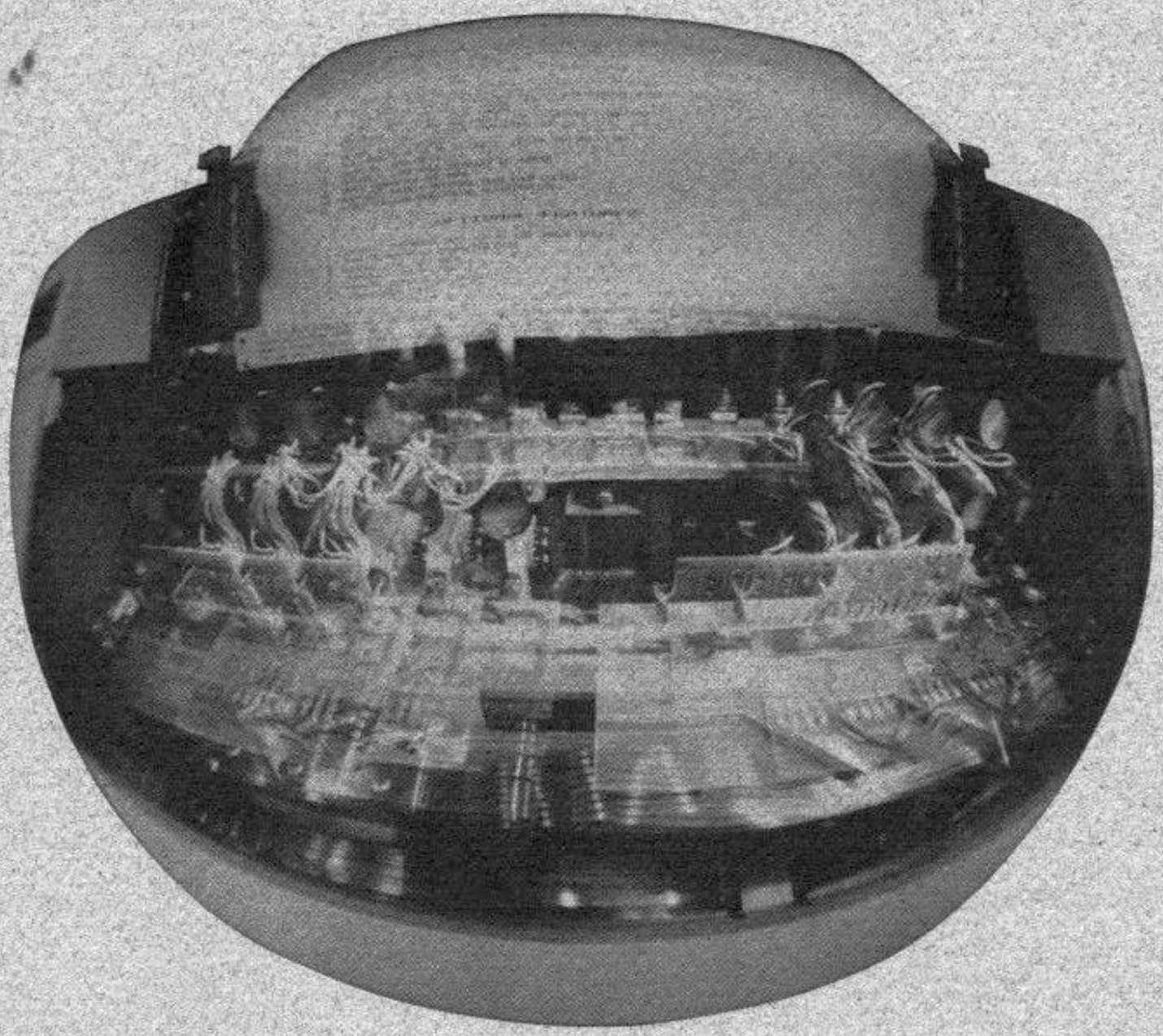
CENTRONICS



101
101A
101AL
102A
306
PRINTERS

SPECIFICATIONS
AND
INTERFACE
INFORMATION

SPECIFICATIONS AND INTERFACE INFORMATION

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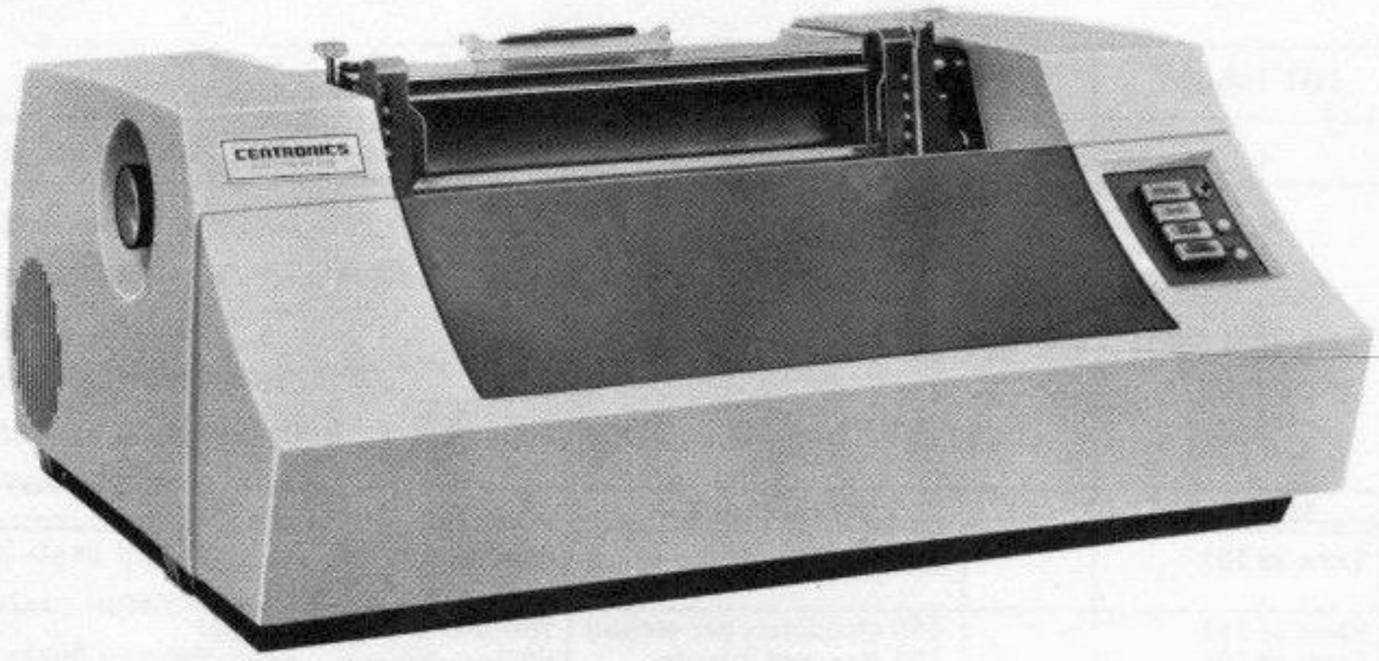
Printed in U.S.A. 8/73

CENTRONICS



SERIES 100
MODELS 100, 101A, 101AL

165 char/sec

132 char/line

60 to 200 lines/min

Centronics' Series 100 printers are medium speed, serial, impact printers which use dot matrix techniques for character generation. The 101 uses a 5 x 7 dot matrix, while the 101A, 101AL and 102A all use a 9 x 7 matrix.

On the 101AL, Large Scale Integration (LSI) techniques allow the logic circuits and power supply to be incorporated on a single printed circuit board.

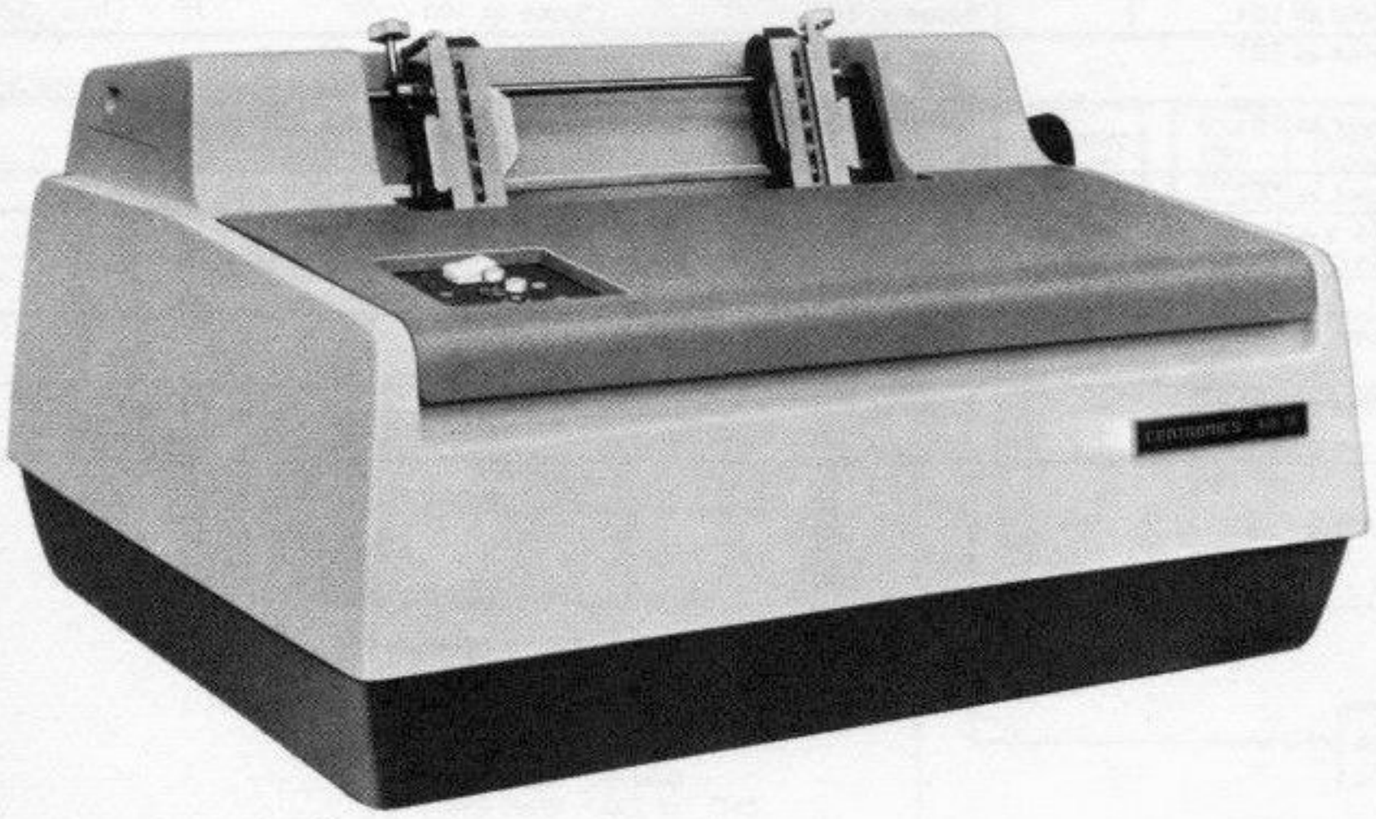
The faster speed of the 102A is achieved with bi-directional printing. Two print heads, operating in unison, print a 132-character line with each head traveling only half the width of the paper. Both heads then print in reverse on the next line resulting in no carriage return.

MODEL 102A

330 char/sec

132 char/line

125 lines/min



MODEL 306

100 char/sec

80 char/line

60 to 150 lines/min

Centronics' Model 306 is a low-cost, 100-character per second printer. Using the same print head as the 101 printer, characters are formed serially by impact using a standard 5 x 7 dot matrix (9 x 7 optional). Capable of producing an original plus up to four clear copies, the 306 can operate with the paper supply located to the rear or below the printer. Like the 101AL, LSI techniques combine the logic and power supply on the same printed circuit board.

CENTRONICS

CENTRONICS PRINTER SPECIFICATIONS

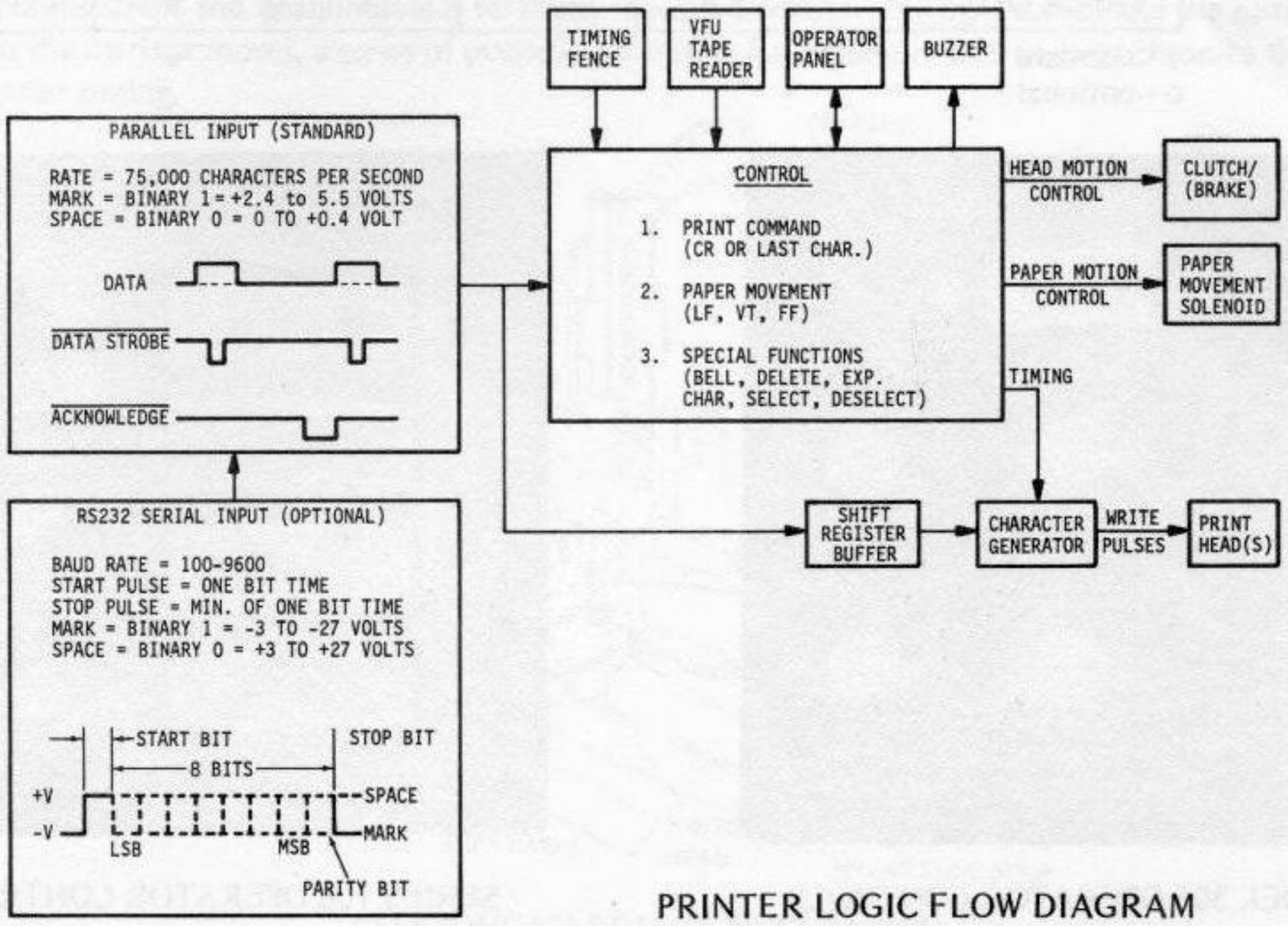
Specifications	Model 101	Model 101A/101AL	Model 102A	Model 306
Printing Method	Impact, character-by-character, one line at a time	Same as 101	Same as 101	Same as 101
Printing Rate - Characters - Full Lines - Short Lines	165 characters per second 60 lines per minute (132 character line) 200 lines per minute (20-30 characters)	Same as 101 Same as 101 Same as 101	330 characters per second 125 lines per minute (132 characters)	100 characters per second 60 lines per minute (80 character line) 150 lines per minute (20-30 characters)
Transmission Rate - Serial - Parallel	100 to 9600 baud (with serial option) Up to 75,000 characters per second	Same as 101 Same as 101	Same as 101 Same as 101	Same as 101 Same as 101
Data Input	Parallel (Serial option available)	Same as 101	Same as 101	Same as 101
Character Structure	5 x 7 dot matrix, 10-point type equivalent	9 x 7 dot matrix, 10-point type equivalent	9 x 7 dot matrix, 10-point type equivalent	5 x 7 dot matrix, 10-point type equivalent 9 x 7 dot matrix, 10-point type equivalent (option)
Code	USASCII - 64 characters printed	USASCII - 64 characters printed, lower case characters recognized and printed as upper case equivalent. Expandable up to 128 characters.	USASCII - 64 characters printed, lower case characters recognized and printed as upper case equivalent. Expandable up to 128 characters.	USASCII - 64 characters printed, lower case characters recognized and printed as upper case equivalent. Expandable up to 128 characters.
Indicator-Switch Controls	ON/OFF, SELECT, TOP OF FORM, FORMS OVERRIDE	Same as 101 plus LINE FEED	Same as 101 plus LINE FEED	ON/OFF, SELECT, FORMS OVERRIDE Option: TOP OF FORM, LINE FEED
Indicators	PAPER OUT, ON/OFF, SELECT	Same as 101	Same as 101	PAPER OUT, SELECT
Manual Controls	Form Thickness, Paper Advance Knob	Same as 101	Same as 101	Same as 101
Character Buffer	132 characters (1 line)	Same as 101	Same as 101	80 characters (1 line)
Format	132 characters maximum per line, 6 lines per inch	Same as 101	Same as 101	80 characters maximum per line, 6 lines per inch
Paper Feed	Sprocket feed, adjustable to 14 7/8" width	Same as 101	Same as 101	Sprocket feed, adjustable to 9 1/2" width
Paper	Standard sprocketed paper	Same as 101	Same as 101	Same as 101
Number of Copies	Original and up to four carbon copies	Same as 101	Same as 101	Same as 101
Dimensions	11 1/2" high, 20" deep, 27 3/4" wide	Same as 101	Same as 101	12" high, 19" deep, 23" wide
Weight	118 pounds	Same as 101	Same as 101	66 pounds
Electrical Requirements	115 VAC ± 10%, 60 Hz 115/230 VAC ± 10%, 50 Hz (option)	115 VAC ± 10%, 60 Hz or 115/230 VAC ± 10%, 50 Hz	115 VAC ± 10%, 60 Hz or 115/230 VAC ± 10%, 50 Hz	115 VAC ± 10%, 60 Hz 115/230 VAC ± 10%, 50 Hz (option)
Temperature - Operating - Storage	40° to 100° F -40° to 160° F	Same as 101	Same as 101	Same as 101
Humidity - Operating - Storage	5% to 90% 0% to 95% (no condensation)	Same as 101	Same as 101	Same as 101

CENTRONICS

STANDARD/OPTIONAL FEATURES

	Model 101	101A	101AL	102A	306
Prints original plus four copies	s	s	s	s	s
Vertical format control (via paper tape)	s	s	s	s	o
Fixed vertical/horizontal registration	s	s	s	s	s
Automatic line feed	s	s	s	s	s
Manual Line Feed switch	-	s	s	s	o
Automatic carriage return on line feed, vertical tab, or form feed	-	-	o	-	o
Line Count Pulse	-	-	-	-	s
Parallel data input	s	s	s	s	s
Serial data input	o	o	o	-	o
Gated strobe pulse (data input)	s	s	s	s	s
Separate prime line and fault line to output connector	-	s	s	s	s
Inhibit prime on select	-	-	o	-	o
Elongated boldface characters (line by line)	s	s	s	s	s
Selectable single character elongation	-	o	o	o	o
Coded character software	s	s	s	s	s
Expanded character set (up to 128 characters)	-	o	o	o	o
Foreign and other character sets	o	o	o	o	o
5 x 7 dot matrix	s	-	-	-	s
9 x 7 dot matrix	-	s	s	s	o
Lower case prints as upper case	s	s	s	s	s
Remote Select/Deselect	-	s	s	s	s
Paper runaway inhibit	-	s	s	s	s
Audio alarm buzzer	s	s	s	s	o
Automatic motor control	o	o	o	s	o
Communications interfaces	o	o	o	o	o
Popular computer interfaces	o	o	o	o	o
Elapsed time indicator	o	o	o	o	o
60 Hz, 115 VAC	s	s	s	s	s
60 Hz, 230 VAC	o	s	s	s	o

LEGEND: s - standard
o - optional



PRINTER LOGIC FLOW DIAGRAM

CENTRONICS

OPERATOR CONTROLS

Switches:

1. ON/OFF — This switch is used to turn power on or off.

2. SELECT — This switch is used to select the printer after turning on power. When the printer is selected, either the switch or a separate indicator is lighted.

3. FORMS OVERRIDE — This switch enables an operator to override the internal Paper Out switch. This allows the operator to complete the last form before changing paper.

4. TOP OF FORM — This switch is used for manually slewing paper to top of form (requires VFU).

5. LINE FEED — This pushbutton switch is used for manual line feeds.

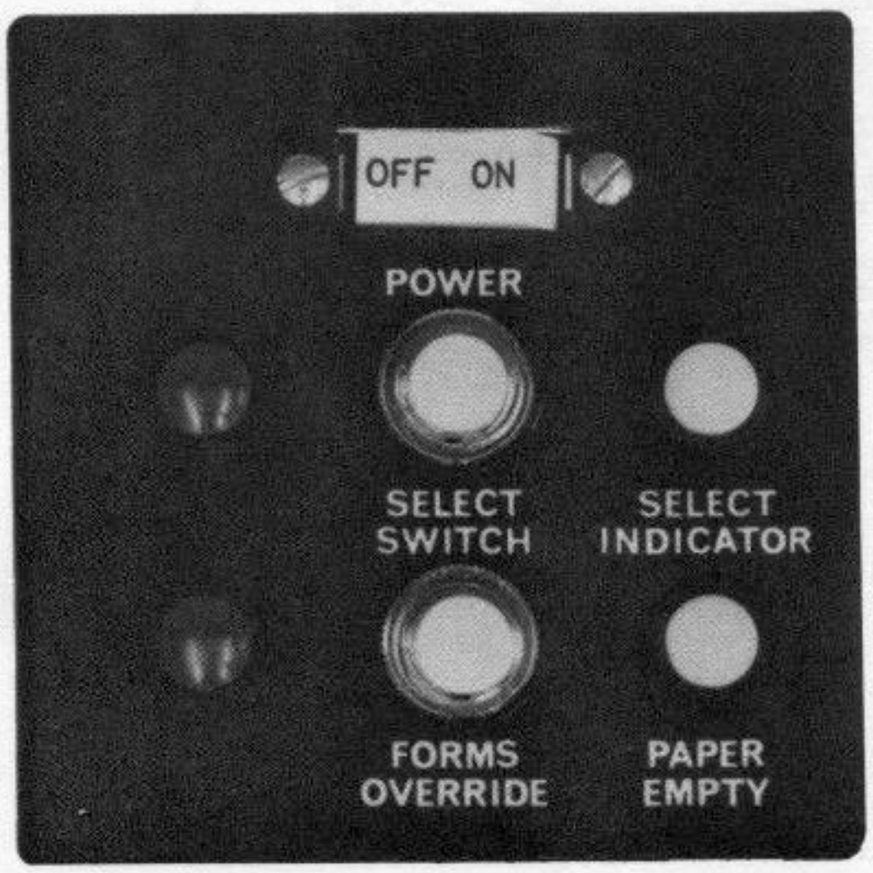
Indicator:

6. PAPER OUT — This indicator is used to signal an out-of-paper condition or a paper handling malfunction.

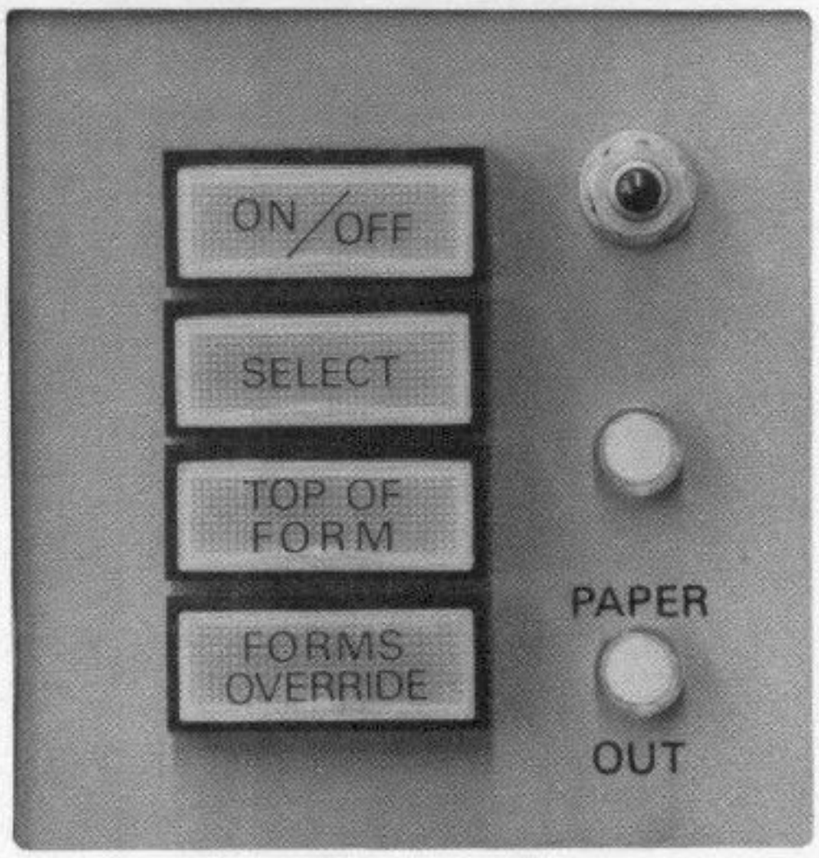
The following table lists the availability of the above controls with each printer.

	101	101A	101AL	102A	306
ON/OFF	s	s	s	s	s
SELECT	s	s	s	s	s
FORMS OVERRIDE	s	s	s	s	s
TOP OF FORM	s	s	s	s	o
LINE FEED	-	s	s	s	o
PAPER OUT	s	s	s	s	s

s - standard
o - optional



MODEL 306 OPERATOR CONTROLS

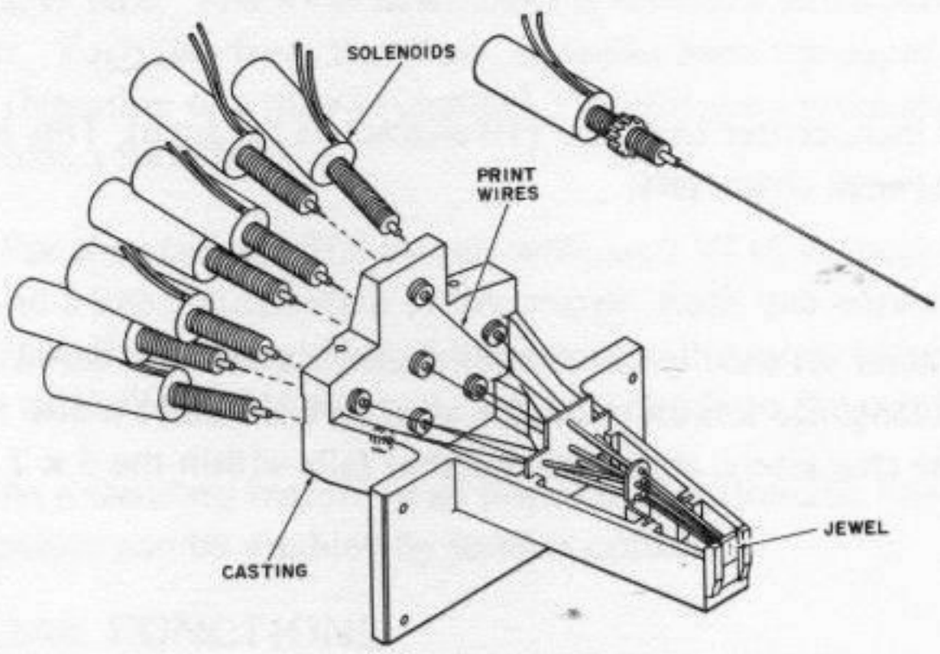


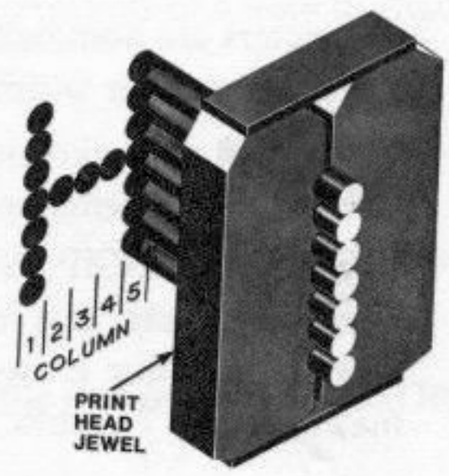
SERIES 100 OPERATOR CONTROLS

CHARACTER PRINTING

Printing is accomplished by selectively firing seven solenoids attached to print wires arranged radially around the print head. Each solenoid can fire independently up to five times for each character.

The free ends of the print wires pass through a wire guide at the front of the print head. The wire guide properly spaces the wires so that the correct wire passes through the correct hole in the print jewel. When the printing impulses are received, the print solenoids are energized to drive the print wires against the ribbon, paper, and platen to form the characters out of dots. When the print solenoids are de-energized, the print wires are drawn in flush to the surface of the print head.

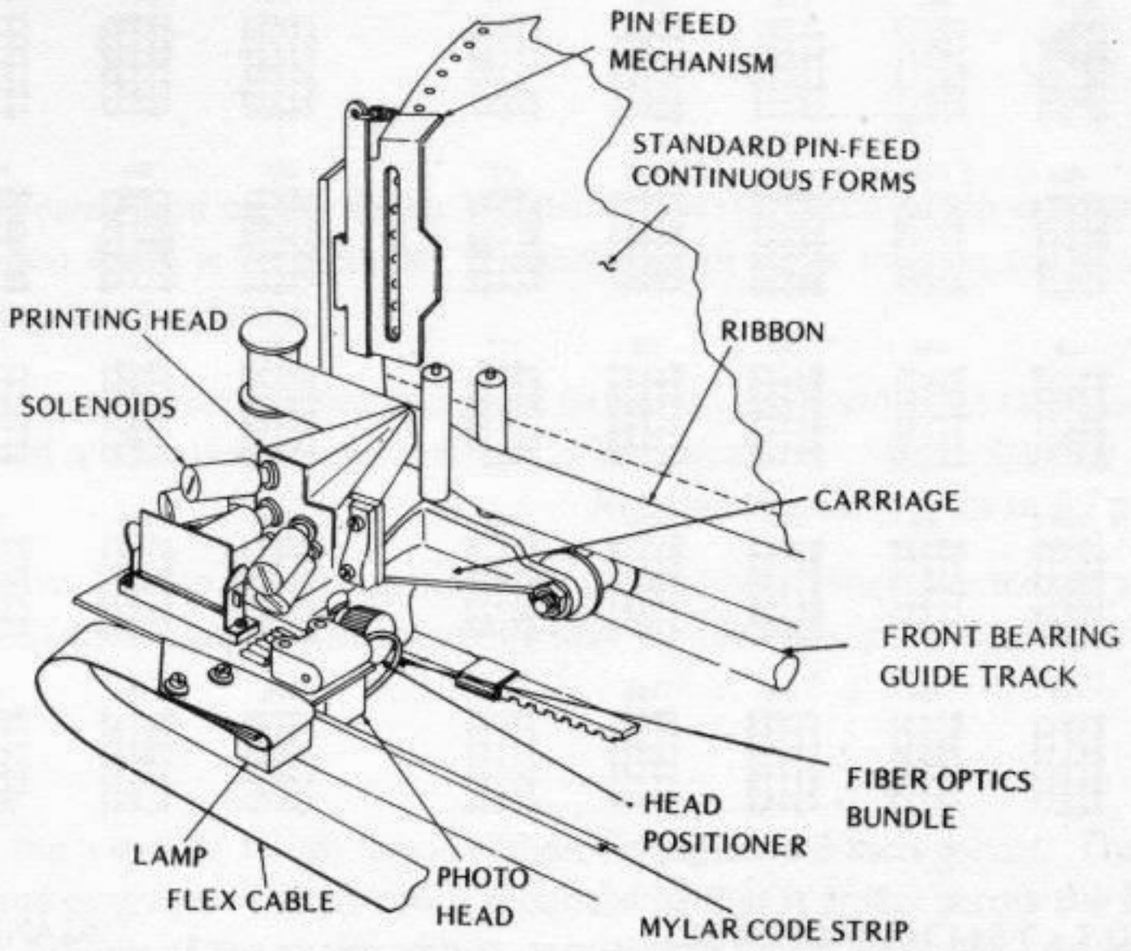




Printing action is initiated when the input buffer is filled or a Carriage Return code is received. The print head then sweeps across the page at a constant rate until the last character in the buffer is printed or the print head carriage reaches the limit switch. As an option in the 306 and 101AL, any paper movement command (FF, VT, or LF) can also initiate a printing action.

CHARACTER REGISTRATION

Horizontal character registration is accomplished by a unique clocking system which permits variations in head speed but still ensures accurate timing and character registration. As shown in the figure, an optical pick-up head and light source is physically connected to the print head carriage. A strip with alternately transparent and opaque slots is vertically mounted between the light source and the optical pick-up. As the carriage moves, a series of pulses is generated. Each pulse is used to resynchronize the character print timing.



CLOCKING/CARRIAGE MECHANISM

CENTRONICS

STANDARD CHARACTERS

Some of the characteristics common to all printed outputs from Centronics printers include:

Character Size

Nominal character height is 0.100 inch, width is 0.080 inch.

Character Spacing – Vertical

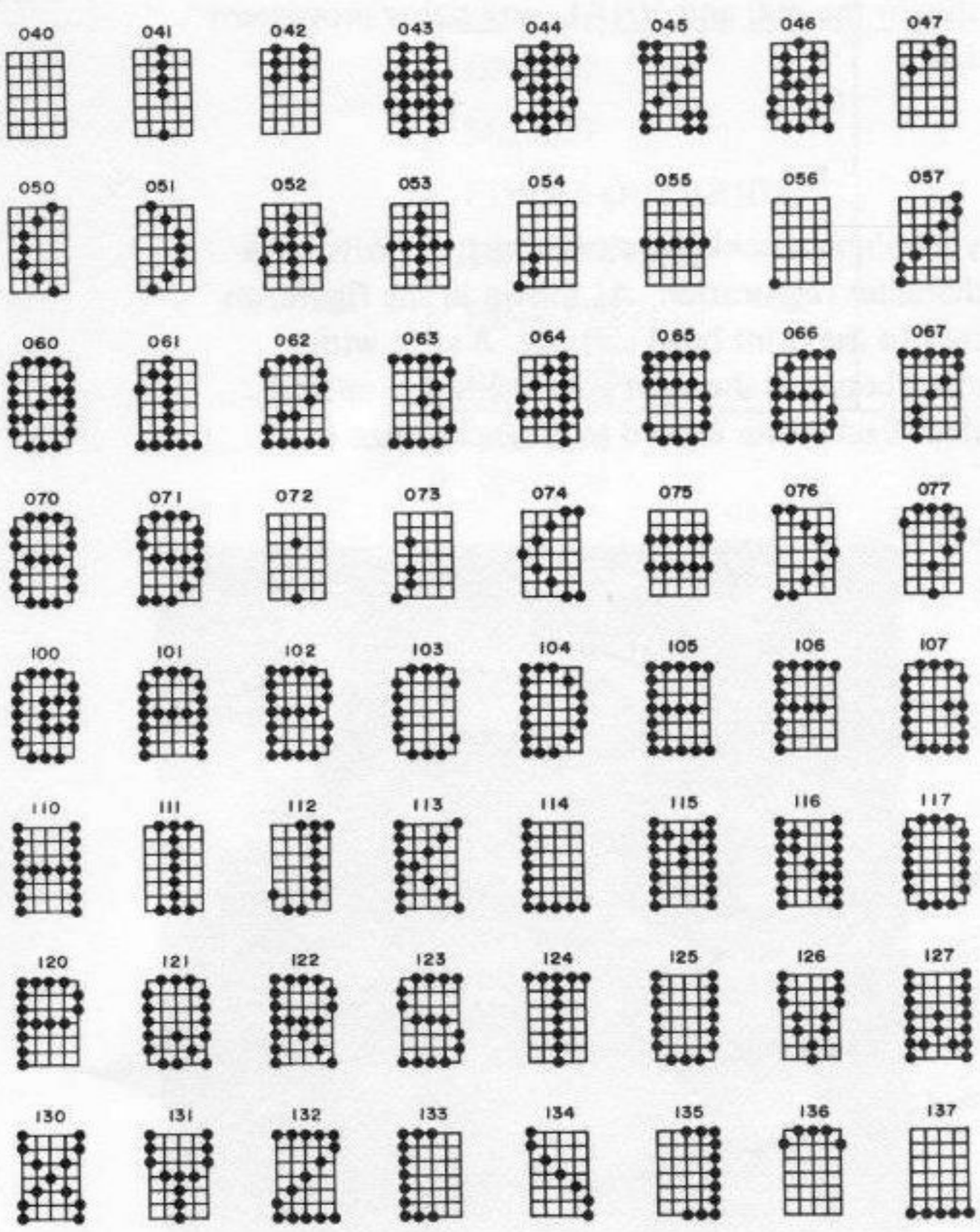
The approximate distance from line to line (6 lines per inch) is 0.166 inch between centers of the printed characters.

Character Spacing – Horizontal

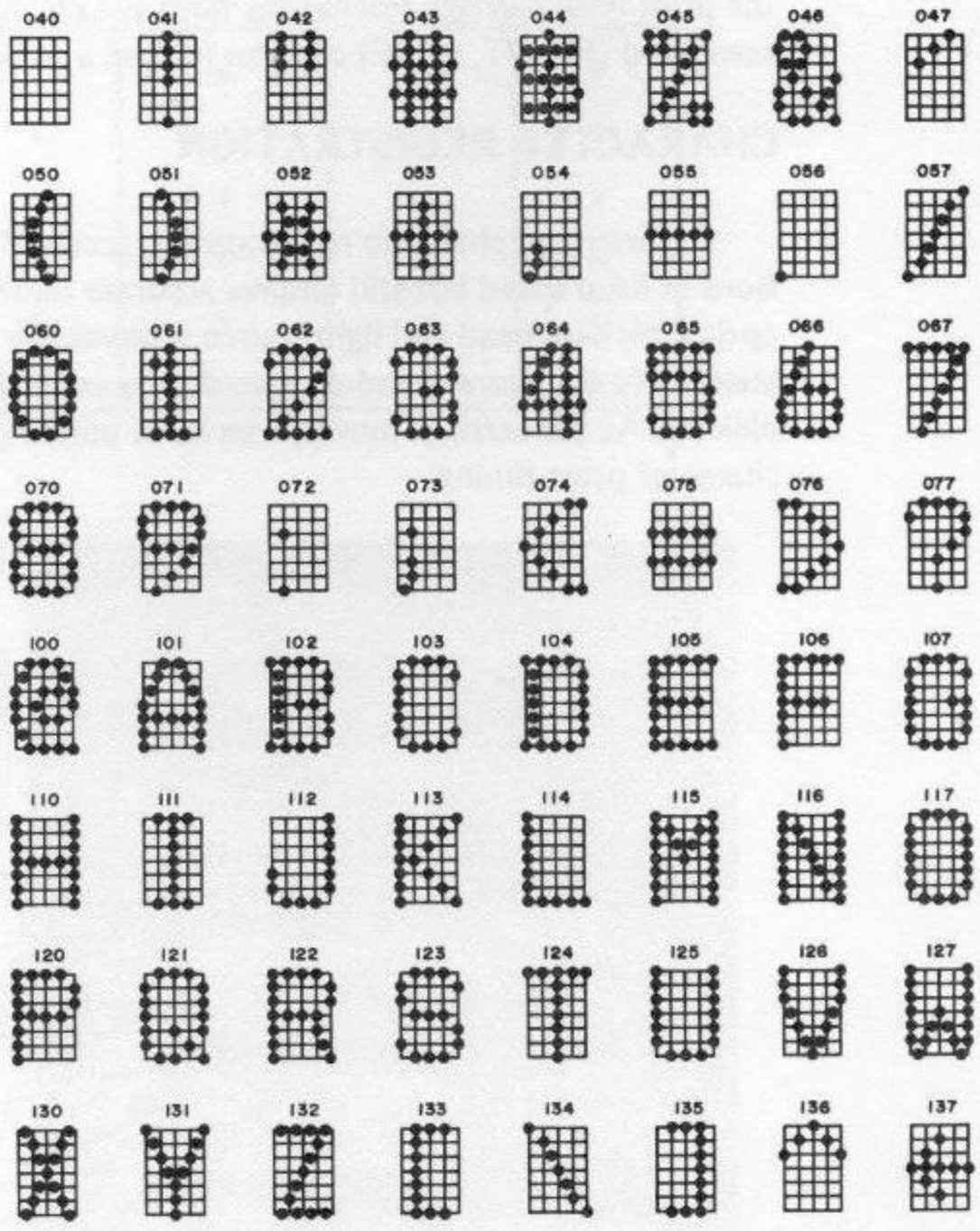
Characters are nominally spaced 0.100 inch, center to center (10 characters per inch). This includes the full character width plus a space between characters.

Character Sets

The basic USASCII 5 x 7 or 9 x 7 character set used in Centronics printers are shown below. Special character sets including foreign language sets are available as an option. Since a dot matrix technique is used to generate the characters, any character that falls within the 5 x 7 matrix or 9 x 7 matrix can be printed.



STANDARD 5 x 7 64-CHARACTER SET
(I.D. NO. C–8940)



STANDARD 9 x 7 64-CHARACTER SET
(I.D. Nos. C–8837 & C–8838)

PAPER MOVEMENT

To move the paper, the printer electronics activates a line feed solenoid which engages a clutch that mechanically links the motor to the sprocket-feed tractors.

Line feeds are accomplished by pulsing the line feed solenoid for approximately 15 milliseconds. Form feed and vertical tab functions are accomplished by activating the line feed solenoid until the function is complete. Upon completion of any paper movement command, a 60-90 millisecond delay is generated to allow the form feed clutch to re-engage.

For printers with a Vertical Format Unit (VFU), form feed and vertical tab functions are controlled by a paper tape. The VFU tape reader is mechanically linked to the gear train which drives the paper feed tractors. Each line feed, therefore, advances both the paper by one line and the paper tape by one sprocket hole. Detection of a hole in channel 5 terminates a vertical tab operation, detection of a hole in channel 7 terminates a form feed.

For the standard 306 printer without a VFU, vertical formatting is controlled by the users' software and a line count switch in the printer. Each line advance generates a line pulse at the interface connector. By keeping track of these pulses, the users' software can terminate the paper movement by issuing an INPUT PRIME signal or a delete code to the printer.

As a standard feature in all printers, an automatic line feed occurs at the end of each printed line. This feature can be disabled by jumper option.

SPECIAL FUNCTIONS

AUDIO ALARM

The audio alarm is used to alert the operator of some special condition requiring his attention. It is activated automatically when the printer is out of paper, or it may be turned on by a BELL code (octal 007).

AUTOMATIC MOTOR CONTROL

This feature automatically turns off the printer motor(s) when not in use and turns the motor(s) back on when data is received. Reception of either a print or paper movement command initiates a 9-second delay. If no other print or paper movement command is received during this 9-second interval, a switch is deactivated which removes the 115 VAC from the printer motor(s). The dc voltages to the printer electronics are not affected. The motors remain off until the next print or paper movement command is received, at which time the switch is activated and 115 VAC is immediately applied to the motors. The automatic motor control is contained within the printer.

FORMS AND RIBBON

FORMS

The maximum width of forms used on the Series 100 printers is restricted to the standard 14 7/8 inch form. On the 306, the maximum width is 9 1/2 inches. However, both paper tractors are adjustable and can be moved to accommodate narrower forms.

The stacking characteristics of forms depend to a great extent on environmental conditions. Good stacking conditions are obtained within the following ranges: Temperature: 50° to 100°F
Relative Humidity: 25 to 62 percent

Occasional operator intervention to adjust stacking may be required. When the temperature or relative humidity falls outside of these ranges, form stacking may be adversely affected, requiring additional operator attention.

RIBBON

The Centronics printers use a special 1-inch fabric ribbon on standard 3-inch spools. There are four selective colors: black, red, blue or green. The ribbon is mounted so that it angles across the face of the back platen plate. This allows full use of the entire ribbon, resulting in long ribbon life. An automatic reverse mechanism changes the direction of the ribbon whenever the end of the ribbon is reached.

PARALLEL INTERFACE (STANDARD)

INTERFACE TIMING

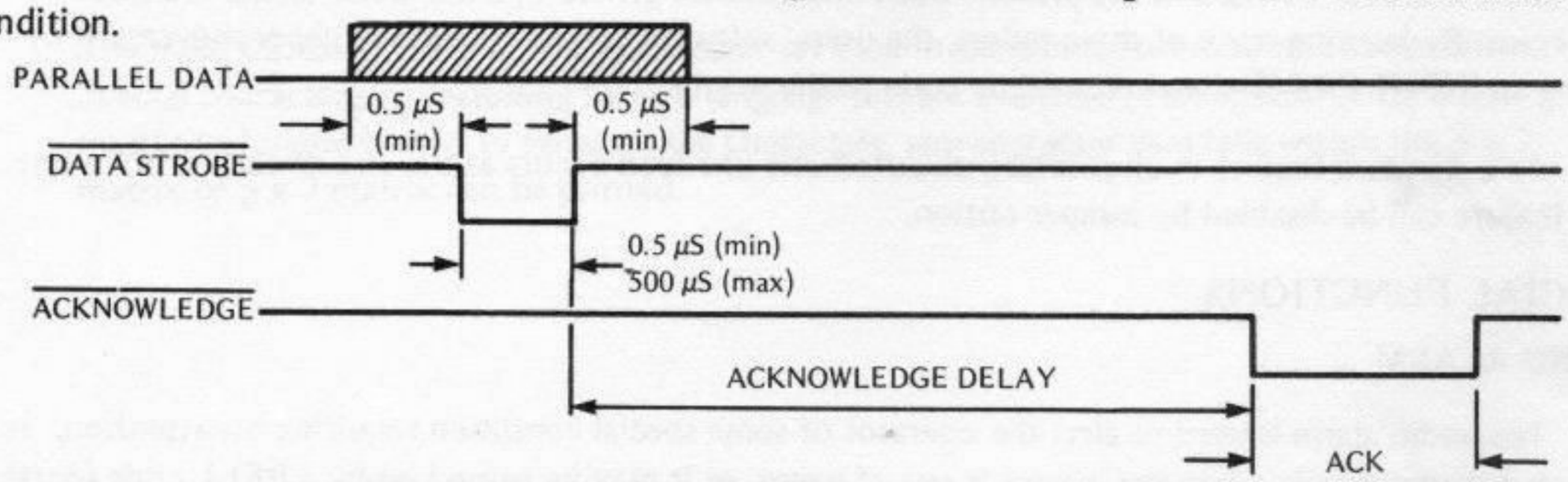
The single line buffer in each standard printer enables the printer to receive parallel data at a rate of up to 75,000 characters per second.

In general, the data transfer sequence consists of the input device placing the appropriate code on the data lines to the printer and then generating a data strobe pulse. The printer, after a slight delay, responds with an acknowledge pulse, or if the received data caused a busy condition, the printer first activates the busy line for the duration of the busy condition and then responds with an acknowledge pulse.

As a standard feature in all printers, data strobe is not recognized until the previous character has been acknowledged (gated data strobe). As an option, however, data strobe can be recognized at any time.

Normal Data Input – No Busy

The diagram shown below illustrates the timing involved in receiving data which does not cause a busy condition.

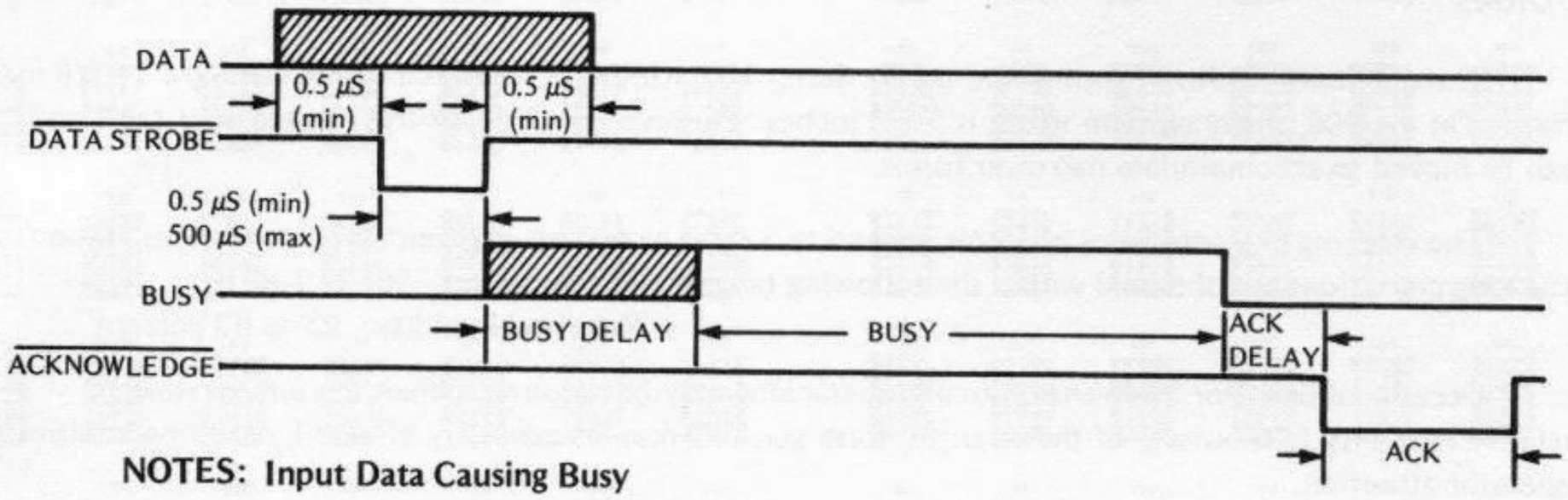


NORMAL DATA INPUT TIMING

	MODEL 101, 101A & 102A	101AL & 306
ACK DELAY	7 µsec	2.5–10 µsec
ACK	4 µsec	2.5–5.0 µsec

Data Input Causing Busy

The diagram shown below illustrates the interface timing involved in receiving any data which causes a busy condition in the printer.



NOTES: Input Data Causing Busy

Line Feed	De-Select
Vertical Tab	Delete
Form Feed	Bell (Models 101, 101A and 102A only)
Carriage Return	80th character in a line (306 only)
Select	132nd character in a line (Series 100 only)

CENTRONICS

EASTERN REGION
CENTRONICS
1 Wall Street
Hudson, New Hampshire 03051
Telephone: (603) 883-0111

CENTRAL REGION
CENTRONICS
Executive East Building, Suite 200
1563 East Dorothy Lane
Kettering, Ohio 45429
Telephone: (513) 294-0070

CHICAGO DISTRICT OFFICE
CENTRONICS
1132 Gail Lane
Sleepy Hollow, Illinois 60118
Telephone: (312) 426-5533

WESTERN REGION
CENTRONICS
2800 South Main Street
Santa Ana, California 92707
Telephone: (714) 979-6650

FOREIGN OFFICES

CANADA

C.A.E. ELECTRONICS LTD.
P. O. Box 1800
St. Laurent, Montreal 379
Canada
Telephone: (514) 341-6780

MEXICO

MAQUINAS DE INFORMACIO, S.A.
Insurgentes Sur No. 1722-202
Mexico, 20, d.f.

JAPAN

BROTHER INDUSTRIES, LTD.
No. 35, 9-Chome
Horita-Dori
Mizuho-ku
Nagoya, Japan

EUROPE

CORE
Unit 15 Airport House
Purley Way Croydon
Surrey CRO 4RS
England
Telephone: 01 - 686-9201

6, Frankfurt 50
Am Lindenbaum, 24
West Germany
Telephone: 0611/52001

ISRAEL
ELTA ELECTRONICS INDUSTRIES, LTD.
P.O. Box 330
Ashdod, Israel
Telephone: 055-31155

LEBANON
SYSTEMS DEVELOPMENT INTERNATIONAL
Gefinor Tower
P.O. Box 7934
Beirut, Lebanon
Telephone: 348 340

AUSTRALIA
STANDARD TELEPHONES AND CABLES PTY. LTD.
252-280 Botany Road
Alexandria, Sidney, N.S.W. 2015
Telephone: 69-0444