Honeywell

THE POWER OF **CONNECTED**

6824

Mobile Full Page Printer

User Manual

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For patent information, refer to www.hsmpats.com.

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Safety Information

Your safety is extremely important. Read and follow all warnings and cautions in this document before handling and operating Intermec equipment. You can be seriously injured, and equipment and data can be damaged if you do not follow the safety warnings and cautions.

This section explains how to identify and understand warnings, cautions, and notes that are in this document.

A warning alerts you of an operating procedure, practice, condition, or statement that must be strictly observed to avoid death or serious injury to the persons working on the equipment.

A caution alerts you to an operating procedure, practice, condition, or statement that must be strictly observed to prevent equipment damage or destruction, or corruption or loss of data.

Note: Notes either provide extra information about a topic or contain special instructions for handling a particular condition or set of circumstances.

Safety Precautions

Read and review all warnings and cautions in this manual before connecting the printer.

Moving parts are exposed when the cover is open. Make sure the cover is closed before you operate the printer.

Do not put your fingers inside the print mechanism when the power is on.

Ensure that dangerous conditions cannot occur under any circumstances, even for a brief period of time.

Observe all safety and accident prevention regulations applicable to your specific region and application.

Carefully read the warning text on the envelope before using a cleaning card.

Do not spray the printer with water. If you are using a hose to clean the premises in an industrial environment, remove the printer or protect it carefully from spray and moisture.

You must implement both hardware and software safety precautions to prevent the possibility of undefined system states.

Risk of explosion if battery is replaced by an incorrect type. Use of another battery may present a risk of fire or explosion.

The battery may present a fire or chemical burn hazard if mistreated. Do not disassemble the battery, heat above 100 °C (212 °F), or incinerate.

Dispose of any used batteries according to the instructions.

Customer Support

If you need assistance installing or troubleshooting your product, contact us by using one of these methods:

Knowledge Base: www.hsmknowledgebase.com

Our Knowledge Base provides thousands of immediate solutions. If the Knowledge Base does not help you solve your problem, log into the Technical Support Portal to submit your problem or ask your question.

Technical Support Portal: www.hsmsupportportal.com

Log into the Technical Support Portal to search our Knowledge Base, submit your problem or question, request a call back, or provide feedback. When filling out one of the forms, provide as much detail as possible. You can even include attachments.

Telephone: www.honeywellaidc.com/locations

For our latest contact information, please check our website.

Product Service and Repair

Honeywell International Inc. provides service for all of its products through service centers throughout the world. To find your service center, go to **www.honeywellaidc.com** and select **Support** > **Contact Support** > **Service and Repair**. Contact your service center to obtain a Return Material Authorization number (RMA #) before you return the product.

To obtain warranty or non-warranty service, return your product to Honeywell (postage paid) with a copy of the dated purchase record.

Limited Warranty

For warranty information, go to **www.honeywellaidc.com** and click **Resources** > **Warranty**.

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About the Printer

This chapter introduces the 6824 printer and includes descriptions of printer features and basic operation.

About the 6824 Mobile Full-Page Printer

The 6824 is a rugged, mobile printer that can print full-size (8.5" x 11") receipts on 3-ply tractor-feed paper. The printer is available in fixed and portable models and includes these features:

- Print speed of 400 characters per second (10 characters per inch)
- Supports fanfold media, 1- to 3-ply, 7.5" to 8.5" by 11", or carbonless NCR paper with adhesive tacking on left border (tractor feed)
- Powered by 12 to 24 VDC, or 100 to 240 VAC with supplied AC power adapter
- Bluetooth communications with a supported mobile computer (range up to 10 meters)
- Serial communications with an installed mobile computer (except CN70)
- Internal holder for selected Honeywell and Intermec mobile computers
- 50-sheet or 200-sheet paper capacity
- (Optional for portable models) Rechargeable battery

Supported Computers

The printer supports these computers and operating systems.

Supported Computers and Operating Systems

Computer	OS	Communications
CN70	Windows Embedded Handheld 6.5	Bluetooth
CN51	Windows Embedded Handheld 6.5 Android 4.2 Android 6.0	Bluetooth, Serial
CT50	Windows 10 IoT Mobile Enterprise Android 4.4 Android 6.0	Bluetooth, Serial
99EX	Windows Embedded Handheld 6.5	Bluetooth, Serial

Note: The printer must have the corresponding computer holder installed for a serial connection. The computer does not need to be installed in the printer for a Bluetooth connection.

Printer Features

Use the next illustrations to locate printer features.
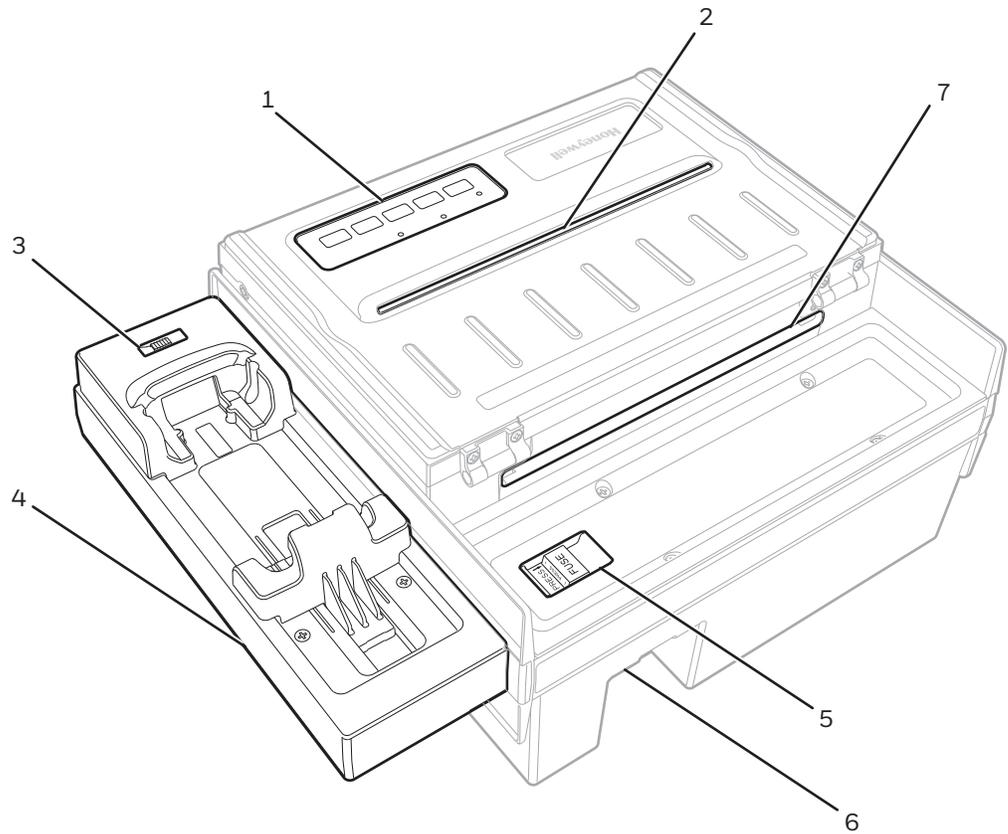
External Features (Fixed mount printer)

6824 (Fixed Model) External Features

Callout	Feature
1	Control panel
2	Output slot
3	Bluetooth/Serial mode switch
4	Computer holder
5	Fuse holder
6	Power connector
7	External media feed slot
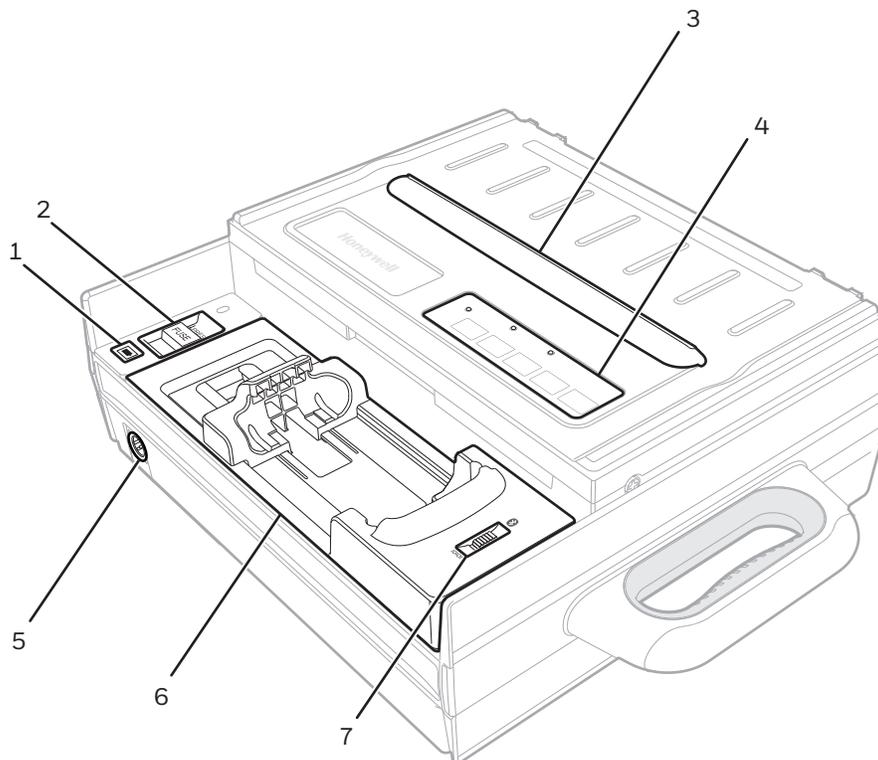
External Features (Portable printer with 50-sheet tray shown)

6824 (Portable Model) External Features

Callout	Feature
1	Low Battery indicator
2	Fuse holder
3	Output slot
4	Control panel
5	Power connector
6	Computer holder
7	Bluetooth/Serial mode switch
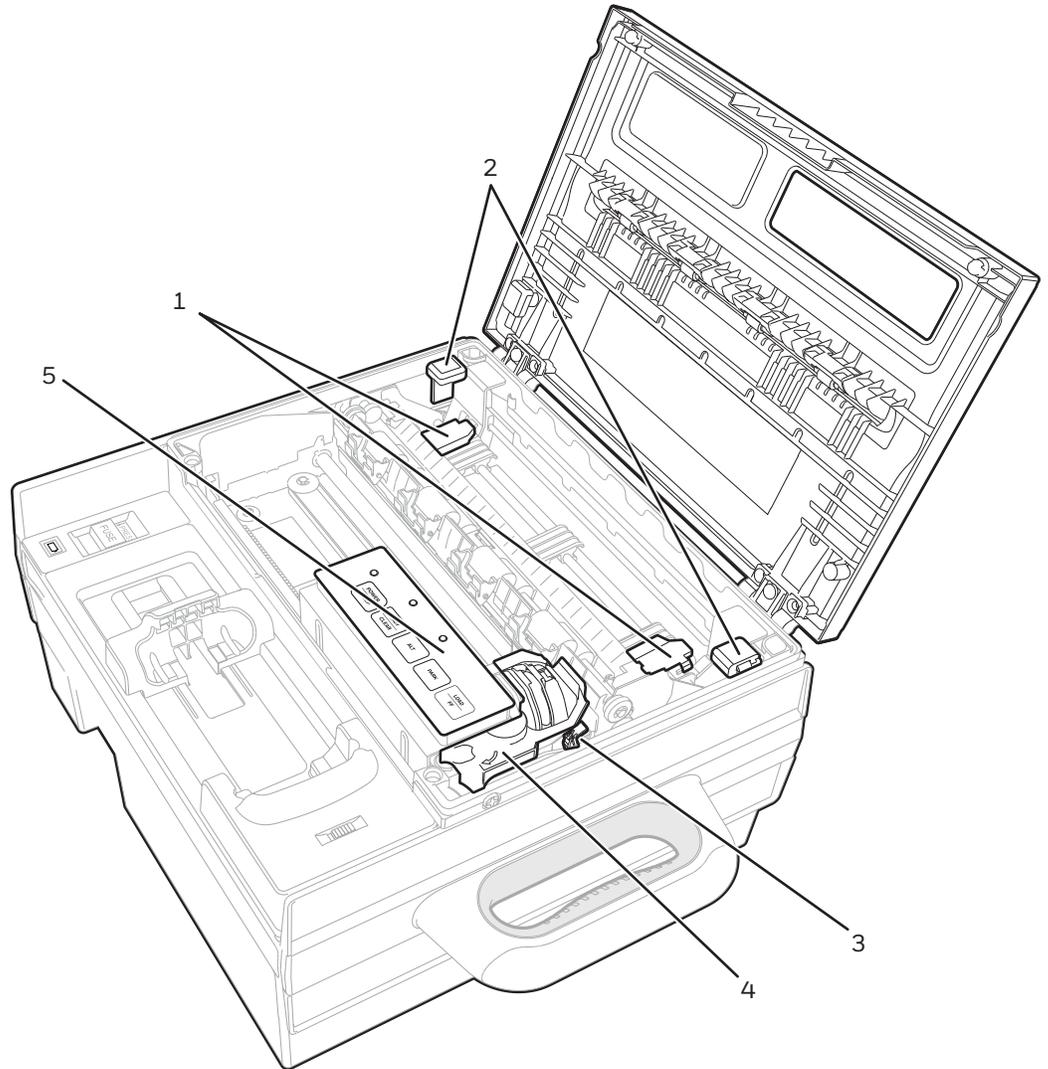
Internal Features (Fixed and portable printers)

6824 Internal Features (Fixed and Portable models)

Callout	Feature
1	Pinfeed holders
2	Mechanism tabs
3	Printhead gap adjustment
4	Ribbon cartridge
5	Control Panel

About the Control Panel

The printer control panel includes function buttons and status indicators for printer operations.
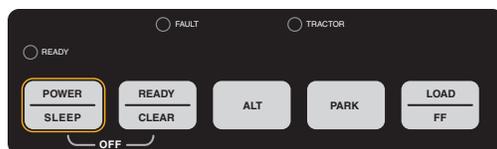
6824 Printer Control Panel

Control Panel Function Buttons and Indicators

Button or Indicator	Description
POWER/SLEEP button	Press to turn on the printer or wake it from Sleep mode.
	Press and hold for 5 seconds to place printer in Sleep mode.
READY/CLEAR button	Hold this button and then press POWER/SLEEP to turn the printer off.
	When the printer is idling, toggles between ready and standby modes.
	When the printer is printing, press to pause and then resume the print job.
ALT button	Press to enable alternate functions for programming and setting up the printer.
PARK button	Press to reverse feed paper up to 17.5 cm (7 in). Use this feature to remove paper from the printer.
LOAD/FF button	After you load paper, press once to feed paper into the print mechanism.
	If paper is already fed into the print mechanism, press once to advance to the next form.
READY indicator	On: Printer is ready to print.
	Blinking: Printer is receiving data.
	Blinking slowly (once every 10 seconds): Printer is in Sleep mode.
	Off: Printer is not ready to print, or current print job is paused.
FAULT indicator	On: No paper is loaded and printer is empty.
	Blinking: Printer error.
	Off: No error. Printer is operating normally.
TRACTOR indicator	On: Paper is loaded.
	Blinking: Printer is receiving data for a firmware upgrade.
	Off: Paper is not loaded.

Restore Default Communication Settings From the Control Panel

If you cannot connect to the printer, you may need to restore the default communications settings (Baud Rate, Data Bit, Stop Bit, Parity, and Buffer Control). Follow these steps to restore the default communications settings from the printer control panel.

1 Press and hold **READY/CLEAR**, and then press **POWER/SLEEP** to turn the printer off.

2 Press **POWER/SLEEP** to turn the printer on, and then immediately press and hold **READY/CLEAR**.

3 Release **READY/CLEAR**. The printer automatically restarts.

Restore All Default Settings From the Control Panel

Follow this procedure to restore all printer settings to their default values from the printer control panel.

1 Press and hold **READY/CLEAR**, and then press **POWER/SLEEP** to turn the pinter off.

2 Press **POWER/SLEEP** to turn the printer on, and then immediately press and hold **READY/CLEAR** and **PARK**.

3 Release **READY/CLEAR** and **PARK**. The printer automatically restarts and all settings are restored to the default values.

Error States

When there is a printer error, the indicators turn on or off or blink to alert you of the error. Use the next table to understand the possible errors and how to recover from errors.

Error State Descriptions

| Error Type	Indicator Behavior	Description and Recovery
Paper empty	READY: Normal FAULT: On TRACTOR: Normal	Paper is not loaded in the print mechanism. To recover, load paper.
Paper jam	READY: Normal FAULT: Blinking every 1.2 seconds TRACTOR: Normal	You pressed PARK to reverse feed paper, and the printer could not detect the end of the paper. To recover, press PARK several more times until the paper is out of the print mechanism, or remove paper manually.
Serial I/F communication error	READY: Normal FAULT: Blinking every 1.2 seconds TRACTOR: Normal	There is a serial parity error, framing error, or buffer overrun error. The printer prints a question mark '?' character. To recover, press READY/ CLEAR twice. If the error occurs again, you need to check the serial communications parameters.
Printhead temperature error	READY: Off FAULT: Blinking every half second TRACTOR: On	The printhead temperature is too hot or too cold (less than -40 °C or more than 150 °C). To recover, turn off the printer to allow the printhead to cool down.

Error State Descriptions (continued)

Error Type	Indicator Behavior	Description and Recovery
Internal temperature error	READY: On FAULT: Blinking every half second TRACTOR: Off	Internal printer temperature is too hot or too cold (less than -40 °C or more than 150 °C). To recover, turn off the printer.
Printhead jam or carrier error	READY: Blinking every half second FAULT: Blinking every half second TRACTOR: On	Either the printhead cannot find the home position when you turn on the printer, or the printhead reaches the home position unexpectedly. To recover, turn off the printer.
System error	READY: Blinking every half second FAULT: Blinking every half second TRACTOR: Off	An illegal printer logic condition was detected. To recover, turn off the printer.
EEPROM error	READY: On FAULT: Blinking every half second TRACTOR: Blinking every half second	An EEPROM checksum error was detected. To recover, turn off the printer.
RAM error	READY: Off FAULT: Blinking every half second TRACTOR: Blinking every half second	RAM read/write check failed. To recover, turn off the printer.
Font error	READY: Blinking every half second FAULT: Blinking every half second TRACTOR: Blinking every half second	Font check code error was detected. The printer indicators show this error state for 7 seconds, and then the printer enters initial program loading mode. In this mode, the printer will not function normally. For more information, see "Recover From a Font Error."

Mount the Fixed Printer

The fixed model of the printer includes mounting holes so you can install the printer in a vehicle with an installation plate.
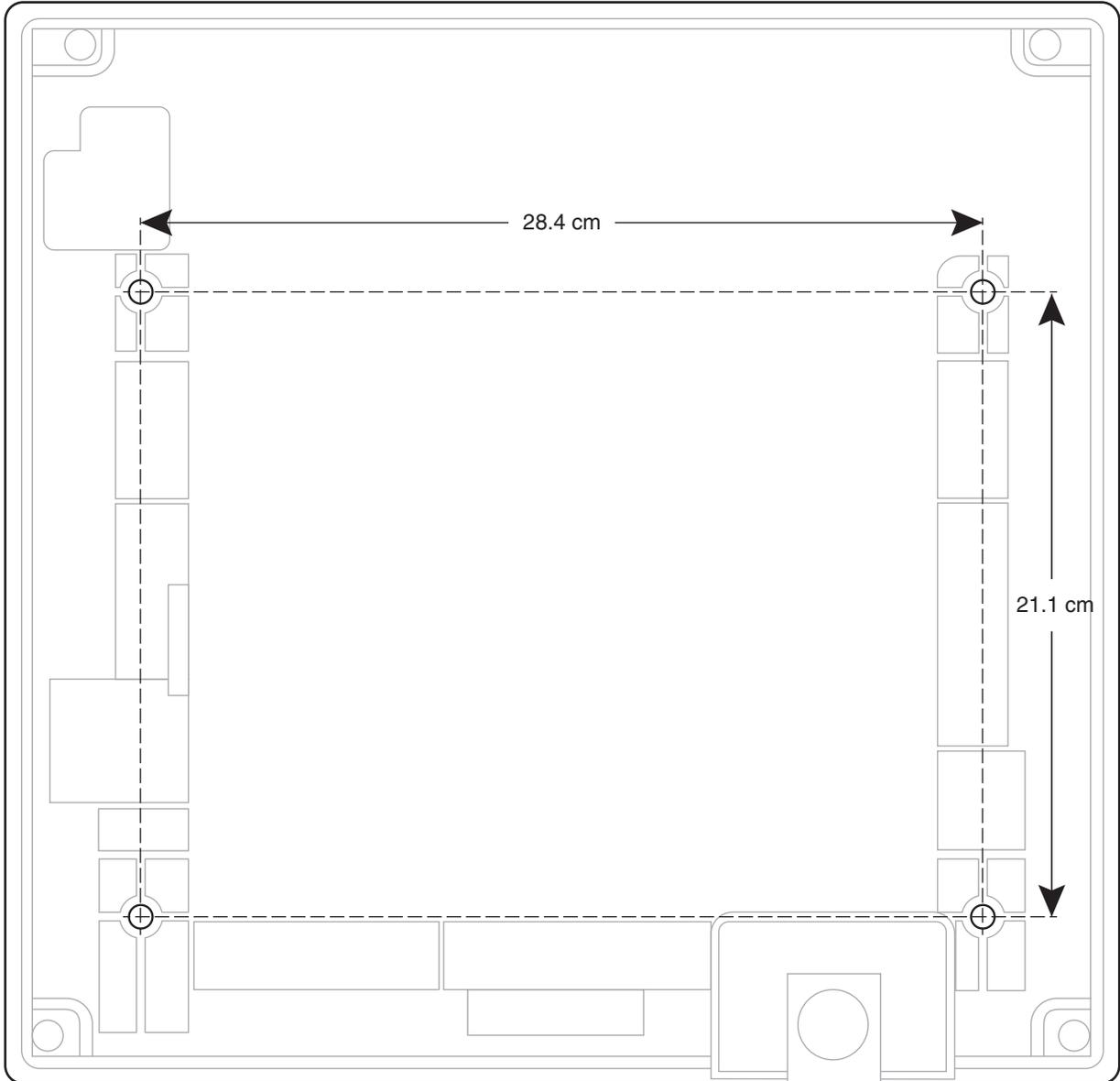
2

Set Up the Printer

This chapter explains how to load paper and ribbon, print a configuration page and printer test pages, adjust the print quality, and install a mobile computer.

Load Paper Into the Printer

1 Open the printer lid and lift the tabs to tilt the printer mechanism up and out of the case.
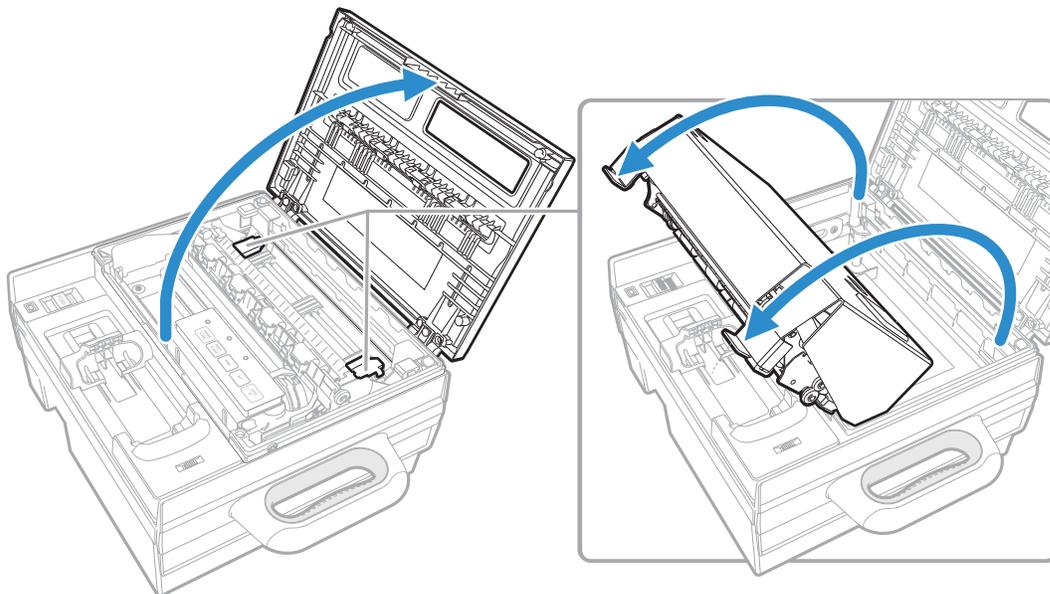
⚠ **Caution:**Be careful not to pinch your hands and fingers between the print mechanism and the printer case.

2 Place up to 50 sheets of paper (or up to 200 sheets for the 200-sheet paper tray) in the printer. Leave the first sheet of paper sticking out of the printer.
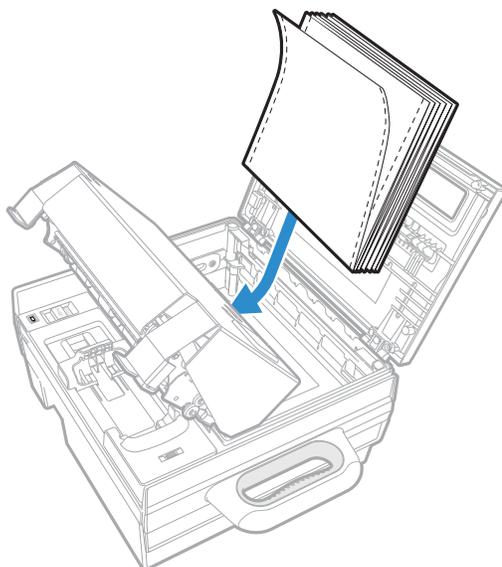
3 Carefully tilt the printer mechanism back into the case. The first sheet of paper should be threaded between the back of the mechanism and the printer case.
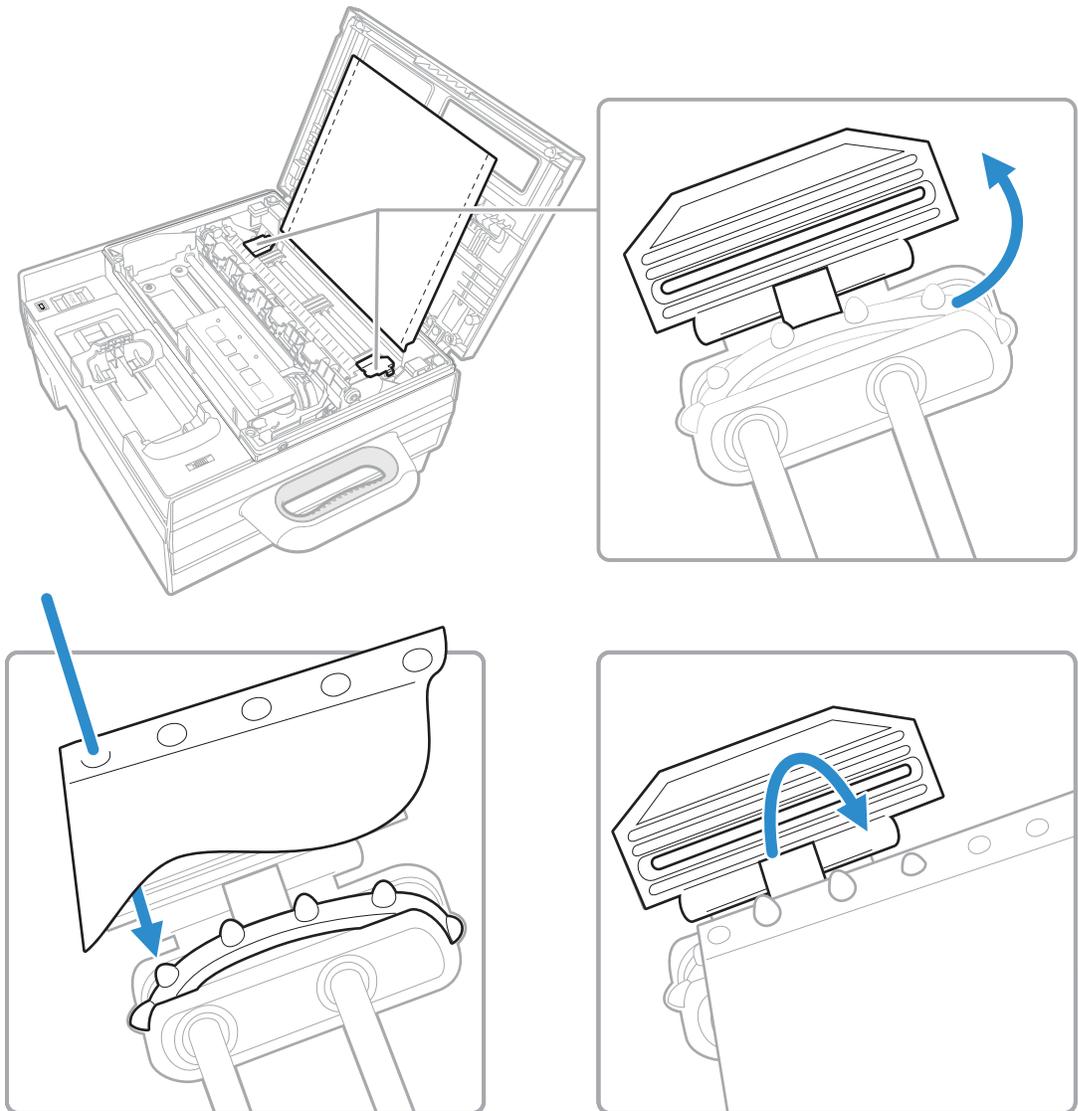
4 Close the printer lid.
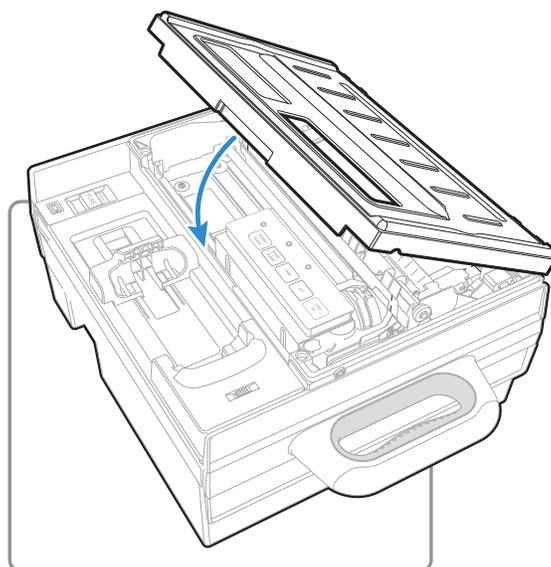
5 Press **POWER/SLEEP**. The printer turns on.

6 Press **LOAD/FF**. The printer feeds the paper through the slot and is ready to print.
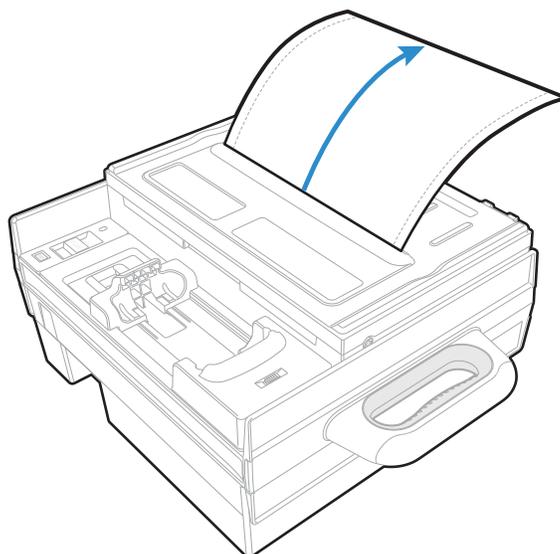
Adjust the Pinfeed Holders

By default, the printer pinfeed holders are set for 8.5" paper stock. Follow these steps to adjust the pinfeed holders for different paper widths.

1 Locate the locking tab on the pinfeed holder.

Tab
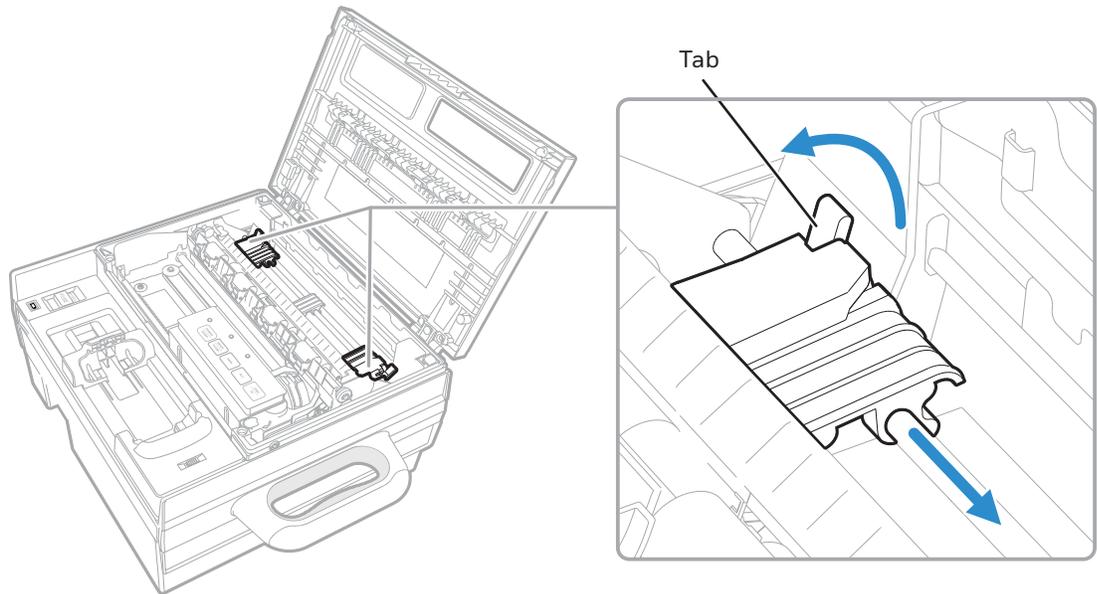
2 Lift the tab to unlock it. You should hear a click sound.

3 Slide the pinfeed holder left or right as needed to fit your paper.

4 Press the tab down to lock the holder in place.

5 Load the paper.

Load Externally Fed Paper Into the Printer

To use a quantity of media that is too large to fit inside the printer, you can feed the media through the external feed slot.
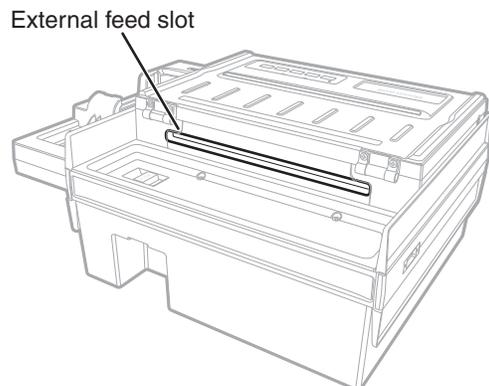
External feed slot

External media feed slot (Fixed mount printer)
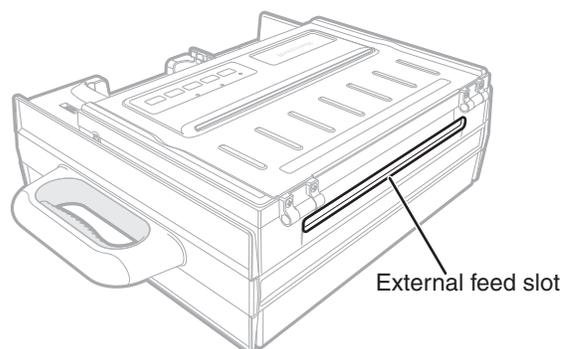
External feed slot

External media feed slot (Portable printer)

1 Place the media behind the printer.

2 Open the top of the printer.

3 Feed the top sheet of the media into the printer through the external feed slot.

4 Install the paper onto the pinfeed holders as usual.

Replace the Ribbon Cartridge

When the print quality becomes unacceptably light, replace the ribbon cartridge before continuing to print.

Note: Before you begin, turn the printer off.

1 Open the printer lid.
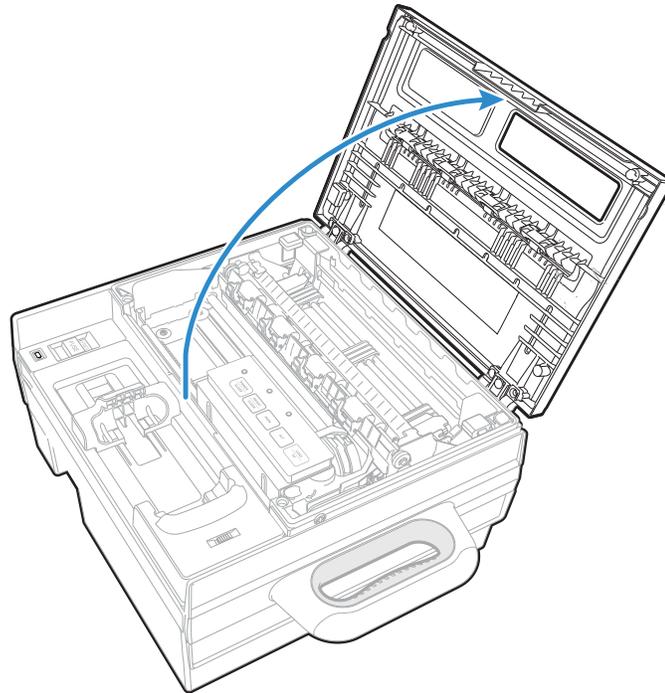
2 If necessary, slide the printhead out from behind the control panel.
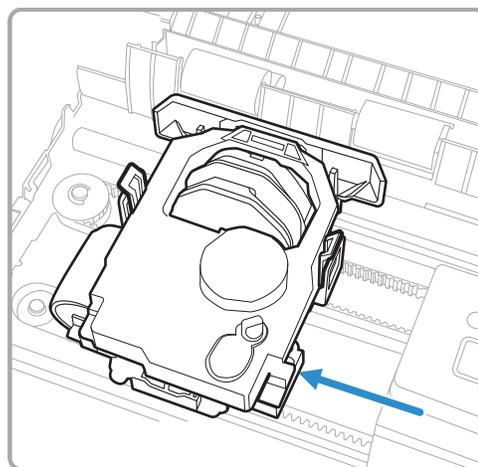
3 Squeeze the tabs on the sides of the ribbon cartridge and lift the cartridge out of the printhead.
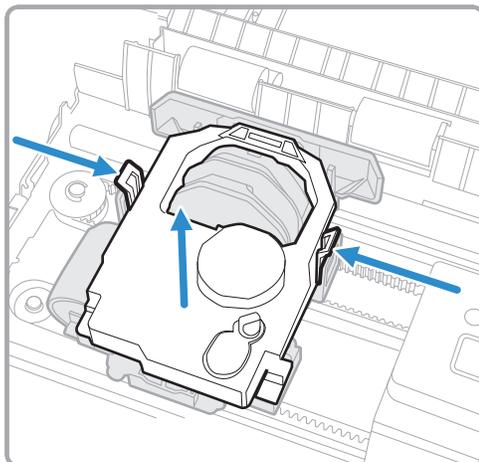
4 Check the new ribbon cartridge to make sure the ribbon is straight and even. Turn the green knob clockwise to remove any slack.

5 Position the new ribbon cartridge over the printhead. Line up the side tabs with the holders on the printhead.

6 Squeeze the side tabs and press the cartridge down into the printhead.
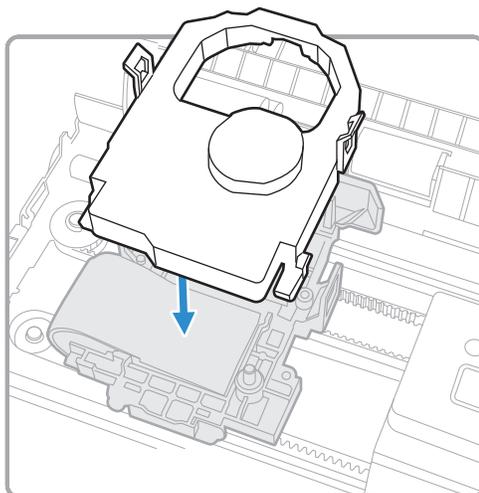
7 Release the tabs and gently rock the cartridge from side to side to make sure the tabs are seated in the clamps.

Connect the Power Supply

You can operate the printer with the optional DC power supply. The power supply operates on 100 to 240 VAC. You need to order the correct AC power cord for your region. For more information, contact your local sales representative.

1 Connect the XLR cable from the external power supply to the power connector on the printer.
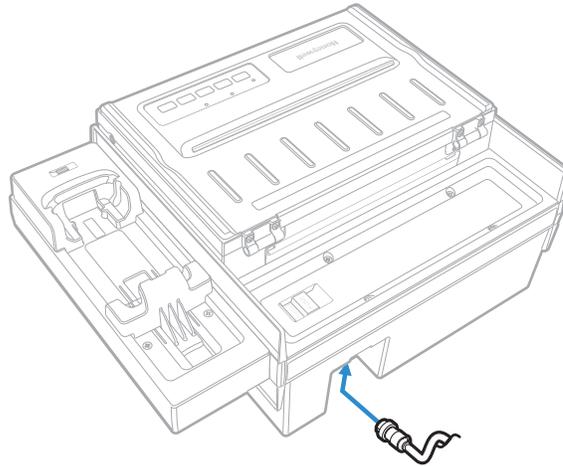
Power port location (Fixed mount printer, portable printer with 200-sheet paper tray)
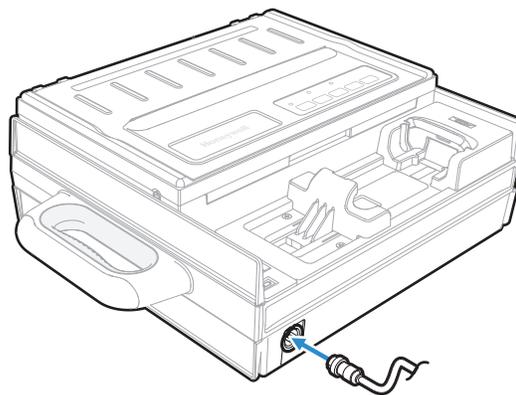
Power port location (Portable printer with 50-sheet paper tray)

2 Connect the external power supply to an AC power source.

Replace the Fuse

✎ **Note:** Before you replace the fuse, turn off the power and disconnect the power cable.
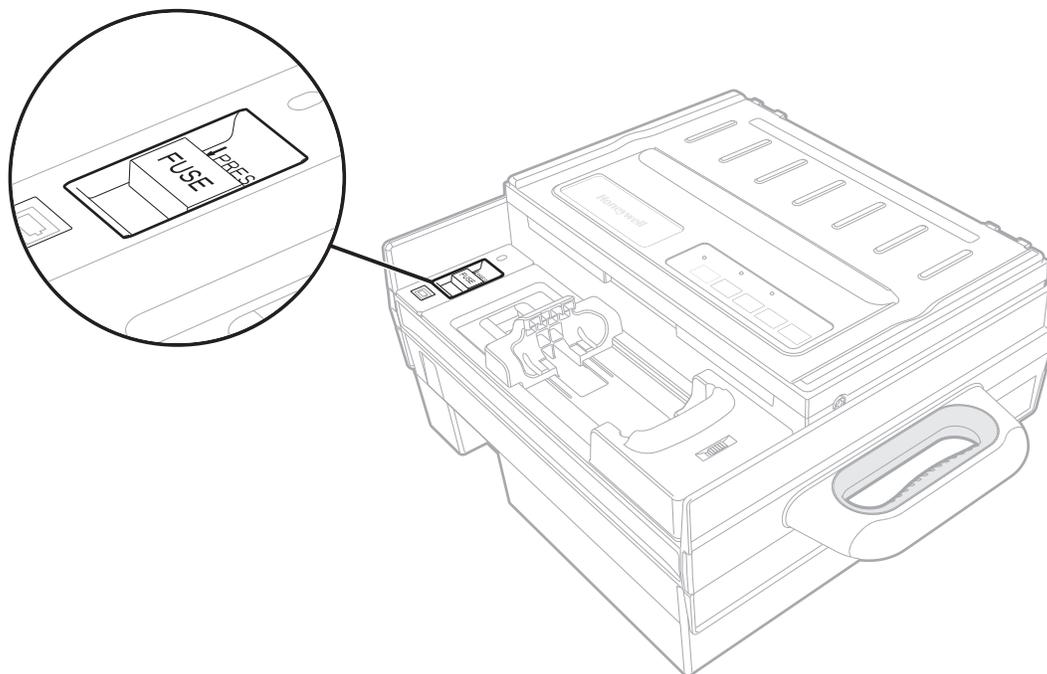
1 Slide the fuse holder in the direction shown by the PRESS arrows and pull the holder up out of the printer. The holder does not come all the way out of the printer.

2 Replace the fuse (6.3A, 250V required).

3 Press the fuse holder back into the printer.

About the Internal Battery

The optional battery (P/N 203-186-100) allows the portable printer to operate independently of other power sources. The battery charges when:

• the printer is connected to a 24 VDC vehicle power system.

• the printer is powered by the external power adapter.

✎ **Note:** The printer battery does not provide power to an installed computer.

⚠ **Caution:** The printer discharges the internal battery even when the printer is not is use. Over time, the internal battery can discharge to the point where the battery is not recoverable. Plug the printer into an external charge source or disconnect the battery when you store the printer for any length of time. A total discharge of the battery is most likely to occur when the battery is new and the battery chemical reactions are not fully formed, or when the battery has had only one charge cycle.

Install the Battery (50-Sheet Tray)

You need a #2 Phillips screwdriver to install the battery. Before you begin, disconnect the power cable and remove the computer if one is installed.

1 Remove the four screws that fasten the computer holder to the printer.
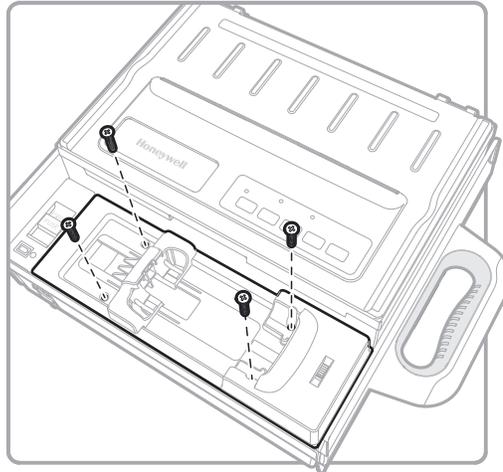
2 Lift the computer holder out of the printer case. Be careful not to disconnect the wiring.
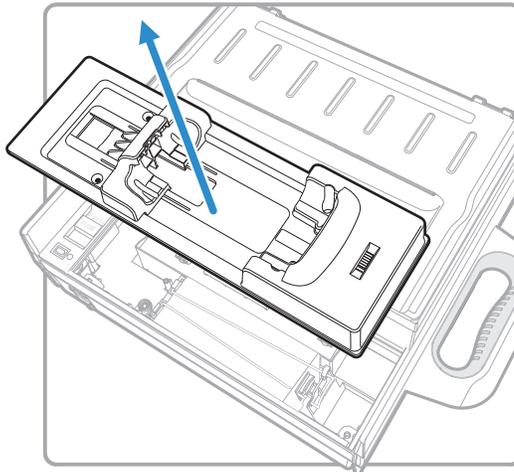
3 Squeeze the battery clip and lift it away from the battery bay.
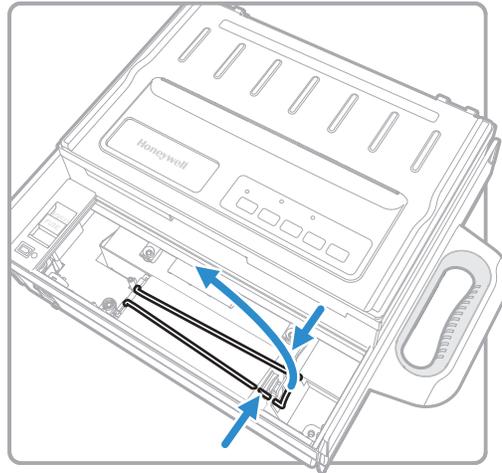
4 Insert the battery into the bay, contact end first. Make sure the contacts are on the bottom, facing the side closest to the wiring.
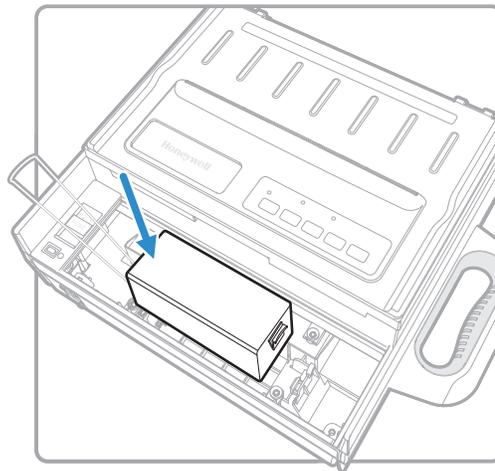
5 Press the battery down into the bay until it snaps into place.
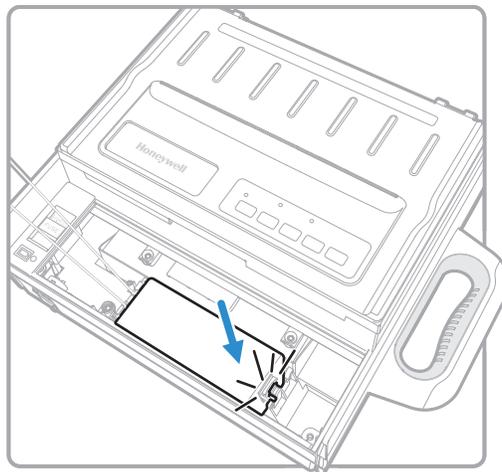
6 Press the battery clip into the clip holder.
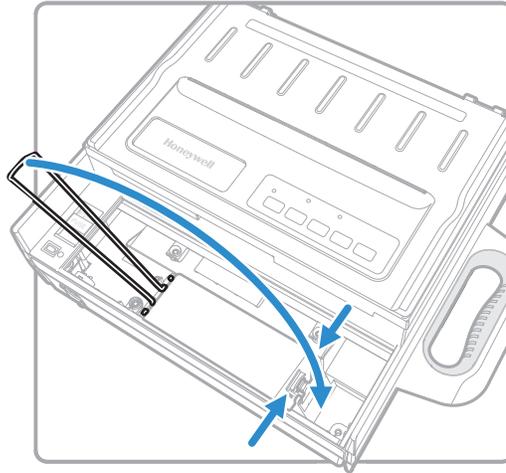
7 Place the computer holder back into the printer body. Be careful not to catch the wiring in between the holder and the printer body.

8 Install the four screws. Do not overtighten.

Install the Battery (200-Sheet Tray)

Before you begin, disconnect the power cable and remove the computer if one is installed.

1 Open the printer lid and lift the tabs to tile the printer mechanism up and out of the case. The battery bay is located in the bottom of the printer case.

2 Squeeze the battery clip and lift it away from the battery bay.
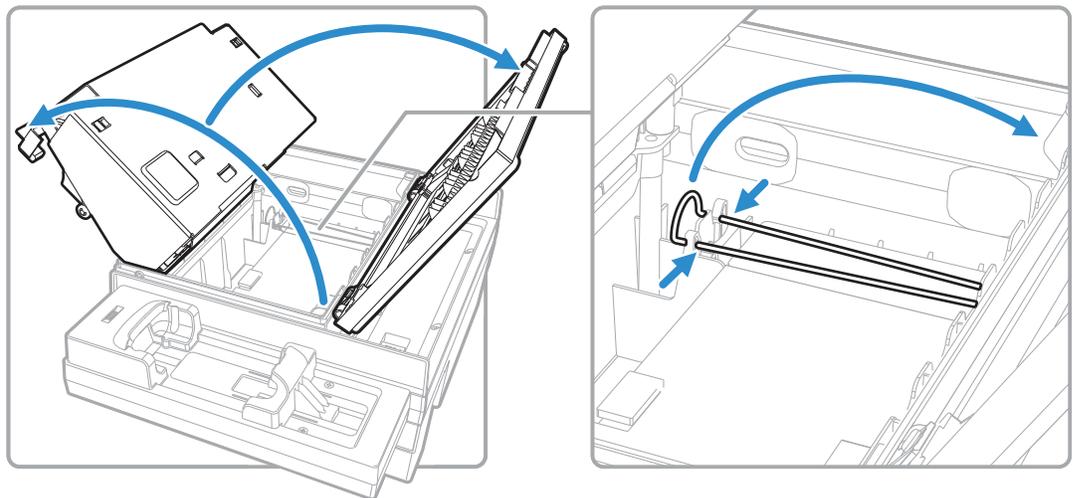
3 Insert the battery into the bay, contact end first. Make sure the contacts are on the bottom, on the end closest to the printer lid.
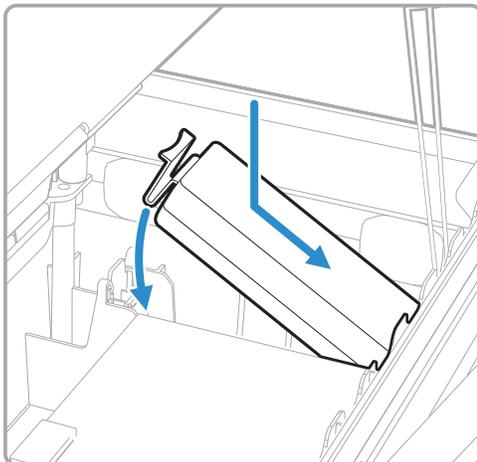
4 Press the battery down into the bay until it snaps into place.
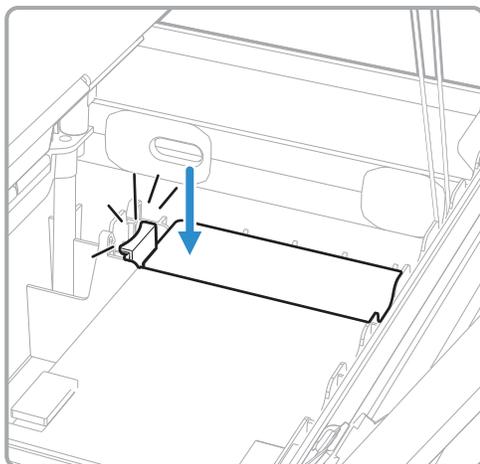
Charge the Battery

With the battery installed, connect the printer to the vehicle power supply or to the external DC power supply. The battery is fully charged in 5 hours (when ambient temperature is between 0 and 40 °C).

Note: Charging the battery requires a 24 VDC vehicle power system, or the external power supply. 12 VDC vehicle power systems will not charge the battery. Using the printer while the battery is charging extends the amount of time needed to fully charge the battery.

About the Low Battery Indicator

The low battery indicator turns on and stays on when the battery needs to be charged immediately. The indicator is located next to the fuse holder.
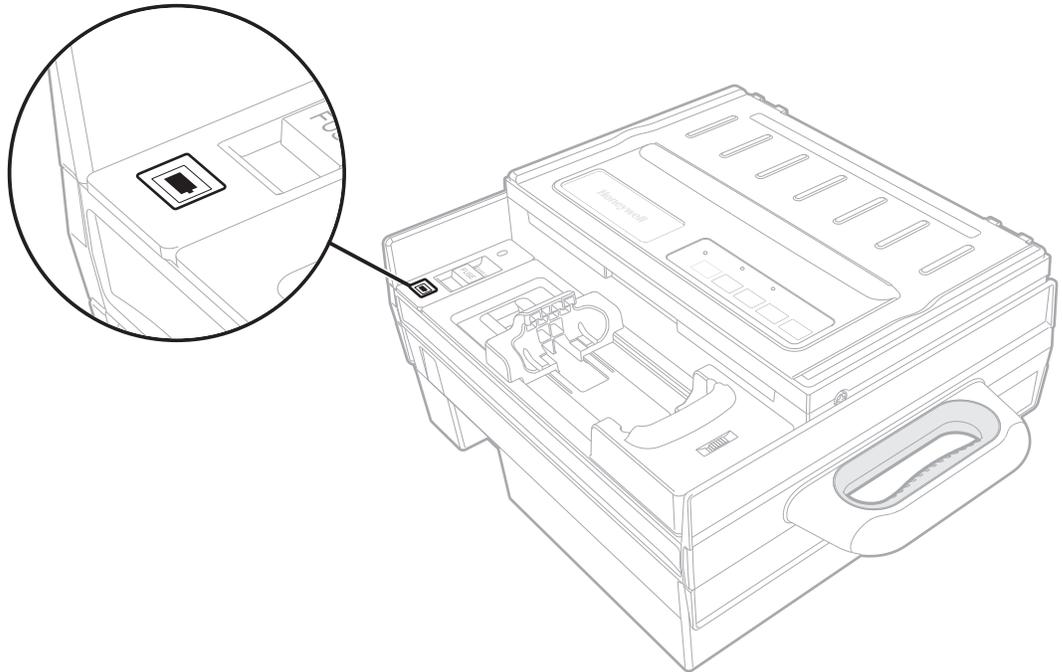
> **Note:** The indicator also turns on if the external power supply is not connected to the printer and no battery is installed.

How to Connect the Printer to Vehicle Power

You need these accessories to install the 6824 printer in a vehicle:

- Printer installation kit, P/N 203-242-101 or 203-242-102. Includes all of the hardware for connecting the battery cable directly to the vehicle battery, including adjustable wire clamps to secure the cable in place.
- Vehicle power cable, P/N 206-875-106 (4.88 m (16 ft))or 206-875-109 (6.7 m (22 ft))
- 5-pin power cable, P/N 50132257-001 (straight connector) or P/N 50132258-001 (right-angle connector)

For more information, see the *6824 DC Power Cable Installation Instructions*.

> **Note:** When the printer is connected to a 12 VDC vehicle power system, Honeywell recommends that you keep the vehicle engine running during printing.

Insert a Computer Into the Printer

Follow these steps to insert a computer into the printer.

1 Insert the top of the computer into the movable slide.

2 Use the computer to push the slide towards the fuse holder.
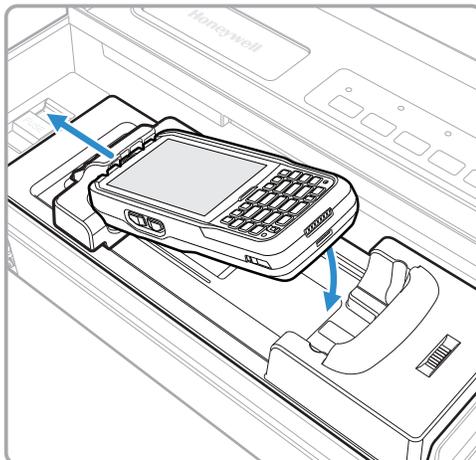
3 Lower the bottom end of the computer into the computer holder.

4 Slide the computer into the docking connector. The movable slide holds the computer in place.
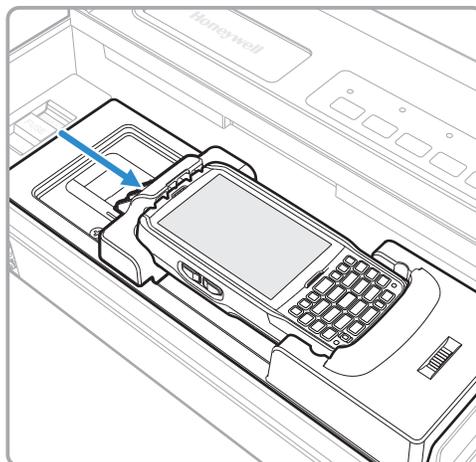
Set the Communication Interface

The printer supports Bluetooth and serial communications with supported computers.

To set the communications interface, slide the switch to either Bluetooth (⍟) or Serial (|O|O|).

Note: When you switch between Bluetooth and serial modes, you need to restart the printer.
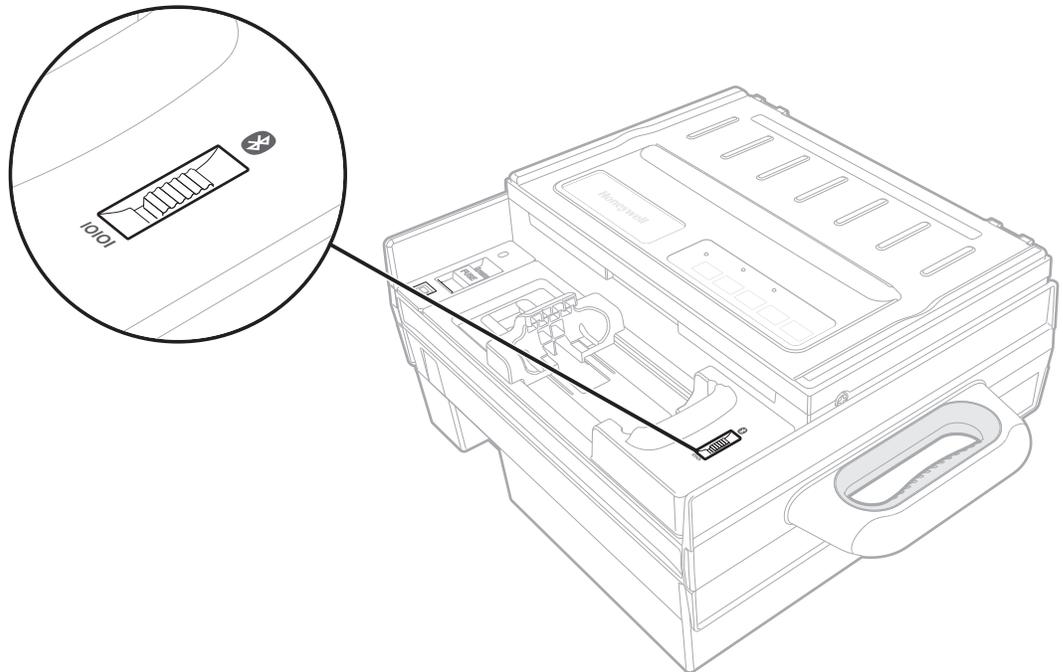
Note: For serial communications, the computer must be installed in the printer computer holder.

Printer Operating Guidelines

Make sure that your mobile computer remains connected to the printer when printing or operating.

- Keep the printer cover closed except during maintenance or when loading paper.
- Make sure the paper is properly installed in the paper tray.
- Disconnect the printer power cable when jump-starting the vehicle.
- Make sure the printer is loaded with paper before communicating with the mobile computer.
- Do not spill liquids or food crumbs into the printer.
- Do not use solvents or abrasive cleaners on the printer.
- Do not rest objects on, under, or against the printer.
- If the printer is connected to a vehicle electrical system, do not start or stop the vehicle engine while you are printing.
- Do not overload the paper tray or paper jams will occur.

3

Configure the Printer

This chapter explains how to configure the printer.

About the Printer Configuration Utility

Use the Printer Configuration Utility application to configure the printer and upgrade printer firmware. The utility runs on your Bluetooth-enabled PC.

The application lets you configure:

- general printer settings, including the code page, typeface, and international character set.
- advanced print settings, including form size and print pitch.
- serial communication settings.

You can also use the application to upload fonts and firmware to the printer.

For more information, contact Honeywell Technical Support.

Download and Install the Printer Configuration Utility

To download the Printer Configuration Utility, contact Honeywell Technical Support.

Connect the Printer to a PC

To configure the printer or update the firmware, you need to connect the printer to a Bluetooth-enabled PC.

1 On the printer, make sure the interface switch is set to Bluetooth.

2 Press **POWER/SLEEP** to turn on the printer.

3 In the taskbar on your PC, right-click the Bluetooth icon, select **Add a Device**, select hte printer in the menu and then click **Next**.

   If the Bluetooth icon is not visible in the taskbar, in the Start menu select **Devices and Printers** > **Add a device**, select the printer in the menu, and click **Next**.

4 Select **Enter the device's pairing code** and click **Next**.

5 Enter `1234` and click **Next**. The PC establishes Bluetooth communications with the printer and assigns a virtual COM port to the printer.

6 To verify the virtual COM port number:

   a In the Start menu select **Devices and Printers**.

   b In the Printers and Faxes section, right-click the printer and select **Properties**.

   c Select the **Services** tab. The Bluetooth virtual COM port number is in the Bluetooth Services section.

Change the Bluetooth Device Name

1 On your desktop PC, open a communications program such as Tera Term.

2 Connect to the printer through the virtual COM port assigned to the printer.

3 In the communications program, send the command `!!!`. The printer responds `OK`.

4 Send the command `AT+BTN?` The printer responds with its current friendly name and `OK`.

5 Send the command `AT+BTN="string"`, where string (maximum 254 bytes) is the new device name for the printer. The printer responds `OK`.

6 Send the command `ATZ.` The printer hardware resets and the new device name is saved.

Configure the Printer With the Configuration Utility

You can use the Printer Configuration Utility to view and change the current configuration settings. To use the Configuration Utility, you need a Bluetooth connection between your PC and the printer.

Note: Changes are stored in printer memory and retained after the printer is turned off.

1 On your PC, start the Printer Configuration Utility.
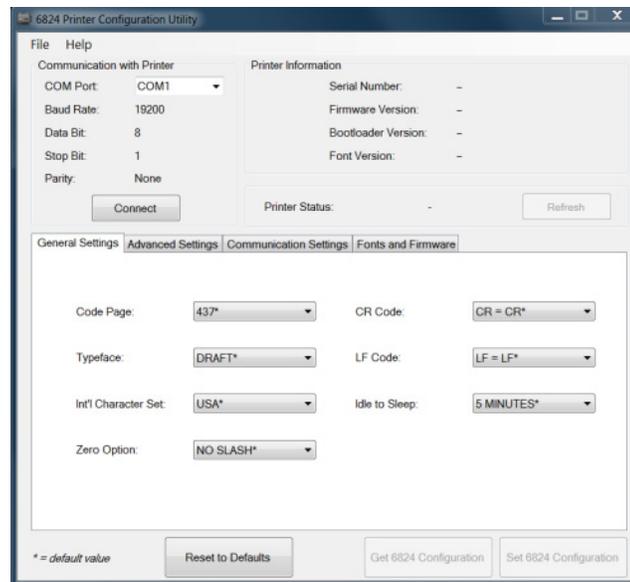
2 In the COM port list, select the virtual COM port your PC uses for communicating with the printer, and then click **Connect**. When the utility connects to the printer, the Printer Information section is updated.
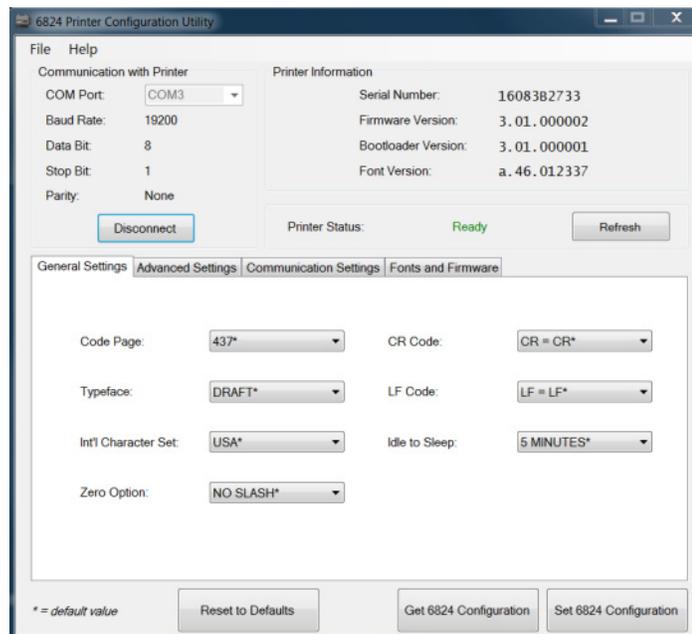
If an "Invalid COM number" error message appears, see the next section, "**Troubleshoot the Connection**."

3 Click one of the tabs:

- Click **General Settings** to view the current settings for the printer Code Page, Typeface, International Character Set, Zero Option, CR Code, LF Code, and Idle to Sleep time.

- Click **Advanced Settings** to view the current settings for Horizontal Pitch, Vertical Pitch, Form Length, Lines per Page, Top of Form, Top Margin, Left Margin, and Tear position behavior.

- Click **Communication Settings** to see the current values for Baud Rate, Data Bit, Stop Bit, Parity, and Buffer Control.

Note: An asterisk ("*") indicates the default value.

4 To change a setting, select a different value from the list for that parameter.

Or, to restore all default settings in a tab, click **Reset to Defaults**.

5 Click **Set 6824 Configuration**. Click **OK** to close the success message.

Note: You can change multiple settings in each tab before you click **Set 6824 Configuration**, but your changes are lost if you click another tab before you click **Set 6824 Configuration**.

Troubleshoot the Connection

If you receive an "Invalid COM number" error message while connecting to the printer with the Configuration Utility, follow this procedure to create a new Bluetooth connection and resolve the error.

1 On the PC, open Bluetooth Settings and select the COM Ports tab.

2 Select the 6824 printer line.

3 Select **Remove**.

4 Select **Add** to create a new virtual COM port connection to the printer.

5 Repeat the procedure for connecting the printer with the new virtual COM port.

General Settings

This section describes general settings for the printer. To view these settings, in the Printer Configuration Utility click the **General Settings** tab.

General Settings

Setting	Description	Default
Code Page	Code page used by the printer: • 437 (IBM PC) • 437G • 851 (Greek) • 852 (Latin-2) • 857 (Turkish) • 858 (Latin-1 with Euro symbol) • 863 (Canadian French) • 864 (Arabic) • 866 (Russian/Cyrillic)	437
Typeface	Character print quality: • DRAFT • LETTER QUALITY This setting corresponds to ESC "x" (Select LQ or Draft).	DRAFT

General Settings (continued)

Setting	Description	Default
Int'l Character Set	Selects the national character set: • USA • FRANCE • GERMANY • ENGLAND (UK) • DENMARK I • SWEDEN • ITALY • SPAIN I • JAPAN • NORWAY • DENMARK II • SPAIN II • LATIN AMERICA • HEBREW • GREECE	USA
Zero Option	Sets whether the zero character prints with or without a slash.	NO SLASH
CR Code	Sets whether or not 'CR' performs a line feed in addition to a carriage return.	CR = CR (carriage return only)
LF Code	Sets whether or not 'LF' performs a carriage return in addition to a line feed.	LF = LF (line feed only)
Idle to Sleep	Sets the method for the inactivity sleep timer: • FOLLOW ESC z: Timer is set by the ESC "z" command. Default is 10 seconds. • 1 MINUTE ... 4 HOURS: Printer goes to sleep mode after idling for the specified time.	5 MINUTES

Advanced Settings

This section lists advanced settings for the printer. To view these settings, in the Printer Configuration Utility click the **Advanced Settings** tab.

Advanced Settings

Setting	Description	Default
Horizontal Pitch	Sets horizontal pitch: • 10 CPI: 10 characters per inch. Corresponds to ESC "P", Select Pica Pitch. • 12 CPI: 12 characters per inch. Corresponds to ESC "M", Select Elite Pitch.	10 CPI
Vertical Pitch	Sets vertical pitch: • 1 to 12 LPI: Specified in lines per inch. • 1 to 4 LPCM: Specified in lines per centimeter.	6 LPI

Advanced Settings (continued)

Setting	Description	Default
Form Length	Form length specified in lines or inches: • 1 to 126 LINES: Specified in number of lines. Corresponds to ESC "C", Set Page Length in Lines. • 3 to 15 INCHES: Specified in inches. Corresponds to ESC "C" (0), Set Page Length in Inches. Note that this distance is the total length of the form from top to bottom, including the distance you set for Top of Form.	11 INCHES
Lines per Page	Printable lines in one page. Range is 1 to 126 lines. This value includes the number of lines to skip set by the Top Margin value.	66 LINES
Top of Form	Specifies the amount (in inches) of space from the top of the form to be skipped before printing the first line. Range is 0/60 to 99/60.	0/60 INCH
Top Margin	Specifies an additional amount of space to skip after the Top of Form distance before printing. Range is 0 to 125 lines. This value counts as part of the Lines per Page setting.	0 LINE
Left Margin	Specifies the number of left columns to be skipped. Range is 0 to 255 columns. Corresponds to ESC "l", Set Left Margin.	0 COLUMN
Tear	Advances a form to the tear position automatically after printing: • AUTO 1 SEC to AUTO 5 SEC: Form is automatically moved to the tear position if the printer does not receive the next job within the specified time (1 to 5 seconds). • MANUAL: User must press READY to manually move the form to the tear position. • NO TEAR OFF: Form does not move automatically and user cannot manually move the form.	AUTO 1 SEC

Note: If you change the settings for Form Length, Top of Form, Top Margin, or Lines per Page, the Configuration Utility prompts you to reload paper.

Communication Settings

This section lists the communication settings for the printer. To view these settings, in the Printer Configuration Utility click the **Communication Settings** tab.

Note: Because the serial and Bluetooth connections share a common interface, changing these communication settings affects both the serial and Bluetooth connections. Changing the serial connection settings will prevent Bluetooth from operating correctly. Restoring the default serial connection settings also restores Bluetooth connectivity. To restore the default settings, press and hold **READY** the next time you turn the printer on.

Communication Settings

Serial Setting	Options	Default
Baud Rate	4800 9600 19200 38400	19200
Data Bit	8 BIT 7 BIT	8 BIT
Stop Bit	1 BIT 2 BIT	1 BIT
Parity	NONE EVEN ODD	NONE
Buffer Control	RTS/CTS XON/XOFF	XON/XOFF

Print the Configuration Page

Follow these steps to print a page showing the current printer configuration settings and other useful information including error logs.

Note: Before you print, make sure that paper and ribbon are loaded.

1 If the printer is on, turn it off.

2 Press **POWER/SLEEP**, and then immediately press and hold **ALT**. The printer automatically restarts.

3 Release **ALT**. The printer prints the configuration page.

4 Press **READY/CLEAR**. The printer restarts.

About the Configuration Page

The printer configuration page includes these items:

- Printer serial number
- Engine serial number
- Printer configuration number
- Firmware (F/W) version
- Bootloader version
- Font version
- Total pages (printed)
- Printhead pin check pattern

- Macro configuration settings:
  - Typeface
  - Horizontal pitch
  - Vertical pitch
  - Form length in inches
  - Left margin
  - Top of form
  - Top margin
  - Lines per page
  - CR code
  - LF code
  - Code page (default is 437)
  - International character set
  - Zero option (default is no slash)
- Installed settings:
  - Tear
  - Baud rate
  - Parity
  - Data bit
  - Stop bit
  - Buffer CTL
  - Sleep timeout (IDLE TO SLEEP)
- Head jam history
- Error log

About Error Log Information

The printer configuration page includes error log information. The error log records the latest 50 errors. For each type of error, the maximum count is 65535. When the error count reaches this value, the value does not increase and does not reset.

Error Log Definitions

Error Type	Description
Serial	Serial interface communication error
Head-T	Head temperature error
Insi-T	Inside temperature error
HD-Jam	Head jam error
System	System error

Error Log Definitions (continued)

Error Type	Description
EEPROM	EEPROM error
RAM-Er	RAM error
FONT-Er	Font error

About Head Jam History

The printer configuration page includes head jam history information.

Head Jam History Descriptions

Information	Description
Total Head Jams	Total number of head jams for the printer. Maximum is 65535.
Direction	Direction the printhead was moving at the time of the most recent head jam. Left is towards the home position (extreme left) and right is away from the home position.
Temperature C	Ambient temperature (in degrees C) at the time of the most recent head jam.
Page	Page count at the time of the most recent head jam.

Run the Printing Test

Follow these steps to run the printing test. Before you begin, make sure the paper is loaded correctly. The printing test uses three sheets of paper.

1 Press and hold **READY/CLEAR**, and then press **POWER/SLEEP** to turn off the printer.

2 Press **POWER/SLEEP** to turn on the printer, and then immediately press and hold **LOAD/FF**.

3 Release **LOAD/FF**. After a few seconds, the printer starts the printing test:

```
 !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\
"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]
#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^
$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_
%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`
&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`a
'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`ab
()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abc
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 !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[
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"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]
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$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_
%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`
&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`a
'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`ab
()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abc
]*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcd
```

To pause the printing test, press **READY/CLEAR**. Press **READY/CLEAR** again to resume the printing test.

4 After the printing test is complete, turn off the printer to exit the test mode.

Adjust the Printhead Gap

The printhead gap adjuster is located behind the control panel. You can adjust the size of the printhead gap for different paper thicknesses.
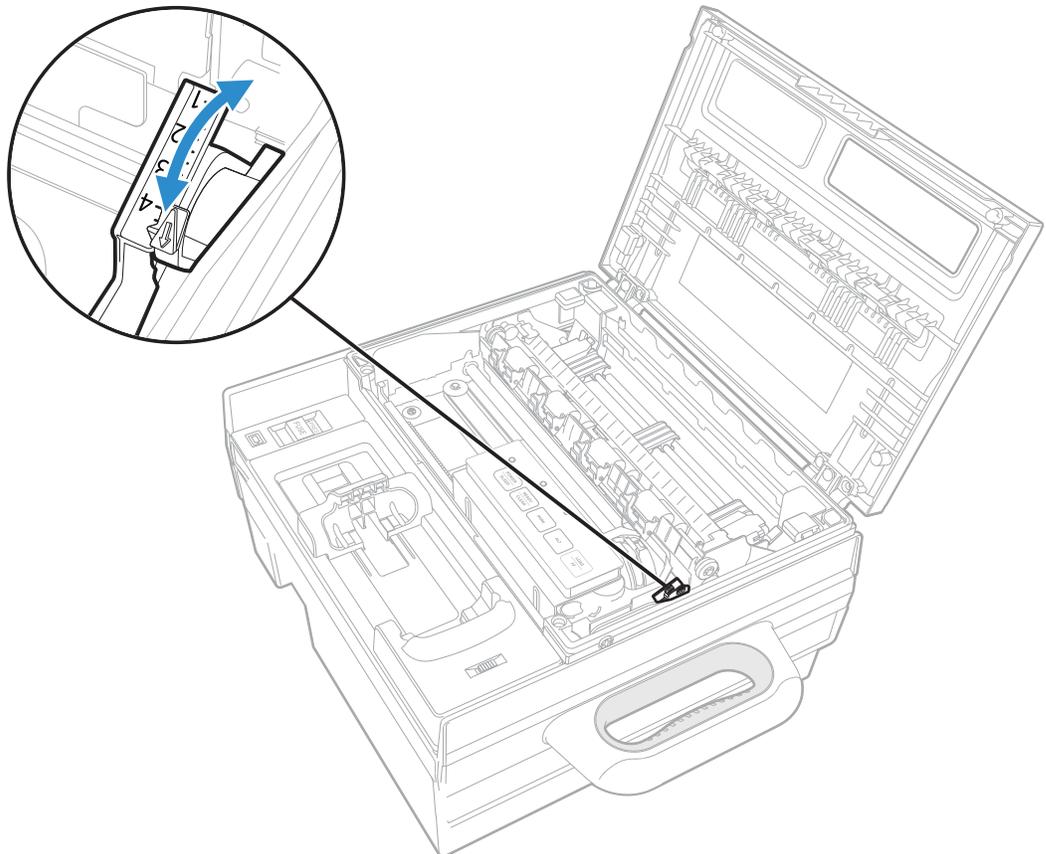
1 Verify the type and thickness of paper you are using. Look in "Recommended Printhead Gap Settings" for your paper type, and set the green printhead gap lever to the recommended setting.

Or, start with these guidelines:

- If you are using single-sheet forms, set the green printhead gap lever to 1 on the scale.

- If you are using 2- or 3-ply forms, set the lever to the range 1.2 to 2.1 on the scale.

2 Try a test print. If the print is too light, set the lever to a lower number to darken the print. If the paper jams frequently, set the lever to a higher number.

For more information, see the next section, "Recommended Printhead Gap Settings."

Recommended Printhead Gap Settings

This section lists the recommended printhead gap settings for supported media types.

Each table lists the acceptable paper thickness for each single sheet or each sheet of multilayer paper. Total thickness must not exceed .35 mm (0.014 inch).

Note: The weight of paper may vary depending on the paper manufacturer.

One-Part Carbonless Media

Parts	Spec (g/m2)	Layer Thickness (Min–Max, in mm)	Total Thickness (Min–Max, in mm)	Gap Setting
Single	47 to 81	.060 to .104	.060 to .104	1.0

Two-Part Carbonless or Carbon-Backed Media

Parts	Spec (g/m2)	Layer Thickness (Min–Max, in mm)	Total Thickness (Min–Max, in mm)	Gap Setting
Top	40 to 64	.051 to .082	.103 to .186	1.1 or 1.2
Bottom	40 to 81	.051 to .082		

Three-Part Carbonless or Carbon-Backed Media

Parts	Spec (g/m2)	Layer Thickness (Min–Max, in mm)	Total Thickness (Min–Max, in mm)	Gap Setting
Top	40 to 64	.051 to .082	.154 to .269	1.2 or 2.0
Middle	40 to 64	.051 to .082		
Bottom	40 to 81	.051 to .104		

Four-Part Carbonless or Carbon-Backed Media

Parts	Spec (g/m2)	Layer Thickness (Min–Max, in mm)	Total Thickness (Min–Max, in mm)	Gap Setting
Top	40 to 64	.051 to .082	.206 to .351	2.2 or 3.0
Middle	40 to 64	.051 to .082		
Middle	40 to 64	.051 to .082		
Bottom	40 to 81	.051 to .104		

Two-Part Carbon-Interleaved Media

Parts	Spec (g/m2)	Layer Thickness (Min–Max, in mm)	Total Thickness (Min–Max, in mm)	Gap Setting
Top	40 to 64	.051 to .082	.133 to .216	1.2 or 2.0
Carbon	One sheet	.030		
Bottom	40 to 81	.051 to .104		

Three-Part Carbon-Interleaved Media

Parts	Spec (g/m2)	Layer Thickness (Min–Max, in mm)	Total Thickness (Min–Max, in mm)	Gap Setting
Top	40 to 64	.051 to .082	.214 to .329	2.2 or 3.0
Carbon	One sheet	.030		
Middle	40 to 64	.051 to .082		
Carbon	One sheet	.030		
Bottom	40 to 81	.051 to .104		

Upload Fonts or Firmware With the Configuration Utility

To upload fonts or firmware to the printer, you use the Printer Configuration Utility.

• Firmware files can be downloaded from honeywellaidc.com.

• For more information on obtaining fonts, contact Honeywell Technical Support.

To use the Configuration Utility, you need a Bluetooth connection between your PC and the printer.

Caution: Do not disconnect or turn off the printer while files are being uploaded.

1 On your PC, start the Printer Configuration Utility.
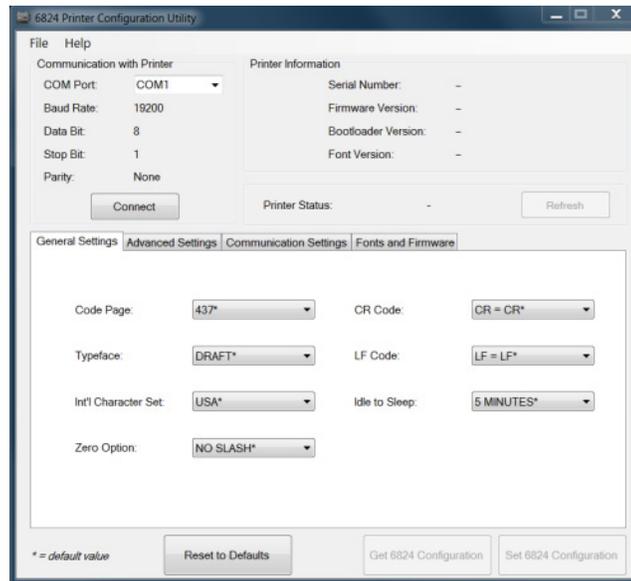
2 In the COM port list, select the virtual COM port your PC uses for communicating with the printer, and then click **Connect**. When the utility connects to the printer, the Printer Information section is updated.
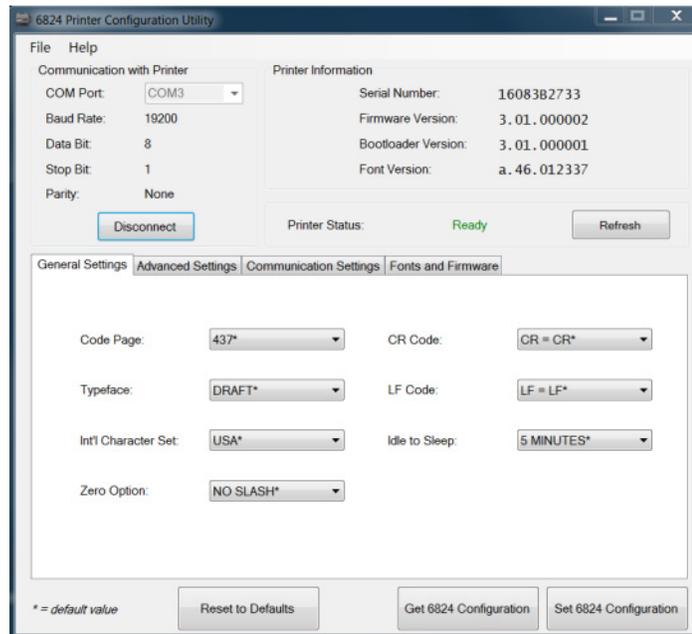
If an "Invalid COM number" error message appears, see "**Troubleshoot the Connection**."

3 Click the **Fonts and Firmware** tab.
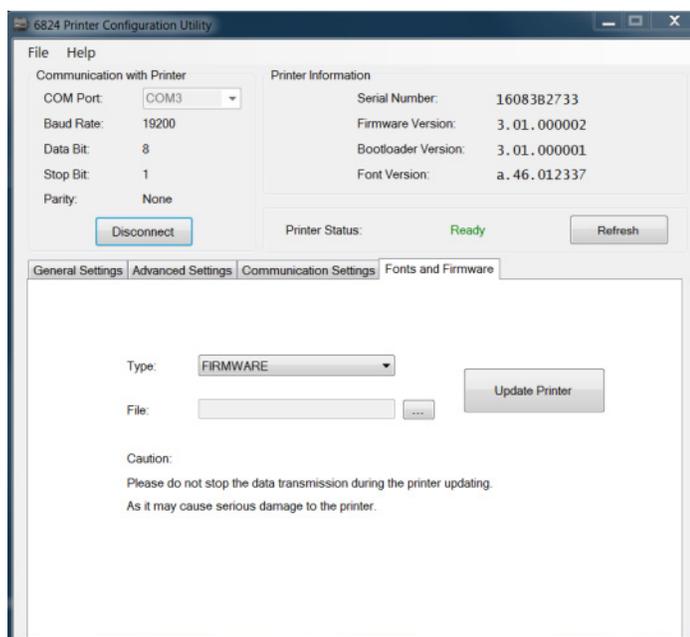
4 In the **Type** list, select **FIRMWARE**, **BOOTLOADER**, or **FONT**.

5 Click the **Browse** button (...), browse to the file you want to upload, and double-click the file. The path appears in the **File** field.

6 Click **Update Printer**. Progress messages appear periodically, and a success message appears when the upload is complete.

7 Click **OK** to close the message. The printer reboots and the Configuration Utility disconnects from the printer.

Recover an Unresponsive Printer

If you are uploading firmware and the printer seems to be unresponsive, follow this procedure to recover the printer and continue the firmware upload.

1 On the host PC, run the Configuration Utility.

2 In the COM port list, select the virtual COM port your PC uses for communicating with the printer, and then click **Connect**. When the utility connects to the printer, the Printer Information section is updated.

3 Press and hold **READY/CLEAR**, and then press **POWER/SLEEP** to turn the printer off.

4 Press **POWER/SLEEP** to turn on the printer, and then immediately press and hold **READY/CLEAR**, **ALT**, **PARK**, and **LOAD/FF**. This enables initial program loading (IPL) mode.

5 When the TRACTOR LED begins to blink, release the buttons.
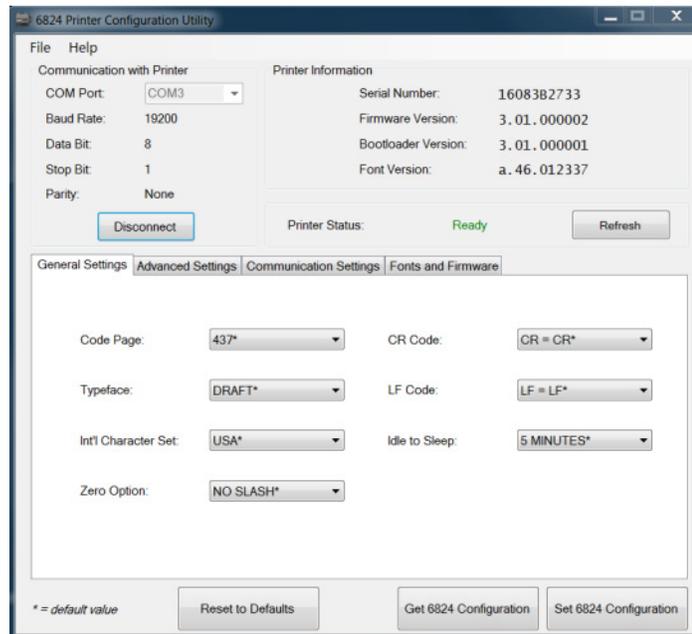
6 Click the **Fonts and Firmware** tab.
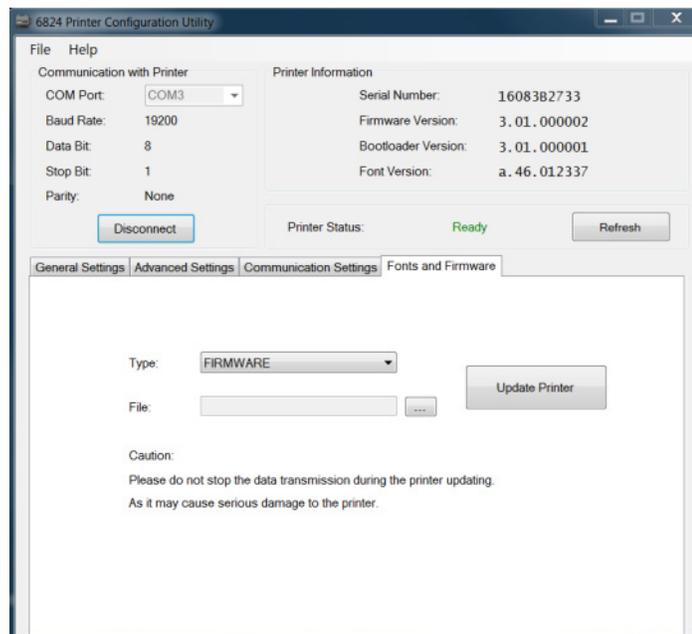
7 In the **Type** list, select **FIRMWARE**.

8 Click the **Browse** button (...), browse to the firmware file, and double-click the file. The path appears in the **File** field.

9 Click **Update Printer**. Progress messages appear periodically, and a success message appears when the firmware upload is complete. Click **OK** to close the message. The printer reboots and the Configuration Utility disconnects from the printer.

Recover From a Font Error

To verify that a font error has occurred, turn the printer off and then on again, and observe the LEDs. When a font error occurs, all three indicator LEDs blink for 7 seconds, and then the printer automatically goes into initial program loading (IPL) mode. In this mode, the printer will not function normally. Follow this procedure to restore normal printer operation.

To recover from a font error, you need a Bluetooth-enabled host PC, the Configuration Utility, and a known good font file.

Note: Font errors are not common, and typically occur when you are trying to upload an incorrect or unsupported font. Before you follow this procedure, be sure you have a known good font file.

1 On your PC, start the Printer Configuration Utility.
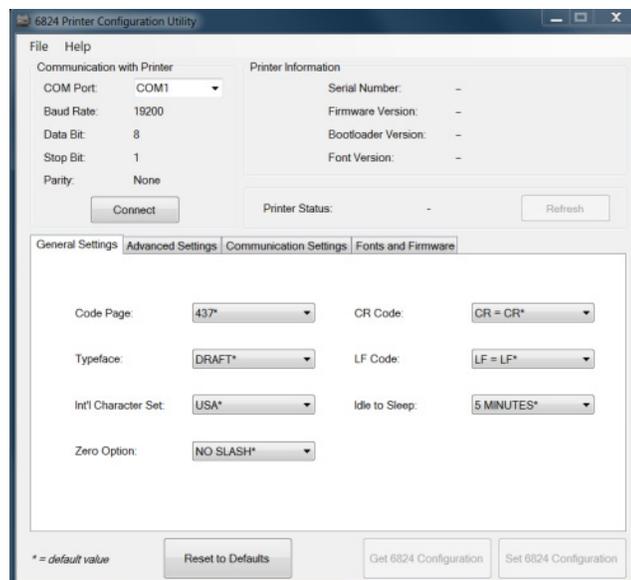
2 In the COM port list, select the virtual COM port your PC uses for communicating with the printer, and then click **Connect**. When the utility connects to the printer, the Printer Information section is updated.
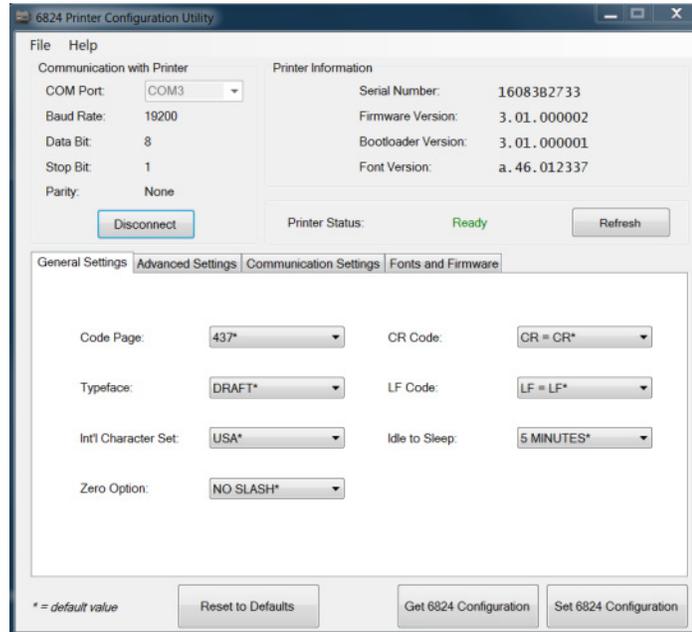
If an "Invalid COM number" error message appears, see "**Troubleshoot the Connection**."

3 Click the **Fonts and Firmware** tab.
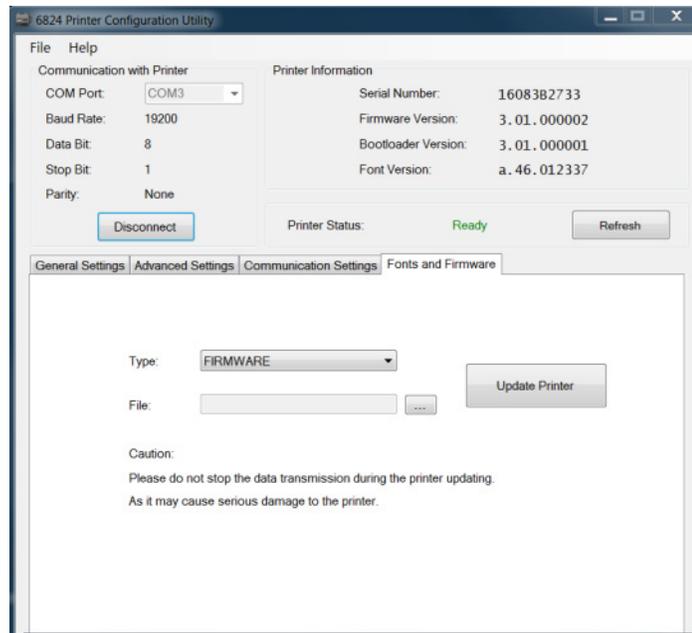
4 In the **Type** list, select **FONT**.

5 Click the **Browse** button (...), browse to the font file, and double-click the file. The path appears in the **File** field.

6 Click **Update Printer**. A success message appears when the upload is complete. Click **OK** to close the message.

A

Specifications and Command Lists

Printer Specifications

Physical Specifications

Specification	Description
Dimensions:	Fixed mount printer with 200-sheet paper tray: 508 mm x 368 mm x 156 mm (20 in x 14.48 in x 6.14 in)
	Portable printer with 50-sheet paper tray, not including handle: 402 mm x 378 mm x 156 mm (15.83 in x 14.88 in x 6.14 in)
	Portable printer with 200-sheet paper tray, not including handle: 402 mm x 378 mm x 213 mm (15.83 in x 14.88 in x 8.39 in)
Weight	Fixed mount printer with 200-sheet paper tray: 8.86 kg (19.54 lbs)
	Portable printer with 200-sheet paper tray: 8.64 kg (19.05 lbs)
	Portable printer with 50-sheet paper tray: 7.97 kg (17.57 lbs)
Operating temperature:	DC: –20 °C to 60 °C (–4 °F to 140 °F)
	AC: –20 °C to 50 °C (–4 °F to 122 °F)
Battery Operating Temperature	0 °C to 45°C (32 °F to 113 °F)
Storage temperature:	AC/DC: –30 °C to 70 °C (–22 °F to 158 °F) With battery: –20 °C to 60 °C (–4 °F to 140 °F)
Operating humidity:	10 to 85% non-condensing
Storage humidity:	5 to 95% non-condensing
Operating altitude:	DC: Up to 5000 m
	AC: Up to 2000 m
Storage altitude:	Up to 15,000 m

Electrical Specifications

Specification	Description
Operating voltage:	Vehicle: Nominal 12 VDC and 24 VDC systems Li Ion Battery: 14.4 V (Nominal) AC Adapter: 100-240 V, 50/60 Hz
Current:	Idle, sleep mode not charging batteries: 75 mA
	Printing: 4 A (typical)
	Charging internal battery: 1.2 A
	Charging computer battery: Up to 0.9 A
Battery shelf life:	1 year at -20 °C to 20 °C (-4 °F to 68 °F)
Battery:	14.4 V, 4S2P Li-ion, 5200 mAh
Battery charge time:	5 hours (0 to 40 °C charge environment) when connected to external 24 V power source

Default Settings

Factory Default Settings

Setting	Default
Carraige position	At left margin
Character set	Normal (not user-defined)
Code page	437
Codes 128-255	Disabled
Condensed (compressed)	Disabled
Double-strike	Disabled
Double-wide	Disabled
Emphasized	Disabled
Graphics mode	Not selected
Half-speed printing	Disabled
Intercharacter space	Zero (0)
Italic	Disabled
Justification	Left
Keyboard, printer	Enabled
Language	U.S.A.
Line spacing	1/6 inch
Margin, left	0
Margin, right	80
MSB control	Disabled
LQ	Disabled
Page length	11 inches (66 lines with Pica pitch)
Paper end sensor	Disabled
Pitch	Pica (10 characters per inch)
Power off sleep timer	5 minutes
Printer Code Area Expansion	Disabled
Printing direction	Top-down, bidirectional
Redefinition of graphic modes	Disabled
Skip over perforation	Disabled
Subscript/superscript	Disabled
Tabs, horizontal	Every 8 columns
Tabs, vertical	1 line feed per tab, channel 0
Top of form	Set to the top line
Underline	Disabled
Unidirectional printing	Disabled
User-defined character set	Removed
Zero print option	Zeros printed without a slash
Auto Feed configuration	CR added at end of line without LF
Protocol	XON/XOFF

Factory Default Settings (continued)

Setting	Default
Parity	None
Bit Rate	19.2 K

Media Specifications

⚠ **Caution:** Using paper that matches the following specifications ensures optimum performance. Variation from these specifications, use of aged paper, or use of paper exposed to elements such as dirt or humidity may cause printing problems.

The printer works with 1-3 ply carbonless paper that is single-edge glued and designed for sprocket feed. Standard paper size is 8.5 x 11 inches or 241 x 305 mm international (8.5 x 12 in). Use 3-ply forms up to a maximum of 0.23 mm (0.009 in) thick.

A soft, flexible, rubber type cement applied to one perforation strip only is preferred. The paper should wrap around a 1 1/4 in diameter roll without curl or wrinkle.

Material Breakdown

This section includes information on supported fanfold media for the printer.

14# CBF (Carbonless Back and Front)

	Target (lb)	Under (lb)	Over (lb)
Basis Weight	14	13.3	14.7
Caliper	2.9	2.6	3.2
Moisture	5.0	4.0	6.0
Smoothness (RS)	165	110	230
Smoothness (CB)	270	220	320
Brightness (Wht)	88	86	90

15# CBF (Carbonless Front)

	Target (lb)	Under (lb)	Over (lb)
Basis Weight	15	14.43	15.8
Caliper	3.0	2.5	3.2
Moisture	5.0	4.0	6.0
Smoothness (RS)	140	100	180
Smoothness (CB)	140	100	180
Brightness (Wht)	85	84	86

16# CB (Carbonless Back)

	Target (lb)	Under (lb)	Over (lb)
Basis Weight	16	15.2	16.8
Caliper	3.3	2.8	3.8
Moisture	5.7	4.2	6.7
Smoothness (RS)	180	120	270
Smoothness (CB)	270	220	320
Brightness (Wht)	86	84	88
Opacity (Wht)	81	78.5	82

20# OCR Laser Bond

	Target (lb)	Under (lb)	Over (lb)
Basis Weight	20	15.2	16.8
Caliper	4.0	3.8	4.2
Moisture	3.8	4.7	5.0
Smoothness	140	100	170
Brightness (Wht)	94	82	NA
Opacity (Wht)	85	84	NA

Caliper Breakdown

This table lists the caliper of forms by number of plies.

Caliper Breakdown

Number of Plies	Target	Maximum
1-ply (20 lb)	4.0	4.2
2ply (15 and 16 lb)	6.3	7.0
3-ply (14, 15, and 16 lb)	9.2	10.2

About the Page Layout

The following illustration shows the printable area of the lower section of a page of fanfold paper and the upper section of the next page. The Assured Print Area is the best area to use for printing.

Page width

Area 2
1.9 cm (0.75 in)
or more

Assured print area
Max. 20.32 cm (8.0 in)

Area 2
1.9 cm (0.75 in)
or more

Assured print area – Max. 55 lines
@.159-cm (1/16-in) line spacing

Paper End
detection position

Area 3
4.66 cm (1.83 in)
11 lines

Area 1 – 2.5 cm (1 in)

Perforation

Area 1 – 2.5 cm (1 in)
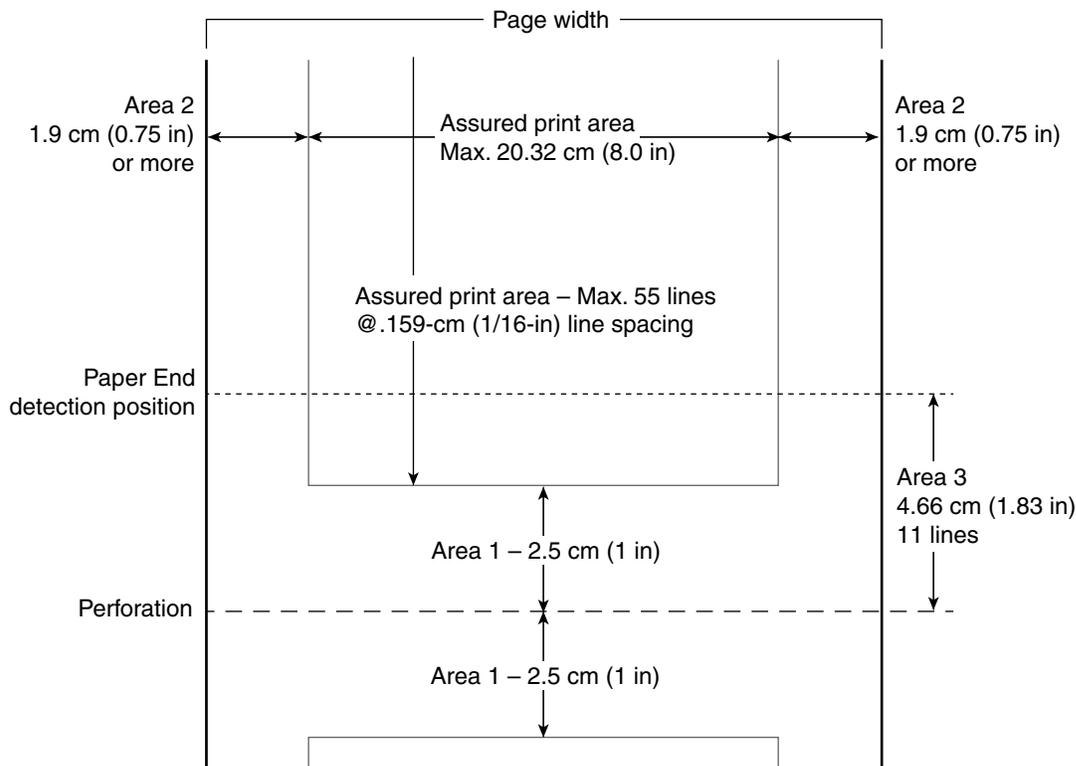
You should leave a 1 inch margin at both the top and the bottom of the page. This provides for a margin of six lines at 1/6 inch line spacing. Even though printing in Area 1 (before or after the perforation) may be possible, you should keep in mind that paper feed precision is reliable only within the Assured Print Area.

- The top and bottom margins are represented by Area 1. The top margin is defined as the distance between the top edge of the paper and the first row of printed characters. The bottom margin is defined as the distance between the last row of printed characters and the bottom edge of the paper.

- For reliable printing, consider there are 55 lines available for reliable printing. Paper feed precision is most reliable with top and bottom margins of approximately one inch.

- The left and right margins are represented by Area 2. For reliable printing, use a margin of at least 0.75 in for the left and right margins.

- The Paper End Detection line indicates the point where the Paper Out sensor detects the bottom edge of the paper.

- Area 3 represents the distance between the Paper End Detection position and the bottom edge of the page.

- Once the last page of the fanfold paper stack is in the printer, and the printhead has advanced past this Paper End Detection line, printing is no longer reliable.

- When the bottom end of the last page has advanced through the printer, past the spring plate along the front of the platen, the paper should not reverse back through the printer, because the printer could jam and cause paper feed problems.

Escape Sequence Descriptions

This section lists the supported escape sequences and includes a brief description of each.

Escape Sequences and Descriptions

ESC	Description
ESC SO	Select double-wide mode (one line only)
ESC SI	Select compressed mode
ESC US (0)	Select top-down printing
ESC US (1)	Select bottom-up printing
ESC SP n	Define intercharacter space
ESC "!" n	Master select
ESC "$" n1 n2	Set print position (absolute)
ESC "%" (0)	Select default character set
ESC "%" (1)	Select user-defined character set
ESC "&" NUL k1 k2 s1 d1 ... d11	Define user-defined characters
ESC "*" m n1 n2	Select graphics mode
ESC "+" n d1 ... dn	Print character graphics
ESC "-" 0*	Cancel underline mode
ESC "-" 1*	Select underline mode
ESC "/" c	Select vertical tab channel
ESC "0"	Select 1/8-inch line spacing
ESC "1"	Select 7/72-inch line spacing
ESC "2"	Select 1/6-inch line spacing
ESC "3" n	Select n/216-inch line spacing
ESC "4"	Select italic mode
ESC "5"	Cancel italic mode
ESC "6"	Enable printing of codes 128–159
ESC "7"	Disable printing of codes 128–159
ESC "<"	Select unidirectional printing (one line only)
ESC ":" NUL NUL NUL	Copy ROM to RAM
ESC "?" s n	Reassign graphics mode
ESC "@"	Perform master reset

Escape Sequences and Descriptions (continued)

ESC	Description
ESC "A" n	Select n/72-inch line spacing
ESC "B" NUL	Clear vertical tabs
ESC "B" n1 n2 ... nk NUL	Set vertical tabs
ESC "C" n	Set page length (lines)
ESC "C" NUL n	Set page length (inches)
ESC "D" NUL	Clear horizontal tabs
ESC "D" n1 n2 ... nk NUL	Set horizontal tabs
ESC "E"	Select emphasized mode
ESC "F"	Cancel emphasized mode
ESC "G"	Select double-strike mode
ESC "H"	Cancel double-strike mode
ESC "I" n	Expand printable code area
ESC "J" n	Perform n/216-inch line feed
ESC "K" n1 n2	Select single-density graphics mode
ESC "L" n1 n2	Select low-speed double-density graphics mode
ESC "M"	Select elite pitch
ESC "N" n	Set skip over perforation
ESC "O"	Cancel skip over perforation
ESC "P"	Select pica pitch
ESC "Q" n	Set right margin
ESC "R" n0 n1 n2	Code page selection
ESC "R" n	Select national character set
ESC "S" 0*	Select superscript mode
ESC "S" 1*	Select subscript mode
ESC "T"	Cancel subscript/superscript mode
ESC "U" 0*	Cancel unidirectional printing
ESC "U" 1*	Select unidirectional printing
ESC "W" 0*	Cancel double-wide mode
ESC "W" 1*	Select double-wide mode
ESC "Y" n1 n2	Select high-speed double-density graphics mode
ESC "Z" n1 n2	Select low-speed quadruple-density graphics mode
ESC "^" (0) n1 n2	Select 9-pin single-density graphics mode
ESC "^" (1) n1 n2	Select 9-pin double-density graphics mode
ESC "b" c NUL	Clear vertical tab channel
ESC "b" c n1 n2 ... nk NUL	Set vertical tabs in channel
ESC "j" n	Perform n/216-inch reverse line feed
ESC "l" n	Set left margin
ESC "s" 0*	Cancel half-speed printing
ESC "s" 1*	Select half-speed printing
ESC "t" (0)	Disable printing of character graphics

Escape Sequences and Descriptions (continued)

ESC	Description
ESC "t" (1)	Enable printing of character graphics
ESC "z" n	Set inactivity time for sleep mode
ESC "\" n1 n2	Set print position (relative)

Single Character Control Codes

This section includes a list of control codes 00h through 7Fh, and provides ASCII symbol definitions.

Single Character Control Codes

Dec	Hex	ASCII	Description
0	00	NUL	Used as a terminator for several escape sequences
1	01	SOH	
2	02	STX	
3	03	ETX	
4	04	EOT	
5	05	ENQ	
6	06	ACK	
8	08	BS	Backspace: Moves printhead one space to left
9	09	HT	Horizontal tab: Moves printhead to next tab stop
10	0A	LF	Line feed: Moves paper to next line
11	0B	VT	Vertical tab: Moves paper to next vertical tab stop
12	0C	FF	Form feed: Advances paper to top of next page
13	0D	CR	Carriage return: Moves printhead to left margin
14	0E	SO	Shift out: Selects double-wide mode (one line only)
15	0F	SI	Shift in: Selects compressed mode
16	10	DLE	
17	11	DC1	Not supported
18	12	DC2	Cancels compressed mode
19	13	DC3	Not supported
20	14	DC4	Cancels double-wide mode (one line only)
21	15	NAK	
22	16	SYN	
23	17	ETB	
24	18	CAN	Cancel line: Clear all characters from print buffer
25	19	EM	
26	1A	SUB	
27	1B	ESC	Escape: Defines start of escape sequence
28	1C	FS	
29	1D	GS	

Single Character Control Codes (continued)

Dec	Hex	ASCII	Description
30	1E	RS	
31	1F	US	
32	20	SP	Space character
127	7F	DEL	Delete: Deletes last character in print buffer

B

Printer Control Codes

About Printer Control Codes

Printer control codes are commands you send to the printer that control print operations, including page layout and formatting, character set selection, buffer management, and graphics handling.

This section includes descriptions of all control codes supported by the printer. Control codes are presented in decimal, hex, and ASCII formats.

About the I/O Buffer

All characters and control codes received by the printer are stored in the I/O buffer, where they are read and acted upon to form the print buffer. Characters are removed from the I/O buffer as they are processed.

About the Print Image Buffer

All characters go through the print image buffer on their way to the printed page. This buffer contains the graphic image of the dots to print, from which characters are rendered. The buffer is cleared when its contents are printed.

Special Notations in This Section

The control code descriptions may include special notations for values as described in this table.

Special Notations in Control Code Formats

Notation	Description
(0)	For ASCII format definitions, indicates that the value can only be zero (and not the character "0"). For example: Select Top-Down Printing ESC US (0).
(1)	For ASCII format definitions, indicates that the value can only be one (and not the character "1"). For example: Select Bottom-Up Printing ESC US (1).
*	When a number (at the end of an escape sequence) is marked with an asterisk, then either the value corresponding to that number or the value of the string character can be used for that number. For example, if 1* is shown, then either the value (1), or the value of the string character (decimal: 49, hex: 31) can be used.
NUL	The NUL character is represented in the Dec column as 0, in the Hex column as 00, and in the ASCII column as NUL.

General Control Codes

Backspace

Description:	Empties the print buffer. Moves the printhead left one character space (using the current pitch). This can be performed to the left margin setting, but not beyond that setting. The backspace is ignored if justification of right, full, or centered is selected.
Decimal:	8
Hex:	08
ASCII:	BS
Notes:	The backspace control code (BS) is not reliable when text contains different character pitches. For reliable backspacing, use the escape sequence (ESC "\"), Set Relative Print Position.

Cancel Line

Description:	Discards all of the characters currently in the print buffer. Sets the current print position to left margin. Text already printed cannot be cancelled.
Decimal:	24
Hex:	18
ASCII:	CAN

Carriage Return

Description:	Repositions the printhead at the start of the print line (usually at the left margin), and repositions the pointer to the start of the print buffer, after printing all data in the buffer. Also, all of the "one line" functions are reset, such as bold, double-strike, double-wide, or unidirectional printing.
Decimal:	13
Hex:	0D
ASCII:	CR
Notes:	You can add an automatic line feed with a configuration item.

Delete

Description:	Deletes the last character in the print buffer. This control code functions only in left justification.
Decimal:	127
Hex:	7F
ASCII:	DEL

Form Feed

Description:	Prints the contents of the print buffer, clears the print buffer, and advances the paper to the top of the next page (Top of Form), according to the current page length setting. The carriage position is moved to the start of the line.
Decimal:	12
Hex:	0C
ASCII:	FF

Select Half-Speed Printing

Description:	Turns on half-speed mode to provide quiet printing, and more accurate print positioning during text mode printing.
Decimal:	27 115 1*
Hex:	1B 73 01*
ASCII:	ESC "s" 1*

Cancel Half-Speed Printing

Description:	Turns off half-speed mode and continues with normal printing.
Decimal:	27 115 0*
Hex:	1B 73 00*
ASCII:	ESC "s" 0*

Set Inactivity Time for Sleep Mode

Description:	Sets the amount of time the printer waits before it goes into low-power mode. Default is 10 seconds.
Decimal:	27 122 *n*
Hex:	1B 7A *n*
ASCII:	ESC "z" *n*
Parameters:	*n* = Number of seconds for the timeout.

Perform Line Feed

Description:	Prints and then clears the contents of the print buffer, resets the character count to zero, and advances the printhead to the next print line using the current spacing. The position of the carriage is not affected and a carriage return is not executed.
Decimal:	10
Hex:	1A
ASCII:	LF

Perform n/216-inch Line Feed

Description:	Advances the paper to *n*/216 of an inch. This does not affect subsequent line feeds. Range of *n* is 0 to 255.
Decimal:	27 74 *n*
Hex:	1B 4A *n*
ASCII:	ESC "J" *n*

Perform n/216-inch Reverse Line Feed

Description:	Reverses the line feed by *n*/216 of an inch. This does not affect subsequent line feeds. Range of *n* is 0 to 255.
Decimal:	27 106 *n*
Hex:	1B 6A *n*
ASCII:	ESC "j" *n*

Perform Master Reset

Description:	Initializes the printer and restores factory default settings.
Decimal:	27 64
Hex:	1B 40
ASCII:	ESC "@"

Set Print Position (absolute)

Description:	Moves the printhead to an absolute horizontal position on the paper. The distance is specified in dots from the left margin to the new print position (at which subsequent characters are printed). The distance in dots is defined as: `number of dots = n1 + (n2 * 256)` Each dot represents 1/60 of an inch. Maximum position is 480. The previous contents of the current print buffer are printed. If the position specified moves the printhead outside the current margins, the command is ignored and the previous setting remains in effect. This command is also ignored in right, center, and full justification modes.
Decimal:	27 36 *n1 n2*
Hex:	1B 24 *n1 n2*
ASCII:	ESC "$" *n1 n2*

Set Print Position (relative)

Description:	Moves the printhead to a horizontal position on the paper, relative to the current printhead position. The distance is specified in dots and defined as:
	`number of dots = n1 + (n2 * 256)`
	To determine *n1* and *n2*, first calculate the displacement required in 1/120ths of an inch. If the displacement is to the left, subtract it from 65536.
	Maximum displacement is ±960. If the position specified places the printhead outside the current margins, this function is ignored and the previous setting remains in effect. This function is also ignored in right, center, and full justification modes.
Decimal:	27 92 *n1 n2*
Hex:	1B 5C *n1 n*
ASCII:	ESC "\" *n1 n2*

Select Top-Down Printing

Description:	Enables top-down printing (factory default). The first page is printed first.
Decimal:	27 31 0
Hex:	1B 1F 00
ASCII:	ESC US (0)*

Select Bottom-Up Printing

Description:	Enables bottom-up printing. The last page is printed first.
Decimal:	27 31 1
Hex:	1B 1F 01
ASCII:	ESC US (1)*

Select Unidirectional Printing

Description:	Turns on unidirectional printing mode. Unidirectional printing moves the printhead from left-to-right only, allowing for more accurate print positioning during text mode printing.
Decimal:	27 85 1*
Hex:	1B 55 01
ASCII:	ESC "U" 1

Cancel Unidirectional Printing

Description:	Turns off unidirectional printing mode, allowing the printhead to move in either direction.
Decimal:	27 85 0*
Hex:	1B 55 00*
ASCII:	ESC "U" 0*

Select Unidirectional (one line) Printing

Description:	Turns on unidirectional printing for the current line only. The contents of the print buffer are printed and the buffer is cleared before setting this mode. This allows more accurate print positioning for the current line during text mode printing.
Decimal:	27 60
Hex:	1B 3C
ASCII:	ESC "<"

Page Formatting Control Codes

These control codes change the formatting of the page:

* The page length (form length) and margin settings define the printable area on the page, and must conform to the actual size of the paper used in the printer.
* The line spacing control codes set the amount of space from one line to the next, for line feeds. The page length, vertical tab, and skip over perforation functions are dependent on the line spacing function.

Set Page Length (lines)

Description:	Sets the length of the paper in lines. Range of n (number of lines) is 1 to 127. Default is 66.
	This function depends on the line spacing and actual length of the paper. Top-of-Form is reset to the current line and the Skip Over Perforation setting is canceled.
Decimal:	27 67 n
Hex:	1B 43 n
ASCII:	ESC "C" n

Set Page Length (inches)

Description:	Sets the length of the paper in inches. Range of n (number of lines) is 1 to 22. Default is 11.
	This function depends on the line spacing and actual length of the paper. Top-of-Form is reset to the current line and the Skip Over Perforation setting is canceled.
Decimal:	27 67 0 n
Hex:	1B 43 00 n
ASCII:	ESC "C" NUL n

Select 1/8-inch Line Spacing

Description:	Sets the line spacing to 1/8 inch for subsequent lines.
Decimal:	27 48
Hex:	1B 30
ASCII:	ESC "0"

Select 7/72-inch Line Spacing

Description:	Sets the line spacing to 7/72 inch (approximately 9.7 lines per inch, or 7 dots) for subsequent lines.
Decimal:	27 49
Hex:	1B 31
ASCII:	ESC "1"

Select 1/6-inch Line Spacing

Description:	Sets the line spacing to 1/6 inch (6 lines per inch) for subsequent lines. 1/6 inch is equal to 12-dot spacing and is the factory default line spacing value.
Decimal:	27 50
Hex:	1B 32
ASCII:	ESC "12"

Select n/216-inch Line Spacing

Description:	Sets the line spacing to n/216 of an inch for subsequent lines. Range for n is 0 to 255.
	A spacing of 1/216 inch is 1/3 the distance between pins of the printhead (approximately 1/3 of a dot). For reference, 27/216 is 8 lines per inch.
Decimal:	27 51 n
Hex:	1B 33 n
ASCII:	ESC "33" n

Select n/72-inch Line Spacing (in dots)

Description:	Sets the line spacing to n/72 of an inch for subsequent lines. A spacing of 1/72 inch (1 point in font size) is the distance between pins on the printhead (approximately 1 dot) and 9/72 is 8 lines per inch. Range for n is 0 to 85.
Decimal:	27 59 n
Hex:	1B 41 n
ASCII:	ESC "A" n

Set Right Margin

Description:	Sets the right margin to n columns using the current character pitch, and clears all text in the print buffer. This is the number of the characters from column 1 (at the left edge of the paper) to the last column before the right margin (factory default is 80).
	Minimum space between margins is the width of one double-width pica character. Maximum value for this control code is the maximum number of characters (based on the current pitch) that would fit between the left margin and the right edge of the default printable area of the page.
	Valid ranges for *n* are as follows:
	• Pica mode: 2 to 80
	• Elite mode: 2 to 96
	• Compressed mode: 2 to 136
Decimal:	27 81 *n*
Hex:	1B 51 *n*
ASCII:	ESC "Q" *n*
Notes:	Ranges may vary, depending on values of other parameters that affect character width. If the value specified is not within the allowed range, the value is ignored.

Set Left Margin

Description:	Clears the print buffer text and sets the left margin, relative to the number of columns to the left of the first column to print (factory default = 0).
	Minimum space between margins is the width of one double-width pica character. Maximum value must be less than the right margin.
	Valid ranges for *n* are as follows:
	• Pica mode: 0 to 78
	• Elite mode: 0 to 93
	• Compressed mode: 0 to 133
Decimal:	27 108 *n*
Hex:	1B 6C *n*
ASCII:	ESC "l" *n*
Notes:	Ranges may vary, depending on values of other parameters that affect character width. If the value specified is not within the allowed range, the value is ignored.

Set Skip Over Perforation

Description:	Defines the number of lines to skip between the last printed line on the page and the first printed line on the next page. If the value specified for this function is greater than the page length, it is ignored. Cancel this function by using one of the Set Page Length functions (factory default is disabled). The amount of blank space at the bottom of the printed page depends on the line spacing.
Decimal:	27 78 *n*
Hex:	1B 4E*n*
ASCII:	ESC "N" *n*
Notes:	This function is valid for continuous paper only.

Cancel Skip Over Perforation

Description:	Cancels the skip over perforation mode, allowing the maximum number of lines to print on each page.
Decimal:	27 79
Hex:	1B 4F
ASCII:	ESC "O"

Character Style and Text Mode Control Codes

Character style and text mode control codes affect the appearance of text on the printed page, including:

- italic, underlined, double-strike (boldface) or double-width printing.
- font pitch, including Pica, Elite, Condensed, or Compressed modes.
- intercharacter space (to the right of each character).
- superscript and subscript modes.

Select Condensed Character Mode

Description:	Selects condensed mode, which prints characters at approximately 60% of the normal width. Enabling this mode results in the following character pitch values: • Condensed mode: 17 characters per inch (approximate) • Condensed + Double-wide mode: 9 characters per inch (approximate) • Condensed + Elite mode: 20 characters per inch (approximate) This function empties the print buffer and turns on Condensed Character Mode. This mode stays on until canceled (by Cancel Condensed Character Mode).
Decimal:	27 15
Hex:	1B 0F
ASCII:	ESC SI

Cancel Condensed Character Mode

Description:	Cancels condensed character mode.
Decimal:	27 18
Hex:	1B 12
ASCII:	DC2

Select Double-Strike Mode

Description:	Enables double-strike printing until the printer encounters a cancel control code. Double-strike printing is disabled by factory default. Text is bolded by printing each dot twice, with the second dot slightly below the first dot. This mode is not available in LQ, but is not canceled when you select LQ.
Decimal:	27 71
Hex:	1B 47

Select Double-Strike Mode (continued)

ASCII:	ESC "G"

Cancel Double-Strike Mode

Description:	Cancels double-strike mode.
Decimal:	27 72
Hex:	1B 48
ASCII:	ESC "H"

Select Double-Wide Mode

Description:	Enables double-wide print for the current line only. The previously set mode returns on subsequent lines. However, double-wide print can be canceled with Cancel Double-Wide Mode (DC4) or Cancel Double-Wide Print (ESC "W" (0)) before the end of the current line or wrapping of the print buffer. This works with all three pitches (Pica, Elite, Compressed). Double-wide mode is also terminated by the execution of a Carriage Return, Line Feed, Form Feed, Vertical Tab or wrapping of the print buffer.
Decimal:	27 14
Hex:	1B 0E
ASCII:	ESC SO

Cancel Double-Wide Mode

Description:	Cancels double-wide print for the current line only. Modes set previously return on subsequent lines. However, this control code does not cancel the double-wide mode if that mode is set by Select Double-Wide Print (ESC "W" 1*) or Master Select (ESC "!").
Decimal:	27 20
Hex:	1B 14
ASCII:	ESC DC4

Select Double-Wide Print

Description:	Enables double-wide print until canceled. This mode is disabled by default.
Decimal:	27 87 1*
Hex:	1B 57 01*
ASCII:	ESC "W" 1*

Cancel Double-Wide Print

Description:	Cancels double-wide print mode.
Decimal:	27 87 0*

Cancel Double-Wide Print (continued)

Hex:	1B 57 00*
ASCII:	ESC "W" 0

Select Elite Pitch

Description:	Selects a character pitch of 12 characters per inch. Cancels Pica pitch (factory default).
Decimal:	27 77
Hex:	1B 4D
ASCII:	ESC "M"

Select Emphasized Print Mode

Description:	Enables emphasized print mode until the mode is canceled. Text is made bolder by printing each dot twice, with the second dot slightly to the right of the first dot. By default, emphasized printing is disabled.
Decimal:	27 69
Hex:	1B 45
ASCII:	ESC "E"

Cancel Emphasized Print Mode

Description:	Cancels emphasized print mode.
Decimal:	27 70
Hex:	1B 46
ASCII:	ESC "F"

Define Intercharacter Space

Description:	Defines the amount of space to the right of each character in addition to the space allowed in the character design. The variable n represents the number of units of space, with each unit equal to 1/120 of an inch. Range for n is 0 (default) to 127.
Decimal:	27 32 n
Hex:	1B 20 n
ASCII:	ESC SP n

Select Italic Mode

Description:	Italicizes text (non-graphic) characters. This mode is disabled by default.
Decimal:	27 52
Hex:	1B 34
ASCII:	ESC "4"

Cancel Italic Mode

Description:	Cancels italic mode.
Decimal:	27 53
Hex:	1B 35
ASCII:	ESC "5"

Select Pica Pitch

Description:	Select a character pitch of 10 characters per inch (factory default). This control code cancels Elite printing mode.
Decimal:	27 60
Hex:	1B 50
ASCII:	ESC "P"

Select Superscript Mode

Description:	Prints all subsequent characters in approximately 2/3 the normal height in the upper part of the character space, until this mode is canceled.
Decimal:	27 83 0*
Hex:	1B 53 00*
ASCII:	ESC "S" 0*

Select Subscript Mode

Description:	Prints all subsequent characters in approximately 2/3 the normal height in the lower part of the character space, until this mode is canceled.
Decimal:	27 83 1*
Hex:	1B 53 01*
ASCII:	ESC "S" 1*

Cancel Subscript or Superscript Mode

Description:	Cancels the superscript or subscript mode.
Decimal:	27 84
Hex:	1B 54
ASCII:	ESC "T"

Select Underline Mode

Description:	Prints underlined characters (including spaces) until the mode is canceled.

Select Underline Mode (continued)

Decimal:	27 45 1*
Hex:	1B 2D 01*
ASCII:	ESC "-" 1*

Cancel Underline Mode

Description:	Cancels underline mode.
Decimal:	27 45 0*
Hex:	1B 2D 00*
ASCII:	ESC "-" 0*

Master Select

Allows you to specify a combination of print modes. The value for *n* is determined by adding up the values for the desired modes.

Format

Decimal	Hex	ASCII
27 33 *n*	1B 21 *n*	ESC "!" *n*

The next table lists hex values for the print modes. Add the values for the desired modes to determine the value for *n*.

Mode Values for Master Select Control Code

Mode	Hex Value
Pica	00h
Elite	01h
Condensed (compressed)	04h
Emphasized	08h
Double-Strike	10h
Double-Width (expanded)	20h
Italic	40h
Underlined	80h

For example, to create a combination of Pica Compressed Italic Underlined, add the values for those modes as follows:

```
00h + 04h + 40h + 80h = C4h
```

Thus, the value for *n* is C4h.

The following print conflicts occur between modes. A mode in any column takes precedence over all modes in the columns to its right.

Print Conflicts

1	2	3
Elite	Emphasized	Compressed

You can combine the Pica, Elite, and Compressed print modes with Double-Wide or Condensed for these character pitch values:

- Pica: 10 characters per inch (cpi)
- Pica + Double-Wide: 5 cpi
- Elite: 12 cpi
- Elite + Double-Wide: 6 cpi
- Compressed: 17.16 cpi
- Compressed + Double-Wide: 8.58 cpi

Tab Setting Control Codes

These control codes set the location of vertical and horizontal tabs for page layouts. Follow these guidelines when setting up tab positions.

Horizontal tabs:

- are not affected by subsequent changes in pitch.
- may range up to the maximum width for character and printer size.
- are cleared when new tab stops are set. If the left margin is changed after the horizontal tabs are set, tab stops are cleared.
- become absolute positions and are not affected by any subsequent change in character size.
- set outside the printable area are ignored.

Vertical tabs:

- are set by line number, counting from the Top of Form, and are not affected by subsequent changes in line spacing.
- set beyond the page length are stored but not used. During a print job, if the next vertical tab lies outside the printable area, that tab is ignored and the printer executes a form feed. The printhead is placed at the next Top of Form.
- set within the Skip Over Performation (SOP) range are stored but not used when SOP is active. When SOP is canceled, those tabs are used.
- are cleared when new tab stops are set.

Perform Horizontal Tab

Description:	Moves the print position to the next horizontal tab stop. Tab positions set by Set Horizontal Tabs are not affected by changes in character pitch. Because the default tab settings are at intervals of eight characters in the currently selected pitch, the actual distance to each tab position is affected by changes in character pitch.
Decimal:	0
Hex:	09
ASCII:	HT

Set Horizontal Tabs

Description:	Sets the horizontal tabs based on the current character width (pitch). Cancels any previously set horizontal tabs.
	Parameters are as follows:

- *n1* is the first tab. Range for tab stops is 1 to 160.
- *n2* is the second tab. Tabs are listed in ascending order.
- ... are subsequent tabs. Maximum number of tabs is 32.
- *nk* is the last tab to set. Any value less than the previous tab value acts as a terminating character.
- NUL is the terminating character.

Decimal:	27 68 *n1 n2 ... nk* 0
Hex:	1B 44 *n1 n2 ... nk* 00
ASCII:	ESC "D" *n1 n2 ... nk* NUL

Clear Horizontal Tabs

Description:	Use this variant of the Set Horizontal Tabs control code to clear all horizontal tab stops.
Decimal:	27 68 0
Hex:	1B 44 00
ASCII:	ESC "D" NUL

Perform Vertical Tab

Description:	Prints the contents of the current print buffer, and then moves the print position to the next vertical tab stop. If no channel is selected, then channel 0 is used. The carriage position is changed to the start of the next print line.

- If the vertical tab is performed beyond the last tab position set or beyond the last line of a form, then a form feed is performed.
- If no vertical tabs are defined, then the paper advances one line, using the currently selected line spacing, without changing the carriage position.

Decimal:	11
Hex:	08
ASCII:	VT

Set Vertical Tabs

Description:	Sets the vertical tabs based on the current line spacing. Cancels any previously set vertical tabs. All tab settings with this control code are stored in channel 0. Tab settings are not affected by subsequent changes in line spacing.
	Parameters are as follows:

- *n1* is the first tab. Range is 1 to 255.
- *n2* is the second tab. All tabs must be listed in ascending order.
- ... are subsequent tabs. Maximum number of tabs is 16.
- *nk* is the last tab set. Any value less than the previous tab value acts as a terminating character.
- NUL is the terminating character.

Decimal:	27 66 *n1 n2 ... nk* 0
Hex:	1B 42 *n1 n2 ... nk* 00
ASCII:	ESC "B" *n1 n2 ... nk* NUL

Clear Vertical Tabs

Description:	Use this variant of the Set Vertical Tabs control code to clear all vertical tab stops.
Decimal:	27 66 0
Hex:	1B 42 00
ASCII:	ESC "B" NUL

Set Vertical Tabs in Channel

Description:	Sets vertical tabs based on the current line spacing, and stores the tabs in a specified channel. Cancels previously set vertical tabs. Specify the channel using the Select Vertical Tab Channel control code.
	Parameters are as follows:

- *c* is the channel number. Range is 0 to 7.
- *n1* is the first tab. Range is 1 to 255.
- *n2* is the second tab. All tabs must be listed in ascending order.
- ... are subsequent tabs. Maximum number of tabs is 16.
- *nk* is the last tab set. Any value less than the previous tab value acts as a terminating character.
- NUL is the terminating character.

Decimal:	27 98 *c n1 n2 ... nk* 0
Hex:	1B 62 *c n1 n2 ... nk* 00
ASCII:	ESC "b" *c n1 n2 ... nk* NUL

Clear Vertical Tabs in Channel

Description:	Use this variant of the Set Vertical Tabs in Channel control code to clear all vertical tab stops in the specified channel.
	c is the channel number to be cleared of vertical tab stops
Decimal:	27 98 *c* 0

Clear Vertical Tabs in Channel (continued)

Hex:	1B 62 *c* 00
ASCII:	ESC "b" *c* NUL

Select Vertical Tab Channel

Description:	Selects a specified vertical tab channel and sets up the current tabs from that channel. Once this function is performed, all subsequent Perform Vertical Tab commands use the tab stops from the list retrieved from the specified channel. At power on, the printer uses the tabs stored in channel 0.
	c is the channel number to be selected. Range is 0 to 7.
Decimal:	27 47 *c*
Hex:	1B 2F *c*
ASCII:	ESC "/" *c*

Character Set Control Code

Use the Select National Character Set control code to select language-specific character sets, including Hebrew and Greek. The selected character set stays in effect until the printer is reset and receives a Master Reset command, or until a new international character set is selected.

Select National Character Set

Description:	Selects the character set *n*:

- 0: U.S.A.
- 1: France
- 2: Germany
- 3: England (U.K.)
- 4: Denmark 1
- 5: Sweden
- 6: Italy
- 7: Spain 1
- 8: Japan
- 9: Norway
- 10: Denmark 2
- 11: Spain 2
- 12: Latin America
- 13: Hebrew
- 14: Greek

Decimal:	27 82 *n*
Hex:	1B 52 *n*
ASCII:	ESC "R" *n*

International Character Information

International characters are limited to 64 characters stored in codes 0 to 31 and 128 t o255. Although these characters are not normally accessible, the ESC "R" command makes these characters available 12 at a time.

The 12 characters are available in positions 35, 36, 64, 91, 92, 93, 94, 96, 123, 124, 125, and 126 of the ASCII character table as seen in the next table.

International Character Sets

n	Country	35	36	64	91	92	93	94	96	123	124	125	126
0	U.S.A.	#	$	@	[	\	]	^	'	{			}	~
1	France	#	$	à	º	ç	§	^	'	é	ù	è	¨
2	Germany	#	$	§	Ä	Ö	Ü	^	'	ä	ö	ü	b
3	England (U.K.)	£	$	@	[	\	]	^	'	{			}	~
4	Denmark 1	#	$	@	Æ	Ø	Å	^	'	æ	ø	å	~
5	Sweden	#	¤	É	Ä	Ö	Å	Ü	é	ä	Ö	å	ü
6	Italy	#	$	@	º	\	é	^	ù	à		è	ì
7	Spain 1	P	$	@	¡	Ñ	¿	^	'	¨	ñ	}	~
8	Japan	#	$	@	[	¥	]	^	'	{			}	~
9	Norway	#	¤	É	Æ	Ø	Å	Ü	é	æ	ø	å	ü
10	Denmark 2	#	$	É	Æ	Ø	Å	Ü	é	æ	ø	å	ü
11	Spain 2	#	$	á	¡	Ñ	¿	é	'	í	ñ	ó	ú
12	Latin America	#	$	á	¡	Ñ	¿	é	ü	í	ñ	ó	ú
13	Hebrew	See the Hebrew Character Set table.											
14	Greece	See the Greek Character Set table.											

Hebrew Character Set

These Hebrew characters (decimal values 65 through 91) are supported when you specify the Hebrew character set in the Select National Character Set control code.

Hebrew Character Set

Character	Decimal	Hex
ב	65	41
ג	66	42
ד	67	43
ה	68	44
ו	69	45
ז	70	46
ח	71	47
ט	72	48
י	73	49

Hebrew Character Set (continued)

Character	Decimal	Hex
ך	74	4A
כ	75	4B
ל	76	4C
ם	77	4D
מ	78	4E
ן	79	4F
נ	80	50
ס	81	51
ע	82	52
ף	83	53
פ	84	54
ץ	85	55
צ	86	56
ק	87	57
ר	88	58
ש	89	59
ת	90	5A
א	91	5B

Greek Character Set

These characters are supported when you specify the Greek character set in the Select National Character Set control code.

Greek Character Set

Character	Decimal	Hex
Α	97	61
Β	98	62
Γ	99	63
Δ	100	64
Ε	101	65
Ζ	102	66
Η	103	67
Θ	104	68
Ι	105	69
Κ	106	6a

Greek Character Set (continued)

Character	Decimal	Hex
Λ	107	6b
Μ	108	6c
Ν	109	6d
Ξ	110	6e
Ο	111	6f
Π	112	70
Π	113	71
Σ?	114	72
Τ	115	73
Ψ	116	74
Φ?	117	75
Ξ	118	76
Ψ	119	77
Ω?	120	78

User-Defined Character Control Codes

Use these control codes to create user-defined characters, including character graphics. To create your own characters, begin with the Copy ROM to RAM control code, which copies characters in ROM into RAM. Then use Define User Defined Characters to redefine characters as necessary. This ensures that all characters are defined when you select a user-defined character set.

Copy ROM to RAM

Description:	Copies characters in ROM into RAM. Then you can redefine those characters as necessary, ensuring that all characters are defined when a user-defined character set is selected.
Decimal:	27 58 0 0 0
Hex:	1B 3A 00 00 00
ASCII:	ESC ":" NUL NUL NUL

Define User-Defined Characters

Description:	Redefine characters in the currently selected mode. For each character defined, you must supply 12 bytes of data.
	s1 is the first byte that describes the character format:
	• Bits 0 to 3 represent the end position in the grid.
	• Bits 4 to 6 represent the start position in the grid.
	• Bit 7 determines whether the character uses the top eight pins or the bottom eight pins of the printhead. If bit 7 = 0, the top eight pins are used. If bit 7 = 1, the bottom eight pins are used. The start and end positions are ignored during character imaging, but must be accurate to redefine the character code.
	k1 is the character code of the first character to redefine.
	k2 is the character code of the last character to redefine.
	• Range for *k1* and *k2* is 0 to 255, as any character in that range can be redefined.
	• *k1* can equal *k2* if only one character is redefined.
	d1 ... d11 is the data that comprises the dot image pattern of the defined character.
Decimal:	27 38 0 *k1 k2 s1 d1 ... d11*
Hex:	1B 26 00 *k1k2 s1 d1 ... d11*
ASCII:	ESC "&" *k1 k2 s1 d1 ... d11*
Notes:	User-defined characters can be used only in draft mode.
	When Expand Printable Code Area is active, and the user-defined character set is selected by Select User-Defined Character Set, then codes less than 20h and greater than 7Fh can be defined for use and are printable.
	When Enable Printing of Codes 128-159 is active, and the user-defined character set is selected by Select User-Defined Character Set, then codes between 80h and 9Fh can be defined for use and are printable.

Select User-Defined Character Set

Description:	Select a user-defined character set.
Decimal:	27 37 1
Hex:	1B 25 01
ASCII:	ESC "%" (1)

Select Default Character Set

Description:	Enables the default character set if a user-defined set was previously selected.
Decimal:	27 37 0
Hex:	1B 25 00
ASCII:	ESC "%" (0)*

Enable Printing of Codes 128-159

Description:	Enables all codes (128 through 159) to be treated as printable characters, allowing the use of these characters for user-defined characters. A user-defined set must be selected, using Select User-Defined Character Set, before these characters can print. Printing of these codes is disabled by default.
Decimal:	27 54
Hex:	1B 36
ASCII:	ESC "6"

Disable Printing of Codes 128-159

Description:	Disables the printing of codes 128 to 159. Printing of these codes is disabled by default.
Decimal:	27 55
Hex:	1B 37
ASCII:	ESC "7"

Expand Printable Code Area

Description:	Allows certain ASCII codes (00h to 1Fh) and codes (80h to 9Fh) to print. This allows the use of these codes for user-defined characters. If $n = 0$, the function returns these two ranges of characters to non-printable control codes. A user-defined character set must be selected by Enable Printing of Codes 128-159 before these codes can print.

Set n as follows:

- $n = 1$ to allow printing of certain ASCII codes in the ranges 00h to 1Fh and 80h to 9Fh.
- $n = 0$ to return these two ranges to non-printable control codes.

In both ranges, only the codes listed can be redefined as printable characters. Codes within the range 00h to 1Fh not listed here print as standard control codes. Codes within the range 80h to 9Fh not listed here are converted to control codes in the range 00h to 1Fh by subtracting 80h.

Decimal:	27 73 n
Hex:	1B 49 n
ASCII:	ESC "I" n*

Expand Printable Code Area (continued)

Printable code expansion characters:	• Hex = 00, ASCII = NUL • Hex = 01, ASCII = SOH • Hex = 02, ASCII = ETX • Hex = 03, ASCII = ETX • Hex = 04, ASCII = EOT • Hex = 05, ASCII = ENQ • Hex = 06, ASCII = ACK • Hex = 10, ASCII = DLE • Hex = 11, ASCII + DC1 • Hex = 15, ASCII = NAK • Hex = 16, ASCII = SYN • Hex = 17, ASCII = ETB • Hex = 1C, ASCII = FS • Hex = 1D, ASCII = GS • Hex = 1E, ASCII = RS • Hex = 1F, ASCII = US • Hex = 80 through 86, 90, 91, 95, 96, 97, 9C through 9F (no equivalent ASCII)

Enable Printing of Character Graphics

Description:	Enables the printing of character graphics, until disabled by the Disable Printing of Character Graphics control code.
Decimal:	27 116 1
Hex:	1B 74 01
ASCII:	ESC "t" (1)
Notes:	For character values from 0 to 31 (00h to 1Fh): • When the default SBCS code page is selected, the FX-86e IBM character graphics symbol set is printed. • When other SBCS code pages are selected, the codes 00h to 1Fh (Printable Code Expansion characters) are printed. For character values from 32 to 126 (20h to Eh): • When the default SBCS code page is selected, the selected international character set is printed. • When other SBCS code pages are selected, the international character set selection is not in effect. For the character value 127 (7Fh): • When the default SBCS code page is selected, a space is printed. • When other SBCS code pages are selected, the character associated with the code page is printed. For character values from 128 to 255 (80h to FFh), the FX-86e Epson Character Graphics set is printed.

Disable Printing of Character Graphics

Description:	Disables the printing of character graphics (disabled by default).

Disable Printing of Character Graphics (continued)

Decimal:	27 116 0
Hex:	1B 74 00
ASCII:	ESC "t" (0)

Enable Printing of Character Graphics

Description:	Allows printing of character graphics from the currently selected SBCS code page by sending a graphics string to the printer.
	Parameters are as follows:
	• *n* is the length of the character graphic string.
	• *d1 ... dn* is the character graphics data stream. The number of data bytes must equal n. Range of values for the characters in each graphics data byte is 0 to 255.
Decimal:	27 43 *n d1 ... dn*
Hex:	1B 2B *n d1 ... dn*
ASCII:	ESC "+" *n d1 ... dn*
Notes:	For character values from 0 to 31 (00h to 1Fh):
	• When the default SBCS code page is selected, the FX-86e IBM character graphics symbol set is printed.
	• When other SBCS code pages are selected, currently selected single byte code page character graphics are printed.
	For character values from 32 to 126 (20h to 7Eh):
	• When the default SBCS code page is selected, the selected international character set is printed.
	• When other SBCS code pages are selected, the character from the currently selected code page are printed.
	For the character value 127 (7Fh):
	• When the default SBCS code page is selected, a space is printed.
	• When other SBCS code pages are selected, the character graphics symbol is printed.
	For character values from 128 to 255 (80h to FFh):
	• When the default SBCS code page is selected, the FX-86e Epson Character Graphics set is printed.
	• When other SBCS code pages are selected, the corresponding character is printed.

Eight-Pin Graphics Control Codes

All 8-pin graphics functions require parameters, *n1* and *n2,* which represent the length of the graphics string that follows the Select Graphics Mode control code. These parameters are calculated using a temporary variable, *n*:

• *n* = total number of graphics dots needed for the graphic string

• *n2* = integer of (n divided by 256)

• *n1* = remainder of the n2 calculation

The simplest calculation is to divide n (total number of dots needed for the graphics string) by 256. Then $n2$ is the quotient (the whole number) and $n1$ is the remainder. If you require less than 256 dots (columns), then $n1$ indicates the number of dots and $n2$ is set to zero.

Select Graphics Mode

Description:	Enables the specified graphics mode. Any graphic string that exceeds the length of the print line is discarded.
	m is the graphics mode to be selected:

- 0: Single-density
- 1: Low speed double-density
- 2: High-speed double density (cannot print adjacent dots in a given row)
- 3: Low-speed quadruple density (cannot print adjacent dots in a given row)
- 4: CRT 1
- 5: Single-density plotter
- 6: CRT II
- 7: Double-density plotter (cannot print adjacent dots in a given row)

$n1$ and $n2$ are calculated based on the temporary variable n, which equals the total number of dots needed for the graphics string.

To calculate n1 and n2, divide n by 256. $n2$ is the quotient (the whole number) and $n1$ is the remainder.

If you require less than 256 dots (columns), then $n1$ indicates the number of dots and $n2$ is set to zero.

Decimal:	27 42 *m n1 n2*
Hex:	1B 2A *m n1 n2*
ASCII:	ESC "*" *m n1 n2*

Reassign Graphics Mode

Description:	Changes graphic modes.
	s is one of the K, I, Y, or Z characters.
	n is one of the graphics modes:

- 0: Single-density (60 dots per inch, 480 dots per 8-inch line)
- 1: Low-speed double-density (120/960)
- 2: High-speed double-density
  (cannot print adjacent dots in a given row, 120/960)
- 3: Low-speed quadruple density (240/1920)
- 4: CRT I (80/640)
- 5: Single-density plotter (72/576)
- 6: CRT II (90/720)
- 7: Double-density plotter
  (cannot print adjacent dots in a given row, 144/1152)

Decimal:	27 63 *s n*
Hex:	1B 3F *s n*
ASCII:	ESC "?" *s n*

Select Single Density Graphics Mode

Description:	This is a simple method of printing graphics. The resolution is 60 dots per inch. Each 8-inch line can accommodate 480 columns of graphic dots. A graphic string that exceeds the length of the print line is discarded.
	To calculate *n1* and *n2*, divide *n* (total number of dots needed for the graphics string) by 256. Then *n2* is the quotient (the whole number) and *n1* is the remainder. If you require less than 256 dots (columns), then *n1* indicates the number of dots and *n2* is set to zero.
Decimal:	27 75 *n1 n2*
Hex:	1B 4B *n1 n2*
ASCII:	ESC "K" *n1 n2*

Select Low-Speed Double Density Graphics Mode

Description:	If Single Density graphics does not produce high enough density, try this mode. The number of dots per inch is doubled to 120 dots per inch. Each 8-inch line can accommodate 960 columns of graphic dots. However, the speed is reduced to half of what it would be with single density. A graphic string that exceeds the length of the print line is discarded.
	To calculate *n1* and *n2*, divide *n* (total number of dots needed for the graphics string) by 256. Then *n2* is the quotient (the whole number) and *n1* is the remainder. If you require less than 256 dots (columns), then *n1* indicates the number of dots and *n2* is set to zero.
Decimal:	27 76 *n1 n2*
Hex:	1B 4C *n1 n2*
ASCII:	ESC "L" *n1 n2*

Select High-Speed Double Density Graphics Mode

Description:	This 8-pin graphics mode produces the same density as the Low-Speed Double Density mode at double the speed.
	The resolution is 120 dots per inch. Each 8-inch line can accommodate 960 columns of graphic dots. A graphic string that exceeds the length of the print line is discarded. Make sure adjacent dots in a given dot row are not printed.
	To calculate *n1* and *n2*, divide *n* (total number of dots needed for the graphics string) by 256. Then *n2* is the quotient (the whole number) and *n1* is the remainder. If you require less than 256 dots (columns), then *n1* indicates the number of dots and *n2* is set to zero.
Decimal:	27 89 *n1 n2*
Hex:	1B 59 *n1 n2*
ASCII:	ESC "Y" *n1 n2*

Select Low-Speed Quadruple Density Graphics Mode

Description:	With this 8-pin graphics mode, the number of dots per inch has gone up to 4x what it was in single density.
	The resolution is now 240 dots per inch. Each 8-inch line can accommodate 1920 columns of graphic dots. A graphic string that exceeds the length of the print line is discarded. Make sure adjacent dots in a given dot row are not printed.
	To calculate *n1* and *n2*, divide *n* (total number of dots needed for the graphics string) by 256. Then *n2* is the quotient (the whole number) and *n1* is the remainder. If you require less than 256 dots (columns), then *n1* indicates the number of dots and *n2* is set to zero.
Decimal:	27 90 *n1 n2*
Hex:	1B 5A *n1 n2*
ASCII:	ESC "Z" *n1 n2*

Nine-Pin Graphics Control Codes

These 9-pin graphics control codes also require two parameters, *n1* and *n2*. They are calculated differently than in the 8-pin graphics modes.

First, determine the value for *n*, which is the total number of dots needed for the graphics string. Divide *n* by 2, then divide the result by 256. Then *n2* is the quotient (the whole number) and *n1* is the remainder. If you require less than 256 dots (columns), then *n1* indicates the number of dots and *n2* is set to zero.

Select 9-Pin Single Density Graphics Mode

Description:	Enables single density 9-pin graphics mode. The resolution is 60 dots per inch. Each 8-inch line can accommodate 480 columns of graphic dots. A graphic string that exceeds the length of the print line is discarded.
	To calculate the values for *n1* and *n2*, determine the value for *n*, which is the total number of dots needed for the graphics string. Divide *n* by 2, then divide the result by 256. Then *n2* is the quotient (the whole number) and *n1* is the remainder. If you require less than 256 dots (columns), then *n1* indicates the number of dots and *n2* is set to zero.
Decimal:	27 94 0 *n1 n2*
Hex:	1B 5E 00 *n1 n2*
ASCII:	ESC "^" (0) *n1 n2*

Select 9-Pin Double Density Graphics Mode

Description:	Enables double density, 9-pin graphics mode. The resolution is 120 dots per inch. Each 8-inch line can accommodate 960 columns of graphic dots. A graphic string that exceeds the length of the print line is discarded.
	To calculate the values for *n1* and *n2*, determine the value for *n*, which is the total number of dots needed for the graphics string. Divide *n* by 2, then divide the result by 256. Then *n2* is the quotient (the whole number) and *n1* is the remainder. If you require less than 256 dots (columns), then *n1* indicates the number of dots and *n2* is set to zero.
Decimal:	27 94 1 *n1 n2*
Hex:	1B 5E 01 *n1 n2*
ASCII:	ESC "^" (1) *n1 n2*

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