Chapter 1
Manual Front Cover

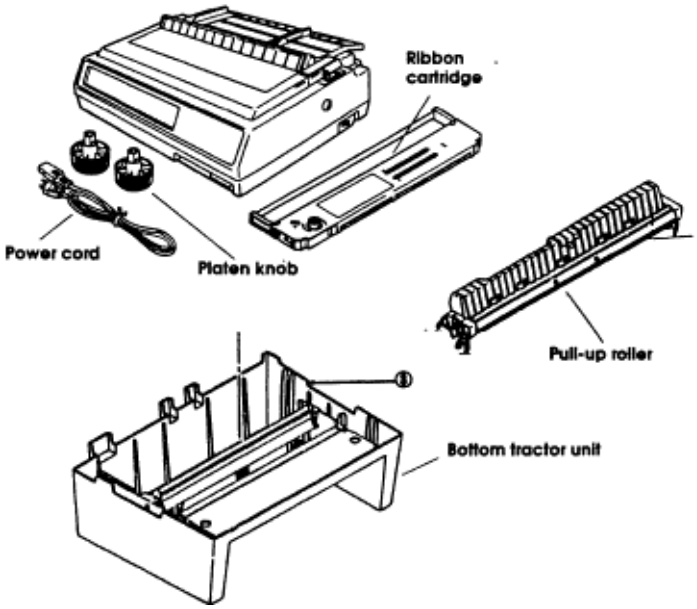
PACEMARK 3410 Printer Handbook
for Epson/IBM & Microline/Pacemark Models

PN 59249101, PM3410, PACE, PM3FM, 12/91, Final

Chapter 1
Setup

Setup

Unpack your printer and make sure you have the following items:
Pacemark 3410 Printer Platen knob
Power cord Ribbon cartridge
Sheet separator (w/rollers)Bottom tractor unit
Printer Handbook
If you are missing any of these items, contact your dealer.



Preliminaries

Preliminaries

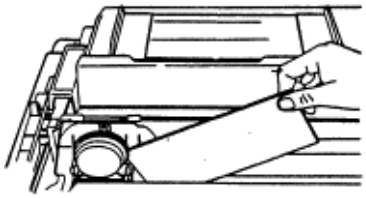
After unpacking the printer, there are a few minor tasks that must be performed

Remove shipping restraint

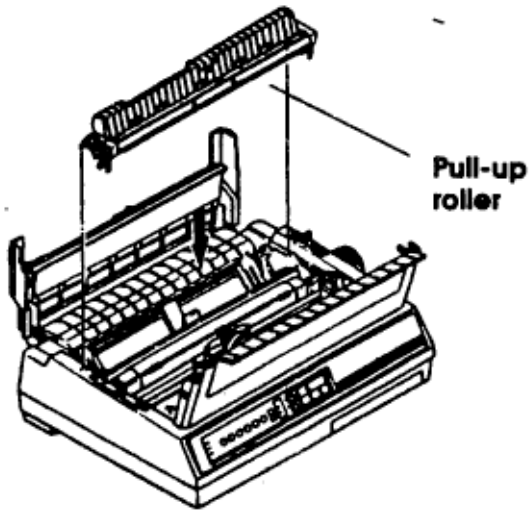
Remove shipping restraint

After unpacking the printer, there are a few minor tasks that must be performed before you can begin.

1. Open the front cover of the printer.
2. Remove the shipping restraint located under the printhead.



3. Open the rear cover. Set the pull-up roller on the printer so that the tabs on the roller are in the grooves in the printer.



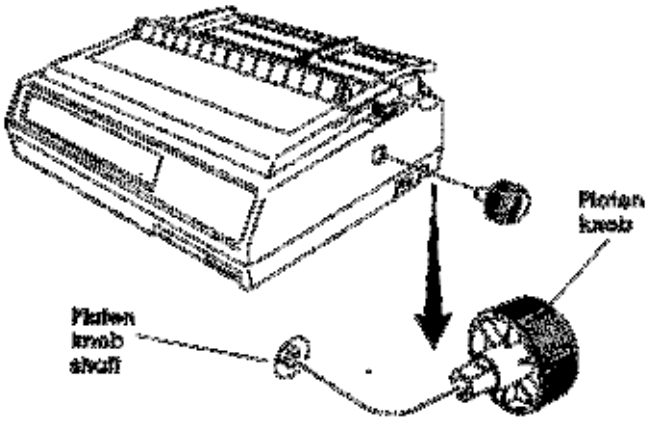
Save the shipping restraint and the packing material for reshipping.

Installing the Platen Knob

Installing the Platen Knob

You will notice that the shaft on the platen knob has a flat side that matches the flat side of the shaft in the printer.

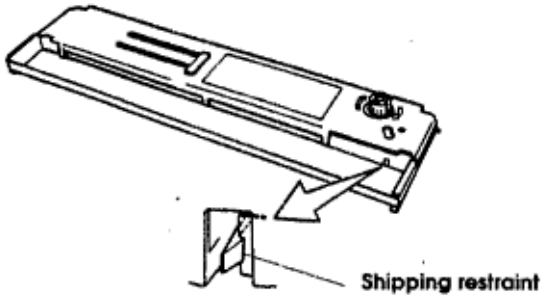
1. Line up the flat side of the platen knob shaft with the flat side of the printer shaft.
2. Push the knob into place.



Inserting the Ribbon

Inserting the Ribbon

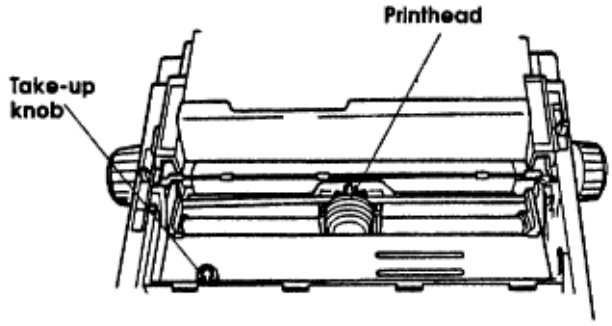
1. Unpack the ribbon and remove the shipping restraint.



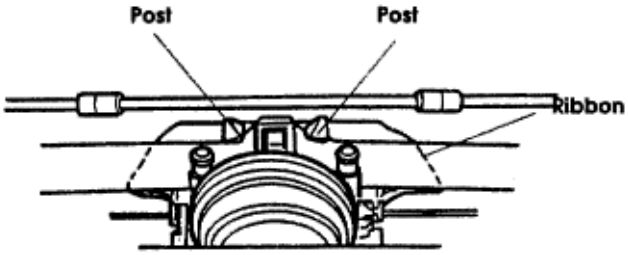
2. Push the idler roller latch in.
3. Lay the ribbon in the printer so that the pins on the cartridge fit into the notches in the side plates of the printer. Push down on the cartridge until it clicks into place (See the diagram on the cartridge).

Note
Turn the knob in the direction of the arrow if the cartridge doesn't fit into place easily.

4. Center the printhead.



5. Thread the ribbon around the posts as shown.



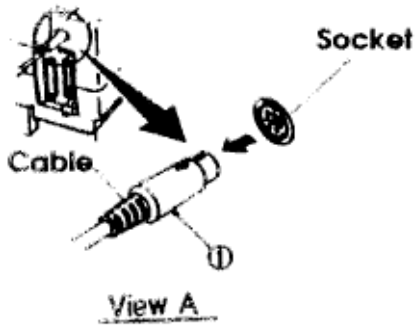
6. Turn the take-up knob clockwise to take up the slack in the ribbon.

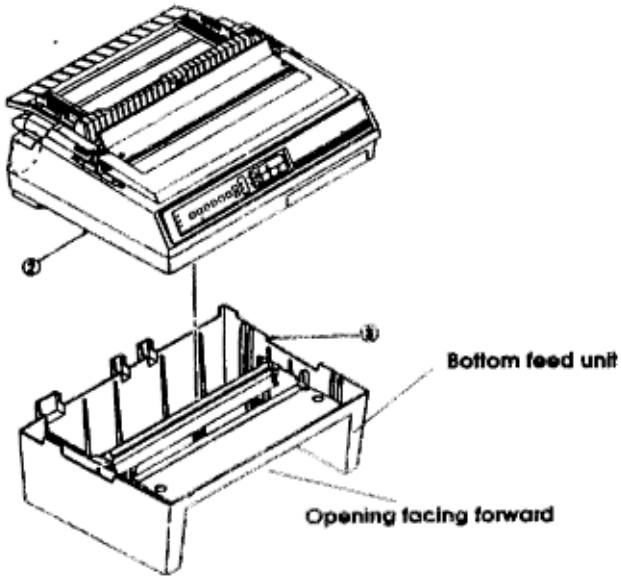
The Bottom Feed Tractor Unit

The Bottom Feed Tractor Unit

This separate unit makes it easy and convenient for you to use continuous forms paper fed from the bottom of the printer.
To install the bottom feed unit:

1. Place the unit where you plan to put the printer. The opening in the unit should face the same direction as the front of the printer.
2. Pick up the printer and put it on top of the bottom feed unit as shown. Be sure the printer is firmly seated on the unit.
3. Plug the cable on the unit into the round socket above the parallel interface connector on the back of the printer. The arrow on the plug faces up.





Caution

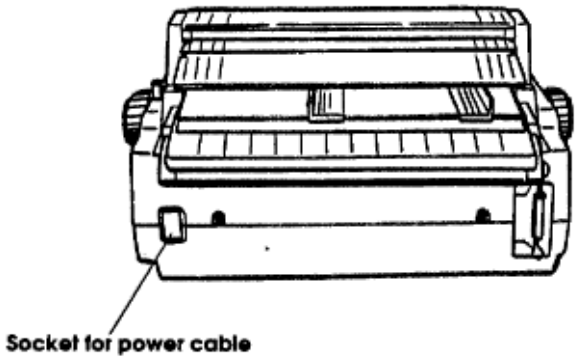
Do not attempt to pick up the printer and bottom feed unit together. Disconnect the printer from the bottom feed unit

and move them separately.

Making Connections

Making Connections

The power cable and the interface cable have to be connected before you can use your printer. Before you begin, make sure that the power switch is off.
Plug the power cord into the printer, but do not plug it into an electrical outlet until setup is complete.



Choosing Parallel or Serial

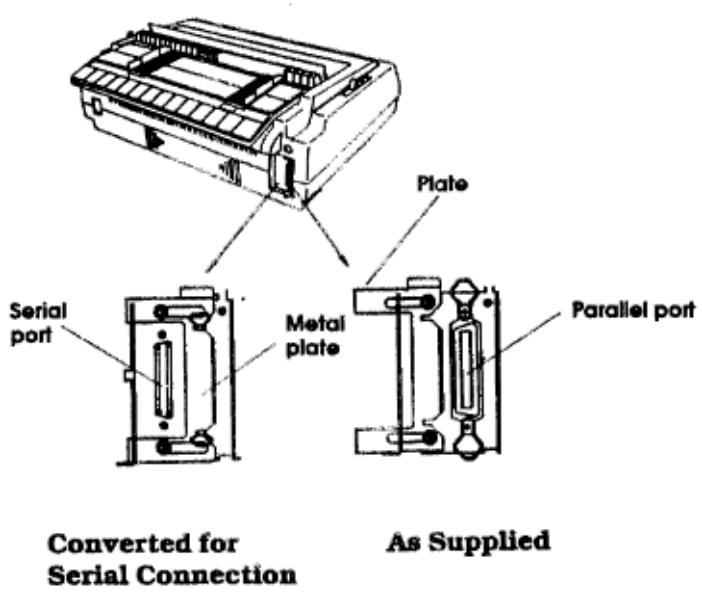
Choosing Parallel or Serial

Your Pacemark 3410 has both a parallel and a serial port. All you have to do is decide which one you want to use. You can only use one of them at a time.

When you take the printer out of the box, there will be a metal plate over the serial port. If you want to use the parallel port, just plug in your cable and fasten the clips to it.

If you want to use the serial interface, loosen the metal plate with a Phillips screwdriver and slide it to the right to uncover the serial port. Plug your cable into the serial port and tighten the screws.

You can fasten the metal plate over the parallel port to eliminate confusion in the future.



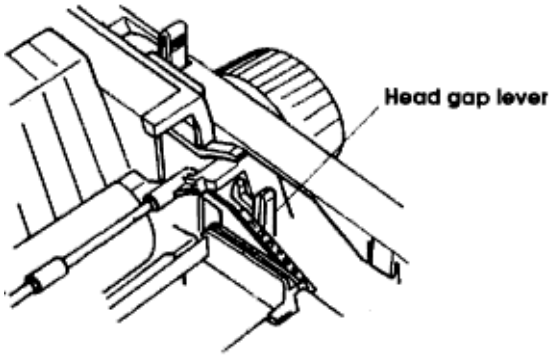
You can fasten the metal plate over the parallel port to eliminate confusion in the future. If you use the serial port, you may have to enter the Menu Select mode and adjust the menu settings. See Chapter 3 ( ) for an explanation of the Menu Select mode.

Adjusting the HeadGap

Adjusting the HeadGap

The headgapis the distance between the printhead andthe roller. When you use envelopes or multi-part forms, you want to have a larger head gap than when you use plain paper. Use the recommended head gap to ensure the best print quality and easy paper feeding.

To adjust the head gap, open the front cover. The blue head gap lever is located on the right side of the printer. Use the following chart to determine the proper head gap for your needs.



Paper	**Setting**
12-24 lb. paper	1
Labels	3-4
Envelopes	5-9
Forms (w/carbon)	
Two-part	2-3
Three-part	3-4
Four-part	5
Five-part	6
Six-part	7

Testing Your Printer

Testing Your Printer

Your Pacemark printer has two built-in tests to make sure your printer is working properly. Run these after you've set up your printer and any time you want to verify that it•s running. The top of each print test contains information on your printer model. Be sure to have a copy of the printout handy if you call for service.

Important

Use only continuous forms paper to run these tests.

Print Sample Test

Turn the printer on while holding down the LINE FEED button. The test prints a two-page sample of your Pacemark•s printing styles. Press the SELECT button or turn off the printer to stop the test.

Rolling ASCII Test

Turn the printer on while holding down the FORM FEED button. This test prints the character set in a rolling pattern using the default type style. Press the SELECT button or turn off the printer to stop the test.

Chapter 2
Loading Paper

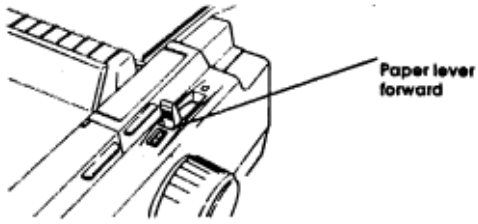
Loading Paper

The Pacemark 3410 has three standard paper handling configurations: rear-fed continuous forms, bottom-fed continuous forms and top-fed single sheets. All three are flexible and trouble-free.

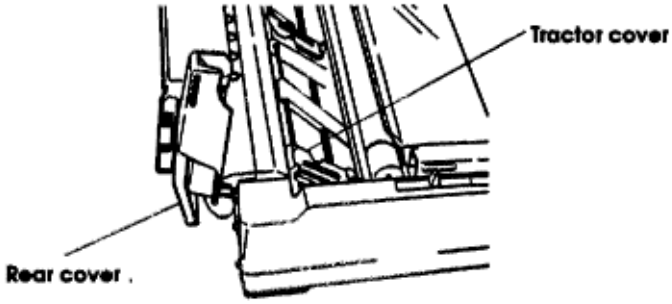
Rear Feed Continuous Forms

Rear Feed Continuous Forms

1. Pull the paperlever forward to the continuous forms position.

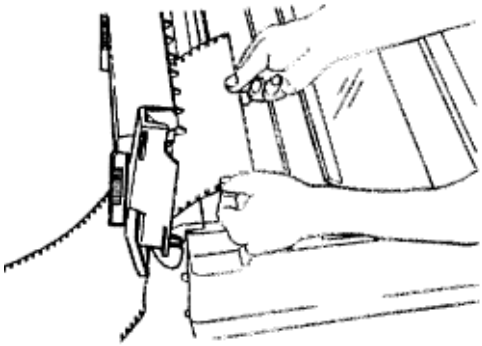


2. Open the rear cover.

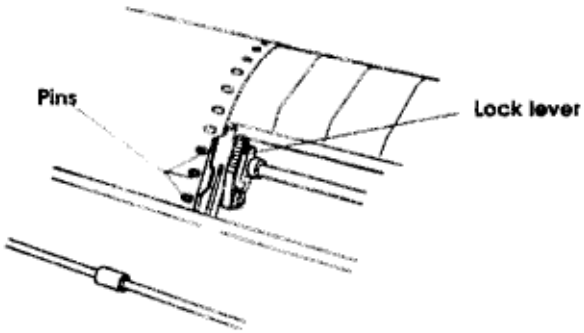


3. Insert the paper under the rear cover and pull it through.

4. Open the tractor covers and set the paper on the pins.

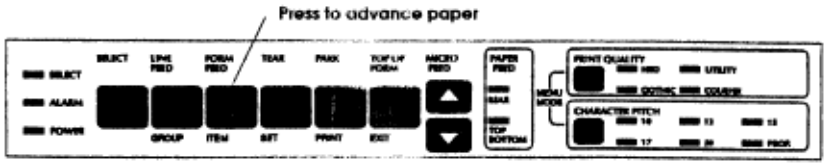


5. Pull the lock lever forward to unlock the tractor.



6. Slide the tractor to adjust to the width of the paper then push the lock lever back to lock the tractor in position. Don't stretch the paper tightlyit can cause the paper to tear.
7. Close the tractor covers.

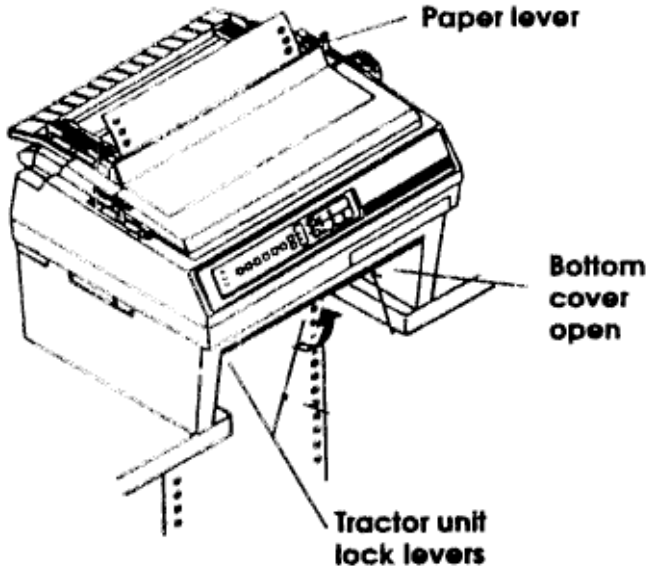
8. Close the rear cover.
9. Press the FORM FEED button to advance the paper.



Bottom Feed Continuous Forms

Bottom Feed Continuous Forms

1. Make sure the paper lever is set for single-sheet paper (back).
2. Put a stack of continuous forms paper below the printer.
3. Open the door on the front of the tractor unit.
4. Open the tractor covers and set the paper on the pins.
5. Pull the lock lever forward to unlock the tractor.
6. Slide the tractor to adjust to the width of the paper, then push the lock lever back to lock the tractor in position.
7. Close the tractor covers and the unit door.
8. Make sure the printer is on and selected. Press the FORM FEED button to advance the paper into the printer.



Form Tear Off (continuous form paper only)

Form Tear Off (continuous form paper only)

This feature lets you remove a printed page from the printer without wasting paper. Activate it by changing the setting for the Form Tear Off menu selection to 500ms, 1 sec, or 2 sec. (See Chapter 3 ( ) for details on the printer menu.)

Note
Keep in mind that there are separate menu groups for each of the three possible paper paths. Be sure to activate the Form Tear Off selection for the one you are using, rear feed or bottom feed.

After you load paper and press the FORM FEED button, the paper will advance past the printing (top of form) position to the tear bar position. It stays in this position until the printer receives data; the paper then moves back down for printing. A few seconds after printing stops, the paper moves back to the tear bar
so you can tear it off without feeding an extra sheet of paper.

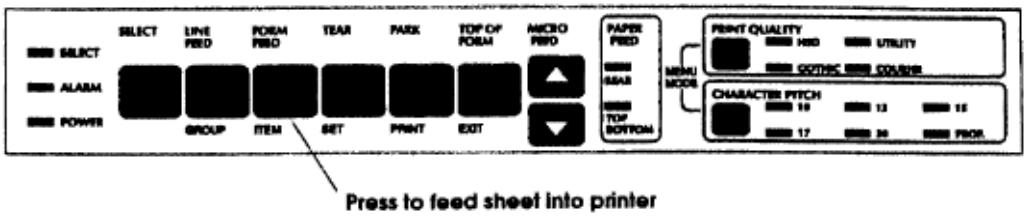
You can check the top of form position by pressing the TEAR button. Release the button to return to the tear off position.

Single-Sheet Paper

Single-Sheet Paper

1. Push the paper lever back to the single sheet position.

2. Lift the paper support to the upright position.
3. Align the left paper guide with the paper icon on the support.
4. Insert a piece of single-sheet paper and adjust the right paper guide to the width of the paper.
5. Press the FORM FEED button to feed the sheet into the printer.



Setting Top of Form

Setting Top of Form

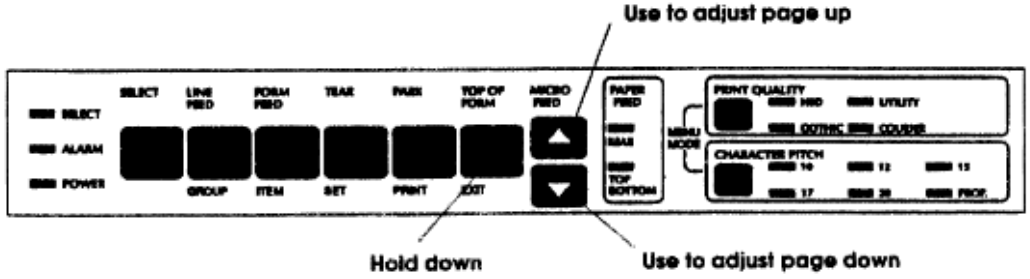
The top of form is the place on the page where printing starts. When the printer advances to the next page, it stops at the top of form.

Your Pacemark printer stores the top of form position independently for the three standard types of paper feeding top, rear, and bottom.

The method of setting top of form is the same for all types of paper:

1. Feed a page into the printer by pressing the FORM FEED button.

2. Hold down the TOP OF FORM button while you adjust the page up or down using the MICRO FEED buttons. The red line on the plastic ribbon shield marks the base of the printing line•use this as a guide.



3. When you release the TOP OF FORM button, the position will be registered in the printers memory until you change it.

Note

If you want to reset the top of form to its original settings, turn off the printer, then hold down the SELECT and TOP OF FORM buttons while turning it on again. Keep in mind, however, that this will also cancel any changes you've made to the menu.

Changing Paper Types

Changing Paper Types

You don't have to remove continuous forms paper in order to print a single sheet. With the touch of a button you can switch from one type of paper to another.

To change from continuous forms to single sheets:
1. Remove any printed pages from the printer.
2. Press the PARK button to retract the continuous forms paper from the paper path.
3. Move the paper lever to the single sheet position if you're switching from rear feed.
4. Follow the instructions under Single-Sheet Paper for loading single sheets.

To change back to continuous forms:
1. Remove any single-sheet paper in the printer.
2. Move the paper lever to the continuous forms position if youre switching to rear feed, leave it set for single sheets if you're switching to bottom feed.
3. Lower the paper support.
4. Press the FORM FEED button to feed continuous forms paper into the printer.

The Optional Pull Tractor

The Optional Pull Tractor

This option is available for specialized bottom feed applications where a pull tractor is required, either alone or in combination with the bottom feed unit.

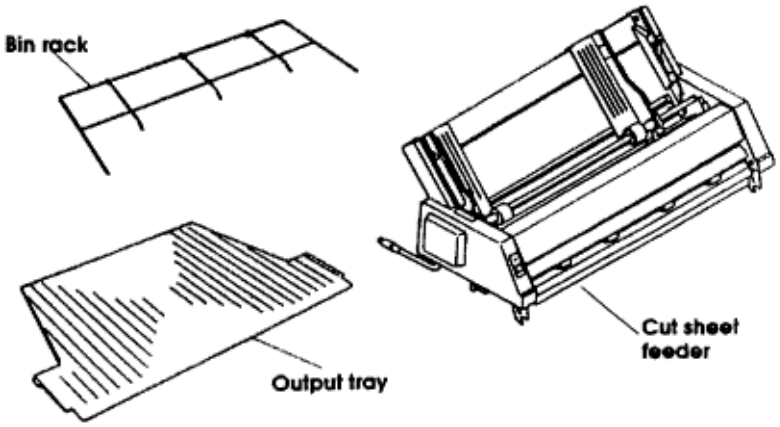
Installing the Optional Cut Sheet Feeder

Installing the Optional Cut Sheet Feeder

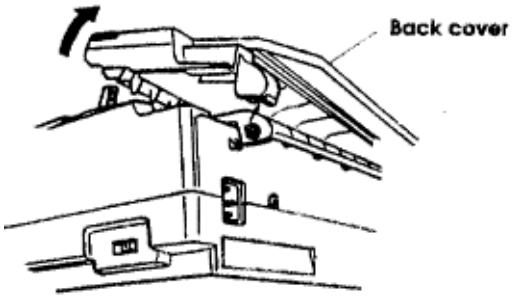
A Cut Sheet Feeder (CSF) is ideal for high-volume printing using single-sheet paper. The CSF feeds paper automatically, controlled from the printer•s front panel or from the computer.

There are two cut sheet feeders available for the Pacemark 3410: the single-bin CSF 3001 and the dual-bin CSF 3002. Since both feeders are installed in the same way, we•ll illustrate the procedure with the CSF 3001, noting any differences as they arise.

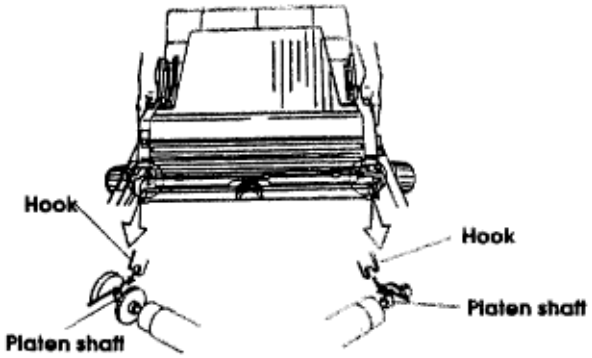
Unpack your cut sheet feeder and make sure you have all the parts.
- Cut Sheet Feeder
- Bin rack (1 for the CSF 3001 and 2 for the CSF 3002)
- Output tray



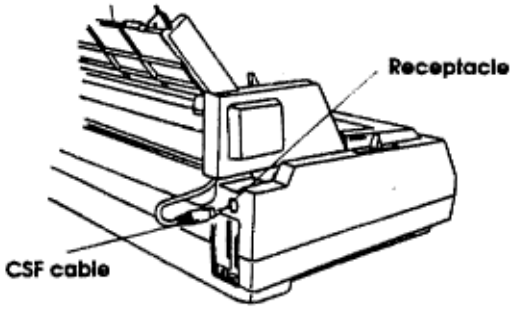
1. Make sure the printer is off.
2. Open the front cover.
3. Remove the back cover: tilt it back slightly and lift it off.



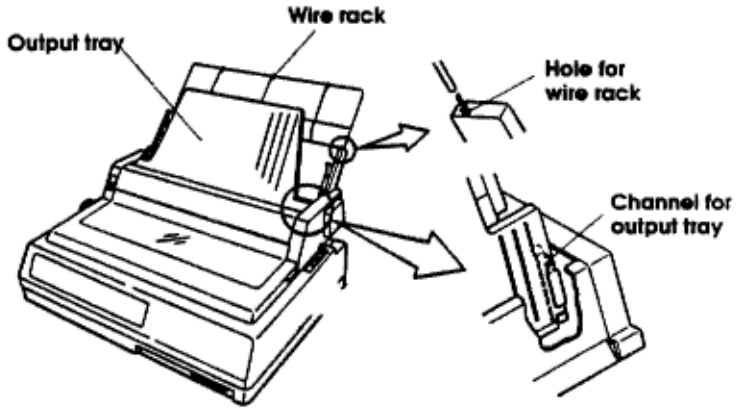
4. Push the bail lever forward to the open position and the paper lever back to the single sheet position.
5. Hold the cut sheet feeder over the printer.
6. While fitting the CSF hooks over the platen shaft, gently lower it onto the printer.



7. Unplug the bottom feed tractor cable and plug the CSF cable into the receptacle on the printer. The arrow on the plug faces up.

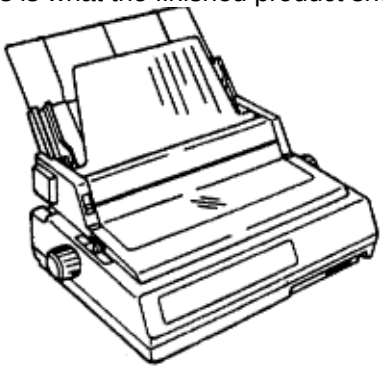


8. Fit the wire rack(s) into the hole(s) on the back of the bins.



9. Slide the output tray into the channels on the sides of the CSF.

This is what the finished product should look like:

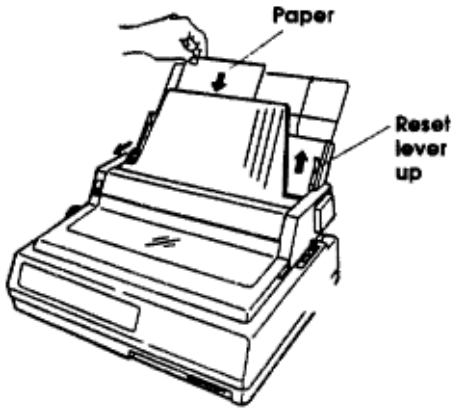


Loading the CSF

Loading the CSF

Each bin of the optional CSF3001 and CSF3002 holds up to 130 sheets of 20lb. paper or between 100 and 120 sheets of 24 lb. paper, depending on thickness and texture.

1. Push the reset lever up to load paper and the envelope lever forward for paper.
2. Make sure the paper lever is in the single sheet position.
3. Fan a stack of paper and square it. Put the paper in the paper bin.



4. Adjust the paper guides to the width of the paper.
5. Once the paper is in the proper position, push the reset lever down.
4. Adjust the paper guides to the width of the paper.
5. Once the paper is in the proper position, push the reset lever down.
6. Push the FORM FEED button to insert a sheet of paper.
7. To eject a page, press the FORM FEED button again.

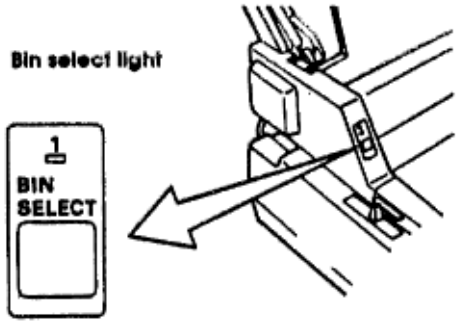
Switching Bins

Switching Bins

If you have the CSF3002, you can move from one bin to another. When the BIN SELECT light is on, you are using bin number 1

To move to bin two:

1. Make sure that the printer is deselected. Press the SELECT button if the SELECT light is on.
2. Press the BIN SELECT button. The BIN SELECT light should go out. When the BIN SELECT light is out, you are using bin number 2.

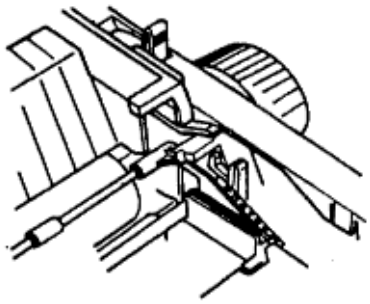


Printing Envelopes with the CSF

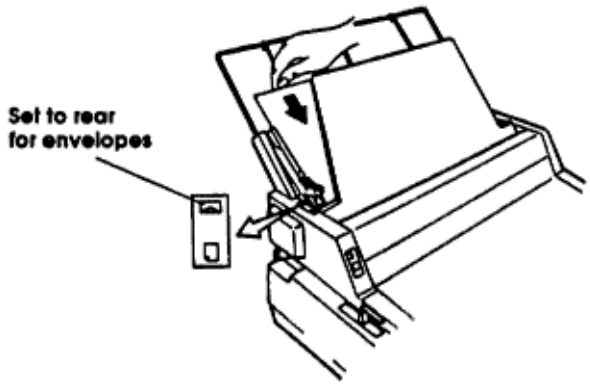
Printing Envelopes with the CSF

You can use #10 envelopes (standard business size) in your CSF3001 and in the front bin only of the CSF 3002.

Be sure to adjust the head gap lever (5-9) and push the envelope lever back.



Load envelopes with the flaps facing down and toward the front of the printer. Set the envelope lever to the rear.



For best results, avoid printing on areas where the flap overlaps the envelope. Printing may be uneven in places where the envelope varies in thickness.

Chapter 3
Operation

Operation

The Pacemark 3410 has a control panel that lets you select the character pitch
and print quality, control paper feeding, and customize your printer settings with the touch of a button. You don't have to be a programmer or a computer expert to learn how to use it.

The control panel always shows the actual settings of the printer. If you change any of these features through your computer, the panel lights will also change.

Some features will only function if you have the correct settings on your control panel. The panel will only let you select valid combinations of features.

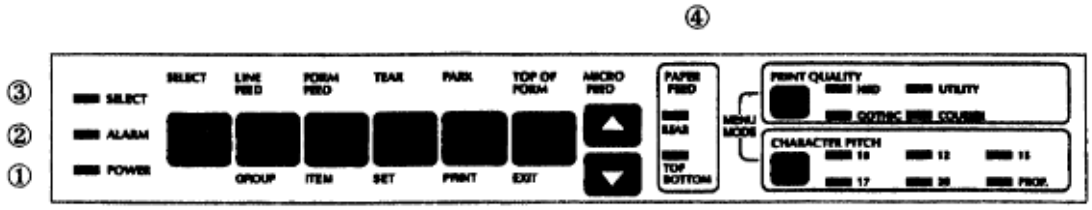
There are three sections to the control panel:
¨ Basic Control
¨ Print Quality
¨ Character Pitch

Basic Control

Basic Control

The basic control portion of the panel displays the status and controls the basic functions of the printer.

There are five lights in this part of the panel. They reflect the printer status at any given time.



1. **POWER light:** The POWER light is lit whenever the printer is on.

2. **ALARM light:** This light is lit when an error condition exists such as a paper jam, cover open, the printer is out of paper, and so on.

3. **SELECT light:** This light is lit when the printer is ready to receive data. If the SELECT light is not lit, the printer is deselected and can•t receive data. If the light flashes, there•s a problem with the printer that requires service.

4. **PAPER FEED lights:** these lights indicate which paper path is active.

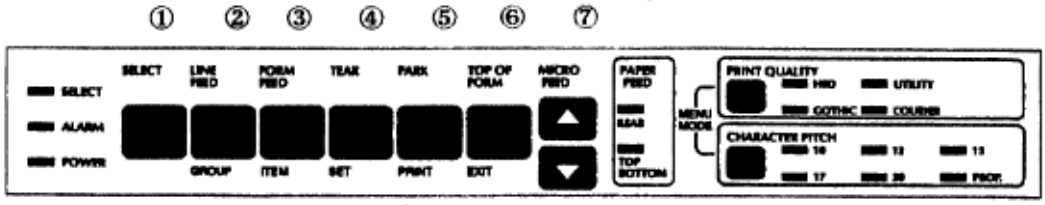
Your printer has two modes of operation: Print mode and Menu Select mode. You will notice that there are functions printed above and below the basic control buttons.

The functions above the buttons are active during Print mode; those below the buttons are active during Menu Select mode.

Print Mode

Print Mode

When you turn your printer on, it is in Print mode. Print mode is the state of normal operation.
In Print mode, the functions above the basic control buttons are active.



1. **SELECT button:** Press this button to deselect the printer (SELECT light goes out). Press it a second time to enable the printer to receive data again (SELECT light goes on).
2. **LINE FEED button:** Press this button to advance the paper one line at a time.
3. **FORM FEED button:** Press this button to advance the paper one page at a time.
4. **TEAR button:** Press this button to advance the paper from the printing position to the tearoff position. This allows you to tear off a printed page without wasting an extra sheet of paper. See page 16 for details (📄).
5. **PARK button:** Press this button to retract continuous forms paper out of the paper path. This lets you use single sheet paper without removing the continuous forms. See 18 for details (📄).
6. **TOP OF FORM button:** When the printer is deselected, pressing this button sets the top of form the point on the page at which printing starts. When you press the FORM FEED button, the new page advances to this line.
7. **MICRO FEED buttons:** Pressing these buttons feeds paper up or down in fine increments. If you hold down the TOP OF FORM button while using the MICRO FEED buttons, the top of form will automatically be set when you release the buttons.

Print Quality

Print Quality

This allows you to select the level of printing quality suitable to your needs.

High Speed Draft (HSD) is the fastest printing mode (550 characters per second). It's suited for situations where speed is more important than appearance, such as editing or proofing a document before final printing.

Utility printing is for everyday use, such as memos and internal documents.

When you want correspondence and documents to look their best, use one of the two Near Letter Quality typefaces: Courier and Gothic.

Press the PRINT QUALITY button until the light next to your choice is lit.

Character Pitch

Character Pitch

With the Character Pitch feature, you can choose between 10, 12, 15, 17.1, and 20 characters per inch and PROPortional spacing at the touch of a button.

Press the CHARACTER PITCH button to cycle through the choices.

Note

Proportional spacing is not available with HSD.

Menu Select Mode

Menu Select Mode

You can customize your printer directly fromthe front panel by using the Menu Select mode.It lets you choose your own printer defaults settings and features automatically active when you turn it on.

Entering Menu Select Mode

Entering Menu Select Mode

Be sure that your printer has ribbon and paper. Press both the PRINT QUALITY button and the CHARACTER PITCH button to enter the Menu Select mode.

When you're in Menu Select mode, the functions written below the buttons are active. For example, the TOP OF FORM button is now the EXIT button.

Exiting Menu Select Mode

Exiting Menu Select Mode

If you want to leave Menu Select mode at any time just press the EXIT button.

Understanding the Menu Select Mode

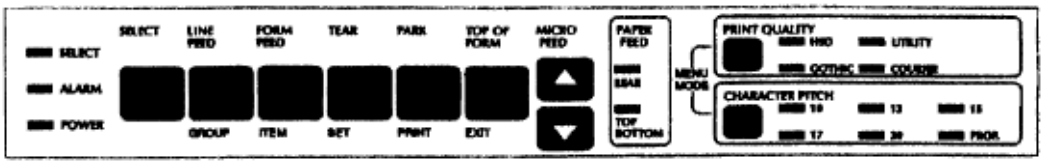
Understanding the Menu Select Mode

The Menu Select mode is just a menu of the Pacemark features. You may want to change the default settings of some of those features to fit your needs. For example, you may want to change the page length to 14 inches if you print alot of legal size documents or 3 inches if you(re working on labels or small cards.

The menu is made up of a number of groups.Within each of thesegroups is a list of items,and each of those items has several settings.

Making Selections

Making Selections



Before you begin, press the PRINT button to get a list of groups, items, and settings. This list will tell you what the current settings are for your printer. Use this list to find your way around in the menu.

Each time you press the GROUP, ITEM, or SET button, the appropriate menu line will print on the paper.

Press the GROUP button to move from group to group. If you pass the group that you want, just keep cycling through. It will come up again. Press the ITEM button to move between the items in a group.

Press the SET button to cycle through the settings for an item. To choose a setting, press the SET button until you come to the setting you want then press the ITEM button to move on to the next item.

Press the EXIT button to save your changes and leave the menu.

See Appendix A for a list of the menu items and factory settings ( ).

Note

To reset the printer to the factory menu settings, turn the printer off, then hold down the SELECT and LINE FEED buttons while you turn it back on.

To reset both the menu and the paper loading position, turn the printer off, then hold down the SELECT and TOP OF FORM buttons while you turn it back on.

Chapter 4
Computer Control

Computer Control

This chapter explains the basics of controlling the printer through your computer. It covers the fundamentals of setting up a software package for use with your printer, MS-DOS printing commands, and provides some tips on writing BASIC programs to control your printer. This information should help you get started; be sure to read your software documentation carefully for more details.

DOS 2.0 and Higher

DOS 2.0 and Higher

Most IBM PC and compatible personal computers use PC-DOS or MS-DOS as their operating system. Although DOS is much more limited in printing capabilities than word processing or graphics software, there are some commands in DOS 2.0 and higher that you can use to control your printer.

DOS Commands for Printing Text Files

DOS Commands for Printing Text Files

¨ PRINT filename
¨ TYPE filename > devicename
¨ COPY filename devicename

If you've used a word processor or other software package to prepare your document, it's usually easiest to use that packages print commands to print it. This is particularly true if the software lets you control a documents appearance, page length, margins, printing features, and so on.

However, if your software doesnt control these kinds of features, it's just as easy to print using DOS commands. Some packages even have a print to disk feature, so you can save the file on a disk in a format that DOS can later read and send to the printer.

DOS PRINT

PRINT

PRINT is a background utility that lets you print a file while you•re running another program. Once you•ve given the command to print your file, you can go on to another task on your computer without waiting until printing is finished.

Note PRINT is not a DOS command but a separate program, so if you want to use it, the file PRINT.COM must be on one of your disks.

Example
In this example, we•re going to print a file called NOTES.TXT, which is on the WORK subdirectory of the computer•s hard disk drive (drive C:). The PRINT.COM program file is in the main (root) directory of the C: drive.Begin by typing the following at the C> prompt:

PRINT C: \WORK\NOTES.TXT [RETURN]

Youll see this display on your screen:
Name of list device [PRN]:

If your printer is connected to the LPT1: parallel printer port, just press [RETURN]; if its connected to another port (LPT2:, COM1:, or COM2:), type the name of the port and press [RETURN].

Next youll see this display:
Resident part of PRINT installed C: \WORK \NOTES.TXT is currently being printed
And the file will print.

Note
If youre not sure which printer port your system uses, try pressing return to specify [PRN]. The device name PRN
refers to LPT1:, the default DOS port. This is the port most printers are connected to.

Once youve used PRINT during a work session, DOS will remember the device you specified and wont have to ask you again where the printer is. Of course, turning off the computer or restarting it will erase this information from memory.

DOS TYPE

TYPE

If you don't have a copy of PRINT.COM available, you can use TYPE, redirecting the file to your printer. If you're not using LPT1: as your printer port, substitute the name of your port for LPT1: in our example.

Example
TYPE C: \WORK \NOTES.TXT > LPT1:

DOS COPY

DOS COPY

Just as you use this command to copy a file from one disk or directory to another, you can copy a text file to the printer. If you're not using LPT1: as your printer port, substitute the name of your port for LPT1: in our example.

Example
COPY C: \WORK \NOTES.TXT LPT1:

Changing the Default Printer Port

Changing the Default Printer Port

If your system doesn•t use LPT1: to connect the printer to the computer, you can specify which port DOS should use as its default. At the DOS prompt, enter the appropriate MODE command(s).

¨ For a serial interface, first enter:

MODE COM1:9600,N,8,1,P Then enter:
MODE LPT1:=COM1: ¨ For a parallel interface, enter:
MODE LPT2:

If your serial interface is COM2:, replace COM1: in the commands shown above with COM2:. Likewise, your parallel interface may be LPT3:, in which case, change the MODE command to MODE LPT3:.

To avoid having to reenter the MODE command(s) every time you reset the computer, enter them in your computers AUTOEXEC.BAT file. To create an AUTOEXEC.BAT file or edit an existing one, use a text editor or a word processor in a mode that allows you to create ASCII text files. If youre editing your systems AUTOEXEC.BAT file, be sure not to change or delete anything already in the file.

For more information on working with AUTOEXEC.BAT files, see your DOS manual.

BASIC Programming

BASIC Programming

The LPRINT command in BASIC makes output go to the printer rather than to the screen. To send text to the printer, simply enclose the words in double quotes:
LPRINT "A line of text"

The statement above prints the line of text, and then moves the printing position to the beginning of the next line. If you dont want this automatic carriage return and line feed, put a semicolon (;) after the data:
LPRINT "A line of text"; LPRINT "...and this text is on the same line"

For serial printers
If you're using your printer with a serial interface, you have to be sure to redirect output from the computer to the serial port you're using, either COM1: or COM2:, rather than to the default port, LPT1:. There are two ways to do this:

1. If youre using DOS, you can use the MODE command, as described on page 38. Then use the LPRINT command in your BASIC programs, just as we do in our examples.

2. You can also redirect output to COM1: or COM": from within BASIC, by opening the port as a file and printing your data to that file. If you want to run any of our sample programs, youll need to modify them. At the beginning of your program, include one of these statements:
OPEN "COM1:9600,N,8,1" AS #1 or OPEN "COM":9600,N,8,1" AS #1

Then, to print data, use the PRINT#1 command, being sure to include a comma between the #1 and the data:

PRINT#1, "A line of text"

Like the LPRINT command, PRINT#1 automatically moves the print position to the next line unless you use a semicolon (;) after the data.

When you send an LPRINT statement, the text between the quotation marks is When you send an LPRINT statement, the text between the quotation marks is converted to a string of numbers, which are then processed by the printer and output as the dot patterns that make up the individual characters. Each character is assigned a numeric value according to the American Standard Code for Information Interchange (ASCII). Since ASCII is a standard coding system, most computers, printers and other electronic devices can interpret ASCII data. There are 256 ASCII codes. The codes from 0 to 127 are completely standardized (with a handful of minor exceptions), while those from 128 to 255 are used in a less standard way to represent a variety of special characters. Although most of the ASCII codes represent alphanumeric characters, punctuation marks, and special symbols, youll notice that the codes from 0 to 31, as well as 127, dont correspond to normal characters. These are control codes, special characters used to control a wide range of peripheral equipment, from monitors to modems to the devices that interest us here, printers.

One of the most important control codes is the ESC character, decimal 27, hexadecimal 1B. Many of the more complicated commands begin with ESC, which serves as a signal to the printer that what follows is to be interpreted as a command rather than just a string of characters.

Since the control codes dont represent any character on your keyboard, you cant send them to the printer enclosed in double quotes, as you would with text. Instead, you have to use the CHR$ function, which lets you send the decimal or hexadecimal value for a character. For example, the escape character is represented as CHR$(27), or, in hexadecimal, as CHR$(&H1B). (Notice that hexadecimal numbers in BASIC are preceded by &H to distinguish them from simple letters or decimal numbers.)

Of course, you can also use the CHR$ function to output printable characters; for instance, CHR$(65) represents the letter A. However, its usually easier to type letters, numbers and punctuation marks, and your BASIC programs will be much easier to read if you use literal characters, enclosed in quotes, wherever possible.

Some printer commands expect you to supply a numerical value, representing tab stops, line spacing, etc. In most cases, values are entered as literal or ASCII characters. For example, using the Microline standard ESC %C command to set a left margin of one inch (120/120 inch), you would enter the following line in BASIC:

```
LPRINT CHR$(27);"%C";"120"
```

A few commands require that you enter numerical values as the argument to a CHR$ function. The descriptions of the commands in the appendices will tell you which format to use.

Menu Selections Epson/IBM Mode

Menu Selections Epson/IBM Mode

The following table lists all the groups items and settings for the printer menu. Factory default settings are printed in ***bold italics***. Except as indicated, the menu for the Epson/IBM model is the same as the menu for the ML/Pacemark model.

Group	Item	Setting	Notes
Printer Mode	Emulation Mode (Epson/IBM)	**IBM PPR**, Epson FX	See page 32.
	Emulation Mode (ML/Pacemark)	**Microline**, Pacemark 2410	
Font	Print Mode	**Utility**, NLQ Courier, NLQ Gothic, HSD,	
	Pitch (Epson/IBM)	**10 CPI**, 12 CPI, 15 CPI, 17.1 CPI, 20 CPI, Proportional	
	Pitch (ML/Pacemark)	**10 CPI**, 12 CPI, 15 CPI, 17.1 CPI, 20 CPI	Proportional spacing is a separate menu item in the ML/Pacemark menu.
	Style	**Normal**, Italics	
	Size	**Single**, Double	Double is double width and height.
Symbol Sets	Character Set	**Set I**, Set II	These are standard IBM character sets.
	Language Set	***American***, French, German,British, Dan-ish I, Swedish, Italian, Spanish I, Japanese, Norwegian, Danish II, Spanish II, Latin American, French Canadian, Dutch, Publisher.T	hese sets contain special characters used in foreign languages. The Publisher set includes special print-ing symbols.
	Zero Character	***Slashed***, Unslashed	Use slashed zero to distin-guish from the capital letter O.

	Code Page	***USA***, Canada French, Multilingual, Portu-gal, Norway	Matches the character set to the computer display character set; see your DOS manual. The next three groups let you set parameters for each of the paper paths independently. When you change from one path to another, the parameters automatically change, too.
Rear Feed	Line Spacing	***6 LPI***, 8 LPI	Sets the distance between lines in lines per inch.
	Form Tear Off	***Off***, 500 mS, 1 sec, 2 sec	2 sec Activate the form tear off feature (page 16) by select-ing a time for the printer to wait after data before advancing the page to tea-roff. If your software pauses during printing and causes the paper to bounce, select a longer time or deactivate the fea-ture.
	Skip Over Perforation	***No***, Yes	When set to Yes, at bottom of page skips 1 inch to next top of form. Use only for unformatted listings or programs that dont format the page.
	Page Width	***13.6***^{2},8^2	The 8^2 setting emulates a narrow carriage printer. If you always use 8 1 /2^2 paper, choose this setting to prevent printing on the platen.
	Page Length	Page Length ***11***^{2}, 11 2/3^2,12^2,14^2, 17^2,3^2, 3.5^2,4^2, 5.5^2, 6^2,7^2,8^2, 8.5^2	

Bottom Feed	Line Spacing	***6 LPI***, 8 LPI	Sets the distance between lines in lines per inch.
	Form Tear Off	Form Tear Off ***Off***, 500 mS, 1 sec, 2 sec	Activate the form tear off feature (page 16) by select-ing a time for the printer to wait after data before advancing the page to tea-roff. If your software pauses during printing and causes the paper to bounce, select a longer time or deactivate the fea-ture.
	Skip Over Perforation	***No***, Yes	When set to Yes, at bottom of page skips 1 inch to next top of form. Use only for unformatted listings or programs that dont for-mat the page.
	Page Width	***13.6***², 8²	The 8² setting emulates a narrow carriage printer. If you always use 8 1 /2 ² paper, choose this setting to prevent printing on the platen.
	Page Length	Page Length ***11***², 11 2/3², 12², 14², 17², 3², 3.5², 4², 5.5², 6², 7², 8², 8.5²	
Top Feed	Line Spacing	***6 LPI***, 8 LPI	Sets the distance between lines in lines per inch.
	Skip Over Perforation	***No***, Yes	When set to Yes, at bottom of page skips 1 inch to next top of form. Use only for unformatted listings or programs that dont for-mat the page.
	Page Width	***13.6***², 8²	The 8² setting emulates a narrow carriage printer. If you always use 8 1 /2 ² paper, choose this setting to prevent printing on the platen.

	Page Length	***11***², 11 2/3²,12²,14², 17²,3², 3.5²,4², 5.5², 6² ,7²,8², 8.5²	
Set-Up	Graphics	***Bi-directional***, Unidirectional	Bi-directional prints from left to right, then right to left; this is faster, but may cause registration prob-lems. Uni-directional printing (left to right only) is more precise, but slower.
	Max. Receive Buffer	1 Line, 4K, ***16K***, 28K	Specifies amount of the printers buffer used to store data.
	Paper Out Override	No, Yes	A sensor stops printing about 1 inch from the bot-tom of a single page. Changing this setting to Yes lets you print closer to the bottom edge of the paper.
	Print Registration	0.25 mm Right, 0.20 mm Right, 0.15 mm Right, 0.10 mm Right, 0.05 mm Right, ***0.00 mm***, 0.05 mm Left, 0.10 mm Left, 0.15 mm Left, 0.20 mm Left, 0.25 mm Left	This lets you adjust the vertical registration in graphics. The best setting may vary from one soft-ware package to another.

	Operator Panel Function	***Full Operation***, Limited Operation	Changing this setting to Limited Operation deacti-vates the menu mode and these control panel but-tons: TOP OF FORM, MICRO FEED UP/DOWN, PRINT QUALITY, and PITCH. This is used in situations where several people are using the printer. To restore to full operation, turn the printer off, then hold down the the PRINT QUALITY and PITCH buttons while you turn on the printer. This will put you into the menu mode; you can then change this setting to Full Operation.
	Reset Inhibit	***No***, Yes	Changing this to Yes pre-vents a reset signal from the computer from reset-ting the printer to its de-faults.
	Print Suppress Effective	***Yes***, No	Determines whether the DC3 code causes the printer to ignore data until a DC1 code is received.
	Auto LF	***No***,Yes	
	Auto CR (IBM only)	***No***,Yes	
	CSF Bin Select	***Bin 1***, Bin 2	Only available when the CSF 3002 is installed. Determines which bin is active.
	SI Select Pitch (10 CPI) (IBM only)	***17.1 CPI*** 15 CPI	Sets the pitch of con-densed mode from 10 CPI using the SI code.
	SI Select Pitch (12 CPI) (IBM only)	***20 CPI*** 12 CPI	Sets the pitch of con-densed mode from 12 CPI using the SI code.

	Time Out Print (Epson/IBM)	***Valid***, Invalid	When set to Valid, con- tents of the buffer will print when no more data is received for a certain period of time.
	Auto Select	***No***,Yes	
	Sensor Disable	***No***,Yes	
Parallel I/F	I-Prime	***Buffer Print***, Line End, Invalid	End, Invalid Buffer Print = I-Prime makes printer print con- tents of buffer; Line End = I-Prime makes printer print to the end of the current line; Invalid = I-Prime signal is ignored.
	Pin 18	***+5V***, 0V	Determines whether volt-age is supplied to pin 18.
	Auto Feed XT (Epson/IBM)	***Invalid***, Valid	Epson emulation. Some interface cables are wired so that the XT signal always causes an auto-matic line feed. The In-valid setting eliminates this. Use the Valid setting if your system uses the XT signal for automatic line feed.
Serial I/F	Parity ***None***, Odd, Even Serial Data 7 or 8 Bits	***8 Bits***,7 Bits	
	Protocol	***Ready/Busy***, X-ON/ X-OFF	

	Diagnostic Test	***No***, Yes	Set to Yes to run the serial interface diagnostic test. To restore to full opera-tion, turn the printer off, then hold down the the PRINT QUALITY and PITCH buttons while you turn on the printer. This will put you into the menu mode; you can then change this setting to No for normal operation.
	Busy Line	***SSD-***, SSD+, DTR, RTS	
	Baud Rate	19200 BPS, ***9600 BPS***, 4800 BPS, 2400 BPS, 1200 BPS, 600 BPS, 300 BPS	
	DSR Signal	***Valid***, Invalid	
	DTR Signal	***Ready on Power Up***, Ready on Select	
	Busy Time	Busy Time ***200 mS***,1 sec	

Control Codes: Epson/IBM Model

Control CodesEpson/IBM Model

Epson Function	ASCII	Decimal	Hexadecimal	Notes
Horizontal Control				
Carriage Return	CR	13	0D	
Set Horizontal Tabs	ESC D n n ... n NUL	27 68 n n ... n 0	1B 44 n n ... n 00	n=position of tab stop~ max one less than # of characters per line k=1 to 32; k=0: clear tabs Default: every 8 columns
Horizontal Tab	HT	9	09	Move to next tab stop
Absolute Horizontal Position	ESC $ n n	27 36 n n	1B 24 n n	Move to position = (n+(n256)) /60 inches from left margin. n, n=0 to 255 Max. value: n=48 n=3
Relative Horizontal position	ESC 1n n	27 92 n n	1B 5C n n	Move to position = (n+(n256)) /120 inches from printing position. n, n=0 to 255 moves to right and moves to left and prints.
Set Print Position	ESC DLE @ P A A P P P P	27 16 64 [data]	1B 10 40 [data]	Sets horizontal position of printhead. P=number of parameter bytes to follow A=motion absolute (even) or relative (odd) A=relative movement right (even) or left (odd) 0P, P, P, P9 PPPP=number of units to move (size of unit depends on character pitch)

Left Margin Set	ESC 1 n	27 108 n	1B 6C n	Sets left margin n character spaces from printhead home position; must be at least 2 spaces to left of right margin. n=0 to 255
Right Margin Set	ESC Q n	27 81 n	1B 51 n	Sets right margin n character spaces from printhead home position; must be greater than the left margin. n=0 to 255
Auto Justification	ESC a n	27 97 n	1B 61 n	Justifies text according to the value of n: n=0: left justification n=1: center justification n=2: right justification n=3: full (left & right) justificationuse carriage return only at end of paragraph.
Print Direction	ESC U n	27 85 n	1B 55 n	Prints unidirectionally (left to right only) or bidirectionally (left to right, then right to left) according to value of n: n=1: unidirectional n=0: bidirectional
One Line Unidirectional Printing	ESC	27 60	1B 3C	Prints unidirectionally (left to right) for one line.
Backspace	BS	8	08	Prints data in buffer and moves one character to the left according to the current character pitch.
Delete One Character	DEL	127	7F	Deletes last character put into the print buffer.

Vertical Control				
Set 1/8 Line Spacing	ESC 0	27 48	1B 30	1/8> Line Spacing=8 lines per inch.
Set 1/6 Line Spacing	ESC 2	27 50	1B 32	This is standard typewriter spacing.
Set 7/72 Line Spacing	ESC 1	27 49	1B 31	
Set n/72> Line Spacing	ESC A n	27 65 n	1B 41 n	n=0 to 85 n=0: no line feed.
Set n/144> Line Spacing	ESC % 9 n	27 37 57 n	1B 25 39 n	n=0 to 255 n=0: no line feed
Set n/216> Line Spacing	ESC 3 n	27 51 n	1B 33 n	n=0 to 255 n=0: no line feed
Line Feed	LF	10	0A	Prints buffer data and moves the printhead by the current line spacing value.
n/144> Line Feed	ESC % 5 n	27 37 53 n	1B 25 35 n	Executes a single n/144> line feed without changing line spacing. n=0 to 255 n=0: no line feed
n/216> Line Feed	ESC J n	27 74 n	1B 4A n	Executes a single n/216> line feed without changing line spacing. n=0 to 255 n=0: no line feed
Form Feed	FF	12	0C	Prints data in buffer and advances paper to next top of form.
Vertical Tab	VT	11	0B	Print buffer data and move to next programmed vertical tab stop.
Set Vertical Tab Stops	ESC B n n ... n NUL	27 66 n n ... n 0	1B 42 n n ... n 00	Sets vertical tab stops at specified lines. k=1 to 16: number of tabs n=1 to 255: line number where tab is to be set

Set Vertical Format Unit (VFU)	ESC b n m m ... m NUL	27 98 m m ... m 0	1B 62 m m ... m 00	Programs up to 8 separate sets (channels) of vertical tab stops. n=0 to 7: channel number (0 is default set by ESC B) k=1 to 16: number of stops in channel m=1 to 255: line number of tab stop
Select Vertical Tab Channel	ESC / n	27 47 n	1B 2F n	Activates preprogrammed vertical tab channel n. VT moves to stops in this channel.
Set Form Length in Inches	ESC C NUL n	27 67 0 n	1B 43 00 n	n=1 to 22 inches This command cancels Skip over Perforation setting.
Set Form Length in Lines	ESC C n	27 67 n	1B 43 n	n=1 to 127 lines at current line spacing. This command cancels Skip over Perforation setting.
Set Skip Over Perforation	ESC N n	27 78 n	1B 4E n	Activates Skip Over Perforation feature and sets it for n lines at the current line spacing. When the printer reaches the bottom of the page, it will skip n lines to next top of form. Command overrides menu. n=1 to 127
Cancel Skip Over Perforation	ESC O	27 79	1B 4F	Deactivates Skip Over Perforation. Command overrides menu.
Cut Sheet Feeder (Option)				

Cut Sheet Feeder Control	ESC EM n	27 25 n	1B 19 n	n=1: Select Bin 1 n=2: Select Bin 2 (if present) n=73 (ASCII ``I''): Insert sheet n=82 (ASCII ``R''): Eject sheet
Character Sets				
Copy ROM Character Set to RAM Character Set	ESC : 0 n 0	27 58 0 n 0	1B 3A 00 n 00	Copies the designated character set to the user defined set in RAM: n=0: NLQ Courier n=1: NLQ Gothic
Define Custom Character(s)	ESC & 0 [data]	27 38 0 [data]	1B 26 00 [data]	Defines and stores in ram up to 256 utility quality character patterns.
Select Custom Character Set	ESC % n	27 37 n	1B 25 n	n=0: Select custom character set n=1: Select default character set
Select Foreign Character Set	ESC R n	27 82 n	1B 52 n	Select character set containing 15 special characters used in foreign language printing: n=0: USASCII n=1: French n=2: German n=3: British n=4: Danish I n=5: Swedish n=6: Italian n=7: Spanish I n=8: Japanese n=9: Norwegian n=10: Danish II n=11: Spanish II n=12: Latin American n=13: French Canadian n=14: Dutch n=64: Publisher
Select Epson Character Set	ESC t n	27 116 n	1B 74 n	n=0: Selects Epson Italic character set n=1: Selects Epson graphic character set

Start Italic Character Set	ESC 7	27 55	1B 37	Activates the Italic character set.
Start Graphic Character Set	ESC 6	27 54	1B 36	Activates graphic character set if received after ESC t 1 has been used.
Print Control Codes	ESC I n	27 73 n	1B 49 n	Enables the printer to print any custom characters stored in locations 031 and 128159: n=0: interpret locations as control codes n=1: interpret locations as printable characters
Bar Code Commands				
Select Bar Code Type and Size	ESC DLE A m n ... n	27 16 65 m n ... n	1B 10 41 m n ... n	m=number of parameters specified
Print Industrial Bar Code Data	ESC DLE B n [data]	27 16 66 n [data]	1B 10 42 n [data]	n=0 to 127: amount of data
Print Postnet Bar Code Data	ESC DLE C n [data]	27 16 67 n [data]	1B 10 43 n [data]	n=1 to 20: number of data bytes Data consists of single-~ digit numbers.
Print Features				
Utility/NLQ Selection	ESC x n	27 120 n	1B 78	n=0: Utility printing n=1: NLQ printing
High Speed Draft Select	ESC (0	27 40 0	1B 28 00	
Select NLQ Typeface	ESC k n	27 107 n	1B 6B n	n=0: NLQ Courier (default) n=1: NLQ Gothic
Proportional Spacing	ESC p n	27 112 n	1B 70 n	See also ESC ! n=1: Start proportional spacing n=0: Stop proportional spacing
Select Pica Pitch (10 cpi)	ESC P	27 80	1B 50	In compressed mode, selects 17.1 cpi.

Select Elite Pitch (12 cpi)	ESC M	27 77	1B 4D	In compressed mode, selects 17.1 cpi.
Select 15 cpi Pitch	ESC g	27 103	1B 67	
Select Compressed Print	SI or ESC SI	15 or 27 15	0F or 1B 0F	Pitch depends on current pitch selected: 10 cpi becomes 17.1 cpi 12 cpi becomes 20 cpi
Cancel Compressed Print	DC2	18	12	
Set Character Spacing	ESC SP n	27 32 n	1B 20 n	Adds n dots of space (depending on the current pitch) between characters. n=0 to 255
Select Italic Characters	ESC 4	27 52	1B 34	See also ESC !, ESC 7.
Cancel Italics	ESC 5	27 53	1B 35	
Underlining	ESC n	27 45 n	1B 2D n	Underlines all text except tabs. n=1: Start underlining n=0: Stop underlining
Start Subscript/~ Superscript	ESC S n	27 83 n	1B 53 n	n=0: Start superscript n=1: Start subscript
Stop Superscript/~ Subscript	ESC T	27 84	1B 54	
Start Emphasized Printing	ESC E	27 69	1B 45	Prints horizontally shifted double dots in utility mode at half speed. See also ESC ! command.
Stop Emphasized Printing	ESC F	27 70	1B 46	
Start Enhanced (Doublestrike) Printing	ESC G	27 71	1B 47	Prints vertically shifted double dots in two passes. See also ESC ! command.
Stop Enhanced Printing	ESC H	27 72	1B 48	

Double Width (Expanded) Printing	ESC W n	27 87 n	1B 57 n	n=1: Start double width printing n=0: Stop double width printing
Immediate Double Width	SO or ESC SO	14 or 27 14	0E or 1B 0E	Prints double width only to end of line; can also be canceled by DC4, ESC W 0 and ESC ! commands.
Stop Immediate Double Width Printing	DC4	20	14	Only cancels double width set by SO or ESC SO.
Double Height Printing	ESC w n	27 119 n	1B 77 n	n=1: Start double height n=0: Stop double height
Graphics				For all graphics commands the number of dot columns of graphic data is as follows: dots=n + (n256)
Print Graphics	ESC * m n n [graphic data]	27 42 m n n [graphic data]	1B 2A m n n [graphic data]	Selects 8-pin graphic mode and prints graphic data. m=0: Single density, 60 dpi m=1: Double density, 120 dpi m=2: Fast double density, quasi-120 dpi m=3: Quadruple density, quasi-240 dpi m=4: CRT I, 80 dpi m=5: Plotter, 72 dpi m=6: CRT II, 90 dpi m=7: DD Plotter, 144 dpi
Single Density Graphics	ESC K n n [graphic data]	27 75 n n [graphic data]	1B 4B n n [graphic data]	Same as ESC * ``0."
Double Density Graphics	ESC L n n [graphic data]	27 76 n n [graphic data]	1B 4C n n [graphic data]	Same as ESC * ``1."
Quasi-Double Density Graphics	ESC Y n n [graphic data]	27 89 n n [graphic data]	1B 59 n n [graphic data]	Same as ESC * ``2." Same as low speed double density, but printer can't put two adjacent dots in the same row.

Quadruple Density Graphics	ESC Z n n [graphic data]	27 90 n n [graphic data]	1B 5A n n [graphic data]	Same as ESC * ``3.'' Printer can't put two adjacent dots in the same row.
9-Pin Graphics	ESC m n n [graphic data]	27 94 m n n [graphic data]	1B 5E m n n [graphic data]	Used for graphics-~ intensive applications, such as screen dumps. Each print pattern requires 2 bytes of data. m=0: Single density m=1: Double density m=2: High speed double density m=3: Quadruple Density
Reassign Graphics Code	ESC ? m n	27 63 m n	1B 3F m n	Assigns one of the graphics modes n to the ESC m mode n=``K''=75 n=``L''=76 n=``Y''=89 n=``Z''=90 m=0: Single density, 60 dpi m=1: Double density, 120 dpi m=2: Fast double density, quasi-120 dpi m=3: Quadruple density, quasi-240 dpi m=4: CRT I, 80 dpi m=5: Plotter, 72 dpi m=6: CRT II, 90 dpi m=7: DD Plotter, 144 dpi

Composite Command	ESC ! n	27 33 n	1B 21 n	Calculate n as the sum of the values of the features to be activated. If a feature's value is not included in the sum, it will be deactivated. 0=10 cpi 1=12 cpi 2=Proportional spacing 4=Compressed 8=Emphasized 16=Enhanced 32=Double Width 64=Italics 128=Underlining
Miscellaneous				
Initialize	ESC @	27 64	1B 40	Clears buffer, resets printer to menu defaults, current position becomes top of page. Custom character data is not touched. Controlled by menu selection.
Cancel	CAN	24	18	Clears buffer; control codes unaffected.
Set 8th Bit to 1	ESC	27 62	1B 3E	Sets the Most Significant Bit to 1.
Set 8th Bit to 0	ESC =	27 61	1B 3D	Sets the Most Significant Bit to 0.
Reset 8th Bit	ESC #	27 35	1B 23	Cancels ESC or ESC =. MSB accepted ``as is'' from computer.
Print Suppress Mode On	DC3	19	13	All data except DC1 is ignored and lost. PRINT SUPPRESS EFFECTIVE menu item must be YES for this to be active.

Print Suppress Mode Off	DC1	17	11	Printer becomes active, processes all data received.
Disable Paper-~ Out Sensor	ESC 8	27 56	1B 38	Paper-out sensor is deactivated: printer will print to next top of form before registering paper end error.
Enable Paper- Out Sensor	ESC 9	27 57	1B 38	Sensor detects when less than 1/2> of paper is left. When PAPER OUT light is on, pressing SELECT prints 1 line of data at a time. Sensor can also be controlled by the menu.
Half-Speed Printing	ESC s n	27 115 n	1B 73 n	Prints at 50% of normal speed to reduce noise. n=1: Half-speed printing ON n=0: Half-speed printing OFF
Software I-Prime	ESC NUL	27 125 0	1B 7D 00	Print buffer cleared, receive buffer unaffected; printer reset to menu default if applicable, non-menu features returned to factory default.

Microline Standard Emulation Commands

Microline Stanadard Emulation Commands

Character style				
Select NLQ Courier	ESC 1	27 49	1B 31	
Select NLQ SansSerif	ESC 3	27 51	1B 33	
Select Utility print-ing	ESC 0	27 48	1B 30	
Select High SpeedDraft printing	ESC # 0	27 35 48	1B 23 30	Cannot combined withproportional spacing.
Begin emphasized printing	ESC T	27 84	1B 54	Double strike, offsethorizontally (singlepass).
Begin enhancedprinting	ESC H	27 72	1B 48	Double strike, offsetvertically (double pass).
End enhanced andemphasized print-ing	ESC I	27 73	1B 49	
Begin italic print-ing	ESC ! /	27 33 47	1B 21 2F	
End italic printing	ESC ! *	27 33 42	1B 21 2A	
Character size				
Select 10 cpi	RS	30	1E	
Select 12 cpi	FS	28	1C	
Select 17.1 cpi	GS	29	1D	
Select 20 cpi	ESC # 3	27 35 51	1B 23 33	
Begin proportionalspaci ng	ESC Y	27 89	1B 59	
End proportionalspaci ng	ESC Z	27 90	1B 5A	
Begindouble-widt h print-ing	US	31	1F	
Begindouble-heig htprinting	ESC US 1	27 31 49	1B 1F 31	

End double-heightprinting	ESC US 0	27 31 48	1B 1F 30	
Print features				
Begin underlining	ESC C	27 67	1B 43	Does not underlinespace created by hori-zontal tabs or printpositioning commands.
End underlining	ESC D	27 68	1B 44	
Begin superscriptprinting	ESC J	27 74	1B 4A	Turns superscript on orcancels subscript.
End superscriptprinting	ESC K	27 75	1B 4B	
Begin subscriptprinting	ESC L	27 76	1B 4C	Turns subscript on orcancels superscript.
End subscriptprinting	ESC M	27 77	1B 4D	
Incremental char-acter spacing	ESC N n	27 78 n	1B 4E n	Adds n dot columnsbetween charactersuntil changed orcancelled. Width of adot column varies withpitch and print quality(utility/NLQ).n = 0 to 11
Cut Sheet FeederControl (option)				
Insert page	ESC S	27 83	1B 53	
Eject page	SEC V	27 86	1B 56	Prints data and ejectspage; additional data atend of page loads nextpage.
Select bin	ESC EM n	27 25 n	1B 19 n	n = 1: bin 1n = 2: bin 2
Character sets	Character sets	Character sets	Character sets	Character sets

Select standardsymbol set	ESC ! 0	27 33 48	1B 21 30	
Select IBM symbolset	ESC ! 2	27 33 50	1B 21 32	
Select block graph-ics symbol set	ESC ! 1	27 33 49	1B 21 31	
Select interna-tional character set	ESC ! n	27 33 n	1B 21 n	n = 64: USASCII,slashed zeron = 65: USASCII,unslashed zeron = 66: Britishn = 67: Germann = 68: Frenchn = 69: Swedishn = 70: Danishn = 71: Norwegiann = 72: Dutchn = 73: Italiann = 74: FrenchCanadiann = 75: Spanish,unslashed zeron = 76: Latin Americann = 90: Publisher
Margins	Margins	Margins	Margins	Margins
Set left margin	ESC % C nn n	27 37 67 n nn	1B 25 43 n nn	Set left margin tonnn/120 from left-most print position.nnn = 000 to 999(ASCII, must be 3digits)
Set right margin	ESC % R nn n n	27 37 82 n nn n	1B 25 52 n nn n	Set right margin tonnnn/120 fromleftmost print position.nnnn = (left margin+ 60) to 1632 (ASCII,must be 4 digits)
Indent for one lineonly	ESC % B nn n n	27 37 66 n nn n	1B 25 42 n nn n	Indent nnnn/120from leftmost printposition for one lineonly. Indent must bewithin set margins.nnnn = 0 to 1632(ASCII, must be 4digits)
Tabs	Tabs	Tabs	Tabs	Tabs
Advance to next tab	HT	9	09	

Set tab stops bycharacter spaces	ESC HT n1n1 n1, ... ,nk nk nkCR	27 9 n1 n1n1 44 ...44nk nk nk 13	1B 09 n1 n1n1 2C ... 2Cnk nk nk 0D	First tab is set at posi-tion n1n1n1 (3-digitASCII number). Tab k isset at positionnknknk. Positionsare separated by com-mas.k = 0-16 (number oftabs)
Clear tabs	ESC HT CR	27 9 13	1B 09 0D	
Set tab stops by dotcolumn	ESC ETX n1n1 n1 n1 ,... , nk nknk nk CR	27 3 n1 n1n1 n1 44 ...44 nk nk nknk 13	1B 03 n1 n1n1 n1 2C ...2C nk nk nknk 0D	First tab is set at dotcolumn n1n1n1n1(4-digit ASCII number).Tab k is set at positionnknknknk. Posi-tions are separated bycommas.k = 0-16 (number oftabs)
Clear tabs	ESC ETX CR	27 3 13	1B 03 0D	
Load Vertical For-mat Unit channeldata	DC4 data?	20 data 63	14 data 3F	VFU can set up to 12channels with a totalmaximum of 54 tabstops. Each line on theform is represented bya SP code (dec. 32). Achannel designation(dec. 49 to dec. 60) fol-lows the line to whichthe tab skips. Maxi-mum form length is127 lines.
Advance to nextvertical tab	VT n	11 n	0B n	Skip to next vertical tabin channel n.n = dec. 49 to dec. 60
Line feed	LF	10	0A	
Line feed withoutcarriage return	ESC DC2	27 18	1B 12	
Direct line skip	ESC VT nn	27 11 n n	1B 0B n n	Skip nn lines (2-digitASCII number) at cur-rent line pitch.
Fine line feed(n/144)	ESC % 5 n	27 37 53 n	1B 25 35 n	n= 0 to 255

Carriage return/line feed control	ESC ? n :	27 63 n 58	1B 3F n 3A	n=17: Carriage returnn=19: Forward line feedn=25: Reverse line feed
Set 6 lpi spacing	ESC 6	27 54	1B 36	
Set 8 lpi spacing	ESC 8	27 56	1B 38	
Set fine linespacing	ESC % 9 n	27 37 57 n	1B 25 39 n	n = 0 to 255
Form feed	FF	12	0C	
Set form length in increments	ESC G n n	27 71 n n	1B 47 n n	nn is a 2-digit ASCIInumber.
Set form length bylines	ESC F n n	27 70 n n	1B 46 n n	nn is a 2-digit ASCIInumber
Skip over perfora-tion	ESC % S n	27 37 83 n	1B 25 53 n	When printing positionis within 2n/6 of thebottom of the page,printer advances to topof next page.n = 0 to 9
Set top of form	ESC 5	27 53	1B 35	Top of form set at cur-rent printing position.
Miscellaneous				
Carriage return	CR	13	0D	
Backspace	BS	8	08	
Unidirectionalprinting	ESC	27 45	1B 2D	Print left to right only inboth text & graphics.
Bidirectionalprinting	ESC =	27 61	1B 3D	
Set 8th data bit to 1	SO	14	0E	Use to print high-ASCIIcharacters on 7-bit sys-tems.
Accept data as is	SI	15	0F	
Print Suppressmode on	DC3	19	13	Ignores all data untilDC1 is received (datalost). Can be disabledthrough menu.
Print Suppressmode off	DC1	17	11	Clears Print Suppressmodeprinter canaccept data.

Initialize	ESC CAN	27 24	1B 18	Resets printer: printbuffer cleared, printfeatures default tomenu settings, pageformat features andDLL memory storagenot affected.
Cancel	CAN	24	18	Clear print buffer. Nofeatures are affected.
Begin quiet mode	ESC	27 60	1B 3C	Print at speed toreduce noise.
End quiet mode	ESC	27 62	1B 3E	Normal speed andnoise level.
Graphics				
Set Single DensityGraphics	ESC P or ESC Q	27 80 or 27 81	1B 50 or 1B 51	Horizontal graphicsdensity 60 dpi. At 12cpi, horizontal densityis 72 dpi. Sets densityonly.
Set Double DensityGraphics	ESC R	27 82	1B 52	Horizontal graphicsdensity 120 dpi. At 12cpi, horizontal densityis 144 dpi. Sets densityonly.
Quasi QuadrupleDensity	ESC # Q	27 35 81	1B 23 51	Horizontal graphicsdensity 240 dpi. At 12cpi, horizontal densityis 288 dpi. Adjacentdots not permitted inthe same row.
Enter GraphicsPrint Mode	ETX	3	03	All following data isinterpreted as graphicinformation except aslisted below. Once ETXis received, it is ignoredexcept in the combina-tions indicated.
LF + CR	ETX SO	3 14	03 0E	Graphics line feed withcarriage return
LF only	ETX DC4	3 20	03 14	Graphics line feed only

Text LF + CR(graphics mode)	ETX LF	3 10	03 0A	Text line feed at currentpitch with carriagereturn
Text LF only(graphics mode)	ETX DC2	3 18	03 12	Text line feed at currentpitch with no carriagereturn
Composite graph-ics mode set	ESC * n n :	27 42 n n 58	1B 42 n n 3A	Add values for validcombinations ofmodes.n = 96 +1: 60 dpi2: 72 dpi: 4: singledensity8: double density16: quad densityn = 64 +8: double speed16: 8-bit graphics
Composite com-mand	ESC & n nn n :	27 38 n n nn 58	1B 3A n n nn 3A	Add values for validcombinations of fea-tures.n = 64 +1: 10 cpi2: 12 cpi4: 15 cpi8: 17.1 cpi16: 20 cpi32: double widthn = 128 +1: no super/subscript2: subscript8: superscript16: emphasized32: enhancedn = 192 +1: Utility 2:NLQ Courier8: DLL mode16: italicn = 224 +1: HSD print16: underline32: double height

Pacemark 2410 Emulation Commands

Pacemark 2410 Emulation Commands

Horizontal Control				
Carriage return	CR	13	0D	
Set horizontal tabs	ESC 3 n n... n NUL	27 51 n n ...n 0	1B 33 n n ...n 00	Sets tabs n characterspaces from left margin(pitch when set). Clears previously set tabs.Default is every 8spaces. k = 0 to 10 (# of tabsn = 0 to 255
Horizontal tabs	HT	9	09	Skip to next horizontaltab position.
Vertical Control				
Set 6 lpi line feed	ESC 4	27 52	1B 34	Also cancels verticaltabs.
Set 8 lpi line feed	ESC 5	27 53	1B 35	Also cancels verticaltabs.
Set line feed	ESC % 9 n	27 37 57	1B 25 39 n	n = 0 to 127
Line feed	LF	10	0A	
Form feed	FF	12	0C	Prints data in bufferand advances paper tonext top of form
Set vertical tabs	ESC 1 n n... n NUL	27 49 n n ...n 0	1B 31 n n ...n 00	n = 0 to 127 (line # oftab0 clears tabs)k = 0 to 10 (total # oftabs)Change in line pitchdoesn't change positionof tabs.
Vertical tab	VT	11	0B	Prints line and skips tonext vertical tab.

Load Vertical For-mat Unit (VFU)channel data	ESC XDATAESC Y	27 88 DATA27 89	1B 58 DATA1B 59	VFU can set up to 14channels on a formmax. of 132 lines.Channel data isbitmapped to 2 bytesfor each line. First byteallocated to channels 1(lsb) to 7; second byteallocated to channels 8(lsb) to 14. Msb isignored. ESC Y indi-cates end of data.
Set page length inlines	ESC 2 n	27 50 n	1B 32 n	Also sets Top of Form atcurrent position.n = 1 to 128 (# of lines)
Cut Sheet FeederControl (option)				
Insert page	ESC I	27 73	1B 49	
Eject page	ESC J	27 74	1B 4A	
Select bin	ESC EM n	27 25	1B 19 n	n = 1: bin 1n = 2: bin 2
Character Sets				
Select custom (DLL) character set	ESC K	27 75	1B 4B	
Select standardcharacte r set	ESC L orESC M	27 76 or 27 77	1B 4C or 1B 4D	
Create Utilityascender customcharacter set	ESC % Aaddressdata	27 37 65addressdata	1B 25 41addressdata	Character rests onbaseline.addre ss = location ofcharacter (dec. 32 to127)data = 1 byte for eachof 11 columns of 7 dots;lsb is top dot

Create Utilitydescender customcharacter set	ESC % Daddressdata	27 37 68addressdata	1B 25 44addressdata	Character extends 2dots below baseline.address = location ofcharacter (dec. 32 to127)data = 1 byte for eachof 11 columns of 7 dots;lsb is top dot
Create NLQ customcharacter	ESC % Waddresswidthdata	27 37 87addresswidthdata	1B 25 57addresswidthdata	address = location ofcharacter (32 to 127dec.)width = width ofcharacter in dot col-umnsCharacters are max. 17dots high; each columnrequires 3 bytes ofdata.
Print Features				
Select NLQsinglepass	ESC 7	27 55	1B 37	
Select NLQdualpass	ESC 9	27 57	1B 39	
Select Utility	ESC 8	27 56	1B 38	
Set 10 cpi pitch	ESC 6	27 54	1B 36	
Set 12 cpi pitch	ESC A	27 65	1B 41	
Set 17.1 cpi pitch	ESC B	27 66	1B 42	
17.1 cpi pitchoneline only	DC2	18	12	Setting clears when lineis terminated.
Start double-widthprinting	ESC C	27 67	1B 43	
Stop double-widthprinting	ESC Z	27 90	1B 5A	
Double-widthprintingone lineonly	SO	14	0E	Setting clears when lineis terminated.
Start superscriptprinting	ESC F	27 70	1B 46	

Start subscriptprinting	ESC D	27 68	1B 44	
Cancel super-script/subscriptprinting	ESC E	27 69	1B 45	Returns superscript orsubscript printing tonormal print.
Start underlineprinting	ESC U	27 85	1B 55	Underlines characters,but not spaces createdby HT command.
Stop underlineprinting	ESC V	27 86	1B 56	
Incremental char-acter spacing	ESC N n	27 78 n	1B 4E n	Adds n dot columnsbetween charactersuntil changed orcancelled (n = 0). Widthof a dot column varieswith pitch and printquality (utility/NLQ).n = 0 to 11
Graphics				
Set single densitygraphics	ESC P	27 80	1B 50	Graphics density72(V) 120(H) dpi. Setsdensity only.
Set double densitygraphics	ESC R	27 82	1B 52	Graphics density144(V) 120(H) dpi.Sets density only.
Set quasi-doubleden sity graphics	ESC Q	27 81	1B 51	Doubles each dot hori-zontally and verticallywith -dot overlap.
Enter graphicsprint mode	ETX	3	03	All following data isinterpreted as graphicinformatio n except aslisted below. Once ETXis received, it is ignoredexcept in the combina-tions indicated.

Exit graphics printmode	ETX STX	3 2	03 02	
Read ETX asgraphic data	ETX ETX	3 3	03 03	Allows ETX to be readas graphic information.
Graphics LF + CR	ETX SO	3 14	03 0E	Graphics line feed withcarriage return.
Graphics LF only	ETX DC4	3 20	03 14	Graphics line feed with-out carriage return.
Text LF + CR(graphics mode)	ETX LF	3 10	03 0A	Text line feed at currentpitch with carriagereturn.
Text LF only(graphics mode)	ETX DC2	3 18	03 12	Text line feed at currentpitch without carriagereturn.
Miscellaneous				
Cancel	CAN	24	18	Initializes printer: printbuffer cleared, printfeatures default tomenu settings, pageformat features andDLL memory storagenot affected.
Print Suppressmode on	DC3	19	13	Ignores all data untilDC1 is received (data islost). Can be disabledthrough menu.
Print Suppressmode off.	DC1	17	11	Clears Print Suppressmodepr inter canaccept data.
Bell	BEL	7	07	Sound buzzer.

Appendix C
Serial Cable Pinout

Serial Cable Pinout for the PM3410

This appendix is designed to help you make a serial cable to connect your printer to your computer. Please do not attempt to make a cable unless you're experienced in doing so. The table below explains the signals from the printer's end. You must read you computer documentation to determine the requirements on your computer's end. Your PM3410 printer requires a **shielded** RS-232C cable which is

- ¨ UL and CSA approved
- ¨ no more than 50 feet in length

and has

- ¨ Cannon DB-25P plug (or equivalent) with 25 pins
- ¨ Cannon DB-C2-J9 (or equivalent) connector shell

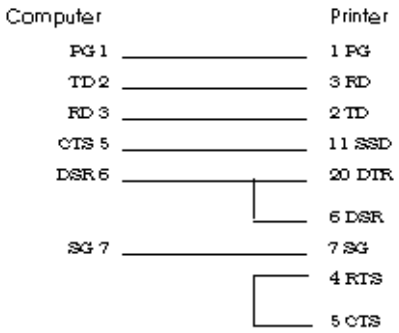
Serial Interface Signal Requirements

Pin	**Signal**	Symbol	**Direction**	**Description**
1	Protective Ground	PG	Ground	Connected to the printer frame.
2	Transmit Data	TD	From printer	Serial data transmitted to the system
3	Receive Data	RD	To printer	Serial data received by the printer
4	Request to Send	RTS	From printer	Always set to low (mark)
6	Data Set Ready	DSR	To printer	Indicates that data can be sent
7	Signal Ground	SG	Ground	Ground
11	Supervisory Send Data	SSD	From printer	Indicates that printer is not ready to receive data
20	Data Terminal Ready	DTR	From printer	Indicates that printer is not ready to receive data

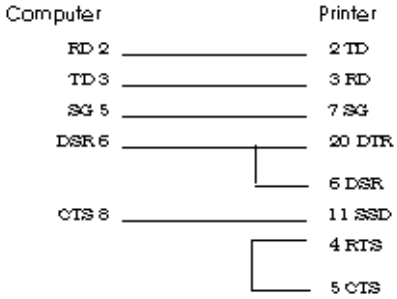
Commonly Used Serial Cable Configurations

Commonly Used Serial Cable Configurations

IBM 25-Pin Cable Configuration



IBM 9-Pin Cable Configuration



Parallel Cable

Parallel Cable

The Pacemark 3410 requires a Centronics-equivalent parallel cable with the following:

¨ Amphenol 57-30360 or AMP 552274-1 plug (or equivalent) with 36 pins

¨ AMP 552073-1 (or equivalent) cover

¨ Beldon (or equivalent) **shielded** cable, maximum 10 feet with twisted pair conductors. It must be UL and CSA approved.

The printer has a 36-pin Amphenol 57-40360-12-D56 receptacle.

Specifications

Specifications

Printhead: 9 pin

Print speed @ 10 cpi: HSD 550 cps Utility 417 cps NLQ 104 cps

Emulations: Epson FX/IBM ProPrinter, co-resident Pacemark/Microline, by means of optional chip set

Interface: Parallel and RS232C serial, standard Optional Twin-Ax/Co-Ax (3rd partycall 1-800-OKIDATA for information) **Graphics resolution:** 1445216 dpi maximum

Fonts: NLQ: Courier, Gothic, Proportional Draft: Utility, High Speed Bar Code: UPC-A, UPC-E, EAN 8, EAN 13, Code 3 of 9, Interleaved 2 of 5 **Buffer size:** 64K

Reliability: Mean Time Between Failures (MTBF) 8,000 hours at 25% duty cycle, 35% page density Mean Time To Repair (MTTR) 15 minutes Printhead life 200 million characters average in 10 cpi utility mode

Paper Specifications: Weight 12 to 24 lb. Thickness Top feed: 0.36 mm (0.014 inches) maximum Bottom feed: 0.50 mm (0.020 inches) maximum

Continuous forms: Types Interleaved: original plus 5 copies Carbonless: original plus 7 copies Width 3.5 to 16.5 inches

Cut sheet multi-part forms: Original plus 3 copies (top edge must be glued tight)

Labels: Carrier width 3.5 to 16.5 inches wide Use bottom feed only.

Envelopes: Weight 24-lb. maximum Size Minimum 6.5 5 3.6 inches Maximum 9.5 5 4.1 inches Feed: Single feed Continuous feed overlap type only

Card stock: 120-lb. maximum Use bottom feed only.

Transparencies: Use top feed only.

Dimensions: Width 25-1/4 inches (540 mm) Depth 19 inches (483 mm) Height 15 inches (203 mm) Weight 63 lbs. (25.4 kg)

Environmental Requirements: Operating Temperature 50 to 104 degrees F (10 to 40 degrees C) Storage Temperature 14 to 122 degrees F (-10 to +50 degrees C) Humidity 20 to 80% RH

Electrical Requirements: Voltage 120 volts, +5.5%/-15% 220/240 volts, ±10% Frequency 50/60 Hz, ±2 Hz Power Idling: 30 watts Operating: 75 watts

Specifications subject to change without notice