Packet Reference Manual

✦ 9403™

✦ 9820™

✦ 9830™

✦ 9835™

```
{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, Oh

Monarch
Marking Systems

GETTING STARTED

1Before you read this manual, review the printer information in the *Operator's Handbook*. 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)

◆ 9820™ (V. 1.0 or greater)

◆ 9830™ (V. 1.0 or greater)

◆ 9835™ (V. 3.0 or greater)

About This Manual

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

This chapter

◆ describes the significant differences between the printers.

◆ creates a sample MPCLII packet.

◆ shows how to download a sample packet.

◆ gives a list of daily procedures for operators.

Overview of Printer Differences

While all three of these printers are very similar, some differences in operation and available options exist.

Feature	9403	9820	9830	9835
Maximum print speed	2.0 IPS	6.0 IPS	6.0 IPS	6.0 IPS
Maximum print area	2.0" x 6.0"	4.0" x 12.0"	4.0" x 16.0"	4.0" x 16.0"
Location of Print Area	Left	Center	Center	Center
Supply Width	.75" x 2.5"	1.2" x 4.25"	1.2" x 4.25"	1.2" x 4.25"
Supply Length	.75" x 9.0"	1.0" x 12.0"	1.0" x 16.0"	.75" x 16.0"
Power Up Mode	Online/Offline	Online	Online	Online
Feed Mode	Continuous	Continuous	On demand /Peel Mode/ Continuous	On demand /Peel Mode/ Continuous
Supplies	Tags or Labels	Labels	Labels	Tags or Labels
Supply Type	Black mark /Die cut	Black mark /Die cut /Non-indexed	Black mark /Die cut /Non-indexed	Black mark /Die cut /Non-indexed
Field Number Range*	0-99	0-999	0-999	0-999
Batch Separator	Yes	Yes	Yes	Yes
High Energy Ribbon	No	No	Yes	Yes
Scalable Font Standard	No	No	Yes	Yes
International Fonts	No	Yes	Yes	Yes
Downloadable Fonts	Yes	Yes	Yes	Yes
Memory Allocation	Yes	Yes	Yes	Yes
2D bar codes	Yes	No	Yes	Yes
Autobaud	Yes	Yes	Yes	Yes
Parallel Port	No	IEEE-1284 or Centronics Mode	IEEE-1284 or Centronics Mode	IEEE-1284 or Centronics Mode
Backfeed	No	Yes	Yes	Yes
Offline Batch Entry	Yes	No	No	No
DIP switches for Communication Settings	No	Yes	Yes	Yes

* The actual number of fields a format can have is limited by the available memory. Earlier printer versions may not support all features. The 9835 printer supports 94x5 emulation. You can send 94x5 data streams to the 9835 printer.

See "Defining Text Fields" in Chapter 4 for a list of available fonts for your printer. See Chapter 5, "Defining Field Options," for a list of available Options for your printer.

Before You Begin

1. Connect the printer to the host. Refer to your *Operator's Handbook* for more information.

2. Load supplies in the printer. Refer to your *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 3, "Configuring the Printer," for more information.

5. Design your format. See "Starting with a Design" in Chapter 2 for more information.

6. Download your format to the printer. See Chapter 7, "Printing," for more information.

Creating an MPCLII Format Packet

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

Make sure supplies are loaded, the printer is connected to the host and is ready to receive data. Refer your *Operator's Handbook* for more information.

For detailed information about the format header, text, constant text, and bar code fields, see Chapter 4, "Defining Fields." For information about batch packets, see Chapter 7, "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," "Using Parallel Communications" in Chapter 3, or your host's documentation for more information.

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

```
{
F, 25, A, R, M, 508, 508, "Fmt 25" |
C, 250, 80, 0, 1, 2, 1, W, C, 0, 0, "MONARCH MARKING" |
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 Chapter 2, "Designing a Format" to design your format and Chapter 4, "Defining Fields" to create text, bar code, and line fields.

Daily Startup Procedures

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

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

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

DESIGNING A FORMAT

This chapter describes how to

◆ determine what kind of information to use in your format.

◆ use the Supply Layout Grid and Format Worksheet.

◆ categorize data into field types.

◆ select fonts to use in your format.

Starting with a Design

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

1. Decide which fields should appear on your label. See "Determining Format Contents" for more information.

2. Determine your label size. Labels are available from Monarch in a wide variety of sizes. Your application and the amount of data you need to print determines the supply size. Contact your Account Manager or Technical Support for more information.

3. Draw a rough sketch of your label. You may want to draw several variations to see what works best. See "Drawing Rough Sketches" for more information.

4. Identify the field types that appear on your label. See "Considering Field Types" for more information.

5. Decide which fonts you want to use. See "Considering Fonts" for more information.

6. Fill out your Format Worksheet. See "Using the Format Worksheet" for more information.

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

7. Create a format packet, based on how you filled out your worksheet. See Chapter 4, "Defining Fields," for more information.

8. Download your format packet to the printer. See Chapter 7, "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?

◆ 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")	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
9820	English	425 x 1200	400 x 1200
	Metric	1080 x 3048	1016 x 3048
	Dots	863 x 2436	812 x 2436
9830	English	425 x 1600	400 x 1600
	Metric	1080 x 4064	1016 x 4064
	Dots	863 x 3248	812 x 3248
9835	English	425 x 1600	400 x 1600
	Metric	1080 x 4064	1016 x 4064
	Dots	863 x 3248	812 x 3248

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:

Butt Cut Supplies   .150 inches at the beginning of the label.
All Supplies   .050 inches on either edge of the label.
All Supplies   .020 inches at the end of the label.

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

```
Dots = inches x 203
Metric (1/10mm) = inches x 254
English (1/100 inch) = 100 x (dots/203)
Dots = Metric (1/10 mm) x 799/1000
```

Drawing Rough Sketches

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

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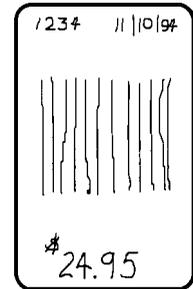
Using Supply Layout Grids

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

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

◆ English

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

◆ Metric

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

◆ Graphic

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

Supply Layout (dpi)

192		**203**
1536		1624
1440		1523
1344		1421
1248		1320
1152		1218
1056		1117
960		1015
864		914
768		812
672		711
576		609
480		508
384		406
288		305
192		203
96		102
0.0		0.0

| **192** | 0.0 | 96 | 192 | 288 | 384 | 480 | 576 | 672 | 768 | 806 |
| **203** | 0.0 | 102 | 203 | 305 | 406 | 508 | 609 | 711 | 812 | 853 |
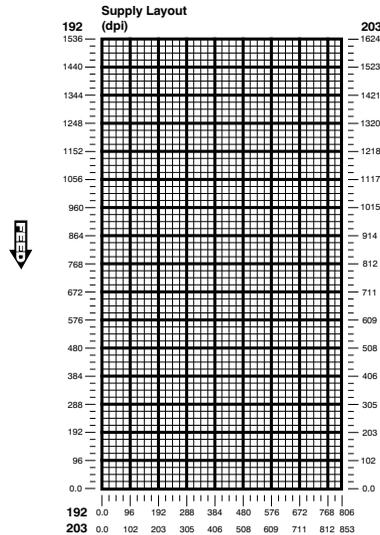
Choose English or Metric units when designing formats to use with different printers. English or Metric units allow more direct use of formats on printers with different density printheads.

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 4. See Chapter 6, "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)

◆ font spacing (monospaced or proportional)

The scalable font, CG Triumvirate Bold™ is standard on the 9830 and 9835 printers. It is not available for the 9403 or 9820 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 the 9800 series printers use a 203 DPI printhead. Some other MPCLII printers use a 192 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 4 for more information.

4. Define options as you require them. See Chapter 5, "Defining Field Options" for more information.

CONFIGURING THE PRINTER 3

This chapter discusses how to

◆ set communication parameters.

◆ upload the printer's configuration or font information.

◆ configure the printer using online configuration packets.

◆ use immediate commands to control the printer's operation at any time.

Some parameters may not be available on this printer. See Appendix E, "Printer Differences," for a list of differences between a 9820 printer and a Monarch® 9446™ printer.

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 or DIP switches to set communication parameters for your printer.

Not all printers have DIP switches.

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

For example

```
MODE  COM1: 96OO, N, 8, 1
```

This command sets your host to these communication values:

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

Using Parallel Communications

If your printer supports parallel communications, the parallel port is IEEE-1284 or Centronics® mode. You can set which mode to use by changing a DIP switch. Refer to your *Operator's Handbook* for DIP switch settings. The communication settings are automatically configured for you. There are no operator settings required.

Using Autobaud

You can use the autobaud feature to automatically set the printer's baud rate, parity, data bits, and stop bits to match the host's. Autobaud overrides the DIP switch settings and the values in the communication settings packet.

Do not send any data to the printer before using autobaud.

To use autobaud, you must:

1. Power up the host first and then turn on the printer. Autobaud only works during the initial power up. Wait 2 to 5 seconds.

2. After the 9800 series printer's power LED comes on (or the 9403 printer displays "Print Mode READY"), send a sequence of 32 alternating **@A** characters (for a total of 64 characters) to the printer.

Example @A@A@A@A@A@A@A@A@A@A@A@A@A@A@A@A@A@A
@A@A@A@A@A@A@A@A@A@A@A@A@A@A

Do not use character pacing (delay for each character) or any other delay while sending the autobaud sequence.

Wait one second after sending the autobaud sequence before sending any commands (including setting flow control) or data to the printer. During this time, the hardware is being changed to the new settings.

3. To select flow control and finalize communications, send the communication settings packet. Or, use the Optional Entry method described in Chapter 7, "Printing."

Example   { I, F, , , , , 3 ¦ }

This packet sets the flow control parameter to XON/XOFF, without changing the current communication settings established with Autobaud.

Using MPCLII Conventions

Here are some guidelines to follow when using MPCLII.

MPCLII Punctuation

Use the following symbols when creating MPCLII packets:

{	start of header
}	end of header
¦	field separator
,	parameter separator
"ABC"	Quotation marks enclose character strings. Empty quotes ("") identify null strings or unused fields.
'comment'	Grave accents enclose comments. Any data enclosed in grave accents is ignored. Do not embed comments within a quoted string. 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 printer) 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 printer) 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 ¦
    R,42,1 ¦

◆ 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 7 for more information.

Using Online Configuration Packets

Use online configuration packets to change the printer settings. You can send an individual packet or a packet that contains all seven online configuration packets. You can supply all parameters for each packet. Leave the parameters blank that you do not need to change. For example,
{ I,A,,,,1 ¦} prints a slashed zero and uses the last sent *online* System Setup parameters.

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

When you turn off the printer, all the information in the online configuration packets is saved and used when the printer is turned back on. After you change printer configurations, you must resend the format, 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 7 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.

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, 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 ¦
>   B, 2, 1, 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. DIP
switch settings will not be displayed. Refer to your *Operator's
Handbook* for information about DIP Switches.

Configuration Syntax Guidelines

When creating a printer configuration packet:

♦ Follow the "Standard Syntax Guidelines" listed at the beginning of this chapter.

♦ Begin a packet with the configuration header (I).

♦ Download multiple configuration packets within one packet or download a single configuration packet.

♦ Include the first five ANSI codes, at a minimum, in the control characters packet.

♦ If you change any of the online configuration packets, resend the format packet to the printer, so the configuration changes take effect.

♦ Make sure the communication settings at the host match those at the printer.

Defining the System Setup Packet

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

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

A1. A   System Setup Packet

A2. powup_mode Online Mode. Options:
0   online mode (default for all printers)
1   offline mode (9403)

A3. language   Display Language. Options
0   English (default for all printers)
1   French (9403)
2   German (9403)
3   Spanish (9403)

A4. *sep_on*	Batch Separators. Options:

0 Does not print a separator (default for all printers).
1 Prints a separator.
2 Double-length separator (prints 2 tags - 9835 only)

NOTE: If using non-indexed supply, the batch separator is always six inches long. If using a stacker, the batch separator is 3.66 inches long.

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

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

Example {I, A, 0, 0, 1, 1, 0 ¦ }

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

Defining the Supply Setup Packet

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

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

B1. *B* Supply Setup Packet

B2. *supply_type* Supply Type. Options:
0 Black mark stock
1 Die Cut/aperture stock (default for all printers)
2 Non-indexed stock (9820/9830/9835)

NOTE: You must use non-indexed supply in continuous mode.

B3. ribbon_on   Ribbon. Options:
       0   Ribbon not installed (default for 9403)
       1   Ribbon installed (default for 9820/9830)
       2   High Energy Ribbon installed (9830/9835)
    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 for all printers)
       1   On-demand mode

B5. supply_posn **-300** to **300** in 1/203 inch. 0 is the default for all printers.
    Adjusts the machine to print at the vertical 0,0 point on the
    supply. This adjustment accounts for mechanical tolerances
    from machine to machine. The supply position adjustment
    only needs to be made on the initial machine setup. 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't 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 9403/9820/9830 printers.
    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_adjust, speed_adj, ph_width ¦ }
C1. C	Print Control Packet
C2. contrast	**-390** to **156**. 0 is the default for all printers.
C3. print_adj	**-99** to **99** in 1/203 inch. 0 is the default for all printers. Adjusts where data prints vertically on the supply. Increase the print position to move print up, decrease to move print down.
C4. margin_adj	**-99** to **99** in 1/203 inch. 0 is the default for all printers. Adjusts where data prints horizontally on the supply. Increase the margin position to move print to the right, decrease to move print to the left. Margin and print position are format adjustments. They will not affect the supply position, dispense position, or backfeed distance.
C5. speed_adj	Print speed in inches per second (IPS). Options:

0	Default value
20	2.0 IPS (only speed available for 9403)
25	2.5 IPS (default for serial bar codes on 9820/9830/9835)
40	4.0 IPS (9820/9830/9835)
60	6.0 IPS (default for 9820/9830/9835)

NOTE: Serial bar codes printed at speeds greater than 2.5 IPS may not scan properly. We recommend a print speed of 2.5 IPS for labels less than two inches long using backfeed or on-demand mode printing. You must use a print speed of 2.5 IPS with the high energy ribbon.

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

D2. cur_sym   Currency Symbol. Options:

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

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

D3. secondary   Secondary Sign. Options:

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

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

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

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

Example	{I, D, 1, 1, 2 ¦ }

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

Defining the Control Characters Packet

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

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

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

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

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

E1. E   Control Characters Packet

E2. "ANSI_cd"	**~123**	Start of header	{	(left bracket)
	~044	Parameter separator	,	(comma)
	~034	Quoted strings	"	(quotes)
	~124	Field separator	¦	(pipe sign)
	~125	End of header	}	(right bracket)
	~126	Data escape character (optional)	~~	(double tilde)
	def. ch.	Immediate command character (optional). Up to any 3 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 9 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." To use DIP switches, refer to your *Operator's Handbook*. Changing the communication settings takes approximately two seconds. Communications sent during this interval will be lost. Make sure the host communication values match the values on the printer.

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

F1. F   Communication Settings Packet

F2. baud   Baud Rate. Options:

0	1200	**3**	9600 (default for all printers)
1	2400	**4**	19200
2	4800	**5**	38400

NOTE: The 9403 does not support 38400 baud.

F3. word_length Word Length. Options:

0	7-bit word length
1	8-bit word length (default for all printers)

F4. stop_bits Stop Bits. Options:

0	1-stop bit (default for all printers)
1	2-stop bits

F5. parity   Parity. Options:

0	None (default for all printers)
1	ODD parity
2	EVEN parity

F6. flow_control Flow Control. Options:

0	None	**2**	(CTS)
1	DTR (default for all printers)	**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.

The 9403 does not support backfeed. 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. You can't change the backfeed distance while the printer is active.

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

G1. G   Backfeed Control Packet

G2. action   Action. Options:
                  0   disable backfeed (default)
                  1   enable backfeed

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

G4. bkfd_dis   Backfeed Distance. Amount to move label backwards. **10** to **200** dots (default 65 dots). 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, 1, 50, 10 ¦ }

Enables backfeed and sets the dispense position to 50 dots (.25 inches) and the backfeed distance to 10 dots (.05 inches).

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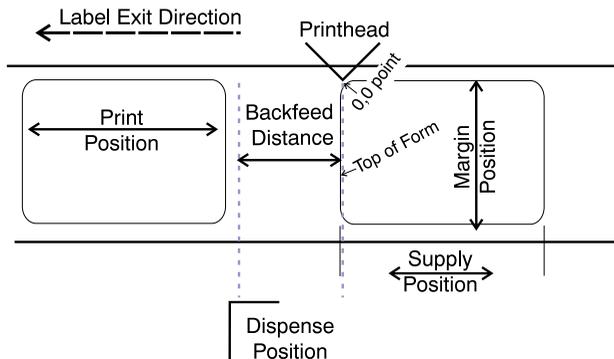
Contact Technical Support if you have problems adjusting where the format prints on the supply.

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
32	320
153	1530
229.5	2295

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

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

M1. M   Memory Configuration Packet

M2. buffer	Buffer type:

      D   Downloadable Fonts
      F   Format
      I   Image
      R   Receive
      T   Transmit
      V   Scalable (vector) Fonts (9830/9835)

M3. device   Storage type:

      N   Non-volatile RAM
      R   Volatile RAM

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

Example   {I, M, I , R, 1530¦ }

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

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

Buffer	Type	9403	9820	9830/9835
Transmit	Volatile	1K (.5K- 4K)	2K (.5K- 4K)	2K (.5K- 4K)
Receive	Volatile	8K (2K- 32K)	8K (2K- 64K)	30K (2K- 64K)
Image	Volatile	67K (41.5K- 124K)	269K (41.5K- 512K)	330K (41.5K- 512K)
Downloadable Fonts	Non-volatile	20K (8K- 32K)	128K (8K- 512K)	128K (8K- 512K)
Scalable Fonts	Volatile	N/A	N/A	384K
Formats (Formats, Batches, and Graphics)	Non-volatile	32K (16K- 64K)	64K (16K- 512K)	64K (16K- 512K)
Internal	N/A	cannot reallocate	cannot reallocate	cannot reallocate

The printer's configuration is stored in
non-volatile RAM and retained when you turn
off the printer.

Checking Current Buffer Sizes

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

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

Example	{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

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

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

Image Buffer Used to image the current format. The 9820 printer supports two 4-inch by 6-inch image buffers. You can create an image up to 12 inches long without reallocating memory. The 9830 and 9835 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 x Length
```

Length is the length of your label in inches.

Example
```
19.13K x 6 = 114.78K
```
(Multiply by 10 and round up.)
```
114.78K x 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: `Linecount x 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 9800 series printers, formats remain in memory when you turn off the printer.
Downloadable Fonts Buffer	Used to store downloaded soft (bitmapped) fonts. To determine the size of your downloadable fonts, send a font packet. See "Using the Font Packet" for more information.
Scalable (Vector) Fonts Buffer	Used to image the scalable font characters. Increasing this buffer size allows more characters to be saved in cache memory, so the characters do not have to be re-built the next time they are printed. Use **0** if you are not using scalable fonts. This buffer must be allocated as volatile (**R**) RAM.

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.

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** 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** to acknowledge an error. Normal operation will resume.
^FD	Feeds a label when printer is **idle**. Simulates the operation of pressing **FEED** and dispenses the next label if printer is in the on-demand mode. **NOTE:** Printer ignores this command if printing.
^ID or ^ICd	Disables the Immediate Command feature by turning off the Immediate Command escape character. Sets the Immediate Command escape character to the ASCII value given by the **d** parameter. The value can be any ASCII character.
^MC	Returns the customer ID or RPQ version to the host. (**00** to **99**)
^MI	Returns the customer ID or RPQ revision level to the host. (**00** to **99**)
^MM	Returns the model number to the host. 06 = M9820 07 = M9830 08 = M9835 09 = M9850 11 = M9403
^MP	Returns the prototype number to the host. (**00** to **99**)
^MR	Returns the revision number to the host. (**00** to **99**)
^MV	Returns the version number to the host. (**00** to **99**)
^PR	Resets the printer. This command takes five seconds to complete and then the printer is ready to receive data. It has the same effect as turning off and then turning on the printer. **NOTE:** Command should be used only when the printer is **not** printing.
^RB	Repeats the last printed batch, printing the same number of labels as specified in the original batch. **NOTE:** Printer ignores this command if printing.
^RS	Resynchronizes supply when supply roll is changed. **NOTE:** Printer ignores this command if printing.
^SD or ^SCd	Disables the status polling feature by turning off the status polling control character. Sets the status polling control character to the ASCII value given by the **d** parameter. The value of **d** can be any ASCII character.
^TP	Prints a test label set. **NOTE:** Printer ignores this command if printing.

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

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

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Clearing Packets from Memory

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

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

1. header   Identifies the packet. Options:
   A   Check Digit Scheme
   B   Batch
   F   Format
   G   Graphic
   W   Font

2. packet#   Identification number of the packet to clear (**1-999**) or font number (**0-9999**). 0 is for all fonts.

3. action   Enter **C** to clear the packet.

4. device   Storage device. Options:

   N   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.

W4. device   Storage device. Options:

                 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,O,M,R¦ }

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

    {W,O,M,R ¦
    Number of bytes free, Number of bytes used ¦ }

Example　　　　{W, O, H, Z ¦ }

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

The printer returns the following to the host:

```
{W, O, H, Z ¦
0, 1, 0, "Standard", 0, 0, 0, 14, 22, 14, 22, 3 ¦
0, 1, 1, "CGTri Bd9", 1, 0, 7, 25, 31, 10, 15, 0 ¦
0, 1, 437, "CGTri Bd9", 1, 0, 7, 25, 31, 10, 15, 0 ¦
0, 1, 850, "CGTri Bd9", 1, 0, 7, 25, 31, 10, 15, 0 ¦
0, 2, 0, "Reduced", 0, 0, 0, 7, 14, 7, 14, 1 ¦
0, 2, 1, "CGTri umv6", 1, 0, 5, 17, 21, 5, 10, 0 ¦
0, 2, 437, "CGTri umv6", 1, 0, 5, 17, 21, 5, 10, 0 ¦
0, 2, 850, "CGTri umv6", 1, 0, 5, 17, 21, 5, 10, 0 ¦
0, 3, 0, "Bol d", 0, 0, 0, 24, 34, 24, 34, 3 ¦
0, 4, 0, "OCRA", 0, 0, 0, 13, 24, 13, 24, 3 ¦
0, 5, 0, "HR1", 0, 0, 0, 12, 20, 12, 20, 2 ¦
0, 6, 0, "HR2", 0, 0, 0, 10, 16, 10, 16, 1 ¦
0, 10, 1, "CGTri Bd9", 1, 0, 7, 25, 31, 10, 15, 0 ¦
0, 10, 437, "CGTri Bd9", 1, 0, 7, 25, 31, 10, 15, 0 ¦
0, 10, 850, "CGTri Bd9", 1, 0, 7, 25, 31, 10, 15, 0 ¦
0, 11, 1, "CGTri umv6", 1, 0, 5, 17, 21, 5, 10, 0 ¦
0, 11, 437, "CGTri umv6", 1, 0, 5, 17, 21, 5, 10, 0 ¦
0, 11, 850, "CGTri umv6", 1, 0, 5, 17, 21, 5, 10, 0 ¦
0, 15, 1, "CGTri umv7", 1, 0, 7, 21, 28, 9, 14, 0 ¦
0, 15, 437, "CGTri umv7", 1, 0, 7, 22, 28, 9, 14, 0 ¦
0, 15, 850, "CGTri umv7", 1, 0, 7, 22, 28, 9, 14, 0 ¦
0, 16, 1, "CGTri umv9", 1, 0, 8, 28, 35, 12, 18, 0 ¦
0, 16, 437, "CGTri umv9", 1, 0, 8, 29, 35, 12, 18, 0 ¦
0, 16, 850, "CGTri umv9", 1, 0, 8, 29, 35, 12, 18, 0 ¦
0, 17, 1, "CGTri umv11", 1, 0, 9, 31, 40, 13, 22, 0 ¦
0, 17, 437, "CGTri umv11", 1, 0, 9, 33, 40, 13, 22, 0 ¦
0, 17, 850, "CGTri umv11", 1, 0, 9, 33, 40, 13, 22, 0 ¦
0, 18, 1, "CGTri umv15", 1, 0, 13, 47, 59, 20, 31, 0 ¦
0, 18, 437, "CGTri umv15", 1, 0, 13, 49, 59, 20, 31, 0 ¦
0, 18, 850, "CGTri umv15", 1, 0, 13, 49, 59, 20, 31, 0 ¦
0, 510, 1, "CGTri umv7", 1, 0, 7, 21, 28, 9, 14, 0 ¦
0, 510, 437, "CGTri umv7", 1, 0, 7, 22, 28, 9, 14, 0 ¦
0, 510, 850, "CGTri umv7", 1, 0, 7, 22, 28, 9, 14, 0 ¦
```

Labels (callouts to the listing above):
- **Font Style**
- **Symbol Set**
- **Type**
- **Cell Width**
- **Font Name**
- **Spacing**
- **Baseline**
- **Cell Height**
- **Nominal Width**
- **Nominal Height**
- **Inter-Character Gap**

```
0, 511, 1, "CGTriumv9", 1, 0, 8, 28, 35, 12, 18, 0 ¦
0, 511, 437, "CGTriumv9", 1, 0, 8, 29, 35, 12, 18, 0 ¦
0, 511, 850, "CGTriumv9", 1, 0, 8, 29, 35, 12, 18, 0 ¦
0, 512, 1, "CGTriumv11", 1, 0, 9, 31, 40, 13, 22, 0 ¦
0, 512, 437, "CGTriumv11", 1, 0, 9, 33, 40, 13, 22, 0 ¦
0, 512, 850, "CGTriumv11", 1, 0, 9, 33, 40, 13, 22, 0 ¦
0, 513, 1, "CGTriumv15", 1, 0, 13, 47, 59, 20, 31, 0 ¦
0, 513, 437, "CGTriumv15", 1, 0, 13, 49, 59, 20, 31, 0 ¦
0, 513, 850, "CGTriumv15", 1, 0, 13, 49, 59, 20, 31, 0 ¦}
```

This example shows the fonts for the 9820
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   Default spacing between characters in
Gap**   monospaced fonts.

DEFINING FIELDS

4

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#   Unique 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. **R** is the only valid value.

F5. measure   Unit of measure. Options:

E   English, measured in 1/100 inches
M   Metric, measured in 1/10 mm
G   Graphic, measured in dots

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

Printer	Unit of Measure	Supply Length	Supply Width	Row or End Row	Column or End Column
9403	English	75-600	75-200	0-599	0-199
	Metric	191-1524	191-508	0-1523	0-507
	Dots	152-1218	152-406	0-1217	0-405
9820	English	100-1200	120-400	0-1199	0-399
	Metric	254-3048	305-1016	0-3047	0-1015
	Dots	203-2436	244-812	0-2435	0-811
9830	English	100-1600	120-400	0-1599	0-399
	Metric	254-4064	305-1016	0-4063	0-1015
	Dots	203-3248	244-812	0-3247	0-811
9835	English	75-1600	120-400	0-1599	0-399
	Metric	191-4064	305-1016	0-4063	0-1015
	Dots	152-3248	244-812	0-3247	0-811

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

9403 range:		**9820** range:	
English	**75 - 600**	English	**100 - 1200**

9830 range:		**9835** range:	
English	**100 - 1600**	English	**75 - 1600**

F7. width	Supply width, from left to right, in selected units.

9403 range:		**9820/9830/9835** ranges:	
English	**75 - 200**	English	**120 - 400**

F8. "name"   Format name (optional), **0-8** characters, enclose within quotation marks.

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

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

Defining Text Fields

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

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

T1. T   Text Field.

T2. field#   Unique number from **0-999** (**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.
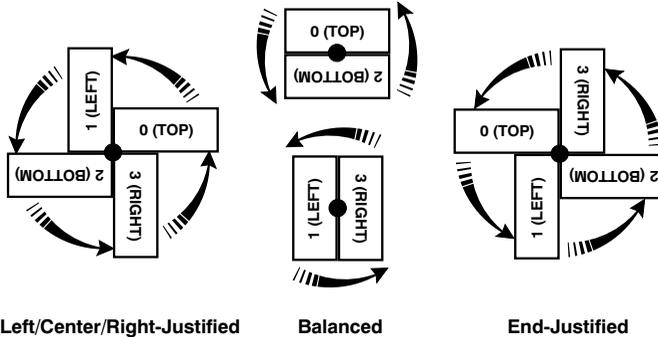
Left/Center/Right-Justified   **Balanced**   **End-Justified**

For proportionally spaced fonts, distance from bottom of print area to baseline of characters in field.

9403 range: **9820** range:

English   **0 - 599**   English   **0 - 1199**

9830/9835 ranges:

English   **0 - 1599**

T6. column   Distance from the left edge of the print area to the pivot point to find the column location.

9403 range:

English   **0 - 199**

9820/9830/9835 ranges:

English   **0 - 399**

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

T7. gap	Number of dots between characters (203 dots per inch). Range: **0-99**.

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

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

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

T8. font   Style of font. Options:

1	Standard	**10**	CG Triumvirate Bold
2	Reduced	**11**	CG Triumvirate
3	Bold	**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	CG Triumvirate Bold

Fonts **5** and **6** are for numeric data only.
The 9403 printer supports fonts **1**, **2**, **3**, **4**, **5**, **6**, **10**, and **11**.
The scalable font, CG Triumvirate Bold, (font **50**) is only available with the 9830 and 9835 printers.

T9. hgt mag   Height magnifier, **1-7** (times). Use a magnifier of **1** with proportionally spaced fonts, because characters lose smoothness at higher magnifications. For the scalable font (Font 50), the height and width refer to the point size (**4 to 90**) of the font. See Appendix B, "Fonts," for more information about the scalable font.

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

T11. color   Options for standard printer fonts:

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

Options for the Scalable Font:

      A   Opaque, Normal, Black, Bold
      B   Opaque, Normal, Black, Normal
      E   Opaque, Italics, Black, Bold
      F   Opaque, Italics, Black, Normal
      N   Transparent, Normal, Black, Bold
      O   Transparent, Normal, Black, Normal
      S   Transparent, Italics, Black, Bold
      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.

COATS
was -79.99 -
is   60.00

**Line field
blocked out by
opaque field
using attribute B**

COATS
was ~~79.99~~
is   60.00

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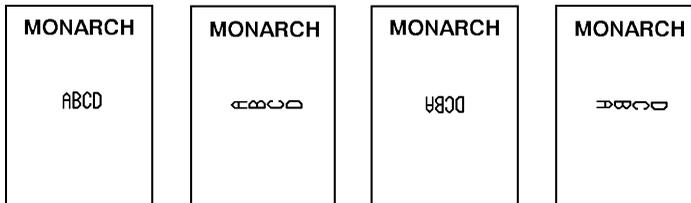
T14. field rot   Field rotation. Field rotation rotates the whole field, not just the characters. Rotation is affected by the pivot point, which varies depending on how text is justified. Lower left corner of field is the pivot point. Options:

0	Top of field points to top of supply
1	Top of field points to left of supply
2	Top of field points to bottom of supply
3	Top of field points to right of supply

T15. sym set   Symbol set. Options:

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

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

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

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

Defining Bar Code Fields

Each bar code field requires a separate definition.

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

B1. B   Bar Code Field.

B2. field#   Unique number from **0-999** (**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).

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

Bar Code	Number of Characters	Fixed or Variable
EAN13+2	15	F
EAN13+5	18	F
EAN13+Price CD	13	F
POSTNET	9 or 11	F
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	V
Code 128	0 to 2710	V
Code 16K	0 to 2710	V
Code 93	0 to 2710	V
MSI	0 to 14	V
PDF417	0 to 2710	V
MaxiCode	15 to 99	V

NOTE: MaxiCode, PDF417, Postnet, and Code 16K are available on the 9403, 9830, and 9835 printers. For the 9403 printer, we recommend these bar codes be used online.

B5. row   Distance from bottom of the print area to the pivot point of the field. The pivot point varies, depeding on how the field is justified. Pivot points:

Left/Center/Right-Justified Fields
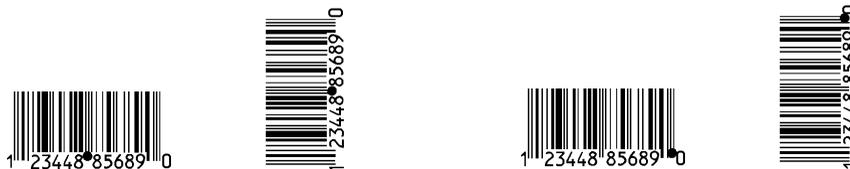
Balanced Fields   **End-Justified Fields**

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

9403 range: **9820** range:

English   **0 - 599**   English   **0 - 1199**

9830/**9835** ranges:

English   **0 - 1599**

B6. column   Distance from the lower left edge of the print area to the pivot point.

9403 range:

English   **0 - 199**

9820/**9830**/**9835** ranges:

English   **0 - 399**

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

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

B7. font	Bar code. Options:	
	1	UPCA
	2	UPCE
	3	Interleaved 2 of 5
	4	Code 39 (no check digit)
	5	Codabar
	6	EAN8
	7	EAN13
	8	Code 128
	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
	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.

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 2 3 4 5 6 7 8 9 10 11 **12** 13	1.1 2.1 3.2 4.2 5.6 6.3 7.5 8.8 9.6 11.2 11.0 12.7 14.5	21/103.4 12/59.1 7/34.5 6/29.6 4/19.7 4/19.7 3/14.8 3/14.8 3/14.8 2/9.9 2/9.9 2/9.9 2/9.9	1:3.0 1:2.5 1:3.0 1:2.5 1:3.0 1:2.5 1:3.0 1:2.3 1:2.0 1:3.0 1:3.0 1:2.5 1:2.0	0 to 2710	8	0 to 9
(Code 39 or MOD43 (Extended Code 39)	1 2 3 4 6 **7** 11 12 20	1.4 1.7 3.5 4.2 6.3 7.0 3.9 12.7 3.0	10/49.3 8/39.4 4/19.7 3/14.8 2/9.9 2/9.9 4/19.7 1/4.9 5/24.6	1:2.5 1:2.5 1:2.5 1:3.0 1:3.0 1:2.5 1:2.0 1:3.0 1:2.2	0 to 2710	8	SPACE $%*+-./ 0 to 9 A to Z
Codabar (NW7)	2 3 4 5 7 **8** 9	2.1 3.0 4.6 5.1 8.4 9.2 10.1	8/39.4 6/29.6 4/19.7 4/19.7 2/9.9 2/9.9 2/9.9	1:3.0 1:2.5 1:2.5 1:2.0 1:3.0 1:2.5 1:2.0	0 to 2710	8	$+-./ 0 to 9 a to d
Code 128 or Code 16 K	20 4 6 **8**	3.7/7.4 4.6/9.2 6.1/12.3 9.2/18.4	5/24.6 4/19.7 3/14.8 2/9.9	N/A	0 to 2710	8	00H to 7FH

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 4.5 5.6 7.5 11.2	6/29.6 5/24.6 4/19.7 3/14.8 2/9.9	N/A	0 to 2710	8	00H to 7FH
MSI	4 5 **7**	4.2 5.6 7.2	4/19.7 3/14.8 2/9.9	1:2.0 1:2.0 1:2.5	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 4.3 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 3 4 5 6 7 8 9	2/9.8 2/9.8 2/9.8 3/14.8 3/14.8 3/14.8 4/19.7 4/19.7 4/19.7	2/9.8 4/19.7 6/29 3/14.8 6/29.6 9/44.3 4/19.7 8/39.4 12/59.1	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

NOTE: Values in bold indicate the default.

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

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

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

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

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

B11. alignment   Choose **L**, **R**, **C**, **B** or **E** to align the bar code data correctly in the field. **B** centers variable width bar codes, which may not allow pad-character centering (Code 128, Code 39, etc.) **E** right justifies variable width bar codes. MaxiCode 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 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 5 for more information.

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

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

Each non-printable text field requires a separate definition.

Syntax   D, field#, # of char¦

D1. D   Non-Printable Text Field.

D2. field#   Unique number from **0-999** (**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.

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

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

C1. C	Constant Text Field.
C2. row	For monospaced fonts, distance from bottom of print area to the pivot point. For proportionally spaced fonts, distance from bottom of print area to baseline of characters in the field. (Bottom exits the printer first.)

9403 range:	**9820** range:
English **0 - 599**	English **0-1199**

9830/**9835** ranges:

English **0 - 1599**

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

9403 range:

English **0 - 199**

9820/**9830**/**9835** ranges:

English **0 - 399**

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

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

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

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

C5. font   Style of font. Options:

1	Standard	**10**	CG Triumvirate Bold
2	Reduced	**11**	CG Triumvirate
3	Bold	**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	CG Triumvirate Bold

Fonts **5** and **6** are for numeric data only.
The 9403 printer supports fonts **1**, **2**, **3**, **4**, **5**, **6**, **10**, and **11**.
The scalable font, CG Triumvirate Bold, (font **50**) is only available with the 9830 and 9835 printers.

C6. hgt mag   Height magnifier, **1-7** (times). Use a magnifier of **1** with proportionally spaced fonts, because characters lose smoothness at higher magnifications. For the scalable font (Font 50), the height and width refer to the point size (**4 to 90**) of the font. See Appendix B, "Fonts," for more information about the scalable font.

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

C8. color   Options for standard printer fonts:

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

Options for the Scalable Font:

A Opaque, Normal, Black, Bold
B Opaque, Normal, Black, Normal
E Opaque, Italics, Black, Bold
F Opaque, Italics, Black, Normal
N Transparent, Normal, Black, Bold
O Transparent, Normal, Black, Normal
S Transparent, Italics, Black, Bold
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. 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.
C Center text within field (for monospaced fonts only)
R Align on right side of field (for monospaced fonts only)
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

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
437	DOS Code Page 437 (Domestic)
850	DOS Code Page 850 (Multilingual)

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

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

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

Defining Line Fields

Use lines to form borders and mark out original prices. Define each line separately. This field is not assigned a field number, but is counted as a field (keep this in mind, as the printer allows a maximum of **1000** fields 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. There are two ways to define lines.

Segments   You choose the starting point and ending point.

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

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

L1. L   Line Field.

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

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

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

9403 range: **9820** range:

English   **0 - 599**   English   **0-1199**

9830/**9835** ranges:

English   **0 - 1599**

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

9403 range:

English   **0 - 199**

9820/**9830**/**9835** ranges:

English   **0 - 399**
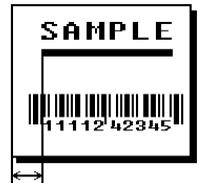
See "Defining the Format Header" for the table of metric and dot values.

L5. angle/ end row	If Using *Segments*

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

If Using *Vectors*

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

L6. length/ end col	If Using *Segments*

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

If Using *Vectors*

Length of the line in selected units.

Ranges for horizontal lines with 9403:

English   **0 - 200**

Ranges for horizontal lines with 9800:

English   **0 - 400**

Ranges for vertical lines with 9403:

English   **0 - 600**

Ranges for vertical lines with 9820:

English   **0 - 1200**

Ranges for vertical lines with 9830/9835:

English   **0 - 1600**

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

Dots	Thickness
1	
10	
24	
48	
96	
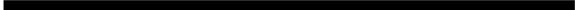
NOTE: Line thickness fills upward on horizontal lines, or to the right on vertical lines.

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

Example   L, S, 110, 30, 110, 150, 10, " " ¦

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

Defining Box Fields

Use boxes to form borders or highlight items of interest. Define each box field separately. This field is not assigned a field number, but is counted as a field (keep this in mind, as the printer allows a maximum of **1000** fields 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 (**Q**uadrilateral) Field.

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

9403 range:		**9820** range:	
English	**0 - 599**	English	**0 - 1199**

9830/9835 ranges:

English   **0 - 1599**

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

9403 range:

English   **0 - 199**

9820/9830/9835 ranges:

English   **0 - 399**
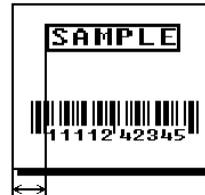
See "Defining the Format Header" for the table of metric and dot values.

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

Q5. end col   Distance from left edge of print area to upper right corner of box.   Ranges same as *column*.
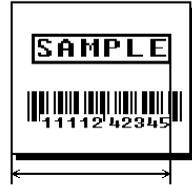
Q6. thickness   Using the chart below for reference, write the desired line thickness (**1 to 99**) in box **Q6**.   Measure in dots.

Dots	Thickness
1	
10	
24	
48	
96	

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

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

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

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

<div style="text-align: right">

5

</div>

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 (supported on all printers):

1	Define fixed characters
4	Copy data from previous field
30	Pad data to left or right with specified character
31	Generate check digit
42	Format as a price field
50	Define bar code densities
60	Define incrementing or decrementing field
61	Reimage fields

9403 Options:

2	Data type restrictions
3	Data entry template
5	Define data entry sources
20	Define data entry prompts
51	Define security and truncation of PDF417 bar codes
52	Define width or length of PDF417 bar codes

9830/9835 Options:

51	Define security and truncation of PDF417 bar codes
52	Define width or length of PDF417 bar codes

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

Option 1 (Fixed Data)

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

Syntax   R, 1, "fixed char"¦

R1. R   Option Header.

R2. 1   Option **1**.

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

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

Example   R, 1, "_ _ _%$_ _ _ _ _"¦

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

Example   R, 1, "MONARCH"¦

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

To fill in the non-fixed portion of the field, see "Defining Batch Data Fields" in Chapter 7. 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 printer.

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).

Option 3 is only available on the 9403 printer.

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.

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 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 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**.

R3. src fld	Field number from which data is copied. Range: **0** - **999**.
R4. src start	Position number in the source field of the first character to be copied. Character positions are numbered **1** to **2710**, starting from the left.
R5. # to copy	Number of characters to copy. Range: **1** - **2710**.
R6. dest start	Position number where copied characters are to begin printing in the destination field. Range: **1** - **2710**.
R7. copy code	Copy Method.

	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.

Option 5 is required for offline data entry on
the 9403 printer.

Syntax   R, 5, code¦

R1. R   Option Header.

R2. 5   Option **5**.

R3. code   Input code for the data in the field. Options:
        K   Keypad
        N   No user input for this field
        S   Scanner

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. This option is not recommended on fields filled entirely by fixed characters or copied data.

Option 20 is only available on the 9403 printer. This option must be defined before Option 5, or the prompt will not display during data entry.

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"`⦀

R1. R　　　　　Option Header.

R2. 30　　　　　Option **30**.

R3. L/R　　　　　Indicates type of padding

> **L**　　　　Pad field on left side
>
> **R**　　　　Pad field on right side

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

> **NOTE:**　Do not use on fixed length fields.

Example	R, 30, L, `"X"`⦀

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

Sample Use for Padding

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

Option 31 (Calculate Check Digit)

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

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

R1. R   Option Header.

R2. 31   Option **31**.

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

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

Example   R, 31, G, 5 ¦

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

Option 42 (Price Field)

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

Syntax	R, 42, appearance code¦
R1. R	Option Header.
R2. 42	Option **42**.
R3. appearance code	Enter **1** to print price field in standard notation, as defined by country setting.
	Use the monetary formatting packet to select monetary notations and symbols by country setting. See "Defining the Monetary Formatting Packet" for more information. See Appendix C, "Symbol Sets/Code Pages," to make sure the monetary symbol you want to use is printable in the font selected for this field. For monetary symbols other than the dollar sign, use the internal symbol set.
Example	R, 42, 1 ¦

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

Option 50 (Bar Code Density)

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

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

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

Syntax	R, 50, narrow, wide, gap, nar_space, wide_space¦

R1. R	Option Header.
R2. 50	Option **50**.
R3. narrow	Dot width of the narrow element. (Code 39 and Codabar only). Range: **1-99**.
R4. wide	Dot width of the wide element. (Code 39 and Codabar only). 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, 5, 1, 1 ¦

Creates a custom bar code density with a narrow element of 4 dots, a wide element of 8 dots, a gap of 5 dots, and one additional dot width for the narrow and 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.

Option 51 is not available on the 9820 printer.

Syntax   R, 51, securi ty, stand/defaul t ¦

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.

Option 52 is not available on the 9820 printer.

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.

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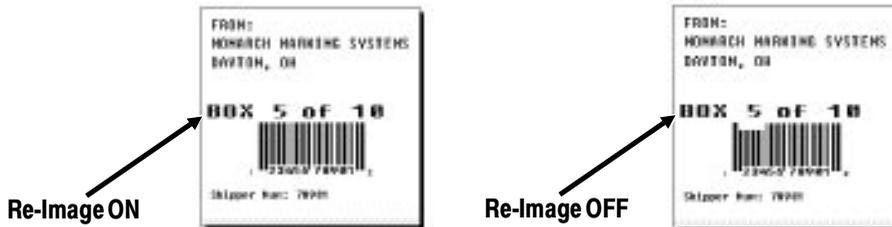
In the above example, Option 61 was applied to the bar code field to keep the incrementing field (Box #) from blocking out the bar code field.

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. Use **R**.
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

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

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

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

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

5. Subtract the remainder from the modulus.

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

   10 – 8 = 2

Sum of Digits Calculation

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

<div align="center">5 2 3 2 4 5 2 1 9</div>

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

field:	5 2 3 2 4 5 2 1 9
weight string:	4 1 2 3 4 1 2 3 4

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

field:	5 2 3 2 4 5 2 1 9
weight string:	4 1 2 3 4 1 2 3 4
products:	20 2 6 6 16 5 4 3 36

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

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

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

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

5. Subtract the remainder from the modulus.

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

10 – 4 = 6

CREATING GRAPHICS

6

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.
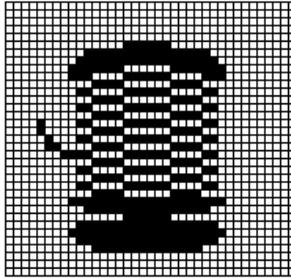
Determining a Method

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.
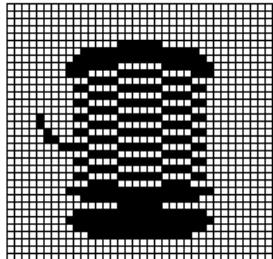
Special Considerations

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.
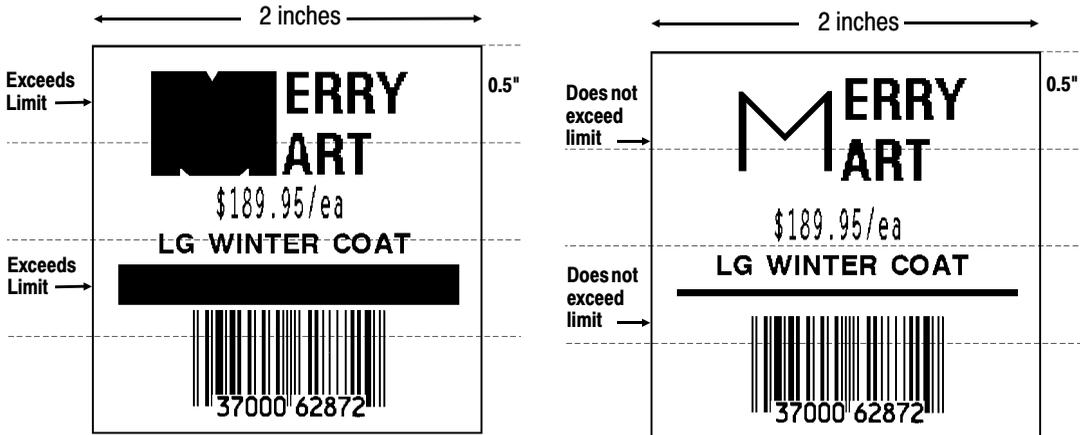
Using the Hex Method

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.

1. Assign **1** to every black square and **0** to every white square.

```
0000000000000000000000000000000000000000000000111111111111111111111111100000000000000000000000000
0000000000000000000000000000000000000000000111111111110000000000000000111111110000000000000000000
0000000000000000000000000000000000000000111110000000000000000111111111111111111111110000000000000
0000000000000000000000000000000000000111100000000000000111111111111111111111111000000001111000000000
0000000000000000000000000000000001111100011111111111111111111111111111111111111111100011111110000
0000000000000000000000000000001100011111111111111111111111111111111111111111111111111111100001100
0000000000000000000000000000011111111111111111111111111111111111111111111111111111111111111111110
0000000000000000000000000000111111111111111111111000000000000000001111111111111111111111111111110
0000000000000000000000000111111111111111111111100000000000000001111111111111111111111111111111110
0000000000000000000000000111111110000000000000001111111111111111100000000000000001111111110000
0000000000000000000000000111110000000111111111111111111111111111111111111110000001111000000
0000000000000000000000000011111111111111111111111111111111111111111111111111110000011000000
0000000000000000000000000111111100000000111111111111111111111111100000000000001111111110000000
0000000000000000000000000111000000011111111111111111111111111111111111111000011100000
0000000000000000000000000111111111111111100000000000000001111111111111111111110000
0000000000000000000000000001110000000111111111111111111111111111111111000011100000
0000000000000000000000000000011111111111111111111111111111111111111111110001110000
0000000000000000000000000111111111111000000000000001111111111111111111111111110000
0000000000000000000000000111110000000111111111111111111111111111111110000011100000
0000000000000000000000000000111111111111110000000000000000011111111111111110000000
0000000000000000000000000011110000000111111111111111111111111111111111000011100000
0000000000000000000000000011100000011111111111111111111111111111111111100011100000
0000000000000000000000000111111100000000011111111111111111111000000000011111110000
000000010000000000000000011100000011111111111111111111111111111111110001110000
00000011000000000000000011100000001111111111111111111111111111111111110000000
00000011100000000000000000011111111111111111111111111111111111111110001110000
000000011110000000000000001110000000111111111111111111111111111111111110000011100000
0000000111111000000000000011100000011111111111111111111111111111111111110000011100000
0000000011111100000000000011111111111111111111111111111111111111111111111000111000
```

2. Section off the grid in columns of eight. If any rows are not divisible by 8, add enough 0's to complete a column.

```
00000000 00000000 00000000 00000000 00000000 00000001 00111111 11111111 11111111 11110000 00000000 00000000 00000000
00000000 00000000 00000000 00000000 00000001 11111111 11000000 00000000 00000000 00011111 11111000 00000000 00000000
00000000 00000000 00000000 00000000 00111110 00000000 00000000 00000000 00000000 00000000 00000111 11100000 00000000
00000000 00000000 00000000 00000000 11000000 11000000 01111111 11111111 11111111 11110000 00000000 00011110 00000000
00000000 00000000 00000001 01111100 00111111 11111111 11111111 11111111 11111111 11111111 11111111 11000001 11110000
00000000 00000000 00000001 10000111 11111111 11111111 11111111 11111111 11111111 11111111 11111111 11111111 00001100
00000000 00000000 00000001 10001111 11111111 11111111 11111111 11111111 11111111 11111111 11111111 11111111 11111110
00000000 00000000 00000001 11111111 11111111 11111111 11111000 00000000 00000000 00000000 01111111 11111111 11111110
00000000 00000000 00000001 11111111 11111111 11111110 00000000 00000111 11111111 11111111 00000000 00011111 11111100
00000000 00000000 00000001 01111111 10000000 00000000 00000111 11111111 11111111 00000000 00000000 00011111 11110000
00000000 00000000 00000000 00011111 11000000 00000000 00000111 11111111 11111111 11111111 11111110 00000001 11000000
00000000 00000000 00000000 00011100 00000011 11111111 11110000 00000000 00000000 00000000 01111111 11111110 00000000
00000000 00000000 00000000 00000011 11111111 11110000 00000000 00000000 00000000 00000000 00111111 11111110 00000000
00000000 00000000 00000000 00011111 11000000 00000011 11111111 11111111 11111111 11111111 11111110 00000001 11000000
00000000 00000000 00000000 00011100 00000011 11111111 11111111 11111111 11111111 11111110 00000001 11000000
00000000 00000000 00000000 00000011 11111111 11110000 00000000 00000000 00000000 00000000 01111111 11111110 00000000
00000000 00000000 00000000 00011111 11000000 00000011 11111111 11111111 00000000 00000000 00011111 11000000
00000000 00000000 00000000 00000011 11111111 11111111 11111111 11111111 11111111 11111111 11100001 11000000
00000000 00000000 00000000 00011111 11000000 00000111 11111111 11111111 00000000 00000000 00011111 11000000
00000000 00000000 00000000 00011100 00000011 11111111 11111111 11111111 11111111 11111110 00000001 11000000
00000000 00000000 00000000 00000011 11111111 11110000 00000000 00000000 00000000 00000000 01111111 11111110 00000000
00000010 00000000 00000000 00011111 11000000 00000111 11111111 11111111 00000000 00000000 00011111 11000000
00000011 00000000 00000000 00011100 00000011 11111111 11111111 11111111 11111111 11111110 00000001 11000000
00000001 11100000 00000000 00000011 11111111 11110000 00000000 00000000 00000000 00000000 01111111 11111110 00000000
00000000 11100000 00000000 00011100 11111111 11110000 00000000 00000000 00000000 00000000 01111111 11111110 11100001
00000000 11111100 00000000 00011100 00000011 11111111 11111111 11111111 11111111 11111110 00000011 11000000
00000000 11111110 00000000 00000000 00111111 11111111 11111111 11111111 11111111 11111111 11100011 11000000
```

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.

```
00000000 00000000 00000000 00000000 00000000 00000000 00111111 11111111 11111111 11110000 00000000 00000000 00000000
00000000 00000000 00000000 00000000 00000001 11111111 11000000 00000000 00000000 00001111 11111000 00000000 00000000
00000000 00000000 00000000 00000000 00111110 00000000 00000000 00000000 00000000 00000000 00001111 11000000 00000000
00000000 00000000 00000000 00000011 11000000 00000000 00111111 11111111 11111111 11100000 00000000 00011110 00000000
00000000 00000000 00000000 01111100 00111111 11111111 11111111 11111111 11111111 11111111 11111111 11111111 11110000
00000000 00000000 00000001 10000011 11111111 11111111 11111111 11111111 11111111 11111111 11111111 11111110 00001100
00000000 00000000 00000001 10001111 11111111 11111111 11111111 11111111 11111111 11111111 11111111 11111111 11111110
00000000 00000000 00000001 11111111 11111111 11111111 11111111 11111111 11111111 11111111 11111111 11111111 11111110
00000000 00000000 00000001 11111111 11111111 11110000 00000000 00000000 00000000 00000000 01111111 11111111 11111100
00000000 00000000 00000000 01111111 10000000 00000000 00000111 11111111 11111111 00000000 00000000 00111111 11110000
00000000 00000000 00000000 00011111 11000000 11111111 11111111 11111111 11111111 11111111 11111111 00000001 11000000
00000000 00000000 00000000 00011100 00111111 11111111 11111111 11111111 11111111 11111111 11111110 00000001 11000000
00000000 00000000 00000000 00011111 11000000 00000000 00000111 11111111 11111111 00000000 00000000 00011111 11000000
00000000 00000000 00000000 00011100 00000011 11111111 11111111 11111111 11111111 11111110 00000001 11000000 11000000
00000000 00000000 00000000 00000000 00111111 11111111 11111111 11111111 11111111 11111111 11111111 11100001 11000000
00000000 00000000 00000000 00000111 11111111 11000000 00000000 00000111 11111111 00000000 00111111 11111110 00000000
00000000 00000000 00000000 00011100 00000011 11111111 11111111 11111111 11111111 11111110 00000001 11000000 11000000
00000000 00000000 00000000 00011111 11000000 00000000 00000111 11111111 11111111 00000000 00000000 00011111 11000000
00000000 00000000 00000000 00000011 11111111 11110000 00000000 00000000 00000000 00000000 01111111 11111110 00000000
00000000 00000000 00000000 00011100 11000000 00000111 11111111 11111111 11111111 00000000 00000000 00111111 11000000
00000000 00000000 00000000 00000000 01111111 11111111 11111111 11111111 11111111 11111111 11000001 11000000 11000000
00000000 00000000 00000000 00011111 11000000 00000000 00000111 11111111 11111111 00000000 00000000 00011111 11000000
00000000 00000000 00000000 00011100 00000011 11111111 11111111 11111111 11111111 11111110 00000001 11000000 11000000
00000000 00000000 00000000 00000000 00111111 11111111 11111111 11111111 11111111 11111111 11111111 11100001 11000000
00000010 00000000 00000000 00011111 11000000 00000000 00000111 11111111 11111111 00000000 00000000 00011111 11000000
00000011 11100000 00000000 00011100 00000011 11111111 11111111 11111111 11111111 11111110 00000001 11000000 11000000
00000001 11100000 00000000 00000011 11111111 11110000 00000000 00000000 00000000 00000000 01111111 11111110 00000000
00000000 11100000 00000000 00000011 11111111 11110000 00000000 00000000 00000000 00000000 01111111 11111110 00000000
00000000 11111100 00000000 00000011 11111111 11111111 11111111 11111111 11111111 11111111 11111111 11100011 11000000
00000000 11111110 00000000 00000000 00111111 11111111 11111111 11111111 11111111 11111111 11111111 11100011 11000000
```

1. Count the number of consecutive OFF or ON dots in a row. Write the number of consecutive dots in sequence for the first row on the grid. Write "ON" or "OFF" after each number to indicate ON or OFF dots.

```
(row 1, position 50) 26 on
(row 2, position 39) 11 on, 26 off, 9 on
(row 3, position 34) 5 on, 45 off, 6 on.
```

2. Replace each number you have written with its corresponding code from the Dot to Run Length Encoding Chart provided in Appendix C, "Symbol Sets/Code Pages." Be sure to use CAPITAL letters for black dots and lower-case letters for white dots.

```
26 on (Z)
11 on (K), 26 off (z), 9 on (I)
.
.
```

If the number is greater than 26, write z, followed by the letter corresponding to the amount over 26. For example, to represent 45 off dots, write zs.

```
5 on (E), 45 off (zs), 6 on (F)
.
.
```

3. Write the letter codes in sequence, uninterrupted, for each row.

```
(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 two options:

◆ RAM
◆ Temporary Storage

Using 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
another format is used for printing. 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.

Graphic images remain in temporary storage until the image
buffer is cleared (a new format is sent). 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).
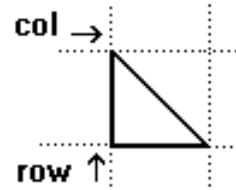
If you want a fixed amount of white space around your graphic image, use something other than **0** for *row* and/ or *column*.
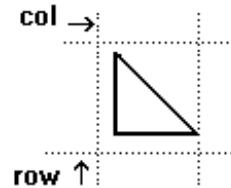
The area enclosed within the dotted lines represents the graphic image starting at **0,0** with a fixed amount of white space (**10,10**) around the graphic image.

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.**
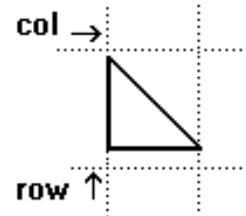
Within a Format

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** (**0-99** for 9403) to identify the graphic image.

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

G4. device   Graphic storage device:
R   Volatile RAM (format must contain a graphic field)
T   Temporary storage

G5. units   Unit of measure. Options:
E   English, measured in 1/100 inches
M   Metric, measured in 1/10 mm
G   Graphic, measured in dots. For bitmapped graphics, **G** 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.

9403 range:		**9820** range:	
English	**0 - 599**	English	**0 - 1199**

9830/**9835** ranges:

English	**0 - 1599**

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.

9403 range:

English	**0 - 199**

9820/**9830**/**9835** ranges:

English	**0 - 399**

See "Defining the Format Header" in Chapter 4 for the table of metric and dot 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.

9403 range:	**9820** range:	
English **0 - 599**	English	**0 - 1199**

9830/9835 ranges:

English **0 - 1599**

B3. column	Distance (in dots) from the graphic image's left edge to the bitmap line.

9403 range:

English **0 - 199**

9820/9830/9835 ranges:

English **0 - 399**

See "Defining the Format Header" in Chapter 4 for the table of
metric and dot 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, "03FFFFFFFFFFFFFFFFFFFC" ¦
                   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 4, "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."

Sample Hex Graphic Packet

```
{G, 99, A, R, G, O, O, O, "99WIRE"
B, 39, 48, H, "3FFFFFF0"¦
B, 40, 32, H, "01FFC000000FF8"¦
B, 41, 32, H, "3E00000000000FC0"¦
B, 42, 24, H, "03C0003FFFFFF0000F"¦
B, 43, 24, H, "7C3FFFFFFFFFFFFFE1F0"¦
B, 44, 16, H, "0183FFFFFFFFFFFFFFFFF06"¦
B, 45, 16, H, "018FFFFFFFFFFFFFFFFFFFE"¦
B, 46, 16, H, "01FFFFFFFFFFFFFFFFFFFFE"¦
B, 47, 16, H, "01FFFFF80001FFFFFFFFE"¦
B, 48, 16, H, "01FFFFF0000000007FFFFC"¦
B, 49, 24, H, "7F800007FFFF00003FF0"¦
B, 50, 24, H, "1FC00007FFFF00001FC0"¦
D, 0, 4, 4¦
B, 51, 24, H, "1C03FFFFFFFFFFFE01C0"¦
D, 0, 4, 4¦
B, 52, 32, H, "3FFFFFFFFFFFFFE1C0"¦
D, 0, 4, 4¦
B, 53, 24, H, "03FFF0000000007FFE"¦
D, 0, 4, 4¦
B, 70, 0, H, "0400001FC00007FFFF00001FC0"¦
B, 71, 0, H, "0600001C03FFFFFFFFFFFE01C0"¦
B, 72, 0, H, "030000003FFFFFFFFFFFFFFE1C0"¦
B, 73, 0, H, "01000003FFF0000000007FFE"¦
B, 74, 8, H, "FC001C03FFFFFFFFFFFE00C0"¦
B, 75, 8, H, "FE00003FFFFFFFFFFFFFE0C0"¦
B, 76, 8, H, "1FF803FFF0000000007FFE"¦
B, 77, 8, H, "0FFFCFFC00000000000001C0"¦
B, 78, 16, H, "FFDF000FFFFFFFFF8003C0"¦
B, 79, 16, H, "7FFFC00007FFFF00001FC0"¦
B, 80, 24, H, "1C03FFFFFFFFFFFE01C0"¦
D, 0, 4, 4¦
B, 81, 32, H, "3FFFFFFFFFFFFFE1C0"¦
D, 0, 4, 4¦
B, 82, 24, H, "03FFF0000000007FFE"¦
D, 0, 4, 3¦
B, 83, 24, H, "1FC00007FFFF00001FC0"¦
D, 0, 4, 3¦
B, 98, 24, H, "03FFFFFFFFFFFFFFFF0"¦
B, 99, 24, H, "07FFFFFFFFFFFFFFFFC"¦
B, 100, 24, H, "1FF9FFFFFFFFFFFFFFF"¦
B, 101, 24, H, "3FFE0007FFFF8000FF80"¦
B, 102, 24, H, "391E0027FFFF803FFFC0"¦
B, 103, 24, H, "1C7FFFFFFFFFFFFFFFFC0"¦
B, 104, 24, H, "1FC1FFFFFFFFFFFFF1FC0"¦
B, 105, 24, H, "0FFDFFFFFFFFFFFE0FF"¦
```
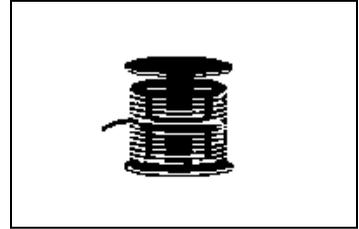
```
B, 106, 24, H, "FFFFFFFFFFFFFFF8" ¦
B, 107, 32, H, "3FFFFFFFFFFFFFE0" ¦
B, 108, 32, H, "03FFFFFFFFFFFF" ¦
B, 109, 48, H, "07FFFF80" ¦
D, 0, 1, 2 ¦
B, 111, 48, H, "FFFFFFFF" ¦
B, 112, 32, H, "FFFF00000000FFE0" ¦
B, 113, 24, H, "078000FFFFFFFF001F" ¦
B, 114, 24, H, "78FFFFFFFFFFFFFFE060" ¦
B, 115, 16, H, "0187FFFFFFFFFFFFFFFFC18" ¦
B, 116, 16, H, "027FFFFFFFFFFFFFFFFFFFF2" ¦
B, 117, 16, H, "03FFFFFFFFFFFFFFFFFFFFFC" ¦
D, 0, 1, 2 ¦
B, 120, 16, H, "01FFFFFFFFFFFFFFFFFFFFF8" ¦
B, 121, 24, H, "FEFFFFFFFFFFFFFFFFFFE0" ¦
B, 122, 24, H, "07FFFFFFFFFFFFFFFFC" ¦
B, 123, 32, H, "FFFFFFFFFFFFFFC0" ¦
B, 124, 32, H, "01FFFFFFFFFFF8" ¦ }
```

Sample Run Length Graphic Packet

```
{ G, 99, A, R, G, 0, 0, 0, "99WIRE" ¦
B, 39, 50, R, "Z" ¦
B, 40, 39, R, "Kzl" ¦
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" ¦
```
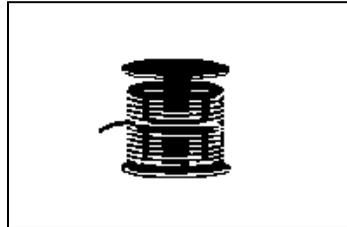
```
B, 76, 11, R, "JiNzkN"¦
B, 77, 12, R, "NbJzzeC"¦
B, 78, 16, R, "JaElZKmD"¦
B, 79, 17, R, "QsSsG"¦
B, 80, 27, R, "ChZWgC"¦
D, 0, 4, 4¦
B, 81, 34, R, "ZZEdC"¦
D, 0, 4, 4¦
B, 82, 30, R, "NzkN"¦
D, 0, 4, 4¦
B, 83, 27, R, "GsSsG"¦
D, 0, 4, 4¦
B, 98, 30, R, "ZZJ"¦
B, 99, 29, R, "ZZM"¦
B, 100, 27, R, "JbZZE"¦
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.

9403 range: **9820** range:

English   **0 - 599**   English   **0 - 1199**

9830/**9835** ranges:

English   **0 - 1599**

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.

9403 range:

English   **0 - 199**

9820/**9830**/**9835** ranges:

English   **0 - 399**

See "Defining the Format Header" in Chapter 4 for the table of metric and dot 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, "999991-001"¦
13, "AR"¦
14, "999-999999-99"¦
15, "32678"¦ }
```

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

This chapter describes how to

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

Turn on the printer and make sure it is ready to receive data before you download. See your host's documentation, 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 5)
   ✦ Format packets (see Chapter 4)
   ✦ Graphic packets (see Chapter 6)

4. Batch data (see "Defining the Batch Header")

To download from a PC:

1. Check that the PC and the printer are connected.

2. Check that communications have been established between the PC and the printer.

3. Send the communication settings packet to select the printer's communication settings. See "Defining the Communication Settings Packet" in Chapter 3 for more information (only used for serial communication). If you change the printer's communication settings, make sure they match those at the host before sending any packets to the printer.

4. Type this command at the DOS prompt:

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

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

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

Refer to your *9403 Operator's Handbook* 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   defines the actual information printed on the
(optional)   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-9835 only)

> **Note:** If using non-indexed supply, the batch separator is always six inches long. If using a stacker, the batch separator is always 3.66 inches long.

E4. print_mult Number of tags with the same image.

1 to **999**

E5. multi_part Number of identical parts on one tag.

1 to **5**

| *E6. cut_type* | Enables or disables the knife. Options: |
| | |

	0	Does not cut
	1	Cut after tag
	2	Cut after batch

NOTE: If you choose cut after 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.

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.

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   `field#,"data string"¦`
                 `C,"continuation"¦`

field#   Identifies the text, bar code, or non-printable text field in which to insert the following data. Range: **0** - **999** (**0** - **99** for 9403).

"*data string*"	Provides the actual information to appear in fields. Enclose in quotation marks. Range: **0 - 2710** (**0** - **100** for 9403).
C	Identifies information to be appended to the data string. (This parameter is optional.)
"*continuation*"	Provides the actual information to be added to the batch packet. Enclose in quotation marks. Use this option to break up longer fields. (This parameter is optional.)

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

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

Merged or Sub-Fields

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

Incrementing Fields

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

Downloading Methods

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

Sequential Method

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

Example   {Format}
                   {Batch Packet}

Batch Method

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

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

Batch Quantity Zero Method

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

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

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

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

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

3. Repeat step 2 for each field except the last one.

4. For the last field, input data and send a batch header with the quantity of labels you want printed. When the printer receives input for the last field, it immediately prints the labels. See "Reducing Imaging Time" in Chapter 11 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:  96OO,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

8

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

```
bit  7  6  5  4  3  2  1  0
    ┌──┬──┬──┬──┬──┬──┬──┬──┐
    │ 0│ 1│ x│ x│ x│ x│ x│ x│
    └──┴──┴──┴──┴──┴──┴──┴──┘
                        └─→ online
                        ──→ active
                        ──→ busy
                        ──→ online data error
                        ──→ operator correctable error
                        ──→ hardware failure
                        ──→ constant ON
                        ──→ constant OFF
```

Status Byte #3

```
bit  7  6  5  4  3  2  1  0
    ┌──┬──┬──┬──┬──┬──┬──┬──┐
    │ 0│ 1│ x│ x│ x│ x│ x│ x│
    └──┴──┴──┴──┴──┴──┴──┴──┘
                        └─→ online error
                        ──→ stock error
                        ──→ ribbon error
                        ──→ waiting to dispense label
                        ──→ format error
                        ──→ low battery
                        ──→ constant ON
                        ──→ constant OFF
```
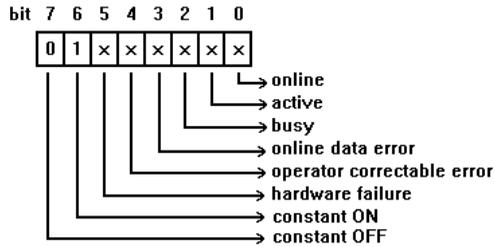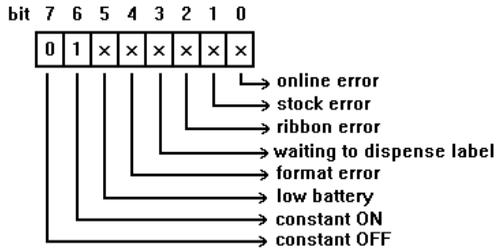
ENQ Reference Table - Byte #2

Char	Const. OFF	Const. ON	Comp. Failure	Corr. Error	Online Data Error	Busy	Active	Online
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
@	0	1	0	0	0	0	0	0
A	0	1	0	0	0	0	0	1
B	0	1	0	0	0	0	1	0
C	0	1	0	0	0	0	1	1
D	0	1	0	0	0	1	0	0
E	0	1	0	0	0	1	0	1
F	0	1	0	0	0	1	1	0
G	0	1	0	0	0	1	1	1
H	0	1	0	0	1	0	0	0
I	0	1	0	0	1	0	0	1
J	0	1	0	0	1	0	1	0
K	0	1	0	0	1	0	1	1
L	0	1	0	0	1	1	0	0
M	0	1	0	0	1	1	0	1
N	0	1	0	0	1	1	1	0
O	0	1	0	0	1	1	1	1
P	0	1	0	1	0	0	0	0
Q	0	1	0	1	0	0	0	1
R	0	1	0	1	0	0	1	0
S	0	1	0	1	0	0	1	1
T	0	1	0	1	0	1	0	0
U	0	1	0	1	0	1	0	1
V	0	1	0	1	0	1	1	0
W	0	1	0	1	0	1	1	1
1	0	1	0	1	1	0	0	0
Y	0	1	0	1	1	0	0	1
Z	0	1	0	1	1	0	1	0
[	0	1	0	1	1	0	1	1
\	0	1	0	1	1	1	0	0
]	0	1	0	1	1	1	0	1
^	0	1	0	1	1	1	1	0
_	0	1	0	1	1	1	1	1
`	0	1	1	0	0	0	0	0

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

ENQ Reference Table - Byte #2 (continued)

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

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

ENQ Reference Table - Byte #3

Char	Const. OFF	Const. ON	Low Battery	Format Error	Waiting to Dispense Label	Ribbon Fault	Stock Fault	Online Error
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
@	0	1	0	0	0	0	0	0
A	0	1	0	0	0	0	0	1
B	0	1	0	0	0	0	1	0
C	0	1	0	0	0	0	1	1
D	0	1	0	0	0	1	0	0
E	0	1	0	0	0	1	0	1
F	0	1	0	0	0	1	1	0
G	0	1	0	0	0	1	1	1
H	0	1	0	0	1	0	0	0
I	0	1	0	0	1	0	0	1
J	0	1	0	0	1	0	1	0
K	0	1	0	0	1	0	1	1
L	0	1	0	0	1	1	0	0
M	0	1	0	1	1	0	0	1
N	0	1	0	0	1	1	1	0
O	0	1	0	0	1	1	1	1
P	0	1	0	1	0	0	0	0
Q	0	1	0	1	0	0	0	1
R	0	1	0	1	0	0	1	0
S	0	1	0	1	0	0	1	1
T	0	1	0	1	0	1	0	0
U	0	1	0	1	0	1	0	1
V	0	1	0	1	0	1	1	0
W	0	1	0	1	0	1	1	1
X	0	1	0	1	1	0	0	0
Y	0	1	0	1	1	0	0	1
Z	0	1	0	1	1	0	1	0
[	0	1	0	1	1	0	1	1
\	0	1	0	1	1	1	0	0
]	0	1	0	1	1	1	0	1
^	0	1	0	1	1	1	1	0
_	0	1	0	1	1	1	1	1
'	0	1	1	0	0	0	0	0

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

ENQ Reference Table - Byte #3 (continued)

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

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

Job Request

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

◆ Numeric Error Codes Only (0, 1, or 2)

◆ Verbose (3 or 4)

Syntax   {J, #}

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

Example   {J, 3}

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

To clear an error, press **CLEAR** or ⌈Enter⌋, 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.

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 10, "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
A- Packet Type   occurred on. The packet could be Format (**F**),
                      Batch (**B**), Check Digit (**A**), Graphic (**G**), or
                      Font (**W**).

Status2   represents the MPCLII field that the error
B- Field Type   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   represents the field number within each
C- Field Number   packet. The packet header is the first field
                        and each subsequent field is indicated by the
                        field separator.

Status2   represents the parameter within the field that
D- Parameter   the error occurred. The numbering begins
                        after the field identifier.

Status2   is the error that coincides with the error
E- Error Number   numbers presented in Chapter 10, "Errors."

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

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

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

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

To clear an error, press **CLEAR** or (**Enter**), 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

DIAGNOSTICS

9

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.

Printing a Test Label

Using the 9403 Printer

1. From the User Diagnostics menu, press ⏵ until you see

```
              USER DIAG
  ⟵         Test Label
```

2. Press ⏎ Enter . You will see

```
  Print Quantity?
  [1/999]: +1
```
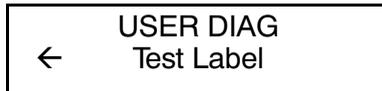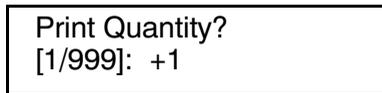
3. Type the quantity of test labels you want to print. Press ⏎ Enter .

You will see


```
           MONARCH MARKING
MODEL:      M9403    SOFTWARE:  V1.0
STOCK CNT: 0000002   COM:       9600.N.8.1.0
ENQ/IMD:    05/--    MPCL:      {,"!}~
ENQ TRL:    --/02/ff RS232 TRL: 0d/0a/--
CONTRAST:   +000     CODE PAGE: 0
AVG RES:    1172     VOLTAGE:   18.08
```
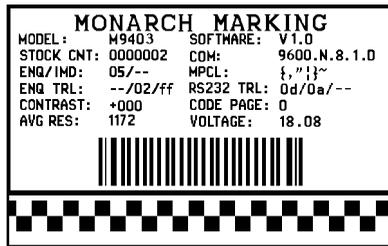
The test label shows the model number, software version, total number of inches printed, voltage, print contrast, printhead resistance, code page, MPCL control characters, ENQ and RS232 characters.

Using the 9800 Series Printers

To print test labels, press **FEED** and **PAUSE** simultaneously. Hold for one second and release. You will see:

```
MONARCH MARKING
MODEL: M9835 S/W:VERSION 3.0.0.0.0
A,0,0,0,0,0|B,2,1,0,0,0|
C,0,0,0,0,0,0|
D,1,0,2|
E,{,,,",|,},~,--,-- Od/Oa|
F,3,1,0,0,1|
G,0,65,65|
M,0,N,1280| M,F,N,640
M,1,R,3300 | M,R,R,300
M,T,R,20|M,V,R,3740
```

```
MONARCH MARKING
MODEL: M9835 S/W:VERSION 3.0.0.0.0
   TOTAL INCHES:    0002407
   HI ENERGY INCHES: 0000000
   VOLTAGE:          36.96
   CONTRAST POT:        20
   PH RESISTANCE:     0846
   BAD DOTS:           000
   MEMORY:   1024KR/256KN
   OPTIONS:            000
   DIPSW  0000000000000000
```

Reading a Test Label

The first label shows the printer's configuration by packet (A-M). See Chapter 3, "Configuring the Printer," for more information. The lines beginning with **M** show the printer's memory allocation, which can be changed.

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, installed options, and DIP switch settings. The test label for the 9830 and 9835 printers shows an inch count for the high energy ribbon. Refer to your *Operator's Handbook* for information about the DIP switch settings. The one-dot rule line at the bottom of the test label indicates the vertical 0,0 point.

Troubleshooting Information

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

If You Receive an Error Message

If an error message appears on the LCD, see Chapter 10, "Errors," for more details. Any time you receive a message that is not described in this manual, or the recommended action does not solve the problem, call Technical Support. Some errors are the result of communication problems. In this case, reset your printer and reboot your computer. For more information, refer to "If the PC and Printer Aren't Communicating."

If you change any of the online configuration packets, resend the format packet to the printer, so the configuration changes take effect.

If the PC and Printer Aren't Communicating

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

◆ Check any messages that occur at the printer and at the computer. See Chapter 10, "Errors," for information about the specific error messages you may receive.

◆ Make sure you are using the correct printer cable.

◆ Make sure the cable is plugged into the correct port on the computer.

◆ Compare your printer's communications settings (especially flow control) with the settings on your PC. Your printer and PC communications should match. Print a test label to identify the printer's communication settings.

◆ Make sure the printer is online (ready to receive data).

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

Resetting Printers

Sometimes, the printer receives mixed signals and loses its ability to communicate. If this happens, reset the printer and attempt communication again. To reset the printer, turn off the printer, wait two seconds (15 seconds for the 9800 printers), 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 3 "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 corrected simply by changing the communication settings.

5. List any changes that have recently been made to the system. Try to record what you did when the problem occurred.

6. Reset your printer. For information on resetting your printer, see "Resetting Printers."

7. Reboot your computer. Refer to your computer documentation for specific instructions.

8. Print a test label, see "Printing a Test Label."

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

Have the following information ready before you call:

◆ computer brand name and model
◆ version of DOS
◆ Monarch printer model
◆ other peripheral devices on your system
◆ support agreement, contract number, or invoice information
◆ customer number
◆ printer serial number

Additional Diagnostics Information

For detailed printer diagnostics information, refer to your *Operator's Handbook*. See Chapter 8, "Status Polling," for information on requesting printer and job status. See Chapter 10, "Errors," for detailed information on error conditions and how to resolve them.

ERRORS

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

If you have trouble loading supplies or performing maintenance, refer to your *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 **CLEAR** or `Enter` , 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** to queue and print an error label.
An error label is not available on the 9403 printer.

Reading an Error Label

An error label queues and prints on the 9800 series printers when you press **FEED** after a data error occurs. 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: M9820  S/W: Version 1.0

FORMAT NAME  :  40200
BATCH NAME   :
PACKET TYPE  :  F
FIELD TYPE   :  C
LINE #       :  8
ERROR #      :  18
```

```
   MONARCH MARKING
MODEL: M9820  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 8, "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 4 for valid lengths.
005	Supply width is invalid. See "Defining the Format Header" in Chapter 4 for valid widths.
006	Storage device must be **R** (volatile RAM).
007	Unit of measure must be **E** (English), **M** (Metric), or **G** (Dots). See "Defining the Format Header" in Chapter 4 for information.
010	Field ID number is outside the range **0** to **999** 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 4 for
           valid row lengths.

013   Column field position is greater than the maximum stock
           dimension. See "Defining Text Fields" in Chapter 4 for
           valid column widths.

014   Font style must be **1**, **2**, **3**, **4**, **10**, **11**, **15**, **16**, **17**, **18**, or
           50. See "Defining Text Fields" in Chapter 4 or Appendix
           B, "Fonts," for more information.

015   Character rotation must be **0** (0 degree), **1** (90 degree),
           2 (180 degree), or **3** (270 degree). See "Defining Text
           Fields" in Chapter 4 for information.

016   Field rotation must be **0** (0 degree), **1** (90 degree), **2**
           (180 degree), or **3** (270 degree). See "Defining Text
           Fields" in Chapter 4 for information.

017   Field restriction must be **V** (variable) or **F** (fixed).

018   Code page selection defined in the field must be **0**
           (Internal), **1** (ANSI), **2** (DOS 437), or **3** (DOS 850).

020   Vertical magnification must be **1** to **7**.

021   Horizontal magnification must be **1** to **7**.

022   Color must be **A**, **B**, **D**, **E, F**, **N**, **O**, **R**, **S**, **T**, or **W**. See
           "Defining Text Fields" in Chapter 4 for more information.

023   Intercharacter gap must be **0** to **99** dots.

024   Field justification must be **B** (balanced), **C** (centered), **E**
           (end), **L** (left), or **R** (right). See "Defining Text Fields" in
           Chapter 4 for more information.

025   String length is outside the range **0** to **2710** or **0** to **100**
           depending on your printer.

030	Bar code height must be at least **20** (English), **51** (Metric), **40** (Dots), or is not within the supply dimensions.
031	Human readable option must be

0	default
1	no CD or NS
5	NS at bottom, no CD
6	CD at bottom, no NS
7	CD and NS at bottom
8	no text

032	Bar code type is invalid. See "Defining Bar Code Fields" in Chapter 4 for valid options.
033	Bar code density is invalid. See "Defining Bar Code Fields" in Chapter 4 for the bar code density chart.
040	Line thickness must be **0** to **99** dots.
041	Line direction must be **0**, **90**, **180**, or **270**.
042	End row is invalid. Line segment or box end row is defined outside of printable area.
043	End column is invalid. Line segment or box end column is defined outside of printable area.
044	Dot pattern for line or box must be "".
045	Line length is defined beyond the maximum length. See "Defining Line Fields" in Chapter 4 for valid lengths.
046	Line type must be **S** (segment) or **V** (vector).
051	Imaging mode in the graphic header must be **0**.
101	The format referenced by batch is not in memory.
102	Print quantity is outside the range **0** to **32000**.

104	Batch mode must be **N** (new) or **U** (update).
105	Batch separator must be **0** (Off), **1** (On), **2** (Double) in the batch control field.
106	Print multiple is outside the range **1** to **999**.
107	Cut multiple is outside the range **0** to **999**. Only valid for printers with a knife.
108	Multiple part supply is outside the range **1** to **5**.
109	Reserved for knife usage. Only valid for printers with a knife.
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 **15**.
222	Data type restriction is outside the range of **1** to **6**.
223	Option is not valid for the field.
224	Bar code Intercharacter gap must be **0** to **99** dots. (This is also known as the additional character gap when using Option 50, Defining Bar Code Densities.)
251	Power up mode must be **0** (online) 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), or **2** (non-indexed).
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 3 for more information.
259	Contrast adjustment must be **-390** to **156** dots.
260	Print adjustment must be **-99** to **99** dots.
261	Margin adjustment must be **-99** to **99** dots.
262	Speed adjustment must be **20** (2.0 IPS), **25** (2.5 IPS), **40** (4.0 IPS), or **60** (6.0 IPS).
263	Primary monetary symbol is invalid. See "Defining the Monetary Formatting Packet" in Chapter 3 for more information.
264	Secondary symbol selection must be **0** (none) or **1** (print secondary sign).
265	Monetary decimal places must be **0** to **3**.
266	Character string length in the control characters packet must be **5** (MPCL control characters) or **7** (ENQ/IMD command character).

267   Baud rate selection must be **0** (1200), **1** (2400), **2** (4800), **3** (9600), **4** (19200), or **5** (38400). Resend the communication settings packet or check the DIP switch settings.

268   Word length selection must be **0** (7 bits), or **1** (8 bits). Resend the communication settings packet or check the DIP switch settings.

269   Stop bits selection must be **0** (1 bit), or **1** (2 bits). Resend the communication settings packet or check the DIP switch settings.

270   Parity selection must be **0** (none), **1** (odd), or **2** (even). Resend the communication settings packet or check the DIP switch settings.

271   Flow control selection must be **0** (none), **1** (DTR), **2** (CTS/RTS), or **3** (XON/XOFF). Resend the communication settings packet or check the DIP switch settings.

272   Internal code page selection must be **0** (Internal), **1** (ANSI), **2** (DOS 437), or **3** (DOS 850).

273   Cut adjustment must be **-300** to **300** dots.

282   RS232 Trailer string is too long. Use a maximum of **3** characters.

283   ENQ Trailer string is too long. Use a maximum of **3** characters.

284   The buffer type must be **T** (Transmit), **R** (Receive), **I** (Image), **F** (Format), or **D** (Downloadable Fonts).

285   The storage device type in the memory configuration packet must be **N** (non-volatile RAM) 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** for 9403) dots in duplicate fields for graphics.
328	Duplicate count must be **0** to **999** (**0** to **99** for 9403).
340	Bitmap line encoding must be **H** (hex) or **R** (run length).
350	Font selector must be **1** to **9999**.
351	Font data length must be **68** to **16384**.
352	Insufficient font memory is available for the downloaded font.
380	Job request is outside the range **0** to **4**.

400	The character immediately following **{** is invalid.
402	Field separator is not in the expected location.
403	Field separator was not found.
404	The number or string that is currently being processed is too long.
405	Too many fields exist in the format. You cannot have more than **1000** (**100** for 9403) 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.
427	Format name is invalid. Valid name is **1 - 8** characters inside quotes or **""** for a printer-assigned name. Press **CLEAR** or Enter , 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 **CLEAR** or Enter , 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 571-619, the batch will still print,
but the field, font, bar code, or density may
be incomplete, missing or contain
incorrect data.

571   UPC or EAN bar code data length is invalid. The bar
          code data length in the batch does not fit the format.

572   A copy field, padded field, or incrementing field length
          is invalid. The field length in the batch does not fit the
          format or the field contains blanks. Or, the fixed length
          field does not contain the specified number of
          characters.

573   Price field length is invalid. The price field length in the
          batch does not fit the format or the field contains blanks.

574   No CD scheme or room for CD. The CD scheme in the
          batch does not fit the format or the field contains blanks.

575   The graphic included in your format could not be found.

611   Font, bar code or density is invalid. The font, bar code
          or density in the batch does not fit the format.

612   The data in this line of the batch is either missing or
          does not match the format.

613   Reference point off tag.

614   Portion of field off tag. There may be an invalid character in the packet. Make sure you did not enter **O** for **Ø**.

615   Bar code width is greater than 16 inches or the number of keywords for your PDF 417 bar code exceeds **928**. Decrease the density or shorten the amount of data to print the bar code.

616   Dot shifting failed. A bad dot falls on a bar code that cannot be shifted. Call Technical Support.

618   Magnification must be **1** to **7**.

619   The JIS (16-bit) code for Kanji is invalid.

Machine Faults

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

703   The printer sensed a calibration of different-sized black marks. Make sure the correct supply is loaded.

704   Printer has not sensed a supply mark within the specified number of inches or out of supplies. Check the

             ✦ supply tracking

             ✦ supply marks

             ✦ black mark sensor position

             ✦ supply roll for binding.

        Press **CLEAR** or ⌷Enter⌷ , 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 **CLEAR** or ⌜Enter⌟ , 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 **FEED**.
        On the 9403 printer, press ⌜Escape⌟ to print on the current
        supply or load new supply and press ⌜Enter⌟ .

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 **FEED** or $\boxed{\text{Enter}}$,
               depending on your printer.

764   Verifier failure. Check the verifier by referring to your
               verifier's manual. Call Technical Support.

765   Printhead failure. You need a new printhead. Call
               Technical Support.

768   Printhead has more than 10 bad dots or is not
               connected. Make sure the printhead is connected and
               call Technical Support.

770   The print motor is not ready. Call Technical Support.

771   The format specified by the application was not found.
               Reload your application and format, and try again. If
               the problem continues, call Technical Support.

790   Wait until the printer is idle (no batch waiting to print or
               not receiving data) before you send any packets. This
               error may occur when you try to print a test label if the
               printer is busy.

791   The printer has an error pending. Turn off the printer.
               Wait 15 seconds and turn it back on. Resend the
               packets. If the problem continues, call Technical
               Support.

792   The printer is not initialized. Call Technical Support.

793   The printer job queue is full. Turn off the printer. Wait
               15 seconds and turn it back on. Resend the packets. If
               the problem continues, call Technical Support.

Errors numbered 900-999 are hard printer failures. Call Technical
Support if you receive these messages.

When a HARD failure occurs on the 9403 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. Refer to your printer's documentation to reset the printer's SETUP options. Transmit your packets again.

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.

Printer Display	Description
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.

P R I N T E R   O P T I M I Z A T I O N   **11**

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 5.

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	MONARCH MARKING	MONARCH MARKING
1 23456 78901	1 23456 78901	1 23456 78901
DAYTON, OHIO	DAYTON, OHIO	DAYTON, OHIO
Dark	**IN SPEC**	**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* on the 9800 series printers:

Butt Cut Supplies   .150 inches at the beginning of the label.
All Supplies   .050 inches on either edge of the label.
All Supplies   .020 inches at the end of the label.

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.

S A M P L E S

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, O, 1, 2, 1, W, C, O, O, "MONARCH MARKING" ¦
B, 1, 12, F, 110, 115, 1, 2, 120, 5, L, O ¦
T, 2, 18, V, 30, 30, 1, 1, 1, 1, B, C, O, O ¦ }
```

Sample Batch Packet

```
{B, 25, N, 1 ¦
1, "12345678901" ¦
2, "DAYTON, OHIO" ¦ }
```
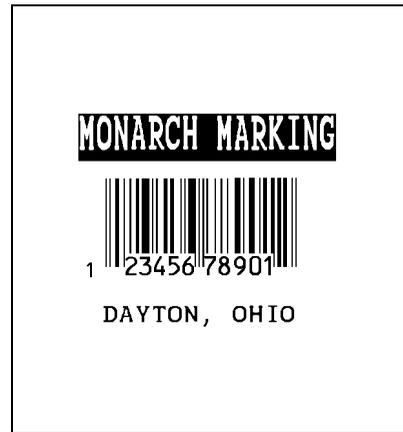
Sample MaxiCode Format Packet

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

◆ 9403   1.0 or greater

◆ 9830   1.0 or greater

◆ 9835   1.0 or greater

```
{F, 1, A, R, E, 200, 400, "MAXICODE" ¦
B, 1, 99, V, 040, 140, 33, 7, 0, 8, L, 0 ¦
 R, 30, R, "!" ¦ }                         Pad data to end with "!"
```

Sample Batch Packet

The first three lines (postal code, class of service, and country
code) are required. The rest of the data is optional and if it isn't
specified, the character "!" is used to fill in the bar code.

```
{B, 1, N, 1 ¦
1, "841706672" ¦                Postal code (required)
C, "001" ¦                      Class of service (required)
C, "840" ¦                      Country code (required)
C, "[)~030" ¦                   Message header
C, "01~02996" ¦                 Transportation header
C, "1Z12345675~029" ¦          Tracking number
C, "UPSN~029" ¦                 Origin carrier SCAC
C, "12345E~029" ¦              Shipper number
C, "089~029" ¦                  Julian day of pickup
C, "~029" ¦                     Shipment ID (empty)
C, "1/1~029" ¦                  Package count
C, "10.1~029" ¦                 Weight (lb.)
C, "Y~029" ¦                    Address validation
C, "~029" ¦                     Street address (empty)
C, "~029" ¦                     City (empty)
C, "UT~030" ¦                   State
C, "~004" ¦ }                   Eot
```
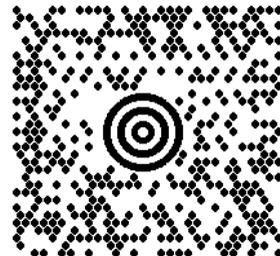
Sample Compliance Packet

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

Sample Batch Packet

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

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

CARRIER:
BROADWAY
PRO NUMBER: 1234567890
B/L NUMBER: 0987654321

TO: **RODGER DIST CTR #8292**
555 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
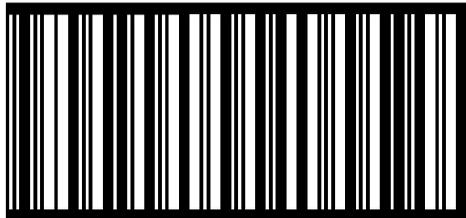
Sample Format Packet

```
{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" ¦ }
```

Sample Data Entry Format Packet

This packet for the 9403 printer uses 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, " " ¦ }
```
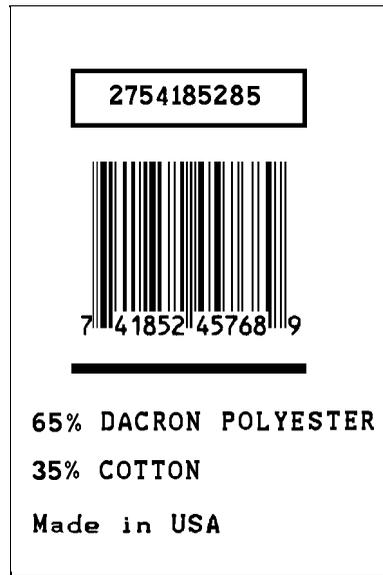
Depending on the operator-entered batch data, a label similar to this one prints.

F O N T S

This appendix contains information you need to work with fonts.

Standard Fonts

Your printer comes with these fonts loaded in ROM:

Number	Font Size and Appearance	Type of Spacing	# of Dots Between Characters
1	Standard	Monospaced	3
2	Reduced	Monospaced	1
3	Bold	Monospaced	3
4	OCRA-like	Monospaced	3
5	HR1	Monospaced	2
6	HR2	Monospaced	1
10	CG Triumvirate Bold (9 pt.)	Proportional	varies w/ each letter
11	CG Triumvirate (6 pt.)	Proportional	varies w/ each letter
15 (510)	7 pt. CG Triumvirate	Proportional	varies w/ each letter
16 (511)	9 pt. CG Triumvirate	Proportional	varies w/ each letter
17 (512)	11 pt. CG Triumvirate	Proportional	varies w/ each letter
18 (513)	15 pt. CG Triumvirate	Proportional	varies w/ each letter
50	CG Triumvirate Bold	Scalable	varies w/ each letter

Fonts **5** and **6** are for numeric data only. The 9403 supports only fonts **1**, **2**, **3**, **4**, **5**, **6**, **10**, and **11**. The scalable font (font **50**) is only available for the 9830 and 9835 printers.
Fonts **510**, **511**, **512**, and **513** are the same as fonts **15**, **16**, **17**, and **18**. The CG Triumvirate fonts support only the ANSI and DOS Code Page Symbol Sets. The CG Triumvirate fonts print a slashed zero when using the ANSI symbol set. Refer to the following pages for illustrations of these fonts.

Standard Font

```
ABCDEFGHIJKLM
NOPQRSTUVWXYZ
abcdefghijklm
nopqrstuvwxyz
0123456789:;<=>?
!"#$%&'()*+,-./
[\]^`{|}~Çüéâäà
çêëèïîìÄÅÆæÉôöò
ûùÿÖÜ¢£ƒáíóúñÑªº¿
--½¼¡«»Øøαβ
$£¥ÞFPL.KᴹᵍRₛ₣ᵂBᵃ¥
```

Reduced Font

```
ABCDEFGHIJKLM
NOPQRSTUVWXYZ
abcdefghijklm
nopqrstuvwxyz
0123456789:;<=>?
!"#$%&'()*+,-./
[\]^`{|}~Çüéâäà
çêëèïîìÄÅÆæÉôöò
ûùÿÖÜ¢£ƒáíóúñÑªº¿
--½¼¡«»Øøαβ
$£¥ÞFPL.KᴹᵍRₛ₣ᵂBᵃ¥
```

Bold Font

```
ABCDEFGHIJKLM
NOPQRSTUVWXYZ
0123456789@½
!"#$%&'()*+,-
[\]^_./:;<=>?
$£¥ᴰFPL.KᴹᵍRₛ¢P
₣ᵂB¥
```

OCRA-like Font

```
ABCDEFGHIJKLM
NOPQRSTUVWXYZ
0123456789
"⁄+,-.⁄<>RₛᴮB¥
$£¥ᴰFPL.KᴹᵍRₛ¢P
```

CG Triumvirate Bold Font

ABCDEFGHIJKLM
NOPQRSTUVWXYZ
abcdefghijklm
nopqrstuvwxyz
0123456789:; < = > ?
!"#$%&'()* + ,-./
[\]ˆ`{ }˜Çüéâäàå
çêëèïîìÄÅÉæÆôöòû
ùÿÖÜ¢PtƒáíóúñѪº¿
┌ ¬ ½ ¼ ¡«»╦╨ ┌─αß

ABCDEFGHIJKLM
NOPQRSTUVWXYZ
abcdefghijklm
nopqrstuvwxyz
0123456789:; < = > ?
!"#$%&'()* + ,-./
[\]ˆ`{ }˜Çüéâäàå
çêëèïîìÄÅÉæÆôöòû
ùÿÖÜ¢PtƒáíóúñѪº¿
┌ ¬ ½ ¼ ¡«»╦╨ ┌─αß

This is 7 point.

This is 9 point.

This is 11 point.

This is 15 point.

CG Triumvirate Font

ABCDEFGHIJKLM
NOPQRSTUVWXYZ
abcdefghijklm
nopqrstuvwxyz
0123456789:; < = > ?
!"#$%&'()* + ,-./_
[\]`'{|}˜çüéâäà
çêëèìÄÅÉæÆôöòù
ùÿÖÜ¢PtƒáíóúñѪº¿
┌ ¬ ½ ¼ ¡«»╦╨ ┌─αß

ABCDEFGHIJKLM
NOPQRSTUVWXYZ
abcdefghijklm
nopqrstuvwxyz
0123456789:; < = > ?
!"#$%&'()* + ,-./_
[\]`'{|}˜çüéâäà
çêëèìÄÅÉæÆôöòù
ùÿÖÜ¢PtƒáíóúñѪº¿
┌ ¬ ½ ¼ ¡«»╦╨ ┌─αß

CG Triumvirate Font (9pt.)

ABCDEFGHIJKLM
NOPQRSTUVWXYZ
abcdefghijklm
nopqrstuvwxyz
0123456789:; < = > ?
!"#$%&'()* + ,-./
[\]ˆ`{}˜Çüéâäàå
çêëèïîìÄÅÉæÆôöòû
ùÿÖÜ¢£¥PtƒáíóúñѪº¿
┌ ¬ ½ ¼ ¡«»╦╨ ┌─αß

ABCDEFGHIJKLM
NOPQRSTUVWXYZ
abcdefghijklm
nopqrstuvwxyz
0123456789:; < = > ?
!"#$%&'()* + ,-./
[\]ˆ`{}˜Çüéâäàå
çêëèïîìÄÅÉæÆôöòû
ùÿÖÜ¢£¥PtƒáíóúñѪº¿
┌ ¬ ½ ¼ ¡«»╦╨ ┌─αß

Monospaced Font Magnification

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

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

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

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

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

Example

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

Height Magnification

	1x	7x
Standard	A	
1/100 in.	10.8	75.9
1/10 mm	27.4	192.8
dots	22	154

	1x	7x
Reduced	A	
1/100 in.	6.9	48.28
1/10 mm	17.5	122.6
dots	14	98

	1x	7x
Bold	A	
1/100 in.	16.7	117.24
1/10 mm	42.4	297.8
dots	34	238

OCRA-like (1x only)

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

Proportional Font Magnification

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

CG Triumvirate Bold (9 pt.)

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

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

Example

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

CG Triumvirate (6 pt.)

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

Height Magnification

1x   7x

CG Triumvirate Bold   W

	1x	7x
1/100 in.	8.87	68
1/10 mm	22.5	172.7
dots	18	138

CG Triumvirate   w

	1x	7x
1/100 in.	5.9	41.38
1/10 mm	14.99	105.1
dots	12	84

CG Triumvirate (7 pt.)

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

Height Magnification

	1x	7x
CG Triumvirate	w	▓
1/100 in.	8.87	68
1/10 mm	22.5	172.7
dots	18	138

CG Triumvirate (9 pt.)

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

Height Magnification

	1x	7x
CG Triumvirate	W	W
1/100 in.	8.87	68
1/10 mm	22.5	172.7
dots	18	138

CG Triumvirate (11 pt.)

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

Height Magnification

	1x	7x
CG Triumvirate	W	
1/100 in.	8.87	68
1/10 mm	22.5	172.7
dots	18	138

CG Triumvirate (15 pt.)

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

CG Triumvirate	1x	7x
1/100 in.	8.87	68
1/10 mm	22.5	172.7
dots	18	138

Scalable Font Information

The scalable font (CG Triumvirate Bold) is smooth at any point size or magnification. There are no jagged edges as in the standard printer bitmapped fonts. CG Triumvirate Bold is a proportionally spaced font. Therefore, the field height and width varies with each letter.

When you define formats using scalable fonts, remember to set the character rotation to **0**, because it is not supported. However, field rotation is supported for text or constant text fields using the scalable font.

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. The minimum point size is 4 and the maximum point size is 90. 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 only available for the 9830 and 9835 printers. Scalable fonts perform better in constant text fields, because those fields are imaged only once per batch, not once per label as in text fields. The scalable font does not print a slashed zero. The transparent overlay allows closer field placement when using scalable or optional ROM fonts.

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

6pt **Sample**

10pt **Sample**

24pt Sample

48pt Sample

72pt Sample 1"
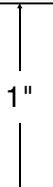
Using Font Numbers in Formats

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 ¦   **Font Number**
                             font data ¦
                             font data ¦ }

Use this number in **T8** or in **C5**. See "Defining Text Fields" or "Defining Constant Text Fields" in Chapter 4 for more information.

                                                  Font Number

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

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

SYMBOL SETS/CODE PAGES C

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

Refer to your *9403 Operator's Handbook* to
enter International and punctuation characters
from the keypad.

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.

Selecting a Symbol Set or Code Page

The printer defaults to the internal symbol set. See "Defining the System Setup Packet" in Chapter 3 to change the symbol set.

Selecting the Internal Symbol Set

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

The CG Triumvirate fonts support only the ANSI and DOS Code Page Symbol Sets. These fonts print a slashed zero when using the ANSI symbol set. The scalable font does not print a slashed zero.

Selecting the ANSI Symbol Set

Use ANSI when you want to use proportionally spaced fonts.

Selecting the 437 or 850 Code Page

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

Using Code 128 Function Codes

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

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

Entering Extended Characters

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

$$1, \text{"} \sim 142\text{"} \ \vdots$$

Internal Symbol Set

Code	Char.	Code	Char.	Code	Char.
128	Ç	151	ù	174	«
129	ü	152	ÿ	175	»
130	é	153	Ö	176	■
131	â	154	Ü	177	$
132	ä	155	¢	178	£
133	à	156	£	179	¥
134	å	157	¥	180	ᴰ⌀ₘ
135	ç	158	₨	181	F
136	ê	159	ƒ	182	P
137	ë	160	á	183	L.
138	è	161	í	184	Kᵣ
139	ï	162	ó	185	ᴹₖ
140	î	163	ú	186	g̱
141	ì	164	ñ	187	Rₛ
142	Ä	165	Ñ	188	ᴾ₆
143	Å	166	ª	189	₩
144	É	167	º	190	₿
145	æ	168	¿	191	¥
146	Æ	169	⌐	199	_
147	ô	170	¬	210	Ø
148	ö	171	½	214	ø
149	ò	172	¼	224	α
150	û	173	¡	225	β
				255	™

ANSI Symbol Set

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).

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

■ designates non-printing characters.

Bold Character Set

These are the printable characters using the Bold font.

Code	Char.	Code	Char.	Code	Char.
33	!	60	<	87	W
34	"	61	=	88	X
35	#	62	>	89	Y
36	$	63	?	90	Z
37	%	64	@	91	[
38	&	65	A	92	\
39	'	66	B	93	]
40	(	67	C	94	^
41	)	68	D	95	_
42	*	69	E	112	p
43	+	70	F	155	¢
44	,	71	G	171	1/2
45	-	72	H	177	$
46	.	73	I	178	£
47	/	74	J	179	¥
48	0	75	K	180	DM
49	1	76	L	181	F
50	2	77	M	182	P
51	3	78	N	183	L.
52	4	79	O	184	Kr
53	5	80	P	185	ᴹₖ
54	6	81	Q	186	g̣
55	7	82	R	187	Rs
56	8	83	S	188	ᴾ₆
57	9	84	T	189	W̶
58	:	85	U	190	B̶
59	;	86	V	191	¥
				199	-

OCRA Character Set

These are the printable characters using the OCRA font.

Code	Char.	Code	Char.	Code	Char.
34	"	67	C	90	Z
36	$	68	D	91	[
37	%	69	E	92	\
43	+	70	F	93	]
44	¬	71	G	94	^
45	-	72	H	95	_
46	.	73	I	112	p
47	/	74	J	155	¢
48	0	75	K	177	$
49	1	76	L	178	£
50	2	77	M	179	¥
51	3	78	N	180	DM
52	4	79	O	181	F
53	5	80	P	182	P
54	6	81	Q	183	L.
55	7	82	R	184	Kr
56	8	83	S	185	ᴹ ᴋ
57	9	84	T	186	g̃
60	<	85	U	187	Rs
62	>	86	V	188	ᴾ 6
64	@	87	W	189	W̵
65	A	88	X	190	B̵
66	B	89	Y	191	¥

Code Page 437

0		32		64	@	96	`	128	Ç	160	á	192	└	224	α
1	☺	33	!	65	A	97	a	129	ü	161	í	193	┴	225	ß
2	☻	34	"	66	B	98	b	130	é	162	ó	194	┬	226	Γ
3	♥	35	#	67	C	99	c	131	â	163	ú	195	├	227	π
4	♦	36	$	68	D	100	d	132	ä	164	ñ	196	─	228	Σ
5	♣	37	%	69	E	101	e	133	à	165	Ñ	197	┼	229	σ
6	♠	38	&	70	F	102	f	134	å	166	ª	198	╞	230	µ
7	•	39	'	71	G	103	g	135	ç	167	º	199	╟	231	τ
8	◘	40	(	72	H	104	h	136	ê	168	¿	200	╚	232	Φ
9	○	41	)	73	I	105	i	137	ë	169	⌐	201	╔	233	Θ
10	◙	42	*	74	J	106	j	138	è	170	¬	202	╩	234	Ω
11	♂	43	+	75	K	107	k	139	ï	171	½	203	╦	235	δ
12	♀	44	,	76	L	108	l	140	î	172	¼	204	╠	236	∞
13	♪	45	-	77	M	109	m	141	ì	173	¡	205	=	237	φ
14	♫	46	.	78	N	110	n	142	Ä	174	«	206	╬	238	ε
15	☼	47	/	79	O	111	o	143	Å	175	»	207	╧	239	∩
16	►	48	0	80	P	112	p	144	É	176	░	208	╨	240	≡
17	◄	49	1	81	Q	113	q	145	æ	177	▒	209	╤	241	±
18	↕	50	2	82	R	114	r	146	Æ	178	▓	210	╥	242	≥
19	‼	51	3	83	S	115	s	147	ô	179	│	211	╙	243	≤
20	¶	52	4	84	T	116	t	148	ö	180	┤	212	╘	244	⌠
21	§	53	5	85	U	117	u	149	ò	181	╡	213	╒	245	⌡
22	▬	54	6	86	V	118	v	150	û	182	╢	214	╓	246	÷
23	↨	55	7	87	W	119	w	151	ù	183	╖	215	╫	247	≈
24	↑	56	8	88	X	120	x	152	ÿ	184	╕	216	╪	248	°
25	↓	57	9	89	Y	121	y	153	Ö	185	╣	217	┘	249	·
26	→	58	:	90	Z	122	z	154	Ü	186	║	218	┌	250	·
27	←	59	;	91	[	123	{	155	¢	187	╗	219	█	251	√
28	∟	60	<	92	\	124	|	156	£	188	╝	220	▄	252	ⁿ
29	↔	61	=	93	]	125	}	157	¥	189	╜	221	▌	253	²
30	▲	62	>	94	^	126	~	158	₧	190	╛	222	▐	254	■
31	▼	63	?	95	_	127	⌂	159	ƒ	191	┐	223	▀	255	

Code Page 850

0	32	64 @	96 `	128 Ç	160 á	192 L	224 Ó
1 ☺	33 !	65 A	97 a	129 ü	161 í	193 ⊥	225 ß
2 ☻	34 "	66 B	98 b	130 é	162 ó	194 T	226 Ô
3 ♥	35 #	67 C	99 c	131 â	163 ú	195 ⊢	227 Ò
4 ♦	36 $	68 D	100 d	132 ä	164 ñ	196 —	228 õ
5 ♣	37 %	69 E	101 e	133 à	165 Ñ	197 ┼	229 Õ
6 ♠	38 &	70 F	102 f	134 å	166 ª	198 ã	230 µ
7 •	39 '	71 G	103 g	135 ç	167 º	199 Ã	231 Þ
8 ◘	40 (	72 H	104 h	136 ê	168 ¿	200 ╚	232 þ
9 ◇	41)	73 I	105 i	137 ë	169 ®	201 ╔	233 Ú
10 ◙	42 *	74 J	106 j	138 è	170 ¬	202 ╩	234 Û
11 ♂	43 +	75 K	107 k	139 ï	171 ½	203 ╦	235 Ù
12 ♀	44 ,	76 L	108 l	140 î	172 ¼	204 ╠	236 ú
13 ♪	45 -	77 M	109 m	141 ì	173 ¡	205 =	237 Ý
14 ♫	46 .	78 N	110 n	142 Ä	174 «	206 ╬	238 ¯
15 ☼	47 /	79 O	111 o	143 Å	175 »	207 ¤	239 ´
16 ►	48 0	80 P	112 p	144 É	176 ░	208 ð	240 -
17 ◄	49 1	81 Q	113 q	145 æ	177 ▒	209 Ð	241 ±
18 ↕	50 2	82 R	114 r	146 Æ	178 ▓	210 Ê	242 =
19 ‼	51 3	83 S	115 s	147 ô	179 │	211 Ë	243 ¾
20 ¶	52 4	84 T	116 t	148 ö	180 ┤	212 È	244 ¶
21 §	53 5	85 U	117 u	149 ò	181 Á	213 ı	245 §
22 ▬	54 6	86 V	118 v	150 û	182 Â	214 Í	246 ÷
23 ↨	55 7	87 W	119 w	151 ù	183 À	215 Î	247 ¸
24 ↑	56 8	88 X	120 x	152 ÿ	184 ©	216 Ï	248 °
25 ↓	57 9	89 Y	121 y	153 Ö	185 ╣	217 ┘	249 ¨
26 →	58 :	90 Z	122 z	154 Ü	186 ║	218 ┌	250 ·
27 ←	59 ;	91 [	123 {	155 ø	187 ╗	219 █	251 ¹
28 ∟	60 <	92 \	124 ¦	156 £	188 ╝	220 ▄	252 ³
29 ↔	61 =	93]	125 }	157 Ø	189 ¢	221 ¦	253 ²
30 ▲	62 >	94 ^	126 ~	158 ×	190 ¥	222 Ì	254 ■
31 ▼	63 ?	95 _	127 ⌂	159 ƒ	191 ┐	223 ▀	255

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	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	01110111	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

ONLINE HEADER

I	HEADER

SYSTEM SETUP

A	HEADER	POWERUP MODE	LANGUAGE	SEPARATOR	SLASH ZERO	SYMBOL SET

SUPPLY SETUP

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

PRINT CONTROL

C	HEADER	CONTRAST	PRINT ADJUST	MARGIN ADJUST	SPEED ADJUST	PRINTHD WIDTH	0

MONETARY FORMATTING

D	HEADER	CURRENCY SYMBOL	SECONDARY	DECIMALS

CONTROL CHARACTERS

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

COMMUNICATION SETUP

F	HEADER	BAUD	WORD LENGTH	STOP BITS	PARITY	FLOW CONTROL

BACK FEED CONTROL

G	HEADER	ACTION	DISPENSE POSITION	BACK FEED DISTANCE

BUFFER ALLOCATION

M	HEADER	BUFFER	DEVICE	BUFFER SIZE

Batch Worksheet

BATCH HEADER

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

BATCH CONTROL

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

BATCH DATA

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

BATCH CONTINUATION

C	DATA
C	
C	
C	
C	
C	
C	
C	
C	
C	
C	
C	
C	
C	

Check Digit Worksheet

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

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

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

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

PRINTER DIFFERENCES

This appendix lists the major differences between a 9820 printer and a 9446 printer.

9820 Printer vs. 9446 Printer

9820 Printer (Version 2.0)	9446 Printer
203 DPI Print Head (Square Dot) This causes print to be approximately 5% smaller. This is most noticeable on large graphics. It also changes the actual printed bar code bar dimensions and density. Density selectors relate to the closest, next smallest dimension available. Existing 9446 formats print without negatively effecting non-print zones or label boundaries.	192 DPI Print Head (Square Dot)
Field Number Range: 0-999 The actual number of fields a format can have is limited by the available printer memory.	Field Number Range: 0-99
Supplies: labels only	Supplies: tags or labels
Set of two test labels for user configuration and printer configuration.	Single test label showing printer setup.
The following 2D bar codes are not supported: PDF417, MaxiCode, or Code 16K. POSTNET is also not supported.	The following bar codes are supported: PDF417, MaxiCode, Code 16K, and POSTNET.
Cannot use Option 51 (PDF417 Security & Truncation) or Option 52 (PDF417 Aspect Ratio), because 2 dimensional bar codes are not supported.	Can use Option 51 (PDF417 Security & Truncation) or Option 52 (PDF417 Aspect Ratio).
DIP switches for Communication settings, ribbon, supply type, feed mode, non-indexed supply, and parallel port.	No DIP switches. Communication settings made at the printer's keypad or through packet F.
Recommended non-print zone: Butt Cut Supplies: .150 inches at the beginning of the label. All Supplies: .050 inches on either edge of the label and .020 inches at the end of the label. NOTE: The printhead is exactly four inches wide.	Software imposed non-print zone: All Supplies: .06 inches on the left side of the supply. There is no non-print zone at the beginning or at the end of the supply.

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Additional fonts from the 9446 Expanded Font rom set # 2 (P/N 115801-99AIAG) are standard: 15 CG Triumvirate 7 pt 16 CG Triumvirate 9 pt 17 CG Triumvirate 11 pt 18 CG Triumvirate 15 pt If an existing 9446 format is using font selector 510, the 9820 will automatically cross reference this font internally to selector 15 to ensure format compatibility. All other rom fonts will be invalid and will generate a error code "611".	These fonts are from the 9446 Expanded Font rom set # 2 (P/N 115801-99AIAG)
The scalable font (selector #50) cannot be purchased separately.	The scalable font (selector #50) can be purchased separately.
Expandable Font ROM memory only for International Fonts on SIMM-ROM.	Fully configurable 256K printer RAM, plus additional configurable 256K optional RAM.
Internal TWINAX/COAX protocol converter.	External TWINAX/COAX protocol converter.
Parallel Port.	No parallel port.
Ethernet print server. Supports IPX (NetWare), TCP/IP, LAT, AppleTalk, and NetBios/NetBEUI.	No Ethernet print server.
Dedicated three-character LCD display with three buttons (no keypad).	Two-line display with six keypad controls.
Hard Printer Errors have been assigned a new three digit error code that ranges from 900-999.	Hard Printer Errors are described on the display.
Center Justified Supply Mechanism.	Left Justified Supply Mechanism.