



AMT ACCEL-5350

User's Guide



Document No. 397000 B



AMT ACCEL-5350

User's Guide

Unpacking

Set Up

Loading Paper

Control Panel

Cleaning & Maintenance

Solving Problems

Bottom-Feed Tractors

Bar Codes

Interfaces

Code Sets

Specifications

Document No. 397000 • Revision B

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Preface

Thank you for selecting an AMT Datasouth® ACCEL™ -5350 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

There are two models of AMT Datasouth ACCEL-5350 series printers. They look different but operate the same. The 5350 has two paper paths (top and rear) and the 5350d has three paper paths (top, rear and bottom).

About This User's Guide




This user's guide provides information that will help you set up and operate your printer. 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, ribbon cartridge and Intelli-card. It also describes how to check the voltage select switch, attach the power cable, 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, multipart 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.
- ✓ 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

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

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

AMT Datasouth is a registered trademark of Advanced Matrix Technology, Inc. ACCEL, Intelli-card and Select-dial are trademarks of Advanced Matrix Technology, Inc. All other brands and product names are registered trademarks of their respective owners.

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One-Year Limited Warranty

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, referencing 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.

Dated proof-of-purchase must be provided by the Purchaser when requesting warranty work to be performed. (A warranty reply card is included with the product 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, 4216 Stuart Andrew Blvd. Charlotte, NC 28217 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.

THE FOREGOING LIMITED WARRANTY SHALL CONSTITUTE THE SOLE AND EXCLUSIVE OBLIGATION AND LIABILITY OF AMT. IN NO EVENT SHALL AMT BE LIABLE FOR INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES, AND IN NO EVENT SHALL THE LIABILITY OF AMT 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

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, 4216 Stuart Andrew Blvd. Charlotte, NC 28217, phone 800-476-2450 and press 4 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



AMT Datasouth ACCEL-5350 and -5350d series printers have been tested and found to comply with the application U.S. and Canadian requirements of Underwriter's Laboratory Inc.®

LISTED

File Number E99947

EDP EQUIPMENT

94KO



Information to the user for Class A digital device

WARNING: This equipment has been tested and found to comply with the limits for Class A digital device pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction's manual, may cause interference to radio communications. Operation of this equipment in a residential area is likely to cause interference in which case the user will be required to correct the interference at his own expense.

The user is cautioned that changes and modifications made to the equipment without approval of the manufacturer could void the user's authority to operate this equipment.

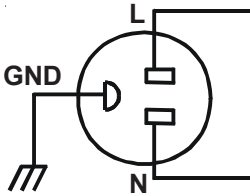
It is suggested that the user use only shielded and grounded cables to ensure compliance with FCC Rules.



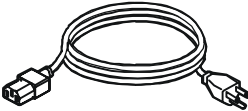
AMT Datasouth ACCEL-5350 and -5350d series printers have been tested and found to comply with the applicable requirements of the EPA Energy Star guidelines for efficiency. The ENERGY STAR™ emblem does not represent EPA endorsement of any product or service.

Power Precautions

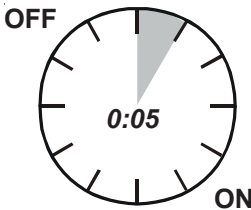
When installing and using the printer, be sure to take the following precautions:



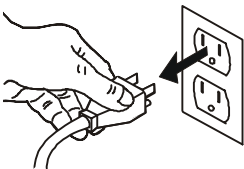
- ✓ Use the appropriate power supply and voltage frequency. Be sure to check the voltage select switch before the printer's first installation.



- ✓ 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.

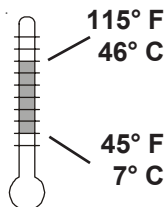


- ✓ In case of smoke, odd smells, or other trouble, unplug the power cord. Do not place furniture or other obstacles in front of the outlet.

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

Operating Precautions

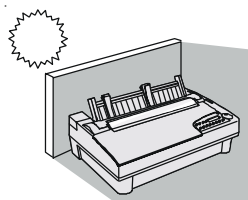
When installing and using the printer, be sure to take the following precautions:



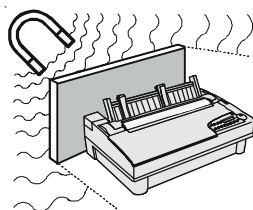
- ✓ Use the printer only within the following temperature and humidity ranges:

Ambient temperature: 7° to 46° Centigrade (45° to 115° F)

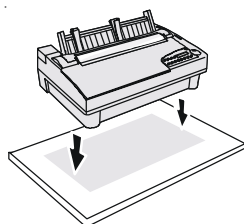
Relative humidity: 10% to 85% noncondensing



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

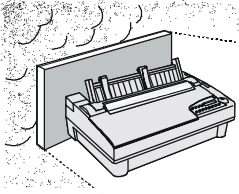


- ✓ Do not install the printer near devices that contain magnets or generate magnetic fields.

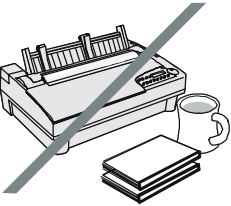


- ✓ Place the printer on a flat, horizontal surface. Protect the printer from strong physical shocks and vibrations. Lift the printer from underneath and on both sides.

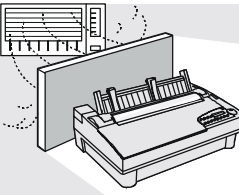
Operating precautions—continued



- ✓ 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.

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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: 24 inches (61 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.

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 printer components from the top foam cap.
3. Lift out the top foam cap.
4. Remove the other items in the shipping carton.
5. Carefully lift the printer out of the carton and place it on the site you selected.
6. Remove the protective plastic covering from the printer.
7. 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.
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. Returning this card ensures that you will be notified of the latest printer news and enhancements.
10. Be sure to save all of the packing materials in case you need to ship or store the printer later.

Unpacking the Printer—continued

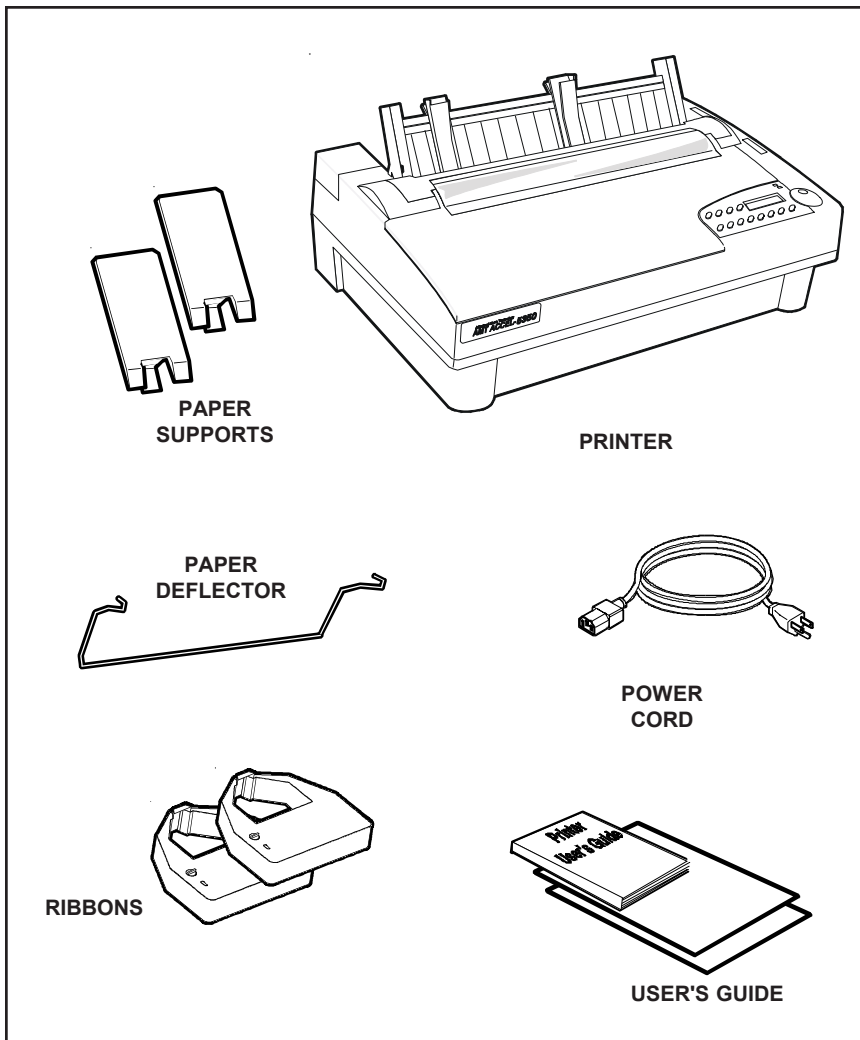


Figure 1-1. Unpacking the Printer

Removing Internal Packing

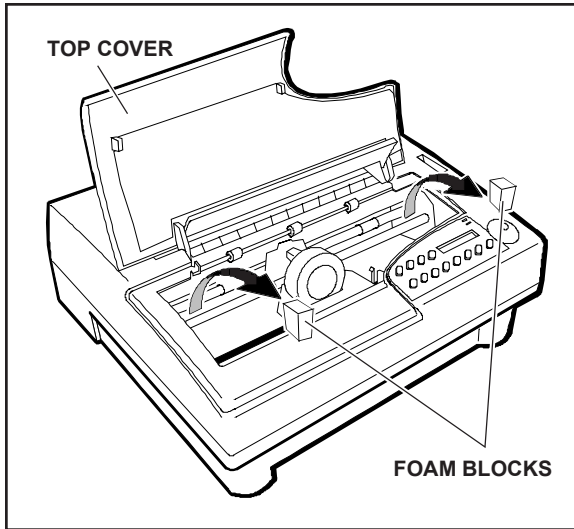


Figure 1-2. Removing the Foam Blocks

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 EXTENDERS

Provide 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

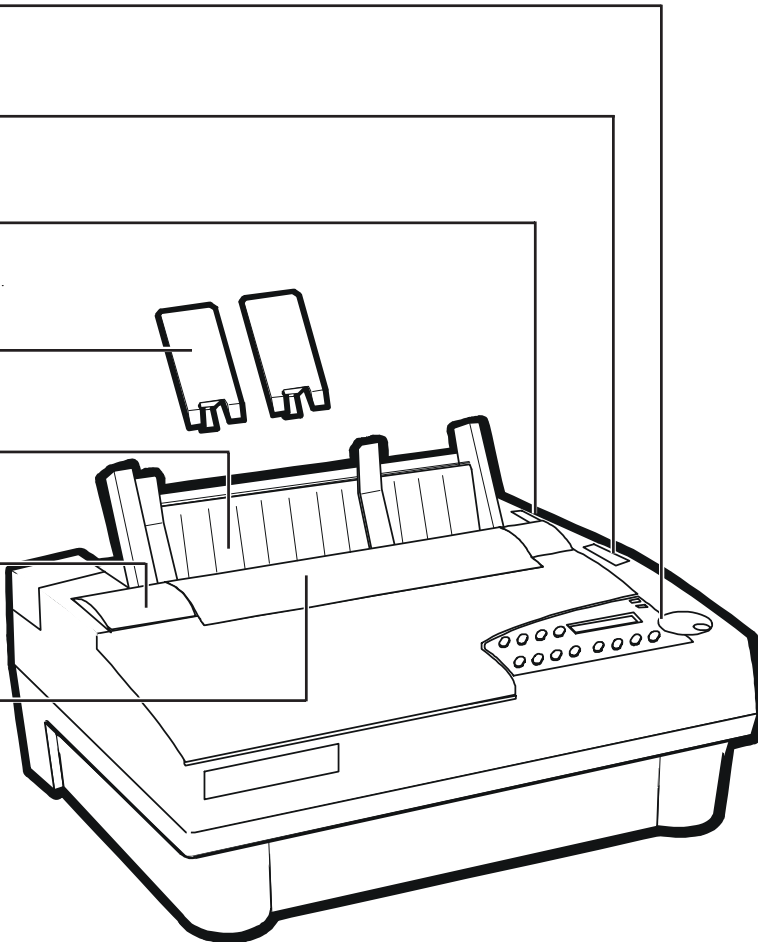


Figure 2-1. Printer Components, Front

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)

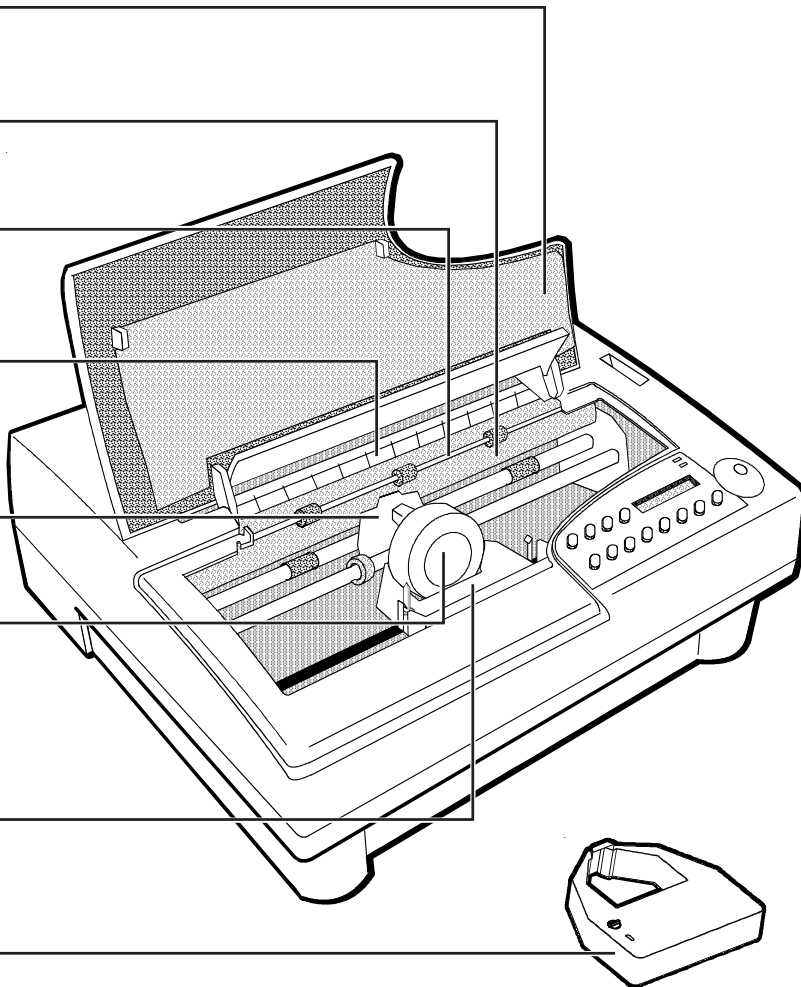


Figure 2-2. Printer Components, Internal

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

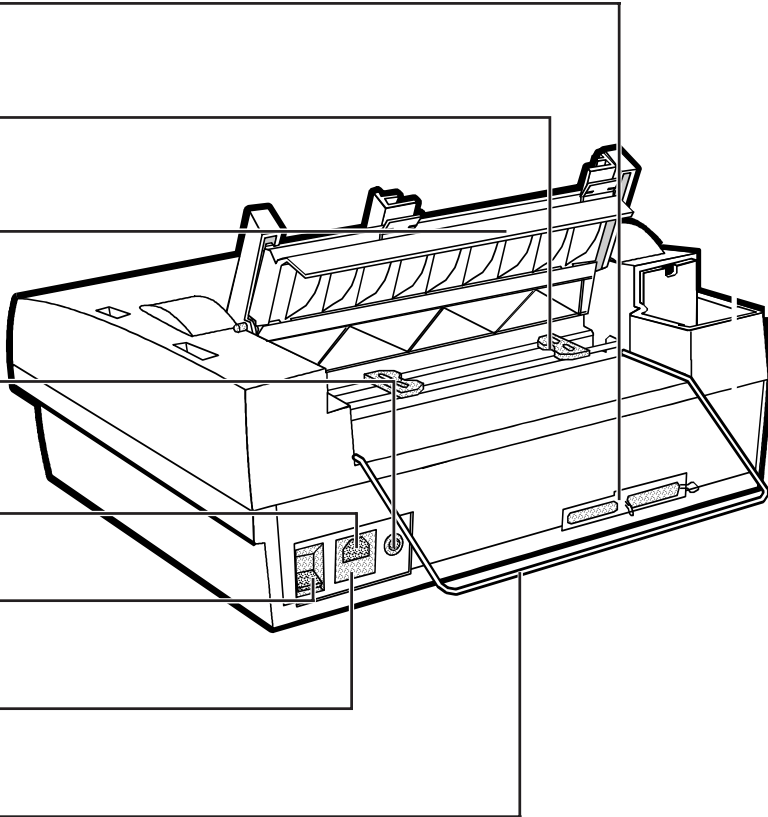


Figure 2-3. Printer Components, Rear

Installing the Paper Deflector

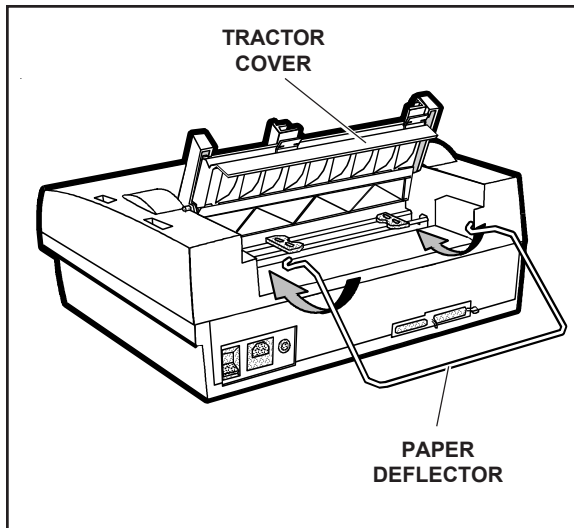


Figure 2-4. Installing the Paper Deflector

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.

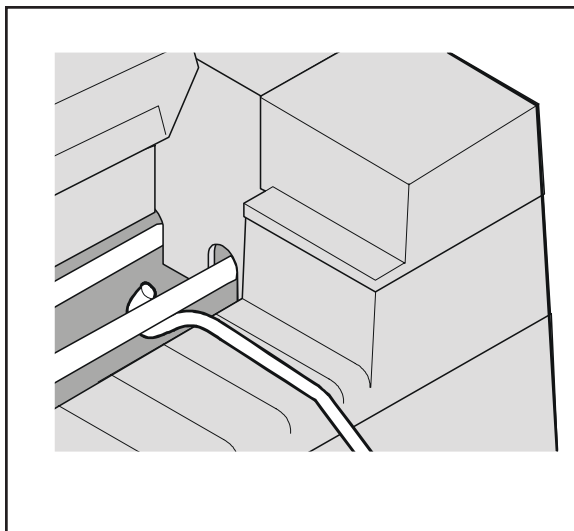


Figure 2-5. Hooking the Paper Deflector

Installing the Ribbon Cartridge

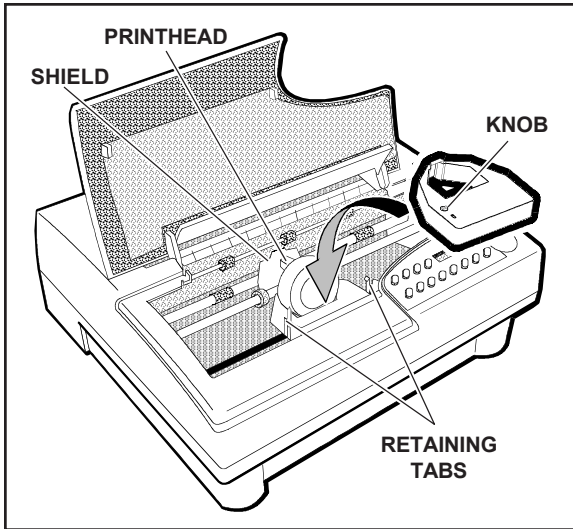


Figure 2-6. Installing a Ribbon Cartridge

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

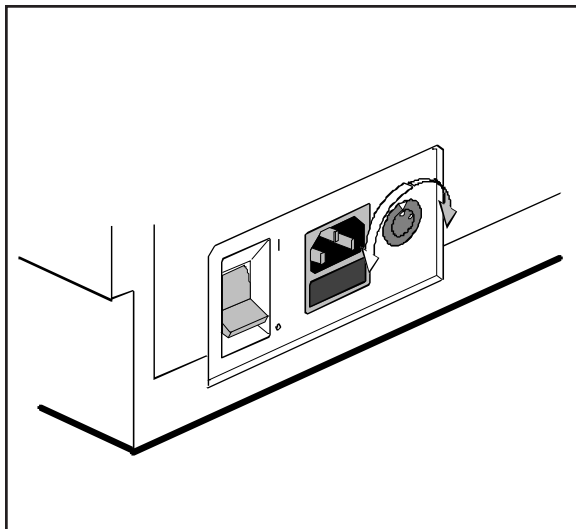


Figure 2-7. Setting the Voltage Select Switch

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.

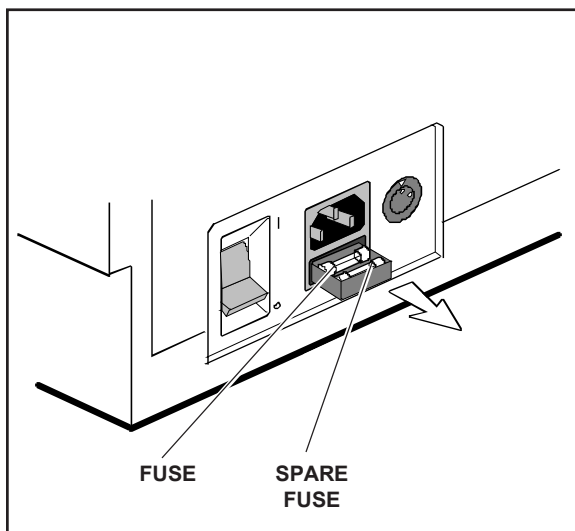


Figure 2-9. Locating the Fuse Compartment

Attaching the Power Cord

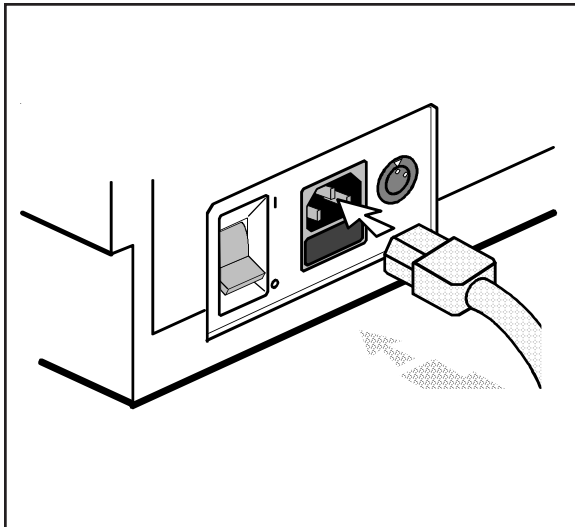


Figure 2-9. Attaching the Power Cord

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

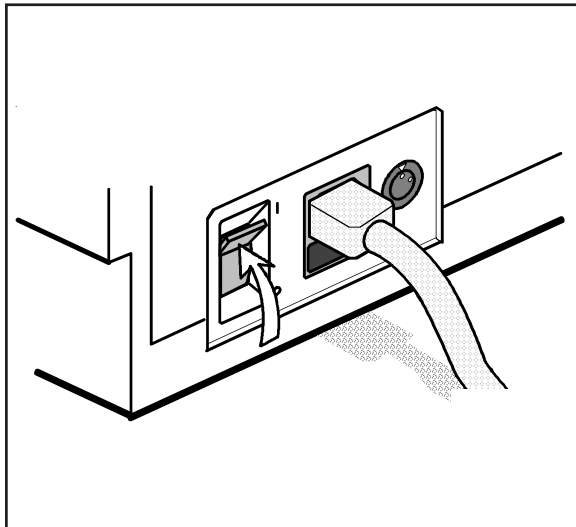


Figure 2-10. Turning On the Printer

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

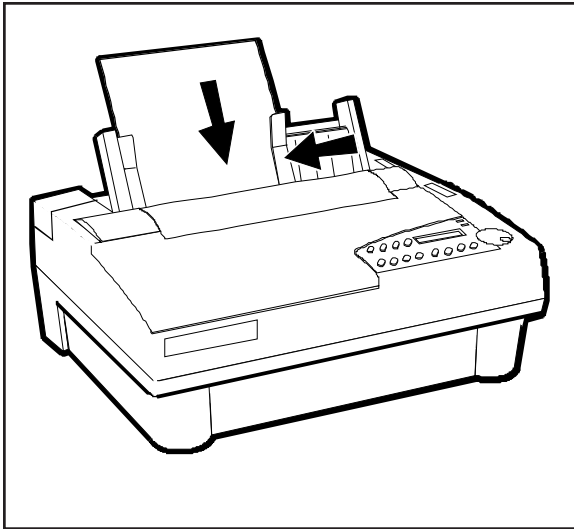


Figure 2-11. Loading a Cut Sheet

Self test lets you verify normal printing operation and inspect print quality. Print a test after installing the printer, after maintenance, after 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 test, press the Test button, as shown in figure 2-12. (Or, to print a test as wide as the WIDTH parameter setting on the Setup menu, press the Test button twice.) The paper will feed into the printer, the TEST message will blink, and the self test will begin printing.
4. While printing, move the form thickness indicator to optimize the print quality.
5. To stop, press the Ready button. The printer will complete the current line and the PAUSE message will appear.
6. 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.

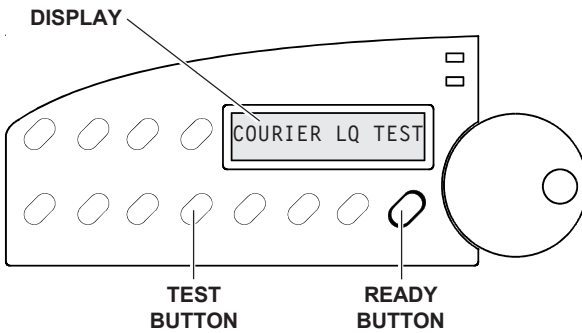


Figure 2-12. Printing a Self Test

Attaching the Interface Cable

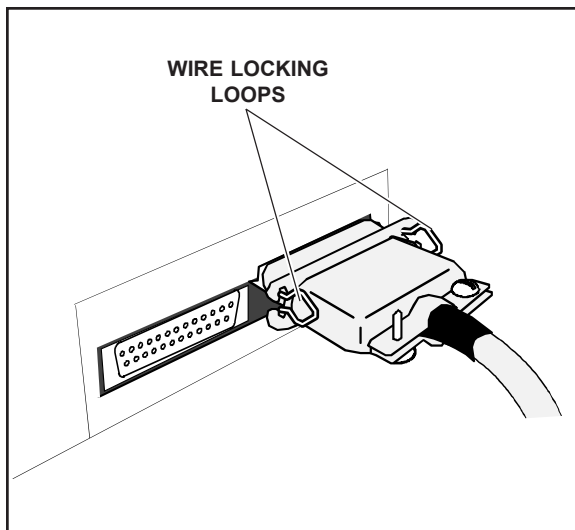


Figure 2-13. Connecting the Parallel Cable

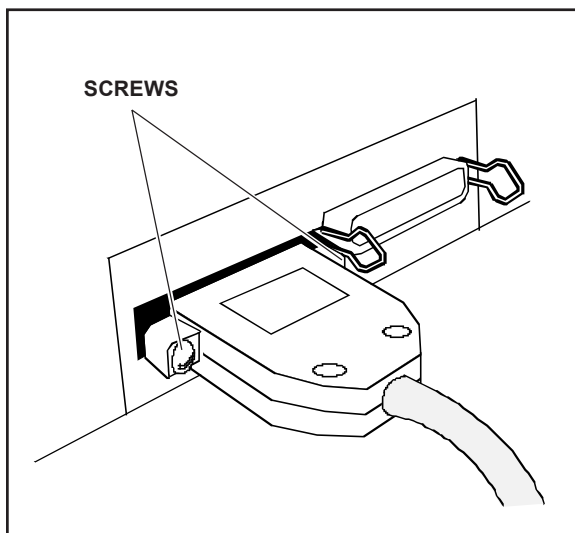


Figure 2-14. Connecting the Serial Cable

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 screw-driver 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 use the parallel interface. 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: parallel or 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, be sure to select one of the following printers from the list of supported printers:

- ✓ *AMT*
- ✓ *Diablo 630*
- ✓ *Xerox 4020*
- ✓ *Epson JX or LQ-2550*
- ✓ *IBM XL24 Proprinter*
- ✓ *ASCII text printer*

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 tractors, refer to the *Bottom-Feed Tractors* appendix.

Choosing Paper

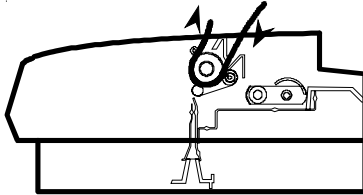
The printer can accommodate many different sizes and types of paper:

- ✓ Media can be from 4 to 17 inches wide. Single sheets must be at least 3 inches long and can be up to 0.015 inch thick.
- ✓ Pin-feed paper must be from 3 to 16.5 inches wide including the perforated edge strips, and can be up to 0.015 inch thick.
- ✓ 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.

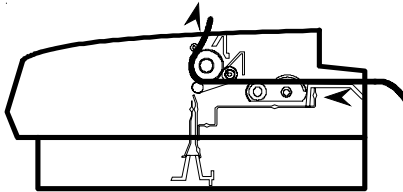
Paper Paths

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

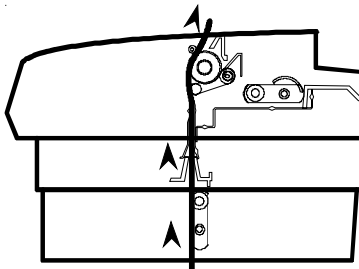
- ✓ *Top path.* You use this path to feed single sheets and forms.



- ✓ *Rear path.* You use this path to feed pin-feed media from the rear of the printer. This rear path is best for up to four-part forms.



- ✓ *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.



Selecting a Paper Path

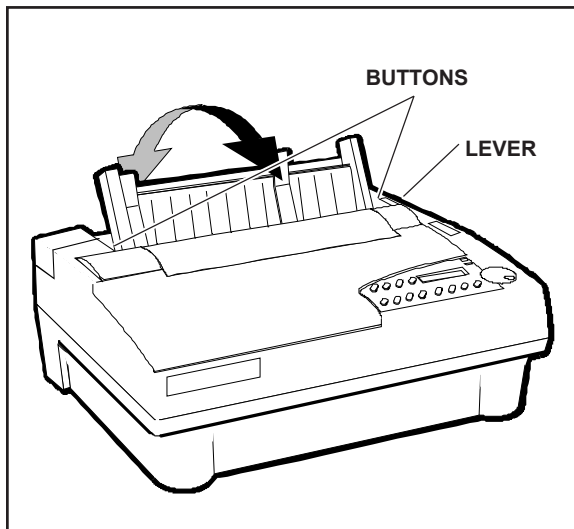


Figure 3-1. Positioning the Paper Support

To change paper paths, you need to set the positions of both the tractor select indicator and the paper support.

The tractor select indicator shows which paper path is selected:

- ☐ *Rear position:* The top and bottom paths are selected.
- ☐ *Front position:* The rear paper path is selected.

To select the paper path, move the tractor select indicator to the desired position. Then, release the paper support buttons, shown in figure 3-1, and move the paper support *up* for the cut sheets and form sets fed through the top path or *down*, over the tractors, for pin-fed forms through the rear path.

To select the bottom paper path, you also have to change the PATH parameter on the printer's Setup menu. Refer to the *Bottom-Feed Tractors* appendix.

Loading Forms

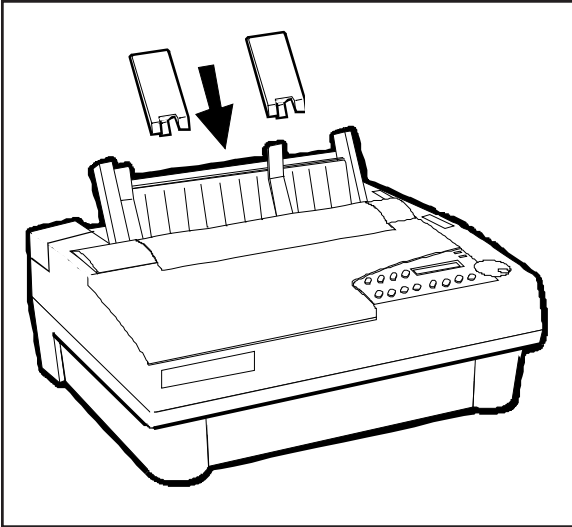


Figure 3-2. Attaching the Support Extenders

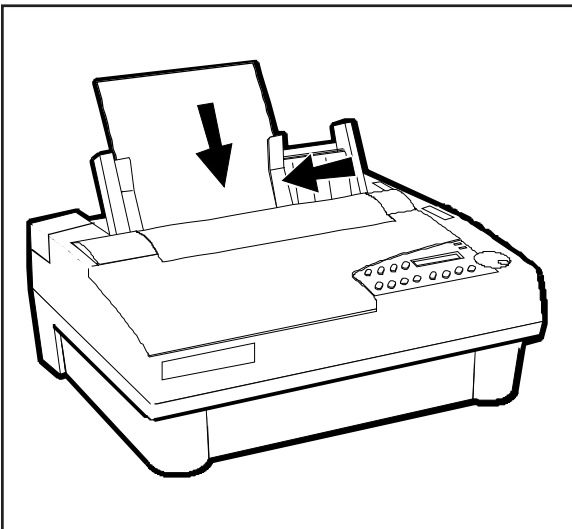


Figure 3-3. Loading a Form


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


To load a form, use this procedure:

1. Move the tractor select lever to activate the top path (☐).
2. Raise the paper support. If necessary for long forms, attach the paper support extenders, as shown in figure 3-2.
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 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 form, as shown in figure 3-3.
5. Press the Form Feed button. The form will advance into the printer.

☞ **Note:** Use of the right paper edge guide is highly recommended for long, multi-sheet forms printing.

Loading Forms—continued

 **Note:** To load sheets wider than 16 inches, don't use the paper edge guides. Just set a sheet into the paper entry slot behind the platen and let it rest against the paper support. If necessary, you can remove the edge guides.

 **Caution:** When loading a cut sheet, do not turn off or reset the printer until the sheet is captured under the bail. If you do, a paper jam may result during the next form feed.

You can load forms with pin-fed report paper already loaded, provided that the pin-fed report paper is in the *parked* position. You'll learn more about *paper park* later in this section.

Positioning a Form

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

Ejecting a Form

The printer ejects a form under any of the following conditions:

- ✓ When instructed by your software application.
- ✓ When printing reaches the last print line on the form.
- ✓ When printing reaches the number of lines you or your software application specified for a form.
- ✓ 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-Fed Report Paper

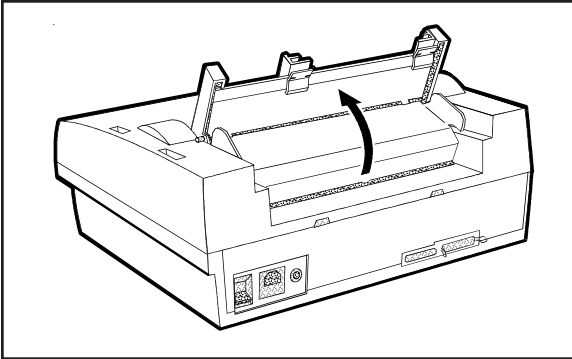


Figure 3-4. Raising the Tractor Cover

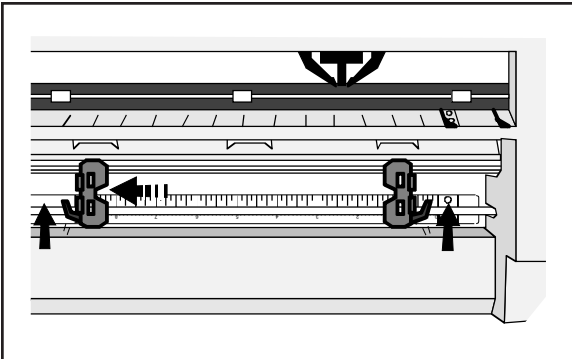


Figure 3-5. Unlocking the Tractors

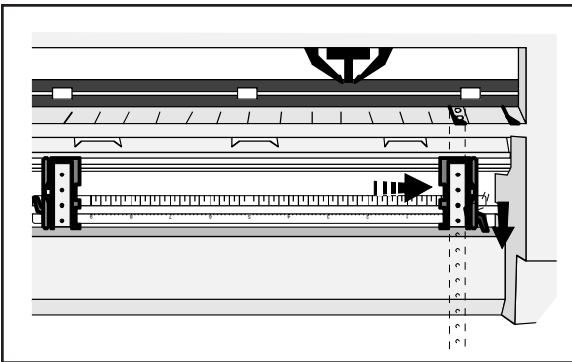


Figure 3-6. Aligning the Left-Edge Tractor

The printer contains two built-in, low-profile tractors that are easy to load. Normally, you load pin-fed report paper from the back of the printer. After loading the 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.

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

1. Select the rear path (☐).
2. Raise the paper support and tractor cover, as shown in figure 3-4.
3. Unlock both tractors by moving the locking levers, as shown in figure 3-5.
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 3-6.
5. Open both tractor doors.

Loading Pin-Fed Report Paper—continued

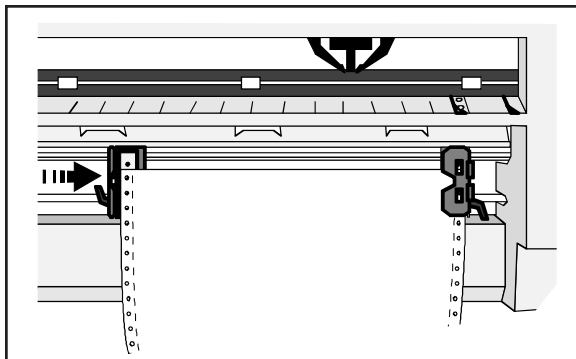


Figure 3-7. Loading Paper Into the Tractors

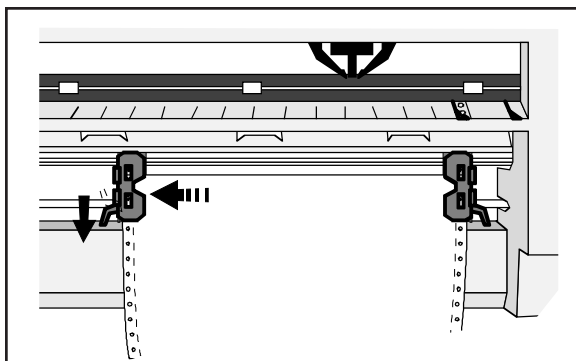


Figure 3-8. Making Sure the Paper is Taut

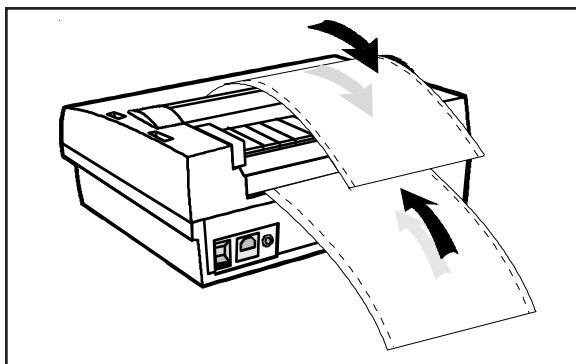


Figure 3-9. Checking the Exit Path

6. Mount the paper onto the first three pins of both tractors, as shown in figure 3-7, 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 3-8. 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 3-9.

Positioning Pin-Fed Report Paper

Although it is usually unnecessary, you can move pin-fed report paper forward or backward after loading it. To move the 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 (top-of-form) button on the control panel.

Advancing Pin-Fed Report Paper

The printer advances pin-fed report paper to the next page 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-fed report paper without wasting the next sheet. This is especially useful when printing serialized or pre-printed reports 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-fed report paper out of the printer is quick and easy. Reloading paper is even easier.

To park pin-fed report paper, use the following procedure:

1. Tear off the last printed report page 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 through the top paper path, move the tractor select indicator to the rear position (☐). Then, load the sheet in the usual way (refer to *Loading Single Sheets* in this section).

To load pin-fed forms on models with bottom-feed tractors, move the tractor select to the rear position (☐). Then, set the BIN parameter to the *Bottom* setting. Refer to the *Bottom-Feed Tractors* appendix.

Unloading Pin-Fed Report Paper

To unload pin-fed report paper, tear off all printed pages that have exited the printer and press the 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-fed paper is clear of the tractors.

Loading Multipart Forms

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

- ✓ Forms are thicker than normal paper. You must adjust the forms thickness indicator. Always start with the indicator all the way towards the front of the printer, then slowly push it back until print density is optimized.
- ✓ If your printer has bottom-feed tractors, 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.

Loading Labels

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

- ✓ Labels are thicker than normal paper. You must adjust the forms thickness indicator. Always start with the indicator all the way towards the front of the printer, then slowly push it back until print density is optimized.
- ✓ When feeding labels, do not use reverse feed, paper park, or 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 aperforation 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.

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 forms or pin-fed report paper, except for the following precautions:

- ✓ Transparencies are thicker than normal paper. You must adjust the forms thickness indicator. Always start with the indicator all the way towards the front of the printer, then slowly push it back until print density is optimized.
- ✓ 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.

Aligning Preprinted Forms

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

1. Load the preprinted form into the printer.
2. With the printer idle, press the Ready button on the control panel to pause printing. Turn the Select-dial to move the paper up or down to align the form.
3. 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.

 **Note:** You can also set the RGT MAR parameter to keep the printhead on the form and keep it from catching on the edge.

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-fed report 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 (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 must be towards the *front* of the printer. When loading single sheets or pin-feed paper from the bottom, the indicator must be towards the *rear* of the printer. You select a paper path by manually moving the indicator.
- ✓ *Forms thickness indicator* shows the current forms thickness. You move this indicator manually to optimize print quality.
- ✓ *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.

Reviewing Paper Handling Controls—continued

- ✓ *Bail button* engages and disengages the bail. During paper loading, bail motion is automatic so you will rarely use this button. Pressing the button moves the bail away from the platen so you can clear a paper jam or clean the platen. Pressing the button again moves the bail back against the platen.
- ✓ *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.
- ✓ *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 below. The control panel consists of a sixteen-character display, twelve buttons and a Select-dial.

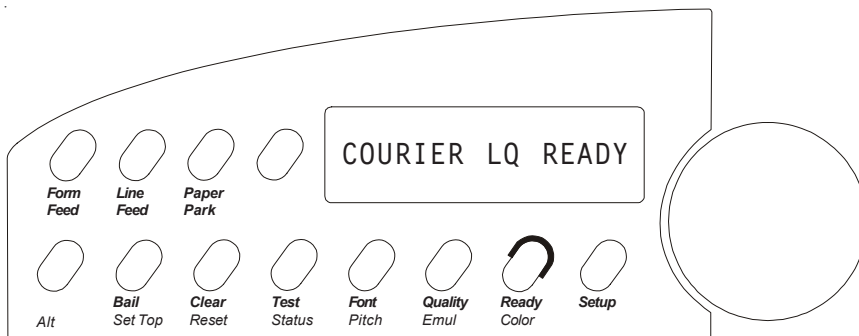
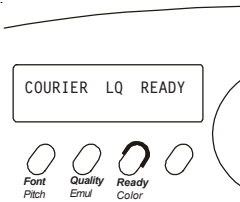


Figure 4-1. Control Panel

Understanding Display Messages

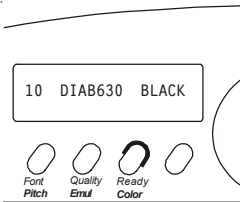
The control panel display can show four kinds of messages.

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 DIAB630 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 alongside 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.

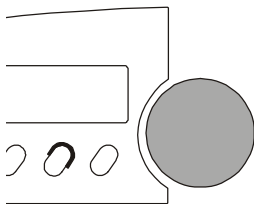
LOAD PAPER *Operator and Error*

Many *operator and error* messages appear to notify you of printer conditions, actions you must take, and errors that occur. You can find a complete list of operator and error messages in the *Solving Problems* section of this guide.

2) SAVE: Usr 1 *Setup Menu*

The *Setup menu* is a list of parameters for operations, print modes, page setup, tabs, communications, and special modes. 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, and scroll through the Setup menu.

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 to the right, hold down the Alt button and turn the dial *clockwise*. To move the carriage to the left, hold down the Alt button and 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

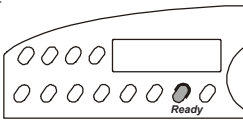
Whenever the Setup menu is displayed, you use the Select-dial to scroll through the menu and make selections. You'll learn how to make selections later in this section.

Using the Control Panel Buttons

You press the buttons to set printer parameters and perform operations. A function label is printed next to 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.

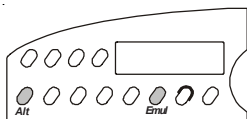
Only the Ready button operates while printing is in progress. To use any other button while printing, you must first press the Ready button and wait for printing to pause. When you change a printer setting with a control panel button, the printer *beeps* to confirm the change.

Turning Printing On and Off



Pressing the Ready button turns printing 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 at the end of the current line. When you press the Ready button again, printing will continue where it left off.

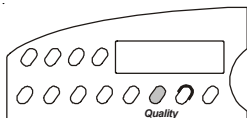
Selecting a Printer Emulation



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. On standard printers you can select from the following emulations: AMT (AMT's native language), DIAB630 (the Diablo 630 daisywheel printer), Xerox 4020, EPSONJX (the Epson JX color dot-matrix printer), EPSONLQ (the Epson LQ-2550 color dot-matrix printer), and IBMXL24 (the IBM Proprinter XL24 color dot-matrix printer). When you select an emulation, all current printer settings remain in effect.

Note: Emulations allow your printer to operate just like printers from other manufacturers, such as Epson or IBM. By emulating other popular printers, your printer becomes compatible with a wider range of software applications.

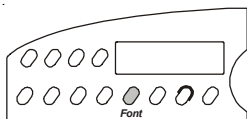
Selecting a Text Quality



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

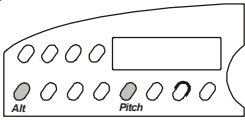
The actual print speed for each text quality depends on your printer model and current pitch setting. Print speeds are listed in the *Specifications* appendix of this guide.

Selecting a Font



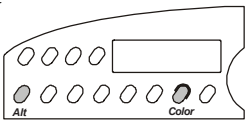
Pressing the Font button selects the next available font (type style) and displays the font name. On standard printers you can select from the following fonts: COURIER (a fixed-pitch serif font), GOTHIC (a fixed pitch sans-serif font), TREND (a proportionally-spaced serif font), and ELITE (a fixed-pitch 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



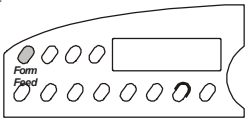
Holding down the Alt button and pressing the Pitch button selects the next available pitch (number of characters per inch) and displays the pitch setting. You can select 10, 12, 13.3, 15, 17.1 or 20 characters per inch. If the current font is a proportionally-spaced font, you can also select PS. If your 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, BLUE, RED, YELLOW, PURPLE, GREEN, or ORANGE. If a monochrome ribbon is installed in the printer, you can select only BLACK.

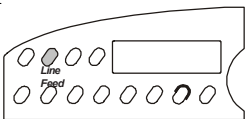
Form Feeding



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

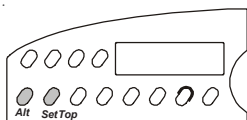
- ✓ If you are loading a single sheet with or without a sheetfeeder, the sheet advances to the top-of-form.
- ✓ If a single sheet is already loaded, the sheet ejects.
- ✓ If you are loading or using pin-feed paper, the paper advances to the next top-of-form.

Line Feeding



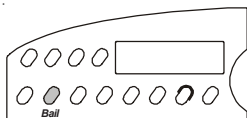
Pressing the Line Feed button advances the paper one line space; holding down the Line Feed button causes continuous line feeding. The actual distance that the paper advances for a line feed depends on the current lines per inch (lpi) setting. As you line feed, the printer increments the internal line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

Setting the Top-of-Form



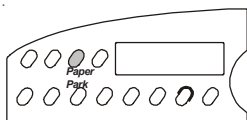
Pressing the Set Top of form button sets the top-of-form at the current print line. When you set a top-of-form, the printer recognizes the current print line as the first line on the page (line 0) and starts counting lines from that point.

Moving the Bail



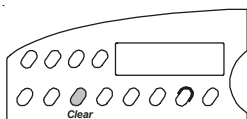
Pressing the Bail button moves the bail back and forth. During normal printing operations, it is *not* necessary to use the Bail button since the bail moves automatically.

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.

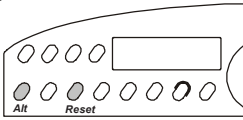
Clearing the Buffer



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

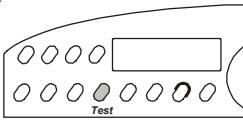
- ✓ If an error or warning message is displayed, the normal status message reappears.
- ✓ If the normal status message is displayed, the printer erases all data that has been received but not yet printed. Since the printer receives incoming data faster than it can print it, the printer temporarily stores 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, except that downloaded fonts remain in effect.

Printing a Self Test

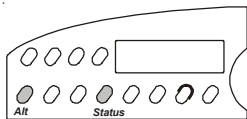


Pressing the Test button prints an 8-inch wide test pattern of some of the characters in the current font (ASCII codes 33 to 126), using the current print modes. Pressing the Test button twice in succession prints a 13.6-inch wide test pattern (or 16-inch wide test pattern, if the maximum print width is set to 16 inches). To terminate the test, press the Ready button.

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

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.

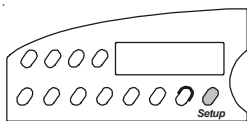
Printing a Printer Status Report



Holding down the Alt button and pressing the Status button prints a *Printer Status Report*. The report consists of a list of the available printer emulations and fonts, a printout of the Setup menu, and a printout of all characters in the current font. The Setup menu is a snap-shot view of the current printer settings. To terminate the printing of the report, just press the Ready button. Printing will stop at the end of the current line.

A sample *Printer Status Report* is shown on the next page. The settings in this example are the factory-set defaults. 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 three minutes, the status message will reappear automatically. Next, you'll learn more about the Setup menu.

AMT PRINTER STATUS REPORT		
MODEL: ACCEL-5350 FIRMWARE: 399101-020-A EMULATIONS: HexMode AMT Di ab630 EpsonJX EpsonLQ IBMXL24 Barcode FONTS: Courier Gothic TmsRomn Elite		
OPERATIONS	TEXT APPEARANCE	PAPER HANDLING
1) RSTOR: None 2) SAVE: None 3) DFALT: Fctry 4) TEST: None PRINTER SETUP 5) EMUL: AMT 6) QUI ET: Off 7) LANG: USA 8) SETS: IBM1 9) AUTO CR: Off 10) AUTO LF: Off 11) ERRBEL: Once	12) QUAL: Letter 13) FONT: Courier 14) PITCH: 10 15) CELL: 10 16) LPI: 6 17) COLOR: Black 18) ITALICS: Off 19) HIGH: Off 20) WIDE: Off 21) SCRIPT: Off 22) UNDLIN: Off 23) BLD/SHA: Off 24) SLASH-0: Off 25) BI-DIR: Text PAGE SETUP 26) LENG: 66/6" 27) WIDTH: 13.6" 28) TOP MAR: 0 29) BOT MAR: 66 30) LFT MAR: 0 31) RGT MAR: 136 32) AUTO FF: Off	33) PATH: Rear 34) LFSLEW: 6ips 35) DEMAND: Off 36) PPR JAM: Off 37) PGE END: On 38) POPUP: Off 39) AUTOBAL: Off 40) PFORCE: Auto 41) POFF: 0/60" COMMUNICATIONS 42) INTRFCE: Auto 43) BAUD: 9600 44) BUFFER: 48K 45) HNDSHK: D/X 46) DATA BITS: 8 47) STOP BITS: 1 48) PARI TY: None 49) DTR: Pos 50) STROBE: Neg

Figure 4-2. Sample Printer Status Report

AMT PRINTER STATUS REPORT						
MODEL: ACCEL-5350 FIRMWARE: 399101-020-A EMULATIONS: HexMode AMT Di ab630 EpsonJX EpsonLQ IBMXL24 Barcode FONTS: Courier Gothic TmsRomn Elite CALIBRATE: CW=2, GT=110, LP=1, DS=0, BS=1, RM=512						
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	Di ab30	EpsonQ	IBMXL24	Barcode	Hexmode
6) QUI ET: 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	Memo	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) UNDERLINE:	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				
34) LFSLEW:	61 ps	61 ps	101 ps				
35) DEMAND:	Off	Off					
36) PPR JAM:	On	On					
37) PGE END:	Off	Off					
38) POPUP:	Off	Off					
39) AUTOBAL:	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	-5					
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:	Unl ock	Unl ock					

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
- ✓ Print Modes
- ✓ Page Settings
- ✓ Tabs
- ✓ Communications Settings
- ✓ Special Modes

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 three minutes, 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
OPERATIONS		
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
PRINTER SETUP		
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 Portgts
8) SETS:	IBM1	IBM2 Ital1 Ital2 None
9) AUTO CR:	Off	On
10) AUTO LF:	Off	On
11) ERRBEL:	Once	Dcay Cont
TEXT APPEARANCE		
12) QUAL:	Letter	Memo Draft
13) FONT:	Courier	Gothic TmsRomn 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 Yellw Viol t Green Orang
18) ITALICS:	Off	On
19) HIGH:	Off	On
20) WIDE:	Off	On
21) SCRIPT:	Off	Sub Supr
22) UNDLINE:	Off	On
23) BLD/SHA:	Off	Bl d Sha
24) SLASH-0:	Off	On
25) BI-DIR:	Text	Graf Full Off
PAGE SETUP		
26) LENG:	66/6"	0/6" to 182/6"
27) WIDTH:	8.5"	8" 11" (settings for narrow-carriage printers)
	13.6"	8" 16" (settings for wide-carriage printers)
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
PAPER HANDLING		
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

Figure 4-4. Setup Menu

PARAMETER	DEFAULT SETTING	OTHER SETTINGS
COMMUNICATIONS		
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

☞ **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.

6) QUAL: Letter

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

6) 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

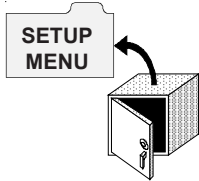
Turn the Select-dial to display another parameter or press the Setup button to redisplay the status message.

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.

Selecting Operations

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

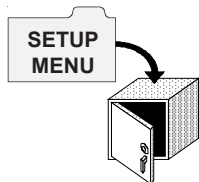
1) RSTOR: None *Restore Printer Settings*



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.

2) SAVE: None *Save Printer Settings*

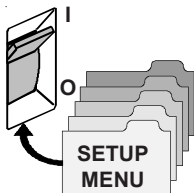


SAVE lets you save the current printer settings in non-volatile memory for use at a later time. Non-volatile memory retains information even when the printer is turned off.

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.

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.

4) TEST: None *Run Printer Tests*



TEST lets you run a variety of printer tests, including a memory check, ribbon alignment test, serial loopback test, and a sensor check. If a test is unsuccessful, an error message appears to notify you.

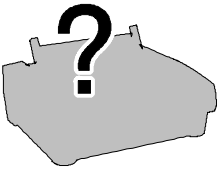
You can select *None*, which is always the default and does not perform any test; *Memory*, which checks the printer memory; *Ribbon*, which performs a ribbon alignment print test; *Serial*, which checks the serial interface; and *Sensor*, which runs the sensor check. Printer tests are described in detail in the *Solving Problems* section of this guide.

Selecting Print Modes

The second section on the Setup menu is print modes. The most important print mode parameter is emulation, which must be set so that it is compatible with your application program. Selecting print modes change the way text prints on the page.

5) EMUL: AMT

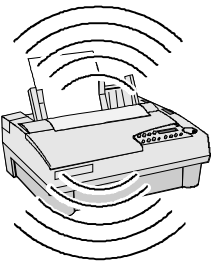
Set Printer Emulation



EMUL lets you select a printer emulation for the printer to use. Selecting an emulation enables the printer to imitate some other popular printer. The emulations you can choose from depend on those in the installed Intelli-card. On standard printers you can select from the following emulations: *AMT* (AMT's native language); *Xerox* (the Xerox 4020), *Diab630* (the Diablo 630 daisywheel printer); *EpsonJX* (the Epson JX color dot-matrix printer); *EpsonLQ* (the Epson LQ-2550 color dot-matrix printer); and *IBMXL24* (the IBM Proprinter XL24 color dot-matrix printer). Always select a printer emulation that is supported by your software. When you select an emulation, all current printer settings remain in effect.

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

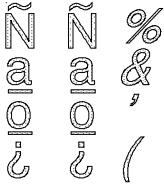
Set Language

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	\$	@	¡	Ñ	¿	^	`	¨	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	¡	Ñ	¿	é	`	í	ñ	ó	ú
<i>Portgs</i>	Portugal	#	\$	á	¡	Ñ	¿	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).

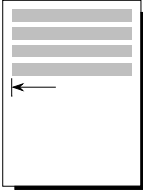
ASCII Code	IBM # 1	IBM # 2	Ital #1	Ital #2	ASCII Code	IBM # 1	IBM # 2	Ital #1	Ital #2
128	NUL	Ç	NUL	Ç	155	ESC	ç	ESC	ç
129		ü		ü	156		£		£
130		é		é	157		¥		¥
131		â		â	158		Pt		Pt
132		ä		ä	159		f		f
133		à		à	160	á	á	∅	∅
134		å		å	161	í	í	!	!
135	BEL	Ç	BEL	Ç	162	ó	ó	"	"
136	BS	ê	BS	ê	163	ú	ú	#	#
137	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	¿	¿	((
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	n	n	/	/
216	⌬	⌬	X	X	253	²	²	}	}
217	⌭	⌭	Y	Y	254	■	■	~	~
218	⌮	⌮	Z	Z	255				

9) AUTO CR: Off

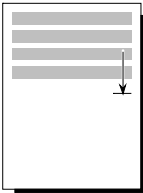
Turn Automatic Carriage Return Mode On and Off



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

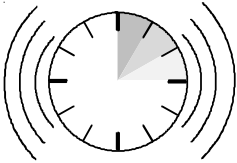
Turn Automatic Line Feed Mode On and Off



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

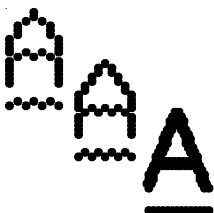
Select Audible Alarm Mode



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

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 actual printing speed for each text quality depends on the printer model and the pitch setting.

Courier
Gothic
Trend PS
Elite

13) FNT: Courier *Set Font*

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*, *Trend* 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.

13) 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: 12 Set Number of Lines Per Inch



LPI lets you specify how many lines to print per inch. You can select 3, 4, 6, 8 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 non-standard value.

17) COLOR: Black *Set Color*

ABCDEF

COLOR lets you specify a color for printing. You can select *Black*, *Blue*, *Red*, *Yellw*, *Purpl*, *Green* or *Ornge*. If a monochrome ribbon is installed, the printer ignores your color selection.

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

ABCD

ITALICS lets you turn the italic mode on and off and specify how many degrees the text should slant to the right. You can select *Off*, *10°*, *20°* or *30°*.

19) HIGH: Off *Turn Double-High Mode On and Off*

ABCDEF

HIGH lets you turn the double-high mode on and off. In double-high mode, characters stretch downward to twice their normal height. 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*

ABCD

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: 0ff

Turn Super/Subscript Modes
On and Off

A^BCD_EF

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 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) UNDLIN: 0ff

Turn Underline Mode On and Off

ABCDEF

UNDLIN lets you set the underline mode. In underline mode, all characters and spaces are underlined. You can select *On* or *Off*.

23) BLD/SHA: 0ff

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.

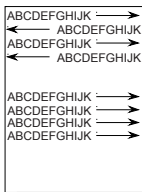
24) SLASH-0: 0ff

Turn Zero Slashing On and Off

0 0

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 (0). Your selection affects the printing of the numeral zero in all fonts and print qualities.

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



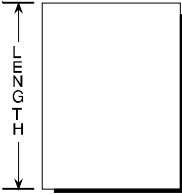
DIRCTN lets you specify whether the printer should print in both directions or from left to right only. Printing from left to right only provides the highest possible vertical alignment, but slows down printing. You can select *Bi-d* for bi-directional printing or *Uni* for left-to-right printing.

<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

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

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

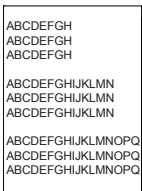


LENG lets you specify the length of the form you are using in 1/6-inch increments. This setting is very important since it controls continuous-forms feeding.

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.

If you set LENG to 0, the printer does not keep track of lines per page. When using single sheets, a form feed control code ejects the page; when using pin-feed paper, a form feed control code performs a carriage return only.

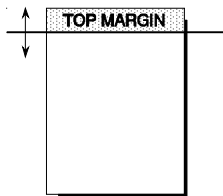
27) WIDTH: 13.6 *Set Maximum Print Width*



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. You can specify 8, 13.6 or 16 inches. When you select 16, be sure to load paper so that it aligns with the blue line (↑) on the paper scale.

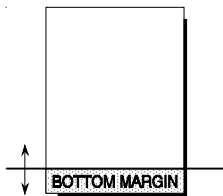
Note: When 16-inch wide printing is selected, printing is unidirectional and slower than normal. Also, draft-quality printing is unavailable. If you select draft-quality printing, the printer will use memo-quality.

28) TOP MAR: 000

Set Top Margin

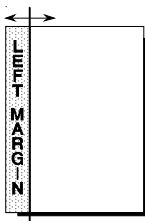
TOP MAR lets you specify a top margin. On subsequent form feeds, paper advances to the top margin you specify. The top margin can be from 0 to 181 lines down from the top-of-form; however, you can only select a line that is above the bottom margin setting. The physical location of the top margin on the page is unaffected by subsequent changes to line spacing. If you change the LENG setting, the top margin resets to 000.

29) BOT MAR: 066

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 182 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: 000

Set Left Margin

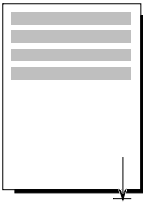
LFT MAR lets you specify a left margin. All subsequent carriage returns cause the carriage to move to the left margin. The left margin can be from 0 to 319 character spaces to the right of the far left print position; however, you can only select a character space that is to the left of the right margin setting. To 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. The right margin is also used in the center and justify modes. The right margin can be from 1 to 320 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: 0ff *Turn Automatic Form Feed Mode On and Off*



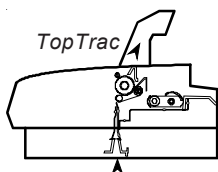
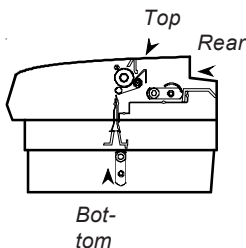
AUTO FF lets you turn the automatic form feed mode on and off. In the automatic form feed mode, the printer skips over the perforations of pin-feed paper by setting the top and bottom margins to one-half inch. You can select *On* to turn the automatic form feed mode on; or *Off* to turn the mode off. 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.

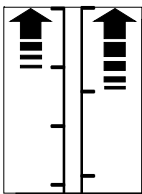
33) PATH: Top *Select Paper Path*

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.

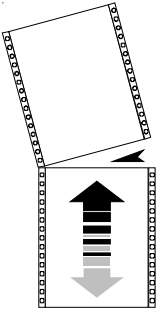
34) LFSLEW: 6ips *Set Line Feed Speed*



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



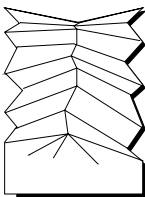
DEMAND lets you turn set the demand document mode. The demand document mode lets you remove a pin-fed form without wasting the next form. With the mode on, pressing the Ready button turns printing off, displays DEMND on the control panel, and advances the last printed page up to the tear bar. You can 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 continues 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, 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.
- ✓ *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*

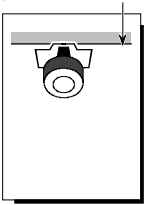


PGE END lets you tell the printer whether or not to use the LENG (form length) setting to determine the last printing line on a cut sheet. You can select *Off* to let printing continue beyond the LENG setting; or *On* to specify that printing stop at the LENG setting. A third setting is *Roll*, which 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

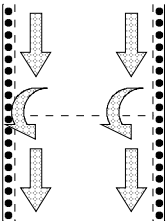
Turn Preprinted Forms Alignment Mode On and Off



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

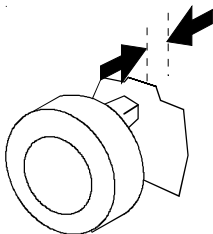
Turn Automatic Bail Mode On and Off



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*

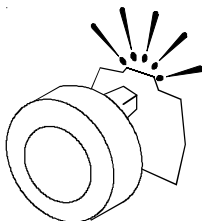


PH GAP lets you enable and disable automatic forms thickness detection. When set to *Auto*, the printer automatically detects forms thickness and adjusts the print gap (that is, the physical distance between the printhead and the form) for optimal print density.

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.

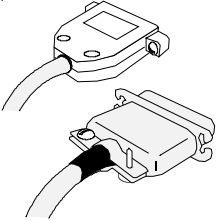
If necessary, you can disable this function and manually select a fixed print force. This causes the printer to use the selected print force when printing all forms, regardless of the actual forms thickness. To set the print force manually, set this parameter to a value from *1* to *10*. A setting of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

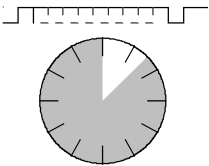
42) INTRFCE:Auto *Select Interface*



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.

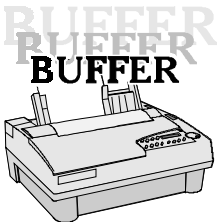
Note: To use the serial interface, you must set the BAUD, HNDSHK, DATA BITS, STOP BITS, and PARITY parameters to match the serial configuration of the host computer. When using the parallel interface, these parameter settings are irrelevant.

43) BAUD: 9600 *Specify Baud Rate*



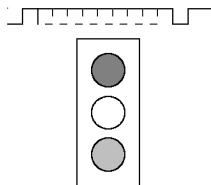
BAUD lets you tell the printer what serial baud rate your computer is using. Baud rate is the speed that serial data is transmitted between your computer and the printer. You can select 75, 150, 300, 600, 1200, 2400, 4800, 9600 or 19200. Both your computer and the printer must be set to the *same* baud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

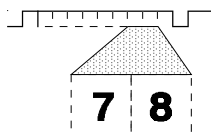
45) HNDSHK: D/X *Specify Handshaking Method*



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.

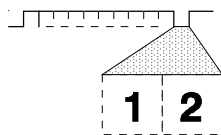
The printer supports three handshake protocols: DTR, X-ON/X-OFF and ENQ/ACK. DTR is a hardware handshake that uses the Data Terminal Ready line in the serial interface. Both X-ON/X-OFF and ENQ/ACK are software handshakes that require the computer or printer to send certain data bytes on its data transmission 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*



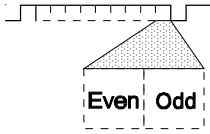
DATA BITS lets you tell the printer how many data bits your computer is sending in each byte. You must select 7 if your computer sends 7-bit bytes; or 8 if your computer sends 8-bit bytes.

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



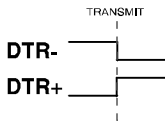
STOP BITS lets you tell the printer how many stop bits your computer is sending in each byte. Stop bits are necessary to separate consecutive bytes in the data stream. You must select 1 if your computer sends one stop bit; or 2 if your computer sends two stop bits.

48) PARITY: None *Specify Parity*



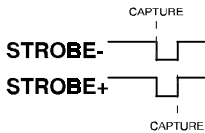
PARITY lets you tell the printer what parity method your computer is using. When your computer uses parity, it adds a special parity bit to each data byte it sends. This parity bit enables the printer to detect a data transmission error. In the even parity method, the sum of the binary 1 bits plus the 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 set-ting 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

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 Dansh1 Swedsh Italn Spnsh1 Jpnese Norwgn Dansh2 Spnsh2 Portgs

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 Elite</i>
PITCH	Set pitch	<i>10 12 13.3 15 17.1</i> <i>20 PS</i>
CELL	Set character cell size	<i>10 12 13.3 15 17.1</i> <i>20 PS</i>
LPI	Set number of lines per inch	<i>2 3 4 5 6 8 9</i> <i>10 12</i>
COLOR	Set color	<i>Black Cyan Mgnta Yellw</i> <i>Violt Green Orang</i>
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 Off
<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> <i>Rear</i> <i>Bottom</i> <i>TopTrac</i>
LFSLEW	Set line feed speed	1ips to 10ips (<i>6ips</i>)
DEMAND	Turn demand document mode on and off	<i>Off</i> <i>On</i> <i>Beep</i> <i>Tear</i> <i>Auto</i>
PPR JAM	Turn paper jam sensing on and off	<i>On</i> <i>Off</i>
PGE END	Select page end method	<i>Off</i> <i>On</i> <i>Roll</i>
POPUP	Turn preprinted forms alignment mode on and off	<i>Off</i> <i>On</i>
AUTO-BAIL	Turn automatic bail mode on and off	<i>Off</i> <i>On</i>
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>		
INTRFACE	Select interface	<i>Auto Par Ser</i>
BAUD	Specify baud rate	75 150 300 600 1200 2400 4800 <i>9600</i> 19200
BUFFER	Specify input buffer size	512 1K 2K 3K 4K 8K 16K 32K <i>48K</i> 64K 80K or more depending on installed memory
HNDSHK	Specify handshaking method	<i>D/X</i> ENQ D/E XON DTR None
DATA BITS	Specify number of data bits	7 8
STOP BITS	Specify number of stop bits	1 2
PARITY	Specify parity	<i>None</i> Odd Even
DTR	Set DTR signal polarity	<i>Pos</i> Neg
STROBE	Specify STROBE pulse edge for data capture	Pos <i>Neg</i>

Section

5

Cleaning and Maintenance

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

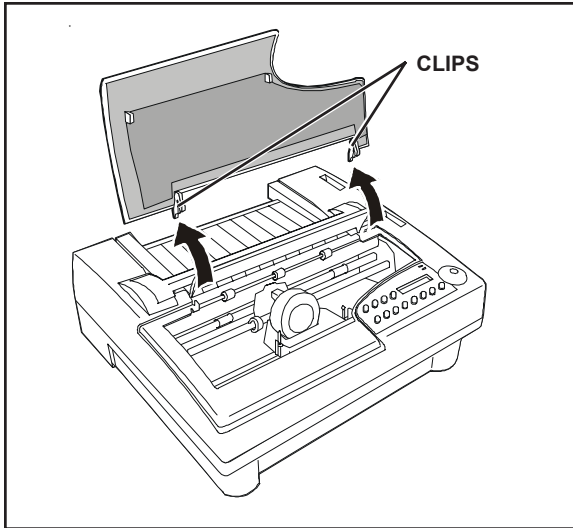


Figure 5-1. Removing the Top Cover

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.

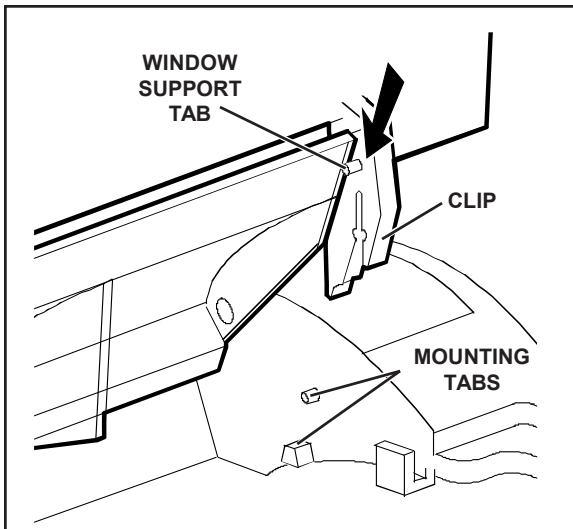


Figure 5-2. Aligning the Platen Window and Top Cover

Cleaning the Platen and Bail Rollers

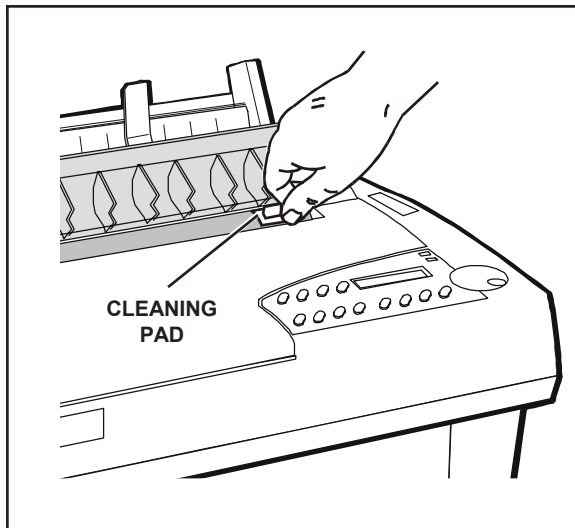


Figure 5-3. Cleaning the Platen and Bail Rollers

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 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

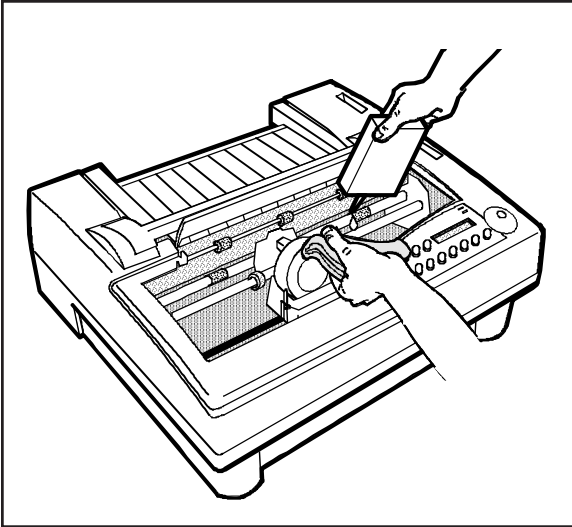



Figure 5-4. Cleaning the Main Carriage Shaft

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

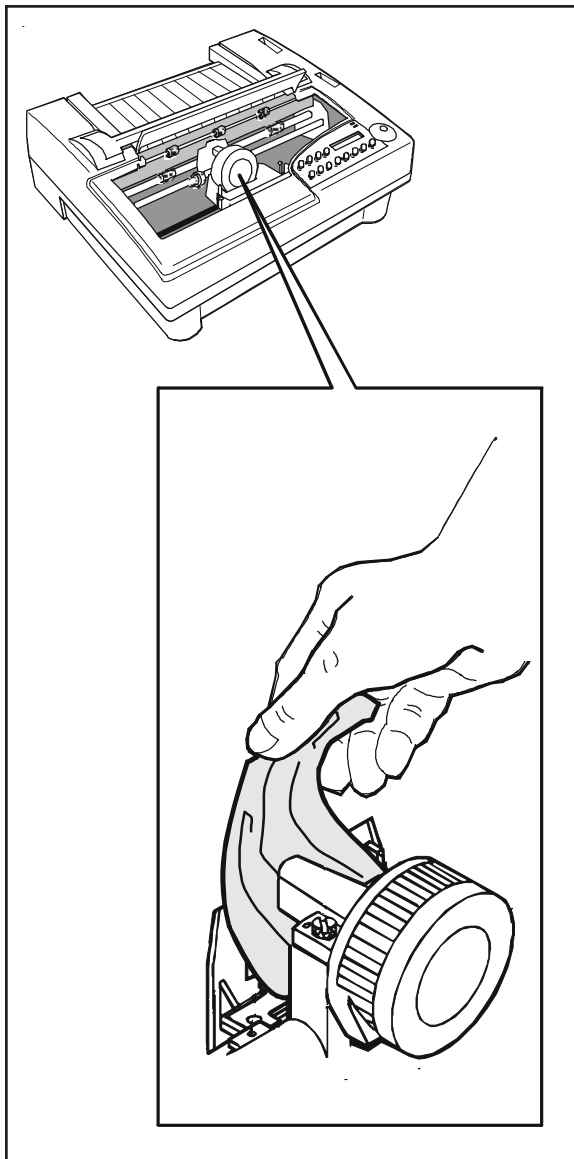


Figure 5-5. Cleaning the Printhead Wires

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

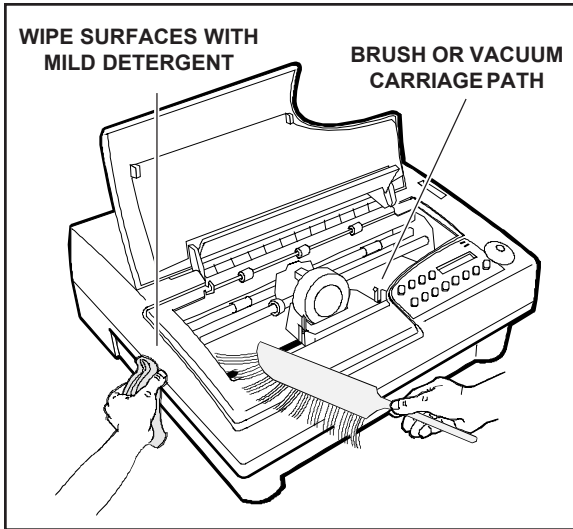


Figure 5-6. Cleaning Printer Surfaces

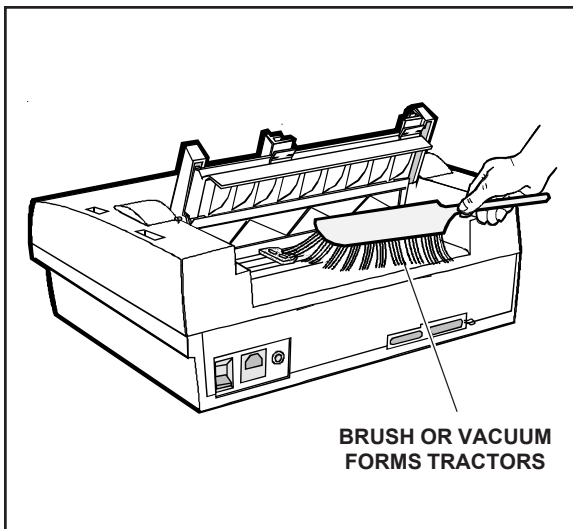


Figure 5-7. Cleaning the Forms Tractors

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.

Replacing the Ribbon Cartridge

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.

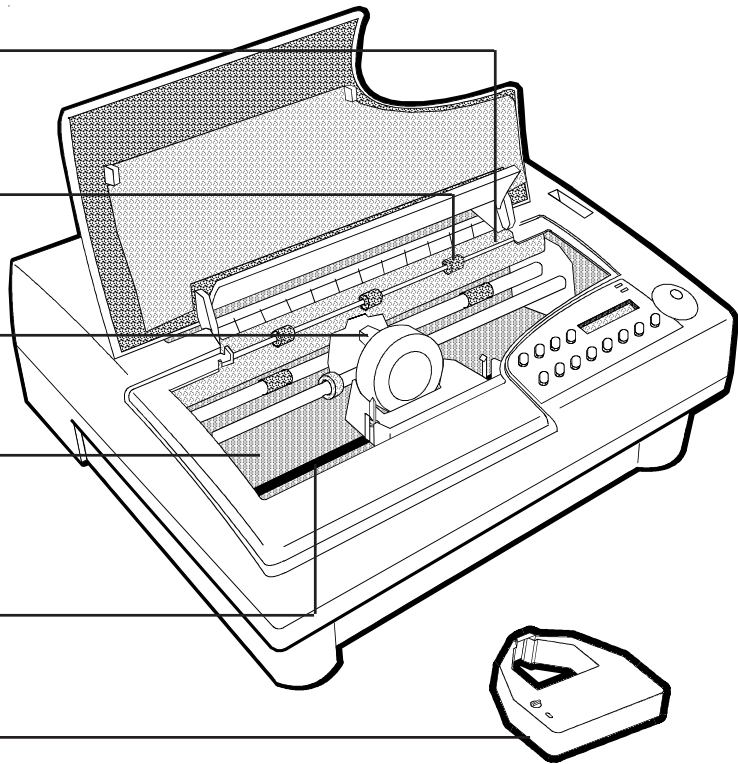


Figure 5-8. Inspecting the Printer, Front

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.

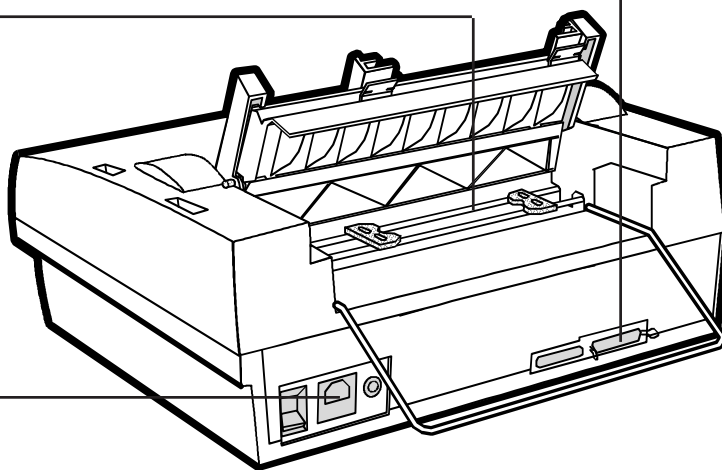


Figure 5-9. Inspecting the Printer, Rear

Replacing the Printhead

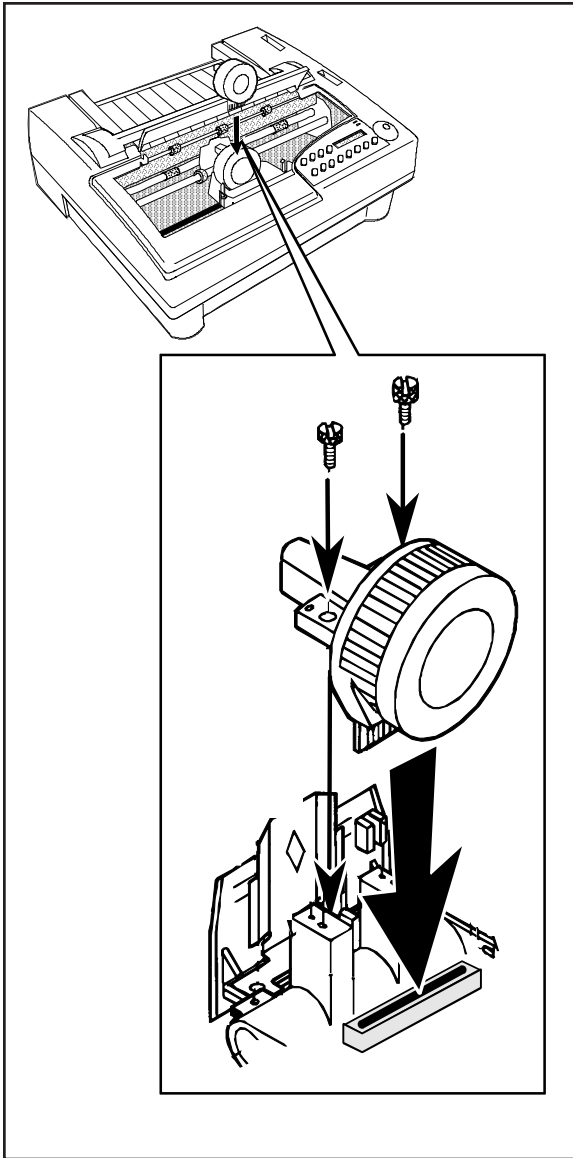


Figure 5-10. Replacing the Printhead

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 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 message: *operating errors*, *programming errors*, *warnings*, *communication errors* and *printer errors*.

Correcting Operating Errors

When an operating error occurs, the printer does not lose any buffered data. After you perform the corrective action(s), printing continues where it left off.

LOAD PAPER

This error message appears when the printer has information to print but no paper is in the printer.

Corrective action: Load paper and press the Ready button.

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.

Correcting operating
errors—continued

CLEAR PAPER JAM

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

Corrective action: Carefully remove the jammed paper and press the Ready button.

PAPER ERROR

This error message appears when the printer tries to eject a single sheet or perform a paper park operation, but continues to detect paper in the printer.

Corrective actions:

- ✓ If the paper is jammed, carefully remove the jammed paper and press the Ready button.
- ✓ If you're just using a very long cut sheet, press the Form Feed button.
- ✓ If you're using pin-feed paper, tear off the last printed sheet and press the Paper Park button again.
- ✓ If this error recurs with no paper in the printer, the paper sensor on the print-line indicator is 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. The sensor may be sensing a dirty platen surface.

CONFIG ERROR

This error message appears when the installed firmware is defective or does not contain valid information.

Corrective action: Turn off the printer, re-FLASH the firmware, and then turn on the printer.

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.

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 current printer emulation remains active and printing continues. Subsequent printing may contain erroneous characters and coding, due to the missing printer emulation.

Corrective actions: Press the Ready button to stop the printing in progress; then press the Clear button to clear the data input buffer. Then 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.

Correcting programming errors—continued

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 stop the printing in progress and then the Clear button to clear the data input buffer. Perform one of the following actions:

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

Understanding Messages

These messages appear to notify you of special printer conditions.

CHECK TRACTR LVR

This message appears after a paper park operation to remind you to move the tractor select indicator *if you are going to load a single sheet into the printer*. Moving this lever disengages the built-in forms tractors and enables single-sheet mode. If you forget to move this lever, a paper jam can result since both the single sheet and the pin-feed paper will feed into the printer at the same time.

Corrective actions: If you are *not* going to load a single sheet, just ignore the message. If you *are* going to load a single sheet, move the tractor select indicator towards the back of the printer and press the Ready button.

TEST IN PROGRESS

When you select a printer test on the Setup menu, this message appears to notify you that the printer is executing the test.

Corrective action: None.

TEST UNAVAILABLE

This message appears when you select a test on the Setup menu, but the test is not in the installed Intelli-card.

Corrective action: Turn the Select-dial to clear the message and return to the Setup menu. If you have an Intelli-card that provides the test you selected, turn off the printer, install the card, turn on the printer, and retry the test.

CONNECT LOOPBACK

When you select the *Serial* test on the Setup menu, this message appears to remind you to attach a loopback connector onto the printer's serial interface. If you perform the test without a loopback connector, the test is invalid and fails automatically.

Corrective action: Attach a loopback connector to the serial interface; then turn the Select-dial to start the test. The loopback connector is described in the *Interfaces* appendix.

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.

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 selected. When a 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.

FRAMING ERROR

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

Corrective action: Change the BAUD and DAT BITS settings on the Setup menu to match your computer's baud rate and number of data bits. Then, press the Ready button to re-enable printing and restart the print job from the beginning.

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: Change the PARITY setting on the Setup menu to match your computer's parity method, press the Ready button to re-enable printing, and then restart the print job from the beginning. If the PARITY setting is correct, press the Clear button to clear the data input buffer and the Ready button to re-enable printing; then restart the print job from the beginning. If the error recurs, reset your computer and the printer to use no parity checking and try again.

Correcting communication errors—continued

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: 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.

TxD/RxD ERROR**DTR/DSR ERROR****RTS/CTS ERROR****BUSY/DCD ERROR**

When you run the *Serial* test on the Setup menu, these messages appear to notify you of a serial line failure.

Corrective action: If any of these messages appear, your serial interface requires servicing. Contact your Service Representative for assistance. To clear the message and return to the Setup menu, turn the Select-dial. If the *Serial* test was performed without a loopback connector installed on the serial interface, the test is invalid.

Correcting Printer Errors

Printer errors occur when the printer is unable to continue printing due to a malfunctioning printer component.

MEMORY ERROR

This error message appears when printer logic detects defective memory during a printer memory test. Memory tests occur at power up and when you select the *Memory* test on the Setup menu. When this error message appears, the #### in the message is replaced by the number of the socket containing the bad memory.

Corrective action: You must replace the memory chip in the indicated socket. Contact your Service Representative for assistance. If this message displays during the Setup menu *Memory* test, you may be able to clear the message and return to the Setup menu by turning the Select-dial.

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 (refer to *Replacing the Ribbon Cartridge* in the *Cleaning and Maintenance* section).
- ✓ If the error recurs, try cleaning the carriage shaft (refer to *Cleaning the Main Carriage Shaft* in the *Cleaning and Maintenance* section).
- ✓ If the error still recurs, the carriage home sensor or tripping tab needs to be adjusted or replaced. Contact your Service Representative for assistance.

Correcting printer errors—continued

RIBBON ERROR

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

- ✓ You turn on the printer with no 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. If the error recurs, the ribbon home sensor may need to be realigned or replaced. Contact your Service Representative for assistance.

EEROM ERROR

This message appears when the printer detects that its non-volatile memory is defective or does not contain the correct information.

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"> ✓ Power cable is not plugged into power outlet or printer. Check cable. ✓ Power outlet is not supplying voltage. Check outlet with another appliance. ✓ Main power fuse is blown or defective. Check fuse and replace if necessary.
Error message appears.	<ul style="list-style-type: none"> ✓ Find error message in this section and perform the corrective action(s).
Self test does not operate and no error message is displayed.	<ul style="list-style-type: none"> ✓ Printer requires service; contact your Service Representative for assistance.
Control panel buttons do not work.	<ul style="list-style-type: none"> ✓ Printing is in progress. Wait until printing stops.
Select-dial does not move paper.	<ul style="list-style-type: none"> ✓ Printing is not paused. Press Ready button and try again.
Self test runs ok; but printer remains idle when computer sends print data.	<ul style="list-style-type: none"> ✓ Printing is paused; press the Ready button.

Table 6-1. Troubleshooting Guide—continued

<i>Symptom</i>	<i>Probable Cause/Corrective Action</i>
<p data-bbox="417 285 801 386">Self test runs ok; but printer remains idle when computer sends print data—continued.</p> <p data-bbox="417 834 642 867">Printing is too light.</p>	<ul style="list-style-type: none"> <li data-bbox="848 285 1224 350">✓ Wrong INTRFCE setting on Setup menu. Check setting. <li data-bbox="848 391 1224 524">✓ Interface cable to computer is loose, defective or wired incorrectly. Check interface cable. <li data-bbox="848 553 1224 654">✓ Computer is sending data to the wrong output port. Check port assignment. <li data-bbox="848 678 1224 812">✓ Interface is fouled up. Turn computer and printer off, then back on; or try a different output port. <li data-bbox="848 841 1224 906">✓ Push forms thickness indicator toward back of printer. <li data-bbox="848 930 1224 995">✓ Ribbon is worn. Replace the ribbon cartridge.

Table 6-1. Troubleshooting Guide—continued

<i>Symptom</i>	<i>Probable Cause/Corrective Action</i>
Printing is too light—continued.	<ul style="list-style-type: none"> ✓ Ribbon cartridge is not fully seated on carriage. Re-install ribbon cartridge. ✓ If the back copies of multipart forms are too light, set normally-hidden SI MODE parameter to <i>On</i>.
Printing is smearing.	<ul style="list-style-type: none"> ✓ Push forms thickness indicator towards front of printer. ✓ Ribbon is tangled. Correct problem or replace ribbon cartridge. ✓ Small piece of paper or debris is lodged in front of printhead. Remove the obstruction. ✓ Paper is not taut between the tractors or around the platen. Reload paper.
Large portions of characters are not printing.	<ul style="list-style-type: none"> ✓ Ribbon is tangled. Correct problem or replace ribbon cartridge.

Table 6-1. Troubleshooting Guide—continued

<i>Symptom</i>	<i>Probable Cause/Corrective Action</i>
Characters are missing one or dots.	<ul style="list-style-type: none"> ✓ Push forms thickness indicator toward back of printer. ✓ Printhead is damaged or worn. Replace printhead.
Printer prints garbled text and paper moves erratically.	<ul style="list-style-type: none"> ✓ Wrong printer emulation selected. Make sure computer and printer are set for same printer emulation.
Single sheets do not feed properly.	<ul style="list-style-type: none"> ✓ Paper is not loaded properly. Refer to <i>Loading Paper</i> section for detailed procedure. ✓ Wrong paper path selected. Make sure top paper path is selected.

Table 6-1. Troubleshooting Guide—continued

<i>Symptom</i>	<i>Probable Cause/Corrective Action</i>
Single sheets do not feed properly—continued.	<ul style="list-style-type: none"> ✓ Push the form thickness indicator toward the back of the printer.
Some or all printer settings change before printing begins.	<ul style="list-style-type: none"> ✓ Application program is overriding your settings. Change the printer setup in your application program.
Pin-fed forms do not load properly.	<ul style="list-style-type: none"> ✓ Forms are not loaded properly. Refer to <i>Loading Paper</i> section for detailed procedure. ✓ Wrong paper path selected. Make sure rear or bottom paper path is selected. ✓ Push forms thickness indicator towards front of printer.

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> <p>Printing goes off right side of page.</p> <p>Lines of text print on top of one another.</p>	<ul style="list-style-type: none"> ✓ Push forms thickness indicator towards front of the printer. ✓ 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 powered, bottom-feed tractors, try feeding forms from the bottom. ✓ Set normally-hidden SI MODE parameter to <i>Off</i>. ✓ WIDTH setting on Setup menu is incorrect; check setting. ✓ AUTO LF mode on Setup menu is off; turn it on. ✓ Paper is not taut between tractors or around platen. Reload paper. ✓ Wrong paper path selected. Check paper path selection.

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"> ✓ AUTO LF mode on Setup menu is on; turn off mode.
Carriage does not return to left margin before printing next line.	<ul style="list-style-type: none"> ✓ LPI setting on Setup menu is incorrect; check setting.
Printer only prints hexadecimal numbers.	<ul style="list-style-type: none"> ✓ AUTO CR mode on Setup menu is off; turn on mode.
Printer prints hexadecimal numbers.	<ul style="list-style-type: none"> ✓ HEX MODE on Setup menu is on; turn off mode.
Printing does not start at far left print position.	<ul style="list-style-type: none"> ✓ LFT MAR setting on Setup menu is incorrect; check setting.
Printer prints on pin-feed paper perforations.	<ul style="list-style-type: none"> ✓ Top-of-form is set incorrectly. Advance paper until first print line is under guide lines on print-line indicator and press Set top of form button. ✓ LENG setting on Setup menu is incorrect for paper you are using; check setting. ✓ AUTO FF mode on Setup menu is off; turn mode on.
Printer does not justify or center text with the corresponding mode turned on.	<ul style="list-style-type: none"> ✓ RGT MAR setting on Setup menu is incorrect; check setting.
Printing starts too far down the page.	<ul style="list-style-type: none"> ✓ TOP MAR setting on Setup menu is incorrect; check setting.
Last line(s) on page print on top of next page.	<ul style="list-style-type: none"> ✓ LENG setting on Setup menu is incorrect; check setting.

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.	✓ DIRCTN setting on Setup menu is bi-directional; change setting to uni-directional.
Printing only occurs from left to right, not in both directions.	✓ DIRCTN setting on Setup menu is uni-directional; change setting to bi-directional.
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.	✓ Color ribbon cartridge is not installed.
Printing continues to physical bottom edge of page on cut sheets, instead of using LENG setting.	✓ PGE END setting on Setup menu is off; change setting to on.
Printer not leaving blank lines (losing line feed) at top of cut sheets.	✓ PGE END setting on Setup menu is off; change setting to on.

Table 6-1. Troubleshooting Guide—continued

<i>Symptom</i>	<i>Probable Cause/Corrective Action</i>
Printer ejects cut sheets before finishing the printing on the page.	<ul style="list-style-type: none"> ✓ PGE END setting on Setup menu is on; change setting to off. ✓ LENG setting on Setup menu does not reflect actual size of page in use. Change the setting.
Forms jam in printer while using the demand document mode.	<ul style="list-style-type: none"> ✓ Forms are snagging on print-head during reverse feed. Change DEMAND setting to <i>Tear</i> and try again.
Paper jams after printer reset.	<ul style="list-style-type: none"> ✓ Do not reset printer before paper is captured under bail.
LOAD PAPER message appears while printing on preprinted form.	<ul style="list-style-type: none"> ✓ Dark areas on form are "fooling" paper sensor. Set BLK BAND parameter on Setup menu to <i>On</i>.
Control panel display goes blank during printing.	<ul style="list-style-type: none"> ✓ Static shock may have interfered with display. When print job is finished and printer is idle, turn the printer off, wait five seconds, and turn the printer back on.
Paper park or demand document mode does not work.	<ul style="list-style-type: none"> ✓ BIN parameter on Setup menu is set incorrectly. Change this parameter to <i>None</i>.

Running Printer Tests

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 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 con-firmation message appears. If the test fails, the message does not appear.

Sensor: Gap 1

Sensor: Gap 2

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: 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.

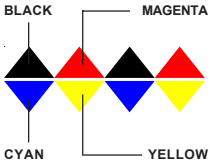
Checking Ribbon Alignment

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

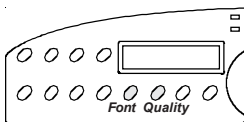
Then, display the TEST parameter on the Setup menu and select *Gap*.

gap values:	46	42	42	When you release the Alt button, the printer will begin moving the carriage
44 45				to various locations across the platen. At each location, the printhead will
gap values:	46	41	41	re-gap automatically. After measuring printhead gaps across the platen,
45 46				the printer will print out the gap values. Then, the platen will rotate slightly
gap values:	45	42	40	and the process will repeat. After printing about 20 lines of gap values,
44 45				press the Ready button to terminate the test. The Setup menu will
gap values:	45	43	44	reappear.
44 44				
gap values:	44	42	43	If there is a problem with platen parallelism, the printhead gap values in
45 45				each line will tend to increase or decrease linearly when read from left-
gap values:	45	42	42	to-right. If there are flaws in the platen surface, there will be an excep-
44 44				tionally high or low gap value in the table. If you see these problems in
gap values:	41	42	43	the test pattern, contact your Service Representative for assistance.
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				

Using Hidden Parameters

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) PTOP: 0/60"

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

PTOP 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. PTOP 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.

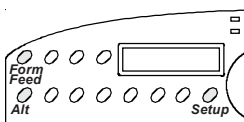
To define a custom control panel lock, use the following procedure:

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 Datasouth ACCEL-5350d 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.

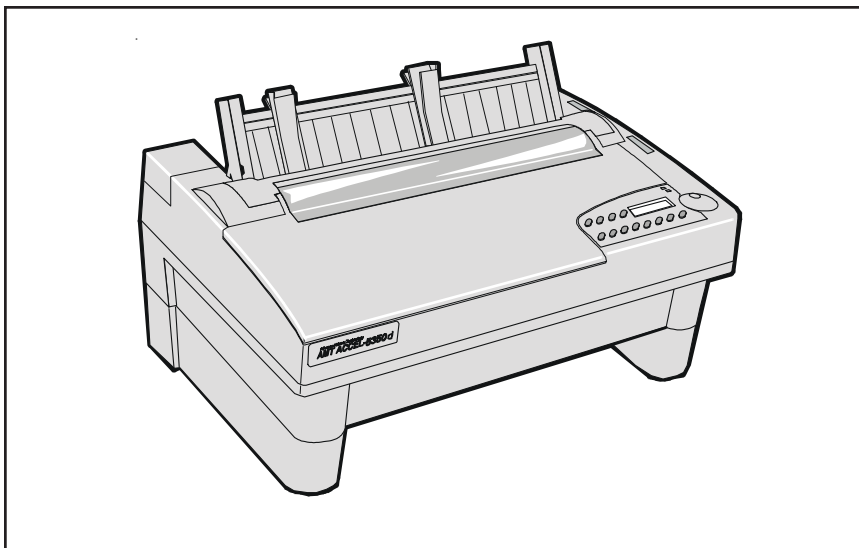


Figure A-1. Printer With Bottom-Feed Tractors

Selecting a Printer Stand

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: 53 pounds (24.1 kg).
- ✓ The table top must be wide enough to hold the printer: 24 inches (61 cm). 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

Move the tractor select indicator to the *rear* position. Then, set the BIN parameter on the Setup menu to the *Bottom* setting. If you're not sure how to use the Setup menu, refer to the *Control Panel* section of this guide.

Accessing the Bottom-Feed Tractors

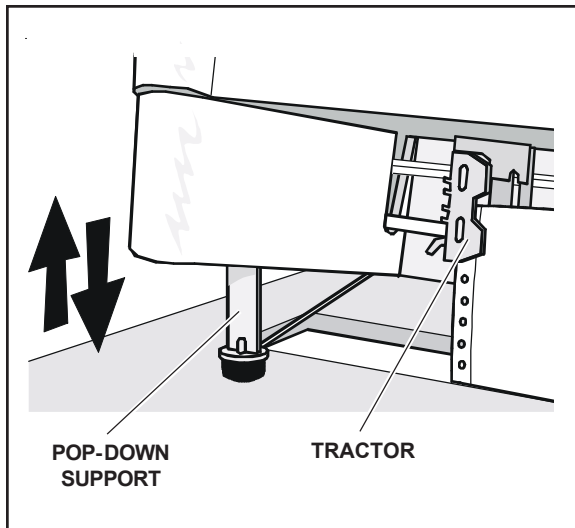


Figure A-2. Raising and Lowering the Printer

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 extended. 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

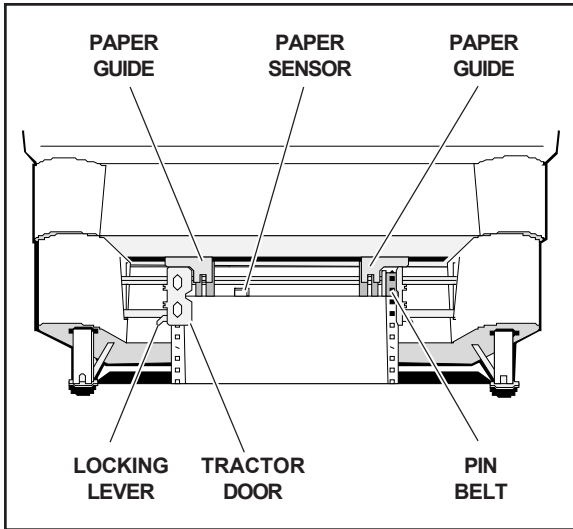


Figure A-3. Loading Paper in the Bottom Path

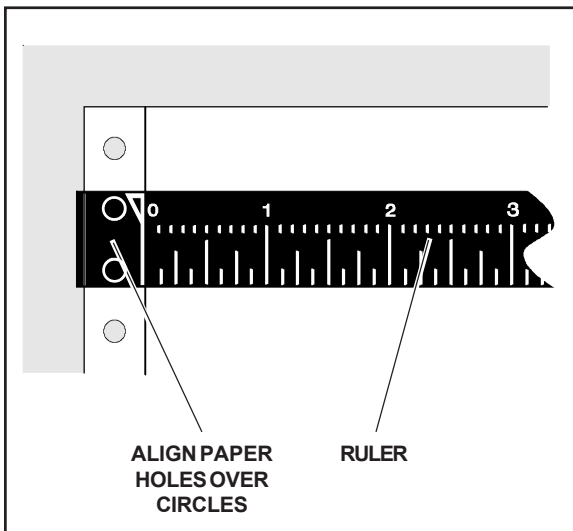


Figure A-4. Aligning Paper in the Bottom Path

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

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

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. Move the tractor select indicator to the opposite position.
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"> ✓ Raise front of printer onto pop-down supports. ✓ 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. ✓ Bottom-feed tractors are not activated. Set the BIN parameter on the Setup menu as needed to select <i>Bottom</i> paper path. ✓ Paper is misaligned on bottom-feed tractors. Reload paper. ✓ Printhead is too close to platen. Move the forms thickness lever towards front of printer. ✓ A torn or crumpled piece of paper is blocking paper entry slot. Inspect bottom paper entry slot and remove debris.

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

<i>Symptom</i>	<i>Probable Cause/Corrective Action</i>
Paper advances into printer but jams inside (continued).	<ul style="list-style-type: none"> ✓ Set the AUTOBAIL parameter to <i>On</i> so that the printer automatically lifts bail for each perforation.
Printer displays CLEAR PAPER JAM but forms are loaded correctly without problems.	<ul style="list-style-type: none"> ✓ High-gloss, smooth papers and certain media stocks can cause the printer to falsely detect jams. Set the PPR JAM parameter to <i>Off</i>.
Printer does not present form for tear-off when you press Ready button.	<ul style="list-style-type: none"> ✓ Demand document mode is not selected or is set incorrectly. Check DEMAND parameter setting on Setup menu.
When you press Form Feed button, paper from both rear and bottom tractors feed	<ul style="list-style-type: none"> ✓ Tractor select indicator is in wrong position. Move indicator to <i>rear</i> position.
Print is smearing.	<ul style="list-style-type: none"> ✓ Paper is not snug between tractors. Adjust tractors. ✓ Printhead is too close to platen. Move forms thickness indicator towards front of printer.
Printing occurs on paper tear strips.	<ul style="list-style-type: none"> ✓ Paper is misaligned in the printer. Refer to <i>Loading Paper in the Bottom-Feed Tractors</i> in this appendix. ✓ Paper is too narrow. Use paper that is at least 4.5 inches (11.4 cm) wide including the perforated tear strips.

Appendix

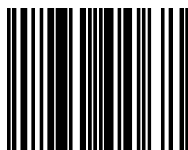
B

Bar Codes

You must purchase and install a *Bar Code Option* before your printer can print bar code symbols.

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 *Bar Code Option Operating Guide* sold separately.

Introducing Bar Codes



12300068

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 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 a series of 5, 9 or 11 digits. It is used by the U.S. Postal Service to sort mail.
- ☞ **Note:** The *AMT Datasouth Bar Code Option Operating Guide* (part no. 337027) provides in-depth information on bar code formats, the component elements, and how bar code symbols are constructed.

Selecting the Bar Code Emulation

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

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.

Note: If *BARCODE* does not appear, then the printer does not contain support for printing bar codes. Contact your dealer or the manufacturer for ordering information.

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 sending 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

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

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 (± 0.010 tolerance)
Height of tall bars	0.125 inch (± 0.010 tolerance)
Bar width	0.020 inch (± 0.005 tolerance)
Pitch	0.0475 inch (± 0.0025 tolerance)
<i>Miscellaneous</i>	
Human-readable text	Selectable using current font selection on printer
Command set compatibility	Genicom- and OTC-compatible

Appendix**C**

Interfaces

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

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 high; if the bit is logical "1", the signal is low.
- ✓ 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.

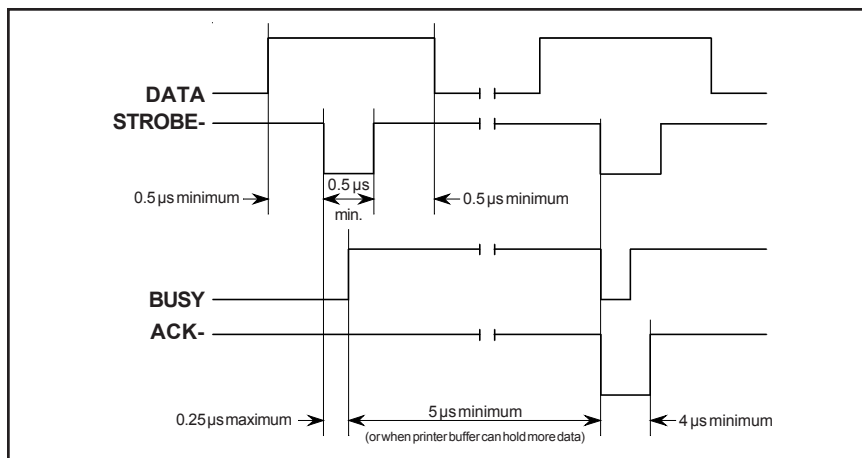


Figure C-1. Parallel Data Transfer Timing Diagram

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.

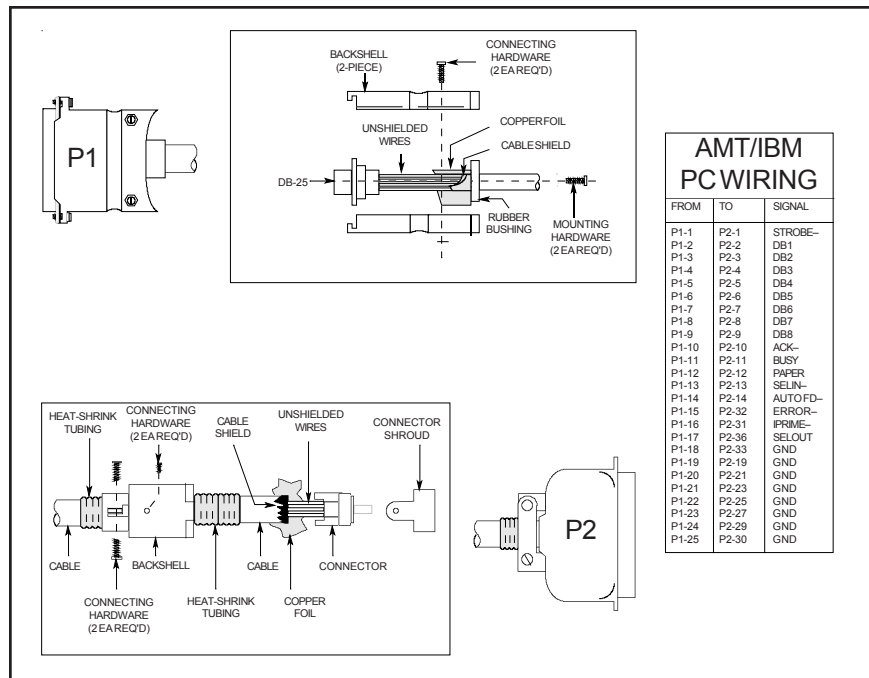


Figure C-2. Parallel Cable Assembly

Setting Parallel Parameters

Four Setup menu parameters affect the parallel interface: STROBE, BUSY, ACK and DAT BITS. 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. You can control whether the printer captures the data byte on the leading or trailing edge of the STROBE- pulse by setting the STROBE parameter on the Setup menu
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

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.

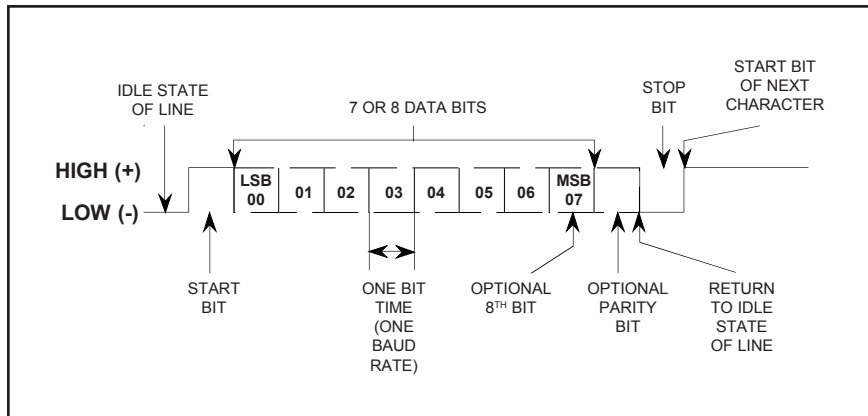


Figure C-3. Serial Data Format

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.

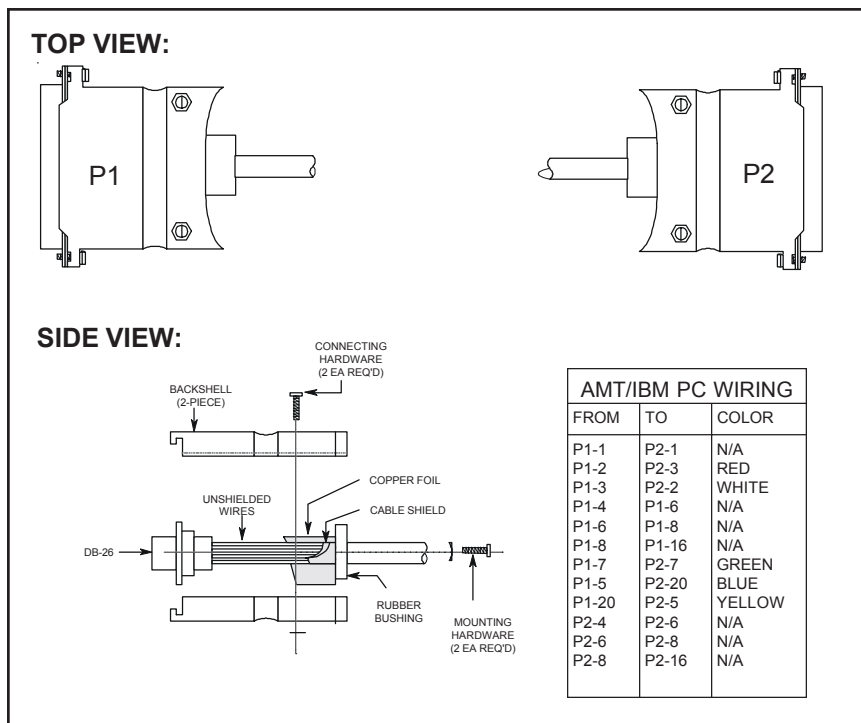


Figure C-4. Serial Cable Assembly

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, DAT 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, 5 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
8	DCD	Computer	Ignored

Table C-2. Serial Pin Assignments—continued

<i>Pin</i>	<i>Signal</i>	<i>Source</i>	<i>Printer Usage</i>
9 - 10			Not connected
11	DTR	Printer	Same as signal on pin 20, except polarity of signal is user-selectable (signal present when JP1 jumper on logic board is on pins 2/3)
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 when JP1 jumper on logic board is on pins 1/2)

Appendix

D

Code Sets

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

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

Codes 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 and Diablo 630 Code Set

The first part of this appendix describes the AMT 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 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 then moves the current print position one character space to the right.

Some codes 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

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 enables the printing of any character assigned a code in the range 00 to 1F hex. Just send a GS code and then the desired character code. The SO code performs the same function as the GS code, except that it affects all subsequent codes until an SI code or ESC SI sequence disables the printing of these characters.

The ESC Y sequence prints the character assigned to the SP control code; 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 and Diablo 630 Character Code Assignments

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

ECS Fonts

The printer can use a special kind of font called an Extended Character Set (ECS) font. ECS fonts contain alternate characters for codes above 7F hex and do not contain any characters for codes below 20 hex. The ESC @ C escape sequence disables the alternate characters and restores the standard characters. This sequence is described later in this appendix.

Control Codes and Escape Sequences

When you select *AMT* or *Diablo 630* 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 moving
- ✓ Text functions
- ✓ Sheetfeeder functions
- ✓ Graphic functions
- ✓ Miscellaneous functions (for 635 and 635d models only)

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 and Diablo 630 Control Codes

<i>Function</i>	<i>ASCII</i>	<i>Hexadecimal</i>	<i>Decimal</i>	<i>Description</i>
Ignore	NUL	00	0	The printer ignores this code unless it is used within an escape sequence.
Continue printing?	ETX	03	3	With the ETX / ACK serial handshake in use, this code causes the printer to return an ACK control code when it can receive more data. When ETX/ACK is not in use, the code prints the assigned character.
Bell	BEL	07	7	This code sounds the audible alarm for a brief period.
Backspace	BS	08	8	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.
Horizontal tab	HT	09	9	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 audible alarm sounds and the printer ignores this code. If the factory defaults are in effect, tab stops are set every eight print positions across the page.
Line feed	LF	0A	10	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.
Vertical tab	VT	0B	11	This code advances the paper to the next vertical tab stop. If no vertical tab stop is set below the current line position, the audible alarm sounds and the printer ignores this code.
Form feed	FF	0C	12	This code performs one of the following actions: <ul style="list-style-type: none"> ✓ If a single sheet is loaded, the printer ejects the sheet. ✓ If pin-feed paper is loaded, the printer advances the paper to the next top-of-form or top margin if one is set. ✓ If an automatic sheetfeeder is installed, the printer loads a new sheet from the active bin. The sheet feeds to the top-of-form or top margin if one is set.
Carriage return	CR	0D	13	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.
Enable characters with codes outside normal range	SO	0E	14	This code causes one of the following actions: <ul style="list-style-type: none"> ✓ If an ECS font is <i>not</i> active, this code permits the printing of characters with codes below 20 hex. After receiving an SO code, the printer does not perform the usual control functions of subsequent control codes it receives, but instead prints the assigned characters. An ESC SI sequence ends this function.

Table D-2. AMT and Diablo 630 Control Codes—continued

<i>Function</i>	<i>ASCII</i>	<i>Hexadecimal</i>	<i>Decimal</i>	<i>Description</i>
Enable characters with codes outside normal range (continued)	SO	0E	14	<ul style="list-style-type: none"> ✓ If an ECS font is active and 8-bit data is in use, this code permits the printing of characters with codes from 80 to 9F hex. An SI code cancels this function. ✓ If an ECS font is active and 7-bit data is in use, this code permits the printing of characters with codes above 7F hex. After receiving an SO code, the printer adds 80 hex to all subsequent codes it receives and prints the resulting characters. An SI code cancels this function.
Disable characters with codes outside normal range	SI	0F	15	<p>This code causes one of the following actions:</p> <ul style="list-style-type: none"> ✓ If an ECS font is active and 8-bit data is in use, this code cancels the printing of characters with codes from 80 to 9F hex. After receiving an SI code, the printer prints spaces for these codes. ✓ If an ECS font is active and 7-bit data is in use, this code cancels the printing of characters with codes above 7F hex.
Print character with code above 7F hex	EM	19	25	<p>If an ECS font is not active and 7-bit data is in use, this code permits the printing of a character with a code above 7F hex. When the printer receives an EM code, it adds 80 hex to the next code it receives and prints the resulting character. This function affects only the next code in the data stream.</p>
Escape	ESC	1B	27	<p>This code begins an escape sequence.</p>
Print character with code below 20 hex	GS	1D	29	<p>If an ECS font is not active, this code permits the printing of a character with a code below 20 hex. 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.</p>
Space	SP	20	32	<p>This code moves the current print position one character space to the right.</p>
Delete	DEL	7F	127	<p>The printer ignores this code unless the code is used within an escape sequence.</p>

Table D-3. AMT and Diablo 630 Escape Sequences

<i>Function</i>	<i>ASCII</i>	<i>Hexadecimal</i>	<i>Decimal</i>	<i>Description</i>	
Basic Functions					
Reset printer	ESC SUB 1	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		
Restore printer settings	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. <i>Note:</i> 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		
Set emulation	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(s), the printer sounds the audible alarm, displays the message EMULATION ERROR, and ignores the sequence.	
AMT	ESC @ E SOH	1B 40 45 01	27 64 69 1		
AMT (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		
Set color	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		
Black (alternate)	ESC B	1B 42	27 66		
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		
Yellow (alternate)	ESC A	1B 41	27 65		
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		
Auto carriage return	ESC @ CR n	1B 40 0D n	27 64 13 n	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		
Auto line feed	ESC @ LF n	1B 40 0A n	27 64 10 n	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		

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

Function	ASCII	Hexadecimal	Decimal	Description
Basic Functions—continued				
Auto line wrap Start End	ESC ? ESC !	1B 3F 1B 21	27 63 27 33	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.
Auto perforation skip Start End	ESC @ FF <i>n</i> ESC @ FF 1 ESC @ FF 0	1B 40 0C <i>n</i> 1B 40 0C 31 1B 40 0C 30	27 64 12 <i>n</i> 27 64 12 49 27 64 12 48	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).
Uni-directional printing Start Start (alternate) End End (alternate)	ESC @ U <i>n</i> ESC @ U 1 ESC \ ESC @ U 0 ESC /	1B 40 55 <i>n</i> 1B 40 55 31 1B 5C 1B 40 55 30 1B 2F	27 64 85 <i>n</i> 27 64 85 49 27 92 27 64 85 48 27 47	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.
Ignore codes	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.
Restore control code functions	ESC SI	1B 0F	27 15	This sequence cancels the printing of characters with codes below 20 hex that was enabled by an SO control code.
Search and replace	ESC @ X <i>n1 n2</i> <i>string1 string2</i>	1B 40 58 <i>n1 n2</i> <i>string1 string2</i>	27 64 88 <i>n1 n2</i> <i>string1 string2</i>	<p>This sequence causes the printer to search through incoming data for <i>string1</i> and replace each occurrence with <i>string2</i>. The search and replace strings can be from 1 to 255 bytes long and can include any combination of codes. Variable <i>n1</i> in the sequence defines the length of <i>string1</i> in bytes; variable <i>n2</i> in the sequence defines the length of <i>string2</i> in bytes. For example, to replace each occurrence of AAA with ABC, the correct sequence is ESC @ X ETX A A A A B C. Or, to get the printer to ignore all occurrences of AAA, the correct sequence is ESC @ X ETX NUL A A A.</p> <p>Only one search and replace sequence can be in effect at a time. Whenever you send a new search and replace sequence, the previous search and replace sequence is discarded. To cancel a search and replace sequence without defining a new one, use ESC @ X NUL NUL.</p> <p><i>Note:</i> Search and replace does not affect graphics escape sequences or the download font escape sequence.</p>

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

Function	ASCII	Hexadecimal	Decimal	Description
Horizontal Spacing				
Set character spacing	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	
Set character spacing to default	ESC S	1B 53	27 83		This sequence sets character spacing to the default spacing of the active font. Each font has a default character spacing that the printer uses when no character spacing is set. Courier is 10 characters per inch (cpi); Letter Gothic and Elite are 12 cpi; Trend is proportional; and so on. With double-wide printing on, this sequence sets character spacing to two times the default character spacing of the active font. If the active font is proportional, this sequence turns on the proportional mode.
Set character cell width	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 <i>between</i> 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	
Set horizontal spacing offset	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"> ✓ 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 bit equals 1, the offset is negative and the printer subtracts it.

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

Function	ASCII	Hexadecimal	Decimal	Description
Horizontal Spacing—continued				
Set horizontal spacing offset (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.
Move carriage left 1/120th inch	ESC BS	1B 08	27 08	The sequence moves the current print position 1/120-inch to the left.
Vertical Spacing				
Set line spacing in 1/48-inch increments	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 RS CR	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 RS ENQ	1B 1E 05	27 30 05	
Set line spacing in 1/120-inch increments	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	
Reverse line feed	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.
Half-line feed	ESC U	1B 55	27 85	This sequence advances the paper one-half line space.
Reverse half-line feed	ESC D	1B 44	27 68	This sequence reverse feeds the paper one-half line space.
Margins, Tabs and Page Formatting				
Set left margin	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 moves, backspacing, or spacing in the backward print mode.

Table D-3. AMT 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				
Set right margin	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.
Set top margin	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 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.
Set bottom margin	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.
Clear top/bottom margins	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.
Clear all tab stops	ESC 2	1B 32	27 50	This sequence clears all previously set horizontal and vertical tab stops.
Set single horizontal tab stop	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.
Clear single horizontal tab stop	ESC 8	1B 38	27 56	This sequence clears the horizontal tab stop at the current print position.

Table D-3. AMT 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				
Set vertical tab stop	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.
Set lines per page	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 Moving				
Absolute move to print position	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.
Absolute move to print line	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.
Text Functions				
Set print quality (speed) Letter	ESC @ P <i>n</i> ESC @ P L	1B 40 50 <i>n</i> 1B 40 50 4C	27 64 80 <i>n</i> 27 64 80 76	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. Some fonts 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.
Memo	ESC @ P M	1B 40 50 4D	27 64 80 77	
Draft	ESC @ P D	1B 40 50 44	27 64 80 68	

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

<i>Function</i>	<i>ASCII</i>	<i>Hexadecimal</i>	<i>Decimal</i>	<i>Description</i>
Text Functions—continued				
Set font	ESC @ F <i>n</i>	1B 40 46 <i>n</i>	27 64 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. Downloaded fonts are assigned numbers in reverse order beginning with FF hex (255 decimal). 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(s), 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	
Trend PS	ESC @ F EOT	1B 40 46 04	27 64 70 4	
Trend PS (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	
Download font 1	ESC @ F <u>255</u>	1B 40 46 FF	27 64 70 255	
Download font 2	ESC @ F <u>254</u>	1B 40 46 FE	27 64 70 254	
End extended character set mode	ESC @ C	1B 40 43	27 64 67	This sequence ends the ECS mode by replacing the ECS characters in the active font with the normal ASCII/IBM characters designated by the SETS parameter on the printer's Setup menu. ECS characters are assigned codes above 7F hex. To restart the ECS mode, select the font again using the <i>Set Font</i> sequence. If the active font is not an ECS font, the printer ignores this sequence.

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

Function	ASCII	Hexadecimal	Decimal	Description
Text Functions—continued				
Download font coding	ESC @ D <i>a1 a2 n1 n2 coding</i>	1B 40 44 <i>a1 a2 n1 n2 coding</i>	27 64 68 <i>a1 a2 n1 n2 coding</i>	This sequence downloads a font to the printer. Variable <i>a1</i> is the number assigned to the font. The <i>Set Font</i> escape sequence uses this number to identify and select the font. Normally, the first font downloaded is assigned 255 (FF hex), the second font downloaded is assigned 254 (FE hex), and so on. Variable <i>a2</i> must always be 00 hex. Variable <i>n2</i> and <i>n1</i> are a 16-bit number that specifies the number of bytes in the font <i>coding</i> . Variable <i>n2</i> is the high-order byte; <i>n1</i> is the low-order byte. The font <i>coding</i> must conform to a prescribed binary coding format. <i>Note:</i> For more detailed information on this escape sequence, refer to <i>AMT Technical Notes—Downloading Fonts</i> , available separately from AMT.
Print character assigned ... to code 20 hex	ESC Y	1B 59	27 89	This sequence prints the character assigned to code 20 hex, which the printer normally interprets as a space.
Print character assigned ... to code 7F hex	ESC Z	1B 5A	27 90	This sequence prints the character assigned to code 7F hex, which the printer normally ignores.
Start print suppression	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.
Set language	ESC @ G <i>n</i>	1B 40 47 <i>n</i>	27 64 71 <i>n</i>	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. <i>Note:</i> 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	
Backward printing				These sequences control backward printing, wherein the printer reverses the direction of normal spacing, backspacing, 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 or absolute moves, carriage returns, or paper movement functions. A carriage return or <i>End Backward Printing</i> sequence ends backward printing.
Start	ESC 6	1B 36	27 54	
End	ESC 5	1B 35	27 53	

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

Function	ASCII	Hexadecimal	Decimal	Description
Text Functions—continued				
Bold / shadow printing				
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	
Auto underscoring				
Start	ESC E	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	ESC R	1B 52	27 82	
End word processing modes	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.
Slant printing (italics)	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. The degree of slant can be 10, 20 or 30 degrees. <i>Note:</i> You can turn slant printing on and off as many times as you like on a line, but you can use only one slant setting. If you attempt to use more than one slant setting on a single line, only the last slant setting is used. For example, if you select 10-degree slant for one word and 20-degree slant for the next word on the same line, both words will print at 20-degree slant.
Start 10-degree slant	ESC @ S 1	1B 40 53 31	27 64 83 49	
Start 20-degree slant	ESC @ S 2	1B 40 53 32	27 64 83 50	
Start 30-degree slant	ESC @ S 3	1B 40 53 33	27 64 83 51	
End	ESC @ S 0	1B 40 53 30	27 64 83 48	
Super / subscripting	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 and Diablo 630 Escape Sequences—continued

<i>Function</i>	<i>ASCII</i>	<i>Hexadecimal</i>	<i>Decimal</i>	<i>Description</i>
Text Functions—continued				
Double-high printing	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	
Double-wide printing	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	
Start auto center mode	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 automatic 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 centering is on, automatic centering turns off and the stored data prints normally.</p>
Start auto justify mode	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 and Diablo 630 Escape Sequences—continued

<i>Function</i>	<i>ASCII</i>	<i>Hexadecimal</i>	<i>Decimal</i>	<i>Description</i>
Text Functions—continued				
Proportional mode 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 and Diablo 630 Escape Sequences—continued

<i>Function</i>	<i>ASCII</i>	<i>Hexadecimal</i>	<i>Decimal</i>	<i>Description</i>
Text Functions—continued				
Start program mode	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"> ✓ Ignores bits 4, 5, and 6 (these define hammer intensity for daisywheel printers). ✓ Reads the least significant four bits as a binary number to determine the PS unit value. <p>For further information on proportional-spacing and PS unit values, refer to the <i>Proportional Mode</i> sequence.</p>
16-inch wide text printing . Enable	ESC @ t n	1B 40 74 n	27 64 116 n	<p>This sequence enables and disables 16-inch wide text printing. When you enable 16-inch wide text printing, the leftmost print position, left margin and horizontal tabs move 1.2 inches to the left; the rightmost print position and right margin move 1.2 inches to the right. The result is a 16-inch wide print line. When you disable 16-inch wide text printing, the leftmost and rightmost print positions, margins and horizontal tabs return to their original locations.</p> <p>With 16-inch 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, draft-quality text printing is disabled. If you select draft-quality, the printer substitutes memo-quality. 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 16-inch wide graphics, you must use the <i>16-Inch Wide Graphics</i> sequence.</p> <p><i>Note:</i> With 16-inch 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>
Disable	ESC @ t 1 ESC @ t 0	1B 40 74 31 1B 40 74 30	27 64 116 49 27 64 116 48	

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

<i>Function</i>	<i>ASCII</i>	<i>Hexadecimal</i>	<i>Decimal</i>	<i>Description</i>
Sheetfeeder Functions				
Perform operation	ESC EM <i>n</i>	1B 19 <i>n</i>	27 25 <i>n</i>	This sequence performs specific sheetfeeder operations. If a sheetfeeder is not installed, the printer ignores this sequence.
Eject current sheet	ESC EM R	1B 19 52	27 25 82	
Load from front bin	ESC EM 1	1B 19 31	27 25 49	
Load from back bin	ESC EM 2	1B 19 32	27 25 50	
Load envelope	ESC EM 3	1B 19 33	27 25 51	
Load envelope (alternate)	ESC EM E	1B 19 45	27 25 69	
Select bin	ESC @ T <i>n</i>	1B 40 54 <i>n</i>	27 64 84 <i>n</i>	This sequence selects a sheetfeeder bin. Subsequent form feeds cause the printer to feed sheets from this bin. If a sheetfeeder is not installed, the printer ignores this sequence.
Front	ESC @ T 1	1B 40 54 31	27 64 84 49	
Back	ESC @ T 2	1B 40 54 32	27 64 84 50	
Envelope	ESC @ T 3	1B 40 54 33	27 64 84 51	
Graphic Functions				
Diablo graphics				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 moves. A subsequent carriage return or the <i>End Diablo Graphics</i> sequence ends Diablo graphics.
Start	ESC 3	1B 33	27 51	
End	ESC 4	1B 34	27 52	
Print 8-wire graphics				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. 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: Number of columns = $(128 \times n2) + n1$ For example, to print 180 columns of dots, <i>n2</i> would be 1 and <i>n1</i> would be 52 ($180 = (128 \times 1) + 52$). 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 control the second dot, and so on. If the bit is a "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. <i>Note:</i> For more detailed information on these escape sequences, refer to <i>AMT Technical Notes—Graphics</i> , available separately from AMT.
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>	
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>	
120V x 480H dpi	ESC @ O <i>n1 n2 list</i>	1B 40 4F <i>n1 n2 list</i>	27 64 79 <i>n1 n2 list</i>	

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

Function	ASCII	Hexadecimal	Decimal	Description
Graphic Functions—continued				
Print 16-wire graphics 120V x 120H dpi 120V x 240H dpi	ESC @ m <i>n1 n2 list</i> ESC @ n <i>n1 n2 list</i>	1B 40 6D <i>n1 n2 list</i> 1B 40 6E <i>n1 n2 list</i>	27 64 109 <i>n1 n2 list</i> 27 64 110 <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 = $(128 \times n2) + n1$</p> <p>For example, to print 360 columns of dots, <i>n2</i> would be 2 and <i>n1</i> would be 104 ($360 = (128 \times 2) + 104$).</p> <p>The <i>list</i> in the sequence is a series of codes that define the columns to print. The first two codes define the first column, the second two codes define 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. 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. If the bit is a "1", the dot prints; if the bit is "0", the dot does not print. For example, FF FF hex prints all 16 dots in the column, 00 00 hex prints no dots, 00 FF hex prints the lower eight dots, and FF 00 hex prints the upper eight dots.</p> <p><i>Note:</i> For more detailed information on these escape sequences, refer to <i>AMT Technical Notes—Graphics</i>, available separately from AMT.</p>
Printhead microshift up	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><i>Note:</i> For more detailed information on this escape sequence, refer to <i>AMT Technical Notes—Graphics</i>, available separately from AMT.</p>
16-inch wide graphics Enable Disable	ESC @ w ESC @ s	1B 40 77 1B 40 73	27 64 119 27 64 115	<p>These sequences enable and disable 16-inch wide graphics, wherein graphics start printing 1.2 inches to the left of the current print position and may extend up to 1.2 inches beyond the normal rightmost print position. Text printing is unaffected by this escape sequence. To print full 16-inch wide graphics, make sure the current horizontal print position is 0.</p>

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

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 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 then moves the current print position one character space to the right.

Some codes 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 I sequence in the Epson JX and LQ-2550 printer emulations enables and disables the characters assigned control codes below 32. The ESC [sequence in the Epson JX and LQ-2550 emulations and the ESC ^ sequence in the IBM XL24 emulation print the character assigned to any code—even one assigned to a control code. 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

NUL 0	▶ 16	SP ç 32	0 48	ø 64	P 80	· 96	p 112	NUL Ç 128	É 144	á 160	▒ 176	L 192	⏏ 208	α 224	≡ 240
☺ 1	DC1 ◀ 17	! 33	1 49	A 65	Q 81	a 97	q 113	ü 129	æ 145	í 161	▒ 177	⏏ 193	⏏ 209	β 225	± 241
☹ 2	DC2 ↕ 18	" 34	2 50	B 66	R 82	b 98	r 114	é 130	Æ 146	ó 162	▒ 178	⏏ 194	⏏ 210	Γ 226	≥ 242
♥ 3	DC3 !! 19	# 35	3 51	C 67	S 83	c 99	s 115	â 131	ô 147	ú 163	| 179	⏏ 195	⏏ 211	Π 227	≤ 243
♦ 4	DC4 ⏏ 20	\$ 36	4 52	D 68	T 84	d 100	t 116	ä 132	ö 148	ñ 164	⏏ 180	— 196	⏏ 212	Σ 228	∫ 244
♣ 5	§ 21	% 37	5 53	E 69	U 85	e 101	u 117	à 133	ò 149	Ñ 165	⏏ 181	⏏ 197	⏏ 213	σ 229	J 245
♠ 6	— 22	& 38	6 54	F 70	V 86	f 102	v 118	å 134	û 150	ª 166	⏏ 182	⏏ 198	⏏ 214	μ 230	÷ 246
● 7	BEL ⏏ 23	' 39	7 55	G 71	W 87	g 103	w 119	ç 135	ù 151	° 167	⏏ 183	⏏ 199	⏏ 215	τ 231	≈ 247
◼ 8	BS ◼ 24	CAN ↑ 40	(56	H 72	X 88	h 104	x 120	ê 136	ÿ 152	¿ 168	⏏ 184	⏏ 200	⏏ 216	Φ 232	° 248
○ 9	HT ○ 25	) 41	9 57	I 73	Y 89	i 105	y 121	ë 137	Ö 153	⏏ 169	⏏ 185	⏏ 201	⏏ 217	⊕ 233	• 249
◼ 10	LF ◼ 26	→ 42	* 58	J 74	Z 90	j 106	z 122	è 138	Ü 154	⏏ 170	⏏ 186	⏏ 202	⏏ 218	Ω 234	· 250
♂ 11	VT ♂ 27	ESC ← 43	+ 59	K 75	[91	k 107	{ 123	ï 139	ç 155	½ 171	⏏ 187	⏏ 203	▒ 219	ø 235	√ 251
♀ 12	FF ♀ 28	⏏ 44	, 60	L 76	\ 92	l 108	| 124	î 140	£ 156	¼ 172	⏏ 188	⏏ 204	▒ 220	∞ 236	∞ 252
🎵 13	CR 🎵 29	↔ 45	= 61	M 77	] 93	m 109	} 125	ì 141	¥ 157	; 173	⏏ 189	= 205	▒ 221	∅ 237	² 253
🎵 14	SO 🎵 30	▲ 46	> 62	N 78	^ 94	n 110	~ 126	Ä 142	£ 158	« 174	⏏ 190	⏏ 206	▒ 222	ε 238	■ 254
⚙ 15	SI ⚙ 31	/ 47	? 63	O 79	 95	o 111	 127	DEL SI Ä 143	f 159	» 175	⏏ 191	⏏ 207	▒ 223	∩ 239	DEL 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.

ECS Fonts

The printer can use a special kind of font called an Extended Character Set (ECS) font. ECS fonts contain alternate characters for codes above 127 decimal and do not contain any characters for codes below 32 decimal. The ESC ESC C escape sequence disables the alternate characters and restores the standard characters. This sequence is described later in this appendix.

Control Codes and Escape Sequences

When you select *Epson JX*, *Epson LQ-2550* or *IBM XL24* 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
- ✓ Sheetfeeder functions
- ✓ Graphic functions

An italicized letter in an escape sequence, such as *n*, *n1* 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>
Ignore	NUL	00 or 80	0 or 128	The printer ignores this code unless it is used within an escape sequence.
Continue printing?	ETX	03 or 83	3 or 131	With the ETX/ACK serial handshake in use, this code causes the printer to return an ACK control code when it can receive more data. When ETX/ACK is not in use, the code prints the assigned character.
Bell	BEL	07 or 87	7 or 135	This code sounds the audible alarm for a brief period.
Backspace	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 leftmost, the printer ignores this code. If this code follows a graphics escape sequence, the code moves the current print position left to where the graphics sequence began.
Horizontal tab	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 the next tab stop on the line is beyond the right margin, the current print position moves to the left margin. If no tab stop is set to the right of the current print position, the current print position moves to the leftmost tab on the next line. If no horizontal tab stops are set, the audible alarm sounds and the printer ignores this code. Also, if the factory defaults are in effect, tab stops are set every eight print positions across the page.
Line feed	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.
Vertical tab	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 paper advances one line space.
Form feed	FF	0C or 8C	12 or 140	This code performs one of the following actions: <ul style="list-style-type: none"> ✓ If a single sheet is loaded, the printer ejects the sheet and moves the current print position to the left margin. ✓ If pin-feed paper is loaded, the printer advances the paper to the next top-of-form or top margin if one is set and moves the current print position to the left margin. ✓ If an automatic sheetfeeder is installed, the printer loads a new sheet from the active bin. The sheet feeds to the top-of-form or top margin if one is set and the current print position moves to the left margin.
Carriage return	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.

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

<i>Function</i>	<i>ASCII</i>	<i>Hexadecimal</i>	<i>Decimal</i>	<i>Description</i>
Start double-wide printing for one line	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.
Start condensed printing	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.
Enable printing/X-ON	DC1	11 or 91	17 or 145	This code enables printing. If printing is already enabled, the printer ignores this code. Also, when the X-ON/X-OFF serial handshake is in use, the printer returns this code during power-up, reset, and after returning a DC3 (X-OFF) code when it can receive more data.
End condensed printing	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.
Disable printing/X-OFF	DC3	13 or 93	19 or 147	This code disables printing until the printer receives a DC1 code or the operator presses the Ready button on the control panel. While printing is disabled, the PAUSE message appears on the control panel. Also, when the X-ON/X-OFF serial handshake is in use, the printer returns this code when it is unable to receive more data.
End double-wide printing on current line	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.
Cancel	CAN	18 or 98	24 or 152	This code cancels the printing of all text on the current line, but does not affect the control codes.
Escape	ESC	1B or 9B	27 or 155	This code begins an escape sequence.
Space	SP	20	32	This code moves the current print position one character space to the right.
Delete	DEL	7F or FF	127 or 255	When this code follows a character code, the printer ignores the character code; otherwise, the printer ignores the delete code.

Table D-6. Epson and IBM Escape Sequences

Function	ASCII	Hexadecimal	Decimal	Description
Basic Functions				
Reset printer	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.
Restore printer settings	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. <i>Note:</i> 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 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	
Set emulation	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(s), 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	
Set color				These sequences set the printing color. If a monochrome ribbon is installed, the printer ignores these sequences. <i>Note:</i> The ESC b sequence is not supported when the Epson LQ-2550 emulation is active.
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

Function	ASCII	Hexadecimal	Decimal	Description
Basic Functions—continued				
Auto carriage return	ESC ESC CR <i>n</i>	1B 1B 0D <i>n</i>	27 27 13 <i>n</i>	This sequence starts/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	
Auto line feed	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	
Auto perforation	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 does a form feed when-ever 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).
skip mode 1	ESC ESC FF 1	1B 1B 0C 31	27 27 12 49	
Start	ESC ESC FF 0	1B 1B 0C 30	27 27 12 48	
End				<p><i>Note:</i> Start the automatic perforation skip mode before loading pin-feed paper in the printer. If you start the mode with paper loaded, the printer performs a form feed when printing reaches one inch from the bottom of the page. The form feed advances the paper to the next top-of-form or top margin (if one is set).</p>
Start auto perforation	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 when-ever 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 n defines how many blank lines are left at the bottom of each page. Variable n 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 End Auto Perforation Skip Mode 2, Set Page Length in Lines or Set Page Length in Inches sequence ends this mode.
End auto perforation	ESC O	1B 4F	27 79	These sequence ends automatic perforation skip mode 2.
Unidirectional printing				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.
One line only	ESC <	1B 3C	27 60	
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	
Ignore codes	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>
Basic Functions—continued				
Set eighth bit To zero To one End (data "as is")	ESC = ESC > ESC #	1B 3D 1B 3E 1B 23	27 61 27 62 27 35	<p>When 8-bit codes are sent, these sequences cause the printer to set the most significant bit of following codes to zero or one before interpreting and executing their functions. When 7-bit codes are being sent, these sequences add an eighth bit of zero or one to each 7-bit code. Setting the most significant bit to zero limits the range of codes to 0 through 127 decimal. Setting the most significant bit to one limits the range of codes to 128 through 255 decimal.</p> <p>These sequences do not affect any graphics escape sequence or the <i>Download Font</i> sequence.</p> <p><i>Note:</i> These sequences are not supported when the IBM XL24 emulation is active.</p>
Disable printing Alternate	ESC j ESC Q	1B 6A 1B 51	27 106 27 81	<p>These sequences disable printing until the printer receives a DC1 code or the operator presses the Ready button on the control panel. While printing is disabled, the PAUSE message appears on the control panel.</p> <p><i>Note:</i> These sequences are not supported when an Epson emulation is active.</p>
Search and replace	ESC ESC X <i>n1 n2</i> <i>string1 string2</i>	1B 1B 58 <i>n1 n2</i> <i>string1 string2</i>	27 27 88 <i>n1 n2</i> <i>string1 string2</i>	<p>This sequence causes the printer to search incoming data for <i>string1</i> and replace each occurrence with <i>string2</i>. The search and replace strings can be from 1 to 255 bytes long and can include any combination of codes. Variable <i>n1</i> in the sequence defines the length of <i>string1</i> in bytes; variable <i>n2</i> in the sequence defines the length of <i>string2</i> in bytes. For example, to replace each occurrence of AAA with ABC, the correct sequence is ESC ESC X ETX ETX A A A B C. Or, to get the printer to ignore all occurrences of AAA, the correct sequence is ESC ESC X ETX NUL A A A.</p> <p>Only one search and replace sequence can be in effect at a time. Whenever you send a new search and replace sequence, the previous search and replace sequence is discarded. To cancel a search and replace sequence without defining a new one, use ESC ESC X NUL NUL.</p> <p><i>Note:</i> Search and replace does not affect graphics escape sequences or the <i>Download Font</i> escape sequence.</p>

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

Function	ASCII	Hexadecimal	Decimal	Description									
Horizontal Spacing													
Set character spacing to 10 or 17.1 CPI	ESC P	1B 50	27 80	This sequence sets character spacing/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. <i>Note:</i> This sequence is not supported when the IBM XL24 emulation is active.									
Set character spacing to 12 CPI	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.									
Set character spacing to 15 CPI	ESC g	1B 67	27 103	This sequence sets character spacing/character cell size to 15 characters per inch. Condensed printing does not affect the function of this sequence.									
Set character spacing to 20 CPI	ESC f	1B 66	27 102	This sequence sets character spacing/character cell size to 20 characters per inch. Condensed printing does not affect the function of this sequence.									
Start condensed printing ...	ESC SI	1B 0F	27 15	This sequence starts condensed printing, wherein character spacing/character cell size are 17.1 characters per inch. A DC2 code ends condensed printing.									
Set spacing and cell size	ESC ESC Z <i>n</i>	1B 1B 5A <i>n</i>	27 27 90 <i>n</i>	This sequence sets the distance that the carriage moves after printing a character or when spacing. The sequence also 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										
Set intercharacter space ...	ESC SP <i>n</i>	1B 20 <i>n</i>	27 32 <i>n</i>	This sequence sets the amount of space for the printer to add to the right of each character in addition to the space already allowed in the design of the character. The value of variable <i>n</i> defines the number of units to add. The size depends on the current print quality/character spacing: <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;"><u>Quality</u></th> <th style="text-align: left;"><u>Character Spacing (CPI)</u></th> <th style="text-align: left;"><u>Unit Size</u></th> </tr> </thead> <tbody> <tr> <td>Letter and memo</td> <td>10, 12, 13.3, 15 & proportional ... 17.1, 20 & prop. condensed</td> <td>1/180 inch 1/360 inch</td> </tr> <tr> <td>Draft</td> <td>10, 12, 13.3, 15 & proportional ... 17.1, 20, & prop. condensed</td> <td>1/120 inch 1/240 inch</td> </tr> </tbody> </table> For example, to add 1/4 inch to the right of each character in letter-quality at 10 cpi, variable <i>n</i> would be 45 decimal (1/4 inch = 45 x 1/180 inch).	<u>Quality</u>	<u>Character Spacing (CPI)</u>	<u>Unit Size</u>	Letter and memo	10, 12, 13.3, 15 & proportional ... 17.1, 20 & prop. condensed	1/180 inch 1/360 inch	Draft	10, 12, 13.3, 15 & proportional ... 17.1, 20, & prop. condensed	1/120 inch 1/240 inch
<u>Quality</u>	<u>Character Spacing (CPI)</u>	<u>Unit Size</u>											
Letter and memo	10, 12, 13.3, 15 & proportional ... 17.1, 20 & prop. condensed	1/180 inch 1/360 inch											
Draft	10, 12, 13.3, 15 & proportional ... 17.1, 20, & prop. condensed	1/120 inch 1/240 inch											

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

Function	ASCII	Hexadecimal	Decimal	Description																		
Vertical Spacing																						
Set line spacing in 1/216- or 1/180-inch increments	ESC 3 <i>n</i>	1B 33 <i>n</i>	27 51 <i>n</i>	<p>This sequence sets the distance that the paper moves for each line feed, reverse line feed, etc. The sequence specifies the distance as 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. The value of variable <i>n</i> defines the line spacing distance:</p> <p>Line spacing = $n \times 1/216$-inch (Epson JX & IBM XL24) Line spacing = $n \times 1/180$-inch (Epson LQ-2550)</p> <p><i>Note:</i> When the IBM XL24 emulation is active, the <i>Set Vertical Units</i> sequence forces the vertical spacing unit to either 1/216 or 1/180 inch.</p>																		
Epson JX & IBM XL24:																						
3 lines per inch	ESC 3 H	1B 33 48	27 51 72																			
4 lines per inch	ESC 3 6	1B 33 36	27 51 54																			
6 lines per inch	ESC 3 \$	1B 33 24	27 51 36																			
8 lines per inch	ESC 3 ESC	1B 33 1B	27 51 27																			
12 lines per inch	ESC 3 DC2	1B 33 12	27 51 18																			
Epson LQ-2250:																						
3 lines per inch	ESC 3 <	1B 33 3C	27 51 60																			
4 lines per inch	ESC 3 -	1B 33 2D	27 51 45																			
6 lines per inch	ESC 3 RS	1B 33 1E	27 51 30																			
8 lines per inch	ESC 3 ETB	1B 33 17	27 51 23																			
12 lines per inch	ESC 3 SI	1B 33 0F	27 51 15																			
Set line spacing in 1/72- or 1/60-inch increments	ESC A <i>n</i>	1B 41 <i>n</i>	27 65 <i>n</i>		<p>This sequence sets the distance that the paper moves for each line feed, reverse line feed, etc. The sequence specifies the distance as 1/72- or 1/60-inch increments, depending on the active emulation. When the Epson JX or IBM XL24 emulation is active, the distance is in 1/72-inch increments. When the Epson LQ-2550 emulation is active, the distance is in 1/180-inch increments. Also, when the IBM XL24 emulation is active, the printer stores but does not use the line spacing setting until it receives a <i>Start New Line Spacing</i> sequence. The value of variable <i>n</i> defines the line spacing distance:</p> <p>Line spacing = $n \times 1/72$-inch (Epson JX & IBM XL24) Line spacing = $n \times 1/60$-inch (Epson LQ-2550)</p> <p><i>Note:</i> When the IBM XL24 emulation is active, the <i>Set Vertical Units</i> sequence forces the vertical spacing unit to either 1/72 or 1/60 inch.</p>																	
Epson JX & IBM XL24:																						
3 lines per inch	ESC A CAN	1B 41 18	27 65 24																			
4 lines per inch	ESC A DC2	1B 41 12	27 65 18																			
6 lines per inch	ESC A FF	1B 41 0C	27 65 12																			
8 lines per inch	ESC A HT	1B 41 09	27 65 9																			
12 lines per inch	ESC A ACK	1B 41 06	27 65 6																			
Epson LQ-2250:																						
3 lines per inch	ESC A DC4	1B 41 14	27 65 20																			
4 lines per inch	ESC A SI	1B 41 0F	27 65 15																			
6 lines per inch	ESC A LF	1B 41 0A	27 65 10																			
8 lines per inch	ESC A BS	1B 41 08	27 65 8																			
12 lines per inch	ESC A ENQ	1B 41 05	27 65 5																			
Set vertical units	ESC [\EOT NUL NUL NUL NUL <i>n</i>	1B 5B 5C 04 00 00 00 00 <i>n</i>	27 91 92 4 0 0 0 0 <i>n</i>	<p>This sequence sets the vertical distance units for the <i>Set Line Spacing</i> (ESC 3 and ESC A) sequences and the <i>Paper Feed</i> (ESC J) sequence. The value of variable <i>n</i> determines the vertical distance units.</p> <p style="text-align: center;"><i>Vertical distance units</i> <i>Variable n</i></p> <table style="margin-left: auto; margin-right: auto;"> <tr> <td style="text-align: center;"><u>ESC 3</u></td> <td style="text-align: center;"><u>ESC A</u></td> <td style="text-align: center;"><u>ESC J</u></td> <td style="text-align: center;"><u>ASCII</u></td> <td style="text-align: center;"><u>Hex</u></td> <td style="text-align: center;"><u>Dec</u></td> </tr> <tr> <td style="text-align: center;">1/180</td> <td style="text-align: center;">1/60</td> <td style="text-align: center;">1/180</td> <td style="text-align: center;">.....</td> <td style="text-align: center;">B4</td> <td style="text-align: center;">180</td> </tr> <tr> <td style="text-align: center;">1/216</td> <td style="text-align: center;">1/72</td> <td style="text-align: center;">1/216</td> <td style="text-align: center;">.....</td> <td style="text-align: center;">D8</td> <td style="text-align: center;">216</td> </tr> </table> <p><i>Note:</i> This sequence is not supported when an Epson emulation is active.</p>	<u>ESC 3</u>	<u>ESC A</u>	<u>ESC J</u>	<u>ASCII</u>	<u>Hex</u>	<u>Dec</u>	1/180	1/60	1/180	B4	180	1/216	1/72	1/216	D8	216
<u>ESC 3</u>	<u>ESC A</u>	<u>ESC J</u>	<u>ASCII</u>		<u>Hex</u>	<u>Dec</u>																
1/180	1/60	1/180		B4	180																
1/216	1/72	1/216	D8	216																	

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

Function	ASCII	Hexadecimal	Decimal	Description
Vertical Spacing—continued				
Set line spacing in 1/120-inch increments	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, 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	
Set line spacing in 1/360-inch increments	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	
Set line spacing to 1/6"	ESC 2	1B 32	27 50	This sequence sets line spacing to 1/6 inch. <i>Note:</i> This sequence is not supported when the IBM XL24 emulation is active.
Start new line spacing	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. <i>Note:</i> This sequence is not supported when an Epson emulation is active.
Set line spacing to 1/8"	ESC 0	1B 30	27 48	This sequence sets line spacing to 1/8 inch.
Set line spacing to 7/72"	ESC 1	1B 31	27 49	This sequence sets line spacing to 7/72 inch.
Reverse line feed	ESC]	1B 5D	27 93	This sequence reverse feeds the paper one line space so the next print line is above the previous line.
Paper feed in 1/216- or 1/180-inch increments	ESC J <i>n</i>	1B 4A <i>n</i>	27 74 <i>n</i>	This sequence advances the paper a set 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. <i>Note:</i> 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

<i>Function</i>	<i>ASCII</i>	<i>Hexadecimal</i>	<i>Decimal</i>	<i>Description</i>
Vertical Spacing—continued				
Reverse paper feed in 1/216- or 1/180-inch increments	ESC j <i>n</i>	1B 6A <i>n</i>	27 106 <i>n</i>	<p>This sequence reverse feeds the paper a set distance without changing the current line spacing. The sequence sets the distance as a number of 1/216- or 1/180-inch increments, depending on the active emulation. When the Epson JX 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 reverse feed the paper 18/216 inch, the sequence is ESC j DC2.</p> <p><i>Note:</i> This sequence is not supported when the IBM XL24 emulation is active.</p>
Absolute and Relative Moving				
Absolute move to print position	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 style="text-align: center;">Distance in 1/60ths = (<i>n2</i> x 256) + <i>n1</i></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 (300 = (1 x 256) + 44). If the sequence specifies a distance beyond the right print boundary, the printer ignores the sequence.</p>
Relative move to print position	ESC \ <i>n1 n2</i>	1B 5C <i>n1 n2</i>	27 92 <i>n1 n2</i>	<p>This sequence moves the carriage a set 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 = (<i>n2</i> x 256) + <i>n1</i></p> <p style="padding-left: 40px;">Draft: Distance in 1/120ths = (<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 during letter-quality printing (360/180 inch), the correct <i>n2</i> value is 1 and the correct <i>n1</i> value is 104 (360 = (1 x 256) + 104).</p>

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

Function	ASCII	Hexadecimal	Decimal	Description
Absolute and Relative Moving—continued				
Relative move to print position (continued)	ESC \ <i>n1 n2</i>	1B 5C <i>n1 n2</i>	27 92 <i>n1 n2</i>	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 ($65,176 = (254 \times 256) + 152$). If the sequence specifies a distance that would move the carriage beyond the left or right print boundary, the printer ignores the sequence. <i>Note:</i> This sequence is not supported when the IBM XL24 emulation is active.
Relative move to print position Right Left	ESC d <i>n1 n2</i> ESC e <i>n1 n2</i>	1B 64 <i>n1 n2</i> 1B 65 <i>n1 n2</i>	27 100 <i>n1 n2</i> 27 101 <i>n1 n2</i>	These sequences move the carriage a set distance from the current print position. The value of <i>n1</i> and <i>n2</i> define the distance in 1/120-inch increments: Distance in 1/120ths = $(n2 \times 256) + n1$ For example, to move the carriage three inches (360/120 inch), the correct <i>n2</i> value is 1 and the correct <i>n1</i> value is 104 ($360 = (1 \times 256) + 104$). If the sequence specifies a distance that would move the carriage beyond the left or right print boundary, the carriage moves to that boundary.
Boundaries, Tabs and Page Formatting				
Set top-of-form (TOF)	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. <i>Note:</i> This sequence is not supported when an Epson emulation is active.
Set left print boundary	ESC I <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 I 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				
Set right print boundary ...	ESC Q <i>n</i>	1B 51 <i>n</i>	27 81 <i>n</i>	<p>This sequence cancels printing of the current line, resets the default tabs, and sets the right print boundary anywhere on the page. When printing reaches this boundary, the printer performs a carriage return/line feed and continues printing. 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.</p> <p><i>Note:</i> This sequence is not supported when the IBM XL24 emulation is active.</p>
Set left and right print boundaries	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. All subsequent line wrapping is relative to the new right 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				
Set/clear absolute horizontal tab stops	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><i>Note:</i> This sequence is not supported when the IBM XL24 emulation is active.</p>
Set/clear absolute vertical tab stops	ESC B <i>list</i> NUL	1B 42 <i>list</i> 00	27 66 <i>list</i> 0	<p>These sequences clear all current vertical tab stops and set 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 printer ignores the value of variable <i>n</i> in the ESC b sequence, so the value you assign to it is irrelevant. The <i>list</i> in the sequences 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>
Alternate	ESC b <i>n list</i> NUL	1B 62 <i>n list</i> 00	27 98 <i>n list</i> 0	
Set absolute horizontal tab stops every eight print positions	ESC R	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><i>Note:</i> 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>
Boundaries, Tabs and Page Formatting—continued				
Set page length in lines	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.
Set page length in inches ...	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.
Text Functions				
Set print quality	ESC x <i>n</i>	1B 78 <i>n</i>	27 120 <i>n</i>	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. Some fonts 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	ESC x SOH	1B 78 01	27 120 1	
Memo	ESC x STX	1B 78 02	27 120 2	
Draft	ESC x NUL	1B 78 00	27 120 0	
Set print quality	ESC ESC P <i>n</i>	1B 1B 50 <i>n</i>	27 27 80 <i>n</i>	This sequence selects letter-, memo- or draft-quality printing.
Letter	ESC ESC P L	1B 1B 50 4C	27 27 80 76	
Memo	ESC ESC P M	1B 1B 50 4D	27 27 80 77	
Draft	ESC ESC P D	1B 1B 50 44	27 27 80 68	
Set typestyle family	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(s), 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

Function	ASCII	Hexadecimal	Decimal	Description
Text Functions—continued				
End extended character set (ECS) mode	ESC ESC C	1B 1B 43	27 27 67	This sequence ends the ECS mode by replacing the ECS characters in the active font with the normal ASCII/IBM characters. ECS characters are assigned codes above 7F hex. To start the ECS mode, reselect the font using the <i>Set Font</i> sequence. If the active font is not an ECS font, the printer ignores this sequence.
Set font	ESC ESC F <i>n</i>	1B 1B 46 <i>n</i>	27 27 70 <i>n</i>	This sequence selects an available font; it does <i>not</i> change the current character spacing. Each font has one or more numbers. To select a font, the sequence specifies one of the assigned numbers. Downloaded fonts are assigned numbers in reverse order beginning with FF hex (255 decimal).
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	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.
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	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.
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	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.
Trend PS	ESC ESC F EOT	1B 1B 46 04	27 27 70 4	
Trend PS (alternate)	ESC ESC F 4	1B 1B 46 34	27 27 70 52	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.
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	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 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	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.
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	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.
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	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.
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	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.
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	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.
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	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.
Download font 1	ESC ESC F 255	1B 1B 46 FF	27 27 70 255	
Download font 2	ESC ESC F 254	1B 1B 46 FE	27 27 70 254	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.
Set print feature combination	ESC I <i>n</i>	1B 49 <i>n</i>	27 73 <i>n</i>	
Gothic, draft, 10 cpi	ESC I NUL	1B 49 00	27 73 0	This sequence sets a combination of printing features: font, print quality, and character spacing/cell size.
Courier, letter, 10 cpi	ESC I STX	1B 49 02	27 73 2	
Trend PS, letter, PS	ESC I ETX	1B 49 03	27 73 3	This sequence sets a combination of printing features: font, print quality, and character spacing/cell size.
Download, draft, 10 cpi ..	ESC I EOT	1B 49 04	27 73 4	
Download, letter, 10 cpi ..	ESC I ACK	1B 49 06	27 73 6	This sequence sets a combination of printing features: font, print quality, and character spacing/cell size.
Download, letter, PS	ESC I BEL	1B 49 07	27 73 7	
Gothic, draft, 12 cpi	ESC I BS	1B 49 08	27 73 8	This sequence sets a combination of printing features: font, print quality, and character spacing/cell size.
Elite, letter, 12 cpi	ESC I LF	1B 49 0A	27 73 10	
Download, draft, 12 cpi ..	ESC I FF	1B 49 0C	27 73 12	This sequence sets a combination of printing features: font, print quality, and character spacing/cell size.
Download, letter, 12 cpi ..	ESC I SO	1B 49 0E	27 73 14	
Gothic, draft, 17.1 cpi	ESC I DLE	1B 49 10	27 73 16	This sequence sets a combination of printing features: font, print quality, and character spacing/cell size.
Courier, letter, 17.1 cpi ..	ESC I DC2	1B 49 14	27 73 18	
Download, draft, 17.1 cpi ..	ESC I DC4	1B 49 14	27 73 20	This sequence sets a combination of printing features: font, print quality, and character spacing/cell size.
Download, letter, 17.1 cpi	ESC I SYN	1B 49 16	27 73 22	

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

Function	ASCII	Hexadecimal	Decimal	Description
Text Functions—continued				
Download font coding	ESC ESC D <i>a1 a2 n1 n2</i> <i>coding</i>	1B 1B 44 <i>a1 a2 n1 n2</i> <i>coding</i>	27 27 68 <i>a1 a2 n1 n2</i> <i>coding</i>	This sequence downloads a font to the printer. Variable <i>a1</i> is the number assigned to the font. The <i>Set Font</i> escape sequence uses this number to identify and select the font. Normally, the first downloaded font is assigned 255 (FF hex), the second font downloaded is assigned 254 (FE hex), and so on. Variable <i>a2</i> must always be 00 hex. Variable <i>n2</i> and <i>n1</i> are a 16-bit number that specifies the number of bytes in the font <i>coding</i> . Variable <i>n2</i> is the high-order byte; <i>n1</i> is the low-order byte. The font <i>coding</i> must conform to a prescribed binary coding format. <i>Note:</i> For more detailed information on this escape sequence, refer to <i>AMT Technical Notes—Downloading Fonts</i> , available separately from AMT.
Set language	ESC ESC G <i>n</i>	1B 1B 47 <i>n</i>	27 27 71 <i>n</i>	These sequences set a language for the printer to use while printing text. This setting causes the printer to replace some 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. <i>Note:</i> 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.
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	
Print character string	ESC \ <i>n1 n2</i> <i>list</i>	1B 5C <i>n1 n2</i> <i>list</i>	27 92 <i>n1 n2</i> <i>list</i>	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 <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: Number of characters = $(256 \times n2) + n1$

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

Function	ASCII	Hexadecimal	Decimal	Description
Text Functions—continued				
Print character string (continued)	ESC \ <i>n1 n2</i> <i>list</i>	1B 5C <i>n1 n2</i> <i>list</i>	27 92 <i>n1 n2</i> <i>list</i>	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). <i>Note:</i> This sequence is not supported when an Epson emulation is active.
Print character Alternate	ESC [<i>n</i> ESC ^ <i>n</i>	1B 5B <i>n</i> 1B 5E <i>n</i>	27 91 <i>n</i> 27 94 <i>n</i>	These sequences print 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 or ESC ^ CR. <i>Note:</i> The ESC [<i>n</i> sequence is not supported when the IBM XL24 emulation is active.
Enable/disable characters with codes 128-159, 255				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.
Enable	ESC 6	1B 36	27 54	
Disable	ESC 7	1B 37	27 55	
Enable/disable characters with codes below 32				This sequence enables/disables the printing of character codes 0 to 6, 16, 21, 22, 23, 25, 26, 28, 29, 30, and 31 decimal.
Enable	ESC I <i>n</i>	1B 49 <i>n</i>	27 73 <i>n</i>	
Disable	ESC I 1 ESC I 0	1B 49 31 1B 49 30	27 73 49 27 43 48	<i>Note:</i> This sequence is not supported when the IBM XL24 emulation is active.
Select characters for codes above 159				This sequence sets the characters that print for codes above 159. The sequence can set either the italic ASCII characters or the normal IBM graphic characters. With 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 <i>n</i>	1B 74 <i>n</i>	27 116 <i>n</i>	
Graphics	ESC t 0 ESC t 1	1B 74 30 1B 74 31	27 116 48 27 116 49	
Bold printing				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).
Start	ESC G	1B 47	27 71	
End	ESC H	1B 48	27 72	
Shadow printing				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).
Start	ESC E	1B 45	27 69	
Start (alternate)	ESC q 1	1B 71 31	27 113 49	
Start (alternate)	ESC u STX	1B 75 02	27 117 2	
End	ESC F	1B 46	27 70	
End (alternate)	ESC q 0	1B 71 30	27 113 48	
End (alternate)	ESC u NUL	1B 75 00	27 117 0	

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

Function	ASCII	Hexadecimal	Decimal	Description																																																							
Text Functions—continued																																																											
Automatic underscoring ...	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																																																								
Slant printing (italics)	ESC ESC S <i>n</i>	1B 1B 53 <i>n</i>	27 27 83 <i>n</i>	This sequence controls slant printing, wherein characters slant forward to simulate italics. The degree can be 10, 20 or 30 degrees. <i>Note:</i> You can turn slant on and off as many times as you like on a line, but you can use only one slant setting. If you attempt to use more than one slant setting on a single line, only the last slant setting is used. For example, if you select 10-degree slant for one word and 20-degree slant for the next word on the same line, both words will print at 20-degree slant. <i>Note:</i> The ESC 4 and ESC 5 sequences are not supported when the IBM XL24 emulation is active.																																																							
10-degree slant	ESC ESC S 1	1B 1B 53 31	27 27 83 49																																																								
20-degree slant	ESC ESC S 2	1B 1B 53 32	27 27 83 50																																																								
20-degree slant (alternate)		ESC 4	1B 34																																																								
30-degree slant	ESC ESC S 3	1B 1B 53 33	27 27 83 51																																																								
End	ESC ESC S 0	1B 1B 53 30	27 27 83 48																																																								
End (alternate)	ESC 5	1B 35	27 53																																																								
Super / subscripting				These sequences start/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																																																								
Double-high / double-wide printing	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 colspan="5" style="text-align: center;"><i>Variable n1</i></th> </tr> <tr> <th style="text-align: left;"><u>Double-High</u></th> <th style="text-align: left;"><u>Line Spacing</u></th> <th style="text-align: left;"><u>ASCII</u></th> <th style="text-align: left;"><u>Hex</u></th> <th style="text-align: left;"><u>Dec</u></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>Variable n1</i>					<u>Double-High</u>	<u>Line Spacing</u>	<u>ASCII</u>	<u>Hex</u>	<u>Dec</u>	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
<i>Variable n1</i>																																																											
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Table D-6. Epson and IBM Escape Sequences—continued

Function	ASCII	Hexadecimal	Decimal	Description																				
Text Functions—continued																								
Double-high / double-wide printing (continued)	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>	<p>The value of variable <i>n2</i> determines whether double-wide printing starts or ends:</p> <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 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																					
Double-high printing				These sequences start/end double-high printing, wherein 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																					
Double-wide printing	ESC ESC W <i>n</i>	1B 1B 57 <i>n</i>	27 27 87 <i>n</i>	This sequence starts/ends double wide printing, wherein 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																					
Double-wide printing	ESC W <i>n</i>	1B 57 <i>n</i>	27 87 <i>n</i>	This sequence starts/ends double wide printing, wherein 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																					
One-line double-wide printing	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.																				
Set master print mode	ESC ! <i>n</i>	1B 21 <i>n</i>	27 33 <i>n</i>	<p>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:</p> <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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2 - Proportional	16 - Bold	128 - Underscore																						

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				
Automatic formatting	ESC a <i>n</i>	1B 61 <i>n</i>	27 97 <i>n</i>	<p>This sequence starts/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> <p>☞ 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.</p> <p>☞ 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.</p> <p>☞ 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.</p>
Start centering	ESC a 1	1B 61 31	27 97 49	
Start flush right	ESC a 2	1B 61 32	27 97 50	
Start justify	ESC a 3	1B 61 33	27 97 51	
End all formatting	ESC a 0	1B 61 30	27 97 48	
Proportional printing	ESC p <i>n</i>	1B 70 <i>n</i>	27 112 <i>n</i>	<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><i>Note:</i> The ESC P <i>n</i> sequence is not supported when an Epson emulation is active.</p>
Start	ESC p 1	1B 70 31	27 112 49	
Start (alternate)	ESC P 1	1B 50 31	27 80 49	
End	ESC p 0	1B 70 30	27 112 48	
End (alternate)	ESC P 0	1B 50 30	27 80 48	

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				
16-inch wide text printing . 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/disables 16-inch wide text printing. When 16-inch wide text printing is enabled, the leftmost print position, left margin and horizontal tabs move 1.2 inches to the left; the rightmost print position and right margin move 1.2 inches to the right. The result is a 16-inch wide print line. When 16-inch wide text printing is disabled, the leftmost and rightmost print positions, margins and horizontal tabs return to their original locations.</p> <p>With 16-inch 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, draft-quality text printing is disabled. If you select draft-quality, the printer substitutes memo-quality. 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 16-inch wide graphics, you must use the <i>16-Inch Wide Graphics</i> sequence.</p> <p><i>Note:</i> With 16-inch 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>

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

Function	ASCII	Hexadecimal	Decimal	Description																																											
Graphic Functions																																															
Print Epson JX graphics	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 border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th rowspan="2">Mode</th> <th rowspan="2">Resolution</th> <th colspan="3">Variable <i>m</i></th> </tr> <tr> <th>ASCII</th> <th>Hex</th> <th>Dec</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 = $(256 \times n2) + n1$</p> <p>For example, to print 300 columns, <i>n2</i> would be 1 and <i>n1</i> would be 44 ($300 = (256 \times 1) + 44$).</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>	Mode	Resolution	Variable <i>m</i>			ASCII	Hex	Dec	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
Mode	Resolution	Variable <i>m</i>																																													
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HS double	72V x 120H dpi	STX	02	2																																											
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One-to-one	72V x 72H dpi	ENQ	05	5																																											
Other CRTs	72V x 90H dpi	ACK	06	6																																											
Print Epson LQ-2550 graphics	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 (shown on the next page).</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>				
Graphic Functions—continued								
Print Epson LQ-2550 graphics (continued)	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>	<i>Variable m</i>				
				<i>Mode</i>	<i>Resolution</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				
<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 = $(256 \times n2) + n1$</p> <p>For example, to print 300 columns, <i>n2</i> would be 1 and <i>n1</i> would be 44 ($300 = (256 \times 1) + 44$).</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 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; e.g., 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, 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, etc. 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. Finally, the most significant bit of the third code controls the 17th dot from the top, the next bit controls the 18th dot, etc. If the bit is "1", the dot prints;</p>								

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

Function	ASCII	Hexadecimal	Decimal	Description																																																
Graphic Functions—continued																																																				
Print IBM XL24 graphics (continued)	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">Mode</th> <th rowspan="2">Resolution</th> <th colspan="3">Variable <i>m</i></th> </tr> <tr> <th>ASCII</th> <th>Hex</th> <th>Dec</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>	Mode	Resolution	Variable <i>m</i>			ASCII	Hex	Dec	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>																																																																		
Graphic Functions—continued																																																																						
Print single-density graphics	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.																																																																		
Print low-speed, double- ... density graphics	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.																																																																		
Print high-speed, double- .. density graphics	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.																																																																		
Print quadruple-density graphics	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.																																																																		
Reassign alternate graphics mode	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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		<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																																																																		

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				
Wide graphics Enable Disable	ESC ESC w ESC ESC s	1B 1B 77 1B 1B 73	27 27 119 27 27 115	<p>These sequences enable/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.</p> <p>☞ Note: Text printing is unaffected by these sequences. To print wide text, you must use the <i>Wide Text Printing</i> escape sequence.</p>

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* sold separately by AMT.

Table D-7. Bar Code Escape Sequences

Function	ASCII	Hexadecimal	Decimal	Description																														
Select bar code emulation	ESC ESC E BS	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>																																		
Interleaved 2-of-5	0	30	48	Parameter <i>p1</i> in the sequence selects the bar code symbology. At left, are the possible <i>p1</i> values.																														
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>$0.014 + (0.010 \times (p4 - 1))$</td> <td>1</td> <td>0.014</td> </tr> <tr> <td><i>p5</i></td> <td>Wide bar</td> <td>$0.014 + (0.010 \times (p5 - 1))$</td> <td>3</td> <td>0.034</td> </tr> <tr> <td><i>p6</i></td> <td>Narrow space</td> <td>$0.006 + (0.010 \times (p6 - 1))$</td> <td>2</td> <td>0.016</td> </tr> <tr> <td><i>p7</i></td> <td>Wide space</td> <td>$0.006 + (0.010 \times (p7 - 1))$</td> <td>4</td> <td>0.036</td> </tr> <tr> <td><i>p8</i></td> <td>Interchar. gap</td> <td>$0.006 + (0.010 \times (p8 - 1))$</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 have the printer 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

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 lists the specifications for AMT ACCEL-5350 and -5350d series printers.

Table E-1. Specifications

<i>Item</i>	<i>Specifications</i>
<i>Physical Characteristics by Model</i>	
5350 model	
Height	8.2 inches (20.8 cm)
Width	24 inches (61 cm)
Depth	16.8 inches (42.7 cm) without paper deflector
Weight	44 pounds (20 kg)
5350d model	
Height	11.4 inches (29 cm) paper support lowered
Width	24 inches (61 cm)
Depth	16.8 inches (42.7 cm) without paper deflector
Weight	53 pounds (24.1 kg)

Table E-1. Specifications—continued

<i>Item</i>	<i>Specifications</i>
<i>Printing Characteristics</i>	
Printing method	24-pin impact dot-matrix with one-half dot microshift
Dot diameter	0.3 millimeter
Movement	Bi-directional and logic-seeking
Color	Fully supported using color ribbon
Speeds	
Letter-quality	80 characters per second at 10 cpi
Memo-quality	200 characters per second at 10 cpi
Draft-quality	400 characters per second at 10 cpi and 480 characters per second at 12 cpi
Noise level	Less than 55 dBA maximum
<i>Controls and Indicators</i>	
Control panel	
Buttons	Form Feed, Line Feed, Paper Park, Alt, Bail/Set Top, Clear/Reset, Test/Status, Font/Pitch, Quality/Emul, Ready/Color, Setup
Display	16-character liquid-crystal display (LCD)
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, bottom tractor (5350d models only)
Solenoids	Microshift, bail and printhead
Sensors	Carriage, paper, Select-dial (2), paper jam, bottom paper jam (5350d models only)
Switches	Tractor select, cover open, ribbon home, color ribbon, power on/off, voltage select
<i>Interfaces</i>	
Parallel Compatibility Connector	Centronics type 36-pin female
Serial Compatibility Connector	EIA RS-232-C DB-25 female
Serial settings Baud rates	150, 300, 600, 1200, 2400, 4800, 9600, 19200 and 38400
Handshaking	DTR, X-ON/X-OFF and ETX/ACK
Parity	Even, odd and none
Data bits	7, 8 and 8 with MSB ignored
Stop bits	1 and 2
External 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
Options	DEC and HP emulations
<i>Vertical and Horizontal Spacing</i>	
Line spacing User-selectable Software-selectable	3, 4, 6, 8 and 12 lines per inch 1 to 120 lines per inch
Character spacing User-selectable Software-selectable	10, 12, 13.3, 15, 17.1 and 20 characters per inch and proportional 1 to 120 characters per inch and proportional
Line length User-selectable Software-selectable 10-pitch 12-pitch 13.3-pitch 15-pitch 17.1-pitch 20-pitch	8, 13.6 and 16 inches Up to 160 character columns Up to 192 character columns Up to 212 character columns Up to 240 character columns Up to 273 character columns Up to 320 character columns

Table E-1. Specifications—continued

<i>Item</i>	<i>Specifications</i>
<i>Fonts</i>	
Fonts	Courier, Gothic, Trend 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
Font download	Fully supported
Attributes	Expanded (double-high, double-wide and double-high/double-wide); italic (10-, 20- and 30-degrees); automatic bold, shadow, underscore, center and justify
Colors	Black, blue, red, yellow, green, orange, and purple
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, 120V x 240H and 120V x 480H
Two-pass resolutions	240V x 120H, 240V x 240H and 240V x 480H
Emulation graphics	Up to 240V x 360H
Dots per column	Up to 16
Columns per line	
60H graphics	Up to 960
120H graphics	Up to 1,920
240H graphics	Up to 3,840
480H graphics	Up to 7,680
Max. image width	16 inches
Colors	All supported by software
<i>Memory</i>	
Input buffer	60 kilobytes
User save areas	5 independent setups plus factory defaults
<i>Bar Codes</i>	
Symbologies	Interleaved 2-of-5, Code 3-of-9, Codabar, UPC-A, UPC-E, EAN-13, EAN-8, Code 128 and ZIP+4 POSTNET
Compatibility	Genicom- and OTC-compatible command set

Table E-1. Specifications—continued

<i>Item</i>	<i>Specifications</i>
<i>Paper Paths and Paper</i>	
Paper width	
Single sheets	From 3 to 17 inches (7.6 to 43.1 cm)
Pin-feed paper	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	Up to 0.015 inch thick
Multipart forms	7-part forms up to 0.024 inch thick
Paper paths	
5350	Top and rear
5350d	Top, rear and bottom
Feed methods	Friction for cut sheets and tractor for continuous pin-feed paper and forms
Special features	Tear bar, first-line printing, auto bail, paper out and paper jam sensing, demand document and paper park
Slew rate	8 and 6 inches per second

Table E-1. Specifications—continued

<i>Item</i>	<i>Specifications</i>
<i>Ribbons</i>	
Type	Continuous loop, inked nylon fabric in plastic cartridge
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
<i>Diagnostics</i>	
Status printout	Automatic printout of printer status
Self test	Rotating character pattern
Hexadecimal mode	Hexadecimal printout of print data
Diagnostics	Full set of interactive tests to check all printer subsystems, including memory, serial interface, sensors, and ribbon alignment
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	100, 120 and 140 vac (+/-10%) 220, 240 and 260 vac (+/-10%)
Frequency	47 to 63 Hz
Operating Temperature	7° to 46° C (45° to 115° F)
Humidity	10% to 90% noncondensing
Altitude	-100 to +10,000 feet
Storage Temperature	-20° to 60° C (-4° to 140° F)
Humidity	10% to 90% noncondensing
Altitude	-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)	20,000 hours average when operated at 50% duty cycle and 50% print density
Agencies	UL Listed, C-UL Listed, FCC Class A compliance

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AMT ACCEL-5350 Series Printers

Warranty Registration

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

Name		Title	
Company name		Department	E-mail
Address			
City	State	ZIP	Phone
Printer model	<input type="checkbox"/> ACCEL-5350 <input type="checkbox"/> ACCEL-5350d <input type="checkbox"/> ACCEL-5350dsi <input type="checkbox"/> ACCEL-5350si	Printer serial number	
Date purchased		Where purchased	

Please answer the following questions. This information will help AMT 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 your 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"/>

FOLD ON DASHED LINE (LOCATED ON REVERSE SIDE), TAPE AND MAIL

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

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**AMT Datasouth Corp.
4216 Stuart Andrew Blvd.
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Attention: Warranty Department

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