ATARI® 1029™ PROGRAMMABLE PRINTER

TABLE OF CONTENTS

MEET THE ATARI 1029 PRINTER

The ATARI 1029 Printer is versatile, convenient, and easy-to-use. It lets you print letters, numbers, and international characters. You can also underline and elongate characters. You can even design your own computer graphics using your ATARI Home Computer, then have the 1029 print them out!

In the next few pages, you'll quickly learn how to hook-up and operate your printer. Take a moment to acquaint yourself with these parts and features of the ATARI 1029 Printer. We'll be talking about them throughout this guide.

TOP COVER   PAPER FEED/FRICTION
                   RELEASE KNOB

POWER ON/OFF   POWER ON LIGHT

BACK ROLLERS

PAPER BAIL

PAPER SEPARATOR

FRONT
ROLLERS

PLATEN

PIN FEED SPROCKETS

SELF TEST SWITCH

POWER CORD

INPUT/OUTPUT PORTS

2
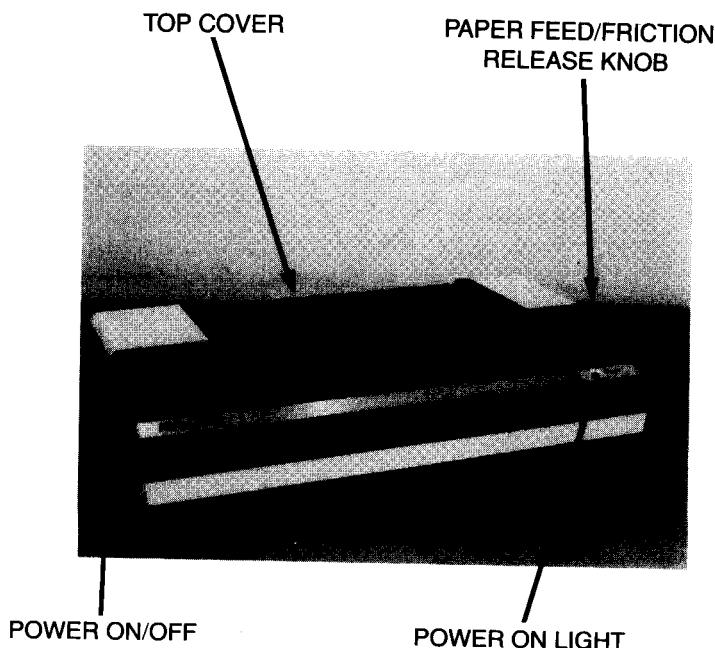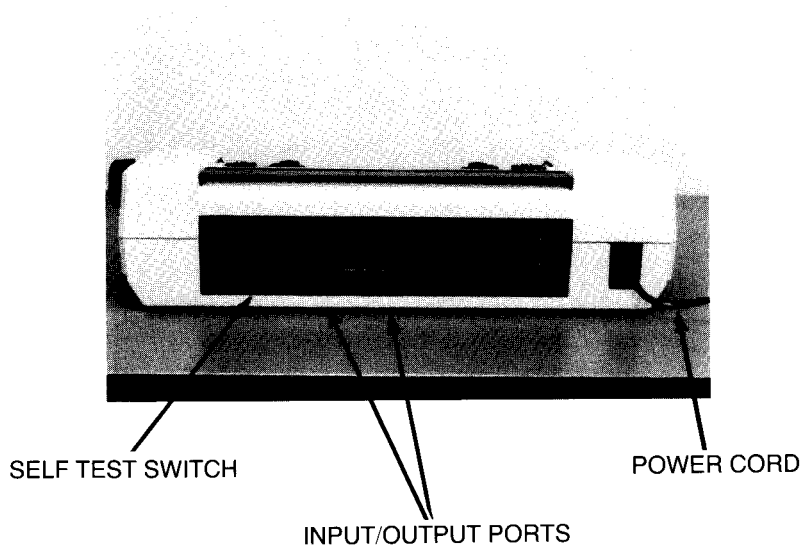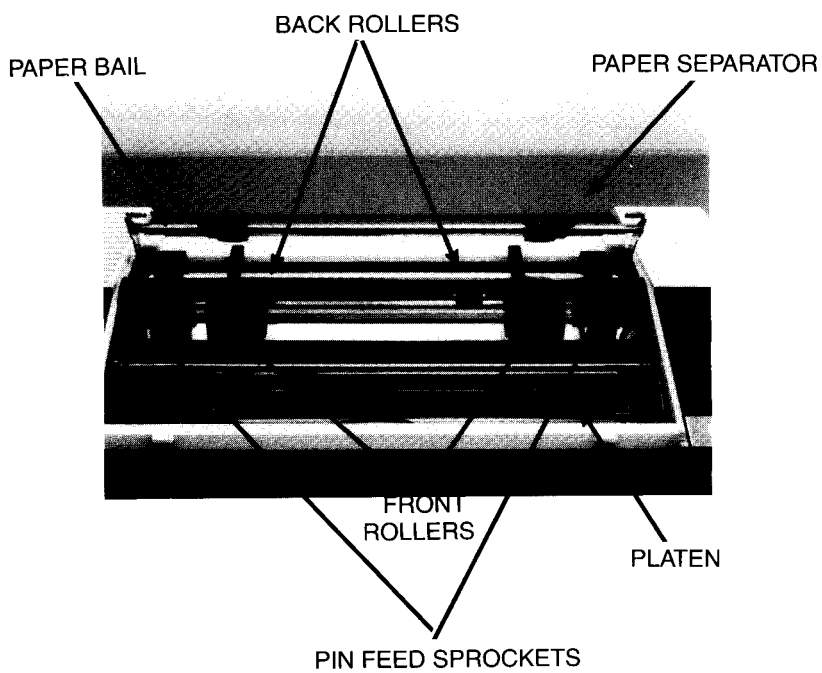
HOOKING IT UP

1. Turn off the power to all parts of your ATARI Home Computer System.

2. Make sure the printer's ON/OFF switch is OFF, and plug the power cord into a wall outlet or power strip.

3. Plug one end of the data cord supplied with your ATARI 1029 Printer into one of the input/output ports marked PERIPHERALS on your ATARI Home Computer, or into another peripheral in your system.
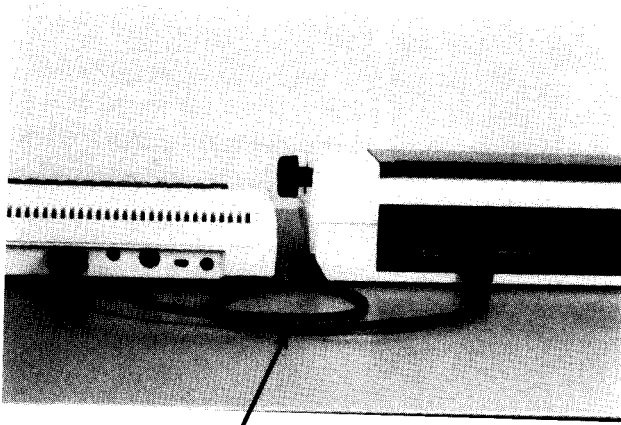
DATA CORD

4. Plug the other end of the data cord into one of the input/output ports at the rear of your printer.

Note: Do not turn on the printer before you remove the protective carrier tube.
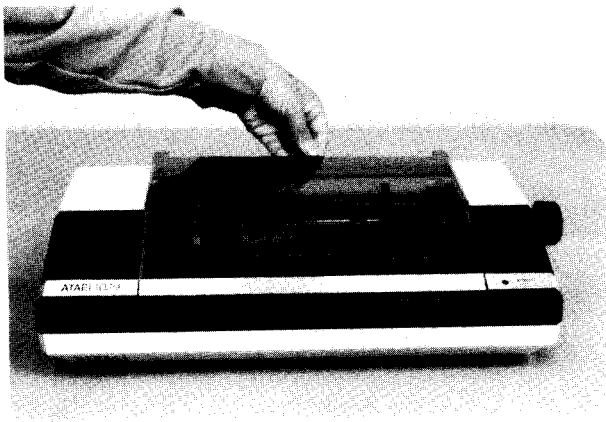
5. Remove the top cover by slipping your hand under the cover from the rear and lifting up.

PROTECTIVE CARRIER TUBE

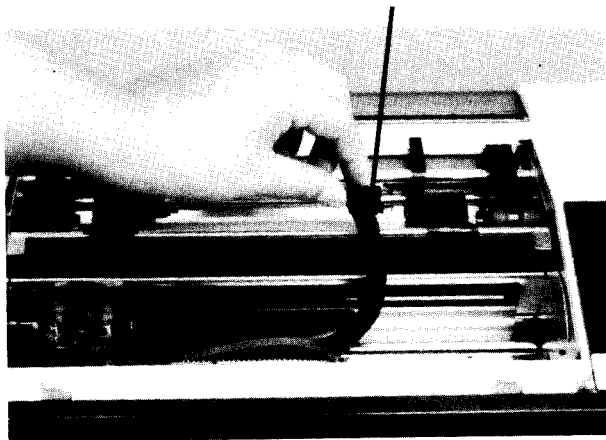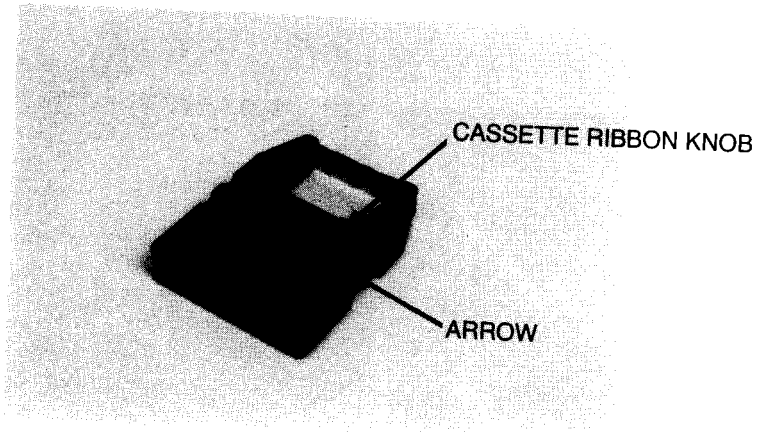6. Remove the protective carrier tube by carefully pulling up on the warning tag attached to the tube.

CASSETTE RIBBON KNOB

ARROW

7. Unwrap the cassette ribbon. Tighten the ribbon by turning the cassette knob in the direction indicated by the arrow on the ribbon cassette.

CASSETTE INKED RIBBON   PRINT HEAD   CASSETTE KNOB

PLATEN

PRINT HEAD ADJUSTMENT LEVER   CASSETTE SIDE SUPPORTS
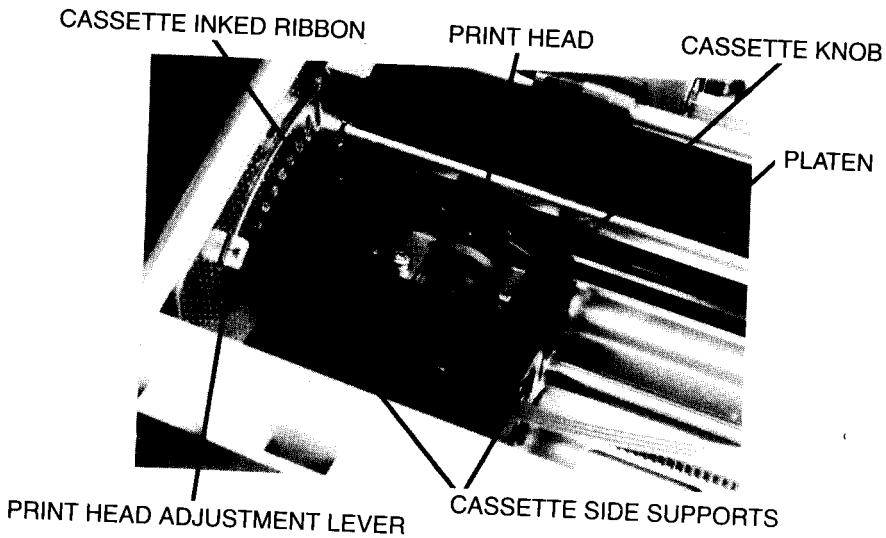
8. Move the print head adjustment lever away from the platen as far as it will go. Carefully slide the exposed section of the ribbon between the print head and the platen. Gently press the left side of the ribbon cassette onto the cassette side support until it snaps in. Then, while turning the cassette knob in the direction indicated by the arrow, gently press the right side of the ribbon cassette onto the cassette side support until it snaps in.

5
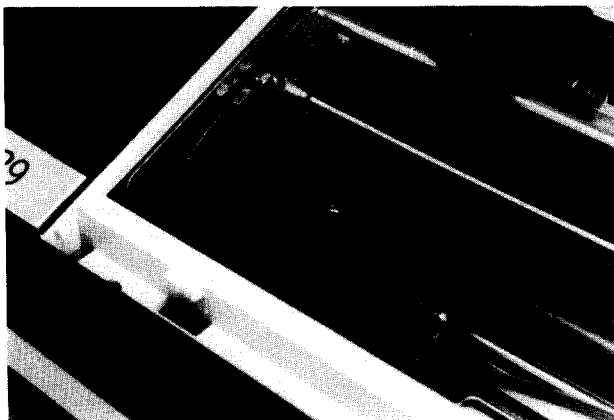
9. Move the print head adjustment lever back to the middle position marked by the red triangle. Replace the top cover.

LOADING PAPER

Fanfold Paper

1. Remove the top cover.

2. Move the print head adjustment lever towards the front of the printer as far as it will go.

PAPER BAIL   PAPER SEPARATOR
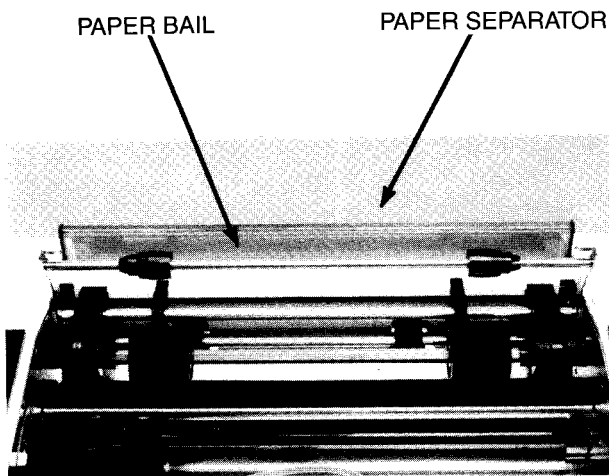
3. Lift the paper bail up and away from the front rollers. Lift the paper separator to its upright position.

PIN FEED CLAMPS

PAPER ADVANCE/FRICTION
RELEASE KNOB
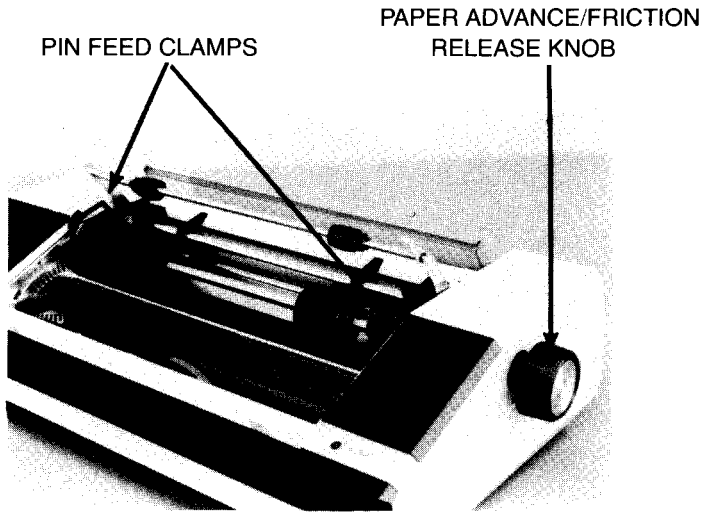
4. To release the back rollers, gently pull out on the paper feed/friction release knob until it clicks into position. Raise the pin feed clamps to their upright, side positions.

PAPER PATH GUIDES
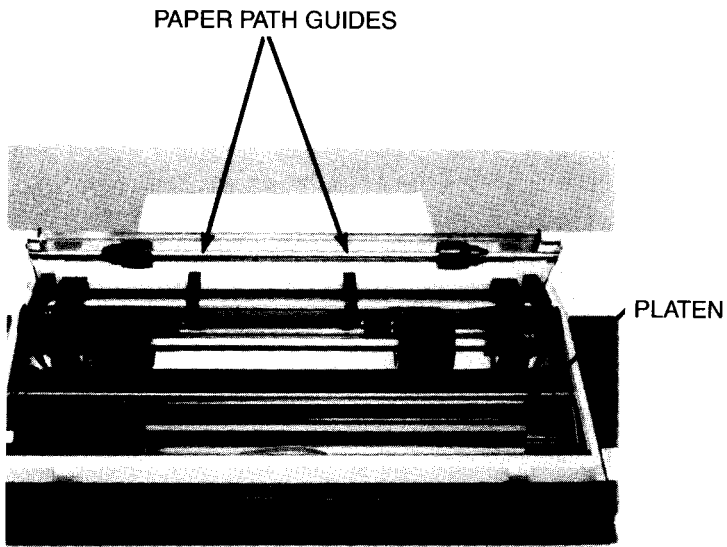
PLATEN

5. Insert the paper's leading edge into the paper chute. Slide the paper under the platen and up past the print head. Be sure the paper path guides lay flat against the paper chute housing.
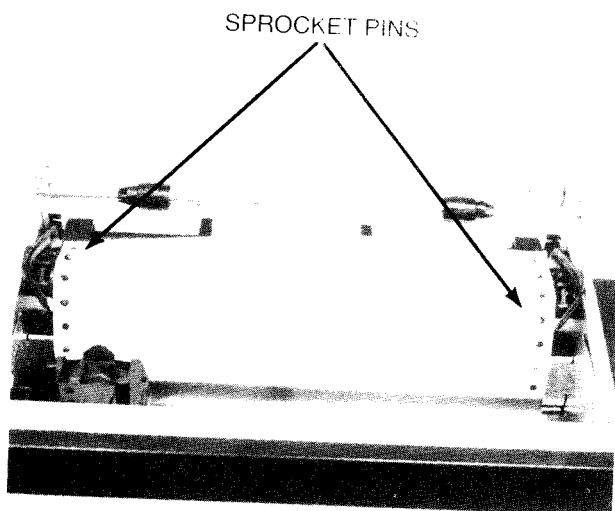
SPROCKET PINS

6 Align the paper holes with the sprocket pins. To adjust the position the sprocket pins, simply slide the pin feed sprockets to either position along their guide bars.

PIN FEED CLAMPS
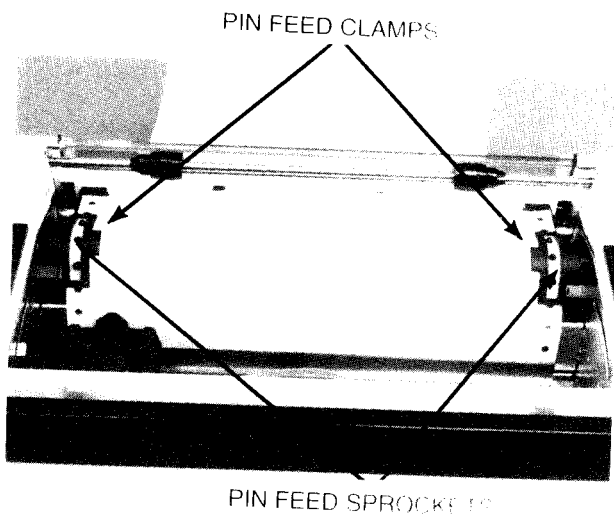
PIN FEED SPROCKETS

7 Close the pin feed clamps to secure the alignment of sprocket pins and paper holes. Turn the platen clockwise to advance the paper. If necessary, adjust the sprockets a little on both sides to remove any slack.

PAPER SEPARATOR   PAPER BAIL
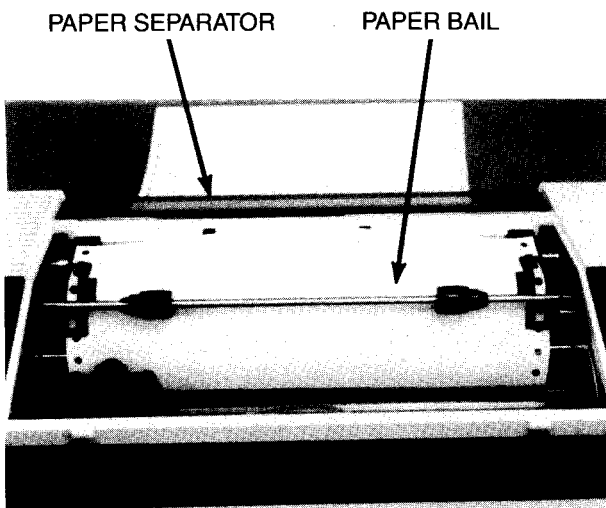
8. Return the paper bail to its down position. Return the paper separa-
   tor to its down position. Move the print head adjustment lever to its
   middle position marked by the red triangle. Replace the top cover.

Helpful Hints

- To unload fanfold paper, tear off your printed paper along the per-
  foration, then turn the paper feed knob counterclockwise. While
  turning the knob, hold the paper as it exits from the printer.

- Make sure the back rollers are released before printing (see Step 4).

- Make sure the front rollers are aligned with their respective paper bail
  rollers before printing.

10

Single-Sheet Printing

Although not specifically designed for single-sheet printing, your 1029 Printer produces reasonably good results when printing a single sheet.

Loading single-sheet paper is much like loading fanfold paper, but with a few exceptions. Slide the pin feed sprockets out of the way, one to the right and one to the left as far as they will go. Push in the paper feed knob to engage the back rollers. Turn the knob clockwise to bring the paper under the platen and past the print head. To ensure better print quality, the paper should be engaged by the front rollers before printing.

Note: To unload a single sheet, turn the paper feed knob clockwise until the paper is free of the front rollers.

READY TO PRINT

Now that you've connected your printer, with the cassette ribbon installed and paper inserted, it's time to try it out.

1. Turn on your printer. The print head will move towards the center of the carrier rod two times, then return to its original position. This should occur each time you turn on the printer.

2. Move the SELF-TEST switch, located on the back panel of the printer, to the ON position. Now . . .

3. Watch it print!

4. When you are satisfied that the printer is in fine working order, simply move the SELF-TEST switch to OFF. The printer will complete the line being printed, then stop.

If you experience any problems during this self-test, please proceed to the Troubleshooting section of this guide.

Helpful Hints

• Do not let the paper pile up on top of your unprinted paper as it enters the paper chute. The printed paper may be pulled back into the printer. This could jam the paper feed and possibly damage the printer.

• The printer does not have a paper-out sensor. When printing a single-sheet, be sure the text you are printing will fit on a single-sheet. If your page of text is any longer, the printer will continue printing right onto the platen. This could damage the print head.

THE ATARI 1029 PRINTER AND ATARI BASIC

In this section, you'll learn how to access all the features of the 1029 Printer using ATARI BASIC Computing Language. If you have an ATARI 400™, 800™, or 1200XL™ Computer, insert a BASIC cartridge then turn on the computer. If you have an ATARI 600XL™ or 800XL™ Computer, you are in BASIC as soon as you turn on your computer.

BASIC offers two modes: Immediate and Programming. In the Immediate mode, no line numbers are used, and the BASIC statement you type in is executed as soon as you press [RETURN]. In the Programming mode, line numbers are used and BASIC statements are executed only after you type RUN and press [RETURN]. As soon as you type in a line number, you are in the Programming mode. If you don't type in a line number, you are in the Immediate mode.

The computer will not execute any BASIC statement, or enter any BASIC statement into its memory, until you press [RETURN]. When you see [RETURN] in the examples below, you should press the [RETURN] key on your computer keyboard.

We're now ready to discuss some BASIC printer commands.

LPRINT

When you type LPRINT, the computer will print whatever you enclose in quotation marks following LPRINT. This command can be used in either the Immediate or Programming mode.

For example, this is how the LPRINT command works in the Immediate mode. Type the statement:

LPRINT "MY 1029 PRINTER IS TERRIFIC!"

As soon as you press [RETURN], the printer will print:

MY 1029 PRINTER IS TERRIFIC!

This is how the LPRINT command works in the Programming mode:

10 LPRINT "MY 1029 PRINTER IS TERRIFIC!"

When you type RUN and press [RETURN], the printer will print:

MY 1029 PRINTER IS TERRIFIC!

The LPRINT command can also be used to tell the printer to advance a line without printing anything. Simply type LPRINT and then press [RETURN].

For example:

10 LPRINT "LINE 20 TELLS THE PRINTER TO ADVANCE ONE LINE."   ,
[RETURN]
20 LPRINT [RETURN]
30 LPRINT "I TOLD YOU SO." [RETURN]
RUN [RETURN]

The printer will print:

```
LINE 20 TELLS THE PRINTER TO ADVANCE ONE LINE,

I TOLD YOU SO,
```

Your computer understands BASIC commands like LPRINT only if they are typed in capital letters. BASIC always comes up on your screen in capital letters. To print lower case letters, press the [CAPS] key, then type them between quotation marks in LPRINT statements.

For example:

LPRINT "[CAPS] to print lower case letters, type them between quotation marks of lprint statements." [RETURN]

The printer will print:

```
to print lower case letters, type them between quotation
marks of lprint statements,
```

16

To go back to capital letters, press the [CAPS] key again. (If you're using an ATARI 400 or 800 Computer, you must hold down [SHIFT] and press [CAPS] to go back to capital letters.)

You can abbreviate LPRINT by typing LP and a period (LP.). The abbreviation works just like LPRINT.

For example:

LP. "I CAN ABBREVIATE LPRINT BY TYPING LP." [RETURN]

The printer will print:

```
I CAN ABBREVIATE LPRINT BY TYPING LP.
```

LIST "P:"

This command instructs your computer to print out your BASIC program using the printer instead of the video display screen.

For example, type:

10 LPRINT "SAMPLE" [RETURN]
20 LPRINT "SAMPLE" [RETURN]

Then type:

LIST "P:" [RETURN]

Your printer will print:

```
10 LPRINT "SAMPLE"
20 LPRINT "SAMPLE"
```

Any program written in ATARI BASIC can be printed out using the LIST **"P:"** command except when an escape code is included in the program listing. To list and print a program that incorporates escape codes, use the CHR$(nn) functions.

17

OPEN

This command opens channels that may be required to execute certain statements or run certain programs. These channels are also called input/output control blocks (IOCBs). Your ATARI Computer communicates with all input/output devices by means of these channels. There are eight channels in all, numbered 0 through 7. BASIC reserves channels 0, 6, and 7 for specific activities. Channels 1 through 5 are completely available to a BASIC program.

The OPEN statement links a channel (or IOCB) to a specific device. The OPEN statement consists of the word OPEN followed by four parameters which define the specific action.

For example:

10 OPEN #2,8,0,"P:" [RETURN]

The first number after OPEN is the channel number. Here channel #2 is used, but it could have been any number from 1 through 5. Subsequent input/output statements can then make easy reference to channel #2.

For example:

10 OPEN #2,8,0,"P:" [RETURN]
20 PRINT #2;"THIS CHANNEL IS OPEN FOR OUTPUT TO THE PRINTER."
[RETURN]

As soon as you type RUN and press [RETURN] your printer will print:

THIS CHANNEL IS OPEN FOR OUTPUT TO THE PRINTER.

The reason for this is that the second number specifies the kind of action that will be allowed on the channel. The number 8 stands for output only. The third number, 0, is permanently reserved for other devices and is ignored here, but must be included to maintain the proper form of the OPEN statement. The fourth parameter specifies the device which will be used. In this case it's **"P:"**, which stands for the printer.

Now when you refer to channel #2 in your program, output to the printer will be executed.

For example:

10 OPEN #2,8,0,"P:" [RETURN]
20 PRINT #2;"THIS CHANNEL IS OPEN FOR OUTPUT TO THE PRINTER."
[RETURN]
30 PRINT #2;"O.K.?" [RETURN]
40 PRINT #2;"O.K." [RETURN]

When you type RUN and press [RETURN] the printer will print:

```
THIS CHANNEL IS OPEN FOR OUTPUT TO THE PRINTER,
O,K,?
O,K,
```

Later, you'll learn to use the OPEN statement more productively. For now, simply note its general form.

CLOSE

This command closes channels which were opened using the OPEN command. Once opened, a channel stays open until the end of the program or until explicitly closed using the CLOSE statement. When a program ends with an END statement, all channels are closed. The same thing happens if the program ends by running out of program statements.

The CLOSE command explicitly closes a channel within a program. Here's an example using the channel we opened in the previous section:

50 CLOSE #2

Channel 2 is now closed.

19

Escape Codes

Escape codes allow you to access special features of your 1029 Printer, such as underlining, elongated characters, international characters, and graphics.

To enter an escape code into your computer, press the [ESC] key *twice*. When you press [ESC] *twice*, you will see the character 🄴 on your screen.

You must enter another command to tell the computer which escape code you're about to use. Most of the time, you'll type in a control code after pressing [ESC] [ESC]. To enter a control code, hold down the [CONTROL] key and *at the same time* press another key—the key you press depends on which control code you are using.

For example, when underlining in BASIC, the control code is [CONTROL Y]. This means you hold down the [CONTROL] key and *at the same time* press the [Y] key on your computer keyboard. If you have successfully entered the control code, a graphics character will appear on your screen. For example, [CONTROL Y] will put the graphics character 🄸 on your screen.

Don't worry, these graphics characters do *not* print out. They are only stand-ins for the function you have entered.

Underlining

One feature of your 1029 Printer which requires an escape code is underlining. To underline printed characters in BASIC, press [ESC] [ESC] [CONTROL Y] between quotation marks and before the characters you want underlined.

For example:

LPRINT "[ESC] [ESC] [CONTROL Y] THIS IS HOW TO UNDERLINE." [RETURN]

The printer will print:

THIS IS HOW TO UNDERLINE.

The printer will underline until the end of the program line (until you press [RETURN]) or until you enter the command to stop underlining. To use the escape code to stop underlining, press [ESC] [ESC] [CONTROL Z].

20

For example:

LPRINT "[ESC] [ESC] [CONTROL Y] THIS IS UNDERLINED. [ESC] [ESC]
[CONTROL Z] BUT THIS IS NOT." [RETURN]

The printer will print:

THIS IS UNDERLINED, BUT THIS IS NOT,

Elongated Characters

Your 1029 Printer can print regular width characters (10 characters per inch) and elongated characters (5 characters per inch). To elongate printed characters in BASIC, press [ESC] [ESC] [CONTROL N] between LPRINT quotation marks and before the characters you want elongated.

For example:

LPRINT "[ESC] [ESC] [CONTROL N] THESE ARE ELONGATED CHARACTERS."
[RETURN]

The printer will print:

T H E S E A R E E L O N G A T E D C H A R A C T E R S ,

As with the underlining escape code, the printer will elongate charac- ters until the end of the program line (until you press [RETURN]) or until the printer receives the escape code to go back to regular width characters. To use the escape code to go back to regular width characters, press [ESC] [ESC] [CONTROL O]

For example:

LPRINT "[ESC] [ESC] [CONTROL N] THESE ARE ELONGATED CHARACTERS.
[ESC] [ESC] [CONTROL O] THESE ARE REGULAR WIDTH CHARACTERS."
[RETURN]

The printer will print:

T H E S E A R E E L O N G A T E D C H A R A C T E R S ,
THESE ARE REGULAR WIDTH CHARACTERS,

21

International Characters

Your 1029 Printer can print a full assortment of international characters. To print international characters on a single line, press [ESC] [ESC] [CONTROL W]. Then type the control code for the international character(s) you wish to print.

For example:

LPRINT "[ESC] [ESC] [CONTROL W] [CONTROL ;]"[RETURN]

The printer will print:

Ä

When you use international characters on multiple program lines within a single program, open an IOCB for international characters with the OPEN command. Now you can easily access international characters throughout your program.

For example:

10 OPEN #2,8,0,"P:"
20 PRINT #2; "[ESC] [ESC] [CONTROL W]"
30 PRINT #2; "[CONTROL ;]"
40 PRINT #2; "[CONTROL G]"
50 PRINT #2; "[CONTROL V]"
60 PRINT #2; "[CONTROL J]"

The printer will print:

Ä
ì
ñ
ü

Note: If you have an ATARI 600XL or 800XL Computer, you can display international characters in BASIC on your video screen. Type POKE 756, 204 then use the control codes for individual international characters. To go back to control graphics characters, type POKE 756, 224.

22

You can mix international and non-international characters on the same line. For a complete listing of the control codes for individual international characters, consult the International Character Tables of this guide.

If you have an ATARI 1200XL Computer, you can also switch from control graphics characters to international characters on your video screen. Type [CONTROL F4] then use the control codes for individual international characters. To go back to control graphics characters, press [CONTROL F4] again. Typing POKE 756, 204 and POKE 756, 224 will also work.

Using the CHR$(nn) Function

Every character your 1029 Printer can print has a decimal equivalent. Each escape code and control code also has a decimal equivalent. The 96 printable ASCII (American Standard Code for Information Interchange) character codes are given in the ASCII Character Tables of this guide. (The international character codes are given in the International Character Tables of this guide.)

In BASIC, every character can be expressed as a decimal and sent to the printer using a CHR$(nn) string function, where (nn) is the decimal number of the character.

For example:

LPRINT CHR$(97);CHR$(98);CHR$(99) [RETURN]

Since the decimal code for the letter a is 97, for b 98, and for c 99, the printer will print:

abc

CHR$(nn) functions work within LPRINT statements, but they must not be typed inside quotation marks. If you type in a CHR$(nn) function inside LPRINT statement quotation marks, the CHR$(nn) notation itself will be printed, like any other string of characters between quotation marks, and the CHR$(nn) function will not be acted upon.

Still, you can mix CHR$(nn) functions and character strings between quotation marks within the same LPRINT statement.

23

For example:

LPRINT CHR$(65);"[SPACE] IS THE FIRST LETTER OF THE
ALPHABET.[SPACE] [SPACE]";CHR$(66);"[SPACE] IS THE SECOND.[SPACE]
[SPACE]"; CHR$(67);"[SPACE] IS THE THIRD." [RETURN]

The printer will print:

A IS THE FIRST LETTER OF THE ALPHABET. B IS THE SECOND.
C IS THE THIRD.

The trick is not to put the CHR$(nn) function between quotation marks.

The CHR$(nn) function is particularly useful for printing otherwise un-
available characters, like quotation marks within LPRINT statements.
You cannot type quotation marks within an LPRINT statement and ex-
pect to have them print out, because quotation marks are part of the
LPRINT command. To print out quotation marks use the CHR$(nn) func-
tion, and for (nn) type in the decimal code 34, which is the decimal code
for quotation marks.

Besides letters, punctuation marks, and numbers, you can also access
escape code functions with the CHR$(nn) function. For example:

LPRINT CHR$(27);CHR$(25);"HERE'S HOW TO UNDERLINE USING THE
CHR$(NN) FUNCTION." [RETURN]

The printer will print:

HERE'S HOW TO UNDERLINE USING THE CHR$(NN) FUNCTION.

Since 27 and 25 are the decimal equivalents for the underlining escape
code, the printer underlined the text. Consult the Atari Escape Code
Table of this guide for other escape code decimal equivalents.

Control codes work the same way. Consult the ASCII Character Tables
of this guide for a complete listing of control code decimal equivalents.

24

Graphics*

Your 1029 Printer allows you to design and print your own graphics. In the graphics mode, you no longer have predetermined characters at your disposal. You are responsible for what the print head prints.

Your 1029 Printer shapes characters with individual dots. Pick up a sample of something you've already printed. Looking closely, you'll see the individual dots and how they shape each character. In the graphics mode, you have direct, programmable control over all the available graphic dots. You can "address" any or all of the available dots.

On one printed line, there are 480 addressable dot columns across. Each column is 7 dots high. Because 7 X 480 equals 3,360, there are potentially 3,360 printable dots for a single line in the graphics mode.

Here's an illustration:

Number of Dot Columns Across

1 2 3 4 5 6 7 8 9 ... 480

One Printed Line
(one pass of the print head)

Direction of Print Head ⟶

It may seem that 3,360 addressable dots are quite a few, but the dots are very small and they must be very close together to shape a character.

---

* If you want to print a listing of the graphics programs you've written, you have to use the CHR$(nn) function to designate the escape codes. For more information, refer to the preceding section of this manual, "Using the CHR$(nn) Function."

25

The dot columns are "addressed" with DATA statements in BASIC. The DATA statements contain numbers which, when read and sent to the printer, make up a graphics pattern.

How do you know which number will print the fourth dot from the bottom in the fifth dot column? Good question, and one which we'll answer right now.

First you must plot out your graphic on a piece of paper. The easiest way to plot out a graphic is with graph paper. Use graph paper with a fairly condensed grid, because you want each of the boxes in the grid to represent one dot—and the dots, remember, are very small. So if the graph paper's grid is too large, you won't be able to plot a sizable graphic.

Divide the graph paper into blocks seven squares high (seven "dots" high). At the far left margin, number the squares like this:

64																						
32																						
16																						
8																						
4																						
2																						
1																						

It's time to plot out our graphic. We'll plot out a small butterfly. We simply fill in the selected squares to design the graphic.

64		X	X	X			X	X	X														
32	X			X		X			X														
16		X			X			X															
8			X		X		X																
4				X	X	X																	
2			X	X	X	X																	
1				X			X																

26

In the first dot column (running up and down), we want the dot second from the top printed. Its value is 32, so that will be the first number of our DATA statement.

In the second dot column, we want the top dot and the dot third from the top printed. Their values are 64 and 16. We add 64 and 16 to get 80. The number 80 will be our next DATA statement entry.

In the third dot column, we want the three dots valued 64, 8, and 2 printed. We add 64, 8, and 2 to get 74. The number 74 will be next in our DATA statement.

In the fourth dot column, we want the dots valued 64, 4, and 1 printed. Adding those numbers together we get 69 as the next DATA statement entry. In the fifth dot column, we want dots 32 and 2 printed, so the value of the fifth dot column is 34. That's the number we'll enter into our DATA statement. In the sixth dot column, we want dots 16, 8, and 4 printed. We add 16, 8, and 4 together to get 28 as our next DATA statement number.

Because the right side of the graphic is a mirror image of the left side, we'll use the DATA statement numbers for the left side, but in reverse order. The seventh column will be 34. The eighth, 69. The ninth, 74. The tenth, 80. The eleventh, 32.

The form of our BASIC DATA statement is as follows:

DATA 32,80,74,69,34,28,34,69,74,80,32

Each of the DATA statement numbers tells the printer which of the seven possible dots will be printed in a single dot column. The first DATA statement number tells what is to be printed in the first dot column. The second number tells what is to be printed in the second dot column, and so on.

The hard part is now done. Now we'll learn how to prepare the printer to receive our DATA statement so that it prints it the way we want it printed. We will do this with a BASIC program, one line of which will be our DATA statement.

The first thing we have to do is open an input/output channel to the printer:

10 OPEN #1,8,0,"P:"

We have opened channel #1 for output to the printer.

The next thing we have to do is tell the printer to print nine lines per inch (9 LPI). For higher dot density, the graphics mode should print at 9 LPI. The normal mode for the 1029 Printer is six printed lines per inch (6 LPI). The printer will always print 6 LPI unless you tell it to print 9 LPI. To print 9 LPI, use the escape code [ESC] [ESC] [9]. (When you want to go back to 6 LPI, press [ESC] [ESC] [6].)

Continuing from the above, we type:

20 PRINT #1;"[ESC] [ESC] [9]";

To put the printer into the graphics mode (or bit image mode), we need to enter [ESC] [ESC] [A]. Continuing from the above, we type:

30 PRINT #1;"[ESC] [ESC] [A]";CHR$(0);CHR$(11); [RETURN]

CHR$(0) and CHR$(11) represent the Most Significant Byte (MSB) and the Least Significant Byte (LSB), respectively. To simplify things, we'll say that these two numbers tell the printer how much data to expect. Notice that the LSB is 11, the same number of data statement numbers we plan to send in our DATA statement.

Next we must tell the computer to READ the DATA statement so that it can send the data to the printer. We do this with the following loop. As before, we continue from the above:

40 FOR X=1 TO 11 [RETURN]
50 READ A [RETURN]
60 PRINT #1;CHR$(A); [RETURN]
70 NEXT X [RETURN]
80 CLOSE #1 [RETURN]
90 DATA 32,80,74,69,34,28,34,69,74,80,32 [RETURN]

Lines 20 through 70 tell the computer to READ each DATA statement number and then to send it to the printer.

Our entire program now looks like this:

```
10 OPEN #1,8,0,"P:"
20 PRINT #1;"[ESC] [ESC] [9]";
30 PRINT #1;"[ESC] [ESC] [A]";CHR$(0):CHR$(11):
40 FOR X=1 TO 11
50 READ A
60 PRINT #1;CHR$(A):
70 NEXT X
80 PRINT #1
90 CLOSE #1
100 DATA 32,80,74,69,34,28,34,69,74,80,32
```

Believe it our not, when you type RUN and press [RETURN] the printer will print:

Our first graphic was only seven dots high (one printed line across). But suppose we want to plot out a graphic that is both higher (more than seven dots high) and wider. How do we calculate the data for it?

As before, we begin with graph paper. This time we'll plot out a larger butterfly:
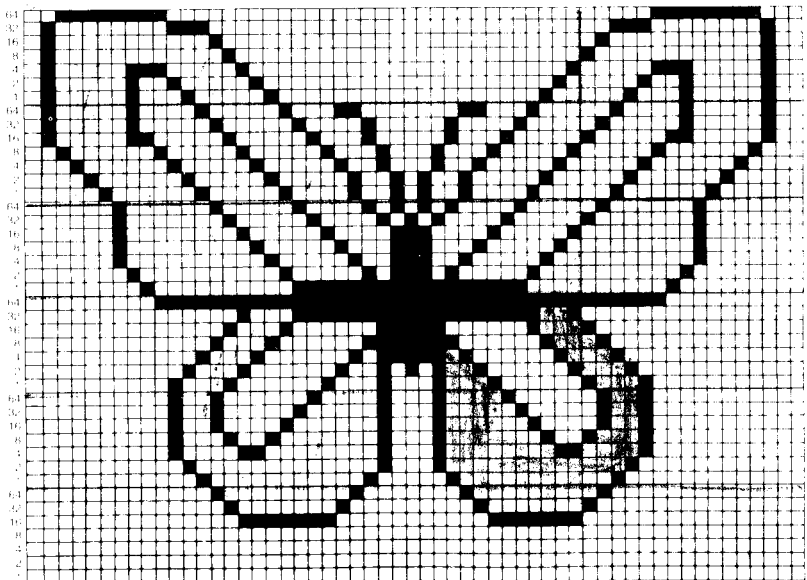
Here's the program that will print out a larger butterfly:

```
10 Z=10000: GOSUB 1000
20 Z=10100: GOSUB 1000
30 Z=10200: GOSUB 1000
40 Z=10300: GOSUB 1000
50 Z=10400: GOSUB 1000
60 Z=10500: GOSUB 1000
99 END
1000 OPEN #1,8,0,"P:"
1010 LSB=0: MSB=0: RESTORE Z
1020 READ A: IF A=-1 THEN 1040
1030 LSB=LSB+1: GOTO 1020
1040 IF LSB=255 THEN MSB=1: LSB=LSB-256
1050 PRINT #1;CHR$(27);CHR$(57);CHR$(27);CHR$(65);CHR$(MSB);
CHR$(LSB);
1060 RESTORE Z
1070 FOR X=1 TO LSB+(MSB*256)
1080 READ A
1090 PRINT #1; CHR$(A);
1100 NEXT X
1110 PRINT #1
1120 CLOSE #1
1130 RETURN
10000 DATA 0,63,127,127,127,127,127,127,124,124,62,63,63,
31,15,7,3,1,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,1,3,7
10010 DATA 15,31,63,63,62,124,124,127,127,127,127,127,
127,63,0,-1
10100 DATA 0,112,120,124,126,127,127,127,31,15,7,3,65,
96,112,120,124,126,127,63,31,15,71,67,48,12,3,0,3,12,
48,67
10110 DATA 71,15,31,63,127,126,124,120,112,96,65,3,7,15,
31,127,127,127,126,124,120,112,0,-1
10200 DATA 0,0,0,0,0,124,126,127,127,127,127,127,127,63,
31,15,7,3,65,97,113,121,125,127,63,95,63,95,63,127,125
10210 DATA 121,113,97,65,3,7,15,31,63,127,127,127,127,
127,127,126,124,0,0,0,0,0,0,-1
10300 DATA 0,0,0,0,0,0,0,0,0,64,65,67,71,79,95,126,
124,120,104,96,96,97,99,103,111,127,124,126,124,127,
111,103,99
10310 DATA 97,96,96,104,120,124,126,95,79,71,67,65,64,0,
0,0,0,0,0,0,0,0,-1
10400 DATA 0,0,0,0,0,0,0,0,0,0,124,126,127,127,15,7,
7,15,31,63,127,127,127,127,127,126,0,0,0,126,127,127,
127,127
10410 DATA 127,63,31,15,7,7,15,127,127,126,124,0,0,0,0,
0,0,0,0,0,0,-1
10500 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,64,96,112,112,112,
112,112,112,112,96,64,0,0,0,0,0,0,0,64,96,112,112,112,112
10510 DATA 112,112,112,96,64,0,0,0,0,0,0,0,0,0,0,0,0,0,-1
```

When you type RUN and press [RETURN] the printer will print:

Lines 10 through 60 each direct the computer to the subroutine begin-
ning on line 1000. The Z variable must set for each DATA statement that
begins a new printed line.

Line 99 prevents the computer from running through the subroutine after
executing line 60.

Line 1000 opens an IOCB to the printer. Lines 1010 through 1030 count
the number of DATA statement entries. Line 1040 calculates the MSB
and LSB.

Line 1050 sets the printer to print at 9 LPI, puts the printer in the graph-
ics mode, and plugs in the MSB and LSB calculated on line 1040. We
used the CHR$(nn) function to put the printer into the graphics mode,
but we also could have typed the escape code between a set of quota-
tion marks.

Lines 1060 through 1100 read the data and tell the printer to print it.

Line 1110 is a naked PRINT command that tells the printer to return the
carriage. Line 1120 closes channel #1. Line 1130 returns the computer
from the subroutine to the line with the next GOSUB (go to subroutine).

Lines 10000 through 10510 are the DATA statements. You will notice that
at the end of DATA statements 10010, 10110, 10210, 10310, 10410, and
10510 there is a −1. The −1 is used by line 1020 as it counts the num-
ber of DATA statement entries. When the computer reads a −1, it knows
that it should stop counting and proceed to calculate the MSB and LSB
for that printed line.

That's why there is no −1 on the other DATA statement program lines. In
this program, the computer will count the data for one printed line until it
reads a −1. If you use this subroutine in your own programs, remember
to put a −1 at the end of each DATA statement that finishes a printed
line.

When we figured out the DATA statement for our first graphic, we talked about the Most Significant Byte (MSB) and the Least Significant Byte (LSB). To keep matters simple, we said that together the two CHR$(nn) functions told the printer how much data was coming.

The MSB and the LSB are related to DATA statements in the following way. Each number in a DATA statement represents one byte of information to be sent to the printer. Each byte represents a single dot column. If you are sending 255 bytes or less (if your DATA statement(s) has 255 or fewer entries) then the MSB will always be CHR$(0).

If your are sending 256 or more bytes, then the MSB will be CHR$(1) and the LSB will be the difference between how many total bytes you are sending and 256. So, suppose you want to send 300 bytes (you are addressing 300 dot columns across on a single line). The MSB would be CHR$(1) and the LSB would be CHR$(44).

You can think of the MSB as the 256s place and the LSB as the ones place. Putting a zero in the 256s place means that fewer than 256 bytes will be sent, and the total number of bytes is given in the ones place (the LSB). Putting a one in the 256s place (the MSB) and 44 in the ones place (the LSB) means that 256 plus 44 bytes will be sent to the printer (300 total bytes). The printer must be prepared to receive the data contained in the DATA statements, and the MSB and LSB CHR$(nn) functions do just that.

You cannot address more than 480 dot columns (480 bytes) at a time, because the printer can only print 480 dot columns across. The MSB will therefore always be either 0 or 1. The LSB, if you are sending fewer than 256 bytes, will be a number from 1 to 255. If you are sending more than 255 bytes, the LSB will be a number from 1 to 224. When the MSB is 1 (standing for 256 bytes), the LSB cannot be more than 224, because 224 plus 256 equals 480 (the maximum number of bytes or dot columns across on a single line).

One program line will hold fewer than 480 DATA statement entries, but as long as you designate the MSB and LSB correctly, the computer will continue to READ data sequentially on multiple program lines. It will READ as many DATA statement numbers as number of bytes you have designated in the CHR$(nn) MSB and the CHR$(nn) LSB, then the printer will feed a line. For each printed line of graphics, you must type in the escape code for the graphics mode, and you must redefine the MSB and LSB according to the number of bytes you are sending on that line. (Unless, of course, you use the subroutine which both puts the printer in graphics mode and automatically calculates the MSB and LSB each time it is run through.)

32

THE ATARI 1029 PRINTER AND ATARIWRITER™

The AtariWriter word processing program makes writing faster and easier. You can write reports, term papers, and letters using virtually any sort of text format. AtariWriter program is available through retail stores. Some AtariWriter features—subscripts, superscripts, double-column printing, condensed, and proportional spacing—are not available using the 1029 Printer.

International Characters

To format your AtariWriter text file to print international characters, type [CONTROL O] 27 and [CONTROL O] 23 at the top of your text file, below the format line at the top of the screen. Your text file is now formatted for international characters. Whenever you want to use an international character in your text, simply type [CONTROL O] and then the decimal number for that character.

For example:

Avanc [CONTROL O] 20

When you request a print out, your printer will print:

Avancé

There are two versions of AtariWriter. One is completely compatible with the 1029 Printer and one is not. Both versions require the same format when printing international characters.

If your AtariWriter Print Menu displays the 1027 Printer as an option, then it *also* fully supports your 1029 Printer. When you're ready to print, type [6] as the printer option number. Although No. 6 is not displayed as an option, that's the number you should type in.

When using both regular-width characters (10 characters per inch) and elongated characters (5 characters per inch) on the same page, set your left margin at an odd-numbered value (e.g., 9 or 11). This instruction applies only to the version of AtariWriter that displays the 1027 as a printer option, the one that fully supports the 1029.

If you have the fully supported version of AtariWriter, you can disregard the following sections on "Underlining" and "Elongated characters." Use the standard procedures as described in the AtariWriter *User's Guide*.

33

If your AtariWriter does *not* display the 1027 Printer as an option on the Print Menu, use option number No.1 whenever you want to print. Option No.1 is the 1025 Printer option. Follow the procedures in the remainder of this chapter to have full access to the printing capabilities of your 1029.

Underlining

To print underlined characters, type [CONTROL O] 27 and [CONTROL O] 25 at the beginning of the character, word, phrase, or sentence you want underlined. To stop underlining, type [CONTROL O] 27 and [CONTROL O] 26 at the end of the character, word, phrase, or sentence you have underlined. (A [RETURN] placed immediately after underlined text will also stop the underlining.) You must place a [RETURN] at the end of the line or paragraph that contains underlined text.

For example:

[CONTROL O] 27 [CONTROL O] 25 This is underlining. [CONTROL O] 27
[CONTROL O] 26 This is not. [RETURN]
[CONTROL O] 27 [CONTROL O] 25 When you press the return key [RETURN]
you also stop underlining.

Now print out your text. Don't forget it's the 1025 printer option you want (No.1). The printer will print:

```
This is underlining, This is not,
When you press the return key
you also stop underlining,
```

Elongated Characters

To elongate characters, type [CONTROL O] 27 and [CONTROL O] 14 before the character, word, phrase, or sentence you wish elongated. To stop elongated print, type [CONTROL O] 27 and [CONTROL O] 15 after the character, word, phrase, or sentence you have elongated. (A [RETURN] placed immediately after the characters you want elongated will also stop elongated print.)

For example:

[CONTROL O] 27 [CONTROL O] 14Here's ELONGATED. [CONTROL O] 27
[CONTROL O] 15This is not.[RETURN]
[CONTROL O] 27 [CONTROL O] 14 A return [RETURN]
will also stop elongated print.

Now print out your text. The printer will print:

```
H e r e ' s  E L O N G A T E D ,  This is not,
A  r e t u r n
will also stop elongated print,
```

When using elongated characters, keep the length of the line at or less than the right margin setting. (Remember that elongated print is twice the width of regular width characters.) If you do not, the printer will violate the left and right margins.

TROUBLESHOOTING

Print Quality

Q: Sometimes I get dark, smudgy characters, and sometimes the characters are too light. What should I do?

A: The print head adjustment lever moves the print head either closer to, or farther from, the paper. If the print head is too close, you may get very dark or smudgy characters; if it's too far from the paper, you may get light characters. Since paper thicknesses vary, and to optimize print quality, try printing at a few of the print head adjustment lever settings on either side of the red arrow. Use the SELF-TEST switch to perform these experiments.

Printed characters may eventually appear smudgy or spotty because the cassette ribbon is worn or damaged. Printed characters may appear too light because the ink reservoir is dry. Replacement ribbon cassettes, which contain ink reservoirs, are available through retail stores. When removing an old ribbon, follow the steps listed below. Reverse the procedure to install a new ribbon.

1. Set POWER switch to OFF. (When you turn the power OFF, any information stored in the printer's buffer will automatically be lost.)

2. Raise the top cover and gently move the print head adjustment lever towards the front of the printer as far as it will go.

3. Gently push the cassette side supports outward on both sides, using your thumbs, and remove the cassette by lifting it upward, bottom end first.

Paper Jams

Q: My printer seems to be printing okay, but the paper won't advance properly. What's wrong?

A: Sounds like you have a paper jam. Remove and reload the paper. Be sure the pin feed sprockets are positioned properly. To check the paper-feed path, manually feed the paper forward and backward using the paper feed knob. (To release the back rollers, gently pull out the paper feed/friction release knob until it clicks into position.) Be sure you carefully remove any torn pieces of paper stuck along the paper path.

37

It Just Won't Work!

Q: When I try to print something, I get an error message on my screen. What can I do?

A: In BASIC, ERROR 138 is the Device Does Not Respond (Device Time Out) error message. In the case of your printer, it means that the printer has not responded to a print request within a reasonable amount of time. AtariWriter will display a similar message. Make sure the power cord is plugged in, the power light is on, and the I/O data cable is connected properly. Also, if you have more than one printer connected to your system, make sure only one printer at a time is turned on.

If the printer still won't respond, contact the nearest authorized Atari Service Center.

Error Indicator

Q: I was printing a document and suddenly the printer stopped and the POWER light started blinking. What does this mean?

A: The POWER light doubles as an error indicator. The blinking informs you of an error in the printer's system. The error indication does not necessarily mean the printer is damaged. Try to reset your printer by turning it OFF and back ON again.

Preventative Maintenance

Q: How do I care for my printer?

A: Your Atari 1029 Printer is designed for low maintenance and high reliability. However, like anything mechanical, at times things can go wrong. If you experience problems you think may be serious, take your printer to an authorized ATARI Service Center.

To insure the best performance from your printer, follow these guidelines:

- Keep your printer dust-free, especially the print head and carrier rod area. To this end, keep the top cover and paper separator on, both when printing and when storing your printer.

- Keep the front and back rollers dust-free. Every so often, clean them using a cotton ball and a little rubbing alcohol.

- Do not touch the carrier rod. Finger oils attract dust which may adversely affect the print head's smooth movement along the carrier rod.

- Do not drop any foreign objects into the print head and carrier rod area. If such an accident does occur, turn the printer OFF immediately and carefully remove the object.

38

- Wait at least two seconds after turning the printer OFF before turning it ON again. Otherwise, the printer's system may not initialize properly.

- Never turn OFF the printer while printing.

- Do not try to move the print head manually.

- Never try to stop the print head while it is moving.

- Do not print without paper and ribbon.

- Always have your printer placed on a flat, level surface.

- Avoid putting the printer in a room with high humidity.

- Keep your printer out of direct sunlight.

- Avoid putting your printer through extreme temperature changes. Operate your printer only at temperatures from 41°F to 104°F (5°C to 40°C). Store your printer only at temperatures from 14°F to 122°F (−10°C to 50°C).

TECHNICAL POINTS

Printing Method: 5 X 7 Dot Matrix.

Formats: Regular width (10 characters per inch, 80 columns across). Elongated (5 characters per inch, 40 columns across).

Line Spacing: 6 lines per inch (regular width and elongated formats.)
9 lines per inch (graphics mode).

Printing Speed: 50 characters per second (regular width format).

Character Set: 132 characters (international and non-international).

Feed Mechanism: Friction feed and pin (tractor) feed.
Friction release using platen knob.

Manual Feed: Forward and reverse using platen knob.

Paper Type: Computer fanfold (4 1/2 to 9 1/2 inches wide).
Single-sheet (8 1/2 inches wide).

Paper Weight: 15 to 20 lb.

Power: Standard 110 volt AC (UL approved).

Other Features: Underlining, built-in interface (directly connects to all Atari Home Computers through peripheral port), self-test switch, error indicator, replaceable ribbon cassette, built-in power supply.

Accessories: Replacement ribbon cassettes are available at retail stores and through Atari Customer Service.

ASCII CHARACTER TABLE

Printed Character	Decimal Code	Hexadecimal Code*	Keystroke	Display Character
A	65	41	A	A
B	66	42	B	B
C	67	43	C	C
D	68	44	D	D
E	69	45	E	E
F	70	46	F	F
G	71	47	G	G
H	72	48	H	H
I	73	49	I	I
J	74	4A	J	J
K	75	4B	K	K
L	76	4C	L	L
M	77	4D	M	M
N	78	4E	N	N
O	79	4F	O	O
P	80	50	P	P
Q	81	51	Q	Q
R	82	52	R	R
S	83	53	S	S
T	84	54	T	T
U	85	55	U	U
V	86	56	V	V

*Note: Hexadecimal codes are provided for advanced programmers using machine language.

43

ASCII CHARACTER TABLE (continued)

Printed Character	Decimal Code	Hexadecimal Code*	Keystroke	Display Character
W	87	57	W	W
X	88	58	X	X
Y	89	59	Y	Y
Z	90	5A	Z	Z
a	97	61	a	a
b	98	62	b	b
c	99	63	c	c
d	100	64	d	d
e	101	65	e	e
f	102	66	f	f
g	103	67	g	g
h	104	68	h	h
i	105	69	i	i
j	106	6A	j	j
k	107	6B	k	k
l	108	6C	l	l
m	109	6D	m	m
n	110	6E	n	n
o	111	6F	o	o
p	112	70	p	p
q	113	71	q	q
r	114	72	r	r
s	115	73	s	s
t	116	74	t	t
u	117	75	u	u

ASCII CHARACTER TABLE (continued)

Printed Character	Decimal Code	Hexadecimal Code*	Keystroke	Display Character
v	118	76	v	v
w	119	77	w	w
x	120	78	x	x
y	121	79	y	y
z	122	7A	z	z
Space	32	20	[SPACE BAR]	
!	33	21	[SHIFT 1]	!
"	34	22	[SHIFT 2]	"
#	35	23	[SHIFT 3]	#
$	36	24	[SHIFT 4]	$
%	37	25	[SHIFT 5]	%
&	38	26	[SHIFT 6]	&
'	39	27	[SHIFT 7]	'
(	40	28	[SHIFT 9]	(
)	41	29	[SHIFT 0]	)
*	42	2A	*	*
+	43	2B	+	+
,	44	2C	,	,
-	45	2D	-	-
.	46	2E	.	.
/	47	2F	/	/
0	48	30	0	0
1	49	31	1	1
2	50	32	2	2
3	51	33	3	3

ASCII CHARACTER TABLE (continued)

Printed Character	Decimal Code	Hexadecimal Code*	Keystroke	Display Character
4	52	34	4	4
5	53	35	5	5
6	54	36	6	6
7	55	37	7	7
8	56	38	8	8
9	57	39	9	9
:	58	3A	[SHIFT :]	:
;	59	3B	;	;
<	60	3C	<	<
=	61	3D	=	=
>	62	3E	>	>
?	63	3F	[SHIFT /]	?
@	64	40	[SHIFT 8]	@
[	91	5B	[SHIFT ,]	[
\	92	5C	[SHIFT +]	\
]	93	5D	[SHIFT .]	]
^	94	5E	[SHIFT *]	^
—	95	5F	[SHIFT -]	—
'	96	60	[CONTROL .]	
{	123	7B	[CONTROL ;]	
I	124	7C	[SHIFT =]	I
}	125	7D	[ESC] [CONTROL <] / [ESC] [SHIFT <]	
~	126	7E	[ESC] [BACK SPACE]	
■	127	7F	[ESC] [TAB]	

46

INTERNATIONAL CHARACTER TABLE

Printed Character	Decimal Code	Hexadecimal Code	Keystroke	BASIC Display Character 400/800	600XL/800XL/1200XL
Å	26	1A	CONTROL Z		Å
Ä	123	7B	CONTROL ;		Ä
á	00	00	CONTROL .		á
ä	11	0B	CONTROL K		ä
â	17	11	CONTROL Q		â
å	24	18	CONTROL X		å
à	25	19	CONTROL Y		à
ç	04	04	CONTROL D		ç
É	03	03	CONTROL C		É
é	20	14	CONTROL T		é
è	21	15	CONTROL U		è
ê	23	17	CONTROL W		ê
ì	07	07	CONTROL G		ì
ï	09	09	CONTROL I		ï
î	19	13	CONTROL S		î
Ñ	02	02	CONTROL B		Ñ
ñ	22	16	CONTROL V		ñ
Ö	12	0C	CONTROL L		Ö
ô	05	05	CONTROL E		ô
ò	06	06	CONTROL F		ò
ó	14	0E	CONTROL N		ó
ö	15	0F	CONTROL O		ö

INTERNATIONAL CHARACTER TABLE

continued

Printed Character	Decimal Code	Hexadecimal Code	Keystroke	BASIC Display Character 400/800	600XL/800XL/1200XL
Ü	16	10	[CONTROL P]	■	Ü
ù	01	01	[CONTROL A]	■	ù
ü	10	0A	[CONTROL J]	■	ü
ú	13	0D	[CONTROL M]	■	ú
û	18	12	[CONTROL R]	■	û
¡	96	60	[CONTROL]	■	¡
£	08	08	[CONTROL H]	■	£
↑	28	1C	[ESC] [CONTROL ↑]	↑	↑
↓	29	1D	[ESC] [CONTROL ↓]	↓	↓
←	30	1E	[ESC] [CONTROL ←]	←	←-
→	31	1F	[ESC] [CONTROL →]	→	→
↖	125	7D	[ESC] [CONTROL <] or [ESC] [SHIFT <]	■	■
◄	126	7E	[ESC] [BACK SPACE]	■	■
►	127	7F	[ESC] [TAB]	■	■

48

ATARI 1029 ESCAPE CODES

Function	Decimal Code	Hex Code	Keystroke	BASIC Display Character
Escape	27	1B	[ESC] [ESC]	E
Select 5 Characters Per Inch	27, 14	1B, 0E	[ESC] [ESC] [CONTROL N]	E ▬
Select 10 Characters Per Inch	27, 15	1B, 0F	[ESC] [ESC] [CONTROL O]	E ■
Start International Character Mode	27, 23	1B, 17	[ESC] [ESC] [CONTROL W]	E ▼
Stop International Character Mode	27, 24	1B, 18	[ESC] [ESC] [CONTROL X]	E ◪
Start Underlining	27, 25	1B, 19	[ESC] [ESC] [CONTROL Y]	E ◧
Stop Underlining	27, 26	1B, 1A	[ESC] [ESC] [CONTROL Z]	E ◣
Select 6 Lines Per Inch	27, 54	1B, 36	[ESC] [ESC] [6]	E 6
Select 9 Lines Per Inch	27, 57	1B, 39	[ESC] [ESC] [9]	E 9
Start Bit Image Mode	27, 65	1B, 41	[ESC] [ESC] [A]	E A

WARNING:

Like any electrical appliance, this ATARI Home Computer equipment uses and produces radio frequency energy. If it's not installed and used properly according to the instructions in this guide, the equipment may cause interference with your radio and television reception.

The 1029 Printer has been type tested and found to comply with the limits for a Class B computing device in accordance with the specifications in Subpart J of Part 15 of the FCC rules. These rules are designed to provide reasonable protection against such interference when the equipment is used in a residential setting. However, there is no guarantee that interference will not occur in a particular home or residence.

If you believe this equipment is causing interference with your television reception, try turning the equipment off and on. If the interference problem stops when the equipment is turned off, then the equipment is probably causing the interference. With the equipment turned on, you may be able to correct the problem by trying one or more of the following measures:

• Adjust the position of the radio or television antenna.
• Reposition the equipment in relation to the radio or television set.
• Move the equipment away from the radio or television.
• Plug the equipment into a different wall outlet so the equipment and the radio or television are on different branch circuits.

If necessary, consult your ATARI computer retailer or an experienced radio/television technician for additional suggestions.

Every effort has been made to ensure the accuracy of the product documentation in this guide. However, because ATARI Corp. is constantly improving and updating computer hardware and software, we are unable to guarantee the accuracy of the printed material after the date of publication and disclaim liability for changes, errors, or omissions.

8411 −130B

ATARI®