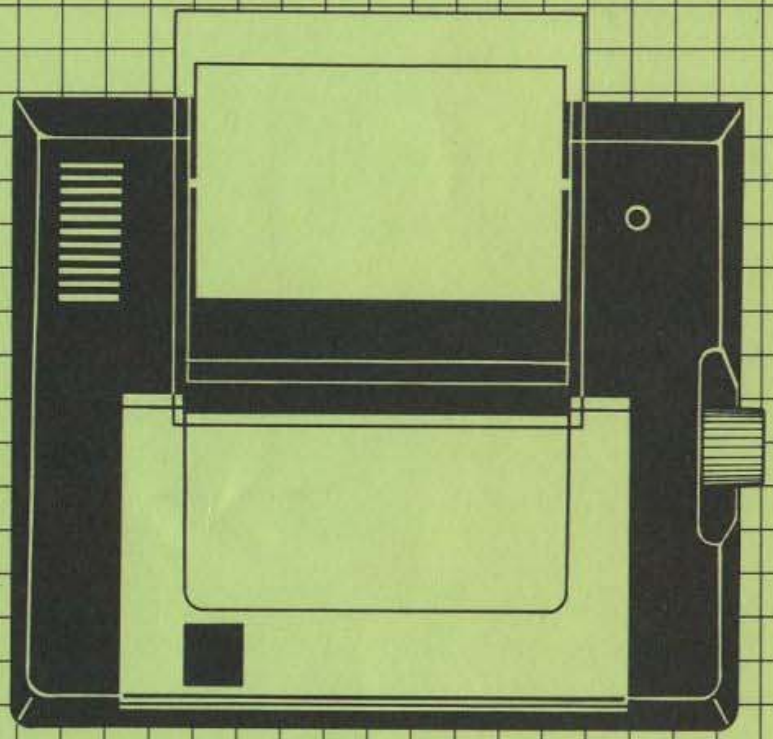
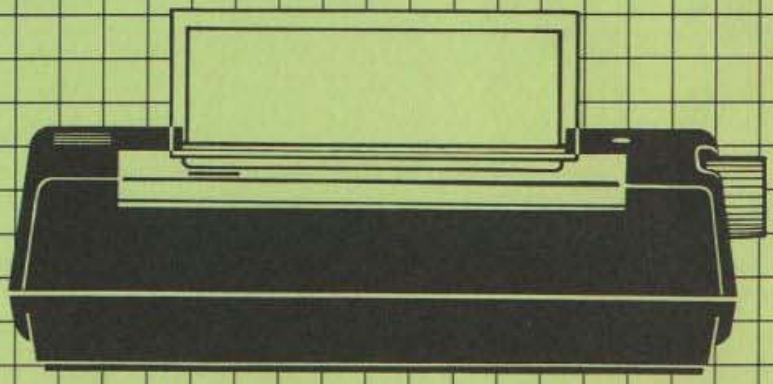
OWNER'S MANUAL

GP-50S

GP Graphic Printer

SEIKOSHA





SEIKOSHA CO.,LTD.
SYSTEM EQUIPMENT DIVISION

INTRODUCTION

Congratulations on your selection of this dot-matrix impact printer, a dedicated printer for the ZX Spectrum (Sinclair 2068) and ZX81 (Sinclair 1500 and Sinclair 1000), personal computers.

CONTENTS

PARTS OF THE PRINTER

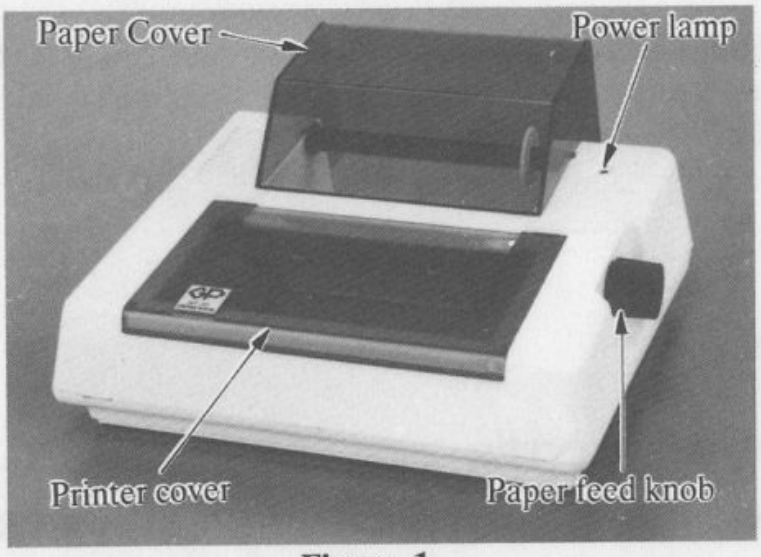


Figure 1

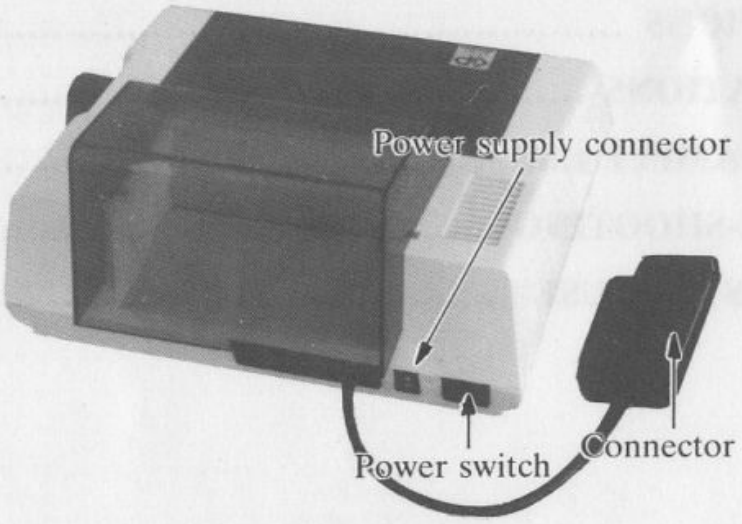


Figure 2

1. **Power switch**
   When the power switch is turned "ON", the printer goes through an initialization sequence in which the print head makes two movements.

2. **Power lamp**
   This lamp comes on when the power switch is turned "ON", and is off when power is "OFF". This lamp blinks in the ERROR state.

3. **Printer cover and Paper cover**
   These covers keep dirt and dust from getting into the printer and also keep sound from getting out.

4. **Paper feed knob**
   This is used to feed paper through manually in either direction.

INSTALLING AND REMOVING THE RIBBON CASSETTE

1. Installation

It is easier to install the ribbon cassette before inserting the paper.

(1) Insert an inker into the ribbon cassette so that the felt is facing the cassette knob as shown below. Then turn the cassette knob in the direction of the arrow.

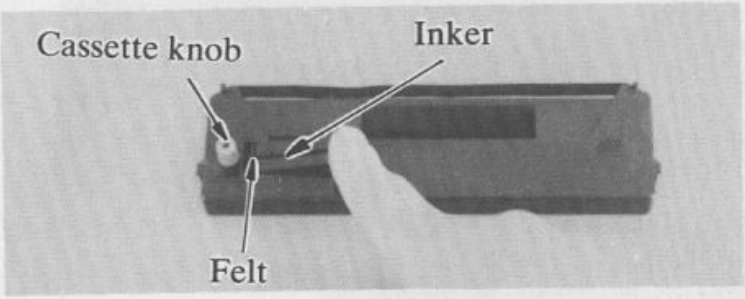


Figure 3

(2) Open the printer cover, insert a portion of the ribbon between the printhead and the platen, and push down on both ends of the cassette. Make sure that ends of the cassette are securely held by the cassette holders on both sides. Turn the cassette knob in the direction of the arrow to tighten the ribbon.

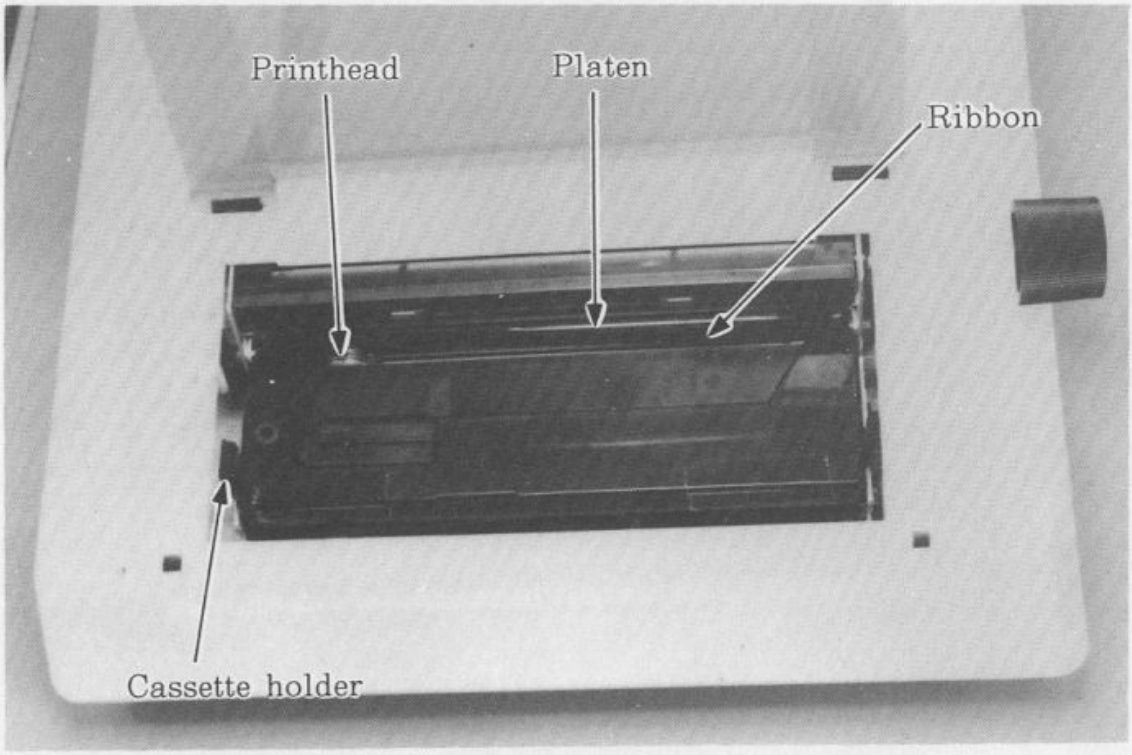


Figure 4

Note: If the left end of the cassette does not click into the cassette holder, turn the cassette knob a little in the direction of the arrow and press again on the left side of the cassette.

2. Removal

Lift up on the cassette by holding the middle part of it as shown in Figure 5.

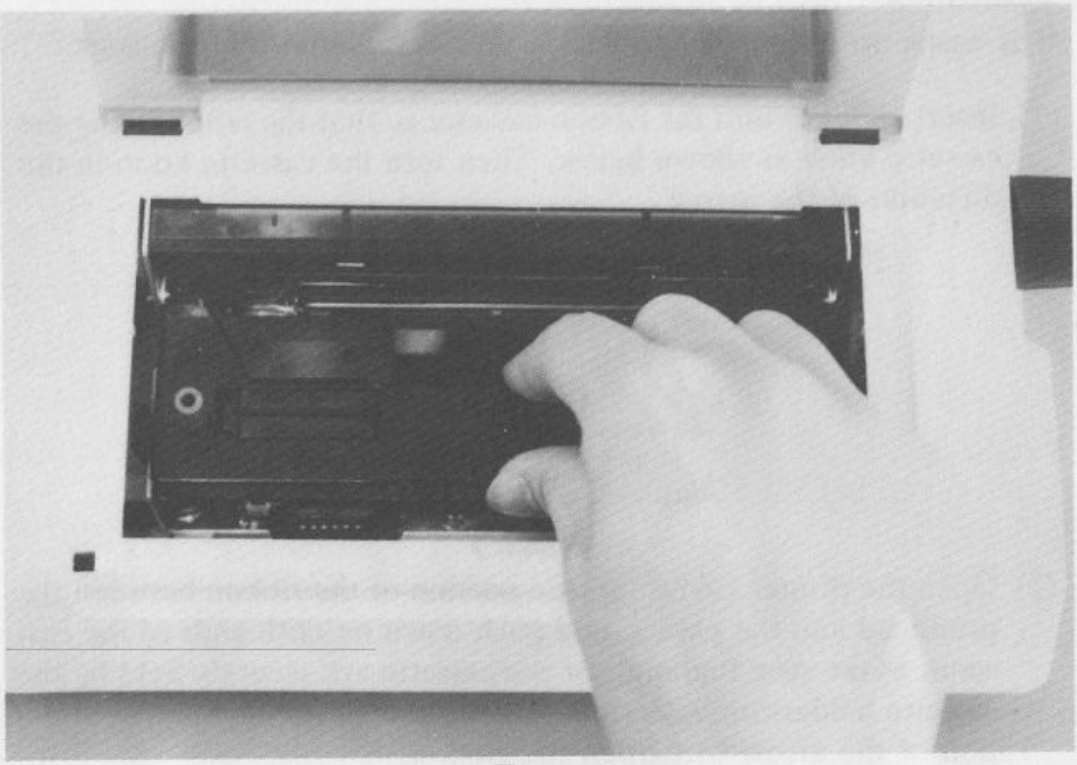


Figure 5

LOADING THE PAPER

1. Roll paper loading

(1) Insert the paper shaft into the hole of the roll of paper and also insert the paper holder (white) into the other end of the paper shaft.

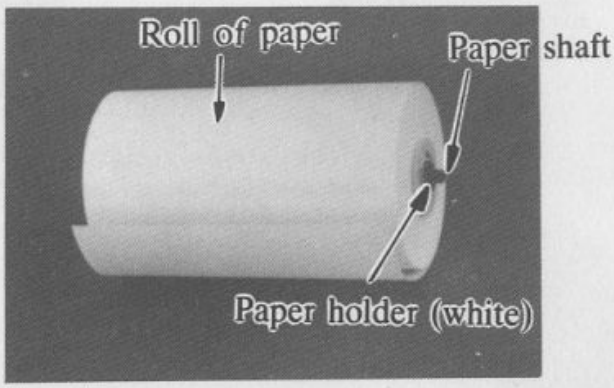


Figure 6

Note: If the roll of paper being used is narrower than 5 inches, after inserting the paper holder into the paper shaft, turn the paper holder while holding the paper shaft and push the paper holder to the roll of paper so that the roll of paper is firmly held to one end of the paper shaft. This prevents the paper from creeping toward the middle of the shaft during printing.

(2) Place the roll of paper on the back of the printer and make sure the paper holder is at the right side of the printer. Use scissors to cut the paper at an angle as shown in the figure below.

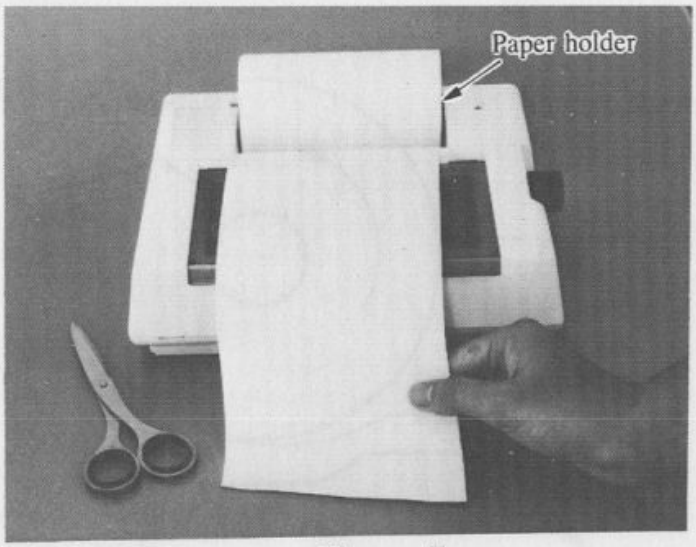


Figure 7

It is easier to install the paper when it is cut at an angle.

(3) Use both hands to insert the paper from the rear as far as it will go and then turn the paper feed knob.

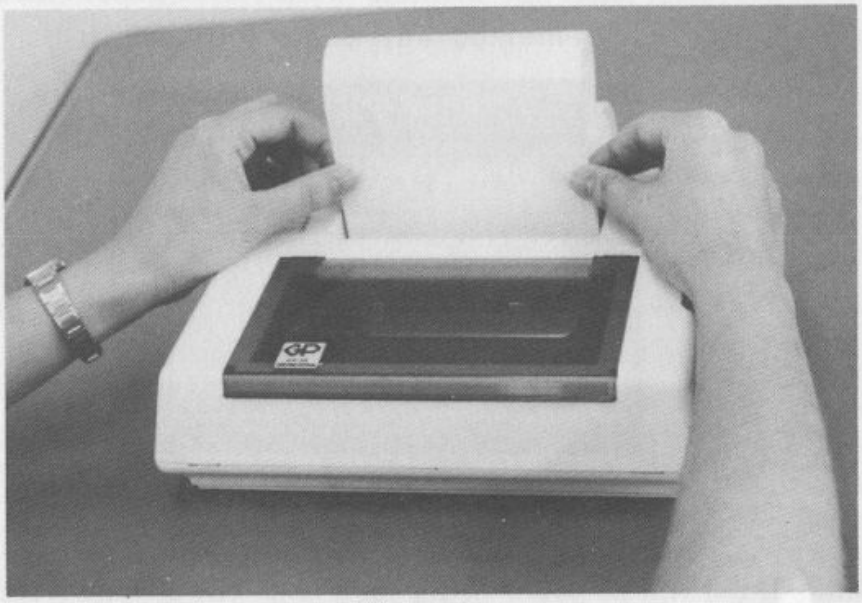
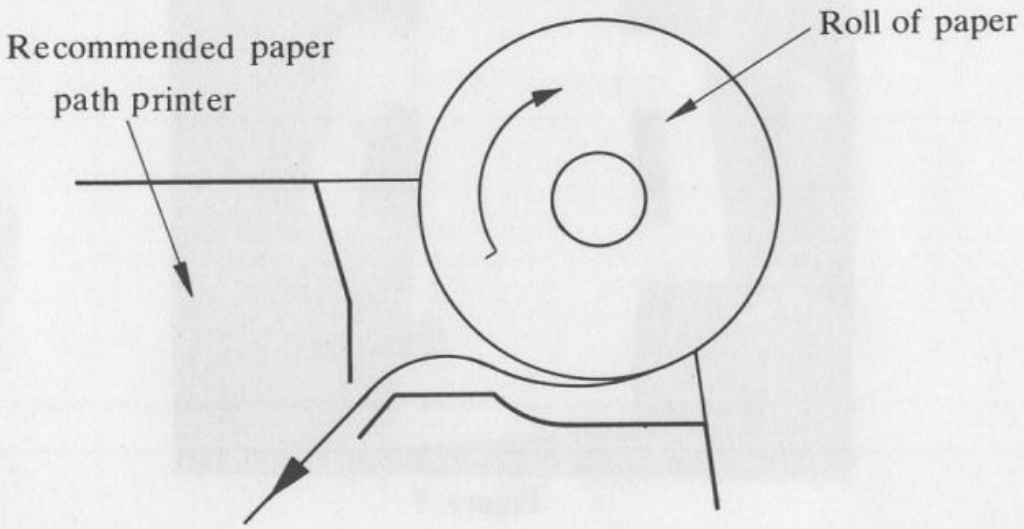


Figure 8

2. Single sheet paper loading
Insert the paper straight into the rear of the printer.

Caution: Never print without paper and ink ribbon installed. Failure to do so may damage the printhead and/or platen.



CONNECTIONS

The power switches on the printer and the personal computer should both be turned OFF before connecting the printer to the personal computer.

1. Connecting to the ZX Spectrum or Sinclair 2068

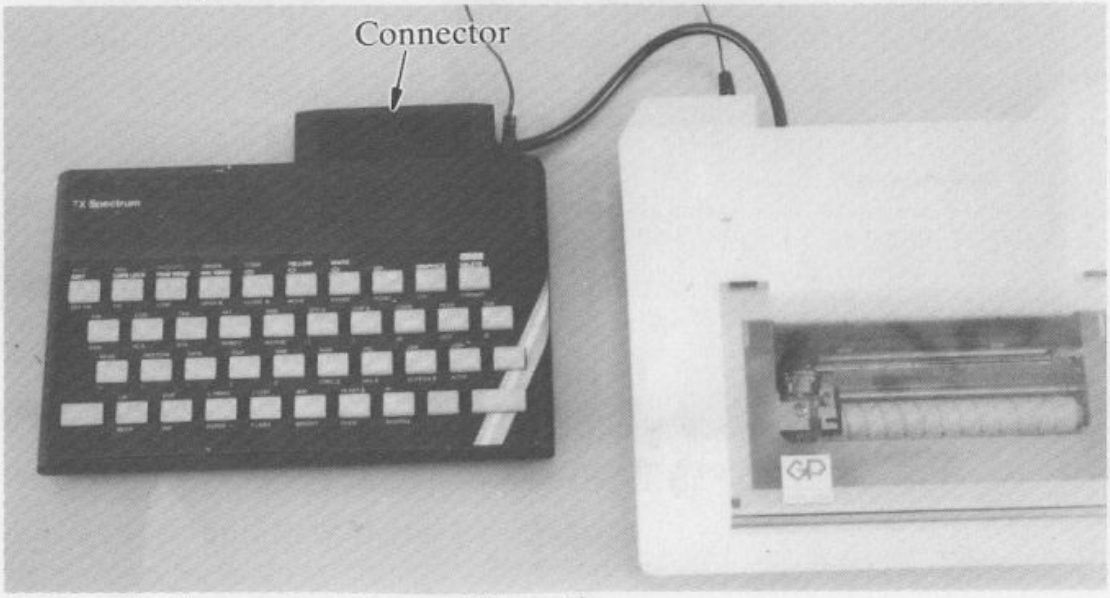


Figure 9

2. Connecting to the ZX 81, Sinclair 1500 or Sinclair 1000.
   The adapting connector (# GP-05020, option) is necessary for connecting to these personal computers.

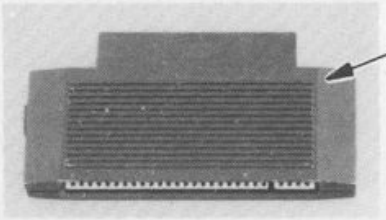


Figure 10

When the 16K RAM pack is being used, connect it to the top of the GP-50S connector as shown in the figure below.

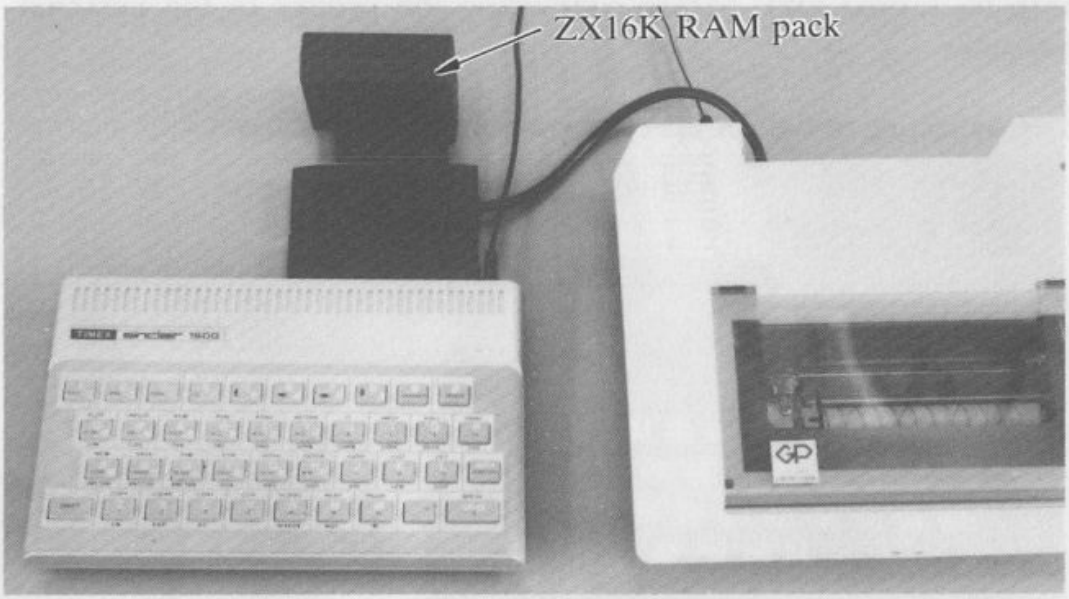


Figure 11

SPECIFICATIONS

1. General Specifications

A. Print method	Impact dot matrix (Uni-hammer method)
B. Character pitch	10.5 characters/inch
C. Line pitch	9 lines/inch
D. Print speed	35 characters/sec.
E. Character structure	7 × 7 + 1 dot
F. Space between dots	1/84″ (Horizontal) × 1/72″ (Vertical)
G. Number of copies	Original plus one
H. Maximum number of columns	32 character columns
I. Line feed speed	6.6 lines/sec
J. Paper feed method	Friction feed
K. Paper type	Roll paper and fan fold paper, Maximum width of 5 inches

2. Operating environment

A. External power supply	120VAC, 220/240VAC ± 10%, 50/60 Hz
B. Temperature	5°C ~ 40°C
C. Humidity	20% ~ 80% (No condensation)
D. Measurements	85 × 250 × 215mm (H × W × D)
E. Weight	1.5kg excluding power supply

PRINT EXAMPLE

Basic statements such as **LPRINT**, **LLIST** and **COPY** are used to operate the GP-50S printer. Refer to the chapter "the ZX printer" in the personal computer's user manual where these statements are explained in detail.

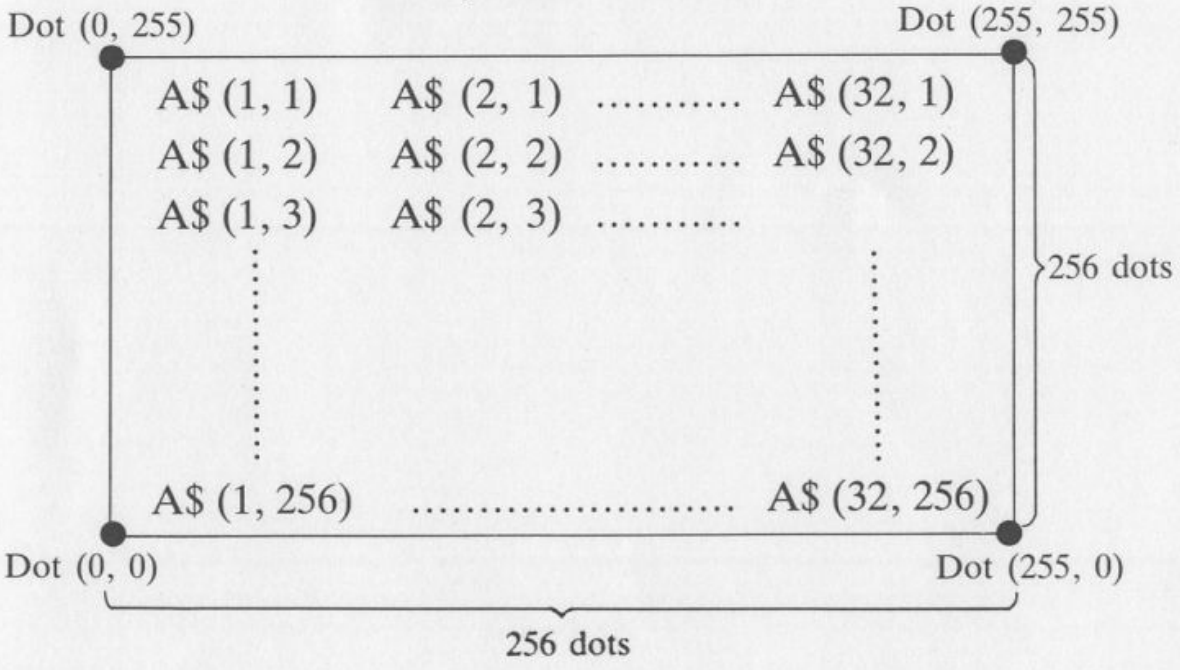
High resolution print example for the ZX 81

A graphic copy for this case is printed using 256 vertical dots × 256 horizontal dots. The 16K RAM pack is necessary to run this program.
First, input the following two statements before entering the program example in order to reserve an area of RAM for storing the graphic data.
Failure to do so will result in "MEMORY NOT RESERVED" being displayed and the program will stop.

```
POKE 16389, 124
NEW
```

The following shows how to allocate memory for a graphic printout of 256×256 dots. The array A$ requires 8 kilo bytes of memory for all the dots to be printed.

The array element allocation



Each element of A$ consists of one byte, or 8 bits.
And each bit corresponds to one graphic dot.

A$ (X, Y) | D_7 | D_6 | D_5 | D_4 | D_3 | D_2 | D_1 | D_0 | 1 byte (8 bits)

MSB LSB

The dot (0, 0) corresponds to D_7 of A$ (1, 256).
The dot (1, 0) corresponds to D_6 of A$ (1, 256).
The dot (255, 0) corresponds to D_0 of A$ (32, 256).

Lines 50 to 100 in the program are used to move a subroutine in ROM starting at address 2161 to the RAM address beginning at 31744 and then four bytes are changed. This subroutine is used to output a dot-line which consists of 256 vertical dots.
Refer to 'Sinclair ZX81 ROM Disassembly Part A: 0000H-0F54H' by Dr. I. LOGAN for further details on the subroutine called THE 'COPY' COMMAND ROUTINE whose start address as used in this example is 2161 (0871H).
Lines 105 to 5070 write graphics data to the reserved RAM area and lines 7000 to 7130 print out this data 8 dot-lines at a time using the subroutine that was transfered out of ROM.
For the Sinclair 1500, approximately 10 minutes is needed before the printing actually starts.
This time is needed for the personal computer to do the calculations needed to take care of $256 \times 256 = 65536$ dots.

Program List

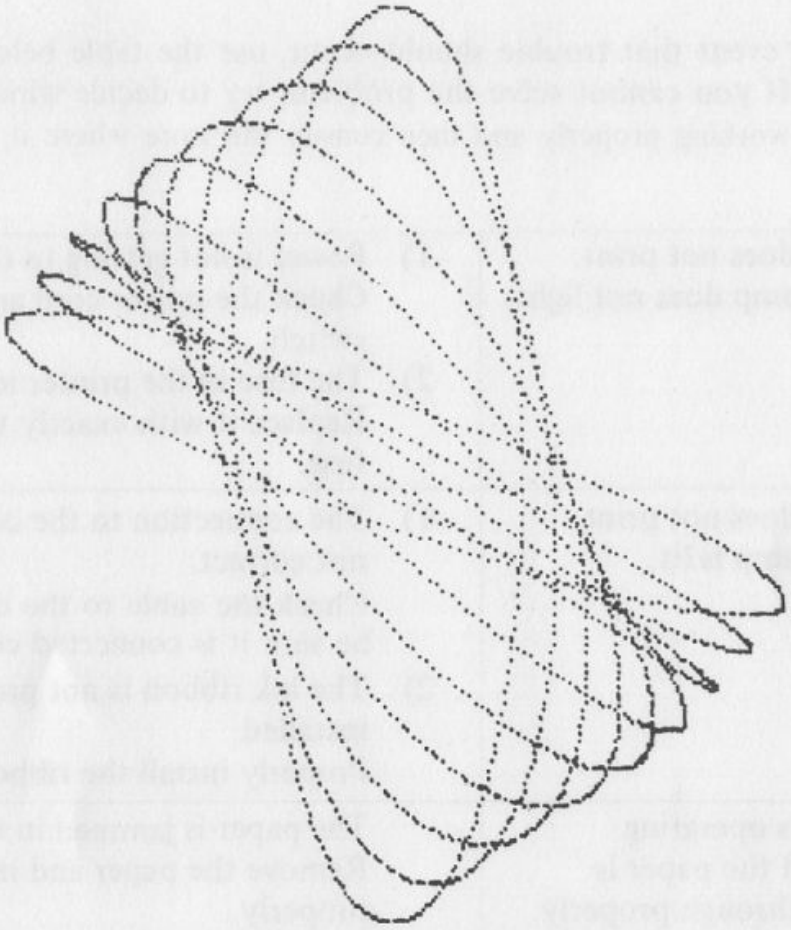
```
  10 REM U■RND?U■RND■■ ?TAN SAVE
■
  20 IF PEEK 16388+256*PEEK 1638
9=31744 THEN GOTO 50
  30 PRINT "MEMORY NOT RESERVED"
  40 STOP
  50 FOR I=0 TO 131
  60 POKE 31744+I,PEEK (2161+I)
  70 NEXT I
  80 POKE 31800,63
  90 POKE 31657,201
  95 POKE 16517,95
 100 POKE 16524,79
 105 LET K=120
 107 LET A=240
 110 DIM A$(32,256)
 120 FOR J=40 TO 120 STEP 10
 200 FOR I=0 TO 240
 210 LET X=128+K*SIN (I/120*PI+A
/120)
 300 LET Y=128-J*COS (I/120*PI)
 310 GOSUB 5000
 400 NEXT I
 410 LET K=K-10
 415 LET A=A-30
 420 NEXT J
 500 GOTO 7000
5000 REM PLOTS(X,Y)INTO A$
5010 IF X<0 OR X>255 OR Y<0 OR Y
>255 THEN RETURN
5020 LET C=1+INT (X/8)
5030 LET R=256-INT Y
5040 POKE 16526,CODE A$(C,R)
5050 POKE 16527,2**(8*C-INT X-1)
5060 LET A$(C,R)=CHR$ (USR 16514
)
5070 RETURN
7000 REM PRINTSA$ 8 LINES AT A T
IME
7010 FOR I=0 TO 246 STEP 8
7020 FOR J=1 TO 32
7030 FOR K=1 TO 8
7040 POKE 32255+K+8*(J-1),CODE A
$(J,K+I)
7045 NEXT K
7050 NEXT J
7060 FOR H=0 TO 31
7070 POKE 16444+H,H
7075 NEXT H
7080 LET HPRINT=USR 31744
7090 NEXT I
7100 LPRINT
7110 LPRINT
7120 LPRINT
7130 LPRINT "          HIGH  RES
OLUTION"
```

A subroutine used to output a dot-line of 256 horizontal dots is moved from ROM to RAM area and 4 bytes are changed.

Graphic data is stored in the reserved RAM area.

Print the stored graphic data using the subroutine that was moved from ROM.

Printed Example



HIGH RESOLUTION

TROUBLE-SHOOTING

In the rare event that trouble should occur, use the table below to diagnose the problem. If you cannot solve the problem, try to decide which part of your system is not working properly and then consult the store where it was purchased.

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. 2) The fuse in the printer may be blown. Replace it with exactly the same type fuse.
The printer does not print. The power lamp is lit.	1) The connection to the computer is not correct. Check the cable to the computer to be sure it is connected correctly. 2) The ink ribbon is not properly installed. Properly install the ribbon.
The printer is operating properly, but the paper is not feeding through properly.	The paper is jammed in the printer. Remove the paper and reinsert it properly.
The print is light or smeared.	1) The ribbon is not properly installed. Properly install the ribbon. 2) The ink ribbon is old or is worn out. Replace it with a new ribbon.

CAUTIONS FOR USE

- Wait at least 2 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.
- The operating temperature range is 5°C ~ 40°C. Rapid temperature variations are to be avoided.
- Be sure that power is turned off to both the printer and computer before connecting or disconnecting the signal cable from the computer.
- Do not turn power off while the printer is printing.
- Regardless of whether the power is ON or OFF, do not try to move or apply undue force to the printhead. Also, do not touch any of the moving parts of the printer while it is in operation.
- Do not operate the printer without the ink ribbon and paper properly installed.
  Failure to do so may cause damage to the printhead and/or platen.
- Concerning print density
  Normal character pattern dot densities are the most desirable. Continuous printing of very high density patterns may affect the life of the printhead.

SEIKOSHA reserves the right to change the contents as stated herein at any time and without notice.

SEIKOSHA CO.,LTD.

SYSTEM EQUIPMENT DIVISION

〒130 4-1-1 TAIHEI SUMIDA-KU TOKYO JAPAN.