

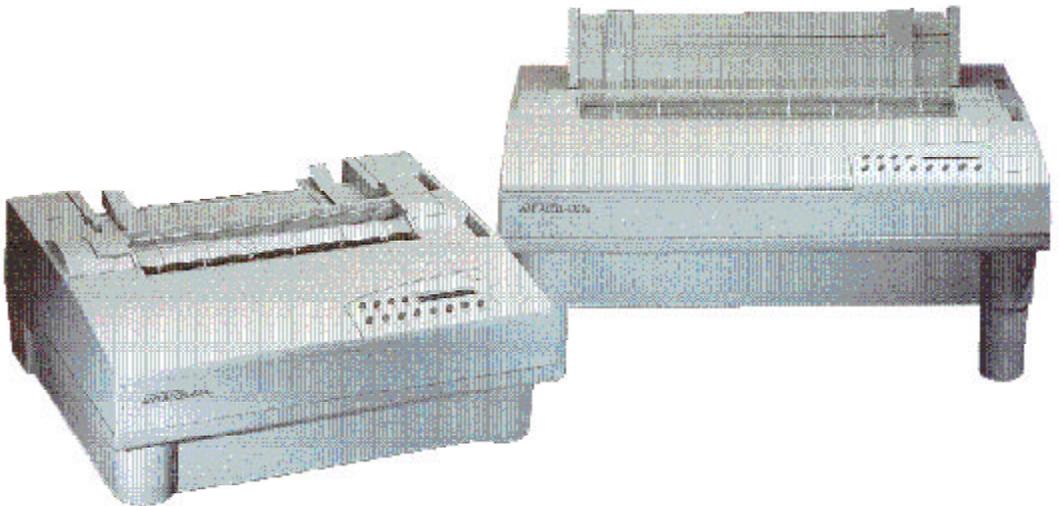


# AMT<sup>®</sup> ACCEL-6300<sup>™</sup>

PRINTER SERIES

## User's Guide

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Document No. 387002, Rev. E



# **AMT<sup>®</sup> ACCEL<sup>™</sup>-6300**

**P R I N T E R S E R I E S**

## **User's Guide**

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**Unpacking**

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**Set Up**

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**Loading Paper**

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**Control Panel**

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**Cleaning & Maintenance**

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**Solving Problems**

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**Bottom-Feed Tractors**

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**Bar Codes**

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**Interfaces**

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**Code Sets**

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**Specifications**

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Document No. 387002 • Revision E

**AMT Datasouth Corp.**  
4765 Calle Quetzal  
Camarillo, CA 93012

**TEL: (805) 388-5799    FAX: (805) 484-5282    WEB: [amtdatasouth.com](http://amtdatasouth.com)**



## Preface

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Thank you for selecting an AMT Datasouth® ACCEL™-6300 series printer. Using an all-metal chassis, 24-wire dot-matrix printhead, state-of-the-art electronics, and simple user controls, your printer will provide fast and reliable printing for years to come.

### *Printer Models*

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AMT Datasouth ACCEL-6300 series printers consist of four models. Each model is distinguished by the following features:

<b>MODEL</b>	<b>Narrow-carriage 11-inch-wide printing</b>	<b>Wide-carriage 16-inch-wide printing</b>	<b>Motorized bottom-feed forms tractor</b>
<b>ACCEL-6310 .....</b>	✓		
<b>ACCEL-6310d ...</b>	✓		✓
<b>ACCEL-6350 .....</b>		✓	
<b>ACCEL-6350d ...</b>		✓	✓

## About This User's Guide

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This user's guide provides information that will help you set up and operate all of the models in the AMT Datasouth ACCEL-6300 printer series. If you are using the printer for the first time, you should perform the procedures in sections 1, 2 and 3 to set up the printer. Then, use section 4 to learn how to use control panel functions. The rest of the guide contains reference information that will help you get the most from your printer.

The guide is divided into six sections and five appendixes:

- ✓ Section 1, *Unpacking*, describes how to find a good place for your printer and unpack it.
- ✓ Section 2, *Set Up*, points out the various components you use to operate the printer and describes how to install the paper deflector and ribbon cartridge. It also describes how to check the voltage select switch, attach the power cord, turn the printer on, load paper, print a self test and attach the interface cables.
- ✓ Section 3, *Loading Paper*, describes how to load various kinds of media into the printer, including single sheets, pin-feed paper, multi-part forms, labels and transparencies.
- ✓ Section 4, *Control Panel*, describes how to use the control panel.
- ✓ Section 5, *Cleaning and Maintenance*, describes how to keep your printer in good shape and how to replace the ribbon cartridge, print-head and fuse.
- ✓ Section 6, *Solving Problems*, describes printer messages, provides a troubleshooting guide, and shows how to run printer tests.
- ✓ Appendix A, *Bottom-Feed Tractors*, describes how to use the powered bottom-feed forms tractors on the AMT Datasouth ACCEL-6310d and -6350d models.
- ✓ Appendix B, *Bar Codes*, provides information on printing bar codes.
- ✓ Appendix C, *Interfaces*, provides technical information on the parallel and serial interfaces of the printer.
- ✓ Appendix D, *Code Sets*, describes the printer's code sets.
- ✓ Appendix E, *Specifications*, lists printer specifications.

## Conventions

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Some of the procedures in this guide contain special notices that highlight important information:

-  **Notes** Indicate information that you should know to help your printer run properly and efficiently.
-  **Cautions** Indicate guidelines that, if not followed, can cause damage to equipment.
-  **Warnings** Indicate a situation where there may be a danger to yourself.

The use of the terms *right* and *left* assume that you are looking at the front of the printer.

## Technical Support

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If you have a problem with your printer, refer to the *Solving Problems* section for troubleshooting information. If you are unable to solve the problem yourself, contact the Dealer that sold you the printer. The Dealer should be able to assist you or tell you where to find additional help.

## Trademarks

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AMT Datasouth is a registered trademark of AMT Datasouth Corp. ACCEL and Select-dial are trademarks of AMT Datasouth Corp. All other brands and product names are registered trademarks of their respective owners.

## Copyright

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## One-Year Limited Warranty

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AMT Datasouth Corp. ("AMT Datasouth") warrants your printer to be free from defects in materials and workmanship for a period of one year from the date of purchase from AMT Datasouth or an Authorized AMT Datasouth Dealer. This warranty is limited to the original purchaser ("Purchaser") of the printer and is not transferable.

AMT Datasouth's obligation under this warranty is limited to replacing or repairing, at its option, at its designated site, and by its designated agent, any products or major assemblies that are returned to AMT Datasouth or its agent within the warranty period that are found by AMT Datasouth to be defective in proper usage. Purchaser may, at its option, return the printer to AMT Datasouth or disassemble the printer and return to AMT Datasouth only the major assembly needing repair, referring in writing the serial number of the major assembly needing repair and the serial number of the product from which the assembly is removed. Purchaser shall prepay transportation and insurance charges to AMT Datasouth's designated site. If returned parts are repaired or replaced under the terms of this warranty, AMT Datasouth will prepay transportation charges back to Purchaser's location; otherwise, Purchaser shall pay transportation and insurance charges in both directions.

*One-Year Limited Warranty—continued*

Dated proof-of-purchase must be provided by the Purchaser when request-ting warranty work to be performed. (A warranty reply card is included at the back of this guide and should be returned to AMT Datasouth within 10 days of accepting the product.) The Purchaser may request information on how to get warranty service by contacting an Authorized AMT Datasouth Dealer or writing to AMT Datasouth Corp., 4765 Calle Quetzal, Camarillo, CA 93012 for further information.

THE FOREGOING LIMITED WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES WITH RESPECT TO THE PRODUCTS, EITHER EXPRESSED OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, AND ANY OTHER OBLIGATION ON THE PART OF AMT DATASOUTH.

THE FOREGOING LIMITED WARRANTY SHALL CONSTITUTE THE SOLE AND EXCLUSIVE OBLIGATION AND LIABILITY OF AMT DATASOUTH. IN NO EVENT SHALL AMT DATASOUTH BE LIABLE FOR INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES, AND IN NO EVENT SHALL THE LIABILITY OF AMT DATASOUTH ARISING IN CONNECTION WITH ANY PRINTER SOLD HEREUNDER (WHETHER SUCH LIABILITY ARISES FROM A CLAIM BASED ON CONTRACT, WARRANTY, TORT OR OTHERWISE) EXCEED THE ACTUAL AMOUNT PAID BY THE PURCHASER FOR THE PRINTER.

## ***Factory Service***

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If you suspect that your printer needs service, first contact the Dealer that sold you the printer. The Dealer will ask you for the printer's model number and serial number, the date you purchased the printer, and an explanation of the problem. In the event that your Dealer is unable to help you and the warranty period is in effect, contact AMT Datasouth Corp., 4216 Stuart Andrew Blvd., Charlotte, NC 28217, (704) 523-8500, option 4, and ask for the Technical Support department. Be ready to provide the name of the Dealer that you contacted, the printer's model number and serial number, the date you purchased the printer, and an explanation of the problem.

If the AMT Datasouth Technical Support Representative is unable to solve the problem on the phone, you will be issued a Return Materials Authorization number (RMA number) and an address where to ship your printer for service. You must write the RMA number on the outside of the printer's shipping carton so that AMT Datasouth will accept the printer when it arrives at the Service Center. You must also enclose a copy of your purchase receipt or some other proof of the date of original purchase. You must send your printer prepaid and with adequate insurance to the supplied address. If the printer is repaired under the terms of the warranty, AMT Datasouth will prepay transportation charges back to your location, provided that this location is within the continental United States; otherwise, you must pay transportation and insurance charges in both directions.

**YOU MUST USE THE ORIGINAL PACKING MATERIAL TO SHIP YOUR PRINTER; OTHERWISE, A CHARGE WILL BE INCURRED FOR REPACKAGING.**

## Agency Compliances

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AMT Datasouth ACCEL-6300 series printers have been tested and found to comply with the applicable U.S. and Canadian requirements of Underwriters Laboratory Inc.®



LISTED File Number E173440  
I.T.E.



AMT Datasouth ACCEL-6300 series printers have been tested and found to comply with the applicable requirements of TÜV Rheinland.

Customer Number K720841

EN 60950:1992

AM1:1993

AM2:1993



AMT Datasouth ACCEL-6300 series printers have been tested and found to comply with the applicable requirements of EMC Directive 89/336/EEC.

EN55022 (1987)

EN50082-1 (1992)



As an ENERGY STAR® Partner, AMT Datasouth Corp. has determined that this product meets ENERGY STAR® guidelines for energy efficiency.

**FCC**  
**Class B**

## Instruction to the User

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- ✓ Reorient or relocate the receiving antenna.
- ✓ Increase the separation between the equipment and device.
- ✓ Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- ✓ Consult the dealer or an experienced radio/TV technician for help.

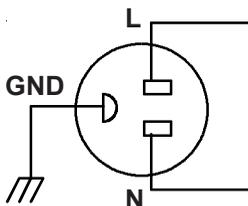
In order to maintain compliance with FCC regulations, shielded cables must be used with this equipment. Operation with non-approved equipment or unshielded cables is likely to result in interference to radio and TV reception. The user is cautioned that changes and modifications made to this equipment without the approval of manufacturer could void the user's authority to operate this equipment.

 **Caution:** Interface connectors may exceed class 2 or LPS limits. Appropriate interconnecting cabling in accordance with the NEC shall be used during installation.

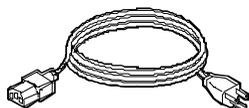
## Power Precautions

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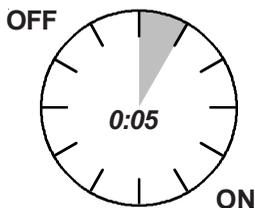
When installing and using the printer, be sure to take the following precautions:



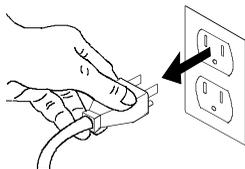
- ✓ Use the appropriate power supply and voltage frequency. Be sure to check the voltage select switch before the printer's first installation.



- ✓ Make sure the *total* length of the power cord does not exceed 16.4 feet (5 meters). Using a longer power cord can result in reduced voltage and possible malfunctions. Do not use an extension cord.



- ✓ After turning the power off, always wait at least five seconds before turning it back on.



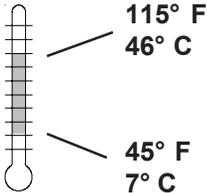
- ✓ In case of smoke, odd smells, or other trouble, unplug the power cord. Do not place furniture or other obstacles in front of the outlet.

⚠ **Caution:** When unplugging the power cord, pull the plug, not the cord.

## Operating Precautions

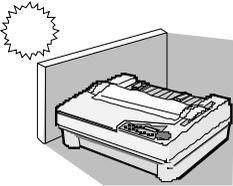
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When installing and using the printer, be sure to take the following precautions:

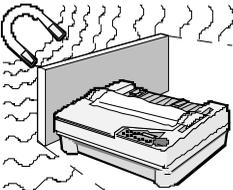


- ✓ Use the printer only within the following temperature and humidity ranges:

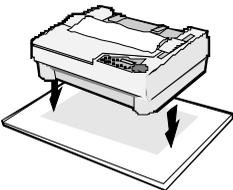
Ambient temperature: 7° to 46° Centigrade (45° to 115° F)  
Relative humidity: 10% to 85% noncondensing



- ✓ Avoid direct sunlight. Use a blind or heavy curtain to protect the printer from direct sunlight when the printer is near a window.

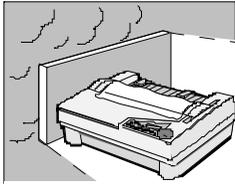


- ✓ Do not install the printer near devices that contain magnets or generate magnetic fields.

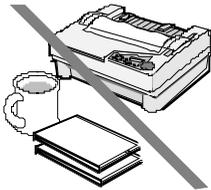


- ✓ Place the printer on a flat, horizontal surface. Protect the printer from strong physical shocks and vibrations. Lift the printer from underneath and on both sides.

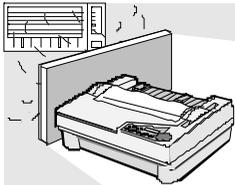
Operating Precautions—continued



- ✓ Keep the printer clean. Dust accumulation and paper fiber deposits can cause the printer to function improperly.



- ✓ Do not place cups, books or other objects on top of the printer. Be careful not to hang jewelry, clothes or hair near the paper entry slots.



- ✓ Do not install the printer near an air conditioner.

**AMT DATASOUTH CORP.**  
**4765 Calle Quetzal**  
**Camarillo, CA 93012**

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**Section****1**

## Unpacking

This section describes how to select a good place for the printer and unpack it. If the printer is already set up, you can skip ahead to the next section.

### *Selecting a Good Place for the Printer*

---

When selecting a place for your printer, observe the following guidelines:

- ✓ The site must be large enough to accommodate the printer. For *narrow*-carriage models, the site must be at least 21 inches (54 cm) wide by 19 inches (49 cm) deep. For *wide*-carriage models, the site must be at least 26 inches (66 cm) wide by 19 inches (49 cm) deep.
- ✓ The printer must be close enough to the computer for your cable to reach: 10 feet (3 meters) for parallel or 50 feet (15 meters) for serial.
- ✓ The printer must be on a flat, solid surface—never on a chair or any other unstable support.
- ✓ Choose a place that is clean and free from excessive heat (including direct sunlight), moisture, and dust.
- ✓ Use a grounded outlet—one that has three holes to match the power plug on the printer. Don't use an adapter plug or an extension cord.

*Unpacking 1-1*

### Selecting a Good Place for the Printer—continued

- ✓ Avoid outlets on the same circuit with large motors, such as copiers or postage machines, or other appliances that might disturb the power supply.
- ✓ Leave several inches of empty space in front, behind, and on both sides of the printer for good air flow.
- ✓ Leave proper clearances for your paper loading needs.

## Unpacking the Printer

---

To unpack the printer, use the following procedure:

1. Cut the packing tape and open the shipping carton.
2. Remove the components that are packed on top and around the printer.
3. Grasp the front and back edges of the printer and lift the printer out of the shipping carton.
4. Remove the foam end caps and place the printer on the site you selected.
5. Remove the protective plastic covering from the printer.
6. Peel off the tape that secures the wire locking loops on the parallel interface connector. The parallel interface connector is located on the back of the printer.
7. If your printer has a powered, bottom-feed forms tractor, peel off the tape that holds the pop-down supports in the raised position. This tape is located on the lower sides of the printer.
8. Verify that you have all of the items shown in figure 1-1. If anything is missing or damaged, contact the Dealer that sold you the printer.
9. Fill in the *Warranty Registration Card* at the back of this guide and mail it to AMT Datasouth. Returning this card ensures that you will be notified of the latest printer news and enhancements.
10. Save the packing materials in case you need to ship the printer later.

Unpacking the Printer—continued

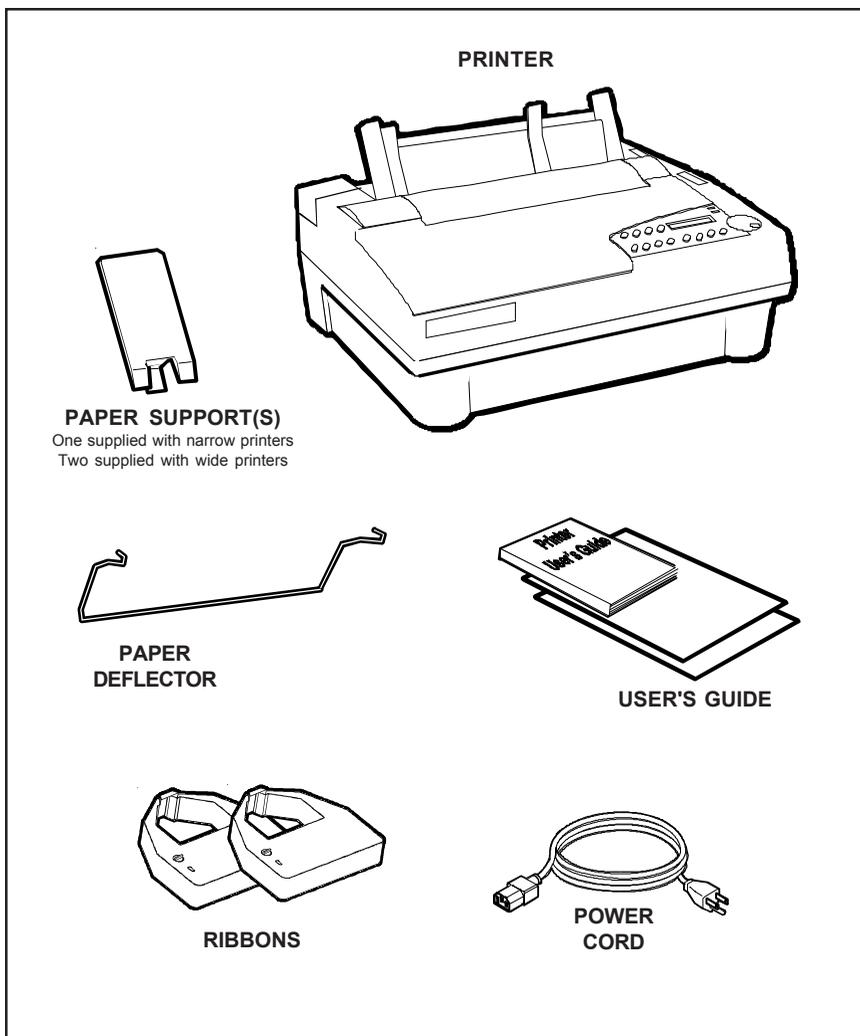


Figure 1-1. Unpacking the Printer

## Removing Internal Packing

---

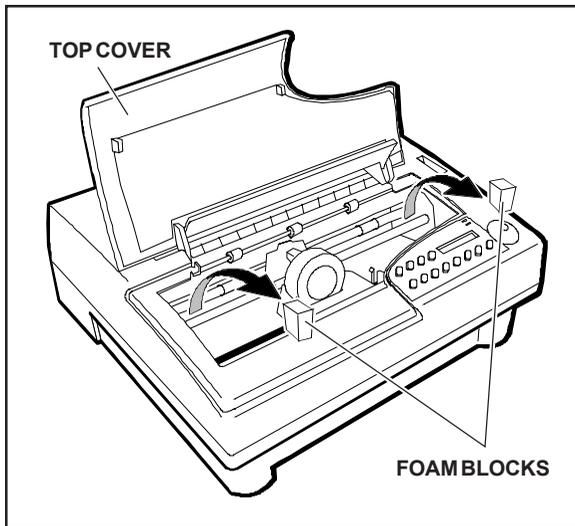


Figure 1-2. Removing the Foam Blocks

To remove the internal packing, use the following procedure:

1. Raise the top cover and locate the two foam blocks (one on each side of the main carriage shaft).
2. Carefully remove the foam blocks from the printer, as shown in figure 1-2.
3. Lower the top cover.

Be sure to save the internal packing materials with the rest of the packaging in case you need to ship or store the printer later.

## Section

# 2

## Set Up

---

This section points out the various printer components that you use to operate the printer and describes how to install the paper deflector and ribbon cartridge. This section also describes how to check the voltage select switch, attach the power cord, turn the printer on and off, load paper, print a self test, and attach the interface cables.

### *Introducing Printer Components*

---

You should familiarize yourself with the printer components that are shown in the figures on the following pages. They are referred to in the procedures throughout this guide.

Introducing Printer Components—continued

**SELECT-DIAL CONTROL PANEL**

Provides easy setup and configuration of the printer

**FORMS THICKNESS INDICATOR**

Shows the current forms thickness

**TRACTOR SELECT INDICATOR**

Shows whether the rear forms tractors are engaged or disengaged

**PAPER SUPPORT EXTENDER**

Provides additional support for long, single sheets

**PAPER SUPPORT**

Guides single sheets into the printer

**PLATEN ACCESS COVER**

Permits access to the platen shaft and gears for mounting paper handling accessories

**PLATEN WINDOW**

Lets you see printing in progress and helps guide paper as it exits the printer

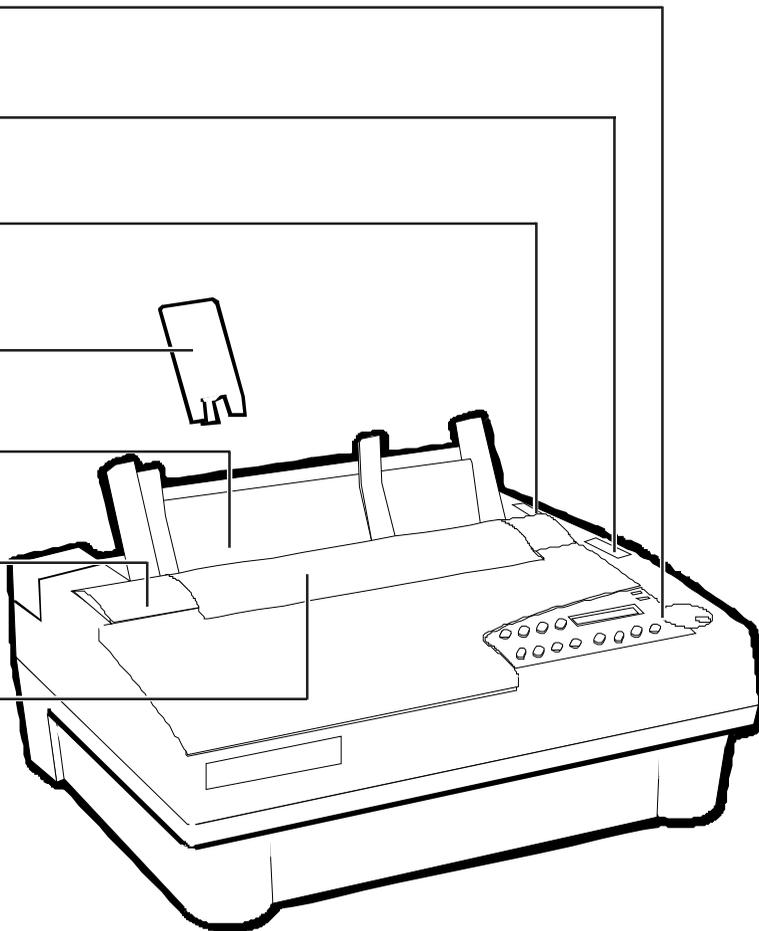


Figure 2-1. Printer Components, Front

## Introducing Printer Components—continued

### TOP COVER

Opens to reveal the carriage, ribbon and printhead

### PLATEN

Provides a firm print impression surface

### BAIL

Holds paper firmly against the platen with pressure rollers

### PAPER SCALE

Provides an easy way to align paper

### PRINT LINE INDICATOR

Shows the current print line on the page

### PRINthead

Impacts the ribbon and paper to produce printed images (user-replaceable and has 24 wires for high-quality printing)

### CARRIAGE

Carries the printhead and ribbon cartridge from side-to-side

### RIBBON

Holds the continuous-loop inked ribbon and is user-replaceable (black and color ribbons are available)

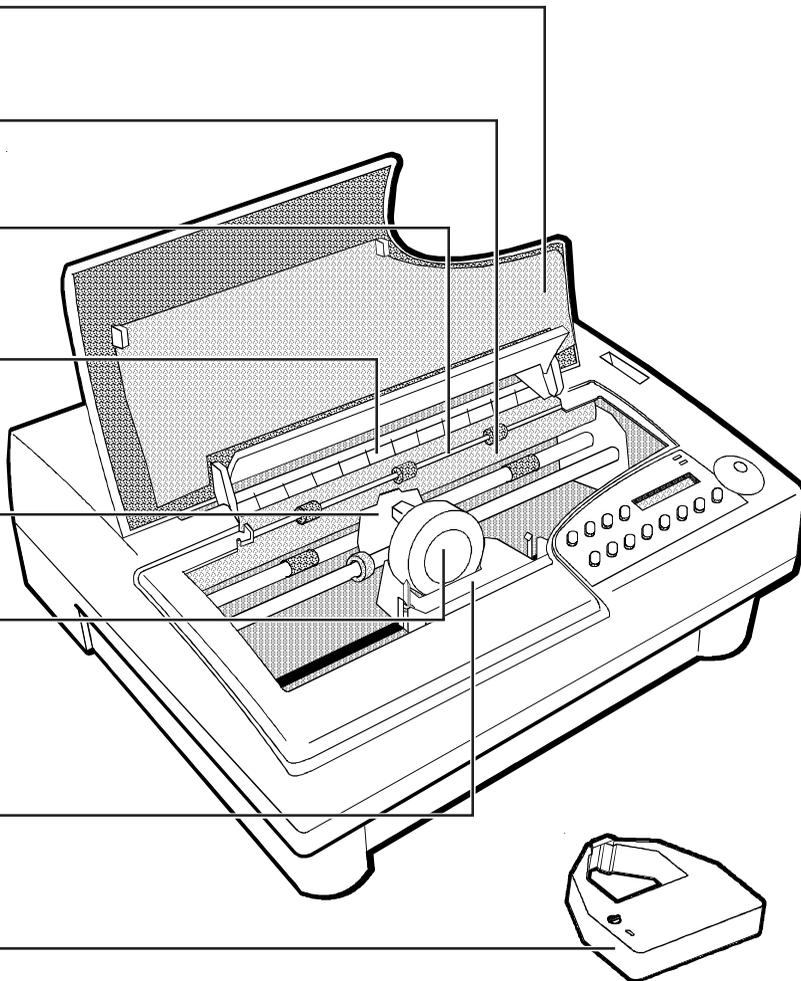


Figure 2-2. Printer Components, Internal

Introducing Printer Components—continued

**INTERFACE CONNECTORS**

Receives parallel and serial interface cables

**FORMS TRACTORS**

Guides pin-fed paper into the printer

**TRACTOR COVER**

Helps to reduce noise and guide paper; snaps into the raised position to allow access to forms tractors

**VOLTAGE SELECT SWITCH**

Lets you set up the printer to receive U.S. or international input power

**AC POWER RECEPTACLE**

Receives the power cable

**POWER SWITCH**

Lets you turn the printer on and off

**FUSE COMPARTMENT**

Contains the main power fuse and a spare fuse

**PAPER DEFLECTOR**

Hooks onto the rear tractor support shaft and deflects pin-fed paper away from the power and interface cables

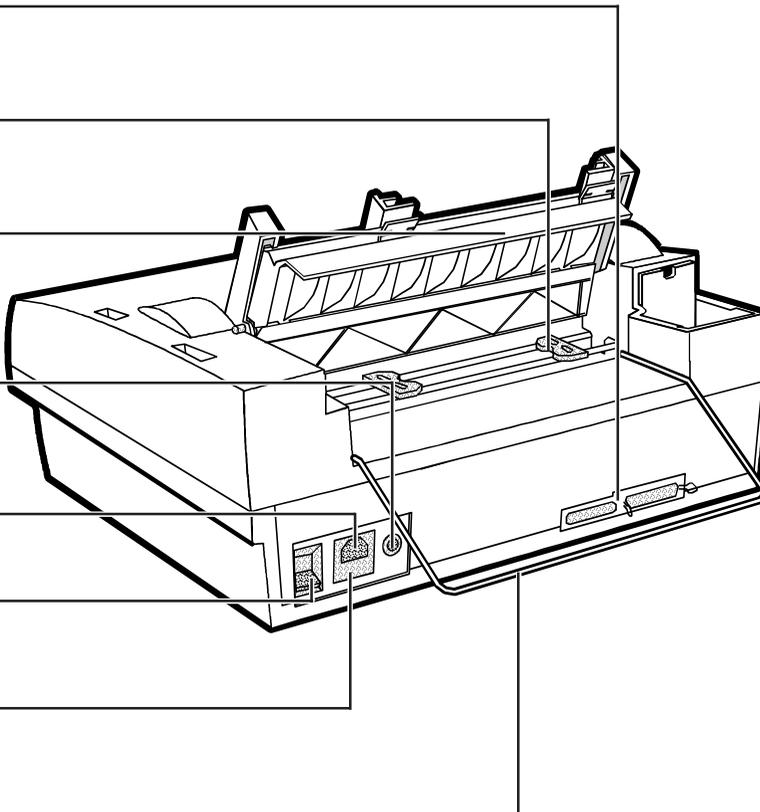


Figure 2-3. Printer Components, Rear

## Installing the Paper Deflector

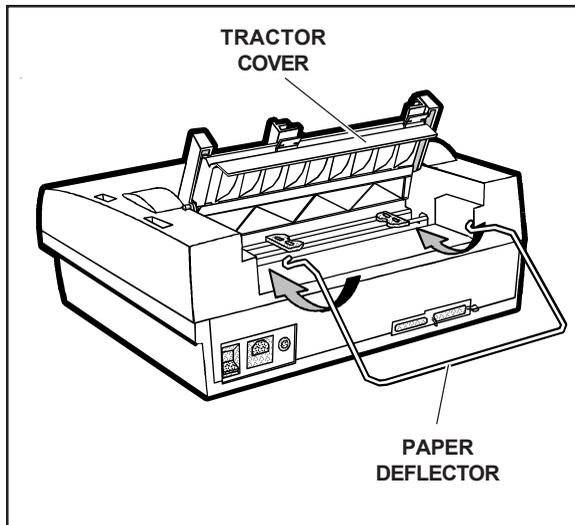


Figure 2-4. Installing the Paper Deflector

The paper deflector hooks onto the rear tractor support shaft to keep pin-feed paper away from the interface and power cables. To install the paper deflector, use the following procedure:

1. To gain access to the forms tractors, raise the tractor cover until it snaps into the raised position. Then, align the paper deflector, as shown in figure 2-4.
2. Hook both ends of the deflector onto the rear tractor support shaft, as shown in figure 2-5.
3. Lower the tractor cover.

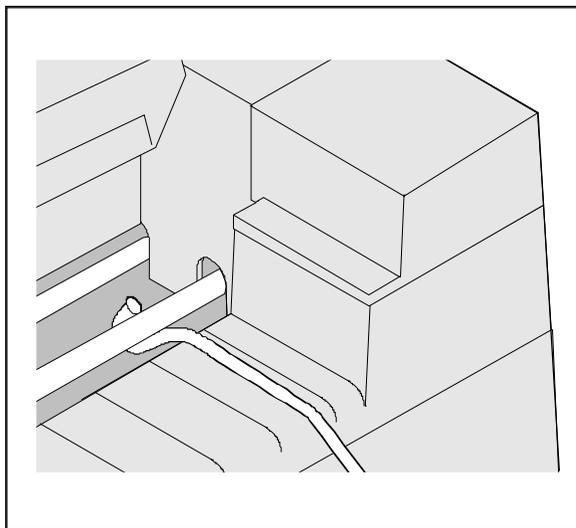


Figure 2-5. Hooking the Paper Deflector

## Installing the Ribbon Cartridge

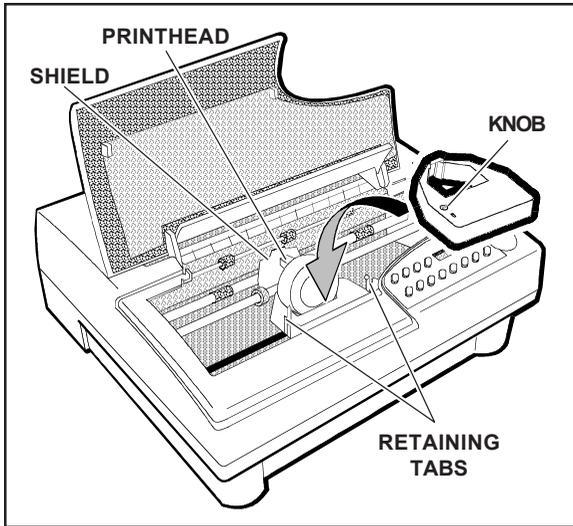


Figure 2-6. Installing a Ribbon Cartridge

Both black and color ribbon cartridges install the same way. To install a ribbon cartridge, use the following procedure:

1. Make sure the printer is off, raise the top cover, and slide the carriage to the center of the printer.
2. If a ribbon cartridge is already installed, remove it by gently pushing outwards on the retaining tabs and lifting the cartridge out of the printer.
3. Remove a new ribbon cartridge from its packaging. Be sure to remove the red ribbon lock from the bottom of the ribbon cartridge. Also, remove any slack in the ribbon fabric by turning the ribbon knob on the cartridge *counterclockwise*.
4. Insert the exposed portion of the ribbon between the printhead and the shield, as shown in figure 2-6.
5. Push down the ribbon cartridge until the retaining tabs snap into place. You may need to turn the ribbon knob slightly to get the cartridge to seat properly.
6. Slide the carriage from side-to-side and make sure the ribbon knob turns. Make sure the exposed ribbon is between the printhead and the shield. Then, lower the top cover.

If you try to print without a ribbon cartridge installed or if the cartridge is installed incorrectly, the message RIBBON ERROR will appear on the control panel to warn you.

## Checking the Voltage Select Switch

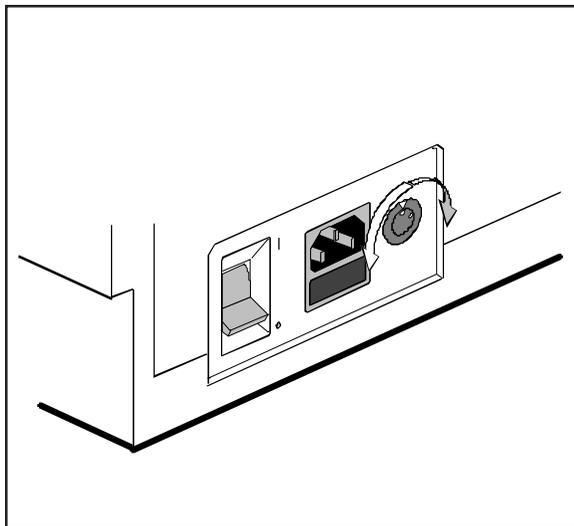


Figure 2-7. Setting the Voltage Select Switch

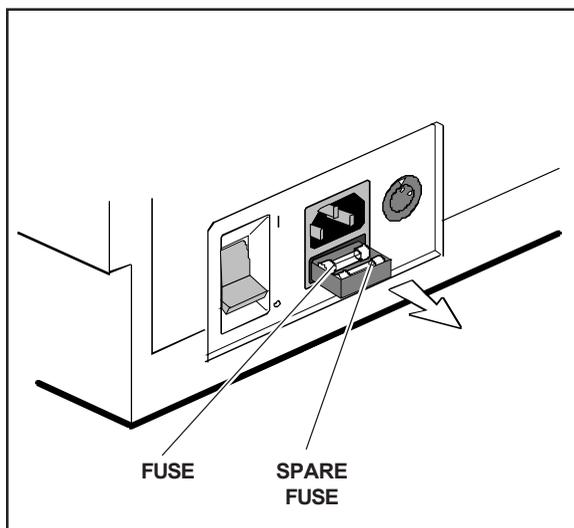


Figure 2-8. Locating the Fuse Compartment

The voltage select switch lets you set up the printer to receive U.S. or international input power. Before attaching the power cable, you must make sure the voltage select switch is set to the correct ac input voltage for your installation. If the voltage select switch is set incorrectly, use the following procedure:

1. Make sure the printer is off.
2. Using a slotted screwdriver, set the voltage select switch to the correct setting, as shown in figure 2-7.
3. Slide open the fuse compartment, as shown in figure 2-8, and check the innermost fuse (the other fuse is a spare).

**Note:** The serial number label on the side or rear of the printer shows the correct fuse rating for the printer.

4. Close the fuse compartment.

You are now ready to attach the power cord and turn on the printer.

## Attaching the Power Cord

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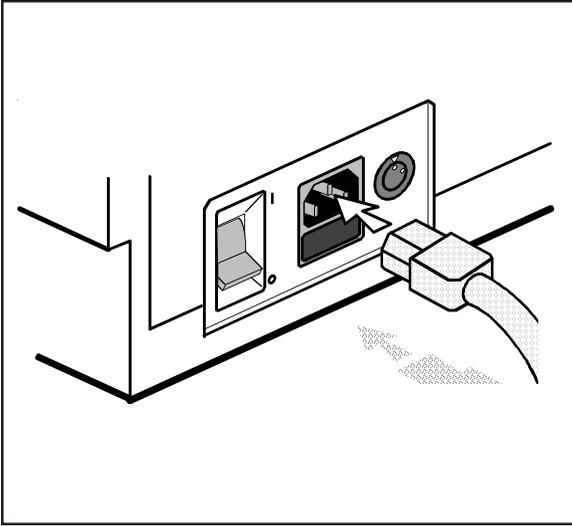


Figure 2-9. Attaching the Power Cord

After checking the voltage select switch, you are ready to attach the power cord. To do so, use the following procedure:

1. Make sure the power switch is off.
2. Take the power cord and plug the three-hole connector into the power receptacle at the rear of the printer, as shown in figure 2-9.
3. Plug the three-prong connector at the other end of the power cord into a properly grounded ac power outlet.

## Turning the Printer On and Off

---

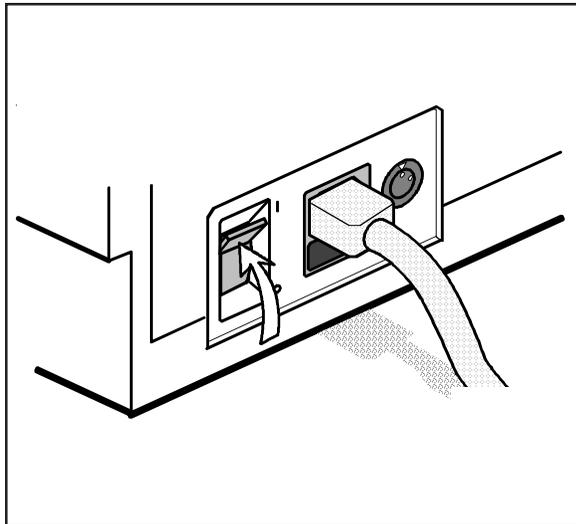


Figure 2-10. Turning On the Printer

To turn on the printer, set the power switch to the **I** position, as shown in figure 2-10.

To turn off the printer, set the power switch to the **O** position.

 **Cautions:**

- ✓ Do not unplug the power cord with the printer turned on.
- ✓ Wait at least five seconds after turning off the printer before turning it back on.

## Printing a Self Test

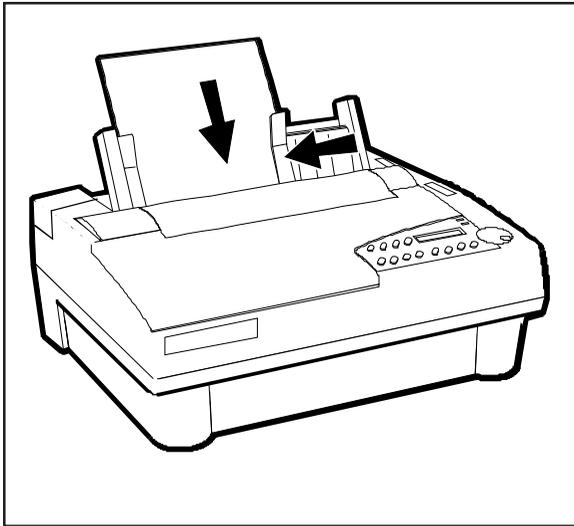


Figure 2-11. Loading a Cut Sheet

Self test lets you verify normal printing operation and inspect print quality. You should print a self test after installing the printer, after preventive maintenance, after extended periods of inactivity, and during troubleshooting when applicable.

To print a self test, perform this procedure:

1. With the paper support raised, squeeze the rear clip on the left paper edge guide and position the guide so that it aligns with the "0" mark (0) on the ruler.
2. Set a sheet of paper between the paper edge guides, as shown in figure 2-11. Squeeze the rear clip of the right paper edge guide and position it against the right side of the paper.
3. To print an 8-inch-wide self test, press the Test button, as shown in figure 2-12. (Or, to print a self test that is the width of the WIDTH parameter setting on the Setup menu, press the Test button twice in succession.) The paper will feed into the printer, the TEST message will blink on the control panel, and the self test will begin printing.
4. To stop the self test, press the Ready button. The printer will stop printing after completing the current line and the PAUSE message will appear.
5. Inspect the printout. Make sure that the characters are dark and crisp. If the quality is unacceptable, install a new ribbon cartridge and try again.

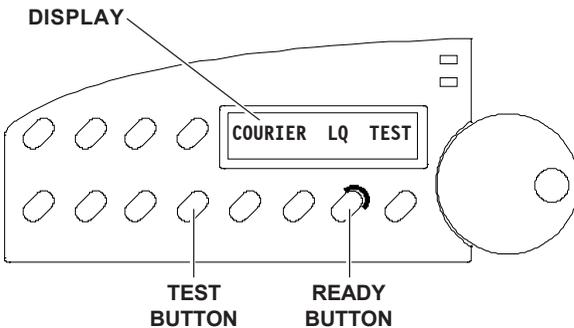


Figure 2-12. Printing a Self Test

## Attaching the Interface Cable

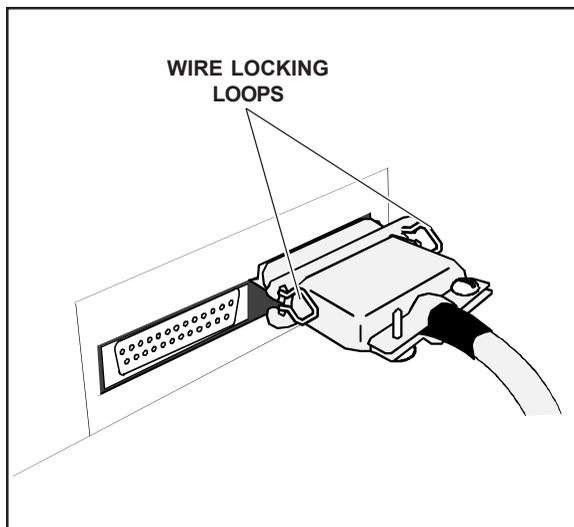


Figure 2-13. Connecting the Parallel Cable

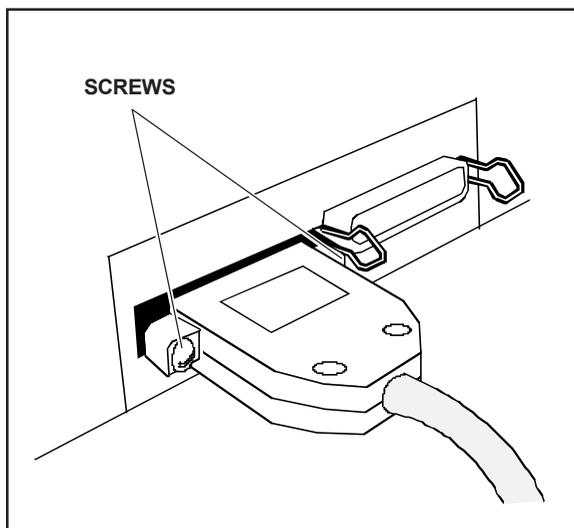


Figure 2-14. Connecting the Serial Cable

The printer has a Centronics®-compatible parallel interface and an EIA RS-232-C-compatible serial interface for communications with computers.

The printer does not come with an interface cable, since the correct cable to use depends on your computer. If you do not already have an interface cable, you can obtain one at a local computer supply store. If you are going to use the parallel interface, the cable must have a 36-pin male Centronics-type connector on the printer end. If you are going to use the serial interface, the cable must have a 25-pin male DB-25 connector on the printer end. The *Interfaces* appendix provides more details.

To connect an interface cable, use the following procedure:

1. Make sure that both your computer and printer are turned off.
2. If you are going to use the parallel interface, plug a parallel cable into the parallel receptacle (see figure 2-13) and lock it into place with the wire locking loops. If you are going to use the serial interface, plug a serial cable into the serial receptacle (see figure 2-14) and use a small slotted screwdriver to tighten the screws that secure the cable to the printer.
3. Connect the other end of the interface cable to the appropriate connector on your computer.

## Setting Communications Parameters

---

When the printer comes from the factory, it is ready to automatically switch between the parallel and serial ports. To use the parallel port, no further action is necessary. If you want to use the serial interface, however, you may need to first set the serial communications parameters on the printer's Setup menu. You'll need to set them so that they match the serial protocol that your computer uses.

The serial communications parameters consist of the following:

- ✓ INTRFCE. Lets you select the active interface: automatic switching, only parallel, or only serial.
- ✓ BAUD. Lets you specify the serial baud rate (that is, the speed of data transmission) that your computer uses.
- ✓ PARITY. Lets you specify the method of parity error checking that your computer uses.
- ✓ DATA BITS. Lets you specify the number of data bits in each serial data byte sent from your computer.
- ✓ STOP BITS. Lets you specify the number of stop bits in each serial data byte sent from your computer.
- ✓ HNDSHK. Lets you specify the handshaking protocol (that is, the method of printer busy notification) that your computer recognizes.

Refer to the *Control Panel* section of this guide for more information on setting communications parameters.

## Configuring Software

---

Your printer is now ready to receive and print data sent from your computer. Configuring most software applications to work with the printer requires only two steps: 1) select the correct printer, and 2) select the correct output port.

### *Selecting the Correct Printer*

Most software applications let you specify the type of printer you're using so that the application can take full advantage of all the printer's features. Many programs provide an installation or setup section that includes a list of printers from which to choose. To print data from your software application, first be sure to select one of the following printers from the list of supported printers:

- ✓ *AMT*
- ✓ *Diablo 630*
- ✓ *Epson JX*
- ✓ *Epson LQ-2550*
- ✓ *IBM XL24 Proprinter*
- ✓ *ASCII text printer*

Select *ASCII text printer* only if none of the other printers are listed. If none of these printers are listed, contact the software manufacturer to inquire about a printer "driver" for one of these printers.

### *Selecting the Correct Output Port*

Most software applications let you specify the output port where your printer is attached, so that the application knows where to send printer output. You normally specify the output port at the same time you specify the correct printer. You *must* specify the correct output port, otherwise printing cannot occur.

If a program does not permit you to specify an output port, it almost always sends data to the computer's line printer port (that is, the first parallel port). Using the proper operating system command, you can redirect all output that goes to the line printer port to any other port. Refer to your operating system manual for further information.



**Section****3**

## Loading Paper

---

This section describes how to load various kinds of media into the printer, including single sheets, pin-feed paper, multipart forms, labels, and transparencies. If your printer has bottom-feed forms tractors (that is, it is a 6310d or 6350d model), please refer to the appendix *Bottom Feed Tractors* for information on loading paper from the bottom of the printer.

### *Choosing Paper*

---

The printer can accommodate many different sizes and types of paper:

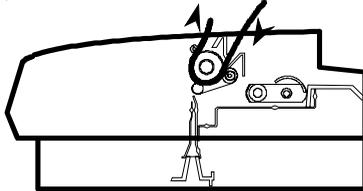
- ✓ Media can be from 4 to 17 inches wide on *wide*-carriage printers and from 4 to 12 inches wide on *narrow*-carriage printers. Single sheets must be at least 3 inches long.
- ✓ Multipart forms can have up to seven parts with carbons, and can be up to 0.024 inch thick.
- ✓ Labels and transparencies must also conform to the preceding dimensions. Transparencies require an ink-absorbent coating and paper backing sheets. You can purchase dot-matrix transparency material at most computer and printer supply outlets.

## Paper Paths

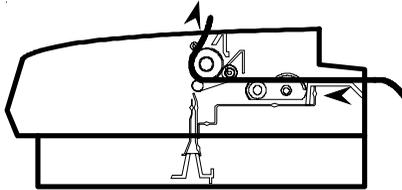
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The printer has three separate paper paths that you can use to load various types of paper.

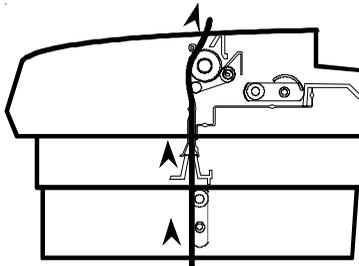
- ✓ *Top path.* You use this path to feed single sheets and forms.



- ✓ *Rear path.* You use this path to feed pin-feed media from the rear of the printer.



- ✓ *Bottom path.* If your printer has bottom-feed forms tractors, you use this path to feed pin-feed media from the bottom of the printer. This bottom path is ideal for thick multipart forms that do not bend easily. The bottom path supports paper movement in both directions.



---

**Note:** If your printer does not have bottom-feed forms tractors, you can purchase a top-pull tractor option that allows you to load pin-feed forms from the bottom of the printer. This option only supports forward paper movement.

---

## Selecting a Paper Path

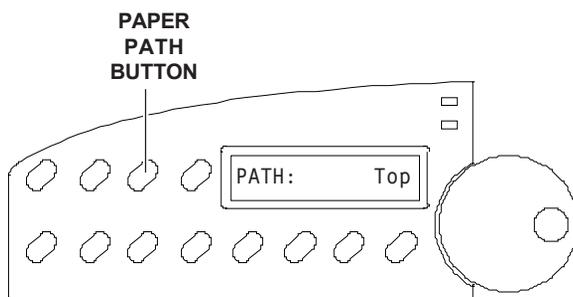


Figure 3-1. Selecting a Paper Path

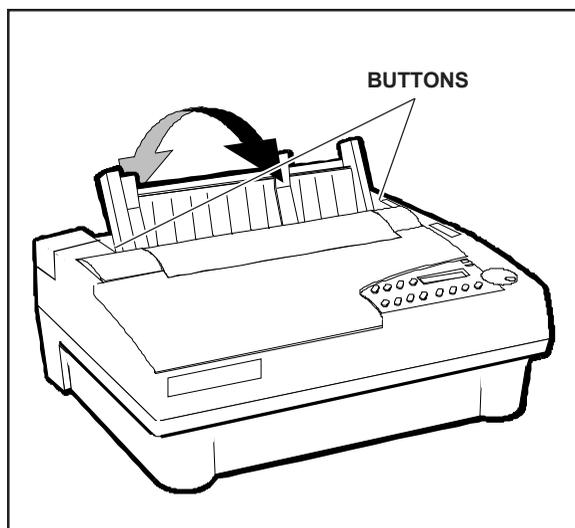


Figure 3-2. Positioning the Paper Support

The tractor select indicator indicates which paper path is selected:

- ☐ *Rear position:* In the rear position, the *top* or *bottom* paper path is selected.
- ☐ *Front position:* In the front position, the *rear* paper path is selected.

To select a paper path, press the Paper Path button on the control panel (see figure 3-1) to cycle through the paper path selections. The paper path that appears on the control panel display indicates the active path:

**PATH: Top**

**PATH: Rear**

**PATH: Bottom**

After you select a paper path, the tractor select indicator will move to the correct position automatically.

You should then position the paper support, shown in figure 3-2, as follows:

- ✓ When feeding cut sheets into the printer, raise the paper support. It will lock into place automatically.
- ✓ When feeding pin-feed paper, lower the paper support. Push in on the buttons on both sides of the support so it will drop toward the back of the printer.

## Loading Single Sheets

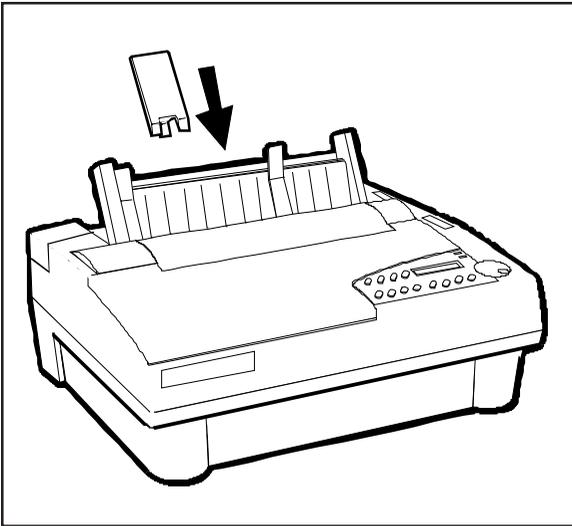


Figure 3-3. Attaching the Support Extender

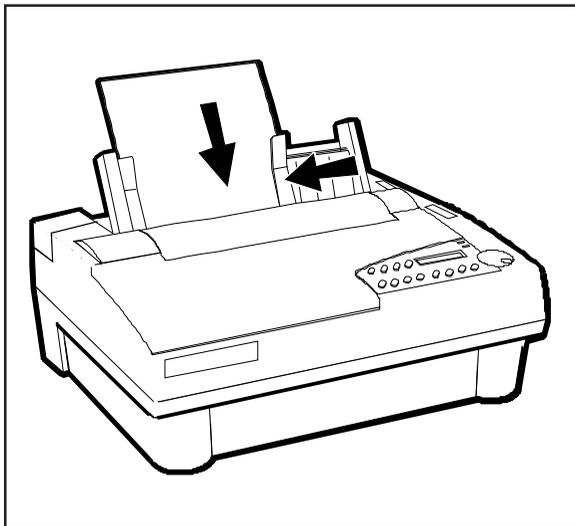


Figure 3-4. Loading a Single Sheet

You load single sheets from the top of the printer. After loading a sheet, the printer automatically positions the sheet to the first printable line. After printing, the printer ejects the sheet. If the printer has more information to print, the LOAD PAPER message appears on the control panel display to notify you.

To load a single sheet, use this procedure:

1. Using the Paper Path button, select the top paper path (  ).
2. Raise the paper support. If necessary for long single sheets, attach the paper support extender, as shown in figure 3-3.
3. Squeeze the rear clip on the left paper edge guide and position the guide so that it aligns with the "0" (  ) on the paper scale.
4. Set a single sheet into the left paper edge guide. Then, squeeze the rear clip on the right paper edge guide and position the guide up against the right edge of the paper, as shown in figure 3-4.
5. Press the Form Feed button. The sheet will advance into the printer.

### *Loading Single Sheets—continued*

You can load single sheets with pin-feed paper already loaded, provided that the pin-feed paper is in the *parked* position. You'll learn more about *paper park* later in this section. With a sheetfeeder option, you can load single sheets continually without operator intervention. For information on installing and operating a sheetfeeder option, refer to the *User's Guide* that came with the option.

### *Positioning a Single Sheet*

If necessary, you can reposition a single sheet after loading it. To do so, press the Ready button to disable printing. Then, turn the Select-dial either *clockwise* to advance the sheet or *counterclockwise* to reverse feed the sheet. Then, press the Ready button again to enable printing.

### *Ejecting a Single Sheet*

The printer ejects a single sheet under any of the following conditions:

- ✓ When instructed by your software application.
- ✓ When printing reaches the last print line on the page.
- ✓ When printing reaches the number of lines you or your software application specified for a page.
- ✓ When automatic form feeding is on and printing reaches a half-inch from the bottom of the page.
- ✓ When you press the Form Feed button on the control panel.

## Loading Pin-Feed Paper

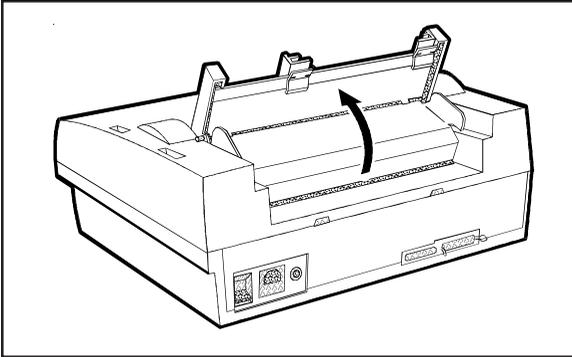


Figure 3-5. Raising the Tractor Cover

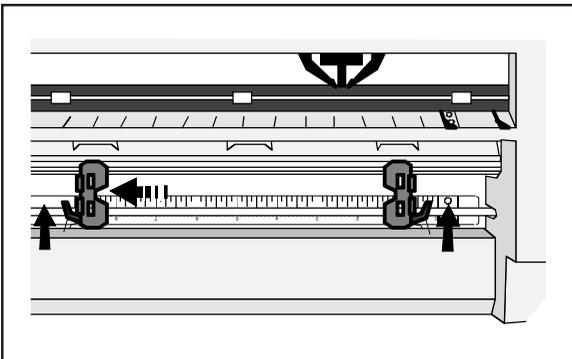


Figure 3-6. Unlocking the Tractors

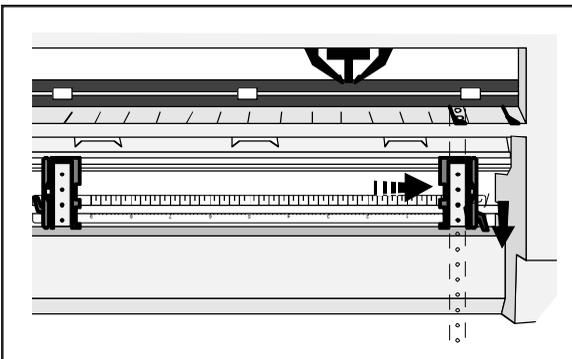


Figure 3-7. Aligning the Left-Edge Tractor

The printer contains two built-in, low-profile tractors that are easy to load. Normally, you load pin-feed paper from the back of the printer. After loading paper, the printer automatically advances the paper to the first printable line. When printing is completed on the first page, the printer advances the paper to the next sheet, again to the first printable line. This cycle continues for as long as the paper supply lasts.

If your printer has bottom-feed forms tractors, please refer to the *Bottom-Feed Tractors* appendix in this guide for information on loading paper from the bottom.

To load pin-feed paper in the printer, use the following procedure:

1. Using the Paper Path button, select the rear paper path (  ).
2. Raise the paper support and tractor cover, as shown in figure 3-5.
3. Unlock both tractors by moving the locking levers, as shown in figure 3-6.
4. Slide the left-edge tractor as needed so that the pin belt aligns with the circles on the paper scale. Then, lock the left-edge tractor into place, as shown in figure 3-7.
5. Open both tractor doors.

## Loading Pin-Feed Paper—continued

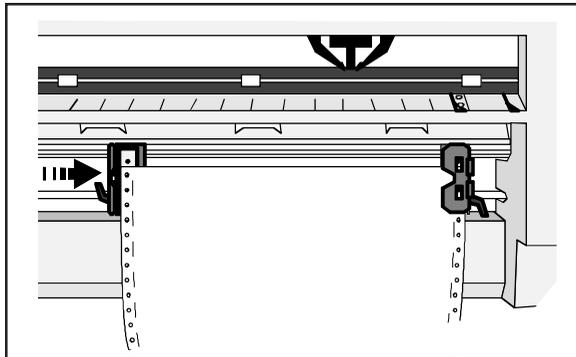


Figure 3-8. Loading Paper Into the Tractors

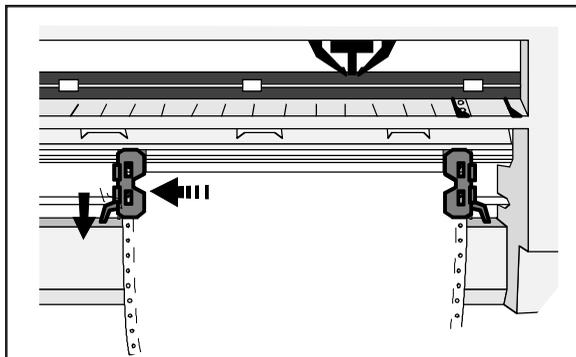


Figure 3-9. Making Sure the Paper is Taut

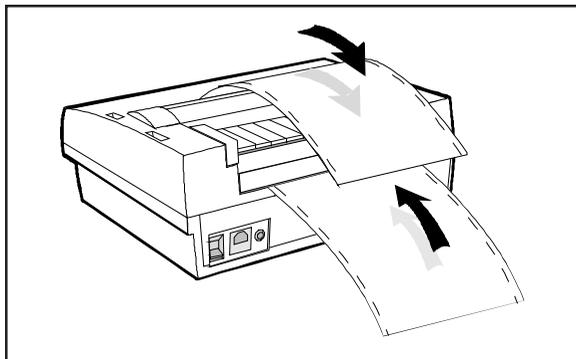


Figure 3-10. Checking the Exit Path

6. Mount the paper onto the first three pins of both tractors, as shown in figure 3-8, and close the tractor doors. You'll need to slide the right-edge tractor left or right as needed until its pin belt aligns with the paper holes.
7. Slide the right-edge tractor as needed to make the paper just slightly taut between the tractors, as shown in figure 3-9. Then, lock the right-edge tractor into place.
8. Lower the tractor cover and paper support.
9. Press the Form Feed button on the control panel. The printer advances the paper to the first printable line. After printing begins, make sure the paper exits the printer over the paper support, as shown in figure 3-10.

### *Positioning Pin-Feed Paper*

Although it is usually unnecessary, you can move pin-feed paper forward or backward after loading it. To move pin-feed paper, press the Ready button to disable printing and then turn the Select-dial. Turning the dial *clockwise* advances the paper; turning the dial *counterclockwise* reverse feeds the paper. After positioning the paper, press the Ready button again to re-enable printing. If you want the printer to feed subsequent pages to the same position, hold down the Alt button and press the Set Top button on the control panel.

### *Advancing Pin-Feed Paper*

The printer advances pin-feed paper to the next sheet under any of the following conditions:

- ✓ When instructed by your software application.
- ✓ When printing reaches the number of lines you or your software application specified.
- ✓ When automatic form feeding is on and printing reaches a half-inch from the bottom of the page.
- ✓ When you press the Form Feed button on the control panel.

### *Using the Demand Document Mode*

A special feature of the printer is the demand document mode. Demand document lets you remove a sheet of pin-feed paper without wasting the next sheet. This is especially useful when printing serialized checks or forms where you must account for each page.

With demand document mode on, pressing the Ready button on the control panel disables printing, flashes the DEMND message (instead of the PAUSE message), and advances the bottom of the last printed page to the top edge of the platen window. You can then tear off and remove the page.

*Using the Demand Document Mode—continued*

The printer automatically senses whether or not you tear off the page. Pressing the Ready button again causes one of the following actions:

- ✓ If you *removed* the last printed page, the paper reverse feeds to the next top-of-form, the READY message reappears, and printing continues.
- ✓ If you *did not remove* the last printed page, the paper reverse feeds to its original position, the READY message reappears, and printing continues at the point where it left off.

Normally, the demand document mode is off. To turn on the demand document mode, use the following procedure:

**OPERATIONS**

With the printer paused or idle, press the Setup button on the control panel to access the Setup menu.

**35) DEMAND: Off**

Turn the Select-dial until the DEMAND parameter appears on the display.

**35) DEMAND: On**

While holding down the Alt button, turn the Select-dial until *On* appears. Then, release the Alt button.

**COURIER LQ READY**

Press the Setup button again to return to the status message display.

*Using the Demand Document Mode—continued*

Instead of selecting *On* at the DEMAND parameter, you can select *Beep*, *Tear* or *Auto*. These options also select the demand document mode, but with special options:

- ✓ *Beep* causes the printer to begin *beeping* 15 seconds after you press the Ready button to pause printing. This *beeping* serves as a reminder to press the Ready button again to re-enable printing.
- ✓ *Tear* causes the printer to reverse feed the paper to the next top-of-form when you re-enable printing, whether or not you actually tear off the last printed sheet. This option is useful when printing thick multipart forms that jam when the leading edge of the form is reverse fed below the printhead.
- ✓ *Auto* causes the printer to advance the bottom of the last printed page to the tear bar whenever the printer is idle—you don't have to press the Ready button. As soon as the printer receives subsequent data to print, the paper reverse feeds as usual.

If you want to stop printing mid-form without advancing the perforation to the tear bar, press the Ready button twice in succession. This disables printing and displays the PAUSE message. Pressing the Ready button again re-enables printing and displays the READY message. These are the normal ready/pause conditions of the printer. You'll learn more about them in the *Control Panel* section of this guide.

## *Using Paper Park*

With the paper park feature, reversing pin-feed paper out of the printer is quick and easy. Reloading paper is even easier. With pin-feed paper parked, you can load a cut sheet.

To park pin-feed paper, use the following procedure:

1. Tear off the last printed sheet at the perforation.
2. Press the Paper Park button on the control panel. The printer reverse feeds the paper until the leading edge of the first sheet is halfway through the tractors.

To reload the pin-feed paper, press the Form Feed button on the control panel. The printer advances the paper to the first printable line.

To load a single sheet, use the Paper Path button to select the top paper path (☐). Then, load the sheet in the usual way (refer to *Loading Single Sheets* in this section).

## *Unloading Pin-Feed Paper*

To unload pin-feed paper, tear off all printed pages that have exited the printer and press the Paper Park button on the control panel. Then, press the Ready button to pause the printer and turn the Select-dial *counter-clockwise* until the pin-feed paper is clear of the tractors.

## Loading Multipart Forms

---

The printer can handle individually-cut or pin-feed forms containing up to seven parts and carbons. The procedures for loading multipart forms are the same as those for loading single sheets and pin-feed paper, except for the following precautions:

- ✓ If your printer has bottom-feed tractors or you have a top-mounted pull tractor option, load forms from the bottom of the printer, especially forms that do not bend easily or tear apart when you bend them. When forms enter the printer from the bottom, they feed straight through the printer without having to bend around the platen.
- ✓ When printing on thick forms, the printer automatically moves the printhead back and increases the print force. These actions usually optimize the print density and increase the readability of multipart forms. Although it is usually unnecessary, you can fine-adjust the print density and print force using control panel functions. You can even disable these automatic functions altogether, if needed. Refer to *Fine Adjusting the Print Density*, *Set Print Density* and *Set Print Force* in the *Control Panel* section of this guide for more information.

## Loading Labels

---

Your printer can handle individual labels or those with a pin-feed backing sheet. The procedures for loading labels are the same as those for loading single sheets or pin-feed paper, except for the following precautions:

- ✓ When feeding labels, do not use reverse feed, paper park, or use the demand document mode. When labels reverse feed, they can peel off the backing and jam in the printer. To avoid reverse feeding when you are ready to remove labels from the printer, tear them off at a perforation that has not yet entered the printer. Then, press the Form Feed button to eject any labels remaining in the printer.

### Loading Labels—continued

- ✓ If your printer has bottom-feed tractors or you have a top-mounted pull tractor option, load labels from the bottom of the printer, especially labels that easily peel off the backing. When labels enter the printer from the bottom, they feed straight through the printer without having to bend around the platen.
- ✓ When printing on labels, the printer automatically moves the print-head back to optimize the print density. Although it is usually unnecessary, you can fine-adjust the print density using the Print Density button on the control panel. Refer to *Fine Adjusting the Print Density* and *Set Print Density* in the *Control Panel* section of this guide for more information.

### Loading Transparencies

---

Your printer can handle individually-cut or pin-feed transparencies made for dot-matrix printers. Dot-matrix transparencies contain an ink-absorbent coating to reduce smearing and a paper backing so printer sensors can detect when a transparency is loaded. The procedures for loading transparencies are the same as those for loading single sheets or pin-feed paper, except for the following precautions:

- ✓ For best results when printing on transparencies, use a fairly new ribbon. A ribbon that is more than half way through its useful life may not transfer enough ink onto the transparency for acceptable projection.
- ✓ When printing on transparencies, the printer automatically moves the printhead back to optimize the print density. Although it is usually unnecessary, you can fine-adjust the print density using the Print Density button on the control panel. Refer to *Fine Adjusting the Print Density* and *Set Print Density* in the *Control Panel* section of this guide for more information.

## Aligning Preprinted Forms

---

When you print on preprinted forms, paper alignment is critical. To align a preprinted form in the printer, use the following procedure:

1. With the printer idle, press the Setup button on the control panel to access the Setup menu. Turn the Select-dial until the POPUP parameter appears. Hold down the Alt button and turn the Select-dial until *On* appears; then release the Alt button. Press the Setup button again.
2. Load the preprinted form into the printer.
3. Press the Ready button to disable printing and then turn the Select-dial as needed to align the first print line on the form with the top edge of the ribbon shield. Then, press the Ready button again.
4. Press the Setup button to access the Setup menu. Turn the Select-dial until the LFT MAR parameter appears on the display.
5. While holding down the Alt button, turn the Select-dial as needed to position the printhead over the first print position on the form. Then, release the Alt button.
6. Press the Setup button again.

## Setting Page Length

---

If the printer's page length setting does not reflect the actual current page length, the following problems can occur:

- ✓ Printing may continue beyond the bottom edge of the page.
- ✓ The page may eject before printing is finished.
- ✓ Pin-feed paper may not advance to the correct top-of-form position. Typically, the amount of error increases in proportion to the number of pages you feed.

### Setting Page Length—continued

Ordinarily, software applications set page length for you. If you experience one of these problems, you may have to set the page length manually.

To set the page length, use the following procedure:

1. Press the Setup button on the control panel to access the Setup menu. Then, turn the Select-dial until the LENG parameter appears on the display.
2. While holding down the Alt button, turn the Select-dial until the LENG setting equals the actual page length in 1/6-inch increments. For example, if the actual page length is 14 inches, the setting would be 84/6" (14 x 6). Then, release the Alt button.
3. Press the Setup button to return to the status message.

☞ **Note:** The page length setting is defined in one-sixth inch increments regardless of the current lines per inch setting.

## Reviewing the Paper Handling Controls

---

Here's a brief review of the paper handling controls:

- ✓ *Tractor select indicator* shows which paper path is selected. When loading pin-feed paper from the rear, the indicator points towards the *front* of the printer. When loading single sheets or pin-feed paper from the bottom, the indicator points towards the *rear* of the printer. You select a paper path by pressing the Paper Path button.
- ✓ *Forms thickness indicator* shows the current forms thickness. The printer automatically detects forms thickness and adjusts this indicator accordingly.
- ✓ *Form Feed button* feeds a single sheet to the top-of-form, ejects a single sheet, and advances pin-feed paper to the next top-of-form. After a form feed, the line count is zero, except when a top margin is set.
- ✓ *Line Feed button* advances the paper one line space. The actual distance the paper moves for one line space is set by software or from the control panel. You can hold down the Line Feed button for continuous line feeding. With each line feed operation, the line count increases by one.
- ✓ *Set Top button* sets the top-of-form at the current print line. The printer recognizes the current print line as the first line on the page (line 0) and starts counting lines from there.
- ✓ *Paper Path button* lets you select a paper path. After you make your selection, the tractor select indicator will move automatically to the correct position.

*Reviewing the Paper Handling Controls—continued*

- ✓ *Paper Park button* reverse feeds pin-feed paper until the leading edge of the first sheet is halfway through the tractors. Paper park is the easiest way to unload pin-feed paper from the printer, although it should not be performed with labels or multipart forms. To reload the paper, just press the Form Feed button.
- ✓ *Paper support* helps direct a cut-sheet into the printer and catches the sheet when printing is completed. When using pin-feed paper, the paper support folds down backward to help guide paper exit to the rear of the printer.
- ✓ *Bail motion* is automatic so you will rarely need to manually move the bail. In the event you need to move the bail, press the *Bail button*. This action moves the bail away from the platen so you can clear a paper jam or clean the platen. Pressing this button again moves the bail back against the platen.
- ✓ *Select-dial* has these paper handling functions:
  - With printing paused, turning the dial *clockwise* advances the paper through the printer; turning the dial *counterclockwise* reverse feeds the paper.
  - With printing paused, holding down the Alt button and turning the Select-dial moves the printer carriage. Turning the dial *clockwise* moves the carriage right; turning the dial *counterclockwise* moves the carriage left.



## Section

## 4

## Control Panel

This section describes how to use the printer's control panel, which is shown in figure 4-1. The control panel consists of two status lights, a sixteen-character display, twelve buttons, and a Select-dial.

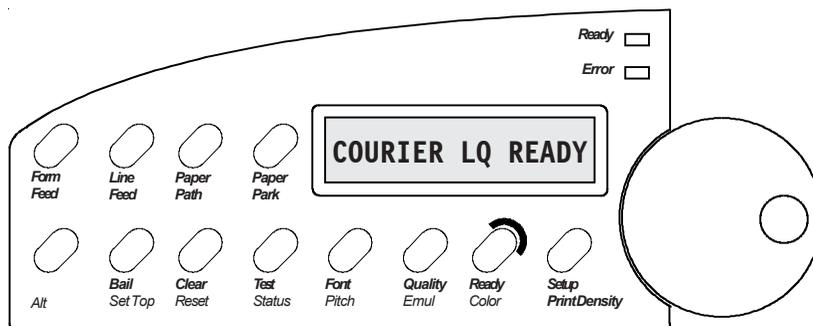


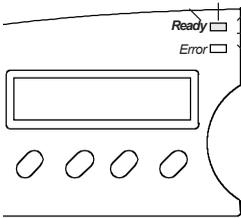
Figure 4-1. Control Panel

## Understanding Status Lights

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The control panel has two status lights.

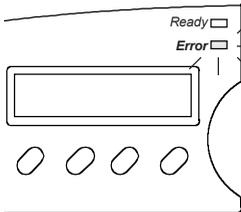
### Ready Light



The Ready light indicates the following conditions:

- ✓ When the light is *on*, the printer is ready for normal operation and can receive and print data.
- ✓ When the light *flickers*, the printer is receiving data from the host computer.
- ✓ When the light *flashes*, the printer is performing a self-diagnostic test.
- ✓ When the light is *off*, printing is suspended due to a user action (such as pausing the printer) or an error condition (such as a paper out, ribbon problem or paper jam). When you complete your action or correct the error condition, the light goes on and printing continues.

### Error Light



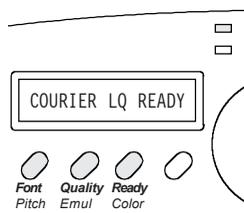
The Error light indicates the following conditions:

- ✓ When the light is *off*, the printer is ready for normal operation and can receive and print data.
- ✓ When the light *flashes*, normal operation is suspended due an error condition. Printing may stop and an error message may appear on the control panel display. To correct the error, you must perform the required action and press the Clear button. If printing is paused, you must also press the Ready button. The *Solving Problems* section of this guide lists error messages and describes the required corrective actions.

## Understanding Display Messages

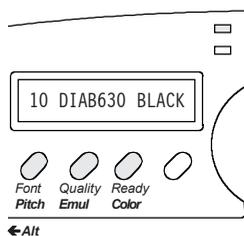
The control panel display can show four kinds of messages.

### **COURIER LQ READY** *Status*



The *status* message appears when you turn on the printer and during normal printing operations. This message shows the current font and print quality, and whether the printer is ready, paused, printing a self test, or in demand document mode. Notice that the button that controls each displayed setting is located just below the displayed setting.

### **10 AMT      BLACK** *Alternate Status*



The *alternate status* message appears when you press the Alt button to invoke the alternate function of a button. The alternate function is printed in blue below the button. The message shows the current character pitch (the number of characters per inch), printer emulation, and color. Notice that the button that controls each displayed setting is located just below the displayed setting.

### **LOAD PAPER** *Operator and Error*

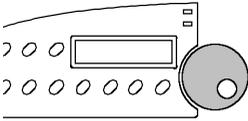
Many *operator and error* messages appear to notify you of printer conditions, actions you must take, and errors that occur.

### **2) SAVE: Usr 1** *Setup Menu*

The *Setup menu* is a list of parameters for operations, printer setup, text appearance, page setup, paper handling, and communications. The menu provides a snapshot view of current printer status. You can change settings as required, then save the settings for use at a later time. You can also specify the power-on default settings. You'll learn more about the Setup menu later in this section.

## Using the Select-Dial

---



You turn the Select-dial to move the paper up and down, move the carriage back and forth, scroll through the Setup menu, and fine adjust the print density.

### *Moving the Paper Up and Down*

To move the paper up and down, press the Ready button to disable printing and then turn the Select-dial. To advance the paper, turn the dial *clockwise*; to reverse-feed the paper, turn the dial *counterclockwise*. After moving the paper, press the Ready button again to re-enable printing. When you move the paper with the dial, printer logic does not change the internal line count. This enables you to decide where the first print line should be and where line counting begins.

### *Moving the Carriage Back and Forth*

To move the carriage back and forth, first press the Ready button to disable printing. Then, hold down the Alt button and turn the dial. To move the carriage to the right, turn the dial *clockwise*; to move the carriage left, turn the dial *counterclockwise*. You may have to move the carriage to install a ribbon cartridge or clear a paper jam. Moving the carriage does not affect the print position. When printing begins, the carriage moves back to its original position.

### *Scrolling Through the Setup Menu*

Whenever the Setup menu is displayed, you use the Select-dial to scroll through the menu and make selections. You'll learn how use the Setup menu later in this section.

### *Fine Adjusting the Print Density*

To fine adjust the print density, hold down the Print Density button and turn the Select-dial. A print density adjustment scale appears on the display to show you the adjustment range. To make printing darker, turn the dial *clockwise*; to make printing lighter, turn the dial *counterclockwise*. This adjustment is effective only when the printer is in the automatic print density mode. The printer retains this adjustment even when turned off.

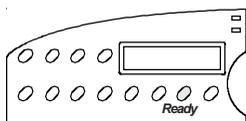
## Using the Control Panel Buttons

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You press the buttons to set printer parameters and perform operations. A brown function label is printed below each button to remind you of its primary function and a blue label to remind you of its alternate function. To invoke the primary function of a button, just press the button. To invoke the alternate function of a button, hold down the Alt button and press the button.

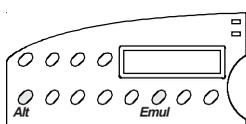
Only the Ready button operates while printing is in progress. To use any other button while printing, you must first press the Ready button and wait for printing to pause. When you change a printer setting with a control panel button, the printer *beeps* to confirm the change.

### Turning Printing On and Off



Pressing the Ready button turns printing (and the Ready light) either on or off and displays either READY or PAUSE. With READY displayed, the printer is free to print any data it receives. With PAUSE displayed, printing cannot occur. If you press the Ready button while printing is in progress, printing will stop after printing up to three more lines. When you press the Ready button again, printing will resume where it left off.

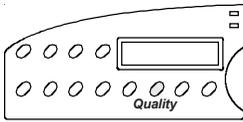
### Selecting a Printer Emulation



Holding down the Alt button and pressing the Emul button selects the next available printer emulation and displays the name of the printer being emulated. The emulations you can choose from consist of those in the installed Intelli-card. On standard printers you can select from the following emulations: AMT (AMT's native mode), DIAB630 (Diablo 630 daisywheel printer), EPSONJX (Epson JX color dot-matrix printer), EPSONLQ (Epson LQ-2550 color dot-matrix printer), IBMXL24 (IBM Proprinter XL24 color dot-matrix printer), BARCODE (Epson LQ-2550 with additional bar coding features), and HEXMODE (hexadecimal printouts of printer data). When you change the emulation from the control panel, the printer retains the current settings, but clears the data input buffer.

**Note:** Emulations allow your printer to operate just like printers from other manufacturers, such as Epson or IBM. Emulations enable the printer to be compatible with a wider range of software applications.

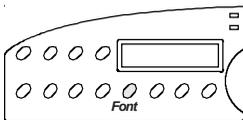
### Selecting a Text Quality



Pressing the Quality button selects the next text quality and displays one of the following: LQ for letter-quality, MQ for memo-quality, or DQ for draft-quality.

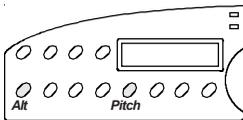
The actual print speed for each text quality depends on the printer's settings for pitch, color, quiet mode, and print direction.

### Selecting a Font



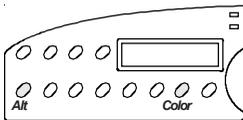
Pressing the Font button selects the next available font (type style) and displays the font name. On standard printers you can select from the following fonts: COURIER (a fixed-pitch serif font), GOTHIC (a fixed pitch sans-serif font), TMSROMN (a proportionally-spaced serif font), and ELITE (a fixed-pitch serif font). Each font has a default pitch, which is the number of characters per inch that you normally use to print the font. When you select a font, pitch changes to the default pitch of that font.

### Selecting a Pitch



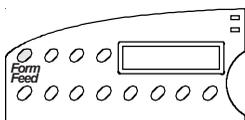
Holding down the Alt button and pressing the Pitch button selects the next available pitch (number of characters per inch) and displays the pitch setting. You can select 10, 12, 13 (actually 13.3), 15, 17 (actually 17.1) or 20 characters per inch. You can also select PS for proportional-spacing. If your software application sets the pitch to some nonstandard value, such as 5- or 8-pitch, NS (for nonstandard) appears as the current pitch. When you select a pitch, characters in the current font expand or compress to fit the new spacing.

### Selecting a Color



Holding down the Alt button and pressing the Color button selects the next available color and displays the name of the color. You can select BLACK, CYAN (light blue), MGNTA (magenta), YELLW (yellow), VIOLT (violet), GREEN, or ORANG (orange). If a monochrome ribbon is installed in the printer, you can select only BLACK.

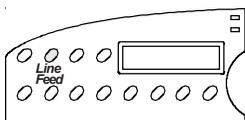
## Form Feeding



Pressing the Form Feed button causes one of the following actions to occur:

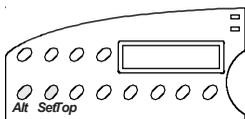
- ✓ If you are loading a single sheet, the sheet advances to the top-of-form.
- ✓ If a single sheet is already loaded, the sheet ejects.
- ✓ If you are loading or using pin-feed paper, the paper advances to the next top-of-form.

## Line Feeding



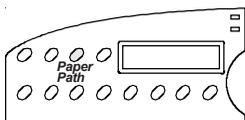
Pressing the Line Feed button advances the paper one line space. Holding down the Line Feed button causes continuous line feeding. The actual distance that the paper advances for a line feed depends on the current lines per inch (lpi) setting. As you line feed, the printer increments the internal line count. If you use the Line Feed button to move paper to the top-of-form, you must hold down the Alt button and press the Set Top button to initialize the line count to zero.

## Setting the Top-of-Form



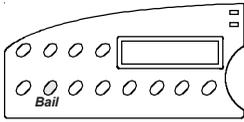
Holding down the Alt button and pressing the Set Top button sets the top-of-form at the current print line. When you set a top-of-form, the printer recognizes the current print line as the first line on the page (line 0) and starts counting lines from that point.

## Selecting a Paper Path



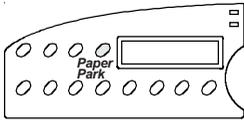
Pressing the Paper Path button lets you select one of the available paper paths for subsequent paper feeding. When you first press the Paper Path button, the current paper path appears on the control panel display. Pressing the Paper Path button again cycles through the available paper paths: Top, Rear, or Bottom (if your printer has a powered bottom-feed forms tractor). After you make your selection, the tractor select indicator moves to appropriate position automatically.

### *Moving the Bail*



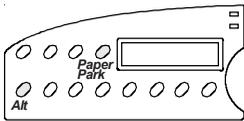
Pressing the Bail button moves the bail back and forth. During normal printing operations, it is *not* necessary to use the Bail button since the bail moves automatically.

### *Parking the Paper*



Pressing the Paper Park button with pin-feed paper loaded in the printer causes the paper to reverse-feed until the top edge of the first sheet is halfway through the tractors. Before pressing the Paper Park button, however, tear off the last printed sheet that has fed beyond the tear bar. With paper park, removing pin-feed paper from the printer is quick and easy. To reload paper, just press Form Feed.

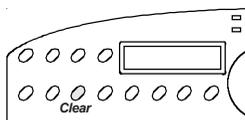
### *Restoring Printer Settings*



Holding down the Alt button and pressing the Paper Park button lets you restore printer settings to the factory (*Fctry*) settings or to the settings you saved previously under one of five user names (*Usr 1* to *Usr 5*). When you first press the Alt and Paper Park buttons, the current user name appears on the control panel display. If you continue to hold down the Alt button and press the Paper Park button again, you can cycle through the available user names. If you release the Alt button with the current user name displayed, this function is cancelled. If you release the Alt button with another user name displayed, the printer settings saved under that user name take effect.

☞ **Note:** For more detailed information on this function, refer to *Restore Printer Settings* and *Save Printer Settings* later in this section.

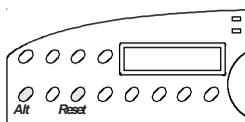
## Clearing Messages and the Buffer



Pressing the Clear button causes one of the following actions to occur:

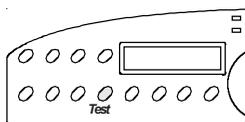
- ✓ If an error or warning message is displayed, the normal status message reappears.
- ✓ If the normal status message is displayed, the printer erases all data that has been received but not yet printed. Since the printer receives incoming data faster than it can print it, the printer temporarily stores data in a buffer in memory. If you turn printing off or an error occurs, you can erase all of the data in the buffer waiting to be printed. Clearing the buffer does not reset any printing parameters; all of the current settings remain in effect.

## Resetting the Printer



Holding down the Alt button and pressing the Reset button resets printer logic, clears the input buffer, and initializes all printing parameters to the defaults. Using the Reset button is like turning the printer off and then back on.

## Printing a Self Test



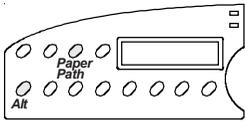
Pressing the Test button prints an 8-inch wide test pattern of some of the characters in the current font (ASCII codes 32 to 127), using the current print modes. To print a test pattern that is as wide as the WIDTH parameter setting on the Setup menu (you'll learn more about this parameter later in this section), press the Test button twice in succession. To terminate the test, press the Ready button.

```

! " # $ % & ' ( ) * + , - . / 0 1 2 3 4 5 6 7 8 9 : ; < = > ? @ A B C D E F G H I J K L M N O P Q R S T U V W X Y Z [ \ ] ^ _ ` a b c d e f g h i j k l m n
o p q r s t u v w x y z { | } ~ ~ ! " # $ % & ' ( ) * + , - . 0 1 2 3 4 5 6 7 8 9 : ; < = > ? @ A B C D E F G H I J K L M N O P Q R S T U V W X Y Z [ \ ] ^
_ ` a b c d e f g h i j k l m n o p q r s t u v w x y z { | } ~ ~ ! " # $ % & ' ( ) * + , - . 0 1 2 3 4 5 6 7 8 9 : ; < = > ? @ A B C D E F G H I J K L M N
O P Q R S T U V W X Y Z [ \ ] ^ _ ` a b c d e f g h i j k l m n o p q r s t u v w x y z { | } ~ ~ ! " # $ % & ' ( ) * + , - . 0 1 2 3 4 5 6 7 8 9 : ; < = >
  
```

Printing a self test is a convenient way to check that your printer is operating normally and that print quality is acceptable. Also, you can view many of the available characters in the current font.

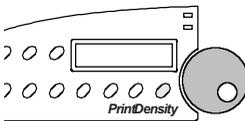
## Resetting Optimal Print Density



Holding down the Alt button and pressing the Paper Path button resets the position of the printhead for optimal print density. Since the printer performs this function automatically, you only need to use it if you accidentally bump the printhead.

**Note:** If automatic forms thickness detection is disabled, holding down the Alt button and pressing the Paper Path button causes the printer to reset the printhead to a user-defined position. Refer to *Set Print Density* later in this section.

## Fine Adjusting the Print Density



Each time you load a new form in the printer, the printhead automatically moves a fixed distance away from the form. This fixed distance is factory-set to provide optimal print density on most forms. You can fine adjust this distance if you prefer a slightly lighter or darker print. To do so:



Hold down the Print Density button until the print density adjustment scale appears.



For darker print, turn the Select-dial *clockwise*. The offset indicator will move to the right.

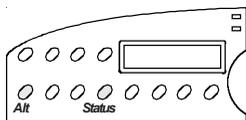


For lighter print, turn the Select-dial *counterclockwise*. The offset indicator will move to the left.

The printer retains this adjustment even when turned off.

**Note:** If you try to access the adjustment scale with automatic forms thickness detection disabled, the message MANUAL PHGAP SET appears instead. Refer to *Set Print Density* later in this section for more information.

## Printing Printer Status Reports



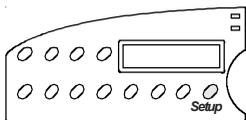
Holding down the Alt button and pressing the Status button *once* prints a *Printer Status Report*. This report includes a list of the available printer emulations and fonts, and a printout of the Setup menu with the current settings.

Holding down the Alt button and pressing the Status button *twice* prints an extended *Printer Status Report*. This report includes all of the information on the standard report plus the Setup menu settings for each user save area and the normally hidden settings.

To terminate the printing of a report before it finishes, just press the Ready button. Printing will stop after up to three more lines print.

A sample *Printer Status Report* and extended *Printer Status Report* are shown on the next pages. The settings in these examples are the factory-set defaults for the ACCEL-6310. The factory-set defaults for other models vary slightly. On the sample extended *Printer Status Report*, notice that only the settings in the user save areas that *differ* from the current setting are printed on the report. This allows the report to print faster than if every duplicate setting was printed. Since the Setup menu is updated from time-to-time, your report may include additional parameters and be numbered differently. Each parameter and setting is described later in this section.

## Displaying the Setup Menu



Pressing the Setup button displays the Setup menu. From the Setup menu, you can view and change most printer settings. If you display but do not use the Setup menu for more than one minute, the status message will reappear automatically. Next, you'll learn more about the Setup menu.

AMT PRINTER STATUS REPORT		
MODEL: ACCEL-6310 FIRMWARE: 389008-010-E EMULATIONS: AMT Diab630 EpsonJX EpsonLQ IBMXL24 Barcode HexMode FONTS: Courier Gothic TmsRmn Elite		
OPERATIONS	TEXT APPEARANCE	PAPER HANDLING
1) RSTOR: None	12) QUAL: Letter	33) PATH: Top
2) SAVE: None	13) FONT: Courier	34) LFSLEW: 61ps
3) DFALT: Fctry	14) PITCH: 10	35) DEMAND: Off
4) TEST: None	15) CELL: 10	36) PPR JAM: On
PRINTER SETUP		
5) EMUL: AMT	16) LPI: 6	37) PGE END: Off
6) QUIET: Off	17) COLOR: Black	38) POPUP: Off
7) LANG: USA	18) ITALICS: Off	39) AUTOBAIL: Off
8) SETS: IBM1	19) HIGH: Off	40) PH GAP: Auto
9) AUTO CR: Off	20) WIDE: Off	41) PFORCE: Auto
10) AUTO LF: Off	21) SCRIPT: Off	COMMUNICATIONS
11) ERRBEL: Once	22) UNDLIN: Off	42) INTRFCE: Auto
	23) BLD/SHA: Off	43) BAUD: 9600
	24) SLASH-0: Off	44) BUFFER: 48K
	25) BI-DIR: Text	45) HNDSHK: D/X
	PAGE SETUP	
	26) LENG: 66/6"	46) DATA BITS: 8
	27) WIDTH: 8.5"	47) STOP BITS: 1
	28) TOP MAR: 0	48) PARITY: None
	29) BOT MAR: 66	49) DTR: Pos
	30) LFT MAR: 0	50) STROBE: Neg
	31) RGT MAR: 85	
	32) AUTO FF: Off	

Figure 4-2. Sample *Printer Status Report*

AMT PRINTER STATUS REPORT							
MODEL: ACCEL-6310 FIRMWARE: 398008-010-E EMULATIONS: AMT Diab630 EpsonJX EpsonLQ IBMXL24 Barcode HexMode FONTS: Courier Gothic TmsRmn Elite							
CURRENT SETTINGS	Factory	Usr 1	Usr 2	Usr 3	Usr 4	Usr 5	
OPERATIONS							
1) RSTOR:	None	None					
2) SAVE:	None	None					
3) DFALT:	Fctry	Fctry					
4) TEST:	None	None					
PRINTER SETUP							
5) EMUL:	AMT	AMT	Diab630	EpsonLQ	IBMXL24	Barcode	Hexmode
6) QUIET:	Off	Off	On				
7) LANG:	USA	USA	Latin1				
8) SETS:	IBM1	IBM1	IBM2				
9) AUTO CR:	Off	Off					
10) AUTO LF:	Off	Off					
11) ERRBEL:	Once	Once					

Figure 4-3. Sample *Extended Printer Status Report*

CURRENT SETTINGS	Factory	Usr 1	Usr 2	Usr 3	Usr 4	Usr 5
TEXT APPEARANCE						
12) QUAL:	Letter	Letter	Draft			
13) FONT:	Courier	Courier	Gothic			
14) PITCH:	10	10	12			
15) CELL:	10	10	12			
16) LPI:	6	6				
17) COLOR:	Black	Black	Green			
18) ITALICS:	Off	Off	On			
19) HIGH:	Off	Off				
20) WIDE:	Off	Off				
21) SCRIPT:	Off	Off				
22) UNDLIN:	Off	Off				
23) BLD/SHA:	Off	Off				
24) SLASH-0:	Off	Off				
25) BI-DIR:	Text	Text	Off			
PAGE SETUP						
26) LENG:	66/6"	66/6"				
27) WIDTH:	8.5"	8.5"				
28) TOP MAR:	0	0				
29) BOT MAR:	66	66				
30) LFT MAR:	0	0				
31) RGT MAR:	85	85				
32) AUTO FF:	Off	Off				
PAPER HANDLING						
33) PATH:	Top	Top	Rear	Bottom		
34) LFSLEW:	61ps	61ps	101ps			
35) DEMAND:	Off	Off				
36) PPR JAM:	On	On				
37) PGE END:	Off	Off				
38) POPUP:	Off	Off				
39) AUTOBAIL:	Off	Off				
40) PH GAP:	Auto	Auto				
41) PFORCE:	Auto	Auto				
COMMUNICATIONS						
42) INTRFCE:	Auto	Auto				
43) BAUD:	9600	9600				
44) BUFFER:	48K	48K				
45) HNSHK:	D/X	D/X				
46) DATA BITS:	8	8				
47) STOP BITS:	1	1				
48) PARITY:	None	None				
49) DTR:	Pos	Pos				
50) STROBE:	Neg	Neg				
HIDDEN ITEMS						
51) RIBBON:	-5	0				
52) PTOP:	-2/60"	0/60"				
53) TEAR:	0/30"	-2/30"				
54) HOME:	6/120"	0/120"				
55) PTHRESH:	177	211				
56) UNAMS:	None	None				
57) PANEL:	Unlock	Unlock				

Figure 4-3. Sample Extended Printer Status Report—continued

## Using the Setup Menu

---

The Setup menu is a selection list of printer parameters organized into the following categories:

- ✓ Operations
- ✓ Printer Setup
- ✓ Text Appearance
- ✓ Page Setup
- ✓ Paper Handling
- ✓ Communications

When the Setup menu appears, the control panel display acts like a one-line window over the menu. Each line contains a different parameter. Turning the Select-dial scrolls the menu up or down below the window. Each parameter is numbered so you can always tell where you are in the menu.

Next to each parameter is the current setting for that parameter. Holding down the Alt button and turning the Select-dial cycles through the possible settings. The setting that is displayed when you release the Alt button becomes the current setting. When you change a setting, the printer *beeps* to confirm the change.

To leave the Setup menu and redisplay the status message, press the Setup button again. If you display the Setup menu but do not use it for more than one minute, the status message reappears automatically.

You can change the current settings as required, then save them for use at a later time. You can also specify the power-on defaults for the printer to use. You can print the Setup menu using the Status button.

PARAMETER	DEFAULT SETTING	OTHER SETTINGS
<b>OPERATIONS</b>		
1) RSTOR:	None	Usr 1 Usr 2 Usr 3 Usr 4 Usr 5 Fctry
2) SAVE:	None	Usr 1 Usr 2 Usr 3 Usr 4 Usr 5
3) DFALT:	Fctry	Usr 1 Usr 2 Usr 3 Usr 4 Usr 5
4) TEST:	None	Memory Sensor Ribbon Align Pcalib Random Gap
<b>PRINTER SETUP</b>		
5) EMUL:	AMT	Diab630 EpsonJX EpsonLQ IBMXL24 Barcode HexMode
6) QUIET:	Off	On
7) LANG:	USA	French German UK Dansh1 Swedsh Italn Spnsh1 Jpnese Norwgn Dansh2 Spnsh2 Portgs
8) SETS:	IBM1	IBM2 Ita11 Ita12 None
9) AUTO CR:	Off	On
10) AUTO LF:	Off	On
11) ERRBEL:	Once	Dcay Cont
<b>TEXT APPEARANCE</b>		
12) QUAL:	Letter	Memo Draft
13) FONT:	Courier	Gothic TmsRmn Elite
14) PITCH:	10	12 13.3 15 17.1 20 PS
15) CELL:	10	12 13.3 15 17.1 20 PS
16) LPI:		6 2 3 4 5 8 9 10 12
17) COLOR:	Black	Cyan Mgnta Yellow Violt Green Orang
18) ITALICS:	Off	On
19) HIGH:	Off	On
20) WIDE:	Off	On
21) SCRIPT:	Off	Sub Supr
22) UNDLIN:	Off	On
23) BLD/SHA:	Off	Bld Sha
24) SLASH-0:	Off	On
25) BI-DIR:	Text	Graf Full Off
<b>PAGE SETUP</b>		
26) LENG:	66/6"	0/6" to 182/6"
27) WIDTH:	8.5"	8" 11" ( <i>settings for narrow-carriage printers</i> )
	13.6"	8" 16" ( <i>settings for wide-carriage printers</i> )
28) TOP MAR:	0	0 to 363
29) BOT MAR:	66	1 to 364
30) LFT MAR:	0	0 to 169
31) RGT MAR:	85	1 to 170
32) AUTO FF:	Off	On

Figure 4-4. Setup Menu

PARAMETER	DEFAULT SETTING	OTHER SETTINGS
<b>PAPER HANDLING</b>		
33) PATH:	Top	Rear TopTrac Bottom
34) LFSLEW:	6ips	lips to 10ips
35) DEMAND:	Off	On Beep Tear Auto
36) PPR JAM:	On	Off
37) PGE END:	Off	On Roll
38) POPUP:	Off	On
39) AUTOBAIL:	Off	On
40) PH GAP:	Auto	10 to 45
41) PFORCE:	Auto	1 to 10
<b>COMMUNICATIONS</b>		
42) INTRFCE:	Auto	Par Ser
43) BAUD:	9600	75 150 300 600 1200 2400 4800 19200
44) BUFFER	48K	512 1K 2K 4K 8K 16K 32K 64K 80K
45) HNDSHK:	D/X	ENQ D/E None XON DTR
46) DATA BITS:	8	7
47) STOP BITS:	1	2
48) PARITY:	None	Odd Even
49) DTR:		Pos Neg
50) STROBE:	Neg	Pos

Figure 4-4. Setup Menu—continued

*Using the Setup Menu—continued*

☞ **Note:** Learning Setup menu functions is *not* necessary. These functions are provided for users who want to explore the advanced capabilities of the printer. During normal printing, application programs control most Setup menu functions automatically.

Before describing the parameters on the Setup menu, let's review how to display, scroll through, and change settings on the Setup menu:

**OPERATIONS**

With the status message displayed, press the Setup button; the Setup menu appears.

**12) QUAL: Letter**

Turn the Select-dial until the parameter you want to change appears.

**12) QUAL: Draft**

While holding down the Alt button, turn the Select-dial to view the possible settings for the parameter. When the setting you want to select appears, release the Alt button. The printer *beeps* to confirm the setting change.

**COURIER DQ READY**

Turn the Select-dial to display another parameter or press the Setup button to redisplay the status message.

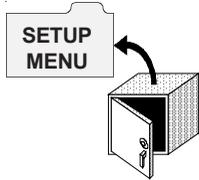
Now that you know how to use the Setup menu, it is time to learn what each parameter does and the possible settings you can select. Parameters are described in the order they appear in the Setup menu.

## Performing Operations

---

The first section on the Setup menu is operations. Selecting an operation performs a specific action.

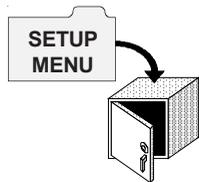
### 1) RSTOR: None *Restore Printer Settings*



RSTOR lets you restore printer settings to the factory settings or to settings you saved previously with a SAVE operation. When you use RSTOR, the printer clears the data input buffer. You can select *None* to cancel the operation; *Fctry* to restore the factory settings; or *Usr 1* through *Usr 5* to restore the settings saved under one of these names.

**Note:** You can rename the five user areas so that they are more meaningful to your particular applications. Refer to *Changing User Names* in the *Solving Problems* section of this guide for more information.

### 2) SAVE: None *Save Printer Settings*

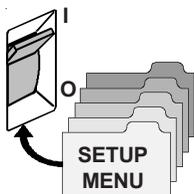


SAVE lets you save the current printer settings in non-volatile memory for use at a later time. Non-volatile memory retains information even when the printer is turned off.

To save the current printer settings, hold down the Alt button and turn the Select-dial to select one of the five user names. As soon as you release the Alt button, the printer saves the current printer settings and assigns the user name that you select. You can use RSTOR to restore the settings you save; you can use DFALT to make your saved settings the power-on default settings. You can select *None* to cancel the operation; or *Usr 1* through *Usr 5* to save the current settings under one of these names.

**Note:** You can rename the five user areas so that they are more meaningful to your particular applications. Refer to *Changing User Names* in the *Solving Problems* section of this guide for more information.

### 3) DFALT: Fctry Select Power-On Default Settings



DFALT lets you select the printer settings to use as the power-on default settings. You can select the factory settings or the settings you saved previously with a SAVE operation. The printer keeps your DFALT selection in non-volatile memory so it is retained when the printer is off.

You can select *Fctry* to use the factory settings as the power-on defaults; or *Usr 1* through *Usr 5* to use the settings saved under one of these names.

**Note:** You can rename the five user areas so that they are more meaningful to your particular applications. Refer to *Changing User Names* in the *Solving Problems* section of this guide for more information.



### 4) TEST: None Run Printer Tests

TEST lets you run a variety of printer tests. If a test is unsuccessful, an error message appears to notify you.

You can select *None*, which is always the default and does not perform any test; *Memory*, which checks the printer memory; *Sensor*, which runs the sensor check; *Ribbon*, which performs a ribbon alignment print test; *Align*, which performs a printing alignment test; *Pcalib*, which recalibrates the sensitivity of the paper sensor; *Random*, which performs a random carriage movement print test; or *Gap*, which prints the printhead gap values measured across and around the surface of the platen. Printer tests are described in detail in the *Solving Problems* section of this guide.

**Note:** Field service technicians use these printer tests to diagnose problems and re-adjust the printer.

## Using Printer Setup Parameters

---

The second section on the Setup menu is printer setup. The most important printer setup parameter is emulation, which *must* be set so that it is compatible with your application program.

### 5) EMUL: AMT Set Printer Emulation



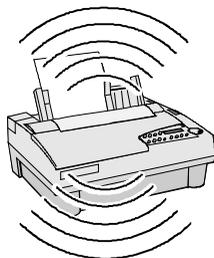
EMUL lets you select a printer emulation for the printer to use. Selecting an emulation enables the printer to print data that is formatted for other popular printers. This makes the printer compatible with a wider range of software applications, including those that are not directly compatible with these printers. The emulations you can choose from depend on those loaded in FLASH memory. On standard printers, you can select from the following emulations:

- ✓ *AMT*. This is the printer's native language.
- ✓ *Diab630*. This is the Diablo 630 daisywheel printer.
- ✓ *EpsonJX*. This is the Epson JX color dot-matrix printer.
- ✓ *EpsonLQ*. This is the Epson LQ-2550 color dot-matrix printer.
- ✓ *IBMXL24*. This is the IBM Proprinter XL24 color dot-matrix printer.
- ✓ *BarCode*. This is the printer's internal bar code emulation. When you select this emulation, the printer emulates the Epson LQ-2550 but also provides bar code printing. Refer to the *Bar Codes* appendix of this guide for more information.
- ✓ *HexMode*. This selects the hexadecimal mode wherein the printer prints the hexadecimal and ASCII representation of every byte it receives instead of actually interpreting and printing the data. This function is useful when you need to view the actual codes being sent from the host computer to the printer.

```
0000:  41 42 43 44 45 46 47 48 49 4A 4B 4C 4D 4E 4F 50  ABCDEFGHIJKLMNPO
0010:  51 52 53 54 55 56 57 58 59 5A 5B 5C 5D 5E 5F 60  QRSTUVWXYZ[\]^_`
```

Always select a printer emulation that is supported by your software. When you change the emulation using this parameter, the printer retains the current settings but clears the data input buffer.

## 6) QUIET: Off Turn Quiet Mode On and Off



QUIET lets you turn the quiet mode on and off. In quiet mode, the print speed slows down by about 40% in draft (DQ) mode and 50% in memo (MQ) and letter (LQ) modes. Slowing the print speed decreases the amount of noise that is generated. You can select *On* to turn the quiet mode on or *Off* to turn the mode off.

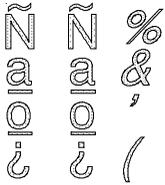
## 7) LANG: USA SetLanguage



LANG lets you specify a language for the printer to use when printing text. When you select any language other than *USA*, the printer replaces some of the standard ASCII printable characters with alternate characters that are used in a specific language. You can select the following:

<u>Setting</u>	<u>Country</u>	<u>Character Replacements</u>											
<i>USA</i>	USA	#	\$	@	[	\	]	^	`	{		}	~
<i>French</i>	France	#	\$	à	°	ç	§	^	`	é	ù	è	¨
<i>German</i>	Germany	#	\$	§	Ä	Ö	Ü	^	`	ä	ö	ü	ß
<i>UK</i>	England	£	\$	@	[	\	]	^	`	{		}	~
<i>Dansh1</i>	Denmark	#	\$	@	Æ	Ø	Å	^	`	æ	ø	å	~
<i>Swedsh</i>	Sweden	#	¤	É	Ä	Ö	Å	Ü	é	ä	ö	å	ü
<i>Italn</i>	Italy	#	\$	@	°	\	é	^	ù	à	ò	è	ì
<i>Spnsh1</i>	Spain	Pt	\$	@	ı	Ñ	ı	^	`	¨	ñ	}	~
<i>Jpnese</i>	Japan	#	\$	@	[	¥	]	^	`	{		}	~
<i>Norwgn</i>	Norway	#	¤	É	Æ	Ø	Å	Ü	é	æ	ø	å	ü
<i>Dansh2</i>	Denmark	#	\$	É	Æ	Ø	Å	Ü	é	æ	ø	å	ü
<i>Spnsh2</i>	Spain	#	\$	á	ı	Ñ	ı	é	`	í	ñ	ó	ú
<i>Portgs</i>	Portugal	#	\$	á	ı	Ñ	ı	é	ü	í	ñ	ó	ú

**8) SETS: IBM1** *Select Characters for Codes 128-255*



When an Epson or IBM emulation is selected, SETS lets you select a character set for ASCII codes 128 to 255. You can select *IBM1* for IBM set #1; *IBM2* for IBM set #2; *Ital1* for Epson italics set #1; *Ital2* for Epson italics set #2; or *None* for no set (the printer ignores codes above 127).

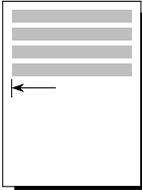
ASCII Code	IBM # 1	IBM # 2	Ital #1	Ital #2	ASCII Code	IBM # 1	IBM # 2	Ital #1	Ital #2
128	NUL	Ç	NUL	Ç	155	ESC	ç	ESC	ç
129		ü		ü	156		£		£
130		é		é	157		¥		¥
131		â		â	158		Pt		Pt
132		ä		ä	159		f		f
133		à		à	160	á	á	¢	¢
134		å		å	161	í	í	!	!
135	BEL	ç	BEL	ç	162	ó	ó	"	"
136	BS	ê	BS	ê	163	ú	ú	#	#
137	HT	ë	HT	ë	164	ñ	ñ	\$	\$
138	LF	è	LF	è	165	Ñ	Ñ	%	%
139	VT	ï	VT	ï	166	a	a	&	&
140	FF	î	FF	î	167	o	o	'	'
141	CR	ì	CR	ì	168	z	z	(	(
142	SO	Ä	SO	Ä	169	┌	┌	)	)
143	SI	Å	SI	Å	170	└	└	*	*
144		É		É	171	½	½	+	+
145	DC1	æ	DC1	æ	172	¼	¼	'	'
146	DC2	Æ	DC2	Æ	173	i	i	-	-
147	DC3	ô	DC3	ô	174	«	«	.	.
148	DC4	ö	DC4	ö	175	»	»	/	/
149		ò		ò	176	▒	▒	0	0
150		û		û	177	▓	▓	1	1
151		ù		ù	178	█	█	2	2
152	CAN	ÿ	CAN	ÿ	179			3	3
153		ö		ö	180	┆	┆	4	4
154	SUB	Û	SUB	Û	181	≡	≡	5	5

Character Sets—  
continued

ASCII Code	IBM # 1	IBM # 2	Ital #1	Ital #2	ASCII Code	IBM # 1	IBM # 2	Ital #1	Ital #2
182	⌈	⌈	6	6	219	■	■	[	[
183	⌋	⌋	7	7	220	■	■	\	\
184	⌌	⌌	8	8	221	■	■	]	]
185	⌍	⌍	9	9	222	■	■	^	^
186	⌎	⌎	:	:	223	■	■	˘	˘
187	⌏	⌏	;	;	224	α	α	˘	˘
188	⌐	⌐	<	<	225	β	β	a	a
189	⌑	⌑	=	=	226	Γ	Γ	b	b
190	⌒	⌒	>	>	227	Π	Π	c	c
191	⌓	⌓	?	?	228	Σ	Σ	d	d
192	⌔	⌔	@	@	229	σ	σ	e	e
193	⌕	⌕	A	A	230	μ	μ	f	f
194	⌖	⌖	B	B	231	τ	τ	g	g
195	⌗	⌗	C	C	232	Φ	Φ	h	h
196	⌘	⌘	D	D	233	Θ	Θ	i	i
197	⌙	⌙	E	E	234	Ω	Ω	j	j
198	⌚	⌚	F	F	235	ø	ø	k	k
199	⌛	⌛	G	G	236	∞	∞	l	l
200	⌜	⌜	H	H	237	∅	∅	m	m
201	⌝	⌝	I	I	238	ε	ε	n	n
202	⌞	⌞	J	J	239	∩	∩	o	o
203	⌟	⌟	K	K	240	≡	≡	p	p
204	⌠	⌠	L	L	241	±	±	q	q
205	⌡	⌡	M	M	242	≥	≥	r	r
206	⌢	⌢	N	N	243	≤	≤	s	s
207	⌣	⌣	O	O	244	∫	∫	t	t
208	⌤	⌤	P	P	245	∫	∫	u	u
209	⌥	⌥	Q	Q	246	÷	÷	v	v
210	⌦	⌦	R	R	247	≈	≈	w	w
211	⌧	⌧	S	S	248	°	°	x	x
212	⌨	⌨	T	T	249	•	•	y	y
213	〈	〈	U	U	250	·	·	z	z
214	〉	〉	V	V	251	√	√	{	{
215	⌫	⌫	W	W	252	√ <sub>n</sub>	√ <sub>n</sub>	/	/
216	⌬	⌬	X	X	253	√ <sub>2</sub>	√ <sub>2</sub>	}	}
217	⌭	⌭	Y	Y	254	■	■	~	~
218	⌮	⌮	Z	Z	255				

**9) AUTO CR: Off**

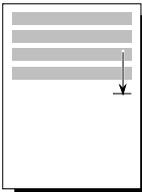
*Turn Automatic Carriage Return Mode On and Off*



AUTO CR lets you turn the automatic carriage return mode on and off. In the automatic carriage return mode, the printer performs a carriage return/line feed for each line feed code it receives. You can select *On* to turn the automatic carriage return mode on; or *Off* to turn the mode off.

**10) AUTO LF: Off**

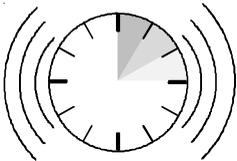
*Turn Automatic Line Feed Mode On and Off*



AUTO LF lets you turn the automatic line feed mode on and off. In the automatic line feed mode, the printer performs a carriage return/line feed for each carriage return code it receives. You can select *On* to turn the automatic line feed mode on; or *Off* to turn the mode off.

**11) ERRBEL: Once**

*Select Audible Alarm Mode*



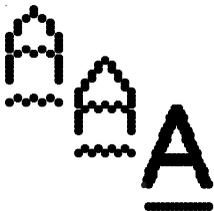
ERRBEL lets you select how often the printer sounds the audible alarm (three quick beeps) when an error occurs. You can select *Once*, so the alarm sounds only once; *Cont*, so the alarm sounds every 15 seconds; or *Dcay*, so the alarm sounds at increasingly longer intervals until it sounds only once every hour.

## Using Text Appearance Parameters

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The next section on the Setup menu is text appearance. The text appearance parameters let you change the way text prints on the page.

### 12) QUAL: Letter *Set Print Quality*



QUAL lets you specify a quality for printing text. You can select *Letter* for letter-quality text; *Memo* for memo-quality text; or *Draft* for draft-quality text. The quality that you select affects the print speed. Letter-quality produces the best quality text, but prints the slowest. Conversely, draft-quality prints the fastest, but produces lower quality text.

### 13) FNT: Courier *SetFont*

Courier  
Gothic  
Times Roman  
Elite

FNT lets you select a font (type style). The fonts you can choose from depend on those in the installed Intelli-card. On standard printers you can select from the following fonts: *Courier*, *Gothic*, *TmsRomn* and *Elite*. When you select a font, the PITCH and CELL settings change to the defaults for the selected font. These defaults ensure that the font is spaced correctly when printed.

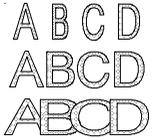
### 14) PITCH: 10 *Set Pitch*

ABCD  
ABCD  
A B C D

PITCH lets you specify how many characters to print per inch. You can select *10*, *12*, *13.3*, *15*, *17.1*, *20* or *PS* (proportional spacing). The *PS* setting only applies if the current font is a PS font. If you select *PS* and the current font is a fixed-pitch font, the printer uses the default pitch of the font. If the current setting is *Other*, then your software application has set the pitch to some nonstandard value.

When you select a pitch, the CELL setting also changes to your pitch selection to ensure that the font expands or compresses to fit the pitch.

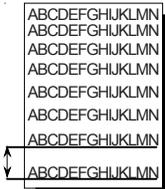
**15) CELL: 10** *Set Character Cell Size*



CELL lets you specify how much to expand or compress characters so that they look good when printed at the selected pitch. You can select the same settings as for PITCH; that is, *10, 12, 13.3, 15, 17.1, 20* or *PS* (proportional spacing). To select a setting, consider the following:

- ✓ Using the *same* setting for CELL and PITCH yields the best results.
- ✓ Using a *lower* setting for CELL than for PITCH can result in characters that overlap.
- ✓ Using a *higher* setting for CELL than for PITCH can result in wide gaps between characters.

**16) LPI: 10** *Set Number of Lines Per Inch*



LPI lets you specify how many lines to print per inch. You can select *2, 3, 4, 5, 6, 8, 9, 10* or *12* lines per inch. If the current setting is *Other*, then your software application has set the number of lines per inch to some nonstandard value.

**17) COLOR: Black** *Set Color*



COLOR lets you specify a color for printing. You can select *Black*, *Cyan* (light blue), *Magenta* (magenta), *Yellow* (yellow), *Violet* (violet), *Green* or *Orange* (orange). If a monochrome ribbon is installed, the printer ignores your color selection.

**18) ITALICS: Off** *Turn Italic Mode On and Off*



ITALICS lets you turn the italic mode on and off. In the italic mode, characters slant to the right by about 20%. You can select *On* or *Off*.

**19) HIGH: Off** *Turn Double-High Mode On and Off*A<sup>B</sup>CDEF

HIGH lets you turn the double-high mode on and off. In double-high mode, characters stretch to twice their normal height (downward in the AMT and Diablo 630 emulations; upward in the IBM and Epson emulations). You can select *On* or *Off*. When you turn on the double-high mode, the LPI setting changes to three lines per inch. When you turn off the mode, the LPI setting changes to six lines per inch.

**20) WIDE: Off** *Turn Double-Wide Mode On and Off*A<sup>B</sup>CD

WIDE lets you turn the double-wide on and off. In double-wide mode, characters stretch rightward to twice their normal width. You can select *On* or *Off*. When you turn on the double-wide mode, the PITCH and CELL settings change to one-half their current values. When you turn off the mode, these settings return to their original values.

**21) SCRIPT: Off** *Turn Super/Subscript Modes On and Off*A<sup>B</sup>CD<sub>E</sub>F

SCRIPT lets you turn on and off the superscript and subscript modes. In superscript mode, characters shrink to about half the normal size and print above the normal print line. In subscript mode, the same small characters print below the normal print line. You can select *Supr* to turn the superscript mode on; *Sub* to turn the subscript mode on; or *Off* to turn both modes off.

**22) UNDLINE: Off** *Turn Underline Mode On and Off*ABCDEF

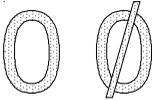
UNDLINE lets you turn the underline mode on and off. In underline mode, all characters and spaces are underlined. You can select *On* or *Off*.

**23) BLD/SHA: Off** *Turn Bold/Shadow Modes On and Off*

ABCDEF

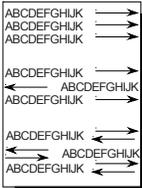
BLD/SHA lets you turn on and off the bold and shadow modes. In bold mode, characters are printed twice—one on top of the other—to produce bold print. In shadow mode, characters are also printed twice—once and then again slightly offset to the right—to produce shadow print. You can select *Bld* to turn the bold mode on; *Sha* to turn the shadow mode on; or *Off* to turn both modes off.

**24) SLASH-0: Off** *Turn Zero Slashing On and Off*



SLASH-0 lets you turn zero slashing on and off. You can select *Off* to specify that the numeral zero be printed without a slash ( 0 ); or *On* to specify that the numeral zero be printed with a slash ( 0̄ ). Your selection affects the printing of the numeral zero in all fonts and print qualities.

**25) BI-DIR: Text** *Set Printing Direction*



BI-DIR lets you select how the printer prints single-pass text, multi-pass text, and graphics with respect to printing direction. Printing unidirectionally provides the highest possible vertical registration, but slows down printing. You can select the following settings:

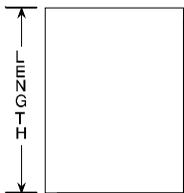
<i>Setting</i>	<i>Single-Pass Text</i>	<i>Multi-Pass Text</i>	<i>Graphics</i>
<i>Off</i>	Left-to-right only	Left-to-right only	Left-to-right only
<i>Text</i>	Bidirectional	Unidirectional passes	Left-to-right only
<i>Graf</i>	Bidirectional	Unidirectional passes	Unidirectional passes
<i>Full</i>	Bidirectional	Bidirectional	Bidirectional

## Using Page Setup Parameters

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The next section of the Setup menu is page setup. Page setup parameters let you specify forms length and margins.

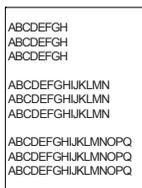
### 26) LENG: 66/6" *Set Form Length*



LENG lets you specify the length of the form you are using in 1/6-inch increments. This setting is very important since it controls continuous-forms feeding.

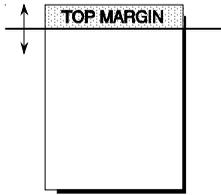
You can select a number from 0 to 182. To determine the correct number to use for your form, multiply the length of the form in inches by 6. For example, if your form is 11 inches long (11 inches  $\times$  6 = 66), you should select 66. When you set form length, the printer sets the top-of-form at the current line and clears the top and bottom margins.

### 27) WIDTH: 13.6" *Set Maximum Print Width*



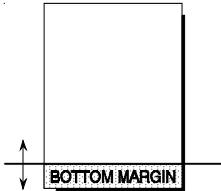
WIDTH lets you specify the maximum print width. If the printer receives a line that exceeds the maximum print width, the excess prints on the next line. On *narrow*-carriage printers, you can specify 8", 8.5", or 11". On *wide*-carriage printers, you can specify 8", 13.6" or 16". If you set the maximum print width to 11" or 16", be sure to load the paper so that it aligns with the blue line at the far left on the paper scale. Also, 11"- and 16"-wide printing is unidirectional and slower than normal.

**28) TOP MAR: 0** *Set Top Margin*



TOP MAR lets you specify a top margin. On subsequent form feeds, paper advances to the top margin you specify. The top margin can be from 0 to 363 lines down from the top-of-form; however, you can only select a line that is above the bottom margin setting. The physical location of the top margin on the page is unaffected by subsequent changes to line spacing. If you change the LENG (form length) setting, the top margin resets to 0.

**29) BOT MAR: 66** *Set Bottom Margin*



BOT MAR lets you specify a bottom margin. After printing on this line, the printer performs a form feed operation automatically; no printing occurs below the bottom margin. The bottom margin can be from 1 to 364 lines down from the top-of-form; however, you can only select a line that is below the top margin setting. The physical location of the bottom margin on the page is unaffected by subsequent changes to line spacing. If you change the LENG (form length) setting, the bottom margin resets to the new form length.

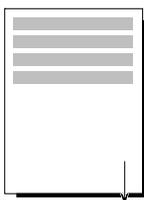
**30) LFT MAR: 0** *Set Left Margin*



LFT MAR lets you specify a left margin. All subsequent carriage returns cause the carriage to move to the left margin. You specify the left margin as a number of character spaces to the right of the far left print position; however, you can only select a character space that is to the left of the right margin setting. To compute the correct LFT MAR setting, just multiply the left margin you want in inches by the PITCH setting. For example, if you want a 1/2-inch left margin and the PITCH is set to 10, you would set this parameter to 5 ( $1/2 \times 10 = 5$ ). To help you visualize left margin locations as you scroll through the possible settings, the carriage moves to the displayed setting. The physical location of the left margin on the page is unaffected by subsequent changes to horizontal spacing (character pitch).

**31) RGT MAR: 136** *Set Right Margin*

RGT MAR lets you specify a right margin. When printing reaches the right margin on a line, the printer performs a carriage return/line feed and continues printing on the next line. You specify the right margin as a number of character spaces to the right of the far left print position; however, you can only select a character space that is to the right of the left margin setting. To help you visualize right margin locations as you scroll through the possible settings, the carriage moves to the displayed setting. The physical position of the right margin on the page is unaffected by subsequent changes to horizontal spacing (character pitch).

**32) AUTO FF: Off** *Turn Automatic Form Feed Mode On and Off*

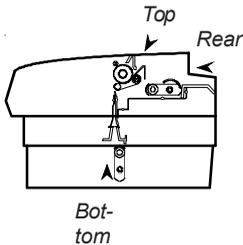
AUTO FF lets you turn the automatic form feed mode on and off. In the automatic form feed mode, the printer skips over the perforations of pin-feed paper by setting the top and bottom margins to one-half inch. You can select *On* to turn the automatic form feed mode on; or *Off* to turn the mode off. For the automatic form feed mode to work correctly, the LENG (form length) parameter must be set to the correct form length.

## Using Paper Handling Parameters

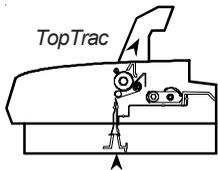
The next section of the Setup menu is paper handling. Paper handling parameters control how paper feeds through the printer.

### 33) PATH: Top *Select Paper Path*

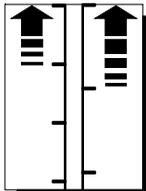
PATH lets you select the active paper path. You can select from the following:



- ✓ *Top*. Loads single sheets from the top of the printer.
- ✓ *Rear*. Loads pin-feed forms from the rear of the printer.
- ✓ *Bottom*. Loads pin-feed forms from the powered, bottom-feed tractor (if your printer has one).
- ✓ *TopTrac*. Activates a top-mounted, pull-tractor option to feed paper from the bottom of the printer. Only select *TopTrac* when the printer is idle and out of paper. The printer will automatically switch to the rear paper path and move the printhead back away from the platen. You can then load paper from the bottom of the printer and into the top-mounted pull-tractor. With *TopTrac* selected, all printer functions that perform reverse paper feeding are disabled, including paper park and the demand document mode.

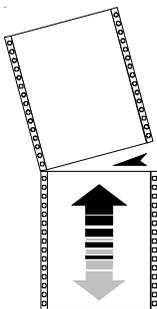


### 34) LFSLEW: 6 ips *Set Line Feed Speed*



LFSLEW lets you change the rate at which paper feeds (slews) through the printer. You can select from *1ips* to *10ips* (inches per second). Slower line feed speeds are recommended for thick paper or multipart forms.

### 35) DEMAND: Off *Turn Demand Document Mode On and Off*



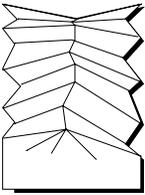
DEMAND lets you turn the demand document mode on and off. The demand document mode lets you remove a pin-fed form without wasting the next form. With the mode on, pressing the Ready button turns printing off, displays DEMAND on the control panel, and advances the last printed page up to the tear bar. You can then tear off the page if you want to. Pressing the Ready button again causes one of the following actions:

- ✓ If you *removed* the last printed page, the paper reverse feeds to the next top-of-form, the READY message reappears, and printing continues.
- ✓ If you *did not remove* the last printed page, the paper reverse feeds to its original position, the READY message reappears, and printing resumes at the point where it left off.

You can select from the following settings:

- ✓ *On*. Turns the demand document mode on.
- ✓ *Beep*. Turns the demand document mode on and causes the printer to begin *beeping* 15 seconds after you press the Ready button as a reminder to re-enable printing.
- ✓ *Tear*. Turns the demand document mode on and causes the printer to reverse feed the paper to the next top-of-form when you re-enable printing, regardless of whether you tear off the last printed sheet. This option is useful when printing thick multipart forms that jam when the leading edge of the form is reverse fed below the printhead.
- ✓ *Auto*. Causes the printer to advance the bottom of the last printed page to the tear bar whenever the printer is idle. You don't have to press the Ready button. As soon as the printer receives subsequent data to print, the paper reverse feeds as usual.
- ✓ *Off*. Turns the demand document mode off.

### 36) PPR JAM: On Turn Paper Jam Sensing On and Off



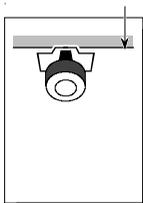
PPR JAM lets you turn the printer's paper jam sensing function on and off. With paper jam sensing on, the printer can detect when a pin-fed form gets jammed inside the printer and will notify you by displaying CLEAR PAPER JAM on the control panel display. With paper jam sensing off, the printer cannot detect paper jams. During ordinary operation, you should leave paper jam sensing on. Certain paper stocks, such as high-gloss, exceptionally smooth paper, can cause the printer to falsely detect paper jams. In these rare cases, you can turn paper jam sensing off. You can select *On* to turn paper jam sensing on; or *Off* to turn it off.

### 37) PGE END: Off Select Page End Method

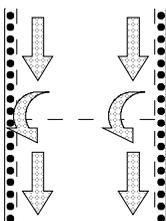


PGE END lets you tell the printer whether or not to use the LENG (form length) setting to determine the last printing line on a cut sheet. You can select *Off* to let printing continue beyond the LENG setting; or *On* to specify that printing stop at the LENG setting. A third setting is *Roll*, which you can select to feed unsprocketed roll paper into the printer. When you select *Roll*, printing is continuous without regard for page length.

**Note:** Most software applications control pagination by sending a form feed control code at the end of each page. In these cases, the PGE END setting should be *Off*. A few software applications do not control pagination directly, but instead send out only line feed control codes between consecutive pages. In these cases, the PGE END setting should be *On*. Regardless of the PGE END setting, the last print line on a cut sheet occurs when the printer receives a form feed control code.

**38) POPUP: Off****Turn Preprinted Forms Alignment Mode On and Off**

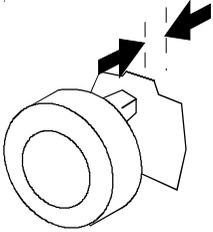
POPUP lets you turn the preprinted forms alignment mode on and off. When the mode is on, you can easily align a preprinted form so that printing begins on any desired line. Just press the Ready button to pause printing and use the Select-dial to align the first print line on the form with the top edge of the ribbon shield. After you press the Ready button again, printing will begin on the desired print line. You can select *On* to turn the preprinted forms alignment mode on; or *Off* to turn it off.

**39) AUTOBAIL:Off****Turn Automatic Bail Mode On and Off**

AUTOBAIL lets you turn the automatic bail mode on and off. With the automatic bail mode on, the printer will open the bail each time the perforation of a pin-feed form passes by. After the perforation is clear of the bail, the printer will close the bail. This mode is useful when using thick, multipart forms with perforations that tend to catch on the bail. You can select *On* to turn the automatic bail mode on; or *Off* to turn it off.

For the automatic bail mode to work correctly, you must turn the mode on before loading pin-feed paper into the printer and the LENG (form length) parameter must be set to the correct form length.

#### 40) PH GAP: Auto *Set Print Density*

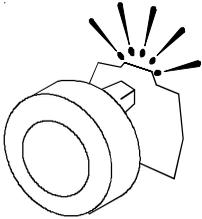


PH GAP lets you enable and disable automatic forms thickness detection. When set to *Auto*, the printer automatically detects forms thickness and adjusts the print gap (that is, the physical distance between the printhead and the form) for optimal print density.

If necessary, you can disable this function and manually select a fixed print gap. This causes the printer to move the printhead a fixed distance away from the platen, regardless of the actual forms thickness. To set the print gap manually, set this parameter to a value from *10* to *45*. A setting of *10* moves the printhead as close to the platen as possible and results in the darkest printing. Conversely, a setting of *45* moves the printhead as far from the platen as possible and results in the lightest printing.

**Caution:** Use care when disabling automatic forms thickness detection. If a manual setting is too high, printing may be too light or disappear altogether. If a manual setting is too low, the ribbon can snag on the printhead causing damage to both the ribbon and printhead.

#### 41) PFORCE: Auto *Set Print Force*



PFORCE lets you enable and disable automatic print force control. When set to *Auto*, the printer automatically adjusts the print force so that it is optimal for the form being printed.

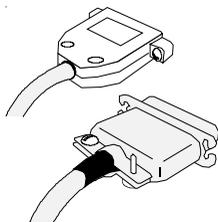
If necessary, you can disable this function and manually select a fixed print force. This causes the printer to use the selected print force when printing all forms, regardless of the actual forms thickness. To set the print force manually, set this parameter to a value from *1* to *10*. A setting of *1* weakens the print force and results in lighter printing. Conversely, a setting of *10* strengthens the print force and results in darker printing.

**Caution:** Printing with too much print force reduces the life of the printhead and also increases printing noise.

## Setting Communications Parameters

The next section of the Setup menu is communications. These parameters control data communications between the printer and the host computer.

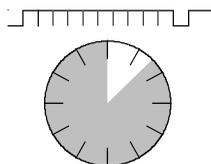
### 42) INTRFCE: Auto *Select Interface*



INTRFCE lets you select the parallel or serial interface port for communications with the host computer. You can select *Par* for parallel, *Ser* for serial, or *Auto* for automatic switching between both ports on a first-come, first-serve basis (while receiving data from one port, the printer will set the other port to the busy state). When you change this parameter, the printer clears the data input buffer.

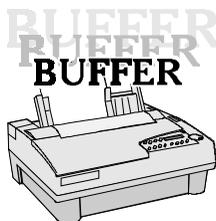
**Note:** To use the serial interface, you must set the BAUD, HNDSHK, DATA BITS, STOP BITS, and PARITY parameters to match the serial configuration of the host computer. When using the parallel interface, these parameter settings are irrelevant.

### 43) BAUD: 9600 *Specify Baud Rate*



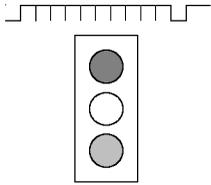
BAUD lets you tell the printer what serial baud rate your computer is using. Baud rate is the speed that serial data is transmitted between your computer and the printer. You can select 75, 150, 300, 600, 1200, 2400, 4800, 9600 or 19200. Both your computer and the printer must be set to the *same* baud rate.

### 44) BUFFER: 48K *Specify Input Buffer Size*



BUFFER lets you change the size of the printer's data input buffer to meet the specific requirements of your computer system. For example, some older computer systems require a small printer buffer which maximizes handshaking and prevents timeout errors from occurring. You can specify 512 bytes, 1K, 2K, 4K, 8K, 16K, 32K, 48K, 64K, 80K, or up to the total printer memory. When you change this parameter, the printer clears the data input buffer.

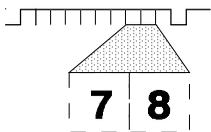
**45) HNDSHK: D/X** *Specify Handshaking Method*



HNDSHK lets you tell the printer what handshaking method your computer is using. Handshaking is a technique that starts and stops data transmission between your computer and the printer. This starting and stopping is important so that neither device receives more data than it can handle at any given time. Without handshaking, the printer's input buffer could overflow.

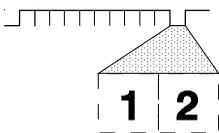
The printer supports three handshake protocols: DTR, X-ON/X-OFF and ENQ/ACK. DTR is a hardware handshake that uses the Data Terminal Ready line in the serial interface. Both X-ON/X-OFF and ENQ/ACK are software handshakes that require the computer or printer to send certain data bytes on its data transmission line. You can specify *DTR* for the DTR hardware method; *XON* for the X-ON/X-OFF software method; *ENQ* for the ENQ/ACK software method; *D/X* for both the DTR and X-ON/X-OFF methods; *D/E* for both the DTR and ENQ/ACK methods; or *None* for no handshaking method. Both your computer and the printer must use the *same* handshaking method(s).

**46) DATA BITS: 8** *Specify Number of Data Bits*



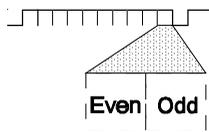
DATA BITS lets you tell the printer how many data bits your computer is sending in each byte. You must select 7 if your computer sends 7-bit bytes; or 8 if your computer sends 8-bit bytes.

**47) STOP BITS: 1** *Specify Number of Stop Bits*



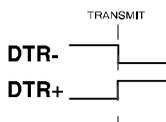
STOP BITS lets you tell the printer how many stop bits your computer is sending in each byte. Stop bits are necessary to separate consecutive bytes in the data stream. You must select 1 if your computer sends one stop bit; or 2 if your computer sends two stop bits.

#### 48) PARITY: None *Specify Parity*



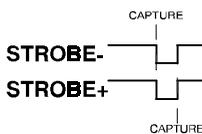
PARITY lets you tell the printer what parity method your computer is using. When your computer uses parity, it adds a special parity bit to each data byte it sends. This parity bit enables the printer to detect a data transmission error. In the even parity method, the sum of the binary 1 bits plus the parity bit must be an even number, or else an error has occurred. In the odd parity method, the sum of the binary 1 bits plus the parity bit must be an odd number, or else an error has occurred. You must select *None* if your computer does not support parity; *Odd* if your computer uses odd parity; or *Even* if your computer uses even parity. Both your computer and the printer must be set for the *same* parity method.

#### 49) DTR: Pos *Set DTR Signal Polarity*



DTR lets you specify the polarity of the extra Data Terminal Ready (DTR) signal in the printer's serial interface. The signal is supplied on pin 25 or pin 11, depending on how the printer is configured. Since most computers use the standard DTR signal on pin 20 for handshaking, this parameter setting is usually ignored. You can select *Neg* for a signal that goes low to enable data transmission; or *Pos* for a signal that goes high to enable data transmission.

#### 50) STROBE: Neg *Specify STROBE Pulse Edge for Data Capture*



STROBE lets you specify on which edge of the parallel STROBE pulse the printer will capture the data byte. You can select *Neg* to capture data on the leading, negative edge of the STROBE pulse; or *Pos* to capture data on the trailing, positive edge of the STROBE pulse. In most cases, the *Neg* setting will provide reliable data transfer. If your computer's parallel interface sends the STROBE pulse before data has fully settled on the data lines (resulting in data loss), you may be able to correct the problem by selecting the *Pos* setting.

## Reviewing the Setup Menu

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Now that you've been introduced to the Setup menu parameters and their possible settings, it's time for a brief review.

Table 4-1. Setup Menu Summary

<i>Parameter</i>	<i>Description</i>	<i>Settings</i>
<i>Operations</i>		
RSTOR	Restore printer settings	<i>None</i> Usr 1 Usr 2 Usr 3 Usr 4 Usr 5 Fctry
SAVE	Save printer settings	<i>None</i> Usr 1 Usr 2 Usr 3 Usr 4 Usr 5
DFALT	Select power-on default settings	<i>Fctry</i> Usr 1 Usr 2 Usr 3 Usr 4 Usr 5
TEST	Run printer tests	<i>None</i> Memory Sensor Ribbon Pcalib Random Gap
<i>Printer Setup</i>		
EMUL	Set printer emulation	<i>AMT</i> Diab630 EpsonJX EpsonLQ IBMXL24 BarCode HexMode
QUIET	Turn quiet mode on and off	<i>Off</i> On
LANG	Set language	<i>USA</i> French German UK Danish1 Swedish Italn Spnsh1 Jpnese Norwgn Danish2 Spnsh2 Portugs

Table 4-1. Setup Menu Summary—continued

<i>Parameter</i>	<i>Description</i>	<i>Settings</i>
<i>Printer Setup—continued</i>		
SETS	Select characters for codes 128 through 255	<i>IBM1 IBM2 Ital1 Ital2</i> None
AUTO CR	Turn automatic carriage return mode on and off	<i>Off On</i>
AUTO LF	Turn automatic line feed mode on and off	<i>Off On</i>
ERRBEL	Select audible alarm mode	<i>Once Dcay Cont</i>
<i>Text Appearance</i>		
QUAL	Set print quality	<i>Letter Memo Draft</i>
FONT	Set font	<i>Courier Gothic TmsRomn</i> Elite
PITCH	Set pitch	<i>10 12 13.3 15 17.1</i> 20 PS
CELL	Set character cell size	<i>10 12 13.3 15 17.1</i> 20 PS
LPI	Set number of lines per inch	<i>2 3 4 5 6 8 9</i> 10 12
COLOR	Set color	<i>Black Cyan Mgnta Yellw</i> Violt Green Orang
ITALICS	Turn italic mode on and off	<i>Off On</i>
HIGH	Turn double-high mode on and off	<i>Off On</i>

Table 4-1. Setup Menu Summary—continued

<i>Parameter</i>	<i>Description</i>	<i>Settings</i>
<i>Text Appearance—continued</i>		
WIDE	Turn double-wide mode on and off	<i>Off</i> On
SCRIPT	Turn super/subscript modes on and off	<i>Off</i> Supr Sub
UNDLIN	Turn underline mode on and off	<i>Off</i> On
BLD/SHA	Turn bold/shadow modes on and off	<i>Off</i> Bld Sha
SLASH-0	Turn zero slashing on and off	<i>Off</i> On
BI-DIR	Set printing direction	<i>Text</i> Graf Full <i>Off</i>
<i>Page Setup</i>		
LENG	Set form length	0/6" to 182/6" (66/6")
WIDTH	Set maximum print width	8" 8.5" 11" ( <i>narrow models</i> ) 8" 13.6" 16" ( <i>wide models</i> )
TOP MAR	Set top margin	0 to 363
BOT MAR	Set bottom margin	1 to 364 (66)
LFT MAR	Set left margin	0 to 319
RGT MAR	Set right margin	1 to 320 (85) ( <i>narrow models</i> ) 1 to 320 (136) ( <i>wide models</i> )
AUTO FF	Turn automatic form feed mode on and off	<i>Off</i> On

Table 4-1. Setup Menu Summary—continued

<i>Parameter</i>	<i>Description</i>	<i>Settings</i>
<i>Paper Handling</i>		
PATH	Select paper path	<i>Top</i> Rear Bottom TopTrac
LFSLEW	Set line feed speed	1ips to 10ips ( <i>6ips</i> )
DEMAND	Turn demand document mode on and off	<i>Off</i> On Beep Tear Auto
PPR JAM	Turn paper jam sensing on and off	<i>On</i> Off
PGE END	Select page end method	<i>Off</i> On Roll
POPUP	Turn preprinted forms alignment mode on and off	<i>Off</i> On
AUTO-BAIL	Turn automatic bail mode on and off	<i>Off</i> On
PH GAP	Set print density	<i>Auto</i> 10 to 45
PFORCE	Set print force	<i>Auto</i> 1 to 10

Table 4-1. Setup Menu Summary—continued

<i>Parameter</i>	<i>Description</i>	<i>Settings</i>
<i>Communications</i>		
INTRFCE	Select interface	<i>Auto Par Ser</i>
BAUD	Specify baud rate	75 150 300 600 1200 2400 4800 9600 19200
BUFFER	Specify input buffer size	512 1K 2K 3K 4K 8K 16K 32K 48K 64K 80K or more depending on installed memory
HNDSHK	Specify handshaking method	<i>D/X ENQ D/E XON</i> <i>DTR None</i>
DATA BITS	Specify number of data bits	7 8
STOP BITS	Specify number of stop bits	1 2
PARITY	Specify parity	<i>None Odd Even</i>
DTR	Set DTR signal polarity	<i>Pos Neg</i>
STROBE	Specify STROBE pulse edge for data capture	<i>Pos Neg</i>

## Section

# 5

## Cleaning and Maintenance

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To maintain trouble-free operation and good print quality, you should perform periodic cleaning and preventive maintenance procedures on your printer. This section provides the following procedures:

- ✓ Removing and installing the top cover
- ✓ Cleaning the platen and bail rollers
- ✓ Cleaning the main carriage shaft
- ✓ Cleaning the printhead wires
- ✓ Cleaning printer surfaces
- ✓ Replacing the ribbon cartridge
- ✓ Replacing the fuse
- ✓ Inspecting printer parts
- ✓ Replacing the printhead

## Removing and Installing the Top Cover

---

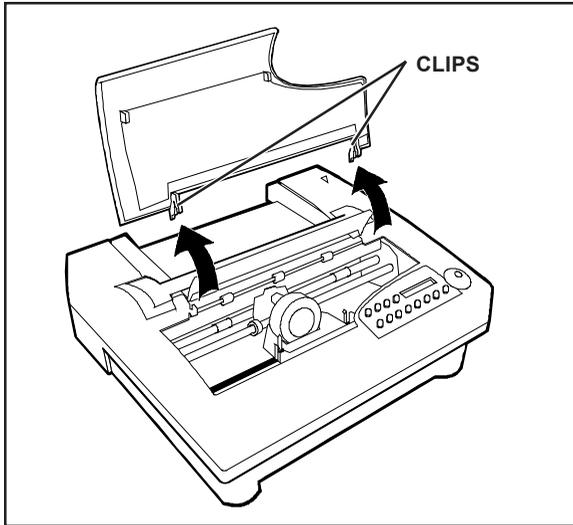


Figure 5-1. Removing the Top Cover

Maintenance and troubleshooting procedures require you to remove the top cover to access internal printer components.

To remove the top cover, simply lift up the front edge, as shown in figure 5-1.

To re-install the top cover, perform the following procedure:

1. Position the platen window between the back edge of the top cover and the window support tabs, as shown in figure 5-2.
2. Press down on the top cover until the clips snap onto the mounting tabs.
3. Lower the top cover back into place.

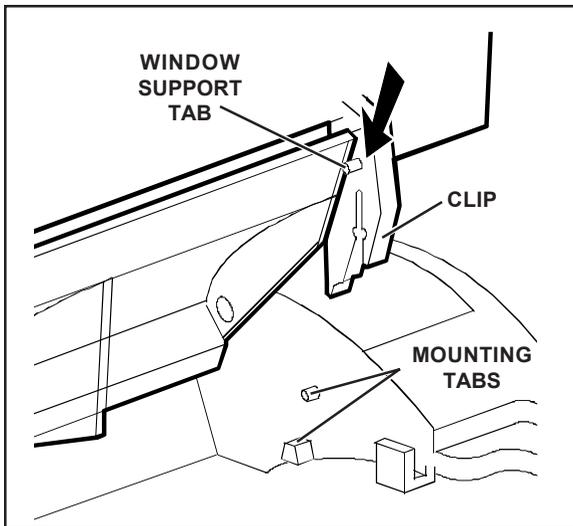


Figure 5-2. Aligning the Platen Window and Top Cover

## Cleaning the Platen and Bail Rollers

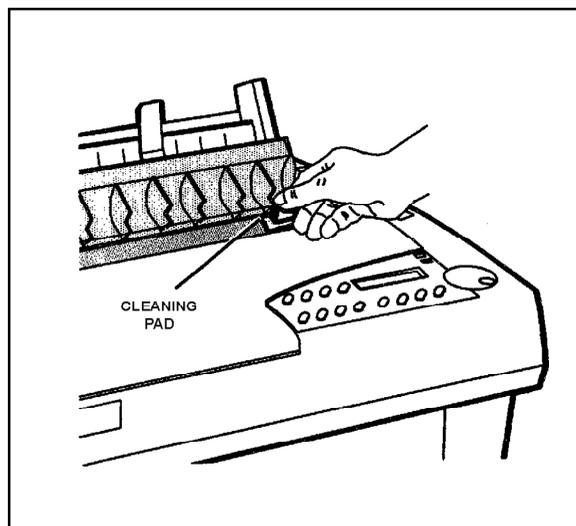


Figure 5-3. Cleaning the Platen and Bail Roller

You should clean the platen and bail rollers whenever there is ink or paper fibers on the platen, the platen appears shiny, or printed pages contain vertical smears. To do so, you'll need a cleaning pad moistened with Fedron® platen cleaner (available at most typewriter supply stores). Fedron includes preservatives and lubricants that greatly increase the life of the platen. Always use Fedron sparingly and do not apply it to any surface other than the platen and bail rollers. Fedron is extremely flammable, so be sure to read and follow all precautions on the container.

To clean the platen and bail rollers, use the following procedure:

1. Remove the top cover. Then, re-install the top cover with the platen window in the raised position.
2. Press the Ready button to pause the printer.
3. Using a clean pad moistened with Fedron, wipe the rubber surfaces of the platen and bail rollers until they are dull and clean, as shown in figure 5-3. Use the Select-dial to turn the platen and the Bail button to move the bail.
4. Remove and re-install the the top cover with the platen window in the normal position. Then, run a printer self test to verify normal operation.

## Cleaning the Main Carriage Shaft

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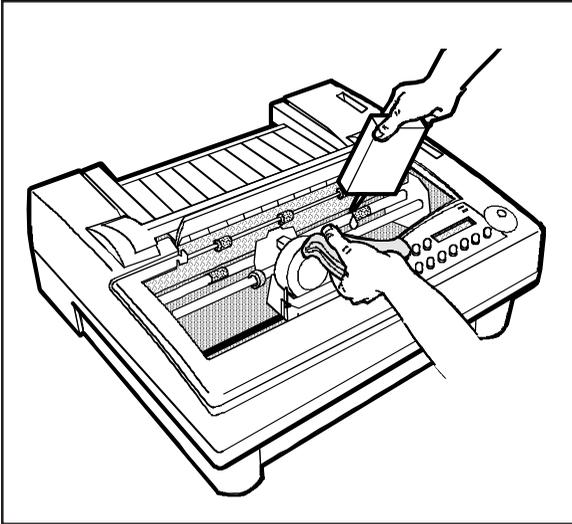


Figure 5-4. Cleaning the Main Carriage Shaft

The carriage slides on two shafts. The main shaft, located directly under the printhead, requires occasional lubrication. The other shaft near the front of the printer *does not* require lubrication. You must use 3-In-One® machine oil or an equivalent oil. To clean the main carriage shaft, use these steps:

1. With the printer off, remove the top cover. Leave the platen window in the raised position.
2. Slide the carriage to one side and, using a clean, lint-free cloth, wipe the main shaft *away from* the carriage. Slide the carriage to the other side and wipe the main shaft again *away from* the carriage.
3. While holding the cloth below the shaft, apply two or three drops of oil, as shown in figure 5-4. Then, slowly slide the carriage along the shaft and stop at the far side of the chassis.
4. Repeat step 4, only this time slide the carriage back and forth several times to work the oil into the carriage's self-lubricating felt rings.
5. To remove any excess oil, slide the carriage to one side and wipe the main shaft. Slide the carriage to the other side and wipe the main shaft again.
6. Replace the top cover.

**⚠ Caution:** If you accidentally lubricate the front support shaft, *do not* use cleaners to remove the oil. Instead, use a lint-free rag to carefully wipe the shaft until it is clean.

## Cleaning the Printhead Wires

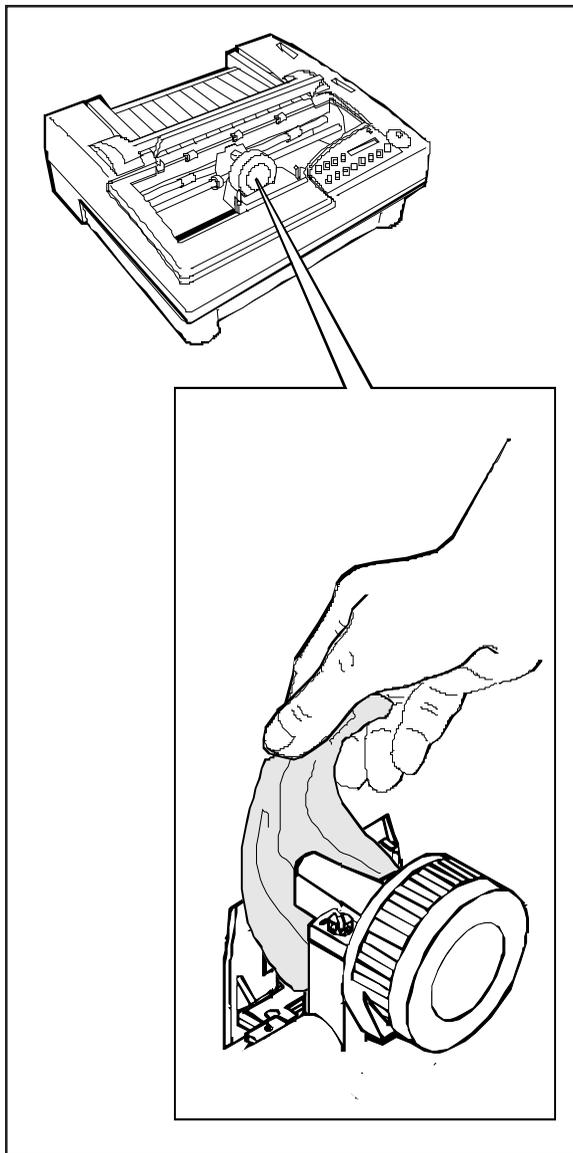


Figure 5-5. Cleaning the Printhead Wires

To prevent excessive ink build-up on the printhead wires, you should periodically wipe them with pure silicone lubricant (LPS-1® or an equivalent).

To clean the printhead wires, use the following procedure:

1. With the printer off, remove the top cover. Leave the platen window in the raised position.
2. If a ribbon cartridge is installed, push outward on the retaining tabs that secure the cartridge to the carriage; then lift up and remove the cartridge.
3. Using a soft tissue moistened with pure silicone lubricant, gently wipe the tip of the printhead to remove any ink build-up, as shown in figure 5-5.
4. Replace the ribbon cartridge.
5. Replace the top cover. Then, run a printer self-test to verify normal operation.

## Cleaning Printer Surfaces

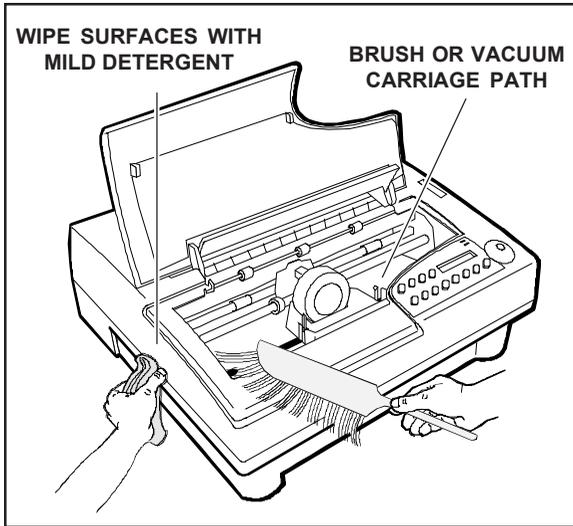


Figure 5-6. Cleaning Printer Surfaces

To keep your printer looking new, you should periodically clean its surfaces with glass cleaner (Windex® or equivalent), 91% isopropyl alcohol, or a mild dishwashing detergent (Lux® or equivalent).

To clean the printer surfaces, use the following procedure:

1. Turn off the printer and detach the power cord.
2. Using a soft brush or lint-free cloth, dust all of the exterior surfaces, as shown in figure 5-6. Be sure the cloth is free of grit or other matter.
3. Using a cloth lightly moistened with glass cleaner, 91% isopropyl alcohol, or a mild dishwashing detergent, wipe and clean the platen window.
4. Raise the top cover. Using a soft brush or vacuum, remove all paper fibers, dust and foreign matter from inside the printer. Then, lower the top cover.
5. Using a soft brush or vacuum, remove all paper fibers, dust, and foreign matter from the rear forms tractors, as shown in figure 5-7.
6. Re-attach the power cord and turn on the printer. Then, run a printer self test to verify normal operation.

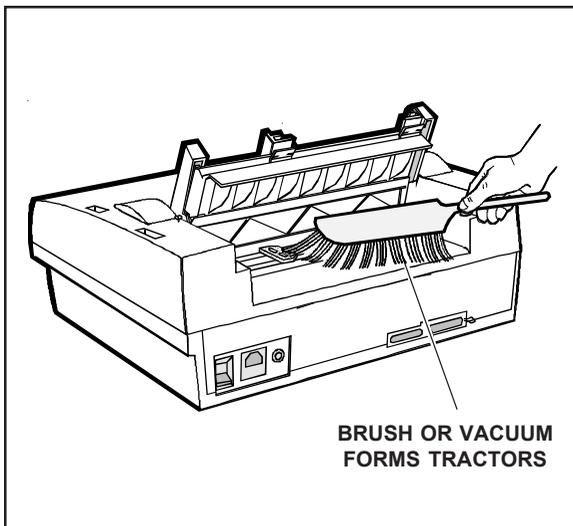


Figure 5-7. Cleaning the Forms Tractors

## Replacing the Ribbon Cartridge

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When printing becomes too light, you should replace the ribbon cartridge. Follow the procedures for *Installing the Ribbon Cartridge* in the *Set Up* section of this guide.

## Replacing the Fuse

---

When the printer is plugged into a power outlet that you have verified is supplying the correct voltage, but the printer shows no sign of operation, the main power fuse may have blown. A blown fuse is a strong indication that the power line is supplying unstable voltage and you should try a different one.

To check and replace the fuse, use the following procedure:

1. Turn off the printer and detach the power cord.
2. Slide open the fuse compartment. The innermost fuse in the compartment is the main power fuse. The other fuse is a spare.
3. Check the main power fuse to make sure that it is in good condition. If it is blown, replace it with the spare fuse. Make sure that the rating on the side of the spare fuse matches the required fuse rating shown on the serial number label on the side or rear of the printer.
4. Close the fuse compartment and re-attach the power cable.
5. Run a printer self test to verify normal operation.

☞ **Note:** For instructions on locating the fuse, refer to the *Checking the Voltage Select Switch* procedure in the *Set Up* section of this guide.

## Inspecting Printer Parts

---

You should occasionally inspect printer components so you can prevent problems before they occur. If some component appears to be damaged or worn, contact your service representative for a replacement part.

 **Caution:** Before starting your inspection, be sure to turn off the printer.

**PLATEN**

The surface should be dull—not shiny. Look for dents or flaws in the rubber surface.

**BAIL AND BAIL ROLLERS**

Look for stiffness or binding in movement. Look for dents or flaws in the rubber surface of the rollers.

**PRINTHEAD**

Look for bent wires or any visible signs of wear.

**CHASSIS**

Look for obstructions in the carriage path. Remove any dust, paper fibers, or other foreign matter from inside the printer.

**PULLEYS AND DRIVE BELTS**

Look for looseness or visible damage.

**RIBBON CARTRIDGE**

Look for worn fabric.

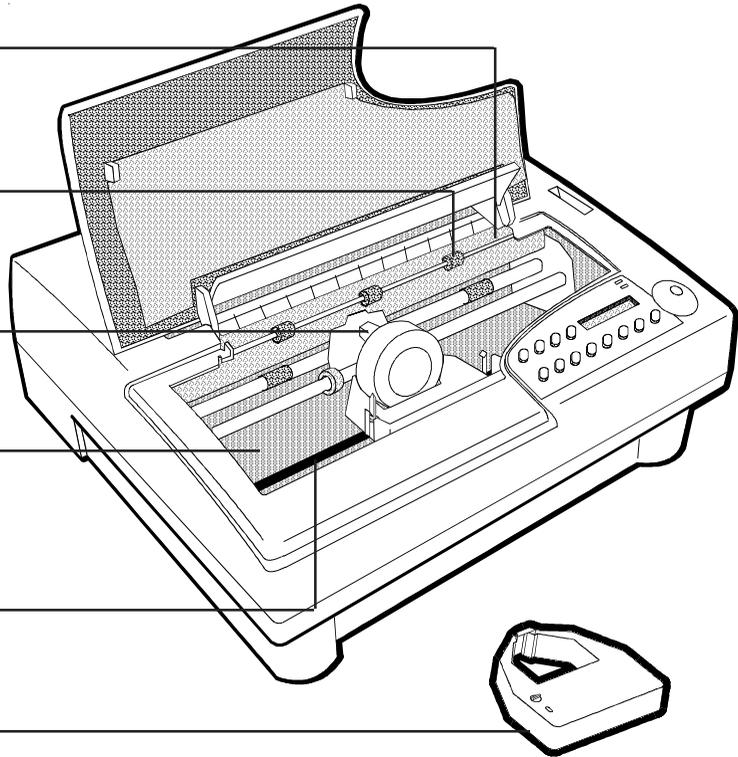


Figure 5-8. Inspecting the Printer, Front

*Inspecting Printer Parts—continued*

*After* you complete the inspection checklist on these two pages, turn on the printer and run a self test to verify normal operation.

 **Caution:** Do not inspect the printer with the power turned on.

 **INTERFACE CONNECTORS**

Detach the cables. Inspect the cables and connectors for broken wires, frayed or burned insulation, or loose fit.

 **FORMS TRACTORS**

Look for obstructions in the paper path. Remove any dust, paper fibers, or other foreign matter from inside the printer. Open and close the tractor locks and doors. Slide the tractors along the shafts. Inspect for binding or stiff movement.

 **AC POWER RECEPTACLE**

Detach the cord. Inspect the cord and receptacle for visible signs of wear or damage.

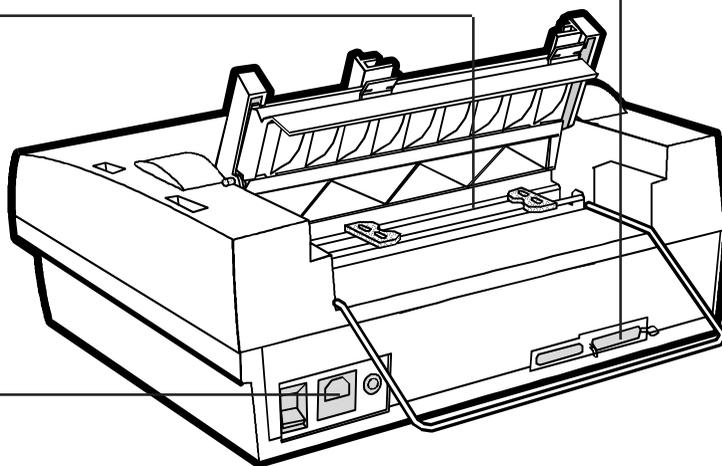


Figure 5-9. Inspecting the Printer, Rear

## Replacing the Printhead

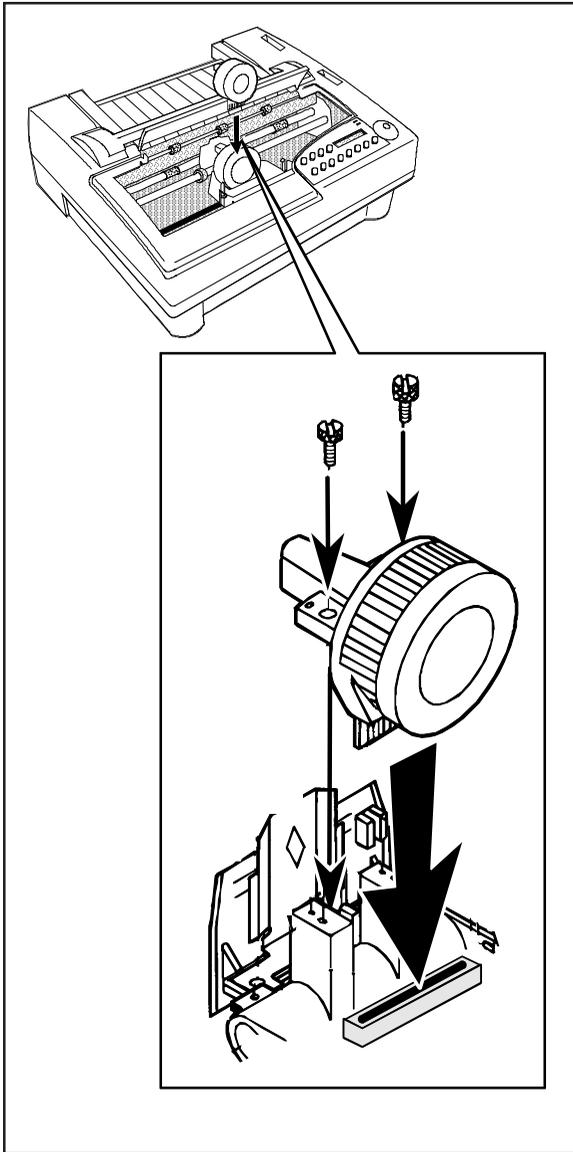


Figure 5-10. Replacing the Printhead

When the printhead wears out, you should replace it with a new one. To do so, use the following procedure:

**▲ Warning:** The printhead can become very hot while in use. If you have been printing, wait at least five minutes with the printer idle before touching the printhead.

1. Turn off the printer and remove the top cover. Leave the platen window in the raised position.
2. Slide the carriage to the center of the printer.
3. Remove the ribbon cartridge.
4. Using the edge of a coin or a small flat-blade screwdriver, loosen and remove the two screws that secure the printhead to the carriage.
5. Pull the printhead out of the carriage.
6. Align a new printhead over the carriage and plug it into the receptacle, as shown in figure 5-10.
7. Re-install the two screws that secure the printhead to the carriage. When the screws are finger-tight, use a coin or flat-blade screwdriver to tighten them another half turn. *DO NOT* overtighten the screws.
8. Replace the ribbon cartridge and top cover. Then, run a printer self test to verify normal operation.

**Section****6**

## Solving Problems

---

This section describes printer messages and tells you what corrective action(s) to take. This section also includes a brief troubleshooting guide and information on running printer tests.

### *Understanding Printer Messages*

---

Printer messages appear on the control panel to warn you of special conditions or notify you of errors. When a special condition or error occurs, several things happen:

- ✓ Printing may pause.
- ✓ The Error light may flash and the Ready light may go off.
- ✓ The printer may *beep* to alert you.
- ✓ A message appears.

When a printer message appears, find it in this section and perform the corrective action(s). There are five kinds of messages: *operating errors*, *programming errors*, *warnings*, *communication errors* and *printer errors*.

## Correcting Operating Errors

These errors occur during normal operation to notify you of an action you must perform before printing can continue. After you correct the error, printing resumes where it left off.

### **CLEAR PAPER JAM**

This error message appears when the printer detects a paper jam while printing, ejecting the current page, or parking the paper.

#### *Corrective actions:*

- ✓ If the paper is jammed, carefully remove the jammed paper and press the Ready button.
- ✓ If you're using pin-fed forms and the paper does not appear to be jammed, make sure that the paper is taut between the tractors. The printer can falsely detect a paper jam if pin-feed paper is too loose to turn the paper detection wheel. Then, press the Ready button to continue printing.
- ✓ If you're ejecting a very long cut sheet, press the Form Feed button. After the sheet ejects, press the Ready button to continue printing.
- ✓ If you're parking pin-feed paper, tear off the last printed sheet and press the Paper Park button again. After the paper parks, press the Ready button.
- ✓ If this error recurs with no paper in the printer, the paper sensor may be falsely detecting paper. Check to see if there is a small scrap of paper caught in front of the sensor. If not, try cleaning the platen as described in *Cleaning the Platen and Bail Rollers* in the *Cleaning and Maintenance* section of this guide. To clear the error, press the Ready button.

*Correcting Operating Errors—continued***LOAD PAPER**

This error message appears when the printer has information to print but detects no paper in the printer:

*Corrective action:* Load paper and press the Ready button.

☞ **Note:** If this error message appears when paper is loaded, clean the surface of the platen as described in *Cleaning the Platen and Bail Rollers* in the *Cleaning and Maintenance* section of this guide. If the error still recurs after you clean the platen, re-calibrate the paper sensor as described in *Re-Calibrating the Paper Sensor* later in this section.

**LOWER TOP COVER**

This error message appears when one of the following conditions exists:

- ✓ Printing is in progress and you raise the top cover.
- ✓ The printer has information to print but the top cover is raised.

*Corrective action:* Lower the top cover and press the Ready button.

☞ **Note:** If this message displays when the top cover is lowered, refer to *Disabling the Cover Open Interlock* later in this section.

### **RIBBON ERROR**

This error message appears when one of the following conditions exists:

- ✓ You turn on the printer without a ribbon cartridge installed.
- ✓ The ribbon cartridge is not fully seated on the printer carriage.
- ✓ The printer is unable to detect the ribbon cartridge at the home position due to a malfunctioning ribbon home sensor.

When this message appears, printing continues although the colors may be wrong.

*Corrective action:* If no ribbon cartridge is installed, install a cartridge. If a cartridge is already installed, remove it and then reinstall it; or use another ribbon cartridge. Then, press the Ready button twice to clear the error. If the error recurs, the ribbon home sensor may need to be re-aligned or replaced. Contact your Service Representative.

### **UNAVAILABLE**

This error message appears when you press a control panel button that has been locked to prevent unauthorized changes.

*Corrective action:* To temporarily unlock all control panel functions, hold down the Alt and Form Feed buttons and press the Setup button twice. To re-lock the control panel functions, press this button combination again. For more information, refer to *Locking Control Panel Functions* later in this section.

### **UNLOAD PAPER**

This error message appears when you attempt to park pin-feed paper while using a top-mounted, pull-tractor option or you attempt to re-calibrate the paper sensor with paper loaded in the printer.

*Corrective action:* Manually unload the paper and press the Ready button.

## Correcting Programming Errors

These messages appear when your computer tries to select a printer feature that is unavailable. When a programming error occurs, a message appears to warn you and printing continues.

### BAR CODE UNAVAIL

This error message appears when your computer tries to select a bar code that is not in the installed FLASH memory. When this message displays, the printer *beeps* and printing continues.

*Corrective actions:* Press the Ready button to pause printing and then the Clear button twice to clear the data input buffer. Perform one of the following actions:

- ✓ If you *do not have* the missing bar code, you must change the print job to request an available bar code. After the change, restart the print job from the beginning.

### EMULATION ERROR

This error message appears when your computer tries to select a printer emulation that is not in the installed FLASH memory. When this message displays, the printer *beeps*, the current printer emulation remains active and printing continues. Subsequent printing may contain erroneous characters and coding, due to the missing printer emulation.

## EMULATION ERROR—continued

*Corrective actions:* Press the Ready button to pause printing and then the Clear button twice to clear the data input buffer. Perform one of the following actions:

- ✓ If you *do not have* the correct emulation, you must configure your software to request an available printer emulation. To determine these emulations, print a *Printer Status Report* or just press the Emul button on the control panel. After the configuration change, restart the print job from the beginning.

### FONT UNAVAILABLE

This error message appears when your computer tries to select a font that is not in the installed FLASH memory. When this message displays, the printer *beeps* and printing continues.

*Corrective actions:* Press the Ready button to pause printing and then the Clear button twice to clear the data input buffer. Perform one of the following actions:

- ✓ If you *do not have* the missing font, you must change the print job to request an available font. To determine these fonts, press the Font button on the control panel. After the change, restart the print job from the beginning.

## Understanding Warnings

These messages appear to warn you of special printer conditions.

### INITIALIZING....

This warning appears each time you turn on or reset the printer to notify you that the printer is preparing for normal operation. When the warning disappears, the printer is ready to print.

*Corrective action:* None.

### MANUAL PHGAP SET

This warning appears when you press the Print Density button to access the print density adjustment scale, but automatic forms thickness detection is disabled.

*Corrective action:* To enable automatic forms thickness detection, set the PH GAP parameter on the Setup menu to *Auto*. Then, when you press the Print Density button, the print density adjustment scale will appear.

### RUN PCALIB TEST

This warning appears when the printer is unable to properly detect paper in the printer.

*Corrective action:* First, try cleaning the platen as described in *Cleaning the Platen and Bail Rollers* in the *Cleaning and Maintenance* section of this guide. If the warning recurs after you clean the platen, recalibrate the paper sensor as described in *Re-Calibrating the Paper Sensor* later in this section.

## Correcting Communication Errors

These messages only appear while the serial interface is in use. When a serial communication error occurs, printing stops and some or all print data is lost. After you perform the corrective action(s), you must restart the print job from the beginning.

### **BUFFER OVERFLOW**

This message appears when the printer's input buffer overflows. A buffer overflow occurs when one of the following conditions exists:

- ✓ The printer and your computer are not using the same handshaking method.
- ✓ The printer and your computer are not using a handshaking method and the baud rate exceeds the print speed.

*Corrective action:* Press the Ready button to pause printing and then the Clear button *twice* to clear the data input buffer. Change the HNDSHK setting on the Setup menu to your computer's handshaking method. Then, press the Ready button to re-enable printing and restart the print job from the beginning. If your computer or software does not use handshaking, you must reduce the baud rate of your computer and the printer to a rate that does not exceed the print speed.

### **FRAMING ERROR**

This message appears when the baud rate of the printer and your computer are not the same, or the number of data bits or stop bits are not the same.

*Corrective action:* Press the Ready button to pause printing and then the Clear button *twice* to clear the data input buffer. Change the BAUD, DATA BITS, and STOP BITS settings on the Setup menu to match your computer's baud rate, number of data bits, and number of stop bits. Then, press the Ready button to re-enable printing and restart the print job from the beginning.

*Correcting Communication Errors—continued***PARITY ERROR**

This message appears when the printer, using the selected parity method, detects a data transmission error affecting one or more data bytes.

*Corrective action:* Press the Ready button to pause printing and then the Clear button *twice* to clear the data input buffer. Change the PARITY setting on the Setup menu to match your computer's parity method. Then, press the Ready button to re-enable printing and restart the print job from the beginning.

☞ **Note:** If the PARITY setting is correct, then a real data communications error may have occurred. If the error recurs, reset your computer and the printer to use no parity checking and try again.

## Correcting Printer Errors

Printer errors occur when the printer is unable to continue printing due to a malfunctioning printer component. When a printer error occurs, you must turn off the printer and perform the corrective action.

### **CARRIAGE ERROR**

This error message appears when the printer is unable to detect the carriage at the home position due to a jammed ribbon, dirty carriage shaft, or malfunctioning carriage home sensor.

*Corrective actions:*

- ✓ Try replacing the ribbon cartridge with another as described in *Installing the Ribbon Cartridge* in the *Set Up* section of this guide.
- ✓ If the error recurs, try cleaning the carriage shaft as described in *Cleaning the Main Carriage Shaft* in the *Cleaning and Maintenance* section of this guide.
- ✓ If the error still recurs, the carriage home sensor or tripping tab needs to be adjusted or replaced. Contact your Service Representative for assistance.

### **OUT OF MEMORY!**

This error message appears when printer the does not contain enough memory to perform the current action.

*Corrective action:* Cycle the printer power and restart the print job from the beginning. If the error recurs, contact your Service Representative for assistance.

*Correcting Printer Errors—continued***PROM CRC FAILURE**

This error message appears when printer logic detects defective read-only memory.

*Corrective action:* Contact your Service Representative for assistance.

**RAM TEST FAILURE**

This error message appears when printer logic detects defective random-access memory.

*Corrective action:* Contact your Service Representative for assistance.

**TOO MANY SETUPS!**

This error message appears when there is not enough space in the printer's non-volatile memory to store the printer settings you are trying to save.

*Corrective action:* Using the RSTOR parameter on the Setup menu, restore the *Fctry* (factory) settings. Then, use the SAVE parameter to save the factory settings under several of the *Usr* names. These actions free up space in the non-volatile memory. Then, reset the Setup menu parameters to the settings you want to save and try the SAVE operation again.

**USER CRC ERROR**

This error message appears when printer logic detects defective non-volatile memory.

*Corrective action:* Contact your Service Representative for assistance.

## Troubleshooting Problems

If you experience a printer problem that you cannot correct, consult the following troubleshooting guide for assistance. If you are still unable to solve the problem, contact your Service Representative.

Table 6-1. Troubleshooting Guide

<i>Symptom</i>	<i>Probable Cause/Corrective Action</i>
Printer does not turn on; control panel is blank.	<ul style="list-style-type: none"> <li>✓ Power cable is not plugged into power outlet or printer. Check cable.</li> <li>✓ Power outlet is not supplying voltage. Check outlet with another appliance.</li> <li>✓ Main power fuse is blown or defective. Check fuse and replace if necessary.</li> </ul>
Error message appears.	<ul style="list-style-type: none"> <li>✓ Find error message in this section and perform corrective action(s).</li> </ul>
Self test does not operate and no error message is displayed.	<ul style="list-style-type: none"> <li>✓ Printer requires service; contact your Service Representative for assistance.</li> </ul>
Control panel buttons do not work.	<ul style="list-style-type: none"> <li>✓ Printing is in progress. Wait until printing stops or press Ready button to pause printing.</li> <li>✓ Control panel is locked. Unlock control panel, if necessary.</li> </ul>
Select-dial does not move paper.	<ul style="list-style-type: none"> <li>✓ Printing is not paused. Press Ready button and try again.</li> </ul>

Table 6-1. Troubleshooting Guide—continued

<i>Symptom</i>	<i>Probable Cause/Corrective Action</i>
Self test runs ok, but printer remains idle when computer sends print data.	<ul style="list-style-type: none"> <li>✓ Printing is paused; press Ready button.</li> <li>✓ Wrong INTRFCE setting on Setup menu. Check setting.</li> <li>✓ Interface cable to computer is loose, defective or wired incorrectly. Check interface cable.</li> <li>✓ Computer is sending data to wrong output port. Check port assignment.</li> <li>✓ Interface is fouled up. Turn computer and printer off, then back on. Or, try a different output port.</li> </ul>
Printing is too light.	<ul style="list-style-type: none"> <li>✓ Ribbon is worn. Replace ribbon cartridge.</li> <li>✓ Print density fine-adjustment is set too light. Hold down Print Density button and re-adjust print density.</li> <li>✓ PH GAP and PFORCE parameters on Setup menu are not set to <i>Auto</i>, or settings are incorrect. Check settings.</li> <li>✓ Ribbon cartridge is not fully seated on carriage. Re-install ribbon cartridge.</li> </ul>

Table 6-1. Troubleshooting Guide—continued

<i>Symptom</i>	<i>Probable Cause/Corrective Action</i>
<p>Printing is smearing.</p>	<ul style="list-style-type: none"> <li>✓ Print density fine-adjustment is set too dark. Hold down Print Density button and re-adjust print density.</li> <li>✓ PH GAP and PFORCE parameters on Setup menu are not set to <i>Auto</i>, or settings are incorrect. Check settings.</li> <li>✓ Ribbon is tangled. Correct problem or replace ribbon cartridge.</li> <li>✓ Small piece of paper or debris is lodged in front of printhead. Remove obstruction.</li> <li>✓ Paper is not taut between the tractors or around the platen. Reload paper.</li> </ul>
<p>Large portions of characters are not printing.</p>	<ul style="list-style-type: none"> <li>✓ Ribbon is tangled. Correct problem or replace ribbon cartridge.</li> </ul>

Table 6-1. Troubleshooting Guide—continued

<i>Symptom</i>	<i>Probable Cause/Corrective Action</i>
Characters are missing one or more dots.	<ul style="list-style-type: none"> <li>✓ Print density fine-adjustment is set too light. Hold down Print Density button and re-adjust print density.</li> <li>✓ PH GAP and PFORCE parameters on Setup menu are not set to <i>Auto</i>, or settings are incorrect. Check settings.</li> <li>✓ Printhead is damaged or worn. Replace printhead.</li> </ul>
Printer prints garbled text and paper moves erratically.	<ul style="list-style-type: none"> <li>✓ Wrong printer emulation selected. Make sure computer and printer are set for same printer emulation.</li> </ul>
Single sheets do not feed properly.	<ul style="list-style-type: none"> <li>✓ Paper is not loaded properly. Refer to <i>Loading Paper</i> section for detailed procedure.</li> <li>✓ Wrong paper path selected. Make sure <i>Top</i> paper path is selected.</li> <li>✓ PH GAP and PFORCE parameters on Setup menu are not set to <i>Auto</i>, or settings are incorrect. Check settings.</li> </ul>

Table 6-1. Troubleshooting Guide—continued

<i>Symptom</i>	<i>Probable Cause/Corrective Action</i>
Selected printer settings change before printing begins.	<ul style="list-style-type: none"> <li>✓ Application program is overriding your settings. Change printer setup in your application program.</li> </ul>
Pin-fed forms do not load properly.	<ul style="list-style-type: none"> <li>✓ Forms are not loaded properly. Refer to <i>Loading Paper</i> section for detailed procedures.</li> <li>✓ Wrong paper path selected. Make sure <i>Rear</i> (or <i>Bottom</i>) paper path is selected.</li> <li>✓ Print density fine-adjustment is set too dark. Hold down Print Density button and re-adjust the print density.</li> <li>✓ PH GAP and PFORCE parameters on Setup menu are not set to <i>Auto</i>, or settings are incorrect. Check settings.</li> <li>✓ Paper is not taut between tractors or around platen. Reload paper.</li> </ul>

Table 6-1. Troubleshooting Guide—continued

<i>Symptom</i>	<i>Probable Cause/Corrective Action</i>
<p>Multipart forms or labels tear during printing. Or, labels peel off the backing sheet during printing.</p>	<ul style="list-style-type: none"> <li>✓ Print density fine-adjustment is set too dark. Hold down Print Density button and re-adjust print density.</li> <li>✓ PH GAP and PFORCE parameters on Setup menu are not set to <i>Auto</i>, or settings are incorrect. Check settings.</li> <li>✓ Forms or labels are too thick to feed around platen. If media is pin-feed and you have a top-mounted pull tractor option, or your printer has bottom-feed tractors, try feeding forms from bottom of printer.</li> </ul>
<p>Printing goes off right side of page.</p>	<ul style="list-style-type: none"> <li>✓ WIDTH setting on Setup menu is incorrect. Check setting.</li> </ul>
<p>Lines of text print on top of one another.</p>	<ul style="list-style-type: none"> <li>✓ AUTO LF mode on Setup menu is off. Turn it on.</li> <li>✓ Paper is not taut between tractors or around platen. Reload paper.</li> <li>✓ Wrong paper path selected. Check paper path selection.</li> </ul>

Table 6-1. Troubleshooting Guide—continued

<i>Symptom</i>	<i>Probable Cause/Corrective Action</i>
Printer leaves blank line after every print line.	<ul style="list-style-type: none"> <li>✓ AUTO LF mode on Setup menu is on. Turn off mode.</li> </ul>
Carriage does not return to left margin before printing next line.	<ul style="list-style-type: none"> <li>✓ LPI setting on Setup menu is incorrect. Check setting.</li> </ul>
Printer only prints hexadecimal numbers.	<ul style="list-style-type: none"> <li>✓ AUTO CR mode on Setup menu is off. Turn on mode.</li> </ul>
Printing does not start at far left print position.	<ul style="list-style-type: none"> <li>✓ EMUL parameter is set to <i>HexMode</i>. Change setting.</li> </ul>
Printer prints on pin-feed paper perforations.	<ul style="list-style-type: none"> <li>✓ LFT MAR setting on Setup menu is incorrect. Check setting.</li> </ul>
Printer prints on pin-feed paper perforations.	<ul style="list-style-type: none"> <li>✓ Top-of-form is set incorrectly. Advance paper until first print line is under guide lines on print-line indicator and press Alt and Set Top buttons.</li> </ul>
Printer prints on pin-feed paper perforations.	<ul style="list-style-type: none"> <li>✓ LENG setting on Setup menu is incorrect for paper you are using. Check setting.</li> </ul>
Printer prints on pin-feed paper perforations.	<ul style="list-style-type: none"> <li>✓ AUTO FF mode on Setup menu is off. Turn on mode.</li> </ul>
Printing starts too far down the page.	<ul style="list-style-type: none"> <li>✓ TOP MAR setting on Setup menu is incorrect. Check setting.</li> </ul>
Last line(s) on page print on top of next page.	<ul style="list-style-type: none"> <li>✓ LPI, LENG, TOP MAR, or BOT MAR setting on Setup menu is incorrect. Check these settings.</li> </ul>

Table 6-1. Troubleshooting Guide—continued

<i>Symptom</i>	<i>Probable Cause/Corrective Action</i>
Characters overlap each other or there are wide gaps between them.	✓ CELL setting on Setup menu is incorrect. Check setting.
Double-high text overlaps text on the next line.	✓ Leave a blank line after every double-high line of text.
Double-wide characters overlap.	✓ Leave a blank space after every double-wide character.
Foreign symbols replace some of the standard ASCII characters.	✓ LANG setting on Setup menu is incorrect. Check setting.
Vertical line drawing and component characters do not align.	✓ Change BI-DIR setting on Setup menu to <i>Off</i> .
Printing only occurs from left-to-right—not in both directions.	✓ Change BI-DIR setting on Setup menu to <i>Text</i> , <i>Graf</i> , or <i>Full</i> .
Some of the IBM graphics characters do not print or print as italic characters.	✓ SETS setting on Setup menu is incorrect. Check setting.
Printing is not in color.	<ul style="list-style-type: none"> <li>✓ Color ribbon cartridge is not installed.</li> <li>✓ Tab on bottom of color ribbon cartridge is broken off. Replace ribbon cartridge.</li> </ul>
Printing continues past physical bottom edge of page on cut sheets, instead of using LENG setting.	✓ PGE END setting on Setup menu is <i>Off</i> . Change setting to <i>On</i> .
Printer not leaving blank lines (losing line feeds) at top of cut sheets.	✓ PGE END setting on Setup menu is <i>Off</i> . Change setting to <i>On</i> .

Table 6-1. Troubleshooting Guide—continued

<i>Symptom</i>	<i>Probable Cause/Corrective Action</i>
Printer ejects cut sheets before finishing printing on page.	<ul style="list-style-type: none"> <li>✓ PGE END setting on Setup menu is <i>On</i>. Change setting to <i>Off</i>.</li> <li>✓ LENG setting on Setup menu does not reflect actual length of page in use. Change setting.</li> </ul>
Forms jam in printer while using demand document mode.	<ul style="list-style-type: none"> <li>✓ Forms are snagging on print-head during reverse feed. Change DEMAND setting to <i>Tear</i> and try again.</li> </ul>
Control panel display goes blank during printing.	<ul style="list-style-type: none"> <li>✓ Static shock may have interfered with display. When print job is finished and printer is idle, turn printer off, wait five seconds, and turn printer back on.</li> </ul>
Paper park, demand document mode, or popup mode does not operate.	<ul style="list-style-type: none"> <li>✓ PATH parameter on Setup menu is set to <i>TopTrac</i>. Change setting to <i>None</i>.</li> </ul>

## Running Printer Tests

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From the Setup menu, you can run tests to check the following: memory, sensors, ribbon alignment, printing alignment, paper sensor, carriage, and platen.

### Checking Memory

The memory test checks printer memory by writing data patterns to all memory locations and reading back the data patterns to verify that they are correct.

**4) TEST: Memory**

To run the test, display the TEST parameter on the Setup menu and select *Memory*.

**MEMORY TEST...**

When you release the Alt button, the printer *beeps*, flashes the Ready light, and executes the test.

**4) TEST: Memory**

If the test is successful, the printer redisplay the Setup menu.

**RAM TEST FAILURE**

If the test fails, an error message will appear. If an error message appears, you should

**PROM CRC FAILURE**

contact your Service Representative for assistance.

## Checking Sensors and Switches

The printer can perform an interactive test to check printer sensors and switches. During the test, you are required to perform various actions so that the printer can check the sensors and switches for normal operation. You can check sensor and switches in any order and you can terminate the test whenever you want.

### 4) TEST: Sensor

To run the test, display the TEST parameter on the Setup menu and select *Sensor*.

### SENSOR TEST...

When you release the Alt button, the printer *beeps*, flashes the Ready light, and executes the test. You can now test printer sensors and switches by performing the appropriate action.

### Sensor: TopCover

For example, to test the top cover switch, raise the top cover. If the test is successful, a confirmation message appears. If the test fails, the message does not appear.

### Sensor: Gap 1

With the top cover open, you can test other sensors. To test the print gap sensors, push the carriage forward and backward and look for the confirmation messages.

### Sensor: Gap 2

### Sensor: CarrHome

To test the carriage sensor, slide the carriage to the far left.

### Sensor: Paper

To test the paper sensor, insert and remove paper between the paper sensor on the print-line indicator and the platen.

### Sensor: RibnHome

To test the ribbon home switch, remove the ribbon cartridge and press on the switch.

### Sensor: ColorRbn

To test the color ribbon switch, remove the ribbon cartridge and press on the switch.

*Checking Sensors and Switches—continued***Sensor: Rear Jam**

To test the rear and bottom paper jam sensors, turn the wheel on each sensor.

**Sensor: Bot Jam****Button: Setup**

To test a control panel button, just press the button and look for a confirmation message. Pressing the Ready button terminates the test.

**Button: Quality****Button: Font**

☞ **Note:** If you are unable to get a confirmation message, the selected sensor or switch is malfunctioning. Contact your Service Representative for help.

**Button: Test****Button: Clear****Button: Bail****Button: Alt****Button: PaprPark****Button: PaprPath****Button: LineFeed****Button: FormFeed****4) TEST: Sensor**

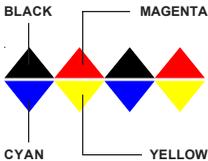
To stop the test and return to the Setup menu, press the Ready button.

## Checking Ribbon Alignment

The ribbon alignment test checks for proper alignment of the ribbon. The test prints two rows of triangles for each of the possible RIBBON parameter settings, with an asterisk next to the rows that print with the currently-selected RIBBON parameter setting. By looking at this test pattern, you can determine whether the currently-selected RIBBON parameter setting is providing the optimal ribbon alignment or not.

### 4) TEST: Ribbon

To run the test, display the TEST parameter on the printer's Setup menu and select *Ribbon*. When you release the Alt button, the printer will print the test pattern.



Color ribbons are optimally aligned when the triangles in the top row alternate between black and magenta (pink) and the triangles in the bottom row alternate between cyan (light blue) and yellow. The color should not vary within any single triangle. The RIBBON value that prints to the left of the optimal triangle rows is the correct RIBBON parameter setting. If an asterisk also prints to the left of the RIBBON value, then the RIBBON parameter is already set to the optimal setting. If not, you should change the RIBBON parameter setting using the *Aligning the Ribbon* procedure described later in this section.



Monochrome ribbons are optimally aligned when all portions of all the triangles in both rows print. If more than one set of triangle rows is complete, the optimal RIBBON parameter setting is the one in the middle. If an asterisk also prints to the left of this line, then the RIBBON parameter is already set to the optimal setting. If not, you should change the RIBBON parameter setting using the *Aligning the Ribbon* procedure described later in this section.

## Checking Printing Alignment

The printing alignment test checks to make sure that left-to-right printing aligns with right-to-left printing. The test prints a row of vertical lines with the carriage moving from left-to-right. Then, the test prints another row of vertical lines on top of the first line with the carriage moving from right-to-left. This repeats for all possible alignment values and for four different print speeds (6, 12, 24 and 48 inches per second). By looking at this test pattern, you can determine whether bi-directional printing is properly aligned.

### 4) TEST: Align

To run the test, display the TEST parameter on the printer's Setup menu and select *Align*. When you release the Alt button, the printer will print the test pattern.

PRINT SPEED	ADJUSTMENT VALUE	
6 ips, -5:		
6 ips, -4:		
6 ips, -3:		
6 ips, -2:		
6 ips, -1:		
6 ips, 0:		
6 ips, 1:		
6 ips, 2:		
6 ips, 3:		
6 ips, 4:		
6 ips, 5:		

The optimal row of vertical lines is the one where the second pass of vertical lines prints exactly on top of the first pass. You cannot see any evidence of the two printing passes. If your printer is aligned, the optimal row of vertical lines should print within the adjustment value range of -2 to +2. This should be the case for each of the four print speed patterns.

If you determine that your printer is not aligned properly, contact your Service Representative for assistance.

## Re-Calibrating the Paper Sensor

The paper sensor test adjusts the sensitivity of the paper sensor so that it can accurately sense paper in the printer. It is only necessary to run this test if the RUN PCALIB TEST error message appears, or if erroneous LOAD PAPER or CLEAR PAPER JAM errors occur.

Before you run the test, make sure that paper is *not* loaded in the printer.

### 4) TEST: Pcalib

Then, display the TEST parameter on the Setup menu and select *Pcalib*.

When you release the Alt button, the printer will begin moving the carriage and rotating the platen. During the test, printer logic will analyze data supplied by the paper sensor from various locations around the platen. From this data, printer logic can determine the amount of reflectivity that the paper sensor must sense to properly detect paper in the printer. This amount of reflectivity is called the *paper threshold* and the printer will reset the normally-hidden PTHRESH parameter to this value. Refer to *Fine-Adjusting the Paper Sensor* later in this section for more information on the PTHRESH parameter.

When the test concludes, the Setup menu reappears.

☞ **Note:** If you attempt to run this test with paper loaded in the printer, the UNLOAD PAPER error message will appear to warn you. If this message appears when paper is not loaded, you must set the normally-hidden PTHRESH parameter to a higher value before you can run the test. Refer to *Fine-Adjusting the Paper Sensor* later in this section for information on setting the PTHRESH parameter.

☞ **Note:** If the paper sensor test sets the PTHRESH parameter to a value or *150 or lower*, the platen surface is too dirty (reflective) for reliable paper sensing to occur. To correct this problem, perform the *Cleaning the Platen and Bail Rollers* procedure in the *Cleaning and Maintenance* section of this guide. Then, rerun the paper sensor test.

## Checking Carriage Movement

The random printing test exercises the carriage, carriage belt, and carriage motor. During the test, the printer moves the carriage erratically and prints a pattern of characters using various fonts, qualities, and character cell sizes. The width of the test pattern is determined by the WIDTH parameter setting on the Setup menu. By looking at the test pattern, you can determine if the carriage is slipping due to a loose carriage belt or pulley, or a malfunctioning carriage motor.

Before you run the test, make sure that paper is loaded in the printer.

### 4) TEST: Random

Then, display the TEST parameter on the Setup menu and select *Random*.

When you release the Alt button, the printer will begin printing the test pattern. After printing several pages, press the Ready button to terminate the test. The Setup menu will reappear.

If there is a problem with carriage movement, you will see characters in the test pattern that overprint other characters. You may also notice that the left margin shifted left or right as the test progressed. If you see these problems in the test pattern, you should contact your Service Representative for assistance.

## Checking the Platen

The gap test prints a table of printhead gap values measured across and around the surface of the platen. From this table, you can verify platen parallelism and identify flaws, such as lumps, dents, or cracks, in the surface of the platen.

Before you run the test, make sure that paper is loaded in the printer. On *wide*-carriage models, load paper that is at least 14 inches (35.5 cm) wide. On *narrow*-carriage models, load paper that is at least 8.5 inches (21.6 cm) wide.

### 4) TEST: Gap

Then, display the TEST parameter on the Setup menu and select *Gap*.

```
gap values: 46 42 42 44
45
gap values: 46 41 41 45
46
gap values: 45 42 40 44
45
gap values: 45 43 44 44
44
gap values: 44 42 43 45
45
gap values: 45 42 42 44
45
gap values: 45 43 43 44
44
gap values: 41 42 43 42
44
gap values: 45 43 42 44
45
gap values: 46 44 45 45
45
gap values: 46 42 44 41
45
gap values: 46 42 42 44
45
```

When you release the Alt button, the printer will begin moving the carriage to various locations across the platen. At each location, the printhead will re-gap automatically. After measuring printhead gaps across the platen, the printer will print out the gap values. Then, the platen will rotate slightly and the process will repeat. After printing about 20 lines of gap values, press the Ready button to terminate the test. The Setup menu will reappear.

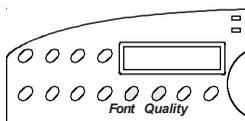
If there is a problem with platen parallelism, the printhead gap values in each line will tend to increase or decrease linearly when read from left-to-right. If there are flaws in the platen surface, there will be an exceptionally high or low gap value in the table. If you see these problems in the test pattern, contact your Service Representative for assistance.

## Using Hidden Parameters

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The Setup menu also contains hidden parameters that are only accessible by pressing a certain combination of control panel buttons. These parameters are hidden since they are set at the factory and there is seldom a need for printer operators to use them. Furthermore, if these parameters are set incorrectly, poor print quality and performance can result. When these parameters are set correctly however, these parameters fine adjust and fully optimize print quality and other printer characteristics.

The SAVE and RSTOR printer functions do not affect hidden parameter settings, since the printer does not save hidden parameter settings as part of the *Usr 1* to *Usr 5* profiles. Instead, the printer retains only one setting for each hidden parameter and this setting affects all future printing.



To access the hidden parameters, press the Setup button to display the Setup menu. Turn the Select-dial until the last parameter in the menu is displayed. Then, hold down both the Font and Quality buttons and turn the Select-dial to display the hidden parameters.

### 51) RIBBON: -2 *Aligning the Ribbon*

RIBBON fine-adjusts the vertical positioning of the ribbon in front of the printhead. This ensures that the color bands on color ribbons are correctly registered with the printhead and that monochrome ribbons are not raised or lowered too far. To determine the correct setting for this parameter, perform the *Checking Ribbon Alignment* procedure described earlier in this section. From the test pattern, you can determine the optimal RIBBON parameter setting. RIBBON parameter settings range from -8 to 2. After you change this parameter, the printer prints a test pattern using the new RIBBON setting so that you can verify ribbon registration.

**52) PTOF: 0/60"**

*Fine-Adjusting the  
Top-Of-Form Position*

PTOF lets you add or subtract an offset distance to the leading edge of the paper on initial load to force the top-of-form position up or down the page. The printer determines the top-of-form position on a page using a paper sensor located near the printhead. This paper sensor can detect the leading edge of a page as it loads into the printer. Then, the printer indexes down one line space to locate the base line of the first print line (top-of-form). If a top margin has been defined, the printer also adds this distance. The offset distance is expressed in 1/60-inch increments. PTOF parameter settings can range from -20 to 40. Negative settings move the top-of-form position farther up the page and positive settings move it farther down.

**53) TEAR: 0/30"**

*Fine-Adjusting the  
Forms Tear-Off Position*

TEAR lets you fine-adjust the distance that a form advances when it is presented for tear-off in the demand document mode. This parameter ensures that the perforation on the form properly aligns with the tear bar on the platen window. The fine-adjustment is expressed in 1/30-inch increments. TEAR parameter settings can range from -26 to 9. Negative settings decrease the distance that forms advance and positive settings increase the distance.

**54) HOME: 0/120"** *Fine-Adjusting the Carriage Home Position*

HOME lets you fine-adjust the carriage home position, which determines the location of the leftmost print position on a page. This parameter ensures that the leftmost print position aligns exactly with the "0" mark on the paper scale. The fine-adjustment is expressed in 1/120-inch increments. HOME parameter settings can range from -6 to 24. Negative settings move the carriage home position farther left and positive settings move it farther right.

**55) PTHRESH: 208** *Fine-Adjusting the Paper Sensor*

PTHRESH lets you fine-adjust the amount of reflectivity that the paper sensor must sense before printer logic recognizes that paper is loaded in the printer. This parameter ensures that the printer does not falsely detect paper from a dirty or shiny platen, or fail to detect paper that is off-white in color. You can set the PTHRESH parameter to the optimal setting automatically by performing the *Re-Calibrating the Paper Sensor* procedure described earlier in this section. The purpose of the PTHRESH parameter is to allow you to fine-adjust the automatic setting. PTHRESH parameter settings range from 0 to 255. Lowering the setting causes printer logic to require more reflectivity (whiteness) before recognizing paper and increasing the setting causes printer logic to require less reflectivity.

☞ **Note:** If the paper sensor re-calibration sets the PTHRESH parameter to a value or *150 or lower*, the platen surface is too dirty (reflective) for reliable paper sensing to occur. To correct this problem, perform the *Cleaning the Platen and Bail Rollers* procedure in the *Cleaning and Maintenance* section of this guide. Then, perform the *Re-Calibrating the Paper Sensor* procedure again.

## 56) UNAMS: None *Changing User Names*

UNAMS lets you rename each of the printer's five user names (that is, *Usr 1*, *Usr 2*, *Usr 3*, *Usr 4*, and *Usr 5*). You can change these default names to names that are more meaningful to your particular needs. For example, if you print five different forms, each requiring a unique printer setup, you could change *Usr 1* to the name of the first form, *Usr 2* to the name of the second form, and so on. Or, if five different operators use the printer and each operator requires their own printer settings, you could change the user names to the five operators' names. The new names that you assign can be from 1 to 6 characters in length. You cannot rename the *Fctry* name, which saves the printer's factory default printer settings.

To rename the user names, use the following procedure:

### 56) UNAMS: Usr 1

Hold down the Alt button and turn the Select-dial to choose a name to change. When you release the Alt button, a flashing cursor box appears on the display to indicate the position where you can change a character.

### 56) UNAMS: Usr 1

Now, turn the Select-dial to cycle through the available characters. You can choose from many letters, numbers and symbols.

### 56) UNAMS: Chsr#

To move to the next character position, press the Alt button. Continue until you finish entering the new name.

### 56) UNAMS: Chck#1

When the cursor passes the last position, the printer saves the new name automatically. Your new name will now appear as a selection for the RSTOR, SAVE, and DFALT parameters and will print on *Printer Status Reports*.

**Note:** While entering a new name, you can start over at any time by pressing the Clear button. To restore the original name, press the Clear button again. To toggle between the last entered name and the factory default name, press the Clear button several more times.

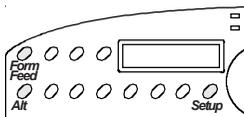
**57) PANEL: Unlock** *Locking Control Panel Functions*

PANEL lets you lock control panel functions to prevent casual users from making unauthorized changes to the printer's setup and configuration. At this parameter, you can select *Unlock*, which allows all control panel functions to operate normally; *Lock*, which locks the entire Setup menu and the Print Density, Quality, Font, Emul, Pitch, and Color button functions; or *Custom*, which allows you to lock any combination of control panel functions.

To define a custom control panel lock, use the following procedure:

**57) PANEL: Custom****LOCKED****UNLOCKED**

At the PANEL parameter, select the *Custom* setting. After releasing the Alt button, press the control panel buttons that you want to lock. When you first press a button, the display shows whether the button is currently LOCKED or UNLOCKED. To change the status, press the button again. To accept your custom lock selections, press the Ready button. To exit the Setup menu, press the Setup button.



To *temporarily* unlock all control panel functions, hold down the Alt and Form Feed buttons and press the Setup button twice. To re-lock the control panel functions, press this button combination again.

To *permanently* unlock all control panel functions, hold down the Alt and Form Feed buttons and press the Setup button twice. Then, set the PANEL parameter on the Setup menu to the *Unlock* setting.

## Disabling the Cover Open Interlock

---

Should you need to operate the printer with the top cover raised, you can reverse the polarity of the cover open interlock switch. This causes the printer to disable printing and display the LOWER TOP COVER message when the top cover is lowered and print normally when the top cover is raised.

**▲ Warning:** The printer carriage moves at high velocities and there are sharp edges inside the printer. Personal injury could result from printing with the top cover raised.

To reverse the polarity of the cover open interlock switch, perform the following procedure:

1. Load a sheet of paper in the printer and press the Test button to start printing a self test pattern.
2. With printing in progress, raise the top cover. Printing will stop and the LOWER TOP COVER error message will appear on the control panel display.
3. Hold down the Alt button and press the Form Feed button.
4. Press the Ready button to clear the error. Printing can now occur with the top cover raised.

To change the polarity of the cover open interlock switch back to the normal setting, perform the following procedure:

1. Lower the top cover.
2. Press the Test button. The LOWER TOP COVER error message will reappear.
3. Hold down the Alt button and press the Form Feed button.
4. Press the Ready button to clear the error. The cover open interlock is now restored to normal operation.

**☞ Note:** The polarity of the cover open interlock is always restored to normal when the printer is turned on or reset.

## Appendix

**A**

## Bottom-Feed Tractors

AMT ACCEL-6310d and -6350d models include powered, bottom-feed tractors in addition to the rear-feed tractors. This appendix describes how to select a printer stand, activate the bottom-feed tractors, load paper, alternate between paper paths, and correct bottom-feed tractor problems.

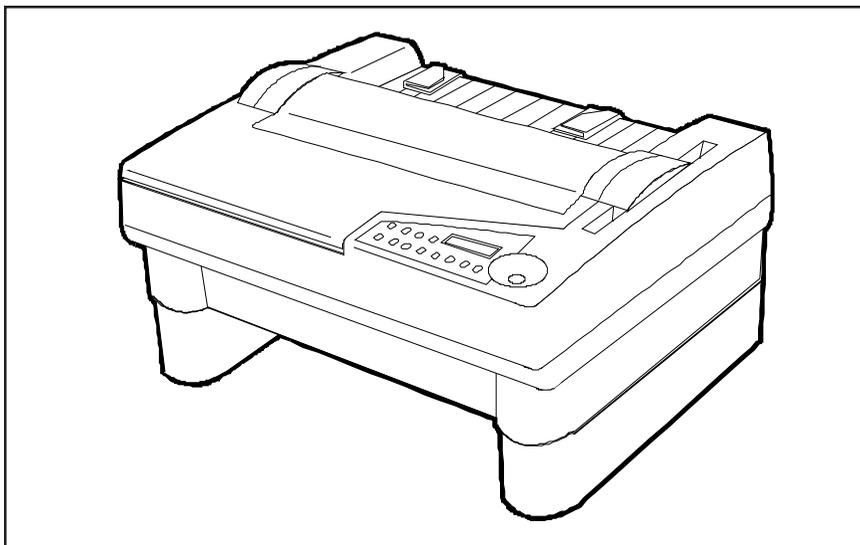


Figure A-1. Printer With Bottom-Feed Tractors

## Selecting a Printer Stand

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You'll need a sturdy printer stand with a paper slot through which paper can be fed. The paper slot permits pin-feed paper to feed straight up from below the printer to the bottom-feed tractors. When selecting a printer stand, observe the following guidelines:

- ✓ The stand must be sturdy enough to support the weight of the printer: 54 pounds (24.5 kg) for *wide*-carriage models or 48 pounds (21.8 kg) for *narrow*-carriage models.
- ✓ The table top must be wide enough to hold the printer: 24 inches (61 cm) for *wide*-carriage models or 19 inches (48.3 cm) for *narrow*-carriage models. It must also be at least 17 inches (43.2 cm) deep.
- ✓ The paper slot must be wide enough for the paper you intend to use and at least 1.5 inches (3.8 cm) deep.
- ✓ The stand should contain shelves or bins for paper entering and exiting the printer.

## Activating the Bottom-Feed Tractors

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To activate the bottom-feed tractors so that they will feed paper, press the Paper Path button on the control panel as needed to select the *Bottom* paper path.

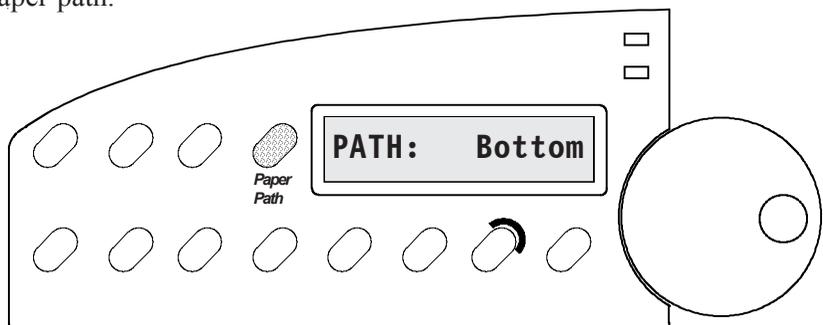


Figure A-2. Selecting the Bottom Path

## Accessing the Bottom-Feed Tractors

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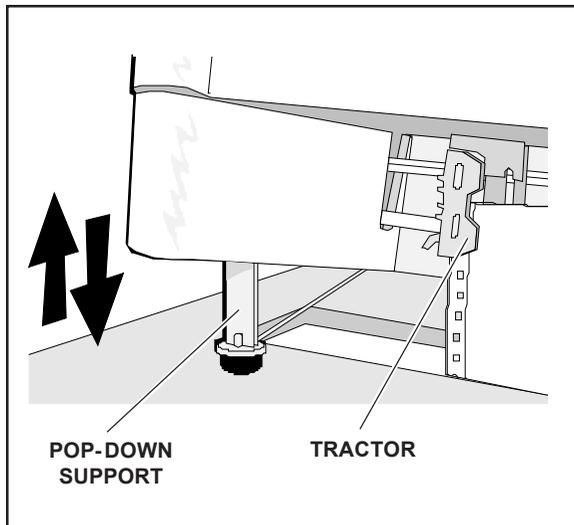


Figure A-3. Raising and Lowering the Printer

There are pop-down supports on the bottom of the printer that extend to lift up the front of the printer. This allows easier access to the bottom-feed tractors.

To use the pop-down supports, lift up the front edge of the printer until the pop-down supports are fully extend. Then, lower the front edge of the printer. The pop-down supports will lock into place and support the weight of the printer. You are now ready to load paper in the bottom-feed tractors.

To retract the pop-down supports after you load paper, just lift up the front edge of the printer again. This time the pop-down supports will unlock and retract into the holes on the bottom of the printer.

## Loading Paper in the Bottom-Feed Tractors

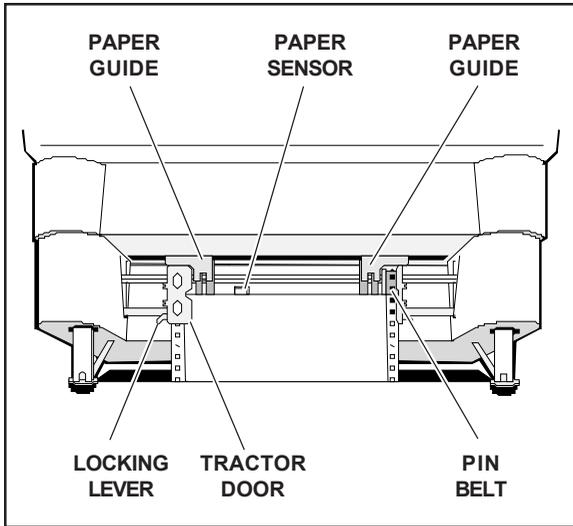


Figure A-4. Loading Paper in the Bottom Path

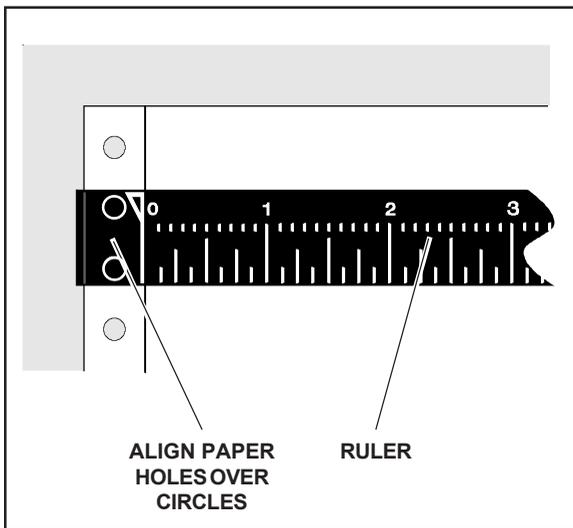


Figure A-5. Aligning Paper in the Bottom Path

To load pin-feed paper into the bottom-feed forms tractors, use the following procedure:

1. Raise the front of the printer onto the pop-down supports.
2. Pull forward on the tractor locking levers so that the tractors can slide freely on the shafts.
3. Open both tractor doors.
4. Push the leading edge of the paper up through the slot in the printer stand and mount the first three paper holes onto the tractor pin belts. Then, close the tractor doors to secure the paper in place.
5. Slide the tractors and paper left or right as needed until the paper holes on the left side of the paper align with the circles on the ruler, as shown in figure A-4. Then, push back the left tractor locking lever to lock that tractor in place.
6. Slide the right tractor to the right until the paper is snug between the tractors. Then, push back the right tractor locking lever to lock that tractor in place. Make sure that the paper is not too tight or too loose between the tractors, since this could cause paper feeding problems.
7. Press the Form Feed button on the control panel. The paper will advance to the ready-to-print position.
8. Lower the front of the printer.

## Using the Bottom-Feed Tractors

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With the bottom-feed tractors activated and paper loaded, you can use the bottom-feed tractors just like the rear-feed tractors. All of the printer's special paper handling features, such as demand document mode and paper parking, are fully supported. For detailed information on the printer's paper handling features, refer to the *Loading Paper* section of this guide.

## Alternating Between Paper Paths

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You can load one kind of pin-feed form through the rear forms tractors and another kind through the bottom-feed forms tractors. You can then switch between these forms without having to manually reload forms. To change between the rear and bottom paper paths, use the following procedure:

1. Tear off all but the last page that has exited the printer.
2. With the printer paused or idle, press the Paper Park button to reverse feed the paper that is loaded in the printer into the parked position.
3. Press the Paper Path button on the control panel as needed to select the desired paper path (*Rear* or *Bottom*).
4. Press the Form Feed button to advance the paper into the ready-to-print position or just send data to the printer and the paper will load automatically.

## Troubleshooting

If you experience a problem while using the bottom-feed forms tractors, consult the following table for assistance. This troubleshooting information pertains only to the bottom-feed forms tractors. For additional troubleshooting information, refer to the *Solving Problems* section.

Table A-1. Troubleshooting the Bottom-Feed Tractors

<i>Symptom</i>	<i>Probable Cause/Corrective Action</i>
<p>Tractors are hard to reach and adjust while loading paper.</p> <p>Pop-down supports don't lock into place or won't unlock.</p> <p>When you press Form feed button, paper does not advance.</p> <p>Paper advances but jams before entering bottom of printer.</p> <p>Paper advances into printer but jams inside.</p>	<ul style="list-style-type: none"> <li>✓ Raise front of printer onto pop-down supports.</li> <li>✓ Lift front edge of printer until supports are fully extended and off of printer stand. If necessary, gently rock supports forward and backward until they slide into place.</li> <li>✓ Bottom-feed tractors are not activated. Press Paper Path button as needed to select <i>Bottom</i> paper path.</li> <li>✓ Paper is misaligned on bottom-feed tractors. Reload paper.</li> <li>✓ Printhead is too close to platen. Make sure PH GAP and PFORCE parameters on Setup menu are set to <i>Auto</i>.</li> <li>✓ A torn or crumpled piece of paper is blocking paper entry slot. Inspect bottom paper entry slot and remove debris.</li> </ul>

Table A-1. Troubleshooting the Bottom-Feed Tractors—continued

<i>Symptom</i>	<i>Probable Cause/Corrective Action</i>
Printer does not present form for tear-off when you press Ready button.	<ul style="list-style-type: none"> <li>✓ Demand document mode is not selected or is set incorrectly. Check DEMAND parameter setting on Setup menu.</li> </ul>
Print is smearing.	<ul style="list-style-type: none"> <li>✓ Paper is not snug between tractors. Adjust tractors.</li> <li>✓ Printhead is too close to platen. Make sure PH GAP and PFORCE parameters on Setup menu are set to <i>Auto</i>.</li> </ul>
Printing occurs on paper tear strips.	<ul style="list-style-type: none"> <li>✓ Paper is misaligned in the printer. Refer to <i>Loading Paper in the Bottom-Feed Tractors</i> in this appendix.</li> <li>✓ Paper is too narrow. Use paper that is at least 4.5 inches (11.4 cm) wide including the perforated tear strips.</li> </ul>



## Appendix

**B**

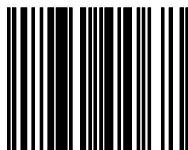
## Bar Codes

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This appendix describes the printer's bar code symbologies (formats) and explains how to configure the printer to print bar codes. For programming information, refer to the *AMT Datasouth Bar Code Option Operating Guide* (part no. 337027) sold separately by AMT Datasouth.

### *Introducing Bar Codes*

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A bar code symbol consists of parallel lines and spaces of varying widths or heights. The bar code symbology describes unambiguous rules for encoding data into the bars and spaces.

#### *Bar Code Symbologies*

The printer supports the following bar code symbologies:

- ✓ *Interleaved 2-of-5*. This is a variable-length, self-checking numeric bar code mainly used in the distribution industry.
- ✓ *Code 3-of-9*. This is a variable-length, self-checking, alphanumeric bar code widely used in the automotive industry and many other non-retail industries.

- ✓ *Codabar*. This is a variable-length, self-checking, alphanumeric bar code that can encode digits 0 through 9 and six additional characters. The code is commonly used in libraries, blood banks and air parcel express applications.
- ✓ *UPC-A*. This is a fixed-length, self-checking, numeric bar code used throughout the supermarket and retail industries to identify a product and its manufacturer. UPC-A encodes a series of 12 digits.
- ✓ *UPC-E*. This is a shortened version of UPC-A that encodes six of the 12 digits in a UPC-A message.
- ✓ *EAN-13*. This is a variation of the U.S.-developed UPC bar code for-format adopted for the international marketplace. It, like UPC-A, is a fixed-length, self-checking, numeric bar code. EAN-13 encodes a series of 13 digits: 12 directly into the symbol and one into a parity pattern of the first six digits.
- ✓ *EAN-8*. This is a shortened version of EAN-13 that encodes a series of 8 digits.
- ✓ *Code 128*. This is a variable-length, self-checking, high-density bar code. It can encode all 128 alphanumeric ASCII characters.
- ✓ *POSTNET*. This is a self-checking, numeric bar code that encodes U.S. Postal Service 5-digit ZIP Codes, 9-digit ZIP+4 Codes, and 11-digit Delivery Point Codes.

☞ **Note:** The *AMT Datasouth Bar Code Option Operating Guide* provides in-depth information on bar code formats, the component elements, and how bar code symbols are constructed.

## Selecting the Bar Code Emulation

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Before you can print bar codes, you must select the printer's bar code emulation.

**COURIER LQ READY**

**10 BARCODE BLACK**

With the status display on the control panel, hold down the Alt button and press the Emul button as needed until *BARCODE* appears; then release both buttons.

With *BARCODE* selected as the current emulation, the printer is now ready to receive bar code commands and data from your computer.

☞ **Notes:** You can also select the bar code emulation via software by send-ing an escape sequence. Escape sequences are listed in the *Code Sets* appendix in this guide. With the bar code emulation selected, the printer can also receive all *Epson LQ-2550* control codes and escape sequences.

## Printing Bar Codes

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To print bar codes, the printer must receive special bar code commands from your computer. This requires a software application that is capable of generating and sending bar code commands to the printer. If you want to use a particular software application to print bar codes, contact the software manufacturer for specific details.

☞ **Note:** If you are a programmer who would like to generate and send bar code commands from your own software applications, refer to the *AMT Datasouth Bar Code Option Operating Guide* (part no. 337027) for programming information. Also, refer to the *Code Sets* appendix of this guide for a listing of the bar code commands.

## Bar Code Specifications

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Table B-1 lists the printer's bar code specifications.

Table B-1. Bar Code Specifications

<i>Item</i>	<i>Specification</i>
<i>Agency Compliances</i>	
Interleaved 2-of-5, Code 3-of-9 and Codabar	American National Standard Institute (ANSI), ANSI MH10.8M-1983
UPC-A and UPC-E	Uniform Code Council, Inc., UPC Symbol Specification 1986
EAN-13 and EAN-8	International Article Numbering Assn., EAN Specification 1987
POSTNET	United States Postal Service, Publication 25
Code 128	Automatic Identification Manufacturers (AIM), Code 128 Standard
<i>Dimensions</i>	
Height	From 1/12 inch to 10 inches in 1/12-inch increments
Width of bars	From 0.014 to 0.504 inch wide in 0.01-inch increments
Width of spaces	From 0.006 to 0.496 inch wide in 0.01-inch increments

Table B-1. Bar Code Specifications—continued

<i>Item</i>	<i>Specification</i>
<i>POSTNET Dimensions</i>	
Height of short bars	0.050 inch ( $\pm 0.010$ tolerance)
Height of tall bars	0.125 inch ( $\pm 0.010$ tolerance)
Bar width	0.020 inch ( $\pm 0.005$ tolerance)
Pitch	0.0475 inch ( $\pm 0.0025$ tolerance)
ZIP Codes	Encodes five digits, one correction character, plus two frame bars
ZIP+4 Codes	Encodes nine digits, one correction character, plus two frame bars
Delivery Point Codes	Encodes eleven digits, one correction character, plus two frame bars
<i>Miscellaneous</i>	
Human-readable text	Selectable using current font selection on printer
Command set compatibility	Genicom- and OTC-compatible



**Appendix****C**

## Interfaces

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This appendix describes the printer's parallel and serial interfaces, including voltages, signals and timing, cables and connectors, pin assignments, and parameters.

### *Centronics Parallel Interface*

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The parallel interface conforms to the Centronics standard for parallel data transfer from computers to printers. The interface contains 36 lines.

#### *Voltages*

A signal on a line is either high or low, depending on the voltage level. Timed high-to-low and low-to-high transitions of a signal enable the transfer of logical information. The valid parallel voltages are as follows:

- ✓ High (+): +2.5 to +5 volts
- ✓ Low (-): -0.2 to +0.8 volts

## *Signals and Timing*

The parallel interface consists of a data clock signal, eight data bit signals, two handshaking signals, two printer error signals, two printer control signals, two printer select signals, a power line, fifteen ground lines, and three lines that are not connected.

### *Data Transfer Signals*

The primary function of the interface is to transfer data from the computer to the printer. This function requires eleven signals. To transfer each data byte from the computer to the printer, the following signals are sent:

- ✓ During normal operation, the computer monitors a BUSY signal from the printer. When BUSY goes low, the printer is ready to receive a data byte.
- ✓ When BUSY is low, the computer simultaneously represents the eight bits of the data byte on eight data lines—DB1 through DB8. The least significant bit (LSB) is represented on DB1, the next bit on DB2, and so on. If the bit is logical "0", the signal is low. If the bit is logical "1", the signal is high.
- ✓ After waiting at least 0.5 microsecond, the computer pulses a STROBE- signal for at least 0.5 microsecond to tell the printer that data is present on the data lines. The computer continues to hold the data on the data lines for at least 0.5 microsecond after the STROBE- pulse.
- ✓ Within 0.25 microsecond after the leading edge of the STROBE- pulse, the printer changes the BUSY signal to high to indicate that it is busy.
- ✓ During the next 5 microseconds (or more), the printer reads the data lines and transfers the byte to printer memory.
- ✓ When ready to receive another byte, the printer sets the BUSY signal back to low and pulses an ACK- signal low for at least 4 microseconds.

The timing of each event is critical. Figure C-1 shows the parallel data transfer timing diagram.

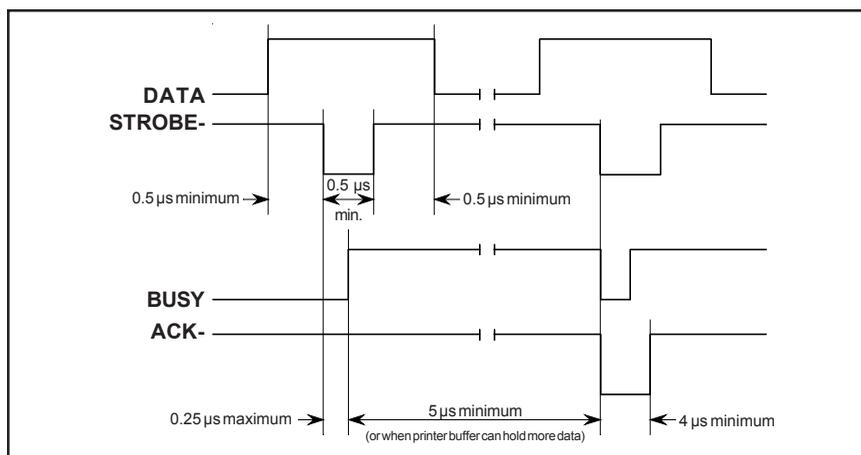


Figure C-1. Parallel Data Transfer Timing Diagram

### *Printer Error Signals*

The printer uses two signals to notify the computer of printer errors: PAPER and ERROR-. PAPER goes high and ERROR- goes low when the printer has data to print but is out of paper. ERROR- also goes low when the printer is off-line or in an error state. PAPER returns low and ERROR- returns high when the error is corrected.

### *Printer Control Signals*

The computer uses two signals to control certain printer operations: AUTO FEED- and IPRIME-. With AUTO FEED- low, the printer advances the paper one line after printing. With AUTO FEED- high or disconnected, no action occurs. When IPRIME- pulses low for at least 50 microseconds, the printer initializes printer settings to the defaults and clears the input buffer. With IPRIME- high or disconnected, no action occurs.

### *Printer Select Signals*

The computer uses a SELIN- signal to select the printer to receive data. The printer uses a SELOUT signal to tell the computer that it is selected and ready to receive data. For the printer's parallel interface to operate, SELIN- must be low or disconnected. SELOUT remains high as long as SELIN- is low or disconnected.

## PowerLine

The printer provides a +5 volts dc power line to drive the logic of an external device.

## Ground Lines

The printer provides fifteen ground lines consisting of a logic ground, chassis ground, and thirteen signal return grounds.

## Cable/Connector Requirements

The parallel connector must be a 36-pin male plug with a metal backshell (Amphenol 157-32360 or equivalent). The cable must be shielded with twisted pair leads (Beldon 9505 or equivalent). The parallel cable must not exceed 10 feet (3 meters). Figure C-2 shows a typical parallel cable assembly.

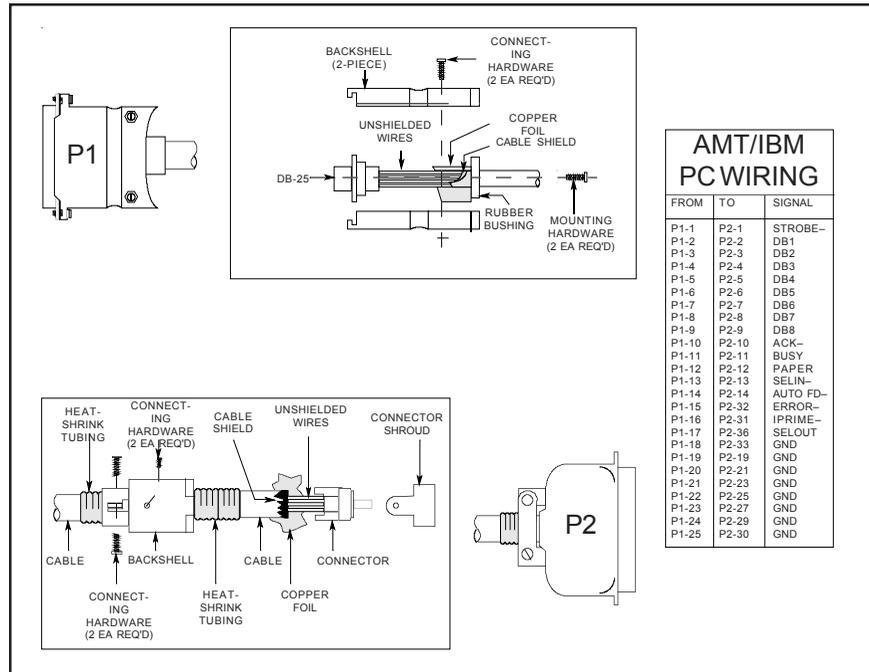


Figure C-2. Parallel Cable Assembly

## Setting Parallel Parameters

Only two Setup menu parameters affect the parallel interface: INTERFACE and STROBE. For more information on these parameters, refer to the *Control Panel* section in this guide.

## Pin Assignments

Table C-1 lists the parallel connector pin assignments and signal requirements.

Table C-1. Parallel Pin Assignments

<i>Pin</i>	<i>Signal</i>	<i>Source</i>	<i>Printer Usage</i>
1	STROBE-	Computer	Must pulse low for at least 0.5 microsecond to clock data on DB1-DB8 lines; data must be present for at least 0.5 microsecond before and after pulse  ☞ <b>Note:</b> The STROBE parameter on the Setup menu lets you control whether the printer captures the data byte on the leading or trailing edge of STROBE-.
2	DB1	Computer	Must contain eight bits of parallel data byte (DB1 = LSB); high signal represents logical "1", low signal represents logical "0"
3	DB2	Computer	
4	DB3	Computer	
5	DB4	Computer	
6	DB5	Computer	
7	DB6	Computer	
8	DB7	Computer	
9	DB8	Computer	
10	ACK-	Printer	Pulses low for at least 4 microseconds when printer has received data byte on DB1-DB8 lines and is ready for another; also pulses low when printer is turned on or reset

Table C-1. Parallel Pin Assignments—continued

<i>Pin</i>	<i>Signal</i>	<i>Source</i>	<i>Printer Usage</i>
11	BUSY	Printer	Goes high within 0.25 microsecond after STROBE— pulse to suspend further data transfer while printer receives data byte on DB1-DB8 lines; returns low at least 5 microseconds later or when printer buffer can hold another byte
12	PAPER	Printer	Goes high when printer has data to print, but no paper is loaded
13	SELOUT	Printer	Remains high while SELIN— is low or disconnected
14	AUTO FEED—	Computer	May go low to cause printer to advance paper one line after printing; otherwise, must be high or disconnected
15			Not connected
16	LGND		Logic ground
17	CGND		Chassis ground
18	+5V	Printer	+5 volts dc, 200 mA maximum
19	GND		Ground
20	GND		Ground
21	GND		Ground
22	GND		Ground
23	GND		Ground
24	GND		Ground
25	GND		Ground
26	GND		Ground
27	GND		Ground
28	GND		Ground
29	GND		Ground
30	GND		Ground

Table C-1. Parallel Pin Assignments—continued

<i>Pin</i>	<i>Signal</i>	<i>Source</i>	<i>Printer Usage</i>
31	IPRIME–	Computer	May pulse low for at least 50 micro-seconds to initialize printer settings to defaults and clear input buffer; otherwise, must be high or disconnected
32	ERROR–	Printer	Goes low when printer has data to print but is out of paper, off-line, or in error state; returns high when condition is corrected
33	GND		Ground
34			Not connected
35			Not connected
36	SELIN–	Computer	Must be low or disconnected

## ***RS-232-C Serial Interface***

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The serial interface conforms to the Electronics Industries Association (EIA) RS-232-C standard for serial communications. This standard describes a data transfer method between data terminal equipment (DTE) and data communications equipment (DCE). DTE refers to computers; DCE refers to modems or other data communications devices. Since the RS-232-C standard does not take printers into account, manufacturers are free to produce printers that operate as either DTE or DCE. AMT printers operate as DTE device.

The RS-232-C serial interface contains 25 lines. Only 10 lines carry signals or are grounded; the remaining 15 lines are not connected.

### ***Voltages***

Each line can carry two voltage levels: high and low. Timed high-to-low and low-to-high transitions on these lines enable the transfer of logical information. Valid RS-232-C voltage levels are as follows:

- ✓ High (+): +3 to +25 volts
- ✓ Low (-): -25 to -3 volts

### ***Signals and Data Format***

The serial interface consists of eight signal lines and two ground lines:

- ✓ Data Set Ready
- ✓ Data Carrier Detect
- ✓ Request To Send
- ✓ Clear To Send
- ✓ Transmit Data
- ✓ Receive Data
- ✓ Data Terminal Ready
- ✓ Inverted Data Terminal Ready
- ✓ Chassis and Signal Grounds

### *Data Set Ready*

The Data Set Ready (DSR) signal indicates when DCE is turned on. If DSR is high, DCE is on; if DSR is low, DCE is off.

### *Data Carrier Detect*

The Data Carrier Detect (DCD) signal indicates when DCE has established a link to a remote receiver. If DCD is high, DCE is linked; if DCD is low, DCE is not linked.

### *Request To Send*

The Request To Send (RTS) signal indicates when DTE is ready to send data. If RTS is high, DTE is ready to send data; if RTS is low, DTE is not ready.

### *Clear To Send*

The Clear To Send (CTS) signal indicates when DCE is ready to receive data. If CTS is high, DCE is ready to receive data; if CTS is low, DCE is not ready.

### *Transmit/Receive Data*

The exchange of data between DTE and DCE occurs on two lines: Transmit Data (TxD) and Receive Data (RxD). DTE transmits data on the TxD line and receives data on the RxD line. Conversely, DCE transmits data on the RxD line and receives data on the TxD line.

Data signals on the TxD and RxD lines must conform to a standard serial data format, consisting of one start bit, seven or eight data bits, an optional parity bit, and at least one stop bit. Figure C-3 shows the data format.

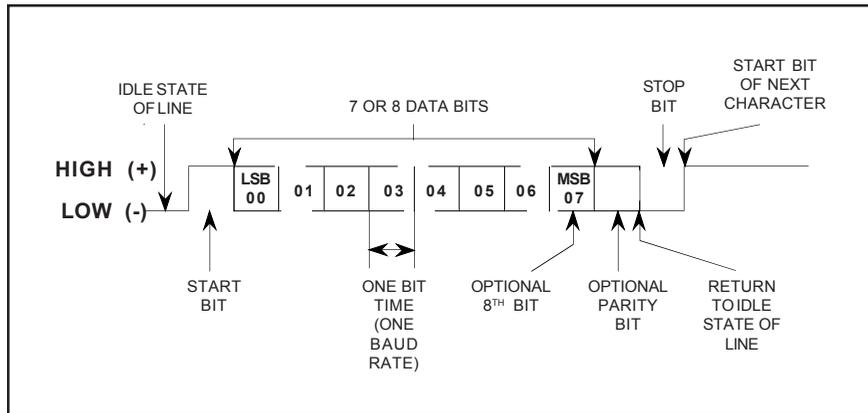


Figure C-3. Serial Data Format

#### *Data Terminal Ready*

The Data Terminal Ready (DTR) signal indicates when DTE must stop sending data and when it should continue. This stopping and starting (called handshaking) is necessary to prevent DCE's input buffer from overflowing. If DTR is high, DTE may send data; if DTR is low, DTE must pause.

#### *Inverted Data Terminal Ready*

The Inverted Data Terminal Ready (DTR-) signal is the same as DTR, except the polarity of the signal is reversed.

#### *Chassis and Signal Grounds*

Chassis Ground (CGND) and Signal Ground (SGND) provide the necessary grounding.

#### *Cable/Connector Requirements*

The serial connector must have a 25-pin male plug (Amphenol 177-RRB-25P D-SUB or equivalent). The backshell must be metal (Amphenol 17-1630-25 or equivalent). The cable must be shielded with twisted pair leads (Beldon 9505 or equivalent). The serial cable must not exceed 50 feet (15.25 meters). Figure C-4 shows a typical serial cable assembly.

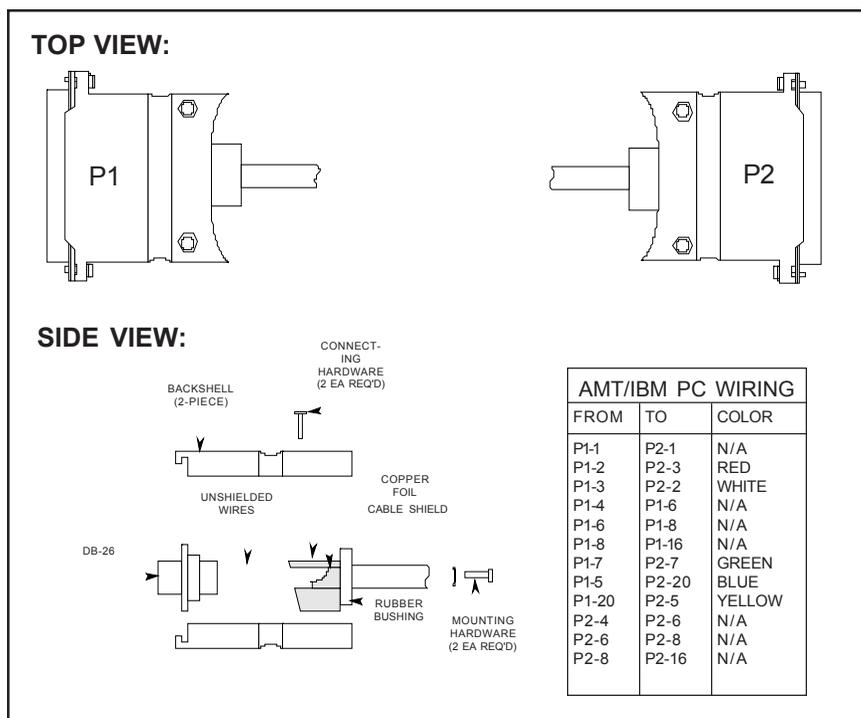


Figure C-4. Serial Cable Assembly

## Setting Serial Parameters

For successful serial communications, the computer and the printer must use identical communications parameters. These parameters consist of baud rate, parity, data bits, stop bits and handshake protocol. You set these parameters—BAUD, PARITY, DATA BITS, STOP BITS and HNDSHK—on the printer's Setup menu. For more information on these parameters, refer to the *Control Panel* section of this guide.

## Handshaking Methods

The printer supports three handshaking methods:

- ✓ **DTR:** The DTR lines in the serial interface provide the DTR handshake. To pause data transfer, the printer sets DTR low; to resume, it sets DTR high.

Handshaking methods—continued

- ✓ *X-ON/X-OFF*: The printer sends an X-OFF code on its data transmission line to pause data transfer, and an X-ON code to resume. An X-OFF is an ASCII DC3 code (19 decimal, 13 hex); an X-ON is an ASCII DC1 code (17 decimal, 11 hex). When you turn on or reset the printer, it sends an X-ON to enable data transfer.
- ✓ *ENQ/ACK*: The computer sends an ENQ code on its data transmission line to ask the printer if it can receive data. When the printer is ready, it returns an ACK code on its data transmission line. An ENQ is an ASCII ENQ code (5 decimal, 05 hex); an ACK is an ASCII ACK code (6 decimal, 6 hex). When you turn on or reset the printer, it sends an ACK to enable data transfer.

You specify which handshaking method to use at the *HNDSHK* parameter on the Setup menu. Refer to the *Control Panel* section of this guide for further information.

**Pin Assignments**

Table C-2 lists the connector pin assignments and signal requirements for the printer's serial interface.

Table C-2. Serial Pin Assignments

<i>Pin</i>	<i>Signal</i>	<i>Source</i>	<i>Printer Usage</i>
1	CGND		Chassis ground
2	TxD	Printer	Transmits data to computer
3	RxD	Computer	Receives data from computer
4	RTS	Printer	Remains high at all times
5	CTS	Computer	Must be high or disconnected
6	DSR	Computer	Must be high or disconnected
7	SGND		Signal ground

Table C-2. Serial Pin Assignments—continued

<i>Pin</i>	<i>Signal</i>	<i>Source</i>	<i>Printer Usage</i>
8	DCD	Computer	Ignored
9 - 10			Not connected
11	DTR	Printer	Same as signal on pin 20, except polarity of signal is user-selectable (signal present only when JP1 jumper on logic board is on pins 2 and 3)
12 - 19			Not connected
20	DTR	Printer	Goes low when printer buffer is almost full; returns high when buffer can hold more data (when DTR handshake is turned off, this signal remains high at all times)
21 - 24			Not connected
25	DTR–	Printer	Same as signal on pin 20, except polarity of signal is user-selectable (signal present only when JP1 jumper on logic board is on pins 1 and 3)



## Appendix

**D**

## Code Sets

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This appendix lists the code sets for the following printer emulations:

- ✓ AMT Datasouth
- ✓ Diablo 630
- ✓ Epson JX
- ✓ Epson LQ-2550
- ✓ IBM Proprinter XL24
- ✓ Bar Code

Code sets include all of the *character codes*, *control codes* and *escape sequences* that you can send from your computer to the printer to control printing operations. The code sets are shown to document the completeness of the emulations, assist programmers who want to send codes to the printer, and help you decipher hexadecimal printouts. This appendix also includes an ASCII code table.

## AMT Datasouth and Diablo 630 Code Set

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The first part of this appendix describes the *AMT Datasouth Datasouth* and *Diablo 630* code set. The printer responds to this code set when either of these emulations is active.

### *Character Codes*

Most of the 256 8-bit codes that a computer can send to the printer are assigned a printable character (see table D-1). When the printer receives a character code, it prints the assigned character at the current print position and moves the current print position one character space to the right.

Codes 0 to 32 and 128 to 159 decimal are assigned control functions that override the printable characters. These codes are called *control codes*. To print the characters assigned to control codes, it is necessary to use a special code sequence that tells the printer to ignore control functions and print the assigned characters.

One code that is assigned a control function is especially important to the printer—code 27 decimal—which is the ASCII ESCape code. This code tells the printer that an *escape sequence* is beginning. An escape sequence is a series of codes that performs a specific printer function. When a code is sent as part of an escape sequence, the assigned character doesn't print.

### *Printing Characters Assigned to Control Codes*

Although there are several control codes and escape sequences in the code set that enable the printing of characters assigned to control codes, the GS control code is recommended. The GS control code enables the printing of the character assigned to any code. Just send a GS code and then the desired character code. The ESC Y sequence prints the character assigned to the SP control code and ESC Z prints the character assigned to the DEL control code.

These codes and sequences are described later in this appendix.

Character code assignments  
(in decimal)

Table D-1. AMT Datasouth and Diablo 630 Control Codes

<b>NUL</b>	▶	<b>SP</b>	0	@	P	˘	p	<b>NUL</b>	É	á	☐	L	⌌	α	≡	
0	16	32	48	64	80	96	112	128	144	160	176	192	208	224	240	
☺	◀	!	1	A	Q	a	q	ü	æ	í	☐	⌌	≡	β	±	
1	17	33	49	65	81	97	113	129	145	161	177	193	209	225	241	
☺	↕	"	2	B	R	b	r	é	Æ	ó	☐	T	⌌	Γ	≥	
2	18	34	50	66	82	98	114	130	146	162	178	194	210	226	242	
♥	!!	#	3	C	S	c	s	â	ô	ú	⌌	⌌	⌌	Π	≤	
3	19	35	51	67	83	99	115	131	147	163	179	195	211	227	243	
♦	¶	§	4	D	T	d	t	ä	ö	ñ	⌌	—	⌌	Σ	∫	
4	20	36	52	68	84	100	116	132	148	164	180	196	212	228	244	
<b>ENQ</b>	§	%	5	E	U	e	u	<b>ENQ</b>	à	ò	Ñ	⌌	⌌	F	σ	∫
5	21	37	53	69	85	101	117	133	149	165	181	197	213	229	245	
♠	—	&	6	F	V	f	v	å	û	ä	⌌	⌌	⌌	μ	÷	
6	22	38	54	70	86	102	118	134	150	166	182	198	214	230	246	
<b>BEL</b>	↕	'	7	G	W	g	w	<b>BEL</b>	ç	ù	ó	⌌	⌌	⌌	τ	≈
7	23	39	55	71	87	103	119	135	151	167	183	199	215	231	247	
<b>BS</b>	↑	(	8	H	X	h	x	<b>BS</b>	ê	ÿ	¿	⌌	⌌	Φ	°	
8	24	40	56	72	88	104	120	136	152	168	184	200	216	232	248	
<b>HT</b>	<b>EM</b>	)	9	I	Y	i	y	<b>HT</b>	<b>EM</b>	ö	ÿ	⌌	⌌	⌌	⊖	•
9	25	41	57	73	89	105	121	137	153	169	185	201	217	233	249	
<b>LF</b>	→	*	:	J	Z	j	z	<b>LF</b>	è	ü	⌌	⌌	⌌	⌌	Ω	·
10	26	42	58	74	90	106	122	138	154	170	186	202	218	234	250	
<b>VT</b>	<b>ESC</b>	+	;	K	[	k	{	<b>VT</b>	<b>ESC</b>	ï	ç	⌌	⌌	⌌	⌌	√
11	27	43	59	75	91	107	123	139	155	171	187	203	219	235	251	
<b>FF</b>	⌌	,	<	L	\	l		<b>FF</b>	î	£	¼	⌌	⌌	⌌	∞	n
12	28	44	60	76	92	108	124	140	156	172	188	204	220	236	252	
<b>CR</b>	<b>GS</b>	-	=	M	]	m	}	<b>CR</b>	<b>GS</b>	ì	¥	⌌	=	⌌	∅	²
13	29	45	61	77	93	109	125	141	157	173	189	205	221	237	253	
<b>SO</b>	▲	.	>	N	^	n	~	<b>SO</b>	Ä	£	«	⌌	⌌	⌌	ε	■
14	30	46	62	78	94	110	126	142	158	174	190	206	222	238	254	
<b>SI</b>	▼	/	?	O	_	o	¬	<b>SI</b>	Å	f	»	⌌	⌌	⌌	∩	□
15	31	47	63	79	95	111	127	143	159	175	191	207	223	239	255	

Notes: Shading designates control codes. The SETS parameter on the Setup menu determines the actual characters that print for codes 128 to 255.

### *Printing International Characters*

The ESC @ G escape sequence causes the printer to replace some of the standard ASCII characters with alternate characters that are used in a specific language. This sequence and the character replacements are described later in this appendix.

### *Control Codes and Escape Sequences*

When you select *AMT Datasouth Datasouth* or *Diab630* as the active printer emulation, you can use the control codes and escape sequences listed in tables D-2 and D-3. The codes and sequences are organized into the following categories:

- ✓ Control codes
- ✓ Basic functions
- ✓ Horizontal spacing
- ✓ Vertical spacing
- ✓ Margins, tabs and page formatting
- ✓ Absolute and relative moving
- ✓ Text functions
- ✓ Graphic functions
- ✓ Miscellaneous functions

An italicized letter in an escape sequence, such as *n*, is a single-byte variable that you define. An italicized word, such as *data*, is a multi-byte variable. An underline value, such as 0 or 1, is a binary number.

Table D-2. AMT Datasouth and Diablo 630 Control Codes

<i>Function</i>	<i>ASCII</i>	<i>Hexadecimal</i>	<i>Decimal</i>	<i>Description</i>
<b>Ignore</b> .....	NUL	00 or 80	0 or 128	The printer ignores this code unless it is used within an escape sequence.
<b>Continue printing?</b> .....	ENQ	05 or 85	5 or 133	With the ENQ/ACK serial handshake in use, this code causes the printer to return an ACK control code when it can receive more data.
<b>Bell</b> .....	BEL	07 or 87	7 or 135	This code sounds the audible alarm for a brief period.
<b>Backspace</b> .....	BS	08 or 88	8 or 136	This code moves the current print position one character space to the left. If the current print position is the left-most, the printer ignores this code.
<b>Horizontal tab</b> .....	HT	09 or 89	9 or 137	This code moves the current print position right to the next horizontal tab stop on the current line. If no tab stop is set to the right of the current print position, the printer ignores this code. If the factory defaults are in effect, tab stops are set every eight print positions across the page.
<b>Line feed</b> .....	LF	0A or 8A	10 or 138	This code advances the paper one line space. If the current line position is the last printable line on the page, the printer performs a form feed instead of a line feed. If the automatic carriage return mode is active, the printer performs a carriage return in addition to the line feed.
<b>Vertical tab</b> .....	VT	0B or 8B	11 or 139	This code advances the paper to the next vertical tab stop. If no vertical tab stop is set below the current line position, the printer ignores this code.
<b>Form feed</b> .....	FF	0C or 8C	12 or 140	This code ejects a single sheet or advances pin-feed paper to the next top-of-form or top margin if one is set.
<b>Carriage return</b> .....	CR	0D or 8D	13 or 141	This code moves the current print position to the left margin. If automatic line feeding is active, the printer performs a line feed in addition to the carriage return.
<b>Shift out</b> .....	SO	0E or 8E	14 or 142	This code permits the printing of characters assigned codes 1 to 6. An SI or ESC SI sequence ends this function.
<b>Shift in</b> .....	SI	0F or 8F	15 or 143	This code cancels the printing of characters assigned codes 1 to 6.
<b>Print character with code above 127</b> .....	EM	19 or 99	25 or 153	If 7-bit data is in use, this code permits the printing of a character with a code above 127 decimal. When the printer receives an EM code, it adds 128 to the next code it receives and prints the resulting character. This function affects only the next code in the data stream.
<b>Escape</b> .....	ESC	1B or 9B	27 or 155	This code begins an escape sequence.
<b>Print character assigned to control code</b> .....	GS	1D or 9D	29 or 157	This code permits the printing of a character assigned to a control code. After receiving a GS code, the printer does not perform the normal control function for the next code it receives, but instead prints the assigned character. This function affects only the next code in the data stream.
<b>Space</b> .....	SP	20	32	This code moves the current print position one character space to the right.

Table D-3. AMT Datasouth and Diablo 630 Escape Sequences

Function	ASCII	Hexadecimal	Decimal	Description
<b>Basic Functions</b>				
<b>Reset printer</b> .....	ESC SUB1	1B 1A 49	27 26 73	These sequences set the top-of-form at the current print line and reset the print modes, page setup parameters, tabs and special modes to the Setup menu defaults. These sequences do not affect the current emulation or communications parameters.
Alternate .....	ESC CR P	1B 0D 50	27 13 80	
<b>Restore printer settings</b> .....	ESC @ r n	1B 40 72 n	27 64 114 n	This sequence restores the printer settings to the factory default settings or the settings you saved previously using the SAVE parameter on the printer's Setup menu. The SAVE parameter lets you save up to five printer setups for recall later. Each setup is assigned a unique user number from 1 to 5.  ⚠ <b>Note:</b> Since communications settings are saved as part of the user setup, be careful not to restore a user setup that changes the active interface, unless you specifically want to do so.
Factory setup .....	ESC @ r 0	1B 40 72 30	27 64 114 48	
User 1 setup .....	ESC @ r 1	1B 40 72 31	27 64 114 49	
User 2 setup .....	ESC @ r 2	1B 40 72 32	27 64 114 50	
User 3 setup .....	ESC @ r 3	1B 40 72 33	27 64 114 51	
User 4 setup .....	ESC @ r 4	1B 40 72 34	27 64 114 52	
User 5 setup .....	ESC @ r 5	1B 40 72 35	27 64 114 53	
<b>Set emulation</b> .....	ESC @ E n	1B 40 45 n	27 64 69 n	This sequence selects the active emulation which determines the active code set. A partial list of sequences is shown to the left. If a sequence selects an emulation that is not in the installed Intelli-card, the printer sounds the audible alarm, displays the message EMULATION ERROR, and ignores the sequence.
AMT Datasouth .....	ESC @ E SOH	1B 40 45 01	27 64 69 1	
AMT Datasouth (alternate) .....	ESC @ E 1	1B 40 45 31	27 64 69 49	
Diablo 630 .....	ESC @ E STX	1B 40 45 02	27 64 69 2	
Epson JX .....	ESC @ E EOT	1B 40 45 04	27 64 69 4	
Epson LQ-2550 .....	ESC @ E ENQ	1B 40 45 05	27 64 69 5	
IBM XL24 .....	ESC @ E ACK	1B 40 45 06	27 64 69 6	
Bar code .....	ESC @ E BS	1B 40 45 08	27 64 69 8	
<b>Set color</b> .....	ESC @ R n	1B 40 52 n	27 64 82 n	This sequence selects a color from a seven-color palette. If a monochrome ribbon is installed, the printer ignores this sequence.
Black .....	ESC @ R 1	1B 40 52 31	27 64 82 49	
Blue .....	ESC @ R 2	1B 40 52 32	27 64 82 50	
Red .....	ESC @ R 3	1B 40 52 33	27 64 82 51	
Yellow .....	ESC @ R 4	1B 40 52 34	27 64 82 52	
Purple .....	ESC @ R 5	1B 40 52 35	27 64 82 53	
Green .....	ESC @ R 6	1B 40 52 36	27 64 82 54	
Orange .....	ESC @ R 7	1B 40 52 37	27 64 82 55	

Table D-3. AMT Datasouth and Diablo 630 Escape Sequences—continued

<i>Function</i>	<i>ASCII</i>	<i>Hexadecimal</i>	<i>Decimal</i>	<i>Description</i>
<b>Basic Functions—continued</b>				
<b>Auto carriage return</b> .....	ESC @ CR <i>n</i>	1B 40 0D <i>n</i>	27 64 13 <i>n</i>	This sequence starts and ends the automatic carriage return mode, wherein the printer performs a carriage return and line feed for every line feed code it receives.
Start .....	ESC @ CR 1	1B 40 0D 31	27 64 13 49	
End .....	ESC @ CR 0	1B 40 0D 30	27 64 13 48	
<b>Auto line feed</b> .....	ESC @ LF <i>n</i>	1B 40 0A <i>n</i>	27 64 10 <i>n</i>	This sequence starts and ends the automatic line feed mode, wherein the printer performs a carriage return and line feed for every carriage return code it receives.
Start .....	ESC @ LF 1	1B 40 0A 31	27 64 10 49	
End .....	ESC @ LF 0	1B 40 0A 30	27 64 10 48	
<b>Auto line wrap</b>				These sequences control the automatic line wrap mode, wherein the printer performs a carriage return/line feed when printing reaches the rightmost print position on a line. The rightmost print position on a line is determined by the WIDTH setting on the printer's Setup menu. With the auto line wrap mode off, the printer truncates text and graphics that exceed the rightmost print position.
Start .....	ESC ?	1B 3F	27 63	
End .....	ESC !	1B 21	27 33	
<b>Auto perforation skip</b> .....	ESC @ FF <i>n</i>	1B 40 0C <i>n</i>	27 64 12 <i>n</i>	This sequence starts and ends the automatic perforation skip mode, wherein the printer performs a form feed whenever printing reaches one-half inch from the bottom of the page. The form feed advances the paper one-half inch beyond the next top-of-form or top margin (if one is set).
Start .....	ESC @ FF 1	1B 40 0C 31	27 64 12 49	
End .....	ESC @ FF 0	1B 40 0C 30	27 64 12 48	
<b>Unidirectional printing</b> .....	ESC @ U <i>n</i>	1B 40 55 <i>n</i>	27 64 85 <i>n</i>	This sequence starts and ends unidirectional printing, wherein printing occurs only while the carriage moves from left-to-right. Unidirectional printing enables the exact alignment of multi-line graphics, component characters and other applications where vertical alignment is crucial.
Start .....	ESC @ U 1	1B 40 55 31	27 64 85 49	
Start (alternate) .....	ESC \	1B 5C	27 92	
End .....	ESC @ U 0	1B 40 55 30	27 64 85 48	
End (alternate) .....	ESC /	1B 2F	27 47	
<b>Ignore codes</b> .....	ESC @ I <i>n</i>	1B 40 49 <i>n</i>	27 64 73 <i>n</i>	This sequence causes the printer to ignore from 1 to 95 subsequent codes that it receives. The value of <i>n</i> minus 32 defines the number of codes to ignore. For example, to ignore the next 20 codes, the correct escape sequence is ESC @ I 4.
<b>Restore control code functions</b> .....	ESC SI	1B 0F	27 15	This sequence cancels the printing of characters with codes 1 to 6 that was enabled by an SO control code.

Table D-3. AMT Datasouth and Diablo 630 Escape Sequences—continued

Function	ASCII	Hexadecimal	Decimal	Description
<b>Horizontal Spacing</b>				
<b>Set character spacing</b> .....	ESC US <i>n</i>	1B 1F <i>n</i>	27 31 <i>n</i>	<p>This sequence sets the distance that the carriage moves after printing a character or when spacing. The value of variable <i>n</i> minus one defines a number of 1/120-inch increments to move:</p> <p>Character spacing = (<i>n</i> - 1) x 1/120-inch</p>
5 characters/inch .....	ESC US EM	1B 1F 19	27 31 25	
6 characters/inch .....	ESC US NAK	1B 1F 15	27 31 21	
6.6 characters/inch .....	ESC US DC3	1B 1F 13	27 31 19	
7.5 characters/inch .....	ESC US DC1	1B 1F 11	27 31 17	
8.5 characters/inch .....	ESC US SI	1B 1F 0F	27 31 15	
10 characters/inch .....	ESC US CR	1B 1F 0D	27 31 13	
12 characters/inch .....	ESC US VT	1B 1F 0B	27 31 11	
13.3 characters/inch .....	ESC US LF	1B 1F 0A	27 31 10	
15 characters/inch .....	ESC US HT	1B 1F 09	27 31 9	
17.1 characters/inch .....	ESC US BS	1B 1F 08	27 31 8	
20 characters/inch .....	ESC US BEL	1B 1F 07	27 31 7	
<b>Set character spacing to default</b> .....	ESCS	1B 53	27 83	
<b>Set character cell width</b> .....	ESC @ Z <i>n</i>	1B 40 5A <i>n</i>	27 64 90 <i>n</i>	<p>This sequence sets the width of character cells. Normally, if you print a font at a character spacing other than the default spacing, the characters overlap or are spaced too far apart. This sequence automatically proportions characters so that they print correctly at other valid character spacings.</p> <p>The value of variable <i>n</i> minus 32 determines the width, in 1/120-inch increments, for each character cell. If the active font is proportional, variable <i>n</i> determines the width of a space (SP); all other character cells adjust proportionally.</p> <p>This sequence does not change the current character spacing. To print a font at a nonstandard pitch, include this escape sequence between the <i>Set Font</i> and <i>Set Character Spacing</i> sequences.</p>
5 characters/inch .....	ESC @ Z 8	1B 40 5A 38	27 64 90 56	
6 characters/inch .....	ESC @ Z 4	1B 40 5A 34	27 64 90 52	
6.6 characters/inch .....	ESC @ Z 2	1B 40 5A 32	27 64 90 50	
7.5 characters/inch .....	ESC @ Z 0	1B 40 5A 30	27 64 90 48	
8.5 characters/inch .....	ESC @ Z .	1B 40 5A 2E	27 64 90 46	
10 characters/inch .....	ESC @ Z ,	1B 40 5A 2C	27 64 90 44	
12 characters/inch .....	ESC @ Z *	1B 40 5A 2A	27 64 90 42	
13.3 characters/inch .....	ESC @ Z )	1B 40 5A 29	27 64 90 41	
15 characters/inch .....	ESC @ Z (	1B 40 5A 28	27 64 90 40	
17.1 characters/inch .....	ESC @ Z '	1B 40 5A 27	27 64 90 39	
20 characters/inch .....	ESC @ Z &	1B 40 5A 26	27 64 90 38	
<b>Set horizontal spacing offset</b> .....	ESC DC1 <i>n</i>	1B 11 <i>n</i>	27 17 <i>n</i>	<p>This sequence causes an offset of 0/120-inch to 63/120-inch to be added to or subtracted from the current character spacing (or PS unit values, if the PS mode is on). Variable <i>n</i> is a byte that determines whether the offset is added or subtracted, and the distance of the offset. The printer interprets <i>n</i> as follows:</p> <ul style="list-style-type: none"> <li>✓ Reads the value of bit 6 to determine whether the offset is positive or negative. If the bit equals 0, the offset is positive and the printer adds it; if the bits equals 1, the offset is negative and the printer subtracts it.</li> </ul>

Table D-3. AMT Datasouth and Diablo 630 Escape Sequences—continued

<i>Function</i>	<i>ASCII</i>	<i>Hexadecimal</i>	<i>Decimal</i>	<i>Description</i>
Horizontal Spacing—continued				
<b>Set horizontal spacing offset</b> ..... (continued)	ESC DC1 <i>n</i>	1B 11 <i>n</i>	27 17 <i>n</i>	✓ Reads the least significant six bits as a binary number to determine the distance of the offset in 1/120-inch increments.  The offset remains in effect until the printer receives another <i>Set Horizontal Spacing Offset</i> sequence, a carriage return, or the <i>End Word Processing Modes</i> sequence.
<b>Move carriage left</b> ..... <b>1/120 inch</b>	ESC BS	1B 08	27 08	The sequence moves the current print position 1/120 inch to the left.
Vertical Spacing				
<b>Set line spacing in</b> ..... <b>1/48-inch increments</b>	ESC RS <i>n</i>	1B 1E <i>n</i>	27 30 <i>n</i>	This sequence sets the distance that the paper moves for each line feed, reverse line feed, etc. The value of variable <i>n</i> minus one defines a number of 1/48-inch increments to move:  Line spacing = ( <i>n</i> - 1) x 1/48 inch
3 lines per inch .....	ESC RS DC1	1B 1E 11	27 30 17	
4 lines per inch .....	ESC RSCR	1B 1E 0D	27 30 13	
6 lines per inch .....	ESC RS HT	1B 1E 09	27 30 09	
8 lines per inch .....	ESC RS BEL	1B 1E 07	27 30 07	
12 lines per inch .....	ESC RSEnQ	1B 1E 05	27 30 05	
<b>Set line spacing in</b> ..... <b>1/120-inch increments</b>	ESC @ A <i>n</i>	1B 40 41 <i>n</i>	27 64 65 <i>n</i>	This sequence sets the distance that the paper moves for each line feed, reverse line feed, etc. The value of variable <i>n</i> minus 32 defines a number of 1/120-inch increments to move:  Line spacing = ( <i>n</i> - 32) x 1/120 inch
3 lines per inch .....	ESC @ A H	1B 40 41 48	27 64 65 72	
4 lines per inch .....	ESC @ A >	1B 40 41 3E	27 64 65 62	
6 lines per inch .....	ESC @ A 4	1B 40 41 34	27 64 65 52	
8 lines per inch .....	ESC @ A /	1B 40 41 2F	27 64 65 47	
12 lines per inch .....	ESC @ A *	1B 40 41 2A	27 64 65 42	
<b>Reverse line feed</b> .....	ESC LF	1B 0A	27 10	This sequence reverse feeds the paper one line space so the next print line is above the previous line.
<b>Half-line feed</b> .....	ESC U	1B 55	27 85	This sequence advances the paper one-half line space.
<b>Reverse half-line feed</b> .....	ESC D	1B 44	27 68	This sequence reverse feeds the paper one-half line space.
Margins, Tabs and Page Formatting				
<b>Set left margin</b> .....	ESC 9	1B 39	27 57	This sequence sets the left margin at the current print position. All subsequent carriage returns cause the carriage to move to this location. The physical position of the left margin position on the page is unaffected by subsequent changes to character spacing. It is possible to move the carriage left of the left margin by using absolute or relative moves, backspacing, or spacing in the backward print mode.

Table D-3. AMT Datasouth and Diablo 630 Escape Sequences—continued

<i>Function</i>	<i>ASCII</i>	<i>Hexadecimal</i>	<i>Decimal</i>	<i>Description</i>
Margins, Tabs and Page Formatting—continued				
<b>Set right margin</b> .....	ESC 0	1B 30	27 48	This sequence sets the right margin at the current print position for use by the automatic center and justify modes. The right margin setting is a soft margin that does not affect normal printing or cause automatic line wrapping. The right margin is a function of character spacing. Therefore, when character spacing changes, the right margin remains at the same print position, but not at the same place on the page.
<b>Set top margin</b> .....	ESC T	1B 54	27 84	This sequence sets the top margin at the current line position. The printer advances each new page to this position before printing begins. It is possible to access the area above the top margin using absolute or relative moves, or reverse line feeds. The top margin clears when the printer receives a <i>Clear Top and Bottom Margins</i> sequence, <i>Set Lines Per Page</i> sequence, or the operator sets a new page length from the control panel. The physical location of the top margin on the page is unaffected by subsequent changes to line spacing.
<b>Set bottom margin</b> .....	ESC L	1B 4C	27 76	This sequence sets the bottom margin at the current line position. After printing on this line, the printer feeds a new sheet, no printing can occur below the bottom margin. The bottom margin clears when the printer receives a <i>Clear Top and Bottom Margins</i> sequence, <i>Set Lines Per Page</i> sequence, or the operator sets a new page length from the control panel. The physical location of the bottom margin on the page is unaffected by subsequent changes to line spacing.
<b>Clear top/bottom margins</b> .....	ESC C	1B 43	27 67	This sequence clears the top and bottom margin settings so that printing can occur on any line on the page.
<b>Clear all tab stops</b> .....	ESC 2	1B 32	27 50	This sequence clears all previously set horizontal and vertical tab stops.
<b>Set single horizontal tab stop</b> .....	ESC 1	1B 31	27 49	This sequence sets a horizontal tab stop at the current print position. Tab stops can be set at any of the first 159 print positions on a line. Horizontal tab stops are a function of the current character spacing. Therefore, when character spacing changes, horizontal tabs remain at the same print positions, but not at the same places on the page. If the factory defaults are in effect, horizontal tab stops are set every eight print positions across the page.
<b>Clear single horizontal tab stop</b> .....	ESC 8	1B 38	27 56	This sequence clears the horizontal tab stop at the current print position.

Table D-3. AMT Datasouth and Diablo 630 Escape Sequences—continued

<i>Function</i>	<i>ASCII</i>	<i>Hexadecimal</i>	<i>Decimal</i>	<i>Description</i>
Margins, Tabs and Page Formatting—continued				
<b>Set vertical tab stop .....</b>	ESC -	1B 2D	27 45	This sequence sets a vertical tab stop at the current line position. Vertical tab stops are a function of the current line spacing. Therefore, when line spacing changes, vertical tabs remain at the same line positions, but not at the same places on the page.
<b>Set lines per page .....</b>	ESC FF <i>n</i>	1B 0C <i>n</i>	27 12 <i>n</i>	This sequence sets the number of lines per page and sets the top-of-form at the current print position. The value of variable <i>n</i> (0 to 182) determines the number of lines per page. Variable <i>n</i> should equal the actual form length in inches divided by the current line spacing. For example, if the form length is 11 inches and the line spacing is 1/6 inch, 11 divided by 1/6 is 66—so <i>n</i> should equal 66 decimal (ASCII B, 42 hex). The number of lines per page is unaffected by subsequent changes to line spacing.
Absolute and Relative Moving				
<b>Absolute move to .....</b> <b>print position</b>	ESC HT <i>n</i>	1B 09 <i>n</i>	27 9 <i>n</i>	This sequence moves the current print position left or right to a specific print position (0 to 255) on the current line. The value of variable <i>n</i> minus one defines the print position to move to. For example, to move to print position 5, the sequence is ESC HT ACK. Print position 0 is the far left print column. If the sequence defines a print position beyond the rightmost print position, the printer ignores this sequence.
<b>Absolute move to .....</b> <b>print line</b>	ESC VT <i>n</i>	1B 0B <i>n</i>	27 11 <i>n</i>	This sequence moves paper up or down to a specific print line (0 to 182) on the page. The value of variable <i>n</i> minus one defines the line to move to. For example, to move to line 5, the sequence is ESC VT ACK. Print line 0 is the top-of-form. If the sequence specifies a line below the last line of the page, the printer ignores this sequence.
<b>Relative move right .....</b> <b>or left</b>	ESC @ h <i>n1 n2</i>	1B 40 68 <i>n1 n2</i>	27 64 104 <i>n1 n2</i>	This sequence moves the carriage a specific distance to the right or left from the current print position. The values of variables <i>n1</i> and <i>n2</i> define the distance in 1/240-inch increments:  $\text{Distance in } 1/240\text{ths} = (n2 \times 256) + n1$ <p>To move the carriage to the right, just compute the number of increments to move and supply the correct <i>n1</i> and <i>n2</i> values. For example, to move the carriage two inches to the right (<math>480 \times 1/240''</math>), the correct <i>n2</i> value is 1 and the correct <i>n1</i> value is 224 (<math>480 = (1 \times 256) + 224</math>).</p>

Table D-3. AMT Datasouth and Diablo 630 Escape Sequences—continued

Function	ASCII	Hexadecimal	Decimal	Description
Absolute and Relative Moving—continued				
<b>Relative move right</b> ..... <b>or left</b> (continued)	ESC @ h n1 n2	1B 40 68 n1 n2	27 64 104 n1 n2	To move the carriage to the left, subtract the number of increments to move from 65,536 and then supply the correct n1 and n2 values. For example, to move the carriage two inches to the left (480 x 1/240"), first subtract 480 from 65,536 to get 65,056. Then, use the equation to determine the correct n1 and n2 values. In this example, the correct n2 value is 254 and the correct n1 value is 32 (65,056 = (254 x 256) + 32). If the sequence specifies a distance that would move the carriage beyond the left or right print boundary, the carriage moves to that boundary.
<b>Relative move down</b> ..... <b>or up</b>	ESC @ v n1 n2	1B 40 76 n1 n2	27 64 118 n1 n2	This sequence advances or reverse feeds the paper a specific distance from the current position. The values of variables n1 and n2 define the distance in 1/240-inch increments:  Distance in 1/240ths = (n2 x 256) + n1  To advance the paper, just compute the number of increments to advance and supply the correct n1 and n2 values. For example, to advance the paper one inch (240 x 1/240"), the correct n2 value is 0 and the correct n1 value is 240 (240 = (0 x 256) + 240).  To reverse feed the paper, subtract the number of increments to move from 65,536 and then supply the correct n1 and n2 values. For example, to reverse feed the paper two inches (480 x 1/240"), first subtract 480 from 65,536 to get 65,056. Then, use the equation to determine the correct n1 and n2 values. In this example, the correct n2 value is 254 and the correct n1 value is 32 (65,056 = (254 x 256) + 32).
Text Functions				
<b>Set print quality (speed)</b> ..... Letter ..... Memo ..... Draft .....	ESC @ P n ESC @ P L ESC @ P M ESC @ P D	1B 40 50 n 1B 40 50 4C 1B 40 50 4D 1B 40 50 44	27 64 80 n 27 64 80 76 27 64 80 77 27 64 80 68	This sequence selects the text quality. Letter-quality characters are formed from a 32-dot-high by 36-dot-wide matrix. Memo-quality characters are formed from a 16-dot-high by 36-dot-wide matrix. Draft-quality characters are formed from an 8-dot-high by 15-dot-wide matrix.  ⚠ <b>Note:</b> Some font options do not contain character sets for all print qualities. If letter-quality is selected, but the font does not contain this character set, memo-quality is selected; and vice-versa. If the font contains neither a letter- or memo-quality character set, the letter- or memo-quality Courier character set is selected. If draft-quality is selected, but the font does not contain this character set, the draft-quality Courier character set is selected.

Table D-3. AMT Datasouth and Diablo 630 Escape Sequences—continued

<i>Function</i>	<i>ASCII</i>	<i>Hexadecimal</i>	<i>Decimal</i>	<i>Description</i>	
Text Functions—continued					
<b>Set font</b> .....	ESC @ F n	1B 40 46 n	27 64 70 n	This sequence selects any available font; it does <i>not</i> change the current character spacing. Each font is assigned one or more numbers. To select a font, the sequence must specify one of the assigned numbers. The list of sequences to the left is only a partial list of font selections.  When the printer receives a sequence that selects a font that is not in the installed Intelli-card, it sounds the audible alarm, displays the message FONT UNAVAILABLE on the control panel, and continues printing.	
Courier .....	ESC @ F SOH	1B 40 46 01	27 64 70 1		
Courier (alternate) .....	ESC @ F 1	1B 40 46 31	27 64 70 49		
Gothic, 12 cpi .....	ESC @ F STX	1B 40 46 02	27 64 70 2		
Gothic, 12 cpi (alternate) ....	ESC @ F 2	1B 40 46 32	27 64 70 50		
Gothic, 17.1 cpi .....	ESC @ F ETX	1B 40 46 03	27 64 70 3		
Gothic, 17.1 cpi (alt.) .....	ESC @ F 3	1B 40 46 33	27 64 70 51		
Times Roman .....	ESC @ F EOT	1B 40 46 04	27 64 70 4		
Times Roman (alternate) ....	ESC @ F 4	1B 40 46 34	27 64 70 52		
Elite .....	ESC @ F ENQ	1B 40 46 05	27 64 70 5		
Orator .....	ESC @ F BEL	1B 40 46 07	27 64 70 7		
Courier Legal .....	ESC @ F HT	1B 40 46 09	27 64 70 9		
Broadway .....	ESC @ F FS	1B 40 46 1C	27 64 70 28		
Micro .....	ESC @ F RS	1B 40 46 1E	27 64 70 30		
Script .....	ESC @ F NAK	1B 40 46 15	27 64 70 21		
Gothic PS .....	ESC @ F ACK	1B 40 46 06	27 64 70 6		
Micro PS .....	ESC @ F '	1B 40 46 27	27 64 70 39		
OCR-A .....	ESC @ F SP	1B 40 46 20	27 64 70 32		
OCR-B .....	ESC @ F ETB	1B 40 46 17	27 64 70 23		
APL .....	ESC @ F EM	1B 40 46 19	27 64 70 25		
General Scientific .....	ESC @ F LF	1B 40 46 0A	27 64 70 10		
DEC Scientific .....	ESC @ F VT	1B 40 46 0B	27 64 70 11		
Chemical .....	ESC @ F CAN	1B 40 46 18	27 64 70 24		
<b>Print character assigned to code 20 hex</b> .....	ESC Y	1B 59	27 89		This sequence prints the character assigned to code 20 hex, which the printer normally interprets as a space.
<b>Print character assigned to code 7F hex</b> .....	ESC Z	1B 5A	27 90		This sequence prints the character assigned to code 7F hex, which the printer normally ignores.
<b>Start print suppression</b> .....	ESC 7	1B 37	27 55		This sequence starts the print suppression mode, wherein the printer replaces all printable characters with spaces. A carriage return ends the print suppression mode.
<b>Set language</b> .....	ESC @ G n	1B 40 47 n	27 64 71 n	This sequence selects a language for the printer to use while printing text. The language settings causes the printer to replace some of the standard characters with alternate characters that are used in a specific language. The character replacements are shown in the <i>Control Panel</i> section of this guide, under the <i>Set Language</i> heading.  ☞ <b>Note:</b> This sequence applies only to fonts with international characters.	
English (US) .....	ESC @ G NUL	1B 40 47 00	27 64 71 0		
French .....	ESC @ G SOH	1B 40 47 01	27 64 71 1		
German .....	ESC @ G STX	1B 40 47 02	27 64 71 2		
English (UK) .....	ESC @ G ETX	1B 40 47 03	27 64 71 3		
Danish I .....	ESC @ G EOT	1B 40 47 04	27 64 71 4		
Swedish .....	ESC @ G ENQ	1B 40 47 05	27 64 71 5		
Italian .....	ESC @ G ACK	1B 40 47 06	27 64 71 6		
Spanish I .....	ESC @ G BEL	1B 40 47 07	27 64 71 7		
Japanese .....	ESC @ G BS	1B 40 47 08	27 64 71 8		
Norwegian .....	ESC @ G HT	1B 40 47 09	27 64 71 9		
Danish II .....	ESC @ G LF	1B 40 47 0A	27 64 71 10		
Spanish II .....	ESC @ G VT	1B 40 47 0B	27 64 71 11		
Portuguese .....	ESC @ G FF	1B 40 47 0C	27 64 71 12		

Table D-3. AMT Datasouth and Diablo 630 Escape Sequences—continued

<i>Function</i>	<i>ASCII</i>	<i>Hexadecimal</i>	<i>Decimal</i>	<i>Description</i>
<b>Text Functions—continued</b>				
<b>Backward printing</b>				
Start .....	ESC 6	1B 36	27 54	These sequences control backward printing, wherein the printer reverses the direction of normal spacing, back spacing, and character escapement. A space moves the current print position one space to the left, a backspace moves the current print position to the right, and character escapement is to the left. Backward printing does not affect horizontal tabbing, absolute and relative moves, carriage returns, and paper movement functions. A carriage return or <i>End Backward Printing</i> sequence ends backward printing.
End .....	ESC 5	1B 35	27 53	
<b>Bold / shadow printing</b>				
Start bold .....	ESC O	1B 4F	27 79	These sequences start and end bold or shadow printing at the current print position. For bold and shadow printing, the printer makes a second printing pass over the line. For bold, the printer prints each character twice at the character's normal print position. For shadow, the printer prints each character twice—once at the character's normal print position, and once 1/120-inch to the right of this position. The printer ends bold or shadow printing when it receives a carriage return, <i>End Bold/Shadow Printing</i> sequence, or <i>End Word Processing Modes</i> sequence.
Start shadow .....	ESC W	1B 57	27 87	
End bold / shadow .....	ESC &	1B 26	27 38	
<b>Auto underscoring</b>				
Start .....	ESCE	1B 45	27 69	These sequences start and end underscored printing at the current print position. During underscored printing, the printer remembers the current print position as the start location. When printing reaches the end location, the printer underscores the area between the start location and the end location. The end location is the print position when the printer receives an <i>End Auto Underscore</i> or <i>End Word Processing Modes</i> sequence, a carriage return, or any paper movement code or sequence. If the end location is before the start location on the line, no underscoring occurs.
End .....	ESCR	1B 52	27 82	
<b>End word processing modes</b>	ESC X	1B 58	27 88	This sequence ends the program mode, bold printing, shadow printing, and automatic underscoring. The sequence also cancels the automatic center mode.
<b>Slant printing (italics)</b>	ESC @ S n	1B 40 53 n	27 64 83 n	This sequence starts and ends slant printing, wherein characters slant forward to simulate italics.
Start .....	ESC @ S 1	1B 40 53 31	27 64 83 49	
Start (alternate) .....	ESC @ S 2	1B 40 53 32	27 64 83 50	
Start (alternate) .....	ESC @ S 3	1B 40 53 33	27 64 83 51	
End .....	ESC @ S 0	1B 40 53 30	27 64 83 48	
<b>Super / subscripting</b>	ESC @ V n	1B 40 56 n	27 64 86 n	This sequence starts and ends automatic superscripting and subscripting of characters. Both superscript and subscript characters are half the normal height. Superscript characters print above the normal print line; subscript characters print below the normal print line.
Start subscripting .....	ESC @ V 1	1B 40 56 31	27 64 86 49	
Start superscripting .....	ESC @ V 2	1B 40 56 32	27 64 86 50	
End .....	ESC @ V 0	1B 40 56 30	27 64 86 48	

Table D-3. AMT Datasouth and Diablo 630 Escape Sequences—continued

<i>Function</i>	<i>ASCII</i>	<i>Hexadecimal</i>	<i>Decimal</i>	<i>Description</i>
Text Functions—continued				
<b>Double-high printing</b> .....	ESC @ H <i>n</i>	1B 40 48 <i>n</i>	27 64 72 <i>n</i>	This sequence starts and ends double-high printing, wherein characters print twice their normal height. This sequence does <i>not</i> change the current line spacing.
Start .....	ESC @ H 1	1B 40 48 31	27 64 72 49	
End .....	ESC @ H 0	1B 40 48 30	27 64 72 48	
<b>Double-wide printing</b> .....	ESC @ W <i>n</i>	1B 40 57 <i>n</i>	27 64 87 <i>n</i>	This sequence starts and ends double-wide printing, wherein characters print twice their normal width. This sequence does <i>not</i> change the current character spacing.
Start .....	ESC @ W 1	1B 40 57 31	27 64 87 49	
End .....	ESC @ W 0	1B 40 57 30	27 64 87 48	
<b>Start auto center mode</b> .....	ESC =	1B 3D	27 61	<p>This sequence starts the automatic center mode, wherein the printer stores all subsequent data in a special buffer. When the printer receives a carriage return, line feed, or any paper movement command, it prints the stored data centered on the point that is midway between the left and right margins; then the automatic center mode ends.</p> <p>Automatic centering allows the line to extend beyond the left and right margins. If automatic justify is on when auto-matic centering starts, automatic centering takes precedence on the current line only. If the printer receives an <i>End Word Processing Modes</i> sequence while automatic center-ing is on, automatic centering turns off and the stored data prints normally.</p>
<b>Start auto justify mode</b> .....	ESC M	1B 4D	27 77	<p>This sequence starts the automatic justify mode, wherein the printer stores all subsequent data in a special buffer. When the printer receives a carriage return, line feed, or any paper movement command, it prints the stored data justified between the left and right margins.</p> <p>This sequence should precede the first printable character on the line to be justified. The printer begins its justify calculations from the position of the first printable character after the carriage return, line feed, horizontal tab or this sequence. This allows unjustified leading spaces or tabs, and partial-line justification. The printer calculates the number of 1/120-inch offsets needed to fill out or condense a line so that it fits perfectly between the first printable character and the right margin. If the line must expand to more than twice its original length or condense so that characters touch, the line prints unjustified. The printer applies the offset value to word spaces and then to word and character spaces.</p> <p>When the printer receives an <i>End Word Processing Modes</i> sequence, the automatic justify mode ends and any text in the buffer prints normally.</p>

Table D-3. AMT Datasouth and Diablo 630 Escape Sequences—continued

<i>Function</i>	<i>ASCII</i>	<i>Hexadecimal</i>	<i>Decimal</i>	<i>Description</i>
Text Functions—continued				
<b>Proportional mode</b> Start ..... End .....	ESC P ESC Q	1B 50 1B 51	27 80 27 81	<p>These sequences start and end the proportional mode, wherein the printer spaces characters by moving a specific number of PS units (1/120-inch increments), printing the character, and then moving by the same number of PS units again.</p> <p>If the active font is a PS font, the printer uses the PS unit values prestored in the font. If the active font is a fixed-pitch font, the printer uses one-half the normal character spacing as the number of PS units for every character.</p> <p>PS fonts contain prestored PS unit values for characters. A PS unit value represents one-half the space, in multiples of 1/120-inch, that is required to print and space a character. PS unit values range from 2 to 8. For example, the letter "V" has a PS unit value of 6, so it prints centered within a space of 12/120-inch (move 6 PS units, print the "V", and then move 6 PS units again). Or, the letter "i" has a PS unit value of 3, so it prints centered within a space of 6/120-inch (move 3 PS units, print the "i", and then move 3 PS units again).</p> <p>To determine the total distance from the center line of one character to the center line of the next character, just add the two characters' PS unit values. In the example above, the distance between the center of the "V" and the center of the "i" is 9/120-inch.</p> <p>All numeric characters (0 to 9) have the same PS unit value. This allows numeric data to be printed aligned in columnar form without having to turn off proportional spacing.</p> <p>During fixed-pitch printing, the printing sequence is PRINT-MOVE, where the distance of the move is the current character spacing setting. During PS printing, the printing sequence is MOVE-PRINT-MOVE, where the distance of the move is PS units.</p> <p>After ending proportional mode, character spacing resets to the default character spacing of the active font. If the active font is a PS font, character spacing resets to 12 characters per inch.</p>

Table D-3. AMT Datasouth and Diablo 630 Escape Sequences—continued

<i>Function</i>	<i>ASCII</i>	<i>Hexadecimal</i>	<i>Decimal</i>	<i>Description</i>
Text Functions—continued				
<b>Start program mode</b> .....	ESC SO M	1B 0E 4D	27 14 77	<p>This sequence starts the Diablo daisywheel program mode. In this mode, a character follows each printable character code to define hammer intensity and ribbon feed. If the proportional mode is on, the second character defines hammer intensity and PS units.</p> <p>With the program mode on and the proportional-spacing mode off, the printer accepts the additional character; however, since both hammer intensity and ribbon feed are not applicable, the printer ignores this character.</p> <p>With both the program and proportional-spacing modes on, the printer interprets the second character as follows:</p> <ul style="list-style-type: none"> <li>✓ Ignores bits 4, 5, and 6 (these define hammer intensity for daisywheel printers).</li> <li>✓ Reads the least significant four bits as a binary number to determine the PS unit value.</li> </ul> <p>For further information on proportional-spacing and PS unit values, refer to the <i>Proportional Mode</i> sequence.</p>
<b>Wide text printing</b> .....	ESC @ t n	1B 40 74 n	27 64 116 n	<p>This sequence enables and disables wide text printing. With wide text printing on, a <i>wide</i>-carriage printer can print a 16-inch line and a <i>narrow</i>-carriage printer can print an 11-inch line. When you disable wide text printing, the leftmost and rightmost print positions, margins and horizontal tabs return to their original locations.</p> <p>With wide text printing enabled, text prints unidirectionally; that is, text printing occurs only while the carriage moves from left-to-right across the platen. Also, print speeds are slower than normal.</p> <p>This sequence does not affect graphics printing. If you want to print wide graphics, you must use the <i>Wide Graphics</i> sequence.</p> <p>☞ <b>Note:</b> With wide text printing enabled, be sure to load paper in the printer so that it aligns with the blue line on the paper scale. This ensures that printing does not run off the left side of the page.</p>
Enable .....	ESC @ t 1	1B 40 74 31	27 64 116 49	
Disable .....	ESC @ t 0	1B 40 74 30	27 64 116 48	

Table D-3. AMT Datasouth and Diablo 630 Escape Sequences—continued

Function	ASCII	Hexadecimal	Decimal	Description
<b>Graphic Functions</b>				
<b>Diablo graphics</b>				
Start .....	ESC 3	1B 33	27 51	These sequences start and end Diablo graphics. Diablo graphics temporarily set spacing and backspacing to 1/60 inch, character spacing to 0, and line spacing to 1/48 inch. The sequence does not affect absolute and relative moves. A subsequent carriage return or the <i>End Diablo Graphics</i> sequence ends Diablo graphics.
End .....	ESC 4	1B 34	27 52	
<b>Print 8-wire graphics</b>				
60V x 60H dpi .....	ESC @ K <i>n1 n2 list</i>	1B 40 4B <i>n1 n2 list</i>	27 64 75 <i>n1 n2 list</i>	<p>These sequences print 8-wire graphics, wherein normal character codes no longer print characters, but instead print seven- or eight-dot-high columns of dots on the current print line. This sequence does <i>not</i> change the current line spacing.</p> <p>Variables <i>n1</i> and <i>n2</i> define the number of columns to print. This number equals the number of bytes in the <i>list</i>. The printer interprets <i>n1</i> and <i>n2</i> as follows:</p> <p>Number of columns = <math>(128 \times n2) + n1</math></p> <p>For example, to print 180 columns of dots, <i>n2</i> would be 1 and <i>n1</i> would be 52 (<math>180 = (128 \times 1) + 52</math>).</p> <p>The <i>list</i> in the sequence is a series of codes that define the columns to print. The first code defines the first column, the second code defines the second column, and so on. Each bit in a code controls a specific dot in the column. The most significant bit controls the top dot, the next bit controls the second dot, and so on. If the bit is a "1", the dot prints; if the bit is a "0", the dot does not print. For example, FF hex prints all eight dots in the column, 00 hex prints no dots, 0F hex prints the lower four dots, and F0 hex prints the upper four dots.</p> <p>☞ <b>Note:</b> For more detailed information on these escape sequences, refer to <i>AMT Datasouth Technical Notes—Graphics</i>, available separately from AMT Datasouth.</p>
60V x 120H dpi .....	ESC @ L <i>n1 n2 list</i>	1B 40 4C <i>n1 n2 list</i>	27 64 76 <i>n1 n2 list</i>	
120V x 120H dpi .....	ESC @ M <i>n1 n2 list</i>	1B 40 4D <i>n1 n2 list</i>	27 64 77 <i>n1 n2 list</i>	
120V x 240H dpi .....	ESC @ N <i>n1 n2 list</i>	1B 40 4E <i>n1 n2 list</i>	27 64 78 <i>n1 n2 list</i>	
<b>Print 16-wire graphics</b>				
120V x 120H dpi .....	ESC @ m <i>n1 n2 list</i>	1B 40 6D <i>n1 n2 list</i>	27 64 109 <i>n1 n2 list</i>	<p>These sequences print 16-wire graphics, wherein normal character codes no longer print characters, but instead print 16-dot-high columns of dots on the current print line. This sequence does <i>not</i> change the current line spacing.</p> <p>Variables <i>n1</i> and <i>n2</i> define the number of columns to print. This number is one-half the number of bytes in the <i>list</i>. The printer interprets <i>n1</i> and <i>n2</i> as follows:</p> <p>Number of columns = <math>(128 \times n2) + n1</math></p> <p>For example, to print 360 columns of dots, <i>n2</i> would be 2 and <i>n1</i> would be 104 (<math>360 = (128 \times 2) + 104</math>).</p>
120V x 240H dpi .....	ESC @ n <i>n1 n2 list</i>	1B 40 6E <i>n1 n2 list</i>	27 64 110 <i>n1 n2 list</i>	



Table D-3. AMT Datasouth and Diablo 630 Escape Sequences—continued

Function	ASCII	Hexadecimal	Decimal	Description
Graphic Functions—continued				
<b>Interpret next graphics column count as 16-bit integer</b> .....	ESC @ 8	1B 40 38	27 64 56	<p>This sequence causes printer logic to interpret the column count in the next AMT Datasouth graphics escape sequence as a 16-bit integer:</p> <p>Number of columns = <math>(256 \times n2) + n1</math></p> <p>For example, to print 360 columns of dots, <math>n2</math> would be 1 and <math>n1</math> would be 104 (<math>360 = (256 \times 1) + 104</math>).</p> <p>This sequence affects <i>only</i> the next AMT Datasouth graphics escape sequence sent.</p>
<b>Decompress next graphics list using TIFF "Packbits" decompression</b> .....	ESC @ c	1B 40 63	27 64 99	<p>This sequence causes printer logic to decompress the graphics <i>list</i> in the next AMT Datasouth graphics escape sequence using industry-standard TIFF 4.0 "Packbits" decompression.</p> <p>"Packbits" decompression causes printer logic to interpret the first code in the <i>list</i> as a control code. If the value of the control code is 0 to 127 (decimal), printer logic interprets the codes that follow as uncompressed graphics data. The actual number of codes interpreted as uncompressed graphics data is determined by the value of the control code <i>plus one</i>. If the value of the control code is 129 to 255 (decimal), printer logic interprets the next code as a compressed code that should be repeated up to 128 times. The actual number of times that the code is repeated is determined by subtracting the value of the control code <i>from</i> 256. If the value of the control code is 128 (decimal), printer logic disregards it. After printer logic interprets the control code and processes the required graphics data, the next code in the data stream after the affected graphics data becomes the next control code and the process repeats.</p> <p>This sequence affects <i>only</i> the next AMT Datasouth graphics escape sequence sent.</p>
<b>Printhead microshift up</b> .....	ESC @ B	1B 40 42	27 64 66	<p>This sequence moves the printhead up 0.0042 inch, which enables the printing of two-pass graphics with up to 240 dots per vertical inch. When graphics end, the printhead moves back down automatically.</p> <p>☞ <b>Note:</b> For more detailed information on this escape sequence, refer to <i>AMT Datasouth Technical Notes—Graphics</i>, available separately from AMT Datasouth.</p>
<b>Wide graphics</b>				
Enable .....	ESC @ w	1B 40 77	27 64 119	<p>These sequences enable and disable wide graphics printing, wherein graphics can print up to 16 inches across on <i>wide</i>-carriage printers and up to 11 inches across on <i>narrow</i>-carriage printers. Margins extend beyond the normal maxi-print positions. Text printing is unaffected by this escape sequence. To print full wide graphics, make sure the current horizontal print position is 0.</p>
Disable .....	ESC @ s	1B 40 73	27 64 115	

Table D-3. AMT Datasouth and Diablo 630 Escape Sequences—continued

<i>Function</i>	<i>ASCII</i>	<i>Hexadecimal</i>	<i>Decimal</i>	<i>Description</i>
Miscellaneous Functions				
<b>Set print gap</b> .....	ESC @ g	1B 40 67	27 64 103	This sequence causes the printer to detect the forms thickness at the current print position and to reset the print gap for optimal print quality. Although the printer sets the print gap automatically each time a new form is loaded, you can use this sequence to reset the print gap at any location on the form. This is useful when printing on multi-thickness forms, such as forms with peel-off cards or labels.
<b>Park paper</b> .....	ESC @ p	1B 40 70	27 64 112	This sequence causes the printer to reverse-feed the paper to the parked position. If pin-feed paper is not loaded when the printer receives this sequence, the printer ignores the sequence.
<b>Select paper path</b> .....	ESC @ 1 n	1B 40 6C n	27 64 108 n	This sequence selects a paper path for subsequent paper feeding. If pin-feed paper is loaded when the printer receives this sequence, the printer parks the paper and then switches to the specified paper path. If a cut sheet is loaded when the printer receives this sequence, the printer ejects the cut sheet and then switches to the specified paper path. If the sequence specifies the active paper path, the printer ignores the sequence.
Top .....	ESC @ 1 NUL	1B 40 6C 00	27 64 108 0	
Rear .....	ESC @ 1 SOH	1B 40 6C 01	27 64 108 1	
Bottom .....	ESC @ 1 STX	1B 40 6C 02	27 64 108 2	
Top-mounted tractor .....	ESC @ 1 ETX	1B 40 6C 03	27 64 108 3	

## ***Epson JX, Epson LQ-2550 and IBM XL24 Code Set***

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The second part of this appendix describes the *Epson* and *IBM* code set. The printer responds to this code set when an Epson or IBM emulation is active.

### ***Character Codes***

Most of the 256 8-bit codes that a computer can send to the printer are assigned a printable character (see table D-4). When the printer receives a character code, it prints the assigned character at the current print position and moves the current print position one character space to the right.

Codes 0 to 32 and 128 to 159 decimal are assigned control functions that override the printable characters. These codes are called *control codes*. To print the characters assigned to control codes, it is necessary to use a special code sequence that tells the printer to ignore control functions and print the assigned characters.

One code that is assigned a control function is especially important to the printer—code 27 decimal—which is the ASCII ESCape code. This code tells the printer that an *escape sequence* is beginning. An escape sequence is a series of codes that performs a specific printer function. When a code is sent as part of an escape sequence, the assigned character does not print.

### ***Printing Characters Assigned to Control Codes***

There are several control codes and escape sequences in the code set that enable the printing of characters assigned to control codes.

The ESC 6 and ESC 7 sequences enable and disable the characters assigned control codes from 128 to 159. The ESC ^ sequence prints the character assigned to any code—even one assigned to a control code. The ESC I sequence in the Epson JX and LQ-2550 printer emulations enables and disables some of the characters assigned control codes. The ESC \ sequence in the IBM XL24 emulation prints a series of characters while ignoring the control functions.

These sequences and others affecting character codes are described later in this appendix.

Character code assignments  
(in decimal)

Table D-4. Epson and IBM Character Code Assignments

<b>NUL</b>	▶	<b>SP</b>	0	@	P	`	p	<b>NUL</b>	É	á	☼	L	⌌	α	≡
0	16	32	48	64	80	96	112	128	144	160	176	192	208	224	240
☺	◀	!	1	A	Q	a	q	ü	æ	í	☼	⌌	⌌	β	±
1	17	33	49	65	81	97	113	129	145	161	177	193	209	225	241
☺	<b>DC2</b>	"	2	B	R	b	r	é	Æ	ó	☼	T	π	Γ	≥
2	18	34	50	66	82	98	114	130	146	162	178	194	210	226	242
♥	!!	#	3	C	S	c	s	â	ô	ú		⌌	⌌	π	≤
3	19	35	51	67	83	99	115	131	147	163	179	195	211	227	243
♦	<b>DC4</b>	\$	4	D	T	d	t	ä	ö	ñ	⌌	—	⌌	Σ	∫
4	20	36	52	68	84	100	116	132	148	164	180	196	212	228	244
♣	§	%	5	E	U	e	u	à	ò	Ñ	⌌	⌌	F	σ	∫
5	21	37	53	69	85	101	117	133	149	165	181	197	213	229	245
♠	—	&	6	F	V	f	v	å	û	ä	⌌	⌌	π	μ	÷
6	22	38	54	70	86	102	118	134	150	166	182	198	214	230	246
●	↕	'	7	G	W	g	w	ç	ù	ó	⌌	⌌	⌌	τ	≈
7	23	39	55	71	87	103	119	135	151	167	183	199	215	231	247
◼	↑	(	8	H	X	h	x	ê	ÿ	¿	⌌	⌌	⌌	Φ	°
8	24	40	56	72	88	104	120	136	152	168	184	200	216	232	248
○	↓	)	9	I	Y	i	y	ë	ÿ	⌌	⌌	⌌	⌌	⊖	•
9	25	41	57	73	89	105	121	137	153	169	185	201	217	233	249
◼	→	*	10	J	Z	j	z	è	ÿ	⌌	⌌	⌌	⌌	Ω	·
10	26	42	58	74	90	106	122	138	154	170	186	202	218	234	250
♂	<b>ESC</b>	+	11	K	[	k	{	ï	ç	½	⌌	⌌	⌌	⌌	√
11	27	43	59	75	91	107	123	139	155	171	187	203	219	235	251
♀	⌌	,	12	L	\	l		î	£	¼	⌌	⌌	⌌	∞	n
12	28	44	60	76	92	108	124	140	156	172	188	204	220	236	252
♪	↔	-	13	M	]	m	}	ì	¥	;	⌌	=	⌌	∅	²
13	29	45	61	77	93	109	125	141	157	173	189	205	221	237	253
♪	▲	.	14	N	^	n	~	ÿ	£	«	⌌	⌌	⌌	ε	■
14	30	46	62	78	94	110	126	142	158	174	190	206	222	238	254
⚙	▼	/	15	O	_	o	⌌	ÿ	f	»	⌌	⌌	⌌	∩	◻
15	31	47	63	79	95	111	127	143	159	175	191	207	223	239	255

Notes: Shading designates control codes. The SETS parameter on the Setup menu determines the actual characters that print for codes 128 to 255.

### *Printing International Characters*

The ESC ESC G and ESC R sequences in the code set cause the printer to replace some of the standard ASCII characters with alternate characters that are used in a specific language. These sequences are described later in this appendix.

### *Control Codes and Escape Sequences*

When you select *EpsonJX*, *EpsonLQ* or *IBMXL24* as the active printer emulation, you can use the control codes and escape sequences listed in tables D-5 and D-6. The codes and sequences are organized into the following categories:

- ✓ Control codes
- ✓ Basic functions
- ✓ Horizontal spacing
- ✓ Vertical spacing
- ✓ Absolute and relative moving
- ✓ Boundaries, tabs and page formatting
- ✓ Text functions
- ✓ Graphic functions
- ✓ Miscellaneous functions

An italicized letter in an escape sequence, such as *n*, *nl* or *m*, represents a single-code variable. An italicized word, such as *list* or *coding*, represents a multiple-code variable.

Table D-5. Epson and IBM Control Codes

<i>Function</i>	<i>ASCII</i>	<i>Hexadecimal</i>	<i>Decimal</i>	<i>Description</i>
<b>Ignore</b> .....	NUL	00 or 80	0 or 128	The printer ignores this code unless it is used within an escape sequence.
<b>Continue printing?</b> .....	ENQ	05 or 85	5 or 133	With the ENQ/ACK serial handshake in use, this code causes the printer to return an ACK control code when it can receive more data.
<b>Bell</b> .....	BEL	07 or 87	7 or 135	This code sounds the audible alarm for a brief period.
<b>Backspace</b> .....	BS	08 or 88	8 or 136	This code moves the current print position one character space to the left. If the current print position is the left-most, the printer ignores this code.
<b>Horizontal tab</b> .....	HT	09 or 89	9 or 137	This code moves the current print position right to the next horizontal tab stop on the current line. If no tab stop is set to the right of the current print position or the next tab stop on the line is beyond the right margin, the printer ignores the code. If the factory defaults are in effect, tab stops are set every eight print positions across the page.
<b>Line feed</b> .....	LF	0A or 8A	10 or 138	This code advances the paper one line space. If the current line position is the last printable line on the page, the printer performs a form feed instead of a line feed. If the automatic carriage return mode is on, the printer performs a carriage return in addition to the line feed.
<b>Vertical tab</b> .....	VT	0B or 8B	11 or 139	This code advances the paper to the next vertical tab stop. If no vertical tab stop is set below the current line position on the page, the printer ejects the page and advances to the first line on the next page. If no vertical tab stops are set, the printer performs a carriage return and line feed.
<b>Form feed</b> .....	FF	0C or 8C	12 or 140	This code ejects a cut sheet or advances pin-feed paper to the next top-of-form or top margin if one is set. This code also moves the current print position to the left margin.
<b>Carriage return</b> .....	CR	0D or 8D	13 or 141	This code moves the current print position to the left margin. If automatic line feeding is active, the printer performs a line feed in addition to the carriage return.
<b>Start double-wide printing for one line</b> .....	SO	0E or 8E	14 or 142	This code starts double-wide printing on the current line and doubles the character spacing to accommodate the wider characters. A DC4 code or any control code or escape sequence that causes paper movement ends double-wide printing and resumes normal character spacing. The <i>Start/End Double-Wide Printing</i> sequence also ends double-wide printing.

Table D-5. Epson and IBM Control Codes—continued

<i>Function</i>	<i>ASCII</i>	<i>Hexadecimal</i>	<i>Decimal</i>	<i>Description</i>
<b>Start condensed printing ..</b>	SI	0F or 8F	15 or 143	This code starts condensed printing, wherein character spacing and character cell size are 17.1 characters per inch. A DC2 code ends condensed printing.
<b>End condensed printing ....</b>	DC2	12 or 92	18 or 146	This code ends condensed printing and sets character spacing and character cell size to 10 characters per inch.
<b>End double-wide printing on current line .....</b>	DC4	14 or 94	20 or 148	This code ends double-wide printing started with an SO code and resumes normal character spacing. This code does not end double-wide printing started with escape sequences.
<b>Escape .....</b>	ESC	1B or 9B	27 or 155	This code begins an escape sequence.
<b>Space .....</b>	SP	20	32	This code moves the current print position one character space to the right.

Table D-6. Epson and IBM Escape Sequences

<i>Function</i>	<i>ASCII</i>	<i>Hexadecimal</i>	<i>Decimal</i>	<i>Description</i>	
<b>Basic Functions</b>					
<b>Reset printer</b> .....	ESC @	1B 40	27 64	This sequence sets the top-of-form at the current print line and resets print modes, page setup parameters, tabs and special modes to the Setup menu defaults. The sequence does not affect the current emulation or communications parameters.	
<b>Restore printer settings</b> .....	ESC ESC r n	1B 1B 72 n	27 27 114 n	This sequence restores the printer settings to the factory default settings or to settings you saved previously using the SAVE parameter on the printer's Setup menu. The SAVE parameter lets you save up to five printer setups for recall later. Each setup is assigned a unique user number from 1 to 5.	
Factory setup .....	ESC ESC r 0	1B 1B 72 30	27 27 114 48		
User 1 setup .....	ESC ESC r 1	1B 1B 72 31	27 27 114 49		
User 2 setup .....	ESC ESC r 2	1B 1B 72 32	27 27 114 50		
User 3 setup .....	ESC ESC r 3	1B 1B 72 33	27 27 114 51		
User 4 setup .....	ESC ESC r 4	1B 1B 72 34	27 27 114 52		
User 5 setup .....	ESC ESC r 5	1B 1B 72 35	27 27 114 53		
<b>Set emulation</b> .....	ESC ESC E n	1B 1B 45 n	27 27 69 n	This sequence selects the active printer emulation which determines the active code set. At left, is a partial list of the printer emulations that this sequence can select. If a sequence selects an emulation that is not in the installed Intelli-card, the printer sounds the audible alarm, displays the message EMULATION ERROR, and ignores the sequence.	
AMT .....	ESC ESC E SOH	1B 1B 45 01	27 27 69 1		
AMT (alternate) .....	ESC ESC E 1	1B 1B 45 31	27 27 69 49		
Diablo 630 .....	ESC ESC E STX	1B 1B 45 02	27 27 69 2		
Epson JX .....	ESC ESC E EOT	1B 1B 45 04	27 27 69 4		
Epson LQ-2550 .....	ESC ESC E ENQ	1B 1B 45 05	27 27 69 5		
IBM XL24 .....	ESC ESC E ACK	1B 1B 45 06	27 27 69 6		
Bar code .....	ESC ESC E BS	1B 1B 45 08	27 27 69 8		
<b>Set color</b>					These sequences set the printing color. If a monochrome ribbon is installed, the printer ignores these sequences.
Black .....	ESC b	1B 62	27 98		
Black (alternate) .....	ESC r 0	1B 72 30	27 114 48		
Black (alternate) .....	ESC ESC R 1	1B 1B 52 31	27 27 82 49		
Blue .....	ESC c	1B 63	27 99		
Blue (alternate) .....	ESC r 2	1B 72 32	27 114 50		
Blue (alternate) .....	ESC ESC R 2	1B 1B 52 32	27 27 82 50		
Red .....	ESC m	1B 6D	27 109		
Red (alternate) .....	ESC r 1	1B 72 31	27 114 49		
Red (alternate) .....	ESC ESC R 3	1B 1B 52 33	27 27 82 51		
Yellow .....	ESC y	1B 79	27 121		
Yellow (alternate) .....	ESC r 4	1B 72 34	27 114 52		
Yellow (alternate) .....	ESC ESC R 4	1B 1B 52 34	27 27 82 52		
Purple .....	ESC v	1B 76	27 118		
Purple (alternate) .....	ESC r 3	1B 72 33	27 114 51		
Purple (alternate) .....	ESC ESC R 5	1B 1B 52 35	27 27 82 53		
Green .....	ESC h	1B 68	27 104		
Green (alternate) .....	ESC r 6	1B 72 36	27 114 54		
Green (alternate) .....	ESC ESC R 6	1B 1B 52 36	27 27 82 54		
Orange .....	ESC o	1B 6F	27 111		
Orange (alternate) .....	ESC r 5	1B 72 35	27 114 53		
Orange (alternate) .....	ESC ESC R 7	1B 1B 52 37	27 27 82 55		

Table D-6. Epson and IBM Escape Sequences—continued

<i>Function</i>	<i>ASCII</i>	<i>Hexadecimal</i>	<i>Decimal</i>	<i>Description</i>
<b>Basic Functions—continued</b>				
<b>Auto carriage return</b> .....	ESC ESC CR <i>n</i>	1B 1B 0D <i>n</i>	27 27 13 <i>n</i>	This sequence starts and ends the automatic carriage return mode, wherein the printer performs a carriage return and line feed for every line feed code it receives.
Start .....	ESC ESC CR 1	1B 1B 0D 31	27 27 13 49	
End .....	ESC ESC CR 0	1B 1B 0D 30	27 27 13 48	
<b>Auto line feed</b> .....	ESC ESC LF <i>n</i>	1B 1B 0A <i>n</i>	27 27 10 <i>n</i>	These sequences start and end the automatic line feed mode, wherein the printer performs a carriage return and line feed for every carriage return code it receives.
Start (all emulations) .....	ESC ESC LF 1	1B 1B 0A 31	27 27 10 49	
Start (IBM emulation) .....	ESC 5 1	1B 35 31	27 53 49	
End (all emulations) .....	ESC ESC LF 0	1B 1B 0A 30	27 27 10 48	
End (IBM emulation) .....	ESC 5 0	1B 35 30	27 53 48	
<b>Auto perforation skip mode 1</b> .....	ESC ESC FF <i>n</i>	1B 1B 0C <i>n</i>	27 27 12 <i>n</i>	This sequence starts and ends the automatic perforation skip mode, wherein the printer performs a form feed whenever printing reaches one-half inch from the bottom of the page. The form feed advances the paper one-half inch beyond the next top-of-form or top margin (if one is set).
Start .....	ESC ESC FF 1	1B 1B 0C 31	27 27 12 49	
End .....	ESC ESC FF 0	1B 1B 0C 30	27 27 12 48	
<b>Start auto perforation skip mode 2</b> .....	ESC N <i>n</i>	1B 4E <i>n</i>	27 78 <i>n</i>	This sequence starts and ends the automatic perforation skip mode, wherein the printer performs a form feed whenever printing approaches the bottom of the page. The form feed advances the paper to the next top-of-form or top margin (if one is set). The value of variable <i>n</i> defines how many blank lines are left at the bottom of each page. Variable <i>n</i> can range from one line up to the current page length. For example, to leave six blank lines at the bottom of a page, the correct sequence is ESC N ACK. The <i>End Auto Perforation Skip Mode 2, Set Page Length in Lines</i> or <i>Set Page Length in Inches</i> sequence ends this mode.
<b>End auto perforation skip mode 2</b> .....	ESC O	1B 4F	27 79	
<b>Unidirectional printing</b> .....				These sequences control unidirectional printing, wherein printing occurs only while the carriage moves from left to right. Unidirectional printing enables the exact alignment of multi-line graphics, component characters and other applications where vertical alignment is important.
Start .....	ESC U 1	1B 55 31	27 85 49	
Start (alternate) .....	ESC ESC U 1	1B 1B 55 31	27 27 85 49	
End .....	ESC U 0	1B 55 30	27 85 48	
End (alternate) .....	ESC ESC U 0	1B 1B 55 30	27 27 85 48	
<b>Ignore codes</b> .....	ESC ESC I <i>n</i>	1B 1B 49 <i>n</i>	27 27 73 <i>n</i>	This sequence causes the printer to ignore from 1 to 95 subsequent codes that it receives. The value of variable <i>n</i> minus 32 defines the number of subsequent codes to ignore. For example, to ignore the next 20 codes, the correct escape sequence is ESC ESC I 4.

Table D-6. Epson and IBM Escape Sequences—continued

<i>Function</i>	<i>ASCII</i>	<i>Hexadecimal</i>	<i>Decimal</i>	<i>Description</i>
<b>Horizontal Spacing</b>				
<b>Set character spacing ..... to 10 or 17.1 CPI</b>	ESC P	1B 50	27 80	This sequence sets character spacing and character cell size to 10 characters per inch. If condensed printing is on, this sequence sets character spacing and character cell size to 17.1 characters per inch.  ⚠ <b>Note:</b> This sequence is not supported when the IBM XL24 emulation is active.
<b>Set character spacing ..... to 12 CPI</b>	ESC M ESC :	1B 4D 1B 3A	27 77 27 58	These sequences set character spacing and character cell size to 12 characters per inch.
<b>Set character spacing ..... to 15 CPI</b>	ESC g	1B 67	27 103	This sequence sets character spacing and character cell size to 15 characters per inch. Condensed printing does not affect the function of this sequence.
<b>Start condensed printing .....</b>	ESC SI	1B 0F	27 15	This sequence starts condensed printing, wherein character spacing and character cell size are 17.1 characters per inch. A DC2 code ends condensed printing.
<b>Set character cell size .....</b>	ESC ESC Z <i>n</i>	1B 1B 5A <i>n</i>	27 27 90 <i>n</i>	This sequence sets the character cell size so that characters are the correct size for the spacing. The value of variable <i>n</i> minus 32 defines a number of 1/120-inch increments to move:  Character spacing = ( <i>n</i> - 32) x 1/120-inch
5 characters/inch .....	ESC ESC Z 8	1B 1B 5A 38	27 27 90 56	
6 characters/inch .....	ESC ESC Z 4	1B 1B 5A 34	27 27 90 52	
6.6 characters/inch .....	ESC ESC Z 2	1B 1B 5A 32	27 27 90 50	
7.5 characters/inch .....	ESC ESC Z 0	1B 1B 5A 30	27 27 90 48	
8.5 characters/inch .....	ESC ESC Z .	1B 1B 5A 2E	27 27 90 46	
10 characters/inch .....	ESC ESC Z ,	1B 1B 5A 2C	27 27 90 44	
12 characters/inch .....	ESC ESC Z *	1B 1B 5A 2A	27 27 90 42	
13.3 characters/inch .....	ESC ESC Z )	1B 1B 5A 29	27 27 90 41	
15 characters/inch .....	ESC ESC Z (	1B 1B 5A 28	27 27 90 40	
17.1 characters/inch .....	ESC ESC Z `	1B 1B 5A 27	27 27 90 39	
20 characters/inch .....	ESC ESC Z &	1B 1B 5A 26	27 27 90 38	
<b>Set intercharacter space .....</b>	ESC SP <i>n</i>	1B 20 <i>n</i>	27 32 <i>n</i>	



Table D-6. Epson and IBM Escape Sequences—continued

<i>Function</i>	<i>ASCII</i>	<i>Hexadecimal</i>	<i>Decimal</i>	<i>Description</i>
<b>Vertical Spacing—continued</b>				
<b>Set line spacing in 1/120-inch increments</b>	ESC ESC A <i>n</i>	1B 1B 41 <i>n</i>	27 27 65 <i>n</i>	This sequence sets the distance that the paper moves for each line feed, reverse line feed, etc. The value of variable <i>n</i> minus 32 defines a number of 1/120-inch increments to move:  Line spacing = ( <i>n</i> - 32) x 1/120-inch
3 lines per inch	ESC ESC A H	1B 1B 41 48	27 27 65 72	
4 lines per inch	ESC ESC A >	1B 1B 41 3E	27 27 65 62	
6 lines per inch	ESC ESC A 4	1B 1B 41 34	27 27 65 52	
8 lines per inch	ESC ESC A /	1B 1B 41 2F	27 27 65 47	
12 lines per inch	ESC ESC A *	1B 1B 41 2A	27 27 65 42	
<b>Set line spacing in 1/360-inch increments</b>	ESC + <i>n</i>	1B 2B <i>n</i>	27 43 <i>n</i>	This sequence sets the distance that the paper moves for each line feed, reverse line feed, etc. The sequence specifies the distance as a number of 1/360-inch increments. The value of variable <i>n</i> defines the line spacing distance:  Line spacing = <i>n</i> x 1/360-inch
3 lines per inch	ESC + x	1B 2B 78	27 43 120	
4 lines per inch	ESC + Z	1B 2B 5A	27 43 90	
6 lines per inch	ESC + <	1B 2B 3C	27 43 60	
8 lines per inch	ESC + -	1B 2B 2D	27 43 45	
12 lines per inch	ESC + RS	1B 2B 1E	27 43 30	
<b>Set line spacing to 1/6"</b>	ESC 2	1B 32	27 50	This sequence sets line spacing to 1/6 inch.  ⚠ <b>Note:</b> This sequence is not supported when the IBM XL24 emulation is active.
<b>Start new line spacing</b>	ESC 2	1B 32	27 50	This sequence starts the new line spacing that was set by the <i>Set Line Spacing</i> (ESC A) sequence. If no line spacing sequence has been sent, the printer sets line spacing to 1/6 inch.  ⚠ <b>Note:</b> This sequence is not supported when an Epson emulation is active.
<b>Set line spacing to 1/8"</b>	ESC 0	1B 30	27 48	This sequence sets line spacing to 1/8 inch.
<b>Set line spacing to 7/72"</b>	ESC 1	1B 31	27 49	This sequence sets line spacing to 7/72 inch.
<b>Reverse line feed</b>	ESC ]	1B 5D	27 93	This sequence reverse feeds the paper one line space so the next print line is above the previous line.
<b>Paper feed in 1/216- or 1/180-inch increments</b>	ESC J <i>n</i>	1B 4A <i>n</i>	27 74 <i>n</i>	This sequence advances the paper a specific distance without changing the current line spacing. The sequence specifies the distance as a number of 1/216- or 1/180-inch increments, depending on the active emulation. When the Epson JX or IBM XL24 emulation is active, the distance is in 1/216-inch increments. When the Epson LQ-2550 emulation is active, the distance is in 1/180-inch increments. For example, with the Epson JX emulation active, to move the paper 18/216 inch, the correct sequence is ESC J DC2.  ⚠ <b>Note:</b> When the IBM XL24 emulation is active, the <i>Set Vertical Units</i> sequence forces the vertical distance unit to either 1/216 or 1/180 inch.

Table D-6. Epson and IBM Escape Sequences—continued

Function	ASCII	Hexadecimal	Decimal	Description
<b>Absolute and Relative Moving</b>				
<b>Absolute move to ..... print position</b>	ESC \$ <i>n1 n2</i>	1B 24 <i>n1 n2</i>	27 36 <i>n1 n2</i>	<p>This sequence moves the carriage a specific distance from the left print boundary. The values of variables <i>n1</i> and <i>n2</i> define the distance in 1/60-inch increments:</p> <p>Distance in 1/60ths = <math>(n2 \times 256) + n1</math></p> <p>For example, to move the carriage five inches to the right of the left print boundary (300/60 inch), the correct <i>n2</i> value is 1 and the correct <i>n1</i> value is 44 (<math>300 = (1 \times 256) + 44</math>). If the sequence specifies a distance beyond the right print boundary, the printer ignores the sequence.</p>
<b>Relative move to ..... print position</b>	ESC \ <i>n1 n2</i>	1B 5C <i>n1 n2</i>	27 92 <i>n1 n2</i>	<p>This sequence moves the carriage a specific distance left or right from the current print position. The values of variables <i>n1</i> and <i>n2</i> define the distance in 1/180-inch increments during letter- or memo-quality printing, and in 1/120-inch increments during draft-quality printing.</p> <p>Letter/Memo: Distance in 1/180ths = <math>(n2 \times 256) + n1</math></p> <p>Draft: Distance in 1/120ths = <math>(n2 \times 256) + n1</math></p> <p>☞ <b>Note:</b> When the Epson IX emulation is active, variables <i>n1</i> and <i>n2</i> define a distance in 1/120-inch increments, regardless of the print quality.</p> <p>To move the carriage to the right, just compute the number of increments to move and supply the correct <i>n1</i> and <i>n2</i> values. For example, to move the carriage two inches to the right during letter-quality printing (360/180 inch), the correct <i>n2</i> value is 1 and the correct <i>n1</i> value is 104 (<math>360 = (1 \times 256) + 104</math>).</p> <p>To move the carriage to the left, subtract the number of increments to move from 65,536 and then supply the correct <i>n1</i> and <i>n2</i> values. For example, to move the carriage two inches to the left during letter-quality printing (360/180 inch), first subtract 360 from 65,536 to get 65,176. Then, use the equation to determine the correct <i>n1</i> and <i>n2</i> values. In this example, the correct <i>n2</i> value is 254 and the correct <i>n1</i> value is 152 (<math>65,176 = (254 \times 256) + 152</math>). If the sequence specifies a distance that would move the carriage beyond the left or right print boundary, the printer ignores the sequence.</p> <p>☞ <b>Note:</b> This sequence is not supported when the IBM XL24 emulation is active.</p>

Table D-6. Epson and IBM Escape Sequences—continued

<i>Function</i>	<i>ASCII</i>	<i>Hexadecimal</i>	<i>Decimal</i>	<i>Description</i>
Absolute and Relative Moving—continued				
<b>Relative move right ..... to print position</b>	ESC d <i>n1 n2</i>	1B 64 <i>n1 n2</i>	27 100 <i>n1 n2</i>	<p>This sequence moves the carriage a specific distance to the right from the current print position. The value of variables <i>n1</i> and <i>n2</i> define the distance in 1/120-inch increments:</p> <p style="text-align: center;">Distance in 1/120ths = (<i>n2</i> x 256) + <i>n1</i></p> <p>For example, to move the carriage three inches to the right (360/120 inch), the correct <i>n2</i> value is 1 and the correct <i>n1</i> value is 104 (360 = (1 x 256) + 104). If the sequence specifies a distance that would move the carriage beyond the right print boundary, the carriage moves to that boundary.</p>
<b>Relative move right ..... or left</b>	ESC ESC h <i>n1 n2</i>	1B 1B 68 <i>n1 n2</i>	27 27 104 <i>n1 n2</i>	<p>This sequence moves the carriage a specific distance to the right or left from the current print position. The values of variables <i>n1</i> and <i>n2</i> define the distance in 1/240-inch increments:</p> <p style="text-align: center;">Distance in 1/240ths = (<i>n2</i> x 256) + <i>n1</i></p> <p>To move the carriage to the right, just compute the number of increments to move and supply the correct <i>n1</i> and <i>n2</i> values. For example, to move the carriage two inches to the right (480 x 1/240"), the correct <i>n2</i> value is 1 and the correct <i>n1</i> value is 224 (480 = (1 x 256) + 224).</p> <p>To move the carriage to the left, subtract the number of increments to move from 65,536 and then supply the correct <i>n1</i> and <i>n2</i> values. For example, to move the carriage two inches to the left (480 x 1/240"), first subtract 480 from 65,536 to get 65,056. Then, use the equation to determine the correct <i>n1</i> and <i>n2</i> values. In this example, the correct <i>n2</i> value is 254 and the correct <i>n1</i> value is 32 (65,056 = (254 x 256) + 32). If the sequence specifies a distance that would move the carriage beyond the left or right print boundary, the carriage moves to that boundary.</p>
<b>Relative move down ..... or up</b>	ESC ESC v <i>n1 n2</i>	1B 1B 76 <i>n1 n2</i>	27 27 118 <i>n1 n2</i>	<p>This sequence advances or reverse feeds the paper a specific distance from the current position. The values of variables <i>n1</i> and <i>n2</i> define the distance in 1/240-inch increments:</p> <p style="text-align: center;">Distance in 1/240ths = (<i>n2</i> x 256) + <i>n1</i></p> <p>To advance the paper, just compute the number of increments to advance and supply the correct <i>n1</i> and <i>n2</i> values. For example, to advance the paper one inch (240 x 1/240"), the correct <i>n2</i> value is 0 and the correct <i>n1</i> value is 240 (240 = (0 x 256) + 240).</p>

Table D-6. Epson and IBM Escape Sequences—continued

<i>Function</i>	<i>ASCII</i>	<i>Hexadecimal</i>	<i>Decimal</i>	<i>Description</i>
Absolute and Relative Moving—continued				
<b>Relative move down or up</b> <i>(continued)</i>				To reverse feed the paper, subtract the number of increments to move from 65,536 and then supply the correct <i>n1</i> and <i>n2</i> values. For example, to reverse feed the paper two inches (480 x 1/240"), first subtract 480 from 65,536 to get 65,056. Then, use the equation to determine the correct <i>n1</i> and <i>n2</i> values. In this example, the correct <i>n2</i> value is 254 and the correct <i>n1</i> value is 32 (65,056 = (254 x 256) + 32).
Boundaries, Tabs and Page Formatting				
<b>Set top-of-form (TOF)</b> .....	ESC 4	1B 34	27 52	This sequence sets the top-of-form at the current line position. The printer regards the current print line as the first line on the page (line 0) and starts counting lines from that point.  ⚠ <b>Note:</b> Most AMT ACCEL-6300 series printers <i>do not</i> support this printer command.
<b>Set left print boundary</b> .....	ESC 1 <i>n</i>	1B 6C <i>n</i>	27 108 <i>n</i>	This sequence cancels printing of the current line, resets the default tabs, and sets the left print boundary anywhere on the line. All subsequent horizontal move commands, such as carriage returns and tabs, are relative to the new boundary. The value of variable <i>n</i> defines where to set the left print boundary relative to the true leftmost print position and with respect to the current character spacing. For example, to set the left print boundary one inch to the right of the true leftmost print position with character spacing at 10 cpi, the correct sequence is ESC 1 LF. If the sequence specifies a boundary that is at or to the right of the right print boundary, the printer ignores this sequence. If you set a left print boundary with proportional-spacing selected, the printer uses 12 cpi to interpret the <i>n</i> variable.

Table D-6. Epson and IBM Escape Sequences—continued

<i>Function</i>	<i>ASCII</i>	<i>Hexadecimal</i>	<i>Decimal</i>	<i>Description</i>
Boundaries, Tabs and Page Formatting—continued				
<b>Set right print boundary .....</b>	ESC Q <i>n</i>	1B 51 <i>n</i>	27 81 <i>n</i>	This sequence cancels printing of the current line, resets the default tabs, and sets the right print boundary anywhere on the page. The value of variable <i>n</i> defines where to set the right print boundary relative to the true leftmost print position and with respect to the current character spacing. For example, to set the right print boundary ten inches to the right of the true leftmost print position with character spacing at 10 cpi, the correct sequence is ESC Q d. If the sequence specifies a boundary that is at or to the left of the left print boundary, the printer ignores this sequence. If you set a right print boundary with proportional-spacing selected, the printer uses 12 cpi to interpret the <i>n</i> variable.
<b>Set left and right print boundaries .....</b>	ESC X <i>n1 n2</i>	1B 58 <i>n1 n2</i>	27 88 <i>n1 n2</i>	<p>This sequence cancels printing of the current line, resets the default tabs, and sets the left and right print boundaries on the page. All subsequent horizontal move commands, such as carriage returns and tabs, are relative to the new left print boundary. The values of variables <i>n1</i> and <i>n2</i> define where to set the left and right print boundaries relative to the true leftmost print position and with respect to the current character spacing. Variable <i>n1</i> defines the left print boundary; variable <i>n2</i> defines the right print boundary. For example, to set the left print boundary one inch from the leftmost print position and the right print boundary ten inches from the leftmost print position at 10 cpi, the correct sequence is ESC X LF d.</p> <p>If the sequence specifies a left print boundary that is at or to the right of the right print boundary, the printer ignores the sequence. If the sequence specifies a right print boundary that is to the right of the rightmost print position, the printer sets the right print boundary at the rightmost print position. If <i>n1</i> is NUL, the printer does not change the left print boundary; or, if <i>n2</i> is NUL, the printer does not change the right print boundary. If you set print boundaries with proportional-spacing selected, the printer uses 12 cpi to interpret the <i>n1</i> and <i>n2</i> variables.</p>

Table D-6. Epson and IBM Escape Sequences—continued

<i>Function</i>	<i>ASCII</i>	<i>Hexadecimal</i>	<i>Decimal</i>	<i>Description</i>
Boundaries, Tabs and Page Formatting—continued				
<b>Set/clear absolute ..... horizontal tab stops</b>	ESC D <i>list</i> NUL	1B 44 <i>list</i> 00	27 68 <i>list</i> 0	<p>This sequence clears all current horizontal tab stops and sets new tab stops using the current character spacing. Tab stops can be set at any of the first 159 print positions on a line. Epson and IBM horizontal tabs are absolute, which means that the physical location of the tab stops on the page are unaffected by changes in character spacing. The <i>list</i> in the sequence is a series of bytes that define where to set the tab stops, and must be listed in ascending order. The last byte of the sequence must be a NUL or a code less than the last tab stop defined in the <i>list</i>. For example, to set absolute horizontal tab stops every inch at 10 cpi, the correct sequence is 27 68 10 20 30 40 50 60 70 80 90 100 110 120 130 0 (decimal). To clear horizontal tab stops without setting new ones, omit the <i>list</i> from the sequence. To set horizontal tab stops with proportional-spacing selected, use 12 cpi when specifying the tab stop locations.</p> <p>If the factory defaults are in effect, horizontal tab stops are set every eight print positions across the page. To reset horizontal tabs every eight print positions across the page, use the <i>Set Absolute Horizontal Tab Stops Every Eight Print Positions</i> sequence.</p> <p>☞ <b>Note:</b> This sequence is not supported when the IBM XL24 emulation is active.</p>
<b>Set/clear absolute ..... vertical tab stops</b>	ESC B <i>list</i> NUL	1B 42 <i>list</i> 00	27 66 <i>list</i> 0	<p>This sequence clears all current vertical tab stops and sets new tab stops using the current line spacing. Epson and IBM vertical tabs are absolute, which means that the physical location of the tab stops on the page are unaffected by changes in line spacing. The <i>list</i> in the sequence is a series of bytes that define where to set the tab stops, and must be listed in ascending order. The last byte of the sequence must be a NUL or a code less than the last tab in the <i>list</i>. For example, to set absolute vertical tab stops every inch at 6 lpi, the correct sequence is 27 66 6 12 18 24 30 36 42 48 54 60 0 (decimal). To clear vertical tab stops without setting new ones, omit the <i>list</i> from the sequence.</p>
<b>Set absolute horizontal ..... tab stops every eight print positions</b>	ESCR	1B 52	27 82	<p>This sequence clears all current horizontal and vertical tab stops and sets new horizontal tab stops at every eight print positions using the current character spacing.</p> <p>☞ <b>Note:</b> This sequence is not supported when an Epson emulation is active.</p>

Table D-6. Epson and IBM Escape Sequences—continued

<i>Function</i>	<i>ASCII</i>	<i>Hexadecimal</i>	<i>Decimal</i>	<i>Description</i>
<b>Boundaries, Tabs and Page Formatting—continued</b>				
<b>Set page length in lines</b> .....	ESC C <i>n</i>	1B 43 <i>n</i>	27 67 <i>n</i>	This sequence sets the number of lines per page and sets the top-of-form at the current line position. The value of variable <i>n</i> (0 to 182) determines the number of lines per page. Variable <i>n</i> should equal the actual form length in inches divided by the current line spacing. For example, if the current form length is 11 inches and the line spacing is 1/6 inch, 11 divided by 1/6 is 66--so <i>n</i> should equal 66 decimal. The number of lines per page is unaffected by subsequent changes to line spacing.
<b>Set page length in inches</b> .....	ESC C NUL <i>n</i>	1B 43 00 <i>n</i>	27 67 0 <i>n</i>	This sequence sets the number of inches per page and sets the top-of-form at the current line position. The value of variable <i>n</i> (1 to 30) determines the number of inches per page. For example, if the form length is 11 inches, the correct <i>n</i> value is 11 decimal.
<b>Text Functions</b>				
<b>Set print quality</b>				
Letter .....	ESC x SOH	1B 78 01	27 120 1	This sequence selects letter-, memo- or draft-quality printing. Letter-quality characters are formed from a 32-dot-high by 36-dot-wide matrix. Memo-quality characters are formed from a 16-dot-high by 36-dot-wide matrix. Draft-quality characters are formed from an 8-dot-high by 15-dot-wide matrix.  ⚠ <b>Note:</b> Some font options do not contain character sets for all print qualities. If letter-quality is selected, but the font does not contain this character set, memo-quality is selected; and vice-versa. If the font contains neither a letter- or memo-quality character set, the letter- or memo-quality Courier character set is selected. If draft-quality is selected, but the font does not contain this character set, the draft-quality Courier character set is selected.
Letter (alternate) .....	ESC ESC P L	1B 1B 50 4C	27 27 80 76	
Memo .....	ESC x STX	1B 78 02	27 120 2	
Memo (alternate) .....	ESC ESC P M	1B 1B 50 4D	27 27 80 77	
Draft .....	ESC x NUL	1B 78 00	27 120 0	
Draft (alternate) .....	ESC ESC P D	1B 1B 50 44	27 27 80 68	
<b>Set typestyle family</b> .....	ESC k <i>n</i>	1B 6B <i>n</i>	27 107 <i>n</i>	This sequence selects the Courier, Gothic, Elite or Script font and sets character spacing and cell size to the default of the selected font. If the sequence selects a font that is not in the installed Intelli-card, the printer sounds the audible alarm, displays the message FONT UNAVAILABLE on the control panel, and continues printing.
Courier (10 cpi) .....	ESC k NUL	1B 6B 00	27 107 0	
Gothic (12 cpi) .....	ESC k SOH	1B 6B 01	27 107 1	
Courier (10 cpi) .....	ESC k STX	1B 6B 02	27 107 2	
Elite (12 cpi) .....	ESC k ETX	1B 6B 03	27 107 3	
Script (12 cpi) .....	ESC k EOT	1B 6B 04	27 107 4	

Table D-6. Epson and IBM Escape Sequences—continued

<i>Function</i>	<i>ASCII</i>	<i>Hexadecimal</i>	<i>Decimal</i>	<i>Description</i>
<b>Text Functions—continued</b>				
<b>Set font</b> .....	ESC ESC F <i>n</i>	1B 1B 46 <i>n</i>	27 27 70 <i>n</i>	This sequence selects any available font; it does <i>not</i> change the current character spacing. Each font is assigned one or more numbers. To select a font, the sequence must specify one of the assigned numbers.  At left is a partial list of fonts. When the printer receives a sequence that selects a font that is not in the installed Intelli-card, it sounds the audible alarm, displays FONT UNAVAILABLE on the control panel, and continues printing.
Courier (10 cpi) .....	ESC ESC F SOH	1B 1B 46 01	27 27 70 1	
Courier (alternate, 10 cpi) ...	ESC ESC F 1	1B 1B 46 31	27 27 70 49	
Gothic (12 cpi) .....	ESC ESC F STX	1B 1B 46 02	27 27 70 2	
Gothic (alternate, 12 cpi) ....	ESC ESC F 2	1B 1B 46 32	27 27 70 50	
Gothic (17.1 cpi) .....	ESC ESC F ETX	1B 1B 46 03	27 27 70 3	
Gothic (alt., 17.1 cpi) .....	ESC ESC F 3	1B 1B 46 33	27 27 70 51	
Times Roman .....	ESC ESC F EOT	1B 1B 46 04	27 27 70 4	
Times Roman (alternate) ....	ESC ESC F 4	1B 1B 46 34	27 27 70 52	
Elite (12 cpi) .....	ESC ESC F ENQ	1B 1B 46 05	27 27 70 5	
Orator (10 cpi) .....	ESC ESC F BEL	1B 1B 46 07	27 27 70 7	
Courier Legal (10 cpi) .....	ESC ESC F HT	1B 1B 46 09	27 27 70 9	
Broadway (PS) .....	ESC ESC F FS	1B 1B 46 1C	27 27 70 28	
Micro (17.1 cpi) .....	ESC ESC F RS	1B 1B 46 1E	27 27 70 30	
Script (PS) .....	ESC ESC F NAK	1B 1B 46 15	27 27 70 21	
Gothic PS .....	ESC ESC F ACK	1B 1B 46 06	27 27 70 6	
Micro PS .....	ESC ESC F '	1B 1B 46 27	27 27 70 39	
OCR-A (10 cpi) .....	ESC ESC F SP	1B 1B 46 20	27 27 70 32	
OCR-B (10 cpi) .....	ESC ESC F ETB	1B 1B 46 17	27 27 70 23	
APL (10 cpi) .....	ESC ESC F EM	1B 1B 46 19	27 27 70 25	
Gen'l Scientific (10 cpi) .....	ESC ESC F LF	1B 1B 46 0A	27 27 70 10	
DEC Scientific (10 cpi) .....	ESC ESC F VT	1B 1B 46 0B	27 27 70 11	
Chemical (10 cpi) .....	ESC ESC F CAN	1B 1B 46 18	27 27 70 24	
<b>Set print feature combination</b> .....	ESC I <i>n</i>	1B 49 <i>n</i>	27 73 <i>n</i>	This sequence selects a combination of printing features, including font, print quality, and character spacing/cell size.
Gothic, draft, 10 cpi .....	ESC I NUL	1B 49 00	27 73 0	
Courier, letter, 10 cpi .....	ESC I STX	1B 49 02	27 73 2	
Times Roman, letter, PS .....	ESC I ETX	1B 49 03	27 73 3	
Gothic, draft, 12 cpi .....	ESC I BS	1B 49 08	27 73 8	
Elite, letter, 12 cpi .....	ESC I LF	1B 49 0A	27 73 10	
Gothic, draft, 17.1 cpi .....	ESC I DLE	1B 49 10	27 73 16	
Courier, letter, 17.1 cpi .....	ESC I DC2	1B 49 14	27 73 18	

Table D-6. Epson and IBM Escape Sequences—continued

<i>Function</i>	<i>ASCII</i>	<i>Hexadecimal</i>	<i>Decimal</i>	<i>Description</i>
Text Functions—continued				
<b>Set language</b> .....	ESC ESC G <i>n</i>	1B 1B 47 <i>n</i>	27 27 71 <i>n</i>	<p>These sequences select a language for the printer to use while printing text. The language setting causes the printer to replace some of the standard ASCII printable characters with alternate characters that are used in a specific language. The character replacements are shown in the <i>Control Panel</i> section of this guide, under the <i>Set Language</i> heading.</p> <p>☞ <b>Note:</b> These sequences apply only to fonts with international characters. Also, the ESC R <i>n</i> sequence is not supported when the IBM XL24 emulation is active.</p>
English, US .....	ESC ESC G NUL	1B 1B 47 00	27 27 71 0	
English, US (alternate) .....	ESC R NUL	1B 52 00	27 82 0	
French .....	ESC ESC G SOH	1B 1B 47 01	27 27 71 1	
French (alternate) .....	ESC R SOH	1B 52 01	27 82 1	
German .....	ESC ESC G STX	1B 1B 47 02	27 27 71 2	
German (alternate) .....	ESC R STX	1B 52 02	27 82 2	
English, UK .....	ESC ESC G ETX	1B 1B 47 03	27 27 71 3	
English, UK (alternate) .....	ESC R ETX	1B 52 03	27 82 3	
Danish I .....	ESC ESC G EOT	1B 1B 47 04	27 27 71 4	
Danish I (alternate) .....	ESC R EOT	1B 52 04	27 82 4	
Swedish .....	ESC ESC G ENQ	1B 1B 47 05	27 27 71 5	
Swedish (alternate) .....	ESC R ENQ	1B 52 05	27 82 5	
Italian .....	ESC ESC G ACK	1B 1B 47 06	27 27 71 6	
Italian (alternate) .....	ESC R ACK	1B 52 06	27 82 6	
Spanish I .....	ESC ESC G BEL	1B 1B 47 07	27 27 71 7	
Spanish I (alternate) .....	ESC R BEL	1B 52 07	27 82 7	
Japanese .....	ESC ESC G BS	1B 1B 47 08	27 27 71 8	
Japanese (alternate) .....	ESC R BS	1B 52 08	27 82 8	
Norwegian .....	ESC ESC G HT	1B 1B 47 09	27 27 71 9	
Norwegian (alternate) .....	ESC R HT	1B 52 09	27 82 9	
Danish II .....	ESC ESC G LF	1B 1B 47 0A	27 27 71 10	
Danish II (alternate) .....	ESC R LF	1B 52 0A	27 82 10	
Spanish II .....	ESC ESC G VT	1B 1B 47 0B	27 27 71 11	
Spanish II (alternate) .....	ESC R VT	1B 52 0B	27 82 11	
Portuguese .....	ESC ESC G FF	1B 1B 47 0C	27 27 71 12	
Portuguese (alternate) .....	ESC R FF	1B 52 0C	27 82 12	
<b>Print character string</b> .....	ESC \ <i>n1 n2 list</i>	1B 5C <i>n1 n2 list</i>	27 92 <i>n1 n2 list</i>	<p>This sequence prints a character string beginning at the current print position. Any printable character can be included in the series, even those assigned control codes. The values of variables <i>n1</i> and <i>n2</i> define the number of characters to print. This number equals the number of character codes in <i>list</i>. The printer interprets <i>n1</i> and <i>n2</i> as follows:</p> <p style="text-align: center;">Number of characters = (256 x <i>n2</i>) + <i>n1</i></p> <p>The <i>list</i> is a series of character codes for the characters to print. For example, to print the characters assigned codes 10 through 20 decimal, the correct sequence is 27 92 11 0 10 11 12 13 14 15 16 17 18 19 20 (decimal).</p> <p>☞ <b>Note:</b> This sequence is not supported when an Epson emulation is active.</p>

Table D-6. Epson and IBM Escape Sequences—continued

Function	ASCII	Hexadecimal	Decimal	Description
<b>Text Functions—continued</b>				
<b>Print character</b> .....	ESC ^ <i>n</i>	1B 5E <i>n</i>	27 94 <i>n</i>	This sequence prints a character that is assigned a valid control code. The value of variable <i>n</i> in the sequence is the control code assigned to the character. For example, to print the music note symbol assigned to the CR control code, the correct sequence is ESC ^ CR.
<b>Enable/disable characters with codes 128-159, 255</b>				
Enable .....	ESC 6	1B 36	27 54	These sequences enable and disable the printing of international characters assigned to codes 128 through 159 and 255. When disabled, the printer performs the control functions assigned to these codes.
Disable .....	ESC 7	1B 37	27 55	
<b>Enable/disable characters in control code range</b> .....	ESC I <i>n</i>	1B 49 <i>n</i>	27 73 <i>n</i>	This sequence enables and disables the printing of characters with codes 0 to 6, 16, 17, 19, 21 to 26, 28 to 31, 129 to 134, 144, 145, 147, 149 to 154, and 156 to 159 decimal.
Enable .....	ESC I 1	1B 49 31	27 73 49	⚠ <b>Note:</b> This sequence is not supported when the IBM XL24 emulation is active.
Disable .....	ESC I 0	1B 49 30	27 43 48	
<b>Select characters for codes above 159</b>	ESC t <i>n</i>	1B 74 <i>n</i>	27 116 <i>n</i>	This sequence selects the characters that print for codes above 159. The sequence can select either the italic ASCII characters or the normal IBM graphic characters. With the italic characters selected, add 128 to the normal character code to print the italicized version. For example, to print an italicized letter A (code 65 decimal), send code 193 (65 + 128 = 193).
Italics .....	ESC t 0	1B 74 30	27 116 48	
Graphics .....	ESC t 1	1B 74 31	27 116 49	
<b>Bold printing</b>				
Start .....	ESC G	1B 47	27 71	These sequences start and end bold printing at the current print position. For bold, the printer prints each character twice at the character's normal print position (this requires a second printing pass over the line).
End .....	ESC H	1B 48	27 72	
<b>Shadow printing</b>				
Start .....	ESC E	1B 45	27 69	These sequences start and end shadow printing at the current print position. For shadow, the printer prints each character twice—once at the character's normal print position, and once 1/120-inch to the right of this position (this requires a second printing pass over the line).
End .....	ESC F	1B 46	27 70	

Table D-6. Epson and IBM Escape Sequences—continued

<i>Function</i>	<i>ASCII</i>	<i>Hexadecimal</i>	<i>Decimal</i>	<i>Description</i>																																																					
<b>Text Functions—continued</b>																																																									
<b>Automatic underscoring</b> .....	ESC - <i>n</i>	1B 2D <i>n</i>	27 45 <i>n</i>	This sequence starts and ends automatic underscoring of characters and spaces.																																																					
Start .....	ESC - 1	1B 2D 31	27 45 49																																																						
End .....	ESC - 0	1B 2D 30	27 45 48																																																						
<b>Slant printing (italics)</b> .....	ESC ESC S <i>n</i>	1B 1B 53 <i>n</i>	27 27 83 <i>n</i>	These sequences start and end slant printing, wherein characters slant forward to simulate italics.  ☞ <b>Note:</b> The ESC 4 and ESC 5 sequences are not supported when the IBM XL24 emulation is active.																																																					
Start .....	ESC ESC S 1	1B 1B 53 31	27 27 83 49																																																						
Start (alternate) .....	ESC ESC S 2	1B 1B 53 32	27 27 83 50																																																						
Start (alternate) .....	ESC ESC S 3	1B 1B 53 33	27 27 83 51																																																						
Start (alternate) .....	ESC 4	1B 34	27 52																																																						
End .....	ESC ESC S 0	1B 1B 53 30	27 27 83 48																																																						
End (alternate) .....	ESC 5	1B 35	27 53																																																						
<b>Super/subscripting</b>				These sequences start and end automatic superscripting and subscripting of characters. Both superscript and subscript characters are half the normal height. Superscript characters print above the normal print line; subscript characters print below the normal print line.																																																					
Subscripting .....	ESC S 1	1B 53 31	27 83 49																																																						
Subscripting (alternate) .....	ESC ESC V 1	1B 1B 56 31	27 27 86 49																																																						
Superscripting .....	ESC S 0	1B 53 30	27 83 48																																																						
Superscripting (alternate) .....	ESC ESC V 2	1B 1B 56 32	27 27 86 50																																																						
End .....	ESC T	1B 54	27 84																																																						
End (alternate) .....	ESC ESC V 0	1B 1B 56 30	27 27 86 48																																																						
<b>Double-high/double-wide printing</b> .....	ESC [ @ EOT NUL NUL NUL <i>n1 n2</i>	1B 5B 40 04 00 00 00 <i>n1 n2</i>	27 91 64 4 0 0 0 <i>n1 n2</i>	This sequence starts and ends double-high and/or double-wide printing. In double-high printing, characters print twice their normal height. In double-wide printing, characters print twice their normal width. The value of variable <i>n1</i> determines whether double-high printing starts or ends and whether line spacing changes to accommodate double-high characters:  <table style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th rowspan="2"><i>Double-High</i></th> <th rowspan="2"><i>Line Spacing</i></th> <th colspan="3"><i>Variable n1</i></th> </tr> <tr> <th><i>ASCII</i></th> <th><i>Hex</i></th> <th><i>Dec</i></th> </tr> </thead> <tbody> <tr> <td>No change</td> <td>No change</td> <td>NUL</td> <td>00</td> <td>0</td> </tr> <tr> <td>End</td> <td>No change</td> <td>SOH</td> <td>01</td> <td>1</td> </tr> <tr> <td>Start</td> <td>No change</td> <td>STX</td> <td>02</td> <td>2</td> </tr> <tr> <td>No change</td> <td>6 lines/inch</td> <td>DLE</td> <td>10</td> <td>16</td> </tr> <tr> <td>End</td> <td>6 lines/inch</td> <td>DC1</td> <td>11</td> <td>17</td> </tr> <tr> <td>Start</td> <td>6 lines/inch</td> <td>DC2</td> <td>12</td> <td>18</td> </tr> <tr> <td>No change</td> <td>3 lines/inch</td> <td>SP</td> <td>20</td> <td>32</td> </tr> <tr> <td>End</td> <td>3 lines/inch</td> <td>!</td> <td>21</td> <td>33</td> </tr> <tr> <td>Start</td> <td>3 lines/inch</td> <td>"</td> <td>22</td> <td>34</td> </tr> </tbody> </table>	<i>Double-High</i>	<i>Line Spacing</i>	<i>Variable n1</i>			<i>ASCII</i>	<i>Hex</i>	<i>Dec</i>	No change	No change	NUL	00	0	End	No change	SOH	01	1	Start	No change	STX	02	2	No change	6 lines/inch	DLE	10	16	End	6 lines/inch	DC1	11	17	Start	6 lines/inch	DC2	12	18	No change	3 lines/inch	SP	20	32	End	3 lines/inch	!	21	33	Start	3 lines/inch	"	22	34
<i>Double-High</i>	<i>Line Spacing</i>	<i>Variable n1</i>																																																							
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Start	6 lines/inch	DC2	12		18																																																				
No change	3 lines/inch	SP	20		32																																																				
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Table D-6. Epson and IBM Escape Sequences—continued

Function	ASCII	Hexadecimal	Decimal	Description																				
Text Functions—continued																								
<b>Double-high/double-wide printing (continued)</b> .....	ESC [ @ EOT NUL NUL NUL <i>n1 n2</i>	1B 5B 40 04 00 00 00 <i>n1 n2</i>	27 91 64 4 0 0 0 <i>n1 n2</i>	The value of variable <i>n2</i> determines whether double-wide printing starts or ends:  <table style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th colspan="4" style="text-align: center;"><i>Variable n2</i></th> </tr> <tr> <th style="text-align: left;"><i>Double-Wide</i></th> <th style="text-align: left;"><i>ASCII</i></th> <th style="text-align: left;"><i>Hex</i></th> <th style="text-align: left;"><i>Dec</i></th> </tr> </thead> <tbody> <tr> <td>No change</td> <td>NUL</td> <td>00</td> <td>0</td> </tr> <tr> <td>End</td> <td>SOH</td> <td>01</td> <td>1</td> </tr> <tr> <td>Start</td> <td>STX</td> <td>02</td> <td>2</td> </tr> </tbody> </table> <p>For example, to start double-high and double-wide printing with line spacing set to 3 lpi, the correct sequence is 27 91 64 4 0 0 0 34 2 (decimal).</p>	<i>Variable n2</i>				<i>Double-Wide</i>	<i>ASCII</i>	<i>Hex</i>	<i>Dec</i>	No change	NUL	00	0	End	SOH	01	1	Start	STX	02	2
<i>Variable n2</i>																								
<i>Double-Wide</i>	<i>ASCII</i>	<i>Hex</i>	<i>Dec</i>																					
No change	NUL	00	0																					
End	SOH	01	1																					
Start	STX	02	2																					
<b>Double-high printing</b>				These sequences start and end double-high printing, where-in characters print twice their normal height. The sequences do <i>not</i> change the current line spacing.																				
Start .....	ESC ESC H 1	1B 1B 48 31	27 27 72 49																					
Start (alternate) .....	ESC w 1	1B 77 31	27 119 49																					
End .....	ESC ESC H 0	1B 1B 48 30	27 27 72 48																					
End (alternate) .....	ESC w 0	1B 77 30	27 119 48																					
<b>Double-wide printing</b> .....	ESC ESC W <i>n</i>	1B 1B 57 <i>n</i>	27 27 87 <i>n</i>	This sequence starts and ends double wide printing, where-in characters print twice their normal width. This sequence does <i>not</i> change the current character spacing.																				
Start .....	ESC ESC W 1	1B 1B 57 31	27 27 87 49																					
End .....	ESC ESC W 0	1B 1B 57 30	27 27 87 48																					
<b>Double-wide printing</b> .....	ESC W <i>n</i>	1B 57 <i>n</i>	27 87 <i>n</i>	This sequence starts and ends double wide printing, where-in characters print twice their normal width. This sequence also doubles the character spacing to accommodate the wider characters. A DC4 code does not turn off double-wide printing started with this sequence.																				
Start .....	ESC W 1	1B 57 31	27 87 49																					
End .....	ESC W 0	1B 57 30	27 87 48																					
<b>One-line double-wide printing</b> .....	ESC SO	1B 0E	27 14	This sequence starts and ends double wide printing on the current line and doubles the character spacing to accommodate the wider characters. A DC4 code or any control code or escape sequence that causes paper movement ends double-wide printing and resumes normal character spacing. The ESC ESC W 0 and ESC W 0 sequences also end double-wide printing started with ESC SO.																				
<b>Set master print mode</b> .....	ESC ! <i>n</i>	1B 21 <i>n</i>	27 33 <i>n</i>	This sequence sets many unique print feature combinations. The value of variable <i>n</i> determines which modes are on and which are off. To find the correct <i>n</i> value, add up the numbers of the desired features:  <table style="margin-left: auto; margin-right: auto;"> <tbody> <tr> <td>0 - 10 pitch</td> <td>4 - Condensed</td> <td>32 - Dble-wide</td> </tr> <tr> <td>1 - 12 pitch</td> <td>8 - Shadow</td> <td>64 - Italic</td> </tr> <tr> <td>2 - Proportional</td> <td>16 - Bold</td> <td>128 - Underscore</td> </tr> </tbody> </table> <p>For example, to select 12-pitch, shadow, italic and underscore, the correct <i>n</i> value is 201 (1 + 8 + 64 + 128 = 201). This sequence ends all print features in the list that are not selected. Also, a proportional printing selection overrides 10- and 12-pitch selections.</p>	0 - 10 pitch	4 - Condensed	32 - Dble-wide	1 - 12 pitch	8 - Shadow	64 - Italic	2 - Proportional	16 - Bold	128 - Underscore											
0 - 10 pitch	4 - Condensed	32 - Dble-wide																						
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Table D-6. Epson and IBM Escape Sequences—continued

<i>Function</i>	<i>ASCII</i>	<i>Hexadecimal</i>	<i>Decimal</i>	<i>Description</i>
Text Functions—continued				
<b>Automatic formatting</b> ..... Start centering ..... Start flush right ..... Start justify ..... End all formatting .....	ESC a <i>n</i> ESC a 1 ESC a 2 ESC a 3 ESC a 0	1B 61 <i>n</i> 1B 61 31 1B 61 32 1B 61 33 1B 61 30	27 97 <i>n</i> 27 97 49 27 97 50 27 97 51 27 97 48	<p>This sequence starts and ends automatic formatting modes, wherein the printer stores all subsequent data in a special buffer. When the printer receives any code or sequence that causes paper movement, it prints the stored data as follows:</p> <ul style="list-style-type: none"> <li>✓ In center mode, data prints centered on the point that is midway between the left and right margins. If a line is too long to fit between the margins, the printer performs line wrapping and centers each line.</li> <li>✓ In flush right mode, data prints so that the line ends at the right margin. If a line is too long to fit, the printer performs line wrapping and prints each line flush right.</li> <li>✓ In justify mode, data prints justified between the left and right margins. If a line is too long to be justified, the printer performs line wrapping and then justifies each line. The printer does not justify any line with a carriage return.</li> </ul>
<b>Proportional printing</b> ..... Start ..... Start (alternate) ..... End ..... End (alternate) .....	ESC p <i>n</i> ESC p 1 ESC P 1 ESC p 0 ESC P 0	1B 70 <i>n</i> 1B 70 31 1B 50 31 1B 70 30 1B 50 30	27 112 <i>n</i> 27 112 49 27 80 49 27 112 48 27 80 48	<p>These sequences start and end the proportional mode, wherein the printer spaces characters by moving a specific number of PS units, printing the character, and then moving by the same number of PS units again.</p> <p>If the active font is a PS font, the printer uses the PS unit values prestored in the font. If the active font is a fixed-pitch font, the printer uses one-half the normal character spacing as the number of PS units for every character. All PS fonts contain prestored PS unit values for characters. A PS unit value represents one-half the space, in multiples of 1/120-inch, that is required to print and space a character. PS unit values range from 2 to 8. For example, the letter "V" has a PS unit value of 6, so it prints centered with a space of 12/120-inch (move 6 PS units, print the "V", and then move 6 PS units). Or, the letter "i" has a PS unit value of 3, so it prints centered within a space of 6/120-inch (move 3 PS units, print the "i", and then move 3 PS units).</p> <p>To determine the total distance from the center line of one character to the center line of the next character, just add the two characters' PS unit values. In the example above, the distance between the center of the "V" and the center of the "i" is 9/120-inch. All numeric characters (0 to 9) have the same PS unit value.</p> <p>After ending proportional mode, character spacing resets to the default character spacing of the active font. If the active font is a PS font, character spacing resets to 12 characters per inch.</p> <p>☞ <b>Note:</b> The ESC P <i>n</i> sequence is not supported when an Epson emulation is active.</p>

Table D-6. Epson and IBM Escape Sequences—continued

<i>Function</i>	<i>ASCII</i>	<i>Hexadecimal</i>	<i>Decimal</i>	<i>Description</i>																																											
<b>Text Functions—continued</b>																																															
<b>Wide text printing</b> ..... Enable ..... Disable .....	ESC ESC t <i>n</i> ESC ESC t 1 ESC ESC t 0	1B 1B 74 <i>n</i> 1B 1B 74 31 1B 1B 74 30	27 27 116 <i>n</i> 27 27 116 49 27 27 116 48	<p>This sequence enables and disables wide text printing. <i>Wide</i>-carriage printers can print up to 16 inches across; <i>narrow</i>-carriage printers can print up to 11 inches across. When wide text printing is disabled, the leftmost and rightmost print positions, margins and horizontal tabs return to their original locations.</p> <p>With wide text printing enabled, text prints unidirection-ally; that is, text printing occurs only while the carriage moves from left-to-right across the platen. Also, the letter- and memo-quality print speeds are slower than normal.</p> <p>This sequence does not affect graphics printing. If you want to print wide graphics, you must use the <i>Wide Graphics</i> sequence.</p> <p>☞ <b>Note:</b> With wide text printing enabled, be sure to load paper in the printer so that it aligns with the blue line on the paper scale. This ensures that printing does not run off the left side of the page.</p>																																											
<b>Graphic Functions</b>																																															
<b>Print Epson JX graphics</b> .....	ESC * <i>m</i> <i>n1 n2 list</i>	1B 2A <i>m</i> <i>n1 n2 list</i>	27 42 <i>m</i> <i>n1 n2 list</i>	<p>This sequence prints bit-image graphics, wherein character codes no longer print characters, but instead print 8-dot-high columns of dots on the current print line. Depending on the mode, the columns are spaced from 1/60 to 1/240 inch apart. This sequence does <i>not</i> change the current line spacing. Variable <i>m</i> in the sequence determines which graphics mode the printer uses:</p> <table style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th rowspan="2"><i>Mode</i></th> <th rowspan="2"><i>Resolution</i></th> <th colspan="3"><i>Variable m</i></th> </tr> <tr> <th><i>ASCII</i></th> <th><i>Hex</i></th> <th><i>Dec</i></th> </tr> </thead> <tbody> <tr> <td>Single</td> <td>72V x 60H dpi</td> <td>NUL</td> <td>00</td> <td>0</td> </tr> <tr> <td>Double</td> <td>72V x 120H dpi</td> <td>SOH</td> <td>01</td> <td>1</td> </tr> <tr> <td>HS double</td> <td>72V x 120H dpi</td> <td>STX</td> <td>02</td> <td>2</td> </tr> <tr> <td>Quadruple</td> <td>72V x 240H dpi</td> <td>ETX</td> <td>03</td> <td>3</td> </tr> <tr> <td>Epson QX-10</td> <td>72V x 80H dpi</td> <td>EOT</td> <td>04</td> <td>4</td> </tr> <tr> <td>One-to-one</td> <td>72V x 72H dpi</td> <td>ENQ</td> <td>05</td> <td>5</td> </tr> <tr> <td>Other CRTs</td> <td>72V x 90H dpi</td> <td>ACK</td> <td>06</td> <td>6</td> </tr> </tbody> </table> <p>In the HS double and quadruple modes, consecutive horizontal dots are not permitted. If the sequence specifies consecutive horizontal dots, the printer does not print the second dot.</p> <p>Variables <i>n1</i> and <i>n2</i> define the number of columns to print. This number equals the number of bytes in the <i>list</i>. The printer interprets <i>n1</i> and <i>n2</i> as follows:</p> <p>Number of columns = (256 x <i>n2</i>) + <i>n1</i></p>	<i>Mode</i>	<i>Resolution</i>	<i>Variable m</i>			<i>ASCII</i>	<i>Hex</i>	<i>Dec</i>	Single	72V x 60H dpi	NUL	00	0	Double	72V x 120H dpi	SOH	01	1	HS double	72V x 120H dpi	STX	02	2	Quadruple	72V x 240H dpi	ETX	03	3	Epson QX-10	72V x 80H dpi	EOT	04	4	One-to-one	72V x 72H dpi	ENQ	05	5	Other CRTs	72V x 90H dpi	ACK	06	6
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Table D-6. Epson and IBM Escape Sequences—continued

<i>Function</i>	<i>ASCII</i>	<i>Hexadecimal</i>	<i>Decimal</i>	<i>Description</i>																																																															
Graphic Functions—continued																																																																			
<b>Print Epson JX</b> ..... <b>graphics (continued)</b>	ESC * <i>m</i> <i>n1 n2 list</i>	1B 2A <i>m</i> <i>n1 n2 list</i>	27 42 <i>m</i> <i>n1 n2 list</i>	<p>For example, to print 300 columns, <i>n2</i> would be 1 and <i>n1</i> would be 44 (<math>300 = (256 \times 1) + 44</math>).</p> <p>The <i>list</i> in the sequence is a series of codes that define the columns to print. The first code defines the first column, the second code defines the second column, and so on. Each bit in a code controls a specific dot in the column. The most significant bit controls the top dot, the next bit controls the second dot, and so on. If the bit is "1", the dot prints; if the bit is "0", the dot does not print. For example, FF hex prints all eight dots in the column, 00 hex prints no dots, 0F hex prints the lower four dots, and F0 hex prints the upper four dots.</p>																																																															
<b>Print Epson LQ-2550</b> ..... <b>graphics</b>	ESC * <i>m</i> <i>n1 n2 list</i>	1B 2A <i>m</i> <i>n1 n2 list</i>	27 42 <i>m</i> <i>n1 n2 list</i>	<p>This sequence prints bit-image graphics, wherein character codes no longer print characters, but instead print 8-dot-high or 24-dot-high columns of dots on the current print line. Depending on the mode, the columns are spaced from 1/60 to 1/360 inch apart and dots within each column are spaced either 1/72 inch apart or 1/180 inch apart. This sequence does <i>not</i> change the current line spacing. Variable <i>m</i> in the sequence determines which graphics mode the printer uses.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th rowspan="2"><i>Mode</i></th> <th rowspan="2"><i>Resolution</i></th> <th colspan="3"><i>Variable m</i></th> </tr> <tr> <th><i>ASCII</i></th> <th><i>Hex</i></th> <th><i>Dec</i></th> </tr> </thead> <tbody> <tr> <td>Single</td> <td>72V x 60H dpi</td> <td>NUL</td> <td>00</td> <td>0</td> </tr> <tr> <td>Double</td> <td>72V x 120H dpi</td> <td>SOH</td> <td>01</td> <td>1</td> </tr> <tr> <td>HS double</td> <td>72V x 120H dpi</td> <td>STX</td> <td>02</td> <td>2</td> </tr> <tr> <td>Quadruple</td> <td>72V x 240H dpi</td> <td>ETX</td> <td>03</td> <td>3</td> </tr> <tr> <td>CRT I</td> <td>72V x 80H dpi</td> <td>EOT</td> <td>04</td> <td>4</td> </tr> <tr> <td>CRT II</td> <td>72V x 90H dpi</td> <td>ACK</td> <td>06</td> <td>6</td> </tr> <tr> <td>Single</td> <td>180V x 60H dpi</td> <td>SP</td> <td>20</td> <td>32</td> </tr> <tr> <td>Double</td> <td>180V x 120H dpi</td> <td>!</td> <td>21</td> <td>33</td> </tr> <tr> <td>CRT III</td> <td>180V x 90H dpi</td> <td>&amp;</td> <td>26</td> <td>38</td> </tr> <tr> <td>Triple</td> <td>180V x 180H dpi</td> <td>'</td> <td>27</td> <td>39</td> </tr> <tr> <td>Hex</td> <td>180V x 360H dpi</td> <td>(</td> <td>28</td> <td>40</td> </tr> </tbody> </table> <p>In the HS double, quadruple and hex modes, consecutive horizontal dots are not permitted. If the sequence specifies consecutive horizontal dots, the printer does not print the second dot.</p> <p>Variables <i>n1</i> and <i>n2</i> define the number of columns to print. For modes with 72 dots per vertical inch, this number equals the number of bytes in the <i>list</i>. For modes with 180 dots per vertical inch, this number equals one-third the number of bytes in the <i>list</i>. The printer interprets <i>n1</i> and <i>n2</i> as follows:</p> <p style="text-align: center;">Number of columns = <math>(256 \times n2) + n1</math></p> <p>For example, to print 300 columns, <i>n2</i> would be 1 and <i>n1</i> would be 44 (<math>300 = (256 \times 1) + 44</math>).</p>	<i>Mode</i>	<i>Resolution</i>	<i>Variable m</i>			<i>ASCII</i>	<i>Hex</i>	<i>Dec</i>	Single	72V x 60H dpi	NUL	00	0	Double	72V x 120H dpi	SOH	01	1	HS double	72V x 120H dpi	STX	02	2	Quadruple	72V x 240H dpi	ETX	03	3	CRT I	72V x 80H dpi	EOT	04	4	CRT II	72V x 90H dpi	ACK	06	6	Single	180V x 60H dpi	SP	20	32	Double	180V x 120H dpi	!	21	33	CRT III	180V x 90H dpi	&	26	38	Triple	180V x 180H dpi	'	27	39	Hex	180V x 360H dpi	(	28	40
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Table D-6. Epson and IBM Escape Sequences—continued

Function	ASCII	Hexadecimal	Decimal	Description
Graphic Functions—continued				
<p><b>Print Epson LQ-2550</b> .....  <b>graphics (continued)</b></p>	<p>ESC * <i>m</i>  <i>n1 n2 list</i></p>	<p>1B 2A <i>m</i>  <i>n1 n2 list</i></p>	<p>27 42 <i>m</i>  <i>n1 n2 list</i></p>	<p>The <i>list</i> in the sequence is a series of codes that define the columns to print. Modes with 72 dots per vertical inch print 8-dot-high columns. For these modes, the first code defines the first column, the second code defines the second col-umn, and so on. Each bit in a code controls a specific dot in the column. The most significant bit controls the top dot, the next bit control the second dot, and so on. If the bit is "1", the dot prints; if the bit is "0", the dot does not print. For example, FF hex prints all eight dots in the column, 00 hex prints no dots, 0F hex prints the lower four dots, and F0 hex prints the upper four dots.</p> <p>Modes with 180 dots per vertical inch print 24-dot-high-columns. For these modes, the first three codes define the first column, the second three codes define the second col-umn, and so on. Each bit in a code controls a specific dot in the column. The most significant bit of the first code con-trols the top dot, the next bit controls the second dot, and so on. The most significant bit of the second code controls the ninth dot from the top, the next bit controls the tenth dot, and so on. And finally, the most significant bit of the third code controls the 17th dot from the top, the next bit con-trols the 18th dot, and so on. If the bit is "1", the dot prints; if the bit is "0", the dot does not print. For example, FF FF FF hex prints all 24 dots in the column, 00 00 00 hex prints no dots, 00 FF 00 hex prints the middle eight dots, and 80 00 01 hex prints the top and bottom dots.</p>
<p><b>Print IBM XL24</b> .....  <b>graphics</b></p>	<p>ESC [ g <i>n1 n2</i>  <i>m list</i></p>	<p>1B 5B 67 <i>n1 n2</i>  <i>m list</i></p>	<p>27 91 103 <i>n1 n2</i>  <i>m list</i></p>	<p>This sequence starts any one of eight different graphics modes, wherein character codes no longer print characters, but instead print 8-dot-high or 24-dot-high columns of dots on the current print line. Depending on the mode, the columns are spaced from 1/60 to 1/360 inch apart and dots within each column are spaced either 1/72 inch apart or 1/180 inch apart. This sequences does <i>not</i> change line spacing.</p> <p>Variables <i>n1</i> and <i>n2</i> define the number of bytes in the <i>list</i>. For modes with 72 dots per vertical inch, this number equals the number of columns being defined plus one. For modes with 180 dots per vertical inch, this number equals three times the number of columns being defined plus one. The printer interprets <i>n1</i> and <i>n2</i> as follows:</p> <p>Number of bytes = (256 x <i>n2</i>) + <i>n1</i></p> <p>For example, to print 300 columns in a graphics mode with 72 dots per vertical inch, <i>n2</i> would be 1 and <i>n1</i> would be 45 (300 = ((256 x 1) + 45) - 1).</p>

Table D-6. Epson and IBM Escape Sequences—continued

<i>Function</i>	<i>ASCII</i>	<i>Hexadecimal</i>	<i>Decimal</i>	<i>Description</i>																																																
<b>Graphic Functions—continued</b>																																																				
<b>Print IBM XL24</b> ..... <b>graphics (continued)</b>	ESC [ g n1 n2 <i>m list</i>	1B 5B 67 n1 n2 <i>m list</i>	27 91 103 n1 n2 <i>m list</i>	<p>Variable <i>m</i> in the sequences determines which graphics mode the printer uses:</p> <table border="1"> <thead> <tr> <th rowspan="2"><i>Mode</i></th> <th rowspan="2"><i>Resolution</i></th> <th colspan="3"><i>Variable m</i></th> </tr> <tr> <th><i>ASCII</i></th> <th><i>Hex</i></th> <th><i>Dec</i></th> </tr> </thead> <tbody> <tr> <td>Single</td> <td>72V x 60H dpi</td> <td>NUL</td> <td>00</td> <td>0</td> </tr> <tr> <td>Double</td> <td>72V x 120H dpi</td> <td>SOH</td> <td>01</td> <td>1</td> </tr> <tr> <td>HS double</td> <td>72V x 120H dpi</td> <td>STX</td> <td>02</td> <td>2</td> </tr> <tr> <td>Quadruple</td> <td>72V x 240H dpi</td> <td>ETX</td> <td>03</td> <td>3</td> </tr> <tr> <td>Single</td> <td>180V x 60H dpi</td> <td>BS</td> <td>08</td> <td>8</td> </tr> <tr> <td>Double</td> <td>180V x 120H dpi</td> <td>HT</td> <td>09</td> <td>9</td> </tr> <tr> <td>Triple</td> <td>180V x 180H dpi</td> <td>VT</td> <td>0B</td> <td>11</td> </tr> <tr> <td>Hex</td> <td>180V x 360H dpi</td> <td>FF</td> <td>0C</td> <td>12</td> </tr> </tbody> </table> <p>In the HS double, quadruple and hex modes, consecutive horizontal dots are not permitted. If the sequence specifies consecutive horizontal dots, the printer does not print the second dot.</p> <p>The <i>list</i> in the sequence is a series of codes that define the columns to print. Modes with 72 dots per vertical inch print 8-dot-high columns. For these modes, the first code defines the first column, the second code defines the second column, and so on. Each bit in a code controls a specific dot in the column. The most significant bit controls the top dot, the next bit controls the second dot, and so on. If the bit is "1", the dot prints; if the bit is "0", the dot does not print. For example, FF hex prints all eight dots in the column, 00 hex prints no dots, 0F hex prints the lower four dots, and F0 hex prints the upper four dots.</p> <p>Modes with 180 dots per vertical inch print 24-dot-high-columns. The first three codes define the first column, the second three codes define the second column, and so on. Each bit in a code controls a specific dot in the column. The most significant bit of the first code controls the top dot, the next bit controls the second dot, and so on. The most significant bit of the second code controls the ninth dot from the top, the next bit controls the tenth dot, and so on. And finally, the most significant bit of the third code controls the 17th dot from the top, the next bit controls the 18th dot, and so on. If the bit is "1", the dot prints; if the bit is "0", the dot does not print. For example, FF FF FF hex prints all 24 dots in the column, 00 00 00 hex prints no dots, 00 FF 00 hex prints the middle eight dots, and 80 00 01 hex prints the top and bottom dots.</p>	<i>Mode</i>	<i>Resolution</i>	<i>Variable m</i>			<i>ASCII</i>	<i>Hex</i>	<i>Dec</i>	Single	72V x 60H dpi	NUL	00	0	Double	72V x 120H dpi	SOH	01	1	HS double	72V x 120H dpi	STX	02	2	Quadruple	72V x 240H dpi	ETX	03	3	Single	180V x 60H dpi	BS	08	8	Double	180V x 120H dpi	HT	09	9	Triple	180V x 180H dpi	VT	0B	11	Hex	180V x 360H dpi	FF	0C	12
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Table D-6. Epson and IBM Escape Sequences—continued

<i>Function</i>	<i>ASCII</i>	<i>Hexadecimal</i>	<i>Decimal</i>	<i>Description</i>																																																																		
<b>Graphic Functions—continued</b>																																																																						
<b>Print single-density graphics</b> .....	ESC K <i>n1 n2 list</i>	1B 4B <i>n1 n2 list</i>	27 75 <i>n1 n2 list</i>	This sequence prints single-density graphics at 72V x 60H dots per inch. Variables <i>n1</i> , <i>n2</i> and <i>list</i> in the sequence operate the same as in the <i>Print Epson JX Graphics</i> sequence.																																																																		
<b>Print low-speed, double-density graphics</b> .....	ESC L <i>n1 n2 list</i>	1B 4C <i>n1 n2 list</i>	27 76 <i>n1 n2 list</i>	This sequence prints low-speed, double-density graphics at 72V x 120H dots per inch. Variables <i>n1</i> , <i>n2</i> and <i>list</i> in the sequence operate the same as in the <i>Print Epson JX Graphics</i> sequence.																																																																		
<b>Print high-speed, double-density graphics</b> .....	ESC Y <i>n1 n2 list</i>	1B 59 <i>n1 n2 list</i>	27 89 <i>n1 n2 list</i>	This sequence prints high-speed, double-density graphics at 72V x 120H dots per inch. Variables <i>n1</i> , <i>n2</i> and <i>list</i> in the sequence operate the same as in the <i>Print Epson JX Graphics</i> sequence. In this graphics mode, consecutive horizontal dots are not permitted. If the sequence specifies consecutive horizontal dots, the printer does not print the second dot.																																																																		
<b>Print quadruple-density graphics</b> .....	ESC Z <i>n1 n2 list</i>	1B 5A <i>n1 n2 list</i>	27 90 <i>n1 n2 list</i>	This sequence prints quadruple-density graphics at 72V x 240H dots per inch. Variables <i>n1</i> , <i>n2</i> and <i>list</i> in the sequence operate the same as in the <i>Print Epson JX Graphics</i> sequence. In this graphics mode, consecutive horizontal dots are not permitted. If the sequence specifies consecutive horizontal dots, the printer does not print the second dot.																																																																		
<b>Reassign alternate graphics mode</b> .....	ESC ? <i>n1 n2</i>	1B 3F <i>n1 n2</i>	27 63 <i>n1 n2</i>	<p>This sequence reassigns the function of ESC K, ESC L, ESC Y, or ESC Z, so that it performs any one of the other six Epson graphics modes. Variable <i>n1</i> defines which sequence to reassign:</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th rowspan="2"><i>Sequence to Reassign</i></th> <th colspan="3"><i>Variable n1</i></th> </tr> <tr> <th><i>ASCII</i></th> <th><i>Hex</i></th> <th><i>Dec</i></th> </tr> </thead> <tbody> <tr> <td>ESC K</td> <td>K</td> <td>4B</td> <td>75</td> </tr> <tr> <td>ESC L</td> <td>L</td> <td>4C</td> <td>76</td> </tr> <tr> <td>ESC Y</td> <td>Y</td> <td>59</td> <td>89</td> </tr> <tr> <td>ESC Z</td> <td>Z</td> <td>5A</td> <td>90</td> </tr> </tbody> </table> <p>Variable <i>n2</i> defines which graphics mode to assign to the selected sequence:</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th rowspan="2"><i>Mode</i></th> <th rowspan="2"><i>Resolution</i></th> <th colspan="3"><i>Variable n2</i></th> </tr> <tr> <th><i>ASCII</i></th> <th><i>Hex</i></th> <th><i>Dec</i></th> </tr> </thead> <tbody> <tr> <td>Single</td> <td>72V x 60H dpi</td> <td>NUL</td> <td>00</td> <td>0</td> </tr> <tr> <td>Double</td> <td>72V x 120H dpi</td> <td>SOH</td> <td>01</td> <td>1</td> </tr> <tr> <td>HS double</td> <td>72V x 120H dpi</td> <td>STX</td> <td>02</td> <td>2</td> </tr> <tr> <td>Quadruple</td> <td>72V x 240H dpi</td> <td>ETX</td> <td>03</td> <td>3</td> </tr> <tr> <td>Epson QX-10</td> <td>72V x 80H dpi</td> <td>EOT</td> <td>04</td> <td>4</td> </tr> <tr> <td>One-to-one</td> <td>72V x 72H dpi</td> <td>ENQ</td> <td>05</td> <td>5</td> </tr> <tr> <td>Other CRTs</td> <td>72V x 90H dpi</td> <td>ACK</td> <td>06</td> <td>6</td> </tr> </tbody> </table>	<i>Sequence to Reassign</i>	<i>Variable n1</i>			<i>ASCII</i>	<i>Hex</i>	<i>Dec</i>	ESC K	K	4B	75	ESC L	L	4C	76	ESC Y	Y	59	89	ESC Z	Z	5A	90	<i>Mode</i>	<i>Resolution</i>	<i>Variable n2</i>			<i>ASCII</i>	<i>Hex</i>	<i>Dec</i>	Single	72V x 60H dpi	NUL	00	0	Double	72V x 120H dpi	SOH	01	1	HS double	72V x 120H dpi	STX	02	2	Quadruple	72V x 240H dpi	ETX	03	3	Epson QX-10	72V x 80H dpi	EOT	04	4	One-to-one	72V x 72H dpi	ENQ	05	5	Other CRTs	72V x 90H dpi	ACK	06	6
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Table D-6. Epson and IBM Escape Sequences—continued

<i>Function</i>	<i>ASCII</i>	<i>Hexadecimal</i>	<i>Decimal</i>	<i>Description</i>
Graphic Functions—continued				
<b>Wide graphics</b> ..... Enable ..... Disable .....	ESC ESC w ESC ESC s	1B 1B 77 1B 1B 73	27 27 119 27 27 115	These sequences enable and disable wide graphics, wherein graphics print up to 16 inches across on <i>wide</i> -carriage printers and up to 11 inches across on <i>narrow</i> -carriage printers. To print full wide graphics, make sure the current horizontal print position is 0 before sending the graphics escape sequence.  ☞ <b>Note:</b> Text printing is unaffected by these sequences. To print wide text, you must use the <i>Wide Text Printing</i> escape sequence.
Miscellaneous Functions				
<b>Set print gap</b> .....	ESC ESC g	1B 1B 67	27 27 103	This sequence causes the printer to detect the forms thick-ness at the current print position and to reset the print gap for optimal print quality. Although the printer sets the print gap automatically each time a new form is loaded, you can use this sequence to reset the print gap at any location on the form. This is useful when printing on multi-thickness forms, such as forms with peel-off cards or labels.
<b>Park paper</b> .....	ESC ESC p	1B 1B 70	27 27 112	This sequence causes the printer to finish printing the current line and then reverse-feed the paper to the parked position. If pin-feed paper is not loaded when the printer receives this sequence, the printer ignores the sequence.
<b>Select paper path</b> ..... Top ..... Rear ..... Bottom ..... Top-mounted tractor .....	ESC ESC 1 <i>n</i> ESC ESC 1 NUL ESC ESC 1 SOH ESC ESC 1 STX ESC ESC 1 ETX	1B 1B 6C <i>n</i> 1B 1B 6C 00 1B 1B 6C 01 1B 1B 6C 02 1B 1B 6C 03	27 27 108 <i>n</i> 27 27 108 0 27 27 108 1 27 27 108 2 27 27 108 3	This sequence selects a paper path for subsequent paper feeding. If pin-feed paper is loaded when the printer receives this sequence, the printer finishes printing the current line, parks the paper, and then switches to the specified paper path. If a cut sheet is loaded when the printer receives this sequence, the printer finishes printing the current line, ejects the cut sheet, and then switches to the specified paper path. If the sequence specifies the active paper path, the printer ignores the sequence.

## Bar Code Escape Sequences

Table D-7 lists the escape sequences that can be sent to the printer to print bar code symbols. For more information on printing bar code symbols, refer to the *Bar Codes* appendix in this guide and to the *AMT Bar Code Option Operating Guide* (part no. 337027) sold separately by AMT.

Table D-7. Bar Code Escape Sequences

Function	ASCII	Hexadecimal	Decimal	Description																														
Select bar code emulation .....	ESC ESC EBS	1B 1B 45 08	27 27 69 8	This sequence selects the bar code emulation.																														
Bar code format .....	ESC [ <i>p1</i> ; <i>p2</i> ; <i>p3</i> ; <i>p4</i> ; <i>p5</i> ; <i>p6</i> ; <i>p7</i> ; <i>p8</i> }	1B 5B <i>p1</i> 3B <i>p2</i> 3B <i>p3</i> 3B <i>p4</i> 3B <i>p5</i> 3B <i>p6</i> 3B <i>p7</i> 3B <i>p8</i> 7D	27 91 <i>p1</i> 59 <i>p2</i> 59 <i>p3</i> 59 <i>p4</i> 59 <i>p5</i> 59 <i>p6</i> 59 <i>p7</i> 59 <i>p8</i> 125	This sequence selects a bar code symbology and defines the bar code height, whether to print a human-readable line of text, and the widths of bar code components.																														
Define symbology— <i>p1</i>				Parameter <i>p1</i> in the sequence selects the bar code symbology. At left, are the possible <i>p1</i> values.																														
Interleaved 2-of-5 .....	0	30	48																															
Code 3-of-9 (default) ....	4	34	52																															
EAN-8 .....	5	35	53																															
EAN-13 .....	6	36	54	Parameter <i>p2</i> defines the height of bar code symbols in 1/12-inch intervals. <i>p2</i> values can range from 1 to 120. If <i>p2</i> is set to 0, the printer will use the default height of 3/4 inch.																														
Codabar-a .....	9	39	57																															
Codabar-b .....	10	31 30	49 48																															
Codabar-c .....	11	31 31	49 49																															
Codabar-d .....	12	31 32	49 50																															
UPC-A .....	13	31 33	49 51	Parameter <i>p3</i> defines whether or not to print a human-readable line of text below each bar code symbol. <i>p3</i> must be set to 0 for no human-readable line or 1 to include the human-readable line.																														
UPC-E .....	14	31 34	49 52																															
Code 128 .....	15	31 35	49 53	Parameters <i>p4</i> through <i>p8</i> set the widths of bars and spaces in bar code symbols:																														
				<table border="1"> <thead> <tr> <th>Par.</th> <th>Setting</th> <th>Formula</th> <th>default Value</th> <th>default Width</th> </tr> </thead> <tbody> <tr> <td><i>p4</i></td> <td>Narrow bar</td> <td><math>0.014 + (0.010 \times (p4 - 1))</math></td> <td>1</td> <td>0.014</td> </tr> <tr> <td><i>p5</i></td> <td>Wide bar</td> <td><math>0.014 + (0.010 \times (p5 - 1))</math></td> <td>3</td> <td>0.034</td> </tr> <tr> <td><i>p6</i></td> <td>Narrow space</td> <td><math>0.006 + (0.010 \times (p6 - 1))</math></td> <td>2</td> <td>0.016</td> </tr> <tr> <td><i>p7</i></td> <td>Wide space</td> <td><math>0.006 + (0.010 \times (p7 - 1))</math></td> <td>4</td> <td>0.036</td> </tr> <tr> <td><i>p8</i></td> <td>Interchar. gap</td> <td><math>0.006 + (0.010 \times (p8 - 1))</math></td> <td>2</td> <td>0.016</td> </tr> </tbody> </table>	Par.	Setting	Formula	default Value	default Width	<i>p4</i>	Narrow bar	$0.014 + (0.010 \times (p4 - 1))$	1	0.014	<i>p5</i>	Wide bar	$0.014 + (0.010 \times (p5 - 1))$	3	0.034	<i>p6</i>	Narrow space	$0.006 + (0.010 \times (p6 - 1))$	2	0.016	<i>p7</i>	Wide space	$0.006 + (0.010 \times (p7 - 1))$	4	0.036	<i>p8</i>	Interchar. gap	$0.006 + (0.010 \times (p8 - 1))$	2	0.016
Par.	Setting	Formula	default Value	default Width																														
<i>p4</i>	Narrow bar	$0.014 + (0.010 \times (p4 - 1))$	1	0.014																														
<i>p5</i>	Wide bar	$0.014 + (0.010 \times (p5 - 1))$	3	0.034																														
<i>p6</i>	Narrow space	$0.006 + (0.010 \times (p6 - 1))$	2	0.016																														
<i>p7</i>	Wide space	$0.006 + (0.010 \times (p7 - 1))$	4	0.036																														
<i>p8</i>	Interchar. gap	$0.006 + (0.010 \times (p8 - 1))$	2	0.016																														
				<i>Note:</i> Parameters <i>p1</i> through <i>p8</i> are optional—you need only include the ones with values that you want to change. You must, however, include all of the semicolons in the command up to the last parameter defined.																														
Print Bar Code																																		
Start .....	ESC [ 4 t	1B 5B 34 74	27 91 52 116	These sequences tell the printer to print all subsequent data as a bar code symbol until an end sequence is received. The actual data to be encoded into the bar code symbol should be sent between the start and end sequences.																														
Start (alternate) .....	ESC [ 3 t	1B 5B 33 74	27 91 51 116																															
Start (POSTNET only) .....	ESC z	1B 7A	27 122																															
End .....	ESC [ 0 t	1B 5B 30 74	27 91 48 116																															
End (Code 128 only) .....	\ESC [ 0 t	5C 1B 5B 30 74	92 27 91 48 116																															
End (POSTNET only) .....	\	5C	92																															

## ASCII Code Table

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Table D-8 is an ASCII code table to assist you in decoding hexadecimal printouts.

Table D-8. ASCII Table

<i>ASCII Character</i>	<i>Dec</i>	<i>Hex</i>	<i>Binary</i>	<i>ASCII Character</i>	<i>Dec</i>	<i>Hex</i>	<i>Binary</i>
NUL (Ctrl @)	0	00	00000000	DLE (Ctrl P)	16	10	00010000
SOH (Ctrl A)	1	01	00000001	DC1 (Ctrl Q)	17	11	00010001
STX (Ctrl B)	2	02	00000010	DC2 (Ctrl R)	18	12	00010010
ETX (Ctrl C)	3	03	00000011	DC3 (Ctrl S)	19	13	00010011
EOT (Ctrl D)	4	04	00000100	DC4 (Ctrl T)	20	14	00010100
ENQ (Ctrl E)	5	05	00000101	NAK (Ctrl U)	21	15	00010101
ACK (Ctrl F)	6	06	00000110	SYN (Ctrl V)	22	16	00010110
BEL (Ctrl G)	7	07	00000111	ETB (Ctrl W)	23	17	00010111
BS (Ctrl H)	8	08	00001000	CAN (Ctrl X)	24	18	00011000
HT (Ctrl I)	9	09	00001001	EM (Ctrl Y)	25	19	00011001
LF (Ctrl J)	10	0A	00001010	SUB (Ctrl Z)	26	1A	00011010
VT (Ctrl K)	11	0B	00001011	ESC (Ctrl [)	27	1B	00011011
FF (Ctrl L)	12	0C	00001100	FS (Ctrl \)	28	1C	00011100
CR (Ctrl M)	13	0D	00001101	GS (Ctrl ])	29	1D	00011101
SO (Ctrl N)	14	0E	00001110	RS (Ctrl ^)	30	1E	00011110
SI (Ctrl O)	15	0F	00001111	US (Ctrl _)	31	1F	00011111

Table D-8. ASCII Table—continued

<i>ASCII Character</i>	<i>Dec</i>	<i>Hex</i>	<i>Binary</i>	<i>ASCII Character</i>	<i>Dec</i>	<i>Hex</i>	<i>Binary</i>
SP (Space)	32	20	00100000	<	60	3C	00111100
!	33	21	00100001	=	61	3D	00111101
"	34	22	00100010	>	62	3E	00111110
#	35	23	00100011	?	63	3F	00111111
\$	36	24	00100100	@	64	40	01000000
%	37	25	00100101	A	65	41	01000001
&	38	26	00100110	B	66	42	01000010
'	39	27	00100111	C	67	43	01000011
(	40	28	00101000	D	68	44	01000100
)	41	29	00101001	E	69	45	01000101
*	42	2A	00101010	F	70	46	01000110
+	43	2B	00101011	G	71	47	01000111
,	44	2C	00101100	H	72	48	01001000
-	45	2D	00101101	I	73	49	01001001
.	46	2E	00101110	J	74	4A	01001010
/	47	2F	00101111	K	75	4B	01001011
0	48	30	00110000	L	76	4C	01001100
1	49	31	00110001	M	77	4D	01001101
2	50	32	00110010	N	78	4E	01001110
3	51	33	00110011	O	79	4F	01001111
4	52	34	00110100	P	80	50	01010000
5	53	35	00110101	Q	81	51	01010001
6	54	36	00110110	R	82	52	01010010
7	55	37	00110111	S	83	53	01010011
8	56	38	00111000	T	84	54	01010100
9	57	39	00111001	U	85	55	01010101
:	58	3A	00111010	V	86	56	01010110
;	59	3B	00111011	W	87	57	01010111

Table D-8. ASCII Table—continued

<i>ASCII Character</i>	<i>Dec</i>	<i>Hex</i>	<i>Binary</i>	<i>ASCII Character</i>	<i>Dec</i>	<i>Hex</i>	<i>Binary</i>
X	88	58	01011000	t	116	74	01110100
Y	89	59	01011001	u	117	75	01110101
Z	90	5A	01011010	v	118	76	01110110
[	91	5B	01011011	w	119	77	01110111
\	92	5C	01011100	x	120	78	01111000
]	93	5D	01011101	y	121	79	01111001
^	94	5E	01011110	z	122	7A	01111010
_	95	5F	01011111	{	123	7B	01111011
`	96	60	01100000		124	7C	01111100
a	97	61	01100001	}	125	7D	01111101
b	98	62	01100010	~	126	7E	01111110
c	99	63	01100011	DEL	127	7F	01111111
d	100	64	01100100		128	80	10000000
e	101	65	01100101		129	81	10000001
f	102	66	01100110		130	82	10000010
g	103	67	01100111		131	83	10000011
h	104	68	01101000		132	84	10000100
i	105	69	01101001		133	85	10000101
j	106	6A	01101010		134	86	10000110
k	107	6B	01101011		135	87	10000111
l	108	6C	01101100		136	88	10001000
m	109	6D	01101101		137	89	10001001
n	110	6E	01101110		138	8A	10001010
o	111	6F	01101111		139	8B	10001011
p	112	70	01110000		140	8C	10001100
q	113	71	01110001		141	8D	10001101
r	114	72	01110010		142	8E	10001110
s	115	73	01110011		143	8F	10001111

Table D-8. ASCII Table—continued

<i>ASCII Character</i>	<i>Dec</i>	<i>Hex</i>	<i>Binary</i>	<i>ASCII Character</i>	<i>Dec</i>	<i>Hex</i>	<i>Binary</i>
	144	90	10010000		172	AC	10101100
	145	91	10010001		173	AD	10101101
	146	92	10010010		174	AE	10101110
	147	93	10010011		175	AF	10101111
	148	94	10010100		176	B0	10110000
	149	95	10010101		177	B1	10110001
	150	96	10010110		178	B2	10110010
	151	97	10010111		179	B3	10110011
	152	98	10011000		180	B4	10110100
	153	99	10011001		181	B5	10110101
	154	9A	10011010		182	B6	10110110
	155	9B	10011011		183	B7	10110111
	156	9C	10011100		184	B8	10111000
	157	9D	10011101		185	B9	10111001
	158	9E	10011110		186	BA	10111010
	159	9F	10011111		187	BB	10111011
	160	A0	10100000		188	BC	10111100
	161	A1	10100001		189	BD	10111101
	162	A2	10100010		190	BE	10111110
	163	A3	10100011		191	BF	10111111
	164	A4	10100100		192	C0	11000000
	165	A5	10100101		193	C1	11000001
	166	A6	10100110		194	C2	11000010
	167	A7	10100111		195	C3	11000011
	168	A8	10101000		196	C4	11000100
	169	A9	10101001		197	C5	11000101
	170	AA	10101010		198	C6	11000110
	171	AB	10101011		199	C7	11000111

Table D-8. ASCII Table—continued

<i>ASCII Character</i>	<i>Dec</i>	<i>Hex</i>	<i>Binary</i>	<i>ASCII Character</i>	<i>Dec</i>	<i>Hex</i>	<i>Binary</i>
	200	C8	11001000		228	E4	11100100
	201	C9	11001001		229	E5	11100101
	202	CA	11001010		230	E6	11100110
	203	CB	11001011		231	E7	11100111
	204	CC	11001100		232	E8	11101000
	205	CD	11001101		233	E9	11101001
	206	CE	11001110		234	EA	11101010
	207	CF	11001111		235	EB	11101011
	208	D0	11010000		236	EC	11101100
	209	D1	11010001		237	ED	11101101
	210	D2	11010010		238	EE	11101110
	211	D3	11010011		239	EF	11101111
	212	D4	11010100		240	F0	11110000
	213	D5	11010101		241	F1	11110001
	214	D6	11010110		242	F2	11110010
	215	D7	11010111		243	F3	11110011
	216	D8	11011000		244	F4	11110100
	217	D9	11011001		245	F5	11110101
	218	DA	11011010		246	F6	11110110
	219	DB	11011011		247	F7	11110111
	220	DC	11011100		248	F8	11111000
	221	DD	11011101		249	F9	11111001
	222	DE	11011110		250	FA	11111010
	223	DF	11011111		251	FB	11111011
	224	E0	11100000		252	FC	11111100
	225	E1	11100001		253	FD	11111101
	226	E2	11100010		254	FE	11111110
	227	E3	11100011		255	FF	11111111



## Appendix

## E

## Specifications

Table E-1. Specifications

<i>Item</i>	<i>Specifications</i>
<i>Physical Characteristics</i>	
Height 6310, 6350 6310d, 6350d	8.2 inches (20.8 cm) paper support lowered 11.4 inches (29 cm) paper support lowered
Width 6310, 6310d 6350, 6350d	19 inches (48.3 cm) 24 inches (61 cm)
Depth All models	16.8 inches (42.7 cm) without paper deflector
Weight 6310 6310d 6350 6350d	40 pounds (18.1 kg) 48 pounds (21.8 kg) 45 pounds (20.4 kg) 54 pounds (24.5 kg)

Table E-1. Specifications—continued

<i>Item</i>	<i>Specifications</i>
<i>Printing Characteristics</i>	
Printing method	24-pin impact dot-matrix with half-dot microshift
Dot diameter	0.3 millimeter
Movement	Bi-directional and logic-seeking
Color	Fully supported using color ribbon
Speeds	
Letter-quality	160 characters per second at 12 cpi
Memo-quality	320 characters per second at 12 cpi
Draft-quality	600 characters per second at 12 cpi
Maximum print width	
6310, 6310d	11 inches (28 cm)
6350, 6350d	16 inches (40.6 cm)
Noise level	Less than 55 dBA maximum
<i>Controls and Indicators</i>	
Control Panel	
Buttons	Form Feed, Line Feed, Paper Path, Paper Park, Alt, Bail/Set Top, Clear/Reset, Test/Status, Font/Pitch, Quality/Emul, Ready/Color and Setup/Print Density
Display	16-place, one-line alphanumeric liquid-crystal display (LCD)
Lights (LEDs)	Ready and Error
Select-dial	For paper/carriage movement and printer setup
Indicators	Forms thickness and tractor select

Table E-1. Specifications—continued

<i>Item</i>	<i>Specifications</i>
<i>Motors, Solenoids, Sensors and Switches</i>	
Motors	Carriage, line feed, ribbon lift, fan, auto gap, paper path select, and bottom tractor (on 6310d and 6350d models only)
Solenoids	Microshift, bail and printhead
Sensors	Carriage, paper, Select-dial (2), paper jam, auto gap (2), and bottom paper jam (6310d and 6350d models only)
Switches	Tractor select, cover open, ribbon home, color ribbon, power on/off, and voltage select
<i>Interfaces</i>	
Parallel Compatibility Connector	Centronics type 36-pin female
Serial Compatibility Connector	EIA RS-232-C (DTR mode) DB-25 female
Serial settings Baud rates	75, 150, 300, 600, 1200, 2400, 4800, 9600 and 19200
Handshaking	DTR, XON/XOFF and ENQ/ACK
Parity	Even, odd, and none
Data bits	7 and 8
Stop bits	1 and 2
Special feature	Automatic interface switching
Options	Coax, Twin-ax, Ethernet and more

Table E-1. Specifications—continued

<i>Item</i>	<i>Specifications</i>
<i>Emulations</i>	
Standard	AMT, Diablo 630, Epson JX, Epson LQ-2550 (includes LQ-1500 and LQ-2500), IBM XL24 Proprinter, bar code and hexadecimal
Options	Many DEC, Apple and HP emulations
<i>Vertical and Horizontal Spacing</i>	
Line spacing	
User-selectable	2, 3, 4, 5, 6, 8, 9, 10 and 12 lines per inch
Software-selectable	1 to 360 lines per inch
Character spacing	
User-selectable	10, 12, 13.3, 15, 17.1 and 20 characters per inch and proportional
Software-selectable	1 to 120 characters per inch and proportional
Line length	
6310 user-selectable	8, 8.5 and 11 inches
6350 user-selectable	8, 13.6 and 16 inches
6310 software-select	
10-pitch	Up to 110 character columns
12-pitch	Up to 132 character columns
13.3-pitch	Up to 146 character columns
15-pitch	Up to 165 character columns
17.1-pitch	Up to 188 character columns
20-pitch	Up to 220 character columns
6350 software-select	
10-pitch	Up to 160 character columns
12-pitch	Up to 192 character columns
13.3-pitch	Up to 212 character columns
15-pitch	Up to 240 character columns
17.1-pitch	Up to 273 character columns
20-pitch	Up to 320 character columns

Table E-1. Specifications—continued

<i>Item</i>	<i>Specifications</i>
<i>Fonts</i>	
Fonts	Courier, Gothic, Times Roman and Elite
Character matrixes	
Draft mode	8V x 15H (one pass)
Memo mode	16V x 36H (one pass)
Letter mode	32V x 36H (two passes)
Pitches	5, 6, 6.6, 7.5, 8.5, 10, 12, 13.3, 15, 17.1 and 20 cpi
Character set	256-character IBM standard with international and graphic characters
Languages	English, French, German, Danish, Swedish, Italian, Spanish, Japanese, Norwegian, and Portuguese
Attributes	Expanded (double-high, double-wide and double-high/double-wide); italic; automatic bold, shadow, underscore, center and justify
Colors	Black, cyan, magenta, yellow, violet, green, and orange
Options	Many fixed-pitch and proportional fonts

Table E-1. Specifications—continued

<i>Item</i>	<i>Specifications</i>
<i>Graphics</i>	
One-pass resolutions	60V x 60H, 60V x 120H, 120V x 120H and 120V x 240H
Two-pass resolutions	240V x 120H and 240V x 240H
Emulation graphics	Up to 240V x 360H
Dots per column	Up to 32
Columns per line	
6350 & 6350d	
60H graphics	Up to 960
120H graphics	Up to 1,920
240H graphics	Up to 3,840
6310 & 6310d	
60H graphics	Up to 660
120H graphics	Up to 1,320
240H graphics	Up to 2,640
Max. image width	
6310 & 6310d	11 inches
6350 & 6350d	16 inches
Colors	All supported by software
<i>Ribbons</i>	
Type	Continuous loop, inked nylon fabric
Dimensions	20 millimeters x 16 meters
Ink	
Monochrome	Black
Color	Process colors—black, cyan, yellow, magenta
Life	
Monochrome	Exceeds 5 million characters
Color	Exceeds 2 million characters

Table E-1. Specifications—continued

<i>Item</i>	<i>Specifications</i>
<i>Paper Paths and Paper</i>	
Paper paths	Top and rear; bottom with pull tractor option or powered bottom-feed tractor on 6310d and 6350d
Feed methods	Friction for cut sheets; tractor for pin-fed paper
Special features	Tear bar, first-line printing, auto bail, paper out and paper jam sensing, demand document and paper park, automatic forms thickness detection and print gap adjustment, remote paper source selection
Cut sheet width 6310, 6310d 6350, 6350d	From 3 to 12 inches (7.6 to 30.5 cm) From 3 to 17 inches (7.6 to 43.2 cm)
Pin-feed paper width 6310, 6310d 6350, 6350d	From 4.5 to 11.5 inches (11.4 to 29.2 cm) including pin-feed tear strips From 4.5 to 16.5 inches (11.4 to 41.9 cm) including pin-feed tear strips
Paper length	From 3 to 30.3 inches (7.6 to 77 cm)
Paper thickness Single sheets Multipart forms	Up to 0.015 inch thick 7-part forms up to 0.024 inch thick
Slew rate	1 to 10 inches per second
Option	Bottom-feed pull tractor

Table E-1. Specifications—continued

<i>Item</i>	<i>Specifications</i>
<i>Intelli-Cards and Memory</i>	
Intelli-card	1 receptacle
Input buffer	160 kilobytes (expandable to over 4 megabytes)
User save areas	5 independent setups plus factory defaults
<i>Bar Code Emulation</i>	
Symbolologies	Interleaved 2-of-5, Code 3-of-9, Codabar, UPC-A, UPC-E, EAN-13, EAN-8, Code 128 and POSTNET
Compatibility	Genicom- and OTC-compatible command set
<i>Diagnostics</i>	
Status printout Standard Expanded	Automatic printout of current printer status Automatic printout of all saved settings, including normally-hidden settings
Self test	Rotating character pattern
Hexadecimal dump	Hexadecimal printout of print data
Diagnostics	Full set of interactive tests to check all printer subsystems, including memory, sensors, ribbon alignment, printing alignment, carriage and printhead gap
Dynamic polling	On-going error checking and fault reporting

Table E-1. Specifications—continued

<i>Item</i>	<i>Specifications</i>
<i>Power and Environmental Requirements</i>	
Voltage U.S. International	90 to 130 vac 180 to 260 vac
Frequency	47 to 63 Hz
Operating Temperature Humidity Altitude	7° to 46° C (45° to 115° F) 10% to 90% noncondensing -100 to +10,000 feet
Storage Temperature Humidity Altitude	-20° to 60° C (-4° to 140° F) 10% to 90% noncondensing -100 to +30,000 feet
<i>Reliability and Agency Compliance</i>	
Warranty	One year, parts and labor
Mean Time To Repair (MTTR)	Less than 15 minutes (average)
Mean Time Between Failure (MTBF)	15,000 hours average when operated at 25% duty cycle
Agencies	UL Listed, C-UL Listed, FCC Class B compliance, TUV compliance, CE compliance, ENERGY STAR compliant



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# AMT Datasouth ACCEL-6300 Series Printers

# Warranty Registration

Please complete this form and return it to AMT within 10 days of installation.

Name		Title	
Company name		Department	E-mail
Address			
City	State	ZIP	Phone
Printer model	<input type="checkbox"/> ACCEL-6310 <input type="checkbox"/> ACCEL-6310d <input type="checkbox"/> ACCEL-6350 <input type="checkbox"/> ACCEL-6350d	Printer serial number	
Date purchased		Where purchased	

Please answer the following questions. This information will help AMT Datasouth meet your future printer needs.

1. Which industry classification most closely describes your organization? Check one.

- |  |  |
|--|--|
| <input type="checkbox"/> Accounting          | <input type="checkbox"/> Manufacturing           |
| <input type="checkbox"/> Agriculture         | <input type="checkbox"/> Medical/dental          |
| <input type="checkbox"/> Banking/finance     | <input type="checkbox"/> Non-profit organization |
| <input type="checkbox"/> Construction        | <input type="checkbox"/> Printing/publishing     |
| <input type="checkbox"/> Data processing     | <input type="checkbox"/> Real estate             |
| <input type="checkbox"/> Education           | <input type="checkbox"/> Research                |
| <input type="checkbox"/> Engr./architectural | <input type="checkbox"/> Retail trade            |
| <input type="checkbox"/> Government          | <input type="checkbox"/> Transportation          |
| <input type="checkbox"/> Insurance           | <input type="checkbox"/> Wholesale trade         |
| <input type="checkbox"/> Legal               | <input type="checkbox"/> Other: _____            |

2. How many persons are employed by your organization?

- |  |                                   |
|--|-----------------------------------|
| <input type="checkbox"/> Self-employed | <input type="checkbox"/> 50-99    |
| <input type="checkbox"/> 2-9           | <input type="checkbox"/> 100-500  |
| <input type="checkbox"/> 10-49         | <input type="checkbox"/> Over 500 |

3. How did you learn about AMT printers?

- |  |  |
|--|--|
| <input type="checkbox"/> Advertisement | <input type="checkbox"/> Computer dealer |
| <input type="checkbox"/> Article       | <input type="checkbox"/> Trade show      |
| <input type="checkbox"/> Colleague     | <input type="checkbox"/> Other: _____    |

If an advertisement or article, what magazine?

If a trade show, what show?

4. What was your main reason for purchasing an AMT printer? Check one.

- |   |   |
|---|---|
| <input type="checkbox"/> Capabilities   | <input type="checkbox"/> Reliability      |
| <input type="checkbox"/> Flexibility    | <input type="checkbox"/> Compatibility    |
| <input type="checkbox"/> Price          | <input type="checkbox"/> System component |
| <input type="checkbox"/> Recommendation | <input type="checkbox"/> Other: _____     |

5. What software packages do you use?

\_\_\_\_\_

\_\_\_\_\_

6. What brand of computer do you use?

\_\_\_\_\_

7. For what applications will you use the AMT printer?

\_\_\_\_\_

\_\_\_\_\_

8. Please rate the vendor that sold you the printer:

	Excellent	Good	Fair	Poor
Installation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Training	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Knowledge	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Follow-through	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Overall	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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**Please list any comments or suggestions you may have concerning the AMT Datasouth printer or the documentation.**

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