graphic field in your format. This is especially true when designing a compliance label overlay.

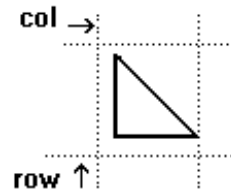
When you are using temporary storage, these parameters control the placement of the graphic image on the supply.

The area enclosed within the dotted lines represents the graphic image starting at **0,0** (as defined in the graphic header).



If you want a fixed amount of white space around your graphic image, use something other than **0** for *row* and/ or *column*.

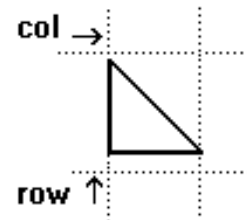
The area enclosed within the dotted lines represents the graphic image starting at **0,0** with a fixed amount of white space (**10,10**) around the graphic image.



Within the Field

The *row* and *column* parameters in a bitmap, constant text, line, or box field control where an individual field or bitmapped row begins in relation to the coordinates defined in the graphic header.

The bottom of the triangle in this example represents the first field of the graphic packet starting at **10,0**.



Within a Format

When you define the graphic field within your format, the *row* and *column* parameters represent where on the **format** to place the graphic image.

If you are doing a compliance label, these numbers are usually **0,0**, because your compliance label covers the entire supply. See "Placing the Graphic in a Format," for a sample compliance label.

If you are placing a graphic (a logo, for example) within a certain area on your supply, enter the starting position (bottom left corner) of the graphic image.

This label shows the triangle "logo" beginning (the bottom left corner) at 400,75 as defined in the graphic field.



Defining the Graphic Header

Every graphic packet must contain a graphic header. This is the first thing you enter. It identifies and provides important measurement and formatting information for the graphic. Bitmap, duplicate, next-bitmap, constant text, line, and box fields follow the graphic header, if they are used.

Syntax {G, graphID, action, device, units, row, col, mode, "name" }

G1. G Graphic Header.

G2. graphID Unique number from **0** to **999** (**0** to **99** for 9403) to identify the graphic image.

G3. action Enter **A** to add the graphic to the printer.

G4. device Graphic storage device. Options:
F Flash (9403/9825)
N Non-volatile RAM
R Volatile RAM
T Temporary storage

NOTE: Graphics stored in flash are saved when the printer is turned off.

G5. units Unit of measure. For bitmapped graphics, **G** (dots) is the only valid option.

G6. row Distance between the *bottom* of the graphic image area and the first bitmap line. This is usually **0**, unless you want a fixed amount of white space around the graphic image. See "Positioning the Graphic Image," for more information.

Printer	Unit of Measure	Row or End Row	Column or End Column
9403	English (1/100 inch)	0-599	0-199
	Metric (1/10 mm)	0-1523	0-507
	203 dpi Dots	0-1217	0-405
9825/ 9850	English (1/100 inch)	0-1599	0-399
	Metric (1/10 mm)	0-4063	0-1015
	203 dpi Dots	0-3247	0-811
9850	English (1/100 inch)	0-1199	0-399
	Metric (1/10 mm)	0-3047	0-1015
	300 dpi Dots	0-3599	0-1199

G7. column Distance between the *left edge* of the graphic image area and the left edge of first bitmap line. This is usually **0**, unless you want a fixed amount of white space around the graphic image. See "Positioning the Graphic Image," for more information. Use the previous table for values.

G8. mode Imaging mode. Enter **0**.

G9. "name" Graphic name (optional), **0-8** characters, enclose within quotation marks.

Example {G,99,A,R,G,0,0,0,"99Wire" }

Adds a graphic image identified by number 99 to volatile RAM. The graphic uses dot measurement. The image will be placed according to the *row* and *column* parameters in the graphic field. The imaging mode is 0 and the image is called 99Wire.

Creating Bitmap Fields

This defines one row of dots, starting at a specific row and column within the graphic image. Each unique row of dots requires a bitmap field. A bitmap field can later be repeated by using a duplicate field.

Syntax `B, row, column, algorithm, "data" |`

B1. B Bitmap Field.

B2. row Distance (in dots) from the graphic image's bottom margin to the bitmap line.

Printer	Unit of Measure	Row or End Row	Column or End Column
9403	English (1/100 inch)	0-599	0-199
	Metric (1/10 mm)	0-1523	0-507
	203 dpi Dots	0-1217	0-405
9825/ 9850	English (1/100 inch)	0-1599	0-399
	Metric (1/10 mm)	0-4063	0-1015
	203 dpi Dots	0-3247	0-811
9850	English (1/100 inch)	0-1199	0-399
	Metric (1/10 mm)	0-3047	0-1015
	300 dpi Dots	0-3599	0-1199

B3. column Distance (in dots) from the graphic image's left edge to the bitmap line. Use the previous table for values.

B4. algorithm Coding method for bitmap data:
H Hex Representation
R Run Length Encoding

B5. data Character string made up of hex or run length encoding. Do not put spaces or any other character between the numbers. Range: **0 - 2710 (0 - 100 for 9403)**.

Example `{ B, 39, 56, H, "3FFFFFF0" |`

Defines a bitmapped graphic field. The image begins 39 dots from the bottom and 56 dots from the left edge of the graphic area. Hex representation is used.

Creating Next-Bitmap Fields

This field uses the previous field's *row* and *column* locations. It allows you to use the bitmap or duplicate field data without having to recalculate row and column locations. This field represents one row of dots on the image.

Syntax `N,adjdir,adjamt,algorithm,"data" |`

N1. N Next-Bitmap Field.

N2. adjdir Increments or decrements the row count. Inserts the duplicate line after or before the current row.

0 Increments (inserts after)

1 Decrements (inserts before)

For example:

`B,50,35,R,"GsSsG" |`

`N,0,R,"DpZoD" |`

prints a next-bitmap field on row **51** at column **35**.

N3. adjamt Amount of row adjustment in dot rows. Using **0** overwrites the same line. Range: **0 - 999 (0 - 99 for 9403)**.

N4. algorithm Coding method for bitmap data:

H Hex Representation

R Run Length Encoding

N5. "data" Character string made up of hex or run length encoding. Do not put spaces or any other character between the hex numbers or run length code letters. Range: **0 - 2710 (0 - 100 for 9403)**.

Example `B,39,56,H,"3FFFFFF0" |`
 `N,0,1,H,"000000E00000" |`

Defines a next-bitmap graphic field beginning on row 40. The row count increments by 1. Hex representation is used.

Creating Duplicate Fields

If a line of data is identical to a previous bitmap or next-bitmap field, the duplicate field allows you to repeat the dot sequence without retyping the data. A duplicate field represents one row of dots on the image. Duplicate fields are useful when you have a graphic with a lot of repetition.

Syntax `D,adjdir,adjamt,count !`

D1. D Duplicate Field.

D2. adjdir Increments or decrements the row count. Inserts the duplicate line after or before the current row.
0 Increments (inserts after)
1 Decrements (inserts before)
For example:
`B,50,35,R,"GsSsG" !`
`D,0,20,2 !`
inserts row 50 again at row 70 and row 90. Rows 70 and 90 do not have to be defined later.

D3. adjamt Amount of row adjustment in dot rows. Range: **0 - 999** (**0 - 99** for 9403). The above example adjusts the duplicate field to image on row 70 and 90 (adding 20 to the current row count).

D4. count Number of times to duplicate the line. Range: **0 - 999** (**0 - 99** for 9403).

Example `B,117,24,H,"03FFFFFFFFFFFFFFFFFFFFFC" !`
 `D,0,1,2 !`

Defines a duplicate field that is imaged after the bitmap line. This field duplicates the preceding bitmap line twice (at row 118 and 119).


You can use constant text, line, or box fields in a graphic packet to create a compliance label overlay. See Chapter 3, "Defining Fields," for more information about these fields.

Sample Compliance Graphic Packet

A sample compliance graphic packet is shown below.

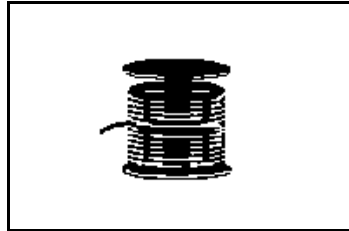
```
{G,57,A,R,E,0,0,0,"OVERLAY" |
L,V,500,155,90,85,3 |
L,V,298,245,90,102,3 |
L,V,500,2,0,390,3 |
L,V,400,2,0,390,3 |
L,V,298,2,0,390,3 |
L,V,200,2,0,390,5 |
C,560,10,0,2,2,2,B,L,0,0,"FROM:",0 |
C,560,160,0,2,2,2,B,L,0,0,"CARRIER:",0 |
C,529,160,0,2,2,2,B,L,0,0,"PRO NUMBER:",0 |
C,511,160,0,2,2,2,B,L,0,0,"B/L NUMBER:",0 |
C,472,10,0,2,2,2,B,L,0,0,"TO:",0 |
C,387,10,0,2,1,1,B,L,0,0,"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,548,6,0,2,1,1,B,L,0,0,"MONARCH MARKING SYSTEMS",0 |
C,538,6,0,2,1,1,B,L,0,0,"170 MONARCH LANE",0 |
C,528,6,0,2,1,1,B,L,0,0,"P.O. BOX 608",0 |
C,518,6,0,2,1,1,B,L,0,0,"DAYTON, OHIO 45401",0 |
C,462,313,0,2,4,3,B,L,0,0,"#",0 | }
```

The sample compliance label overlay was created with this packet, using the format provided in "Placing the Graphic in a Format."

FROM:	CARRIER: PRO NUMBER: B/L NUMBER:
TO: 	
SHIP TO POSTAL CODE	APPOINTMENT NUMBER: ORDER TYPE: ITEM:
UPC SHIPPING CONTAINER CODE	

Sample Hex Graphic Packet

```
{G,99,A,R,G,0,0,0,"99WIRE"  
B,39,48,H,"3FFFFFFF0" |  
B,40,32,H,"01FFC000000FF8" |  
B,41,32,H,"3E0000000000FC0" |  
B,42,24,H,"03C0003FFFFFFF0000F" |  
B,43,24,H,"7C3FFFFFFFFFFFFFFF0" |  
B,44,16,H,"0183FFFFFFFFFFFFFFF06" |  
B,45,16,H,"018FFFFFFFFFFFFFFFFFE" |  
B,46,16,H,"01FFFFFFFFFFFFFFFFFFE" |  
B,47,16,H,"01FFFFFF80001FFFFFFFFFE" |  
B,48,16,H,"01FFFFFF0000000007FFFC" |  
B,49,24,H,"7F800007FFFF00003FF0" |  
B,50,24,H,"1FC00007FFFF00001FC0" |  
D,0,4,4 |  
B,51,24,H,"1C03FFFFFFFFFFFFFFE01C0" |  
D,0,4,4 |  
B,52,32,H,"3FFFFFFFFFFFFFFFFE1C0" |  
D,0,4,4 |  
B,53,24,H,"03FFF00000000007FFE" |  
D,0,4,4 |  
B,70,0,H,"0400001FC00007FFFF00001FC0" |  
B,71,0,H,"0600001C03FFFFFFFFFFFFFFE01C0" |  
B,72,0,H,"030000003FFFFFFFFFFFFFFFFE1C0" |  
B,73,0,H,"01000003FFF00000000007FFE" |  
B,74,8,H,"FC001C03FFFFFFFFFFFFFFE00C0" |  
B,75,8,H,"FE00003FFFFFFFFFFFFFFFFE0C0" |  
B,76,8,H,"1FF803FFF00000000007FFE" |  
B,77,8,H,"0FFFCFFC00000000000001C0" |  
B,78,16,H,"FFDF000FFFFFFFFFF8003C0" |  
B,79,16,H,"7FFFC00007FFFF00001FC0" |  
B,80,24,H,"1C03FFFFFFFFFFFFFFE01C0" |  
D,0,4,4 |  
B,81,32,H,"3FFFFFFFFFFFFFFFFE1C0" |  
D,0,4,4 |  
B,82,24,H,"03FFF00000000007FFE" |  
D,0,4,3 |  
B,83,24,H,"1FC00007FFFF00001FC0" |  
D,0,4,3 |  
B,98,24,H,"03FFFFFFFFFFFFFFFFF0" |  
B,99,24,H,"07FFFFFFFFFFFFFFFFFC" |  
B,100,24,H,"1FF9FFFFFFFFFFFFFFF" |  
B,101,24,H,"3FFE0007FFFF8000FF80" |  
B,102,24,H,"391E0027FFFF803FFFC0" |  
B,103,24,H,"1C7FFFFFFFFFFFFFFFFC0" |  
B,104,24,H,"1FC1FFFFFFFFFFFFFFF1FC0" |
```



```

B,105,24,H,"0FFDFFFFFFFFFFFFE0FF" |
B,106,24,H,"FFFFFFFFFFFFFFFFF8" |
B,107,32,H,"3FFFFFFFFFFFFFFFFE0" |
B,108,32,H,"03FFFFFFFFFFFFFFF" |
B,109,48,H,"07FFFF80" |
D,0,1,2 |
B,111,48,H,"FFFFFFFF" |
B,112,32,H,"FFFF00000000FFE0" |
B,113,24,H,"078000FFFFFFFF001F" |
B,114,24,H,"78FFFFFFFFFFFFFFFFE060" |
B,115,16,H,"0187FFFFFFFFFFFFFFFFFC18" |
B,116,16,H,"027FFFFFFFFFFFFFFFFFF2" |
B,117,16,H,"03FFFFFFFFFFFFFFFFFFFC" |
D,0,1,2 |
B,120,16,H,"01FFFFFFFFFFFFFFFFFF8" |
B,121,24,H,"FEFFFFFFFFFFFFFFFFFE0" |
B,122,24,H,"07FFFFFFFFFFFFFFFFFC" |
B,123,32,H,"FFFFFFFFFFFFFFFFFC0" |
B,124,32,H,"01FFFFFFFFFFFF8" | }

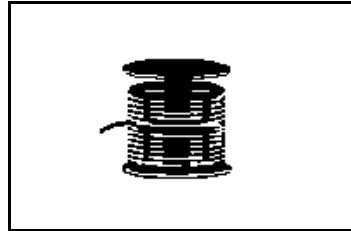
```

Sample Run Length Graphic Packet

```

{G,99,A,R,G,0,0,0,"99WIRE" |
B,39,50,R,"Z" |
B,40,39,R,"KzI" |
B,41,34,R,"EzsF" |
B,42,30,R,"DpZoD" |
B,43,25,R,"EdZZEdE" |
B,44,23,R,"BeZZMeB" |
B,45,23,R,"BcZZW" |
B,46,23,R,"ZZZA" |
B,47,23,R,"ZDsZE" |
B,48,24,"TzkU" |
B,49,25,"HtRqJ" |
B,50,27,"GsSsG" |
D,0,4,4 |
B,51,27,"ChZWgC" |
D,0,4,4 |
B,52,34,R,"ZZEdC" |
D,0,4,4 |
B,53,30,R,"NzkN" |
D,0,4,4 |
B,70,5,R,"AuGsSsG" |
B,71,5,R,"BtChZWgC" |
B,72,6,R,"DxZZEdC" |
B,73,7,R,"CtNzkN" |

```




```

B,74,8,R,"FmChZWhC" |
B,75,8,R,"GsZZEdC" |
B,76,11,R,"JiNzkN" |
B,77,12,R,"NbJzzeC" |
B,78,16,R,"JaElZKmD" |
B,79,17,R,"QsSsG" |
B,80,27,R,"ChZWgC" |
D,0,4,4 |
B,81,34,R,"ZZEdC" |
D,0,4,4 |
B,82,30,R,"NzkN" |
D,0,4,4 |
B,83,27,R,"GsSsG" |
D,0,4,4 |
B,98,30,R,"ZZJ" |
B,99,29,R,"ZZM" |
B,100,27,R,"JbZZE" |
B,101,26,R,"MnToI" |
B,102,26,R,"CbHnTiP" |
B,103,27,R,"CcZZC" |
B,104,27,R,"GeZWcG" |
B,105,28,R,"JaZReH" |
B,106,32,R,"ZZI" |
B,107,34,R,"ZZE" |
B,108,38,R,"ZQ" |
B,109,53,R,"T" |
D,0,1,2 |
B,111,48,R,"ZF" |
B,112,33,R,"PzfK" |
B,113,29,R,"CpZBoE" |
B,114,25,R,"DcZZGfB" |
B,115,23,R,"BdZZMeB" |
B,116,22,R,"AbZZVbA" |
B,117,22,R,"ZZZB" |
D,0,1,2 |
B,120,23,R,"ZZZ" |
B,121,25,R,"ZZV" |
B,122,29,R,"ZZM" |
B,123,32,R,"ZZF" |
B,124,39,R,"ZT" | }

```

Placing the Graphic in a Format

The graphic image may be a bitmapped graphic or a compliance label overlay.

To include a graphic within a format:

1. Design the graphic image as shown in "Designing Bitmapped Images."
2. If you are using RAM, place a graphic field in the format file to reference the graphic. See the following section, "Defining the Graphic Field," for more information.

If you are using temporary storage, you do not need a graphic field in your format to reference the graphic image.

3. Download all the necessary packets (check digit, format, etc.).
4. Send the graphic file to the printer, if you have not already done so. See "Creating a Graphic Packet," for more information.

Defining the Graphic Field

The graphic field in a format references the graphic image by the *graphID* in the graphic header.

This field is required only if the graphic will be stored in RAM.

Syntax `G,graphID,row,col,mode,rotation !`

G1. G Graphic Field.

G2. *graphID* Unique number from **0** to **999** (**0** to **99** for 9403) to identify the graphic image.

G3. row

Distance between the *bottom* of the print area on the supply to the bottom of the graphic image. Measured in selected units.

Printer	Unit of Measure	Row or End Row	Column or End Column
9403	English (1/100 inch)	0-599	0-199
	Metric (1/10 mm)	0-1523	0-507
	203 dpi Dots	0-1217	0-405
9825/ 9850	English (1/100 inch)	0-1599	0-399
	Metric (1/10 mm)	0-4063	0-1015
	203 dpi Dots	0-3247	0-811
9850	English (1/100 inch)	0-1199	0-399
	Metric (1/10 mm)	0-3047	0-1015
	300 dpi Dots	0-3599	0-1199

The row specified in the constant text, bitmap, line, or box field is added to the *row* value above to determine the actual position in the format.

G4. column

Distance between the *left edge* of the print area on the supply and the left edge of the graphic. Measured in selected units. Use the previous table for values. The column specified in the constant text, bitmap, line, or box field is added to the *col* value above to determine the actual position in the format.

G5. mode

Imaging mode. Enter **0**.

G6. rotation

The orientation of the graphic on the supply. Enter **0**.

Example

G, 57, 0, 0, 0, 0 |

Defines a graphic field that is identified by the number 57. The image begins at 0,0. The imaging mode is 0 and there is no rotation.

Sample Compliance Label



This sample format packet uses the graphic packet in "Creating a Graphic Packet."

```
{F,1,A,R,E,600,400,"RDCI" |  
G,57,0,0,0,0 |  
T,1,15,V,529,252,0,2,2,2,B,L,0,0,0 |  
T,2,15,V,511,252,0,2,2,2,B,L,0,0,0 |  
B,3,13,V,311,28,8,4,50,8,L,0 |  
B,4,14,V,17,60,50,5,110,8,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,545,160,0,2,2,2,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,368,270,0,2,3,2,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) " } }

Sample Batch Packet

{B,1,N,1 }
1,"123456789" }
2,"987654321" }
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,"9999991-001" }
13,"AR" }
14,"999-999999-99" }
15,"32678" } }

FROM: HOMMACH MARKING SYSTEMS 170 HOMMACH LANE P.O. BOX 608 DAYTON, OH 45401	CARRIER: ROADWAY PRO NUMBER: 123456789 B/L NUMBER: 987654321
TO: RODGER DIST CTR #8292 555 WEST OAK AVE. DAYTON, OH 45401-0608	
SHIP TO POSTAL CODE (420) 32678 	APPOINTMENT NUMBER: 999991-001 ORDER TYPE: AR ITEM: 999-999999-99
SPEC SHIPPING CONTAINER CODE 1 00 28028 66285 4 	

Sample Bitmap Graphic Image

The following format shows the graphic packets (hex and run length) in a sample format.

```
{F,2,A,R,E,400,400,"FMT2" |  
G,99,227,35,0,0 |  
Q,240,15,300,125,10," " |  
T,1,5,V,285,137,0,10,2,2,B,L,0,0,0 |  
T,2,5,V,255,137,0,10,2,2,B,L,0,0,0 |  
T,3,15,V,180,25,0,10,1,2,B,L,0,0,0 |  
T,4,15,V,121,35,0,1,3,1,B,L,0,0,0 |  
L,S,94,15,94,235,10," " |  
B,5,12,F,50,65,1,2,40,1,L,0 | }
```

Sample Batch Packet

```
{B,2,N,1 |  
1,"Pat's" |  
2,"Parts" |  
3,"3/8 inch Wire" |  
4,"3.55/8 Pack" |  
5,"345911871209" | }
```



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.

This chapter also lists some special printing considerations.

Turn on the printer and make sure it is ready to receive data before you download. See your host's documentation, system administrator, or "Downloading Methods" for information on ways to download.

When downloading, send your packets in this order:

1. Memory configuration packet (M)
2. Configuration packets (A-G)
3. Any of the following:
 - ◆ Check digit packets (see Chapter 4)
 - ◆ Format packets (see Chapter 3)
 - ◆ Graphic packets (see Chapter 5)
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 2 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.

Refer to the *Operator's Handbook* or *Keypad Operating Instructions* for offline data entry and more printing information.

Defining the Batch Header

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.

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.

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."

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

B1. B Batch Header.

B2. format# Format number: **0-999** (**0-99** for 9403) 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,cut_type,cut_mult }

E1. E Batch Control Field.

E2. feed_mode Feed Mode. Options:

0	Continuous Feed (default)
1	On-demand

E3. batch_sep Batch Separator (striped label in between batches). Options:

0	Does not print a separator (default)
1	Prints a separator
2	Double-length separator- prints 2 tags (9850)

NOTE: Do not use batch separators with continuous (non-indexed) supply. If using a stacker, the batch separator is always 3.66 inches long.

E4. print_mult Number of tags with the same image. 0 is the default.

1 to 999

E5. multi_part Number of identical parts on one tag. 0 is the default.

1 to 5

E6. cut_type

Enables or disables the knife. Options:

- 0** Does not cut (default)
- 1** Cuts before first tag, cuts each tag, and cuts after last tag. (9850)
- 2** Cuts before first tag, cuts after batch. Cuts in strips, not each tag. (9850)
- 3** Cuts before first tag, cuts each tag, cuts after the last tag and feeds one or two tags past the printhead when it cuts the last tag in the last batch. (9850)
- 4** Does not cut before the first tag in a batch, but cuts between each tag and after the last tag in the batch. Press **Feed** to feed the last tag out far enough to be cut. The last tag is queued to be cut once it reaches the knife. (9850)

NOTE: If you choose cut after batch or last tag in last batch, the last tag in the batch is cut. However, there may be one or two tags left between the printhead and the knife, because the knife is two-and-a-half inches away from the printhead.

E7. cut_mult

Number of tags to print before cutting. A cut multiple of one cuts after each tag. The range is 0 to 32,000. 0 is the default.

The cut multiple is a multiple of the print quantity. If the cut multiple is three and the print quantity is 16, then five sets of three tags and one set of one tag is produced.

NOTE: The last tag in the batch is always cut, regardless of the multiple.
Only the 9850 printer supports an optional knife, which must be purchased separately.

Example

E, 0, 1, 4, 2, 1, 4 ;

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. The knife cuts after every four tags.

Defining Batch Data 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	<code>field#,"data string" | C,"continuation" |</code>
<i>field#</i>	Identifies the text, bar code, or non-printable text field in which to insert the following data. Range: 0 - 999 (0 - 99 for 9403).
<i>"data string"</i>	Provides the actual information to appear in fields. Enclose in quotation marks. Range: 0 - 2710 (0 - 100 for 9403).
<i>C</i>	Identifies information to be appended to the data string. (This parameter is optional.)
<i>"continuation"</i>	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	<code>1,"Size 12" | 2," " | 3,"Blue" | C,"and this would be appended." |</code>
----------------	---

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 characters is ignored. You can also use ~XXX where XXX is the decimal equivalent or 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.

9850 Special Printing Considerations

Keep in mind the following special printing considerations when using a 9850 printer.

Print Speed	Printing	Printhead Density	Knife	Peel Mode
2.5/4.0/6.0 ips	direct transfer	203/300 dpi	supported	supported
8.0 ips	direct transfer	203/300 dpi	not supported	supported
10.0 ips	direct transfer	203 dpi only	not supported	not supported
12.0 ips	direct transfer	203 dpi only	not supported	not supported

* The 9850 minimum label feed length is 0.75 inches using 8, 10, or 12 ips printing. 94x5 emulation is not supported using 300 dpi. The maximum supply and image length with the optional 300 dpi printhead is 12.0 inches (305 mm). The recommended print speed using the optional verifier is 6.0 ips. Contact your Monarch Representative for supply requirements in high temperature and high humidity environments.

9850 Serial Bar Code Printing Information

Keep in mind the following serial bar code printing information when using a 9850 printer.

Print Speed	Printhead Density	Minimum Bar Code Narrow Element
2.5 ips	203/300 dpi	less than 3 dots
4.0 ips	203 dpi	3 dots
6.0/8.0/10.0 ips	203 dpi	4 dots or more

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 9 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

7


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 .

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:  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:  ??

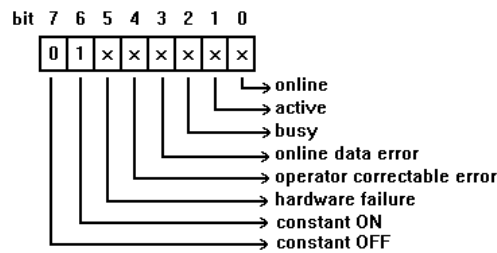
Indicates that this is the first ENQ response since the printer was turned on. Send another ENQ immediately to receive the printer's status.

Example:  @@

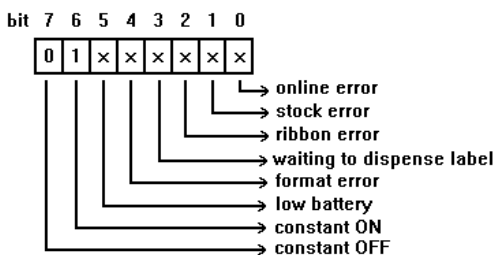
Indicates the printer is offline.

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
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 #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	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	1	0	1	1	0	0
m	0	1	1	0	1	1	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
x	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.

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	1	0	1	1	0	0
m	0	1	1	0	1	1	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
x	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.

You may need to press **ENTER** or **FEED/CUT**,
depending on your printer before the job
response is returned.

To clear an error, press **ENTER** or **ESCAPE/CLEAR**, depending on your printer. 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.

The following syntax is the response for a Job 3 request. You may need to press **ENTER** or **FEED/CUT**, depending on your printer before the job response is returned.

Syntax {J, "Status1 A,B", "Status2
A,B,C,D,E", "FMT-1", "BCH-2" }

"Status1 A,B" Status1 A contains the field number, in the format or batch, where an error was found. If the error is not in the format or batch, a "0" is returned.

 Status1 B contains an error number, which represents the actual printer error. The error numbers can be found in Chapter 8, "Diagnostics and Errors."

Example {J, "2,612", }

2 is the field number where an error was found. **612** is the error number, indicating that data is missing or does not match the format definition for that field.

Error numbers found in Status1 B, always have a value equal to or greater than 500. These are considered very serious errors.

"Status2 A,B,C,D,E" contains the packet type, field type, field number, parameter, and error number.

Status2 represents the MPCLII packet that the error occurred on. The packet could be Format (**F**),
A- Packet Type Batch (**B**), Check Digit (**A**), Graphic (**G**), or
 Font (**W**).

Status2 B- Field Type	represents the MPCLII field that the error occurred on. If the packet has no fields, Status2 A will be replicated. If the error occurs before the field is identified a question mark is sent. Since the batch data is variable, a D is sent to indicate data.
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 8, "Diagnostics and 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 , 3 3 " , " 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 **ENTER** or **ESCAPE/CLEAR**, depending on your printer. 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

Status Polling Considerations for Script Mode

This information only applies to 9825 and 9850 printers running scripts.

The following table shows the effects of the **I Packet** and the 9825 or 9850 printer's front panel on status polling and immediate commands.

	I Packet Printer Configuration Packet (inside the script or sent online to the printer)	While Running in Script Mode ONLY (set through printer's front panel)	
		Disabled	Enabled
Status Polling	OFF (status polling not enabled by I packet)	OFF (status polling not enabled through printer's front panel)	OFF (status polling enabled through printer's front panel)
	ON (status polling enabled by I packet)	OFF (status polling not enabled through printer's front panel)	ON (status polling enabled through printer's front panel)
Immediate Commands	OFF (immediate commands not enabled by I packet)	OFF (immediate commands not enabled through printer's front panel)	OFF (immediate commands enabled through printer's front panel)
	ON (immediate commands enabled by I packet)	OFF (immediate commands not enabled through printer's front panel)	ON (immediate commands enabled through printer's front panel)

If status polling and immediate commands are NOT enabled through the **I Packet**, enabling status polling and immediate commands at the printer's front panel has NO effect.

DIAGNOSTICS AND ERRORS

8

This chapter explains how to

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

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

This chapter also 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 the *Operator's Handbook*.

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 **ENTER** or **ESCAPE/CLEAR**, depending on your printer. If a formatting error occurs, the label prints; but data may be missing. Correct the format or batch and resend them to the printer. If a data error occurs, press **FEED/CUT** to queue and print an error label.

An error label is not available on
the 9403 printer.

Printing a Test Label

1. From the User Diagnostics menu, press **the right arrow** until you see

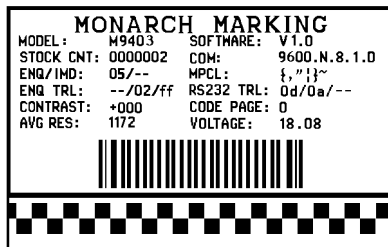
USER DIAG
Test Label

2. Press **ENTER (ENTER/PAUSE)**. The 9825 and 9850 printers print the test labels shown below.

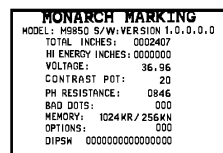
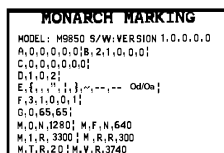
On the 9403 printer, you will see

Print Quantity?
[1/999]: +1

3. Type the quantity of test labels you want to print. Press **ENTER**. You will see



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.



Reading a Test Label

The 9825/9850 first label shows the printer's configuration by packet (A-M). See Chapter 2, "Configuring the Printer," for more information. The lines beginning with **M** show the printer's memory allocation, which can be changed. The units for supply position, etc. are displayed in dots, even if you entered them in English or Metric units.

The second label shows the model number, software version, total number of inches printed, number of inches printed by current printhead, voltage, print contrast, printhead resistance, number of bad dots, and installed options (see the following table). The test label for the 9850 printer shows an inch count for the high energy ribbon. The one-dot rule line at the bottom of the test label indicates the vertical 0,0 point.

Installed Options	Description
C	Cutter (Knife)
M	256K memory expansion
P	Peel mode
R	RS-232 option (Keypad)
S	Stacker
V	Verifier

If You Receive an Error Message

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. 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:

- ◆ Check any messages that occur at the printer and at the computer. See the following error message listing in this chapter for more information.
- ◆ 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 15 seconds, and turn it back on.

When you turn off the printer, all the information set through the online configuration packets (A-M) is saved. See the sections in Chapter 2, "Configuring the Printer," for more information about each packet.

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."

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, and printer serial number.

Additional Diagnostics Information

For detailed printer diagnostics information, refer to the *Quick Reference* or *Operator's Handbook*. See Chapter 7, "Status Polling," for information on requesting printer and job status. See the following error message listing in this chapter for more information.

Reading an Error Label

An error label queues and prints on the 9825/9850 printers when you press **FEED/CUT** after a data error (0-499) occurs. **An error label is not available on the 9403 printer.** The error label contains the packet type, field type, line number, and error number. The packet and field type return the first letter after the { or |. A "?" is returned if the letter cannot be determined. The line number refers to which line in the packet the error occurs. The error number is the three-digit error code. Use this information to correct the format, batch, font, check digit, graphic, or online configuration packet.

```
MONARCH MARKING
MODEL: M9825  S/W: Version 1.0
FORMAT NAME : 40200
BATCH NAME  :
PACKET TYPE : F
FIELD TYPE  : C
LINE #      : 8
ERROR #     : 18
```

```
MONARCH MARKING
MODEL: M9825  S/W: Version 1.0
FORMAT NAME :
BATCH NAME  : Bch14002
PACKET TYPE : B
FIELD TYPE  : B
LINE #      : 1
ERROR #     : 101
```

The first label shows an error in line 8, which is a constant text field within the format packet. The error number is 18.

The second label shows an error in line 1 of the batch packet. The error number is 101.

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, font, or graphic 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 3 for valid lengths.
005	Supply width is invalid. See "Defining the Format Header" in Chapter 3 for valid widths.
006	Storage device must be F (Flash), R (volatile RAM), or T (temporary for graphics).
007	Unit of measure must be E (English), M (Metric), or G (Dots). See "Defining the Format Header" in Chapter 3 for information.
010	Field ID number is outside the range 0 to 999 or 0 to 99 depending on your printer.
011	Field length exceeds 2710 or 100 depending on your printer.
012	Row field position is greater than the maximum stock dimension. See "Defining Text Fields" in Chapter 3 for valid row lengths.
013	Column field position is greater than the maximum stock dimension. See "Defining Text Fields" in Chapter 3 for valid column widths.
014	Font style must be 1, 2, 3, 4, 10, 11, 15, 16, 17, 18, or 50 . See "Defining Text Fields" in Chapter 3 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 3 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 3 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), **100** (Macintosh), **101** (Wingdings), **102** (UNICODE), **103** (BIG5 for UNICODE), **104** (GB2312 for UNICODE), **105** (SJIS for UNICODE), **106** (GB2312), **107** (BIG5), **437** (DOS Page 437), **850** (DOS Page 850), **852** (Latin 2), **855** (Russian), **857** (Turkish), **860** (Portuguese), **1250** (Latin 2), **1251** (Cyrillic), **1252** (Latin 1), **1253** (Greek), **1254** (Turkish), **1255** (Hebrew), **1256** (Arabic), **1257** (Baltic), or **1258** (Vietnamese).
- 020 Vertical magnification must be **1** to **7** or **4** to **255** for the scalable or downloaded TrueType fonts.
- 021 Horizontal magnification must be **1** to **7** or **4** to **255** for the scalable or downloaded TrueType fonts.
- 022 Color must be **A**, **B**, **D**, **E**, **F**, **N**, **O**, **R**, **S**, **T**, or **W**. See "Defining Text Fields" in Chapter 3 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 3 for more information.
- 025 String length is outside the range **0** to **2710** or **0** to **100** depending on your printer.
- 030 Bar code height must be at least **19** (English), **48** (Metric), **38** (203 Dots), **57** (300 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 3 for valid options.
- 033 Bar code density is invalid. See "Defining Bar Code Fields" in Chapter 3 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 3 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**. Only valid for printers with a knife.
- 108 Multiple part supply is outside the range **1** to **5**.
- 109 Cut type is outside the range **0** to **4**.
- 200 Option number must be **1, 2, 3, 4, 5, 20, 30, 31, 42, 50, 51, 52, 60, or 61**.
- 201 Copy length is outside the range **0** to **2710** or **0** to **100** depending on your printer.
- 202 Copy start position must be **1** to **2710** or **1** to **100** depending on your printer.
- 203 Destination start position must be **1** to **2710** or **1** to **100** depending on your printer.
- 204 Source field must be **0** to **999** or **0** to **99** depending on your printer.
- 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** or **0** to **100** depending on your printer.
- 208 Incrementing end position must be **0** to **2710** or **0** to **100** depending on your printer.
- 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 **16**.
- 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) or **1** (offline).
- 252 Language selection must be **0** (English), **1** (French), **2**
(German), **3** (Spanish).
- 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), **2** (non-indexed), or **3** (aperture).
- 256 Ribbon selection must be **0** (direct), **1** (transfer) or **2** (High Energy).
- 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 2 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), **20** (2.0 ips), **25** (2.5 ips), **40** (4.0 ips), **60** (6.0 ips), **80** (8.0 ips), or **10** (10.0 ips).
- 263 Primary monetary symbol is invalid. See "Defining the Monetary Formatting Packet" in Chapter 2 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), **5** (38400), **6** (57600), or **7** (115200). 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), **3** (DOS 850), **4** (1250- Latin 2), **5** (1251- Cyrillic), **6** (1252- Latin 1), **7** (1253- Greek), **8** (1254- Turkish), **9** (1255- Hebrew), **10** (1256- Arabic), **11** (1257- Baltic), **12** (1258- Vietnamese), **13** (852- Latin 2), **14** (855- Russian), **15** (857- IBM Turkish), **16** (860- DOS Portuguese), **17** (Wingdings), **18** (Macintosh), **19** (UNICODE), **20** (BIG5), **21** (GB), **22** (SJIS to SJIS), **23** (GB to GB), **24** (BIG5 to BIG5), or **25** (KSC to KSC).
- 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) or **R** (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** depending on your printer) dots in duplicate fields for graphics.
- 328 Duplicate count must be **0 to 999** (**0 to 99** depending on your printer).
- 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** (or **100** depending on your printer) 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 printer's menu. Resend the format, graphic, and check digit packets. If the error reappears, call Technical Support.
- 420 Internal software list error. Call Technical Support.
- 421 Internal software list error. Call Technical Support.
- 422 Duplicate internal name. Call Technical Support.
- 423 Internal software list error. Call Technical Support.
- 424 Internal software list error. Call Technical Support.

- 425 Internal software list error. Call Technical Support.
- 426 Internal software list error. Call Technical Support.
- 427 Format name is invalid. Valid name is **1 - 8** characters inside quotes or "" for a printer-assigned name. Press **ENTER** or **ESCAPE/CLEAR**, depending on your printer and try to continue. If the error reappears, call Technical Support.
- 428 Batch name is invalid or graphic not found. Press **ENTER** or **ESCAPE/CLEAR**, depending on your printer 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 571-622, 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. Resend the graphic packet. If the error persists, call Technical Support. |
| 600 | The printer could not image the batch, because the batch was refused. Call Technical Support. |
| 601 | An error occurred while imaging the batch. Resend the format, batch, font, and/or any graphic packets. If the error persists, call Technical Support. |
| 603 | The batch was not found while imaging. Resend the batch packet. If the error persists, call Technical Support. |

- 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 A bad dot falls on a bar code and the dot cannot be shifted. A gray box is printed instead of the bar code. However, 2D bar codes still print on the 9825/9850 printers when bad dots are present within the bar code field.
- 618 Magnification must be **1** to **7** or **4** to **255** for the scalable font.
- 619 The JIS (16-bit) code for Kanji is invalid.
- 620 Font and printhead dot density mismatch. A 300 dpi font is specified in the format, but a 203 dpi printhead is used in the printer or vice-versa. Check the font or change the printhead to correct the error.
- 621 An error occurred opening the TrueType font file. Select a different font to download. If the error message persists, call Technical Support.
- 622 Not enough memory to create the downloaded TrueType characters in the scalable (vector) fonts buffer. Reconfigure the printer's memory and increase the scalable (vector) fonts buffer. Resend the font, format, and batch packet after reconfiguring the memory. See

"Reconfiguring Memory" for more information. If the error message persists, call Technical Support.

Machine Faults

These errors 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 **ENTER** or **ESCAPE/CLEAR**, depending on your printer. 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 **ENTER** or **ESCAPE/CLEAR**, depending on your printer 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 **ESCAPE**, **FEED/CUT**, or the **up arrow** (9403) to print on the current supply or load new supply and press **ENTER/PAUSE**.
- 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 **ENTER** or **FEED/CUT**, depending on your printer.
- 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 8 bad dots (4 dots for 9403/9850 printers). The printer can shift bar code fields to avoid bad dots. You may need to press **ESCAPE/CLEAR** to continue printing. Print a test label to confirm the number of bad dots.
- 768 Printhead has more than 30 bad dots (10 dots for 9403/9850 printers) or is not connected. Make sure the printhead is connected.
- 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.
- 850 Invalid script packet or not enough flash memory for the script. The script download failed. Format flash memory and download the script using the COPY command from DOS or the ADK2 software.
- 851 Invalid lookup table or not enough flash memory for the script. The lookup table download failed. Check the data in the lookup table. Format flash memory and download the script using the COPY command from DOS or the ADK2 software.

- 852 Invalid buffer definition packet or not enough flash memory for the script. One or more of the following buffers were invalid: input buffer, temporary buffer, lookup buffer, printer, or array buffer. Check the buffer definitions. Format flash memory and download the script using the COPY command from DOS or the ADK2 software.
- 853 Invalid version string or not enough flash memory for the script. The version information in the APPVERSION command is missing or invalid. Make sure the information is enclosed in double quotation marks. Format flash memory and download the script using the COPY command from DOS or the ADK2 software.
- 854 Invalid table (string and numeric) data or not enough flash memory for the script. Check the data. Format flash memory and download the script using the COPY command from DOS or the ADK2 software.
- 855 Invalid start/clear command. The script is missing the start or clear command **{S space}**.
- 856 Invalid quit command. The script is missing the quit command **{Q space}**.
- 857 Illegal command in the script. Your script may include commands that have been removed from the ADK2 scripting language.
- 858 Check sum error. Each packet has a four-digit checksum at the beginning of the packet. Compile the script again using the ADK2 software.
- 859 Script download buffer overflow. The image buffer is used as the SCRATCH buffer. Increase the size of the image buffer.
- 900 RAM test failure.
- 901 ROM/EPROM checksum failure.

902	Software timer failure.
903	Software interrupt failure.
905	Illegal interrupt.
906	Non-maskable interrupt. Check format packet for font clear or format clear packets.
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.

When a HARD failure (errors 900-999) occurs on the printer, the printer displays **WARNING** or **POWER DOWN** on the top line of the keypad display.

If this happens, record the displayed message and turn off the printer. If the problem reoccurs when you turn the printer on again, call Technical Support.

If the problem does not reoccur after you turn your printer on again, reset your printer's SETUP options. Retransmit your packets.

**Printer
Display****Description**

WARNING
RAM Test Failure

RAM check failed on power up. Reset your SETUP options. Transmit your packets again.

POWER DOWN
ROM Sum Failure

ROM checksum test failed.

POWER DOWN
Timer Failure

Timer test failed.

POWER DOWN
Intr Test Failure

Interrupt test failed.

POWER DOWN
Low System RAM

Not enough RAM for system. Reset your SETUP options. Transmit your packets again.

POWER DOWN
Illegal Intr#

Illegal interrupt occurred.

POWER DOWN
NMI Received

Non-maskable interrupt occurred. Reset your SETUP options. Transmit your packets again.

POWER DOWN
Low Appl RAM

Not enough RAM for application. Reset your SETUP options. Transmit your packets again.

POWER DOWN
NVRAM Sum Fail

RAM checksum test failed. Reset your SETUP options. Transmit your packets again.

POWER DOWN
RAM Corrupt

Item storage RAM failed. Reset your SETUP options. Transmit your packets again.

This chapter provides information on how to improve your printer's performance by

- ◆ adjusting the print quality
- ◆ reducing the imaging time for printing
- ◆ providing general tips and hints for designing formats.

This printer uses "smart imaging" to image and print fields on supplies. Smart imaging remembers the exact boundaries and locations of each field and places a boundary box (white space) around each field. When a field changes that particular boundary box is cleared and the new field data is imaged. However, the new field data may require a larger boundary box than the previous field did. In some cases, neighboring fields that do not change may be covered with white space from the changing field's boundary box. To prevent existing fields from being covered by a changing field, see "Option 61 (Reimage Field)" in Chapter 4.

Smart imaging is automatically disabled on formats with a Data Matrix bar code.

Adjusting the Print Quality

Many factors affect print quality: type of supplies, print speed, print contrast, and the type of printer's application. This printer supports both thermal transfer and thermal direct supplies. The type of supply should match the printer's application.

- ◆ If you want to print at high speeds, you should use premium supplies. Using premium supplies reduces smudged images, hard to read labels, and faded print. Supply type, print speed, and print contrast work together to improve the print quality of labels. Contact your Monarch Representative for more information.

- ◆ Select the print speed based on desired throughput and print quality. If print quality is more important, reduce the print speed, because a lower print speed increases the print quality of labels. If throughput is more important, increase the print speed as high as it will go to give you the needed print performance. See "Increasing Throughput" for more information.
- ◆ If the print quality is too light or too dark, adjust the print contrast. The correct contrast setting is important because it effects how well your bar codes scan and how long the printhead lasts.

Be sure to check the print quality of bar codes with a bar code verifier or scanner. If you do not have a verifier or scanner, check the bar code visually. A bar code that is **IN SPEC** will have complete bars and clear spaces. Small alphanumeric characters will look complete. A bar code that is **IN SPEC** may not look as good as one that is too dark, but it will have the highest scan rate.

MONARCH MARKING



DAYTON, OHIO

Dark

MONARCH MARKING



DAYTON, OHIO

IN SPEC

MONARCH MARKING



DAYTON, OHIO

Light

For highest scan rates, make sure there is adequate white space before and after the bar code. Also, a darker bar code does not mean it will scan better.

- ◆ When designing formats, keep in mind the following non-print zones on the 9403 printer.

Top and Bottom	.035 inches
Left and Right Edges	.10 inches

The following non-print zones are *recommended* for the 9800 series printers:

All Supplies	.050 inches on either edge of the label.
All Supplies	.020 inches at the end of the label.

If using the optional verifier, allow a minimum no-scan zone at the top of the label of 1.3" (33 mm) for speeds 6.0 ips or less; 1.8" (46 mm) for 8.0 ips; and 2.2" (56 mm) for 10.0 ips.

Reducing Imaging Time

Imaging time is the time it takes the printer to image the data for the first label after the printer receives the format and batch packet. There are several ways to reduce the imaging time: send formats and configurations once, use a batch quantity of zero, or update batch fields.

- ◆ If the formats use the same check digit scheme, you only need to send the check digit scheme once.
- ◆ Send formats once and use the batch update field to change information on the label. Using a batch update field reduces the imaging time, because only the fields that change are imaged. All other fields remain the same as the last queued batch.
- ◆ 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 pre-image a label:

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).

Example {B,1,N,0 | }

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

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

Example {B,1,U,0 |
1,"RODGER DIST CTR" | }
 {B,1,U,0 |
2,"8292" | }

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.

 {B,1,U,0 |
3,"BROADWAY" | }
 {B,1,U,0 |
4,"555 WEST OAK AVE." | }

4. For the last field, input data and send it with the quantity of labels you want printed. When the printer receives input for the last field, it immediately prints the labels.

Example {B,1,U,10 |
5,"DAYTON, OHIO" | }

Increasing Throughput

Reducing the imaging time increases throughput. You can also increase the baud rate to increase the transmission time and increase throughput. Make sure the communication settings at the printer match those at the host. Using a baud rate of 19200 is almost twice as fast as 9600 baud. Using a baud rate of 38400 is almost twice as fast as 19200 baud.

General Format Tips and Hints

The following tips and hints are helpful to keep in mind when designing MPCLII formats.

With Formats

- ◆ If you want to modify your format fields, check digit fields, and configuration commands, use the 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.

With Packets

- ◆ Leave parameters blank that you do not need to change when sending online configuration packets. For example, `{I,A, , , 1 }` prints a slashed zero and uses the last sent *online* system setup parameters.

You can group fields with similar parameters. For example

```
T,1,10,V,250,50,1,1,1,1,B,C,0,0 !  
T,2,15,,,75 !  
T,3,,,,100 !
```

The first text field sets all the parameters for that field. The second text field's number of characters and column location changes from what was defined in the first field. In the third text field, only the column location is changed. This method can be used on bar code and constant text fields as well.

You should understand the basics of each
field before using this method.

After you modify any fields or parameters with the optional entry method, resend the format, batch, or configuration packet to the printer.

With Bar Codes

- ◆ Be careful when rotating or placing a UPC/EAN bar code with human readable characters, because the bottom reference point is at the bottom of the bars, **not** at the bottom of the human readable characters.

With Fields

- ◆ Data that remains the same for each label should be in a constant text field. Data that varies for each label should be in a text field.
- ◆ Check for trailing spaces in text or constant text fields if you receive a "field off tag" error. An easy way to see trailing spaces is to print the field in the reverse font.
- ◆ Make sure if you magnify a field, it does not go off the label or cover another field. Magnifying a field increases the distance between the printed character and the edge of the cell.

SAMPLES



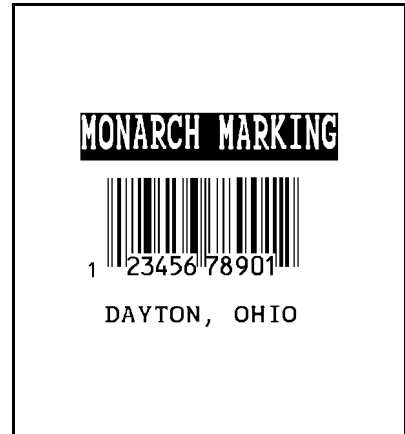
This appendix contains sample formats. You can customize any of these formats to meet your needs.

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.

The printers support Modes 0, 1, 2, and 3. Contact Monarch for information about additional MaxiCode modes.

Mode	Description
0	Obsolete
1	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. Use these updated format and batch packets with the following firmware:

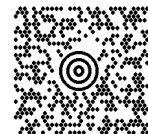
- ◆ 9403 1.0 or greater
- ◆ 9825 1.0 or greater
- ◆ 9850 1.0 or greater

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" |
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 (empty)
Package count
Weight (lb.)
Address validation
Street address (empty)
City (empty)
State
EOT



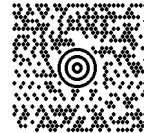
Mode 2 Sample

```
{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" |  
C,"CT~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 (empty)
Package count
Weight (lb.)
Address validation
Street address (empty)
City (empty)
State
EOT

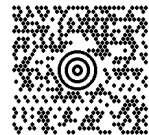


Mode 3 Sample

```
{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 (empty)
Package count
Weight (lb.)
Address validation
Street address (empty)
City (empty)
State
EOT



Sample Data Matrix Packets

Data Matrix (ECC-200) is a two-dimensional bar code which is made up of square modules arranged within a perimeter finder pattern. There are 24 square symbol sizes available ranging from 10 rows by 10 columns to 144 rows by 144 columns. There are six rectangular symbol sizes available ranging from 8 rows by 8 columns to 16 rows by 48 columns. The symbol size is data dependent. Data Matrix automatically pads data.

The Data Matrix bar code is only available on the 9825 and 9850 printers.

Make sure you do not overlay other fields when designing your Data Matrix symbol. Smart imaging is automatically disabled on formats with a Data Matrix bar code. You should also allow a 3 or 4 dot "quiet zone" (blank space around the bar code's perimeter) for scanning. See "Defining a Bar Code Field" for more information.

Square Data Matrix Packet

```
{F,36,A,R,E,400,400,"DTMTRX1" |  
B,1,50,V,50,100,35,0,100,8,L,0 | }
```

```
{B,36,N,1 |  
1,"1234567890ABCDEFGHIJKLMNQRST" | }
```



This example prints a one-inch wide by one-inch tall (100) square Data Matrix symbol using the default density (0) without any field rotation (0).

Rectangular Data Matrix Packet

```
{F,36,A,R,E,400,400,"DTMTRX2" |  
B,1,400,V,100,200,35,29,50,8,L,1 | }
```

```
{B,36,N,1 |  
1,"1234567890ABCDEFGHIJKLMNQRST" | }
```



This example prints a one-inch by a half-inch tall (**50**) rectangular 16 rows by 36 columns (**density 29**) Data Matrix symbol rotated 90 (**1**).

Sample Quick Response Packets

Quick Response (QR Code) is a two-dimensional bar code, which is made up of square modules arranged in an overall square pattern. A unique finder pattern is located at three corners of the symbol. Four levels of error correction are available, along with a wide range of symbol sizes. The 9850 and 9825 printers support both models of QR Code:

- ◆ Model 1 is the original specification.
- ◆ Model 2 is an enhanced form that includes additional features.

The maximum number of characters depends on the type of characters entered for the batch data and differs for the two models of QR Code.

Data Type	Model1	Model2
Numeric data	1167	2710
Alphanumeric data	707	2710
8-Bit data	486	2710
Kanji data	299	1817

QR Code can accommodate Japanese *Kana* and *Kanji* characters and has a variety of applications, including marking spark plugs, radiators, printed circuit boards, and test tubes. Refer to the *AIM International Symbology Specification* for more details about data requirements.

Entering Batch Data for QR Code

QR Code requires certain parameters at the beginning of all batch data.

Syntax "error_cor mask# data_input, char"

error_cor Level of error correction. Some damaged bar codes may still be scannable if the error correction is high enough. Options:

- H** Ultra high reliability level
- Q** High reliability level
- M** Standard level
- L** High density level

NOTE: As you increase the error correction level, the maximum number of characters (in the field) decreases.

mask# Mask number. Undefined. Leave blank or use 0.

data_input Type of data input. Options:

- A** Automatic
- M** Manual

char Type of characters. Options:

- A** Alphanumeric
- B** Binary
- K** Kanji
- N** Numeric

NOTE: In binary mode, the number of characters must be represented by the 4-digit number in decimal.

Example 1, "HM,N0123456789012345" | }

Defines the following batch data for the QR Code: The error correction level is **H**, which provides very high reliability. Leave the mask number blank. The data input mode is **Manual**. The type of characters are **Numeric** and the data is **0123456789012345**.

QR Code Packet

```
{F,1,A,R,E,200,200,"QRCODE" |  
B,1,200,V,50,50,36,0,100,2,B,0 |}  
{B,1,N,1 |  
1,"HM,N0123456789012345" |}
```



Structured Append Mode

QR Code offers a mode called structured append (or concatenated) that allows you to collect data from multiple QR Code symbols and use that data elsewhere. For example, the components of a sub-assembly can have individual QR Codes and the QR Code for the entire assembly contains all the data from the individual codes. This mode also requires certain parameters at the beginning of all batch data.

Syntax	<i>"mode_id code# #of_div parity, error_cor mask# data_input char"</i>								
<i>mode_id</i>	Mode identifier. Use D to indicate the structured append (or concatenated) mode.								
<i>code#</i>	Code number of the individual symbol in the concatenated set. You must use a two-digit number in decimal.								
<i>#of_div</i>	Total number of symbols in this concatenated set. You must use a two-digit number in decimal.								
<i>parity</i>	Parity byte. You must use a two-digit number in hexadecimal. There is no standard parity byte.								
<i>error_cor</i>	Level of error correction. Some damaged bar codes may still be scannable if the error correction is high enough. Options: <table><tr><td>H</td><td>Ultra high reliability level</td></tr><tr><td>Q</td><td>High reliability level</td></tr><tr><td>M</td><td>Standard level</td></tr><tr><td>L</td><td>High density level</td></tr></table>	H	Ultra high reliability level	Q	High reliability level	M	Standard level	L	High density level
H	Ultra high reliability level								
Q	High reliability level								
M	Standard level								
L	High density level								
	NOTE: As you increase the error correction level, the maximum number of characters (in the field) decreases.								
<i>mask#</i>	Mask number. Undefined. Leave blank or use 0.								

data_input Type of data input. Options:
 A Automatic
 M Manual

char Type of characters. Options:
 A Alphanumeric
 B Binary
 K Kanji
 N Numeric

NOTE: In binary mode, the number of characters must be represented by the 4-digit number in decimal.

Example 1, "D0205E9,Q0A," |
 C, "B006qrco de," | }

Defines the structured append mode (**D**) for QR Code. This is symbol (**02**) of a concatenated set containing (**05**) symbols. The parity byte is **E9**. The error correction level is **Q**, which provides a high reliability. Use **0** for the mask number. The data input mode is **Automatic**. The type of characters are binary (**B**) and there will be six (**06**) data characters (**qrco de**).

Structured Append QR Code Packet

```
{F,2,A,R,E,200,200,"QR CODE2" |
B,1,200,V,50,50,36,0,100,2,B,0 | }
{B,2,N,1 |
1,"D0202E9,Q0A" |
C,"0123456789ABCD+___â&u~129~064~159~252~224~064" | }
```



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,"~20142032678" |  
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, OH 45401

CARRIER:

BROADWAY

PRO NUMBER: 1234567890

B/L NUMBER: 0987654321

TO: RODGER DIST CTR #8292

555 WEST 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

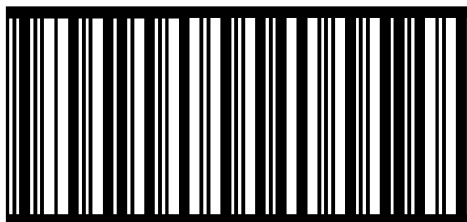
WYSIWYG

WELCOMES GUEST #99999

TO A PRODUCT DEMO

UPC SHIPPING CONTAINER CODE

1 00 28028 66285 4

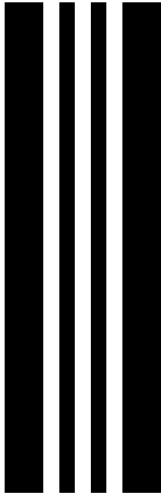
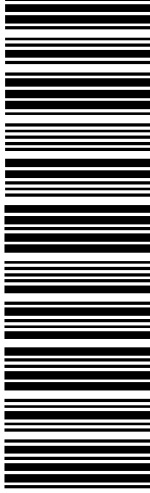


Sample Format Packet

```
{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

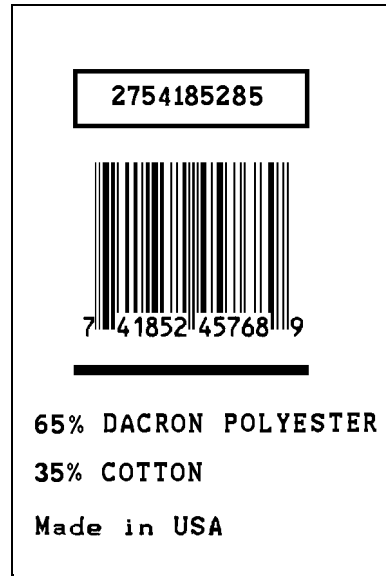
```
{B,5,N,0 | }  
{B,5,U,1 |  
1,"6005710" |  
2,"106" |  
3,"3" |  
4,"3" |  
5,"ALLIED FREIGHT1234" |  
6,"123456789012" |  
7,"P" |  
8,"10650337" |  
9,"0" |  
10,"VIC" |  
11,"1/6/94" |  
12,"106503378" | }
```

	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		

Sample Data Entry Format Packet

This packet for the 9403, 9835, or 9840 printers use Options 5 (Data Entry Sources) and 20 (Data Entry Prompts). After the printer receives the format packet, the operator can go into Batch Entry Mode at the printer and enter the batch data.

```
{F,1,A,R,E,300,200,"TEXTILES" |
T,1,10,V,250,50,0,1,1,1,B,C,0,0,0 |
  R,20,"PART NUMBER:" |
  R,5,K |
B,2,12,V,150,40,1,2,80,7,L,0 |
  R,20,"UPC NUMBER:" |
  R,5,K |
D,3,20 |
  R,20,"FIBER#1:" |
  R,5,K |
D,4,3 |
  R,20,"PERCENTAGE:" |
  R,5,K |
T,5,30,V,80,10,0,1,1,1,B,L,0,0,0 |
  R,1,"      %              " |
  R,4,3,1,20,5,1 |
  R,4,4,1,3,1,1 |
  R,5,N |
D,6,20 |
  R,20,"FIBER #2:" |
  R,5,K |
D,7,3 |
  R,20,"PERCENTAGE:" |
  R,5,K |
T,8,30,V,65,10,0,1,1,1,B,L,0,0,0 |
  R,1,"      %              " |
  R,4,6,1,20,5,1 |
  R,4,7,1,3,1,1 |
  R,5,N |
C,30,10,0,1,1,1,B,L,0,0,"MADE IN USA",0 |
L,S,110,30,110,150,10," " |
Q,240,30,270,150,3," " | }
```



Depending on the operator-entered batch data, a label similar to this one prints.

FONTS



Monarch® printers support two types of fonts: Bitmapped (traditional printer fonts such as Standard and Reduced) and Scalable/TrueType (Font 50). This appendix gives a brief overview of each type of font and how your printer interprets fonts. It also shows examples of the fonts loaded in your printer.

Number	Font Size and Appearance	Type of Spacing	# of Dots Between Characters
1	Standard	Monospaced	3 (203 dpi) 5 (300 dpi)
2	Reduced	Monospaced	1 (203 dpi) 2 (300 dpi)
3	Bold	Monospaced	3 (203 dpi) 5 (300 dpi)
4	OCRA-like	Monospaced	3 (203 dpi) 5 (300 dpi)
5*	HR1	Monospaced	2 (203 dpi) 3 (300 dpi)
6	HR2	Monospaced	1 (203 dpi) 2 (300 dpi)
10	CG Triumvirate Bold (9 pt. at 203 DPI) (8 pt. at 300 DPI)	Proportional	varies w/ each letter
11	CG Triumvirate (6 pt.)	Proportional	varies w/ each letter
15	7 pt. CG Triumvirate	Proportional	varies w/ each letter
16	9 pt. CG Triumvirate	Proportional	varies w/ each letter
17	11 pt. CG Triumvirate	Proportional	varies w/ each letter
18	15 pt. CG Triumvirate	Proportional	varies w/ each letter
50	EFF Swiss Bold	Scalable	varies w/ each letter
70	Paxar (15 pt.)	Proportional	varies w/ each letter
71	Paxar (18 pt.)	Proportional	varies w/ each letter
72	NAFTA (15 pt.)	Proportional	varies w/ each letter
73	NAFTA (18 pt.)	Proportional	varies w/ each letter

* Fonts 5 and 6 are for numeric data only. The 9403 printer supports only fonts 1, 2, 3, 4, 5, 6, 10, and 11. The CG Triumvirate fonts support only ANSI and DOS Code Page 437 and 850 Symbol Sets. The scalable font does not support Code Page 1256 (Arabic). The Euro-dollar symbol at position ~192 is only available in the Standard, Reduced, and Bold fonts.

These samples were printed using the Internal Symbol set.

Standard Font

ABCDEFGHIJKLM
NOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
nopqrstuvwxyz
0123456789:;<=>?
!"#\$%&'()*+,-./
[\]^_`{|}~Çüéääåä
çëèéíîïÀÁÂÃÄÖðóô
ùÿÖÜÇŔŖſáíóúñÑº;
--¼½;«»Øøαβ@TM--
\$£¥℥FPLKŔŖſŒWß¥

ABCDEFGHIJKLM
NOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
nopqrstuvwxyz
0123456789:;<=>?
!"#\$%&'()*+,-./
[\]^_`{|}~Çüéääåä
çëèéíîïÀÁÂÃÄÖðóô
ùÿÖÜÇŔŖſáíóúñÑº;
--¼½;«»Øøαβ@TM--
\$£¥℥FPLKŔŖſŒWß¥

Reduced Font

ABCDEFGHIJKLM
NOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
nopqrstuvwxyz
0123456789:;<=>?
!"#\$%&'()*+,-./
[\]^_`{|}~Çüéääåä
çëèéíîïÀÁÂÃÄÖðóô
ùÿÖÜÇŔŖſáíóúñÑº;
--¼½;«»Øøαβ--
\$£¥℥FPLKŔŖſŒWß¥

ABCDEFGHIJKLM
NOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
nopqrstuvwxyz
0123456789:;<=>?
!"#\$%&'()*+,-./
[\]^_`{|}~Çüéääåä
çëèéíîïÀÁÂÃÄÖðóô
ùÿÖÜÇŔŖſáíóúñÑº;
--¼½;«»Øøαβ--
\$£¥℥FPLKŔŖſŒWß¥

Bold Font

ABCDEFGHIJKLM
NOPQRSTUVWXYZ
0123456789@½
!"#\$%&'()*+,-
[\]^_`{|}~Çüéääåä
çëèéíîïÀÁÂÃÄÖðóô
ùÿÖÜÇŔŖſáíóúñÑº;
--¼½;«»Øøαβ@TM--
\$£¥℥FPLKŔŖſŒWß¥

ABCDEFGHIJKLM
NOPQRSTUVWXYZ
0123456789@½
!"#\$%&'()*+,-
[\]^_`{|}~Çüéääåä
çëèéíîïÀÁÂÃÄÖðóô
ùÿÖÜÇŔŖſáíóúñÑº;
--¼½;«»Øøαβ@TM--
\$£¥℥FPLKŔŖſŒWß¥

OCRA-like Font

ABCDEFGHIJKLM
NOPQRSTUVWXYZ
0123456789@
!"#\$%&'()*+,-./<>RŒWß¥
\$£¥℥FPLKŔŖſŒWß¥

ABCDEFGHIJKLM
NOPQRSTUVWXYZ
0123456789@
!"#\$%&'()*+,-./<>RŒWß¥
\$£¥℥FPLKŔŖſŒWß¥

These samples were printed using Code Page 437.

CG Triumvirate Bold Font

ABCDEFGHIJKLM
NOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
nopqrstuvwxyz
0123456789; < = > ?
!"#\$%&'()*+,-./_~
[] ^ ` { } ~ Ç ü é â á à å æ ø ö ð ù
ÿ Ö Ü ç Þ ß à í ó ú ñ Ñ º ¿
¬ ¬ ½ ¼ ¡ « » ¶ α β

ABCDEFGHIJKLM
NOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
nopqrstuvwxyz
0123456789; < = > ?
!"#\$%&'()*+,-./_~
[] ^ ` { } ~ Ç ü é â á à å æ ø ö ð ù
ÿ Ö Ü ç Þ ß à í ó ú ñ Ñ º ¿
¬ ¬ ½ ¼ ¡ « » ¶ α β

This is 7 point.

This is 9 point.

This is 11 point.

This is 15 point.

CG Triumvirate Font

ABCDEFGHIJKLM
NOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
nopqrstuvwxyz
0123456789; < = > ?
!"#\$%&'()*+,-./_~
[] ^ ` { } ~ Ç ü é â á à å æ ø ö ð ù
ÿ Ö Ü ç Þ ß à í ó ú ñ Ñ º ¿
¬ ¬ ½ ¼ ¡ « » ¶ α β

ABCDEFGHIJKLM
NOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
nopqrstuvwxyz
0123456789; < = > ?
!"#\$%&'()*+,-./_~
[] ^ ` { } ~ Ç ü é â á à å æ ø ö ð ù
ÿ Ö Ü ç Þ ß à í ó ú ñ Ñ º ¿
¬ ¬ ½ ¼ ¡ « » ¶ α β

CG Triumvirate Font (9pt.)

ABCDEFGHIJKLM
NOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
nopqrstuvwxyz
0123456789; < = > ?
!"#\$%&'()*+,-./~
[] ^ ` { } ~ Ç ü é â á à
ç è ê ì ï Ä Å Æ ø ö ð ù
ÿ Ö Ü ç £ ¥ Þ ß à í ó ú ñ Ñ º ¿
¬ ¬ ½ ¼ ¡ « » ¶ α β

ABCDEFGHIJKLM
NOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
nopqrstuvwxyz
0123456789; < = > ?
!"#\$%&'()*+,-./~
[] ^ ` { } ~ Ç ü é â á à
ç è ê ì ï Ä Å Æ ø ö ð ù
ÿ Ö Ü ç £ ¥ Þ ß à í ó ú ñ Ñ º ¿
¬ ¬ ½ ¼ ¡ « » ¶ α β

EFF Swiss Bold Font

ABCDEF GHIJ KLM
NOPQRSTU VWXYZ
abcdefghijklmnop
nopqrstuvwxyz
0123456789;:<=>?
!\"#\$%&'()*+,-./:
[\\]-1234567890;
çëëëïïÄÅË&/Éóóó
ûüÿÖÜç£¥¥¥f&ióúñÑ²¿
¬→½¼¡«»¶||aB

ABCDEF GHIJ KLM
NOPQRSTU VWXYZ
abcdefghijklmnop
nopqrstuvwxyz
0123456789;:<=>?
!\"#\$%&'()*+,-./:
[\\]-1234567890;
çëëëïïÄÅË&/Éóóó
ûüÿÖÜç£¥¥¥f&ióúñÑ²¿
¬→½¼¡«»¶||aB

EFF Swiss Bold 9 pt
EFF Swiss Bold 15 pt
EFF Swiss Bold 20 pt

Paxar Font 70 and Font 71 Characters

32	33	34	35	36	37	38	39
	○	Ⓐ	Ⓕ	Ⓟ	ⓧ	Ⓡ	Ⓢ
40	△	⚠	⚡	Ⓚ	Ⓛ	Ⓜ	Ⓝ
48	☐	☐	☐	☐	☐	☐	☐
56	☐	☐	☐	☐	☐	☐	☐
64	☐	☐	☐	☐	☐	☐	☐
72	☐	☐	☐	☐	☐	☐	☐
80	Ⓛ	Ⓛ	Ⓛ	Ⓛ	Ⓛ	Ⓛ	Ⓛ
81	Ⓛ	Ⓛ	Ⓛ	Ⓛ	Ⓛ	Ⓛ	Ⓛ
82	Ⓛ	Ⓛ	Ⓛ	Ⓛ	Ⓛ	Ⓛ	Ⓛ
83	Ⓛ	Ⓛ	Ⓛ	Ⓛ	Ⓛ	Ⓛ	Ⓛ
84	Ⓛ	Ⓛ	Ⓛ	Ⓛ	Ⓛ	Ⓛ	Ⓛ
85	Ⓛ	Ⓛ	Ⓛ	Ⓛ	Ⓛ	Ⓛ	Ⓛ
86	Ⓛ	Ⓛ	Ⓛ	Ⓛ	Ⓛ	Ⓛ	Ⓛ
87	Ⓛ	Ⓛ	Ⓛ	Ⓛ	Ⓛ	Ⓛ	Ⓛ

NAFTA Font 72 and Font 73 Characters

32	33	34	35	36	37	38	39
40	41	42	43	44	45	46	47
48	49	50	51	52	53	54	55
56	57	58	59	60	61	62	63
64	65	66	67	68	69	70	71
72	73	74	75	76	77	78	79
80	81	82	83	84	85	86	87
88	89	90	91	92	93	94	95
96	97	98	99	100	101	102	103
104	105	106	107	108	109		

Bitmap Font Information




The Monarch bitmap fonts are either monospaced (fixed width) or proportional (variable width). Use monospaced fonts for price fields and data you want to list in a column. With proportionally spaced fonts, you may be able to place more characters on a line. However, you may need to experiment with these fonts and adjust field measurements in your format. The bitmapped fonts (either monospaced or proportional) appear jagged when magnified.

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.

Using 203 DPI

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	

Using 300 DPI

Width Mag.		Standard		Reduced		Bold	
Units		Character Width	Sample	Character Width	Sample	Character Width	Sample
1x	1/100 in.	8.7		4		13.7	
	1/10 mm	22		10.2		34.7	
	Dots	26	A	12	A	41	A
7x	1/100 in.	50.7		25		85.7	
	1/10 mm	128.7		63.5		217.6	
	Dots	152		75		257	


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.

203 DPI 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

			
	A		
Bold			
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

300 DPI Height Magnification

1x

7x

			
	A		
Standard			
1/100 in.	11	77	
1/10 mm	28	195.6	
dots	33	231	

			
	A		
Reduced			
1/100 in.	7	49	
1/10 mm	17.8	124.5	
dots	21	147	

300 DPI Height Magnification

Bold

A



1/100 in.	18.7	130.7
1/10 mm	47.4	332
dots	56	392

OCRA-like (1x only)

1/100 in.	12
1/10 mm	30.5
dots	36

A

Proportional Font Magnification

Each character in a proportionally spaced font is a different 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.) 203 DPI


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.

Height Magnification 203 DPI

1x		7x	
CG Triumvirate Bold W			
1/100 in.	8.87	56	
1/10 mm	22.5	158	
dots	18	126	




CG Triumvirate Bold (9 pt.) 300 DPI

Width Mag.		Minimum	Average		Maximum
1x	1/100 in.	1.5	8		11
	1/10 mm	3.8	20.3		28
	Dots	4.5	i	L	33W
7x	1/100 in.	10.5	56		77
	1/10 mm	26.7	142.2		195.6
	203 Dots	31.5			231 

Height Magnification 300 DPI

1x		7x	
CG Triumvirate Bold		W	
1/100 in.	9	63	
1/10 mm	22.9	160.2	
dots	27	189	

CG Triumvirate (6 pt.) 203 DPI

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	L	12W
7x	1/100 in.	6.9	20.7		41.4
	1/10 mm	17.5	52.6		105.2
	Dots	14			84 

Height Maginfication 203 DPI



CG Triumvirate w

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

CG Triumvirate (6 pt.) 300 DPI

Width Mag.		Minimum	Average	Maximum
1x	1/100 in.	1	3	6
	1/10 mm	2.54	7.62	15.2
	Dots	3 i	9 L	18 W
7x	1/100 in.	7	21	42
	1/10 mm	17.8	53.3	106.7
	Dots	21 ■	63 ■	126 ■

Height Maginfication 203 DPI




CG Triumvirate w

1/100 in.	6.7	46.7
1/10 mm	16.9	118.5
dots	20	140

CG Triumvirate (7 pt.) 203 DPI

Width Mag.		Minimum	Average	Maximum
1x	1/100 in.	.99	2.96	5.9
	1/10 mm	2.51i	7.52L	15W
	Dots	2	6	12
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 203 DPI

1x		7x	
CG Triumvirate		W	
1/100 in.	8.87	56	
1/10 mm	22.5	158	
dots	18	126	

CG Triumvirate (7 pt.) 300 DPI

Width Mag.		Minimum	Average	Maximum
1x	1/100 in.	1	3	7.3
	1/10 mm	2.54i	7.62L	18.6W
	Dots	3	9	22
7x	1/100 in.	9	21	51.3
	1/10 mm	22.9■	53.3■	130.4
	Dots	27	63	154

Height Magnification 300 DPI

1x

7x



W

CG Triumvirate

1/100 in.	9	63
1/10 mm	22.9	160.2
dots	27	189

CG Triumvirate (9 pt.) 203 DPI

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

i

L

W



Height Magnification 203 DPI

1x

7x





W


CG Triumvirate

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

CG Triumvirate (9 pt.) 300 DPI

Width Mag.		Minimum	Average		Maximum
1x	1/100 in.	1.3	4.7		9.6
	1/10 mm	3.4	11.8		24.5
	Dots	4	14	L	29 W
7x	1/100 in.	9.3	32.7		67.7
	1/10 mm	23.7	83		171.8
	Dots	28	98		203 



Height Magnification 300 DPI

1x	7x
W	
	

CG Triumvirate

1/100 in.	10.7	74.7
1/10 mm	27.1	189.6
dots	32	224

CG Triumvirate (11 pt.) 203 DPI

Width Mag.		Minimum	Average		Maximum
1x	1/100 in.	.99	2.96		5.9
	1/10 mm	2.51	7.52		15
	Dots	2	6	I	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 203 DPI

1x

7x



W

CG Triumvirate

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

CG Triumvirate (11 pt.) 300 DPI

Width Mag.		Minimum	Average	Maximum
1x	1/100 in.	1.7	5.3	10.7
	1/10 mm	4.2	13.5	27.1
	Dots	5	16	32
7x	1/100 in.	11.7	37.3	74.7
	1/10 mm	29.6	94.8	189.6
	Dots	35	112	224

i

l

W



Height Magnification 300 DPI

1x

7x





W

CG Triumvirate

1/100 in.	11.7	81.7
1/10 mm	29.6	207.4
dots	35	245

CG Triumvirate (15 pt.) 203 DPI

Width Mag.		Minimum	Average		Maximum	
1x	1/100 in.	.99	i	2.96	L	5.9
	1/10 mm	2.51		7.52		15
	Dots	2		6		12
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 203 DPI

1x

7x







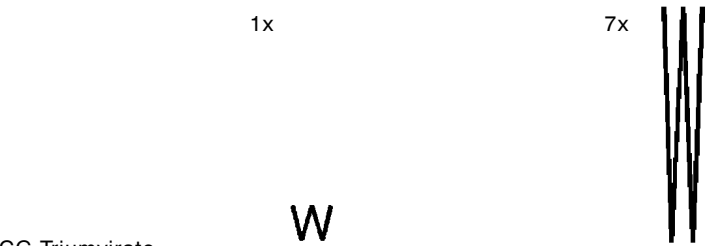
CG Triumvirate

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

CG Triumvirate (15 pt.) 300 DPI

Width Mag.		Minimum	Average		Maximum
1x	1/100 in.	2	7.6		15.7
	1/10 mm	5.1	19.4		39.8
	Dots	6	23		47
7x	1/100 in.	14	53.7		47
	1/10 mm	35.5	136.3		119.4
	Dots	42	161		141

Height Magnification 300 DPI



CG Triumvirate		
1/100 in.	17.7	8123.7
1/10 mm	44.8	314.1
dots	53	371

Scalable/TrueType® Font Information

The scalable font characters print smoothly, without the jagged edges you may see when bitmapped fonts are magnified. Scalable/TrueType fonts are proportionally spaced (field width varies with each letter).

Format Considerations

When defining formats with scalable/TrueType fonts, keep the following in mind:

- ◆ While field rotation can be set to any value (0-3), character rotation must be set to **0**.
- ◆ The slashed zero is not available.
- ◆ The minimum point size for all scalable/TrueType fonts is 4.
- ◆ The maximum point size for Font 50- EFF Swiss Bold and downloadable TrueType fonts is 255.
- ◆ Field color (**O**-transparent overlay) allows closer field placement (fields can overlap) without the loss of data.
- ◆ To use large point sizes (greater than 60), you must reconfigure memory and increase the size of the scalable (vector) fonts buffer.

The height and width magnification are defined in point size. 72 points = one inch. One inch = cell size. The cell size is the built-in space around the individual characters of the scalable font. If height and width magnification are not set to the same point size, the printed characters look tall and thin or short and thick, which allows for greater flexibility in the appearance of the font.

The scalable font (font **50**) is not available on
the 9403 printer.

The 72 point CG Triumvirate Bold sample shows the one inch cell size.

6pt Sample

10pt Sample

24pt Sample

48pt Sample

72pt Sample 1"

Downloading TrueType Fonts (9825/9850)

The printers can also accept downloaded TrueType fonts. The MONARCH® MPCL™ Toolbox (**Font Utility**) is available on our Web site and converts TrueType fonts to Hex or Run-Length encoding for the printer. Previously, the printers could accept a TrueType bitmap font that was converted to a bitmapped file using the **Font Utility**. However, you were limited to a particular character set and specific point size.

When downloading a TrueType font, you download the entire font. You cannot specify a subset (particular characters or point size) of the font. This allows you to print a variety of Code Pages with International (Turkish, Latin, Spanish, etc.) characters. TrueType fonts are designed to be regionally specific; therefore, all code pages may not be supported in a given font.

These font files are large and may image slower than bitmap fonts. The size of the font file, in bytes, is the minimum amount of memory you must have available for fonts in the printer's downloadable fonts buffer.

You may need to reconfigure the printer's memory to use downloaded TrueType fonts. After reconfiguring memory, resend the font, format, and batch packets. See "Defining the Memory Configuration Packet" in Chapter 2 for more information. Also, Chapter 2 lists some special considerations when defining memory for downloaded TrueType fonts.

Using Asian (Double-Byte) TrueType Fonts

Previously, Monarch printers supported downloadable fonts, but with limited code pages. Characters are represented by character code pages. These fonts are designed to be regionally specific; therefore, all code pages may not be supported in a given font. For example, using Code Page 1252 (Latin 1), index 192 (represented as ~192 in an MPCL batch packet) prints this character, **À**. The 9850 printer previously supported single-byte character sets, which provided 255 different characters.

However, the 9850 printer now supports printing double-byte character sets, which provide over 65,000 characters. Double-byte character sets are typically used in Asian (Far East) countries. Code pages, such as 932 (Japanese Shift JIS) are available. Each code page contains several thousand characters. To access these characters in an MPCL batch packet, you need to pick a specific code page and a specific type of font encoding.

One standard font encoding is Unicode. Unicode is a double-byte (16-bit) encoding that includes many characters used throughout the world. Each Unicode index refers to a particular character, just like the index in a code page. Other double-byte font encodings exist for specific characters, such as BIG5 (Traditional Chinese), GB2312 (Simplified Chinese) and SJIS (Japanese Shift-JIS).

Double-Byte Bitmap Fonts

Double-byte bitmap fonts, like single-byte bitmap fonts, are smaller and may image faster than TrueType fonts. When you create a double-byte bitmap font, you must specify a particular point size and code page. The batch data character mapping must match the code page of the font. For example, a BIG5 bitmap font must use BIG5 batch data.

Double-Byte TrueType Fonts

Asian TrueType font files are large and may image slower than bitmap fonts. The size of the font file, in bytes, is the minimum amount of memory you must have available for fonts in the printer's downloadable fonts buffer. Due to the size of these files, you must store these fonts in the optional 8-Meg SIMM board.

Character Mapping Overview

The printer can accept TrueType fonts in UNICODE, BIG5, GB2312, SJIS, or KSC5601 character mapping. Based on your data and code page selection, the printer determines the type of encoding (UNICODE, BIG5, GB2312, SJIS, or KSC5601) to use.

Character Mapping		Code Page
Batch Data*	TrueType Font Encoding	use in text or constant text fields
UNICODE	BIG5	102
UNICODE	SJIS	102
UNICODE	KSC5601	102
UNICODE	GB2312	102
UNICODE	UNICODE	102
BIG5	UNICODE	103
GB2312	UNICODE	104
SJIS	SJIS	105 Code Page 932 (Japanese Shift-JIS)
GB2312	GB2312	106 Code Page 936 (Simplified Chinese)
BIG5	BIG5	107 - Code Page 950 (Traditional Chinese)

* Characters in batch data must be entered based on their UNICODE, BIG5, etc. ID.

Sample Asian (Double-Byte) Font Format and Batch

```
{F,3,A,R,E,140,400,"EXAMPLE" |  
T,1,40,V,50,0,0,1003,48,48,B,L,0,0,103 | }  
  
{B,3,U,1 |  
1,"~177~065~177~066~177~067" | }
```

This example prints these three characters with BIG5 batch data of ~177~065, ~177~066, and ~177~067. Refer to www.microsoft.com for a listing of the characters in each code page. For example, search on a particular code page, such as "codepage 936" and view the characters for that code page.

婢婚婆

Licensing Your Fonts

Monarch provides you with tools to create and download double-byte/TrueType fonts. However, it is your responsibility to license the fonts you purchase and download to your Monarch® printer. Contact your font supplier for licensing information.

Additional fonts that are compatible with the 9850 printer can be purchased from:

The Electronic Font Foundry
11 Silwood Road
Ascot
SL5 OPY
England
(0)1344 875 201
www.eff.co.uk

Korean, Chinese, and Japanese fonts can be purchased from:

Dynalab Inc.
2055 Gateway Place
Suite 400
San Jose, CA 95110
408-490-4224
www.dynalab.com

Using Font Numbers in Formats

Use the following font numbers in your format when designating new fonts.

1 - 49	Resident fonts (bitmapped only)
50 - 99	Resident fonts (scalable only)
100 - 499	Customer-generated RAM fonts (bitmapped)
500 - 999	Monarch's optional ROM fonts (bitmapped and scalable)
1000 - 8999	Monarch's optional RAM fonts (bitmapped)
9000 - 9999	Monarch's optional RAM fonts (scalable only)

If you use a font number that is not a standard font for your printer, make sure the font has been installed in the printer.

Locating the Font Number in a Font Packet

If you are creating font packets, the font number is the second parameter in the packet. Software is available to create the font data and packet. Call Technical Support for more information.

Example {W,200,A,N,68 | **FontNumber**
font data |
font data | }

Use this number in **T8** or in **C5**. See "Defining Text Fields" or "Defining Constant Text Fields" in Chapter 3 for more information.

Example

```
T,1,10,V,30,10,0,200,1,1,B,L,0,0,0 |
C,50,30,0,200,1,1,B,L,0,0,"MONARCH",0 |
```

Font Number

Font Number

Defines a text and constant text field using the downloaded (#200) font.

SYMBOL SETS/CODE PAGES



This appendix contains a listing of the symbol sets, code pages, and extended character sets the printers support.

Use the charts in this appendix to convert dot sequences from the image dot pattern to codes you can use in the fields. Use the Binary to Hex Conversion Chart to convert Binary dot sequences to Hexadecimal numbers for bitmap files. Use the Dot to Run Length Encoding Chart to convert dot sequences to alphabetic characters for bitmap files.

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. Additional Code Pages are supported with downloaded TrueType or Double-byte fonts.

The printer defaults to the internal symbol set. See "Defining the System Setup Packet" in Chapter 2 to change the symbol set.

The CG Triumvirate fonts support only the ANSI and DOS Code Page 437 and 850 Symbol Sets. These fonts print a slashed zero when using the ANSI symbol set. However, the scalable font does not print a slashed zero or support Code Page 1256 (Arabic).

Internal	Use this symbol set to print international monetary symbols, the trademark (™) symbol, and for formats that may be used on other MPCLII printers.
-----------------	---

ANSI	Use this symbol set with proportionally spaced fonts.
-------------	---

DOS Code Pages 437 or 850	Use this symbol set for extended and international characters with 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 Å in a text field using the Internal Symbol Set, type:

1, "~142" |

Using International Character Sets/Code Pages

Code pages 100, 101, 852-860, and 1250-1258 may only be used with downloaded TrueType fonts. TrueType fonts are designed to be regionally specific; therefore, all code pages may not be supported in a given font. Font 50 does not support Code Pages 101 (Wingdings), 1255 (Hebrew), 1256 (Arabic), or 1258 (Vietnamese). For example, to print Hebrew characters, you need to find a font (such as Arial) that supports Hebrew characters; convert, and then download the font to your printer. Make sure the correct Code Page for Hebrew characters is selected. The character sets (100 and greater) were printed using Arial or a similar downloaded TrueType font. To determine the character code, add the column number and row number for the character. For example, to produce the ÿ character, you would press **Alt 255** (column 15 + row 240).

The Euro-dollar symbol at position ~192 is only available in the Standard, Reduced, and Bold fonts.

Additional code pages (932, 936, and 950) are available when using downloaded Asian double-byte TrueType fonts. Each of these Asian code pages contain thousands of characters, which are not represented in this manual.

Internal Symbol Set

240																™
224	α	β														
208	Ø				ø											
192	€															—
176	\$	£	¥	₤	₯	₰	₱	₲	₳	₴	₵	₶	₷	₸	₹	
160	á	í	ó	ú	ñ	Ñ	ª	º	¿	¬	¬	½	¼	;	«	»
144	Ē	æ	Æ	ô	ö	ò	û	ù	ÿ	Ö	Ü	Ç	£	¥	₤	₯
128	Ç	ü	é	â	ä	à	å	ç	ê	ë	è	ï	î	ì	Ä	Å
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

ANSI Symbol Set

240	ð	ñ	ò	ó	ô	õ	÷	ø	ù	ú	û	ü	ý	þ	ÿ
224	à	á	â	ã	ä	å	æ	ç	è	é	ê	ë	ì	í	î
208	Ð	Ñ	Ò	Ó	Ô	Õ	×	Ø	Ù	Ú	Û	Ü	Ý	Þ	ß
192	À	Á	Â	Ã	Ä	Å	Æ	Ç	È	É	Ê	Ë	Ì	Í	Î
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
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
48	O	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

Bold Character Set

240															
224															
208															
192	€														
176	\$	£	¥	₹	₠	₡	₢	₣	₤	₥	₦	₧	₨	₩	₪
160												½			
144												¢			
128															
112															
96															
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
48	O	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

OCRA Character Set

240																
224																
208																
192																
176	¢	£	¥	¤	F	P	L	K	M	§	®	™	®	™	¥	
160																
144											◊					
128																
112																
96																
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 100 (Macintosh)

240	Ò	Ó	Ô	Ù	Ì	^	~	-	˘	˙	˚	˛	˜	˝	˜
224	‡	·	,	”	‰	Â	Ê	Á	Ë	È	Í	Î	Ì	Ó	Ô
208	—	—	“	”	`	’	÷	◊	ÿ	ÿ	/	€	<	>	fi fl
192	¿	¡	¬	√	f	≈	Δ	«	»	...	À	Ã	Ö	œ	œ
176	∞	±	≤	≥	¥	μ	∂	Σ	Π	π	∫	α	ο	Ω	æ ø
160	†	°	¢	£	§	•	¶	β	®	©	™	’	”	≠	Æ Ø
144	ê	ë	í	ì	î	ï	ñ	ó	ò	ô	ö	õ	ú	ù	û
128	Ä	Å	Ç	É	Ñ	Ö	Ü	á	à	â	ä	å	ç	é	è
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 101 (Wingdings)

240	➔	⬆	⬇	↶	↷	↵	↶	↷	◻	◻	✕	✓	☒	☑	☒
224	➔	⬆	⬇	↶	↷	↵	↶	↷	⬆	⬇	↶	↷	↶	↷	↶
208	✂	✂	✂	✂	✂	✂	✂	✂	✂	✂	✂	✂	✂	✂	✂
192	⌚	⌚	⌚	⌚	⌚	⌚	⌚	⌚	⌚	⌚	⌚	⌚	⌚	⌚	⌚
176	⊕	⊕	⊕	⊕	⊕	⊕	⊕	⊕	⊕	⊕	⊕	⊕	⊕	⊕	⊕
160	•	○	○	●	◎	◎	○	◻	◻	△	+	★	★	★	★
144	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫	⑬	⑭	⑮	⑯	⑰	⑱	⑲
128	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫	⑬	⑭	⑮
112	◻	◻	◻	♦	♦	♦	♦	✂	✂	✂	✂	✂	✂	✂	✂
96	Ⅱ	Ⅲ	Ⅳ	Ⅴ	Ⅵ	Ⅶ	Ⅷ	Ⅸ	Ⅹ	Ⅺ	Ⅻ	Ⅼ	Ⅽ	Ⅾ	Ⅿ
80	✂	✂	✂	✂	✂	✂	✂	✂	✂	✂	✂	✂	✂	✂	✂
64	✂	✂	✂	✂	✂	✂	✂	✂	✂	✂	✂	✂	✂	✂	✂
48	✂	✂	✂	✂	✂	✂	✂	✂	✂	✂	✂	✂	✂	✂	✂
32	✂	✂	✂	✂	✂	✂	✂	✂	✂	✂	✂	✂	✂	✂	✂
16															
0															

Code Page 437 (Latin U.S.)

240	≡	±	≥	≤	┌	┐	÷	≈	°	·	·	√	n	2	■
224	α	β	Γ	π	Σ	σ	μ	τ	Φ	Θ	Ω	δ	∞	φ	ε
208	⌌	⌌	⌌	⌌	⌌	⌌	⌌	⌌	⌌	⌌	⌌	⌌	⌌	⌌	⌌
192	⌌	⌌	⌌	⌌	⌌	⌌	⌌	⌌	⌌	⌌	⌌	⌌	⌌	⌌	⌌
176	⌌	⌌	⌌	⌌	⌌	⌌	⌌	⌌	⌌	⌌	⌌	⌌	⌌	⌌	⌌
160	á	í	ó	ú	ñ	Ñ	ª	º	¿	¬	½	¼	¡	«	»
144	É	æ	Æ	ô	ö	ò	û	ù	ÿ	Ö	Ü	ø	£	¥	Pls
128	Ç	ü	é	â	ä	à	å	ç	ê	ë	è	ï	î	ï	Ä
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
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
48	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>
32	!	"	#	\$	%	&	'	()	*	+	,	-	.	/
16															
0															

Code Page 850 (Latin 1)

240	-	±	=	¾	¶	§	÷	,	°	˝	.	¹	³	²	■
224	Ó	ß	Ô	Ò	ö	Õ	µ	þ	Þ	Ú	Û	Ù	ý	Ý	—
208	ø	Ð	Ê	Ë	È	í	î	ï			▀	▁	|	ì	▄
192	L	⊥	T	└	+	ă	Ă	ℓ	ƒ	≡	≠	||	=	≠	x
176	░	▒	█	|	†	Á	Â	À	©	¶	||	¶	¢	¥	ŕ
160	á	í	ó	ú	ñ	Ñ	ª	º	®	¬	½	¼	;	«	»
144	É	æ	Æ	ô	ö	ò	û	ü	ÿ	Ö	Ü	ø	£	∅	×
128	Ç	ü	é	â	ä	à	â	ç	ê	ë	è	ï	î	ï	Ä
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
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
48	O	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 852 (Latin 2)

240	-	ˆ	˘	˙	˚	§	÷	°	˝	˙	ú	Ř	ř	■	
224	Ó	ß	Ô	Ň	ń	ň	Š	š	Ř	Ú	ř	Ů	ý	Ý	ť
208	đ	Đ	Ď	Ě	ď	ň	í	î	ě	┘	┐	■	■	Ť	Ů
192	Ł	ł	Ť	ť	—	†	Ǻ	ǻ	ℒ	ℱ	≡	≡	≡	≡	≡
176	▨	▩	▪	|	└	Á	Â	Ě	Š	||	||	ŋ	||	Ž	ž
160	á	í	ó	ú	À	à	Ž	ž	Ě	Ě	↵	ž	Č	š	«
144	É	Í	Í	ô	ö	Ĺ	ĺ	Š	š	Ö	Ü	Ť	ť	Ł	×
128	Ç	ü	é	â	ä	û	ć	ç	ł	ë	Ö	ö	î	Ž	Ä
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
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
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

Code Page 855 (Russian)

240	-	ы	Ы	з	З	ш	Ш	э	Э	щ	Щ	ч	Ч	§	■
224	Я	р	Р	с	С	т	Т	у	У	ж	Ж	в	В	ь	Ь №
208	л	Л	м	М	н	Н	о	О	п	┘	г	■	■	П	я ■
192	┘	┘	┘	┘	┘	┘	┘	┘	┘	┘	┘	┘	┘	┘	┘
176	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
160	а	А	б	Б	ц	Ц	д	Д	е	Е	ф	Ф	г	Г	« »
144	ль	ЛЬ	нь	НЬ	ћ	Ѓ	ќ	Ќ	ў	Ў	џ	Ю	Ъ	Ъ	Ъ
128	ђ	Ђ	ѓ	Ѓ	ё	Ё	є	Є	ѕ	Ѕ	і	І	ї	Ї	Ј
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 857 (IBM Turkish)

240	-	±	¾	¶	§	÷	,	°	¨	.	¹	³	²	■	
224	Ó	ß	Ô	Ö	ö	Õ	μ	×	Ú	Û	Ü	ı	ÿ	—	‘
208	°	ª	Ê	Ë	È	Í	Î	Ï	┘	г	■	■	ı	İ	■
192	┘	┘	┘	┘	┘	┘	┘	┘	┘	┘	┘	┘	┘	┘	┘
176	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
160	á	í	ó	ú	ñ	Ñ	Ç	ğ	ı	®	¬	½	¼	ı	« »
144	É	æ	Æ	ô	ö	ò	û	ü	İ	Ö	Ü	ø	£	Ø	\$ §
128	Ç	ü	é	â	ä	à	â	ç	ê	ë	è	ï	î	ı	Ä Å
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 860 (MS-DOS Portuguese)

240	≡	±	≥	≤	|	|	÷	≈	°	.	.	√	n	²	■	
224	α	β	Γ	π	Σ	σ	μ	τ	Φ	Θ	Ω	δ	∞	φ	ε	∩
208	⌌	⌌	⌌	⌌	⌌	⌌	⌌	⌌	⌌	⌌	⌌	⌌	⌌	⌌	⌌	⌌
192	L	⌌	T	⌌	⌌	⌌	⌌	⌌	⌌	⌌	⌌	⌌	⌌	⌌	⌌	⌌
176	⌌	⌌	⌌	⌌	⌌	⌌	⌌	⌌	⌌	⌌	⌌	⌌	⌌	⌌	⌌	⌌
160	á	í	ó	ú	ñ	Ñ	ª	º	¿	Ò	¬	½	¼	¡	«	»
144	É	À	Ê	ô	õ	ò	Ú	ù	ì	Ö	Ü	¢	£	Ù	Þ	Ó
128	Ç	ü	é	â	ã	à	Á	ç	ê	Ê	è	Í	Ô	ì	Ã	Â
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 1250 (Latin 2)

240	đ	ń	ň	ó	ô	õ	ö	÷	ř	ů	ú	ů	ü	ý	ţ	·
224	í	á	â	ă	ä	í	ć	ç	č	é	ę	ě	ē	í	î	đ
208	Đ	Ń	Ň	Ó	Ô	Õ	Ö	×	Ř	Ů	Ú	Ů	Ü	Ý	Ț	ß
192	Ř	Á	Â	Ă	Ä	Í	Ć	Ç	Č	É	Ę	Ě	Ē	Í	Î	Đ
176	°	±	˘	˙	˚	˛	˜	˜	˜	˜	˜	˜	˜	˜	˜	˜
160	˘	˙	˚	˛	˜	˜	˜	˜	˜	˜	˜	˜	˜	˜	˜	˜
144	˘	˙	˚	˛	˜	˜	˜	˜	˜	˜	˜	˜	˜	˜	˜	˜
128	€	,	„	...	†	‡	‰	Š	<	Š	Ť	Ž	Ž			
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 1251 (Cyrillic)

240	р	с	т	у	ф	х	ц	ч	ш	щ	ъ	ы	ь	э	ю	я
224	а	б	в	г	д	е	ж	з	и	й	к	л	м	н	о	п
208	Р	С	Т	У	Ф	Х	Ц	Ч	Ш	Щ	Ъ	Ы	Ь	Э	Ю	Я
192	А	Б	В	Г	Д	Е	Ж	З	И	Й	К	Л	М	Н	О	П
176	°	±	І	і	Ҁ	μ	¶	·	ё	№	€	»	ј	Ѕ	ѕ	ї
160	Ў	ў	Ј	ѣ	Г	І	§	Ё	©	Є	«	¬	-	®	İ	
144	ђ	`	'	"	"	•	—	—	™	љ	>	њ	ќ	ћ	џ	
128	Ђ	Ѓ	,	ѓ	„	...	†	‡	€	‰	Љ	<	Њ	Ќ	Ѕ	Ѕ
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 1252 (Latin 1)

240	đ	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	Đ	Ñ	Ò	Ó	Ô	Õ	Ö	×	Ø	Ù	Ú	Û	Ü	Ý	Þ	ÿ
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	ı	¢	£	¤	¥	¦	§	¨	©	ª	«	¬	-	®	¯	
144	`	'	"	"	•	—	—	~	™	š	>	œ	ž	ÿ		
128	€	,	f	„	...	†	‡	^	‰	Š	<	Œ	Ž			
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 1253 (Greek)

240	π	ρ	ς	σ	τ	υ	φ	χ	ψ	ω	ϊ	ϋ	ό	ύ	ώ
224	Û	α	β	γ	δ	ε	ζ	η	θ	ι	κ	λ	μ	ν	ξ ο
208	Π	Ρ		Σ	Τ	Υ	Φ	Χ	Ψ	Ω	Ϊ	Ϋ	ά	έ	ή ι
192	Ĭ	Α	Β	Γ	Δ	Ε	Ζ	Η	Θ	Ι	Κ	Λ	Μ	Ν	Ξ Ο
176	°	±	²	³	´	μ	¶	·	Έ	Ή	Ί	»	Ό	½	Υ Ώ
160	ˆ	Ά	£	¤	¥	¦	§	¨	©		«	¬	-	®	—
144	`	/	"	"	•	—	—	™							
128	€		,	ƒ	„	...	†	‡	‰						
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 1254 (Turkish)

240	ğ	ñ	ò	ó	ô	õ	ö	÷	ø	ù	ú	û	ü	ı	ş Ÿ
224	à	á	â	ã	ä	å	æ	ç	è	é	ê	ë	ì	í	î ï
208	Ğ	Ñ	Ò	Ó	Ô	Õ	Ö	×	Ø	Ù	Ú	Û	Ü	İ	Ş 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	ı	¢	£	¤	¥	¦	§	¨	©	ª	«	¬	-	®	¯
144	`	/	"	"	•	—	—	~	™	š					ÿ
128	€		,	ƒ	„	...	†	‡	ˆ	‰	Š				Æ
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 1255 (Hebrew)

240	נ	ס	ע	ך	פ	ץ	צ	ק	ר	ש	ת				
224	א	ב	ג	ד	ה	ו	ז	ח	ט	י	ך	ל	ם	ן	מ
208	|	·	:	ן	ו	י	י	'	"						
192	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
176	°	±	²	³	'	μ	¶	·	·	¹	÷	»	¼	½	¾
160	ı	¢	£	₪	¥	¦	§	¨	©	×	«	¬	-	®	—
144	`	'	"	"	•	—	—	~	™	>					
128	€	,	f	"	...	†	‡	^	%	‰	<				
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
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
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

Code Page 1256 (Arabic)

240	="	°	·	·	·	·	·	·	·	·	·	·	·	·	·
224	à	ا	â	م	ن	و	ç	è	é	ê	ë	ی	آ	ي	İ
208	ذ	ر	ز	س	ش	ص	×	ط	ع	غ	-	ف	ق	ك	ل
192	د	خ	ح	ج	ث	ت	ة	ب	ا	ئ	إ	ؤ	أ	آ	ء
176	°	±	²	³	'	μ	¶	·	·	¹	÷	»	¼	½	¾
160	ı	¢	£	₪	¥	¦	§	¨	©	×	«	¬	-	®	—
144	گ	`	'	"	"	•	—	—	™	>	œ	|	ı		
128	€	ب	,	f	"	...	†	‡	^	%	‰	<	Œ	ج	ز
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
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
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

Code Page 1257 (Baltic)

240	š	ń	ņ	ó	ō	õ	ö	÷	ų	ţ	ś	ū	ü	ž	ž	.
224	ą	į	ā	ć	ä	ǣ	ē	č	é	ž	ė	g	k	ī	į	
208	Š	Ń	Ņ	Ó	Ō	Õ	Ö	×	Ų	Ț	Ś	Ū	Ü	Ž	Ž	β
192	Ą	Į	Ā	Ć	Ä	Ǽ	Ē	Č	É	Ž	Ė	Ġ	Ķ	Ī	Ĳ	
176	°	±	²	³	´	μ	¶	·	ø	¹	²	»	¼	½	¾	æ
160		¢	£	¤		¦	§	¨	©	ª	«	¬	-	®	¯	Æ
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 1258 (Vietnamese)

240	đ	ñ	.	ó	ô	ơ	ö	÷	ø	ù	ú	û	ư	đ	ỹ	
224	à	á	â	ă	ä	ǣ	ç	è	é	ê	ë	í	î	ï		
208	Đ	Ñ	.	Ó	Ô	Ơ	Ö	×	Ø	Ù	Ú	Û	Ư	~	β	
192	À	Á	Â	Ă	Ä	Ǽ	Ç	È	É	Ê	Ë	Ì	Î	Ï		
176	°	±	²	³	´	μ	¶	·	ø	¹	º	»	¼	½	¾	¿
160		¢	£	¤	¥	¦	§	¨	©	ª	«	¬	-	®	¯	
144	`	'	"	"	•	—	—	™		>	æ					ÿ
128	€		,	f	„	...	†	‡	‰		<	œ				
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

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

Binary to Hex Conversion Chart

Binary	Hex	Binary	Hex
00000000	00	00100000	20
00000001	01	00100001	21
00000010	02	00100010	22
00000011	03	00100011	23
00000100	04	00100100	24
00000101	05	00100101	25
00000110	06	00100110	26
00000111	07	00100111	27
00001000	08	00101000	28
00001001	09	00101001	29
00001010	0A	00101010	2A
00001011	0B	00101011	2B
00001100	0C	00101100	2C
00001101	0D	00101101	2D
00001110	0E	00101110	2E
00001111	0F	00101111	2F
00010000	10	00110000	30
00010001	11	00110001	31
00010010	12	00110010	32
00010011	13	00110011	33
00010100	14	00110100	34
00010101	15	00110101	35
00010110	16	00110110	36
00010111	17	00110111	37
00011000	18	00111000	38
00011001	19	00111001	39
00011010	1A	00111010	3A
00011011	1B	00111011	3B
00011100	1C	00111100	3C
00011101	1D	00111101	3D
00011110	1E	00111110	3E
00011111	1F	00111111	3F

Binary to Hexadecimal Conversion Chart (continued)

Binary	Hex	Binary	Hex
01000000	40	01100000	60
01000001	41	01100001	61
01000010	42	01100010	62
01000011	43	01100011	63
01000100	44	01100100	64
01000101	45	01100101	65
01000110	46	01100110	66
01000111	47	01100111	67
01001000	48	01101000	68
01001001	49	01101001	69
01001010	4A	01101010	6A
01001011	4B	01101011	6B
01001100	4C	01101100	6C
01001101	4D	01101101	6D
01001110	4E	01101110	6E
01001111	4F	01101111	6F
01010000	50	01110000	70
01010001	51	01110001	71
01010010	52	01110010	72
01010011	53	01110011	73
01010100	54	01110100	74
01010101	55	01110101	75
01010110	56	01110110	76
01010111	57	01110111	77
01011000	58	01111000	78
01011001	59	01111001	79
01011010	5A	01111010	7A
01011011	5B	01111011	7B
01011100	5C	01111100	7C
01011101	5D	01111101	7D
01011110	5E	01111110	7E
01011111	5F	01111111	7F

Binary to Hexadecimal Conversion Chart (continued)

Binary	Hex	Binary	Hex
10000000	80	10100000	A0
10000001	81	10100001	A1
10000010	82	10100010	A2
10000011	83	10100011	A3
10000100	84	10100100	A4
10000101	85	10100101	A5
10000110	86	10100110	A6
10000111	87	10100111	A7
10001000	88	10101000	A8
10001001	89	10101001	A9
10001010	8A	10101010	AA
10001011	8B	10101011	AB
10001100	8C	10101100	AC
10001101	8D	10101101	AD
10001110	8E	10101110	AE
10001111	8F	10101111	AF
10010000	90	10110000	B0
10010001	91	10110001	B1
10010010	92	10110010	B2
10010011	93	10110011	B3
10010100	94	10110100	B4
10010101	95	10110101	B5
10010110	96	10110110	B6
10010111	97	10110111	B7
10011000	98	10111000	B8
10011001	99	10111001	B9
10011010	9A	10111010	BA
10011011	9B	10111011	BB
10011100	9C	10111100	BC
10011101	9D	10111101	BD
10011110	9E	10111110	BC
10011111	9F	10111111	BF

Binary to Hexadecimal Conversion Chart (continued)

Binary	Hex	Binary	Hex
11000000	C0	11100000	E0
11000001	C1	11100001	E1
11000010	C2	11100010	E2
11000011	C3	11100011	E3
11000100	C4	11100100	E4
11000101	C5	11100101	E5
11000110	C6	11100110	E6
11000111	C7	11100111	E7
11001000	C8	11101000	E8
11001001	C9	11101001	E9
11001010	CA	11101010	EA
11001011	CB	11101011	EB
11001100	CC	11101100	EC
11001101	CD	11101101	ED
11001110	CE	11101110	EE
11001111	CF	11101111	EF
11010000	D0	11110000	F0
11010001	D1	11110001	F1
11010010	D2	11110010	F2
11010011	D3	11110011	F3
11010100	D4	11110100	F4
11010101	D5	11110101	F5
11010110	D6	11110110	F6
11010111	D7	11110111	F7
11011000	D8	11111000	F8
11011001	D9	11111001	F9
11011010	DA	11111010	FA
11011011	DB	11111011	FB
11011100	DC	11111100	FC
11011101	DD	11111101	FD
11011110	DE	11111110	FE
11011111	DF	11111111	FF

Dot to Run Length Encoding Chart

ON (Black) Dots

# of Dots	Code	# of Dots	Code
1	A	14	N
2	B	15	O
3	C	16	P
4	D	17	Q
5	E	18	R
6	F	19	S
7	G	20	T
8	H	21	U
9	I	22	V
10	J	23	W
11	K	24	X
12	L	25	Y
13	M	26	Z

OFF (White Dots)

# of Dots	Code	# of Dots	Code
1	a	14	n
2	b	15	o
3	c	16	p
4	d	17	q
5	e	18	r
6	f	19	s
7	g	20	t
8	h	21	u
9	i	22	v
10	j	23	w
11	k	24	x
12	l	25	y
13	m	26	z

FORMAT DESIGN TOOLS



Use copies of these worksheets and grids to create formats, batch data, and check digit schemes. 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

COMMUNICATION SETUP

T	HEADER
	BAUD
	WORD LENGTH
	STOP BITS
	PARITY
	FLOW CONTROL

MONETARY FORMATTING

D	HEADER
	CURRENCY SYMBOL
	SECONDARY
	DECIMALS

ONLINE HEADER

I	HEADER
----------	--------

SYSTEM SETUP

A	HEADER
	POWERUP MODE
	LANGUAGE
	SEPARATOR
	SLASH ZERO
	SYMBOL SET

BACK FEED CONTROL

G	HEADER
	ACTION
	DISPENSE POSITION
	BACK FEED DISTANCE

CONTROL CHARACTERS

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

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

BUFFER ALLOCATION

M	HEADER
	BUFFER
	DEVICE
	BUFFER SIZE

The 9403 printer does not support backfeed.

B	B1 HEADER
	B2 FORMAT #
	B3 NEW / UPDATE
	B4 QUANTITY

FIELD #	DATA
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	

F	E1 HEADER
	E2 FEED-MODE
	E3 BATCH-SEP
	E4 PRINT-MULT
	E5 MULTI-PART
	E6 CUT-TYPE
	E7 CUT-MULT

[illegible]

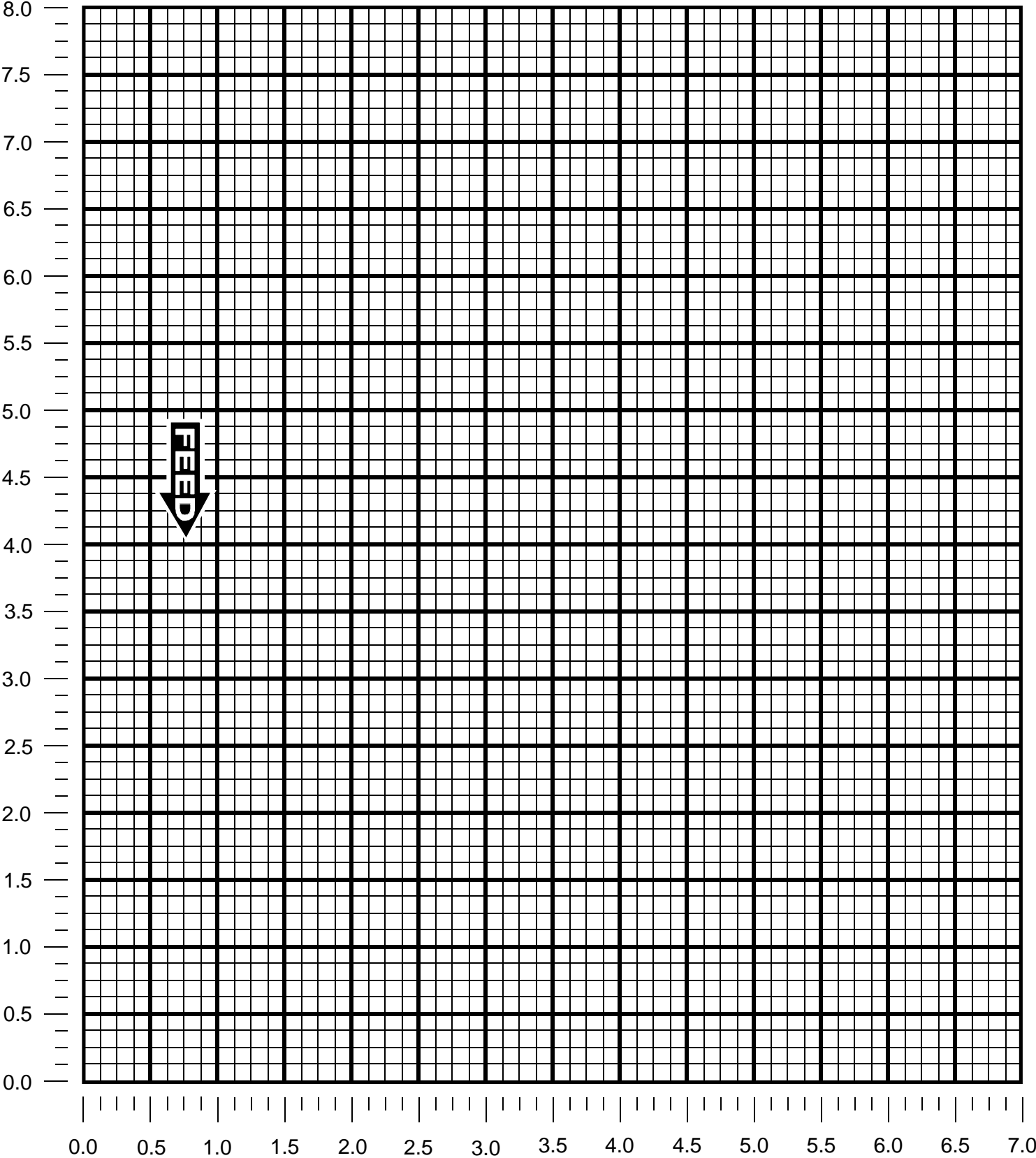
A	A1 HEADER	A2 SELECTOR #	A3 ACTION	A4 DEVICE	A5 MODULUS	A6 LENGTH	A7 ALGORITHM	WEIGHTS A8

A	A1 HEADER	A2 SELECTOR #	A3 ACTION	A4 DEVICE	A5 MODULUS	A6 LENGTH	A7 ALGORITHM	WEIGHTS A8
R								

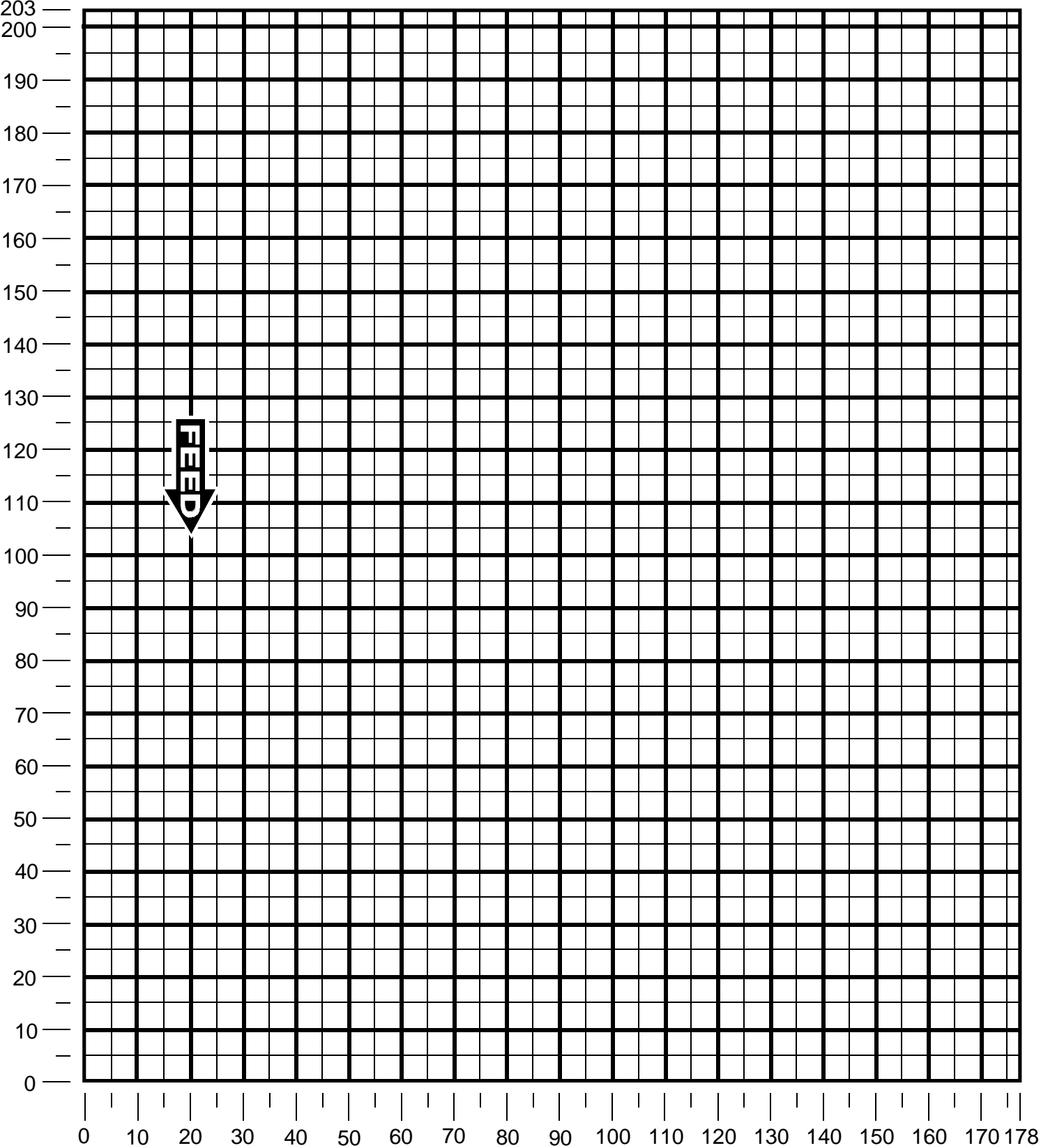
[illegible]

A	A1 HEADER	A2 SELECTOR #	A3 ACTION	A4 DEVICE	A5 MODULUS	A6 LENGTH	A7 ALGORITHM	WEIGHTS A8
R								

Supply Layout (Inches)



Supply Layout (Metric)

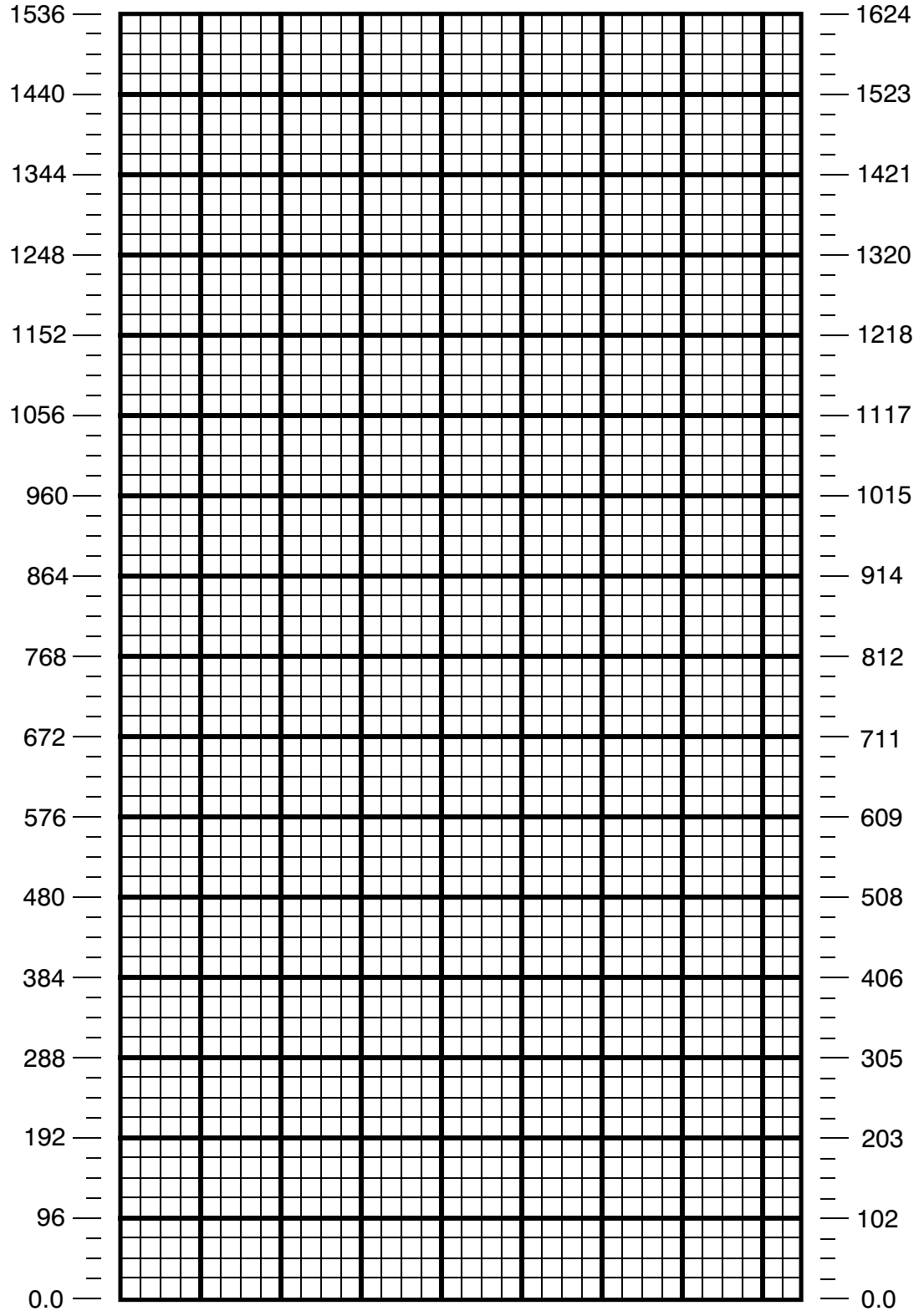


Supply Layout (dpi)



192

203

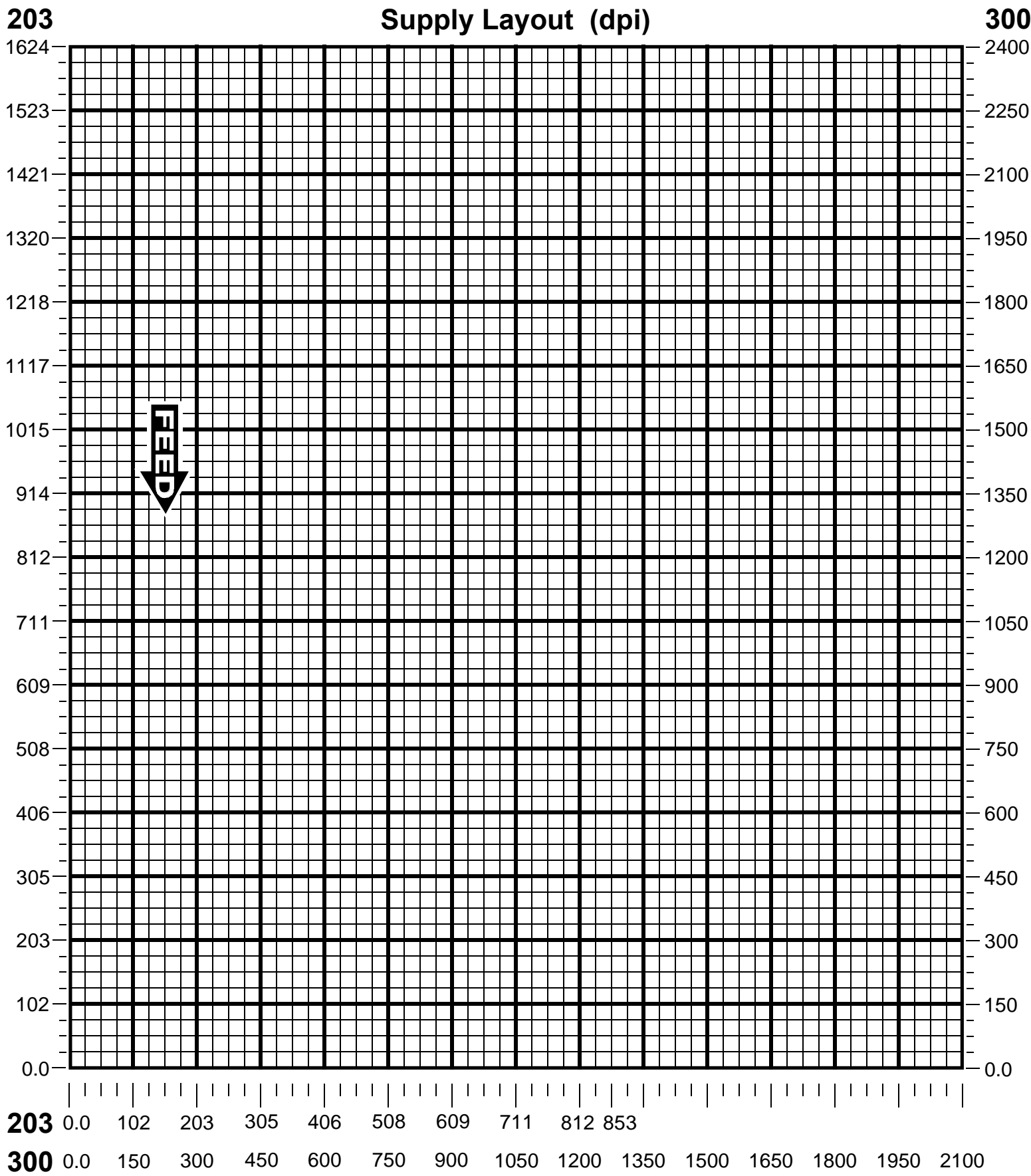


192

203

0.0 96 192 288 384 480 576 672 768 806

0.0 102 203 305 406 508 609 711 812 853



FORMAT HEADER	
F1 HEADER	
F2 FORMAT #	
F3 ACTION	
F4 DEVICE	
F5 MEASURE	
F6 LENGTH	
F7 WIDTH	
F8 NAME: ("IN QUOTES")	

B1	HEADER				
B2	FIELD #				
B3	# OF CHAR.				
B4	FIX/VAR				
B5	ROW				
B6	COLUMN				
B7	FONT				
B8	DENSITY				
B9	HEIGHT				
B10	TEXT				
B11	ALIGNMENT				
B12	FIELD ROT.				

[illegible][illegible]

Q1 HEADER	Q2 ROW	Q3 COLUMN	Q4 END ROW	Q5 END COLUMN	Q6 THICKNESS	Q7 PATTERN

			OPTION #1		OPTION #4								
			Fixed Characters		Copy Data from Previous Field								
D1 HEADER	D2 FIELD #	D3 # OF CHAR.	R1 HEADER	R2 CODE #	R3 FIXED CHAR. ("IN QUOTES")	R1 HEADER	R2 CODE #	R3 SRC FIELD	R4 SRC START	R5 # TO COPY	R6 DEST. START	R7 COPY CODE	
D			R	1			R	4					
D			R	1			R	4					
D			R	1			R	4					
D			R	1			R	4					

G1 HEADER	G2 GRAPH ID	G3 ROW	G4 COLUMN	G5 MODE	G6 ROTATION
G					
G					
G					

Format Name _____

Format # _____

Date _____

Supply Size _____

Supply Type _____

Customer Name _____

Software Version _____

FORMAT HEADER	F1	HEADER					
	F2	FORMAT #					
	F3	ACTION					
	F4	DEVICE					
	F5	MEASURE					
	F6	LENGTH					
	F7	WIDTH					
	F8	NAME ("IN QUOTES")					
T	1	A	R	R	300	400	"TEXTILES"

B1	B1 HEADER	
B2	B2 FIELD #	3
B3	B3 # OF CHAR.	12
B4	B4 FIX/VAR	Y
B5	B5 ROW	150
B6	B6 COLUMN	040
B7	B7 FONT	1
B8	B8 DENSITY	2
B9	B9 HEIGHT	80
B10	B10 TEXT	1
B11	B11 ALIGNMENT	L
B12	B12 FIELD ROT.	0

[illegible]

L1 HEADER	L2 TYPE	L3 ROW	L4 COLUMN	L5 ANGLE/ END ROW	L6 LENGTH/ END COL	L7 THICKNESS	L8 PATTERN
F	S	110	030	110	150	10	" "
F							
F							
F							

[illegible]

		OPTION #1			OPTION #4				
		Fixed Characters			Copy Data from Previous F				
B11 ALIGNMENT	B12 FIELD ROT.	R1 HEADER	R2 CODE #	R3 FIXED CHAR. ("IN QUOTES")	R1 HEADER	R2 CODE #	R3 SRC FIELD	R4 SRC START	R5 # TO COPY
C	0	R1	1	"-----"	R1	4	3	1	3
		R1	1		R1	4			
		R1	1		R1	4			
		R1	1		R1	4			

			OPTION #1			OPTION #4						
			Fixed Characters			Copy Data from Previous Field						
D1 HEADER	D2 FIELD #	D3 # OF CHAR.	R1 HEADER	R2 CODE #	R3 FIXED CHAR. ("IN QUOTES")	R1 HEADER	R2 CODE #	R3 SRC FIELD	R4 SRC START	R5 # TO COPY	R6 DEST. START	R7 COPY CODE
D	3	3	R	1	"-----%-----"	R	4	3	1	3	1	1
D	4	20	R	1		R	4					
D			R	1		R	4					
D			R	1		R	4					

[illegible]

Field		OPTION #30 Pad Data				OPTION #31 Define Check Data			
R6 DEST. START	R7 COPY CODE	R1 HEADER	R2 CODE #	R3 L / R	R4 CHARACTER	R1 HEADER	R2 CODE #	R3 CHARACTER	
/	/	R	30	R	0	R	31	0	
		R	30			R	31		
		R	30			R	31		
		R	30			R	31		

G1 HEADER	G2 GRAPH ID	G3 ROW	G4 COLUMN	G5 MODE	G6 ROTATION
G	5	010	200	0	0
G					
G					
G					

		OPTION #4						
		Copy Data from Previous Field						
		R1 HEADER	R2 CODE #	R3 SRC FIELD	R4 SRC START	R5 # TO COPY	R6 DEST. START	R7 COPY CODE
1	1	R	4	3	1	3	1	1
2	2	R	4					
3	3	R	4					
4	4	R	4					

Format Name TEXTILES

Format # 1

Date 09/08/97

Supply Size 4" x 3"

Supply Type THERMAL DIRECT

Customer Name ACE INDUSTRIES

Software Version V2.0

PRINTER DIFFERENCES



Here are the major features and differences between each printer. Specific 1464/1465 printer applicator information is listed. Earlier printer versions may not support all features.

Printer Comparison

Feature	9403 Printer	9825 Printer	9850 Printer
Printhead Density DPI (dots per inch)	203 DPI	203 DPI	203 DPI 300 DPI (optional)
Print speed IPS (inches per second)	2.0 IPS	2.5, 4.0, or 6.0 IPS	2.5, 4.0, 6.0, 8.0, 10.0 IPS 12.0 IPS (optional)
Maximum print area	2.0" x 6.0"	4.0" x 16.0"	4.0" x 16.0"
Non-Print Zone	.035" at the beginning and .10" from the left edge	Recommended: all supplies - .05" on either edge and .02" at the end Butt cut supplies - .15" at the beginning	Recommended: all supplies - .05" on either edge and .02" at the end Butt cut supplies - .15" at the beginning
Location of Print Area	Left	Center	Center
Supply Width	.75" x 2.5"	.75" x 4.25"	.75" x 4.25"
Supply Length	.75" x 9.0"	.50" x 17.5"	.32" x 17.5"
Power Up Mode	Online/ Offline	Online	Online/Offline
Feed Mode	Continuous	On demand/ Continuous/ Peel Mode (optional)	On demand/ Continuous/ Peel Mode (optional)
Supplies	Tags or Labels	Labels or Perforated Tags	Labels or Tags
Supply Type	Black mark Die cut	Edge Aperture/ Black mark/Die cut/ Continuous	Aperture/ Black mark/Die cut/ Continuous

Feature	9403 Printer	9825 Printer	9850 Printer
Keypad	21 keys for offline data entry	Feed/Cut Enter/Pause Escape/Clear buttons	Feed/Cut Enter/Pause Escape/Clear buttons Offline data entry with optional 917 keypad
Display	2-line 16 characters per line	2-line 16 characters per line	2-line 16 characters per line
Serial Port Speed	1200/2400/4800/9600 /19200 Baud	1200/2400/4800/9600 /19200/38400 Baud	1200/2400/4800/9600/ 19200/38400/57600/ 115200 Baud
Field Number Range	0-99	0-999	0-999
Batch Separator	Yes	Yes	Yes
High Energy Ribbon	No	No	Yes
Standard Fonts	Standard/Reduced/Bold OCRA/CG Triumvirate Bold 9 pt/CG Triumvirate 6 pt	Standard/Reduced/Bold OCRA/CG Triumvirate Bold 9 pt/CG Triumvirate 6, 7, 9, 11, or 15 pt	Standard/Reduced/Bold OCRA/CG Triumvirate Bold 9 pt/CG Triumvirate 6, 7, 9, 11, or 15 pt
Scalable Font Standard	No	Yes (EFF Swiss Bold)	Yes (EFF Swiss Bold)
Downloadable Fonts	Yes	Yes	Yes
Memory Allocation	Yes	Yes	Yes
RAM	256K 512K (Flash)	4 Meg 2 Meg (Flash)	16 Meg 4 Meg (Flash)
Storage on Power-down	512K (Flash)	512K (Flash)	512K (Battery-backed RAM)
Extended Memory	No	No	Yes
2D bar codes	MaxiCode/PDF417 POSTNET	MaxiCode/PDF417 POSTNET/Data Matrix/Quick Response	MaxiCode/PDF417 POSTNET/Data Matrix/Quick Response
Parallel Port	No	IEEE-1284 or Centronics Mode	IEEE-1284 or Centronics Mode
94x5 Emulation	No	No	Yes
Backfeed	No	Yes	Yes
Offline Batch Entry	Yes	No	Yes with optional keypad

E-2 Printer Differences

Feature	9403 Printer	9825 Printer	9850 Printer
Status Polling	Yes	Yes	Yes
Immediate Commands	Yes	Yes	Yes
Test Label	Single label for printer setup	Two labels for user and printer configuration	Two labels for user and printer configuration
Ethernet Print Server	No	Yes- supports IPX (NetWare), TCP/IP, LAT, AppleTalk, and NetBios/NetBEUI.	Yes- supports IPX (NetWare), TCP/IP, LAT, AppleTalk, and NetBios/NetBEUI.
External Knife	No	No	Yes
Stacker	No	No	Yes
Verifier	No	No	Yes
External Rewind	No	Yes	Yes
Tear Bar	No	Yes (optional)	Yes (optional)
12 IPS	No	No	Yes (optional)
300 DPI	No	No	Yes (optional)

1464/1465 Printer/Applicator Information

When designing formats for the Printer Applicators, use the 9850 specifications with these changes:

- ◆ **1464** Supply Widths: 2.0" to 4.25" (51 mm to 108 mm)
1465 Supply Widths: 1.5" to 4.25" (38 mm to 108 mm)
- ◆ Supply Lengths: 0.75" to 8.0" (19 mm to 203 mm)
- ◆ Supply Thickness: 2.3 to 7.9 mils (0.058mm to 0.2 mm)
- ◆ **1464** Maximum Roll Outside Diameter: 10.0" (254 mm)
1465 Maximum Roll Outside Diameter: 16.0" (406 mm)
- ◆ **1464** Minimum Roll Inside Diameter: 3.0" (76 mm)
1465 Minimum Roll Inside Diameter: 4.0" (102 mm)

Also, keep in mind the following:

- ◆ The Printer Applicators are released for 110-volt sales only.
- ◆ You can use thermal direct printing (no ribbon) or thermal transfer printing (with ribbon).
- ◆ The Printer Applicators do not support continuous (non-indexed) supplies.

Printer Configuration Information

The default configuration packet settings are:

{I,A,0,0,0,0,0 }	The supply type must be center aperture (3).
B,3,1,1,0,0 }	Backfeed must be enabled (1). The dispense
C,0,0,0,0,0,0 }	position when and backfeed distances must be set to
D,1,0,2 }	95 dots using 1/8-inch gap supplies.
E,{,,," , } ~,--,--,Od/Oa }	
F,1,1,0,0,3 }	
G,1,95,95 }	

Status Polling Information

ENQ Response	Meaning
??	Powerup
A@	Online/Ready to receive data after label has been applied
C@	Label is printing
CH	Label is printed
SB	Out of supplies
SD	Out of ribbon

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 , D , 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 ({}). 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).

Soft (Downloaded) Fonts Reside in the printer's RAM. They can be erased or overwritten.

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

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