

"I designed Dots-Perfect™ so that computer users could get more productivity, convenience, and better looking printed documents from their Epson printers, without busting their budgets."

Dan Dresselhaus,
Inventor/C.E.O.

Today, thousands of Dots-Perfect™ upgrade kits are installed in printers across America, Canada, Europe, Australia, Japan and South America.

LIMITED WARRANTY

Dresselhaus Computer Products warrants to the original end-user purchaser of Dots-Perfect™ that all components will be free of defects in materials and labor for one year from date of purchase.

During the warranty period, Dresselhaus Computer Products will repair or replace, at no charge, any defective Dots-Perfect™ provided it is returned to the address below.

This warranty is limited to repair or replacement of the original unit.

To protect your warranty rights and enable us to serve you better, please fill in the registration form and mail immediately to Dresselhaus Computer Products.

There are no warranties which extend beyond the description hereof.

Epson America has determined that proper installation of Dots-Perfect™ (formerly known as Finger Print LetterWriter) in Epson printers will not void the printer warranty; however, damage caused by improper installation may not be covered by the Epson warranty.

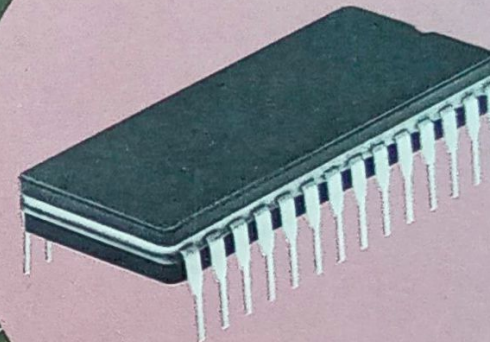


Dresselhaus
COMPUTER PRODUCTS

8560 Vineyard Avenue, Suite 405, Rancho Cucamonga, CA 91730
Tel: (714) 945-5600

Upgrade Kit

Dots-Perfect™



Owner's Manual



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Dots-Perfect™

Dots-Perfect™ is an upgrade kit for Epson MX-series dot

NOTE:

There are two important reasons to return this warranty.

First, doing so identifies you as the owner of a Dots-Perfect™ unit entitled to telephone technical support.

Second, it enables us to notify you of future enhancements as they are released.

So, please take a few seconds and completely answer the information requested. Sign the card and drop it in the mail.

Registration # **Nº 22049**

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837 E. Alostia Ave., Glendora, CA 91740

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837 East Alosta Avenue
Glendora, California 91740-9977

PLACE
STAMP
HERE

Dots-Perfect™

Dots-Perfect, an upgrade kit for Epson MX-series dot matrix printers.

Your Dots-Perfect kit is a small circuit board that simply plugs into your Epson MX-80, MX-80 F/T, or MX-100 printer. This kit also works in the IBM Graphics Printer.

No soldering is required. All you need for installation is two ordinary screwdrivers, one a flat-blade (ordinary kind), and the other a phillips (cross shaped).

When installing Dots-Perfect, please follow the instructions below carefully and check each off when completed. Pay particular attention to those paragraphs marked **IMPORTANT**. By using this procedure you will soon have your Dots-Perfect kit installed and working perfectly.

IMPORTANT: For best results, please read through all instructions **BEFORE** beginning. If you feel you are not qualified to perform this installation, **PLEASE DO NOT ATTEMPT IT!** Most dealers will install your Dots-Perfect kit for a nominal charge.


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If you have any questions or problems during installation, you may call (714) 945-5600 and ask for technical service. We will be happy to assist you.

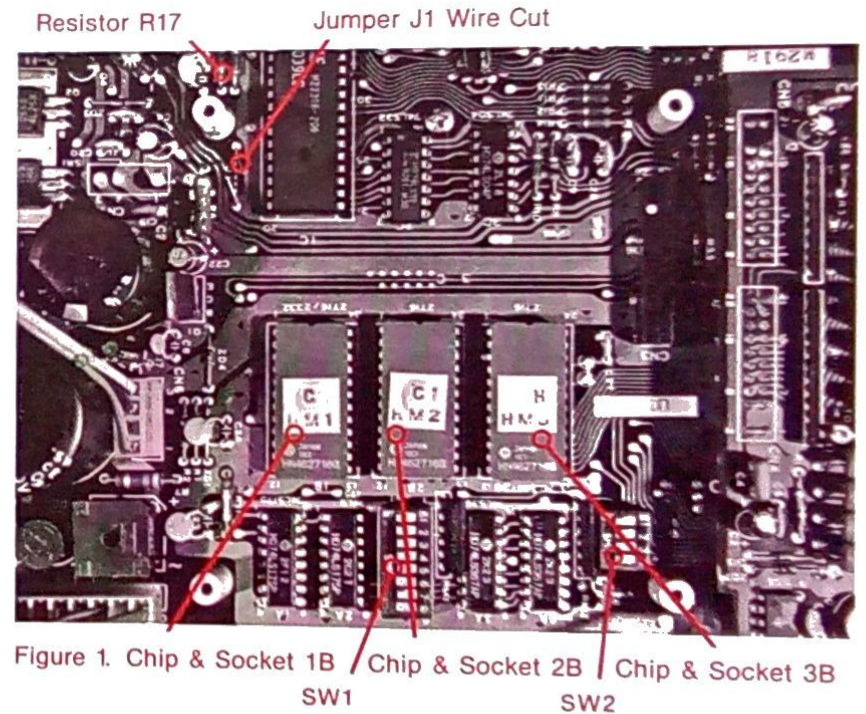
Installation Instructions

SECTION A / OPENING THE PRINTER CASE

- Step 1. Unplug the printer. Disconnect the printer cable from your computer.
- Step 2. Remove the paper separator, hinged cover, and if you have an MX-100 or MX-80 F/T, the tractor feed mechanism.
- Step 3. If you have an MX-80, MX-80 F/T, or IBM Graphics printer, turn the printer upside down on a soft surface. Remove the four case screws using a phillips screwdriver. Turn the printer right-side up. Pull off the paper feed knob.
- If you have an MX-100 printer, the case screws are located on the top of the printer. Remove the five case screws using a phillips screwdriver.
- Step 4. Turn the printer so the rear is facing you.
- Step 5. Carefully lift and rotate the top of the printer case about its left edge. Take care not to strain the wires connecting the printer and the panel buttons. You may unplug the connector to the panel buttons if you wish.

SECTION B / REMOVING THE MX CHIPS

- Step 1. With the case top removed, compare the circuit board of your printer to Figure 1. If you cannot see the three sockets shown (1B, 2B, and 3B) then you may have an interface card (serial, IEEE-488, buffer) installed in your printer. This interface board is over the main circuit board and must be temporarily removed in order to install Dots-Perfect. Simply remove the four screws in the corners of the card and lift it straight up.



- Step 2. Using Figure 1, locate sockets 1B, 2B, and 3B on your printer's circuit board. The Epson chips in these sockets must be removed before you can install Dots-Perfect. Your printer may not have chips in all sockets. Also, the numbers on the chips in your printer may differ from those shown in Figure 1.

Step 3. Remove the chips in sockets 1B, 2B, and 3B by using a flat-blade screwdriver as shown in Figure 2.

Slip the screwdriver between the chip and the socket.

IMPORTANT: Be sure that the screwdriver is between the chip and the socket, not between the socket and the circuit board, to prevent prying the socket off of the circuit board.

Twist the screwdriver blade to gently lift the near end of the chip out of the socket. Next, slip the screwdriver blade under the chip and again twist the blade gently to lift the far end of the chip. Once the chip is completely free from the socket you may use your fingers to pick it up.

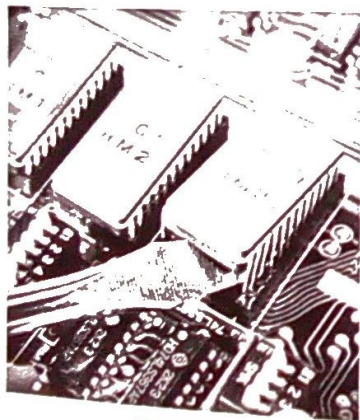


Figure 2.
Twist the Screwdriver Blade Gently

Step 4. Most Epson MX printers (but not all) will have a thin (1/16") plastic pin guide clipped to the top of each socket. This guide must be removed from sockets 2B and 3B before the Dots-Perfect board can be plugged in. Compare your sockets to those in Figure 3. If you do have pin guides on your sockets, simply pull them off with your fingers.

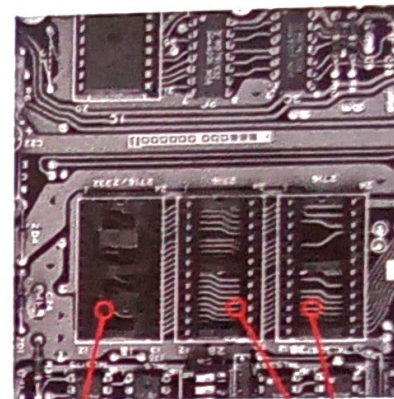


Figure 3.
Plastic Pin Guide No Pin Guides

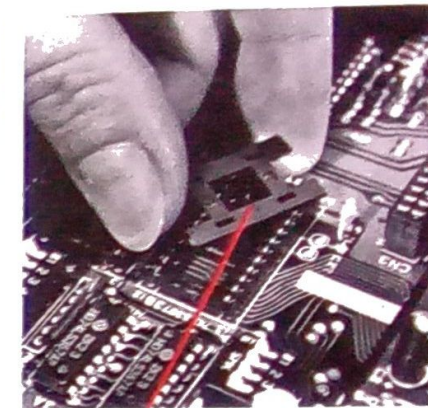


Figure 4.
Remove Pin Guide From Sockets

SECTION C / INSTALLING THE DOTS-PERFECT BOARD

Examine your Dots-Perfect Board. On the bottom side of the board you will find a 24-pin plug. Position this plug on socket 3B so that each of the plug pins is over the proper opening in the socket. Refer to Figures 5 and 6 for proper orientation of the Dots-Perfect board. Now press the Dots-Perfect board firmly into place. The Dots-Perfect board should now be level and securely held by the socket.

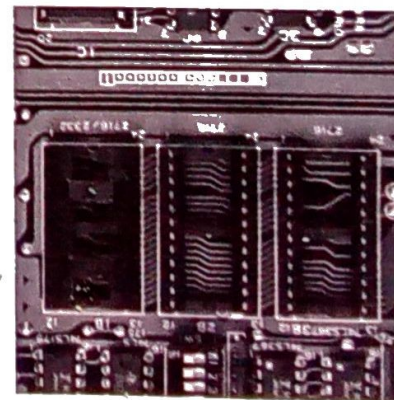


Figure 5
Ready for Dots-Perfect Board

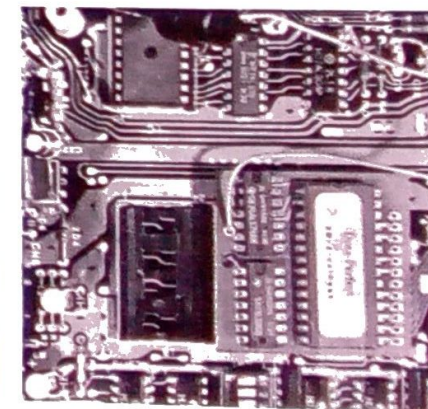


Figure 6
Dots-Perfect Board Installed

SECTION D / CONNECTING THE SPRING HOOK TO R17

Locate resistor R17 using Figures 1 and 6. Connect the spring hook to the wire on the end of R17 at a point nearest the rear of the printer. The gripper is opened by pressing on the top of the spring hook.

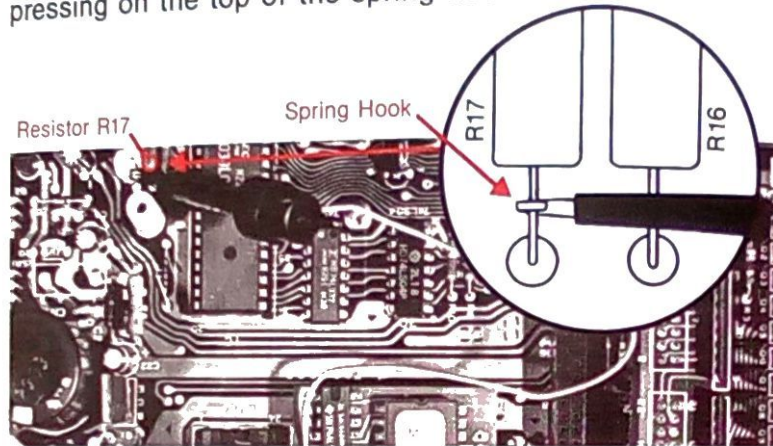


Figure 6. Connect Spring Hook to R17

SECTION E / DISENGAGING JUMPER WIRE J1 (if present)

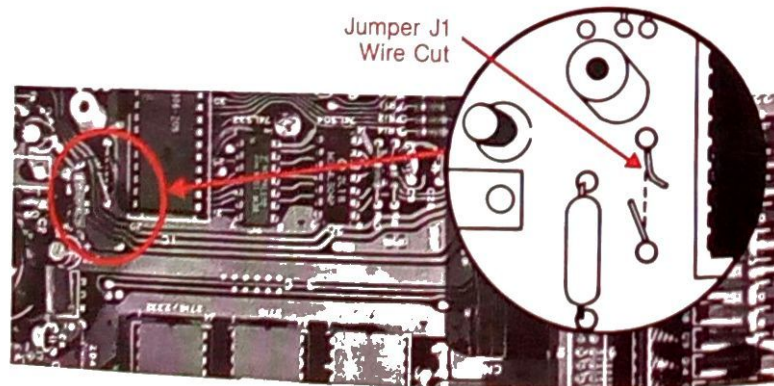


Figure 7.

A small percentage of printers have a jumper wire installed which must be cut in order for Dots-Perfect to function. Locate jumper J1 on your printer circuit board using Figures 1 and 7 as a guide. On some printers (units without an Epson chip in socket 3B) there will be a loop

SECTION F / RESETTING THE DIP SWITCHES

of wire. Simply cut it in the center and bend the ends of the wire apart as shown in Figure 7. A common nail clipper will do nicely. (If your printer does not have this wire, or if the wire is already cut, you may skip this step.)

Dots-Perfect redefines the functions of several of the DIP switches inside your printer. You **MUST** reset these switches according to the following charts. Use Figure 1 to locate DIP switches SW1 and SW2.

SW1	Function	ON	OFF
1-8	Select	Fixed*	Not fixed
1-7	Zero font	∅ (slashed)	0 (not slashed)*
1-6	Buzzer	On*	Off
1-5	Emphasized	On	Off*
1-4	Italic	On	Off*
1-3	Paper out sensor	Disabled	Active*
1-2	Character Set	IBM	Epson*
1-1	Compressed	On	Off*

SW2	Function	ON	OFF
2-4	1" Perf skip	On	Off*
2-3	Auto LF with CR	On	LF from host*
2-2	Print mode	NLQ	Draft*
2-1	Paper Width	13½"	8½"

*Suggested switch settings

IMPORTANT: Do not set 13 1/2" paper width (SW2-1 ON) unless you have an MX-100 model printer.

NOTE: The DIP switches only set the power-up condition (mode when printer is turned on) of each function. The functions can be changed thereafter by using the Dots-Perfect Menu commands or software commands. The printer power must be off whenever you reset these DIP switches.

INSTALLATION IS NOW COMPLETE.
 AT THIS POINT, REASSEMBLE YOUR PRINTER
 BY RETRACING THE STEPS IN SECTION A.

SECTION G / TESTING THE PRINTER

Plug in the printer.

Load some paper and run the self-test to verify that the printer is working properly. To activate the self-test, hold down the LF button while turning the printer on.

If your printer will not self-test, go back over the installation procedure to check for error. The most common causes of problems are:

- The Dots-Perfect board is not plugged into socket 3B correctly. The board is probably installed one pin to the front or back of the correct position.
- The spring hook is clipped to R16 not to R17.
- The pin guides were not removed from sockets 2B and 3B causing the Dots-Perfect board to be improperly seated, resulting in a poor connection.
- Jumper J1 was not disconnected.
- DIP switches are not set correctly.

If your printer still will not self-test properly, call our technical service department at (714) 945-5600 for assistance.

When the self-test is completed successfully, connect your printer to a computer, attach the Dots-Perfect menu label to the front panel of your printer (or any other convenient place), pat yourself on the back and start the satisfaction of printing Dots-Perfect.

Operating Instructions

Dots-Perfect is an upgrade kit for Epson dot matrix printers. It adds important capabilities to your printer. Once the Dots-Perfect kit is installed, your printer will have these new features:

1. NLQ (Near Letter Quality) Print mode
2. IBM Graphics Printer Emulation
3. Buffer Clear Command
4. Panel Button Font Selection

NLQ Print Mode

NLQ print uses a special two-pass character set with four times the dot resolution of regular draft print. This method provides a much finer detail in each character and eliminates the normal "dotty" appearance. The result is clear professional document printing.

Draft: abcdefghijklmnopqrstuvwxyz1234567890
 NLQ: abcdefghijklmnopqrstuvwxyz1234567890

NLQ print can be selected from the panel buttons or via software. To select NLQ from the panel buttons, simply tap the FF key while the printer is on-line. The printer will emit one short beep to indicate that NLQ has been selected. To return to draft mode printing, tap the LF key while the printer is on-line. A long beep confirms that draft mode has been selected. The software codes for NLQ are:

	ASCII	HEX	DECIMAL	BASIC
NLQ On:	Esc x 1	1B,78,31	27,120,49	CHR\$(27)"x1"
NLQ Off:	Esc x 0	1B,78,30	27,120,48	CHR\$(27)"x0"

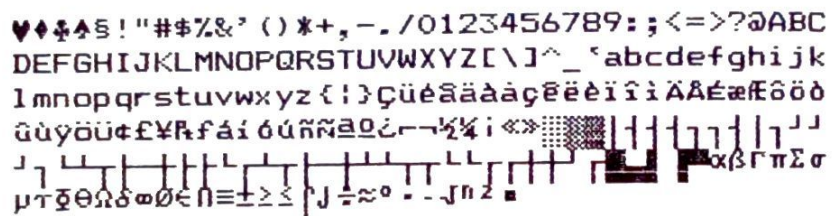
NOTE: The "x" in the above software code must be entered in lowercase.

NLQ can be used with most other print functions such as emphasized, italics, and double-wide.

IBM Graphics Printer Emulation

With Dots-Perfect your printer can be set to print these special graphics characters found on the IBM 5152 Graphics printer.

This makes it possible to print screens and documents containing these special characters.



The IBM mode can be selected automatically when your printer is turned on by setting DIP switches SW1-2 to ON. It can also be set by the following software command:

	ASCII	HEX	DECIMAL	BASIC
IBM On	Esc x 3	1B,78,33	27,120,51	CHR\$(27)"x3"
IBM Off	Esc x 4	1B,78,34	27,120,52	CHR\$(27)"x4"

NOTE: The "x" in the above software code must be entered in lowercase.

Buffer Clear Command

The Buffer Clear Command feature is a valuable time-saver for those who use buffers or spoolers. If you do not want to print the data currently stored in your buffer or spooler you may clear the buffer simply by pressing the on-line and LF buttons together. The printer will cancel all pending print data. The result is an empty buffer ready to accept new data. While the buffer clear control is in progress, the buzzer will sound and the ready light will flicker. The buffer clear stops when no data is received for two seconds or the on-line button is pressed.

Push-Button Font Selection

Dots-Perfect allows you to switch between NLQ and draft print modes by pressing only one button. In addition, you can select from a menu of 12 special print functions to create over 160 different printing combinations. With Dots-Perfect, you can give your printouts a personal touch without complicated software codes.

All of the panel button selection steps begin with the printer on-line. When the printer is off-line, the FF and LF keys operate in their usual form feed and line feed modes.

- To select NLQ:
Tap the FF button only
- To select draft:
Tap the LF button only
- To select from the menu:
Press on-line and FF together
- To activate buffer clear command:
Press on-line and LF together

Menu Selection

- As you press and release the on-line and FF buttons to activate the selection menu you will hear two quick beeps. This signals that you are at the top of the menu.
- The keys now have new functions as follows:
 - FF Beeps, moves the selection to the next function.
 - LF Toggles the selected function on or off.
 - On-line Returns to ON-LINE mode. You may now print.

Dots-Perfect

Menu

1. To begin, printer must be in ON-LINE mode.	2. To select NLQ mode, tap the FF button only.	3. To select draft mode, tap LF button only.	4. To clear buffer, press ON-LINE & LF together.
1. To activate menu selection mode, press ON-LINE & FF together.	2. To move to next function, press FF.	3. To toggle function on or off, press LF once.	4. To return to ON-LINE and resume printing, press ON-LINE.

BEEPS FUNCTION	BEEPS FUNCTION	BEEPS FUNCTION	BEEPS FUNCTION
2short Reset			
1 Condensed	4 Double-Strike	7 Italics	10 8 Lines/Inch
2 Double-Wide	5 Perf-Skip	8 Underline	11 Slash Zero
3 Emphasized	6 1/2" Left Margin	9 Fine Print	12 8 1/2" Wide Paper

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Beeps	Function
(Two short)	Reset
1	Condensed
2	Double-wide
3	Emphasized
4	Double-strike
5	Perf-skip
6	1/2" Left Margin
7	Italics
8	Underline
9	Fine Print
10	8 Lines Per Inch
11	Slash Zero
12	8 1/2" Wide Paper

3. Each time you press the FF button you will hear a beep and you will move down the menu one function. When you have entered the number of beeps for the function you wish, tap the LF key to activate it. You may then continue down the menu using the FF and LF buttons to activate more functions. When your selections are complete, simply tap the on-line button. At this point your selections are set.

4. We recommend that you test your menu selections with the test program below. It is a simple BASIC program that will send several lines to the printer. Use the Dots-Perfect Menu to select different print functions and then run the program to verify the results.

```
10 FOR X=1 TO 10
20 LPRINT "THIS IS A TEST OF DOTS-PERFECT."
30 NEXT X
RUN
```

If you are using an Apple computer use this program:

```
10 PR#1
20 FOR X=1 TO 10
30 PRINT "THIS IS A TEST OF DOTS-PERFECT."
40 NEXT X
50 PR#0
RUN
```

Sample Selections

To toggle on Condensed Print

1. Be sure printer is on-line.
2. Press and release the on-line and FF buttons at the same time
3. Tap the FF button once (Note: 1 Beep= Condensed)
4. Tap the LF button to activate condensed mode
5. Tap the on-line button to resume printing

To toggle on Emphasized and Italics together

1. Be sure printer is on-line
2. Press and release the on-line and FF buttons at the same time
3. Tap the FF button three times (3 Beeps= Emphasized)
4. Tap the LF button to activate Emphasized mode
5. Tap the FF button four more times (7 Beeps= Italics)
6. Tap the LF button to activate italics mode
7. Tap the on-line button to resume printing

To Cancel All Functions

1. Be sure printer is on-line
2. Press and release the on-line and FF buttons at the same time
3. Tap the LF button to reset
4. Tap the on-line button to resume printing

Sounds of Dots-Perfect

Once in the menu mode, Dots-Perfect uses your printer's buzzer to confirm your selection.

Two short beeps signals that the menu mode is activated and that you are at the top of the menu.

One regular beep signals that you have advanced to the next function on the menu.

One short beep signals that a function has been toggled on.

One long beep signals that a function has been toggled off.

Four short beeps signals that the menu mode is deactivated.

Additional Features

1. You can return to the top of menu at any time by holding down the FF button for one second.
2. You can also use the LF key to toggle off a function.
3. The menu mode can be used to change your print on a line-by-line basis while printing. This allows the use of several print styles for a professional look. Hold down the ON-LINE and FF buttons until the printer stops printing. Then release them and you will be in menu mode. Next, select your new functions and then press on-line to resume printing.

Example: Use menu mode to select double-wide, emphasized print for a headline, then reset to standard print for the rest of the document.

Commonly Asked Questions

Q: My printer is working, but strange things happen. What is wrong?

A: This problem is usually caused by improper settings of the printer DIP switches. You **MUST** reset these switches in accordance with the information in Section F of the installation instructions. We strongly recommend that you use our suggested settings first before experimenting with other settings.

Q: Will my printer still respond to regular software codes?

A: Yes, your printer will respond to all software codes. Refer to your printer manual for information about software codes.

Q: My MX-100 printer will not print beyond 80 columns. Why?

A: Put wide paper in your printer and run the self-test. If the printer prints only 80 characters per line, it means that DIP switch 2-1 is not set correctly; it should be ON. If the printer prints the full width of the paper, then it is your computer or software that is limiting your line length, not the printer.

Q: When I use the Dots-Perfect menu to select print functions, it works perfectly with BASIC, but not with some of my other programs. Why?

A: Some programs send software commands to the printer that reset the functions you have selected using the Dots-Perfect Menu. Usually, it is best to use the program's built-in print controls, rather than the Menu;

however, if you still cannot get the print functions you want, here is a suggestion.

Most software sends the reset codes at the beginning of the document. If you select from the menu after these codes have been sent, then the functions you select will not be reset. One way to do this is to tell the software to print the document. When the printer begins to feed paper, stop the printer with the on-line/FF buttons and use the Menu. When you go back on-line you should have the functions you want.

Q: What is Fine Print?

A: Fine Print is a combination of three functions:

1) Condensed, 2) Superscript, and 3) 6/72" line spacing (12 LPI).

Q: Who can I call for help, or if I have other questions about using Dots-Perfect?

A: Call us, not your dealer. Our technical staff is better trained to solve the problem. You can reach our technical service department, between the hours of 9AM and 3PM (Pacific Time) by calling (714) 945-5600.

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APPENDIX: Control Codes for Dots-Perfect/MX

These are the same codes as used in Epson Graftrax-Plus or Type III printers.

This page is intended as a starting reference only. Refer to your Epson printer manual for more detailed information about using these codes.

DEC	HEX	ASCII	FUNCTION
7	07	BEL	Sounds buzzer
8	08	BS	Backspace
9	09	HT	Horizontal tab
10	0A	LF	Line feed
11	0B	VT	Vertical tab
12	0C	FF	Form feed
13	0D	CR	Carriage return, prints line
14	0E	SO	Sets double-wide for current line
15	0F	SI	Sets condensed print
18	12	DC2	Cancel condensed print
20	14	DC4	Cancel double-wide if set by SO
27	1B	ESC	Escape, precedes printer control codes

The following codes must be preceded by an escape code:

35	23	#	Accepts high bit as is from computer
45	2D	- n	Underline mode, n=0 off, n>0 on
48	30	0	Sets line spacing to 1/8" (8 lpi)
49	31	1	Sets line spacing to 7/72"
50	32	2	Sets line spacing to 1/6" (6 lpi)
51	33	3 n	Sets line spacing to n/216"
52	34	4	Italics On
53	35	5	Italics Off
56	38	8	Disables paper out sensor
57	39	9	Enables paper out sensor
60	3C	<	Prints one line unidirectionally
61	3D	=	Clears high bit
62	3E	>	Sets high bit
64	40	@	Resets modes to power-up state

DEC	HEX	ASCII	FUNCTION
65	41	A n	Sets line spacing to n/72"
67	43	C n	Sets form length to n lines
67	43	C 0 n	Sets form length to n inches
68	44	D n1.. 0	Sets horizontal tab positions
69	45	E	Sets emphasized print
70	46	F	Cancel emphasized print
71	47	G	Sets double-strike print
72	48	H	Cancel double-strike print
74	4A	Jn	Prints buffer and does one-time n/216" line feed
75	4B	K n1 n2	Sets 60 dpi graphics. # of data=n1+256*n2
76	4C	L n1 n2	Sets 120 dpi graphics. # of data=n1+256*n2
78	4E	N n	Sets skip over perforation to n lines
79	4F	O	Cancel skip over perforation
81	51	Q n	Sets right margin to n characters
83	53	S n	Sets super/subscript print, n = 0 super, n >= 0 sub
84	54	T	Cancel super/subscript print
85	55	U n	Sets bi/unidirectional print, n = 0 bi, n >= 0 uni
87	57	W n	Sets double-wide print, n = 0 off, n = 1 on
120	78	x0	Cancel NLQ mode (Sets draft)
120	78	x1	Sets NLQ mode
120	78	x3	Sets IBM character set
120	78	x4	Sets Epson character set

NOTE: n represents a data value, not a character value.
Example of basic code to turn off underline:

Incorrect: CHR\$(27) "—0"
Correct: CHR\$(27) "—"CHR\$(0)

Notes