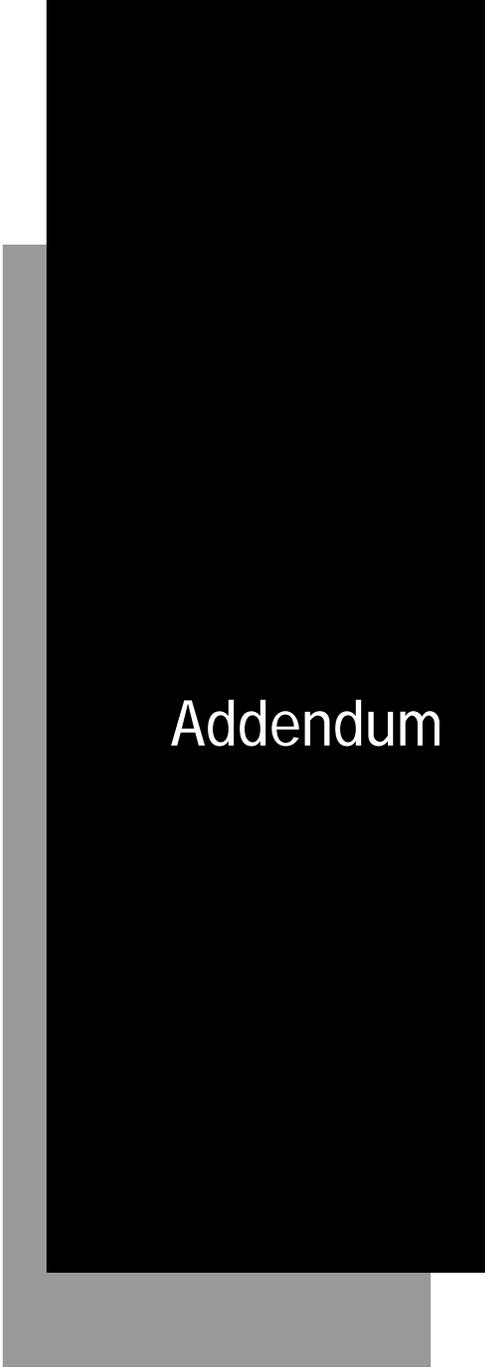


Intermec



Addendum

3440 Bar Code Label Printer

P/N 067112-001

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U.S. service and technical support: 1.800.755.5505
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Canadian service and technical support: 1.800.688.7043
Canadian media supplies ordering information: 1.800.268.6936

Outside U.S. and Canada: Contact your local Intermec service supplier.

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3440 Bar Code Label Printer Addendum

Several new features are now available on the 3440 printer. This addendum explains how to use these new features:

- Global Languages On Bar Code Equipment (GLOBE)
- Quick Response (QR) Code
- Maxicode modes 2 through 6
- Direct Graphics mode

This information supplements the PrintSet printer install tool online help and the IPL commands chapter of your printer user's manual. Please keep this addendum with your printer user's manual.

Installing International Character Sets Using GLOBE

It is Intermec's goal to help you easily localize your 3440 printer with the font set you choose. To support this goal, Intermec printers now use GLOBE (Global Languages On Bar Code Equipment) technology to download and access single and double-byte international character sets.

What Types of Fonts Does GLOBE Support?

Use GLOBE technology to install international character sets on your 3440 printer. GLOBE technology is part of PrintSet, the Windows-based configuration program that came with your printer. You can use PrintSet to install these types of fonts:

- TrueType fonts
- Bitmap fonts generated from TrueType fonts using PrintSet

Your TrueType fonts must be compatible with Microsoft Windows. To generate bitmap fonts from TrueType fonts for a particular language, you must run PrintSet under that language version of Microsoft Windows. You can run PrintSet under Microsoft Windows 3.11, Windows 95, or Windows NT.

Do You Need to Purchase Additional RAM?

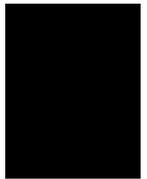
If you wish to install a TrueType font in your printer, you must have enough memory available to contain the entire font file. The size of the TrueType font file, in bytes, is the minimum amount of memory you must have available in your printer. Bitmap fonts generated from TrueType files will vary in size, depending on the point size and number of characters you create. The larger the point size you choose, the larger the resulting file size.

Chinese, Japanese, and Korean languages contain thousands of characters. If you wish to use these languages, you will need to purchase expanded flash RAM to store them in your printer. The amount of memory depends on the size and number of fonts you wish to install.

Use this table to determine the approximate size of some Asian TrueType fonts. The approximate size is shown in dots per inch (dpi).

TrueType Font	Point Size	Approximate Size (400 dpi)	Approximate Size (200 dpi)
Korean KSC-5601	12 pt	1.6MB	0.5MB
	16 pt	2.7MB	0.8MB
	24 pt	5.8MB	1.5MB
Traditional Chinese Big 5	12 pt	3.1MB	0.9MB
	16 pt	5.25MB	1.6MB
Simplified Chinese GB	12 pt	3.5MB	1MB
	16 pt	6.2MB	1.8MB
Japanese Shift-JIS	12 pt	3.9MB	1.1MB
	16 pt	6.75MB	2MB

Some TrueType fonts require large amounts of dynamic RAM to operate. If you receive an error code 37 when printing a label using TrueType fonts, you may need to purchase expanded dynamic RAM.



Licensing Your Fonts

Although Intermec provides you with a tool to download international characters sets, it is your responsibility to license the fonts that you purchase and install in your printers. Contact your font vendor for licensing information.

These companies resell TrueType fonts that work with the 3440 printer:

Precision Type
47 Mall Drive
Commack, NY 11725
phone 1.800.248.3668
fax 516.543.5721
email info@precisiontype.com

Galapagos Design Group
256 Great Road
Suite 15
Littleton, MA 01360-1916
phone 978.952.6200
fax 978.952.6260
email info@galapagosdesign.com

These companies also provide TrueType fonts compatible with the 3440 printer:

Dynalab Inc.
2055 Gateway Place
Suite 400
San Jose, CA 95110
phone 408.490.4224
fax 408.490.2233
web address www.dynalab.com

Microsoft Corporation
One Microsoft Way
Redmond, WA 98052-6399
phone 206.882.8080
web address www.microsoft.com

Note: Dynalab Inc. provides Chinese, Japanese, and Korean fonts. You can also purchase fonts from their offices in Taiwan and Hong Kong. See the Dynalab web page for the address of these offices.

Installing Fonts

This section gives you detailed instructions on how to:

- install a TrueType font as a scaleable font.
- install a bitmap font generated from a TrueType font.

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To prepare your printer for font installation

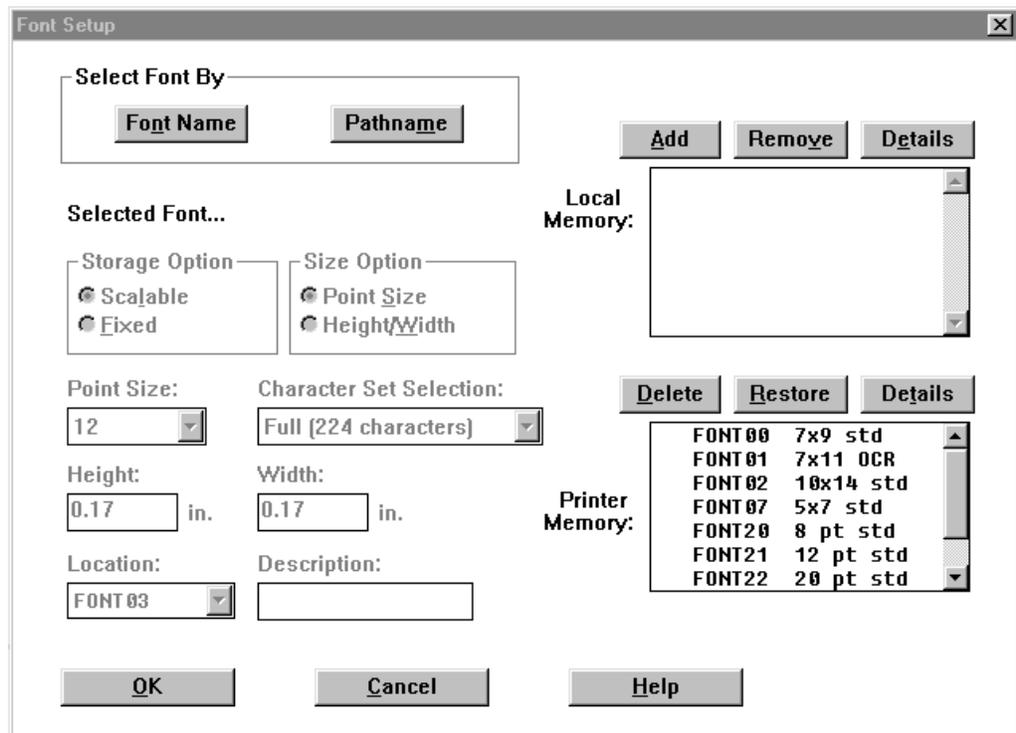
1. Load PrintSet on your PC.
2. Enter PrintSet and make sure that the communications settings are correct.

Note: You must configure the printer and PrintSet for 8 data bits when downloading double-byte fonts.

3. From the PrintSet main menu, click the Font Setup button:

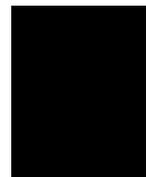


The Font Setup dialog box appears:



The screenshot shows the 'Font Setup' dialog box with the following fields and controls:

- Select Font By:** Two buttons, 'Font Name' and 'Pathname'.
- Selected Font...:** Two groups of radio buttons:
 - Storage Option:** Scalable, Fixed.
 - Size Option:** Point Size, Height/Width.
- Point Size:** A dropdown menu showing '12'.
- Character Set Selection:** A dropdown menu showing 'Full (224 characters)'.
- Height:** A text box with '0.17' and 'in.' next to it.
- Width:** A text box with '0.17' and 'in.' next to it.
- Location:** A dropdown menu showing 'FONT 03'.
- Description:** An empty text box.
- Local Memory:** A large empty list box with 'Add', 'Remove', and 'Details' buttons above it.
- Printer Memory:** A list box containing:
 - FONT00 7x9 std
 - FONT01 7x11 OCR
 - FONT02 10x14 std
 - FONT07 5x7 std
 - FONT20 8 pt std
 - FONT21 12 pt std
 - FONT22 20 pt stdwith 'Delete', 'Restore', and 'Details' buttons above it.
- Buttons:** 'OK', 'Cancel', and 'Help' at the bottom.



Selecting a TrueType Font

TrueType fonts are scaleable fonts that retain smooth contours at any size. Since TrueType fonts may be very large, they tend to image slower than bitmap fonts. You cannot subset a TrueType font. You must download the entire font to the printer. You may want to install your TrueType fonts in Microsoft Windows to ensure that they are compatible with your 3440 printer.

If you wish to install a Chinese, Japanese, or Korean TrueType font, you must install the necessary code page tables. You can download the code page tables from the Internet. For help, see “Installing Code Page Tables” later in this addendum.

To select a TrueType font

1. To select a font by font name, click the Font Name button in the Select Font By box. From the list of installed fonts, select your TrueType font name.

To select a font by path, click the Pathname button in the Select Font By box. From the Folders list box, select a TrueType font file.

2. Under Storage Option, click the Scaleable button. You cannot change the settings in the Size Option, Point Size, or Height and Width boxes.
3. From the Location list box, choose the font number you wish to assign to the font. In Intermec printers, fonts are identified by their font number.
4. Above the Local Memory box, click Add. You will see that your font number now appears in the Local Memory box.

You may select additional fonts to add to local memory. Each font must have a unique location number.

Creating Bitmap Fonts From TrueType Fonts

To create bitmap fonts from TrueType fonts, you must run PrintSet under the correct language version of Windows. For example, to create a Traditional Chinese font, you must run PrintSet under Traditional Chinese Microsoft Windows. In addition, you must install the font using Microsoft Windows for PrintSet to convert it to a bitmap font.

The advantage of bitmap fonts is that they usually require less RAM and the printer can image them faster. When you download bitmap characters to the printer, you must select the size of the characters. Make sure that you select the size you want to use in your formats. If you magnify the character size in the printer, the edges of the characters will be jagged.

Note: *You can create Traditional or Simplified Chinese bitmap fonts up to a size of 16 points at 400 dpi or 32 points at 200 dpi in Windows 3.1.*

To create bitmap fonts from TrueType fonts

1. Click the Font Name button in the Select Font By box. From the list of installed fonts, select your TrueType font name.

Note: *You must install the TrueType font under Windows for PrintSet to use it.*

2. In the Storage Option box, click the Fixed button.
3. In the Size Option box, click either Point Size or Height/Width.
4. If you select Point Size, select the size that you want the bitmap characters to be from the Point Size list box. One point equals 1/72 of an inch.

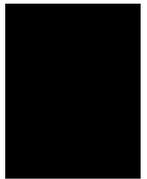
If you select Height/Width, enter the height and width (in inches or cm) that you want the bitmap characters to be in the Height and Width boxes.

Note: *If you enter 0 for the width, you preserve the aspect ratio of the font.*

5. In the Character Set Selection box, you may restrict the number of bitmap characters that you want created. Restricting the number of characters will create a smaller font that requires less memory and takes less time to install.

If you are creating a Chinese, Japanese, or Korean font, you must select the language you are using. You can choose from these selections:

- Japanese (Shift JIS)
- Traditional Chinese (BIG 5)
- Simplified Chinese (GB 2312)
- Korean ((KSC 5601)



6. From the Location list box, choose the font number you wish to assign to the font. In Intermec printers, fonts are identified by their font number.
7. In the Local Memory box, click Add. You will see that your font number now appears in the Local Memory box.

You may select additional fonts to add to local memory. Each font must have a unique location number.

Installing Your Font in the Printer or Saving the Font to File

Now that you have defined your font, you need to either install it in your printer or save it to file. Follow one of these procedures to complete the process.

To install fonts in your printer

1. From the Font Setup dialog box, click OK to return to the main PrintSet window.
2. Click the To Printer button:



Note: If you download an incompatible TrueType font, the font type will be 999. If you select the incompatible font for a text field, the printer will print the default font 0.

Saving a font to a file and copying to your printer

1. From the Font Setup dialog box, click OK to return to the main PrintSet window.
2. Click the Save As button:



The Save As dialog box appears.

3. In the file manager dialog box, enter a file name and assign a path. The file must use a .PCF extension. For example, you could name your file CHINESE.PCF.
4. Click OK.

When you save the font to file, the Intermec Printer Language (IPL) commands necessary to install the font are automatically written to the file.

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5. Use the DOS copy command to copy the .PCF file to your printer. For example, type:

```
COPY CHINESE.PCF COM1
```

Selecting the Printer Language

When you install a TrueType font, you must select the correct printer language. You use the Intermec printer language (IPL) command, Printer Language, Select, to choose the correct language. For help, see the IPL Commands chapter of your user's manual. If the language setting you have chosen does not work, use the default language setting.

Installing Code Page Tables

If you install a Japanese, Chinese, or Korean TrueType font you must also install the code page tables. The code page tables are available on the Internet at www.intermec.com/products/print.htm.

To install the code page tables in your printer

1. Copy these tables from the Internet to your PC:

```
SJIS.PCF  
BIG5.PCF  
GB.PCF  
KSC.PCF
```

2. Configure the PC for a serial connection to the printer by typing:

```
MODE COM1 96,E,7,1,N
```

3. Use the DOS copy command to copy the .PCF files to your printer. For example, type:

```
COPY *.PCF COM1
```



Quick Response (QR) Code

QR Code is a matrix 2D symbology that encodes data into patterns consisting of black and white dots or modules. A three position detection pattern enables omni-directional reading and ultra high-speed reading. QR Code can handle a wide range of data, including numerical, alphabetical, Kanji, Hiragana, Katakana, graphics, and control codes. A built-in error correction function enables the QR Code to repair errors in the code.

Purpose: Selects QR Code.

Syntax: `c18[,m][,n]`

Defaults: `,m = 2`
`,n = M`

`,m` is the QR model. Possible values are:

<code>,m = 1</code>	Model 1
<code>,m = 2</code>	Model 2

`,n` is the error correction level. Possible values are:

<code>,n = L</code>	7% correction
<code>,n = M</code>	15% correction
<code>,n = Q</code>	25% correction
<code>,n = H</code>	30% correction

Notes: You can only create QR symbols up to 3550 characters.

Maxicode

Maxicode is a fixed-size 2D symbology in which the printer ignores height and width magnification. This symbology is made up of offset rows of hexagonal elements, each of which is 35 mils wide by 40 mils high, arranged around a bull's-eye finder pattern. Each hexagon represents one bit of information and is either black or white depending on the state of the encoded data bit. United Parcel Service (UPS) developed Maxicode for the specific purpose of encoding information about a parcel.

Purpose: Selects Maxicode.

Syntax: `c14[,m1]`

This table lists the possible values for `,m1`. The default value autodiscriminates between Modes 2, 3, and 4.

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Note: If you have developed previous applications using Mode 0, your printer will still support your application. However, we recommend using Mode 2 or 3 for new applications.

Mode (,m1)	Description
2	Structured Carrier Message for U.S. destinations
3	Structured Carrier Message for International destinations
4	Standard Symbol
5	Full Enhanced Error Correction (EEC)
6	Reader Programming

When you select Maxicode, you must format your data to conform to these five fields.

Note: The header only applies to Structured Carrier Message (Modes 2 and 3). It is an optional field. If it is present, the printer moves it to the beginning of the secondary message. It is not encoded as part of the primary message. The primary message consists of the zip code, country code, and the service class.

Field	Description of Field	Number of Characters	Default
1	Header (optional)	Nine	None
2	ZIP code + 4-digit extension	Four	None
3	Country code	Three	840 (U.S.)
4	Service class	Three	999
5	Secondary message	84	None

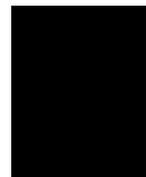
1
2
3
4
5

[>^R_S01^G_S97982039280^G_S840^G_S001^G_S Up to 84 Character Message^E_T

IPL.018

Notes: The NULL character is not supported. If the NULL character appears in the user data, you will lose it along with any following data.

Maxicode only supports the control characters for field separators (<RS> and <GS>) in the secondary message.



Using Direct Graphics Mode

You can significantly reduce the amount of time necessary to download and image a graphic by using Direct Graphics mode. Direct Graphics mode allows the printer to receive a compressed bitmap graphic and image it directly into the image bands without storing it in the printer.

Before you download the graphic, you must compress it into run-length encoded (RLE) data. The data compression greatly reduces the amount of data to download and the rasterized graphic requires minimal processing to image it into the image bands. You no longer need to store the graphic in Program mode and then set up a format in Print mode.

When you download a direct graphic to the printer, the printer stores the graphic in the image bands until you:

- clear the label data.
- set up another format.
- enter Program mode or Test and Service mode.

When printing a label with direct graphics, you must have enough dynamic RAM installed in your printer to contain the entire label. Intermec printers normally reuse image bands which enables you to print long labels with standard RAM. However, when you download direct graphics, the printer retains no information regarding the existence of the graphic in its image bands. Therefore, the printer cannot reuse those image bands when you download a direct graphic.

With standard dynamic RAM, you should be able to print almost any label up to 6 inches long. For longer labels you may need to install expanded dynamic RAM.

What Is Run-Length Encoding?

Run-length encoding (RLE) is a method of compressing bitmap graphics. RLE efficiently compresses graphics that have repeated runs of white or black dots in a column and reduces the amount of time required to download the graphics to a printer.

RLE sends a series of commands that define each bitmap column of a graphic. It takes advantage of a series of repeated dots within a column by encoding them as transition commands. Instead of sending the entire column of bitmap data, it sends commands telling the printer how many series of black and white dots to image. If columns are identical, a command can instruct the printer to repeat the last column. RLE is ideal for bar code graphics or designs with simple patterns.

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In cases where patterns do not exist, you can send uncompressed bitmap data to the printer. You can mix raw bitmap data and RLE commands to ensure the most efficient way to download a graphic.

The RLE file may contain five types of data, each of which is one byte long:

Immediate commands Immediate commands are recognized and executed as regular IPL commands or protocol commands. Immediate commands are removed from the compressed data.

Compression encodation commands Compression encodation commands are used as a part of the compressed graphics file to change or set data modes, repeat lines, change the origin where the next line or lines of data will print, and to end the compressed graphics file and return to IPL command parsing.

Low order data Low order data is 7 bits in length and may be combined with high order data. A single low order data byte can represent up to 7 bits of data (0-127). Combined with a high order byte, the combined data can represent at most 13 bits of data (0 - 8191). Data bytes cannot exist by themselves, but must be preceded by a command byte so that the printer knows how to interpret them. Any data may be represented by either combined data or just low order data. The 8th bit is always set to 1.

High order data High order data is six bits in length and is always combined with low order data. The combined data can represent at most 13 bits of data (0 - 8191). Data bytes cannot exist by themselves, but must be preceded by a command byte so that the printer knows how to interpret them. Any data may be represented by either combined data or just low order data. The printer will ignore high order data followed by a command or more high order data. You must set the 7th bit to 1 and the 8th bit to 0.

Bitmap data Bitmap data is composed of uncompressed bytes that represent columns of your graphic. The uncompressed bytes contain 7 data bits per byte. The 8th bit is always set to 1.

Use this table to understand how the printer uses these five types of data:

Type of Data	Byte Format (7 - 0)	Range	Data it Represents
Immediate commands	0 0 0 x x x x x	0 - 31	N/A
Compression encodation commands	0 0 1 x x x x x	32 - 63	N/A
Low order data	1 x x x x x x x	128 - 255	0 - 127
High order data	0 1 x x x x x x	64 - 127	0 - 63
Bitmap data	1 x x x x x x x	128 - 255	Raw data



How Do I Send a Direct Graphic to the Printer?

Once you have compressed the graphic, you need to use several IPL commands to send the RLE file to the printer. These are the commands accompanied by their descriptions:

Direct Graphics Mode, Enter

Purpose: Instructs the printer to receive RLE compressed graphics data in nibblized format.

Default: $m = 0$

Syntax: `<ESC>gm`

Where m specifies the format of the data to follow.

$m = 0$ 8 bits per byte.

$m = 1$ 7 bits per byte of nibblized data.

When you select $m = 0$, the printer parses subsequent data streams as RLE commands. The printer still recognizes immediate IPL commands. Non-immediate commands are not parsed. The printer resumes normal IPL parsing when it receives an end of bitmap RLE command.

When you select $m = 1$, the printer receives the RLE compressed graphics data in nibblized format. The printer converts each pair of bytes from ASCII to their numerical equivalent and then combines them to form the original byte. For example:

ASCII	Numerical	Original byte
1,B	0x1,0xB	0x1B

Change Origin

Purpose: Tells the printer the X and Y coordinates of the next RLE data column.

Default: 0,0

Syntax: 0x21 [x, y]

Where *x* and *y* are the coordinates of the next data column. Values for *x* and *y* range from 0 to 8191.

The change origin command tells the printer where to place the graphic on the label. If you do not send the command, the printer uses the default setting of 0,0.

You can use the command to place different sections of the RLE graphic in different parts of the label.

Notes: It is not necessary to use this command for every column. Column-to-column transitions are automatic following the end of line command.

The default origin of any direct graphic (0,0) is in the lower left corner instead of in the upper left corner. The upper left corner is the label format origin.

End of Bitmap

Purpose: Marks the end of RLE encoded data.

Syntax: 0x28

Notes: The printer parses subsequent characters as IPL commands.

On the final column of the RLE encoded data, an end of line command does not need to precede the end of bitmap command.

End of Line

Purpose: Causes the printer to assign subsequent bitmap data to the next column.

Syntax: 0x22

Notes: The printer images the next data stream in the next column position, incrementing the X position. This command causes an action similar in function to a carriage return.

**Raw Bitmap Data Follows**

Purpose: Indicates raw bitmap data bytes follow.

Syntax: `0x27[data]`

Notes: The printer only uses the first 7 bits of the data byte. If you set a bit to 1, it prints black. The most significant bit prints farthest to the left. Data order runs from right to left, so the first dot in a column is the least significant bit of the first data byte.

Repeat Last Line

Purpose: Causes the printer to copy the previously defined column *n* number of times.

Syntax: `0x24n`

Values for *n* range from 0 - 8191.

Notes: The printer automatically increments the X origin of each column. This command is only valid when preceded by a column of encoded, raw data, or an end of line command.

Transition Black

Purpose: Transition data follows. The first transition is black.

Syntax: `0x25[data,data,...data]`

Where *data* specifies the number of black or white dots. Values for *data* can range from 0 - 8191.

Notes: Each transition data specifies the number of dots of either black or white to draw. Each data alternates black and white dot counts.

Transition White

Purpose: Transition data follows. The first transition is white.

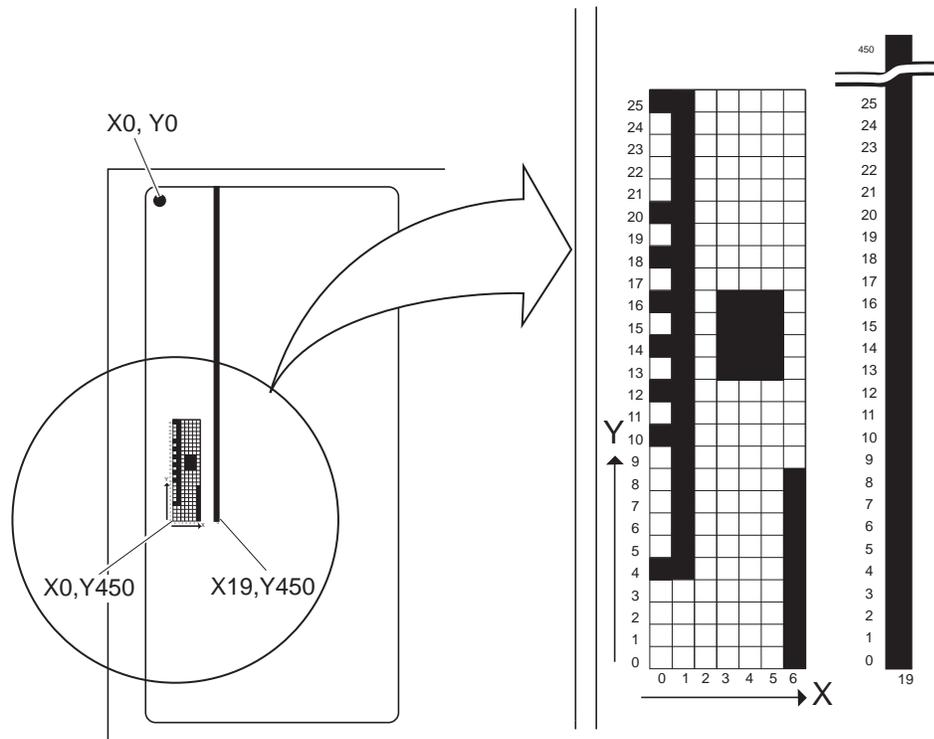
Syntax: `0x26[data,data,...data]`

Where *data* specifies the number of black or white dots. Values for *data* can range from 0 - 8191.

Notes: Each transition data specifies the number of dots of either black or white to draw. Each data alternates black and white dot counts.

Using Direct Graphics Commands

This example consists of two parts: a graphic and a line. The origin of the direct graphic is defined the same as the origin of a normal graphic. In this example, the coordinates for the origin of the complicated graphic are X0,Y450. However, once you enter Direct Graphics mode, your printer loads the information in the reverse Y direction. Each column of the graphic loads from the bottom to the top. Your Y coordinates now start at 0 from the bottom left corner and increase in size as the data loads. So, the printer starts loading data for the complicated graphic at X0,Y450 and loads up to X0,Y425. Likewise, the data for the line starts loading at X19,Y450 and loads up to X19,Y0.



3440A.001

Here is a hex data file for the example above:

1B	67	30	21	80	43	C2	27	90	A8	D5
90	22	26	84	96	22	22	26	8C	84	22
24	82	25	88	22	21	93	43	C2	25	43
C2	28									



This table explains the hex data file in the example:

Data	Command	Description
1B 67 30	<ESC>g0	Enter Direct Graphics mode
21 80 43 C2	0x21 80 43 C2	Change origin 80 - 80 (LO) = 0x00 -> X0 43 - 40 (HI) = 0x03 C2 - 80 (LO) = 0x42 (0x03 * 0x80) + 0x42 = 1C2 -> Y450
27 90 A8 D5 90 22	0x27 90 A8 D5 90 0x22	Raw bitmap data follows, starts at Y0 90 - 80 (LO) = 0x10 -> 1 dot at Y4 A8 - 80 (LO) = 0x28 -> 2 dots at Y10 and Y12 D5 - 80 (LO) = 0x45 -> 3 dots at Y14, Y17, and Y20 90 - 80 (LO) = 0x10 -> 1 dot at Y25 End of line
26 84 96 22	0x26 84 96 0x22	Transition white 84 - 80 (LO) = 4 white 96 - 80 (LO) = 22 black End of line
22	0x22	End of line
26 8C 84 22	0x26 8D 84 0x22	Transition white 8D - 80 (LO) = 13 white 84 - 80 (LO) = 4 black End of line
24 82	0x24 82	Repeat last line 82 - 80 (LO) = 2 times
25 88 22	0x25 88 0x22	Transition black 89 - 80 (LO) = 9 black End of line
21 93 43 C2	0x21 93 43 C2	Change origin 93 - 80 (LO) = 0x13 -> X19 43 - 40 (HI) = 0x03 C2 - 80 (LO) = 0x42 (0x03 * 0x80) + 0x42 = 1C2 -> Y450
25 43 C2	0x25 43 C2	Transition black 43 - 40 (HI) = 0x03 C2 - 80 (LO) = 0x42 (0x03 * 0x80) + 0x42 = 1C2 -> Y450
28	0x28	End of bitmap

