

DICONIX

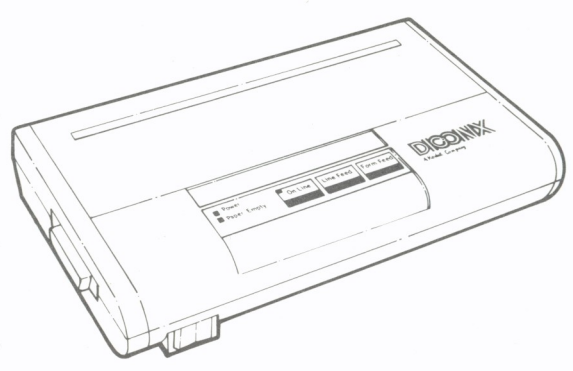
A Kodak Company

InkJet Printer Model 150



DICONIX InkJet Printer

A Kodak Company



Model 150

Operator Manual

Preface

This operator manual provides set-up, operation and service procedures for the Diconix Model 150 InkJet Printer. For owner registration, warranty, and other service related information, please refer to the appendix.

Table of Contents

1.0 Setup

1.1 Unpacking	1-2
1.2 Print Head Installation	1-3
1.3 Interface Cable Installation	1-4
1.4 A.C. Adapter	1-4
1.5 Batteries	1-5
1.6 Cover Positions	1-6
1.7 Paper Loading	1-7
1.8 Printing	1-8

2.0 Operation

2.1 Default Settings	2-1
2.2 Buttons and Indicators	2-2
2.3 Simultaneous Button Operation	2-4
2.4 Indicator LEDs	2-5
2.5 Printing at Paper End	2-5
2.6 Dip Switch Selections	2-6
2.7 International Character Sets	2-6
2.8 Font Selection	2-7
2.9 Printing Pages	2-7
2.10 Control Codes	2-8

2.11 Compatibility	2-9
--------------------	-----

3.0 Commands

3.1 Print Commands	3-1
3.2 Format Commands	3-15
3.3 Graphic Commands	3-35
3.4 Envelope Mode Commands	3-43

4.0 Maintenance

4.1 Hardware Troubleshooting Chart	4-2
4.2 Questions and Answers	4-3
4.3 Environmental Conditions	4-5
4.4 Preventive Maintenance	4-5
4.5 Print Head Maintenance	4-6
4.6 Battery Maintenance	4-7
4.7 Exploded View	4-9

Appendix A— Specifications

Printer	A-1
---------	-----

Parallel Interface	A-3
Serial Interface	A-7

Appendix B— Abstracts

Font Chart	B-1
Envelope Mode	B-1
Graphics Mode	B-2
ASCII Chart	B-3
International Char.	B-5
IBM Set 1	B-6
IBM Set 2	B-8
IBM Set All	B-9
Epson Codes	B-10
Diconix 150 Fonts	B-11
Warranty Repair Command Index	
Command Summary	

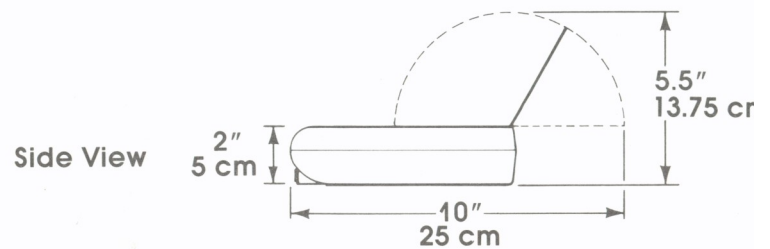
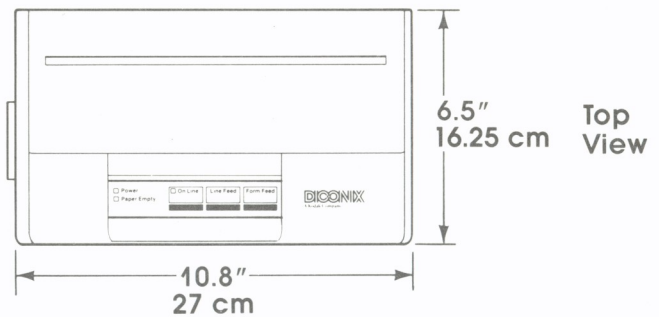
1.1 Unpacking

When unpacking the printer, verify that all of the following items are in the shipping container:

- InkJet Printer
- Print Head
- A.C. Adapter/Recharger
- Operator Manual
- Sample Paper

If any items are missing, contact the retail outlet where you purchased the printer.

Place the printer in an area free of extreme temperatures, direct sunlight, and sources of dust or contamination. Retain the shipping container for later use.



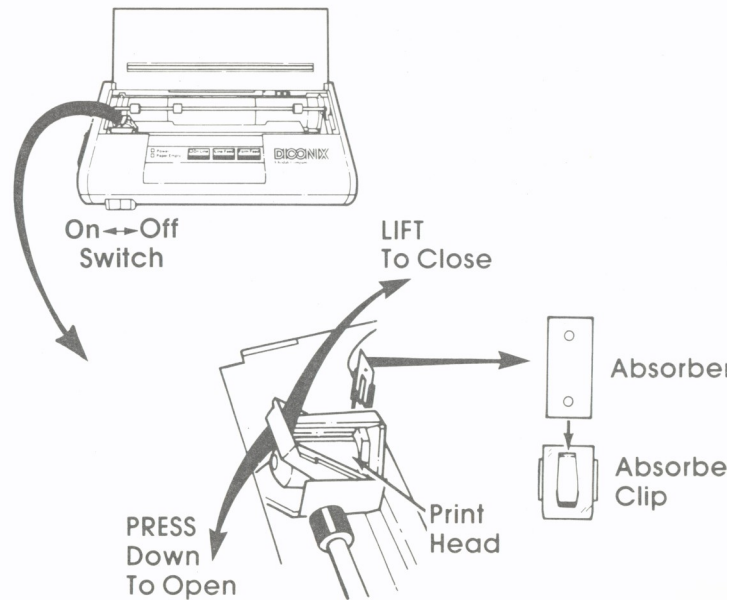
1.2 Print Head Installation

Remove the print head and absorber from the shipping container and complete the following:

1. With power off, open the top cover.
2. Insert the white absorber into the clip holder with fiber side facing the print head carriage.
3. Press down on the print head carriage latch.
4. Insert the print head into the carriage.
5. Close the carriage latch by lifting up.

Note: Use precaution not to scratch or otherwise damage the metal surface of the print head.

Warning: The ink in the print head is harmful if swallowed. **Keep out of reach of children.**



1.3 Interface Cable Installation

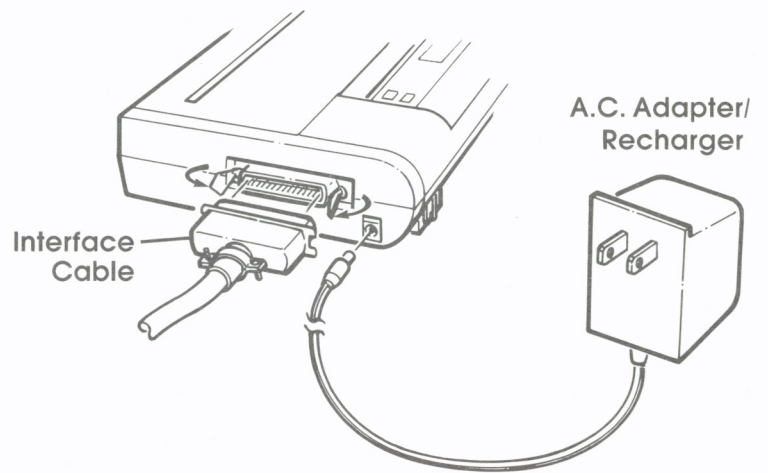
The Diconix InkJet Printer communicates with the host computer by a parallel transmission interface cable or a serial transmission interface cable.

Information to determine what type of cable to use with the printer is in Appendix A.

1.4 A.C. Adapter

The printer operates with the A.C. adapter/recharger or with batteries. The A.C. adapter/recharger plugs into a normal appliance outlet (120 volt A.C., 50/60 hertz).

Warning: Due to differences in voltage and polarity, use of an A.C. adaptor other than the one shipped with the printer may result in damage and require factory service.

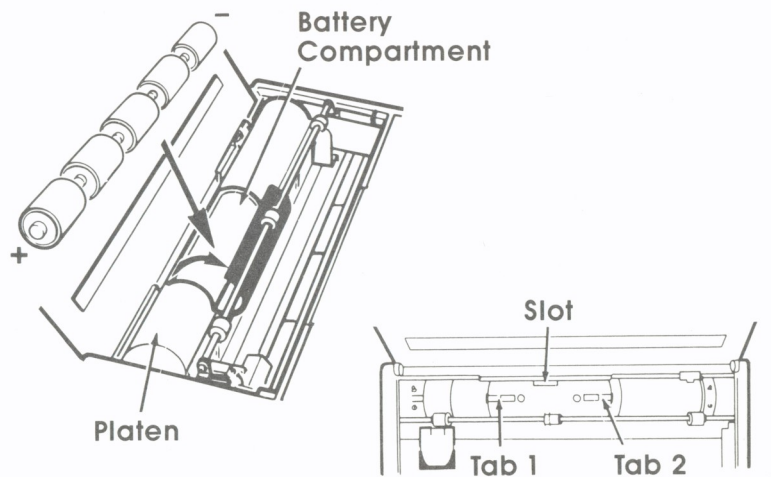


1.5 Batteries

For battery mode operation install five "C" size, nickel-cadmium (NiCad), rechargeable batteries as follows:

1. With power off, open the top cover.
2. Lift the bail arm until it is locked away from the platen.
3. Rotate the platen until the battery compartment is aligned between the rear cover and the paper guide.
4. Open the battery compartment.
5. Install five (5) rechargeable batteries according to the polarity diagram illustrated in the battery compartment.

Caution: Do not use non-rechargeable batteries or leave weak rechargeable batteries in the printer for an extended period. For more information on batteries, see section 4.4.



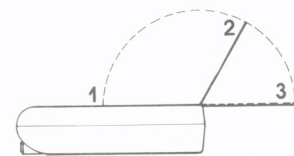
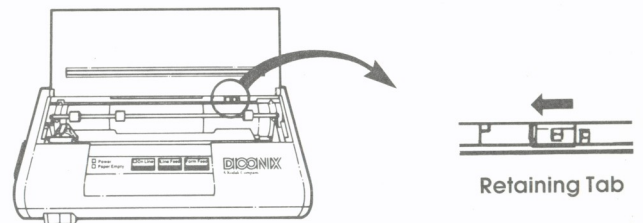
To close: push tab 1, then tab 2

1.6 Cover Positions

1. In the closed position, the top cover slot can be used to guide single sheet or fanfold paper. As sheets are printed, the opening helps prevent paper skewing. The paper slot also acts as a tear surface for reducing paper usage.

2. In the partially open position, the top cover forms a viewing surface for pages as they are being printed.

3. In the open position, the top cover acts as a guide for tractor feed or continuous fanfold paper. This helps prevent refeeding of paper back into the rear opening. To open to the back position, move the retaining tab to the left and tilt cover backward.



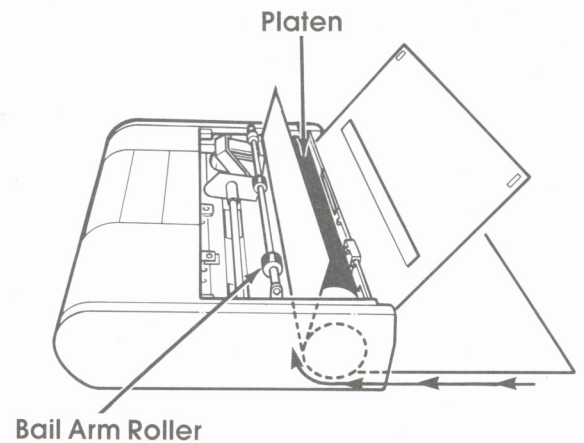
1.7 Paper Loading

Single sheet, fanfold, and tractor feed paper can be used with the printer.

Single Sheet or Fanfold Paper

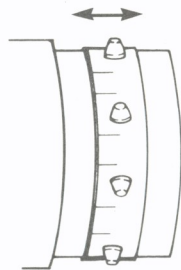
1. Open the top cover.
2. Lift the bail arm until it is locked away from the platen.
3. Insert the paper into the rear opening until it appears above the platen.
4. Release the bail arm.

Straighten the paper by referencing the paper alignment marks on the tractor feed pin wheel or the top cover opening. The left edge of the paper should be aligned to the left edge of the rubber on the platen.



Tractor Feed Paper

1. Open the top cover.
2. Lift the bail arm until it is locked away from the platen.
3. Insert the paper into the rear opening until it appears above the platen.
4. Align the left side holes with the left side pin wheel.
5. Slide the moveable right side pin wheel over until it matches the paper holes.
6. Release the bail arm.



1.8 Printing

After installing the print head and paper, ensure correct printer operation by printing a test pattern.

To start test pattern: While pressing FORM FEED, turn the power switch on. Test printing will stop automatically after one page.

To stop test pattern: Turn the power switch off or press ON LINE. (If ON LINE is pressed, test printing will continue when ON LINE is pressed again.)

To link with a computer host, the printer may require selection in the computer software set-up menu. If the Model 150 does not appear as a choice, try either an Epson or IBM printer. The emulation dip switch (see section 2.6) must reflect this choice. For more information on compatibility, see section 2.11.

2.0 Printer Operation

After setup procedures are completed, the printer is ready to receive data from the host

To initialize the printer, do one of the following:

- Turn the power switch on.
- Send a master reset command [ESC] @ through the data stream.
- Send an Initiate signal.

Initialization will cause the following:

- The printer goes online if paper is installed.
- The print head returns to home position.
- The buffers clear ([ESC] @ does not clear receive buffer).
- The printer returns to default settings.

2.1 Default Settings

Factory settings reflect the following default format:

- | | |
|------------------------|---|
| • Epson compatibility | • Line Space is 1/6" |
| • Draft font selected | • CR only (not CR + LF) |
| • No perforation skip | • LF + CR (not LF only) |
| • page length is 11" | • Horizontal tab every eight characters |
| • U.S.A. character set | |

Factory settings remain in effect until one of the following occurs:

- Dip switches are changed (see section 2.6).
- A setup print command is sent by the host (see section 2.10).
- A feature selection is made by operator panel buttons (see section 2.2).

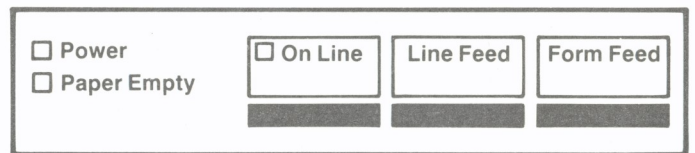
2.2 Buttons and Indicators

The **Operator Panel** is used to request line feeds, form feeds, bring the printer online and offline, and select quality and draft fonts.

Also, simultaneous selection of the buttons can initiate a reverse form feed, select the script font, and enter battery recharge or envelope mode.

- **ON LINE** toggles the printer between online and offline states. If paper is installed when power is initiated, the printer is automatically online.

The ON LINE switch is also used for **recovery from error conditions**. If the Paper Empty indicator LED is blinking, press ON LINE to try recovery. (See section 4.0 for more information on error recovery.)



Operating Instructions*	When lights are lit...			Press buttons...		
	Power	Paper Empty	On Line	On Line	Line Feed	Form Feed
Power On		<input type="checkbox"/>	<input type="checkbox"/>			
Online	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Line Feed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
Form Feed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Reverse Line Feed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Select Quality	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	
Select Draft	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
Select Script (Parallel Only)	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>		
Select Condensed (Serial Only)	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>		
Battery Recharge						
Envelope Mode		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Test Pattern		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Error Recovery			<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Paper Empty			<input type="checkbox"/>			
Battery Low		<input type="checkbox"/>	<input type="checkbox"/>			
Serial I/F Error		<input type="checkbox"/>				

Key: Light on Flashing Power switch to on Press button *This chart is displayed on the bottom of the printer

- **LINE FEED** advances the paper by one line when the printer is offline. If momentarily pressed, paper advances by one line. If the button is held down, line feeds occur continuously until the button is released.

When the printer is online, this button functions as a **draft font select**.

- **FORM FEED** advances the paper to the next Top of Form (TOF) when the printer is offline. Top of Form is determined by the page location when the printer is initialized or page length set.

When the printer is online, this button functions as a **quality font select**.

2.3 Simultaneous Button Operation

- **Reverse Line Feed** reverses the paper by one line. By pressing LINE FEED and FORM FEED at the same time while the printer is offline, paper feeds backward 1/6". If the buttons are held down, reverse line feeds will occur continuously until the buttons are released.

- **Script font or Condensed font** is selected by pressing LINE FEED and FORM FEED at the same time while the printer is online. Printers with a parallel interface select script; serial printers select condensed.

- **Battery Recharge Mode** can be selected by use of all three buttons at the same time. For more information on this operation, see section 4.4.

- **Envelope Mode** can be selected by pressing LINE FEED while turning the power switch on. For more information, see section 3.4.

2.4 Indicator LEDs

- **The Power LED (red)** indicates when power is on. If battery voltage is low, the light begins to flash on and off to indicate that the batteries need to be recharged or replaced.

- **The Online LED (green)** indicates that the printer is in online or offline. If the indicator is lit, the printer is online and ready to begin printing. If the indicator is unlit, the printer is offline and unable to receive data.

A flashing Online LED indicates a serial interface error. (Please see this Appendix for more information.)

- **The Paper Empty LED (red)** indicates if the printer is out of paper.

A flashing Paper Empty LED indicates a problem with the printer. (Please see section 4.0 for more information.)

2.5 Printing at Paper End

When the end of paper is detected by the printer, the following occurs:

- The Paper Empty LED lights.
- The printer stops printing after a few additional lines are printed.
- The printer goes offline.

To continue printing, do the following:

1. Insert more paper.
2. Press the ON LINE button.

Printing resumes with no loss of data.

2.6 Dip Switch Selections

Most default settings can be changed by setting the appropriate dip switch in the printer. Dip switches are located under the top cover on the front side of the carriage opening. Reference the chart below for default options. 1 means dip switch is in the up position; 0 means dip switch is down.

Switch	Function	0	1
1	CR definition	CR only*	CR + LF
2	LF definition	CR + LF*	LF only
3	Perforation skip	no skip*	1" skip
4	Page length	11"*	12"
5	Font selection	Draft*	Quality
6	Emulation **	Epson*	IBM

* Indicates factory default setting.

** IBM is a trademark of International Business Machines Corporation; Epson is a trademark of Epson Corp.

2.7 International Character Sets

Three dip switches establish the current international character set. The default setting is U.S.A. Character set can also be established by data stream command as explained in section 3.2.12.

Dip Switch			Character Set
7	8	9	
0	0	0	U.S.A.*
1	1	0	England
1	0	1	Sweden
0	1	1	Italy
1	0	0	France
0	1	0	Germany
0	0	1	Denmark
1	1	1	Spain

* Switch 10 should not be used.

2.8 Font Selection

The following fonts are available:

- Draft*
- Quality
- Script**
- Condensed
- Superscript/Subscript
- Condensed Super/Subscript

Fonts are selected through the data stream or by operator panel buttons while the printer is online.

Button	Font
• Line Feed	Draft
• Form Feed	Quality (Vintage 12)
• LF and FF	Script or Condensed**

*Draft is the factory set default. It can be changed by dip switch.

**Script is only available with parallel interface printers; Condensed is selectable only with serial interface printers.

2.9 Printing Pages

Printed pages can be generated in three ways:

1. A simple PRINT command from the host generates printing in the default format. Defaults are listed in section 2.1.

2. A software program can generate printed pages with a specific format. Check the software manual for information on this method.

3. Control Codes placed in the data stream generate many different print features. This method is explained in detail on the following pages.

2.10 Control Codes

Control codes are generated from the host computer and sent to the printer with the data to be printed. They consist of two sets of non-printed characters.

(`ESC` Sequence) + (Command) = Control Code

The first set of characters is an "escape sequence" which tells the printer that a set of instructions follows. The second part is a "command", which acts as an instruction in abbreviated form. Each print command is explained in detail in section 3.0.

NOTE: *The "Escape" sequence is not standardized. Do not confuse it with the `ESC` key. Some computers are programmed to generate the required sequence by use of the `ESC` key (or the control key), but others are not. Refer to the computer manual for more information.*

Control Code Generation

To generate a control code, send the escape sequence followed by the required command. There are three ways to generate the required control code.

1. Any keyboard stroke can be programmed to generate the escape sequence. If this is the case, simply press the programmed key and type the print command as defined in the next chapter. Choose a rarely used key for this requirement so that regular typing is not hindered.

2. ASCII coding can generate the control code. The ASCII (American Standard Code for Information Interchange) character code establishes a system

to abbreviate characters using numbers and symbols. For instance, "A" is represented by (1000001) in binary code, (65) in decimal code, and <41> in hexadecimal code. The printer accepts printer commands using any of these codes. Refer to the ASCII Chart in Appendix B.

If ASCII characters are used, input the numerical escape sequence and follow it with the required command.

For example, the sequence for setting Emphasized Mode `[ESC]E` would be one of the following:

Binary:	(0011011) (1000101)
Decimal:	(27) (69)
Hexadecimal:	(1B) (45)

3 . Generate a control code using a software program. An escape sequence can be generated by using a program language, such as BASIC, to generate the control code. For instance, decimal code CHR\$(27), followed by the print command, will generate the control code.

The following is an example of a BASIC program to generate printing using control code instructions. Note that there are many types of BASIC programming and the host software manual should be consulted before attempting to generate this type of instruction. Also, please see the BASIC program for envelope addressing located in the appendix.

```
10 Rem Underline Mode
20 LPRINT CHR$(27);"-";CHR$(1);
30 LPRINT "InkJet Printer"
40 LPRINT CHR$(27);"-";CHR$(0);
50 LPRINT "By Diconix"
```

In this example, underline mode $\text{ESC}-1$ is initialized and a sequence of characters is printed with a line beneath. Then, underline mode is turned off, $\text{ESC}-0$, and another line is printed as show below.

InkJet Printer
By Diconix

2.11 Compatibility

The Diconix InkJet Printer is compatible with most types of computers and software. Specifically, it has been designed to be compatible with computers or software which use either the Epson or IBM command sets. Epson default mode can be changed to IBM by setting the dip switches as explained in section 2.6.

The Epson command set provides two distinct modes. Text Mode prints corresponding characters in response to input of normal keyboard characters (ASCII characters). Graphics Mode (Bit Image Mode) provides a way to use Text Mode as well as a variety of graphic commands for printing bit map images. For an explanation of Graphics Mode, see section 3.3.

The IBM command set is similar to the Epson command set. When there is a difference between the way a command operates under IBM and Epson, it is noted by use of separate descriptions of each command set. These commands are listed below:

Epson only commands:

[ESC] # [ESC] = [ESC] > [ESC] Q [ESC] / [ESC] b

IBM only commands:

[ESC] : [ESC] Q3 [ESC] \

Epson/IBM mode-dependent function:

[ESC] 4 [ESC] 5 [ESC] 6 [ESC] 7

[ESC] I [ESC] R [ESC] ^

Epson/IBM mode-dependent response:

`[ESC] D [ESC] B [ESC] 2`
`HT VT [ESC] A`

NOTE:

If problems encountered after software installation are indicated by one of the following:

1. text or graphics is printed in reduced size,
2. the form feed is activated three quarters down on the page,
3. text is printed with 88 lines instead of the normal 66 lines per page,

set the printer to Epson mode (see operator manual section 2-6) and try a generic or standard printer emulation as defined by the computer's software package.

The Model 150 technology employs a higher resolution (the vertical dots are closer together) and this may cause some application programs to print in eight lines per inch. The use of a generic emulation will correct text problems, but graphics will always be printed at the higher resolution (smaller size). For a more detailed explanation of resolution differences, see the operator manual (page 3-37).

In addition to the differences described above, the Model 150 does not accept downloaded fonts (as in Epson's `[ESC] %`; `[ESC] ;`, and `[ESC] &` or IBM's `[ESC] =`), use quad density graphics (IBM/Epson `[ESC] Z`), or print 10 pitch fonts (Epson's `[ESC] P` or IBM's DC2). Also, the printer does not support reverse line feed or half speed (Epson's `[ESC] ;` and `[ESC] s`), BEL, DEL, or the paper empty functions (Epson's `[ESC] 8`, `[ESC] 9`).

The following subsections describe in detail the commands used with the Diconix InkJet Printer. Unless otherwise indicated, the commands are compatible both with the Epson and IBM printer command sets. Commands that generate a different response are indicated with separate descriptions for each emulation.

For convenience, commands are separated into four subsections: Print Commands, Format Commands, Graphic Commands, and Envelope Mode Commands.

Note: All examples are given using BASIC programming expressions with decimal coding. Standard control codes are provided where valid. Also see the command summary in the Appendix.

3.1 Print Commands

3.1.1 Reset **ESC** @

Initializes the printer.

Returns the printer to default conditions as defined by the dip switch settings. Defaults are listed in section 2.1. Receiver buffer is not cleared.

Expression: CHR\$(27);"@";

3.1.2 Deselect Printer (DC3)

Deactivates the printer.

Places the printer in a disabled, offline state.

The printer is not able to receive data. DC1 reselects the printer. In IBM mode, this function is also performed by `[ESC] Q CHR$(3)`. Select and deselect commands will not effect the Online LED.

Expression: `CHR$(19);`

Code: Ctrl S

3.1.3 Deselect Printer `[ESC] Q CHR$(3)`

IBM only: Deactivates the printer.

Places the printer in a disabled, offline state.

The printer is not able to receive data. DC1 reselects the printer. In Epson mode, this function is performed by DC3. Select and deselect commands will not effect the Online LED.

Expression: `CHR$(27); "Q";CHR$(3);`

3.1.4 Select Printer (DC1)

Activates the printer.

Enables the printer to receive data in an online state

This command is valid only if used to return from the deselect mode set by DC3. If the DC1 code is input during data transfer, all previously stored data in the buffer is ignored. Select and deselect commands will not effect the Online LED.

Expression: CHR\$(17);

Code: Ctrl Q

3.1.5 Line Feed (LF)

Advances paper one line.

Initiates a line feed. All data stored in the print buffer is printed before the line feed. Printing begins at the left margin. If the dip switch setting is "on", the printer will perform a carriage return and line feed.

Line feed depends on the currently set line feed spacing. Spacing can be set by a variety of commands, including `[ESC] 0`, `[ESC] 1`, `[ESC] 2`, `[ESC] 3`, or `[ESC] A`. The default line feed is 1/6".

The SO command for enlarged characters is cancelled if this command is used.

Expression: CHR\$(10);

Code: Ctrl J

3.1.6 Form Feed (FF)

Advances paper to the next Top of Form position.

When input, all data stored in the print buffer is printed before advancing the page.

Default page length is 11" and can be changed to 12" via dip switch. Also, length may be changed by using the `[ESC] C` or the `[ESC] C CHR$(0)` command.

The SO command for enlarged characters is cancelled if this command is used. TOF position is set when the printer is initialized.

Expression: CHR\$(12);

Code: Ctrl L

3.1.7 Carriage Return (CR)

Starts printing.

In the factory default (CR only), a carriage return to the leftmost position is performed after buffer data is printed. If the dip switch setting is "on", the printer will perform a carriage return and line feed.

A line feed after printing is also initiated when the auto line feed mode has been set by `[ESC] 5`. CR cancels the enlarged character mode set by SO.

Expression: CHR\$(13);

Code: Ctrl M

3.1.8 Backspace (BS)

Backspaces one character.

All data in the buffer is printed when this command is received.

In enlarged mode, the carriage backspaces the length of two characters. Backspace is invalid in proportional mode.

Expression: CHR\$(8);

Code: Ctrl H

3.1.9 Auto Line Feed On/Off **ESC** 5

IBM: Sets and cancels automatic line feed.

This command enables or disables an automatic line feed with every carriage return.

n = 1 or 49 Sets automatic line feed
n = 0 or 48 Cancels automatic line feed

Epson: See italic mode off in section 3.2.29.

Expression: CHR\$(27);"5";CHR\$(n);

3.1.10 Temporary LF **ESC** J

Initiates one line feed at n/288 inches.

A line feed is initiated at the set value n/288. The next line feed terminates the command.

The **ESC** J command can enable a n/288 inch line feed setting, except that it will not be terminated by a line feed. This command cancels the enlarged character mode. Paper feed by this code ignores the perforation skip set by **ESC** N.

Expression: CHR\$(27);"J";CHR\$(n);
(0 ≤ n ≤ 255)

3.1.11 Incremental Print **ESC** i

Prints each character Incrementally.

n = 1 or 49	Incremental Printing
n = 0 or 48	Normal Printing

If characters are input at less than 0.5 seconds, the printing will be continuous with a normal print start command. In incremental mode, printing is unidirectional; in non-incremental mode (normal printing), printing is bidirectional.

Expression: CHR\$(27);"i";CHR\$(n);

3.1.12 Skip-Over Perforation **[ESC] N**

Sets number of lines to skip at end of form.

Specifies "n" as the number of lines to skip each time the bottom of form is reached. This command allows the user to skip any number of lines at the bottom of a page. The skip-over default is ignored if this code is used.

For example, if seven lines are to be skipped, the value for n is seven. Printing of data continues at the Top of Form position on the next page.

The perforation skip default is one inch and is selectable through the dip switch. When form length is changed, **[ESC] N** must be reentered. When a value

exceeds length of form, all perforation skips will be ignored. This command is cancelled by **[ESC] C** or **[ESC] C CHR\$(0)**

Expression: CHR\$(27);"N";CHR\$(n);
(1 ≤ n ≤ 255)

3.1.13 Skip-Over Perforation OFF **[ESC] O**

Cancels the **[ESC] N** command.

Escape O (capital "o") returns perforation skip length to the currently set default. Default skip is set by dip switch as outlined in section 2.6.

Expression: CHR\$(27);"O"

3.1.14 Cancel CAN

Cancels one line of data in the print buffer.

Data stored in the buffer in the same line is cancelled.

Expression: CHR\$(24);

Code: Ctrl X

3.1.15 Escape ESC

Initiates the escape sequence.

When the escape code is followed by a control command, the action described by the control command is initiated.

This command is not to be confused with the escape key on the computer keyboard. The escape sequence is not standard on computers. Please reference the host computer manual for usage of ESC.

Expression: CHR\$(27);

Code: Ctrl [

3.1.16 Control Code Select **ESC** I

Epson: Selects printable characters or control codes.

The **ESC**I (capital "I") command changes the undefined characters in the ASCII table from decimal 0 to decimal 31 and 128 to 159 as either control codes or printable characters.

n = 0 or 48	Control codes
n = 1 or 49	Printable characters

International characters are provided in these undefined areas of the ASCII table. When $n = 1$ or 49 is input, these codes become printable characters. When $n = 0$ or 48 is selected, the undefined codes are ignored. This command does not influence codes such as FF, LF, etc.

IBM: See print quality select in section 3.2.10.

Expression: CHR\$(27);"I";CHR\$(n);

3.1.17 Sets MSB to 0 **ESC** =

Epson: Sets most significant bit (MSB) as 0.

The MSB of an 8-bit data input after this command is input becomes 0.

Expression: CHR\$(27);"=";

3.1.18 Cancel MSB Function **ESC**

Epson: Cancels most significant bit function.

Cancels the most significant bit (MSB) functions set by ESC> or ESC=.

Expression: CHR\$(27);"#";

3.1.19 Sets MSB to 1 **ESC** >

Epson: Sets most significant bit (MSB) as 1.

The MSB of an 8-bit data input after this command is input becomes 1.

Expression: CHR\$(27);">";

3.1.20 Deactivate High Order Code `ESC 6`

Epson: Sets Italic International Characters.

Codes in the ASCII table from decimal 128 to 159 are usually control codes. When this command is input, they become Italic International Characters.

IBM: See select character set 2 in section 3.1.27.

Expression: `CHR$(27);"6";`

3.1.21 Activates High Order Code `ESC 7`

Epson: Cancels Italic International Characters.

When `ESC 6` is input, codes in the ASCII table from decimal 128 to 159 become a special italic font (see appendix). When this command is input, they return to control codes.

IBM: See select character set 1 in section 3.1.26.

Expression: `CHR$(27);"7";`

3.1.22 One-line Unidirectional **ESC** <

Sets leftmost to right printing for one line.

Printing proceeds from the left margin to the right margin and prints in only one direction.

Recommended when high quality print accuracy is required, this mode reduces horizontal aberration in dot placement. An alternative command is **ESC** U enables unidirectional printing continually.

Expression: CHR\$(27);"<";

3.1.23 Unidirectional Print On/Off **ESC** U

Sets or cancels left to right printing.

Printing proceeds from the left margin to the right margin and prints in only one direction.

n = 1 or 49 Unidirectional
n = 0 or 48 Bidirectional

Recommended when high quality print accuracy is required, this mode reduces horizontal aberration in dot placement. An alternative command is **ESC** < which enables unidirectional printing for just one line.

Expression: CHR\$(27);"U";CHR\$(n);

3.1.24 One Character Printing `ESC` ^

IBM: Prints one character according to the All-Character Set.

See the appendix for the All-Character Set. The one-character data following this code can not be treated as a control code.

Epson: See 9-jet graphics mode in section 3.3.6.

Expression: `CHR$(27);" ^";`

3.1.25 Continuous Printing `ESC` \

IBM: Prints continuously according to the All-Character Set.

Please see the appendix for the All-Character Set. In this mode, a " $n_2 \times 256 + n_1$ " character print is initiated. A space is substituted where there are no characters in the corresponding codes. Control codes are not accessible in the All-Character Set.

Expression: `CHR$(27);" \ ";CHR$(n1);CHR$(n2);`
($1 \leq n_1 \times n_2 \leq 65535$)

3.1.26 Select Character Set 1 **ESC** 7

IBM: Character Set 1 is selected.

When this command is input, all subsequent data is processed as character data or function codes according to Character Set 1. See the appendix for this character set.

Epson: See activates high order code in section 3.1.21.

Expression: CHR\$(27);"7";

3.1.27 Select Character Set 2 **ESC** 6

IBM: Character Set 2 is selected.

When this command is input, all subsequent data is processed as character data or function codes according to Character Set 2. See the appendix for this character set.

Epson: See deactivate high order code in section 3.1.20.

Expression: CHR\$(27);"6";

3.1.28 Test Print **ESC** †

Starts the test pattern printing.

One page of the test pattern is printed in the same way as initiated through the operator panel (see section 1.8).

Expression: CHR\$(27);"†";

3.2 Format Commands

3.2.1 Horizontal Tab Set `ESC D`

Specifies the tab positions for the horizontal tab.

The setting *n* denotes column position. The number of horizontal tab positions is derived from the character width of the current font multiplied by the specified number of columns.

Place tab settings in ascending order. Up to 32 tab settings can be input. Tab positions above 32 are ignored. End the tab string with `CHR$(0)`. The horizontal tabs are cleared with `ESC D <Null>` or `ESC @`.

The default horizontal tab setting is every 8 character positions.

IBM differences: see section 3.2.2.

Expression: `CHR$(27);"D";CHR$(n1);`
`CHR$(n2);...CHR$(nk);CHR$(0);`
(1 ≤ *n* ≤ 255)
(1 ≤ *k* ≤ 32)

3.2.2 Horizontal Tab (HT)

Executes a Horizontal Tab.

Epson: If the horizontal tab position is set with `[ESC]D`, this command will move the print position. If no tab position has been established, the default HT of eight characters is used. In Epson mode, tabs are stored as an absolute value and will not change with the print pitch. Column number 0 represents the leftmost position in Epson.

IBM differences: Tab position is stored as a column number and executed for the value obtained by multiplying the column number n-1 by the current pitch. Column number 1 represents the leftmost position in IBM.

At power on or input of `[ESC]R`, the tab is set automatically at every eight characters.

Expression: `CHR$(9)`;

Code: Ctrl I

3.2.3 Vertical Tab Set `ESC B`

Specifies the tab positions for the vertical tab.

IBM: Tab values are obtained by multiplying the current line feed pitch by the line number. The tab does not need to be changed with a change in pitch. Line number 1 represents the top of form position.

Tab settings can be made for up to 64 positions in ascending order. If more are input, they are ignored. The series must end with a `CHR$(0)`. Vertical tabs may be cleared by `ESC B <NULL>`, `ESC R`, or `ESC @`.

`ESC b` can also be used to generate this command

Epson differences: Tab position values can be made at 16 positions. Line number 0 represents the top of form position. (IBM's $n=2$ corresponds to Epson's $n=1$.) Tab positions are not cleared by `ESC R`.

Expression: `CHR$(27);"B";CHR$(n1);`
`CHR$(n2);...CHR$(nk);CHR$(0);`
($1 \leq n \leq 255$)
($1 \leq k \leq 16$ or 64)

3.2.4 Vertical Tab (VT)

Executes a vertical tab.

If the vertical tab position is set with `[ESC]B` or `[ESC]b`, this command will move the print position to that setting after printing all data in the buffer.

If no position is established or if a number greater than the page length is established, the VT command will act the same as a line feed. VT cancels enlarged mode set by an SO code.

Epson differences: A tab position beyond page length will initiate the same action as a form feed.

Expression: `CHR$(11);`

Code: Ctrl K

3.2.5 Set All Tabs to Default `[ESC]R`

IBM: Resets all tab positions to the default.

The default tab settings in horizontal is every 8 character positions. There are no vertical tab default positions.

Epson: See international characters in section 3.2.12.

Expression: `CHR$(27);"R";`

3.2.6 Right Margin Set **ESC** Q

Epson: Sets right margin.

Right margin is set by the number of characters as measured by character width.

Value maximums and minimums:

Elite $2 \leq n \leq 85$
 Condensed $4 \leq n \leq 136$

If a value is exceeded or if in Graphics Mode the line is exceeded, printing and a Line Feed are performed automatically. In enlarged mode, the values are one half (fraction rounded to a whole) of other print mode values.

Expression: CHR\$(27);"Q";CHR\$(n);

3.2.7 Set Left Margin **ESC** I

Sets left margin at column head.

The **ESC** I (small "el") command will set the left margin at the column head in the current character size.

Value maximums and minimums:

Elite $0 \leq n \leq 83$
 Condensed $0 \leq n \leq 132$

If a value exceeds page parameters, the command is ignored. In enlarged mode, the values are one half (fraction rounded to a whole) of other print mode values. Any data on the same line before this command is input will be lost.

Expression: CHR\$(27);"I";CHR\$(n);

3.2.8 Proportional Mode On/Off **ESC** p

Selects and deselects proportional spaced printing.

Each character is assigned a proportional value based on character width. Command is valid in all modes.

n = 1 or 49 Proportional
n = 0 or 48 Normal spacing

Expression: CHR\$(27);"p";CHR\$(n);

3.2.9 Select Font **ESC** x

Selects font style.

n = 0 or 48 Draft font
n = 1 or 49 Quality font
n = 2 or 50 Script font*

All other numbers are ignored.

Expression: CHR\$(27);"x";CHR\$(n);

Note: This command is not available in either Epson or IBM printers.

*Script font is only available in printers with parallel interfaces.

3.2.10 Print Quality Select **ESC** I

IBM: **ESC** I (capital "i") sets the print mode.

n = 0	Draft mode
n = 2	Quality mode
n = 4	Draft mode
n = 6	Script mode*

Epson: See controls code select in section 3.1.16

Expression: CHR\$(27);"I";CHR\$(n);

*Available only with parallel interface printers.

3.2.11 Underline Mode On/Off **ESC** —

Sets underline printing.

The **ESC** — (dash) command enables and disables continuous underlining.

n = 1 or 49	Sets underline on
n = 0 or 48	Sets underline off

Expression: CHR\$(27);"—" ;CHR\$(n);

3.2.12 International Characters **ESC** R

Epson: Selects an international character set.

The value *n* selects the country for the required character set. Please see the International Character Set Chart in the appendix. Below is a chart for setting the value of *n*.

Character sets may also be selected through the dip switches explained in section 2.7

IBM: See set all tabs to default in Section 3.2.5.

Expression: CHR\$(27);"R";CHR\$(n);
 $0 \leq n \leq 8$

Note: Japan character set is not selectable by dip switch.

n	Country
0	U.S.A.
1	France
2	Germany
3	England
4	Denmark
5	Sweden
6	Italy
7	Spain
8	Japan

3.2.13 Page Length in Lines `ESC C`

Sets page length by number of lines.

The page length is an absolute length derived from the line spacing multiplied by the number of lines per page. The page length will not change after it is set even if the line spacing changes.

When this command is input, the current line position is set to TOF and the perforation skip function is cancelled. Page length can also be changed by dip switch as explained in section 2.6 or by page length in inches, `ESC C CHR$(0)`.

Expression: `CHR$(27);"C";CHR$(n);`
($1 \leq n \leq 255$)

3.2.14 Page Length In Inches `ESC C CHR$(0)`

Sets page length by inches.

When this command is input, the current line position is set to TOF and the perforation skip function is cancelled. Page length can also be changed by dip switch as explained in section 2.6 or by the page length by lines, `ESC C`, command.

Expression: `CHR$(27);"C";CHR$(0);CHR$(n);`
($1 \leq n \leq 127$)

3.2.15 Double-Strike Mode `ESC G`

Sets double-strike mode printing.

All data following this command is printed with two passes of the print head (double-strike). The paper is advanced by 1/192" between the first and second pass.

The printer performs a paper feed adjustment to maintain the absolute length and line number values. Double-strike mode is cancelled with a `ESC H` command.

Expression: `CHR$(27);"G";`

3.2.16 Double-Strike Mode Off `ESC H`

Cancels double-strike mode printing.

Expression: `CHR$(27);"H";`

3.2.17 Overscore Mode On/Off **[ESC]** _

Sets and cancels overscore mode.

After the input of this command, subsequent printable characters, including spaces, are printed with overscores.

- n = 1 or 49** Sets overscore mode
- n = 0 or 48** Cancels overscore mode

Expression: CHR\$(27);"_ "CHR\$(n);

3.2.18 Super/Subscript Mode **[ESC]** S

Sets superscript or subscripting printing.

The same command with a different n value can set either super or subscripting mode.

- n = 1 or 49** Subscript mode
- n = 0 or 48** Superscript mode

In superscript mode a character measuring 1.6 mm is printed in the upper half of the line. In subscript mode, the character would be printed on the lower half of the line. This command is terminated by an **[ESC]**T input.

Use of underline mode in superscript mode will underline continuous below normal character height.

Expression: CHR\$(27);"S";CHR\$(n);

3.2.19 Super/Subscript Mode Off **ESC** T

Cancels superscript or subscript printing.

Expression: CHR\$(27);"T";

3.2.20 Select Mode Combination **ESC** !

Selects various combinations of printing modes.

Mixed print modes are set with one command using the chart below. Each print mode is determined by the value of n according to bit definition as defined. This command will take precedence over all other print mode selection commands.

Bit	7	6	5	4	3	2	1	0
When 1	Always 0		Double Width	Double Strike	Emphasized	Condensed	Always 0	Elite
When 0			—	—	—	—		Elite
Bit Value	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0

For example, to set condensed double-width, n should be:

$$2^5 \times 1 + 2^2 \times 1 = 36 \text{ (decimal)}$$
$$= 24 \text{ (hexadecimal)}$$

Note: Mode selection in the Epson command set will not allow mixed modes. In the Model 150, any mode can be mixed.

Expression: CHR\$(27);"!";CHR\$(n);
($0 \leq n \leq 61$)

3.2.21 1/8" Line Spacing **ESC** 0

The **ESC** 0 (zero) sets 1/8 inch line spacing.

Expression: CHR\$(27);"0";

3.2.22 7/96" Line Spacing **ESC** 1

Sets 7/96 inch line spacing.

Expression: CHR\$(27);"1";

Note: Epson and IBM printers use 7/72 of an inch increments for line spacing.

3.2.23 1/6" Line Spacing **ESC** 2

Sets 1/6 inch line spacing.

Epson: With the input of **ESC** 2, subsequent paper feeds are carried out at 1/6th inch.

IBM difference: Paper feeds are carried out at the value set by **ESC** A. Default is 1/6".

Expression: CHR\$(27);"2";

3.2.24 n/288" Line Spacing **ESC** 3

Sets line spacing to n/288 inches.

1/288 inch corresponds to 1/3 dots.

Expression: CHR\$(27);"3";CHR\$(n);
(0 ≤ n ≤ 255)

Note: Epson and IBM printers use n/216 of an inch increments for line spacing.

3.2.25 n/96" Line Spacing **ESC** A

Sets line spacing to n/96 inches.

Epson: After input of this command, subsequent paper feeds are set at n/96 inches.

IBM difference: Paper feed is set to n/96 inch, but the value is not valid until **ESC** 2 is input.

Expression: CHR\$(27);"A";CHR\$(n);
(0 ≤ n ≤ 85)

Note: Epson and IBM printers use n/72 of an inch increments for line spacing.

3.2.26 Emphasized Mode **ESC** E

Sets emphasized mode printing.

Emphasized characters give a bold-like effect. All data following this command is printed in emphasized characters.

This command can be cancelled by **ESC** F or **ESC** ! commands.

Expression: CHR\$(27);"E";

3.2.27 Emphasized Mode Off **ESC** F

Cancels emphasized mode printing.

Expression: CHR\$(27);"F";

3.2.28 Italic Mode **ESC** 4

Epson only: Selects alternative (italic) character set.

All characters following this command are printed in the italic font.

IBM Mode: See set top of form in section 3.2.32.

Expression: CHR\$(27);"4";

3.2.29 Italic Mode Off **ESC** 5

Epson: Deselects alternative (italic) character set.

IBM: See auto line feed in section 3.1.9.

Expression: CHR\$(27);"5";

3.2.30 Elite Mode **ESC** M

Enables elite type style printing.

Elite mode enables all characters following the command to be printed in 12 characters per inch.

Expression: CHR\$(27);"M";

3.2.31 Elite Mode **ESC** :

IBM: Enables elite type style printing.

Elite mode enables all characters following the command to be printed in 12 characters per inch.

Expression: CHR\$(27);":";

3.2.32 Set Top of Form **ESC** 4

IBM: Sets the present paper position as top of form (TOF).

Epson: See italic mode in section 3.2.28.

Expression: CHR\$(27);"4";

3.2.33 Shift Out (SO) or **ESC** SO

Sets temporary enlarged mode printing.

All characters following this command on the same line are printed in enlarged characters.

Enlarged printing is cancelled by a CR, CAN, LF, VT, FF, DC4, **ESC** ! or **ESC** W.

Expression: CHR\$(14); or CHR\$(27);CHR\$(14);

Code: Ctrl N

3.2.34 Shift Out Off (DC4)

Cancels temporary enlarged mode printing.

This command cancels the Shift Out (SO or **ESC** SO) commands. Expanded printing set by **ESC** W or **ESC** ! remains in effect.

Expression: CHR\$(20);

Code: Ctrl T

3.2.35 Enlarged Mode On/Off **[ESC] W**

Sets or cancels enlarged printing.

This command will enable or disable enlarged printing.

n = 1 or 49 Enlarged printing
n = 0 or 48 Cancel enlarged

Unlike the Shift Out commands which perform the same function, enlarged printing continues until changed by **[ESC] W** or **[ESC] !**.

Expression: CHR\$(27);"W";CHR\$(n);

3.2.36 Shift In (SI) or **[ESC] SI**

Sets condensed mode printing.

All characters printed on the same line as the command is input are printed in condensed mode. The maximum characters per line is 136 (19.2 characters per inch).

Condensed printing continues until a DC2 or **[ESC] !** is received. When the SO (Shift Out) command is input, enlarged characters are printed in condensed format.

Expression: CHR\$(15);
 or
 CHR\$(27);CHR\$(15);

Code: Ctrl O

3.2.37 Shift In Off (DC2)

Cancels condensed mode printing.

The condensed mode (SI or `[ESC]SI`) command is not cancelled with a LF or CR. Condensed mode can also be cancelled by `[ESC]!`, `[ESC]@`, or `[ESC]P`.

Expression: `CHR$(18);`

Code: Ctrl R

3.2.38 Vertical Tab Channel Select `[ESC] /`

Epson: Selects Vertical Format Unit (VFU) channel.

The printer will execute specified vertical tabs in accordance with the format specified by the channel *n* of a Vertical Format Unit format. With VFU, the printer prints information at various locations according to channel selections made with the `[ESC]b` commands.

Example: Channel 1 can be set for vertical tabs at the second, fifth, and twentieth lines. Channel 2 can be set at the second, eighth, and fifteenth lines. Mixed format positions can also be used. Positions are always referenced to the Top of Form (TOF).

Expression: `CHR$(27);"/";CHR$(n)`
($0 \leq n \leq 7$)

3.2.39 Set Vertical Tab Position **[ESC] b**

Epson: Sets the Vertical Format Unit (VFU) positioning of vertical tabs.

With VFU, the printer will print information at various locations according to channel selections made with this command. The VFU has eight channels (0 to 7). For each channel, up to 16 positions can be set. See vertical tab channel select **[ESC] /**.

Tab positions must be terminated with CHR\$(0). The channel positions must be set within the page length. Channel 0 is the default. Tab positions can also be set with the Vertical Tab Set command **[ESC] B**.

Expression: CHR\$(27);"b";CHR\$(n);CHR\$(m₁);
CHR\$(m₂);...CHR\$(m_k);CHR\$(0);
(0 ≤ n ≤ 7)
(1 ≤ m ≤ 255)
(1 ≤ k ≤ 16)

3.3 Graphics Commands

The following sections contain the commands for utilizing Bit Image Mode graphics. With these commands, bit image data will be printed in dot patterns. There are several density and speed modes which give the user more creative and time saving options.

When one of the escape sequence commands is entered and followed by data, the printer enters the Bit Image Mode. Before each set of bit data, the numbers n_1 and n_2 are required. These one byte numbers specify the number of bit image data bytes to be transferred.

These numbers, conveyed with either decimal or hexadecimal coding, can be derived from the following formula.

$$n_1 = (\text{number of data}) - (256 \times n_2)$$

$$n_2 = \text{Integer}(\text{number of data}/256)$$

The following example uses 300 as the number of bit image data.

$$\begin{array}{r} 1 = n_2 \\ 256 \overline{)300} \\ \underline{256} \\ 44 = n_1 \end{array}$$

The formula derives n_1 as representing the values from 0-255. n_2 represents values from $(0-255) \times 256$.

Text and Graphics

When text and bit image data are used in the same line, the amount of maximum printable space for bit image data decreases by the amount of space necessary for the text. In single density graphics mode, the maximum number of dot positions printable per line is 566. In double density graphics mode, the maximum number of dot positions printable per line is 1133. Use the following chart and formula for determining this space requirement.

Print Mode	No. of dot position decreases per character
Emphasized	16*
Condensed	10
Elite-sized	16
Expanded	32

*high resolution

For example, if 20 emphasized characters in Text Mode are to be placed in a line with a total of 480 positions, the number of dot positions left for graphics is 160.

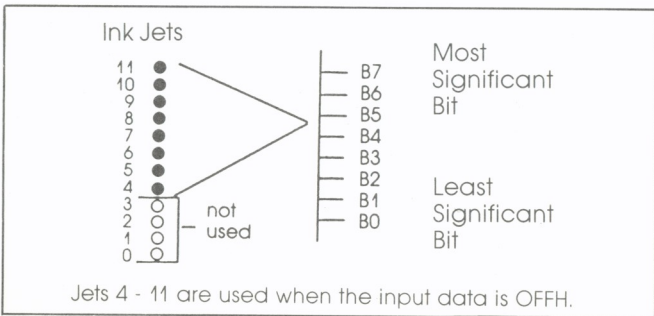
$$\begin{array}{r} \text{Total} = 480 \\ (20 \times 16) = 320 \\ \hline \end{array}$$

$$= 160 \text{ dot positions for graphics}$$

Dot Pattern

The relationship between the bit image data and the dot firing pattern on the print head is shown in the illustration. Nine jets in the print head can be arbitrarily fired. If a bit is 1, the jet fires. If a bit is 0, the jet does not fire.

Bit Image	Epson	Model 150
Vertical	1/72"	1/96"
Horizontal	1/60"; 1/120"	1/80"; 1/160"



Bit Data and Ink Jets Relationship

Note: The Diconix InkJet printer, which is a 12-jet printer, employs a vertical dot pitch of 1/96 instead of other printers with the 1/72, 9-pin print head. Accordingly, the bit image, when printed, is vertically reduced at a ratio of 72/96 (3/4). Yet, the bit image printing of the 9-pin printer is emulated by this printer by reducing the bit image horizontal dot pitch to 1/80". This printer can, therefore, print image data files for the 9-pin printer without additional data process or conversion.

3.3.1 Single-Density Graphics **ESC** K

Sets single-density bit image graphics.

When this command is entered, the bit image data which follows is printed in dot patterns. The maximum number of bit image data per line is 566.

Excess data, if designated, is ignored. For printing in this mode for two lines or more, the setting must be made for each line. Text mode is automatically restored upon completion of bit image printing.

Expression: CHR\$(27);"K";CHR\$(n₁);CHR\$(n₂);
followed by bit image data:
CHR\$(d₁);CHR\$(d₂)...CHR\$(Dn₁,n₂);

(0 ≤ d ≤ 255)
(1 ≤ Dn₁,n₂ ≤ 566)

Note: With all 8-pin graphics, line spacing must be set with **ESC** A. "n" must equal 8.

3.3.2 Double-Density Graphics `[ESC] L`

Sets double-density bit image graphics.

When this command is entered, the bit image data which follows is printed in dual-density dot patterns. The maximum number of bit image data per line then becomes 1133.

The command acts the same as `[ESC] K`, but the dot pattern is done in twice the dot density in the horizontal direction. Mixing single and double-density as well as graphics and text modes is an option to the user.

The speed of printing is reduced unless double-speed `[ESC] Y` is used. If data exceeds the maximum, the excess will be ignored. After completing the command, the printer will return to text mode.

Expression: `CHR$(27);"L";CHR$(n1);CHR$(n2);`
followed by bit image data;
`CHR$(d1);CHR$(d2)...CHR$(Dn1,n2);`

($0 \leq d \leq 255$)

($1 \leq Dn_1, n_2 \leq 1133$)

3.3.3 Double Speed and Density **ESC** Y

Sets double-speed, double-density bit image graphics.

This command enables printing to continue at the same rate of printing speed as in single-density while using double-density graphics.

All characteristics for double-density mode remain in effect. Horizontally adjacent dots can not be printed using this command.

Expression: CHR\$(27);"Y";CHR\$(n₁);CHR\$(n₂);
followed by bit image data:
CHR\$(d₁);CHR\$(d₂)...CHR\$(Dn₁,n₂);

Note: **ESC** Z, *Quadruple-density Bit Image Mode* defaults to **ESC** Y.

3.3.4 Dot Graphics Mode Select **ESC** *

Selects a bit image mode.

The value m will select a wide range of bit image modes. (For details on the operation of each mode, see each particular section and the graphics overview in section 3.3.)

When the designated number of bit image data is over that printable on one line, the extra data is ignored. For a continuous bit image printing of over two lines, the setting must be made for each line.

Bit image printing is not affected by such modes as underline, double-strike, or emphasized mode. Bit image printing is unidirectional.

Expression: CHR\$(27);"*";CHR\$(m);CHR\$(n₁);
CHR\$(n₂);
(0 ≤ m ≤ 6) (0 ≤ n₁ ≤ 255) (0 ≤ n₂ ≤ 255)

Mode	Density	Resolution DPI
0	Single	H-80 V-96
1 2 3	Double	H-160 V-96
4	QX-10	H-96 V-96
5	One-to-One	H-96 V-96
6	CRT	H-160 V-96

# of Dots	Line Width
480	6"
960	6"
640	6.67"
576	6"
720	4.5"

3.3.5 Assign Bit Image Mode $\text{ESC} ?$

Assigns graphics commands to bit image mode $\text{ESC}^* n$.

This command will assign $\text{ESC} K$, $\text{ESC} L$, $\text{ESC} Y$, or $\text{ESC} Z$ to the n parameter in ESC^* .

The default values are listed in the chart on this page.

Expression: $\text{CHR}\$(27);"?";m;\text{CHR}\(n)
 ($m = K, L, Y, \text{ or } Z$)
 ($0 \leq n \leq 6$)

Example: By sending $\text{ESC} ? K; \text{CHR}\(4) , any further use of $\text{ESC} K$ will give Q X-10 density rather than single density.

3.3.6 9-Jet Graphics Mode **ESC** ^

Epson: Sets 9-jet Bit Image Mode.

This command selects 9-jet bit image mode. *m* represents the following modes:

m	dots per inch
0	80 horizontal—single density
1	160 horizontal—double density

The n_1 and n_2 represent the total number of dot positions. In this mode, different from other bit image modes, 1/2 of total data sent is designated by n_1 and n_2 .

To send data, the 9 jets are divided into the upper 8 jets and the lowest one jet. The upper 8 jets are used as the 1st byte and the lowest one jet as the 2nd byte. The first byte is sent out first and the 2nd byte next. These two bytes make a one-dot position pattern. The lower 7 bits of the 2nd byte are ignored. To activate the lowest jet (3), set the second byte to 128.

IBM: See one character printing in section 3.1.24.

Expression:

CHR\$(27);"^^";CHR\$(*m*);CHR\$(n_1);CHR\$(n_2);
CHR\$(d_{1F});CHR\$(d_{1S});CHR\$(d_{2F});CHR\$(d_{2S})...

$(0 \leq m \leq 1)$

$(0 \leq n_1 \leq 255)$

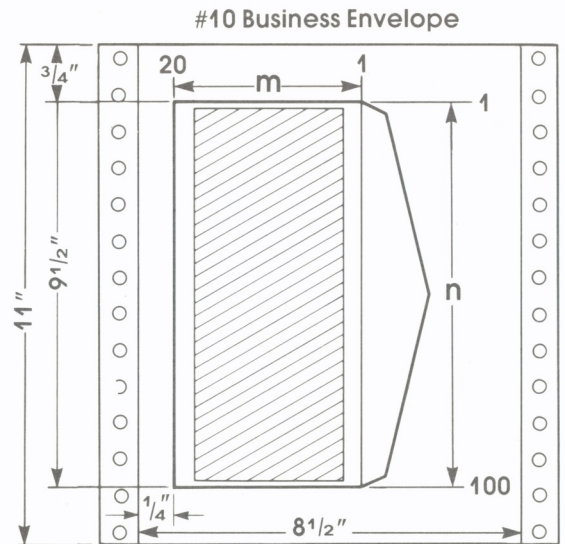
$(0 \leq n_2 \leq 255)$

3.4 Envelope Mode

The Diconix InkJet Printer is capable of printing addresses on special #10 business size envelopes. Both single and continuous feed envelopes are available on special forms.

1. Enter envelope mode by pressing LINE FEED while turning the printer on. The Online LED will momentarily flash, then remain lit.
2. Load envelope(s). The loading procedures are the same as for regular paper.
3. Send address information from the host as explained in the following pages.

Note: If multiple copies of each envelope address are needed, hold the ONLINE button down and press FORM FEED once for each copy required.



Envelopes print in landscape format.

Envelope printing begins after the address information is sent from the host and when one of the following occurs:

1. Form Feed (FF) is sent from the host.
2. ONLINE and FORM FEED are pressed.
3. Buffer overflow indicates address information beyond the 20 line limit.

To exit envelope mode turn the printer off.

Use of control commands is required for composing address data. (Reference section 2.10 for an overview of these procedures.) There is an example of a program used to generate envelope printing in the appendix.

Address Data

To generate envelope address data, prepare the address field as explained below.

1. By using "m" (above) as the reference, determine vertical placement on the envelope. Up to 20 vertical lines can be entered.
2. By using "n" as the reference, determine horizontal placement on the envelope. Up to 100 character positions can be entered.
3. By using the commands explained below, enter the data and send it to the printer.

A field of up to 20 lines of 100 characters can be used. Character pitch is fixed at 1/12" and line pitch at 1/6". Up to 2000 characters can be stored in the buffer.

Envelope Mode Commands

The following commands are used to set up and execute envelope printing. These are the only commands available while in this mode.

3.4.1 Carriage Return (CR)

Returns the location of printing to the first column of the field.

3.4.2 Line Feed (LF)

Automatically generates a carriage return. Line height is fixed at 1/6".

3.4.3 Form Feed (FF)

Used to start envelope printing after the printer is loaded with address information. The envelope is advanced to next Top of Form after the address is printed. Top of Form is fixed at 11".

3.4.4 ESC z

Specifies the number of copies required. Multiple copies can also be selected through the operator panel as explained above.

Expression: CHR\$(27);"z";CHR\$(n);
(1 ≤ n ≤ 255)

3.4.5 ESC y

Locates the first character at the locations defined by m and n (see illustration). All succeeding characters are positioned from this setting until the location is changed. When a line exceeds the 100 character print field per line, excess characters begin on the next line.

"m" = vertical position from 1 to 20

"n" = horizontal position from 1 to 100

Note: Vertical print field position 20 is identified by the right side of the left bail arm roller.

Expression: CHR\$(27);"y";CHR\$(m);CHR\$(n)

3.4.6 ESC x

Selects font used. Quality and script are the available font styles in this mode.

n = 1 or 49 Quality font

n = 2 or 50 Script font (parallel I/F only)

Note: Font style can also be changed through the operator panel.

Expression: CHR\$(27);"x";CHR\$(n)

Some computer programs automatically insert Carriage Returns or Carriage Return/Line Feeds at certain times (usually after 80 characters). To prevent this, the computer must suppress these unwanted characters. The following BASIC program statement will suppress the automatic 80 character Carriage Return:

```
WIDTH "LPT1:," 255
```

4.0 Maintenance

With proper care, the Diconix InkJet Printer will operate continuously with minimal maintenance. This section will suggest a few procedures for preventing and diagnosing problems.

Some troubleshooting procedures have been outlined below. For more complicated error conditions, see service policies and procedures in the appendix.

The indicator LEDs function as an indication that something is wrong with printer operation.

Power LED Flashing indicates that the batteries are low. Go to Battery Maintenance in section 4.6.

Paper Empty LED Flashing indicates an error condition. Press ON LINE. The printer attempts to recover from the error condition. If the printer does not recover, refer to the troubleshooting chart shown below.

4.1 Hardware Troubleshooting Chart

Symptom	Possible Cause	Corrective Action
1. Printer does not function Paper Empty LED flashing	a. Paper empty b. Carriage malfunction	a. Install paper. b. Clear paper path of any obstruction.
2. Printer does not function LED lights are erratic	a. Batteries low	a. Try A.C. adapter. If printer works, recharge or replace batteries.
3. Printer does not function no LEDs lit	a. Batteries low b. No A.C. line voltage	a. Try A.C. adapter. If printer works, recharge or replace batteries. b. Change outlets; see section 1.4.
4. Paper Feed Problems	a. Paper misaligned b. Paper feed obstruction c. Slow printing	a. Reinstall paper correctly. b. Clear obstruction from inside the carriage or around the paper supply. c. No action. Repeated LF or FF may slow printing in extreme cases.
5. Print Problems	a. Dirty print head b. Faulty print head c. Wrong side of paper* d. Ink on paper's left corner	a. See section 4.5 for clean procedure. b. Replace print head cartridge. c. Use correct side of paper. d. See section 1.2 for blotter pad installation.

*Print quality also depends on other factors such as grain and quality of paper.

4.2 Questions and Answers

How do I “install” the Model 150 with my host computer?

Most computer software has an installation program in which the printer can be selected from a list of common names. Reference the printer installation section of the software manual and choose either an IBM or Epson printer. The dip switch (see section 2.6) on the printer should match this selection.

Also, make sure, especially when using the serial interface, that the computer and printer are connected correctly. See the interface specifications in the Appendix or consult a computer equipment store for more information.

Why do I have problems setting up my software programs even though I have installed it as an IBM or Epson printer?

Problems of this kind are due to the wide variety of computer software available. Some problems are indicated by wrong line spacing or reduced size of graphics printing. The Model 150 has higher resolution than most printers (the dots are closer together) and may cause one of the following:

1. Text printed in 88 lines per page instead of 66 lines.
2. A Form Feed is activated three quarters down the page.
3. Graphics is printed in reduced size.

The line spacing problems can be corrected by choosing a generic (some are called standard) printer during installation. Some software generated graphics will always be printed in 3/4 size reduction because of the higher resolution. See sections 2.11, 3.2.25, and 3.3 for more details.

Note: For IBM PC and compatible computers, the DOS Graphics Command must be run prior to loading graphics software.

Are some IBM or Epson commands not supported in the Model 150?

In addition to resolution, the Model 150 does not support download fonts, quad density graphics, 10 pitch fonts, half-speed printing, or the paper empty functions. For more information on compatibility, see section 2.11.

How can I obtain maximum battery performance in the Model 150 printer?

NiCad battery life usually depends on the recharging schedule and a few simple rules. Always let the batteries run completely down before attempting to recharge and always replace all five batteries when replacing the set. For more information, see section 4.6.

4.3 Environmental Conditions

Operate or store the printer only within the following:

- Operating temperature: 50°-100°F
- Storage temperature 0°-150°F
- Humidity (non-condensing): 10% to 90% relative

Note: *When ink cartridge is subjected to extreme temperatures, allow time for it to reach normal operating temperature before printing.*

4.4 Preventive Maintenance

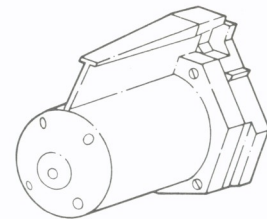
Periodically clean the printer with a soft brush to remove dust and particles that accumulate during both printing and storage. The covers can be cleaned with a mild detergent and water solution on a damp cloth.

Caution: *Do not use an abrasive cloth or volatile solvents to clean the printer. Do not use solvents on or around the printing surface of the print head.*

4.5 Print Head Maintenance

Misplaced or missing ink dots during printing is an indication that the print head should be replaced or cleaned as explained below.

1. Remove and reinstall the print head according to the procedure outlined in section 1.2. Try printing again.
2. If the problem persists, remove the print head and carefully push a partially unfolded paper clip through the back slot in the center of the print head. Push slightly on the ink bladder until ink drops form on the printing surface.
3. Clean any excess ink off the surface with a lint-free, non-abrasive cloth. Repeat step 2, if necessary.



4. Reinstall the print head and see if the problem has been corrected. If the problem continues, install a new print head cartridge.

4.6 Battery Maintenance

When battery voltage drops below adequate operation level (5.8 volts), the printer stops printing and the Power LED begins to flash.

Two or more printed pages can be completed with low battery power by pressing the ON LINE button. The Power LED will continue to blink, but printing will continue without loss of data.

Better options are to switch to the A.C. adapter or recharge the batteries. (This will cause printer to reset.)

Battery Recharge Mode

1. With A.C. adapter connected and batteries in the printer compartment, turn power on.

2. Press and hold all three buttons on the operator panel until the Paper Empty and Online LEDs begin to flash alternately. This indicates batteries are recharging.

Recharging can be interrupted for printing, then placed back in recharge mode without loss of measured hours. For instance, if batteries have been recharging for four hours, then interrupted for printing without turning off the power, recharge time will continue from the four hour mark. To exit from recharge mode, press ON LINE. Reenter recharge mode the same way as explained above.

Battery recharging is completed when the LEDs stop flashing and the Power LED is lit. Recharge time normally takes up to ten hours, but time varies significantly according to normal A.C. line voltage conditions.

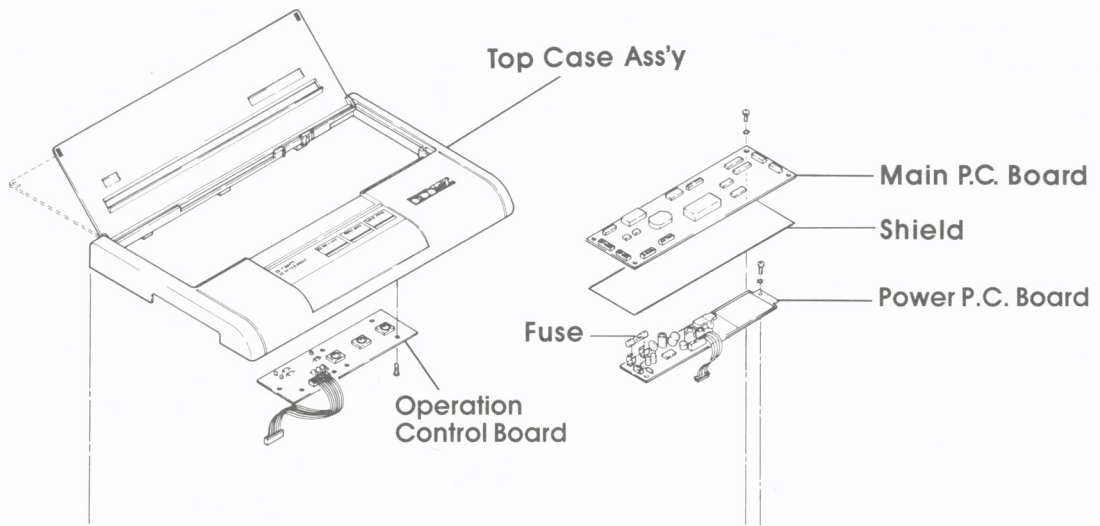
When batteries are fully charged, the printer prints for a minimum of fifty minutes of continuous printing or approximately 150 pages. Fully charged batteries will power the printer in standby for a minimum of twelve hours. During battery recharging, normal printing is not possible.

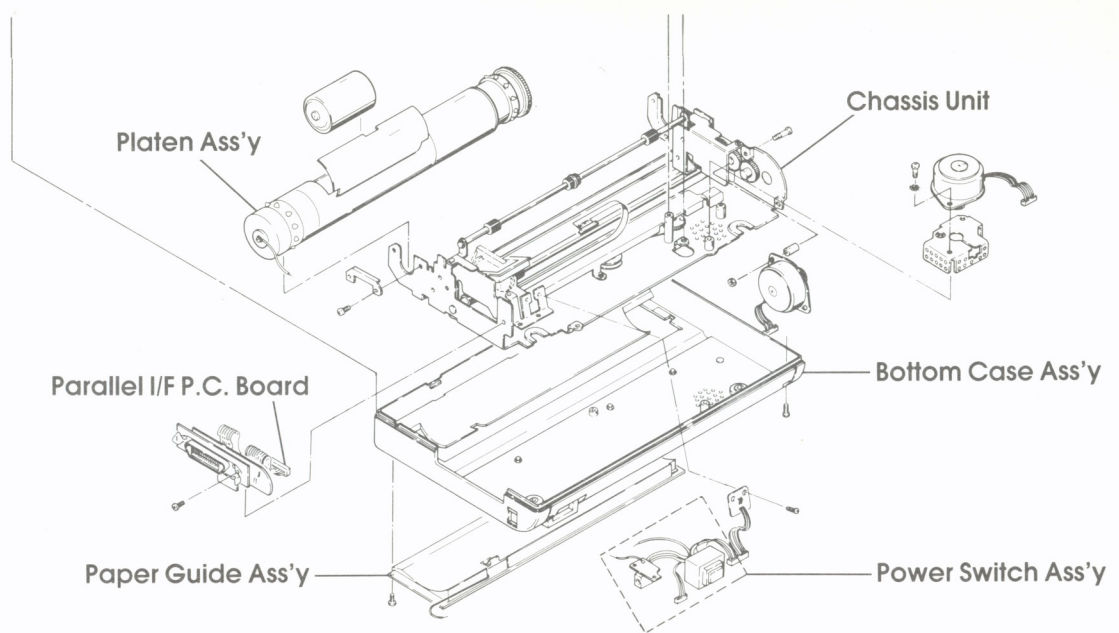
For Maximum Battery Performance

NiCad battery life is a function of the batteries and their recharging schedule. The few simple rules described below will help maximize battery life.

- Use high quality NiCad C size of the correct rating (1.2 amp hour). Do not leave dead batteries in the unit for long periods or leakage of corrosive fluids may damage the printer. Do not use non-rechargeable batteries and by no means attempt to recharge non-rechargeable batteries.
- Recharge batteries only after the Power LED is flashing to indicate they are fully discharged. Recharging partially low batteries will result in reduced operating time and shorter battery life.
- Always replace all five batteries at the same time. Replacing a partial set will result in poor performance and decreased battery life.
- When replacing batteries, carefully open and close the battery compartment to avoid damaging the holding tabs. The compartment should be closed by pressing on the left side (marked as 1) then the right side (marked 2).

4.7 Exploded View





Appendix A—Specifications

A

Printer Specifications

Print Method:	Drop-on-demand thermal inkjet
Print Media:	Single Sheet—8-1/2" x 11" Tractor Feed Paper Continuous Form, Fanfold Transparency Single Envelopes Tractor Feed Envelopes
Print Modes:	Italics, Emphasized, Enlarged, Proportional, Condensed
Print Width:	7.08"; 17.7 cm; 85 draft characters
Print Direction:	Draft—Bidirectional NLQ—2 passes semi-bidirectional Graphics—Unidirectional Logic Seeking

A.C. Power:	120 VAC, 60 Hz, wall mount; Charger output 9V/1A, 13W
Battery Power:	Five "C" Ni Cad rechargeable 1.2V rated 1.2AH Prints 150 pages full charge 12 hour life non-printing
Fuse:	Type 5MF, 2A, 250V fast blow
Environment:	Operation: 50°-100°F Storage: 0°-150°F Humidity: 10% to 90%
Compatibility:	Epson IBM
Resolution:	Quality—192 DPI Draft—96 DPI
Graphics:	Low Res.—566 DPL High Res.—1133 DPL

Interface: Centronics 8-Bit Parallel
Serial RS-232-C

Front Panel: On/Offline
Line Feed
Form Feed
Font Selection
Reverse Feed
Battery Recharge Mode
Envelope Mode

Print Speed:

Speed*	Mode
150	Draft
50	Quality
50	Script
240	Condensed
50	Super/Subscript
50	Enhanced Draft
50	Double-Strike Draft
21	Enhanced Quality
21	Double-Strike Quality

*characters per second (cps)

Characters: ASCII Characters-152
Coded Graphics-50
International-33

Print Head: Disposable ink supply
Prints 500 pages text
Available in colors

InkJet: 12 jet vertical array
1/96" pitch

Dimensions: 2.0" x 6.5" x 10.8"
5 cm x 16.25 cm x 27 cm

Weight: 3.75 lb.; 1.7 Kg (with batteries)

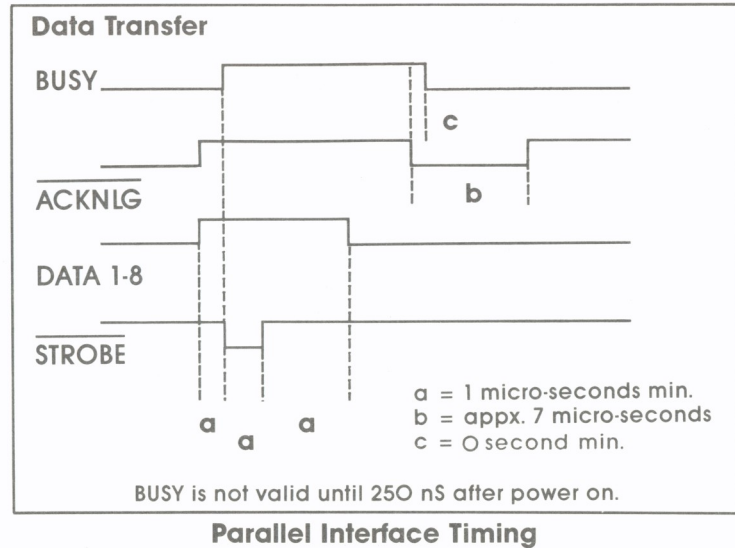
Operating Noise: 45 decibels

Appendix A

A

Parallel Interface Specifications

- Type:** 8-bit parallel
- Connector:** 36 pin, female, Amphenol #57-30360
- Cabling:** Shielded cable
Should not exceed 10 feet.
- Buffer:** 2K bytes
- Protocol:**
- a.) Logic Level—TTL compatible
 - b.) Synchronization: Externally applied Data Strobe.
 - c.) Handshake: ACK and Busy signals



Signal Definitions

DATA STROBE

- Negative logic
- A synchronized signal for reading DATA 1—8. Normal state is high. When it goes from high to low, BUSY goes high and DATA 1—8 is read the next time it goes from high to low. The pulse width is a minimum of 1 micro-seconds.

DATA 1—8

- Positive logic.
- This input signal receives the information expressed in bit 1 to bit 8 of each signal. DATA 1 is the least significant bit (LSB). DATA 8 is the most significant bit (MSB). The pulse width is a minimum of 3 micro-seconds.

Paper Empty

- Positive logic.
- This signal goes high when the paper begins to run out.

ACKNOWLEDGE

- Negative logic.
- This signal acknowledges the reception of data. It responds to the reception of the DATA STROBE signal. When power is on, it is unconditionally output once.
- It is normally high and outputs a pulse of approximately 7 micro-seconds when low. BUSY will be reset at the falling or rising edge of this signal.
- It is configured in falling edge trigger at the factory.

INITIATE

- When this signal is low, the printer goes to initial state. The pulse width must be more than 15 micro-seconds.
- This signal is effective when the SELECT signal is high or low.

FAULT

- This signal goes low when the following occurs:
 1. when the PE signal is high
 2. when the SELECT signal is low
 3. when a printer error occurs

BUSY

- Positive logic.
- This signal shows that the unit is in a state where data reception is not possible. Data input is possible when it is low.
- Normal state is low. It will go high when any of the following occurs:
 1. Deselect mode.
 2. The interval between data reception and notification of completion to the main unit.
 3. Receive buffer full.
 4. Detection of an error.
- Timing will allow data reception through even though the signal is high. DATA STROBE is sent within 50 milliseconds after the unit goes to the Deselect Mode.

Select

- Positive logic.
- This signal shows whether the unit is in the Select Mode (high) or the Deselect Mode (low). Data reception is possible in the Select Mode.
- The following sets the unit to Select Mode (no printing errors):
 1. The select switch is pressed when the unit is in the Deselect Mode.
 2. The unit is turned on when paper is loaded.
- The Deselect Mode is set by the following:
 1. The select switch is pressed when the unit is in Select Mode.
 2. In paper empty state when PE is high.
 3. When in an error state and FAULT is low.

Pin	Signal	Pin	Signal
1	DATA STROBE	19	SIGNAL GND
2	DATA 1	20	SIGNAL GND
3	DATA 2	21	SIGNAL GND
4	DATA 3	22	SIGNAL GND
5	DATA 4	23	SIGNAL GND
6	DATA 5	24	SIGNAL GND
7	DATA 6	25	SIGNAL GND
8	DATA 7	26	SIGNAL GND
9	DATA 8	27	SIGNAL GND
10	ACK	28	SIGNAL GND
11	BUSY	29	SIGNAL GND
12	PE	30	SIGNAL GND
13	SELECT	31	INPUT PRIME
14	RESERVED	32	FAULT
15	RESERVED	33	SIGNAL GND
16	SIGNAL GND	34	RESERVED
17	FRAME GND	35	+5V (3.3 Kohm)
18	RESERVED	36	RESERVED



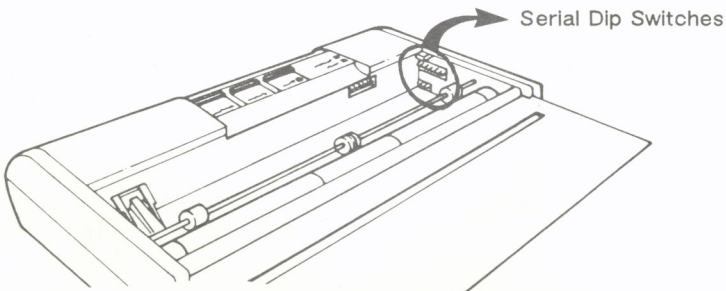
Centronics Pin Assignment Chart

Serial Interface Specifications

- Type:** RS-232-C 7 or 8 bit Serial, Asynchronous
- Connector:** 25 pin, female, sub-D type
- Cable:** Shielded
- Buffer:** 2K bytes
- Protocol:** RDY/BSY XON/XOFF ETX/ACK
- Transmission:** Full Duplex
- Baud Rate:** 110, 300, 600, 1200, 2400, 4800 and 9600 baud

Serial Connector Assignments

Pin	Symbol	Description	Direction
1	FG	Frame Ground	n/a
2	SD	Send Data	to host
3	RD	Received Data	to printer
4	RTS	Request to Send	to host
5	CTS	Clear to Send	to printer
6	DSR	Data Set Ready	to printer
7	SG	Signal Ground	n/a
8	CD	Carrier Detect	to printer
20	DTR	Data Terminal Ready	to host



Serial Signal Definitions

Frame Ground

- Ground

Send Data

- Held low before and after data transmission.

Receive Data

- When data is not being transmitted, line must be in low state.

Request to Send

- Indicates the printer is ready for transmission.
- Goes high after printer is initialized and remains high until the printer is turned off.

Clear to Send

- In high state if printer is able to transmit data to the host computer.
- This signal may be disabled by setting dip switch 10 to 1.

Signal Ground

- Ground

Data Set Ready

- In high state, the printer will accept data from the host.
- This signal may be disabled by setting dip switch 11 to 1.

Carrier Detect

- If this line is high, data on the Receive Data line is valid.
- This signal may be disabled by setting dip switch 9 to 1.

Data Terminal Ready

- In low state when the printer is deselected.
- In high state when the printer is selected and the receive buffer has more than 255 bytes of empty space.

Serial Dip Switch Settings

Default Switch Settings:

The printer is shipped with a setting of 9600 baud, 7 data bits, 1 stop bit, no parity, RDY/BSY protocol when all switches are in the down position. Dip switches are located inside the top cover on the left side. (1 is in the up position.)

Baud Rate	Stop Bits	Switch		
		#1	#2	#3
9600	1	0	0	0
4800	1	0	0	1
2400	1	0	1	0
1200	1	0	1	1
600	1	1	0	0
300	1	1	0	1
300	2	1	1	0
110	2	1	1	1

Data Bits

7
8

Sw #4

0
1

Parity

No Parity
Even Parity
Odd Parity
Not Applicable

Sw #5

0
0
1
1

Sw #6

0
1
0
1

Data Protocol

RDY/BSY
XON/XOFF
ETX/ACK

Sw #7

0
0
1

Sw #8

0
1
0

Handshake Disable

Carrier Detect (CD)
Clear to Send (CTS)
Data Set Ready (DSR)

Sw #9

1
—
—

Sw #10

—
1
—

Sw #11

—
—
1

Serial Protocol Descriptions

RDY/BSY

The DTR signal is a handshaking line to the host. The DTR signal indicates by going to the low state when the printer receiver buffer is nearly full. The printer continues to receive data until buffer overflow. The DTR line goes high again when the received data is processed and the buffer reaches 1K. If the printer is deselected before the DTR status goes high, it remains so until the printer is selected again.

XON/XOFF

After system initialization, the printer transmits the XON code to the host computer and begins accepting data. When the buffer has less than 256 empty bytes, the XOFF is transmitted. Additional data can be accepted until the buffer overflows. The XON is transmitted when the buffer reaches 1K of empty buffer.

ETX/ACK

The ACK code is sent to the host after system initialization. The host transmits a block of data less than 2K bytes in length followed by ETX. The printer processes the data in the receive buffer and, after coming to the ETX code, transmits an ACK to the host. If the printer is deselected before the ACK is sent, it is held until the printer is again selected.

Error Handling

If parity, framing, or over-run errors are detected during transmission, the On Line LED will flash but the received data will be processed as if no error is detected. The On Line indicator will stop flashing when data is received with no error. The condition will reset when the printer is powered off.

Appendix B-Abstracts

E

Font Chart

Font Style	Character Pitch	Characters Per Line
Draft	16/192	85
Quality	16/192	85
Script	16/192	85
Graphic 1	16/192	85
Graphic 2	16/192	85
Graphic 3	10/192	136
Condensed	10/192	136
Sub/Superscript	16/192	85

Envelope Mode Example*

```
10 LPRINT CHR$(27);"y";CHR$(1);CHR$(1);"DICONIX INC."  
20 LPRINT "3100 Research Blvd."  
30 LPRINT "Dayton, Ohio 45420"  
40 LPRINT CHR$(27);"y";CHR$(10);CHR$(15);"John Doe"  
50 LPRINT "222 Oak Drive"  
60 LPRINT "New York, N.Y. 23687"  
70 LPRINT CHR$(12)
```

*This BASIC program will work with most IBM compatible computers.

Diconix, Inc.
3100 Research Blvd.
Dayton, Ohio 45420

John Doe
222 Oak Drive
New York, NY

Graphics Mode Example

8 JET GRAPHICS USING ESC K

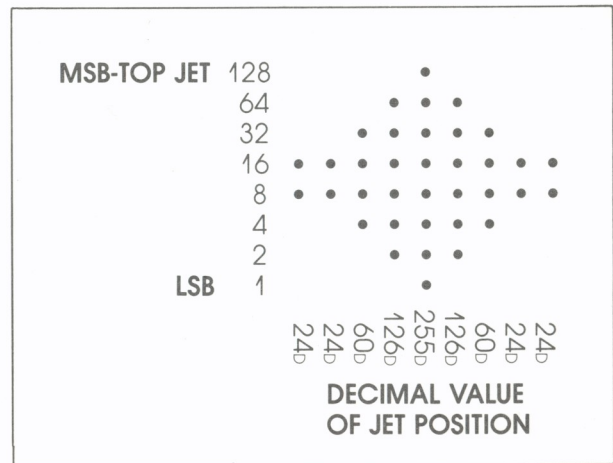
```

10 OPEN "LPT1" FOR OUTPUT AS 1
20 PRINT #1,CHR$(27);"K";CHR$(9);CHR$(0);
30 FOR I = 1 TO 9
40 READ N
50 PRINT#1,CHR$(N);
60 NEXT
70 PRINT #1,
80 DATA 24,24,60,126,255,126,60,24,24
90 END
    
```

DERIVATION OF n_1 , n_2 :

THERE ARE 9 COLUMNS OF DATA THEREFORE:

$$\frac{9}{256} = \text{INTEGER OF 0 (N}_2 = 0) \\ = \text{AND REMAINDER OF 9 (N}_1 = 9)$$



Appendix B

ASCII Chart

	Hex No.	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F															
Hex No.	Binary No.	0000	0001	0010	0011	0100	0101	0110	0111	1000	1001	1010	1011	1100	1101	1110	1111															
0	0000	0	16	SP	32	O	48	@	64	P	80	'	96	p	112		128	144	SP	160	o	176	@	192	P	208		224	p	240		
1	0001	1	DC1	!	17	1	33	A	49	Q	65	a	81	q	97		113	129	DC1	145	!	161	I	177	A	193	Q	209	a	225	q	241
2	0010	2	DC2	"	18	2	34	B	50	R	66	b	82	r	98		114	130	DC2	146	"	162	2	178	B	194	R	210	b	226	r	242
3	0011	3	DC3	#	19	3	35	C	51	S	67	c	83	s	99		115	131	DC3	147	#	163	3	179	C	195	S	211	c	227	s	243
4	0100	4	DC4	\$	20	4	36	D	52	T	68	d	84	t	100		116	132	DC4	148	\$	164	4	180	D	196	T	212	d	228	t	244
5	0101	5		%	21	5	37	E	53	U	69	e	85	u	101		117	133		149	%	165	5	181	E	197	U	213	e	229	u	245
6	0110	6		&	22	6	38	F	54	V	70	f	86	v	102		118	134		150	&	166	6	182	F	198	V	214	f	230	v	246
7	0111	BEL		'	23	7	39	G	55	W	71	g	87	w	103		119	135	BEL	151	'	167	7	183	G	199	W	215	g	231	w	247

	Hex No.	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
Hex No.	Binary No.	0000	0001	0010	0011	0100	0101	0110	0111	1000	1001	1010	1011	1100	1101	1110	1111
8	1000	BS 8	CAN 24	(40	8 56	H 72	X 88	h 104	x 120	BS 136	CAN 152	(168	8 184	H 200	X 216	h 232	x 248
9	1001	HT 9	) 25	9 41	I 57	Y 73	i 89	y 105	HT 121	) 137	9 153	I 169	Y 185	i 201	y 217	HT 231	Y 247
A	1010	LF 10	* 26	: 42	J 58	Z 74	j 90	z 106	LF 122	* 138	: 154	J 170	Z 186	j 202	z 218	LF 234	Z 250
B	1011	VT 11	ESC 27	+ 43	; 59	K 75	[91	k 107	{ 123	VT 139	ESC 155	+ 171	; 187	K 203	[219	k 235	{ 251
C	1100	FF 12	, 28	< 44	L 60	\ 76	l 92	| 108	| 124	FF 140	, 156	< 172	L 188	l 204	| 220	| 236	| 252
D	1101	CR 13	- 29	= 45	M 61	] 77	m 93	} 109	} 125	CR 141	- 157	= 173	M 189	] 205	m 221	} 237	} 253
E	1110	SO 14	. 30	> 46	N 62	^ 78	n 94	~ 110	~ 126	SO 142	. 158	> 174	N 190	^ 206	~ 222	~ 238	~ 254
F	1111	SI 15	/ 31	? 47	O 63	_ 79	o 95	DEL 111	DEL 127	SI 143	/ 159	? 175	O 191	_ 207	o 223	o 239	DEL 255

Appendix B

B

International Characters

	35	36	64	91	92	93	94	96	123	124	125	126
USA	#	\$	@	[	\	\]	^	`	{	|	}	~
France	#	\$	à	°	ç	§	^	`	é	ù	è	¨
Germany	#	\$	§	Ä	Ö	Ü	^	`	ä	ö	ü	β
England	£	\$	@	[	\	\]	^	`	{	|	}	~
Denmark	#	\$	@	Æ	ø	Å	^	`	æ	ø	å	~
Sweden	#	☒	É	Ä	Ö	Å	Ü	é	ä	ö	å	ü
Italy	#	\$	@	°	\	é	^	ù	à	ò	è	ì
Spain	℞	\$	@	í	Ñ	¿	^	`	¨	ñ	}	~
Japan	#	\$	@	[	¥	]	^	`	{	|	}	~

**Graphics Printer Control and Character Set (IBM Mode)
ASCII Decimal Value Set 1**

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
NUL									HT	LF		FF	CR	SO	SI			DC2		DC4					CAN
26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51
	ESC					SP	!	"	#	\$	%	&	'	(	)	*	+	,	-	.	/	0	1	2	3
52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77
4	5	6	7	8	9	:	;	<	=	>	?	@	A	B	C	D	E	F	G	H	I	J	K	L	M
78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103
N	O	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	\]	^	_	`	a	b	c	d	e	f	g
104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129
h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	w	x	y	z	{	|	}	~		NUL	

**Graphics Printer Control and Character Set (IBM Mode)
ASCII Decimal Value Set 1 (Continued)**

130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155
							HT	LF		FF	CR	SO	SI			DC2		DC4				CAN			ESC
156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181
				á	í	ó	ú	ñ	Ñ	ä	ö	¿	⌈	⌋	½	¼	ı	«	»	⋮	⋱	⋲	|	†	‡
182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207
‡	¶	§	¶	¶	¶	¶	¶	¶	¶	¶	¶	¶	¶	¶	¶	¶	¶	¶	¶	¶	¶	¶	¶	¶	¶
208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233
¶	¶	¶	¶	¶	¶	¶	¶	¶	¶	¶	¶	¶	¶	¶	¶	α	β	Γ	π	Σ	σ	μ	τ	Φ	θ
234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255				
Ω	δ	∞	∅	ε	∩	≡	±	≥	≤	∫	∫	÷	≈	°	•	•	√	ⁿ	²	▪	SP				

Graphics Printer Control and Character Set (IBM Mode) ASCII Decimal Value Set 2

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	
NUL			♥	♦	♣	♠		HT	LF		FF	CR	SO	SI			DC2		DC4	§		CAN			ESC					SP	!	"	#	\$	%			
38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	
&	'	(	)	*	+	,	-	.	/	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?	@	A	B	C	D	E	F	G	H	I	J	K
76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	
L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	\]	^	_	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q
114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	
r	s	t	u	v	w	x	y	z	{	|	}	~		Ç	ü	é	â	ã	ä	å	ç	ê	ë	è	é	î	ï	ï	Ä	Å	É	æ	Æ	ö	õ	ô	ù	û
152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	
ÿ	Ö	Ü	ç	£	¥	℞	f	á	í	ó	ú	ñ	Ñ	à	q	¿	¬	½	¼	í	◀	▶	⋮	⋮	⋮	|	†	‡	||	¶	¶	¶	||	¶	¶	¶	¶	
190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	
ƒ	ſ	ℓ	⊥	⊤	†	-	†	†	†	ℓ	π	±	π	†	=	†	±	μ	τ	π	ℓ	ℓ	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	
228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255											
Σ	σ	μ	τ	Φ	θ	Ω	δ	∞	∅	ε	∩	≡	±	≥	≤	∫	J	÷	≈	°	•	•	•	√	n	2	▪	SP										

Codes for Other Character Sets (Epson Mode)

Memory locations 0 to 31 and 128 to 159 store the international character sets other than the one for the U.S. These characters are printable only with the ESC "6", ESC "I", or ESC "R" sequences.

Dec	Hex	Char/ Function	Dec	Hex	Char/ Function	Dec	Hex	Char/ Function	Dec	Hex	Char/ Function	Dec	Hex	Char/ Function
0	00	à None	13	0D	À CR	26	1A	ä	135	87	í	148	94	ø
1	01	é None	14	0E	Á SO	27	1B	ö	136	88	í	149	95	ø
2	02	ù None	15	0F	Â SI	28	1C	û	137	89	ñ	150	96	..
3	03	ò None	16	10	Ã None	29	1D	Û	138	8A	ñ	151	97	À
4	04	í None	17	11	Ä DC1	30	1E	è	139	8B	Û	152	98	Ö
5	05	° None	18	12	Å DC2	31	1F	¥	140	8C	À	153	99	Û
6	06	£ None	19	13	Æ DC3	128	80	à	141	8D	È	154	9A	ä
7	07	ì BEL	20	14	Ø DC4	129	81	è	142	8E	á	155	9B	ö
8	08	ç BS	21	15	∅ None	130	82	ù	143	8F	ç	156	9C	Û
9	09	Ñ HT	22	16	∴ None	131	83	ò	144	90	§	157	9D	Ë
10	0A	ñ LF	23	17	Ä None	132	84	í	145	91	β	158	9E	é
11	0B	⊠ VT	24	18	Ö CAN	133	85	°	146	92	Æ	159	9F	¥
12	0C	Ⓜ FF	25	19	Û None	134	86	£	147	93	æ			

Diconix 150 Fonts in the EPSON Mode

<u>SETUP COMMAND STRING</u>	<u>FONT STYLE</u>
CHR\$(27);"5";CHR\$(27);"!";CHR\$(1)	Elite, Italics OFF
CHR\$(27);"4";CHR\$(27);"!";CHR\$(1)	<i>Elite, Italics ON</i>
CHR\$(27);"5";CHR\$(27);"!";CHR\$(4)	Condensed, Italics OFF
CHR\$(27);"4";CHR\$(27);"!";CHR\$(4)	<i>Condensed, Italics ON</i>
CHR\$(27);"5";CHR\$(27);"!";CHR\$(32)	Wide Elite, Italics OFF
CHR\$(27);"4";CHR\$(27);"!";CHR\$(32)	<i>Wide Elite, Italics ON</i>

CHR\$(27);"5";CHR\$(27);"!";CHR\$(36)
CHR\$(27);"4";CHR\$(27);"!";CHR\$(36)

Wide Condensed, Italics OFF
Wide Condensed, Italics ON

CHR\$(27);"5";CHR\$(27);"!";CHR\$(8)
CHR\$(27);"4";CHR\$(27);"!";CHR\$(8)

Elite, Italics OFF, Emphasized
Elite, Italics ON, Emphasized

CHR\$(27);"5";CHR\$(27);"!";CHR\$(12)
CHR\$(27);"4";CHR\$(27);"!";CHR\$(12)

Condensed, Italics OFF, Emphasized
Condensed, Italics ON, Emphasized

CHR\$(27);"5";CHR\$(27);"!";CHR\$(40)
CHR\$(27);"4";CHR\$(27);"!";CHR\$(40)

Wide Elite, Italics OFF, Emph
Wide Elite, Italics ON, Emph

CHR\$(27);"5";CHR\$(27);"!";CHR\$(44)
CHR\$(27);"4";CHR\$(27);"!";CHR\$(44)

Wide Condensed, Italics OFF, Emphasized
Wide Condensed, Italics ON, Emphasized

Warning:

The Model 150 InkJet Printer generates and uses radio frequency energy and may cause interference to radio and television reception. It complies with Subpart J of Part 15 of FCC rules for a Class B computing device. These specifications provide reasonable protection against such interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation. If the printer does cause interference to radio or television reception, which can be determined by turning the printer off and on, you can try to eliminate the interference problem by doing one or more of the following:

- Reorient the receiving antenna.
- Reorient the position of the printer with respect to the receiver.
- Move the printer away from the receiver.
- Plug the printer into a different outlet so that the printer and the receiver are on different branch circuits.

If necessary, consult an authorized service organization or an experienced radio/television technician for additional suggestions. You may find the following booklet, prepared by the FCC, helpful: *How to Identify and Resolve Radio/TV Interference Problems*. Write the U.S. Government Printing Office, Washington, D.C. 20402, Stock No. 004-000-00345-4.

Note: Use of a non-shielded printer interface cable will invalidate the FCC certification.

Limited Warranty

In the U.S.A. and Canada, this unit is warranted by Diconix against defects in materials and workmanship for 90 days from the date of original purchase. During the warranty period, if any part is defective, Diconix will repair or replace the printer at their option, with no charge for parts or labor.

This warranty does not apply to the print head or to the appearance items of the equipment, or to any product of which the exterior has been damaged or defaced, which has been subjected to misuse or abnormal handling, which has been altered or modified, or which has been serviced or repaired by anyone other than an Authorized Diconix Service Center.

The Limited Warranty herein described is in addition to whatever implied warranties may be granted to purchasers by law. This warranty gives you specific legal rights. You may also have other rights which vary from state to state. This 90-day warranty is non-transferrable.

Extended Warranty

Diconix offers a one-year Extended Warranty on parts and labor. For information on purchasing the Extended Warranty, check the appropriate box before returning the Owner Registration card.

PLEASE RETURN THE OWNER REGISTRATION CARD BELOW TO ENSURE PROPER WARRANTY COVERAGE

Owner Registration

Your Name _____

Address _____

street

city

state

zip

Model Number _____ Parallel Serial

Serial Number _____

Date Purchased _____

Occupation _____ Age _____

Yes, I would like Extended Warranty Information.

Was this unit:

- Purchased for personal use
- Purchased for business use
- Purchased for both personal and business use
- Received as a gift

How did you first learn of this product?

- From dealer
- Direct mail
- T.V.
- Magazine
- Newspaper
- Store display
- Exhibit
- Other

3. Did you buy the Diconix 150 to:

- Use with a desktop computer
- Use with a portable or laptop computer

What brand? _____

4. Including this purchase, what is the total value of your computer system?

Value _____

5. What software package do you use most often?

Package _____

6. When you purchased your Diconix 150 printer did you compare it with other models?

- Yes
- No

Brand/Model _____

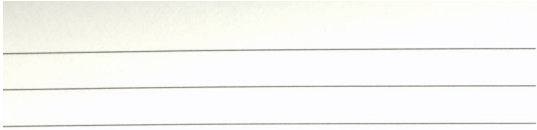
7. What do you like best about your Diconix 150 printer?

- Design/size
- Quiet operation
- Font styles
- Portability/battery mode
- Print quality
- Graphics
- Compatibility

8. What type of store?

- Department
- Computer

Other: _____



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATE

BUSINESS REPLY MAIL
FIRST CLASS PERMIT NO. 4270 DAYTON, OHIO

POSTAGE WILL BE PAID BY ADDRESSEE

Diconix Service Center
3100 Research Blvd.
Dayton, Ohio 45420



Return Instructions:

1. Call the Diconix Service Center, using the following toll free number 800-344-0006. Request a Material Return Authorization (MRA) number. Record this number on the Service Request card for proper tracking of your unit. Also, include the MRA number on the bottom of the mailing label. No unit will be accepted without an MRA number.

If the return is a non-warranty repair, the operator will inform you of the flat fee repair charge. Include payment with the Service Request card. Payment can be by major credit card, money order, or cashier check. **No personal checks will be accepted.**

2. Pack the printer in the original box, if available. **Do not return the print head or batteries but do include the A.C. adaptor.** Complete the Service Request card. Be sure the MRA number is on the card and mailing label. Select the method of payment and include the card in the box with the printer. If under warranty include a copy of the sales invoice or other proof of purchase to establish warranty coverage.

3. Ship the printer to the address listed on this card. Shipping charges to the repair facility are the responsibility of the owner. Diconix will pay the return charge after the printer is repaired.

Send to: **Diconix Service Center**
3100 Research Boulevard
Dayton, Ohio 45420

Date

Computer:

Description of problem:

Warranty or Non-Warranty Repair

If the printer should require service, you may choose one of two options:

1. Return the printer to Diconix for service.
2. Return the printer to the retail outlet where it was purchased.

Diconix Service Center

For any printer that requires service during the warranty period, Diconix will repair or replace, free of charge, the failed module or unit. The owner is required to ship the printer, postage prepaid, along with proof of purchase date to the Diconix Service Center. Diconix will repair the printer within 48 hours and ship freight prepaid back to the owner.

Note: A Material Return Authorization (MRA) number must be included on the Service Request card and the mailing label or the unit will be returned unrepai red.

For non-warranty repair, Diconix will repair or replace the unit for a flat repair fee. The owner is required to ship the printer, postage prepaid to the Diconix Service Center. Diconix will repair the printer within 48 hours and ship it freight prepaid back to the owner. Return instructions are explained on the back of this card.

Service Request

Name (please print) _____

Address _____

City _____ State _____ Zip Code _____

This address must be the same as the shipping address.

Material Return Authorization (MRA) number: _____

Model number: _____ Serial number: _____

Method of payment?

Money Order

Cashier Check

Mastercard

American Express

Visa

Card number

Expiration Date _____

Yes, I would like information on Extended Warranty.

DICOMIX Ink Jet Printer Command Index By Function

Reset/Select

Reset	ESC @	3.1.1
Deselect Printer	DC3 (Ctrl S)	3.1.2
Deselect Printer**	ESC Q;CHRS (3)	3.1.3
Select Printer	DC1 (Ctrl Q)	3.1.4

Print Position/Movement

Line Feed	LF (Ctrl J)	3.1.5
Form Feed	FF (Ctrl L)	3.1.6
Carriage Return	CR (Ctrl M)	3.1.7
Backspace	BS (Ctrl H)	3.1.8
Auto Line Feed On/Off**	ESC 5 n	3.1.9
Temporary LF	ESC J n	3.1.10
Incremental Print	ESC i n	3.1.11
Skip-Over Perforation	ESC N n	3.1.12
Skip-Over Perforation Off	ESC O	3.1.13
One-line Unidirectional	ESC <	3.1.22
Unidirectional Print On/Off	ESC U n	3.1.23
Set Top of Form**	ESC 4	3.2.32
Vertical Tab Channel Select*	ESC/n	3.2.38
Set Vertical Tab Position*	ESC b n m ₁ m ₂ m _k 0	3.2.39

Character Set Control

Control Code Select*	ESC I n	3.1.16
----------------------	---------	--------

Deactivate High Order Code*	ESC 6	3.1.20
Activates High Order Code*	ESC 7	3.1.21
One Character Printing**	ESC ~	3.1.24
Continuous Printing**	ESC \ n ₁ n ₂	3.1.25
Select Character Set 1**	ESC 7	3.1.26
Select Character Set 2**	ESC 6	3.1.27
International Characters*	ESC R n	3.2.12

Tabs

Horizontal Tab Set***	ESC D n ₁ n ₂ ...n _k	
	<Null>	3.2.1
Horizontal Tab***	HT (Ctrl J)	3.2.2
Vertical Tab Set***	ESC B n ₁ n ₂ ...n _k	
	<Null>	3.2.3
Vertical Tab***	VT (Ctrl K)	3.2.4
Set All Tabs to Default**	ESC R	3.2.5

Margins

Right Margin Set*	ESC Q n	3.2.6
Left Margin Set	ESC L n	3.2.7
Page Length in Lines	ESC C n	3.2.13
Page Length in Inches	ESC C	3.2.14

Fonts

Proportional Mode On/Off	ESC p n	3.2.8
Select Font	ESC x n	3.2.9
Print Quality Select**	ESC I n	3.2.10
Double-Strike Mode	ESC G	3.2.15
Double-Strike Mode Off	ESC H	3.2.16
Overscore Mode On/Off	ESC _ n	3.2.17
Super/Subscript Mode	ESC S n	3.2.18
Super/Subscript Mode Off	ESC T	3.2.19
Select Mode Combination	ESC ! n	3.2.20
Emphasized Mode	ESC E	3.2.26
Emphasized Mode Off	ESC F	3.2.27
Italic Mode*	ESC 4	3.2.28
Italic Mode Off*	ESC 5	3.2.29
Elite Mode	ESC M	3.2.30
Elite Mode**	ESC :	3.2.31
Temporary Enlarged Mode (Shift Out)	SO or ESC SO (Ctrl N)	3.2.33
Temporary Enlarged Mode Off (Shift Off)	DC4 (Ctrl T)	3.2.34
Enlarged Mode On/Off	ESC W n	3.2.35
Condensed Mode (Shift In)	SI or ESC SI (Ctrl O)	3.2.36
Condensed Mode (Shift In Off)	DC2 (Ctrl R)	3.2.37

Line Spacing

1/8" Line Spacing	ESC 0	3.2.21
7/64" Line Spacing	ESC 1	3.2.22

1/6" Line Spacing***	ESC 2	3.2.23
n/288" Line Spacing	ESC 3 n	3.2.24
n/96" Line Spacing***	ESC A n	3.3.25

Graphics Commands

Single-Density Graphics	ESC K n ₁ n ₂ n...n	3.3.1
Double-Density Graphics	ESC L n ₁ n ₂ n...n	3.3.2
Double Speed and Density	ESC Y n ₁ n ₂ n...n	3.3.3
Dot Graphics Mode Select	ESC * n	3.3.4
Assign Bit Image Mode	ESC ? n	3.3.5
9-Jet Graphics Mode**	ESC ^ m n ₁ n ₂ d _{1F} d _{1S} d _{2F} d _{2S} ...	3.3.6

Envelope Commands

Carriage Return	CR	3.4.1
Line Feed	LF	3.4.2
Form Feed	FF	3.4.3
Set Number of Copies	ESC z n	3.4.4
Define Address Position	ESC y m n	3.4.5
Select Font	ESC x n	3.4.6

Miscellaneous

Cancel	CAN (Ctrl X)	3.1.14
Escape	ESC (Ctrl [)	3.1.15
Sets MSB to 0*	ESC =	3.1.17
Cancel MSB Function*	ESC #	3.1.18
Sets MSB to 1*	ESC >	3.1.19
Test Print	ESC †	3.1.28
Underline Mode On/Off	ESC - n	3.2.12

* Epson only commands ** IBM only commands *** IBM/Epson mode-dependent commands

DIICONIX Ink Jet Printer **Command Summary**

A Kodak Company

3.1 Print Commands

3.1.1	Reset	ESC @
3.1.2	Deselect Printer	DC3 (Ctrl S)
3.1.3	Deselect Printer**	ESC Q;CHRS (3)
3.1.4	Select Printer	DC1 (Ctrl Q)
3.1.5	Line Feed	LF (Ctrl J)
3.1.6	Form Feed	FF (Ctrl L)
3.1.7	Carriage Return	CR (Ctrl M)
3.1.8	Backspace	BS (Ctrl H)
3.1.9	Auto Line Feed On/Off**	ESC 5 n
3.1.10	Temporary LF	ESC J n
3.1.11	Incremental Print	ESC i n
3.1.12	Skip-Over Perforation	ESC N n
3.1.13	Skip-Over Perforation Off	ESC O
3.1.14	Cancel	CAN (Ctrl X)
3.1.15	Escape	ESC (Ctrl [])
3.1.16	Control Code Select*	ESC In
3.1.17	Sets MSB to 0*	ESC =
3.1.18	Cancel MSB Function*	ESC #
3.1.19	Sets MSB to 1*	ESC >
3.1.20	Deactivate High Order Code*	ESC 6
3.1.21	Activates High Order Code*	ESC 7
3.1.22	One-line Unidirectional	ESC <
3.1.23	Unidirectional Print On/Off	ESC U n

3.1.24	One Character Printing**	ESC ^
3.1.25	Continuous Printing**	ESC \ n ₁ n ₂
3.1.26	Select Character Set 1**	ESC 7
3.1.27	Select Character Set 2**	ESC 6
3.1.28	Test Print	ESC †

3.2 Format Commands

3.2.1	Horizontal Tab Set***	ESC D n ₁ n ₂ ...n _k <Null>
3.2.2	Horizontal Tab***	HT (Ctrl I)
3.2.3	Vertical Tab Set***	ESC B n ₁ n ₂ ...n _k <Null>
3.2.4	Vertical Tab***	VT (Ctrl K)
3.2.5	Set All Tabs to Default**	ESC R
3.2.6	Right Margin Set*	ESC Q n
3.2.7	Left Margin Set	ESC L n
3.2.8	Proportional Mode On/Off	ESC p n
3.2.9	Select Font	ESC x n
3.2.10	Print Quality Select**	ESC I n
3.2.11	Underline Mode On/Off	ESC - n
3.2.12	International Characters*	ESC R n
3.2.13	Page Length in Lines	ESC C n
3.2.14	Page Length in Inches	ESC C CHRS (0) n
3.2.15	Double-Strike Mode	ESC G
3.2.16	Double-Strike Mode Off	ESC H
3.2.17	Overscore Mode On/Off	ESC _ n

3.2.18	Super/Subscript Mode	ESC S n
3.2.19	Super/Subscript Mode Off	ESC T
3.2.20	Select Mode Combination	ESC ! n
3.2.21	1/8" Line Spacing	ESC 0
3.2.22	7/16" Line Spacing	ESC 1
3.2.23	1/6" Line Spacing***	ESC 2
3.2.24	n/288" Line Spacing	ESC 3 n
3.2.25	n/96" Line Spacing***	ESC A n
3.2.26	Emphasized Mode	ESC E
3.2.27	Emphasized Mode Off	ESC F
3.2.28	Italic Mode*	ESC 4
3.2.29	Italic Mode Off*	ESC 5
3.2.30	Elite Mode	ESC M
3.2.31	Elite Mode**	ESC :
3.2.32	Set Top of Form**	ESC 4
3.2.33	Temporary Enlarged Mode (Shift Out)	SO or ESC SO (Ctrl N)
3.2.34	Temporary Enlarged Mode Off (Shift In Off)	DC4 (Ctrl T)
3.2.35	Enlarged Mode On/Off	ESC W n
3.2.36	Condensed Mode (Shift In)	SI or ESC SI (Ctrl O)
3.2.37	Condensed Mode Off (Shift In Off)	DC2 (Ctrl R)
3.2.38	Vertical Tab Channel Select*	ESC / n
3.2.39	Set Vertical Tab Position*	ESC b n m ₁ m ₂ m ₃ 0

3.3 Graphics Commands

3.3.1	Single-Density Graphics	ESC K n ₁ n ₂ n...n
3.3.2	Double-Density Graphics	ESC L n ₁ n ₂ n...n
3.3.3	Double Speed and Density	ESC Y n ₁ n ₂ n...n
3.3.4	Dot Graphics Mode Select	ESC * n
3.3.5	Assign Bit Image Mode	ESC ? n
3.3.6	9-Jet Graphics Mode**	ESC ^ m n ₁ n ₂ d _{1F} d _{1S} d _{2F} d _{2S} ...

3.4 Envelope Mode Commands

3.4.1	Carriage Return	CR
3.4.2	Line Feed	LF
3.4.3	Form Feed	FF
3.4.4	Set Number of Copies	ESC z n
3.4.5	Define Address Position	ESC y m n
3.4.6	Select Font	ESC x n

* Epson only commands

** IBM only commands

*** IBM/Epson mode-dependent commands











CONIX Inc. 3100 Research Blvd. Post Office Box 3100 Dayton, Ohio 45420 (513) 259-3100 Telex: 288280 Printed in Japan
8040743-0203

Scandinavian Character Set

Our Danish and Swedish customers can access three additional characters (ø, Ø, å) in the IBM mode, character set 2.

To use these characters, set the DIP switches as shown below:

	DIP Switch								
	1	2	3	4	5	6	7	8	9
Denmark		1				1	0	0	1
Sweden		1				1	1	0	1

0 = ↓ (down); 1 = ↑ (up)

DIP switch 2 now controls the IBM character set; 0 = set 1, 1 = set 2. You may also use ESC 6 to switch from set 1 to set 2 (see Operator's Manual page 3-14).

The table below illustrates the effects of these DIP switch settings:

Hex Code	Decimal Code	Character
9B	155	ø
9D	157	Ø
AF	175	å

Place this sheet in your Operator's Manual for convenient reference.