Sinclair QL Printer

Replacement Manual

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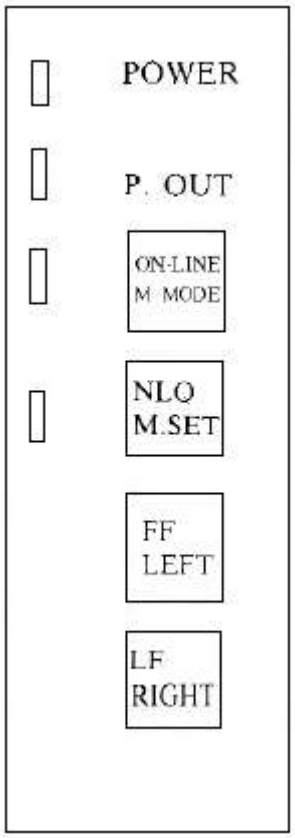
_MAIN FUNCTIONS_____

1. Paper out detection function
   Paper detection function determines whether paper is out or not.
2. A variety of character fonts are possible including High Quality (N.L.Q.), Proportional and Graphic printing.
3. Form feed function: possible by using the switch or the corresponding command.
4. Self Test printing
5. Automatic printing
6. Double Width Character mode
7. Bold Character mode
8. Double Strike Character mode
9. Italic Cursive Character mode
10. Buzzer function
11. Internal RAM error detection function
12. Hexadecimal dump list function
13. Automatic paper loading function
14. Margin designating function (both sides): by using the switches or the corresponding command.
15. Automatic paper feeding out function
16. When a paper out is detected, the paper automatically advances by three more inches for easier paper removal.

_SWITCHES AND LAMPS_____



A. POWER switch

Turns the printer ON/OFF.

B. ON-LINE switch

Puts the printer into the ON-LINE/OFF-LINE state. Pressing this switch puts the printer into the opposite state. In the OFF-LINE state a BUSY signal is output. The head moves to the home position when the printer goes from the OFF-LINE state to the ON-LINE state.

C. NLQ switch (Near Letter Quality)

(Valid only while in the OFF-LINE state) Selects the High Quality or Standard mode. Pressing this switch selects the other print mode. If the High Quality mode is selected the lamp is on. If the Standard mode is selected the lamp is off.

D. LF switch (Line Feed)

(Valid only while in the OFF-LINE state)

Each time this switch is pressed a 1/6 inch line feed is performed.

E. FF switch (Form Feed)

(Valid only while in the OFF-LINE state)

Pressing this switch results in a form feed. The length of each page is determined by the DIP switches or is command designated.

F. POWER lamp (green)

Is on while the power is on.

G. ON-LINE lamp (green)

Is on while in the ON-LINE state (capable of receiving data), Is off while in the OFF-LINE state. If in the margin set mode it flickers at a rate of 0.3 seconds.

H. NLQ lamp (green)

Is on while in High Quality mode. Is off while in the Standard mode.

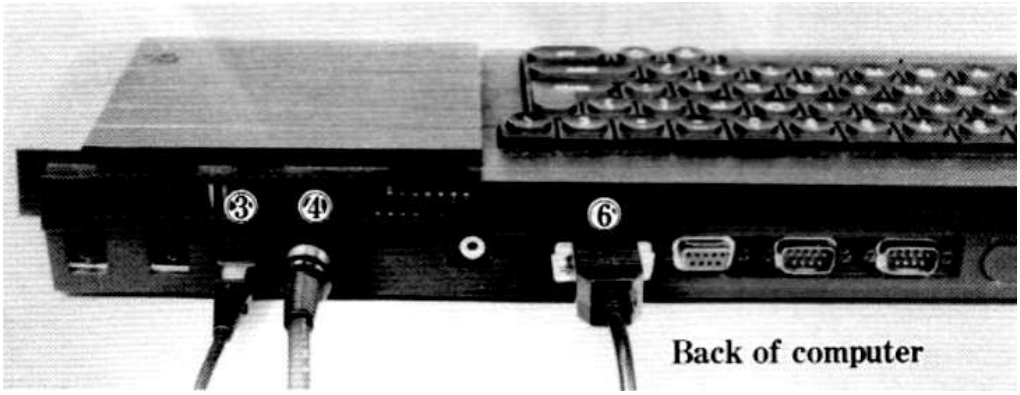
I. P. OUT lamp (red)

Is on if paper out is detected. In this case the printer enters the OFF-LINE state and outputs a busy signal. The buzzer also sounds for 1 second. If paper is inserted and the ON-LINE switch is pressed this state is terminated.
While in the error state the lamp flickers.

_CONNECTING TO THE COMPUTER_____

Follow the instructions below to connect the printer to the computer.

1. Check that the monitor, the printer and the computer are all switched off.



③: POWER for the power supply unit
④: RGB for a monitor
⑥: SER1 for the printer

2. Connect the printer to the computer by the attached cable as shown above.

3. Apply power to the printer, the monitor and the computer in this order. When power is applied to the printer, the print head makes one movement.

Note

Please remember not to connect the power supply lead to the computer until all other leads and peripherals have been connected. Always connect the power supply lead to the computer last of all.

4. Install the ribbon cassette and set paper in the printer. Refer to "PAPER LOADING" and "RIBBON INSTALLATION/REMOVAL" to set them properly.

Note

After setting paper, make sure that the ON-LINE lamp is lit. If it is on, the printer is ready to receive data from the computer.

_INTRODUCTION TO PRINT OUT_____

First, press the F1 or F2 key to select a screen you prefer.

Try typing in the program below and running it.

10 OPEN #3,ser ENTER
20 PRINT #3,"I HAVE A PRINTER." ENTER
30 PRINT #3,"A VERY NICE PRINTER."\\ ENTER
40 LIST #3 ENTER
50 CLOSE #3 ENTER

RUN ENTER

The printout will be:

```
I HAVE A PRINTER.
A VERY NICE PRINTER.
```

```
10 OPEN #3,ser
20 PRINT #3,"I HAVE A PRINTER."
30 PRINT #3,"A VERY NICE PRINTER."\\
40 LIST #3
50 CLOSE #3
```

Each line of the program is explained as follows.

```
10 OPEN #3, ser
```

The OPEN command initialises a device and activates it for use. When a device is activated, a channel is opened and linked to the device. To correctly open a channel, device basic information must be supplied to initialise the device driver. #3 designates channel number 3, ser selects the SER1 port and its default setting is 8-bit no parity with handshake. The printer can receive only this default setting.

```
20 PRINT #3,"I HAVE A PRINTER."
```

"I HAVE A PRINTER." followed by a New Line code, 10 in decimal number, is now sent to the printer.

```
30 PRINT #3,"A VERY NICE PRINTER."\\
```

```
40 LIST #3
```

The command allows the program stored in the computer to be listed on the printer.

```
50 CLOSE #3
```

The CLOSE command closes the serial channel for the printer. In thi scase it is channel 3 that is deactivated.

_PAPER LOADING_____

A. Cut Sheet Paper

Remove the tractor unit when using friction feed for the cut sheet paper.

1. Open the printer cover.

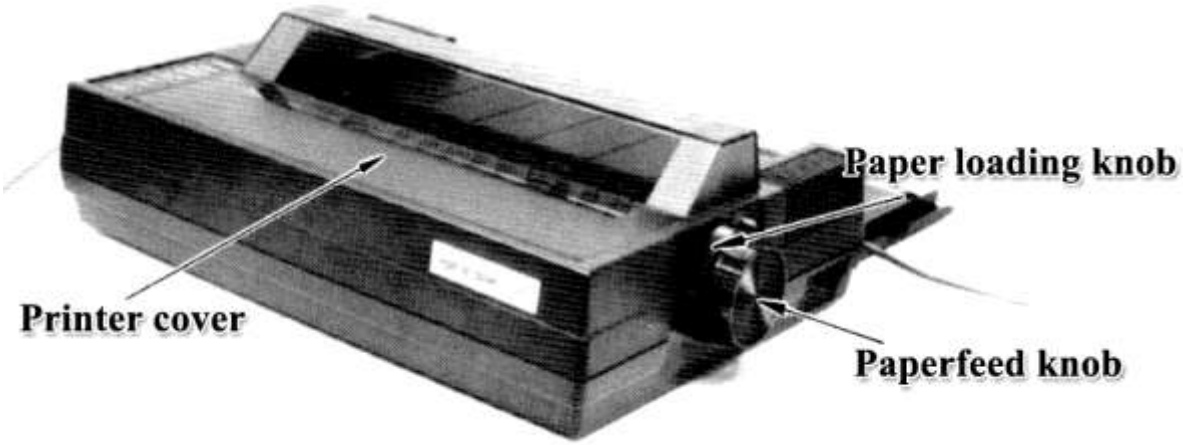


Fig. 1

2. Hold the paper rack upright and insert it to the two supporters on both sides. Insert the folding leg into the hole located on the top of the case.

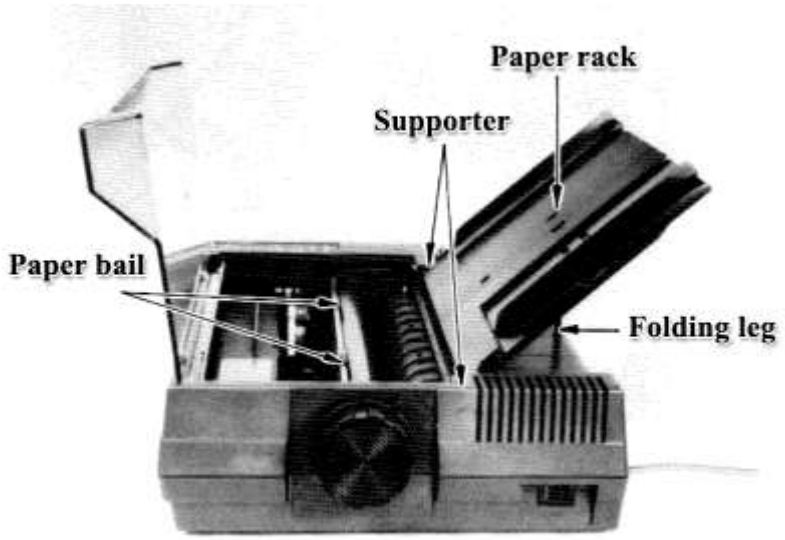


Fig. 2

3. Slide the paper guide right to the extreme right.

4. Position the cut sheet paper at the extreme left of the paper rack as shown below.

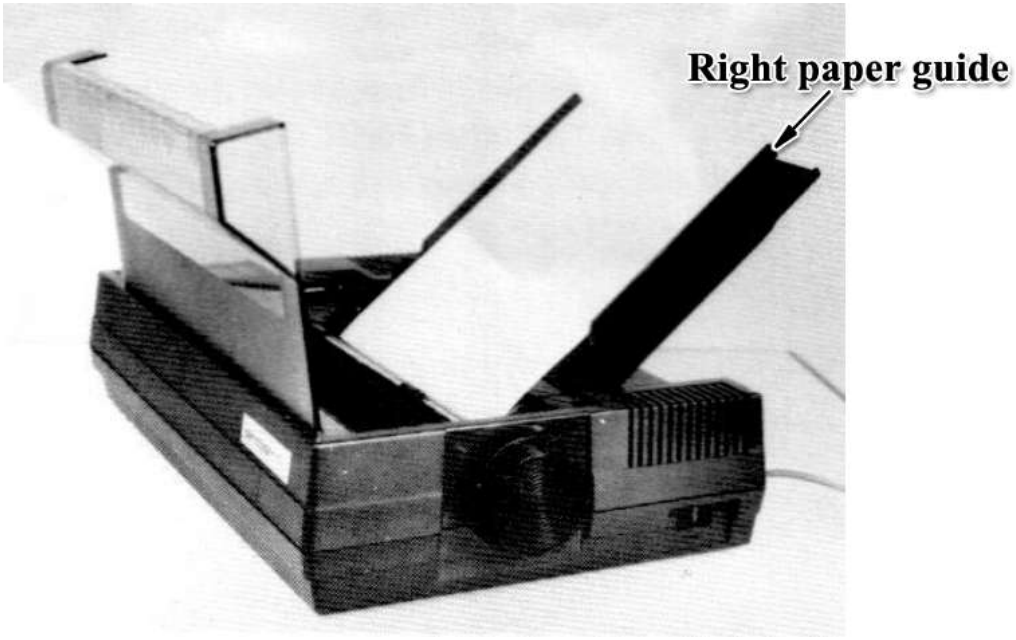


Fig.3

5. Slide the right paper guide to the left to match the paper width.

6. Apply power to the printer.

7. The paper automatically advances to the TOF position if the paper loading knob is turned counter-clockwise. TOF stands for Top Of Form.

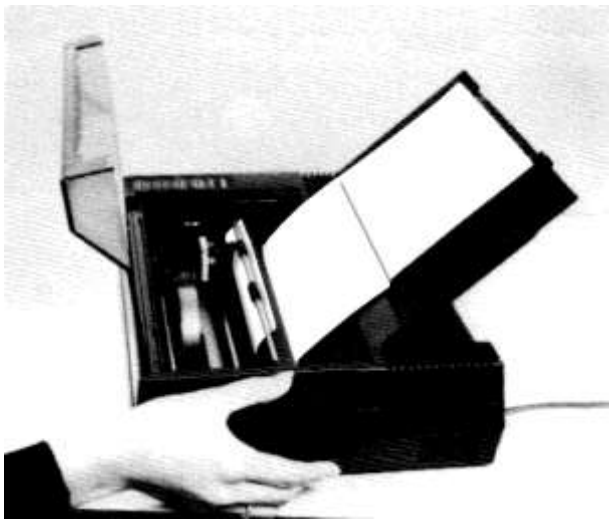


Fig. 4

8. Turn the paper loading knob clockwise to set the paper bail.

9. Close the printer cover.

NOTE 1: If you wish to shift the loaded paper to the right or to the left, remove the paper by the paperfeed knob and repeat the process from step 3.

NOTE 2: If a cut sheet is positioned at the leftmost side of the paper rack, printing starts at a position one inch away from the left edge of a form.

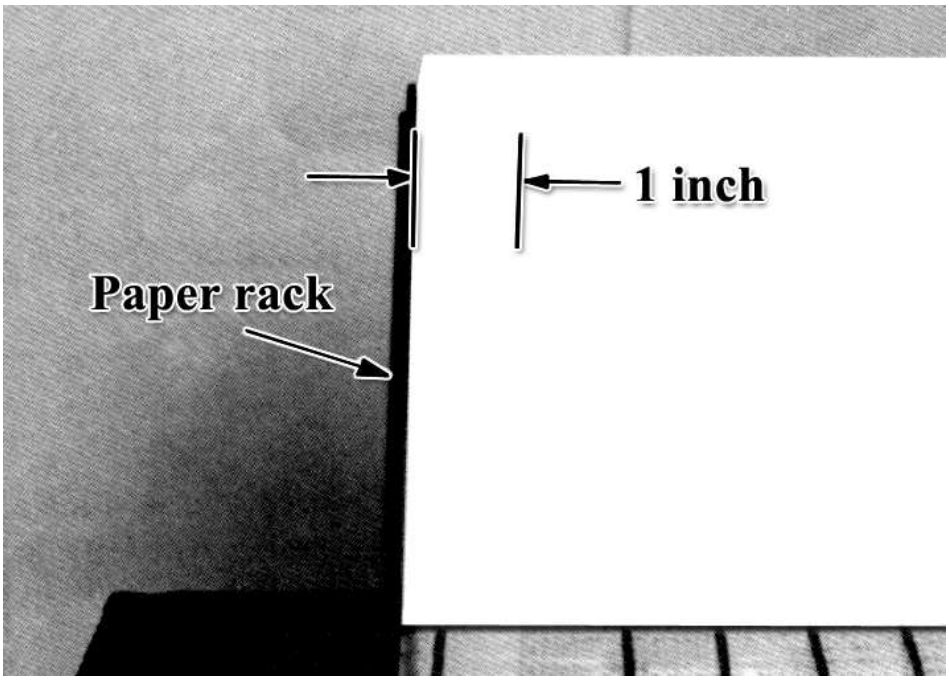


Fig. 5

NOTE 3: The position of the paper guide, which has been installed at the leftmost end of the paper rack when shipped, can be adjusted by pulling it upwards. This will remove it from the paper rack. The user is then able to position it at any desired location.

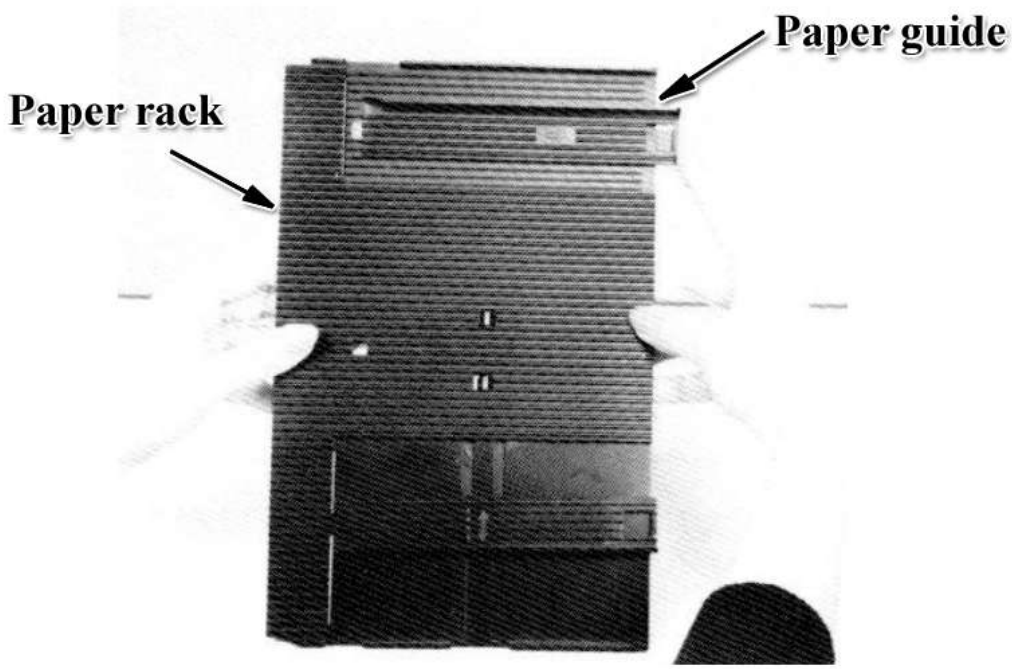
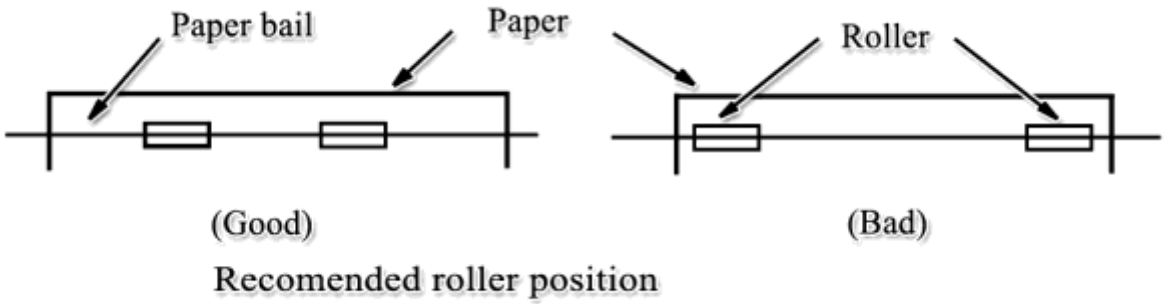


Fig. 6

NOTE 4: When using the paper loading knob to automatically set a form, the ribbon at the print head may slightly be raised. But the user does not have to manually reset the ribbon because it automatically returns to its normal position before printing is performed. Therefore, printing is not affected at all by the ribbon raised.

NOTE 5:



Recomended roller position

Reference: The paper out detection switch is located at a position about 6 centimeters away from the left edge of the platen. The left edge of a cust sheet of paper should cover the switch to avoid the paper out condition.

B. Continuous Forms

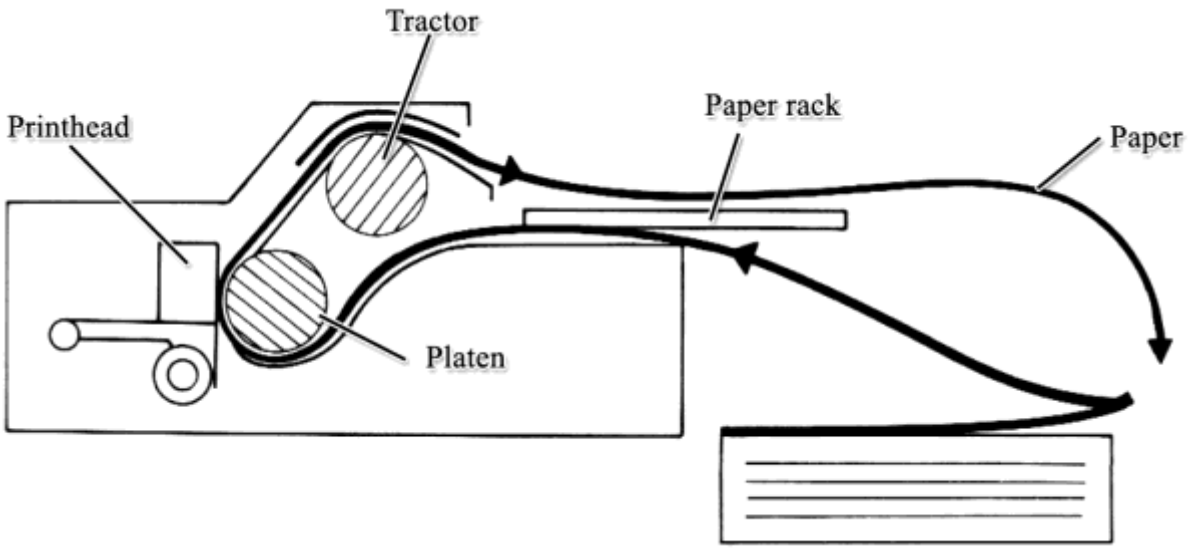


Fig.7 Paper feed path

1. Remove the paper rack and the printer cover.
   Make sure the power is turned OFF.

2. Turn the paper loading knob counter-clockwise to move the paper bail toward the front.

3. Install the tractor unit on the top of the platen in the following process.
   ① Insert the front hook of the tractor unit into the hole on both sides.
   ② Push down the rear of the tractor to fit the back hook securely.

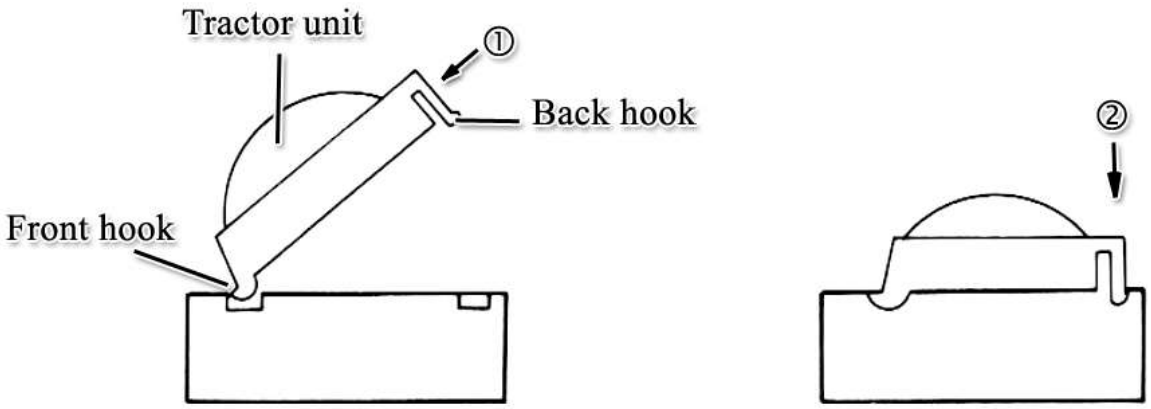


Fig. 8

4. Feed the paper into the printer from the back and then turn the paperfeed knob in a clockwise direction until it appears between the platen and the printhead.

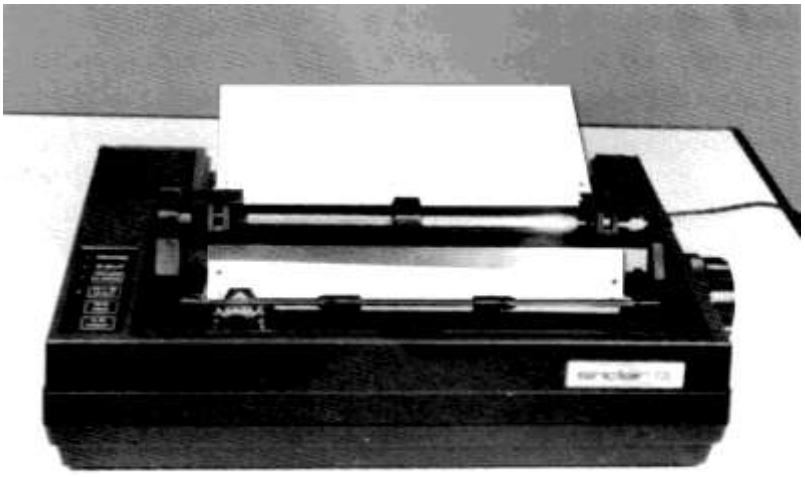


Fig. 9

5. Open the tractor covers on the left and right.

6. Adjust the tractors such that the distance between them matches the holes in the paper.

7. With the holes along both sides of the paper matched up with the paper feed pins on the left and right tractors, close the tractor covers.

8. Turn the paper loading knob clockwise to set the paper bail to the platen side.

NOTE: This is important to be done because the friction roller below the platen is released so that paper is free to be advanced by the tractors only. Failure to do so may cause paper jamming.

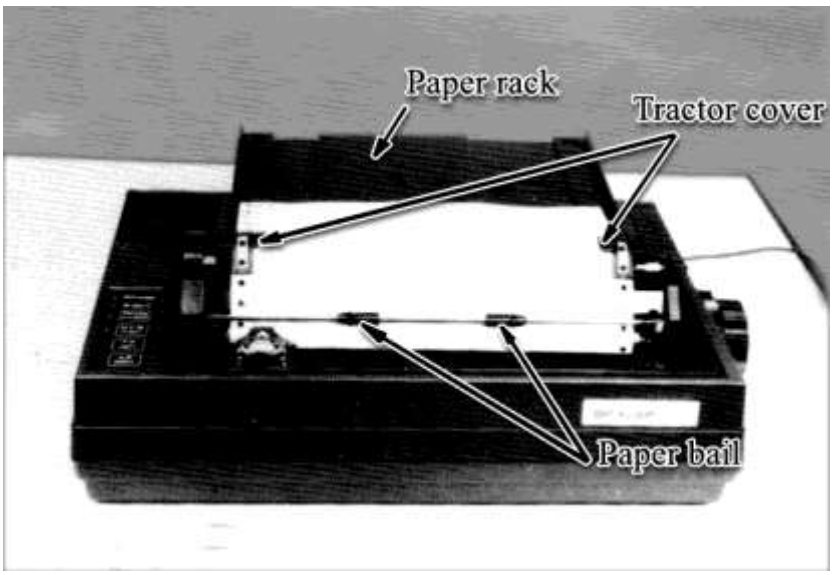


Fig. 10

9. Set the paper rack and the printer cover.

10. Turn the power switch ON.

C. Top of Page Setting

a. Cut sheet

i) Paper out at power-on
If paper is input by the automatic paper loading function, printing is initiated 1 inch from the top.
This 1 inch worth of paper feed is stored within the printer's memory.

ii) Paper already inserted at power-on.
The position of the paper in front of the print head at the time of power on is to become the top of form.
If cut sheets are to be used make sure that the print head is 1 inch from the top of the sheet.

b. Continuous Form

1. Paper already inserted at power-on.
The position of the paper in front of the print head at the time of power-on is to become the top of form position.

2. To start printing at the perforationm adjust the paper using the paperfeed knob so that the perforation is located right above the printhead.
One of the followign steps is to then be taken.

1) Turn the power on once again.
2) Perform an | ESC @ | command.
3) Perform an | ESC C | command.

_RIBBON INSTALLATION/REMOVAL_____

Installation

1. Turn the ribbon feed knob in the direction of the arrow to remove slack in the ribbon

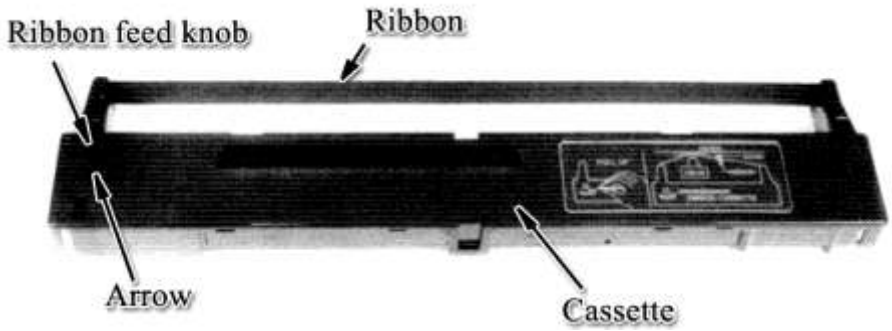


Fig. 11

2. Insert the ribbon in-between the ribbon mask and the print head, and position the cassette so that the ribbon feed shaft is inserted into the hole under the ribbon feed knob.

NOTE: It is easier to insert the ribbon when the printhead is at the home position (extreme left).

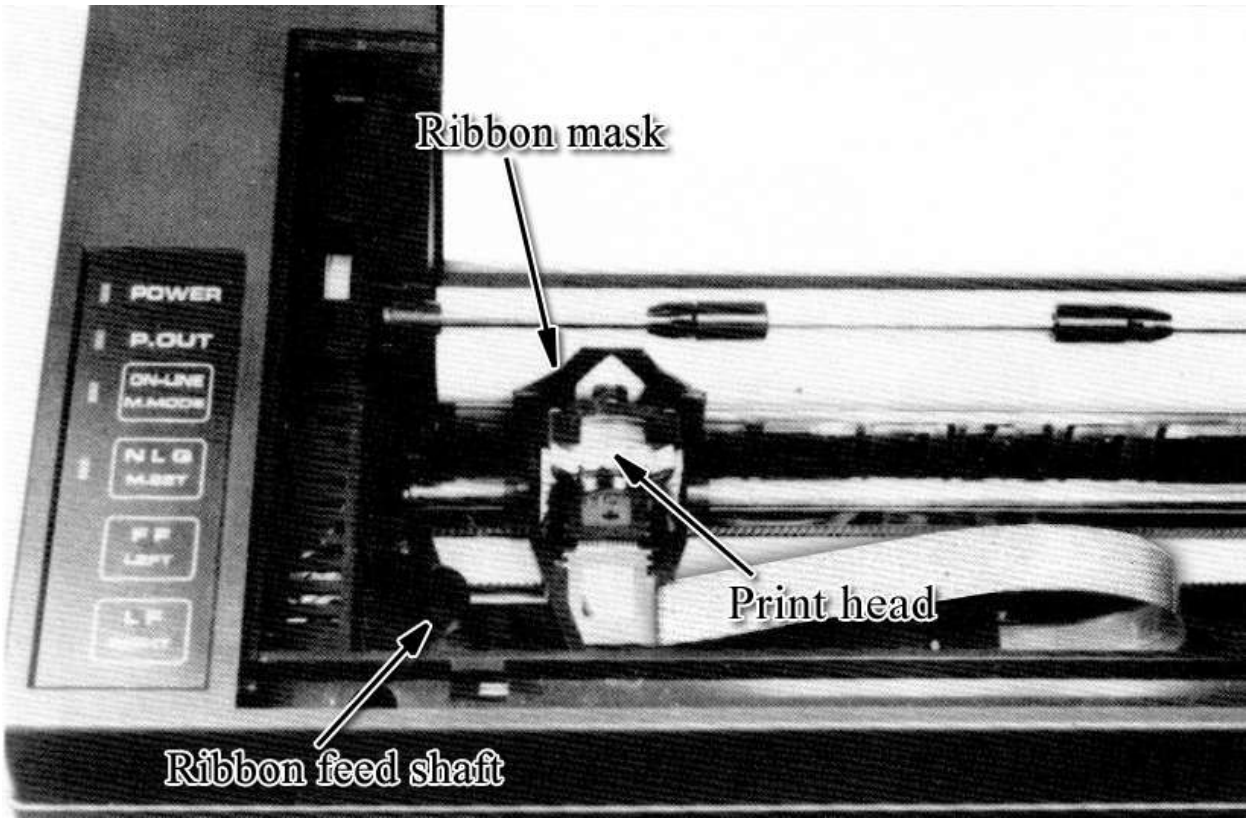


Fig. 12

3. Press on both sides of the cassette.

Fig. 13

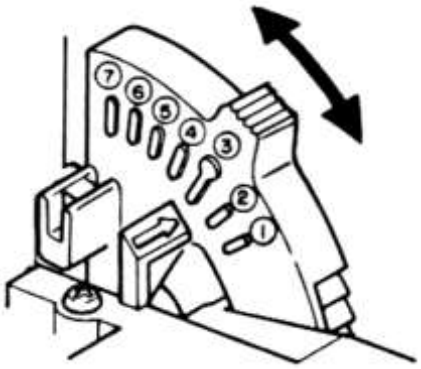
4. Twist the ribbon feed knob of the cassette to tighten the ribbon. Make sure that the ribbon is properly positioned in front of the printhead.

Removal

Hold the fin of the cassette and pull it up to remove.

Fig. 14

_HEAD POSITION ADJUSTMENT_____



The print head position can be adjusted using the head adjustment lever located inside of the printer on the rightband side.

Position is suitable for one-part general paper. The printer is shipped with the lever set to position ③.

When using three-part paper, it is recommended that the lever be set to position ⑤ or ⑥.

_MARGIN SETTING BY SWITCHES_____

(1) Margin mode switch (the M. MODE switch)

If this switch is pressed for more than 1 second in the ON-LINE state, the printer enters the right/left margin set mode. At this time the ON-LINE lamp will turn off and on every 0.3 seconds. If pressed again, the printer will return to the ON-LINE state.

(2) RIGHT switch

(Valid only while in the margin set mode)
By pressing this switch the print head moves to the right of its present position. The margin position is located at the center of the print head.

(3) LEFT switch

(Valid only while in the margin set mode)
By pressing this switch the print head moves to the left of its present position. The margin position is located at the center of the print head.

(4) Margin set switch (the M. SET switch)

(Valid only while in the margin set mode)
Pressing this switch sets the margin positions.
The margins are set from left to right.
The printer returns to the ON-LINE state as soon as the right margin is set.
If only the left margin is to be set, after setting the left margin, press the margin mode switch (the M. MODE switch). If only the right margin is to be set, it must be performed after setting the left margin.
The minimum margin setting possible is 1 PICA Double Width Character worth. After the margin is set the buzzer sounds for approximately 0.1 second.

_SELF TEST PRINTING FUNCTION_____

If the LF or NLQ switch is pressed during power-on a pattern is printed repeatedly. If the LF switch is pressed during power-on the self test printing is performed in Standard Character mode. If the NLQ switch is pressed during power-on the self test printing is performed in High Quality Character mode.

The printer is in the OFF-LINE state while performing the self test printing function.
To stop the self test printing the ON-LINE switch is to be pressed.
At this time the ON-LINE lamp turns on.

During the self test printing, if a paper out is detected the self test printing is terminated. The self test printing does not start in the paper out state.

_AUTOMATIC PRINTING FUNCTION_____

During the input process of character data (excluding graphic data). if the amount of data exceeds 1 line worth of characters, a printing and line feed is performed.

During the input of graphic data, if the data exceeds 1 line, printing is performed without a line feed. The graphic data that exceeds 1 line is ignored.

_AUTOMATIC PAPER LOADING FUNCTION_____

At paper out, if a form is inserted into the form entrance and the paper loading knob is turned counter-clockwise, the form is automatically inserted into the printer.

The distance from the top of the form to the first line printed is l inch. After loading, the paper loading knob is to be turned clockwise.

_HEXADECIMAL DUMP LIST FUNCTION_____

This function is very useful if you want to check what codes the printer actually receives from the computer using various output commands.

The data that is input is printed in 2-digit hexadecimal numbers. This function can be set by pressing the FF switch during power-on. After printing a hexadecimal digit 2 characters worth of space is left open. This allows 16 pairs of data per line to be printed.

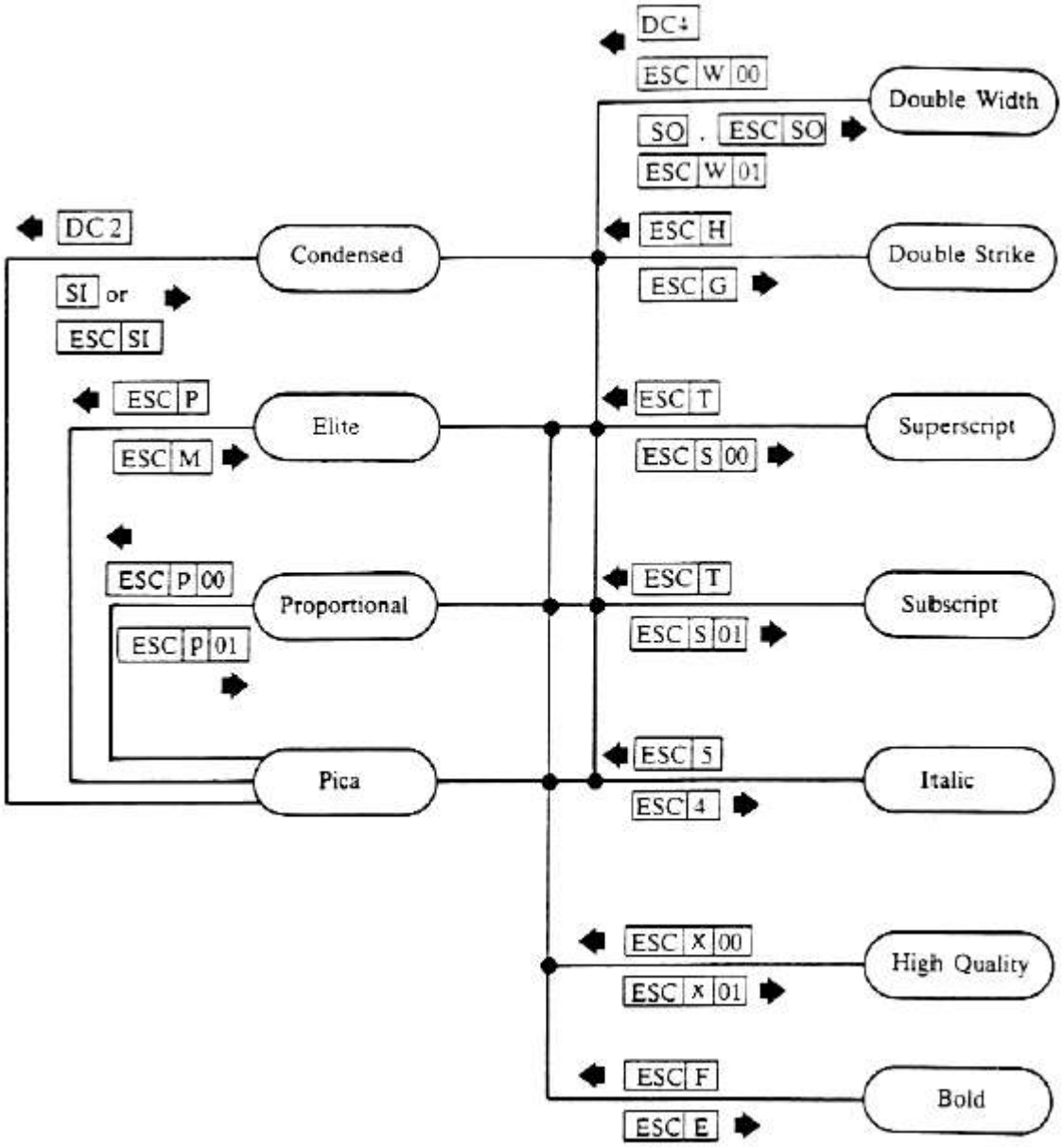
Printing is initiated after 16 pairs of data is input. If the input data is less than 16 pairs, pressing the ON-LINE switch will print the input data. After this printing is done the OFF-LINE state is set. Pressing the ON-LINE switch once more sets the hexadecimal dump function. The characters to be printed is set to Pica Character mode. High Quality Character mode can be set by pressing the NLQ switch in the OFF-LINE state.

The hexadecimal dump list function can be terminated by turning the printer off then on once again.

_PRINT MODE FLOWCHART_____

When the power is applied to the printer, the default mode automatically set is Pica character mode.

To print Italic characters, forst output the ESC 4 command by typing:
PRINT #3,CHR$(27);"4";
See the ESC 4 command on page 28 for further details.



In print mode the following priorities exist:

1. Elite > Proportional > Bold > Condensed > Pica
2. Superscript/Subscript > High Quality > Double Strike

For greater detail refer to the character Category Priority Table.

The ESC ! command clears character modes specified thus far and sets modes according to its designation.

_CONTROL CODE EXPLANATIONS_____

In this chapter, all the control commands are explained in detail. A square containing a symbol indicates one byte of control commands.
Then follows the actual code in Hexadecimal and Decimal numbers.

(1) Print Command

1. CR **(OD) Hex (13) Decimal**

Input of this code initiates printing. A line feed is not performed after printing. If print data is input or if the input data is all space code the print head does not move. The print data that is input after the CR command is printed from the left margin.
After this command is executed, the SO or ESC SO Double Width mode is terminated.

If you run the listed program below, you can get the printed sample.

```
PROGRAM ONE      }  Printed sample
```

```
10 OPEN #3,SER                          }
20 REMark CARRIAGE RETURN               }
30 PRINT #3,"PROGRAM ONE";CHR$(13);     }  Program list
40 PRINT #3,"PROGRAM TWO"\\\\ .         }
50 LIST #3                              }
60 CLOSE #3                             }
```

2. NL **(OA) H (l0) D**

Input of this code imnates printing and performs a line feed after printing. the amount of line feed is set by the line feed pitch command. If the print data is not input or if the input data is all space code only a line feed is performed. The print data that is input after this command is printed from the left margin.

After this command is performed, the SO or ESC SO Double Width mode is terminated.

```
PROGRAM ONE
PROGRAM TWO
```

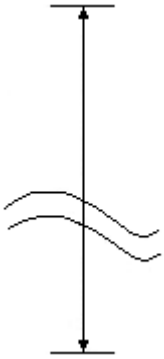
```
10 OPEN #3,SER
20 REMark LINE FEED
30 PRINT #3,"PROGRAM ONE";CHR$(10);
40 PRINT #3,"PROGRAM TWO"\\\\
50 LIST #3
60 CLOSE #3
```

3. FF (0C) H (12) D

Input of this code initiates printing and performs a form feed after printing. The form feed value (1 page length) can be selected from 2 choices by the DIP switches1-3 at power-on. This value can be altered by the ESC C command.

After this command the SO or ESC SO Double Width mode is terminated.

```
PROGRAM ONE
   PROGRAM 2
   PROGRAM THREE
```



11 inches

```
PROGRAM 4
```

```
10 OPEN #3,SER
20 REMark FORM FEED
30 PRINT #3,"PROGRAM ONE"\
40 PRINT #3,"   PROGRAM TWO"\
50 PRINT #3,"   PROGRAM 3";CHR$(12);
60 PRINT #3,"PROGRAM FOUR"\\\\
70 LIST #3
80 CLOSE #3
```

4. VT (0B) H (11) D

This command forms the same function as the NL command.

```
PROGRAM ONE
PROGRAM TWO
```

```
10 OPEN #3,SER
20 REMark VERTICAL TAB
30 PRINT #3,"PROGRAM ONE";CHR$(11);
40 PRINT #3,"PROGRAM TWO"\\\\
50 LIST #3
60 CLOSE #3
```

5. **ESC** **J** **n** **(1B, 4A, n) H (27, 74, n) D**

n is an 8-bit binary code 0 <= n <= 255

Input of this code initiates printing and performs an n/216 inch linefeed after printing. The amount of line feed is not stored in the printer. After performing this command printing starts at the beginning of the line. When n = 0, printing without a line feed is performed.

```
PROGRAM ONE
PROGRAM TWO
```

```
10 OPEN #3,SER
20 REMARK n/216 INCHES LINE FEED
30 PRINT #3,"PROGRAM ONE";CHR$(27);"J";CHR$(27);
40 PRINT #3,"PROGRAM TWO"\\\
50 LIST #3
60 CLOSE #3
```

(2) Character Mode Designation

6. **ESC** **P** **(1B, 50) H (27, 80) D**

Input of this command terminates the Elite Print mode.

```
PICA CHARACTER 1
ELITE CHARACTER
PICA CHARACTER 2
```

```
10 OPEN #3,SER
20 REMark ELITE CHARACTER
30 PRINT #3,"PICA CHARACTER 1"\
40 PRINT #3,CHR$(27);'M';
50 PRINT #3,"ELITE CHARACTER"\
60 PRINT #3,CHR$(27);"P";
70 PRINT #3,"PICA CHARACTER 2"\\\\
80 LIST #3
90 CLOSE #3
```

7. **ESC** **M** **(1B, 4D) H (27, 77) D**

Input of this command designates the Elite Print mode.

Refer to **6.**

8. **SI** **(0F) H (15) D**

Input of this command designates the Condensed Character mode.

```
OPEN #2, SER  ENTER
LIST  ENTER
```

```
10 OPEN #3,SER
20 REMark SMALL CHARACTER
30 PRINT #3,"PICA CHARACTER 1"\
40 PRINT #3,CHR$(15);
50 PRINT #3,"SMALL CHARACTER"\
60 PRINT #3,CHR$(28);
70 PRINT #3,"PICA CHARACTER 2"\\\\
80 CLOSE #3
```

```
CLOSE #2  ENTER
RUN  ENTER
```

```
PICA CHARACTER 1
SMALL CHARACTER
PICA CHARACTER 2
```

9. **ESC** **SI** **(1B, 0F)H (27,15)D**

This command is the same as the SI command.

Refer to **8.**

10. **DC2** **(12)H (18)D**

Input of this command terminates the Condensed Character mode designated by the SI or ESC SI command.

Refer to **8.**

11. **ESC** **x** **(01) or (31)** **(1B, 78, 01) H (27, 120, 1) D**
(1B, 78, 31) H (27, 120, 49) D

Input of this command designates the High Quality Character mode and turns the NLQ lamp on. While in Condensed Character mode, if this command is performed, Standard characters are printed even though the NLQ lamp is on. When the Con- densed Character mode is terminated High Quality printing is performed.

```
NORMAL QUALITY 1
HIGH QUALITY
NORMAL QUALITY 2
```

```
10 OPEN #3, SER
20 REMark HIGH QUALITY (CORRESPONDENCE)
30 PRINT #3,"NORMAL QUALITY 1"\
40 PRINT #3,CHR$(27);"x1";
50 PRINT #3,"HIGH QUALITY"\
60 PRINT #3,CHR$(27);'x0";
70 PRINT #3,"NORMAL QUALITY 2"\\\\
80 LIST #3
90 CLOSE #3
```

12. **Esc** **x** **(00) or (30)** **(lB, 78, 00) H (27, 120, 0) D,**
(lB, 78, 30) H (27, 120, 48) D

Input of this command terminates the High Quality Character mode and turns the NLQ lamp off. After this command is input the printer returns to Standard Character mode.

Refer to **11.**

13. **ESC** **p** **(01) or (31)** **(lB, 70, 0l) H (27, 112, l) D,**
(lB, 70, 31) H (27, 112, 49) D

Input of this command designates the Proportional Character mode. In this mode the distance between characters varies. When comparing Standard and High Quality Character modes, notice must be taken of the character widths and spacings that differ.

```
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMN
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMN
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMN
```

```
10 OPEN #3,SER
20 REMark PROPORTIONAL
30 FOR I=32 TO 78
40 PRINT #3.CHRS(I);
50 NEXT I
60 PRINT #3,CHRS(27);"p1"\
70 FOR J=32 TO 78
80 PRINT #3,CHRS(J);
90 NEXT J
100 PRINT #3,CHRS(27);"p0"\
110 FOR K=32 TO 78
120 PRINT #3,CHRS(K);
130 NEXT K
140 PRINT #3,CHRS(13);\\\\
150 LIST #3
160 CLOSE #3
```

```
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMN
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMN
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMN
```

```
10 OPEN #3,SER
20 REMark PROPORTIONAL
30 FOR I=32 TO 78
40 PRINT #3.CHRS(I);
50 NEXT I
60 PRINT #3,CHRS(27);"p1"\
70 FOR J=32 TO 78
80 PRINT #3,CHRS(J);
90 NEXT J
100 PRINT #3,CHRS(27);"p0"\
110 FOR K=32 TO 78
120 PRINT #3,CHRS(K);
130 NEXT K
140 PRINT #3,CHR$(27);”x0”;
150 PRINT #3,CHRS(13);\\\\
160 LIST #3
170 CLOSE #3
```

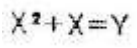
14. **ESC** **p** **(00) or (30)** **(1B, 70, 00) H (27, 112, 0) D**
(1B, 70, 30) H (27, 112, 48) D

Input of this command terminates the Proportional Character mode.

Refer to **13.**

15. ESC S (00) or (30) **(lB, 53, 00) H (27, 83, 0) D**
(lB, 53, 30) H (27, 83, 48) D

Input of this command designates the Superscript Character mode,




```
10 OPEN #3,SER
20 REMark SUPERSCRIPT
30 PRINT #3,"X";
40 PRINT #3,CHR$(27);"SO";
50 PRINT #3,CHR$(15);
60 PRINT #3,"2";
70 PRINT #3,CHR$(27);"T";
80 PRINT #3,CHR$(18);
90 PRINT #3,"+X=Y"\\\
100 LIST #3
110 CLOSE #3
```

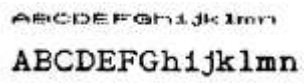
16. ESC S (01) or (31) **(1B, 53, 01) H (27, 83, 1) D**
(1B, 53, 3l) H (27, 83, 49) D

Input of this command designates the Subscript Character mode,


```
10 OPEN #3,SER
20 REMark SUBSCRIPT
30 PRINT #3,"H";
40 PRINT #3,CHR$(27);"S1";
50 PRINT #3,"2";
60 PRINT #3,CHR$(27);"T";
70 PRINT #3,"O"\\\\
80 LIST #3
90 CLOSE #3
```

17. ESC T (1B, 54) H (27,84) D

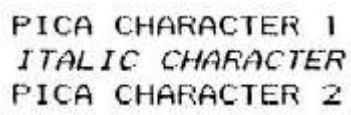
Input of this command terminates the Superscript/Subscript Character mode. Superscript/Subscript Character mode condenses the height of a standard character to ½ its original value. The characters are the same in either Standard or High Quality Character mode. If Proportional Character mode is designated while in Superscript/Subscript Character mode, character widths and spacings become the same as in Standard Character mode. Thus I fboth Superscript/Subscript Character mode and Proportional Character mode are designated while in High Quality Character mode, character widths and spacings between characters are different from the case in which Superscript/Subscript Character mode is not designated.




```
10 OPEN #3,SER
20 REMarkN HIGH QUALITY&PROPORTIONAL&SUPER
30 PRINT #3,CHR$(27);"x1";
40 PRINT #3,CHR$(27);"p1";
50 PRINT #3,CHR$(27);"S0";
60 PRINT #3,"ABCDEFGhijklmn"\
70 PRINT #3,CHR$(27);"T";
80 PRINT #3,"ABCDEFGhijklmn"\
90 PRINT #3,CHR$(27);"x0";
100 PRINT #3,CHR$(27);"p0"\\\\
110 LIST #3
120 CLOSE #3
```

18. ESC 4 (1B, 34) h (27, 52) D, (9B, 34) H (155, 52) D

Input of this command designates the Italic Character mode. All data following this command is printed in Italic. This command is ignored during the printing of graphic data.




```
10 OPEN #3,SER
20 REMark ITALIC CHARACTER
30 PRINT #3,"PICA CHARACTER 1"\
40 PRINT #3,CHR$(27);"4";
50 PRINT #3,"ITALIC CHARACTER"\
60 PRINT #3,CHR$(27);"5";
70 PRINT #3,"PICA CHARACTER 2"\\\\
80 LIST #3
90 CLOSE #3
```

19. ESC 5 **(lB,35) H (27, 53) D**

Input of this command terminates the Italic Character mode.

Refer to 18.

20. ESC ! n **(lB, 21, n) H (27, 33, n) D**
1 <= n <= 63

Input of this command designates mixed modes of the Elite, Condensed, Bold, Double Strike, and Double Width Character mode by changing the value of n.
Each bit of n designates the following modes.

n =	D_7	D_6	D_5	D_4	D_3	D_2	D_1	D_0

D7: Always 0 ..... MSB (Most Significant Bit)
D6: Always 0
D5: Double Width Character mode
D4: Double Strike Character mode
D3: Bold Character mode
D2: Condensed Character mode
D1: Always 0
D0: Elite Character mode ..... LSB (Least Significant Bit)

Refer to the "MODE COMBINATIONS" table below.


```
10 OPEN #3,SER
20 REMark MODE SELECTION
30 PRINT #3,"ABCDEFGhijklmn"\
40 PRINT #3,CHR$(27);"!";CHR$(60);
50 PRINT #3,"ABCDEFGhijklmn"\
60 PRINT#3,CHR$(27);"@"\\\\
70 LIST #3
80 CLOSE #3
```

PRINT MODE COMBINATIONS SPECIFIED BY THE ESC, !, n COMMAND

n	DW	OS	BO	CO	EL	Printed Example
0						ABCdef
1					O	ABCdef
2						ABCdef
3					O	ABCdef
4				O		ABCdef
5					O	ABCdef
6				O		ABCdef
7					O	ABCdef
8			O			ABCdef
9			O		O	ABCdef
10			O			ABCdef
11			O		O	ABCdef
12			O			ABCdef
13			O		O	ABCdef
14			O			ABCdef
I5			O		O	ABCdef
16		O				ABCdef
17		O			O	ABCdef
18		O				ABCdef
19		O			O	ABCdef
20		O		O		ABCdef
21		O			O	ABCdef
22		O		O		ABCdef
23		O			O	ABCdef
24		O	O			ABCdef
25		O	O		O	ABCdef
26		O	O			ABCdef
27		O	O		O	ABCdef
28		O	O			ABCdef
29		O	O		O	ABCdef
30		O	O			ABCdef
31		O	O		O	ABCdef

OW: Double Width OS: Double BO: Bold
co: Condensed EL: Elite

PRINT MODE COMBINATIONS SPECIFIED BY THE ESC, !, n COMMAND

n	DW	DS	80	CO	EL	Printed Example
32	O					ABCdef
33	O				O	ABCdef
34	O					ABCdef
35	O				O	ABCdef
36	O			O		ABCdef
37	O				O	ABCdef
38	O			O		ABCdef
39	O				O	ABCdef
40	O		O			ABCdef
41	O		O		O	ABCdef
42	O		O			ABCdef
43	O		O		O	ABCdef
44	O		O			ABCdef
45	O		O		O	ABCdef
46	O		O			ABCdef
47	O		O		O	ABCdef
48	O	O				ABCdef
49	O	O			O	ABCdef
50	O	O				ABCdef
51	O	O			O	ABCdef
52	O	O		O		ABCdef
53	O	O			O	ABCdef
54	O	O		O		ABCdef
55	O	O			O	ABCdef
56	O	O	O			ABCdef
57	O	O	O		O	ABCdef
58	O	O	O			ABCdef
59	O	O	O		O	ABCdef
60	O	O	O			ABCdef
61	O	O	O		O	ABCdef
62	O	O	O			ABCdef
63	O	O	O		O	ABCdef

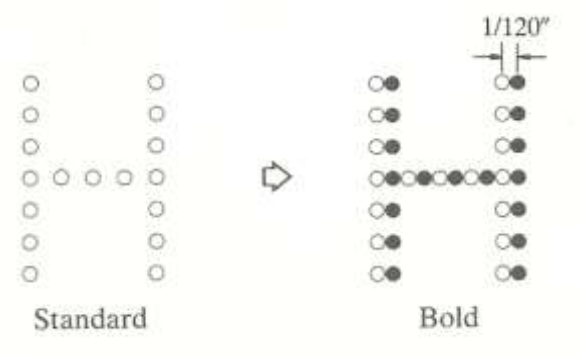
OW: Double Width OS: Double Strike BO: Bold
CO: Condensed EL: Elite

(3) Bold Character Mode

21. ESC E (lB, 45) H (27, 69) D

Input of this command designates Bold Character mode. In this mode the print head is moved in the right direction 1/120 inch to print the same character once again.

If this command is set while in Condensed Character mode, Bold Pica (10 cpi) characters are printed. If the Bold Character mode is first terminated by the ESC F command the printer returns to Condensed Character mode (17 cpi).




```
NORMAL CHARACTER
SMALL CHARACTER
BOLD CHARACTER
SMALL CHARACTER 2
```

```
10 OPEN #3,SER
20 REMark BOLD CHARACTER
30 PRINT #3,"NORMAL CHARACTER"\
40 PRINT #3,CHR$(15);
50 PRINT #3,"SMALL CHARACTER"\
60 PRINT #3,CHR$(27);"E";
70 PRINT #3,"BOLD CHARACTER"\
80 PRINT #3,CHR$(27);"F";
90 PRINT #3,"SMALL CHARACTER 2"\
100 PRINT #3,CHR$(18)\\\\
110 LIST #3
120 CLOSE #3
```

22. ESC F (1B, 46) H (27,70) D

Input of this command terminates the Bold Character mode.

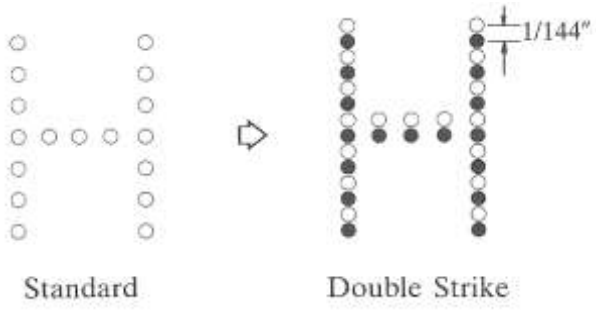
Refer to 21.

(4) Double Strike Character Mode

23. ESC G (1B, 47) H (37, 71) D

Input of this command designates the Double Strike Character mode. In this mode the paper moves up 1/144 inch and prints the same character once again.

The Double Strike function is only able to be performed on Standard characters. If the Double Strike Character mode is set and is overlapped with Superscript/Subscript or High Quality character mode, Superscript/Subscript or High Quality Character mode is given priority. The printer returns to Double Strike Character mode once the other modes are terminated.




```
NORMAL CHARACTER
DOUBLE STRIKE CHARACTER
NO DOUBLE HIGH QUALITY
DOUBLE STRIKE CHARACTER 2
```

```
10 OPEN #3,SER
20 REMark DOUBLE STRIKE
30 PRINT #3,"NORMAL CHARACTER"\
40 PRINT #3,CHR$(27);"G";
50 PRINT #3,"DOUBLE STRIKE CHARACTER"\
60 PRINT #3,CHR$(27);"x1";
70 PRINT #3,"NO DOUBLE HIGH QUALITY"\
80 PRINT #3,CHR$(27);"x0";
90 PRINT #3,"DOUBLE STRIKE CHARACTER 2"\
100 PRINT #3,CHR$(27);"H"\\\\
110 LIST #3
120 CLOSE #3
```

24. ESC H (1B, 48) H (27, 72) D

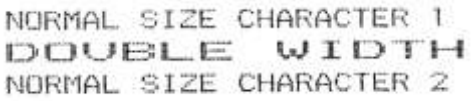
Input of this command terminates the Double Strike Character mode.

Refer to 23.

(5) Double Width Character Mode

25. SO **(0E) H (14) D**

Input of this command designates Double Width Character mode. This command is not valid for graphic data. If more than a single line of character data is input, printing and a line feed are auotmatically performed and this command is terminated. This command is also terminated by DC4, ESC W n or line feed commands other than the ESC J n command.




```
10 OPEN #3,SER
20 REMark DOUBLE WIDTH
30 PRINT #3,"NORMAL SIZE CHARACTER 1"\
40 PRINT #3,CHR$(14);
50 PRINT #3,"DOUBLE WIDTH"\
60 PRINT #3,CHR$(20);
70 PRINT #3,"NORMAL SIZE CHARACTER 2"\\\\
80 LIST #3
90 CLOSE #3
```

26. ESC SO **(1B, 0E) H (27,14) D**

Same as the SO command.

Refer to 25.

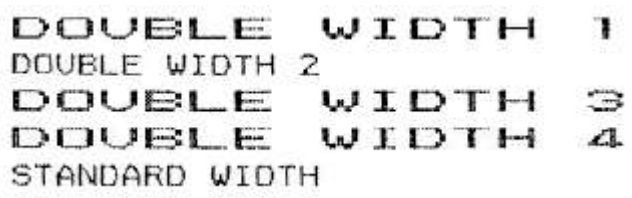
27. DC4 **(14) H (20) D**

Input of this command terminates the Double Width Character mode designated by the SO command.

Refer to 25.

28. **ESC** **WI** **(0l) or (31)** **(lB, 57, 0l) H (27, 87, 1) D,**
(IB, 57, 3l) H (27, 87, 49) D

Input of this command designates Double Width Character mode that will not be terminated by a line feed. This command terminates a SO Double Width Character mode command.




```
10 OPEN #3,SER
20 REMark DOUBLE WIDTH NOT CLEARED BY LF
30 PRINT #3,CHR$(14);
40 PRINT #3,"DOUBLE WIDTH 1"\
50 PRINT #3,"DOUBLE WIDTH 2"\
60 PRINT #3,CHR$(27);"W1";
70 PRINT #3,"DOUBLE WIDTH 3"\
80 PRINT #3,"DOUBLE WIDTH 4"\
90 PRINT #3,CHR$(27);"W0";
100 PRINT #3,"STANDARD WIDTH"\\\\
110 LIST #3
120 CLOSE #3
```

29. **ESC** **W** **(00) or (30)** **(lB, 57, 00) H (27, 87, 0) D,**
(lB, 57, 30) H (27, 87, 48) D

Input of this command terminates the Double Width Character mode of ESC W (01) that is not terminated by a line feed command. The Double Width Character mode designated by the SO command is also terminated.

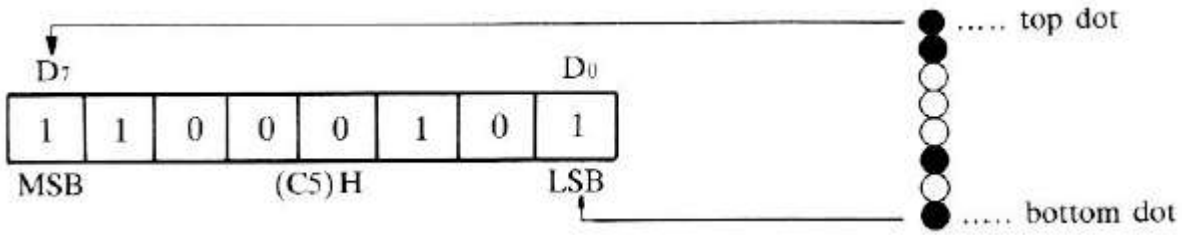
Refer to 28.

(6) Graphic Print Mode

30. ESC K n1 n2 (1B, 4B, n1, n2) H (27, 75, n1, n2) D

Input of this command designates Standard Density Graphics printing. The maximum number of horizontal dots is 480. n1 and n2 are binary numbers that specify the graphic data number. The graphic data number is calculated as n1 + 256 x n2. n2 is the high order bit and n1 is the low order bit. After this command the printer returns to the prior print state. If n1 and n2 specify a number that exceeds a single line worth of dots, automatic printing is performed without a line feed and the exceeding dots are cleared.

Graphic Data and the Corresponding Dots



Inputting the ESC A (08) command is useful in graphics mode since the patterns then appear continuous.

```
10 OPEN #3,SER
20 REMark STANDARD GRAPHIC
30 PRINT #3,CHR$(27);"A";CHR$(8);
40 FOR I = 1 TO 3
50 PRINT #3,CHR$(27);"K";CHR$(0);CHR$(1);
60 FOR J = 0 TO 255
70 PRINT #3,CHR$(J);
80 NEXT J
90 PRINT #3,CHR$(10);
100 NEXT I
110 PRINT #3,CHR$(27);"2"\\\\
120 LIST #3
130 CLOSE #3
```

31. ESC L n1 n2 **(lB, 4C, n1, n2) H (27, 76, n1, n2) D**

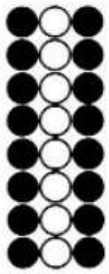
Input of this command designates Double Density Graphic printing. The maximum number of horizontal dots is 960. The print speed is half as fast as Standard Density Graphic printing. n1 and n2 are binary numbers that indicate the number of graphic data that follow. n1 is the low byte and n2 is the high byte. The others are the same as the ESC K code.

```
10 OPEN #3,SER
20 REMark DOUBLE DENSITY
30 PRINT #3,CHR$(27);”A”;CHR$(8);
40 FOR I = 1 TO 3
50 PRINT #3,CHRS(27);"L";CHRS(0);CHR$(1);
60 FOR J = O TO 255
70 PRINT #3,CHRS(J);
80 NEXT J
90 PRINT #3,CHR$(10);
100 NEXT I
110 PRINT #3,CHR$(27);"2"\\\\
120 LIST #3
130 CLOSE #3
```

32. ESC Y n1 n2 (1B, 59, n1 n2) H (27, 89, n1, n2) D

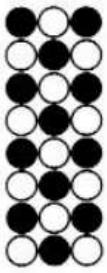
Input of this command designates Double Speed Double-Density Graphic printing. The maximum number of horizontal dots is 960. Horizontally aligned dots are not printed. Therefore, the number of dots that can be printed continuously in a horizontal direction is 480. The print speed is the same as Standard Density Graphic mode. The rest is the same as the ESC K command.

Example 1. Input data: (1B, 59, 03, 00, FF, FF) H



The second dot column cannot be printed.

Example 2. Input data (1B, 59, 03, 00, AA, 55, AA) H



All the dots specified in this case can be printed.

```
10 OPEN #3,SER
20 REMark DOUBLE DENSITY & SPEED
30 PRINT #3,CHR$(27);"A";CHR$(8);
40 FOR I = 1 TO 3
50 PRINT #3,CHR$(27);"Y";CHR$(0);CHR$(1);
60 FOR J = 0 TO 255
70 PRINT #3,CHR$(J);
80 NEXT J
90 PRINT #3,CHR$(10);
100 NEXT I
110 PRINT #3,CHR$(27);"2"\\\\
120 LIST #3
130 CLOSE #3
```

33. ESC Z n1 n2 (1B, 5A, n1 n2) H (27, 90, n1, n2) D

Input of this command designates Quadruple Density Graphic printing. The maximum number of horizontal dots is 1920. Horizontally aligned dots are not printed. Therefore, the number of dots that can be printed continuously in a horizontal direction is 960. The print speed is the same as Double Density Graphic speed. The rest is the same as the ESC K command.

```
10 OPEN #3,SER
20 REMark 4 TIMES DENSITY
30 PRINT #3,CHR$(27);"A";CHR$(8);
40 FOR I = 1 TO 3
50 PRINT #3,CHR$(27);"Z";CHR$(0);CHR$(1);
60 FOR J = 0 TO 255
70 PRINT #3,CHR$(J);
80 NEXT J
90 PRINT #3,CHR$(10);
100 NEXT I
110 PRINT #3,CHR$(27);"2"\\\\
120 LIST #3
130 CLOSE #3
```

34. **ESC** ***** **m** **n1** **n2** **(lB, 2A, m, nl, n2) H (27, 42, m, n1, n2) D**

0 <= m <= 6

Input of this command allows Graphic types to be printed. As shown below in the table, m determines the following print types. As in the ESC K command, nl and n2 is the Graphic Data number.

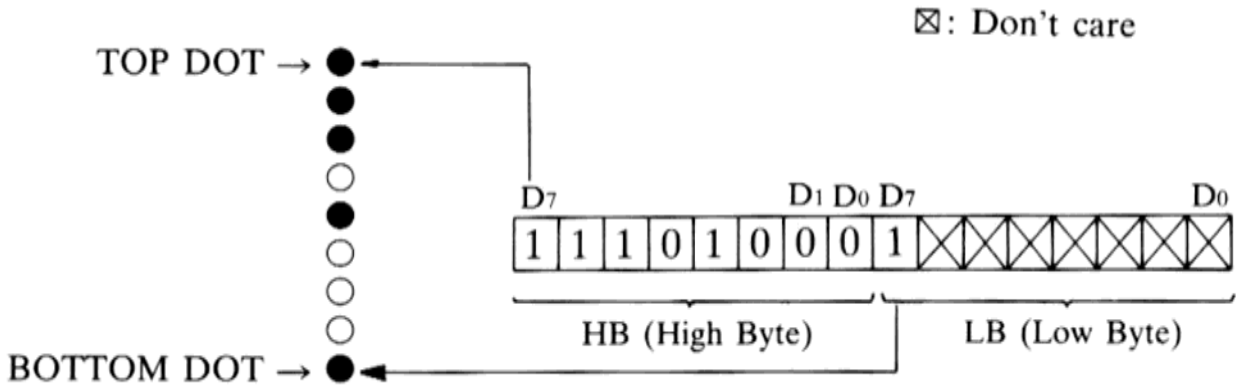
m	Graphic Type	1 Line Dot Number (8inch)	Horizontal Dot Spacing	Vertical: Horizontal	Equivalent Commands
0	Single Density Graphic	480 dot	1/60 inch	1:1.2	ESK, K
1	Double Density Graphic	960 dot	1/120 inch	1:0.6	ESC, L
2	Double-Speed Double-Density Graphic	960 dot	1/120 inch	1:0.6	ESC,Y
3	Quadruple Density Graphic	1920 dot	1/240 inch	1:0.3	ESC, Z
4	640 Dot Graphic	640 dot	1/80 inch	1:0.9	-
5	576 Dot Graphic	576 dot	1/72 inch	1:1	-
6	720 Dot Graphic	720 dot	1/90 inch	1:0.8	-

```
10 OPEN #3,SER
20 REMark GRAPHIC SELECTION
30 PRINT #3,CHR$(27);"A";CHR$(8);
40 FOR I=1 TO 3
50 PRINT #3,CHR$ (27);"*";CHR$(5);CHR$(0);CHR$(1);
60 FOR J=0 TO 255
70 PRINT #3,CHRS(J);
80 NEXT J
90 PRINT #3,CHRS(10);
100 NEXT I
110 PRINT #3,CHRS(27);"2"\\\\
120 LIST #3
130 CLOSE #3
```

35. ESC ^ a n1 n2 HB LB (1B, 5E, a, n1, n2) H (27,94,a,n1,n2) D

Input of this command designates 9-pin graphic mode.
The maximum number of horizontal dots is 480 when a = 0 and it is 960 when a = 1. Since 1 dot column is composed of 9 vertical dots, 2 bytes are used to designate a data. The rest is the same as the ESC K command.

Example:



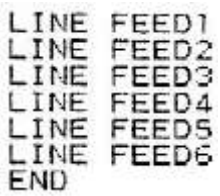
9 PIN GRAPHIC

```
10 OPEN #3,SER
20 REMark 9 PIN GRAPHIC
30 PRINT #3,"9 PIN GRAPHIC";CHR$(13);
40 PRINT #3,CHR$(27);"^";CHR$(0);CHR$(80);CHR$(1);
50 FOR I = 1 TO 80
60 PRINT #3,CHR$(0);CHR$(128);
70 NEXT I
80 FOR I=0 TO 255
90 PRINT #3,CHR$(I);CHR$(128);
100 NEXT I
110 PRINT #3,CHR$(27);"@";\\\\
120 LIST #3
130 CLOSE #30
```

(7) Line Feed Spacing

36. ESC 0 (1B, 30) H (27, 48) D

Input of this command designates a line feed value of 1/8 inch.




```
10 OPEN #3,SER
20 REMark 1/8 INCHES LINE SPACING
30 PRINT #3,CHR$(27);"0";
40 FOR I=1 TO 6
50 PRINT #3,"LINE FEED";I;
60 PRINT #3,CHR$(10);
70 NEXT I
80 PRINT #3,"END"
90 PRINT #3,CHR$(27);"2"\\\\
100 LIST #3
110 CLOSE #3
```

37. ESC 1 (1B, 31) H (27, 49) D

Input of this command designates a line feed value of 7/72 inches.


```
10 OPEN #3,SER
20 REMark 7/72 INCHES LINE SPACING
30 PRINT #3,CHR$(27);"1";
40 FOR I=1 TO 6
50 PRINT #3,"LINE FEED";I;
60 PRINT #3,CHR$(10);
70 NEXT I
80 PRINT #3,"END"
90 PRINT #3,CHR$(27);"2"\\\\
100 LIST #3
110 CLOSE #3
```

38. ESC 2 **(1B, 32) H (27, 50) D**

The linefeed value is designated as 1/6 inch.

```
LINE FEED1
LINE FEED2
LINE FEED3
LINE FEED4
LINE FEED5
LINE FEED6
END
```

```
10 OPEN #3,SER
20 REMark 1/6 INCHES LINE SPACING
30 PRINT #3,CHR$(27);"2";
40 FOR I=1 TO 6
50 PRINT #3,"LINE FEED";I;
60 PRINT #3,CHR$(10);
70 NEXT I
80 PRINT #3,"END"
90 PRINT #3,CHR$(27);"2"\\\\
100 LIST #3
110 CLOSE #3
```

39. ESC 3 n **(1B, 33, n) H (27, 51, n) D**
0 <= n <= 255

Input of this command designates a line feed value of n/216 inch.

```
LINE FEED 20/216
LINE FEED 25/216
LINE FEED 30/216
LINE FEED 35/216
LINE FEED 40/216
LINE FEED 45/216
LINE FEED 50/216
LINE FEED 55/216
LINE FEED 60/216
END
```

```
10 OPEN #3,SER
20 REMark n/216 INCHES LINE SPACING
30 FOR I=20 to 60 STEP 5
40 PRINT #3,CHR$(27);"3";CHR$(I);
50 PRINT #3,"LINE FEED";I;"/216";
60 PRINT #3,CHR$(10);
70 NEXT I
80 PRINT #3,"END"
90 PRINT #3,CHR$(27);"2"\\\\
100 LIST #3
110 CLOSE #3
```

40. **ESC** **A** **n**

(1B, 41, n) H (27, 65, n) D,
0 <= n <=85 Ignored if n >= 86

Input of this command desigantes a line feed value of n/72 inch.

```
LINE FEED1
LINE FEED2
LINE FEED3
LINE FEED4
LINE FEED5
LINE FEED6
END
```

```
10 OPEN #3,SER
20 REMark n/72 INCHES LINE SPACING
30 PRINT #3,CHR$(27);"A";CHR$(18);
40 FOR I=1 TO 6
50 PRINT #3,"LINE FEED";I;
60 PRINT #3,CHR$(10);
70 NEXT I
80 PRINT #3,"END"
90 PRINT #3,CHR$(27);"2"\\\\
100 LIST #3
110 CLOSE #3
```

(8) Page Length Setting

41. ESC C n **(1B, 43, n) H (27, 67, n) D,**
1 <= n <= 127

Input of this command designates the page length in line units, n specifies the number of lines per page. The length of the page is determined by multiplying the line feed value to n.

The position of the paper, at the time this command is performed, is taken as the top of the form.

The page length is not altered even if the line feed value is changed.

If n >= 128 the three bytes of this command are ignored.

```
START
PAGE 1


PAGE 2



PAGE 3
END
```

```
10 OPEN #3,SER
20 REMark PAGE LENGTH
30 PRINT #3,CHR$(27);"C";CHR$(5);
40 PRINT #3"START"\
50 PRINT #3,"PAGE 1"\
60 PRINT #3,CHR$(12);
70 PRINT #3,"PAGE 2"\
80 PRINT #3,CHR$(12);
90 PRINT #3,"PAGE 3"\
100 PRINT #3,"END"
110 PRINT #3,CHR$(27);"C";CHR$(66)\\\\
120 LIST #3
130 CLOSE #3
```

42. **ESC** **C** **(00)** **n** **(1B, 43, 00, n) H (27, 67, 0, n) D**

1 <= n <= 22

Input of this command designates the page length in inch units, n refers to the inch unit.

If n>= 23 or n = 0, the 3 bytes of this command are ignored.

```
START
PAGE 1



PAGE 2



PAGE 3
END
```

```
10 OPEN #3,SER
20 REMark PAGE LENGTH
30 PRINT #3,CHR$(27);"C";CHR$(0);CHR$(1);
40 PRINT #3"START"\
50 PRINT #3,"PAGE 1"\
60 PRINT #3,CHR$(12);
70 PRINT #3,"PAGE 2"\
80 PRINT #3,CHR$(12);
90 PRINT #3,"PAGE 3"\
100 PRINT #3,"END"
110 PRINT #3,CHR$(27);"C";CHR$(0);CHR$(11)\\\\
120 LIST #3
130 CLOSE #3
```

(9) Horizontal Tab Setting

43. ESC D n1 n2 … nk NUL

(1B, 44, n1, n2, …, nk, 00) H (27, 68, n1, n2, …, nk, 0) D

1 <= k <= 28 IF k >= 29, nk is ignored.

Input of this command designates the Horizontal Tab. The maximum number of Horizontal Tab settings is 28.

At power-on the Horizontal Tab is set at every eight character location. This command alters these settings.

n is a binary number that is multiplied to the present character width to set the Horizontal Tab location. The Horizontal Tab settings are to be done in order from the smallest to largest value. The setting process is terminated by the NUL code.

```
01234567890123456789012345
    TAB1    TAB2
```

```
10 OPEN #3,SER
20 REMark HORIZONTAL TAB SETTING
30 PRINT #3,"01234567890123456789012345"\
40 PRINT #3,CHR$(27);"D";CHR$(4);CHR$(12);CHR$(0);
50 FOR I = 1 TO 2
60 PRINT #3,CHR$(9);
70 PRINT #3,"TAB";I;
80 NEXT I
90 PRINT #3,CHR$(10);
100 PRINT #3,CHR$(27);"@";\\\\
110 LIST #3
120 CLOSE #3
```

44. HT (09) H (9) D

Data input following this command is printed from the next Horizontal Tab location.

```
012345678901234567890123456789012345
        TAB1    TAB2    TAB3
```

```
10 OPEN #3,SER
20 REMark DEFAULT TAB
30 PRINT #3,"012345678901234567890123456789012345"\
40 FOR I=1 TO 3
50 PRINT #3,CHR$(9);
60 PRINT #3,"TAB";I;
80 NEXT I
90 PRINT #3,CHR$(10);
100 PRINT #3,CHR$(27);"@";\\\\
110 LIST #3
              120OSE #3
```

(10) Margin Setting

45. ESC Q n (1B, 51, n) H (27, 81, n) D

Input of this command designates the right margin. n specifies the column number according to the present character width. If the value of n exceeds the column number of a single line the three bytes of this command are ignored.

This command is also ignored when the distance between the left and right margins is less than the character width of a single Pica Double Width character.

Input of this command clears all print data input prior to this command.

```
01234567890123456789012345
MARGINMARGINMARGINMARGINMA
RGINMARGINMARGIN
```

```
10 OPEN #3,SER
20 REMark RIGHT MARGIN
30 PRINT #3,"012345678901234567890123456789012345"\
40 PRINT #3,CHR$(27);"Q";CHR$(20);
50 FOR I = 1 TO 6
60 PRINT #3,"MARGIN";
70 NEXT I
80 PRINT #3,CHR$(10);
90 PRINT #3,CHR$(27);"@";\\\\
100 LIST #3
110 CLOSE #3
```

46. ESC l n (1B, 6C, n) H (27, 108, n) D

(N.B. l is lower case letter L)

Input of this command designates the left margin. n specifies the column number according to the present character width. If the value of n exceeds the column number of a single line the three bytes of this command are ignored.

If the left margin setting exceeds the right margin setting this command is ignored. This command is also ignored when the distance between the left and right margins is less than the character width of a single Pica Double Width character.

```
012345678901234567890123456789012345678901234
          LEFT MARGIN START LINE
          LEFT MARGIN NO.2 LINE
          LEFT MARGIN END LINE
START POSITION 0
```

```
10 OPEN #3,SER
20 REMark LEFT MARGIN
30 PRINT #3,"012345678901234567890123456789012345678901234"\
40 PRINT #3,CHR$(27);"l";CHR$(10);
50 PRINT #3,"LEFT MARGIN START LINE"\
60 PRINT #3,"LEFT MARGIN NO.2 LINE"\
70 PRINT #3,"LEFT MARGIN END LINE"\
80 PRINT #3,CHR$(27);"l";CHR$(0);
90 PRINT #3,"START POSITION 0"\
100 PRINT #3,CHR$(27);"@";\\\\
110 LIST #3
120 CLOSE #3
```

(11) Underline

47. ESC - (01) or (31) **(1B, 2D, 01) H (27, 45, 1) D**
(1B, 2D, 31) H (27, 45, 49) D

Input of this command underlines each character input following the command. This excludes graphic data of all categories.

An underline is added to space code. If the printing location is shifted due to the HT command the blanked are is not underlined.

PERSONAL COMPUTER
COLOR TELEVISION
VIDEO TAPE
ELECTRONICS

```
10 OPEN #3,SER
20 REMark UNDERLINE
30 PRINT #3,"PERSONAL ";
40 PRINT #3,CHR$(27);"-";CHR$(1);
50 PRINT #3,"COMPUTER"\
60 PRINT #3,"COLOR";
70 PRINT #3,CHR$(9);
80 PRINT #3,"TELEVISION"\
90 PRINT #3,"VIDEO  TAPE"\
100 PRINT #3,CHR$(27);"-";CHR$(0);
110 PRINT #3,"ELECTRONICS"\\\\
120 LIST #3
130 CLOSE #3
```

48. ESC - (00) or (30) **(1B, 2D, 00) H (27, 45, 0) D,**
(1B, 2D, 30) H (27, 45, 48) D

Input of this command terminates the Underline command.

Refer to 47.

(12) Buffer Clear

49. CAN **(18) H (24) D**

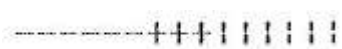
Input of this command clears all previously input print data. Control Functions, however, are still valid. (The printer mode is not altered)


```
10 OPEN #3,SER
20 REMark BUFFER CLEAR
30 PRINT #3,CHR$(27);"x1";
40 PRINT #3,"ABCDEFGHIJKLMN"\
50 PRINT #3,"ABCDEFG";
60 PRINT #3,CHR$(24);
70 PRINT #3,"HIJKLMN"\
80 PRINT #3;CHR$(27);"x0";\\\
90 LIST #3
100 CLOSE #3
```

(13) Back Space

50. BS **(08) H (8) D**

If this command is input, after printing of the present data, the print initiation position is moved to the left by a single character width.



```
10 OPEN #3,SER
20 REMark BACK SPACE
30 PRINT #3,"---------";
40 PRINT #3,CHR$(8);CHR$(8);CHR$(8);
50 PRINT #3,"|||||||||"\
60 PRINT #3,CHR$(27);"@";\\\\\
70 LIST #3
80 CLOSE #3
```

(14) Buzzer

51. BEL (07) H (7) D

Input of this command causes the buzzer to sound for approximately 0.3 seconds.

(15) Home Positioning

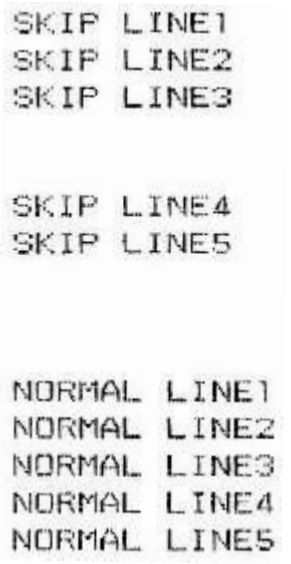
52. ESC < (1B, 3C) H (27, 60) D

Input of this command moves the print head to the home position.

(16) Skip-over Perforation

53. ESC N n **(lB, 4E, n) H (27,78,n) D,**
1 <= n <= 127

Input of this command designates skip perforation. n specifies the number of lines to be skipped over. If the remainder of the page is less than the value in n, the printer automatically performs a form feed making the top of the next page the printing position.
If n = 0 or n >= 128 this command is ignored.
If the skip value exceeds 1 page this command is ignored.




```
10 OPEN #3,SER
20 REMark SKIP PERFORATION
30 PRINT #3,CHRS(27);"C";CHRS(5);
40 PRINT #3,CHRS(27);"N";CHRS(2);
50 FOR I=1 TO 5
60 PRINT #3,"SKIP LINE";I\
70 NEXT I
80 PRINT #3,CHR$(12);
90 PRINT #3,CHRS(27);"O";
100 FOR 1=1 TO 5
110 PRINT #3,"NORMAL LINE”;I\
120 NEXT I
130 PRINT #3,CHR$(10);
140 PRINT #3,CHR$(27);”@”;\\\\
150 LIST #3
160 CLOSE #3
```

54. ESC O (1B, 4F) H (27, 79) D

Input of this command terminates the skip-over perforation command.

Refer to 53.

(18) Paper Out Detection

55. ESC 8 (1B, 38) H (27, 56) D

Input of this command makes the printer ignore the paper out detection function.

56. ESC 9 (1B, 40) H (27, 57) D

Input of this command makes the paper out detection function valid.

(19) Reset

57. ESC @ (1B, 40) H (27, 64) D

Input of this command puts the printer into the same state as the power-on state. All data input prior to this command is ignored. The first data following this command is not guaranteed.

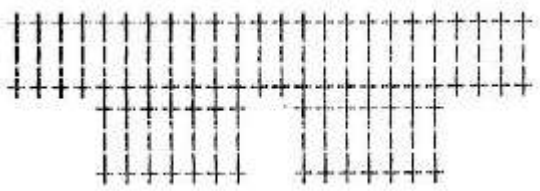
```
ITALIC CHARACTER 2
```

```
10 OPEN #3,SER
20 REMark RESET
30 PRINT #3,CHR$(27);"4";
40 PRINT #3,"ITALIC CHARACTER 1";
50 PRINT #3,CHR$(27);"@";
60 PRINT #3,"ITALIC CHARACTER 2"\\\
70 LIST #3
80 CLOSE #3
```

(20) Unidirectional Printing

58. ESC U (01) or (31) **(1B, 55, 01) H (27, 85, 1) D,**
(1B, 55, 31) H (27, 85, 49) D

All data that is input after this command is printed from left to right.



```
10 OPEN #3,SER
20 REMark UNIDIRECTIONAL
30 PRINT #3,CHR$(27);"1";
40 PRINT #3,CHR$(27);"U1";
50 PRINT #3,"------------------------";CHR$(13);
60 PRINT #3,"||||||||||||||||||||||||"\
70 PRINT #3,"||||||||||||||||||||||||"\
80 PRINT #3,"||||||||||||||||||||||||"\
90 PRINT #3,"||||||||||||||||||||||||";CHR$(13);
100 PRINT #3,"------------------------"\
110 PRINT #3,CHR$(27);"U0";
120 PRINT #3,"    -------  -------    ";CHR$(13);
130 PRINT #3,"    |||||||  |||||||    "\
140 PRINT #3,"    |||||||  |||||||    "\
150 PRINT #3,"    |||||||  |||||||    "\
160 PRINT #3,"    |||||||  |||||||    ";CHR$(13);
170 PRINT #3,"    -------  -------    "\
180 PRINT #3,CHR$(27);"2"\\\\
190 LIST #3
200 CLOSE #3
```

59. ESC U (00) or (30) **(1B, 55, 00) H (27, 85, 0) D,**
(1B, 55, 30) H (27, 85, 48) D

Input of this command terminates the above ESC U (01) command.

Refer to 58.

_DIP SWITCH SETTING_____

The following function can be selected by using the DIP switches located at the back of the printer. The DIP switches are read after the initialisation process. This is done by either turning the power switch on or by input of an ESC @ command.

Switch No.	Function	ON	OFF	Setting as shipped
1-1	Baud rate selection	See below		OFF
1-2				OFF
1-3	Page length setting	12 inches	11 inches	OFF
1-4	Character zero shape selection	0	0	OFF

Switch 1-1	Switch 1-2	Baud rate
OFF	OFF	9600
ON	OFF	4800
OFF	ON	2400
ON	ON	1200

_SERIAL INTERFACE_____

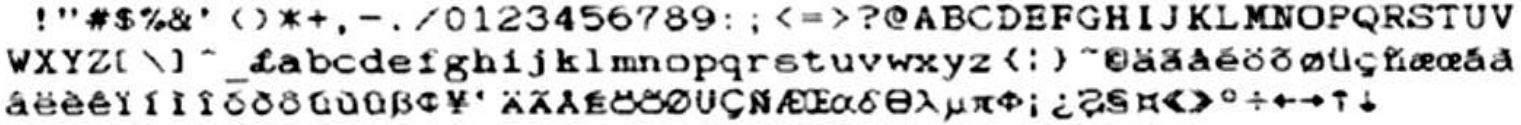
RS-232C, 25-pin D male.

Pin configuration of the input connector.

PIN	SIGNAL	EXPLANATION
1	FG	Frame Ground
3	RXD	Input data
7	SG	Signal Ground
20	DTR	BUSY/READY state fo the printer ON (+3 ~ +25V) … Ready to receive data OFF (-3 ~ -25V) … Busy

Character Set Table

Upper Bit / Lower Bit	HEX	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
HEX	Binary	0000	0001	0010	0011	0100	0101	0110	0111	1000	1001	1010	1011	1100	1101	1110	1111
0	0000	0	16	32	0 48	@ 64	P 80	£ 96	p 112	ä 128	è 144	Ä 160	µ 176	192	208	224	240
1	0001	1	17	! 33	1 49	A 65	Q 81	a 97	q 113	ã 129	ê 145	Å 161	π 177	193	209	225	241
2	0010	2	DC2 18	" 34	2 50	B 66	R 82	b 98	r 114	å 130	í 146	Â 162	Φ 178	194	210	226	242
3	0011	3	19	# 35	3 51	C 67	S 83	c 99	s 115	é 131	í 147	É 163	¡ 179	195	211	227	243
4	0100	4	DC4 20	$ 36	4 52	D 68	T 84	d 100	t 116	ö 132	ì 148	Ö 164	¿ 180	196	212	228	244
5	0101	5	21	% 37	5 53	E 69	U 85	e 101	u 117	õ 133	î 149	Ò 165	₴ 181	197	213	229	245
6	0110	6	22	& 38	6 54	F 70	V 86	f 102	v 118	ø 134	ó 150	Ø 166	§ 182	198	214	230	246
7	0111	BEL 7	23	' 39	7 55	G 71	W 87	g 103	w 119	ü 135	ò 151	Ü 167	¤ 183	199	215	231	247
8	1000	BS 8	CAN 24	(40	8 56	H 72	X 88	h 104	x 120	ç 136	ô 152	Ç 168	« 184	200	216	232	248
9	1001	HT 9	25	) 41	9 57	I 73	Y 89	i 105	y 121	ñ 137	ú 153	Ñ 169	» 185	201	217	233	249
A	1010	NL 10	26	* 42	: 58	J 74	Z 90	j 106	z 122	æ 138	ù 154	Æ 170	° 186	202	218	234	250
B	1011	VT 11	ESC 27	+ 43	; 59	K 75	[91	k 107	{ 123	œ 139	û 155	Œ 171	÷ 187	203	219	235	251
C	1100	FF 12	28	, 44	< 60	L 76	\ 92	l 108	¦ 124	á 140	β 156	α 172	← 188	204	220	236	252
D	1101	CR 13	29	- 45	= 61	M 77	] 93	m 109	} 125	à 141	ć 157	δ 173	→ 189	205	221	237	253
E	1110	SO 14	30	. 46	> 62	N 78	^ 94	n 110	~ 126	â 142	¥ 158	θ 174	↑ 190	206	222	238	254
F	1111	SI 15	31	/ 47	? 63	O 79	_ 95	o 111	© 127	ë 143	` 159	λ 175	↓ 191	207	223	239	255



_TROUBLESHOOTING_____

Use the table below to diagnose any problems that may occur. If you cannot solve the problem, try to decide what part of your system is not working properly and consult your dealer.

PROBLEM	CAUSE AND REMEDY
The printer does not print. The POWER lamp does not light.	1) Power is not getting to the printer. • Check the power cord and power switch.
The printer does not print. The POWER lamp is lit.	1) The connection to the computer is not correct. • Check to make sure that the cable connecting the printer and computer is correctly connected. 2) The ribbon cassette is not properly installed. • Properly install it.
The printer is operating properly, but the paper is not feeding through properly.	1) The paper is jammed in the printer. • Remove the paper and reinsert it properly.
The print is light or smeared.	1) The printhead position is not correct. • Move the head adjustment lever to match the paper being used. 2) The ribbon cassette is not properly installed. • Properly install the cassette. 3) The ink ribbon is old or is worn out. • Replace the old ribbon cassette with a new one.
The P.OUT lamp is blinking.	1) An error condition has been detected. • Turn power off and then back on again.

_CAUTIONS FOR USE_____

- Do not use a power supply voltage which is out of the specified range.
- Do not touch the print head immediately after printing because it is too hot.
- Be careful not to twist the ribbon while installing it.
- Wait at least two seconds after turning power off before turning it back on again. The initialization process may not be performed correctly if this is not done.
- The printer should be used where the humidity is low, there is little dust, and where it is not in direct sunlight.
- Do not perform printing without the ribbon cassette and paper properly installed.
- Never install the tractor unit when using friction feed for cut sheet paper.
- When using continuous forms, the paper bail must be set to the platen side otherwise a paper jam may occur.

_APPENDIX A (Specifications)_____

1. SPECIFICATIONS

- Dimensions W390 x H119 x D266mm
- Weight Approximately 4.9 kg
- Temperature 5 ~ 35°C, during operation
- Humidity 20-80%, during operation (No condensation)
- Power Supply 117 VAC ± 10%, 220/240 VAC ± 10% 50/60 Hz ± 3%
- Power Consumption 30 watts (Self test printing)
  15 watts (Stand-by)

2. PRINTING SPECIFICATIONS

- Print Method Impact Dot Matrix (Bi-directional Logic Seeking)
- Print Head 9-pin
- Character Category 160 characters
- Graphic Printing 7 categories
  480#, 576, 640, 720, 960#, 960*, 1920* (dot columns/line)

  * dots that are horizontally aligned cannot be printed.
  # 9 vertical dots printing is possible.

- Print Mode

Standard Pica	10 CPI
Standard Elite	12 CPI
Standard Condensed	17 CPI
High Quality Pica	10 CPI
High Quality Elite	12 CPI
7 Categories of Graphic Printing	

  Mixing any of the above modes within a single line is possible.
  In addition, this printer is capable of Bold, Double Strike, Double Width, Superscript/Subscript, Proportional, and Italic character modes.

- Paper Feed Method Friction method
  Tractor method
- Line Feed Pitch Minimum of 1/216 inch
- Line Feed Speed 6.7 lines/second (6 lines/inch)
  10 lines/second (9 lines/inch)
  (during continuous linefeed by the LF and FF switch)
- Printing Forms

Paper width	4 inches – 10 inches
Paper thickness	15lbs – 20lbs in U.S.A.
	(52 g/m² - 76 g/m²)
	0.07 mm – 0.1 mm

- Multiple Copies Original plus 2, non-carbon paper
  Total thickness of less than 0.2 mm
- Ribbon Cassette style, single color (Black)

_APPENDIX B (Character Category Priority Table)_____

CHARACTER CATEGORY PRIORITY TABLE

* In print mode the following priorities exist.

1. Elite > Proportional > Bold > Condensed > Pica
2. Superscript/Subscript> High Quality > Double Strike

Examples:

a. If the Elite, Condensed, Superscript, and Double Strike modes are designated, according to Priority chart No. 84, Elite Superscript characters will be printed.

b. If the Elite mode is terminated from the above example, Condensed Superscript characters will be printed according to No. 20.

c. If the Superscript mode is terminated from example a., Elite Double Strike characters will be printed according to No. 83.

Prop: Proportional Cond: Condensed H.Q.: High Quality D.S.: Double Strike Sup/Sub: Superscript/Subscript

	Command Combination							Character Mode Printed								Printed Ex.
No.	Elite	Prop	Cond	Bold	H.Q.	D.S.	Sup/Sub	Pica	Elite	Prop	Cond	Bold	H.Q.	D.S.	Sup/Sub	ABChijk
1								O								ABChijk
2							O	O							O	ABChijk
3						O		O						O		ABChijk
4						O	O	O							O	ABChijk
5					O			O					O			ABChijk
6					O		O	O							O	ABChijk
7					O	O		O					O			ABChijk
8					O	O	O	O							O	ABChijk
9				O				O				O				ABChijk
10				O			O	O				O			O	ABChijk
11				O		O		O				O		O		ABChijk
12				O		O	O	O				O			O	ABChijk
13				O	O			O				O	O			ABChijk
14				O	O		O	O				O			O	ABChijk
15				O	O	O		O				O	O			ABChijk
16				O	O	O	O	O				O			O	ABChijk
17			O								O					ABChijk
18			O				O				O				O	ABChijk
19			O			O					O			O		ABChijk
20			O			O	O				O				O	ABChijk
21			O		O						O					ABChijk
22			O		O		O				O				O	ABChijk
23			O		O	O					O			O		ABChijk
24			O		O	O	O				O				O	ABChijk
25			O	O				O				O				ABChijk
26			O	O			O	O				O			O	ABChijk
27			O	O		O		O				O		O		ABChijk
28			O	O		O	O	O				O			O	ABChijk
29			O	O	O			O				O				ABChijk
30			O	O	O		O	O				O			O	ABChijk
31			O	O	O	O		O				O		O		ABChijk
32			O	O	O	O	O	O				O			O	ABChijk
33		O						O		O						ABChijk
34		O					O	O		O					O	ABChijk

Prop: Proportional Cond: Condensed H.Q.: High Quality D.S.: Double Strike Sup/Sub: Superscript/Subscript

	Command Combination							Character Mode Printed								Printed Ex.
No.	Elite	Prop	Cond	Bold	H.Q.	D.S.	Sup/Sub	Pica	Elite	Prop	Cond	Bold	H.Q.	D.S.	Sup/Sub	ABChijk
35		O				O				O				O		ABChijk
36		O				O	O			O					O	ABChijk
37		O			O					O			O			ABChijk
38		O			O		O			O					O	ABChijk
39		O			O	O				O			O			ABChijk
40		O			O	O	O			O					O	ABChijk
41		O		O						O		O				ABChijk
42		O		O			O			O		O			O	ABChijk
43		O		O		O				O		O		O		ABChijk
44		O		O		O	O			O		O			O	ABChijk
45		O		O	O					O		O	O			ABChijk
46		O		O	O		O			O		O			O	ABChijk
47		O		O	O	O				O		O	O			ABChijk
48		O		O	O	O	O			O		O			O	ABChijk
49		O	O							O						ABChijk
50		O	O				O			O					O	ABChijk
51		O	O			O				O				O		ABChijk
52		O	O			O	O			O					O	ABChijk
53		O	O		O					O			O			ABChijk
54		O	O		O		O			O					O	ABChijk
55		O	O		O	O				O			O			ABChijk
56		O	O		O	O	O			O					O	ABChijk
57		O	O	O						O		O				ABChijk
58		O	O	O			O			O		O			O	ABChijk
59		O	O	O		O				O		O		O		ABChijk
60		O	O	O		O	O			O		O			O	ABChijk
61		O	O	O	O					O		O	O			ABChijk
62		O	O	O	O		O			O		O			O	ABChijk
63		O	O	O	O	O				O		O	O			ABChijk
64		O	O	O	O	O	O			O		O			O	ABChijk
65	O								O							ABChijk
66	O						O		O						O	ABChijk
67	O					O			O					0		ABChijk
68	O					O	O		O						O	ABChijk

Prop: Proportional Cond: Condensed H.Q.: High Quality D.S.: Double Strike Sup/Sub: Superscript/Subscript

	Command Combination							Character Mode Printed								Printed Ex.
No.	Elite	Prop	Cond	Bold	H.Q.	D.S.	Sup/Sub	Pica	Elite	Prop	Cond	Bold	H.Q.	D.S.	Sup/Sub	ABChijk
69	O				O				O				O			ABChijk
70	O				O		O		O						O	ABChijk
71	O				O	O			O				O			ABChijk
72	O				O	O	O		O						O	ABChijk
73	O			O					O			O				ABChijk
74	O			O			O		O			O			O	ABChijk
75	O			O		O			O			O		O		ABChijk
76	O			O		O	O		O			O			O	ABChijk
77	O			O	O				O			O	O			ABChijk
78	O			O	O		O		O			O			O	ABChijk
79	O			O	O	O			O			O	O			ABChijk
80	O			O	O	O	O		O			O			O	ABChijk
81	O		O						O							ABChijk
82	O		O				O		O						O	ABChijk
83	O		O			O			O					O		ABChijk
84	O		O			O	O		O						O	ABChijk
85	O		O		O				O				O			ABChijk
86	O		O		O		O		O						O	ABChijk
87	O		O		O	O			O				O			ABChijk
88	O		O		O	O	O		O						O	ABChijk
89	O		O	O					O			O				ABChijk
90	O		O	O			O		O			O			O	ABChijk
91	O		O	O		O			O			O		O		ABChijk
92	O		O	O		O	O		O			O			O	ABChijk
93	O		O	O	O				O			O	O			ABChijk
94	O		O	O	O		O		O			O			O	ABChijk
95	O		O	O	O	O			O			O	O			ABChijk
96	O		O	O	O	O	O		O			O			O	ABChijk
97	O	O							O							ABChijk
98	O	O					O		O						O	ABChijk
99	O	O				O			O					O		ABChijk
100	O	O				O	O		O						O	ABChijk
101	O	O			O				O				O			ABChijk
102	O	O			O		O		O						O	ABChijk

Prop: Proportional Cond: Condensed H.Q.: High Quality D.S.: Double Strike Sup/Sub: Superscript/Subscript

	Command Combination							Character Mode Printed								Printed Ex.
No.	Elite	Prop	Cond	Bold	H.Q.	D.S.	Sup/Sub	Pica	Elite	Prop	Cond	Bold	H.Q.	D.S.	Sup/Sub	ABChijk
103	O	O			O	O			O				O			ABChijk
104	O	O			O	O	O		O						O	ABChijk
105	O	O		O					O			O				ABChijk
106	O	O		O			O		O			O			O	ABChijk
107	O	O		O		O			O			O		O		ABChijk
108	O	O		O		O	O		O			O			O	ABChijk
109	O	O		O	O				O			O	O			ABChijk
110	O	O		O	O		O		O			O			O	ABChijk
111	O	O		O	O	O			O			O	O			ABChijk
112	O	O		O	O	O	O		O			O			O	ABChijk
113	O	O	O						O							ABChijk
114	O	O	O				O		O						O	ABChijk
115	O	O	O			O			O					O		ABChijk
116	O	O	O			O	O		O						O	ABChijk
117	O	O	O		O				O				O			ABChijk
118	O	O	O		O		O		O						O	ABChijk
119	O	O	O		O	O			O				O			ABChijk
120	O	O	O		O	O	O		O						O	ABChijk
121	O	O	O	O					O			O				ABChijk
122	O	O	O	O			O		O			O			O	ABChijk
123	O	O	O	O		O			O			O		O		ABChijk
124	O	O	O	O		O	O		O			O			O	ABChijk
125	O	O	O	O	O				O			O	O			ABChijk
126	O	O	O	O	O		O		O			O			O	ABChijk
127	O	O	O	O	O	O			O			O	O			ABChijk
128	O	O	O	O	O	O	O		O			O			O	ABChijk

_APPENDIX C (Character Category Specifications)_____

Character Category			Character Structure (H x V + Space)	Maximum Column Number	Character Spacing (CPI)	Print Speed (CPS)	Minimum Dot Spacing (H x V in inches)	Character Dimensions (H x V in mm)	Number of Passes
Standard Character	Standard	Pica	12* x 9	80	10	80	1/120* x 1/72	2.0 x 2.5 (*9 x 7)	1
		Elite	12* x 9	96	12	96	1/144* x 1/72	1.8 x 2.5 (*9 x 7)	1
		Condensed	14* x 9	137	17	68.5	1/240* x 1/72	1.2 x 2.5 (*9 x 7)	1
	High Quality (N.L.Q)	Pica	24* x 18	80	10	20	1/240* x 1/144	2.3 x 2.5 (*19 x 13)	2
		Elite	24* x 18	96	12	24	1/288* x 1/144	1.9 x 2.5 (*19 x 13)	2
Italic Cursive Characters	Standard	Pica	16* x 9	80	10	80	1/240* x 1/72	2.7 x 2.5	1
		Elite	16* x 9	96	12	96	1/288* x 1/72	2.3 x 2.5	1
		Condensed	18* x 9	137	17	68.5	1/480* x 1/72	1.5 x 2.5	1
	High Quality (N.L.Q)	Pica	32* x 18	80	10	20	1/480* x 1/144	2.9 x 2.5	2
		Elite	32* x 18	96	12	24	1/576* x 1/144	2.5 x 2.5	2
Graphic	Standard Density Graphic		n x 8	480 dot column	-	480 dot column/s	1/60 x 1/72	-	1
	Double Density Graphic		n x 8	960 dot column	-	480 dot column/s	1/120 x 1/72	-	1
	Double-Speed Double-Density Graphic		n x 8	*960 dot column	-	*960 dot column/s	1/120* x 1/72	-	1
	Quadruple Density Graphic		n x 8	*1920 dot column	-	*960 dot column/s	1/240* x 1/72	-	1
	640 Dot Graphic		n x 8	640 dot column	-	320 dot column/s	1/80 x 1/72	-	1
	576 Dot Graphic		n x 8	576 dot column	-	576 dot column/s	1/72 x 1/72	-	1
	720 Dot Graphic		n x 8	720 dot column	-	360 dot column/s	1/90 x 1/72	-	1

"*" Includes Half Dot

Note: Print speeds (CPS) of 2-pass mode shown here exclude a return time of the print head between the first and the second pass

_APPENDIX D (Control Code Summary)_____

Category	Item	Symbol	Hex (Decimal) Code	Function	Page
Print Command	1	CR	0D (13)	Printing only or plus linefeed	21
	2	NL	0A (10)	New line after printing	21
	3	FF	OC (12)	Form feed after printing	22
	4	VT	0B (11)	Same as NL	22
	5	ESC,J,n	1B, 4A, n (27, 74, n)	n/216 " linefeed after printing	23
Character Mode Designation	6	ESC,P	1B, 50 (27, 80)	Elite character mode termination	23
	7	ESC,M	1B, 4D (27, 77)	Elite character mode designation	23
	8	SI	0F (15)	Condensed character mode designation	24
	9	ESC,SI	1B, 0F (27, 15)	Same as SI	24
	10	DC2	12 (18)	Condensed character mode termination	24
	11	ESC,x,(01)	1B, 78, 01 (27, 120, 1)	High Quality character mode designation	25
	12	ESC,x,(00)	1B, 78, 00 (27, 120, 0)	High quality character mode termination	25
	13	ESC,p,(01)	1B, 70, 01 (27, 112, 1)	Proportional character mode designation	26
	14	ESC,p,(00)	1B, 70, 00 (27, 112, 0)	Proportional character mode termination	26
	15	ESC,S,(00)	1B, 53, 00 (27, 83, 0)	Superscript character mode designation	27
	16	ESC,S,(01)	1B, 53, 01 (27, 83, 1)	Subscript character mode designation	27
	17	ESC,T	1B, 54 (27, 84)	Subscript/Superscript character mode termination	28
	18	ESC,4	1B, 34 (27, 52)	Italic character mode designation	28
	19	ESC,5	1B, 35 (27,53)	Italic character mode termination	29
	20	ESC,!,n	1B, 21, n (27, 33, n)	Combined print mode designation	29
Bold Character	21	ESC,E	1B, 45 (27,69)	Bold character mode designation	32
	22	ESC,F	1B, 46 (27,70)	Bold character mode termination	32
Double Strike Character Mode	23	ESC,G	1B, 47 (27,71)	Double Strike character mode designation	33
	24	ESC,H	1B, 48 (27,72)	Double Strike character mode termination	33
Double Width Character Mode	25	SO	0E (14)	Double width character mode designation (line feed terminates the command)	34
	26	ESC,SO	1B, 0E (27,14)	Same as SO	34
	27	DC4	14 (20)	Termination of the SO command	34
	28	ESC,W,(01)	1B, 57, 01 (27, 87, 1)	Double Width character mode designation (line feed does not terminate the command)	35
	29	ESC,W,(00)	1B, 57, 00 (27, 87, 0)	ESC, W, (01) command termination	35

Category	Item	Symbol	Hex (Decimal) Code	Function	Page
Graphic Print Mode	30	ESC, K, n1, n2	1B, 4B, n1, n2 (27, 75, n1, n2)	Standard density graphic designation	36
	31	ESC, L, n1, n2	1B, 4C, n1, n2 (27, 76, n1, n2)	Double density graphic designation	37
	32	ESC, Y, n1, n2	1B, 59, n1, n2 (27, 89, n1, n2)	Double-speed double density graphic designation	38
	33	ESC, Z, n1, n2	1B, 5A, n1, n2 (27, 90, n1, n2)	Quadruple density graphic designation	39
	34	ESC, *, m, n1, n2	1B, 2A, m, n1, n2 (27, 42, m, n1, n2)	Various graphic modes designation	40
	35	ESC, ^, a, n1. n2	1B, 5E, a, n1, n2 (27, 94, a, n1, n2)	9-pin graphic designation	41
Line Feed Spacing	36	ESC, 0	1B, 30 (27, 48)	Set line feed pitch to 1/8”	42
	37	ESC, 1	1B, 31 (27, 49)	Set line feed pitch to 7/72”	42
	38	ESC, 2	1B, 32 (27, 50)	Set line feed pitch to 1/6”	43
	39	ESC, 3, n	1B, 33, n (27, 51, n)	Set line feed pitch to n/216”	43
	40	ESC, A, n	1B, 41, n (27, 65, n)	Set line feed pitch to n/72”	44
Page Length Setting	41	ESC, C, n	1B, 43, n (27, 67, n)	Line unit page length setting	45
	42	ESC, C, (00), n	1B, 43, 00, n (27, 67,0, n)	Inch unit page length setting	46
Horizontal Tab	43	ESC, D, n1, n2, …,nk, NUL	1B, 44, n1, n2, …nk,00 (27, 68, n1, n2, …nk, 0)	Horizontal tab position setting	47
	44	HT	09 (9)	Move to next horizontal tab position	48
Margin Setting	45	ESC, Q, n	1B, 51, n (27, 81, n)	Right margin setting	48
	46	ESC, l, n	1B, 6C, n (27, 108, n)	Left margin setting	49
Underline	47	ESC, -, (01)	1B, 2D, 01 (27, 45, 1)	Underline setting	50
	48	ESC, -, (00)	1B, 2D, 00 (27, 45, 0)	Underline termination	50
Buffer Clear	49	CAN	18 (24)	Clearing of internal buffer	51
Backspace	50	BS	08 (8)	After printing, move 1 character position to the left	51
Buzzer	51	BEL	07 (7)	Sound buzzer for 0.3 seconds	52
Home Positioning	52	ESC, <	1B, 3C (27,60)	Move print head to home position	52
Skip-Over Perforation	53	ESC, N, n	1B, 4E, n (27, 78, n)	Skip over n bottom lines of the page	53
	54	ESC, O	1B, 4F (27, 69)	Termination of skip over perforation	54
Paper Out Detection	55	ESC, 8	1B, 38 (27, 56)	Ignore paper out detection	54
	56	ESC, 9	1B, 39 (27,57)	Make paper out detection valid	54
Reset	57	ESC, @	1B, 40 (27, 64)	Initialise printer	54
Unidirectional Printing	58	ESC, U, (01)	1B, 55, 01 (27, 85, 1)	Unidirectional printing designation	55
	59	ESC, U, (00)	1B, 55, 00 (27, 85, 0)	Bidirectional printing designation	55