
Chapter 5

DOWNLOAD CHARACTERS

With this printer you can create new characters and symbols, download their dot data, and have them printed in place of selected characters in the regular character set. Characters that can be generated in this way range from simple but useful symbols like the check mark through complex Chinese or Japanese characters.

Regular characters are permanently stored in the printer's ROM, but characters you design are downloaded and stored in RAM for use.

Before you start to define your own characters, you must set the EDS switch A-2 to the OFF position. Otherwise, the RAM is used to store the input buffer, and the download commands are ignored. If you want to download characters with IBM mode, you must have the optional RAM cartridge (RC-32Z) installed in the monochrome printer.

DEFINING YOUR OWN CHARACTERS WITH STANDARD MODE

Designing and printing your own characters has two requirements: first, designing the shape of the character, calculating the data necessary to make the shape, and sending that data to the printer, and secondly, sending the command to print the downloaded characters instead of the regular characters. There are a number of design constraints for download characters:

- The matrix or grid on which you design the characters depends upon the print mode as shown below:

Character mode	Horizontal	Vertical
Draft characters	9	24
LQ pica characters	31	24
LQ elite characters	27	24
LQ semi-condensed	19	24
LQ proportional	37	24
Draft super/subscript	7	16
LQ super/subscript	19	16
LQ prop. super/subscript	37	16

- The minimum width of a character is five dots.
- Dots cannot overlap.
- You may define any position in the ASCII table.

Photocopy the grid in Figure 5-1 to help design your new characters. We will use a tiny representation of a telephone symbol for our example.

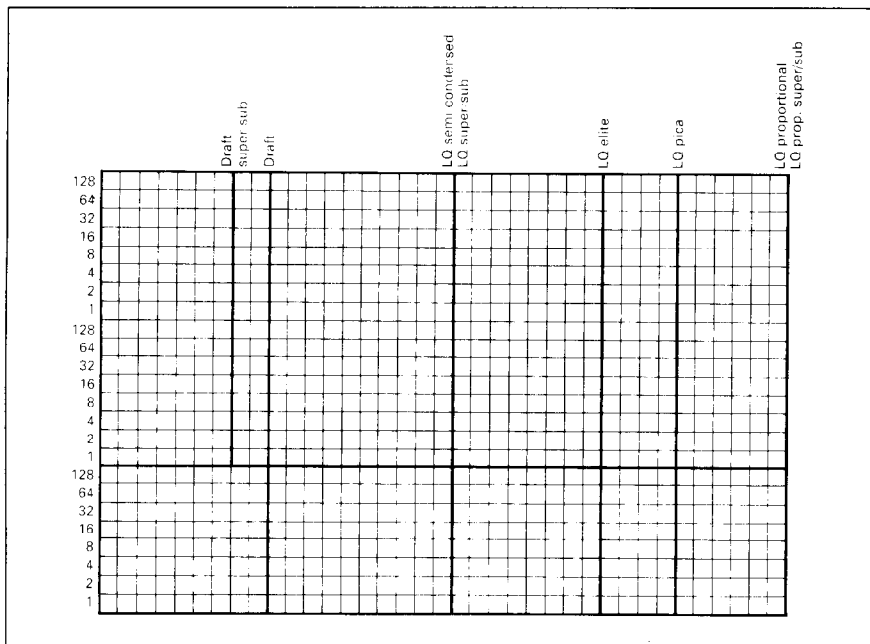


Figure 5-1. Use this grid (or one similar to it) to define your own characters

Assigning the character data

Now, we calculate the vertical numerical values of the columns of dots, and enter them underneath the grid. Each vertical column (which has a maximum of 24 dots) is first divided into three groups (or two groups for super/subscripts) of eight dots. Each group of eight dots is represented by one byte, which consists of eight bits.

This is where the numbers down the left side of the grid come in. Notice that there is a number for each row of dots and that each number is twice the number below it. By making these numbers powers of two we can take any combination of dots in a vertical column and assign them a unique value.

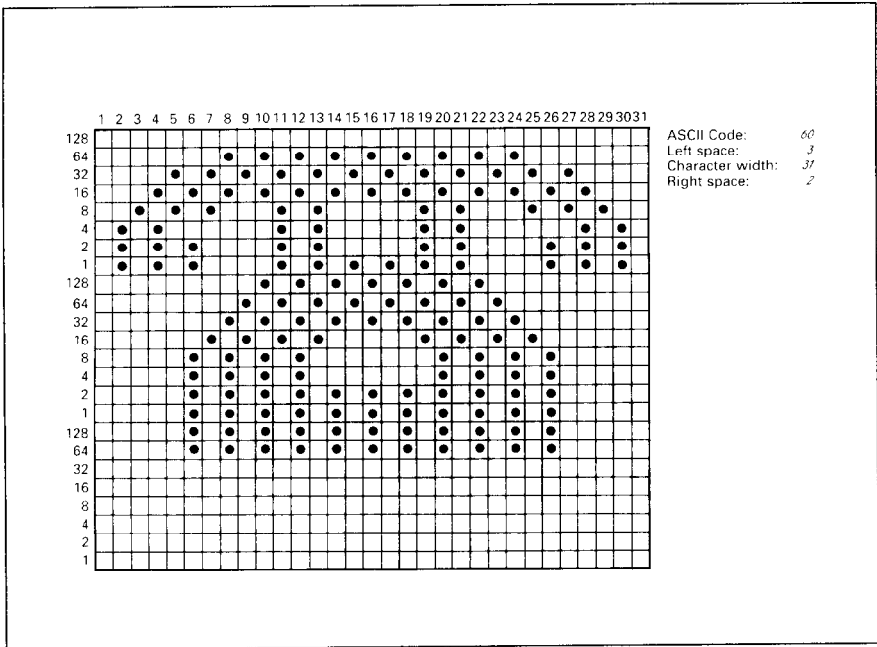


Figure 5-2. Telephone symbol with normal LQ pica

Assigning a value of character space

Besides being able to specify the actual width of the character, this printer allows you to specify the position in the standard grid where the character will print. You must specify the dot column in which the printed character starts and the dot column in which the character ends. Why, you may ask, would you want to define a character this way instead of merely defining the overall width of the character? Because this printer's proportional character definitions can also be used to print normal width characters, and by centering even the narrow characters in the complete grid they will look good even if you are not printing them proportionately.

The three bytes are used to specify the width of the character and the space to be allowed on either side of it. The left space (in dot columns) is specified by *m0* and the right space is specified by *m2*. The second byte (*m1*) specifies the width of the character in dots. By varying the width of the character itself and the spaces around it, you can actually create proportional width characters.

When defining characters, the number of printed columns ($m1$), and the sum of side spaces and the character width ($m0 + m1 + m2$) cannot exceed the value shown below.

Character mode	$m1$	$m0 + m1 + m2$
Draft characters	9	12
LQ pica characters	31	36
LQ elite characters	27	30
LQ semi-condensed	19	24
LQ proportional	37	42
Draft super/subscript	7	12
LQ super/subscript	19	36
LQ prop. super/subscript	37	42

Sample program

To demonstrate how to use the download characters, let's use the "telephone" character and the other user-defined characters to print a small graph. This program will do just that:

```

1000 LPRINT WIDTH "LPT1:",255
1010 LPRINT CHR$(27);"x1";
1020 LPRINT CHR$(27);"&";CHR$(0);
1030 LPRINT CHR$(60);CHR$(61);
1040 FOR N=60 TO 61
1050 READ LS :LPRINT CHR$(LS);
1060 READ CW :LPRINT CHR$(CW);
1070 READ RS :LPRINT CHR$(RS);
1080 FOR M=1 TO CW*3
1090 READ MM
1100 LPRINT CHR$(MM);
1110 NEXT M
1120 NEXT N
1130 LPRINT CHR$(27);"D";CHR$(11);CHR$(0)
1140 LPRINT CHR$(27);"k";CHR$(4);
1150 LPRINT CHR$(27);"h";CHR$(1);
1160 LPRINT "  DIFFUSION RANGES OF"
1170 LPRINT "    CARS & TELEPHONES"
1180 LPRINT CHR$(27);"h";CHR$(0)
1190 LPRINT CHR$(27);"k";CHR$(0);
1200 LPRINT CHR$(27);"%";CHR$(1);
1210 LPRINT "USA";CHR$(9);
1220 FOR I=0 TO 681 STEP 25 :LPRINT CHR$(60); :NEXT I
1230 LPRINT
1240 LPRINT CHR$(9);
1250 FOR I=0 TO 781 STEP 25 :LPRINT CHR$(61); :NEXT I
1260 LPRINT
1270 LPRINT "GERMANY";CHR$(9);
1280 FOR I=0 TO 412 STEP 25 :LPRINT CHR$(60); :NEXT I
1290 LPRINT
1300 LPRINT CHR$(9);
1310 FOR I=0 TO 488 STEP 25 :LPRINT CHR$(61); :NEXT I
1320 LPRINT
1330 LPRINT "JAPAN";CHR$(9);

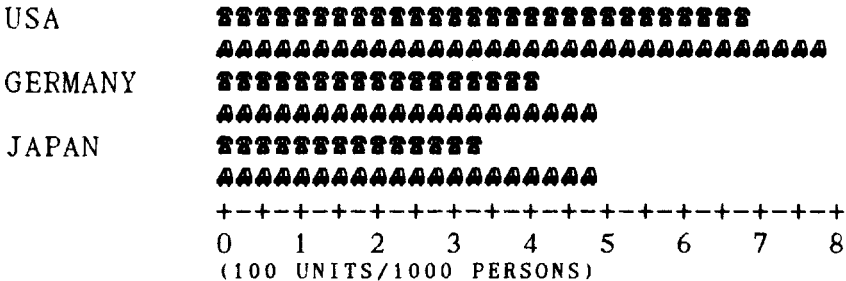
```

```

1340 FOR I=0 TO 347 STEP 25 :LPRINT CHR$(60); :NEXT I
1350 LPRINT
1360 LPRINT CHR$(9);
1370 FOR I=0 TO 493 STEP 25 :LPRINT CHR$(61); :NEXT I
1380 LPRINT
1390 LPRINT CHR$(9);"+-";
1400 SCALES="+--"
1410 FOR I=2 TO 8 :LPRINT SCALES; :NEXT I
1420 LPRINT "+--"
1430 LPRINT CHR$(9);"0 ";
1440 FOR I=1 TO 8
1450 LPRINT " ";I;
1460 NEXT I
1470 LPRINT CHR$(27);"%";CHR$(0)
1480 LPRINT CHR$(27);"M";
1490 LPRINT CHR$(27);"S";CHR$(0);
1500 LPRINT CHR$(9);"(100 UNITS/1000 PERSONS)"
1510 LPRINT CHR$(27);"T";
1520 LPRINT CHR$(27);"@"
1530 END
2000 ' DATA
2010 ' Telephone Symbol
2020 DATA 3, 31, 2
2030 DATA 0, 0, 0, 7, 0, 0, 8, 0, 0, 23, 0, 0, 40, 0, 0
2040 DATA 19, 15,192, 40, 16, 0, 80, 47,192, 32, 80, 0, 80,175,192
2050 DATA 47, 80, 0, 80,175,192, 47, 80, 0, 80,163,192, 33, 64, 0
2060 DATA 80,163,192, 33, 64, 0, 80,163,192, 47, 80, 0, 80,175,192
2070 DATA 47, 80, 0, 80,175,192, 32, 80, 0, 80, 47,192, 40, 16, 0
2080 DATA 19, 15,192, 40, 0, 0, 23, 0, 0, 8, 0, 0, 7, 0, 0
2090 DATA 0, 0, 0
2100 ' Car Symbol
2110 DATA 3, 31, 2
2120 DATA 0, 0, 0, 0, 30, 0, 0, 0, 0, 0, 60, 0, 0, 3, 0
2130 DATA 0,252,128, 0, 3, 64, 1,252,128, 2, 3, 64, 5,124,128
2140 DATA 10, 3, 0, 20,124, 0, 40, 0, 0, 80,126, 0, 32, 0, 0
2150 DATA 64,126, 0, 63,128, 0, 64,126, 0, 63,128, 0, 64,124, 0
2160 DATA 32, 3, 0, 64,124,128, 32, 3, 64, 64,124,128, 48, 3, 64
2170 DATA 76,124,128, 51, 3, 0, 12,252, 0, 3, 0, 0, 0,254, 0
2180 DATA 0, 0, 0

```

DIFFUSION RANGES OF CARS & TELEPHONES



DEFINING YOUR OWN CHARACTERS WITH IBM MODE

Downloading fonts in IBM mode requires downloading character Dot Pattern data and character Index Table data. Dot pattern data controls which pins fire when printing a character. Index Table data is placed in a "lookup table" that provides information on where Dot Pattern data is stored in memory and defines certain attributes of the character.

Assigning the download character set

You can define one or more download character sets for later use in IBM mode. Before you start to design your characters, you must define what character set(s) you want to download.

The character width on which you design the characters depends upon the character set as shown below:

Character set	Character width	Character ID
Draft characters	9	0
LQ pica characters	35	1
LQ elite characters	29	2
LQ proportional	17 ~ 41	3

After you have decided your download character set, you must tell the printer where the download character data to be stored, and how many download character sets you will define.

The first download font area starts from <800F>h, and you must enter 0 for the Format byte. This Format byte indicates to the printer that the RAM cartridge has stored the download character set.

Following the format byte, you must enter the Character ID data. If you want to define more character set, add 128 to the Character ID data.

The second area starts from <8911>h, the third area starts from <9212>h, and the last area starts from <9B13>h. But you need not enter the Format byte for these area.

Assigning the character dot pattern

We will use a tiny representation of a telephone symbol for our example.

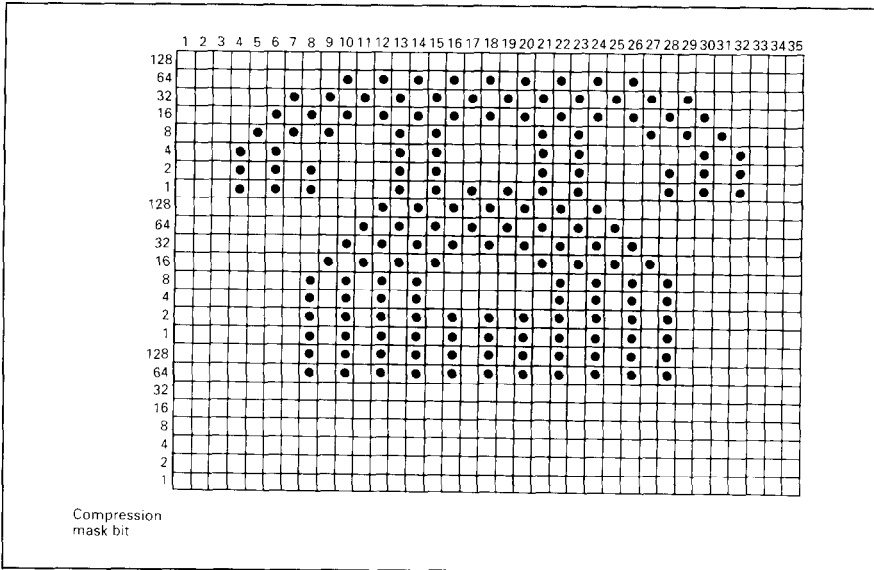


Figure 5-3. Telephone symbol with LQ pica

After you have designed the character pattern, you will need to compress the Dot Pattern. Data compression allows you to store more download characters than without compression. It is a more efficient use of memory. The printer will repeat the previous dot column when the current column compression mask bit is set to "1".

Fill up the adjacent dot even they do not print, then compare the each vertical line to the left line. If the line is the same as the left one, write "1" in the column of the "compression mask bit". If it is different, write "0".

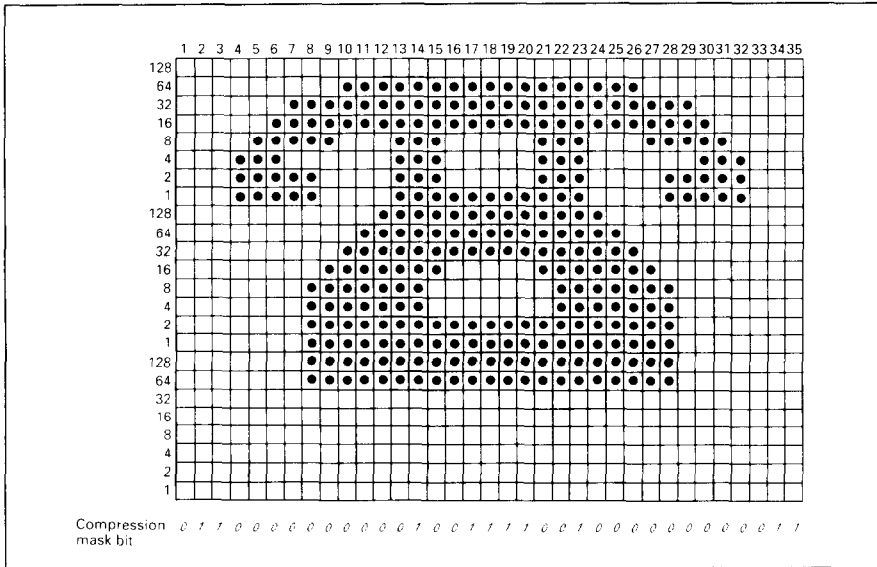


Figure 5-4. Fill up the adjacent dot, then write the "compression data"

After you have written the "compression mask bit" data, line up all the character data for the "compression mask bit" that requires "0". The telephone symbol looks like Figure 5-5.

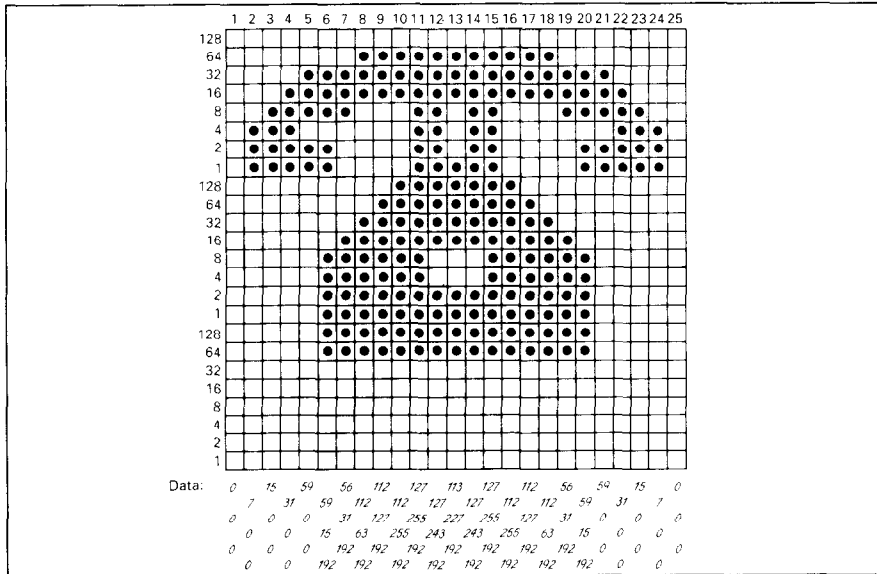


Figure 5-5. Compressed character pattern of telephone symbol

Now we will calculate the vertical numerical values of the columns of dots, and enter them underneath the grid. Each vertical column is first divided into three groups of eight dots. Each group of eight dots is represented by one byte, which consists of eight bits.

This is where the numbers down the left side of the grid come in. Notice that there is a number for each row of dots and that each number is twice the number below it. By making these numbers powers of two we can take any combination of dots in a vertical column and assign them a unique value.

Assigning the Index Table data

Unlike defining in the Standard mode, you must assign the Index Table with the IBM mode. This Index Table is prepared for the information of each character's attribute data, such as character type (Normal 24-dot high, or 30-dot high block graphics), the dot pattern data in the memory, and the compression mask bit data.

Each character requires 9 index table data.

The first and the second bytes ($m1$ and $m2$) indicate the position of the first dot pattern in the memory. $m1$ is the high order byte, and $m2$ is the low order byte.

The third byte, $m3$, indicates the character type and the dot pattern data width in the memory.

If the character is normal, simply enter the width of dot pattern in the memory. If the character is a block graphic, add 128 to the width of dot pattern in the memory.

Our telephone symbol is a normal character and the width of the dot pattern in the memory should be 25, so this value is 25.

The fourth byte, $m4$, indicates the printing attribute.

This byte indicates the character width to be printed, and information of the repetition dots for block graphics characters.

If the character is a normal character, add 192 to the character width.

If the character is a block character, and it should be printed as a line draw character, add 64 to the character width. If the block character is not a line draw character, this byte should be the same as the character width.

Our telephone symbol is a normal pica character, so the character width is 35, and this byte should be 227.

The remaining five bytes (m_5 through m_9) indicate the compression mask bits. Each bit shows the data that will translate the compressed dot pattern data back to the original character pattern.

For example, the compression mask bits of our telephone symbol are 01100000 00000100 11110010 00000000 01100000. So these bytes are 96, 4, 242, 0, and 96.

You must define the index table data for all characters from 0 to 255. If you do not want to define a particular character, enter 0 into that index table data.

Sample program

To demonstrate how to define and to use the download characters in IBM mode, let's use the "telephone" character and the other user-defined characters to print a small graph. This program will do just that:

```
1000 LPRINT WIDTH "LPT1:",255
1010 LPRINT CHR$(27);"=";CHR$(164);CHR$(9);"#";
1020 LPRINT CHR$(&HOF);CHR$(&H80);CHR$(0);
1030 ' INDEX TABLE
1040 LPRINT CHR$(1);
1050 FOR I=0 TO 59
1060 LPRINT STRING$(9,0);
1070 NEXT I
1080 FOR IT=1 TO 9 :READ MM :LPRINT CHR$(MM) :NEXT IT
1090 FOR IT=1 TO 9 :READ MM :LPRINT CHR$(MM) :NEXT IT
1100 FOR I=62 TO 255
1110 LPRINT STRING$(9,0);
1120 NEXT I
1130 ' DOT PATTERN
1140 FOR DP=1 TO 159
1150 READ MM
1160 LPRINT CHR$(MM);
1170 NEXT DP
1180 ' PRINTOUT PROGRAM
1190 LPRINT CHR$(27);"D";CHR$(11);CHR$(0)
1200 LPRINT CHR$(27);"k";CHR$(4);
1210 LPRINT CHR$(27);"h";CHR$(1);
1220 LPRINT "    DIFFUSION RANGES OF"
1230 LPRINT "    CARS & TELEPHONES"
1240 LPRINT CHR$(27);"h";CHR$(0);
1250 LPRINT CHR$(27);"k";CHR$(0)
1260 LPRINT "USA";CHR$(9);
1270 LPRINT CHR$(27);"I";CHR$(6);
1280 FOR I=0 TO 681 STEP 25 :LPRINT CHR$(60) :NEXT I
1290 LPRINT
1300 LPRINT CHR$(9);
1310 FOR I=0 TO 781 STEP 25 :LPRINT CHR$(61) :NEXT I
1320 LPRINT CHR$(27);"I";CHR$(2)
1330 LPRINT "GERMANY";CHR$(9);
1340 LPRINT CHR$(27);"I";CHR$(6);
1350 FOR I=0 TO 412 STEP 25 :LPRINT CHR$(60) :NEXT I
1360 LPRINT
1370 LPRINT CHR$(9);
1380 FOR I=0 TO 488 STEP 25 :LPRINT CHR$(61) :NEXT I
1390 LPRINT CHR$(27);"I";CHR$(2)
```

```

1400 LPRINT "JAPAN";CHR$(9);
1410 LPRINT CHR$(27);"I";CHR$(6);
1420 FOR I=0 TO 347 STEP 25 :LPRINT CHR$(60); :NEXT I
1430 LPRINT
1440 LPRINT CHR$(9);
1450 FOR I=0 TO 493 STEP 25 :LPRINT CHR$(61); :NEXT I
1460 LPRINT CHR$(27);"I";CHR$(2)
1470 LPRINT CHR$(9);"+-";
1480 SCALE$="+-+-"
1490 FOR I=0 TO 2 :LPRINT SCALE$; :NEXT I
1500 LPRINT "+-+"
1510 LPRINT CHR$(9);"0 ";
1520 FOR I=1 TO 8
1530 LPRINT " ";I;
1540 NEXT I
1550 LPRINT CHR$(27);": ";
1560 LPRINT CHR$(27);"S";CHR$(0);
1570 LPRINT CHR$(9);"(100 UNITS/1000 PERSONS)"
1580 LPRINT CHR$(27);"T";
1590 LPRINT CHR$(27);"@ "
1600 END
2000 ' DATA
2010 ' Index Table Data
2020 DATA 137, 17, 25,227, 96, 4,242, 0, 96
2030 DATA 137, 92, 28,227, 96, 0, 80, 64, 96
2040 ' Dot Pattern Data
2050 ' Telephone symbol
2060 DATA 0, 0, 0, 7, 0, 0, 15, 0, 0, 31, 0, 0, 59, 0, 0
2070 DATA 59, 15,192, 56, 31,192,112, 63,192,112,127,192,112,255,192
2080 DATA 127,255,192,127,243,192,113,227,192,127,243,192,127,255,192
2090 DATA 112,255,192,112,127,192,112, 63,192, 56, 31,192, 59, 15,192
2100 DATA 59, 0, 0, 31, 0, 0, 15, 0, 0, 7, 0, 0, 0, 0, 0
2110 ' Car symbol
2120 DATA 0, 0, 0, 0, 30, 0, 0, 28, 0, 0, 60, 0, 0, 63, 0
2130 DATA 0,255,128, 0,255,192, 1,255,192, 3,255,192, 7,127,128
2140 DATA 14,127, 0, 28,124, 0, 56,124, 0,112,126, 0, 96,124, 0
2150 DATA 127,254, 0,127,252, 0, 96,124, 0, 96,127, 0, 96,127,128
2160 DATA 96,127,192,112,127,192,124,127,128, 63,127, 0, 15,124, 0
2170 DATA 3,124, 0, 0,254, 0, 0, 0, 0

```

MEMO

Chapter 6

MS-DOS AND YOUR PRINTER

When using your printer with an IBM PC, PC-XT, or PC-AT or compatible, you will probably be using PC-DOS or MS-DOS as an operating system. A number of software tricks may be useful here. This chapter is not, however, a substitute for the operating system manuals supplied with your computer.

To learn how to print files, etc. it is best to read the relevant parts of these manuals.

INSTALLING APPLICATION SOFTWARE WITH YOUR PRINTER

When installing application software, you may find that your printer is not specifically mentioned in the lists of printers given for installation. However, this should pose no problem. Read this section, and guidelines provided with your software on printer installation.

If you have your printer set up in standard mode, then choose an Epson LQ-860 as your printer to be selected.

If this is not mentioned, choose one of the following (in order of preference): Star XB24-10 Color, Star LC24-10, Epson LQ-850.

If you have your printer set up with the EDS switches to emulate an IBM Proprinter X24E, simply choose this from the list of printers available in the application software list.

If the IBM Proprinter X24E is not mentioned, select the Proprinter X24.

If your software package does not mention printers by name, but asks instead what features your printer is capable of, the most common questions are: "Can your printer perform a backspace?" and "Can it do a hardware form feed?". You should answer "Yes" to both these questions.

Other software packages may allow you to install specific features. Spreadsheet programs will often ask for the maximum number of columns to be printed. This is given below.

	CPI	Number of columns
Pica	10	80
Elite	12	96
Semi-condensed	15	120
Condensed pica	17.1	137
Condensed elite	20	160
Proportional		Variable

Sometimes the software installation will ask you for an initialization sequence to return to the default settings. The command for your printer is <ESC> @.

Make sure that the EDS switches are set for the correct printer emulation, and that you have selected the appropriate character set using the EDS switches.

If you are in doubt about the configuration of your application software, seek expert advice. Your software supplier will probably be your most qualified reference.

EMBEDDING PRINTER COMMANDS

Many word-processors and other software lack commands for changing font, printing double-size characters, or printing in color. Your printer therefore has commands that can be embedded in documents to control these functions without software help. The commands consist of a capital letter enclosed in double parentheses, followed by a digit:

Font:	((F))0	Roman
	((F))1	Sanscrif
	((F))2	Courier
	((F))3	Prestige
	((F))4	Script
Size:	((F))9	Draft
	((S))0	Standard size
	((S))1	Double width
	((S))2	Double height
Color:	((S))3	Double width and height
	((C))0	Black
	((C))1	Magenta
	((C))2	Cyan
	((C))3	Violet

((C))4	Yellow
((C))5	Orange
((C))6	Green

If you want to print a title in double-size Script, then change to regular-size fonts for other text, you can use these commands as follows:

File as seen on computer screen:

```
((F))4 ((S))3
Printer commands
((F))0 ((S))0
Font commands ((F))1can be ((F))2embedded
((F))3anywhere ((F))9in a document.
```

Printout:

Printer commands

Font commands can be embedded
anywhere in a document.

When you use these commands there are several points to note:

- The font ((F)) command is ignored if the **FONT** button was held down when power was switched on.
- The color ((C)) command is valid only with the color printer.
- A line consisting of command alone prints as a blank line.
- The software will not know that these are commands, so you cannot trust your software to give you the correct line width. The printed line may be considerably shorter than the line on the screen; the extra space being the space that was occupied by the commands.

One way to handle the last problem is to prepare your document without the commands, then insert them as a final step, with the margins released. The find, replace, and copy functions of word-processing software can be helpful here.

If you do not use these commands or the panel controls, the printer will print standard-size, draft characters.

The printer supports various commands in addition to the above, such as quadruple-size printing. Most of these other commands consist of the escape code followed by one or more letters or numbers.

If your software enables you to place the escape code in your files, or if you are able to define this as a user option during installation, you can also embed these escape sequences.

PROGRAMMING THE PRINTER WITH DOS COMMANDS

If your system includes the file PRINT.COM you can use the main DOS printing command. Simply type the word PRINT followed by the name of the file you want to print. To print a file named README.DOC, for example, type:

```
A>PRINT README.DOC
```

The computer may respond with the following message, asking which printer to use:

```
Name of list device [PRN]:
```

If your computer is connected to only one printer, press RETURN to select the default choice (PRN). Printing will begin and the A> prompt will reappear. You can execute other commands or programs while the file is being printed.

A single PRINT command can print two or more files. List the file names consecutively on the same line, or use wild-card characters (* and ?). Each file will be printed starting on a new page. The PRINT command also has control options. For example, you can terminate a printing job in progress with the /T option. (The printer may not stop printing immediately as there may be considerable data stored ahead in its buffer.) For the /T option, type:

```
A>PRINT/T
```

See your DOS manual for further information about the PRINT command. If your system does not include PRINT.COM, you can print files by using the PRN device name in COPY or TYPE commands such as the following:


```
A>COPY README.DOC PRN
A>TYPE README.DOC >PRN
```

COPY and TYPE do not permit you to execute other commands while the file is printing.

If you want a particular font, or print pitch, you can make these settings from the control panel before you start printing. See Chapter 2.

If you print from the DOS command level very often, it will be advantageous to create a printer setup file. Then instead of setting font etc. manually each time, you can complete the setup with a single command from your computer. For example, you can create a file containing printer commands to select letter quality, and select elite pitch with the Standard mode. You can find the commands in Chapter 4. We suggest the following:

- Letter quality <ESC> "x" "1"
- Elite pitch <ESC> "!" <1>

<ESC> "!" <1> is a powerful command that, in addition to selecting elite pitch, cancels unwanted features such as underlining which might be left from previous commands. The angle brackets around the <1> indicate character code 1, which is a control code, not the printable digit "1".

You may want to place additional commands in this file, such as left and right margins, line spacing and bottom margin commands. Or you may want to create a variety of setup files with a different set of commands in each.

To avoid excess line feeds, you should place the commands on one line in the setup file. You may or may not be able to generate a setup file with word-processing software; it depends on whether your software lets you enter control codes. If your system includes the file EDLIN.COM, however, you can easily create a setup file with the DOS line editor.

An appropriate name for this setup file would be LQELITE.DAT. To use the DOS line editor, type the command EDLIN LQELITE.DAT, then type the underlined parts of the following display. Press RETURN at the end of each line. Do not type the symbol "^". This symbol means to hold the CTRL key down while pressing the next key: for example, ^V means to type CTRL-V. ^C means to type CTRL-C, which indicates the end of the input.

```

A>EDLIN LQELITE.DAT
New file
*1
      1: *^V[X1^V[!^VA
      2: *^C
*E

```

^V indicates that the following character is a control code. ^V[enters the <ESC> code. <ESC> has character code 27, and “[” is the 27th character from A in the ASCII sequence. Similarly, ^VA enters the control code <1>. See your DOS manual if you need further information about EDLIN.

You can now set up the printer by sending it the file LQELITE.DAT. To avoid unnecessary logging of commands, switch hard-copy output off (by pressing CTRL-PRTS if hard copy is on). To print the file README.DOC in LQ elite type, give the following two commands:

```

A>COPY LQELITE.DAT PRN
A>PRINT README.DOC

```

For greater convenience you can make a batch file that will set up the printer and print any specified file with a single command. To create such a batch file with the name LQPRINT.BAT, type in the first four lines shown next. ^Z means to press the CTRL and Z keys simultaneously. To use this file to print README.DOC, type the fifth line.

```

A>COPY CON LQPRINT.BAT
COPY LQELITE.DAT PRN
PRINT %1
^Z
A>LQPRINT README.DOC

```

The first line above is a copy command from the CONsole screen to a file named LQPRINT.BAT. The next two lines are the contents of this file. The %1 is a dummy parameter: whatever file name you type after LQPRINT will be substituted for %1 and printed.

PROGRAMMING WITH BASIC

As an example of programming the printer on Microsoft BASIC, we have listed the program for the IBM-PC. This program runs in the printer's Standard mode, and the downloadable condition (EDS switch A-1 ON and A-2 OFF).

```
1000 ' Set control codes
1010 E$=CHR$(27) 'Escape code
1020 D$=E$+"x0" 'Draft quality
1030 L$=E$+"x1" 'Letter quality
1040 RM$=E$+"k0"+L$ 'Roman characters
1050 SA$=E$+"k1"+L$ 'Sanserif characters
1060 CO$=E$+"k2"+L$ 'Courier characters
1070 PR$=E$+"k3"+L$ 'Prestige characters
1080 SC$=E$+"k4"+L$ 'Script characters
1090 H$=CHR$(9) 'Horizontal tab
1100 PI$=E$+"P" 'Pica pitch
1110 ' Start printing
1120 WIDTH "LPT1:",255
1130 LPRINT E$;"D";CHR$(3);CHR$(24);CHR$(0) 'Set HT
1140 LPRINT RM$;"Resident fonts are:"
1150 LPRINT H$;D$;"Draft characters,";
1160 LPRINT H$;RM$;"Roman characters,"
1170 LPRINT H$;SA$;"Sanserif characters,";
1180 LPRINT H$;CO$;"Courier characters,"
1190 LPRINT H$;PR$;"Prestige characters,";
1200 LPRINT H$;SC$;"Script characters."
1210 LPRINT
1220 LPRINT RM$;"Print pitches are:"
1230 LPRINT H$;PI$;"Pica pitch (10 CPI),";
1240 LPRINT H$;E$;"M";"Elite pitch (12 CPI),";
1250 LPRINT H$;E$;"g";"Semi-condensed pitch (15 CPI),";
1260 LPRINT H$;PI$;
1270 LPRINT CHR$(15); 'Select condensed print
1280 LPRINT "Condensed pica pitch (17 CPI),";
1290 LPRINT H$;E$;"M";"Condensed elite pitch (20 CPI),";
1300 LPRINT CHR$(18) 'Cancel condensed print
1310 LPRINT H$;E$;"p1"; 'Select proportional spacing
1320 LPRINT PI$;"Normal proportional,";
1330 LPRINT H$;CHR$(15);"Condensed proportional.";
1340 LPRINT CHR$(18);
1350 LPRINT E$;"p0" 'Cancel proportional spacing
1360 LPRINT
1370 LPRINT H$;E$;"w1";"Double-height,";E$;"w0"
1380 LPRINT H$;E$;"W1";"Double width,";E$;"W0"
1390 LPRINT H$;CHR$(28);"E";CHR$(2);"Triple width,";
1400 LPRINT CHR$(28);"E";CHR$(0)
1410 LPRINT H$;E$;"h";CHR$(1);"Double-sized,"
1420 LPRINT H$;E$;"h";CHR$(2);"Quad-sized.";
1430 LPRINT E$;"h";CHR$(0)
1440 LPRINT :LPRINT
1450 LPRINT E$;"Q";CHR$(47) 'Set right margin
1460 LPRINT RM$;"Various line and character spacings:"
1470 LPRINT E$;"a1" 'Center text
1480 FOR I=1 TO 7
1490 LPRINT E$;"A";CHR$(I); 'Line spacing set
1500 LPRINT E$;" ";CHR$(I); 'Increase character space
1510 LPRINT "THE SPACINGS ARE CHANGED"
1520 NEXT I
1530 FOR I=7 TO 1 STEP -1
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1540 LPRINT ES;"A";CHR$(1); 'Line spacing set
1550 LPRINT ES;" ";CHR$(1); 'Increase character space
1560 LPRINT "THE SPACINGS ARE CHANGED"
1570 NEXT I
1580 LPRINT ES;"a0" 'Left justify
1590 LPRINT ES;"3";CHR$(30); 'Set 1/6" line spacing
1600 LPRINT ES;" ";CHR$(0); 'Normal character space
1610 LPRINT :LPRINT
1620 LPRINT RMS;"Other features:"
1630 LPRINT H$;ES;"q";CHR$(1);"OUTLINED";ES;"q";CHR$(0);", ";
1640 LPRINT H$;ES;"q";CHR$(2);"SHADOWED";ES;"q";CHR$(0);", ";
1650 LPRINT ES;"q";CHR$(3);"OUTLINED WITH SHADOWED";
1660 LPRINT ES;"q";CHR$(0);", "
1670 LPRINT H$;ES;"E";"Emphasized";ES;"F";", ";
1680 LPRINT ES;"G";"Double-strike";ES;"H";", ";
1690 LPRINT ES;"4";"Italics";ES;"S";", "
1700 LPRINT H$;ES;"-1";"Underlining";ES;"-0";", ";
1710 LPRINT ES;"(-";CHR$(3);CHR$(0);CHR$(1);CHR$(2);CHR$(2);
1720 LPRINT "Strike-through";
1730 LPRINT ES;"(-";CHR$(3);CHR$(0);CHR$(1);CHR$(2);CHR$(0);", ";
1740 LPRINT ES;"(-";CHR$(3);CHR$(0);CHR$(1);CHR$(3);CHR$(1);
1750 LPRINT "Overlining";
1760 LPRINT ES;"(-";CHR$(3);CHR$(0);CHR$(1);CHR$(3);CHR$(0);", "
1770 LPRINT H$;ES;"S0";"SUPERSCRIPT";ES;"T";" and ";
1780 LPRINT ES;"S1";"SUBSCRIPT";ES;"T";", "
1790 LPRINT H$;RMS;"Download characters:";
1800 SS$=ES+"S0" 'Superscript
1810 GOSUB 2520
1820 LPRINT ES;"%1"; 'Select download character
1830 FOR I=1 TO 5
1840 LPRINT CHR$(60); 'Print download character
1850 NEXT I
1860 LPRINT ES;"%0"; 'Select normal character
1870 LPRINT ES;"T"; 'Cancel superscript
1880 GOSUB 2650
1890 LPRINT ES;"%1"; 'Select download character
1900 FOR I=1 TO 5
1910 LPRINT CHR$(60); 'Print download character
1920 NEXT I
1930 LPRINT ES;"%0"; 'Select normal character
1940 SS$=ES+"S1" 'Subscript
1950 GOSUB 2520
1960 LPRINT ES;"%1"; 'Select download character
1970 FOR I=1 TO 5
1980 LPRINT CHR$(60); 'Print download character
1990 NEXT I
2000 LPRINT ES;"%0"; 'Select normal character
2010 LPRINT ES;"T"; 'Cancel superscript
2020 LPRINT H$;RMS;"Dot graphics:"
2030 RESTORE 3170
2040 LPRINT ES;"A";CHR$(8); 'Set 8/60" line spacing
2050 FOR I=1 TO 3
2060 LPRINT ES;"f0";CHR$(8);
2070 LPRINT ES;"*";CHR$(33);CHR$(240);CHR$(0);
2080 FOR J=1 TO 240*3
2090 READ DAT
2100 LPRINT CHR$(DAT);
2110 NEXT J
2120 LPRINT
2130 NEXT I
2140 LPRINT ES;"@" 'Initialize printer
2150 END
2500 '
2510 ' SUBROUTINES
2520 ' Define super/subscript download character

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2530 LPRINT SS$;                               'Select super/subscript
2540 LPRINT E$;"&";CHR$(0);CHR$(60);CHR$(60);
2550 RESTORE 3010
2560 READ LS :LPRINT CHR$(LS);
2570 READ CW :LPRINT CHR$(CW);
2580 READ RS :LPRINT CHR$(RS);
2590 FOR M=1 TO CW*2
2600 READ MM
2610 LPRINT CHR$(MM);
2620 NEXT M
2630 RETURN
2640 '
2650 ' Define LQ pica download character
2660 LPRINT C$;
2670 LPRINT E$;"&";CHR$(0);CHR$(60);CHR$(60);
2680 RESTORE 3070
2690 READ LS :LPRINT CHR$(LS);
2700 READ CW :LPRINT CHR$(CW);
2710 READ RS :LPRINT CHR$(RS);
2720 FOR M=1 TO CW*3
2730 READ MM
2740 LPRINT CHR$(MM);
2750 NEXT M
2760 RETURN
3000 ' DATA
3010 ' Super/subscript download character data
3020 DATA 9, 19, 8
3030 DATA 12, 0, 16, 0, 44, 0, 80,120, 32,128, 95,120, 32,128
3040 DATA 95,120, 32,128, 65,120, 32,128, 95,120, 32,128, 95,120
3050 DATA 32,128, 80,120, 44, 0, 16, 0, 12, 0
3060 '
3070 ' LQ pica download characer data
3080 DATA 3, 31, 2
3090 DATA 0, 0, 0, 7, 0, 0, 8, 0, 0, 23, 0, 0, 40, 0, 0
3100 DATA 19, 15,192, 40, 16, 0, 80, 47,192, 32, 80, 0, 80,175,192
3110 DATA 47, 80, 0, 80,175,192, 47, 80, 0, 80,163,192, 33, 64, 0
3120 DATA 80,163,192, 33, 64, 0, 80,163,192, 47, 80, 0, 80,175,192
3130 DATA 47, 80, 0, 80,175,192, 32, 80, 0, 80, 47,192, 40, 16, 0
3140 DATA 19, 15,192, 40, 0, 0, 23, 0, 0, 8, 0, 0, 7, 0, 0
3150 DATA 0, 0, 0
3160 '
3170 ' Dot graphics data
3180 ' 1st Line
3190 DATA 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
3200 DATA 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
3210 DATA 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
3220 DATA 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
3230 DATA 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 127,255, 0,255,255
3240 DATA 1,255,255, 3, 0, 0, 7, 0, 0, 7, 0, 0, 15, 0, 0
3250 DATA 31, 0, 0, 31, 0, 0, 31, 0, 0, 31, 0, 0, 31, 0, 0, 0
3260 DATA 31, 0, 0, 31, 0, 0, 31, 0, 0, 31, 0, 0, 31, 0, 0, 0
3270 DATA 31, 0, 0, 31, 0, 0, 31, 0, 0, 31, 0, 0, 31, 0, 0, 0
3280 DATA 31, 0, 0, 31,128, 0, 31,224, 0, 31,248, 0, 31,255, 0
3290 DATA 31,255,224, 15,255,248, 7,255,255, 1,255,255, 0,127,255
3300 DATA 0, 7,255, 0, 0,255, 0, 0, 63, 0, 0, 63, 0, 0, 0,248
3310 DATA 0, 3,192, 0, 63, 0, 0,248, 0, 1,128, 0, 3, 0, 0
3320 DATA 7, 0, 0, 15, 0, 0, 15, 0, 0, 31, 0, 0, 31, 0, 0, 0
3330 DATA 31, 0, 0, 31, 0, 0, 31, 0, 0, 31, 0, 0, 31, 0, 0, 0
3340 DATA 31, 0, 0, 31, 0, 0, 31, 0, 0, 31, 0, 0, 31, 0, 0, 0
3350 DATA 31, 0, 0, 31, 0, 0, 31, 0, 0, 31, 0, 0, 31, 0, 0, 0
3360 DATA 31,255,255, 31,255,255, 31,255,255, 31,255,255, 31,255,255
3370 DATA 31,255,255, 15,255,255, 0, 0, 0, 0, 0, 0, 0, 0, 0
3380 DATA 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
3390 DATA 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
3400 DATA 0, 0, 0, 0, 0, 60, 0, 3,255, 0, 11,195, 0, 28, 0

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3410 DATA	0, 12, 0, 0, 96, 0, 0, 192, 0, 0, 192, 0, 1, 128, 0
3420 DATA	3, 0, 0, 3, 0, 0, 7, 0, 0, 7, 0, 0, 15, 0, 0
3430 DATA	15, 0, 0, 31, 0, 0, 31, 0, 0, 31, 0, 0, 31, 0, 15
3440 DATA	31, 0, 31, 31, 0, 31, 31, 0, 31, 31, 0, 31, 31, 0, 31
3450 DATA	31, 0, 31, 31, 0, 31, 31, 0, 31, 31, 0, 31, 31, 0, 31
3460 DATA	31, 0, 31, 31, 0, 31, 31, 0, 31, 31, 0, 31, 31, 0, 31
3470 DATA	31, 0, 31, 31, 0, 31, 31, 0, 31, 31, 0, 31, 31, 0, 63
3480 DATA	31, 255, 255, 31, 255, 255, 31, 255, 247, 31, 255, 231, 31, 255, 199
3490 DATA	15, 255, 135, 7, 255, 7, 0, 0, 3, 0, 0, 1, 0, 0, 0
3500 DATA	0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
3510 DATA	0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 254, 0
3520 DATA	1, 255, 240, 3, 135, 255, 7, 0, 63, 15, 0, 0, 15, 0, 0
3530 DATA	31, 0, 0, 31, 0, 0, 31, 0, 0, 31, 0, 0, 31, 0, 0
3540 DATA	31, 0, 0, 31, 0, 0, 31, 0, 0, 31, 128, 0, 31, 128, 0
3550 DATA	31, 192, 0, 31, 255, 0, 31, 255, 255, 31, 255, 255, 31, 255, 255
3560 DATA	31, 255, 255, 15, 255, 255, 7, 255, 255, 0, 255, 240, 1, 254, 0
3570 DATA	1, 240, 0, 3, 128, 0, 7, 0, 0, 15, 0, 0, 31, 0, 0
3580 DATA	31, 0, 0, 31, 0, 0, 31, 0, 0, 31, 0, 0, 31, 0, 0
3590 DATA	31, 0, 0, 31, 0, 0, 31, 0, 0, 31, 128, 0, 31, 128, 0
3600 DATA	31, 192, 0, 31, 240, 0, 31, 255, 0, 31, 255, 240, 31, 255, 255
3610 DATA	31, 255, 255, 7, 255, 255, 0, 255, 255, 0, 255, 255, 1, 255, 240
3620 DATA	3, 192, 0, 7, 128, 0, 15, 0, 0, 31, 0, 0, 31, 0, 0
3630 DATA	31, 0, 0, 31, 0, 0, 31, 0, 0, 31, 0, 0, 31, 0, 0
3640 DATA	31, 0, 0, 31, 0, 0, 31, 0, 0, 31, 0, 15, 31, 135, 255
3650 DATA	31, 255, 255, 31, 255, 255, 31, 255, 255, 31, 255, 255, 31, 255, 240
3660 DATA	15, 252, 0, 47, 128, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
3670	2nd Line
3680 DATA	0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
3690 DATA	0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
3700 DATA	0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
3710 DATA	0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
3720 DATA	0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 255, 255, 255, 255, 255
3730 DATA	255, 255, 255, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
3740 DATA	0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
3750 DATA	0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
3760 DATA	255, 255, 255, 31, 255, 255, 7, 255, 255, 0, 255, 255, 0, 31, 255
3770 DATA	0, 3, 255, 0, 0, 255, 0, 0, 31, 0, 0, 7, 0, 0, 0
3780 DATA	0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 224, 0, 0, 252, 0
3790 DATA	254, 0, 0, 248, 0, 0, 192, 0, 0, 0, 0, 0, 0, 0, 0
3800 DATA	0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 63
3810 DATA	0, 1, 255, 0, 15, 255, 0, 127, 255, 1, 255, 255, 15, 255, 255
3820 DATA	255, 255, 255, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
3830 DATA	0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
3840 DATA	0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
3850 DATA	255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255, 255
3860 DATA	255, 255, 255, 255, 255, 255, 0, 0, 0, 0, 0, 0, 0, 0, 0
3870 DATA	0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
3880 DATA	0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
3890 DATA	0, 7, 224, 0, 63, 252, 128, 120, 31, 192, 224, 3, 97, 128, 0
3900 DATA	59, 0, 0, 30, 0, 0, 14, 0, 0, 12, 0, 0, 12, 0, 0
3910 DATA	0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
3920 DATA	0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 63, 0
3930 DATA	128, 127, 128, 128, 127, 128, 128, 127, 128, 128, 127, 128, 128, 128, 255, 128
3940 DATA	223, 255, 128, 255, 255, 128, 255, 255, 0, 224, 0, 0, 224, 0, 0
3950 DATA	224, 0, 0, 224, 0, 0, 224, 0, 0, 224, 0, 0, 224, 0, 0
3960 DATA	224, 0, 0, 224, 0, 0, 224, 0, 0, 224, 0, 0, 224, 0, 0
3970 DATA	224, 0, 1, 224, 0, 3, 240, 0, 15, 255, 255, 255, 255, 255, 254
3980 DATA	255, 255, 254, 255, 255, 252, 255, 255, 248, 255, 255, 224, 255, 255, 128
3990 DATA	0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
4000 DATA	0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
4010 DATA	0, 0, 0, 0, 0, 0, 240, 0, 0, 255, 0, 0, 15, 248, 0
4020 DATA	0, 63, 0, 0, 3, 248, 0, 0, 31, 0, 0, 3, 0, 0, 0
4030 DATA	0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
4040 DATA	0, 0, 0, 0, 0, 0, 0, 0, 0, 255, 0, 0, 255, 224, 0
4050 DATA	255, 128, 0, 240, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0

4060 DATA	0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 7, 0, 0, 127
4070 DATA	0, 7,255, 0, 63,255, 1,255,255, 31,255,255, 3,255,255
4080 DATA	0,127,254, 0, 7,252, 0, 0,127, 0, 0, 7, 0, 0, 0
4090 DATA	0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,128, 0, 0
4100 DATA	248, 0, 0,255, 0, 0,255,192, 0,128, 0, 0, 0, 0, 0
4110 DATA	0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
4120 DATA	0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 1, 0, 0, 63
4130 DATA	0, 31,255, 7,255,255,255,255,255,255,255,255,255,254
4140 DATA	255,255,192,255,248, 0,255, 0, 0, 0, 0, 0, 0, 0
4150 DATA	0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
4160	3rd Line
4170 DATA	0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 24, 0, 0, 56
4180 DATA	0, 0, 56, 0, 0,120, 0, 0,248, 0, 1,248, 0, 1,248
4190 DATA	0, 3,248, 0, 7,248, 0, 7,248, 0, 15,248, 0, 15,248
4200 DATA	0, 31,248, 0, 63,248, 0,127,248, 0,127,248, 0,255,248
4210 DATA	0,255,248, 1,255,248, 3,255,248,199,255,248,247,255,248
4220 DATA	255,255,248, 31,255,240, 15,255,240, 15,255,224, 15,255,224
4230 DATA	15,255,192, 15,255,192, 15,255,192, 15,255,128, 15,255,128
4240 DATA	15,255, 0, 15,255, 0, 15,255, 0, 15,254, 0, 15,254, 0
4250 DATA	252,252, 24,252,252, 56,249,252,248,249,252,248,243,255,248
4260 DATA	227,255,248,231,255,248,199,255,248,231,255,248,255,255,248
4270 DATA	31,255,248, 15,255,248, 15,255,248, 15,255,248, 15,255,248
4280 DATA	15,255,248, 15,255,248, 15,255,248, 15,255,248, 15,207,248
4290 DATA	31, 15,248, 30, 31,248,252, 63,248,248,127,248,240,127,240
4300 DATA	224,255,240,225,255,240,195,255,224,199,255,192,247,255,128
4310 DATA	255,255,128, 63,255, 0, 31,254, 0, 15,254, 0, 15,252, 0
4320 DATA	15,248, 0, 15,240, 0, 15,240, 0, 15,224, 0, 15,192, 0
4330 DATA	15,192, 0, 15,128, 0, 15, 0, 0, 31, 0, 0, 62, 0, 0
4340 DATA	252, 0, 0,252, 0, 0,248, 0, 0,240, 0,224,240, 0,240
4350 DATA	224, 1,240,192, 1,248, 0, 3,248, 0, 3,248, 0, 3,248
4360 DATA	0, 7,248, 0, 7,248, 0, 63,248, 0,127,248, 0,127,248
4370 DATA	0,255,248, 0,255,248, 1,255,248, 1,255,248, 1,255,248
4380 DATA	3,255,248, 3,255,248, 3,255,248,131,255,248,199,255,248
4390 DATA	103,255,248,119,255,248,55,255,248,63,255,248,31,255,248
4400 DATA	31,255,248,31,255,248,15,255,248,15,255,248,15,255,248
4410 DATA	15,255,248,15,255,248,15,255,248,15,255,248,15,255,240
4420 DATA	15,255,240,15,255,224,15,255,192,15,255,192,15,254,0
4430 DATA	15,254,0,15,254,0,15,254,0,15,254,0,15,254,0
4440 DATA	15,252,0,15,252,0,15,248,0,15,240,0,31,240,0
4450 DATA	31,224,0,31,192,0,55,128,0,48,0,8,96,0,24
4460 DATA	192,0,24,128,0,56,0,0,56,0,0,120,0,0,120
4470 DATA	0,0,248,0,0,248,0,1,248,0,1,248,0,3,248
4480 DATA	0,3,248,0,7,248,0,7,248,0,15,248,0,15,248
4490 DATA	0,31,248,0,31,240,0,63,240,0,63,224,0,127,224
4500 DATA	0,127,192,0,255,192,0,255,128,1,255,128,1,255,24
4510 DATA	3,255,56,3,255,248,231,255,248,255,255,248,31,255,248
4520 DATA	15,255,248,15,255,248,15,255,248,15,255,248,15,255,248
4530 DATA	15,255,248,15,255,248,15,255,248,15,255,248,15,255,240
4540 DATA	15,255,240,15,255,240,15,255,224,15,255,224,15,255,192
4550 DATA	15,255,192,31,255,128,254,127,128,252,127,24,248,255,56
4560 DATA	248,255,248,240,255,248,225,255,248,193,255,248,131,255,248
4570 DATA	3,255,248,7,255,248,135,255,248,231,255,248,255,255,248
4580 DATA	63,255,248,31,255,248,15,255,248,15,255,248,15,255,240
4590 DATA	15,255,240,15,255,224,15,255,192,15,255,128,15,255,0
4600 DATA	15,254,0,15,252,0,15,248,0,15,240,0,15,224,0
4610 DATA	15,192,0,15,0,0,62,0,0,252,0,0,248,0,0,0
4620 DATA	240,0,0,224,0,0,192,0,0,128,0,0,0,0,0,0
4630 DATA	0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
4640 DATA	0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0

How the program works

This program begins by assigning a number of printer commands to BASIC string variables (lines 1000 to 1100). You can find most of these commands near the beginning of chapter 4.

The WIDTH "LPT1:" 255 statement in line 1120 means infinite line width. It prevents the IBM-PC from inserting unwanted carriage returns and line feeds in graphics data.

Actual printing begins in line 1130. Using the preassigned commands, the program prints samples of its different fonts, followed by samples of the print pitches, then some double and quadruple-sized printing.

Next comes the central attraction of the program: a line of text printed fourteen times in expanding and contracting loops to give a barrel effect. The work is done by four printer commands: a command setting the right margin (line 1450); a centering command (line 1470); a command to vary the line spacing (lines 1490 and 1540); and a command to micro-adjust the space between characters (lines 1500 and 1550).

Next the program returns to normal spacing and gives a demonstration of the printer's word-processing abilities: italic printing, bold printing, underlining, subscripts, etc.

The row of telephone symbols in the next printed line is created by downloading two new character patterns, which are printed in place of the character "<" (character 60). Details can be found in Chapter 5.

The final part of the program uses dot graphics to print an "M&W" logo. The dot pattern of the logo was originally laid out on graph paper, then converted to the data in lines 3180 to 4640 with the help of a calculator. Each number represents eight vertical dots. (See "Graphics commands" in Chapter 4 for details.)

The pattern is printed in three rows, each row is twenty-four dots high and 240 dots wide. Line 2040 sets the line spacing to 8/60 inch so that the rows will connect vertically. The loop in lines 2050 to 2130 does the printing in three passes of the print head.

Resident fonts are:

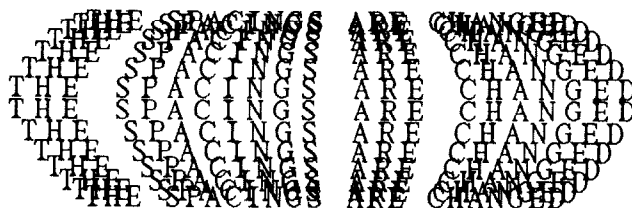
Draft characters, Roman characters,
Sanserif characters, Courier characters,
Prestige characters, *Script characters.*

Print pitches are:

Pica pitch (10 CPI), Elite pitch (12 CPI),
Semi-condensed pitch (15 CPI), Condensed pica pitch (17 CPI),
Condensed elite pitch (20 CPI),
Normal proportional, Condensed proportional.

Double-height,
Double width,
Triple width,
Double-sized,
Quad-sized.

Various line and character spacings:



Other features:

OUTLINED, SHADOWED, OUTLINED WITH SHADOWED,
Emphasized, Double-strike, *Italics,*
Underlining, ~~Strike-through~~, Overlining,
SUPERSCRIPT and SUBSCRIPT,
Download characters: *****
Dot graphics:



MEMO

Chapter 7 **TROUBLESHOOTING AND MAINTENANCE**

The following section on troubleshooting and maintenance is intended only as a brief guide. Remember that your printer is a highly sophisticated electronic device, which also contains high voltage inside. For that reason, only carry out those operations that are described in this chapter.

CAUTION: Any attempt to carry out operations other than those described here may result in electric shock and/or damage to the printer. When carrying out any repairs or maintenance, always follow the instructions carefully.

TROUBLESHOOTING

Your printer is a reliable piece of precision machinery, which should not cause you any trouble, provided that it is used and treated sensibly. However, if you do experience a minor problem, the few tips below should help you avoid having to make an unnecessary service call. The following table gives you ideas on where to look in this section if you experience problems:

Region of fault	Description
Power supply	Power is not being supplied to the printer
Printing	The printer does not print, or stops printing
	The print is faint or uneven
	Dots are missing in characters or graphics
	While using application software, fonts or characters cannot be printed
	The printout is not what is expected when running a program
Paper feeding	Single sheets do not feed properly (without ASF)
	Continuous paper does not feed properly with the tractor feed
	The ASF is not operating or is not feeding paper properly
	Paper park (switching between continuous paper and cut sheets) is not working properly
	Text is being printed all on one line, or with extra blank lines
	Page length and margin settings are not what is expected.

Remember - it is better not to attempt operations or repairs above your level of competence. Otherwise, you run the risk of damaging the printer.

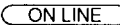
Power supply

If the POWER indicator does not illuminate, check the following:

Check	Possible remedy
Is the power cable properly plugged into the electrical outlet?	Turn off the printer, make certain that the power cable is securely connected, and then turn the printer back on.
Is power being supplied to the outlet?	Turn off the printer and unplug it. Try out another appliance of the outlet to determine if electricity is being supplied to that outlet.
Is the printer voltage correct?	Check the bottom panel of your printer to verify that the outlet voltage corresponds to the voltage required by the printer. If they do not match, DO NOT try to operate the printer. Contact your supplier.

Printing

If your printer does not print, or suddenly stops printing, check the following:

Check	Possible remedy
Is the interface cable connected securely?	Check both ends of the cable - printer and computer to make sure that the connector is firmly in position.
Is the ON LINE indicator illuminated?	If it is not, press the  button to set the printer on-line.
Is the POWER indicator flashing?	If it is, the paper has run out. Load more paper.
Is the printer beeping intermittently?	The release lever has moved while the paper is in printing position. Move the release lever to the original position.
Is the paper caught up internally?	Turn off the power, remove the jammed paper, replace, turn on the printer, and continue printing. Make sure that the leading edge of the paper is smooth and increased.
Is the ribbon caught up around the print head?	Turn off the power, remove the ribbon, retension it, and replace it. This problem occurs most frequently with a worn ribbon, so you may need to replace the ribbon.
Is the software you are using properly installed for your printer?	Check the installation settings in your software, and re-install if necessary.
Can the printer perform self-test operations?	Turn the printer off, and turn it on again, holding down one of the buttons to perform a self-test. If these do not work, contact your dealer.

If the print is faint, or uneven, check the following:

Check	Possible remedy
Is the ribbon properly installed?	Check and reinstall if necessary.
Is the ribbon worn out?	The ribbon has a long life, but will eventually need replacing. Fit a new ribbon cartridge if necessary.

If dots are missing in the printing, check the following:

Check	Possible remedy
Are dots missing at random in the printing?	The ribbon has become slack, causing it to get caught up. Stop printing, remove the ribbon cartridge, retension and replace it.
Is a line of dots missing consistently throughout the printing?	The print head is damaged. Stop printing, and contact your supplier for a new print head.

If your application software cannot print the fonts or characters selected, check the following:



Check	Possible remedy
Is your application software properly installed?	Check the software installation, and re-install the software if necessary.
Are fonts not being selected properly?	Check the software installation, and insert the commands necessary for font changes into the software.
Are characters other than those expected being printed?	Either you are using the wrong International Character Set (reset with EDS switches or software commands), or you have the wrong character set selected (for example if characters other than IBM block graphic characters are being printed). Correct this with EDS switches or the appropriate software sequences.

If the printout is not what is expected:



Check	Possible remedy
Is the printer installed correctly?	Your software may think that it is driving a different emulation to the one actually set. Check the EDS settings to make sure you have the right emulation.
Is the printer not printing anything that you are expecting?	Use the Hex Dump mode to analyze the output from the computer to the printer. This will enable you to determine that the right escape sequences, etc are being transmitted.

Paper feeding

If cut sheet paper (without the ASF) is not feeding smoothly, check the following:


Check	Possible remedy
Is the paper release lever pushed back (to the  position)?	Set the release lever to the  position.
Is the paper guide in place and vertical?	The paper guide should be in place vertically for cut sheets to feed smoothly.
Are the left and right guides too close together?	If the left and right guides are too close together, the paper will not feed smoothly. Move them a little further apart to allow the paper to feed freely.
Is the ASF selected with the EDS settings?	If it is, then deselect it.
Are you trying to feed paper using the front panel buttons while the ONLINE indicator is illuminated?	You can only feed paper in this way when the printer is off-line. Set the printer off-line and then feed paper.
Is the paper too thick?	There are limits to the thickness of paper that can be fed in this way. Try using thinner paper.
Are forms jamming between printing surface and the platen?	Clean the surface of the platen roller with a cloth barely dampened with a little alcohol.

If fanfold (continuous) paper is not being fed correctly using the tractor feed, check the following:



Check	Possible remedy
Is the paper release lever pushed to the  position?	Make sure the release lever is pushed to the  position.
Is the paper guide in the vertical position?	When using the tractor feed, the paper guide should be horizontal.
Are the holes on each side of the paper aligned with regard to each other in the tractor units?	If the two sides of the paper are out of alignment, realign them so that the tractor holes match up.
Are the tractor units too close or too far apart?	Misalignment of the tractor units, making the paper too loose or too tight, will prevent a smooth paper feed.
Are the tractor units locked in position and the covers closed?	Correct this if necessary.

Check	Possible remedy
Is the paper feeding freely into the printer?	The paper should not be too far from the printer (less than 1 meter/ 3 feet), and there should be no cables or other obstacles obstructing its path. The paper should also be feeding straight into the printer, as an angled feed may cause jams and blockages.
Are you trying to feed paper using the front panel buttons while the ONLINE indicator is illuminated?	You can only feed paper in this way when the printer is off-line. Set the printer off-line and then feed paper.
Is the paper too thick?	There are limits to the thickness of paper that can be fed in this way. Try using thinner paper.

If the ASF is not operating or is not feeding paper correctly, check the following:

Check	Possible remedy
Has the ASF option been selected with the EDS switch?	Select this option.
Is the release lever set to the  position?	The release lever should be set to the single-sheet position.
Is the ASF correctly mounted?	Make sure that the ASF is properly seated on the printer.
Is paper caught up near the print head?	Stop printing, remove the jammed sheet (you may have to remove the ASF for this), and continue.
Are the left and right guides too close together?	If the left and right guides are too close together, the paper will not feed smoothly. Move them a little further apart to allow the paper to feed freely.
Is there too much paper in the paper feed hopper or stacker?	The ASF's paper feed hopper and stacker can hold 50 sheets each. Make sure that there is no more paper than this in either the hopper or stacker.
Was the paper fanned before being fed into the ASF?	If this is not done, paper jams may occur. Remove the stack of paper from the ASF and fan it before reinserting.
Has the paper been used already or is it creased?	Only new, uncreased paper should be used with the ASF.
Are you trying to feed paper using the front panel buttons while the ONLINE indicator is illuminated?	You can only feed paper in this way when the printer is off-line. Set the printer off-line and then feed paper.
Is the paper too thick or too thin?	There are limits to the thickness of paper that can be fed in this way. Try using different paper.

If the paper park function does not appear to be working correctly, check the following:

Check	Possible remedy
Is the paper release lever in the  position?	The paper release lever must be set to the  position after the fanfold paper has been parked.
Has the fanfold paper been properly parked?	Make sure that the POWER indicator comes on flashing after the fanfold paper has been parked.

If text is being printed all on one line, or with extra blank lines, check the following:

Check	Possible remedy
Is the text all on the same line?	Carriage returns are not being expanded to <CR> + <LF> pairs. Check the EDS setting and correct.
Is text being printed with extra blank lines?	Two line feeds are being printed. Make your software prints just a carriage return or (if this is not possible), set the AUTO LF to OFF with the EDS setting.

If the page length and margins are not what is expected, check the following:

Check	Possible remedy
Is the printing starting too high or too low on the page?	Use the Micro Feed function to adjust the print position relative to the page.
Does the printer's page length not match the physical page length?	Use the EDS switches to set up the correct page length, or use software commands to do it.

MAINTENANCE

Essentially, your printer is a robust piece of equipment, but should be treated with a modicum of care in order to avoid malfunctions. For example:

- Keep your printer in a “comfortable” environment. Roughly speaking, if you are comfortable, then the environment is suitable for your printer, too (see Chapter 1).
- Do not subject the printer to physical shocks or excessive vibration.
- Avoid extremely dusty environments. Dust is the enemy of all precision mechanical devices.
- To clean the exterior of the printer, use a cloth barely dampened with either water with a little detergent or a little alcohol, but do not allow any liquid to fall inside the printer.
- The interior of the printer may be cleaned with a small vacuum cleaner or a compressed-air aerosol (sold for this purpose). When performing this operation, be sure not to bend or damage any cable connections or electronic components.

REPLACING THE PRINT HEAD

This is not a job which you will need to do very often. The print head has been designed to last for about 200 million dots. In normal everyday use, this translates to years of life. However, if the print quality is faint, even after you have changed the ribbon or you have adjusted the gap between the print head and the platen (see Chapter 1), the print head may need replacement.

Only use a replacement print head as recommended by your supplier.

1. Turn OFF the printer, and unplug the power cord.
2. Remove the top cover and ribbon cartridge.
3. If the printer has been in operation immediately before this operation, the print head will be hot. Allow time for the print head to cool before attempting to work on it.
4. Move the print head carriage toward the right until you can see the connector cover. Remove the connector cover and pull the cables free from the connectors.
5. Unscrew the two screws that hold the print head in place and set them aside.

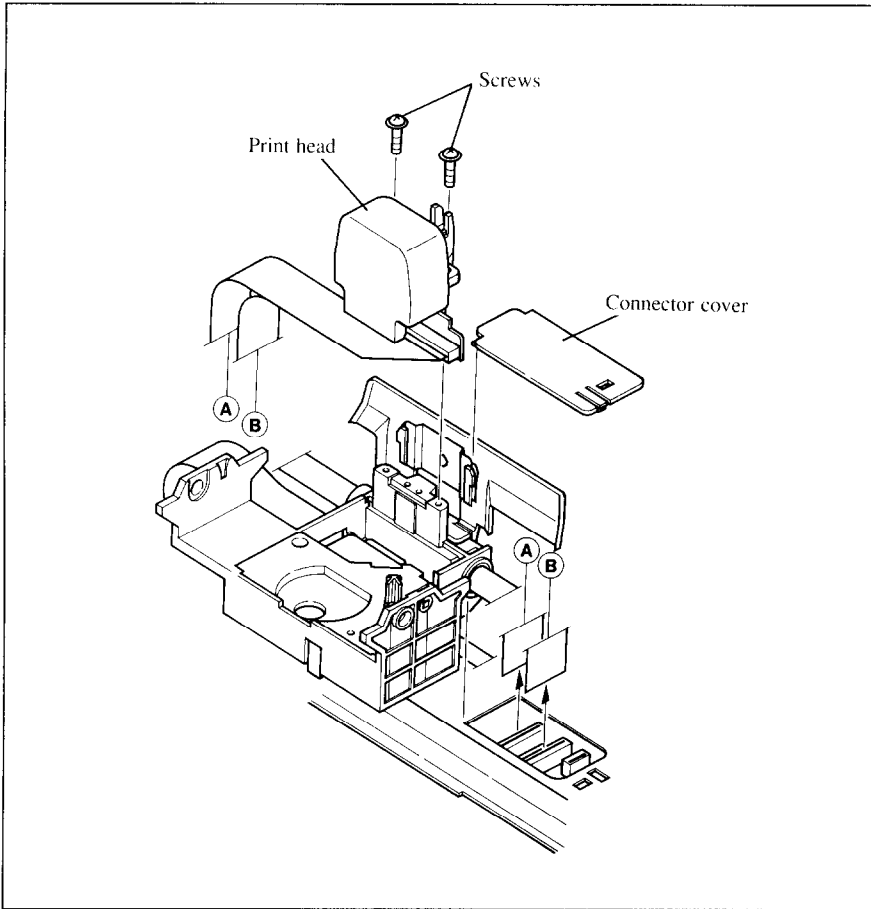


Figure 7-1. Replacing the print head

6. Disengage the cable from the tabs holding it down, then remove the print head.
7. Pass the cable of the new print head through the tabs.
8. Place the new print head on its support, seating it on the two pins.
9. Fasten the print head down with the two screws.
10. Replace the connector cover sliding it to the left until it locks into place.
11. Replace the ribbon cartridge and top cover, and plug the power cord back in.

Chapter 8

SPECIFICATIONS

Printing system	Serial Impact Dot-matrix	
Printing speed	Pica	Elite
High-Speed Draft	222cps	—
Draft	167cps	200cps
Letter Quality	55.5cps	66.7cps
Print direction	Bidirectional, logic-seeking	
(Text and Graphics)	Unidirectional, logic-seeking (selectable)	
Print head	24pins	
	Life:200 million dots	
Line spacing	1/6, 1/8, <i>n</i> /60, <i>n</i> /72, <i>n</i> /180, <i>n</i> /216, <i>n</i> /360 inches	
Characters	ASCII	96
	International	16 sets (*)
	IBM special	111
	IBM block graphic	50
	IBM code page	6 sets (**)
	Download	255

* USA, France, Germany, England, Denmark I, Sweden, Italy, Spain I, Japan, Norway, Denmark II, Spain II, Latin America, Korea, Irish, Legal

** #437 (USA), #850 (Multi-Lingual), #860 (Portuguese), #861 (Icelandic), #863 (Canadian French), #865 (Nordic)

Number of columns	CPI	
Pica	10	80
Elite	12	96
Semi-condensed	15	120
Condensed pica	17.1	137
Condensed elite	20	160
Proportional		Variable

Character dot matrix	Draft	LQ
Pica	24 × 9	24 × 35
Elite	24 × 9	24 × 29
Semi-condensed	16 × 7	16 × 23
Condensed pica	24 × 9	24 × 18
Condensed elite	24 × 9	24 × 15
Super/subscript	16 × 7	16 × 23
Proportional	–	24 × <i>n</i>
Super/subscript proportional	–	16 × <i>n</i>

Bit image dot-matrix	DPI	
8-bit normal	60	8 × 480
8-bit double	120	8 × 960
8-bit high-speed double*	120	8 × 960
8-bit quadruple*	240	8 × 1920
8-bit CRT I	80	8 × 640
8-bit CRT II	90	8 × 720
24-bit normal	60	24 × 480
24-bit double	120	24 × 960
24-bit CRT III	90	24 × 720
24-bit Triple	180	24 × 1440
24-bit hex*	360	24 × 2880

* It is impossible to print adjacent dots in the mode marked with an asterisk (*).

Paper feed

Friction and rear (push tractor) or bottom (pull tractor)
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Paper feed speed 3.4 inches/second max

Paper width	Cut sheet	4"-11.7"
	Fanfold (continuous)	4"-10"
Copies	Original + 4 copies (Max.)	
Maximum buffer size		
	Without Download	7KB (30KB for Color printer)
	With Download	1 line
Emulations	Epson LQ-860 IBM Proprinter X24E	
Interface	Centronics parallel (standard) RS-232C serial (option)	
Ribbon type	On-carriage, dedicated Monochrome (Black only) Color (Black, magenta, cyan, violet, yellow, orange, green)	
Ribbon life		
	Monochrome (Z24)	2 million characters (draft pica)
	Monochrome (LZ24)	4 million characters (draft pica)
	Color (X24CL)	1 million characters (draft pica)
Dimensions	463(w) × 356(d) × 156(h) mm 18.2(w) × 14.0(d) × 6.1(h) in	
Weight	6.6kg (14.6lb)	
Power supply	120VAC, 220VAC, 240VAC, 50/60Hz (varies according to the country of purchase)	
Options	Automatic sheet feeder (SF-10DQ) Serial-Parallel converter (SPC-8K) Roll paper holder (RH-10Z) Font cartridge (FC-1Z, FC-2Z, FC-3Z, FC-4Z) RAM cartridge (RC-32Z)	

The following describes the pinout of the parallel (Centronics-type) interface connector (signals which are low when active are overlined):

Pin	Name	Function
1	<u>STROBE</u>	Goes from high to low (for $\geq 0.5\mu\text{s}$) when active
2	DATA0	High when active
3	DATA1	High when active
4	DATA2	High when active
5	DATA3	High when active
6	DATA4	High when active
7	DATA5	High when active
8	DATA6	High when active
9	DATA7	High when active
10	<u>ACK</u>	5 μs low pulse acknowledges receipt of data
11	BUSY	Low when printer ready to receive data
12	PAPER	High when paper out. Can be disabled with EDS setting
13	SELECT	High when printer is on-line
14, 15	N/C	
16	SIGNAL GND	Signal ground
17	CHASSIS	Chassis ground (isolated from signal ground)
18	+5V	+5V DC output from printer
19~30	GND	Twisted pair ground return
31	<u>RESET</u>	When this input signal is low, printer is reset
32	<u>ERROR</u>	Outputs low when printer cannot continue, due to an error
33	EXT GND	External ground
34, 35	N/C	
36	<u>SELECT IN</u>	Always high

Chapter 9

CHARACTER SETS

The following tables show the standard and IBM character sets.

The decimal character code of each character is shown in an inset to the lower right of the character.

The hexadecimal code can be found by reading the entries at the top and left edges of the table. For example, the character "A" is in column 4 and row 1, so its hexadecimal character code is 41. This is equivalent ($4 \times 16 + 1 = 65$) to decimal 65, the number in the inset.

Control codes recognized by this printer are indicated by abbreviations inside pointed brackets < >.

<Sample>

	0	1	2	3	4	5	6	7
0	<NUL> 0	<DLE> 16	0 32	@ 48	P 64	` 80	p 96	
1	<DC1> 1	! 17	1 33	A 49	Q 65	a 81	q 97	
2	<DC2> 2	" 18	2 34	B 50	R 66	b 82	r 98	
3	<DC3> 3	# 19	3 35	C 51	S 67	~ 83	s 99	

Character

Hexadecimal value (high order)

Control code

Decimal value

Hexadecimal value (low order)

STANDARD CHARACTER SET #1

	0	1	2	3	4	5	6	7
0	<NUL> 0	<DLE> 16		0 48	@ 64	P 80	` 96	p 112
1		<DC1> 17	! 33	1 49	A 65	Q 81	a 97	q 113
2		<DC2> 18	" 34	2 50	B 66	R 82	b 98	r 114
3		<DC3> 19	# 35	3 51	C 67	S 83	c 99	s 115
4		<DC4> 20	\$ 36	4 52	D 68	T 84	d 100	t 116
5			% 37	5 53	E 69	U 85	e 101	u 117
6		<SYN> 22	& 38	6 54	F 70	V 86	f 102	v 118
7	<BEL> 7		' 39	7 55	G 71	W 87	g 103	w 119
8	<BS> 8	<CAN> 24	(40	8 56	H 72	X 88	h 104	x 120
9	<HT> 9	 25) 41	9 57	I 73	Y 89	i 105	y 121
A	<LF> 10		* 42	: 58	J 74	Z 90	j 106	z 122
B	<VT> 11	<ESC> 27	+ 43	; 59	K 75	[91	k 107	{ 123
C	<FF> 12	<FS> 28	, 44	< 60	L 76	\ 92	l 108	; 124
D	<CR> 13		- 45	= 61	M 77	] 93	m 109	} 125
E	<SD> 14		. 46	> 62	N 78	^ 94	n 110	~ 126
F	<SI> 15		/ 47	? 63	O 79	_ 95	o 111	 127

	8	9	A	B	C	D	E	F
0	<NUL> 128	<DLE> 144	160	0 176	@ 192	P 208	` 224	p 240
1	<DC1> 129	<DC1> 145	! 161	1 177	A 193	Q 209	a 225	q 241
2	<DC2> 130	<DC2> 146	" 162	2 178	B 194	R 210	b 226	r 242
3	<DC3> 131	<DC3> 147	# 163	3 179	C 195	S 211	c 227	s 243
4	<DC4> 132	<DC4> 148	\$ 164	4 180	D 196	T 212	d 228	t 244
5	<DC4> 133	<DC4> 149	% 165	5 181	E 197	U 213	e 229	u 245
6	<SYN> 134	<SYN> 150	& 166	6 182	F 198	V 214	f 230	v 246
7	<BEL> 135	<BEL> 151	' 167	7 183	G 199	W 215	g 231	w 247
8	<BS> 136	<CAN> 152	(168	8 184	H 200	X 216	h 232	x 248
9	<HT> 137	 153) 169	9 185	I 201	Y 217	i 233	y 249
A	<LF> 138	<LF> 154	* 170	: 186	J 202	Z 218	j 234	z 250
B	<VT> 139	<ESC> 155	+ 171	: 187	K 203	[219	k 235	{ 251
C	<FF> 140	<FS> 156	, 172	< 188	L 204	\ 220	l 236	; 252
D	<CR> 141	<CR> 157	- 173	= 189	M 205	] 221	m 237	} 253
E	<SD> 142	<SD> 158	. 174	> 190	N 206	^ 222	n 238	~ 254
F	<SI> 143	<SI> 159	/ 175	? 191	O 207	_ 223	o 239	 255

STANDARD CHARACTER SET #2

Other characters are identical to standard character set #1.

	8	9
0	à 128	š 144
1	è 129	ß 145
2	ù 130	Æ 146
3	ò 131	æ 147
4	ì 132	ø 148
5	° 133	ø 149
6	£ 134	… 150
7	ï 135	Ä 151
8	í 136	Ö 152
9	Ñ 137	Ú 153
A	ñ 138	ä 154
B	α 139	ö 155
C	Ř 140	ü 156
D	Á 141	É 157
E	á 142	é 158
F	ç 143	¥ 159

INTERNATIONAL CHARACTER SETS

When an international character set is selected by a command from software, the following changes are made in the character set with the Standard mode:

Country	35	36	64	88	90	91	92	93	94	96	123	124	125	126
U.S.A.	#	\$	@	X	Z	[	\	\]	^	`	{	|	}	~
FRANCE	#	\$	à	X	Z	°	ç	§	^	`	é	ù	è	¨
GERMANY	#	\$	§	X	Z	Ä	Ö	Ü	^	`	ä	ö	ü	ß
ENGLAND	£	\$	@	X	Z	[	\	\]	^	`	{	|	}	~
DENMARK 1	#	\$	@	X	Z	Æ	Ø	Å	^	`	æ	ø	å	~
SWEDEN	#	¤	É	X	Z	Ä	Ö	Å	Ü	é	ä	ö	å	ü
ITALY	#	\$	@	X	Z	°	\	é	^	ù	à	ò	è	ì
SPAIN 1	₧	\$	@	X	Z	í	ñ	¿	^	´	¨	ñ	}	~
JAPAN	#	\$	@	X	Z	[	¥	]	^	`	{	|	}	~
NORWAY	#	¤	É	X	Z	Æ	Ø	Å	Ü	é	æ	ø	å	ü
DENMARK 2	#	\$	É	X	Z	Æ	Ø	Å	Ü	é	æ	ø	å	ü
SPAIN 2	#	\$	á	X	Z	í	ñ	¿	é	´	í	ñ	ó	ú
LATIN AMERICA	#	\$	á	X	Z	í	ñ	¿	é	ü	í	ñ	ó	ú
KOREA	#	\$	@	X	Z	[	₩	]	^	`	{	|	}	~
IRISH	#	\$	@	Ú	˘	[	\	\]	^	`	Á	É	Ó	~
LEGAL	#	\$	§	X	Z	°	'	"	¶	`	©	®	†	™

The command for selecting the international character sets is:

<ESC> "R" *n*

Where *n* means character code *n*, i.e. CHR\$(*n*) in BASIC. The values of *n* are:

- | | | |
|-------------|-----------|------------------|
| 0 U.S.A. | 5 Sweden | 10 Denmark II |
| 1 France | 6 Italy | 11 Spain II |
| 2 Germany | 7 Spain I | 12 Latin America |
| 3 England | 8 Japan | 13 Korea |
| 4 Denmark I | 9 Norway | 14 Irish |
| | | 64 Legal |

IBM CHARACTER SET #2

Code Page #437 (U.S.A.)

	0	1	2	3	4	5	6	7
0	<NUL> 0	<DLE> 16		0 32	@ 48	P 64	` 80	p 96
1		<DC1> 17	!	1 33	A 49	Q 65	a 81	q 97
2		<DC2> 18	"	2 34	B 50	R 66	b 82	r 98
3	♥ 3	<DC3> 19	#	3 35	C 51	S 67	c 83	s 99
4	♦ 4	<DC4> 20	\$	4 36	D 52	T 68	d 84	t 100
5	♣ 5	§ 21	%	5 37	E 53	U 69	e 85	u 101
6	♠ 6	<SYN> 22	&	6 38	F 54	V 70	f 86	v 102
7	<BEL> 7		'	7 39	G 55	W 71	g 87	w 103
8	<BS> 8	<CAN> 24	(	8 40	H 56	X 72	h 88	x 104
9	<HT> 9	 25)	9 41	I 57	Y 73	i 89	y 105
A	<LF> 10		*	: 42	J 58	Z 74	j 90	z 106
B	<VT> 11	<ESC> 27	+	; 43	K 59	[75	k 91	{ 107
C	<FF> 12	<FS> 28	,	< 44	L 60	\ 76	l 92	; 108
D	<CR> 13		-	= 45	M 61	] 77	m 93	} 109
E	<SO> 14		.	> 46	N 62	^ 78	n 94	~ 110
F	<SI> 15		/	? 47	O 63	_ 79	o 95	 111

	8	9	A	B	C	D	E	F
0	Ç 128	É 144	á 160	⌘ 176	Ł 192	⌘ 208	α 224	≡ 240
1	ü 129	æ 145	í 161	⌘ 177	⊥ 193	⌘ 209	β 225	± 241
2	é 130	Æ 146	ó 162	⌘ 178	⊥ 194	π 210	Γ 226	≥ 242
3	à 131	ø 147	ú 163	| 179	† 195	⌘ 211	π 227	≤ 243
4	ä 132	ö 148	ñ 164	† 180	— 196	⌘ 212	Σ 228	∫ 244
5	à 133	ò 149	ñ 165	‡ 181	† 197	ƒ 213	σ 229	∫ 245
6	á 134	ô 150	á 166	‡ 182	‡ 198	π 214	μ 230	÷ 246
7	ç 135	ù 151	ó 167	π 183	‡ 199	‡ 215	τ 231	≈ 247
8	ê 136	ÿ 152	¿ 168	‡ 184	⌘ 200	‡ 216	Φ 232	° 248
9	ë 137	ö 153	ƒ 169	‡ 185	ƒ 201	∫ 217	Θ 233	• 249
A	è 138	ù 154	ƒ 170	‡ 186	⌘ 202	ƒ 218	Ω 234	— 250
B	ï 139	¢ 155	½ 171	‡ 187	‡ 203	■ 219	δ 235	√ 251
C	î 140	£ 156	¾ 172	‡ 188	‡ 204	■ 220	∞ 236	n 252
D	ì 141	¥ 157	ı 173	⌘ 189	= 205	■ 221	∅ 237	² 253
E	Ë 142	₤ 158	« 174	‡ 190	‡ 206	■ 222	ε 238	■ 254
F	À 143	f 159	» 175	ƒ 191	± 207	■ 223	∩ 239	

Code Page #850 (Multi-lingual)

Other characters are identical to Code Page #437.

	8	9	A	B	C	D	E	F
0	Ç 128	É 144	á 160	• 176	Ł 192	ð 208	ó 224	- 240
1	ü 129	æ 145	í 161	• 177	ł 193	Ð 209	β 225	± 241
2	é 130	Æ 146	ó 162	• 178	Ť 194	È 210	ô 226	= 242
3	à 131	ø 147	ú 163	| 179	† 195	È 211	ò 227	≈ 243
4	ä 132	ö 148	ñ 164	† 180	- 196	È 212	õ 228	¶ 244
5	à 133	ò 149	Ñ 165	À 181	† 197	ı 213	ö 229	§ 245
6	á 134	ó 150	æ 166	À 182	ã 198	í 214	μ 230	÷ 246
7	ç 135	ù 151	ó 167	À 183	Ä 199	İ 215	þ 231	• 247
8	ê 136	ÿ 152	ı 168	© 184	Ł 200	Ÿ 216	þ 232	° 248
9	ë 137	ÿ 153	® 169	¶ 185	ŕ 201	Ɔ 217	ú 233	• 249
A	è 138	Û 154	¬ 170	¶ 186	Ł 202	ŕ 218	û 234	- 250
B	ï 139	ø 155	½ 171	¶ 187	ŕ 203	■ 219	Û 235	¹ 251
C	î 140	£ 156	¾ 172	¶ 188	¶ 204	■ 220	ý 236	³ 252
D	ì 141	Ø 157	ı 173	¢ 189	= 205	ı 221	Ÿ 237	² 253
E	Ä 142	× 158	« 174	¥ 190	¶ 206	ı 222	- 238	• 254
F	Å 143	f 159	» 175	ƒ 191	α 207	■ 223	• 239	• 255

Code Page #860 (Portuguese)

Other characters are identical to Code Page #437.

	8	9	A	B	C	D	E	F
0	Ç 128	É 144	á 160	• 176	Ł 192	ll 208	α 224	≡ 240
1	ü 129	À 145	í 161	• 177	Ł 193	ƒ 209	β 225	± 241
2	é 130	Ê 146	ó 162	• 178	Ɔ 194	π 210	Γ 226	≥ 242
3	â 131	ô 147	ú 163	| 179	† 195	ll 211	π 227	≤ 243
4	ã 132	õ 148	ñ 164	† 180	- 196	Ł 212	Σ 228	ƒ 244
5	à 133	ò 149	Ñ 165	‡ 181	† 197	Ɔ 213	σ 229	Ɔ 245
6	Á 134	Ú 150	æ 166	|| 182	Ɔ 198	π 214	μ 230	÷ 246
7	ç 135	ù 151	ø 167	π 183	|| 199	|| 215	τ 231	≈ 247
8	ê 136	Ï 152	ç 168	‡ 184	Ł 200	≠ 216	Φ 232	° 248
9	ê 137	Ö 153	ò 169	|| 185	Ɔ 201	Ɔ 217	Θ 233	• 249
A	è 138	Ù 154	Ɔ 170	|| 186	ll 202	Ɔ 218	Ω 234	- 250
B	í 139	φ 155	½ 171	Ɔ 187	Ɔ 203	■ 219	δ 235	√ 251
C	ô 140	£ 156	¼ 172	ll 188	|| 204	■ 220	∞ 236	n 252
D	ì 141	Û 157	ï 173	ll 189	= 205	|| 221	∅ 237	² 253
E	À 142	Ř 158	« 174	Ɔ 190	|| 206	|| 222	ε 238	• 254
F	Á 143	Ó 159	» 175	Ɔ 191	ll 207	■ 223	∩ 239	

Code Page #861 (Icelandic)

Other characters are identical to Code Page #437.

	8	9	A	B	C	D	E	F
0	Ç 128	É 144	á 160	ð 176	Ł 192	ll 208	α 224	≡ 240
1	ü 129	æ 145	í 161	þ 177	ł 193	ƚ 209	β 225	± 241
2	é 130	Æ 146	ó 162	ð 178	ƚ 194	π 210	Γ 226	≥ 242
3	â 131	ô 147	ú 163	| 179	ƚ 195	ll 211	π 227	≤ 243
4	ä 132	ö 148	Á 164	ƚ 180	- 196	Ł 212	Σ 228	∫ 244
5	à 133	þ 149	Í 165	ƚ 181	† 197	ƚ 213	σ 229	ƚ 245
6	á 134	û 150	Ó 166	|| 182	ƚ 198	π 214	μ 230	÷ 246
7	ç 135	ÿ 151	Û 167	π 183	|| 199	|| 215	τ 231	≈ 247
8	ê 136	ý 152	í 168	ƚ 184	Ł 200	ƚ 216	Φ 232	° 248
9	ë 137	ö 153	ƚ 169	|| 185	ƚ 201	ƚ 217	θ 233	▪ 249
A	è 138	ù 154	ƚ 170	|| 186	ll 202	ƚ 218	Ω 234	- 250
B	Ð 139	ø 155	½ 171	π 187	ƚ 203	■ 219	δ 235	√ 251
C	ð 140	£ 156	¾ 172	ll 188	|| 204	■ 220	∞ 236	n 252
D	Ð 141	Ø 157	í 173	ll 189	= 205	■ 221	ø 237	² 253
E	Å 142	ƚ 158	« 174	ƚ 190	|| 206	■ 222	ε 238	▪ 254
F	Å 143	f 159	» 175	ƚ 191	ll 207	■ 223	∩ 239	

Code Page #863 (Canadian French)

Other charcters are identical to Code Page #437.

	8	9	A	B	C	D	E	F
0	Ç 128	É 144	Ï 160	Ï 176	Ł 192	Ů 208	α 224	≡ 240
1	Ü 129	È 145	Ï 161	Ï 177	Ł 193	Ů 209	β 225	± 241
2	É 130	È 146	Ó 162	Ï 178	Ť 194	Π 210	Γ 226	≥ 242
3	À 131	Ó 147	Ú 163	Ï 179	Ť 195	Ů 211	κ 227	≤ 243
4	À 132	È 148	Ï 164	Ť 180	— 196	Ł 212	Σ 228	∫ 244
5	À 133	Ï 149	Ï 165	Ť 181	Ť 197	ƒ 213	σ 229	∫ 245
6	Ŧ 134	Û 150	³ 166	Ŧ 182	Ŧ 198	π 214	μ 230	÷ 246
7	Ç 135	Û 151	— 167	π 183	Ŧ 199	Ŧ 215	τ 231	≈ 247
8	È 136	α 152	Ŧ 168	Ŧ 184	Ł 200	Ŧ 216	Φ 232	° 248
9	È 137	Ó 153	Ŧ 169	Ŧ 185	Ŧ 201	Ŧ 217	Θ 233	· 249
A	È 138	Û 154	Ŧ 170	Ŧ 186	Ł 202	Ŧ 218	Ω 234	— 250
B	Ï 139	Φ 155	½ 171	Ŧ 187	Ŧ 203	■ 219	ó 235	√ 251
C	Ï 140	£ 156	¾ 172	Ŧ 188	Ŧ 204	■ 220	∞ 236	n 252
D	= 141	Û 157	¾ 173	Ů 189	= 205	■ 221	∅ 237	² 253
E	À 142	Û 158	« 174	Ŧ 190	Ŧ 206	■ 222	ε 238	■ 254
F	Š 143	ƒ 159	» 175	Ŧ 191	Ł 207	■ 223	∩ 239	255

Code Page #865 (Nordic)

Other charcters are identical to Code Page #437.

	8	9	A	B	C	D	E	F
0	Ç 128	É 144	á 160	⋯ 176	Ł 192	⋈ 208	α 224	≡ 240
1	ü 129	æ 145	í 161	⋯ 177	⊥ 193	⸮ 209	β 225	± 241
2	é 130	Æ 146	ó 162	⋯ 178	⌂ 194	π 210	Γ 226	≥ 242
3	à 131	ò 147	ú 163	| 179	† 195	⋈ 211	κ 227	≤ 243
4	ä 132	ö 148	ñ 164	‡ 180	— 196	⋈ 212	Σ 228	∫ 244
5	â 133	ô 149	ñ 165	‡ 181	† 197	ƒ 213	ο 229	∫ 245
6	â 134	û 150	â 166	‡ 182	ƒ 198	π 214	μ 230	÷ 246
7	ç 135	ù 151	ó 167	π 183	‡ 199	‡ 215	τ 231	≈ 247
8	ê 136	ÿ 152	¿ 168	ƒ 184	⋈ 200	‡ 216	Φ 232	° 248
9	ë 137	ö 153	ƒ 169	‡ 185	ƒ 201	∩ 217	Θ 233	▪ 249
A	è 138	ù 154	ƒ 170	‡ 186	⋈ 202	ƒ 218	Ω 234	- 250
B	ï 139	ø 155	½ 171	π 187	⸮ 203	■ 219	δ 235	√ 251
C	î 140	£ 156	¾ 172	⋈ 188	‡ 204	■ 220	∞ 236	n 252
D	ì 141	Ø 157	ı 173	⋈ 189	= 205	■ 221	ø 237	² 253
E	Ë 142	Ř 158	« 174	ƒ 190	‡ 206	■ 222	ε 238	▪ 254
F	Å 143	f 159	α 175	ƒ 191	± 207	■ 223	∩ 239	

IBM CHARACTER SET #1

	0	1
0	<NUL> 0	<DLE> 16
1	1	<DC1> 17
2	2	<DC2> 18
3	3	<DC3> 19
4	4	<DC4> 20
5	5	21
6	6	<SYN> 22
7	<BEL> 7	23
8	<BS> 8	<CAN> 24
9	<HT> 9	 25
A	<LF> 10	26
B	<VT> 11	<ESC> 27
C	<FF> 12	<FS> 28
D	<CR> 13	29
E	<SO> 14	30
F	<SI> 15	31

	8	9
0	<NUL> 128	<DLE> 144
1	129	<DC1> 145
2	130	<DC2> 146
3	131	<DC3> 147
4	132	<DC4> 148
5	133	149
6	134	<SYN> 150
7	<BEL> 135	151
8	<BS> 136	<CAN> 152
9	<HT> 137	 153
A	<LF> 138	154
B	<VT> 139	<ESC> 155
C	<FF> 140	<FS> 156
D	<CR> 141	157
E	<SO> 142	158
F	<SI> 143	159

Other characters are identical to character set #2.

The duplication of control codes enables systems with a 7-bit interface to obtain control functions when the most significant bit is set to 1 by the <ESC> ">" command in the standard mode.

IBM SPECIAL CHARACTER SET

Additional characters can be printed by special commands.

	0	1
0	∅ 0	▶ 16
1	⊕ 1	◀ 17
2	● 2	↑ 18
3	♥ 3	!! 19
4	◆ 4	¶ 20
5	♣ 5	§ 21
6	♠ 6	- 22
7	• 7	↓ 23
8	◼ 8	↑ 24
9	○ 9	↓ 25
A	◼ 10	→ 26
B	♂ 11	← 27
C	♀ 12	└ 28
D	♪ 13	↔ 29
E	♫ 14	▲ 30
F	✳ 15	▼ 31

PROPORTIONAL SPACING TABLE

This table lists the widths of your printer's proportional LQ characters, for Standard mode and IBM mode.

The values given are in 360ths of an inch. For example, a value of 36 is 36/360ths of an inch. You may need to enter these widths into a special table for your processing program so it can calculate the number of proportional characters that will fit on a line.

The following width table shows each character, its ASCII code (decimal) for each character set, and its width for Standard normal mode, Standard super/subscript mode, and IBM mode.

Character code							Chr.	Proportional width		
Std.	#437	#850	#860	#861	#863	#865		Normal	Super/Sub	IBM
-	0	0	0	0	0	0	∅	30	20	30
-	1	1	1	1	1	1	⊕	30	20	30
-	2	2	2	2	2	2	●	30	20	30
-	3	3	3	3	3	3	♥	30	20	30
-	4	4	4	4	4	4	♦	30	20	30
-	5	5	5	5	5	5	♠	30	20	30
-	6	6	6	6	6	6	♣	30	20	30
-	7	7	7	7	7	7	•	30	20	30
-	8	8	8	8	8	8	▣	30	20	30
-	9	9	9	9	9	9	◦	30	20	30
-	10	10	10	10	10	10	◼	30	20	30
-	11	11	11	11	11	11	♂	30	20	30
-	12	12	12	12	12	12	♀	30	20	30
-	13	13	13	13	13	13	♪	30	20	30
-	14	14	14	14	14	14	♯	30	20	30
-	15	15	15	15	15	15	*	30	20	30
-	16	16	16	16	16	16	▶	30	20	30
-	17	17	17	17	17	17	◀	30	20	30
-	18	18	18	18	18	18	†	30	20	30
-	19	19	19	19	19	19	!!	30	20	30

Character code							Chr.	Proportional width		
Std.	#437	#850	#860	#861	#863	#865		Normal	Super/Sub	IBM
INT	20	20	20	20	20	20	¶	30	20	30
INT	21	21	21	21	21	21	§	30	20	30
-	22	22	22	22	22	22	-	30	20	30
-	23	23	23	23	23	23	‡	30	20	30
-	24	24	24	24	24	24	†	30	20	30
-	25	25	25	25	25	25	‡	30	20	30
-	26	26	26	26	26	26	→	30	20	30
-	27	27	27	27	27	27	←	30	20	30
-	28	28	28	28	28	28	⌊	30	20	30
-	29	29	29	29	29	29	↔	30	20	30
-	30	30	30	30	30	30	▲	30	20	30
-	31	31	31	31	31	31	▼	30	20	30
32	32	32	32	32	32	32		30	20	30
33	33	33	33	33	33	33	!	18	12	30
34	34	34	34	34	34	34	"	30	20	30
35	35	35	35	35	35	35	#	30	20	30
36	36	36	36	36	36	36	\$	30	20	30
37	37	37	37	37	37	37	%	36	24	30
38	38	38	38	38	38	38	&	36	24	36
39	39	39	39	39	39	39	'	18	12	18
40	40	40	40	40	40	40	(	24	16	30
41	41	41	41	41	41	41	)	24	16	30
42	42	42	42	42	42	42	*	30	20	30
43	43	43	43	43	43	43	+	30	20	30
44	44	44	44	44	44	44	,	18	12	30
45	45	45	45	45	45	45	-	30	20	30
46	46	46	46	46	46	46	.	18	12	30
47	47	47	47	47	47	47	/	30	20	30
48	48	48	48	48	48	48	0	30	20	30
49	49	49	49	49	49	49	1	30	20	30

Character code							Chr.	Proportional width		
Std.	#437	#850	#860	#861	#863	#865		Normal	Super/Sub	IBM
50	50	50	50	50	50	50	2	30	20	30
51	51	51	51	51	51	51	3	30	20	30
52	52	52	52	52	52	52	4	30	20	30
53	53	53	53	53	53	53	5	30	20	30
54	54	54	54	54	54	54	6	30	20	30
55	55	55	55	55	55	55	7	30	20	30
56	56	56	56	56	56	56	8	30	20	30
57	57	57	57	57	57	57	9	30	20	30
58	58	58	58	58	58	58	:	18	12	30
59	59	59	59	59	59	59	;	18	12	30
60	60	60	60	60	60	60	<	30	20	30
61	61	61	61	61	61	61	=	30	20	30
62	62	62	62	62	62	62	>	30	20	30
63	63	63	63	63	63	63	?	30	20	30
64	64	64	64	64	64	64	@	36	24	30
65	65	65	65	65	65	65	A	36	24	42
66	66	66	66	66	66	66	B	36	24	42
67	67	67	67	67	67	67	C	36	24	42
68	68	68	68	68	68	68	D	36	24	42
69	69	69	69	69	69	69	E	36	24	36
70	70	70	70	70	70	70	F	36	24	36
71	71	71	71	71	71	71	G	36	24	42
72	72	72	72	72	72	72	H	36	24	42
73	73	73	73	73	73	73	I	24	16	24
74	74	74	74	74	74	74	J	30	20	30
75	75	75	75	75	75	75	K	36	24	42
76	76	76	76	76	76	76	L	36	24	36
77	77	77	77	77	77	77	M	42	28	42
78	78	78	78	78	78	78	N	36	24	42
79	79	79	79	79	79	79	O	36	24	42

Character code							Chr.	Proportional width		
Std.	#437	#850	#860	#861	#863	#865		Normal	Super/Sub	IBM
80	80	80	80	80	80	80	P	36	24	36
81	81	81	81	81	81	81	Q	36	24	42
82	82	82	82	82	82	82	R	36	24	42
83	83	83	83	83	83	83	S	36	24	36
84	84	84	84	84	84	84	T	36	24	42
85	85	85	85	85	85	85	U	42	28	42
86	86	86	86	86	86	86	V	36	24	42
87	87	87	87	87	87	87	W	42	28	42
88	88	88	88	88	88	88	X	36	24	42
89	89	89	89	89	89	89	Y	36	24	42
90	90	90	90	90	90	90	Z	30	20	36
91	91	91	91	91	91	91	[	24	16	30
92	92	92	92	92	92	92	\	30	20	30
93	93	93	93	93	93	93	]	24	16	30
94	94	94	94	94	94	94	^	30	20	30
95	95	95	95	95	95	95	_	30	20	30
96	96	96	96	96	96	96	`	18	12	30
97	97	97	97	97	97	97	a	30	20	30
98	98	98	98	98	98	98	b	36	24	36
99	99	99	99	99	99	99	c	30	20	30
100	100	100	100	100	100	100	d	36	24	36
101	101	101	101	101	101	101	e	30	20	30
102	102	102	102	102	102	102	f	24	16	24
103	103	103	103	103	103	103	g	36	24	36
104	104	104	104	104	104	104	h	36	24	36
105	105	105	105	105	105	105	i	18	12	18
106	106	106	106	106	106	106	j	24	16	18
107	107	107	107	107	107	107	k	36	24	36
108	108	108	108	108	108	108	l	18	12	18
109	109	109	109	109	109	109	m	42	28	42

Character code							Chr.	Proportional width		
Std.	#437	#850	#860	#861	#863	#865		Normal	Super/Sub	IBM
110	110	110	110	110	110	110	n	36	24	36
111	111	111	111	111	111	111	o	30	20	30
112	112	112	112	112	112	112	p	36	24	36
113	113	113	113	113	113	113	q	36	24	36
114	114	114	114	114	114	114	r	30	20	30
115	115	115	115	115	115	115	s	30	20	30
116	116	116	116	116	116	116	t	24	16	24
117	117	117	117	117	117	117	u	36	24	36
118	118	118	118	118	118	118	v	36	24	36
119	119	119	119	119	119	119	w	42	28	42
120	120	120	120	120	120	120	x	30	20	36
121	121	121	121	121	121	121	y	36	24	36
122	122	122	122	122	122	122	z	30	20	30
123	123	123	123	123	123	123	{	24	16	30
124	124	124	124	124	124	124	|	18	12	30
125	125	125	125	125	125	125	}	24	16	30
126	126	126	126	126	126	126	~	30	20	30
-	127	127	127	127	127	127	o	30	20	30
128	128	128	128	128	128	128	Ç	36	24	42
129	129	129	129	129	129	129	ü	36	24	36
130	130	130	130	130	130	130	é	30	20	30
131	131	131	131	131	131	131	à	30	20	30
132	132	132	-	132	-	132	ä	30	20	30
133	133	133	133	133	133	133	à	30	20	30
134	134	134	-	134	-	134	à	30	20	30
135	135	135	135	135	135	135	ç	30	20	30
136	136	136	136	136	136	136	è	30	20	30
137	137	137	-	137	137	137	ë	30	20	30
138	138	138	138	138	138	138	è	30	20	30
139	139	139	-	-	139	139	ï	18	12	18

Character code							Chr.	Proportional width		
Std.	#437	#850	#860	#861	#863	#865		Normal	Super/Sub	IBM
140	140	140	-	-	140	140	î	18	12	18
141	141	141	141	-	-	141	ï	18	12	18
142	142	142	-	142	-	142	Ë	36	24	42
143	143	143	-	143	-	143	Ä	36	24	42
144	144	144	144	144	144	144	É	36	24	36
145	145	145	-	145	-	145	æ	42	28	42
146	146	146	-	146	-	146	Æ	42	28	42
147	147	147	147	147	147	147	ø	30	20	30
148	148	148	-	148	-	148	ö	30	20	30
149	149	149	149	-	-	149	õ	30	20	30
150	150	150	-	150	150	150	ù	36	24	36
151	151	151	151	-	151	151	û	36	24	36
152	152	152	-	-	-	152	ÿ	36	24	36
153	153	153	-	153	-	153	ÿ	36	24	42
154	154	154	154	154	154	154	Û	42	28	42
155	155	189	155	-	155	-	ϕ	30	20	30
156	156	156	156	156	156	156	£	30	20	30
157	157	190	-	-	-	-	¥	36	24	30
158	158	-	158	158	-	158	Ŕ	42	28	42
159	159	159	-	159	159	159	ƒ	30	20	30
160	160	160	160	160	-	160	á	30	20	30
161	161	161	161	161	-	161	í	18	12	18
162	162	162	162	162	162	162	ó	30	20	30
163	163	163	163	163	163	163	ú	36	24	36
164	164	164	164	-	-	164	ñ	36	24	36
165	165	165	165	-	-	165	Ñ	36	24	42
166	166	166	166	-	-	166	ª	30	20	30
167	167	167	167	-	-	167	º	30	20	30
168	168	168	168	168	-	168	¿	30	20	30
169	169	-	-	169	169	169	ƒ	30	20	30

Character code							Chr.	Proportional width		
Std.	#437	#850	#860	#861	#863	#865		Normal	Super/Sub	IBM
170	170	170	170	170	170	170	¬	30	20	30
171	171	171	171	171	171	171	½	30	20	30
172	172	172	172	172	172	172	¼	30	20	30
173	173	173	173	173	-	173	i	30	20	30
174	174	174	174	174	174	174	«	30	20	42
175	175	175	175	175	175	-	»	30	20	42
176	176	176	176	176	176	176	•	30	30	30
177	177	177	177	177	177	177	••	30	30	30
178	178	178	178	178	178	178	•••	30	30	30
179	179	179	179	179	179	179	|	30	30	30
180	180	180	180	180	180	180	┆	30	30	30
181	181	-	181	181	181	181	≡	30	30	30
182	182	-	182	182	182	182	≡≡	30	30	30
183	183	-	183	183	183	183	≡≡≡	30	30	30
184	184	-	184	184	184	184	≡≡≡≡	30	30	30
185	185	185	185	185	185	185	≡≡	30	30	30
186	186	186	186	186	186	186	≡≡	30	30	30
187	187	187	187	187	187	187	≡≡	30	30	30
188	188	188	188	188	188	188	≡≡	30	30	30
189	189	-	189	189	189	189	≡	30	30	30
190	190	-	190	190	190	190	≡	30	30	30
191	191	191	191	191	191	191	∟	30	30	30
192	192	192	192	192	192	192	∟	30	30	30
193	193	193	193	193	193	193	└	30	30	30
194	194	194	194	194	194	194	└	30	30	30
195	195	195	195	195	195	195	└	30	30	30
196	196	196	196	196	196	196	-	30	30	30
197	197	197	197	197	197	197	┆	30	30	30
198	198	-	198	198	198	198	≡	30	30	30
199	199	-	199	199	199	199	≡≡	30	30	30

Character code							Chr.	Proportional width		
Std.	#437	#850	#860	#861	#863	#865		Normal	Super/Sub	IBM
200	200	200	200	200	200	200	Ⓔ	30	30	30
201	201	201	201	201	201	201	Ⓕ	30	30	30
202	202	202	202	202	202	202	Ⓖ	30	30	30
203	203	203	203	203	203	203	Ⓗ	30	30	30
204	204	204	204	204	204	204	Ⓙ	30	30	30
205	205	205	205	205	205	205	=	30	30	30
206	206	206	206	206	206	206	Ⓝ	30	30	30
207	207	-	207	207	207	207	Ⓞ	30	30	30
208	208	-	208	208	208	208	Ⓟ	30	30	30
209	209	-	209	209	209	209	Ⓠ	30	30	30
210	210	-	210	210	210	210	Ⓡ	30	30	30
211	211	-	211	211	211	211	Ⓢ	30	30	30
212	212	-	212	212	212	212	Ⓣ	30	30	30
213	213	-	213	213	213	213	Ⓤ	30	30	30
214	214	-	214	214	214	214	Ⓥ	30	30	30
215	215	-	215	215	215	215	Ⓦ	30	30	30
216	216	-	216	216	216	216	Ⓧ	30	30	30
217	217	217	217	217	217	217	Ⓨ	30	30	30
218	218	218	218	218	218	218	Ⓩ	30	30	30
219	219	219	219	219	219	219	■	30	30	30
220	220	220	220	220	220	220	■	30	30	30
221	221	-	221	221	221	221	■	30	30	30
222	222	-	222	222	222	222	■	30	30	30
223	223	223	223	223	223	223	■	30	30	30
224	224	-	224	224	224	224	α	30	30	30
225	225	225	225	225	225	225	β	30	30	36
226	226	-	226	226	226	226	Γ	30	30	36
227	227	-	227	227	227	227	π	30	30	36
228	228	-	228	228	228	228	Σ	30	30	42
229	229	-	229	229	229	229	σ	30	30	36

Character code							Chr.	Proportional width		
Std.	#437	#850	#860	#861	#863	#865		Normal	Super/Sub	IBM
230	230	230	230	230	230	230	μ	30	30	36
231	231	-	231	231	231	231	τ	30	30	30
232	232	-	232	232	232	232	Φ	30	30	42
233	233	-	233	233	233	233	θ	30	30	42
234	234	-	234	234	234	234	Ω	30	30	42
235	235	-	235	235	235	235	δ	30	30	30
236	236	-	236	236	236	236	∞	30	30	30
237	237	-	237	237	237	237	∅	30	30	42
238	238	-	238	238	238	238	€	30	30	30
239	239	-	239	239	239	239	∩	30	30	30
240	240	-	240	240	240	240	≡	30	30	30
241	241	241	241	241	241	241	±	30	30	30
242	242	-	242	242	242	242	≥	30	30	30
243	243	-	243	243	243	243	≤	30	30	30
244	244	-	244	244	244	244	∫	30	30	30
245	245	-	245	245	245	245	∫	30	30	30
246	246	246	246	246	246	246	÷	30	30	30
247	247	-	247	247	247	247	≈	30	30	30
248	248	248	248	248	248	248	°	30	30	30
249	249	-	249	249	249	249	▪	30	30	30
250	250	250	250	250	250	250	-	30	30	30
251	251	-	251	251	251	251	√	30	30	30
252	252	-	252	252	252	252	ⁿ	30	30	30
253	253	253	253	253	253	253	²	30	30	30
254	254	254	254	254	254	254	▪	30	30	30
255	255	255	255	255	255	255		30	20	30
INT	-	155	-	155	-	155	∅	30	30	42
INT	-	157	-	157	-	157	∅	36	28	42
-	-	158	-	-	-	-	×	42	20	30
INT	-	169	-	-	-	-	⊙	36	21	30

Character code							Chr.	Proportional width		
Std.	#437	#850	#860	#861	#863	#865		Normal	Super/Sub	IBM
INT	-	181	134	164	-	-	Á	36	28	42
-	-	182	143	-	132	-	À	42	20	42
-	-	183	145	-	142	-	Ä	42	28	42
INT	-	184	-	-	-	-	©	36	21	30
-	-	198	132	-	-	-	ã	30	20	30
-	-	199	142	-	-	-	Ā	42	28	42
INT	-	207	-	-	152	175	α	30	20	30
-	-	208	-	140	-	-	ø	36	24	36
-	-	209	-	139	-	-	Ð	42	28	42
-	-	210	137	-	146	-	È	36	24	36
-	-	211	-	-	148	-	Ë	36	24	36
-	-	212	146	-	145	-	Ê	36	24	36
-	-	213	-	-	-	-	ı	18	12	18
-	-	214	139	165	-	-	í	24	16	24
-	-	215	-	-	168	-	î	24	16	24
-	-	216	-	-	149	-	ÿ	24	16	24
-	-	221	-	-	160	-	ı	18	12	30
-	-	222	152	-	-	-	ı	24	16	24
INT	-	224	159	166	-	-	ó	30	28	42
-	-	226	140	-	153	-	ò	30	28	42
-	-	227	169	-	-	-	õ	30	28	42
-	-	228	148	-	-	-	ö	30	20	30
-	-	229	153	-	-	-	ø	30	28	42
-	-	231	-	149	-	-	þ	30	24	36
-	-	232	-	141	-	-	þ	30	28	42
INT	-	233	150	167	-	-	ú	30	28	42
-	-	234	-	-	158	-	û	30	28	42
-	-	235	157	-	157	-	ù	30	28	42
-	-	236	-	152	-	-	ý	30	24	36
-	-	237	-	151	-	-	ÿ	30	28	42

Character code							Chr.	Proportional width		
Std.	#437	#850	#860	#861	#863	#865		Normal	Super/Sub	IBM
-	-	238	-	-	167	-	-	30	20	30
INT	-	239	-	-	161	-	'	18	20	30
-	-	240	-	-	-	-	-	30	20	30
-	-	242	-	-	-	-	=	30	20	30
-	-	243	-	-	173	-	≈	30	21	30
-	-	244	-	-	134	-	¶	30	20	30
-	-	245	-	-	143	-	§	30	20	30
-	-	247	-	-	165	-	,	30	20	30
INT	-	249	-	-	164	-	..	30	20	30
-	-	251	-	-	-	-	1	30	20	30
-	-	252	-	-	166	-	3	30	20	30
-	-	-	-	-	141	-	=	30	20	30
INT	-	-	-	-	-	-	/	30	20	30
INT	-	-	-	-	-	-	°	24	16	24
INT	-	-	-	-	-	-	W	42	28	42
INT	-	-	-	-	-	-	†	30	20	30
INT	-	-	-	-	-	-	β	36	24	36
INT	-	-	-	-	-	-	™	36	24	36

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COMMAND SUMMARY

Standard Mode

The following commands take effect with the Standard mode.

CONTROL CODE	FUNCTION	PAGE
<BEL>	Bell	83
<BS>	Backspace	69
<HT>	Horizontal tab	71
<LF>	Line feed	63
<VT>	Vertical tab	67
<FF>	Form feed	65
<CR>	Carriage return	69
<SO>	Expanded printing for one line	57
<SI>	Condensed pitch	56
<DC1>	Set printer on-line	82
<DC2>	Cancel condensed pitch	56
<DC3>	Set printer off-line	82
<DC4>	Cancel one-line expanded printing	57
<CAN>	Cancel last line	82
<ESC> <LF>	Reverse line feed	63
<ESC> <FF>	Return to top of current page	66
<ESC> <SO>	Expanded printing for one line	57
<ESC> <SI>	Condensed pitch	56
<ESC> <0>	Manual feed	84
<ESC> <4>	Auto feed	84
<ESC> "R"	Eject paper from ASF	84
<ESC> "T" <i>n</i>	Set print start position on ASF	84
<ESC> <SP> <i>n</i>	Increase character spacing	58
<ESC> "!" <i>n</i>	Select master print mode	58
<ESC> "#"	Accept MSB as is	82
<ESC> "\$" <i>n1 n2</i>	Absolute horizontal tab in inches	72
<ESC> "%" <0>	Select ROM character set	80
<ESC> "%" <1>	Select download character set	78
<ESC> "%" "0"	Select ROM character set	80
<ESC> "%" "1"	Select download character set	78
<ESC> "&" <0> <i>n1 n2 m0 m1 m2 d1 d2 ...</i>	Define download characters	76
<ESC> "()" " " <3> <0> <1> <i>n1 n2</i>	Select score	51
<ESC> "*" <i>n0 n1 n2 m1 m2 ...</i>	Select graphics mode	74
<ESC> "+" <i>n</i>	Set line spacing to <i>n</i> /360 inch	61
<ESC> "-" <0>	Stop underlining	50
<ESC> "-" <1>	Start underlining	50
<ESC> "-" "0"	Stop underlining	50
<ESC> "-" "1"	Start underlining	50
<ESC> "P" <i>n0</i>	Select vertical tab channel	67
<ESC> "0"	Set line spacing to 1/8 inch	61
<ESC> "1"	Set line spacing to 7/60 inch	61
<ESC> "2"	Set line spacing to 1/6 inch	61
<ESC> "3" <i>n</i>	Set line spacing to <i>n</i> /180 inch	62
<ESC> "4"	Select italic characters	49
<ESC> "5"	Select upright characters	49
<ESC> "6"	Select character set #2	53
<ESC> "7"	Select character set #1	53
<ESC> "8"	Disable paper-out detector	66
<ESC> "9"	Enable paper-out detector	66

CONTROL CODE	FUNCTION	PAGE
<ESC> “.” <0> <i>n</i> <0>	Copy character set from ROM into RAM	78
<ESC> “^”	One-line unidirectional printing	83
<ESC> “_”	Set MSB to 0	81
<ESC> “>”	Set MSB to 1	81
<ESC> “?” <i>n m</i>	Convert graphics density	75
<ESC> “@”	Reset printer	84
<ESC> “A” <i>n</i>	Set line spacing to <i>n</i> /60 inch	62
<ESC> “B” <i>n1 n2 ...</i> <0>	Set vertical tab stops	66
<ESC> “C” <i>n</i>	Set page length to <i>n</i> lines	64
<ESC> “C” <0> <i>n</i>	Set page length to <i>n</i> inches	65
<ESC> “D” <i>n1 n2 ...</i> <0>	Set horizontal tab stops	71
<ESC> “E”	Emphasized printing	49
<ESC> “F”	Cancel emphasized printing	49
<ESC> “G”	Double-strike printing	49
<ESC> “H”	Cancel double-strike printing	50
<ESC> “J” <i>n</i>	Perform one <i>n</i> /180-inch line feed	64
<ESC> “K” <i>n1 n2 m1 m2 ...</i>	Print normal-density 8-bit graphics	73
<ESC> “L” <i>n1 n2 m1 m2 ...</i>	Print double-density 8-bit graphics	73
<ESC> “M”	Elite pitch	55
<ESC> “N” <i>n</i>	Set bottom margin	65
<ESC> “O”	Cancel bottom margin	65
<ESC> “P”	Pica pitch	55
<ESC> “Q” <i>n</i>	Set right margin	68
<ESC> “R” <i>n</i>	Select international character set	53
<ESC> “S” <0>	Superscript	51
<ESC> “S” <1>	Subscript	52
<ESC> “S” “0”	Superscript	51
<ESC> “S” “1”	Subscript	52
<ESC> “T”	Cancel superscript or subscript	52
<ESC> “U” <0>	Bidirectional printing	83
<ESC> “U” <1>	Unidirectional printing	83
<ESC> “U” “0”	Bidirectional printing	83
<ESC> “U” “1”	Unidirectional printing	83
<ESC> “W” <0>	Cancel expanded printing	56
<ESC> “W” <1>	Expanded printing	56
<ESC> “W” “0”	Cancel expanded printing	56
<ESC> “W” “1”	Expanded printing	56
<ESC> “Y” <i>n1 n2 m1 m2 ...</i>	Print double-density, double-speed 8-bit graphics	73
<ESC> “Z” <i>n1 n2 m1 m2 ...</i>	Print quadruple-density 8-bit graphics	73
<ESC> “[” “T” <4> <0> <0> <0> <i>n1 n2</i>	Select IBM code page	54
<ESC> “^” <i>n1 n2</i>	Relative horizontal tab	72
<ESC> “a” <0>	Left justify	70
<ESC> “a” <1>	Center text	70
<ESC> “a” <2>	Right justify	70
<ESC> “a” <3>	Full justify	70
<ESC> “a” “0”	Left justify	70
<ESC> “a” “1”	Center text	70
<ESC> “a” “2”	Right justify	70
<ESC> “a” “3”	Full justify	70
<ESC> “b” <i>n0 n1 n2 ...</i> <0>	Set vertical tab stops in channel	67
<ESC> “e” <0> <i>n</i>	Set horizontal tab stops every <i>n</i> columns	71
<ESC> “e” <1> <i>n</i>	Set vertical tab stops every <i>n</i> lines	67
<ESC> “e” “0” <i>n</i>	Set horizontal tab stops every <i>n</i> columns	71
<ESC> “e” “1” <i>n</i>	Set vertical tab stops every <i>n</i> lines	67
<ESC> “f” <0> <i>n</i>	Absolute horizontal tab in columns	72
<ESC> “f” <1> <i>n</i>	Feed paper <i>n</i> lines	64
<ESC> “f” “0” <i>n</i>	Absolute horizontal tab in columns	72
<ESC> “f” “1” <i>n</i>	Feed paper <i>n</i> lines	64
<ESC> “g”	Semi-condensed pitch	56
<ESC> “h” <i>n</i>	Select double or quadruple size	59
<ESC> “j” <i>n</i>	Perform one <i>n</i> /180-inch reverse line feed	64

CONTROL CODE	FUNCTION	PAGE
<ESC> "k" <i>n</i>	Select LQ font	48
<ESC> "l" <i>n</i>	Set left margin	68
<ESC> "p" <0>	Select fixed spacing	58
<ESC> "p" <1>	Select proportional spacing	57
<ESC> "p" "0"	Select fixed spacing	58
<ESC> "p" "1"	Select proportional spacing	57
<ESC> "q" <i>n</i>	Select ornament character	51
<ESC> "t" <i>n</i>	Select print color	81
<ESC> "t" <0>	Select standard character set	52
<ESC> "t" <1>	Select IBM character set	52
<ESC> "t" <2>	Shift download character area	78
<ESC> "t" "0"	Select standard character set	52
<ESC> "t" "1"	Select IBM character set	52
<ESC> "t" "2"	Shift download character area	78
<ESC> "w" <0>	Return to normal height	60
<ESC> "w" <1>	Print double-height characters	59
<ESC> "w" "0"	Return to normal height	60
<ESC> "w" "1"	Print double-height characters	59
<ESC> "x" <0>	Select draft quality characters	46
<ESC> "x" <1>	Select LQ characters	47
<ESC> "x" "0"	Select draft quality characters	46
<ESC> "x" "1"	Select LQ characters	47
<ESC> "~" <0>	Select normal zero	55
<ESC> "~" <1>	Select slash zero	55
<ESC> "~" "0"	Select normal zero	55
<ESC> "~" "1"	Select slash zero	55
<FS> "3" <i>n</i>	Set line spacing to <i>n</i> /360 inch	61
<FS> "@"	Reset printer	84
<FS> "C" <i>n</i>	Select LQ font	48
<FS> "E" <i>n</i>	Select character width	57
<FS> "F" <i>n</i>	Select forward feed mode	63
<FS> "I" <0>	Select standard character set	52
<FS> "I" <1>	Select IBM character set	52
<FS> "I" <2>	Shift download character area	78
<FS> "I" "0"	Select standard character set	52
<FS> "I" "1"	Select IBM character set	52
<FS> "I" "2"	Shift download character area	78
<FS> "R" <i>n</i>	Select reverse feed mode	63
<FS> "V" <0>	Return to normal height	60
<FS> "V" <1>	Print double-height characters	59
<FS> "V" "0"	Return to normal height	60
<FS> "V" "1"	Print double-height characters	59
<FS> "Z" <i>n1 n2 m1 m2 ...</i>	Print hex-density 24-bit graphics	74
"(" "0" ")"	Manual feed	84
"(" "4" ")"	Auto feed	84
"(" "C" ")" <i>n</i>	Select print color	81
"(" "F" ")" <i>n</i>	Select font	48
"(" "R" ")" <i>n</i>	Eject paper from ASF	84
"(" "S" ")" <i>n</i>	Select character size	59
"(" "T" ")" <i>n</i>	Set print start position on ASF	84
	Delete last character sent	82

IBM Mode

The following commands take effect with the IBM mode.

CONTROL CODE	FUNCTION	PAGE
<BEL>	Bell	83
<BS>	Backspace	69
<HT>	Horizontal tab	71
<LF>	Line feed	63
<VT>	Vertical tab	67
<FF>	Form feed	65
<CR>	Carriage return	69
<SO>	Expanded printing for one line	57
<SI>	Condensed pitch	56
<DC1>	Set printer on-line	82
<DC2>	Pica pitch	55
<DC4>	Cancel one-line expanded printing	57
<CAN>	Cancel last line	82
<ESC> <SO>	Expanded printing for one line	57
<ESC> <SI>	Condensed pitch	56
<ESC> <0>	Manual feed	84
<ESC> <4>	Auto feed	84
<ESC> "R"	Eject paper from ASF	84
<ESC> "T" <i>n</i>	Set print start position on ASF	84
<ESC> "_" <0>	Stop underlining	50
<ESC> "_" <1>	Start underlining	50
<ESC> "_" "0"	Stop underlining	50
<ESC> "_" "1"	Start underlining	50
<ESC> "0"	Set line spacing to 1/8 inch	61
<ESC> "1"	Set line spacing to 7/72 inch	61
<ESC> "2"	Execute <ESC> "A"	63
<ESC> "3" <i>n</i>	Set line spacing to <i>n</i> /180 or <i>n</i> /216 inch	62
<ESC> "4"	Set top of page at current position	64
<ESC> "5" <0>	Cancel automatic line feed	69
<ESC> "5" <1>	Set automatic line feed	69
<ESC> "6"	Select character set #2	53
<ESC> "7"	Select character set #1	53
<ESC> "8"	Disable paper-out detector	66
<ESC> "9"	Enable paper-out detector	66
<ESC> "."	Elite pitch	55
<ESC> "=" <i>n1 n2 "#" n3 n4</i> <0> <i>n5</i> ...	Define download characters	77
<ESC> "@"	Reset printer	84
<ESC> "A" <i>n</i>	Set line spacing to <i>n</i> /72 inch	62
<ESC> "B" <i>n1 n2</i> ... <0>	Set vertical tab stops	66
<ESC> "C" <i>n</i>	Set page length to <i>n</i> lines	64
<ESC> "C" <0> <i>n</i>	Set page length to <i>n</i> inches	65
<ESC> "D" <i>n1 n2</i> ... <0>	Set horizontal tab stops	71
<ESC> "E"	Emphasized printing	49
<ESC> "F"	Cancel emphasized printing	49
<ESC> "G"	Double-strike printing	49
<ESC> "H"	Cancel double-strike printing	50
<ESC> "I" <0>	Select draft pica characters	46
<ESC> "I" <2>	Select LQ pica characters	47
<ESC> "I" <3>	Select LQ proportional characters	48
<ESC> "I" <4>	Select draft pica download character set	79
<ESC> "I" <6>	Select LQ pica download characters	79
<ESC> "I" <7>	Select LQ proportional download characters	80
<ESC> "I" <8>	Select draft elite characters	46
<ESC> "I" <LF>	Select LQ elite characters	47
<ESC> "I" <FF>	Select draft elite download character set	79

CONTROL CODE

FUNCTION

PAGE

<ESC> "T" <SO>	Select LQ elite download characters	80
<ESC> "T" <DLE>	Select draft condensed characters	46
<ESC> "T" <DC2>	Select LQ condensed characters	47
<ESC> "T" <DC4>	Select draft condensed download characters	79
<ESC> "T" <SYN>	Select LQ condensed download characters	80
<ESC> "J" <i>n</i>	Perform one <i>n</i> /180-inch or <i>n</i> /216-inch line feed	64
<ESC> "K" <i>n1 n2 m1 m2 ...</i>	Print normal-density 8-bit graphics	73
<ESC> "L" <i>n1 n2 m1 m2 ...</i>	Print double-density 8-bit graphics	73
<ESC> "N" <i>n</i>	Set bottom margin	65
<ESC> "O"	Cancel bottom margin	65
<ESC> "P" <0>	Select fixed spacing	58
<ESC> "P" <1>	Select proportional spacing	57
<ESC> "Q" "\$"	Set printer off-line	82
<ESC> "R"	Reset all tab stops	71
<ESC> "S" <0>	Superscript	51
<ESC> "S" <1>	Subscript	52
<ESC> "S" "0"	Superscript	51
<ESC> "S" "1"	Subscript	52
<ESC> "T"	Cancel superscript or subscript	52
<ESC> "U" <0>	Bidirectional printing	83
<ESC> "U" <1>	Unidirectional printing	83
<ESC> "U" "0"	Bidirectional printing	83
<ESC> "U" "1"	Unidirectional printing	83
<ESC> "W" <0>	Cancel expanded printing	56
<ESC> "W" <1>	Expanded printing	56
<ESC> "W" "0"	Cancel expanded printing	56
<ESC> "W" "1"	Expanded printing	56
<ESC> "X" <i>n1 n2</i>	Set left and right margins	69
<ESC> "Y" <i>n1 n2 m1 m2 ...</i>	Print double-density, double-speed 8-bit graphics	73
<ESC> "Z" <i>n1 n2 m1 m2 ...</i>	Print quadruple-density 8-bit graphics	73
<ESC> "I" "@" <4> <0> <0> <0> <i>n m</i>	Select character height, width, and line spacing	60
<ESC> "I" "T" <4> <0> <0> <0> <i>n1 n2</i>	Select IBM code page	54
<ESC> "I" "A" <4> <0> <0> <0> <0> <i>n</i>	Set base unit for line spacing	62
<ESC> "I" "g" <i>n1 n2 m0 m1 m2 ...</i>	Select graphics mode	75
<ESC> "I" <i>n1 n2</i>	Enable printing of all character codes	54
<ESC> "I"	Reverse line feed	63
<ESC> "A"	Enable printing of all character codes on next character	54
<ESC> " " <0>	Stop overlining	50
<ESC> " " <1>	Start overlining	50
<ESC> " " "0"	Stop overlining	50
<ESC> " " "1"	Start overlining	50
<ESC> "d" <i>n1 n2</i>	Relative horizontal tab in inches	72
<ESC> "j"	Stop printing	83
<ESC> "k" <i>n</i>	Select LQ font	48
<ESC> "t" <i>n</i>	Select print color	81
<ESC> "t" <0>	Select standard character set	52
<ESC> "t" <1>	Select IBM character set	52
<ESC> "t" "0"	Select standard character set	52
<ESC> "t" "1"	Select IBM character set	52
"(" "0" ")"	Manual feed	84
"(" "A" ")"	Auto feed	84
"(" "C" ")" <i>n</i>	Select print color	81
"(" "P" ")" <i>n</i>	Select font	48
"(" "R" ")" <i>n</i>	Eject paper from ASF	84
"(" "S" ")" <i>n</i>	Select character size	59
"(" "T" ")" <i>n</i>	Set print start position on ASF	84