

 **ATARI®**

XDM121™

LETTER-QUALITY
DAISY-WHEEL PRINTER



OWNER'S MANUAL

Important Information

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

The XDM121 Printer has been certified 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.

To satisfy Federal Communications Regulation 15.838(d), this peripheral includes an Atari shielded cable to minimize interference with older electronic devices. Use of this device without an Atari shielded cable or equivalent is prohibited. Replacement cables are available through your Atari dealer.

If you believe that this equipment is causing interference with your radio or television reception, try turning the equipment off and on. If the interference stops when the equipment is turned off, then the equipment is probably causing the problem. 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 that the equipment and the radio or television are connected to different branch circuits.

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

A resource that you may find helpful is *How to Identify and Resolve Radio-TV Interference Problems*, a booklet prepared by the Federal Communications Commission. This booklet is available from the U.S. Government Printing Office, Washington, DC 20402, Stock No. 004-000-00345-4.

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INTRODUCTION



MEET THE ATARI XDM121 PRINTER

Your ATARI XDM121 produces letter-quality printing from your ATARI Personal Computer system. The daisy wheel rotates to print fully formed characters—just like those you'd get from a high-quality office typewriter. At home or in the office, it's the ideal printer for word-processing applications that require legibility and style.

Sophisticated features such as boldface printing, underlining, subscripts, superscripts, and an international character set will greatly enhance your written work. The bidirectional, logic-seeking printing method eliminates wasteful mechanical movement, thereby allowing greater printing speed (12 characters per second). The printer offers an array of tabbing controls and page-length options and can store these format commands in its memory. Its control panel includes three built-in functions, yet it remains uncomplicated and is a snap to use.

HOW TO USE THIS MANUAL

There's no secret to operating your new printer, but you must first learn how to use it properly. This manual has been prepared with the reader in mind. Whether you are a newcomer to computing or a seasoned expert, you will easily find the information you need.

Here's a brief summary of how the manual is arranged:

Chapter 1, Getting Started, familiarizes you with the printer's parts and features and how they work. It explains how to unpack the printer and connect it to your computer system, how to get the printer ready for printing, and how to put the printer through its self-test routine.

Chapter 2, Two Ways to Print, introduces you to printing from within a programming language (such as ATARI BASIC™) and printing from within a prepackaged applications program. The chapter includes a special section about using the XDM121 Printer with the AtariWriter™ and AtariWriter Plus™ word-processing programs.

Chapter 3, Printer Control, explains how to use printer control codes so that you can access special features or modify the printer's operation to produce various printing formats. A BASIC programming example accompanies the explanation of each printer control code.

Chapter 4, Troubleshooting and Preventive Maintenance, contains a rundown of problems that you might encounter while you are operating your printer and offers simple solutions. Here you'll also find some helpful hints regarding the care and maintenance of your printer.

Appendix A: Printer Control Code Summary, lists all XDM121 control codes, their functions, and their decimal and hexadecimal equivalents.

Appendix B: ASCII Table, lists the decimal and hexadecimal codes for the printer's international and noninternational character sets.

Appendix C: Overview of Print Formatting, explains how the printer formats a page. It includes the formulas for calculating line spacing, character pitch, and the number of lines per page.

Appendix D: XDM121 Printer Specifications, summarizes the major features and requirements of the printer.

Customer Support provides you with information about how to get your questions and comments about the XDM121 Printer addressed.

Throughout this manual you will encounter paragraphs marked **Warning** or **Note**. Warnings alert you to potential problems and explain how to avoid them. Notes contain useful hints and other incidental bits of information, including cross-references to the topic at hand.

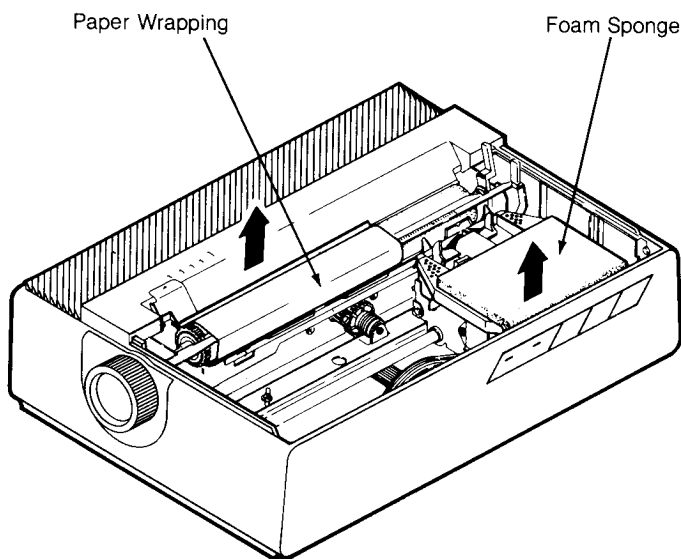
CHAPTER 1

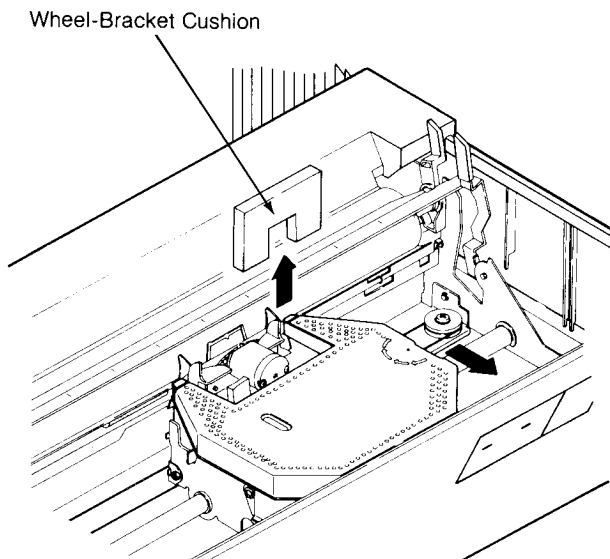
GETTING STARTED



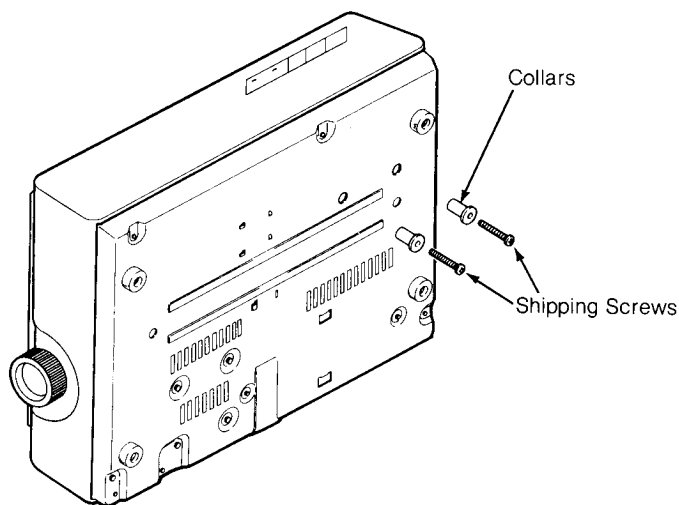
UNPACKING INSTRUCTIONS

1. Using both hands, lift the printer in its white foam packing out of the carton.
2. Place the printer on a firm, level surface; then remove the foam packing and plastic bag.
3. Remove the dustcover from the top of the printer by slipping your hand under the cover and lifting it up and away from the printer.
4. Remove the foam sponge and the wheel-bracket cushion from atop the carriage. Remove the white paper wrapping from the platen.

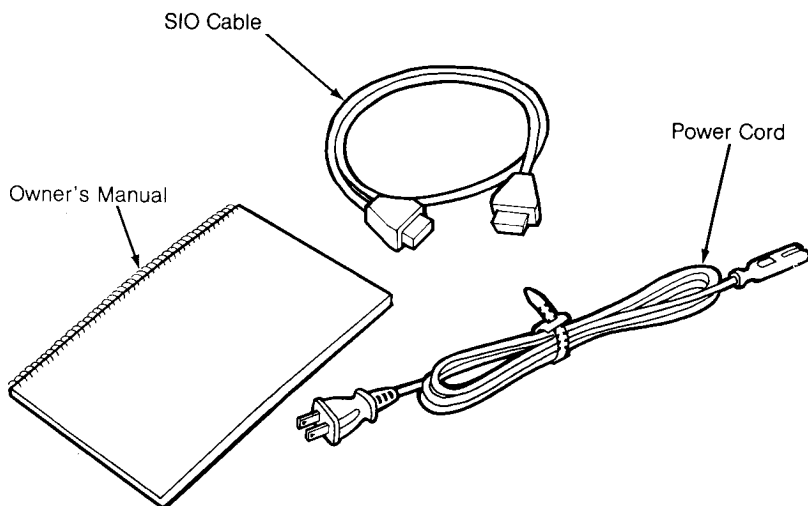




5. Lift the printer up from the front and rest it on its back panel. Unscrew and remove the two shipping screws and collars. These fasteners keep the carriage in place during transport. Right the printer and replace the dustcover.



6. Packed along with your XDM121 Printer you should find a ribbon cassette and a daisy wheel (both installed on the carriage), a power cord, a serial input/output (SIO) cable, an owner's manual, and a warranty card. Make sure all these items are present.



Note: Save all packing materials to repack your printer for storage or transport.

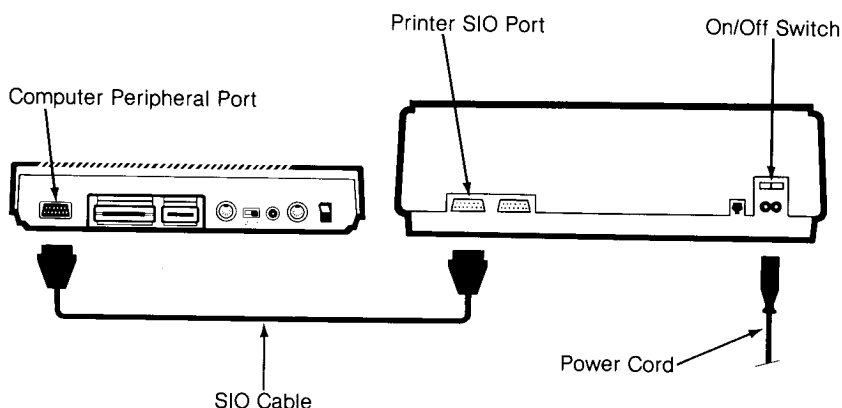
CONNECTING THE PRINTER

Choose the right working environment for your printer—indeed, for your entire computer system. Do not set up your system where it will be exposed to dust, grease, extreme temperatures, or high humidity. Place your printer securely on a firm, level surface.

To connect the printer to your computer system, follow these steps:

1. Switch off all components in your ATARI Personal Computer system.

2. Plug one end of the SIO cable supplied with your printer into the peripheral port of your computer or into another component in your system such as a disk-drive.



3. Plug the other end of the SIO cable into either one of the two ports marked SIO on the back panel of the printer.
4. Insert the oval end of the power cord into the two-pronged jack marked Power on the back panel of the printer (just below the on/off switch). Make sure the printer is switched off, then plug the power cord into a wall outlet or a power strip.

THE RIBBON CASSETTE

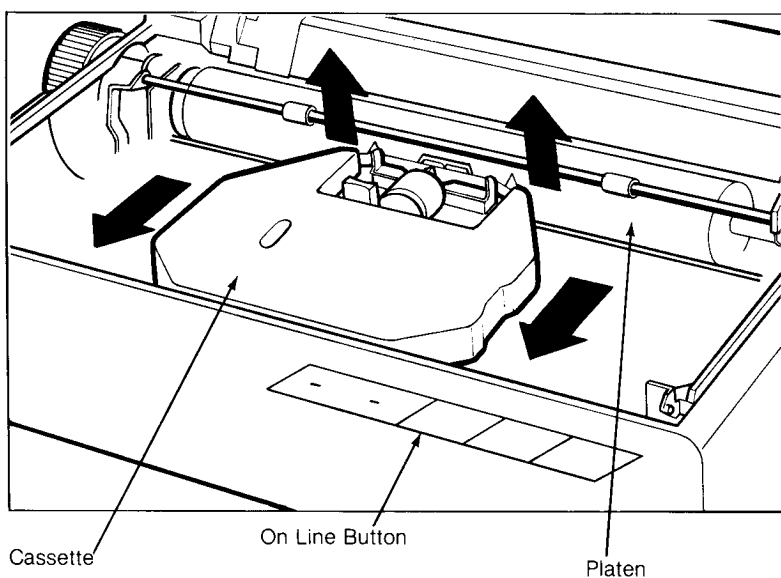
Your printer comes equipped with a multistrike carbon-film ribbon housed in a replaceable cassette. The ribbon is designed to bring out the daisy wheel's excellent print quality over long use. The cassette has been specially fitted to the XDM121 Printer. Replacement multistrike ribbons, as well as one-strike carbon-film and fabric ribbons, are available.

Removing the Ribbon Cassette

The cassette is installed on the printer's carriage at the factory. Of course, you will eventually have to remove the ribbon — when the cassette is used up or in the event you wish to change the daisy wheel.

To remove the ribbon, follow these steps:

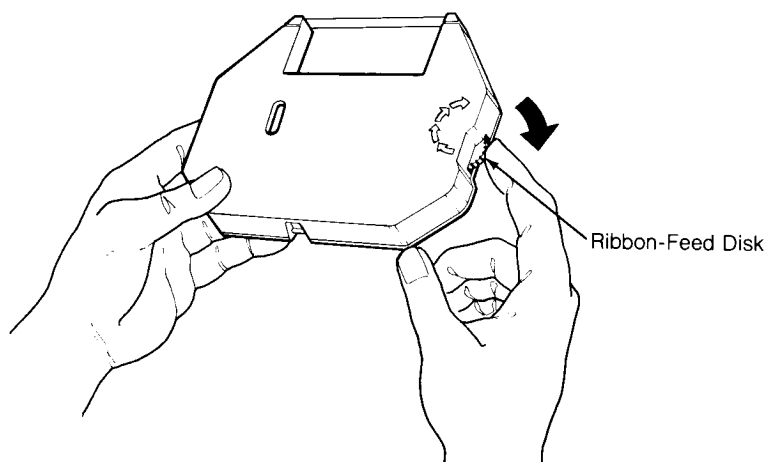
1. Remove the printer's dustcover.
2. Switch on your printer (the on/off switch is located on the back panel). Depress the On Line button. The On Line light goes off, and the carriage moves to the center of the platen. Now turn off the printer. The carriage remains in place.
3. Take hold of the cassette on both sides and lift it up while you pull it gently towards you.



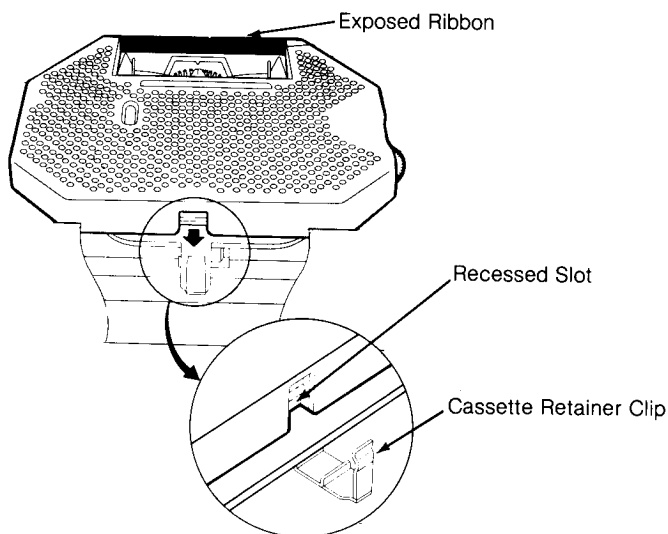
Replacing the Ribbon Cassette

To replace the ribbon cassette, follow these steps:

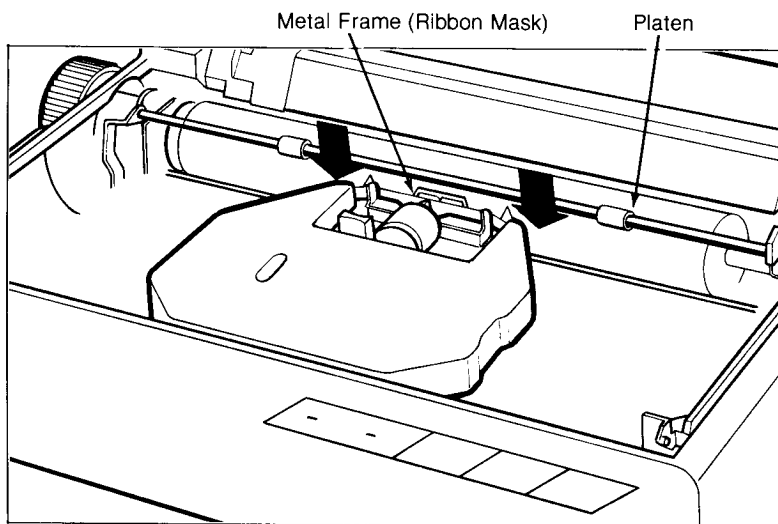
1. Hold the ribbon cassette so that the blue ribbon-feed disk protrudes from the right side. Turn the disk clockwise to remove any slack in the exposed length of the ribbon.



2. Position the cassette so that the exposed ribbon is on the side farthest from you and the recessed slot on the near side is above the cassette retainer clip on the carriage.

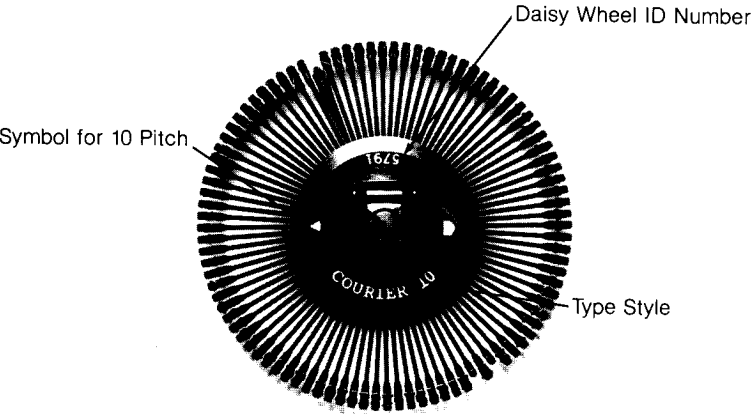


3. Using both hands, gently push down on the cassette until it snaps into position. Be sure that the exposed portion of the ribbon slips between the daisy wheel and small metal frame (ribbon mask) cradling the platen. Now turn the ribbon-feed disk clockwise again to take up any slack in the ribbon.



4. Replace the dustcover.

THE DAISY WHEEL



The daisy wheel is really quite a remarkable device. Around the rim of the wheel you can see the type characters arranged for printing. When the printer receives an instruction to print a certain character, the wheel spins to bring that character into striking position. After it prints the character, the wheel spins to bring the next character into position. All this happens very quickly while the carriage is moving back and forth (printing left to right as well as right to left).

The daisy wheel supplied with your XDM121 Printer is uniquely designed to produce both standard characters and the special set of ATARI International Characters. The wheel prints international characters by striking a standard character, then overstriking the relevant diacritical mark. The wheel's two character sets are shown below.

!"#\$%&'()*+,-./0123456789:;<=>?@
ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_~
abcdefghijklmnopqrstuvwxyz|~ -

âûñÊçôöïëïüäÖüöÜâûîëêñëääÅ↑▼↔
!"#\$%&'()*+,-./0123456789:;<=>?@
ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_~i
abcdefghijklmnopqrstuvwxyzÄ|

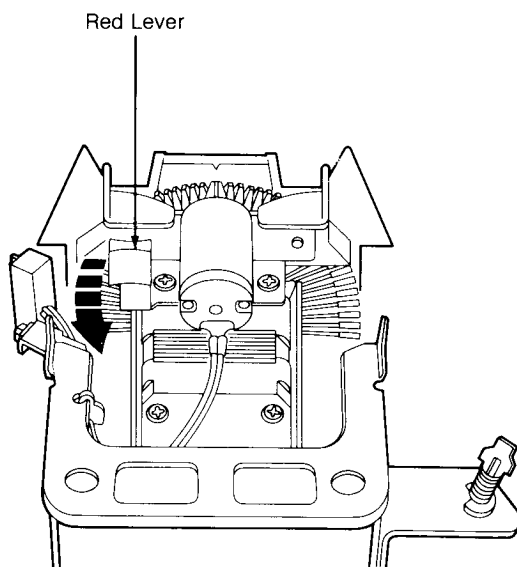
Interchangeable daisy wheels with different type styles and character pitches are available.

Removing the Daisy Wheel

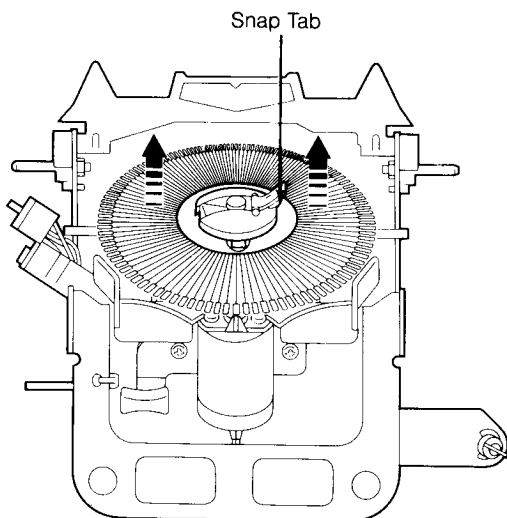
The daisy wheel is installed at the factory. However, over time the daisy wheel may become damaged, or simply wear out; or you may choose to install a daisy wheel with a different type style or character pitch. In that case, you'll have to remove the old wheel and replace it with a new one.

To remove the wheel, follow these steps:

1. Remove the ribbon cassette (see pp. 6-7).
2. Pull the red lever on the carriage towards you to tilt the daisy-wheel mount up and back from the platen.



3. At the center of the daisy wheel you see a small, black, plastic snap tab. Pull up on the tab until it clicks open. Hold the daisy wheel by the (open) black plastic tab and lift the wheel from its mount.

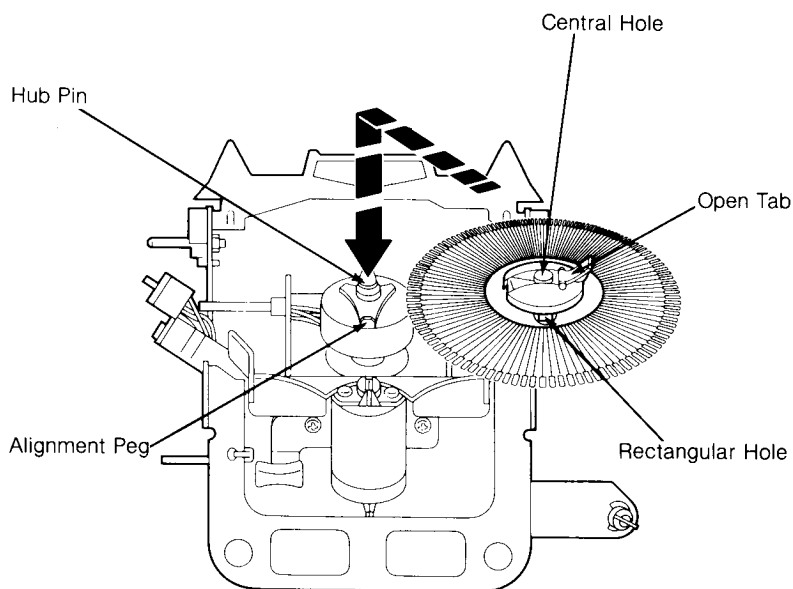


Warning: When handling the wheel, be careful not to bend the spokes or scratch the type characters. Hold the wheel at all times by its solid central disk, *not* by the character spokes.

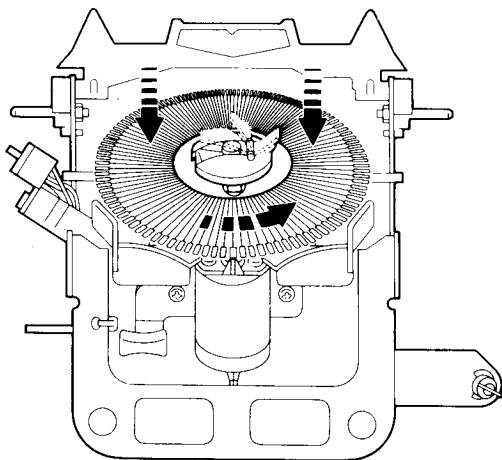
Replacing the Daisy Wheel

To replace the daisy wheel, follow these steps:

1. Holding the wheel by the open tab, position the wheel over its mount. Place the center hole of the daisy wheel over the hub pin on the mount. Align the small, black alignment peg on the mount with the rectangular alignment hole in the daisy wheel.



2. Fit the aligned daisy wheel on the mount and close the black snap tab until it clicks shut. With your finger on the central disk, turn the daisy wheel to make sure that it is seated properly.



3. Restore the daisy wheel mount to its upright position by pushing the red lever gently but firmly towards the platen and away from you. The mechanism must be seated in this position when printing.
4. Install the ribbon cassette and replace the dustcover.

Warning: If an entangled ribbon ever hinders the movement of the daisy wheel, the On Line light on the printer's Control Panel blinks and the printer goes off-line. Carefully untwist and reinstall the ribbon. Then press the On Line button to place the printer back on-line.

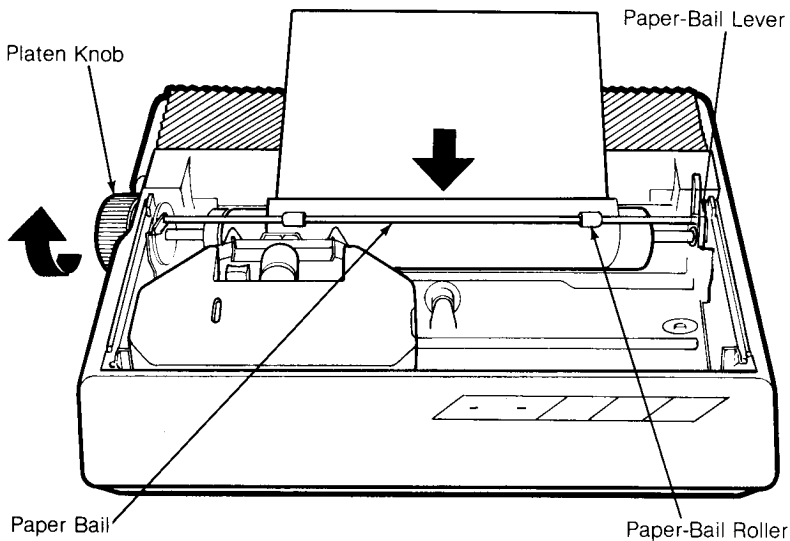
LOADING PAPER

Because your printer feeds paper by friction (like a typewriter), it accepts single sheets of paper. You can use typing paper, personal or business stationery, or any other single sheet up to 11.8 inches wide. The printer will accept one original sheet plus up to three carbon copies, so duplicates and multiple-copy business forms are easily accommodated.

Note: A pin-feed tractor feeder and a single-sheet feeder are available for the XDM121. The tractor feeder allows you to use pin-feed computer paper with your printer. The single-sheet feeder automatically feeds single sheets of paper. There is a jack on the back panel of the printer for connecting the single-sheet feeder and pin-feed tractor.

Feeding paper into your printer is much like feeding paper into a typewriter. Follow these steps:

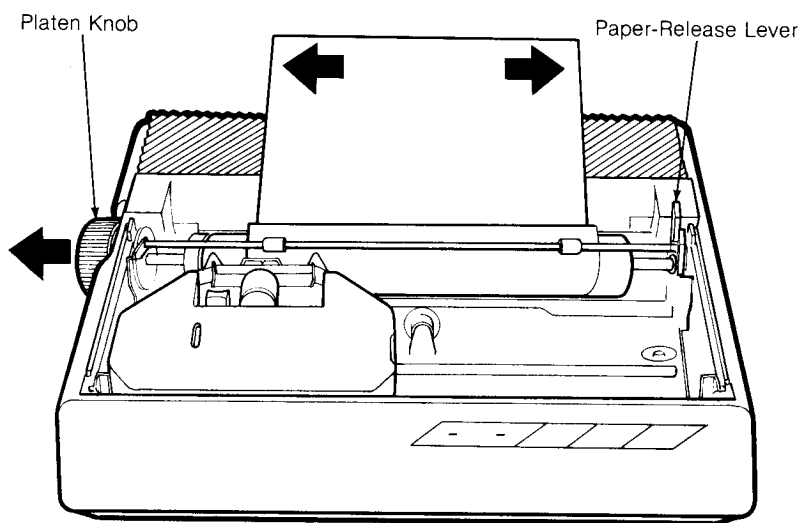
1. To load paper, you need not remove the dustcover. In the following illustrations, the dustcover has been removed to give you a better view. If you wish, you may remove or raise the dustcover.
2. Note that the paper bail is marked off in units numbered from 1 to 80. Like the markings on a typewriter, each unit represents one standard character space; 10 units make up an inch. Normally, you'll align the left edge of your paper with the 1 mark. To do so, line up the small arrow-head cutout on the paper guide with the longest of the paper guide settings (the raised lines molded on the upper panel of the printer). The longest setting is the second line from the right.



3. Pull the paper bail lever toward you to lift the paper bail up and away from the platen. Now insert the paper behind the platen. Be sure it's firmly and evenly inserted and that its left edge fits flush against the raised "ear" of the paper guide.
4. Turn the platen knob counterclockwise (away from you) to advance the paper under the platen and under the paper bail. Once the edge of the paper is above the level of the paper-bail rollers, push the paper-bail lever away from you to lower the paper bail back against the platen.

Straightening the Paper

Check to be sure that the paper is properly aligned. The easiest way is to see whether the top edge of the paper is parallel with the paper bail. If the paper appears crooked, pull the paper-release lever toward you with your right hand. This lever releases the paper so that you can reposition it. Keeping the left edge flush against the paper guide, straighten the sheet of paper. Then hold the paper in place with your left hand while you lower the paper-release lever to its original (friction-feed) position with your right hand.



Use the platen knob in its fixed or variable position to advance the paper to the desired "top of form" position (the line on the paper that the printer will use as the top of every new page). The top of form is set at the position of the daisy wheel when you turn on the printer. The variable position of the platen knob allows you to set the top line at any level, regardless of the set line spacing; the fixed position restricts you to the set line spacing. To use the variable line setting, pull the platen knob out while you turn it. The small "tooth" in the center of the ribbon mask's printing frame marks the top level of the printing line.

Note: On each page the printer will repeat the top of form that you set when you first turned on the printer. To reset the top of form, see the instructions under **The Control Panel** section.

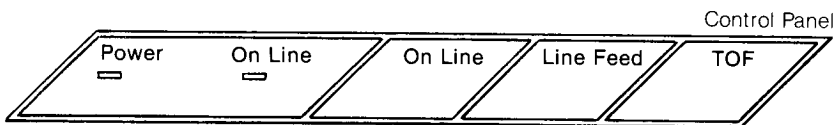
Unloading Paper

To remove the paper, turn the platen knob counterclockwise (away from you) until the paper is free of the platen and the bail rollers. (If it's easier, you can also back the paper out by turning the platen knob clockwise, or toward you.)

Warning: Unless you have installed either the pin-feed tractor or single-sheet feeder (both optional), the XDM121 Printer has *no* paper-out sensor. You must be sure that the text you are printing will fit on the sheet you are using. If your work is any longer, the printer will continue to print right onto the platen. This can severely damage the platen. However, if you have either the pin-feed tractor or single-sheet feeder installed, the printer *will* alert you when the paper supply nears its end, or when you have switched on the printer but have failed to load paper. The On Line light on the Control Panel will blink, and the printer will go off-line.

THE CONTROL PANEL

Typically, you'll be using your computer to tell your printer what to do. But the XDM121 printer itself has a few built-in functions, which are represented on the Control Panel. This section describes the lights and buttons on the panel and what they mean.



Indicators

Power: Whenever the power to the printer is switched on, the red Power light is illuminated. The light stays on until you turn the printer off. The On/Off switch is located on the back panel of the printer.

On Line: This light is illuminated when the printer is ready to receive instructions from the computer. It blinks when the printer is experiencing a problem, such as when the ribbon has run out, when the paper has run out (paper feeder options only), or when the ribbon is entangled in the daisy

wheel. The light goes off when the printer goes off-line. After you correct the problem, depress the On Line button to reactivate the printer.

Controls

On Line: Press this button to switch the printer from off-line to on-line and vice versa. When the printer is on-line, it is ready to receive printing instructions from the computer. When it is off-line, it cannot receive instructions from the computer, but it can perform the Control Panel functions.

Line Feed: Press and release this button to advance the paper one line at a time. Holding down the Line Feed button advances the paper continuously until you release the button. This function is a convenient way to remove your completed page from the printer. You can also use continuous line feed to load paper. You must switch the printer to off-line to use the Line Feed button.

Top of Form Set (TOF): When you first switch on the printer, the top of form (the line that functions as the top of every new page) is determined by the position of the daisy wheel on the paper. Once the power is switched on, you can reset the top of form by moving the paper up or down to the desired position and pressing the TOF button. You must switch the printer to off-line to use the TOF button. Until you reset or turn off the printer, it will use this position on the paper as the top of each page.

SELF-TEST PRINTING

Your XDM121 offers a self-test function: when you turn the printer on in a certain way, it will automatically print out the daisy wheel's entire character set and run the test continuously until you switch the printer off.

To start the self-test, follow these steps:

1. Make sure that the ribbon cassette and the daisy wheel are installed correctly and that the paper is loaded properly.

Warning: Do not switch on the machine before you remove the shipping screws and the carriage packing materials (see **Unpacking Instructions**).

2. Switch on the printer *while* you are holding down the Line Feed button on the Control Panel.
3. Watch it print!

4. When you've seen enough, turn the printer off.

The purpose of this test is to ensure that the printer is in good working order. Examine the self-test printout carefully. You should find consistent print quality and even spacing between characters and lines. If you find irregularities, check to see that the ribbon and the daisy wheel are installed correctly and that the paper is loaded properly. If any irregularity persists, contact your ATARI Computer retailer or an authorized ATARI Service Center.

CHAPTER 2

TWO WAYS TO PRINT



There are two ways to use your printer in conjunction with your computer: by printing from original programs that you have written in a programming language, such as ATARI BASIC, and by printing from prepackaged applications software, such as the AtariWriter and AtariWriter Plus word-processing programs.

USING THE XDM121 PRINTER WITH ATARIWRITER AND ATARIWRITER PLUS

Perhaps the single most valuable task that your XDM121 Printer can help you tackle is word processing—using your computer to compose letters, term papers, and business reports.

The AtariWriter and AtariWriter Plus word-processing programs make writing and revising both faster and easier. You can arrange your written work in virtually any format. You can correct, add, delete, and rearrange neatly and efficiently. And you can store your work on diskette or cassette for later reference or revision.

Because your XDM121 Printer connects directly with your ATARI Computer, you can take advantage of the speed, storage convenience, and versatility of the AtariWriter and AtariWriter Plus word-processing programs—then send your work directly to the XDM121 Printer. And because the XDM121 prints letter-quality characters, the end product will match the print quality normally available only from the best office typewriters.

AtariWriter

The XDM121 Printer has been designed for compatibility with AtariWriter. There are only a few extraordinary formatting requirements. On the whole, you need only follow the AtariWriter manual. When you print your work, you can use any printer option in the AtariWriter menu, but the ATARI 825™ printer option is the most compatible.

The XDM121 Printer has certain features that AtariWriter cannot implement explicitly. For instance, AtariWriter has no formatting instruction for boldface print, yet the printer can print

boldface characters. To activate a printer feature such as boldface characters, use the **[Control] [O]** command in AtariWriter. (See your AtariWriter manual for details. Contrary to the instructions in the manual, you need not use a special printer option when you use the **[Control] [O]** command with your XDM121 Printer.) Also, AtariWriter has some features—elongated characters, condensed print, and proportional character spacing—that are geared to dot-matrix printers and, therefore, cannot be implemented by the XDM121 Printer.

AtariWriter Plus

AtariWriter Plus, the new version of AtariWriter, enables you to use explicit codes to implement all the XDM121 Printer's features. Inserting **[Control] [O]** commands is unnecessary because AtariWriter Plus contains a printer driver for the XDM121 Printer.

PRINTER COMMANDS IN BASIC

If your printer is connected to an ATARI 400™, 800™, or 1200XL™ Computer, first insert a BASIC cartridge, then switch on your computer, printer, and video display. If you are using an ATARI 600XL™, 800XL™, 130XE™, or 65XE™ Computer, you are in BASIC as soon as you switch on your computer (provided, of course, you have not inserted some other software cartridge).

Note 1: The computer will not act on any BASIC statement, nor will it enter any BASIC statement into its memory, until you press **[Return]**. *Remember to press the [Return] key on your computer keyboard at the end of each BASIC statement.*

Note 2: The BASIC examples used in this manual are shown in BASIC's programming mode, where a line number appears at the beginning of each statement. To execute a BASIC program, you must type RUN and press **[Return]**. Consult your computer manual or the *ATARI BASIC Reference Manual* for more details.

LPRINT

Probably the most common way to send BASIC instructions to a printer is through the LPRINT command (short for LINE PRINT). Using LPRINT, you can send straight text and other sorts of instructions. For now the discussion will concentrate on straight text; the other instructions will be presented in Chapter 3.

The following example shows how the LPRINT command works. Type the statement

NEW

10 LPRINT "MY COMPUTER COMMUNICATES WITH MY PRINTER."

When you type RUN and press [Return], the printer prints

MY COMPUTER COMMUNICATES WITH MY PRINTER.

You can also use the LPRINT command to tell the printer to advance a line without printing anything. Just type LPRINT without anything after it. For example:

NEW

10 LPRINT "LINE 20 TELLS THE PRINTER TO ADVANCE ONE LINE."

20 LPRINT

30 LPRINT "I TOLD YOU SO."

RUN

The printer responds:

LINE 20 TELLS THE PRINTER TO ADVANCE ONE LINE.

(Now the printer advances a line.)

I TOLD YOU SO.

Your computer understands BASIC commands such as LPRINT only if they are typed in capital letters. In BASIC, words that appear on your screen must be typed in capital letters, unless they are to be printed and are enclosed in quotation marks. To print lowercase letters, press the [Caps] key, then type the letters between the quotation marks.

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

NEW

10 LPRINT [Caps] "to print lowercase letters, type them between quotation marks." [Caps]

RUN

The printer will print

to print lowercase letters, type them between quotation marks.

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

NEW

```
10 LP. "I CAN ABBREVIATE LPRINT BY TYPING LP."  
RUN
```

The printer prints

I CAN ABBREVIATE LPRINT BY TYPING LP.

LIST "P:"

This command instructs your computer to print out your BASIC program on the printer instead of displaying it on the video display screen (compare with LIST in your computer manual).

For example, type

NEW

```
10 LPRINT "WOULD YOU CHECK MY PROGRAM?"  
20 LPRINT "I'LL PRINT OUT A COPY FOR YOU."
```

Then type

LIST "P: "

The printer responds:

```
10 LPRINT "WOULD YOU CHECK MY PROGRAM?"  
20 LPRINT "I'LL PRINT OUT A COPY FOR YOU."
```

PRINT # and OPEN

Another way to send instructions to your printer is to use the PRINT # command. Although similar to LPRINT, PRINT # has its own distinctive characteristics.

To send a PRINT # command, you must first open an input/output channel to the printer. Your computer uses channels called "input/output control blocks" (IOCBs) to communicate with other components in your system. To open one of these channels, you must use an OPEN command.

The OPEN command links a channel, or an IOCB, to a specific device, such as your printer. The statement consists of the word OPEN followed by four elements that define your intended action.

For example:

NEW

10 OPEN #2,8,0,"P:"

The first number after OPEN assigns the channel number. This program is using channel 2. There are eight channels in all, numbered 0 through 7. Channels 1 through 5 are completely available for your use when you write BASIC programs. BASIC reserves channels 0, 6, and 7 for specific activities. (For instance, an LPRINT command automatically opens channel 7.)

The second number in the OPEN statement specifies the kind of action that will be allowed on the channel. The number 8 indicates output only, which is the kind of action you want because your computer will be sending out data to your printer. The third number is permanently reserved for uses with other devices but must be included to maintain the proper four-part form of the statement; because this program uses the printer, this number must be 0. The fourth element in the OPEN statement specifies the device that the computer will be using. In this case, "P:" represents the printer.

Subsequent PRINT #2 statements specify output to the printer.

For example:

NEW

10 OPEN #2,8,0,"P:"

20 PRINT #2;"THIS CHANNEL IS OPEN FOR OUTPUT TO THE PRINTER."

As soon as you type RUN and press [Return], your printer will print

THIS CHANNEL IS OPEN FOR OUTPUT TO THE PRINTER.

The important thing to remember is that the OPEN command will always look like line 10 when you want to specify output to the printer. The single change you can make is to substitute a different channel number (1 through 5) for channel 2.

One advantage in using the PRINT # command instead of the LPRINT command is that you can print a line without an automatic carriage return and line feed. LPRINT always returns

the carriage to the left margin and advances the paper one line at the end of the program line. However, when you use the PRINT # command and place a semicolon at the end of the program line, the carriage will not return, nor will the paper feed a line.

For example:

NEW

```
10 OPEN #2,8,0,"P: "  
20 PRINT #2;"TESTING";  
30 PRINT #2;"123";  
40 PRINT #2;"TESTING";  
50 PRINT #2;"123"
```

When you run this program, the printer will print

TESTING123TESTING123

Note: You can abbreviate the PRINT # command by typing a question mark (?) in place of PRINT. For example, using the abbreviation for PRINT in the previous program, line 50 would read

```
50 ? #2; "123"
```

This section is just an introduction to the general form of PRINT # and OPEN commands. The programs in the next chapter use these commands more productively. (For a detailed explanation of the PRINT # and OPEN commands, refer to the *ATARI BASIC Reference Manual*.)

CLOSE

This command closes channels that were opened by an OPEN command. Once opened, a channel stays open until the end of the program or until you use a CLOSE statement to close it.

The next example explicitly closes the channel that the previous program had opened:

```
50 CLOSE #2
```

Channel 2 is now closed.

The CHR\$(nn) Function

Every character that your XDM121 Printer can print has a decimal equivalent. The characters can be expressed as

these decimal numbers. When you send a decimal number to the printer, the printer will type the corresponding character. The standard correspondence between decimal codes and characters is known as ASCII (American Standard Code for Information Interchange). The 128 ASCII characters and decimal codes are given in **Appendix B, The ASCII Table**.

In BASIC, you can send the decimal codes to the printer via the `CHR$(nn)` function, in which *nn* is the decimal number of any given character.

For example:

NEW

10 LPRINT CHR\$(65);CHR\$(66);CHR\$(67);

Decimal code 65 stands for the letter A, 66 represents B, and 67 corresponds to C. When you type RUN and Press [Return], the printer will print

ABC

`CHR$(nn)` functions work within `LPRINT` and `PRINT #` command lines, but they must not be inside quotation marks. If you type a `CHR$(nn)` function inside print-statement quotation marks, the printer will print the `CHR$(nn)` notation itself — like any other series of characters between quotation marks — instead of carrying out the `CHR$(nn)` function.

Still, within the same print statement you can mix `CHR$(nn)` functions and text that is enclosed between quotation marks:

NEW

10 LPRINT CHR\$(65); " IS THE FIRST LETTER OF THE ALPHABET. "

RUN

The printer will print

A IS THE FIRST LETTER OF THE ALPHABET.

The `CHR$(nn)` function is particularly useful for printing otherwise unavailable characters, such as quotation marks within print statements. You cannot type quotation marks within a print statement and expect to have them print out, because quotation marks are part of the print command. To print out quotation marks, use the `CHR$(nn)` function and type decimal code 34 (which is the decimal code for quotation marks) in place of *nn*.



CHAPTER 3 PRINTER CONTROL



POWER-UP ROUTINE AND DEFAULT CONDITION

When you first turn on the XDM121 Printer, it automatically performs a few opening routines and prepares itself to print according to a set of "default," or preselected, instructions. The following list outlines the printer's "power-up" routine and default condition:

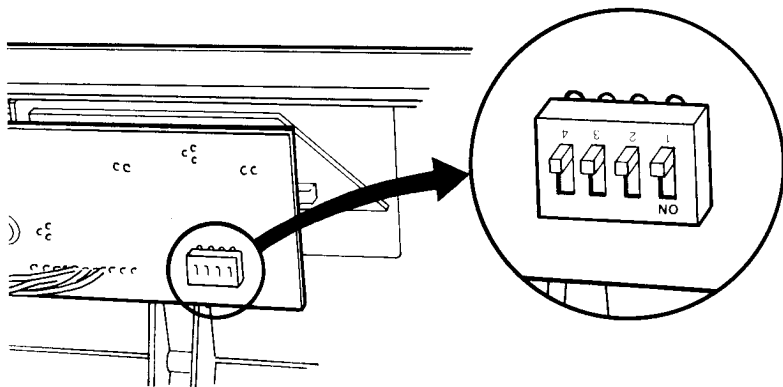
- The carriage returns to the "home" (far left) position.
- The printer goes on-line, unless the ribbon is used up or has not been installed.
- The left margin is set at horizontal position 1.
- All tab stops are cleared.
- Line spacing is set at 1/6 inch (six lines per inch).
- The top of page is set at the line on which the print head is located.
- The DIP switches are checked.
- All special print or formatting instructions are cleared if any were previously in use.
- The printing direction is bidirectional.
- The character set is noninternational.

Note: See **Initialize Printer** for information about how to return the printer to its default conditions without switching it off and on.

DIP SWITCHES

One way to vary the printer's default condition is to change the "DIP-switch" settings. The acronym DIP is short for "dual in-line package."

The DIP switches are located in a small blue switchbox inside the front panel of the printer, directly behind the Control Panel. Although there are four white tabs numbered 1 through 4, you will use only Switches 1 and 2 on the XDM121. Ignore Switches 3 and 4.



A DIP switch has two possible states: on and off. Turn the switch on by moving the white tab to the ON position; otherwise, the switch is off. The DIP switches are set to their off positions at the factory.

The printer checks its DIP-switch settings for printing instructions only when you turn the printer on or when you instruct the printer to return to its default conditions.

DIP-Switch Settings

SWITCH	ON	OFF	FUNCTION
1	12-pitch	10-pitch	Sets character pitch
2	Used	Ignored	Sets page length at 15 inches (use with single-sheet feeder <i>only</i>)

Switch 1 controls the character pitch. When the switch is on, the printer prints 12 characters per inch. When the switch is off, the printer prints 10 characters per inch. (See **Print Pitch** in **Chapter 3** for information about overriding Switch 1's setting.)

Switch 2 controls the page length. When the switch is on, the page length is set at 15 inches. You must turn this switch on when you are using the optional single-sheet feeder; otherwise, you must leave it off. When the switch is off, the printer ignores it and sets the default page length of 11 inches. (See **Lines per Page** in **Chapter 3** for information about overriding Switch 2's setting.)

Note: Remember that the printer checks its DIP-switch settings only when you switch the printer on or when you instruct it to return to its default conditions. Therefore, you must set the switches before you perform either action.

CONTROL CHARACTERS AND ESCAPE SEQUENCES

You can override the printer's default print instructions by sending certain control codes that your printer is programmed to accept from your computer. For instance, you can send a code that instructs the printer to print boldface characters or a code that changes the page length. Printer control codes allow you to vary the printing format so that you have greater flexibility in designing the style of your printed work.

There are two basic types of printer control codes: *control characters* and *escape sequences*. When you send these codes to your printer in BASIC programs, you can keystroke them in between quotation marks in print statements.

You produce control characters by holding down the **[Control]** key on your computer keyboard while you strike another key *at the same time*. For example, the control character that instructs the printer to underline is **[Control] [R]**, which you produce by holding down the **[Control]** key and *simultaneously* striking the **[R]** key. In BASIC, keystroking in **[Control] [R]** will produce the control character **—** on your video display screen.

Most printer control codes are escape sequences, which consist of the escape character followed by one or more characters. For example, the code for boldface print is **[Escape] [E]**. To enter the escape sequence in your computer, first press the **[Escape]** key *twice*. In BASIC, when you press the **[Escape]** key twice, the escape graphics character **E** comes up on your screen. Next enter the other character(s) in the escape sequence — in this case, E. So altogether, this escape sequence consists of the keystrokes **[Escape] [Escape] [E]**.

Note: Some escape sequences contain variables. In the charts that accompany the explanations of the printer control codes later in this chapter, an *italicized* lowercase letter designates a variable. If you are keystroking an escape sequence between quotation marks, do not simply keystroke the number that you are substituting for the variable. You must keystroke the *character* that will send the decimal value you want to insert. For instance, if you want to replace a variable with the number 10, you would keystroke [Control] [J]. (See Appendix B, The ASCII Table.)

However, in many instances, keystroking printer control codes is not the best way to send the codes to your printer.

USING THE CHR\$(nn) FUNCTION

Keystroking printer control codes in your programs has certain disadvantages. When you print out your program, neither the control characters nor the escape sequences will print. Blank spaces will appear in place of these characters, which is an obvious disadvantage when you are reviewing the program on paper.

What's worse is that the printer will begin implementing the codes as it prints out the program. For instance, suppose you want to print out a copy of a program in which you have keystroked the code for boldface print. When the printer reaches the program line containing the code, it will print the rest of the program in boldface characters.

To get around this difficulty, use the CHR\$(nn) string function to send printer control codes in BASIC programs. (For an explanation of the CHR\$(nn) function, see the section on The CHR\$(nn) Function in Chapter 2.)

For example, the escape sequence for boldface characters is [Escape] [E]. The decimal codes for Escape and E are 27 and 69 respectively. Using the CHR\$(nn) function to send the control code in BASIC, you would type

```
10 LPRINT CHR$(27);CHR$(69);
```

Or you could type

```
10 LPRINT CHR$(27);"E"
```

The second example seems to print the E. However, when the printer receives an escape character, it waits for at least one more character to follow. The printer “knows” that the E following CHR\$(27) determines a function and should not actually be printed.

You may find that combining decimal codes and characters in this way helps you remember many escape sequences. After all, the Escape part of the sequence will always be 27, and you’ll more readily recall the following letter or letters in the sequence than their corresponding decimal numbers.

The 128 ASCII characters include both the printable characters (like the letter A) and the control characters (like [Control] [R]). Consult **Appendix B, The ASCII Table**, for their decimal equivalents.

Appendix A: Printer Control Code Summary gives the decimal equivalents for all escape sequences and control characters.

Note: If you mistakenly enter an undefined printer control code, the printer simply ignores it.

The rest of this chapter covers all the XDM121 Printer’s control codes and explains how to use the CHR\$(*nn*) function to express them in BASIC programs. You should have at least an introductory knowledge of BASIC before you proceed further.

PRINTER CONTROL CODES

To help you understand the functions of the codes and locate the ones you need to use in your programs, the codes have been arranged in categories. The **Horizontal Action** section includes codes that control the movement of the carriage and the print head across the paper, such as the tab functions, the character pitch, and the printing direction. **Vertical Action** discusses codes that control the up-and-down movement of the paper and such vertical measurements as line spacing and page length. The codes in **Print Style** allow you to control the style of the characters with such flourishes as boldface print and underlining. And the **Character Set** section explains the use of international characters. The last section, **Other Codes**, pertains mostly to the mechanical operations of the printer.

The discussion of each code begins with a chart. At a glance you can find the control character or the escape sequence for the code, its decimal equivalent to be used in the CHR\$(nn) function, and the function that the code performs. After a brief description of the code, a sample BASIC program shows you how to send the code to the printer.

Horizontal Action

Space

CODE	DECIMAL	FUNCTION
Space Bar	32	Moves the carriage forward one character space

This code causes the carriage to move forward one space.

BASIC example:

```
5 REM : SPACE
10 LPRINT "SP";CHR$(32);"ACE"
20 END
```

The printer prints

SP ACE

Backspace

CODE	DECIMAL	FUNCTION
Control H	8	Backspaces one character space

Everyone is familiar with the [Backspace] key on a typewriter or a computer keyboard: when pressed, it moves the carriage (of a typewriter) or the cursor (on a computer screen) backward one character space.

The Backspace code functions in much the same way. When you send the code, the carriage moves back one character space, where it will print the next character that you type. This function is useful for printing two characters on top of each other. In the BASIC example, the Backspace code is used to print ≠.

BASIC example:

```
5 REM: BACKSPACE: CONTROL H
10 LPRINT "X=";CHR$(8);"/ Y MEANS X IS NOT EQUAL
   TO Y."
20 END
```

The printer prints

X ≠ Y MEANS X IS NOT EQUAL TO Y.

Carriage Return

CODE	DECIMAL	FUNCTION
Control M	13	Returns the carriage to the home position

As the computer transmits data to the printer, the printer's internal buffer holds approximately the next line of incoming text to be printed. When you send the Carriage Return code, the printer prints all the data in the printer buffer and returns the carriage to its home (far left) position. The Carriage Return code does *not* include a line-feed instruction (see End of Line code).

BASIC example:

```
5 REM: CARRIAGE RETURN: CONTROL M
10 LPRINT "RETURN THE CARRIAGE,
   OK?";CHR$(13);"OK."
20 END
```

The printer prints

RETURN THE CARRIAGE, OK?

Because the Carriage Return code does not include a line-feed instruction, the carriage moves to the far left of the same line and prints the second OK on top of the first sentence.

Note: The printer has a "logic-seeking" capability. This feature allows the printer to "know" when to conserve mechanical movement. For instance, if the BASIC example did not contain the second OK, the printer would print the first sentence, check its printer buffer for more data, and stop the carriage. Although the printer would not *physically*

move the carriage to the left margin, the printer would *logically* be in place at the far left margin: it would know to return the carriage when it receives more data to print.

End of Line

CODE	DECIMAL	FUNCTION
Return	155	Causes an automatic line feed and a carriage return

The printer buffer holds approximately the next line of incoming text that the computer is sending to the printer. When you send the End of Line code, the printer prints the contents of the printer buffer, then performs a line feed and a carriage return in one action (like a typewriter **[Return]** key).

BASIC example:

```
5 REM: END OF LINE: RETURN
10 LPRINT "DO A CARRIAGE RETURN AND LINE FEED,
OK?";CHR$(155);"OK."
20 END
```

The printer prints

DO A CARRIAGE RETURN AND LINE FEED, OK?
OK.

Left-to-Right Printing

CODE	DECIMAL	FUNCTION
Escape U Control A	27, 85, 1	Prints from left to right

When you send this code, the print head prints from left to right only. This function ensures a more accurate starting position on each line. Normally, the print head prints continuously from left to right and from right to left (bidirectionally) for greater speed.

BASIC example:

```
5 REM : LEFT-TO-RIGHT PRINTING: ESCAPE U CONTROL A
10 LPRINT CHR$(27); "U"; CHR$(1);
20 FOR X=1 TO 3
30 LPRINT "PRINT FROM LEFT TO RIGHT ONLY."
40 NEXT X
50 END
```

The printer prints the sentence from left to right on three consecutive lines.

Bidirectional Printing

CODE	DECIMAL	FUNCTION
Escape U Control ,	27, 85, 0	Selects bidirectional printing

If you have sent the Left-to-Right printing code, you can return to bidirectional printing by sending this code.

BASIC example:

```
5 REM : BIDIRECTIONAL PRINTING: ESCAPE U CONTROL ,
10 LPRINT CHR$(27); "U"; CHR$(1);
20 FOR X=1 TO 3
30 LPRINT "PRINT FROM LEFT TO RIGHT ONLY."
40 NEXT X
50 LPRINT CHR$(27); "U"; CHR$(0);
60 FOR Y=1 TO 3
70 LPRINT "NOW PRINT FROM LEFT TO RIGHT AND FROM
RIGHT TO LEFT."
80 NEXT Y
90 END
```

The printer prints the first sentence from left to right three times. Immediately after it prints the last "left to right only" sentence, the printer begins its bidirectional movement and prints the second sentence three times.

Backward Printing

CODE	DECIMAL	FUNCTION
Escape U Control B	27, 85, 2	Prints a line backward from right to left

When you send this code, the print head prints from right to left only and reverses the order in which you typed the characters. This code will override the Left-to-Right and Bidirectional printing codes. After the code is cancelled, the printer returns to either Left-to-Right or Bidirectional mode, whichever was being used. A carriage return or the end of a line cancels the Backward Printing code. You must repeat the code for each line you wish to print backward.

Before you send this code, the carriage must be positioned the appropriate number of spaces to the right of the left margin so that the printer can print the line from right to left. If the text you are printing exceeds the number of spaces you've allotted, the excess will print at the far left margin. To position the carriage, the BASIC example uses a Line Feed code in line 20 after a line of left-to-right text.

BASIC example:

```
5 REM: BACKWARD PRINTING: ESCAPE U CONTROL B  
10 OPEN #1, 8, 0, "P:"  
20 PRINT #1; "THIS IS FORWARD  
PRINTING." ;CHR$(10);  
30 PRINT #1; CHR$(27);"U";CHR$(2);"THIS IS  
BACKWARD PRINTING."  
40 END
```

The printer prints

THIS IS FORWARD PRINTING.
.GNITNIRP DRAWKCAB SI SIHT

Print Pitch

CODE	DECIMAL	FUNCTION
Escape Control * <i>h</i>	27, 31, <i>h</i>	Sets character pitch (number of characters per inch)

When you first turn on the printer, the machine checks its DIP switches. Because DIP Switch 1 determines the character pitch, the printer will print 10 or 12 characters per inch—unless you override the DIP-switch setting by sending a Print Pitch code.

Print pitch is calculated according to the following formula:

$$\text{Print Pitch} = 1/120 \text{ inch} \times (h-1)$$

The $h-1$ value is called the Horizontal Motion Index (HMI). The h variable can be a number from 1 to 126, so the HMI can be a value from 0 to 125.

The carriage moves in increments of 1/120 inch. The reason is that the fraction 1/120 inch is the least common denominator of 10-pitch characters (1/10 inch each) and 12-pitch characters (1/12 inch each). To produce a 10-pitch setting, in other words, you could substitute 13 for h in the preceding formula: $1/120 \times (13-1) = 12/120 = 1/10$. Or, to produce a 12-pitch setting, you could let h equal 11: $1/120 \times (11-1) = 10/120 = 1/12$. In practice, of course, you would seldom need to code either 10- or 12-pitch yourself, because DIP Switch 1 takes care of these standard settings. To produce nonstandard letterspacing in either pitch, use the procedure shown in the BASIC example.

In the BASIC example, a FOR/NEXT loop substitutes eight sample values for the h variable. You can experiment with other values. Remember, however, that although you can use the formula to specify a variety of print pitches (or, in effect, letterspacing), practically speaking the character pitch of your daisy wheel restricts your selection.

For example, Courier 10 (the typeface on the daisy wheel that you received with your printer) was designed for 10-pitch printing. You can vary the print pitch, but the further you go from 10-pitch spacing, the less attractive and readable the printed characters become. Increasing the h variable beyond 13 expands the letterspacing—that is, spreads out the letters and words. Decreasing h from 13 contracts the letterspacing—draws the letters together and even overlaps them.

BASIC example:

```
5 REM : PRINT PITCH: ESCAPE CONTROL *  
10 FOR H=8 TO 15  
20 LPRINT CHR$(27);CHR$(31);CHR$(H);  
30 LPRINT "PRINT PITCH WHEN H EQUALS ";H  
40 NEXT H  
50 END
```

The printer prints

PRINT PITCH WHEN H EQUALS 8

PRINT PITCH WHEN H EQUALS 9

PRINT PITCH WHEN H EQUALS 10

PRINT PITCH WHEN H EQUALS 11

PRINT PITCH WHEN H EQUALS 12

PRINT PITCH WHEN H EQUALS 13

PRINT PITCH WHEN H EQUALS 14

PRINT PITCH WHEN H EQUALS 15

Horizontal Tab

CODE	DECIMAL	FUNCTION
Control I	9	Moves the carriage forward to a preset horizontal tab stop

When you send the Horizontal Tab code, the carriage moves to the next horizontal tab stop (see Horizontal Tab Set). No tab stops are set when you first switch the printer on. If you set no tab stops (as in the BASIC example), the tab stop is 1, which is the beginning of the printing line.

BASIC example:

```
5 REM: HORIZONTAL TAB: CONTROL I
10 LPRINT CHR$(9); "TAB"
20 END
```

The printer prints

TAB

Horizontal Tab Set

CODE	DECIMAL	FUNCTION
Escape #	27, 35	Sets horizontal tab stop at present carriage position

This code sets a horizontal tab stop at the position of the carriage when you send the code. The tab stop remains set until you clear it (see Horizontal Tab Clear) or until you initialize the printer. Tab stops may be set at any point within the first 160 horizontal character spaces of the printing line.

BASIC example:

```
5 REM : HORIZONTAL TAB SET: ESCAPE #
10 OPEN #1,8,0,"P:"
20 PRINT #1;"01234567890123456789"
30 FOR X=1 TO 3
40 PRINT #1;"    ";CHR$(27);"#";"TAB";
50 NEXT X
60 END
```

The printer prints

```
01234567890123456789
      TAB      TAB      TAB
```

Note: In line 40, type 5 spaces between the first set of quotation marks.

Horizontal Tab Clear

CODE	DECIMAL	FUNCTION
Escape \$	27, 36	Clears horizontal tab stop at present carriage position

Sending this code clears the horizontal tab stop at the position of the carriage when you send the code.

BASIC example:

```
5 REM : HORIZONTAL TAB CLEAR: ESCAPE $
10 OPEN #1,8,0,"P:"
20 PRINT #1;"01234567890123456789"
30 FOR X=1 TO 3
40 PRINT #1;"      ";CHR$(27);"#";"TAB";
50 NEXT X
60 PRINT #1
70 FOR Y=1 TO 3
80 PRINT #1;"      ";CHR$(9);CHR$(27);" $"
90 NEXT Y
100 PRINT #1;CHR$(9);"TABS CLEARED"
110 END
```

The printer prints

```
01234567890123456789
      TAB      TAB      TAB
```

TABS CLEARED

Note: In lines 40 and 80, type 5 spaces between the first set of quotation marks.

Clear All Horizontal Tabs

CODE	DECIMAL	FUNCTION
Escape '	27, 39	Clears all preset tab stops

This code at once clears all preset horizontal tab stops.

BASIC example:

```
5 REM : CLEAR ALL HORIZONTAL TABS: ESCAPE '
10 OPEN #1,8,0,"P:"
20 PRINT #1;"01234567890123456789"
30 FOR X=1 TO 3
40 PRINT #1;"      ";CHR$(27);"#";CHR$(9);"TAB";
50 NEXT X
60 PRINT #1;CHR$(27);" "
70 PRINT #1;CHR$(9);"ALL TABS CLEARED"
80 END
```


The printer prints

01234567890123456789

 TAB TAB TAB
ALL TABS CLEARED

Note: In line 40, type 5 spaces between the first set of quotation marks.

Absolute Horizontal Tab

CODE	DECIMAL	FUNCTION
Escape Control I <i>n</i>	27, 9, <i>n</i>	Moves carriage to a designated horizontal position

Use this code to move the carriage to any designated horizontal print position, independent of any preset tab stops. The value of *n* is the number of character spaces you want the carriage tabbed to the right, counting from the left margin setting. It can be any number from 1 to 126. The Absolute Horizontal Tab code does not set tab stops; it merely moves the carriage to the horizontal character space designated by *n*.

BASIC example:

```
5 REM : ABSOLUTE HORIZONTAL TAB SET : ESCAPE  
CONTROL I  
9 OPEN #1,8,0,"P:"  
10 PRINT #1;CHR$(27);CHR$(9);CHR$(10);"10";  
20 PRINT #1;CHR$(27);CHR$(9);CHR$(20);"20";  
30 PRINT #1;CHR$(27);CHR$(9);CHR$(30);"30";  
40 END
```

The printer prints

 10 20 30

Left Margin Set

CODE	DECIMAL	FUNCTION
Escape (27, 40	Sets the left margin at the present carriage position

This code sets the left margin (the initial printing on any line) at the position of the carriage when you send the code. The margin remains set until you change it or until you initialize the printer.

BASIC example:

```
5 REM : LEFT MARGIN SET: ESCAPE (
10 LPRINT "1      10      20"
20 LPRINT "          ";CHR$(27);"("
30 LPRINT "THE LEFT MARGIN IS SET AT 10."
40 END
```

The printer prints

```
1      10      20
      THE LEFT MARGIN IS SET AT 10.
```

Note: Like the margin release of a typewriter, the Backspace code, the Absolute Horizontal Tab code, and the Space code allow you to move the carriage to the left of the left margin (when the printer is printing from right to left).

Vertical Action

Line Feed

CODE	DECIMAL	FUNCTION
Control J	10	Advances the paper one line

The Line Feed code prints out the text contained in the printer buffer, then advances the paper one line. When you initialize the printer, the line spacing is preset at six lines per inch. If you change the line spacing, the printer will execute the Line Feed code according to the new line spacing. Note that no carriage return occurs when you send the Line Feed code. This code works just like the Line Feed button on the printer, except that the instruction is sent from the computer.

BASIC example:

```
5 REM LINE FEED: CONTROL J
10 LPRINT "I'LL TAKE ";CHR$(10);"THE LOW ROAD."
20 END
```

The printer prints

I'LL TAKE
THE LOW ROAD.

Reverse Line Feed

CODE	DECIMAL	FUNCTION
Escape Control J	27, 10	Retracts the paper one line

When you send this code, the paper feeds backward one line, and the text following the code is printed one full line above the preceding text. To return to your original printing line, send the Line Feed code.

BASIC example:

```
5 REM : REVERSE LINE FEED: ESCAPE CONTROL J
10 LPRINT "YOU TAKE";CHR$(27);CHR$(10);
"THE HIGH ROAD."
```

The printer prints

THE HIGH ROAD.
YOU TAKE

If a line of text ends on the line you've reversed to, the printer will, as usual, return the carriage to the left margin of the next line—that is, to the line you reversed from—and the printer will begin printing on top of the first line. To avoid such overprinting, send the Line Feed code right before the end of the line you reversed to.

For example:

```
5 REM : REVERSE LINE FEED/LINE FEED
10 LPRINT "YOU TAKE";CHR$(27);CHR$(10);
"THE HIGH ROAD,";CHR$(10);
20 LPRINT "I'LL TAKE";CHR$(10);"THE LOW ROAD,"
30 LPRINT "AND I'LL GET TO SCOTLAND BEFORE YOU."
40 END
```

The printer prints

 THE HIGH ROAD,
YOU TAKE
I'LL TAKE
 THE LOW ROAD,
AND I'LL GET TO SCOTLAND BEFORE YOU.

Form Feed

CODE	DECIMAL	FUNCTION
Control L	12	Advances the paper one page length

The Form Feed code advances the paper to the top of the next page. The position of the paper when you turn on or initialize the printer determines where the top of every page begins. At that time, the page length is preset at 11 inches, unless you've installed the optional single-sheet feeder and have turned on DIP Switch 2. If you've used the TOF button on the printer to change the page-length setting, the Form Feed code functions according to the new length.

Practically speaking, the Form Feed code is useful only when you've attached the optional single-sheet feeder or pin-feed tractor feeder to your printer. If you are loading single sheets by hand, the printer cannot advance automatically to the next page.

BASIC example:

```
5 REM: FORM FEED: CONTROL L
10 LPRINT "DO A FORM FEED, OK?"
20 LPRINT CHR$(12);
30 LPRINT "OK."
40 END
```

The printer prints

DO A FORM FEED, OK?

(The printer advances the paper to the top of the next page.)

OK.

Paper Advance

CODE	DECIMAL	FUNCTION
Escape Control K <i>n</i>	27, 11, <i>n</i>	Advances the paper to a designated line

This code advances the paper to any line on the page from any other line on the same page. Replace the *n* variable with the desired line number.

BASIC example:

```
5 REM : VERTICAL TAB: ESCAPE CONTROL K
10 LPRINT CHR$(27);CHR$(11);CHR$(10);"FEED TO
LINE 10."
20 LPRINT CHR$(27);CHR$(11);CHR$(41);"FEED TO
LINE 41."
30 LPRINT CHR$(27);CHR$(11);CHR$(59);"FEED TO
LINE 59."
40 LPRINT CHR$(27);CHR$(11);CHR$(25);"FEED UP
TO LINE 25."
50 END
```

The printer feeds the paper to the designated lines.

Line Spacing

CODE	DECIMAL	FUNCTION
Escape Control = <i>v</i>	27, 29, <i>v</i>	Sets line spacing in increments of 1/48 inch

When you turn on or initialize the printer, the spacing between printing lines is automatically set at 1/6 inch (six lines per inch). The Line Spacing code allows you to override this default line spacing.

The printer can feed paper in increments of 1/48 inch. To calculate the line spacing incrementally, use the following formula:

$$1/48 \text{ inch} \times (v-1) = \text{line spacing (inches)}$$

The v-1 value is called the Vertical Motion Index (VMI). The v variable can be any number from 1 to 126, so the VMI can be a value from 0 to 125.

For example $1/48 \times (13-1) = 12/48 = 1/4$ -inch line spacing. In this example, 13 is substituted for the v variable. Therefore, replace the v variable with 13 in the Line Spacing escape sequence if you desire 1/4-inch line spacing (see the BASIC example.)

BASIC example:

```
5 REM : LINE SPACING: ESCAPE CONTROL =
10 FOR W=1 TO 3
20 LPRINT CHR$(27);CHR$(29);CHR$(5);"THIS LINE
SPACING IS 1/12 INCH (V=5). "
30 NEXT W
40 LPRINT CHR$(27);"@";CHR$(155);
50 FOR X=1 TO 3
60 LPRINT CHR$(27);CHR$(29);CHR$(7);"THIS LINE
SPACING IS 1/8 INCH (V=7). "
70 NEXT X
80 LPRINT CHR$(27);"@";CHR$(155);
90 FOR Y=1 TO 3
100 LPRINT CHR$(27);CHR$(29);CHR$(13);"THIS
LINE SPACING IS 1/4 INCH (V=13). "
110 NEXT Y
120 LPRINT CHR$(27);"@";CHR$(155);
130 FOR Z=1 TO 3
140 LPRINT CHR$(27);CHR$(29);CHR$(17);"THIS
LINE SPACING IS 1/3 INCH (V=17). "
150 NEXT Z
160 END
```

The printer prints

THIS LINE SPACING IS 1/12 INCH {V=5} :
THIS LINE SPACING IS 1/12 INCH {V=5} :

THIS LINE SPACING IS 1/8 INCH {V=7} .
THIS LINE SPACING IS 1/8 INCH {V=7} :
THIS LINE SPACING IS 1/8 INCH {V=7} .

THIS LINE SPACING IS 1/4 INCH (V=13) .
THIS LINE SPACING IS 1/4 INCH (V=13) .
THIS LINE SPACING IS 1/4 INCH (V=13) .

THIS LINE SPACING IS 1/3 INCH (V=17) .
THIS LINE SPACING IS 1/3 INCH (V=17) .
THIS LINE SPACING IS 1/3 INCH (V=17) .

Note: You will also use the Vertical Motion Index (VMI) to calculate the number of inches per page.

Lines per Page

CODE	DECIMAL	FUNCTION
Escape C <i>p</i>	27, 67, <i>p</i>	Sets the number of lines per page

When you turn on or initialize the printer, the page length is automatically set at 66 lines (11 inches, 6 lines per inch). The Lines per Page code allows you to override this default page length.

The value of *p* specifies the desired number of lines per page. Because the maximum page length for the printer is 126 lines, *p* cannot exceed 126. The number of lines per page is stored as an absolute value and will not change even if you change the line spacing or the setting for the top of the page.

Note: The top of the page is automatically reset at the present position of the carriage when you send the Lines per Page code. Dependent codes (such as Form Feed) will operate according to the lines-per-page setting.

BASIC example:

```
5 REM : PAGE LENGTH: ESCAPE C  
10 LPRINT CHR$(27);"C";CHR$(48);  
20 END
```

The page length is set at 48 lines (eight inches).

To calculate the number of inches per page, use the following formula:

$$1/48 \times \text{VMI} \times p = \text{inches per page}$$

in which p may be a value from 1 to 126.

The BASIC example assumes that the printer is operating under the default line spacing (1/6 inch); therefore, the VMI is 8 [line spacing = $1/48 \times (v-1) = 1/48 \times (9-1) = 1/48 \times 8 = 1/6$]. The example sets the lines per page (p) at 48 lines. Now insert the VMI and p values in the formula to get the number of inches per page ($1/48 \times \text{VMI} \times p = 1/48 \times 8 \times 48 = 8$ inches).

The number of inches per page is a relative value that changes if you alter the values of VMI or p . The following table gives examples of inches-per-page values when p and the VMI are adjusted:

VMI	p (lines per page)	Page Length
4	48	4 inches
6	80	10 inches
12	50	12.5 inches
16	33	11 inches

Note: The values of the VMI in this table are those used in the illustrations of the Line Spacing code.

Warning: Always keep in mind the length of the sheet you are feeding when you adjust the number of lines per page and the line spacing relative to each other. Otherwise, you may print onto the platen and damage it.

Print Style

Bold Print

CODE	DECIMAL	FUNCTION
Escape E	27, 69	Prints boldface characters

This code produces boldface characters. The daisy-wheel printer actually forms boldface characters by striking each character twice; the second impression is 1/120 inch to the right of the first. The Bold Print code lasts for one printed line only; in addition to the Bold Print Off code, a carriage return or a line feed cancels the instruction for bold print. When the printer prints boldface characters, it prints from left to right only.

BASIC example:

```
5 REM : BOLD PRINT : ESCAPE E
10 LPRINT CHR$(27);"E";"THESE CHARACTERS ARE
BOLDFACE ."
20 END
```

The printer prints

THESE CHARACTERS ARE BOLDFACE.

Bold Print Off

CODE	DECIMAL	FUNCTION
Escape F	27, 70	Cancels boldface print

This code cancels the Bold Print code.

BASIC example:

```
5 REM : BOLD PRINT OFF : ESCAPE F
10 LPRINT CHR$(27);"E";"THESE ARE BOLDFACE ." ;
CHR$(27);"F";"THESE ARE NOT ."
20 END
```

The printer prints

THESE ARE BOLDFACE.THESE ARE NOT.

Auto Underlining

CODE	DECIMAL	FUNCTION
Control O	15	Underlines text
Escape Control Y	27, 25	

When you send the Auto Underlining code, all text following the code will be underlined until you send the Auto Underlining Off code.

BASIC example:

```
5 REM : AUTO UNDERLINING: CONTROL O  
10 LPRINT CHR$(15);  
20 LPRINT "UNDERLINE"  
30 END
```

The printer prints

UNDERLINE

Note: The two Auto Underlining codes are functionally equivalent. Use either one to underline.

Auto Underlining Off

CODE	DECIMAL	FUNCTION
Control N	14	Cancels underlining
Escape Control Z	27, 26	

This code cancels the Auto Underlining code.

BASIC example:

```
5 REM : AUTO UNDERLINING OFF: CONTROL N  
10 LPRINT CHR$(15);"START UNDERLINING."  
20 LPRINT CHR$(14);"NOW STOP IT."  
30 END
```

The printer prints

START UNDERLINING.
NOW STOP IT.

Note: The two Cancel Auto Underlining codes are functionally equivalent. Use either one to cancel underlining.

Subscript Print (Half-Line Feed)

CODE	DECIMAL	FUNCTION
Escape Control -	27, 28	Advances the paper one-half line

When you send this code, the text following the code is printed one-half line below the preceding text. The subscript function is handy for mathematical and chemical notation.

BASIC example:

```
5 REM : SUBSCRIPTS: ESCAPE CONTROL N
10 LPRINT "H";CHR$(27);CHR$(28);"2"
20 END
```

The printer prints

H₂

Superscript Print (Reverse Half-Line Feed)

CODE	DECIMAL	FUNCTION
Escape Control +	27, 30	Retracts the paper one-half line

When you send this code, the text following the code is printed one-half line above the preceding text. The superscript function is handy for footnoting and exponential notation.

BASIC example:

```
5 REM : SUPERSSCRIPTS: ESCAPE CONTROL +
10 LPRINT "10";CHR$(27);CHR$(30);"10"
20 END
```

The printer prints

10¹⁰

Canceling Subscript and Superscript Printing

If you wish to return to the line from which you've printed subscript characters, simply send the superscript code; conversely, to return to the original line from a superscript character, send the subscript code.

Subscript or superscript printing is automatically canceled when the carriage reaches the end of a line of printed text and returns to the left margin. Accordingly, either the Carriage Return code or the End of Line code will cancel the Subscript Print and Superscript Print codes. Note that sending a line feed immediately after either a subscript or a superscript character will advance the printing line one full line down from the subscript or superscript printing line: that is, the print head will move only one-half line below the original printing line containing the superscript or one and one-half lines below the original printing line containing the subscript.

To get around this difficulty, send the Subscript Print code or the Superscript Print code right before the end of the line of text. For example:

```
5 REM : CANCEL SUBSCRIPT PRINTING
10 LPRINT "H";CHR$(27);CHR$(28);"2";CHR$(27);
CHR$(30);"0";CHR$(10);
20 LPRINT "IS THE CHEMICAL FORMULA FOR WATER."
30 END
```

The printer prints

H₂O

IS THE CHEMICAL FORMULA FOR WATER.

Notice that the preceding example sent an extra line feed at the end of program line 10. Otherwise, the bottom of the subscript 2 in line 10 would touch the top of the character S in line 20—a problem that's unavoidable with single line spacing. When you are using subscripts and superscripts, you must consider overall line height in setting spacing between printed lines.

```
5 REM : CANCEL SUPERScript PRINTING
10 LPRINT "10";CHR$(27);CHR$(30);"10";
CHR$(27);CHR$(28);
20 LPRINT "EQUALS 10,000,000,000."
30 END
```

The printer prints

10¹⁰

EQUALS 10,000,000,000.

Character Set

International Character Mode

CODE	DECIMAL	FUNCTION
Escape Control W	27, 23	Prints international characters

This code allows the printer to print international characters. In this mode, 92 noninternational and 33 international characters are available for printing. Consult **Appendix B, The ASCII Table**, for a complete listing of international characters. The printer control codes for most international characters are control characters.

BASIC example:

```
5 REM : INTERNATIONAL CHARACTER MODE :  
ESCAPE CONTROL W  
10 LPRINT CHR$(27);CHR$(23);"INTERNATIONAL  
CHARACTER MODE ON"  
20 LPRINT CHR$(123);CHR$(7);CHR$(22);CHR$(10);  
30 END
```

The printer prints

INTERNATIONAL CHARACTER MODE ON

Äïñü

Note 1: Some control characters that are used for certain nonessential printer functions, as well as three printable characters, will be unavailable to you in the International Character Mode because their codes are used to print particular international characters. Consult **Appendix B, The ASCII Table**.

Note 2: To format your AtariWriter text file for international characters, use the [Control] [O] command to enter at the top of the file the decimal escape sequence for international characters: [Control] [O] 27 [Control] [O] 23. To print a particular character, type [Control] [O] and the decimal code for that character at the point where you want the character to appear in your text file.

Note 3: If you have an ATARI 600XL, 800XL, 1200XL, or XE Computer, you can display international characters in BASIC on your video display screen. Type POKE 756, 204. Then type the control character keystrokes for the individual international characters. To go back to control characters, type POKE 756, 224. (For the 1200XL, pressing [Control] [F4] and then typing the control character keystrokes for the individual international characters will also work. To go back to control characters, press [Control] [F4] again.)

International Character Mode Off

CODE	DECIMAL	FUNCTION
Escape Control X	27, 24	Cancels international characters

This code cancels the international character instruction and returns the printer to its noninternational character set.

Basic Example:

```
5 REM: INTERNATIONAL CHARACTER MODE OFF: ESCAPE  
CONTROL X  
10 LPRINT CHR$(27);CHR$(23);  
20 LPRINT "INTERNATIONAL CHARACTER MODE ON"  
30 LPRINT CHR$(96);  
40 LPRINT CHR$(27);CHR$(24);  
50 LPRINT "INTERNATIONAL CHARACTER MODE OFF"  
60 LPRINT CHR$(96);  
70 END
```

The printer prints

INTERNATIONAL CHARACTER MODE ON

INTERNATIONAL CHARACTER MODE OFF

i

Other Codes

Initialize Printer

CODE	DECIMAL	FUNCTION
Escape @	27, 64	Initializes the printer

If you have used printer control codes to override the printer's default instructions, you can use this code to return the printer to its default conditions. This code "initializes" the printer (returns it to its initial state when it was first turned on). Whenever you turn the printer on or send this code, the sequence of events listed in the section **Default Conditions** takes place.

BASIC example:

```
5 REM: INITIALIZE PRINTER: ESCAPE @  
10 LPRINT "CHR$(27);"@"  
20 END
```

The printer is initialized.

Paper-Out Sensor Off

CODE	DECIMAL	FUNCTION
Escape 0	27, 48	Disables the paper-out sensor (paper-feeder options only)

If you have either the form-tractor or single-sheet paper feeder installed, this code disables the paper-out sensor, enabling you to print to the very bottom of the sheet. Normally the paper-out sensor switches the printer off-line when it comes within approximately one inch of the bottom of the sheet. In the program example below, it is assumed that you've begun printing at the top of the page. The program also assumes that you are using 11-inch long paper and that the line spacing is 1/6 inch.

BASIC example:

```
5 REM: PAPEROUT SENSOR OFF: ESCAPE 0
10 LPRINT CHR$(27); "0"
20 FOR X=1 TO 66
30 LPRINT "IGNORE PAPER END."
40 NEXT X
50 END
```

The printer prints to the last line of the sheet.

Paper-Out Sensor On

CODE	DECIMAL	FUNCTION
Escape /	27, 47	Reactivates the paper-out sensor (paper-feeder options only)

If you have disabled the paper-out sensor, use this code to reactivate it.

BASIC example:

```
5 REM: PAPER-OUT SENSOR ON: ESCAPE /
10 LPRINT CHR$(27); "0"
20 LPRINT CHR$(27); "/"
30 FOR X=1 TO 66
40 LPRINT "ACTIVATE PAPER-OUT SENSOR"
50 NEXT X
60 END
```

The printer prints out the sentence until it nears the bottom of the sheet.

CHAPTER 4

TROUBLESHOOTING AND PREVENTIVE MAINTENANCE



TROUBLESHOOTING

It Just Won't Work

Probably the most common problem cited by computer users is that sometimes the machine just won't work—it just doesn't respond. And usually the reason the machine won't respond turns out to be something very simple.

If your printer just won't budge, take the following steps:

- Make sure all the connections are attached properly. Check that the power cord is plugged in, that the Power light is on, and that the black SIO cable is connected securely to the printer and to the computer (see the section, **Connecting the Printer**).
- Make sure the On Line light is illuminated. If it isn't, press the On Line button.
- If you have connected more than one printer to your system, be certain that only one printer at a time is turned on.

Print Quality

If you detect inconsistencies in print quality or find the quality generally poor, a few things may be going wrong. Again, the reasons and solutions are simple and straightforward.

- Be sure the ribbon cartridge is installed correctly (see the section, **The Ribbon Cassette**).
- If printed characters appear light, smudged, or spotty even after you've checked to see that the ribbon cassette is installed correctly, the ribbon is probably feeding incorrectly because it is damaged. Replace the ribbon cassette.
- The printer is equipped with a sensor that alerts you when the ribbon has run out, as well as when you've neglected to install the ribbon. If the sensor switches the printer off-line when the ribbon is installed, most likely the ribbon is used up. The window on the underside of the cassette allows you to check the ribbon. Replacement ribbon cassettes are available.
- Check to see whether the daisy wheel is installed properly (see the section **The Daisy Wheel**). If a particular character prints poorly, the type element for that character may

be damaged. Remove the daisy wheel and inspect it. If any element is damaged, replace the daisy wheel with a new one. Replacement daisy wheels like the one packed with your printer, as well as daisy wheels with other type fonts and character pitches, are available.

Paper Jams

Sometimes the paper may fail to advance properly, and you'll have a paper jam on your hands. Most often, paper jams occur when the paper is loaded incorrectly. Here's how to solve the problem:

- Turn off the printer. Carefully remove the paper, locating and extricating any torn pieces stuck along the paper path. Use tweezers to remove bits of paper that you cannot grasp easily with your fingers.
- Reload the paper and be sure the paper-release lever is lowered to the friction-feed position (see the section, **Loading Paper**).

Note: Your ATARI XDM121 Printer is designed for low maintenance and high reliability. However, like anything mechanical, a printer can break down. If you encounter problems you think may be serious, take your printer to an authorized ATARI Service Center immediately. To prevent problems, have your printer checked by an authorized ATARI Service technician at least once a year.

PREVENTIVE MAINTENANCE

To ensure top performance from your printer, follow these simple maintenance guidelines:

- Keep the printer dust-free, especially the daisy-wheel and carriage areas. To avoid dust, keep the top cover on and closed both when you are using and when you are storing your printer.
- Keep the platen and paper-bail rollers clean. Use a cotton ball moistened lightly with rubbing alcohol to wipe them off occasionally. Rotate the platen as you swab across it.
- Do not touch the carriage rod or guide bar. Finger oils attract dust, which may interfere with the smooth movement of the carriage along the rod and bar.
- Do not drop foreign objects into the print-head and carriage-rod areas. If you do so by accident, immediately switch the printer off. Carefully remove the object.

- Use only a soft, damp cloth to clean the outside of the printer as needed. Household cleansers and abrasives may damage the printer's plastic housing.
- Wait at least two seconds after you turn the printer off before you turn it on again. If you don't, the printer may not initialize properly.
- Never try to move the carriage manually.
- Never print without paper.
- Always place your printer securely on a firm, flat surface.
- Avoid operating the printer in an environment where electrostatic or electromagnetic fields exist.
- Avoid installing or operating the printer in a room subject to 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 95° F (5°C to 35°C). Store your printer only at temperatures from 4°F to 140°F (– 20°C to 60°C).
- To ship or store the printer, carefully repack it in the original factory packing materials. (Refer to the section, **Unpacking Instructions**).



APPENDIX A

PRINTER CONTROL CODE SUMMARY

□ □ □ □ □ □ □ □ □ □ □ □ □ □ □

NAME	CODE	DECIMAL	HEXA- DECIMAL	FUNCTION
Absolute Horizontal Tab	Escape Control I <i>n</i>	27, 9, <i>n</i>	\$1B, \$09, <i>n</i>	Moves the carriage to a designated horizontal position
Auto Underlining	Control O Escape Control Y	15 27, 25	\$0F \$1B, \$19	Underlines text
Auto Underlining Off	Control N Escape Control Z	14 27, 26	\$0E \$1B, \$1A	Cancels underlining
Backspace	Control H	8	\$08	Backspaces one character space
Backward Printing	Escape U Control B	27, 85, 2	\$1B, \$55, \$02	Prints a line backward from right to left
Bidirectional Printing	Escape U Control ,	27, 85, 0	\$1B, \$55, \$00	Selects bidirectional printing
Bold Print	Escape E	27, 69	\$1B, \$45	Prints boldface characters
Bold Print Off	Escape F	27, 70	\$1B, \$46	Cancels boldface print
Carriage Return	Control M	13	\$0D	Returns the carriage to the home position
Clear All Horizontal Tabs	Escape ' <i>n</i>	27, 39	\$1B, \$27	Clears all preset tab stops
End of Line	Return	155	\$9B	Causes automatic line feed and carriage return
Form Feed	Control L	12	\$0C	Advances the paper one page length
Horizontal Tab	Control I	9	\$09	Moves the carriage forward to a preset horizontal tab stop

Horizontal Tab Set	Escape #	27, 35	\$1B, \$23	Sets horizontal tab stop at present carriage position
Horizontal Tab Clear	Escape \$	27, 36	\$1B, \$24	Clears horizontal tab stop at present carriage position
Initialize Printer	Escape @	27, 64	\$1B, \$40	Initializes the printer
International Character Mode	Escape Control W	27, 23	\$1B, \$17	Prints international characters
International Character Mode Off	Escape Control X	27, 24	\$1B, \$18	Cancels international characters
Left Margin Set	Escape (27, 40	\$1B, \$28	Sets the left margin at the present carriage position
Left-to-Right Printing	Escape U Control A	27, 85, 1	\$1B, \$55, \$01	Prints from left to right
Line Feed	Control J	10	\$0A	Advances the paper one line
Line Spacing	Escape Control = v	27, 29, v	\$1B, \$1D, v	Sets line spacing in increments of 1/48 inch
Lines per Page	Escape C p	27, 79, p	\$1B, \$43, p	Sets the number of lines per page
Paper Advance	Escape Control K n	27, 11, n	\$1B, \$0B, n	Advances the paper to a designated line
Paper-Out Sensor Off	Escape 0	27, 48	\$1B, \$30	Disables paper-out sensor (paper-feeder option only)
Paper-Out Sensor On	Escape /	27, 47	\$1B, \$2F	Reactivates the paper-out sensor (paper-feeder options only)
Print Pitch	Escape Control * h	27, 31, h	\$1B, \$1F, h	Sets character pitch (number of characters per inch)

Reverse Line Feed	Escape Control J	27, 10	\$1B, \$0A	Retracts the paper one line
Space	Space Bar	32	\$20	Moves the car- riage forward one character space
Subscript Print	Escape Control -	27, 28	\$1B, \$1C	Advances the paper one-half line
Superscript Print	Escape Control +	27, 30	\$1B, \$1E	Retracts the paper one-half line



APPENDIX B

ASCII TABLE

□ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □

Decimal Code	Hexa-decimal Code	Printed Character/ Printer Function	Keystrokes	International Character ¹
0	\$00		Control ,	á
1	\$01		Control A	ù
2	\$02		Control B	Ñ
3	\$03		Control C	É
4	\$04		Control D	Ç
5	\$05		Control E	ô
6	\$06		Control F	ò
7	\$07		Control G	ì
8	\$08	(Backspace)	Control H	£
9	\$09	(Horizontal Tab)	Control I	ï
10	\$0A	(Line Feed)	Control J	ü
11	\$0B	(Vertical Tab)	Control K	ä
12	\$0C	(Form Feed)	Control L	Ö
13	\$0D	(Carriage Return)	Control M	ú
14	\$0E	(Auto Underlining Off)	Control N	ó

¹The printer must be in the International Character Mode to print the international characters. All noninternational characters (except for decimal codes 96 and 126) are also available when the printer is in international mode.

Decimal Code	Hexa-decimal Code	Printed Character/ Printer Function	Keystrokes	International Character
15	\$0F	(Start Auto Underlining)	Control O	ö
16	\$10		Control P	Û
17	\$11		Control Q	â
18	\$12		Control R	û
19	\$13		Control S	î
20	\$14		Control T	é
21	\$15		Control U	è
22	\$16		Control V	ñ
23	\$17		Control W	ê
24	\$18		Control X	à
25	\$19		Control Y	à
26	\$1A		Control Z	À
27	\$1B		Escape Escape	
28	\$1C		Escape Control -	↑
29	\$1D		Escape Control =	↓
30	\$1E		Escape Control +	←
31	\$1F		Escape Control *	→
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	

Decimal Code	Hexa-decimal Code	Printed Character/ Printer Function	Keystrokes	International Character
41	\$29)	Shift 0	
42	\$2A	*	*	
43	\$2B	+	+	
44	\$2C	,	,	
45	\$2D	-	-	
46	\$2E	.	.	
47	\$2F	/	/	
48	\$30	0	0	
49	\$31	1	1	
50	\$32	2	2	
51	\$33	3	3	
52	\$34	4	4	
53	\$35	5	5	
54	\$36	6	6	
55	\$37	7	7	
56	\$38	8	8	
57	\$39	9	9	
58	\$3A	:	Shift ;	
59	\$3B	;	;	
60	\$3C	<	<	
61	\$3D	=	=	
62	\$3E	>	>	
63	\$3F	?	Shift /	
64	\$40	@	Shift 8	
65	\$41	A	A	
66	\$42	B	B	

Decimal Code	Hexa-decimal Code	Printed Character/ Printer Function	Keystrokes	International Character
67	\$43	C	C	
68	\$44	D	D	
69	\$45	E	E	
70	\$46	F	F	
71	\$47	G	G	
72	\$48	H	H	
73	\$49	I	I	
74	\$4A	J	J	
75	\$4B	K	K	
76	\$4C	L	L	
77	\$4D	M	M	
78	\$4E	N	N	
79	\$4F	O	O	
80	\$50	P	P	
81	\$51	Q	Q	
82	\$52	R	R	
83	\$53	S	S	
84	\$54	T	T	
85	\$55	U	U	
86	\$56	V	V	
87	\$57	W	W	
88	\$58	X	X	
89	\$59	Y	Y	
90	\$5A	Z	Z	
91	\$5B	[Shift ,	
92	\$5C	\	Shift +	

Decimal Code	Hexa-decimal Code	Printed Character/ Printer Function	Keystrokes	International Character
93	\$5D]	Shift .	
94	\$5E	^	Shift *	
95	\$5F	—	Shift —	
96	\$60	\	Control .	i
97	\$61	a	a	
98	\$62	b	b	
99	\$63	c	c	
100	\$64	d	d	
101	\$65	e	e	
102	\$66	f	f	
103	\$67	g	g	
104	\$68	h	h	
105	\$69	i	i	
106	\$6A	j	j	
107	\$6B	k	k	
108	\$6C	l	l	
109	\$6D	m	m	
110	\$6E	n	n	
111	\$6F	o	o	
112	\$70	p	p	
113	\$71	q	q	
114	\$72	r	r	
115	\$73	s	s	
116	\$74	t	t	
117	\$75	u	u	
118	\$76	v	v	

Decimal Code	Hexa-decimal Code	Printed Character/ Printer Function	Keystrokes	International Character
119	\$77	w	w	
120	\$78	x	x	
121	\$79	y	y	
122	\$7A	z	z	
123	\$7B		Control;	Ä
124	\$7C		Shift =	
125	\$7D		Escape Control < or Escape Shift <	
126	\$7E	~	Escape Delete Backspace	
127	\$7F		Escape Tab	

APPENDIX C

OVERVIEW OF PRINT FORMATTING



HORIZONTAL ACTION

Print Pitch and the Horizontal Motion Index

The print pitch is the spacing between the characters printed consecutively across a line. The printer's carriage can move horizontally at a minimum of 1/120-inch increments.

To calculate the print pitch, you must specify the value of the h variable in the following formula:

$$1/120 \text{ inch} \times (h-1) = \text{Print Pitch}$$

The value of $(h-1)$ is called the Horizontal Motion Index (HMI). The HMI can be a value from 0 to 125 (that is, h can be a number from 1 to 126).

To set the character spacing, you would use the Print Pitch control code (Escape Control * h). The number that you insert for the h variable in the control code determines the HMI and, hence, the print pitch.

Horizontal Column Number

A horizontal column number is the particular horizontal position (or character space) that a given character occupies on a line. The printer can print a maximum line length of about eight inches across, and the carriage can move in increments of 1/120 inch ($8 \div 1/120 = 960$, approximately). These incremental positions are called Horizontal Positions (HPs). The far-left horizontal position is designated as HP 0. The far-right horizontal position is HP 950.

To calculate the horizontal column number, use the following formula:

$$(\text{HP}/\text{HMI}) + 1 = \text{Horizontal Column Number}$$

The horizontal column number expresses the numbered position that a given character can occupy from the far-left margin setting (HP 0).

Using 10-pitch character spacing ($HMI = 12$), the maximum number of horizontal column numbers (character spaces across a line) is $950/12 + 1 = 80$ (approximately).

That is, you can print a maximum of 80 horizontal columns (characters) across a line when you are using 10-pitch character spacing.

VERTICAL ACTION

The Vertical Motion Index and Line Spacing

The printer can advance the paper in minimal increments of $1/48$ inch. To calculate the spacing between printed lines, you must specify the value of the v variable in the following formula:

$$1/48 \text{ inch} \times (v-1) = \text{Line Spacing (inches)}$$

The $(v-1)$ value is called the Vertical Motion Index (VMI). The VMI can be a value from 0 to 125 (that is, v can be a number from 1 to 126).

To set the line spacing, you would use the Line Spacing code (Escape Control + v). The number that you insert for the v variable in the control code determines the VMI and, hence, the line spacing in inches.

Vertical Line Number

The vertical line number indicates the vertical position of any given printed line. The printer can advance paper in increments of $1/48$ inch. When you are using 11-inch paper, the maximum number of $1/48$ -inch increments is 520 ($11 \div 1/48 = 520$, approximately). These incremental positions are called Vertical Positions (VPs). The top-of-page position is designated as VP 0. The last line is VP 520.

To calculate the vertical line number, use the following formula:

$$(VP/VMI) + 1 = \text{Vertical Line Number}$$

The vertical line number expresses the position of any given line from the top of the page.

When you are using 1/6-inch line spacing (the default line spacing, VMI = 8) and 11-inch paper, the maximum number of lines per page is

$$(520/8) + 1 = 66$$

That is, you can print a maximum of 66 lines per page on 11-inch paper at 1/6-inch line spacing.

To set the number of lines per page, you would use the Escape C *p* code. The Escape C *p* code also affects the number of inches per page.



APPENDIX D

XDM121 PRINTER SPECIFICATIONS

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Printing Method	Daisy wheel
Printing Speed	12 characters per second
Print Direction	Bidirectional with logic-seeking capability (unidirectional programmable option)
Daisy Wheel	96 characters
Horizontal Pitches	10- or 12-pitch and programmable
Maximum Characters per Line	10-pitch: 80 characters 12-pitch: 96 characters
Line Spacing	1/6 inch (4.23 mm) or programmable in increments of 1/48-inch minimum
Line-Feed Speed	2.5 inches per second
Paper-Feed Method	Friction
Paper-Feed Direction	Forward and reverse
Paper Width	11.8 inches (300 mm) maximum
Paper Thickness	One original plus three carbon copies maximum
Paper Type	Single sheets or pin-feed paper with optional pin-feed tractor feeder
Paper Entry	Rear
Standard Ribbon	Cassette containing multistrike carbon-film ribbon; life expectancy: 190,000 characters

Ribbon Options	Cassette containing fabric or one-strike carbon-film ribbon; life expectancies: 750,000 and 60,000 characters, respectively
Interface	ATARI 8-bit serial
Power Options	100V, 120V, 220V, 240V AC (50/60Hz)
Power Consumption	Operating: 55W
Weight	14.4 pounds (7 kg)
Dimensions (W x H x D)	15.6 x 5.0 x 12.4 inches (398 x 128 x 316 mm)
Ambient Temperature:	
Operating	41°F to 95°F (5°C to 35°C)
Storage	-4°F to 140°F (-20 °C to 60°C)
Maximum Humidity:	
Operating	20% to 80% relative humidity, non-condensing
Storage	10% to 80% relative humidity, non-condensing

CUSTOMER SUPPORT



Atari Corp. welcomes any questions and suggestions you might have about your XDM121 Printer or about any other ATARI Computer product.

Please call the Customer Relations Department at (408) 745-4851.

Or write to:

ATARI Customer Relations
P.O. Box 61657
Sunnyvale, CA 94088

Your local ATARI User Groups are outstanding sources of information on using ATARI Computer products. To obtain a list of User Groups in your area, send a self-addressed stamped envelope to:

ATARI User Group List
P.O. Box 61657
Sunnyvale, CA 94086





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Printed in Japan
CO26323