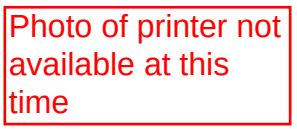
6822

Series 80-Column Printer



User's Manual

Intermec®

4 Configuring the Printer

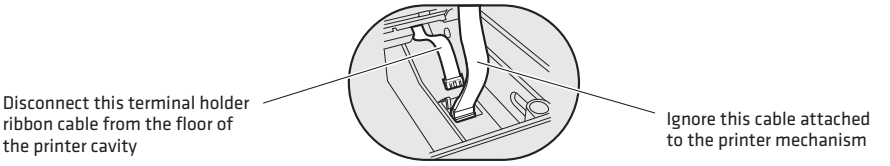
A Printer Configuration Utility is used to load font on the printer and to change the printer settings. In this chapter you will find these sections:

- Connecting to the printer
- Understanding the font modules
- Using the Windows 95 or Windows 98 Printer Configuration Utility
- Using the Windows 2000 or Windows XP Printer Configuration Utility

Connecting to the Printer

Connect your printer to your desktop computer using a serial cable (P/N 226-270-001). The serial COM port connector on either the fixed mount printer or portable printer is on your printer mechanism, the same side as the green thumb wheel.

Before connecting to your PC, locate and disconnect the gray terminal holder ribbon cable connector from the floor of the printer cavity. The cable is located behind the printer mechanism on the same side as the green thumb wheel and is the one that is not attached to the printer mechanism.



Intermec provides printer configuration utilities for the following Windows operating systems.

- If your PC has either Windows 95 or Windows 98, go to page 27 for instructions.
- If your PC has Windows 2000 or Windows XP, go to page 42.

Understanding the Font Modules

Intermec provides the following font modules for your 6822:

- nft00000.mod — Default International, 4820 compatible
- nft00437.mod — IBM/Microsoft compatible Code Page 437
- nft00932.mod — JIS Japanese
- nft00936.mod — GB2312 Chinese Simplified
- nft00949.mod — KSC5601 Korean

- nft00950.mod — Big 5 Traditional Chinese

Note: There are three versions of the default font module (nft0000.mod): Arabic, Turkish, and International. Any one version of this module, but not all three versions, can appear in the 6820 Printer Configuration Utility FONTS directory and install on the 6822. The International version of this font module is automatically placed in the FONTS directory when the Printer Configuration Utility is installed on the PC.

All three versions are included on the printer toolkit CD:

- The Arabic version is included in the "Default Fonts\Arabic" directory.
- The Turkish version is in the "Default Fonts\Turkish" directory.
- The International version is in the "Default Fonts\International" directory.

Use the Printer Configuration Utility to replace the existing default font module (nft00000.mod) with any of the of the other provided fonts. The Printer Configuration Utility is provided in the 6820 Tool Kit. Instructions for installing fonts are provided later in this chapter.

For Windows 95 and Windows 98 Users

If the default installation process was followed, the Printer Configuration Utility "FONTS" directory is located at "6820PRTR\TOOLKIT\FONTS" where "6820PRTR" is replaced by the actual directory in which you chose to extract the files.

For Windows 2000 and Windows XP Users

If you followed the default installation process, the Printer Configuration Utility "FONTS" directory is located at "Program Files\Intermec\6820 Printer Configuration Utility\FONTS.

Caution

Do not rename the font files in the FONTS directory. If rename the fonts will not work correctly.

Using the Windows 95 or Windows 98 Printer Configuration Utility

These instructions apply to desktop computers running either Windows 95 or Windows 98 operating systems.

Installing the Configuration Files

Configuration files for the 6822 are located in the toolkit CD (P/N 215-270-001), these include the rpgpconf.exe Printer Configuration Utility program and the rpgpconf.ini initialization file. The Printer Configuration Utility uses the initialization file to specify the location and names of font and printer control program folders.

To set up your PC

1. Extract the toolkit files from the nptk6822.exe self-extracting archive file.
2. Create a directory, on your PC, with an appropriate name for the Printer Configuration Utility files. You could choose to have the files extracted at the root directory of your PC or specify another folder.

Execute the self-extracting file from the target directory while specifying the path to nptk6822.exe in the command line.

When you run nptk6822.exe, a TOOLKIT folder is created, as well the following folders:

- 6820SYS
- DOS
- FONTS
- PCFS

Generating Custom Configuration Files

The Printer Configuration Utility also helps you create custom configuration files. These files have a .pcf file extension, and stored in the folder specified in the initialization file. See the default .pcf file in the PCFS folder for an example configuration file.

Understanding the Printer Configuration

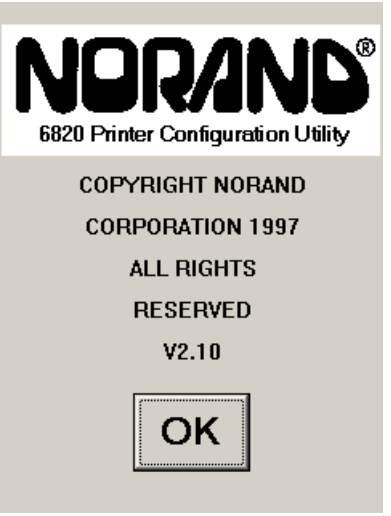
A configuration consists of a list of fonts, some parameter settings, and optionally, a printer control program.

When you start the Printer Configuration Utility, it creates a printer configuration. This configuration has no fonts, parameters are set to the default values, and there is no printer control program in memory. You can modify the basic printer configuration to meet your needs and load the custom configuration to your printer.

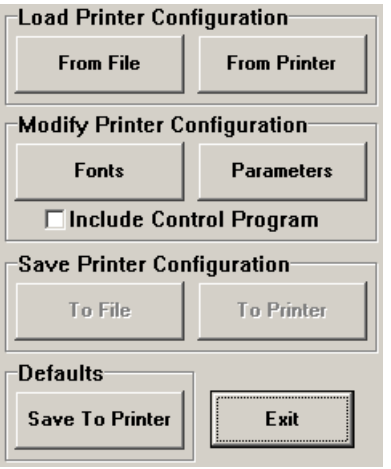
Note: The working configuration is deleted when you exit the Printer Configuration Utility.

To start the Printer Configuration Utility.

1. Run rpgconf.exe and click OK on the first screen to continue to the Main Menu.



2 The following options are available on the Main Menu.



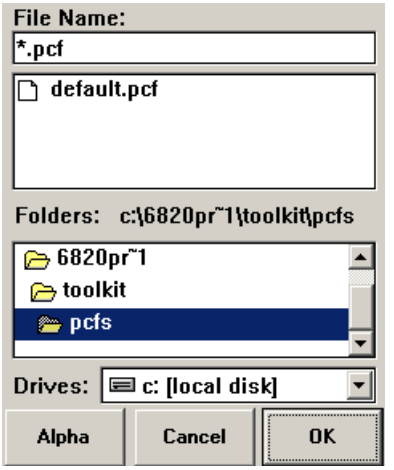
- Use Load Printer Configuration to load an existing configuration. Load either from a file or from the printer.
- Use Modify Printer Configuration to review or modify the working configuration, include the printer control program in the currently loaded configuration, or load fonts.
- Use Save Printer Configurations to save a configuration file to disk or download the working configuration to your 6822.
- Use Defaults to restore the printer to its default configuration.

Note: When the Main Menu is first displayed, the **Save Printer Configuration** options are grayed out, prohibiting selection of those options until a configuration is loaded or modified.

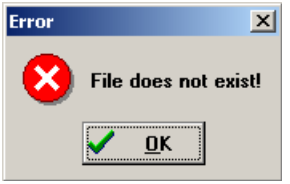
3 Click Exit, then click Yes to exit the Printer Configuration Utility. Click No to the keep the Main Menu open.

To load configuration files from your PC

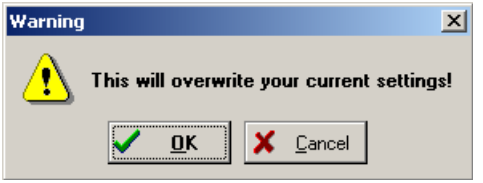
1 Click From File to access the File, Open window.



2 Select a configuration file to load, then click OK. If the selected file does not exist, a “File does not exist!” error message appears. Click OK to return to the Main Menu without loading a file.

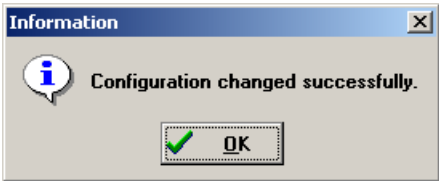


3 If the file does exist, a warning message indicates that loading the selected file will overwrite your working configuration. Click OK to overwrite settings in working configuration, or Cancel to return to the Main Menu.

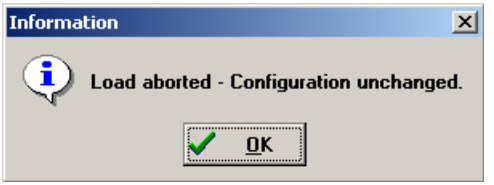


4 OK, the configuration from the selected file is loaded into memory and becomes the current working configuration. If this load is

successful, a message similar to the one shown below is displayed. Click OK to return to the Main Menu.



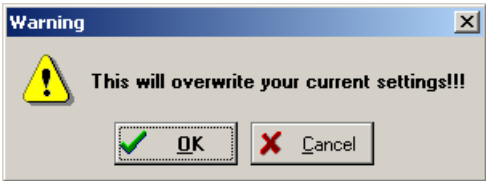
5 If the working configuration is not replaced successfully with the configuration from the selected file, an error message appears indicating that the operation failed. Click OK to return to the Main Menu without loading a file.



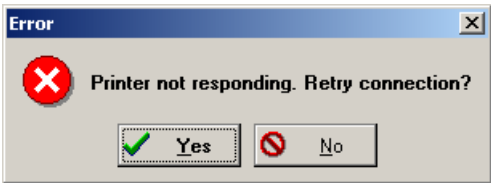
To load a configuration from the 6822

1 Click From Printer from the Main Menu to display a warning message that indicates that the printer's configuration will overwrite the working configuration.

2 Click OK to overwrite the configuration, otherwise click Cancel to return to the Main Menu without loading the printer's configuration.

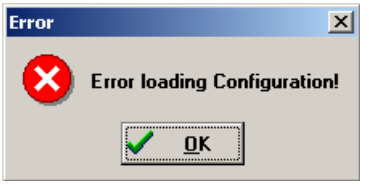


3 If you click OK, a message is then displayed prompting you to reset the printer. If the connection is not successful, after approximately 20 seconds, the following message appears.

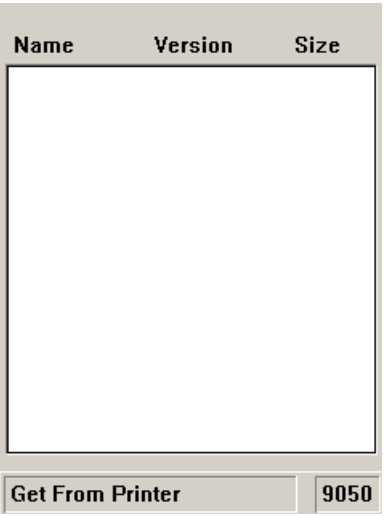


4 Click Yes, to retry connecting to the printer.

5 If you click No, an error message appears and indicates that the configuration was not loaded. Click OK to return to the Main Menu.



6 If a connection is established, no further action is required



The Printer Configuration Utility communicates with the 6822 to find out the current settings and which font modules are loaded. The name, version, and size of the font modules are displayed on the Get From Printer screen.

To modify a printer configuration

Use this option to view or change a working configuration, including adding fonts from disk (on the PC), deleting printer fonts, and changing parameters settings.

- Select Modify Printer Configuration to view or modify the printer configuration.

To include the control program

Use this option to include the printer control program when saving the working configuration to the printer. The npfl6822.mod control program only needs to be changed when a new version becomes available.

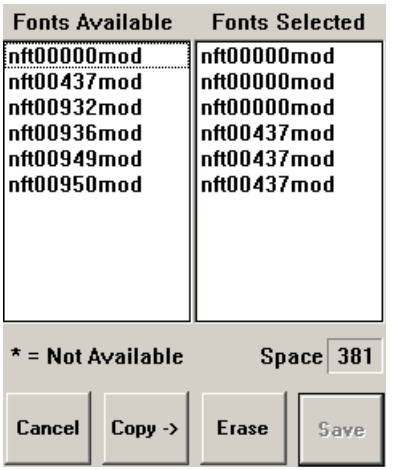
- Select the **Include Control Program** check box to add the control program the next time you save the printer configuration.

Selecting an International Font

A variety of different international fonts are also available in the toolkit for the 6822.

To select a font

- Click Fonts from the Main Menu to access the Font Selection screen where you can perform operations related to font files. The Fonts Available list shows font files that are available on disk. The Fonts Selected list show fonts that are in the current printer configuration.



Note: Save is grayed out, prohibiting that selection, until either new fonts are selected, or fonts are removed from the **Fonts Selected** list.

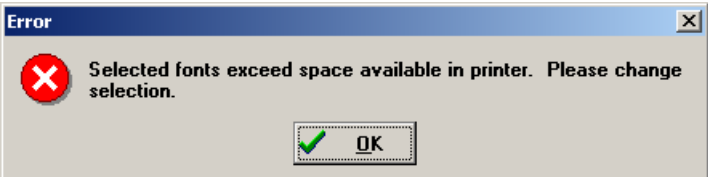
To copy font files

1 Highlight the font files in the Fonts Available list. You can highlight several files at one time, using conventional Windows selection methods.

Click **Copy** to copy those font files to the **Fonts Selected** list.

Note: If you attempt to copy fonts from the **Fonts Available** list when these fonts already exist in the **Fonts Selected** list, the following error message is displayed, once for each of the duplicate fonts (where the current font file name is listed in place of nft00000.mod).

2 Click OK to close the error message and not copy the font to the Fonts Selected list. If there are two or more duplicate fonts, the cycle repeats until an error message is displayed for each of the duplicate font files.



To delete font files

Delete fonts from the **Fonts Selected** list to increase available memory in the printer.

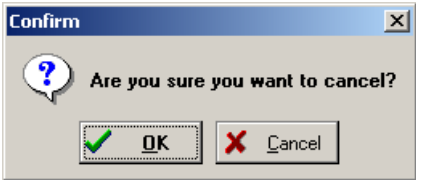
- Select the font names you want to delete from the **Fonts Selected** list, then click **Erase** to clear those names.

The **Space Selection** box, below the **Fonts Selected** list, displays the space remaining in flash (in kilobytes), based on fonts currently selected. When this number is negative, it means the available space in flash is less that the size of the selected fonts. Delete some fonts before saving the rest.

Fonts marked with an asterisk (*), in the **Fonts Selected** list, are currently in printer memory.

To cancel changes

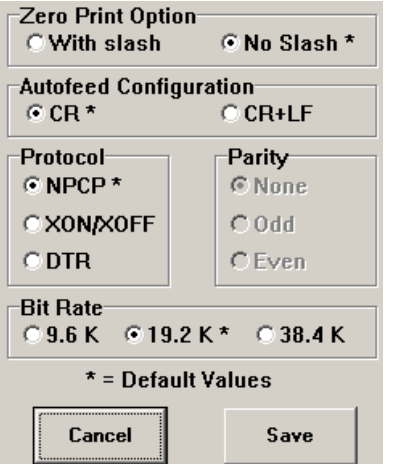
- Click **Cancel** to return to the Main Menu without making any changes. If you have not made any changes to the Fonts Selected list, you return to the Main Menu.



Selecting Parameters

To select a parameter

- Click **Parameters** from the Main Menu to access the Parameters window where you can modify any of the parameters that are not grayed out. Default parameter values are marked with an asterisk (*).



To modify parameter configurations

- Select parameters on the screen using your stylus.

Note: If you are using Bluetooth communication, you must change from the Norand Portable Communications Protocol (NPCP) mode to the Epson DTR mode with the baud rate set to 19.2 K and the parity set to None.

To save parameters

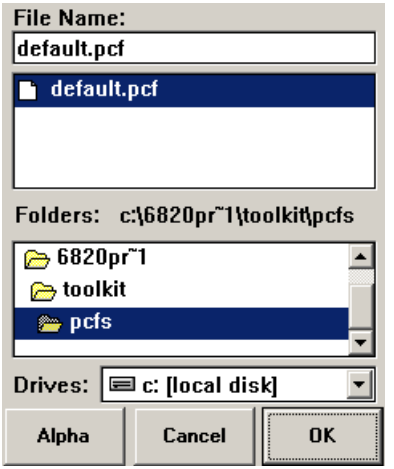
- Click **Save** to update the working configuration and return to the Main Menu.

To cancel the operation

- Click **Cancel** to return to the Main Menu without modifying any configuration parameters.

To save a printer configuration

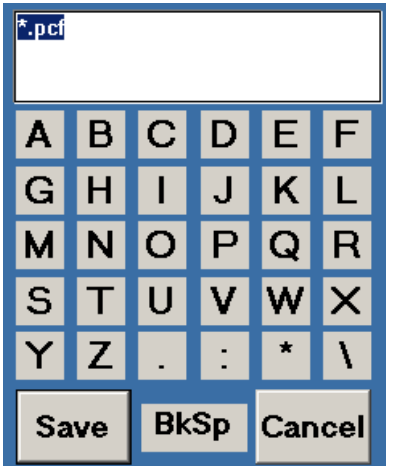
- Click **To File** from the Main Menu to access the **File Save As** dialog.



Specify the drive, directory, and filename for the printer configuration file.

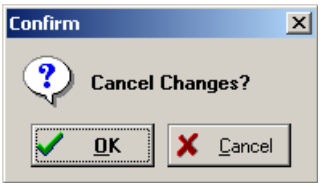
To specify a file name

1. Click the **Alpha** button, on either the **File Open** window or the **File Save As** window to open the keyboard onscreen for you to enter text.



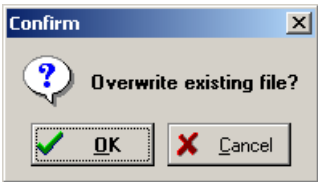
2. Click **Save** to save the file name or click **Cancel** to exit without saving the text. The following confirmation message appears.

3 Click **OK** to return to the previous window without the entered text, or click **Cancel** to continue using the alpha keyboard.



To save the configuration to disk

- After you have selected the drive, directory, and file name, click **OK** to save the configuration file. If a file by the same name exists, the following confirmation message is displayed, informing you that if you continue it will overwrite the existing file. Click **Cancel** to return to the Main Menu without saving the working configuration.



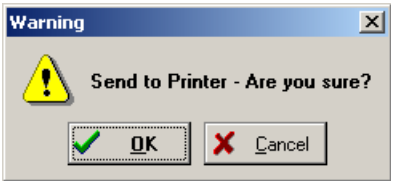
Click **OK** fto continue. The following information is displayed assuring you that the working configuration was successfully saved to disk. Click **OK** to return to the Main Menu.

To cancel the "Save to File" operation

- From the File, Save As window, click **Cancel** to abort the Save to File operation and return to the Main Menu without saving the working configuration.

Saving Files to the Printer

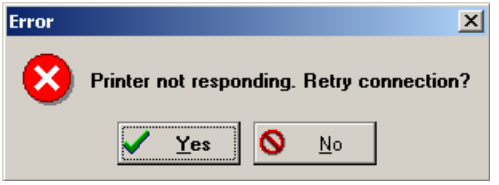
Select the **Save File to Printer** option from the Main Menu, to send the working configuration to your 6822. When you select this option, the following warning message is displayed:



The message indicates the configuration will be copied into the 6822 flash memory and overwrite the current configuration. Click **OK** for the system to connect to the printer and transfer the configuration, or **Cancel** to return to the Main Menu without updating the printer.

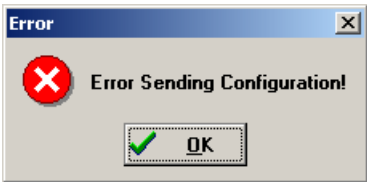
Connecting to the printer

1. After you click **OK,** a message appears informing you that the system is attempting to establish connection with the printer.
2. Connect a serial cable (P/N 226-270-001) between your PC and the printer.
3. Press the **Reset** button to reset the printer.
4. If the connection is not successful after approximately 20 seconds, the following message is appears.

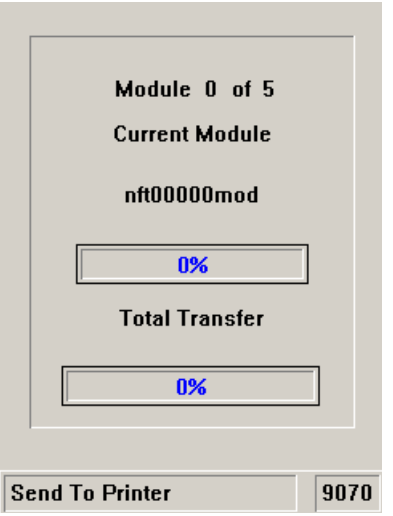


5. Click **Yes** to retry making a connection to the printer.

6 If the configuration was not saved to the printer, the following error message appears.



If the connection is successful, the following screen appears and the printer configuration is updated. The screen also displays the data transfer status.



Default Printer Settings

The following are the default settings used when you click **Restore Defaults to Printer**:

Default Printer Settings

Settings	Values
Zero Print Option	Slash all zeros (zeros are printed with a slash)
Autofeed Configuration	CR (carriage return at end of line without line feed)
Protocol	NPCP

Default Printer Settings

Settings	Values
Parity	N/A (for NPCP)
Bit Rate	19.2 K

For other printer defaults, see **“Factory-Installed Printer Defaults” on page 175**.

Using the Windows 2000 or Windows XP Printer Configuration Utility

These instructions apply to desktop computers running either Windows 2000 or Windows XP operating systems.

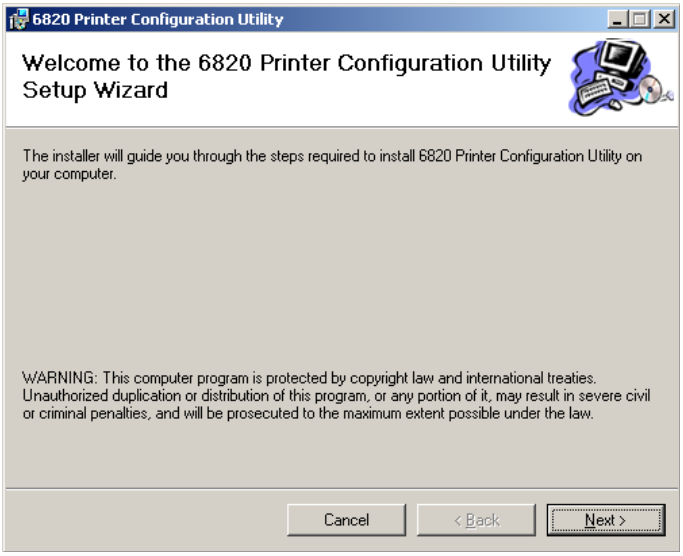
Installing the Windows 2000/XP Printer Configuration Utility

The Windows 2000/XP Printer Configuration Utility is provided on the 6822TKCD toolkit CD (P/N 235-145-001).

To set up your PC to use the Printer Configuration Utility

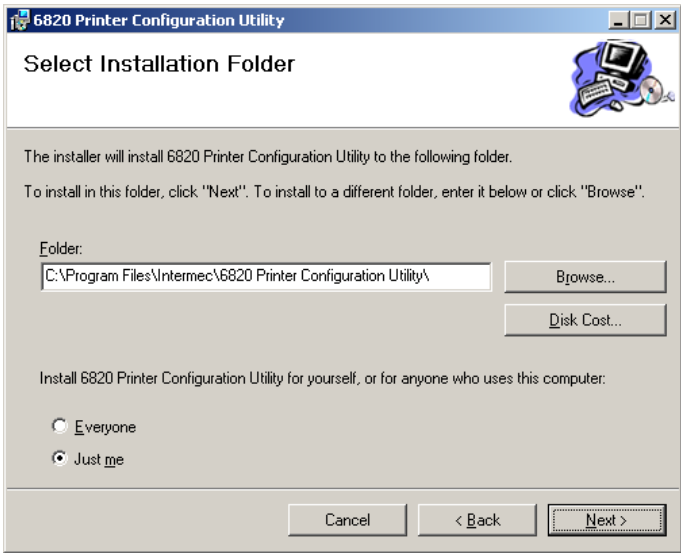
1. Insert the toolkit CD in your PC.
2. From your desktop, use your Explorer application to view the contents of the toolkit CD.

3 Double-click the setup.exe executable file, then click **Next** from the Welcome screen to continue.

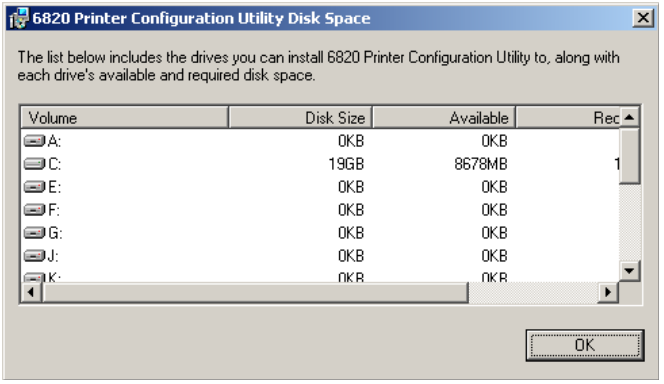


4 The printer configuration utility files are copied to the **Program Files\Intermec\6822 Printer Configuration Utility** folder. To install the files in a different folder, enter the path and folder name.

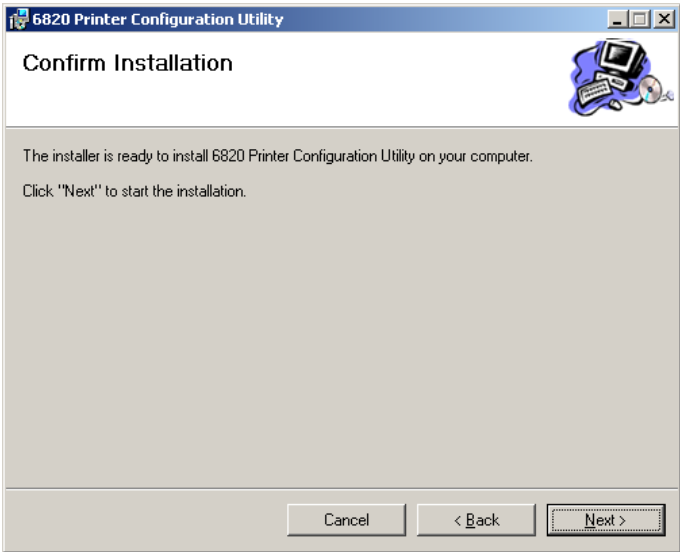
You can also specify if everyone who uses the computer has access to the printer configuration files or limit access to yourself.



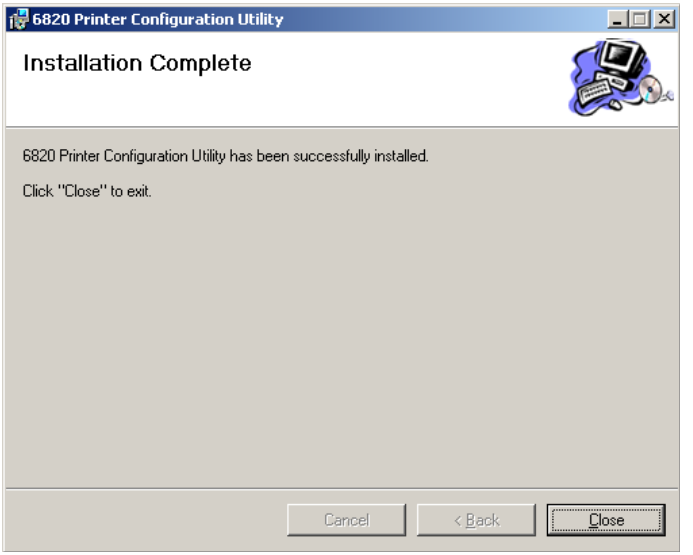
5 Click **Disk Cost** to see the amount of disk space required to install the Printer Configuration Utility. Click **OK** to close and return to the installation screens.



6 Click **Next** to verify installation, click **Back** to adjust the information on the previous screen, or click **Cancel** to exit the installation.'



7 **Installation Complete** appears on the screen. Click **Close** to exit the installation program.

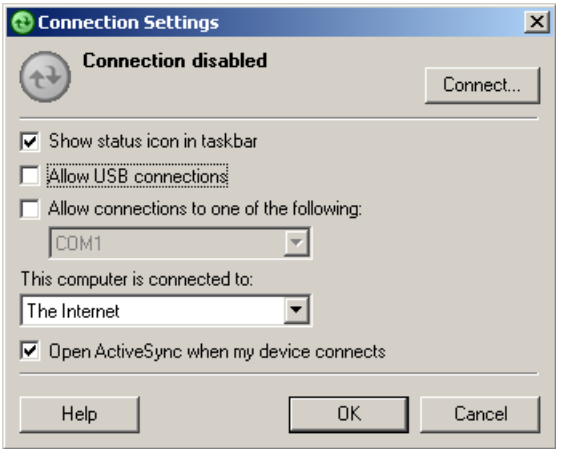


Disabling the Microsoft ActiveSync Serial Port Connections

If you use Microsoft ActiveSync to connect to your computers, you need to disable the serial port connections before using the Printer Configuration Utility.

To disable ActiveSync

1. In the ActiveSync application on your desktop, select **File** > **Connection Settings**.
2. Clear **Allow USB** connections and **Allow connections to one of the following**.



3. Click **OK**.
4. Close the ActiveSync application.

Operating the Printer Configuration Utility

The Printer Configuration Utility consists of a list of fonts, some parameter settings, and a printer control program.

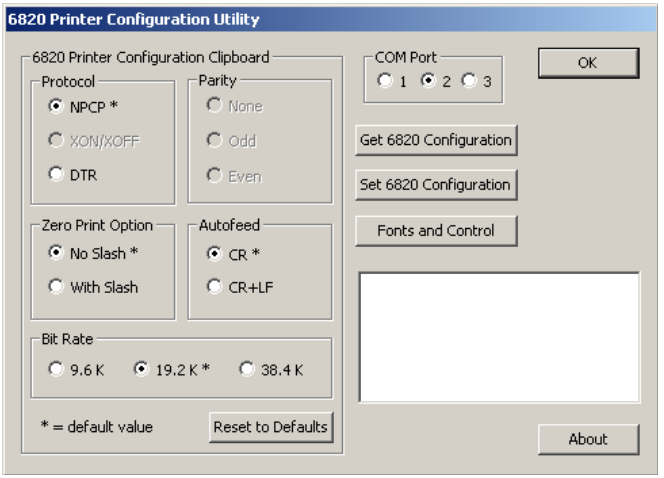
When the Printer Configuration Utility is active, it holds a "configuration clipboard" in memory. Initially, this configuration has parameters set to their default values. Consider the contents of the configuration clipboard as temporary and lost when you exit from the utility.

- Click the **Get 6820 Configuration** button to view the current printer configuration.

- Click the **Set 6820 Configuration** button to change printer setting and send those settings to the printer.
- Click the **Reset to Defaults** button to reset the to the factory default printer configuration.

To start the Printer Configuration Utility

- Click **Start** > **Programs** > **Intermec** > **6820 Printer Configuration Utility** > **PConfigApp.exe** to start the Printer Configuration Utility.



Communicating with the Printer

You can use COM port 1, 2, or 3 to communicate with your printer. COM port 1 is the default selection, but if it is not available or is being used by another application, select another COM port.

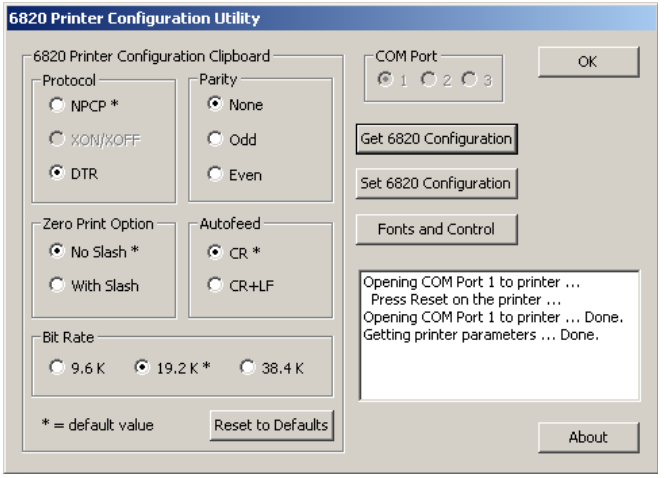
To communicate with the printer

1 Click either the **Get 6820 Configuration** or the **Set 6820 Configuration** button to open communications with the printer.

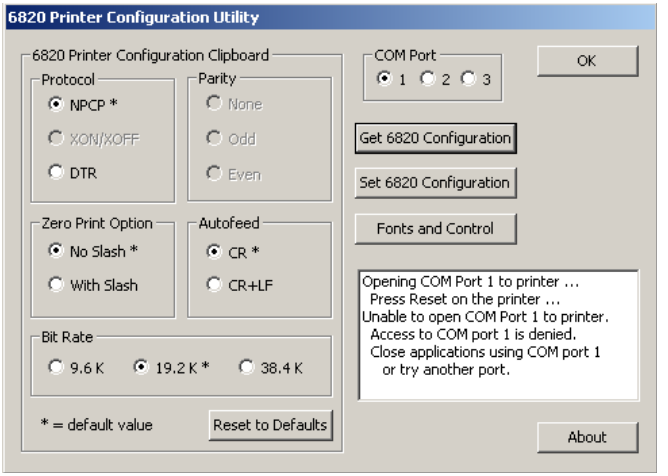
The “Opening COM Port x to printer . . . ” message appears in the text box when you initiate communications sith the printer. The “x” in the message indicates which COM port is being used.

2 When the “Press Reset on the printer” message appears in the text box, press the **Reset** button on your printer. For the location of the **Reset** button on your printer, see **“Using the Reset Button” on page 4**

3 The “Opening COM Port x to printer. . . Done.” message indicates that communication between your PC and the printer has been established.



Note: If “Unable to open COM Port x to printer” appears in the text box another software application may be using the selected COM port. Select another COM port or disable the software application using the COM port. See page 54 for more error messages.



To view the settings on your 6822

1. Click the **Get 6820 Configuration** button to initiate communication.
2. The "Getting printer parameters . . . " message appears when the Printer Configuration Utility retrieves configuration information from the printer.
3. The message "Getting printer parameters . . . Done" appears after configuration information is retrieved.
4. Modify configuration settings or click **OK** to close the Printer Configuration Utility.

Setting the 6822 Configuration

To modify configuration settings

1. Make changes to the Configuration Clipboard or click the **Reset to Defaults** button to undo your selections and return them to their defaults.

Note: When using a Bluetooth adapter you must select the DTR communications protocol and a bit rate of 19.2K.

2. Click the **Set 6820 Configuration** button to initiate communication with the printer. The "Setting printer parameters . . ." message appears when you initiate communication with the printer.

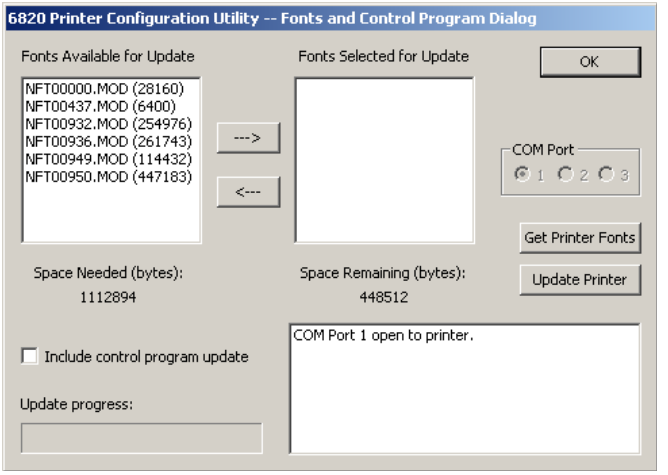
3 The “Setting printer parameters . . . Done” message appears when configuration parameters are set.

Note: The “Unable to set printer parameters” message indicates a dropped connection between your PC and your printer.

4 Click **OK** to close the utility and detach the serial cable.

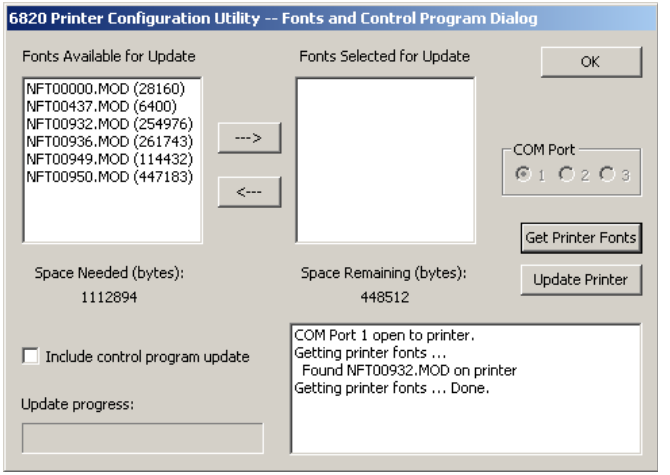
To update 6822 fonts or the 6822 control program

- Click the **Fonts and Control** button to update the fonts stored in your printer or to update the printer control program. The **Fonts Available for Update** list shows font files that are available. The **Fonts Selected for Update** list show fonts that are to be installed jon the printer.



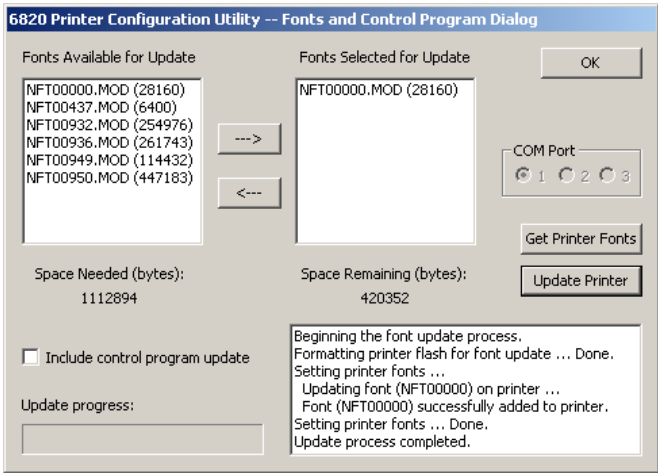
To learn what fonts are currently installed on your printer

- Click the **Get Printer Fonts** button. The installed fonts appear in the text box in the bottom right corner of the dialog.



To select font files

- Highlight the font files you want to download in the **Fonts Available for Update** list.
- Click the right arrow pointing to the **Fonts Selected for Update** list to copy the selected font files to this list. Below is a sample screen.



If the fonts you select exceed the space available in printer memory, an error message appears. Click **OK** to close the error message and not copy the font to the **Fonts Selected for Update** list. If there are two or more fonts that exceed the space allowed, this message repeats until an error message is displayed for each of the font files that went over the space allowed.

The **Space Needed** information shown beneath the **Fonts Available for Update** list indicates the total space required (in bytes) for all of the fonts in the list. The Space Remaining information listed below the Fonts Selected for Update list displays the space remaining in the printer, given the fonts in the Selected list.

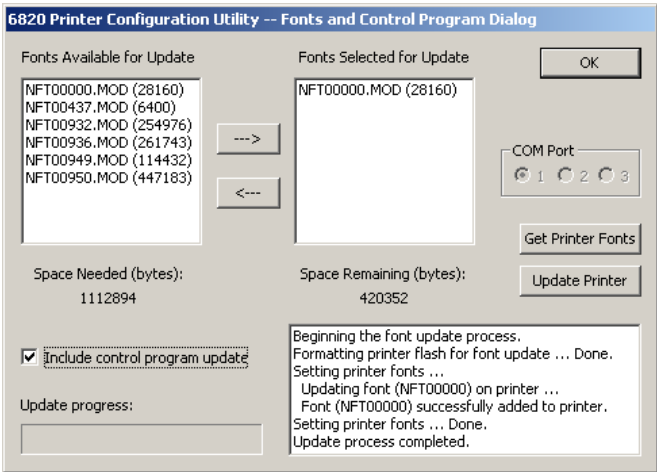
Click **Update Printer** to update the printer fonts and the control program depending on the options selected on the dialog. If the **Selected** list is empty and the Include control program update is not checked, a "Nothing selected for update" message appears in the text box.

- Formats the printer flash for font updates and writes new font files to the printer for any fonts in the **Selected** list.

Click the top, right arrow to copy selected font files from the **Fonts Available for Update** list to the **Fonts Selected for Update** list. Click the bottom, left arrow to remove any selected files from the **Fonts Selected for Update** list.

Click **Update Printer** to update the fonts in the printer with those in the **Fonts Selected for Update** list. The **Update progress:** bar indicates the progress as the control program or fonts are written to the printer.

- Check the **Include program control update** check box to include the printer control program when updating the printer.



Note: You only need to update the control program when new versions of the control program are released.

Default Printer Settings.

Default Printer Settings

Settings	Value
Zero Print Option	Print zeros without a slash
Autofeed Configuration	CR (carriage return at end of line without line feed)
Protocol	NPCP
Parity	N/A (for NPCP)
Bit Rate	19.2 K (19200)

For other printer defaults, see **“Factory-Installed Printer Defaults” on page 175**.

Error Messages

There are three instances when the 6822 may not connect to your PC. In the example error messages, an "x" indicates the assigned COM port number.

Timeout Error

The timeout error may occur due to either of these situations:

- The printer was not reset in the time allowed.
- The COM port exists on the desktop computer but nothing is connected to the port.

Error Message

```
Unable to open COM port x to printer. Printer not
reset within the time allowed or printer not connected
to COM port x.
```

Port Not Found Error

The COM port does not exist. The particular COM port is identified in the error message.

Error Message

```
Unable to open COM port x to printer. COM port x
cannot be found.
```

Access Denied Error

The COM port exists but a connection with the 6822 is not established. The particular COM port is identified in the error message.

Error Message

```
Unable to open COM port x to printer. Access to COM
port x is denied. Close applications using COM port x
or try another port.
```

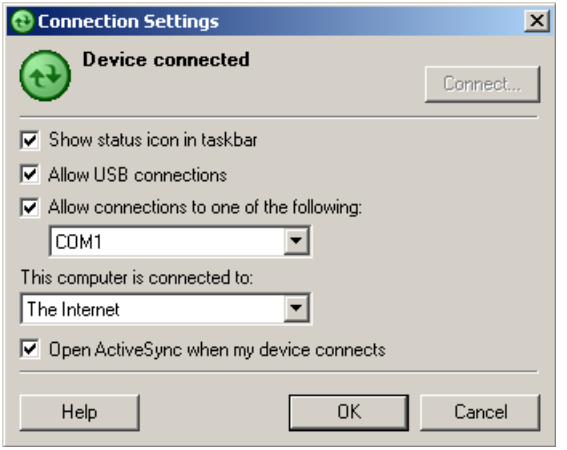
Connecting to the Bluetooth Adapter

If your 6822 has a Bluetooth adapter, be sure to connect this adapter after you finish reconfiguring the 6822 fonts and exit the Printer Configuration Utility (gray cable beneath the printer mechanism).

To enable Microsoft ActiveSync serial port based connections

1 Start ActiveSync and select **File** > **Connection Settings**.

2. Check **Allow USB connections** and **Allow connections to one of the following**.
3. Click **OK**.
4. Close the ActiveSync application.



5 Control Code Definitions

This chapter contains a set of control code definitions and specifications for page layout for the 6822 printer. In this chapter you will find these sections:

- Understanding control code definitions
- Using printer control codes
- Understanding the fanfold paper page layout

Understanding Control Code Definitions

I/O Buffer

All characters and control codes received by the printer are stored in this buffer. Characters and controls codes are read from this buffer and acted upon to form the print buffer. Characters are removed from the I/O buffer as they are processed.

Print Image Buffer

All characters go through this buffer on their way to the printed page. This buffer contains the graphic image of the dots to print, from which characters are rendered. It is cleared when its contents are printed.

Special Notations

The following information defines notations included in the format definitions of the escape sequences, throughout this section.

Special Notations

Notation	Description
(0)	Used in the ASCII column of any of the Format definitions, indicates that its value can only be zero (and not the character “0”). For example: Select Top-Down Printing ESC US (0).
(1)	Used in the ASCII column of any of the Format definitions, indicates that its value can only be one (and not the character “1”). For example: Select Bottom-Up Printing ESC US (1).
*	When a number (at the end of an escape sequence) is marked with an asterisk, then either the value corresponding to that number or the value of the string character can be used for that number. For example, if 1* is shown, then either the value (1), or the value of the string character (decimal: 49, hex: 31) can be used.
NUL	The NUL character is represented in the **Dec** column as 0, in the **Hex** column as 00, and in the **ASCII** column as NUL.

Using Printer Control Codes

These control code definitions are organized by categories of functions. The following methods assist in locating control codes easily:

- Alphabetically organized (complete list)—refer to the “Control Codes and Escape Sequences” table on **page 164**. Locate the index for the control code, and turn directly to that page.
- Numeric order (single character codes only)—refer to the “Single Character Control Code Definitions” table on **page 180**. Locate the index for the control code, and turn directly to that page.
- Numeric order (complete list)—refer to the “Escape Sequence Quick Reference” table on **page 183** and look up control codes by their actual code values. Locate the index for the escape sequence, and turn directly to that page.

Backspace

The print buffer is emptied. The printhead is moved to the left one character space (using the current pitch). This can be performed to, but not beyond, the left margin setting. The backspace is ignored if justification of right, full, or centered is selected.

Format

Decimal	Hex	ASCII
8	08	BS

The backspace control code (BS) is not reliable when text contains different character pitches. For reliable backspacing, use the escape sequence (ESC “\”), Set Relative Print Position.

Beeper

The printer produces a beep lasting approximately 1/10 of a second

Format

Decimal	Hex	ASCII
7	07	BEL

Cancel Line

All of the characters currently in the print buffer are discarded. Current print position is set to left margin. Text already printed cannot be canceled

Format

Decimal	Hex	ASCII
24	18	CAN

Carriage Return

Repositions the printhead at the start of the print line (usually at the left margin), and repositions the pointer to the start of the print buffer, after printing all data in the buffer. Also, all of the “one line” functions are reset, such as bold, double-strike, double-wide, or unidirectional printing.

Format

Decimal	Hex	ASCII
13	0D	CR

Note: You can add an automatic line feed with a configuration item.

Delete

Deletes the last character in the print buffer. This functions only in left justification.

Format

Decimal	Hex	ASCII
127	7F	DEL

Form Feed

Prints the contents of the print buffer, clears the print buffer, and advances the paper to the top of the next page (Top of Form), according to the current page length setting. The carriage position is moved to the start of the line

Format

Decimal	Hex	ASCII
12	0C	FF

Select Half-Speed Printing

Turns on half-speed mode to provide quiet printing, and more accurate print positioning during text mode printing.

Format

Decimal	Hex	ASCII
27 115 1*	1B 73 01*	ESC “s” 1*

Cancel Half-Speed Printing

Turns off half-speed mode (factory default), and continues with normal speed printing.

Format

Decimal	Hex	ASCII
27 115 0*	1B 73 00*	ESC “s” 0*

Set Inactivity Time for Sleep Mode

Sets the amount of time the printer waits before it goes into low-power mode. The factory default is 10 seconds.

Format

Decimal	Hex	ASCII
27 122 n	1B 7A n	ESC “z” n

Line Feed

Perform Line Feed

Prints and then clears the contents of the print buffer, resets the character count to zero; and advances the printhead to the next print line, using the current spacing. The position of the carriage is not affected and a carriage return is not executed.

Format

Decimal	Hex	ASCII
10	0A	LF

Perform n/216-inch Line Feed

Advances the paper to n/216 of an inch. This does not affect subsequent line feeds. Range of *n* is 0-255.

Format

Decimal	Hex	ASCII
27 74 n	1B 4A n	ESC “J” n

Perform n/216-inch Reverse Line Feed

Reverses the line feed by n/216 of an inch. This does not affect subsequent line feeds. Range of n is 0-255.

Format

Decimal	Hex	ASCII
27 106 n	1B 6A n	ESC “j” n

Perform Master Reset

Initializes the printer and restores factory installed printer defaults, (see **“Factory-Installed Printer Defaults” on page 175** for a complete list of settings that are initialized with this command).

Format

Decimal	Hex	ASCII
27 64	1B 40	ESC “@”

Set Print Position (absolute)

Moves the printhead to an absolute horizontal position on the paper. The distance is specified in dots from the left margin to the new print position (at which subsequent characters are printed). Each dot represents 1/60 of an inch. The values for n1 and *n2* determine the distance, as follows:

```
number of dots = n1 + (n2 * 256)
```

Maximum position is 480. The previous contents of the current print buffer is printed.

If the position specified moves the printhead outside the current margins, the command is ignored and the previous setting remains in effect. This command is also ignored in right, center, and full justification modes.

Format

Decimal	Hex	ASCII
27 36 n1 n2	1B 24 n1 n2	ESC “$” n1 n2

Set Print Position (relative)

Moves the printhead to a horizontal position on the paper, relative to the current printhead position. The distance specified is in dots. To determine n1 and n2, first calculate the displacement required in 1/120ths of an inch. If the displacement is to the left, subtract it from 65536. The values for n1 and n2 determine the distance, as follows:

```
number of dots = n1 + (n2 * 256)
```

Maximum displacement is ±960. If the position specified would place the printhead outside the current margins, this function is ignored and the previous setting remains in effect. This function is also ignored in right, center, and full justification modes.

Format

Decimal	Hex	ASCII
27 92 n1 n2	1B 5C n1 n2	ESC “\” n1 n2

Select Top-Down Printing

Enables top-down printing (factory default). First page is printed first.

Format

Decimal	Hex	ASCII
27 31 0	1B 1F 00	ESC US (0)

Select Bottom-Up Printing

Enables bottom-up printing. The last page is printed first.

Format

Decimal	Hex	ASCII
27 31 1	1B 1F 01	ESC US (1)

Select Unidirectional Printing

Turns on unidirectional printing mode. Unidirectional printing moves the printhead from left-to-right only, allowing for more accurate print positioning during text mode printing.

Format

Decimal	Hex	ASCII
27 85 1*	1B 55 01*	ESC “U” 1*

Cancel Unidirectional Printing

Turns off unidirectional printing (factory default), allowing the printhead to print in both directions

Format

Decimal	Hex	ASCII
27 85 0*	1B 55 00)	ESC “U” 0*

Select Unidirectional (one line) Printing

Turns on unidirectional printing for the current line only. The contents of the print buffer is printed, and cleared before setting this mode. This allows more accurate print positioning during text mode printing, for the current line.

Format

Decimal	Hex	ASCII
27 60	1B 3C	ESC “<”

Page Formatting Functions

This set of functions consists of control codes that change the formatting of the page. The page length (form length) and margin settings define the printable area on the page. These settings need to conform to the actual size of the paper used in the printer. The line spacing functions set the amount of space from one line to the next, for line feeds. The factory default is 1/6 inch (6 lines per inch). The page length, vertical tab, and skip over perforation functions are also dependent on the line spacing function.

Set Page Length (lines)

Sets the length of the paper in lines, where the range of *n* (number of lines) is 1-127 (default = 66). Keep in mind the line spacing and actual length of the paper when specifying this value, since this function is dependent on those parameters. Top-of-Form is reset to the current line and the Skip Over Perforation setting is canceled.

Format

Decimal	Hex	ASCII
27 67 n	1B 43 n	ESC “C” n

Set Page Length (inches)

Sets thee length of the paper in inches, where the range of *n* (number of inches) is 1-22 (default = 11). Keep in mind the line spacing and actual length of the paper when specifying this value, since this function is dependent on those parameters. Top-of-Form is reset to the current line and the Skip Over Perforation setting is canceled.

Format

Decimal	Hex	ASCII
27 67 0 n	1B 43 00 n	ESC “C” NUL n

Select 1/8-inch Line Spacing

Sets the line spacing is set to 1/8 of an inch (8 lines per inch), for subsequent lines.

Format

Decimal	Hex	ASCII
27 48	1B 30	ESC “0”

Select 7/72-inch Line Spacing (7 dots)

Sets the line spacing to 7/72 of an inch (approximately 9.7 lines per inch), for subsequent lines.

Format

Decimal	Hex	ASCII
27 49	1B 31	ESC “1”

Select 1/6-inch Line Spacing

Sets the line spacing to 1/6 of an inch (6 lines per inch), for subsequent lines (factory default). 1/6 inch is equal to 12 dot spacing.

Format

Decimal	Hex	ASCII
27 50	1B 32	ESC “2”

Select n/216-inch Line Spacing

Sets the line spacing to n/216 of an inch, for subsequent lines. A spacing of 1/216 inch is 1/3 the distance between pins of the printhead (approximately 1/3 of a dot) and 27/216 is 8 lines per inch. Range of *n* is 0-255.

Format

Decimal	Hex	ASCII
27 51 n	1B 33 n	ESC “33” n

Select n/72-inch Line Spacing (n dots)

Sets the line spacing to n/72 of an inch, for subsequent lines. A spacing of 1/72 inch (1 point in font size) is the distance between pins on the printhead (approximately 1 dot) and 9/72 is 8 lines per inch. Range of *n* is 0-85.

Format

Decimal	Hex	ASCII
27 59 n	1B 41 n	ESC “A” n

Set Right Margin

Clears all text in the print buffer and sets the right margin to *n* columns, using the current character pitch. This is the number of the characters from column 1 (at the left edge of the paper) to the last column before the right margin (factory default = 80).

Minimum space between margins is the width of one double-width pica character. Maximum value for this is the maximum number of characters (based on the current pitch) that would fit between the left margin and the right edge of the default printable area of the page. Ranges shown below could vary, depending on values of other parameters that affect character width. If the value specified is not within the allowed range, it is ignored.

Range of n is 2-80 in Pica mode, 2-96 in Elite mode, and 2-136 in Compressed mode.

Format

Decimal	Hex	ASCII
27 81 n	1B 51 n	ESC “Q” n

Set Left Margin

Clears the print buffer text and sets the left margin, relative to the number of columns to the left of the first column to print (factory default = 0).

Minimum space between margins is the width of one double-width pica character. Maximum value must be less than the right margin. Ranges shown below could vary, pending on other parameter values that affect character width. If the specified value is not within the range, it is ignored.

Range of *n* is 0-78 in Pica mode; 0-93 in Elite mode, and 0-133 in Compressed mode.

Format

Decimal	Hex	ASCII
27 108 n	1B 6C n	ESC “l” n

Set Skip Over Perforation

Defines the number of lines to skip between the last printed line on the page and the first printed line on the next page is set. If the value specified for this function is greater than the page length, it is ignored. This function is canceled by using one of the Set Page Length functions (factory default = disabled). This function is valid for continuous paper only.

The amount of space left blank at the bottom of the printed page is dependent upon the current Line Spacing.

Format

Decimal	Hex	ASCII
27 78 n	1B 4E n	ESC “N” n

Cancel Skip Over Perforation

Cancels the skip over perforation, which allows the maximum number of lines to print on each page.

Format

Decimal	Hex	ASCII
27 79	1B 4F	ESC “O”

Character Style and Text Mode Functions

The following set of functions affect the appearance of text on the printed page. This could involve size, typeface, or other characteristics of the text.

Select Condensed Mode (compressed)

Selects condensed mode which prints characters at approximately 60% of the normal width. This results in character pitches, as shown below (for exact pitch values, see **“Master Select” on page 74**).

Character Pitches

Condensed Mode	Condensed + Expanded	Condensed + Elite
17 cpi (approximate)	9 cpi (approximate)	20 cpi (approximate)

This function empties the print buffer and turns compressed mode on, and stays on until canceled by Cancel Compressed Mode, ESC SI or DC2 (factory default = disabled).

Note: This function is not supported in Double-Byte Character Sets (DBCS).

Format

Decimal	Hex	ASCII
27 15	1B 0F	ESC SI
15	0F	SI

Cancel Condensed Mode

Cancels the compressed mode, enabled by Select Compressed Mode, SI or ESC SI (1).

Note: This function is not supported in DBCS.

Format

Decimal	Hex	ASCII
27 18	1B 12	DC2
18	12	DC2

Select Double-Strike Mode

Enables double-strike printing, until Cancel Double-Strike Mode is encountered. Factory default disables double-strike. Text is made bolder by printing each dot twice, with the second dot slightly below the first dot. This mode is not available in NLQ, but is not canceled when you select NLQ.

Note: This function is not supported in DBCS.

Format

Decimal	Hex	ASCII
27 71	1B 47	ESC “G”

Cancel Double-Strike Mode

Cancels Double-Strike Mode.

Note: This function is not supported in DBCS.

Format

Decimal	Hex	ASCII
27 72	1B 48	ESC “H”

Select Double-Wide Mode

Enables expanded print for the current line only. The mode set previously returns on subsequent lines. However, expanded print can be canceled with Cancel Expanded Print, DC4 or ESC “W” (0), before end of current line, or wrapping of the print buffer. This works with all three pitches (Pica, Elite, Compressed).

This mode is also terminated by the execution of a Carriage Return, Line Feed, Form Feed, Vertical Tab or wrapping of the print buffer.

Note: This function is not supported in DBCS.

Format

Decimal	Hex	ASCII
27 14	1B 0E	ESC SO
14	0E	SO

Cancel Double-Wide Print

Cancels expanded print for the current line only. Modes set previously return on subsequent lines. However, it does not cancel expanded mode set by Select Double-Wide (expanded) Mode, ESC “W” (1) or Master Select, ESC “!”.

Note: This function is not supported in DBCS.

Format

Decimal	Hex	ASCII
27 20	1B 14	DC4
20	14	DC4

Select Double-Wide Mode

Enables expanded print until Cancel Expanded Print is encountered. Factory default disables double-wide mode.

Note: This function is not supported in DBCS.

Format

Decimal	Hex	ASCII
27 87 1*	1B 57 01*	ESC “W” 1*

Cancel Double-Wide Mode

Cancels Double-Wide Print mode.

Note: This function is not supported in DBCS.

Format

Decimal	Hex	ASCII
27 87 0*	1B 57 00*	ESC “W” 0

Select Elite Pitch

A character pitch of 12 cpi (characters per inch) is selected. This also cancels Pica Pitch (factory default = Pica).

Note: This function is not supported in DBCS.

Format

Decimal	Hex	ASCII
27 77	1B 4D	ESC “M”

Select Emphasized Print Mode

Enables Emphasized Print mode until Cancel Emphasized Mode is encountered. The text is made bolder by printing each dot twice, with the second dot slightly to the right of the first dot. Factory default disables Emphasized mode.

Note: This function is not supported in DBCS.

Format

Decimal	Hex	ASCII
27 69	1B 4B	ESC “E”

Cancel Emphasized Print Mode

Cancels Emphasized Pring mode.

Note: This function is not supported in DBCS.

Format

Decimal	Hex	ASCII
27 70	1B 46	ESC “F”

Defining Intercharacter Space

Defines the amount of space to the right of each character, in addition to the space allowed in the character design. The variable *n* represents the number of units of space, with each unit equal to 1/120 of an inch. Range of values for *n* is 0-63 with a factory default of 0.

Format

Decimal	Hex	ASCII
27 32 n	1B 20 n	ESC SP n

Select Italic Mode

The text (nongraphic) characters are italicized. Factory default disables Italic mode.

Note: This function does not work well with DBCS or alternate Single Byte Character Sets (SBCS).

Format

Decimal	Hex	ASCII
27 52	1B 34	ESC “4”

Cancel Italic Mode

Cancels the Italic mode.

Note: This function does not work well with DBCS or alternate Single Byte Character Sets (SBCS).

Format

Decimal	Hex	ASCII
27 53	1B 35	ESC “5”

Master Select

Allows you to specify a combination of print modes. The variable *n* is determined by combining values for the desired modes, by adding them together.

Note: This function is not supported in DBCS.

Format

Decimal	Hex	ASCII
27 33 n	1B 21 n	ESC “!” n

Valid combinations of the values in the following table include any combinations except that Pica cannot combine with Elite.

Example

Pica Compressed Italic Underlined, by adding values (00h + 04h + 40h + 80h), which results in C4h for the value of *n*.

Master Select Values

Hex Value	Mode
00h	Pica
01h	Elite
04h	Condensed (compressed)
08h	Emphasized
10h	Double-Strike
20h	Double-Width (expanded)

Master Select Values (continued)

Hex Value	Mode
40h	Italic
80h	Underlined

The following print conflicts occur between modes. A mode in any column takes precedence over all modes in the columns to its right.

Print Conflicts

1	2	3
Elite	Emphasized	Compressed

The following print modes can be combined producing different pitches:

Print Modes

Pitch	Mode
5 cpi	Expanded
6 cpi	Expanded Elite
8.58 cpi	Expanded Compressed
10 cpi	Pica
12 cpi	Elite
17.16 cpi	Compressed

Select Pica Pitch

Selecta a character pitch of 10 cpi (characters per inch) (factory default). This also cancels Elite pitch.

Note: This function is not supported in DBCS.

Format

Decimal	Hex	ASCII
27 60	1B 50	ESC “P”

Select Superscript Mode

Prints all subsequent characters in approximately 2/3 the normal height in the upper part of the character space, until Cancel Subscript/ Superscript is encountered.

Note: This function is not supported in DBCS.

Format

Decimal	Hex	ASCII
27 83 0*	1B 53 00*	ESC “S” 0*

Select Subscript Mode

Prints all subsequent characters in approximately 2/3 the normal height in the lower part of the character space, until Cancel Subscript/ Superscript is encountered.

Note: This function is not supported in DBCS.

Format

Decimal	Hex	ASCII
27 83 1*	1B 53 01*	ESC “S” 1*

Cancel Subscript/Superscript Mode

Cancels the effects produced by Select Superscript Mode and Select Subscript Mode. Factory default also disables both of these modes.

Note: This function is not supported in DBCS.

Format

Decimal	Hex	ASCII
27 84	1B 54	ESC “T”

Select Underline Mode

Enables the underlining of all subsequent characters (including spaces) until the Cancel Underline mode function is encountered.

Format

Decimal	Hex	ASCII
27 45 1*	1B 2D 01*	ESC "–" 1*

Cancel Underline Mode

Cancels the effect of the Select Underline mode. Factory default also disables the Underline mode.

Format

Decimal	Hex	ASCII
27 45 0*	1B 2D 00*	ESC "–" 0*

Tabs and Tab Setting Functions

There are control codes for setting horizontal and vertical tabs.

Horizontal tabs:

- Are not affected by subsequent changes in pitch.
- May range up to maximum width for character and printer size.
- All previous tab stops are cleared when new tab stops are set. If the left margin is changed after the horizontal tabs are set, tab stops are cleared.
- Become absolute positions and are not affected by any subsequent change in character size.
- Set outside of the printable area are ignored.

Vertical tabs:

- Tab positions are line numbers, counting from the Top of Form.
- All tabs set beyond the page length are stored, but are not used.
- Any tab set within the SOP range (Skip Over Perforation), during the time SOP is active, are stored but not used until SOP is canceled.

- If a vertical tab, and the next tab stop is outside the printable page area, a form feed is executed placing the printhead at the next Top of Form.
- Previous tab stops are cleared when new tab stops are set.
- Are not affected by subsequent changes in line spacing.

Perform Horizontal Tab

Moves the print position to the next horizontal tab stop. The tab positions, set by ESC “D”, the Set Horizontal Tabs function, are not affected by any changes in character pitch.

The factory default tab settings are at intervals of eight characters, in the currently selected pitch. For the default tabs, the actual distance to each tab position is affected by changes in character pitch.

Format

Decimal	Hex	ASCII
9	09	HT

Set Horizontal Tabs

Resets the current horizontal tabs, and new horizontal tabs are set up, based on the current character width (pitch).

Format

Decimal	Hex	ASCII
27 68 n1 n2 ..nk 0	1B 44 n1 n2 .. nk 00	ESC “D” n1 n2 .. nk NUL

n1 is the first tab (range for tab stops: 1-160), n2 is the second tab (all tabs in ascending order), ... are subsequent tabs (maximum tabs: 32), nk is the last tab to set (any value less than the previous tab value acts as a terminating character), NUL is the terminating character.

Clear Horizontal Tabs

Clears all horizontal tab stops. It is merely a variant behavior of the Set Horizontal Tabs function, where the *NUL* acts as an early terminating character, as existing tabs normally clear before setting any new tabs.

Format

Decimal	Hex	ASCII
27 68 0	1B 44 00	ESC “D” NUL

Perform Vertical Tab

Prints the contents of the current print buffer, and then moves the print position to the next vertical tab stop. If no channel is selected, then channel 0 is used. The carriage position is changed to the start of the next print line. If the vertical tab is performed beyond the last tab position set or beyond the last line of a form, then a form feed is performed. If no vertical tabs are defined, then the paper advances one line, using the currently selected line spacing, without changing the carriage position.

Format

Decimal	Hex	ASCII
11	0B	VT

Set Vertical Tabs

Resets the current tabs, and vertical tabs are set up, based on the current line spacing. Tab settings are not affected by subsequent changes in line spacing.

Format

Decimal	Hex	ASCII
27 66 n1 n2 .. nk 0	1B 42 n1 n2 .. nk 00	ESC “B” n1 n2 .. nk NUL

n1 is the first tab (range of values for tab stops: 1-255), n2 is the second tab (all tabs must be in ascending order), ... are subsequent tabs (maximum number of tabs: 16), nk is the last tab to set (any value less than the previous tab value acts as a terminating character), NUL is the terminating character. All tab settings with this function are stored in channel 0.

Clear Vertical Tabs

Clears all vertical tab stops . This is a variant behavior of the Set Vertical Tabs function, where the *NUL* acts as an early terminating character.

Format

Decimal	Hex	ASCII
27 66 0	1B 42 00	ESC “B” NUL

Set Vertical Tabs in Channel

This function works the same as the Set Vertical Tabs function, except that it stores the tabs into a specified channel, as specified by the variable *c*. This channel is selected for use by the Select Vertical Tab Channel function.

Format

Decimal	Hex	ASCII
27 98 c n1 n2 .. nk 0	1B 62 c n1 n2 .. nk 00	ESC “b” c n1 n2 .. nk NUL

c is the channel number (range: 0-7), n1 is the first tab (range of values for tab stops: 1-255), n2 is the second tab (all tabs must be in ascending order), ... are subsequent tabs (maximum number of tabs: 16), nk is the last tab to set (any value less than the previous tab value acts as a terminating character), and NUL is the terminating character.

Clear Vertical Tabs in Channel

Clears all vertical tab stops in the specified channel. This is merely a variant behavior of the Set Vertical Tabs in Channel function, where the *NUL* acts as an early terminating character, since this function normally clears the existing tabs before setting any new tabs.

Format

Decimal	Hex	ASCII
27 98 c 0	1B 62 c 00	ESC “b” c NUL

Select Vertical Tab Channel

Selects a specified vertical tab channel. It sets up the current tabs from that channel. Once this function is performed, all subsequent Perform Vertical Tab commands use the tab stops from the list retrieved from the specified channel. At power on, the printer uses the tabs stored in channel 0.

Format

Decimal	Hex	ASCII
27 47 c	1B 2F c	ESC "/" c

c is the channel number (range: 0-7).

Using Character Sets and User-Defined Functions

You can install different character sets on the printer. In some cases more than one character set may be present at one time, depending on the amount of available font memory. The 6822 reserves 438K of memory for installing fonts in flash memory. You can install fonts using NPCP or the Printer Configuration Utility.

Single-Byte Character Sets

Single-byte character sets (SBCS) are supported for MS-DOS, PL/N, and Intermec application compatibility. Nft00000.mod is the default character set (font) for compatibility with the 6822 80-Column Printer. Nft00437.mod is the IBM/Microsoft compatible character set for code page 437.

Double-Byte Character Sets

Double-byte character (DBCS) sets require two bytes to send to the printer to define the character to print. The first byte of the character code sent to the printer is known as a lead-in byte. The second byte of the character code is known as the trailing byte. Different character sets have different requirements for the values of both lead-in and trailing byte. When the lead-in byte does not fall in the range listed for the character set, a character from a SBCS may print. The following double-byte character sets are supported by the 6822.

Double Byte Character Sets

Font Module	Code Page	DBCS Languages	Lead-in Byte	Trailing Byte
nft00936.mod	936	GB 2312 Chinese (simplified)	A1h–ABh B0h–F7h	A1h–FEh
nft00950.mod	950	big 5 Traditional Chinese	A1h–C6h C9h–F9h	40h–FEh (except 7Fh)
nft00932.mod	932	Shift JIS Japanese	81h–9Fh E0h–FCh	40h–FCh (except 7Fh)
nft00949.mod	949	KSC 5601 Korean	A1h–ACh B0h–C8h CAh–FDh	A1h–FEh

Multi-Byte Character Sets

Double-byte character sets and single-byte character sets can mix when printing a report. This mixture is referred to as a Multi-Byte Character Set (MBCS). When a DBCS is selected, the characters from the SBCS code page currently selected are used for rendering character codes and control codes from 0 to 127. Codes above 127 (that fall within the range of lead-in bytes for the selected character set) treat the byte that follows as a trailing byte for that character set. Otherwise, for character codes above 128, the character code from the selected SBCS is printed. NFT00950.MOD (BIG 5 DBCS) does not allow the MBCS mode. For this character set, only control codes from 0-31 are treated as single byte characters when they are not proceeded by a lead-in byte. All escape sequence character strings are treated as SBCS.

Select National Character Set

By default, code page 0 is selected by the printer at reset. Use the following escape sequence to select international character support. Escape sequence codes can only be used for code page 0. All other code pages use direct character code mapping to select the appropriate font for rendering.

Format

Decimal	Hex	ASCII
27 82 n	1B 52 n	ESC “R” n

n is 0-14 and is the country code, as shown in the International Character Sets table on the next page. The default value for n is zero (USA).

A full 256 character set is not provided for these sets. There are 64 international characters stored in ROM, 32 in Roman and 32 in Italic. They are stored as codes 0-31 and 128-255. These are normally not accessible. The ESC “R” command makes these codes available, but only 12 characters at a time. These 12 are available in these positions of the ASCII character table: 35, 36, 64, 91, 92, 93, 94, 96, 123, 124, 125, and 126, as shown in the International Character Sets table.

International Character Sets

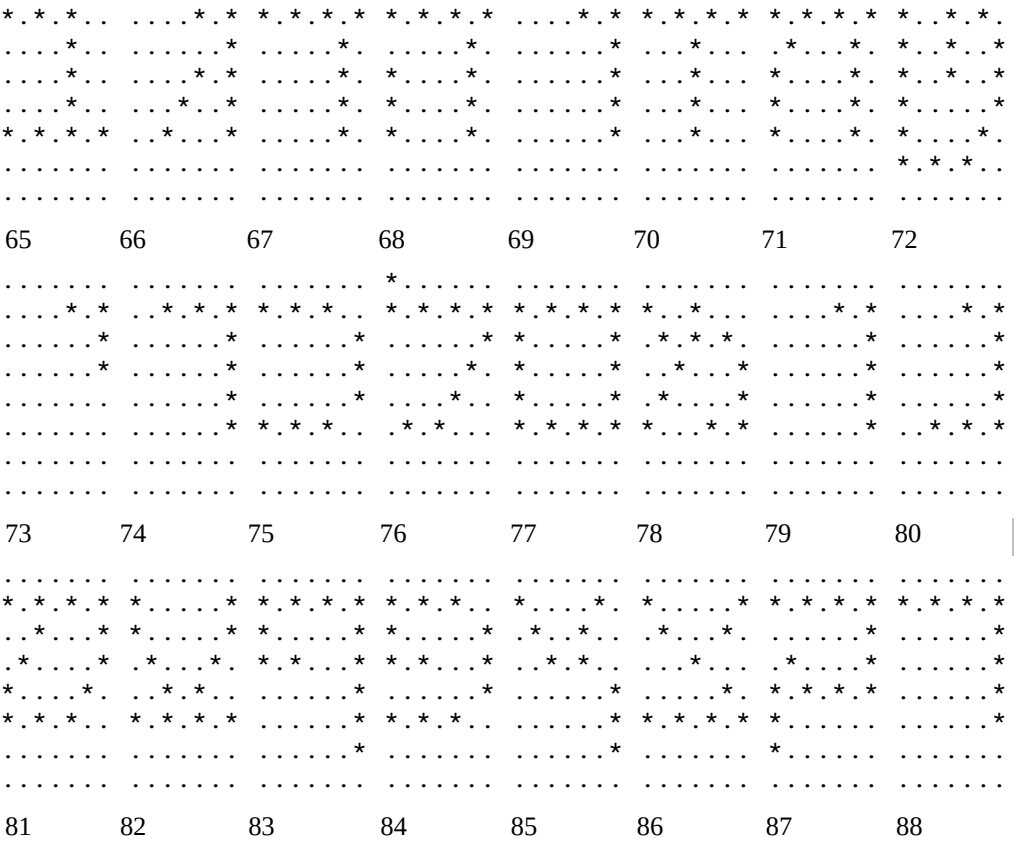
Country	Country Number	35	36	64	91	92	93	94	96	123	124	125	126
USA	0	#	$	@	[	\	]	^	‘	{	|	}	~
France	1	#	$	à	º	ç	§	^	‘	é	ù	è	¨
Germany	2	#	$	§	Ä	Ö	Ü	^	‘	ä	ö	ü	b
England (UK)	3	£	$	@	[	\	]	^	‘	{	|	}	~
Denmark 1	4	#	$	@	Æ	Ø	Å	^	‘	æ	ø	å	~
Sweden	5	#	¤	É	Ä	Ö	Å	Ü	é	ä	Ö	å	ü
Italy	6	#	$	@	º	\	é	^	ù	à		è	ì
Spain 1	7	P	$	@	¡	Ñ	¿	^	‘	¨	ñ	}	~
Japan	8	#	$	@	[	¥	]	^	‘	{	|	}	~
Norway	9	#	¤	É	Æ	Ø	Å	Ü	é	æ	ø	å	ü
Denmark 2	10	#	$	É	Æ	Ø	Å	Ü	é	æ	ø	å	ü
Spain 2	11	#	$	á	¡	Ñ	¿	é	‘	í	ñ	ó	ú
Latin America	12	#	$	á	¡	Ñ	¿	é	ü	í	ñ	ó	ú

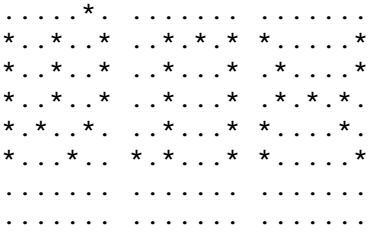
International Character Sets (continued)

Country	Country Number	35	36	64	91	92	93	94	96	123	124	125	126
Hebrew	13	Hebrew fonts are available in the supplied font files. See "Hebrew Character Fonts" below.											
Greek	14	Greek fonts are available in the supplied font files. See the **"Greek Character Sets" on page 85**.											

Hebrew Character Fonts

Hebrew characters represented by decimal values 38 and 65 through 90 are represented by the following 7x7 font descriptions.





89 90 91

Greek Character Sets

Dec	Hex	Chr	Dec	Hex	Chr	Dec	Hex	Chr
97	61	A	105	69	I	113	71	P
98	62	B	106	6a	K	114	72	S
99	63	G	107	6b	L	115	73	T
100	64	D	108	6c	M	116	74	Y
101	65	E	109	6d	N	117	75	F
102	66	Z	110	6e	X	118	76	X
103	67	H	111	6f	O	119	77	Y
104	68	q	112	70	P	120	78	W

The selected set stays in effect until the printer is reset and receives a Master Reset command, or a new international character set is selected.

Note: This function is only used with the default character set.

User Defined Characters

This code addresses user-defined characters and selection into memory.

Note: RAM-based definition or redefinition of standard characters is only useful when the default SBCS code page is selected. There is no method to redefine characters in the other code pages, since unique code pages can be created and loaded into the printer memory.

Copy ROM to RAM

The characters in ROM are copied into RAM, so a complete user-defined character set is created by editing selected characters. This ensures that all characters are defined when a user-defined character set is selected. This eliminates the need to cancel the selection when printing defined characters.

Note: This function is only useful with the default SBCS.

Format

Decimal	Hex	ASCII
27 58 0 0 0	1B 3A 00 00 00	ESC “.” NUL NUL NUL

Define User-Defined Characters

Characters are redefined by the user in the currently selected mode. However, they can only be used in draft mode.

Note: This function is only useful with the default SBCS.

Format

Decimal	Hex	ASCII
27 38 0 k1 k2 s1 d1 ... d11	1B 26 00 k1 k2 s1 d1 ... d11	ESC “&” k1 k2 s1 d1.....d11

k1 is the character code of the first character to redefine, k2 is the character code of the last character to redefine (any character between 0-255 can be redefined), and (k1 could equal k2, if only one character is defined).

For each character defined, you must supply 12 bytes of data.

- *s1* is the first byte that describes the character format
- Bits 0-3 represent the end position in the grid
- Bits 4-6 represent the start position in the grid
- Bit 7 determines whether the character uses the top eight pins or the bottom eight pins of the printhead. If bit 7 = 0, the top eight pins are

used. If bit 7 = 1, the bottom eight pins are used. The start and end positions are ignored during character imaging, but must be accurate to redefine the character code. d1...d11 is the data that comprises the dot image pattern of the defined character.

When printable code expansion is enabled with ESC I, the Printable Code Area Expansion function, and the user-defined character set is selected with ESC "%" (1), the Select User-Defined Set function, then the codes (less than 20h and greater than 7Fh) can be defined for use and are printable.

When printable code expansion is enabled with the Enable Printing of Codes 128-159 function, and the user-defined character set is selected with the Select User-Defined Set function, then codes (between 80h and 9Fh) can be defined for use and are printable.

For a list of these characters, refer to the **"Printable Code Expansion Characters" on page 89**

Select User-Defined Character Set

A user-defined character set can be selected, after the Define User-Defined Characters function is used to define the character set.

Note: This function is only useful with the default SBCS.

Format

Decimal	Hex	ASCII
27 37 1	1B 25 01	ESC "%" (1)

Select Default Character Set

If the Select User-Defined Set function was previously set, this function switches back to the default character set.

Note: This function is only useful with the default SBCS.

Format

Decimal	Hex	ASCII
27 37 0	1B 25 00	ESC "%" (0)

Enable Printing of Codes 128-159

All codes (128-159) are treated as printable characters, rather than control codes, with this function. This allows the use of these characters for user-defined characters. A user-defined set must be selected, using the Select User-Defined Set function, before these characters can print. Factory default disables printing of these codes..

Note: This function can only be used when the default SBCS is selected.

Format

Decimal	Hex	ASCII
27 54	1B 36	ESC “6”

Disable Printing of Codes 128-159

Disables the printing of codes 128-159. By default, these codes are disabled.

Format

Decimal	Hex	ASCII
27 55	1B 37	ESC “7”

Expand Printable Code Area

This function allows certain ASCII codes (00h to 1Fh) and codes (80h to 9Fh) to print when the variable n is set to the value of 1. This allows the use of these codes for user-defined characters. If n = 0, the function returns these two ranges of characters to non-printable control codes. A user-defined character set must be selected by ESC “%” (1), the Enable Printing of Codes 128-159 function, before these codes can print. In both ranges, only the following codes can redefine as printable characters. Codes not listed, within the range (00h-1Fh), print as standard control codes. Codes not listed, within the range (80h-9Fh), are converted to a control code in the range of (00h-1Fh), by subtraction of 80h.

Note: This function is only useful with the default SBCS.

Format

Decimal	Hex	ASCII
27 73 n	1B 49 n	ESC “I” n

Printable Code Expansion Characters

Hex	ASCII	Hex	ASCII	Hex	ASCII	Hex	ASCII
00	NUL	11	DC1	80	none	91	none
01	SOH	15	NAK	81	none	95	none
02	STX	16	SYN	82	none	96	none
03	ETX	17	ETB	83	none	97	none
04	EOT	1C	FS	84	none	9C	none
05	ENQ	1D	GS	85	none	9D	none
06	ACK	1E	RS	86	none	9E	none
10	DLE	1F	US	90	none	9F	none

Enable Printing of Character Graphics

Enables the printing of character graphics, until disabled with the Disable Printing of Character Graphics function.

Note: This function is only useful with the default SBCS.

Format

Decimal	Hex	ASCII
27 116 1	1B 74 01	ESC “t” (1)

For character values from 0 to 31 (00h-1Fh):

- When the default SBCS code page is selected, the FX-86e IBM character graphics symbol set is printed.
- When other SBCS code pages are selected, the codes (00h-1Fh), listed above in the Printable Code Expansion Characters table are printed.

For character values from 32 to 126 (20h-7Eh):

- When the default SBCS code page is selected, the selected international character set is printed.
- When other SBCS code pages are selected, the international character set selection is not in effect.

For the character value 127 (7Fh):

- When the default SBCS code page is selected, a space is printed
- When other SBCS code pages are selected, the character associated with the code page is printed.

For character values from 128 to 255 (80h-FFh), the FX-86e Epson Character Graphics set is printed.

Disable Printing of Character Graphics

Disables the printing of character graphics. Factory default disables this function.

Format

Decimal	Hex	ASCII
27 116 0	1B 74 00	ESC “t” (0)

Printing Character Graphics

This function allows printing of character graphics from the currently selected SBCS code page, by sending a graphics string to the printer. The values of the graphics data bytes can range between 0-255.

Format

Decimal	Hex	ASCII
27 43 n d1 ... dn	1B 2B n d1 ... dn	ESC “+” n d1 ... dn

n is the length of the character graphic string and d1 ... dn are the character graphics data stream.

The number of data bytes must be equal to the value of the variable n. The range of values (for the characters in each graphics data byte): 0-255.

For character values from 0 to 31 (00h-1Fh):

- When the default SBCS code page is selected, the FX-86e IBM character graphics symbol set is printed.
- When other SBCS code pages are selected, currently selected single byte code page character graphics are printed.

For character values from 32 to 126 (20h-7Eh):

- When the default SBCS code page is selected, the selected international character set is printed.
- When other SBCS code pages are selected, the character from the currently selected code page are printed.

For the character value 127 (7Fh):

- When the default SBCS code page is selected, a space is printed
- When other SBCS code pages are selected, the character graphics symbol is printed.

For character values from 128 to 255 (80h-FFh):

- When the default SBCS code page is selected, the FX-86e Epson Character Graphics set is printed.
- When other SBCS code pages are selected, the corresponding character is printed.

Graphics Functions

Eight-Pin Graphics Modes

All 8-pin graphics functions require parameters, n1 and n2, which represent the length of the graphics string that follows the Select Graphics Mode command, and are calculated as follows (assuming a temporary variable n):

- n = total number of graphics dots needed for the graphic string
- n2 = integer of (n divided by 256)
- n1 = remainder of the n2 calculation

The simplest calculation, is to divide n (total number of dots needed for the graphics string) by 256. Then n2 is the quotient (the whole number) and n1 is the remainder. If you require less than 256 dots (columns), then *n1* indicates the number of dots and n2 is set to zero.

Select Graphics Mode

Enables the Graphics moderepresented by the variable m in the Graphic Modes table. The total number of dot columns to print is represented by n1 and n2. Any graphic string that exceeds the length of the print line is discarded.

Format

Decimal	Hex	ASCII
27 42 m n1 n2	1B 2A m n1 n2	ESC “*” m n1 n2

Reassign Graphics Mode

Changes Graphic modes.

Format

Decimal	Hex	ASCII
27 63 s n	1B 3F s n	ESC “?” s n

s is one of the K, I, Y, or Z characters and n is one of the 0-7 modes as shown in Graphic Modes table.

Graphic Modes

Mode	m	Dots per Inch / Dots per 8 in Line
Single-density	0	60 dots per inch, 480 dots per 8 in line
Low Speed Double–density	1	120 dots per inch, 960 dots per 8 in line
*High Speed Double-density	2	120 dots per inch, 920 dots per 8 in line
*Low-Speed Quadruple-density	3	240 dots per inch, 1920 dots per 8 in line
CRT I	4	60 dots per inch, 480 dots per 8 in line
Single–Density Plotter	5	72 dots per inch, 576 dots per 8 in line
CRT II	6	90 dots per inch, 720 dots per 8 in line
*Double-Density Plotter	7	144 dots per inch, 1152 dots per 8 in line
*Adjacent dots in a given row cannot be printed in these modes.		

Select Single Density Graphics Mode

This is a simple method of printing graphics. The resolution is 60 dots per inch. Each 8 in line can accommodate 480 columns of graphic dots. A graphic string that exceeds the length of the print line is discarded. Calculating the parameters, n1 and n2, is described on page 94.

Format

Decimal	Hex	ASCII
27 75 n1 n2	1B 4B n1 n2	ESC “K” n1 n2

Select Low-Speed Double Density Graphics Mode

If Single Density graphics does not produce high enough density, try this mode. The number of dots per inch is doubled. However, the speed is reduced to half of what it would be with single density. Calculating the parameters, n1 and n2, is described on page 94.

This is 8-pin single density graphics. The resolution is now 120 dots per inch. Each 8-inch line can accommodate 960 columns of graphic dots. A graphic string that exceeds the length of the print line is discarded.

Format

Decimal	Hex	ASCII
27 76 n1 n2	1B 4C n1 n2	ESC “L” n1 n2

Select High-Speed Double Density Graphics Mode

This 8-pin graphics mode produces the same density as the Low-Speed Double Density mode, however, the speed is doubled. Calculating the parameters, n1 and n2, is described on page 94.

Format

Decimal	Hex	ASCII
27 89 n1 n2	1B 59 n1 n2	ESC “Y” n1 n2

The resolution is still 120 dots per inch. Each 8-in line can accommodate 960 columns of graphic dots. A graphic string that exceeds the length of the print line is discarded. Make sure adjacent dots in a given dot row are not printed.

Select Low-Speed Quadruple Density Graphics Mode

With this 8-pin graphics mode, the number of dots per inch has gone up to 4x what it was in single density. Calculating the parameters, n1 and n2, is described on page 94.

Format

Decimal	Hex	ASCII
27 90 n1 n2	1B 5A n1 n2	ESC “Z” n1 n2

The resolution is now 240 dots per inch. Each 8-in line can accommodate 1920 columns of graphic dots. A graphic string that exceeds the length of the print line is discarded. Make sure adjacent dots in a given dot row are not printed.

Nine-Pin Graphics Modes

These 9-pin graphics functions also require two parameters, n1 and n2. However, they are calculated slightly different than in the 8-pin graphics modes. Since two data bytes represent each dot column to print, first divide the total length of the graphic string (following the Select ... Graphics Mode command) by two. These parameters are calculated as follows (assuming a temporary variable n):

- n = total number of dots needed, divided by 2
- n2 = integer of (n divided by 256)
- n1 = remainder of the n2 calculation

First, divide n (the total number of dots needed for the graphics string) by 2, then divide the result by 256. Then n2 is the quotient (the whole number) and n1 is the remainder. If you require less than 256 dots (columns), then n1 indicates the number of dots and n2 is set to zero.

Select 9-Pin Single Density Graphics Mode

Enables Single Density 9-pin Graphics mode. Calculating the parameters, n1 and n2, is described previously under Nine-Pin Graphics Modes.

Format

Decimal	Hex	ASCII
27 94 0 n1 n2	1B 5E 00 n1 n2	ESC “^” (0) n1 n2

The resolution is 60 dots per inch. Each 8-in line can accommodate 480 columns of graphic dots. A graphic string that exceeds the length of the print line is discarded.

Select 9-Pin Double Density Graphics Mode

Enables Double Density, 9-pin graphics Mode. The parameters, n1 and n2, is described previously under Nine-Pin Graphics Modes

Format

Decimal	Hex	ASCII
27 94 1 n1 n2	1B 5E 01 n1 n2	ESC “^” (1) n1 n2

The resolution is now 120 dots per inch. Each 8-in line can accommodate 960 columns of graphic dots. A graphic string that exceeds the length of the print line is discarded.