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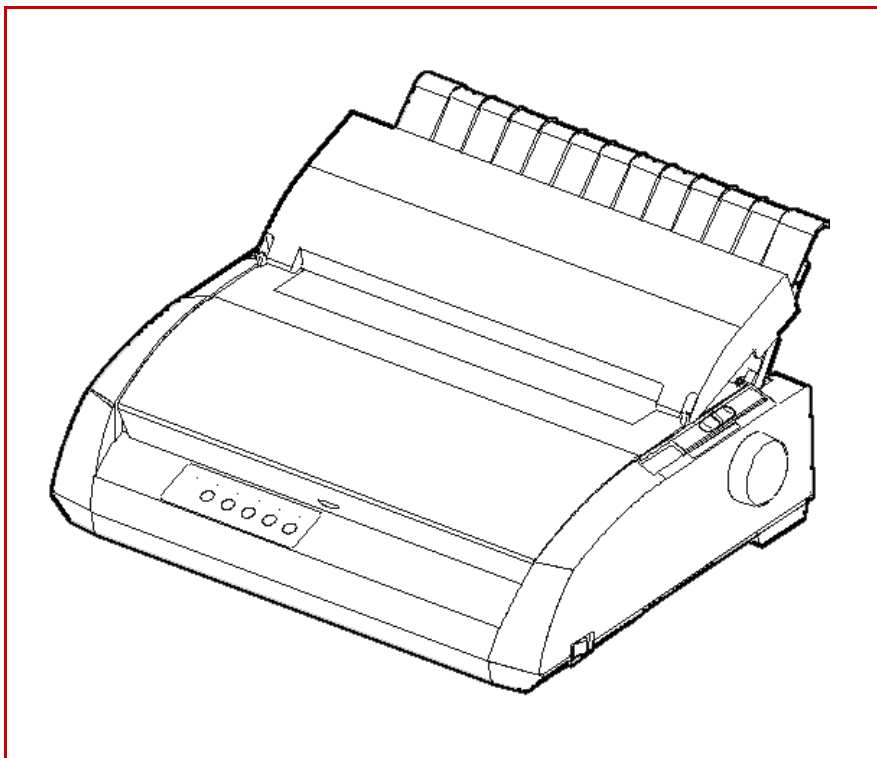
TallyGenicom®

LA48N

LA48W

User Guide

Matrix Printer





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Table of contents

| | | |
|----------|---|------|
| 1 | Introduction | 1-1 |
| | Features | 1-1 |
| | Consumables | 1-2 |
| 2 | Setting up the printer | 2-1 |
| | Selecting a location | 2-1 |
| | Unpacking the printer | 2-2 |
| | Assembling the printer | 2-4 |
| | Installing the Cut Sheet Stand | 2-4 |
| | Installing the Ribbon Cartridge | 2-5 |
| | Getting acquainted with your printer | 2-8 |
| | Connecting the power cord | 2-9 |
| | Connecting the printer to your computer | 2-11 |
| | Selecting a Parallel Interface Cable | 2-11 |
| | Selecting a Serial Interface Cable | 2-11 |
| | Selecting a USB Cable | 2-12 |
| | Connecting the Interface Cable | 2-12 |
| | Removing the shutter | 2-14 |
| | Attaching the shutter | 2-14 |
| | Selecting an emulation | 2-15 |
| | Operations of the control panel | 2-18 |
| | Control panel indicators and buttons | 2-18 |
| | Basic states of the printer | 2-18 |
| | Control Panel Operations | 2-20 |
| | Printer Acoustical Feedbacks | 2-22 |

| | | |
|----------|--|------|
| 3 | Paper Handling | 3-1 |
| | Selecting Paper | 3-2 |
| | Paper Specifications | 3-2 |
| | Paper Size | 3-2 |
| | Paper Thickness and Number of Copies | 3-2 |
| | Overview of Paper Operations | 3-3 |
| | Levers and Buttons Used for Paper Handling | 3-4 |
| | Adjusting for Paper Thickness | 3-6 |
| | Paper Thickness Lever Positions | 3-7 |
| | Using Single Sheets | 3-8 |
| | Loading a Single Sheet of Paper | 3-8 |
| | Ejecting Single Sheets | 3-10 |
| | Using Continuous Forms | 3-11 |
| | Positioning the Paper Stack | 3-11 |
| | Good placement | 3-11 |
| | Bad placement | 3-11 |
| | Loading Continuous Forms | 3-12 |
| | Adjusting the left margin | 3-13 |
| | Adjusting the Tear-off position | 3-15 |
| | Adjustment procedure | 3-15 |
| | Unloading Continuous Forms | 3-16 |
| | Installing the Tractor Unit | 3-16 |
| | Tearing Off Continuous Forms | 3-17 |
| | Feeding and Positioning Paper | 3-18 |
| | Print Area Definition | 3-18 |
| | Line Feed/Form Feed | 3-20 |
| | Top-of-Form Adjustment | 3-20 |
| | Switching Paper Types | 3-22 |
| | Switching from Continuous Forms to Single Sheets (Push-Feed Mode) | 3-22 |

| | |
|--|------|
| Switching from Single Sheets to Continuous Forms (Push-Feed Mode) | 3-22 |
| Tips on Paper Handling | 3-23 |
| General Tips | 3-23 |
| Multipart Forms | 3-23 |
| Envelopes | 3-23 |
| Labels | 3-23 |
| 4 Printing | 4-1 |
| Selecting Print Features | 4-1 |
| Using Commercial Software | 4-1 |
| Using the Control Panel | 4-2 |
| Macro1 selection | 4-2 |
| Macro 1 and Macro 2 Settings | 4-3 |
| Installation Settings | 4-5 |
| Adjustments Settings | 4-5 |
| Menu Access Settings | 4-5 |
| Changing the Protocol | 4-6 |
| Starting or Stopping Printing | 4-8 |
| Starting Printing | 4-8 |
| Stopping and Viewing Printing | 4-8 |
| Resuming Printing | 4-8 |
| Resuming from a Paper-Out | 4-8 |
| Removing Printed Pages | 4-10 |
| Removing Single Sheets | 4-10 |
| Removing Continuous Forms | 4-10 |
| 5 Using Set-Up Mode | 5-1 |
| What is Set-Up Mode for? | 5-1 |
| How Set-Up Works | 5-2 |
| Entering the Set-Up Mode | 5-2 |

| | |
|--|---------|
| Overview of the Set-Up Mode | 5-4 |
| Set-Up Mode Functions | 5-4 |
| Example: Changing the Vertical Pitch | 5-5 |
| Options with Undetermined Values | 5-7 |
| Range Management for a Wide Range of Values | 5-7 |
| Example: Changing the Left Margin | 5-7 |
| Options with Both Pre-determined and Undetermined Values | 5-8 |
| Points to Remember | 5-11 |
| Printing the Printer Configuration | 5-12 |
| Deciding Which Options to Change | 5-14 |
| Required Options | 5-14 |
| Changing Macro 1 and Macro 2 Options | 5-15 |
| Macro 1 and Macro 2 Options and Values | 5-16 |
| Changing Install Options | 5-25 |
| Install Options and Values | 5-26 |
| Adjusting Top-of-Form Origin | 5-30 |
| Adjust Options and Values | 5-30 |
| Changing Menu Access Options | 5-31 |
| Menu Access Option and Values | 5-32 |
| Save Settings and Exit Set-up mode | 5-33 |
| Recall Factory Settings | 5-33 |
| Using the Diagnostic Functions | 5-34 |
| Printing Test | 5-34 |
| Hex Dump Mode | 5-35 |
| Set-Up Mode Quick Reference | 5-37 |
| 6 Maintenance | 6-1 |
| Cleaning | 6-1 |
| Cleaning and Vacuuming the Printer | 6-1 |
| Cleaning the Platen | 6-2 |

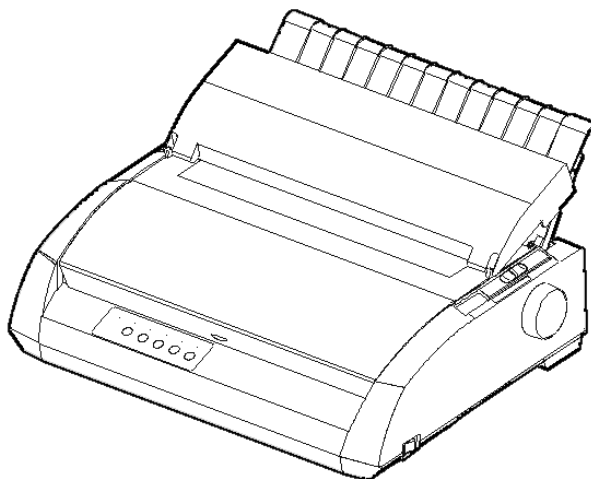
| | |
|---|-----|
| Replacing the ribbon | 6-3 |
| Replacing the Print Head | 6-7 |
| 7 Trouble-Shooting | 7-1 |
| Solving Problems | 7-1 |
| Print Quality Problems | 7-1 |
| Paper Handling Problems and Solutions | 7-4 |
| Operating Problems and Solutions | 7-6 |
| Printer Failures | 7-7 |
| Diagnostic Functions | 7-8 |
| Checking Vertical Alignment | 7-8 |
| A Supplies | A-1 |
| Supplies | A-1 |
| B Printer and Paper Specifications | B-1 |
| Physical Specifications | B-1 |
| Functional Specifications | B-2 |
| Performance Specifications | B-4 |
| Certification | B-4 |
| Paper Specifications | B-5 |
| Print Area | B-5 |
| Paper Thickness | B-7 |



| | | |
|----------|--|------|
| C | Command Sets | C-1 |
| | DEC PPL2 Quick Reference Guide | C-2 |
| | IBM Proprinter X24E and XL24E Quick Reference Guide | C-22 |
| | Epson ESC/P2 Quick Reference Guide | C-27 |
| D | Interface Information | D-1 |
| | Parallel Interface | D-1 |
| | Serial Interface | D-4 |
| | USB Interface | D-7 |
| E | Character Sets | E-1 |
| | DEC PPL2 Protocol | E-1 |
| | Common to IBM Proprinter X24 and XL24E Protocol and EpsonESC/P2 Protocol | E-19 |
| | IBM Proprinter X24E and XL24E Protocol | E-25 |
| | Epson ESC/P2 Protocol | E-26 |
| F | Resident Fonts | F-1 |

Introduction

Congratulations on purchasing a LA48N/LA48W printer. This printer is a compact, versatile printer that offers maximum compatibility with today's software packages and personal computers. The 24-wire print head provides crisp, clear printing for business, office, and home environments. This printer is also easy to install and use.



Matrix Printer LA48N

Features

Key printer features and options are listed in the next two sections.

- **Software compatibility.** This printer operates with the DEC PPL2, IBM XL24E, and EPSON ESC/P2 command sets.
- **Various character sets.** For the DEC PPL2 protocol, 31 character sets (twenty-five 94-character sets and six 96-character sets) are available. For IBM Proprinter X24E and XL24E protocol, set 1, set 2, and 30 default sets (code pages and specific character sets) are available. For Epson ESC/P2 protocol, 15 national character sets and 30 default sets (code pages and specific character sets) are available.
- **Multiple fonts.** The printer has 12 resident fonts: Draft, High speed Draft, High impact Font, Courier 10, Pica 10, Prestige 12, Compressed, Boldface PS, Timeless Normal, Nimbus Sans Normal, OCR-A, OCR-B.



- **High-speed printing.** At 10 cpi, print speed ranges from 113 cps for letter quality to 400 cps (80-column printer) or 448cps (136-column printer) for high-speed draft quality.
- **Large print buffer.** 64 Kbytes are available in total for storing input data and downloading fonts. A large input data buffer allows you to send files to the printer and return quickly to work in your application. A large download buffer allows you to use custom fonts.
- **80-column or 136-column print line.** 80-column printers are the most suitable for printing in landscape mode using letter or A4 size paper. 136-column printers are the most suitable for printing in landscape mode using legal or standard size computer forms.
- **Simple switching of paper types.** The ability to "park" continuous forms makes it easy to switch between continuous forms and single sheets.
- **Auto tear-off.** Continuous forms are fed automatically up to the tear-off position at the end of each job.
- **Maintenance-free.** The printer only requires periodic cleaning and changing of the ribbon cartridge.

Consumables

For details, see Appendix A, "Supplies".



Setting up the printer

Your new printer is easy to install and set up. This chapter tells you how to set up the printer and start printing right away. If this is your first printer, you should read the entire chapter before attempting to use the printer. In this chapter, you will learn how to:

- Unpack, assemble, and select a good location for the printer
- Identify the printer's major parts
- Connect the power cord and the interface cable
- Test the printer before connecting it to your computer
- Select an emulation and print a sample page using your software

If you have a problem while setting up the printer, review the section "Solving Problems" in Chapter 7. If the problem persists, contact your dealer or service.

Selecting a location

This printer is suitable for most business, office, and home environments. To obtain peak performance from the printer, select a location that meets the following guidelines:

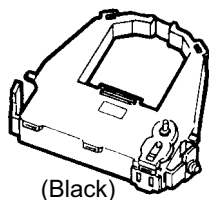
- ✓ Place the printer on a sturdy, level surface.
- ✓ Place the printer near a well-grounded AC power outlet.
- ✓ Ensure easy access to the front and rear of the printer by leaving several inches of space around the printer. Do not block the air vents on the front, left, and right sides of the printer.
- ✓ Do not place the printer in direct sunlight or near heaters.
- ✓ Make sure that the room is well-ventilated and free from excessive dust.
- ✓ Do not expose the printer to extremes of temperature and humidity.
- ✓ Use only the power cord supplied with the printer or recommended by your dealer. Do not use an extension cord.
- ✓ Do not plug the printer into a power outlet that is shared with heavy industrial equipment, such as motors, or appliances, such as copiers or coffee makers. Such equipment often emits electrical noise or causes power degradation.

Unpacking the printer

Unpack the printer as follows:

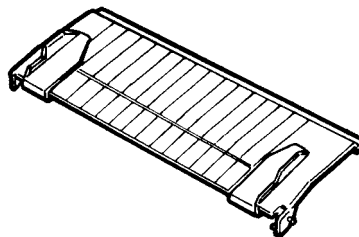
1. Open the carton and remove the printer and its components. Make sure that you have all of the items shown below. Note that the power cord supplied depends on the printer model (100-120 or 220-240 VAC power supply).

Ribbon cartridge

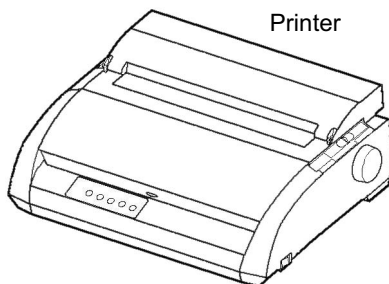


(Black)

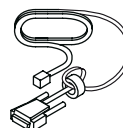
Cut sheet stand



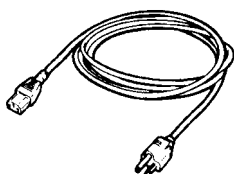
Printer



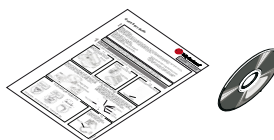
MMJ Interface adapter



Power cord



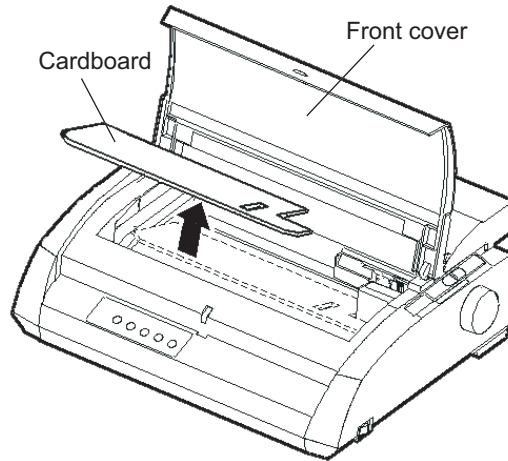
Quick Start Guide
and CD-ROM



Checking items received

2. Carefully examine each item for damage. Report any problems to your dealer or shipping agent.
3. Place the printer where you plan to use it.
4. Remove the tapes securing the front cover, ejection cover, and back cover. Open the front cover and remove the shipping restraint cardboard that holds the print

head carriage in place (shown below).



Removing the shipping restraint cardboard

5. Store the original shipping carton and packaging materials for future use. For example, the original packaging is ideal for use when you move or ship your printer to another location.

NOTE: *The interface cable is not included with the printer. You must purchase it separately. Connection of the interface cable is described later in this chapter.*

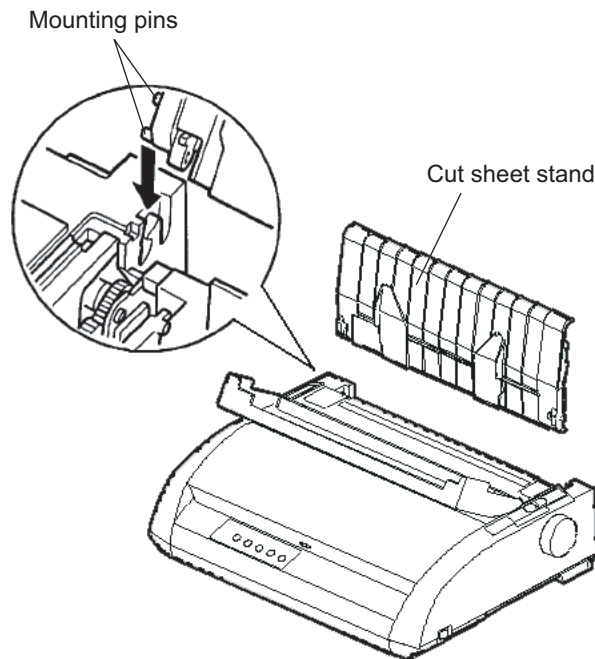
Assembling the printer

This section explains how to install the cut sheet stand and ribbon cartridge.

Installing the Cut Sheet Stand

The cut sheet stand enables smooth feeding of both single sheets and continuous forms. Install the cut sheet stand as described below:

1. Referring to the following figure, locate the two grooved notches on the top of the printer, behind the top cover. Note that each notch has a front groove and a rear groove.
2. Locate the two mounting pins on each side of the cut sheet stand.



Installing the cut sheet stand

3. Hold the cut sheet stand at an angle over the top of the printer. Slide the mounting pins into the long, front grooves of the notches. This is the cut sheet stand's up position, used for printing single sheets.

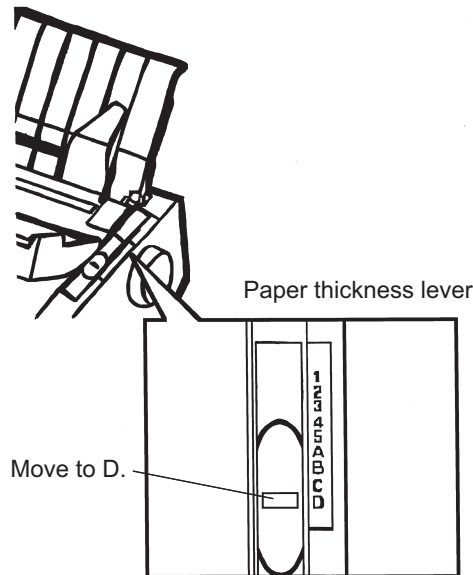
To rotate the cut sheet stand to its down position, grasp it at the sides and lift it up until the two upper mounting pins clear the front notches. Rotate the cut sheet stand backward to place the upper mounting pins in the rear grooves.



Installing the Ribbon Cartridge

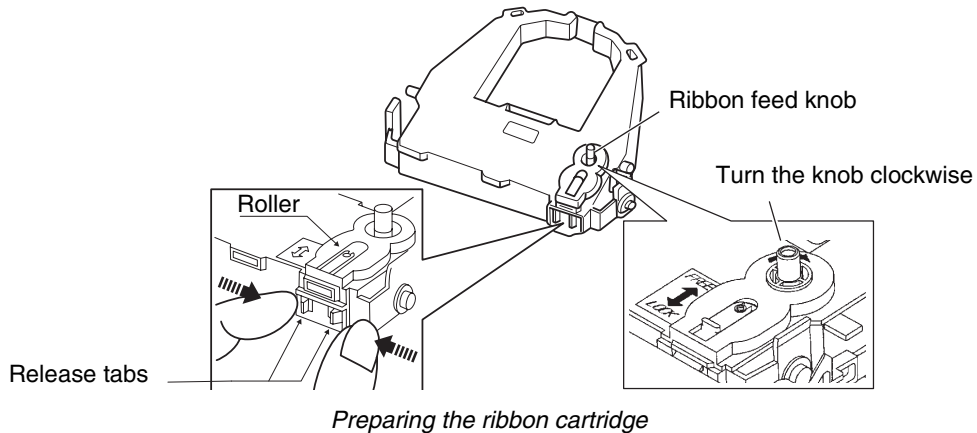
The printer uses a black ribbon cartridge. To install the ribbon cartridge:

1. Turn the printer off. Open the front cover of the printer. For easy installation, slide the print head carriage to the middle.
2. The paper thickness lever, located on the right of the printer, has nine positions. Before you install the ribbon cartridge, move this lever to **D**.



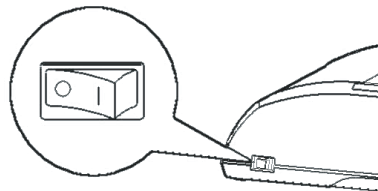
Preparing to install the ribbon

3. Using the procedure below, release the roller from the LOCK position and turn the ribbon feed knob clockwise to take up any ribbon slack. Push in the gray ribbon release tabs on the side of the ribbon cartridge to release them, and slide the roller from the LOCK position to the FREE position.



CAUTION: Do not turn the ribbon feed knob in counterclockwise direction.

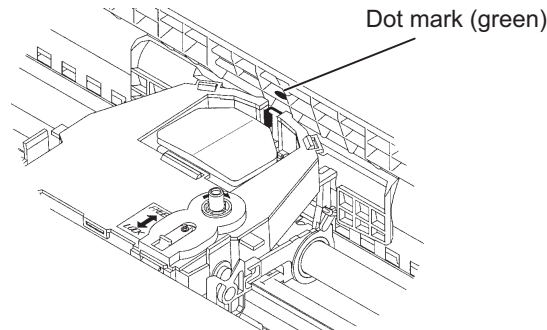
4. Verify that the power to the printer is off (make sure that the circle mark on the power switch is pressed).



Verify that the printer is switched off

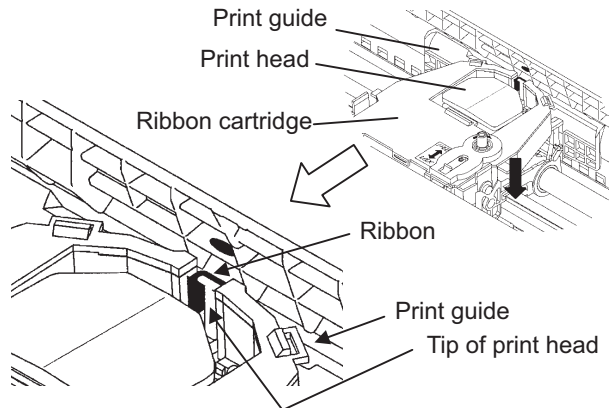
5. Move the paper thickness lever to the D position.
6. Open the front cover.

7. Align the print head position with the dot mark (green) on the printer ejection cover.



WARNING: Avoid touching the print head while using or immediately after using the printer, as doing so may lead to burns. Wait until the print head cools down before touching it.

8. Thread the ribbon between the print head and the print guide, then gently press down on the ribbon cartridge against the printer until it clicks into place. (Make sure that the ribbon feed knob is facing upward.)

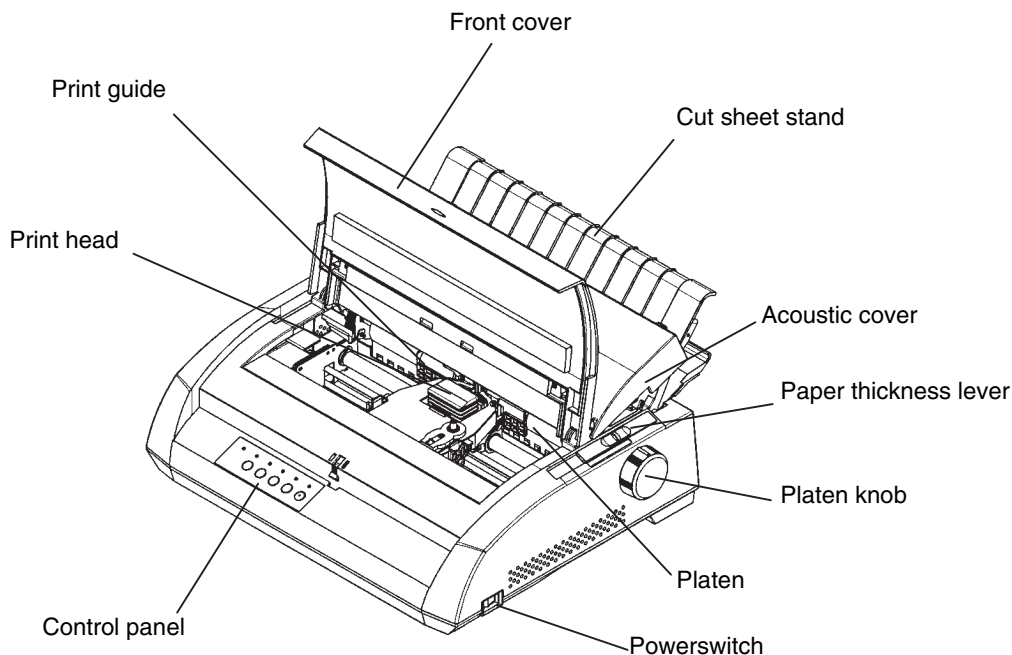


9. Turn the ribbon feed knob clockwise to take up any ribbon slack.
10. After the ribbon cartridge has been installed in the printer, adjust the paper thickness lever to match the thickness of the paper and the number of sheets of paper to be used.
For information about the paper thickness lever, see the section entitled “Adjusting for Paper Thickness” in Chapter 3.

Getting acquainted with your printer

Now that your printer is assembled, take a moment to become familiar with its major parts.

Looking at the printer from the front right side, you can see the parts of the printer shown in the figure below.

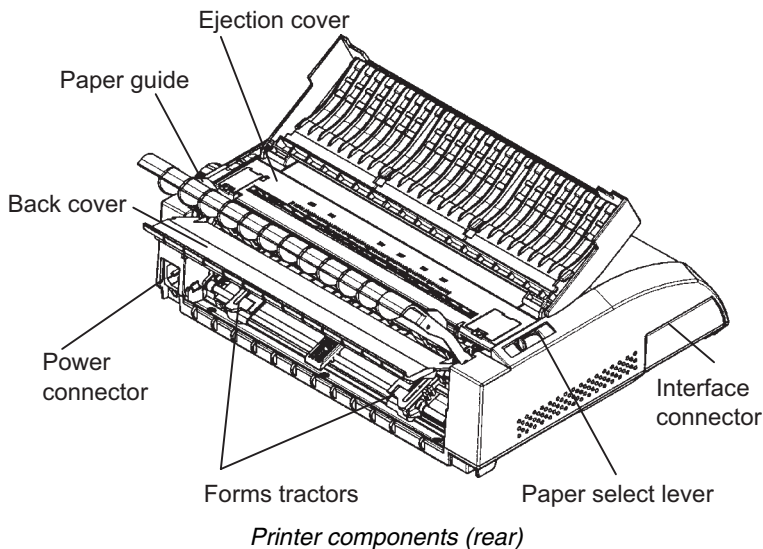


Printer components (front and right)

The printer control panel has the buttons and indicators used to load and feed paper (see Chapter 3, “Paper Handling”) and select print features (see Chapter 4, “Printing”). The control panel also allows you to change the printer’s optional settings (see Chapter 5, “Using Set-Up Mode”).



Looking at the printer from the back with the cut sheet stand and back cover removed, you can see the following parts of the printer:



Connecting the power cord

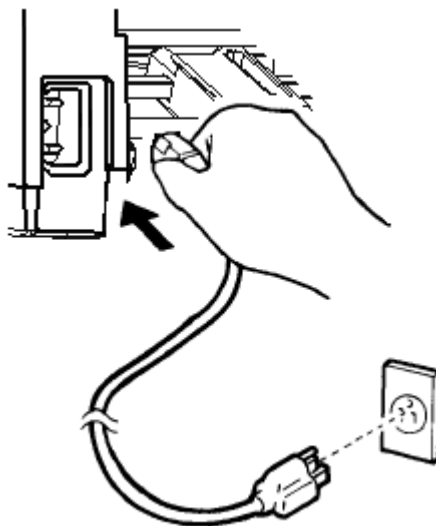
Before you plug in the printer:

- ✓ Make sure that the printer power is switched off. The side marked “1” on the power switch should be raised.
- ✓ Make sure that the power outlet is properly grounded.
- ✓ Make sure that you use the power cord shipped with the printer. This cord is designed to minimize radio frequency interference.

To plug in the power cord:

1. Plug one end of the power cord into the power connector on the rear of the printer.

2. Plug the other end of the power cord into the power outlet.



Connecting the power cord

3. Make sure that the power cord is securely connected.
4. Turn on the power by pressing the side marked “I” on the power switch. Within a few seconds, the POWER indicator on the printer control panel will light, the print head will move to its home position, and the ONLINE indicator will light (green).

NOTE: *If no forms are loaded, the printer may beep and the green FAULT indicator may light and the ONLINE indicator will not light if the paper select lever is set backward to the continuous forms position. Move the paper select lever forward to the single sheet position (as described in the next section). The FAULT indicator will go out. This condition is a result of the factory default settings and poses no problem.*

Connecting the printer to your computer

Your printer supports one of the following interface options:

- Centronics parallel interface only
- Centronics parallel interface and RS-232C serial interface
- Centronics parallel interface and USB interface

The RS-232 serial interface is a factory-installed option for a Centronics parallel interface model. Installation of the serial option provides a dual interface feature enabling the connection of either interface but inhibiting the operation of both interfaces at the same time.

The parallel interface connector has wire clips. The serial interface connector has tapped holes. Cables for these interfaces are available from dealers, cable manufacturers, and other suppliers.

The LAN adapter is a user installable option. For details, refer to the Manual that comes with the LAN card.

NOTE: *If a LAN interface card is installed, the Centronics parallel interface is not available.*

For detailed interface specifications, see Appendix D.

Selecting a Parallel Interface Cable

For the parallel interface, use a cable that meets the following specifications:

- ✓ At the printer end, use a shielded male Centronics connector, such as an Amphenol DDK 57FE-30360 or its equivalent. To prevent RFI (radio frequency interference), the connector cover must be connected to the cable shield.
- ✓ At the computer end, most computers (including IBM PCs) require a male DB-25P connector. Some computers, however, require a Centronics connector. To determine the type of connector your computer uses, refer to your computer user manual.
- ✓ Make sure that the cable length does not exceed 3 meters (10 feet).

Selecting a Serial Interface Cable

For the serial interface, use a cable that meets the following specifications:

- ✓ At the printer end, use a 25-pin male connector, such as a Cannon DB-25P or its equivalent.
- ✓ To determine the type of connector your computer requires, refer to your computer user manual or ask your dealer.
- ✓ The cable length can be up to 15 meters (50 feet). This type of length is required in many networking and shared-printer configurations.

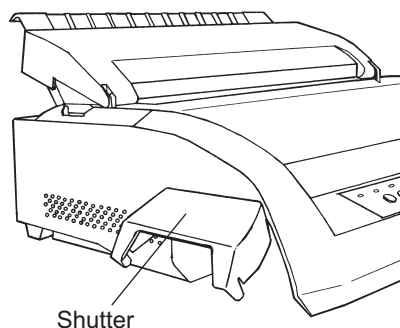
Selecting a USB Cable

- ✓ When the USB interface is used to connect to the host computer, the parallel interface and the serial interface (factory add-on option) cannot be connected simultaneously.
- ✓ The USB interface does not guarantee all connections of USB-supported devices.

Connecting the Interface Cable

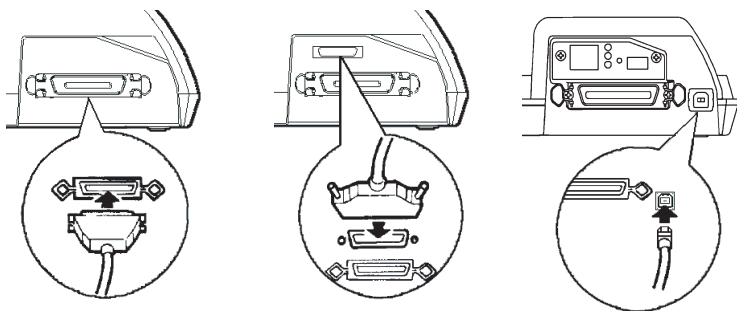
To connect the interface cable:

1. Turn off both the printer and the computer.
2. Pull the shutter on the left side of the printer upward as far as it will go.



Opening the shutter

3. Attach the interface cable to the connector. Do not connect more than one interface cable type to the printer at the same time.



Centronics parallel

Centronics parallel + RS-232C

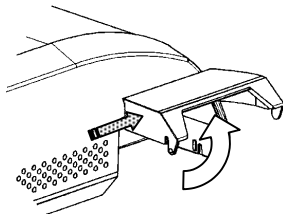
Centronics parallel + USB

Connecting the interface cable

4. To secure a parallel interface cable, flip the fastener clips located on the printer into the notches on the cable connector. To secure a serial interface cable, tighten the screws in the cable connector.
5. Attach the other end of the interface cable to your computer. Gently pull on the cable to verify that it is secure.
6. Close the shutter.

NOTE: *When use of the shutter is not required, remove it by using the following procedure.*

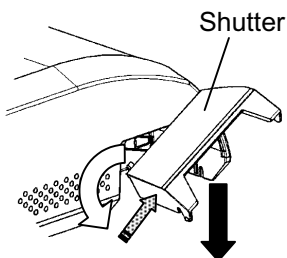
Removing the shutter



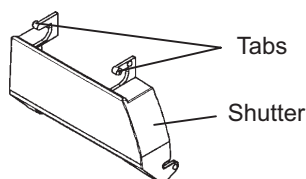
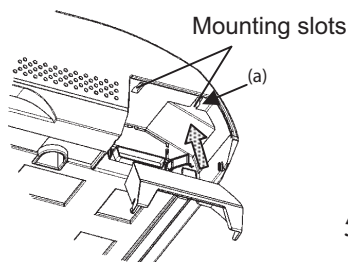
1. Open the shutter.

2. Gently push the back end of the shutter toward the front of the printer.

3. While holding the shutter in the position described in step 2, rotate it in the manner shown in the



Attaching the shutter



5. Tilt the shutter and pass the shutter tabs through the mounting slots, starting with the slot on side (a) shown in the figure on the left. The order in which the shutter tabs are

CAUTION: Take care not to use excessive force when pushing the back of the shutter toward the front of the printer. Otherwise, the shutter tabs may be damaged.

To reattach the shutter, tilt the shutter and insert one of its convex parts into the installation hole of the printer, and then insert the other part in the other hole. After inserting both convex parts, lower and push the shutter in to its original position.

Selecting an emulation

Before printing with your software, verify that the correct emulation is selected on your printer. This section describes the available emulations and their selection.

An emulation is a set of commands used by your software to communicate with the printer. There are many different emulations available for printers. Each emulation has unique features and capabilities. This printer offers three resident emulations:

- DEC PPL2
- IBM Proprinter XL24E
- EPSON ESC/P2

The printer's preselected factory setting for the emulation settings is port dependant (PORT DEPND), which means that for every interface a different emulation is set. The default setting for the serial interface is DEC PPL2, for the parallel interface EPSON ESC/P2 and for the USB interface EPSON ESC/P2.

It is also the possibility to select an Autosensing setting, which detects the correct emulation setting automatically.

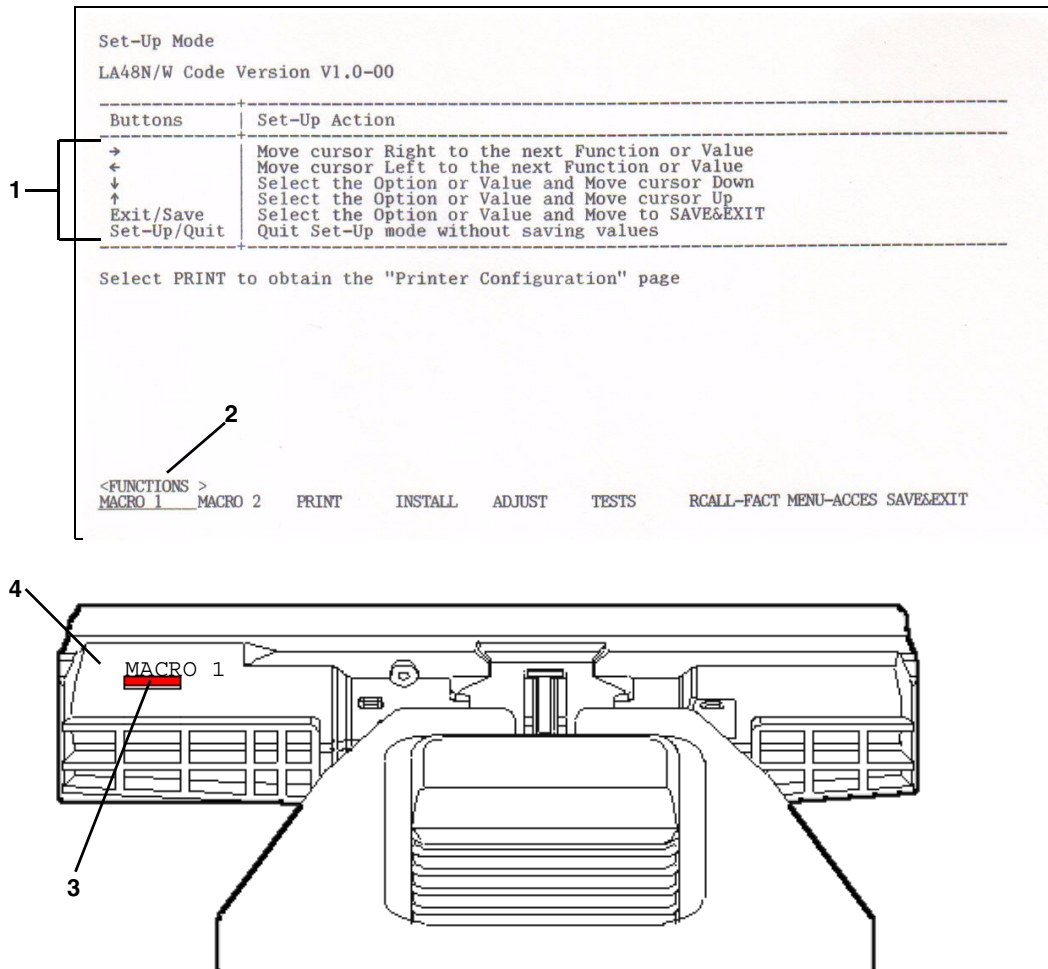
Resident emulations are stored in the printer's permanent memory.

Here are some points to help you determine which emulation to select:

- ✓ Determine which emulations your software supports. (Refer to your software documentation.) Since most software programs support this printer, try to run a program with the factory default emulation first. Try this emulation even if you are not sure of which emulation to choose. See Chapter 5, "Using Set-Up Mode", for detailed information about how your printer communicates with your software.
- ✓ If you are using more than one software package, determine which emulation is supported by the software you use most frequently. Select that emulation.
- ✓ If your software supports more than one emulation, select the DEC PPL2 emulation if possible. This emulation has the greatest capabilities.
- ✓ If you want to use an emulation that is not supported by your software, contact your software manufacturer or printer dealer and ask whether support is available. You may be able to obtain a printer driver that is not shipped with the original software package.

To select an emulation, proceed as follows:

1. Switch off the printer.
2. Make sure that paper is loaded (continuous paper or single form).
3. Remove the acoustic cover in order to see the printed text.
4. Hold the **Setup/Quit** buttons depressed and switch the printer on. After initializing the printer enters the setup mode and prints the following information:



The initial printout contains a header, help menu **1**, and <FUNCTIONS> menu **2**. The header tells you that the printer is in the Set-Up mode. The help menu provides a quick summary of how to use buttons in the Set-Up mode.

The <FUNCTIONS> menu **2** lists all of the functions available in the Set-Up mode.

Generally speaking, the red cursor **3** on the plastic print guide **4** indicates the function or value to be selected. When entering the Set-Up mode, the red cursor is initially positioned under MACRO 1.

5. Press the ↓ button to select the Macro 1 function and print the <PROTOCOL> option and its values.
6. Repeatedly press the → button or the ← button to position the red cursor on the plastic print guide under the emulation you require.
7. Press the **Exit/Save** button to select the emulation and exit Set-Up mode.

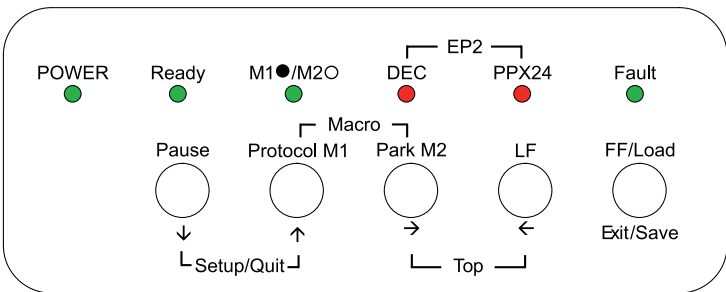
Operations of the control panel

This section summarizes status indications and operations of the control panel in Normal mode. For details on Set-Up mode, see Chapter 5, “Using Set-Up Mode”.

Normal mode operation includes everyday operations, such as paper handling, macro selection, and protocol selection. The first table lists basic states represented by the Ready and Fault indicators. The second table lists Normal mode operations and required user response. Operations are listed by functions.

Control panel indicators and buttons

The control panel indicators display the state of the printer and the control panel buttons control the work with the printer.



Basic states of the printer

| Indicator | Status | Printer status |
|-----------|----------|---|
| Ready | On | The printer is ready for printing or The printer is receiving or printing data. |
| | Blinking | The printer is not ready and holds printing data. |
| | Off | The printer is not ready and it does not hold printing data. |



| Indicator | Status | Printer status |
|-------------|-----------------|--|
| Fault | On | The printer is out of paper. |
| | Blinking fast | It is blinking at a 0.5 second period when paper jam, carriage error, communication error, buffer overflow is detected, or when the Automatic Sheet Feeder must be active but paper can not be ejected after 22 inches feeding, or when parking is not successful after 20 inches reverse feeding. |
| | Blinking slowly | When the paper source in a present MACRO setting and Setting of Paper Select Lever are different, five seconds are blinked for warning. |
| Macro | On | Shows that Macro 1 is selected. |
| | Off | Shows that Macro 2 is selected. |
| Protocol | | Two indicators are available to indicate the currently selected protocol: |
| DEC | On | The DEC ANSI protocol is active. |
| PPX24 | On | The IBM Proprinter X24E/XL24E protocol is active. |
| DEC + PPX24 | On | The Epson ESC/P2 protocol is active. |
| | Blinking | Port dependent |

Control Panel Operations

—: This operation has no connection with this condition.

N/A: The condition does not apply because this operation is executed before powerin-
gon.

| Operation | Required Conditions ¹ | | | Required Action |
|--|----------------------------------|-----------------------|-------|--|
| | Ready | Printing ² | Fault | |
| Load continuous forms paper | — | Not printing | On | Press FF/Load. |
| Load single sheet paper | — | Not printing | On | Press FF/Load if single sheetload is switched from AUTO to MANUAL in Set-Up mode. |
| Feed paper a page | — | Not printing | Off | Press FF/Load. |
| Feed paper a line | — | Not printing | Off | Press LF. |
| Advance perforation to tear bar | — | Not printing | Off | Press Pause if the TEARop- tion is switched from AUTO to MANUAL in Set-Up mode, or press FF/Load. |
| Advance paper for viewing | — | Not printing | Off | Press Pause if the TEARop- tion is switched from AUTO to MANUAL in Set-Up mode. |
| Return paper to previous position | — | Not printing | Off | Press Pause if the TEARop- tion is switched from AUTO to MANUAL in Set-Up mode, or press FF/Load. |
| Eject single-sheet paper | — | Not printing | Off | Press FF/Load or Park or turn the printer off and on again. |
| Unload continuous- forms ³ | — | Not printing | Off | Press Park. |
| Pause printing | On | Printing | Off | Press Pause. |
| Resume printing | Blinking | Not printing | Off | Press Pause. |
| Resume printing after a fault | Off | Not printing | On | Clear error and press Pause. |

| Operation | Required Conditions ¹ | | | Required Action |
|--|----------------------------------|-----------------------|-------------------|--|
| | Ready | Printing ² | Fault | |
| Resume printing after paper-out | Off | Not printing | On | Load paper. |
| Place printer in Ready state | Off | Not printing | Off | Press Pause. |
| Place printer in pause state | On | — | Off | Press Pause. |
| Enter Normal mode | N/A | N/A | N/A | Turn power on without pressing any buttons |
| Continuous Test Print | N/A | N/A | N/A | Turn power on while pressing FF/Load. |
| Enter Macro selection mode Select Macro 1 ⁴ Select Macro 2 ⁴ | | | Off Off Off | Press Protocol(M1) and Park(M2). Press M1 Press M2. |
| Switch the protocol ⁴ | — | Not printing | Off | Press Protocol. |
| Enter Top-of-Form Adjustment mode | — | Not printing | Off | Press LF button and FF/Load button. |
| Move paper by 1/60inch | Off | — | Off | Press ↑ or ↓ button. |
| Use the adjustment temporarily | Off | — | Off | Press Set-Up/Quit. |
| Use the adjustment permanently | Off | — | Off | Press Exit/Save. |
| Clear the adjustment | Off | — | Off | Press Top buttons. |
| Enter Set-Up mode | N/A | N/A | N/A | Hold the Setup/Quit buttons depressed and switch the printer on. |
| Move cursor to select a Set-Up Function or Value | Off | Not printing | Off | Press → or ← button. |
| Move cursor to select a Set-Up Option | Off | Not printing | Off | Press ↑ or ↓ button. |
| Select a Set-Up Function or Value | Off | Not printing | Off | Press ↑ or ↓ button. |

| Operation | Required Conditions ¹ | | | Required Action |
|--|----------------------------------|-----------------------|----------|------------------------------|
| | Ready | Printing ² | Fault | |
| Select a Set-Up Value and move cursor to SAVE&EXIT | Off | Not printing | Off | Press Exit/Save. |
| Quit Set-Up mode without saving values | Off | Not printing | Off | Press Set-Up/Quit. |
| Clear software-detected errors | — | — | Blinking | Press Pause. |
| Initialize the printer | — | — | — | Turn power off and on again. |

- 1 In Normal mode operation, all buttons except Pause are inactive in the Busy state in which the printer is receiving or printing data.
- 2 Not printing includes the following situations: the printer is ready and awaiting data, or the Pause button is pressed and the printer is awaiting data, or the Pause button is pressed during printing.
- 3 This operation is available in the rear-feeding push-tractor mode.
- 4 Switching is not done if the printer is holding printing data.

Printer Acoustical Feedbacks

Except for paper handling and when the factory setting for beep is not changed, the printer beeps in the following ways when you press a control panel button, as follows.

- A short beep indicates that the printer accepts your pressing or specification.
- A longer beep indicates that your specification is invalid.
- In a certain mode, a middle long beep indicates that the specified mode becomes active and a short beep indicates the end of the mode.
- When the Fault indicator lights, the printer also makes a longer beep.

Paper Handling

This chapter explains how your printer uses paper. Topics covered are:

- Selecting paper
- Overview of paper operations
- Adjusting for paper thickness
- Using single sheets
- Using continuous forms (push-tractor feed and pull-tractor feed)
- Feeding and positioning paper
- Switching paper types

Tips for paper handling are given at the end of this chapter. Check that section if you are using multipart forms, envelopes, or labels.

Selecting Paper

The printer can handle either single sheets or continuous forms. Single sheets, also called cut sheets, include envelopes and noncontinuous, multipart forms. Continuous forms include labels and multipart forms fed into the printer using the forms tractors.

For best results, use paper that meets the specifications listed in the following table. (See Appendix B, “Printer and Paper Specifications” for detailed specifications.) If you are unsure of the suitability of a particular type of paper, try testing the paper or consult your dealer.

Paper Specifications

Paper Size

| | | LA48N | LA48W |
|------------------|--------|---------------------------------|---------------------------------|
| Continuous forms | Width | 102 to 267 mm (4 to 10.5 in) | 102 to 420 mm (4 to 16.5 in) |
| | Length | 102 mm (4 in) or greater | 102 mm (4 in) or greater |
| Cut sheets | Width | 102 to 267 mm (4 to 10.5 in) | 102 to 420 mm (4 to 16.5 in) |
| | Length | 76 to 364 mm (3 to 14.3 in) | 76 to 420 mm (3 to 16.5 in) |

Paper Thickness and Number of Copies

| | Description |
|-----------|--|
| Thickness | 0.35 mm (0.014 in) maximum total thickness. |
| Copies | 1 to 5 copies, including the original. For carbon-interleaved paper, the carbon counts as a copy. |

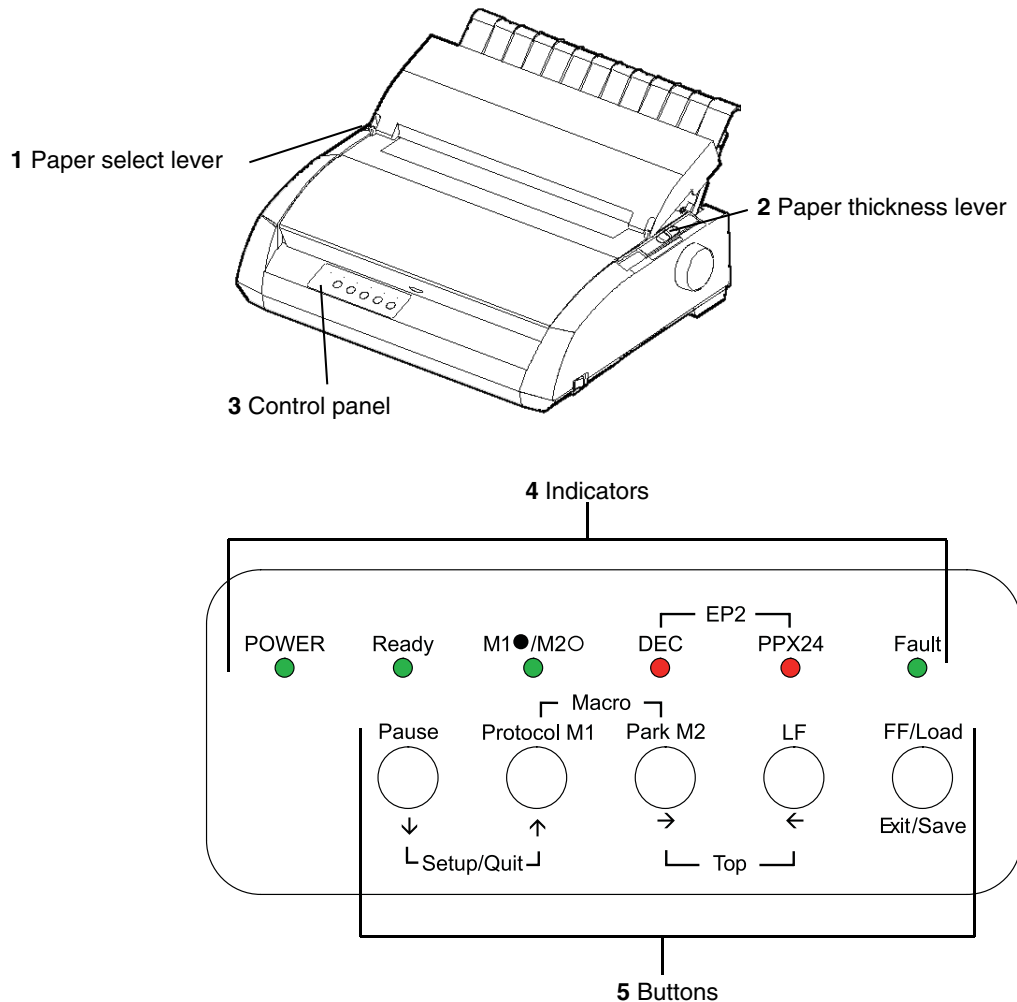


Overview of Paper Operations

The following levers and buttons are used in paper handling:

- Paper select lever **1** at the top left corner of the printer
- Paper thickness lever **2** at the top right corner of the printer
- All buttons **5** on the control panel **3** (Primary and alternative functions are labelled respectively above and under each button.)

The following figure shows the location of each lever, indicators, and buttons:



Printer Levers and Buttons

The following table summarizes the use of levers and buttons in paper handling. More detailed information is provided later in this chapter.

CAUTION: *To load or feed paper, the printer must be:*

- *In the Ready state but not receiving or printing data*
- *In the Pause state*

Levers and Buttons Used for Paper Handling

| Lever/Button | Purpose | Action |
|--------------|---|--|
| FF/LOAD | Form feed Load paper | Press FF/Load to execute a form feed. Continuous forms are fed forward by one page. Single sheets are ejected. Press FF/Load to feed paper to the top of form position. |
| LF | Line feed | Press LF to feed paper forward by one line. |
| Park | Unload forms | Press Park to retract continuous forms to the “park position.” |
| LF + FF/LOAD | Enter Top-of-Form (TOF) Adjustment mode | Press LF and FF/LOAD buttons at the same time to enter TOF Adjustment mode where the paper loading position can be adjusted. |
| ↑ | Increase TOF value by 1/60 inch | Press the ↑ button to feed paper forward by 1/60 inch in TOF Adjustment mode. |
| ↓ | Decrease TOF value by 1/60 inch | Press the ↓ button to feed paper backward by 1/60 inch in TOF Adjustment mode. |
| Exit/Save | Save TOF value | Press Exit/Save to permanently store the TOF position adjusted by the ↑ button and the ↓ button in TOF Adjustment mode. |
| Top | Clear TOF adjustment | Press the Top buttons at the same time to clear the adjusted value and return to the initial state. |



| Lever/Button | Purpose | Action |
|-----------------------|---|--|
| Pause | Advance forms to the tear bar when forms are at the Top-of-Form (TOF) position. | Press Pause to advance the forms perforation to the tear bar. Tear off the forms, then press Pause again to return the forms to the previous position. |
| Paper select lever* | Select paper path | Move the paper select lever forward for single sheets. Move the paper select lever backward for continuous forms. |
| Paper thickness lever | Adjust for paper thickness or number of copies | Select the number corresponding to the number of copies (including the original). Vary the setting upward or downward (including A to D) to optimize printing. Select D when replacing ribbon or clearing a paper jam. |

* The following graphics are engraved on the casing.



Continuous forms



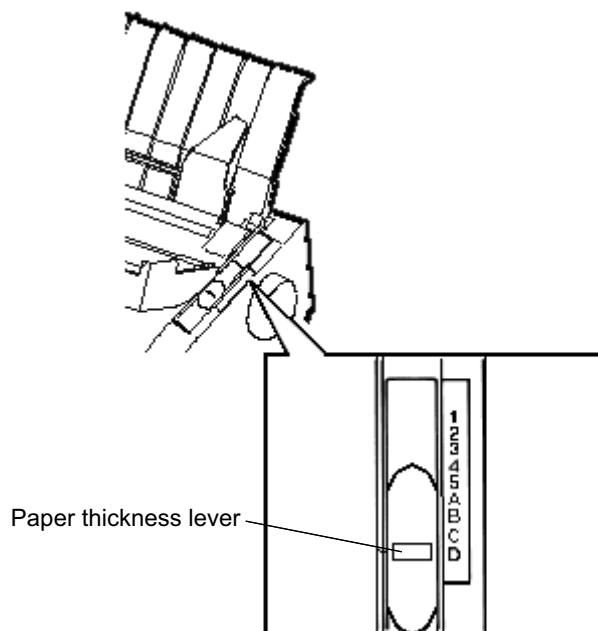
Cut sheets

Adjusting for Paper Thickness

The printer can handle paper with different thicknesses, including multipart forms with up to five parts (original plus four copies). For details on paper thickness specifications, see Appendix B, “Printer and Paper Specifications”.

The paper thickness lever, located at the top right corner of the printer, allows you to adjust for different paper thicknesses. Be sure to adjust the paper thickness lever whenever you change the number of copies being printed.

The paper thickness lever has nine settings: **1** to **5** and **A** to **D**. Use the following table to determine the appropriate setting for your paper; then, move the paper thickness lever to the appropriate position.



Adjusting the Paper Thickness Lever

Paper Thickness Lever Positions

| Number of Copies (Including the Original) | Position |
|--|----------|
| 1 copy | 1 |
| 2 copies | 2 |
| 3 copies | 3 |
| 4 copies | 4 |
| 5 copies | 5 |
| Ribbon replacement | D |

For carbon-interleaved paper, the carbon counts as one copy.

Vary the position upward or downward (including A to D) to optimize printing. Select D when replacing a ribbon or clearing a paper jam. For labels and envelopes, use the trial-and-error approach to determine a satisfactory position.

CAUTION: *If printing is poor, the ribbon misfeeds, or the paper jams, move the lever one position higher.*

Using Single Sheets

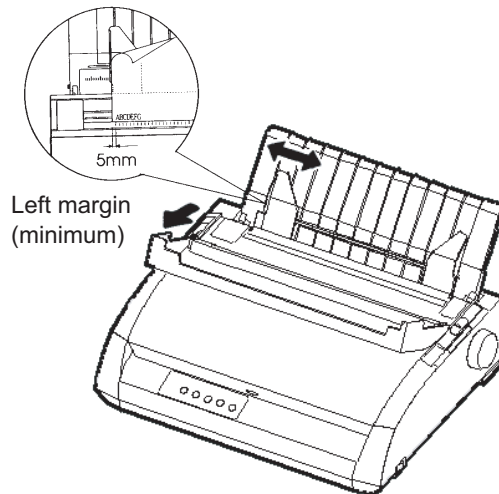
This section describes how to load paper in the cut sheet stand. The cut sheet stand allows paper to be loaded manually, one sheet at a time.

Loading a Single Sheet of Paper

To load a sheet of paper into the cut sheet stand:

1. Make sure that the printer is turned on. Check that rear-fed continuous forms are retracted to the park position. (For details, see the section “Unloading Continuous Forms” later in this chapter.)
2. If necessary, reset the paper thickness lever. (See the section “Adjusting for Paper Thickness” earlier in this chapter.)
3. Move the paper select lever forward. (This lever is at the top left part of the printer.)
4. Raise the cut sheet stand. Position the left paper guide in accordance with the Note below. Note that the movable range of the paper guide is limited.

NOTE: *Below the left paper guide, the cut sheet stand has a scale graduated in units of 0.1 inch. When the left paper guide is positioned all the way to the right, the left margin is 5 mm (0.2 inch). To help align paper, also use the inch-based ruler on the top cover of the printer. The gradations on the ruler are for 10 columns per inch.*

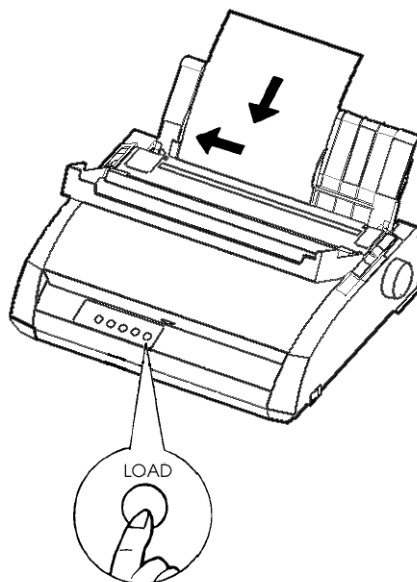


Preparing to load a sheet of paper

5. Adjust the right paper guide to the width of paper. Insert the paper into the cut sheet stand. Make sure that the bottom edge of the paper engages snugly with the platen. The paper will automatically advance to the top-of-form position if the Single Sheet Load option of the Set-Up mode is set to Automatic.

NOTE: *The factory setting for the Single Sheet Load option is automatic loading, two seconds after paper detection. If you set this option to manual, you will have to press **FF/Load** to feed the paper.*

6. If you want to slightly adjust the Top-of-Form position, the first line on which printing can start, adjust the Top-of-Form position of the paper using control panel buttons. Press the **Set-Up/Quit (Pause)** button and the two **Top** buttons at the same time. The M1/M2 indicator flashes alternately with the DEC and PPX24 indicators, indicating Top-of-Form Adjustment mode. Press the **↑** button or the **↓** button. The paper will move forward or backward in 1/60-inch increments. Press the Set-Up/Quit button after adjusting the position. Note that this adjustment is temporarily saved. It will not be active at next power-up of the printer. For permanent adjustment, see the section “Feeding and Positioning Paper” later in this chapter.



Loading a sheet of paper

7. Place the printer in the Ready state. Print a sample page and check the page margins. Make the following adjustments, as necessary:
 - Horizontal alignment. Readjust the paper guides if required.
 - Top-of-form setting. Use the printer Set-Up mode (see Chapter 5, “Using Set-Up Mode”) or the TOF Adjustment mode (see the section “Feeding and Positioning Paper” later in this chapter).
 - Margin settings. Use your software or the printer Set-Up mode (see Chapter 5, “Using Set-Up Mode”).

Ejecting Single Sheets

If you print using software, each sheet is ejected automatically upon the completion of the page printing. To manually eject sheets of paper:

- Press the FF/Load button to execute a forward form feed.
- Turn the platen knob.

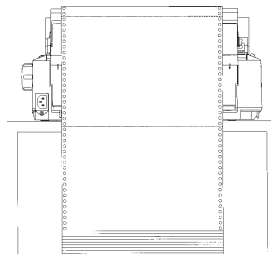
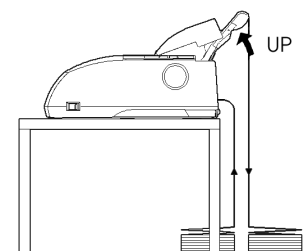
Using Continuous Forms

Continuous forms paper, fanfolded at the horizontal perforations, is ideal for printing rough drafts and long files. The paper is fed into the printer using the forms tractors. The forms tractors unit at the rear of the printer pushes paper from the rear to the platen. This is called push-tractor feeding.

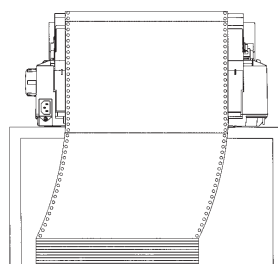
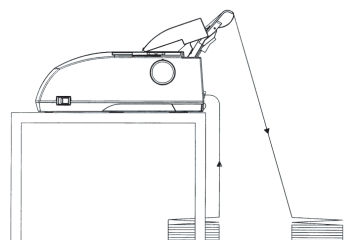
Positioning the Paper Stack

Place the stack of continuous forms paper directly below the rear of the printer. After the paper is installed in the printer, the paper path should look like this:

Good placement



Bad placement



Placement of continuous forms

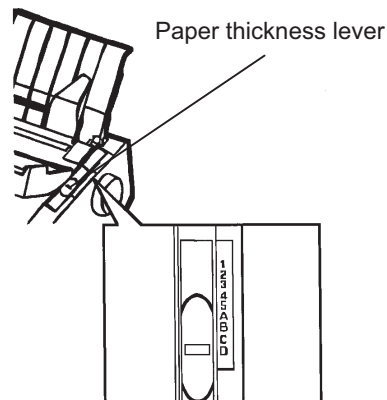
Loading Continuous Forms

This section explains how to use continuous forms. The tractor unit pushes continuous forms.

To load continuous forms paper:

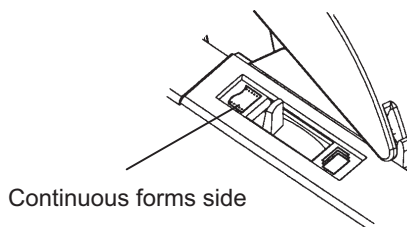
1. Make sure that the printer is turned on. Remove any single-sheet paper from the printer.
2. If necessary, readjust the paper thickness lever for continuous forms. (See the section “Adjusting for Paper Thickness” earlier in this chapter.)

| No. of Copies | Setting |
|---------------|---------|
| 1 | 1 to 2 |
| 2 to 3 | 2 to 3 |
| 4 | 3 to 4 |
| 5 | 4 to 5 |



Paper thickness lever setting

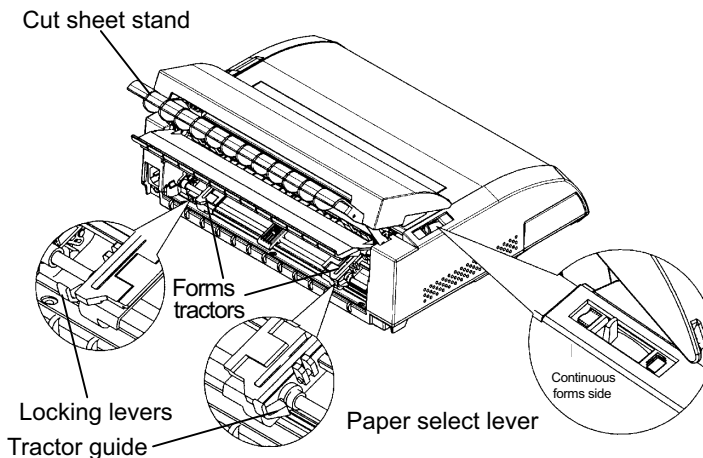
3. Move the paper select lever to the rear of the printer.



Preparing to load continuous forms paper

4. Release the tractor locking levers by pulling them up. Open the tractor paper holders. See the following figure.

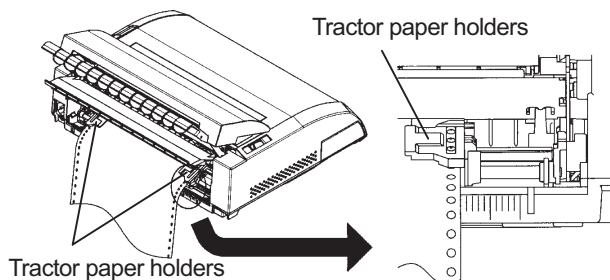
5. Position the right tractor (as seen from the rear of the printer). Push the right locking lever down to secure the tractor. Center the middle forms support.



Positioning the tractors

Adjusting the left margin

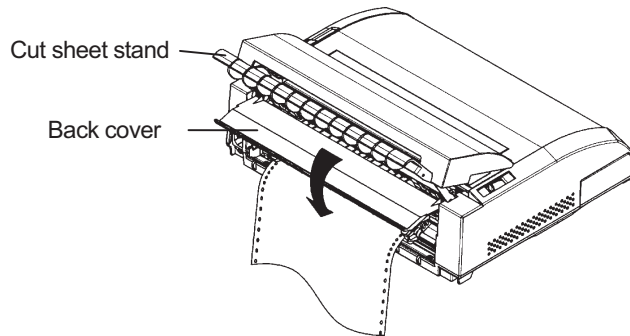
Below the right tractor, as seen from the back, there is a tractor guide, short inch-based ruler graduated in 10 columns per inch. Use the ruler to help position the tractor. When the paper edge is positioned to the left most line, the left margin is approximately 12 mm (0.5 inch) including perforation area.



Adjusting the left margin

6. Fit the paper feed holes onto the left and right tractor pins. Adjust the left tractor (as seen from the rear of the printer) to the width of the form. Close the paper holders.
7. Pull the left tractor (as seen from the rear) to stretch the paper taut. Push the left locking lever down to secure the tractor in place.

8. Strongly pull the back cover off of the cut sheet stand (in the direction indicated by the arrow) and set it down.

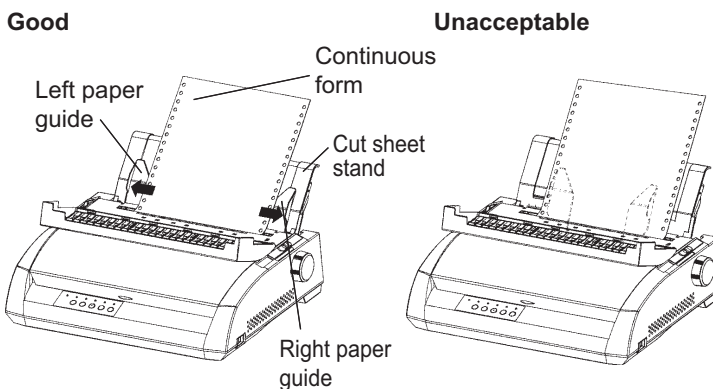


Setting the back cover

9. Install the cut sheet stand. For installation, see the section “Installing the Cut Sheet Stand” in Chapter 2.
10. Press the **FF/Load** button to advance the paper to the top-of-form position. Top-of-form is the first line on which printing can start.
11. Press the **ONLINE** button to place the printer online. Print a sample page and check the page margins. Make the following adjustments, as necessary:
 - Horizontal alignment. Move the forms tractors as required.
 - Top-of-form setting (see Chapter 5, “Adjusting Top-of-Form Origin”).
 - Margin settings. Use your software or the printer setup mode (see Chapter 5, “Using Set-Up Mode”).

If the paper cut position and the perforation position do not fit, adjust them by using the following procedure.

NOTE: When you use continuous forms, make sure that the edges of both left and right paper guides do not touch the paper. Slide both paper guides flush against the ends of both sides.



Adjustment of the paper guides

Adjusting the Tear-off position

When the **FF/Load** button is used to advance the paper to cut it, the paper cut position and the perforation position may not match. In such cases, adjust their positions by using the following procedure.

Adjustment procedure

1. Use the **FF/Load** button to advance the paper to its cut position.
2. Press **Park** and **FF/Load** buttons simultaneously to enter adjustment mode.
3. Adjust the Tear-off position by using the following buttons:
 - **↑** button: Pressing this button once extends the paper feed amount by 1/180 inches.
 - **↓** button: Pressing this button once reduces the paper feed amount by 1/180 inches.
 - **Exit/Save** button: Saves the adjusted value and exits the adjustment mode.
 - **Setup/Quit** button: Exits the adjustment mode without saving the adjusted value.

NOTE: The adjustment range is plus or minus 63/180 inches (approximately 9 mm). When it is exceeded, an alarm beeps.

Unloading Continuous Forms

To unload continuous forms:

1. Make sure that the paper select lever is set to the rear position.
2. Press the **Park** button. The continuous forms paper is retracted to the park position. If the paper cannot be retracted in one operation, continue to press the **Park** button until the paper is parked.

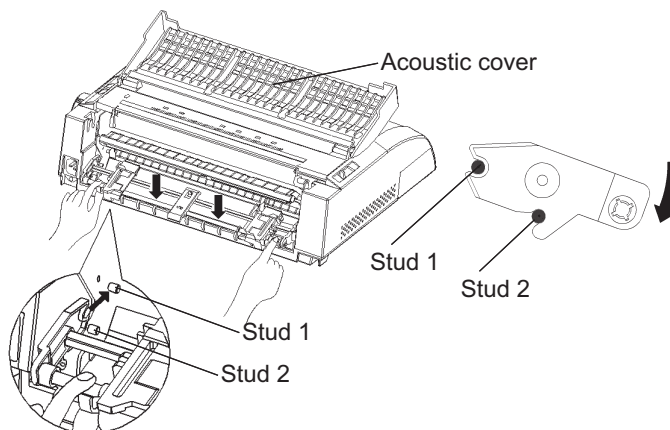
NOTE: *The printer can retract continuous forms paper a maximum of 55.8 cm (22 inches) per operation.*

3. To remove the paper, raise the tractor paper holders and lift out the paper.

Installing the Tractor Unit

Install the tractor unit by following the procedure below if it happens to be disengaged from the studs.

1. Turn off the printer.
2. Remove the cut sheet stand and open the acoustic cover.
3. Hook the notch of the tractor unit against stud 1, and then rotate the unit downward so as to set the other notch onto stud 2.



Tractor unit installation

Tearing Off Continuous Forms

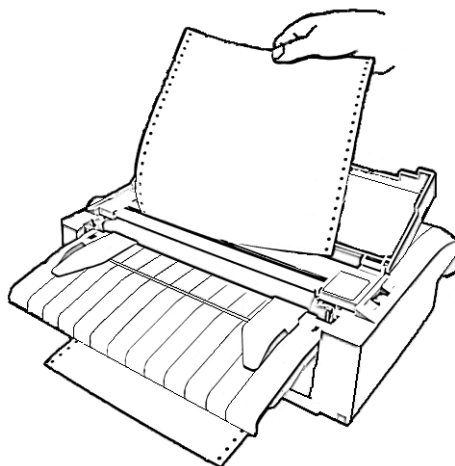
Your printer has a special “tear-off edge” that allows you to tear off printed pages without wasting paper. The tear-off edge is located on the ejection cover.

To tear off continuous forms using the tear-off edge:

1. Press the **FF/Load** button. The bottom perforation of the last page advances to the tear-off edge. If you specified TEAR: AUTO using the INSTALL function in setup mode, the paper automatically advances to the tear-off edge at the end of each job (or when the printer has printed all the data received).

NOTE: *If the bottom perforation of your paper is not positioned at the tear-off edge, the length of your paper may not be specified correctly in your software or the printer setup mode. Check that the paper length is specified correctly. For information on specifying page length using setup mode, see Chapter 5, “Using Set-Up Mode”.*

2. Tear the paper off at the perforation.



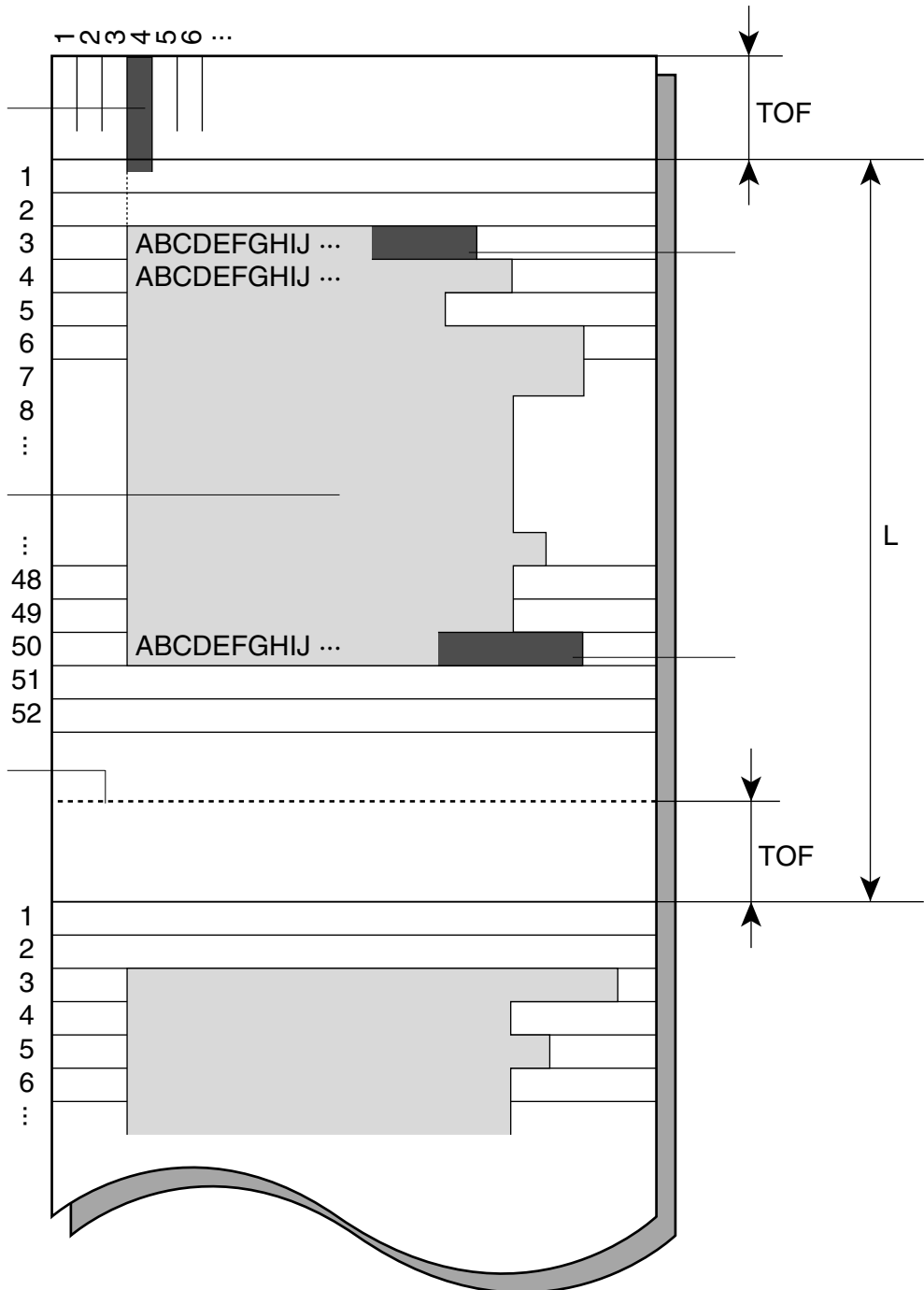
Tearing off continuous forms

3. Press any button to retract the forms back to the top-of-form position.

Feeding and Positioning Paper

Print Area Definition

- **TOF (Top-of-Form):** This value defines the distance between the edge of the paper and the place where you allow the printing to begin (position of line number 1). You can adjust this distance according to the condition of your paper (for example, pre-printed forms). When you load the paper, the printer feeds the paper to this position, waiting for printing commands.
- **L (Form Length):** Set the corresponding Set-Up option (FORM LENGH) according to the actual physical page length (distance between two perforations for continuous forms). This will allow the printer to know exactly where the print head is and to position it at the same position when a form feed occurs.
- **Top line 1:** This is the line where the printing actually starts. To define a top margin, select the number of this line within Set-Up mode (TOP MRGN option). Example: In the following picture, TOP MRGN option is set to 3.
- **Bottom line 2:** This is the line where the printing actually stops. To define a bottom margin, select the number of this line within Set-Up mode (BOTTOM MRG option). Example: In the following picture, BOTTOM MRG option is set to 50.
- **Left column 3:** This is the column where the printing actually starts. To define a left margin, select the number of this column within Set-Up mode (LEFT MARGN option). Example: In the following picture, LEFT MARGN option is set to 4.
- **Print area 4:** Print area defined by the corresponding Set-Up options: Form Length, Top-of-Form, Top Margin, and Bottom Margin.
- **Paper perforation 5:** The perforation defines the physical page length.



Print Area Definition

Line Feed/Form Feed

Use the line feed/form feed function to move paper forward. This function is valid whenever the printer is not receiving or printing data and has no fault. Pressing the **LF** button advances the paper one line. Pressing the **FF/Load** button feeds one sheet of paper.

Except using the **Park** button for unloading paper or using the Top-of-Form Adjustment mode for fine-adjusting the Top-of-Form position, you are not allowed to execute “reverse” feed from the control panel. To feed paper backward, manually rotate the platen knob. Remember that the Top-of-Form will slip from the original setting.

Top-of-Form Adjustment

NOTE: *For Top-of-Form definition, see the previous section “Print Area Definition”.*

The Top-of-Form adjustment is available for single sheets or continuous forms fed by the push-tractor. The adjustment is reflected to the Top-of-Form setting of Macro 1 or Macro 2 currently selected from the control panel.

NOTE: *This adjustment is not available for continuous forms fed by the pull-tractor.*

You can adjust the Top-of-Form value within the range from 0 to 99/60 inches.

NOTE: *The horizontal embossed rib under the red cursor on the print head carriage corresponds to the base line of the characters to be printed.*

1. Position the paper at the current Top-of-Form position:
 - For continuous forms, park the paper, then press the **FF/LOAD** button.
 - For a single sheet, simply insert the sheet in the cut sheet stand.
Paper is automatically fed to the Top-of-Form position, if the Set-Up option S-SHEET LD (Single Sheet Load) is set to AUTO. Otherwise, press the **FF/LOAD** button.
2. Make sure the is in the pause state (Offline). Press the **Pause** button if necessary. Enter the Top-of-Form mode by pressing the **LF** and **FF/LOAD** buttons at the same time. The printer beeps and the M1/M2 indicator flashes alternately with the DEC and PPX24 indicators, indicating the Top-of-Form mode.

3. Adjust the Top-of-Form value:

- To increase the Top-of-Form value of a 1/60 inch, press the **↑** button. The paper moves forward.
- To decrease the Top-of-Form value of a 1/60 inch, press the **↓** button. The paper moves backward.
- To reset the Top-of-Form value to 0, press the **Top** button. The paper moves to the edge of the page (position 0).

NOTE: *If you reach the limit of the permitted range, the printer beeps, and the paper stops moving.*

4. Save the Top-of-Form value:

- To permanently save the value, press the **Exit/Save** button. The printer returns to Normal mode.
- To temporarily save the value, press the **Set-Up/Quit** button. The printer returns to Normal mode. (The new value is lost at the next power-off.)

NOTE: *The use of the **↑** and **↓** buttons for micro-feeding is available for some cases of software errors (Fault indicator blinking).*

NOTE: *If you want to clear the adjusted TOF position and to return to the initial state, press the **Top** buttons at the same time.*

Switching Paper Types

If you have more than one type of job, it is often necessary to switch between continuous forms and single sheets. This section explains how to switch between paper types. It is not necessary to remove the continuous forms paper from the printer.

CAUTION: *This function is not available for continuous forms paper that is fed by the pull-tractor.*

Switching from Continuous Forms to Single Sheets (Push-Feed Mode)

To switch from continuous forms to single sheets:

1. Tear off your printed pages.
2. Retract the forms paper to the park position by pressing the **Park** button. The Fault indicator turns on.

CAUTION: *Retracting many pages by using the **Park** button without tearing off will cause paper jams. To avoid damage to your printed pages, be sure to tear off the printed pages before retracting the continuous forms paper.*

3. Move the paper select lever forward to the single sheet position.
4. Raise the cut sheet stand to the up position. (For details see the section “Using Single Sheets” earlier in this chapter.) Put a sheet of paper on the cut sheet stand with its bottom edge aligned with the platen. The paper automatically advance to the top-of-form position if the option S-SHEET LD (Single Sheet Load) is set to AUTO. Otherwise, press the **FF/LOAD** button to advance the single sheet paper to the top-of-form position.

You are now ready to print using single sheets.

Switching from Single Sheets to Continuous Forms (Push-Feed Mode)

To switch from single sheets to continuous forms:

1. If a sheet of paper is loaded, remove the paper by turning the platen knob or pressing the **FF/LOAD** button.
2. Move the paper select lever to the rear to the continuous forms position.
3. Press the **FF/LOAD** button. The continuous forms paper advances from the park position to the top-of-form position.

You are now ready to print using continuous forms paper.

Tips on Paper Handling

General Tips

- Use high-quality paper. Do not use paper that is wrinkled or curled at the edges.
- Do not use paper with staples or metal parts.
- Do not use paper with unpredictable variations in thickness, such as paper with partial multilayers, paper with embossed printing, or labels with the backing sheet exposed.
- Store paper in a clean, dry environment.

Multipart Forms

- Avoid using carbon-interleaved single sheets if possible. Printing tends to become misaligned on the bottom sheet.
- Set the paper thickness lever to best accommodate the multipart form thickness.
- To ensure smoother feeding of paper-stapled, multipart forms, raise the cut sheet stand to support the forms.

Envelopes

When printing envelopes, use the cut sheet stand. Note the following:

- Set the paper thickness lever to best accommodate the envelope thickness.
- When loading envelopes, make sure that the envelope flaps face forward. Otherwise, the envelopes may jam in the printer.

Labels

- Be careful to check operating conditions when using labels. Labels are sensitive to temperature and humidity.
- Only use labels mounted on continuous forms backing sheets. Do not print labels mounted on single sheet backing. Labels mounted on single sheet backing tend to slip and printing becomes crooked.
- Do not leave labels loaded in the printer. If labels curl around the platen, jamming may occur when printing is resumed.
- Set the paper thickness lever to best accommodate the label thickness.



- Test-print labels before running a job. If jams occur, set the paper thickness lever to a wider position. If jamming problems continue, try a different type of label.

Printing

This chapter describes the following typical printing operations:

- Selecting print features
- Starting, stopping, or resuming printing and viewing last printed lines
- Removing printed pages

Selecting Print Features

The print features you select determine how your printer interprets commands from the computer and how your printed pages will look. For example, print features include the following:

- Protocol (M1/M2)
- Font
- Pitch (characters per horizontal inch)
- Line spacing (lines per vertical inch)
- Page length and margins

To select print features, you can use either commercial software or the printer control panel. The method you use depends on the capabilities of your software. If your software has most of the features you require, you may rarely – if ever – have to use the control panel. *In fact, your software mostly overrides the printer settings.*

If your software has limited options, you can use the printer control panel to select print features. Sometimes, the control panel enables you to select features not available through your software. For example, you can select downloaded fonts not supported by your software.

Using Commercial Software

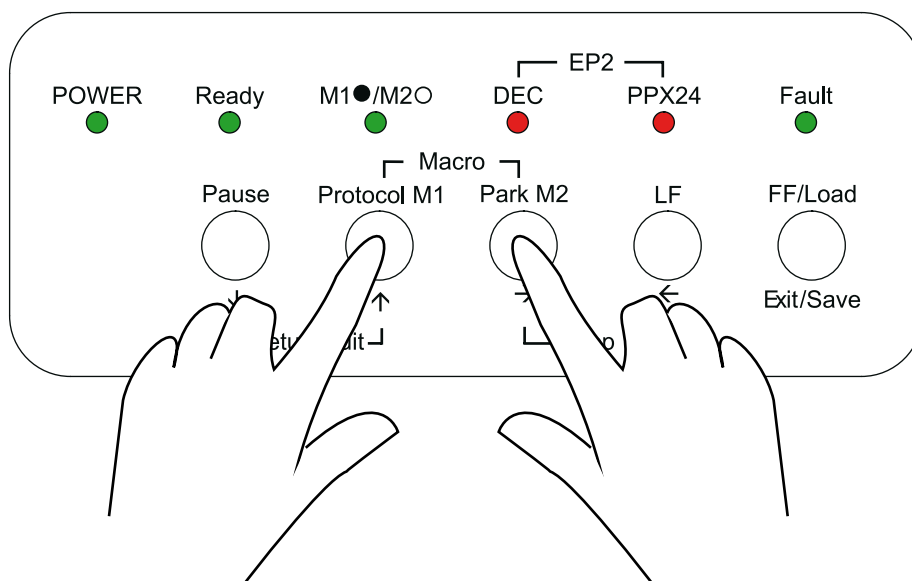
Many commercial software packages offer a wide variety of print features, including some features that are not supported by this printer. For example, software often provides a wider range of font sizes than the printer can accommodate. Software also allows you to specify multiple fonts on a page. To determine which features your software supports and how to select them, refer to your software documentation.

Using the Control Panel

This printer can directly select some print features from the control panel. These features, listed on the control panel, are two predetermined sets (macros) of print features and three protocols. Use the following procedures to select Macros and Protocols:

Macro selection

1. Press the **Protocol M1** and the **Park M2** buttons simultaneously to enter Macro selection mode. The **M1/M2** indicator starts blinking.
2. Then press within 3 seconds **Protocol M1** button to select macro 1 or **Park M2** button to select macro 2. If macro 1 is selected, the **M1/M2** indicator lights, if macro 2 is selected the **M1/M2** indicator is off.



Macro select mode

3. Press the Pause button to return the printer to the Ready state. You are ready to print using the selected macro.

NOTE: *The active Macro at power-off remains active at next power-up.*

Macro 1 and Macro 2 Settings

When you switch from one macro to another, each modification you made using the control panel for the Top-of-Form option or the Protocol option is lost, and the values of these options stored in the new macro become active.

The following tables list default values of options for print features. The former is for options in Macro 1 and Macro 2 and the latter is for options independent of Macro selection.

| Print Feature | Factory Settings | |
|---|--|--|
| | Macro 1 | Macro 2 |
| Protocol Protocol serial Protocol parallel Protocol USB | Port dependent DEC PPL2 EPSON-ESC EPSON-ESC | Port dependent DEC PPL2 IBM PPX24 IBM PPX24 |
| Font Horizontal pitch Vertical pitch | Draft 10 cpi 6 lpi | Draft 10 cpi 6 lpi |
| Form length Left margin Top of Form ¹ Top margin Bottom margin | 11 inches 1 column 0/60 inch 1 line 66 lines | 11 inches 1 column 0/60 inch 1 line 66 lines |
| Line mode Paper source ² Print direction | LF = LF, CR = CR Tractor Soft control | LF = LF, CR = CR Tractor Soft control |
| DEC defaults DEC printer ID Auto wrap EOT disconnect Initial report Auto answerback Answerback on ENQ DEC G0 character set DEC user preference character set | PPL2 Wrap No disconnect on EOT No No No US ASCII DEC Supplemental | PPL2 Wrap No disconnect on EOT No No No US ASCII DEC Supplemental |
| IBM&Epson Default Character set | CP 437 | CP 437 |
| IBM defaults IBM set 1 or 2 IBM double height IBM AGM | IBM set 1 No No | IBM set 1 No No |



| Print Feature | Factory Settings | |
|--|------------------|---------|
| | Macro 1 | Macro 2 |
| Epson defaults Epson national character set | USA | USA |
| <p>1 When you change the Macro selection and the new Top-of-Form value is different from the former, paper is automatically fed to the next page, using the new Top-of-Form value.</p> <p>2 When you change the Macro selection and the paper source selection is different, the printer automatically parks the continuous forms (in Push-Feed mode only) or ejects the cut sheet. The Fault indicator blinks, indicating you should change the position of the paper select lever.</p> | | |

NOTE: *You cannot attempt to change the Macro selection when the printer is printing, even if you switch to the Pause state.*



Installation Settings

| Print Feature | Factory Settings |
|---|---|
| Language Tear Single sheet loading Error beep | English Auto, 1 second Auto, 2 second One |
| Buffer | 64 Kbytes |
| Interface type Auto interface switch time Baud rate Bits and parity Buffer control Disconnected on fault Area control Gather control Tear off control Skip control | Automatic sense 2 seconds 9600 bps 8 bits and none XON/XOFF No No No Speed Yes |

Adjustments Settings

| Print Feature | Factory Settings |
|---|--|
| Fanfold adjust (continuous forms) Manual adjust (single sheets) Reserved 1 Reserved 2 Manual adjust 2 Fanfold adjust 2 Fanfold adjust 3 Reserved 3 | 0/60 inch 0/60 inch 0/60 inch 0/60 inch 0/30 inch 0/30 inch 0/30 inch 0/30 inch |

Menu Access Settings

| Print Feature | Factory Settings |
|---------------|-----------------------|
| Menu access | All functions allowed |

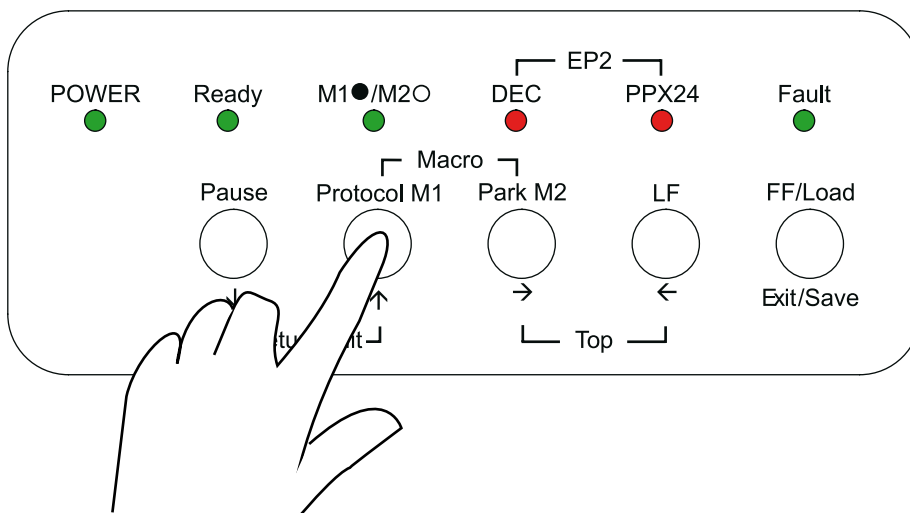
Changing the Protocol

When you first turn the printer on, the active protocol depends on what port will be used for printing.

- For Macro 1: If you use the serial port, the active protocol will be the DEC protocol.
If you use the parallel port, the active protocol will be the Epson protocol.
If you use the USB port, the active protocol will be the Epson protocol.
- For Macro 2: If you use the serial port, the active protocol will be the DEC protocol.
If you use the parallel port, the active protocol will be the IBM protocol.
If you use the USB port, the active protocol will be the IBM protocol.

This printer has three protocols and allows you to set the protocol mode in one of the following three ways: the printer engages one of the three protocols, automatically determines the active protocol, or assigns different protocols for parallel, serial or USB interfaces.

To change the protocol: Repeatedly press the **Protocol** button. The DEC and PPX24 indicators turn on and off. The combination of lighted indicators shows the protocol mode selected, according to the next table.



Changing the protocol

| Indicator Status | Active Protocol |
|----------------------|--|
| DEC lit | DEC ANSI protocol is active |
| PPX24 lit | IBM Proprinter X24E/XL24E protocol is active |
| Both indicators lit | Epson ESC/P2 protocol is active |
| Flashing alternately | According to Set-Up settings, the printer waits for data to switch to a proper protocol. |

Starting or Stopping Printing

Starting Printing

Before you start to print, make sure that paper is loaded. Also, verify that the paper thickness lever is set to the appropriate position (**1 to D**).

To start printing, make sure that the Ready indicator is lit (the printer is ready). If not so, press the **Pause** button to place the printer in the Ready state. Then start your software.

Stopping and Viewing Printing

To stop printing, press the Pause button to place the printer in the Pause state. The printer stops after printing the current and next lines. You can also use your software to stop printing, but there will be a slight delay before printing stops. After the printer enters the Pause state, it still receives data until the print buffer becomes full of new data. The data in the print buffer will be lost if you turn the printer off.

When the printer stops printing, the paper is advanced to the viewing position so that you can view the last printed lines. This function is valid for single sheets and continuous forms in push-tractor feed mode but not valid for continuous forms in pull-tractor feed mode.

Resuming Printing

To resume printing, press the Pause button again. If the paper is advanced for viewing, it is backed to the previous position before printing. To cancel printing, use the cancel commands provided by your software or computer. To clear the print buffer, turn the printer off. Any data sent to the print buffer before you canceled printing will be lost.

Resuming from a Paper-Out

The printer can “sense” when paper runs out. The printer stops printing and lights the Fault indicator. To resume printing when paper runs out, follow the procedures described below:

1. Install paper on the forms tractor unit or on the cut sheet stand as described in Chapter 2, “Setting up the printer”.
2. To load the first sheet of paper, press the **FF/LOAD** button for continuous forms. Single sheets are automatically loaded unless you change the factory setting. The Fault indicator will turn off and the printer resumes printing.

CAUTION: *For continuous forms paper, the page where printing stopped and the page where printing resumes may be incorrectly printed. In this case, wait for the entire job to finish printing. Then reprint the incorrect pages.*

Removing Printed Pages

This section describes the best methods for removing single sheets or continuous forms paper after printing.

Removing Single Sheets

When you print using software, the printer automatically ejects each sheet of paper when the end of the printed page is reached. To eject sheets manually:

- Press the FF/Load button to execute a form feed.

Removing Continuous Forms

To avoid wasting paper when removing printed continuous forms paper, use the printer's tear-off function.

Depending on the TEAR option value of the Set-Up, the printer automatically feeds the paper so that the perforation faces the tear bar. Tear the paper off. The paper will automatically return to the Top-of-Form position when the printer receives data to print.

If you have set the TEAR option to MANUAL, you have to press the Pause button to move the paper to the tear bar, and then to return the paper to the Top-of-Form position.

NOTE: See the section “Tearing Off Continuous Forms” in Chapter 3, “PaperHandling”.

Using Set-Up Mode

Your Printer has two operation modes:

- The Normal mode is used for daily operations like paper handling and printing as explained in Chapter 3, “Paper Handling” and Chapter 4 “Printing”.
- The Set-Up mode is used to change the printer settings that affect the daily operations.

What is Set-Up Mode for?

The Set-Up mode allows you:

- To define the two user environments, Macro 1 and Macro 2, which prepare two sets of printer operating environments for your application software. Printer operating environments include the protocol, font, horizontal and vertical pitches, page length and margins, line mode, and printing direction. They also include protocol dependent options like the character set.
- To check your settings by printing a list of all the printer’s currently selected values.
- To define general installation parameters related to the integration in your environment (e.g., menu language, tear-off control, auto-load control, and interface).
- To fit Top-of-Form adjustments for paper feed control.
- To help diagnose your printer for trouble-shooting by printing test and hexadecimal dumps.
- To recall all the factory settings (including both user environments, installation parameters, and adjustment parameters).
- To define what kind of settings modifications are allowed to avoid accidentally changing of Set-Up values.

How Set-Up Works

The Set-Up mode consists of Set-Up functions which correspond to the printer settings described in the previous page. Each function generally has many options which correspond to the print features to be changed. Each option includes many parameters values to be selected. All the Set-Up functions, options, and values are printed in a logical sequence on the paper when you enter the Set-Up mode, including the usage of buttons. You can perform all the Set-Up operations by using buttons on the control panel in the following order:

- Navigating through the option menu structure.
- Selecting a new value for an option.
- Saving your new printer configuration (permanently or temporarily).

For information on using the printing test and hex dump functions, see the section “Using the Diagnostic Functions” later in this chapter.

Entering the Set-Up Mode

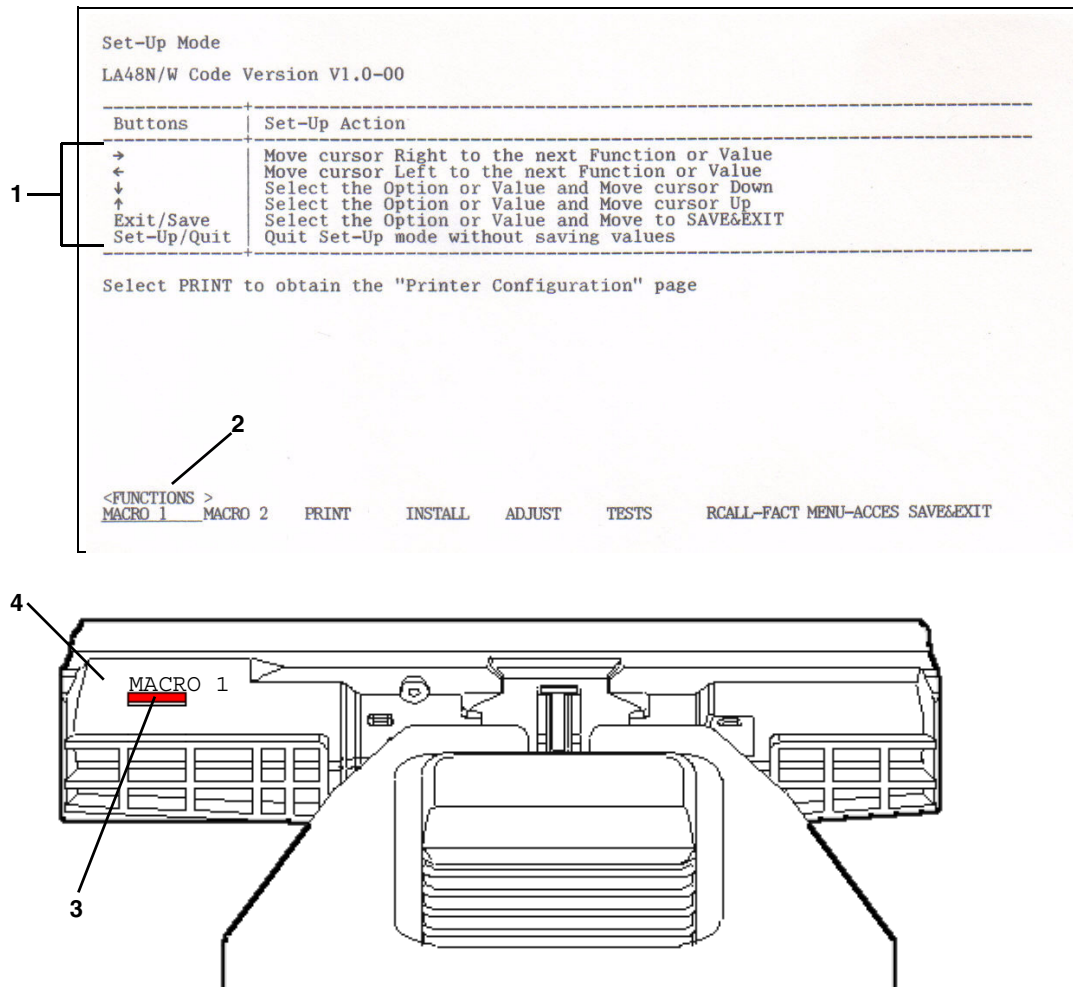
Before entering the Set-Up mode, load continuous feed paper on the tractors as described in the section, “Using Continuous Forms,” in Chapter 2. Several sheets of paper may be required to make all of your Set-Up mode selections. Of course, you can use single sheets.

NOTE: *We recommend the use of the push-tractor mode in order to avoid paper jams.*

To enter the Set-Up mode:

1. Make sure that the tractors are loaded with continuous feedpaper and that the paper select lever is set backward.
2. Turn the printer off.
3. Turn the printer back on while pressing the two Set-Up/Quit buttons until the printer beeps.
4. Open the front cover in order to see the printed text.

5. When the printer enters the Set-Up mode, it prints the following information.
During the Set-Up mode, the M1/M2 indicator flashes.



Initial printout in setup mode

The initial printout contains a header, help menu **1**, and <FUNCTIONS> menu **2**. The header tells you that the printer is in the Set-Up mode. The help menu provides a quick summary of how to use buttons in the Set-Up mode.

The <FUNCTIONS> menu **2** lists all of the functions available in the Set-Up mode.

Generally speaking, the red cursor **3** on the plastic print guide **4** indicates the function or value to be selected. When entering the Set-Up mode, the red cursor is initially positioned under MACRO 1.

Overview of the Set-Up Mode

When you enter the Set-Up mode, the following <FUNCTIONS> menu is printed:

```
<FUNCTIONS>
MACRO 1  MACRO 2  PRINT  INSTALL  ADJUST  TESTS  RCALL-FACT  MENU-ACCESS  SAVE&EXIT
```

The following table summarizes the purpose of each function.

Set-Up Mode Functions

| Function | Purpose |
|---------------------|--|
| MACRO 1 and MACRO 2 | Assigns print features to MACRO 1 and MACRO 2 |
| PRINT | Prints the Printer Configuration |
| INSTALL | Changes the Set-Up menu language, computer interface, and paper feed control options |
| ADJUST | Changes the top-of-form fine adjustment options |
| TESTS | Runs the printing test and hex dumps |
| RCALL-FACT | Resets factory settings in MACRO 1, MACRO 2, INSTALL and ADJUST |
| MENU-ACCESS | Restricts access to Set-Up functions from the control panel |
| SAVE&EXIT | Exits the Set-Up mode and saves any changes made in the Set-Up mode |

To select a function from the <FUNCTIONS> menu:

1. Repeatedly press the → button or the ← button to position the red cursor on the plastic print guide under the function you require.
2. Press the ↓ button or the ↑ button to select the function. If the function has options and values, the printer prints the first option and its values. The MACRO 1, MACRO 2, INSTALL, ADJUST, TESTS, and MENU-ACCESS functions contain options that have selectable values. The other functions have neither options nor values.

3. After selecting the desired values, press the Exit/Save button to reprint the <FUNCTIONS> menu where the red cursor is positioned beneath SAVE&EXIT.

For each option, the bolded value is the current default value (the value currently saved in the printer's permanent memory). In the previous example, the default values are PORT DEPND (Port Dependent) for protocol selection and DRAFT (Draft) for font selection.

Example: Changing the Vertical Pitch

To become familiar with the Set-Up mode, try the following example. This example shows how to change the vertical pitch in Macro 2 from 6 lines per inch to 8 lines per inch.

1. **Enter the Set-Up mode.**

Turn the printer off and back on while pressing the Set-Up/Quit button until the printer beeps.

2. **Select the Macro 2 function.**

Wait for the printer to stop printing and press the → button once to position the red cursor on the plastic guide of the print head under MACRO 2. Press the ↑ button or the ↓ button to select the Macro 2 function and print the <PROTOCOL> option and its values.

3. **Print the menu of the vertical pitch option.**

Since you only want to change the vertical pitch, press the ↓ button to select the current protocol. Bolded PORT DEPND is underlined, and the next option <PRTCL SERL> is printed. (The bolded value indicates the current setting, and the underlined value is the new setting.) Repeatedly press the ↓ button in the same way until the <VERT PITCH> option and its values are printed.

4. **Change the vertical pitch from 6 to 8 lines per inch.**

Press the → button once to position the red cursor beneath 8 LPI. Press the ↓ button to select 8 LPI. 8 LPI is underlined, and the next option, <HORZ PITCH>, and its values are printed.

5. **Exit the Macro 2 function.**

Since you do not want to make any other changes in MACRO 2, press the **Exit/Save** button. The <FUNCTIONS> menu is then reprinted, and the red cursor is positioned beneath SAVE&EXIT.



6. Exit the Set-Up mode, saving or not saving the new vertical pitch.

Press the ↓ button or the ↑ button to save 8 lines per inch as the new power-on default in Macro 2, and then exit Macro 2. The printer exits the Set-Up mode and returns to the Ready state. These settings remain in effect until the next time they are changed.

Press the **Set-Up/Quit** button if you do not intend to save these settings in Macro 2.

Options with Undetermined Values

For some options, you can choose among a continuous range of many values. These options are identified as follows:

- <XXX-No of INCH>, which means the unit of the range is the Inch.
- <XXX-No of COLM>, which means the unit of the range is the Column.
- <XXX-No of LINE>, which means the unit of the range is the Line.

When you select such an option, only the current value is printed. The numeric range of these respective options are from 1 to 256, from 0 to 255, or from 0 to 99.

To select such a value:

1. Press the → button or the ← button (the printer beeps) as many times as you decrease from or increase to the current value. If you change the value by a wide margin, you can keep the button pressed continuously; the printer beeps at intervals of 0.2 seconds. The number of beeps corresponds to the number of times you press the button.
2. When you stop pressing the button, the new value is printed to the right of the current value.
3. If this new value is not satisfactory, repeat step 1 until the next new value is satisfactory.

Range Management for a Wide Range of Values

The permitted range of these values may be limited as to physical range.

If you intend to change to a value which is outside of the permitted physical range, the actual current value will be the highest possible value considering other Set-Up dependent values and may not match the value displayed.

See the Options tables to ascertain the permitted range.

Example: Changing the Left Margin

This example shows how to change the left margin in Macro 2 from column 1 to column 20.

1. Enter the Set-Up mode.

Turn the printer off and back on while pressing the Set-Up/Quit button until the printer beeps.



2. Select the Macro 2 function.

Wait for the printer to stop printing. Then press the → button once to position the red cursor on the plastic guide of the print head under MACRO 2. Press the ↓ button or the ↑ button to select the Macro 2 function and print the <PROTO-COL> option and its values.

3. Print the menu of the left margin option.

Since you only want to change the left margin, press the ↓ button to select the current protocol. The bolded PORT DEPND is underlined, and the next option <PRTCL SERL> is printed. (The bolded value indicates the current setting, and the underlined value is the new setting.) Repeatedly press the ↓ button until the <LEFT MARGN> option and its value are printed.

4. Change the left margin from column 1 to column 20.

Press and hold the → button until the printer beeps nineteen times. When the button is released, the new value is printed next to the current value. If the new value is not 20 COL, repeat this operation. If it is 20 COL, press the button to select 20 COL. 20 COL is underlined, and the next option, <TOP OF FRM>, and its value are printed.

5. Exit the Macro 2 function.

Since you do not want to make any other changes in MACRO 2, press the **Exit/Save** button. The <FUNCTIONS> menu is then reprinted, and the red cursor is positioned beneath SAVE&EXIT.

6. Exit the Set-Up mode, saving or not saving the new left margin.

Press the ↓ button or the ↑ button to save 20 columns as the new power-on default in Macro 2 and exit Macro 2. The printer then exits the Set-Up mode and returns to the Ready state. These settings remain in effect until the next time they are changed.

Press the **Set-Up/Quit** button if you do not intend saving these settings in Macro 2.

Options with Both Pre-determined and Undetermined Values

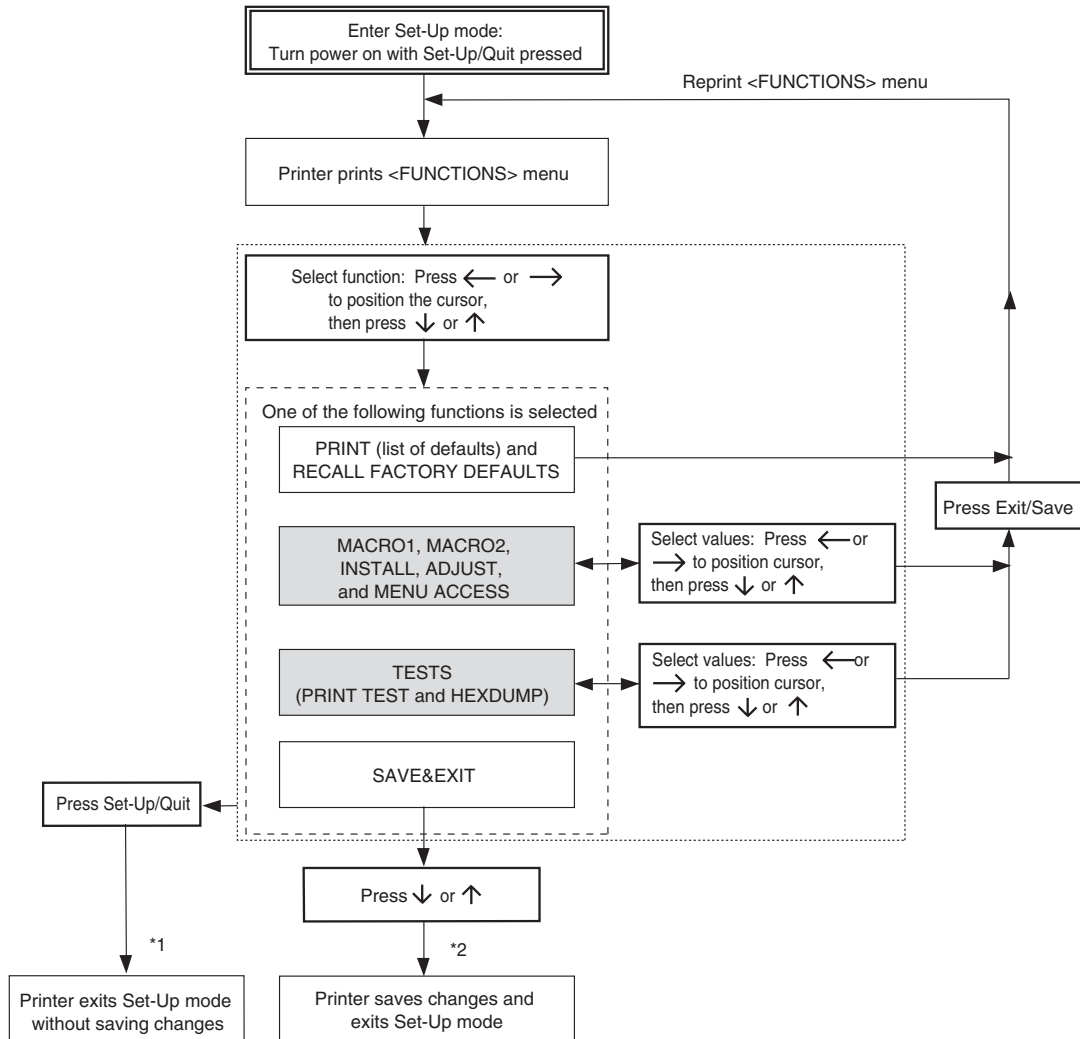
Some options include both types of values. Undetermined values appear at the end of the list of pre-determined values, identified by the unit of the corresponding range.


For example, when you select the <FORM LENGH> option (Form Length), the following menu is printed:

```
<FORM LENGH>
3    INCHES 3.5 INCHES 4    INCHES 5.5 INCHES 6    INCHES 7    INCHES 8    INCHES
8.5 INCHES 11    INCHES
11 2/3INCH 12    INCHES 14    INCHES 15    INCHES No of LINE
```

1. Select the No of LINE value.
A new option menu with undetermined values is printed.
2. Change the value according to the previous procedure.

The chart on the next page summarizes how to select options such as protocol and font and how to use the functions that do not have options.



 : Functions having options and/or values

*1 Changes are valid, but will be lost at next power-off.

*2 Changes will remain valid at next power-on.

Points to Remember

- We recommend that you use continuous forms paper for printing in the Set-Up mode because the output will exceed a single page. To load paper, use the **FF/Load** button. To adjust the line position of the paper in the Set-Up mode, use the platen knob.
- Whenever you enter the Set-Up mode, short help menus are printed at the top of the page. Help menus are also printed when you select the TESTS function. Use the help menus for quick reference while in the Set-Up mode.
- When printing the options and values for each function, you can move either forward or backward in the option list. To move forward (print the next option), press the **↓** button. To move backward (print the previous option), press the **↑** button. You can skip printing the value list for the undesired options by pressing and holding down these buttons.
- While in the <FUNCTIONS> menu or when selecting a function that contains options and selectable values, press the **Exit/Save** button to reprint the <FUNCTIONS> menu. In this case, the red cursor is positioned beneath SAVE&EXIT.
- A bolded (overprinted) value indicates that it is the current setting. An underlined value indicates a selected setting.
- While in the Set-Up mode, you can use the PRINT function to print out a list of the currently selected values. (See the next section for details.)
- To exit the Set-Up mode and permanently save your changes, select the SAVE&EXIT function. For details, see the section “Save Settings and Exit Set-up mode” later in this chapter.
- To exit the Set-Up mode and temporarily use your changes, press the **Set-Up/Quit** button. Your previous power-on settings will be active when you turn the printer on again.

Printing the Printer Configuration

The PRINT function prints a list of all the printer's currently selected values. This function is useful for checking the printer settings when you first enter the Set-Up mode or just before you exit. To print a list of values, first load continuous forms paper, and then enter the Set-Up mode to select the PRINT function. The printer starts to print a list of the currently selected values. The pre-selected factory settings are shown on the next page.

When the printer finishes printing the list of values, it reprints the <FUNCTIONS> menu.

CAUTION: *To remove the printout, turn the platen knob until the paper can be torn off at the perforation. In the Set-Up mode, you cannot use the printer tear-off feature (**Pause** button).*

Select another function or exit the Set-Up mode, saving any changes you made. For details about other functions, see the other sections in this chapter. To exit the Set-Up mode and save your changes, make sure that the red cursor is positioned beneath SAVE&EXIT, then press the ↓ button or the ↑ button.

Printer Configuration

LA48N/W Code Version V1.3-00

MACRO 1

| Options | Value |
|------------|-------------|
| PROTOCOL | PORT DEPND |
| PRTCL SERL | DEC PPL2 |
| PRTCL PARL | EPSON-ESCP |
| PRTCL USB | EPSON-ESCP |
| FONT | DRAFT |
| HORZ PITCH | 10 CPI |
| VERT PITCH | 6 LPI |
| FORM LENGH | 11 INCHES |
| LEFT MARGN | 1 COL |
| FORM WIDTH | 8 IN |
| TOP OF FRM | 0 /60 IN |
| TOP MRGN | 1 LINES |
| BOTTOM MRG | 66 LINES |
| LINE MODE | LF=LFPCR=CR |
| PAPER SRC | TRACTOR |
| PRINT DIR | SOFT CNTRL |

<DEC DEFLT>

| | |
|------------|-----------|
| DEC PRT ID | PPL2 |
| AUTO WRAP | WRAP |
| EOT DISCON | NO DISCON |
| INIT REPRT | NO |
| AUTO ANSBK | NO |
| ANSWER ENQ | NO |
| DEC G0 CST | US ASCII |
| USER PREF | D-SUPPL |

<IBM&EPSON>

| | |
|-----------|--------|
| DEFLT SET | CP 437 |
|-----------|--------|

<IBM DEFLT>

| | |
|------------|-----------|
| I-SET 1/2 | IBM SET 1 |
| I-DBL HIGT | NO |
| IBM AGM | NO |

<EPSON DFLT>

| | |
|-----------|-----|
| E-CHR SET | USA |
|-----------|-----|

INSTALL

| Options | Value |
|------------|------------|
| LANGUAGE | ENGLISH |
| TEAR | AUTO 1 SEC |
| S-SHEET LD | AUTO 2 SEC |
| ERROR BEEP | ONE |
| BUFFER | 64 KBYTE |
| I/F TYPE | AUTO |
| AUTO SW | 2 SEC |
| BAUD RATE | 9600 BPS |
| BIT&PARITY | 8 NONE |
| BUFFER CTL | XON/XOFF |
| DISC FAULT | NO |
| AREA CTL | NO |
| GATHER CTL | NO |
| TEROFF CTL | SPEED |
| SKIP CTL | YES |

MACRO 2

| Options | Value |
|------------|-------------|
| PROTOCOL | PORT DEPND |
| PRTCL SERL | DEC PPL2 |
| PRTCL PARL | IBM PPX24 |
| PRTCL USB | IBM PPX24 |
| FONT | DRAFT |
| HORZ PITCH | 10 CPI |
| VERT PITCH | 6 LPI |
| FORM LENGH | 11 INCHES |
| LEFT MARGN | 1 COL |
| FORM WIDTH | 8 IN |
| TOP OF FRM | 0 /60 IN |
| TOP MRGN | 1 LINES |
| BOTTOM MRG | 66 LINES |
| LINE MODE | LF=LFPCR=CR |
| PAPER SRC | TRACTOR |
| PRINT DIR | SOFT CNTRL |

<DEC DEFLT>

| | |
|------------|-----------|
| DEC PRT ID | PPL2 |
| AUTO WRAP | WRAP |
| EOT DISCON | NO DISCON |
| INIT REPRT | NO |
| AUTO ANSBK | NO |
| ANSWER ENQ | NO |
| DEC G0 CST | US ASCII |
| USER PREF | D-SUPPL |

<IBM&EPSON>

| | |
|-----------|--------|
| DEFLT SET | CP 437 |
|-----------|--------|

<IBM DEFLT>

| | |
|------------|-----------|
| I-SET 1/2 | IBM SET 1 |
| I-DBL HIGT | NO |
| IBM AGM | NO |

<EPSON DFLT>

| | |
|-----------|-----|
| E-CHR SET | USA |
|-----------|-----|

ADJUST

| Options | Value |
|------------|----------|
| FNFOLD ADJ | 0 /60 IN |
| MNUAL ADJ | 0 /60 IN |
| RESVD 1 | 0 /60 IN |
| RESVD 2 | 0 /60 IN |
| MNUAL ADJ2 | 0/360 |
| FNFLD ADJ2 | 0/360 |
| FNFLD ADJ3 | 0/360 |
| RESVD 3 | 0/360 |

MENU-ACCES

| Options | Value |
|------------|----------|
| MENU-ACCES | ALL FUNC |



Deciding Which Options to Change

The previous page shows a printout of the printer’s factory settings. In this printout, options are listed by functional group:

- MACRO 1 and MACRO 2 functions
- INSTALL function
- ADJUST function
- MENU-ACCES function

Most selectable values only alter print features such as the type style and page format. Some values must be selected correctly for the printer to work properly with your hardware and software, however. For each function, the following table lists options whose values must be selected correctly for your system and printer.

Required Options

| Function | Option | Value |
|--------------------|----------|--|
| MACRO 1 MACRO 2 | PROTOCOL | <p>The protocol selected on the printer must be the same as the protocol selected in your software. If you selected a protocol when you set up the printer, you do not need to change the PROTOCOL option unless you want to change to a different protocol.</p> <p>For MACRO 1, the factory setting is PORT DEPND (Port Dependent). This means that the active protocol depends on which port is actually used by the printer. The protocol for the serial port (PRTCL SERL) is factory set to DEC PPL2, and the protocol for the parallel port (PRTCL PARL) is factory set to EPSON-ESCP.</p> <p>For MACRO 2, the factory setting is also PORT DEPND. The protocol for the serial port (PRTCL SERL) is also set to DEC PPL2, but the protocol for the parallel port (PRTCL PARL) is factory set to IBM PPX24.</p> <p>See the section “Changing Macro 1 and Macro 2 Options” later in this chapter.</p> |

| Function | Option | Value |
|------------|---|--|
| ADJUST | FNFOLD ADJ MANUAL ADJ | You can separately adjust the origin of the Top-of-Form for both continuous forms and single sheets. See the section “Adjusting Top-of-Form Origin” later in this chapter. |
| INSTALL | BAUD RATE BIT&PARITY BUFFER CTL DISC FAULT | If you have a serial interface, the serial interface options selected on the printer must be the same as the settings you selected using your software or your computer operating system. If the settings are not the same, the printer will not print or will print garbage. See the section “Changing Install Options” later in this chapter. |
| TESTS | None | See the section “Using the Diagnostic Functions” later in this chapter. |
| MENU-ACCES | None | You can inhibit the Set-Up functions from being accessed from the control panel. |

Changing Macro 1 and Macro 2 Options

The MACRO 1 and MACRO 2 functions allow you to use two sets of different print options according to your application software. You can easily switch between MACRO 1 and MACRO 2 in Normal mode as described in Chapter 4, “Printing”.

With the factory setting, MACRO 1 is invoked when you first turn on the printer. The Macro selection change is permanently retained in the printer.

Select the same protocol on the printer as is selected in your software. If the protocols are not the same, the printer will not work correctly with your software. If you plan to use two different protocols on a regular basis, assign the most frequently used protocol to MACRO 1. Assign the second protocol to MACRO 2. All of the other settings available for MACRO 1 and MACRO 2 are optional. Some of the options and values will vary with the protocol.

To determine which features your software supports, refer to your software documentation.

The following table describes the MACRO 1 and MACRO 2 options and values. Both functions offer the same options and values. The options in the table are listed in the order in which they are printed. Not all options are defined for all protocols, and some values vary with the protocol.

The procedure for changing the MACRO 1 and MACRO 2 options are presented in the previous sections of this chapter.

Macro 1 and Macro 2 Options and Values

- Overprinted values are the factory settings.
- Some settings are overridden by commands from the computer.
- Options that differ by protocol are described at the end of the table.

| Macro1/Macro 2 | Values | Description |
|---------------------------------------|--|---|
| <PROTOCOL> | DEC PPL2 IBM PPX24 EPSON ESCP AUTO PORT DEPND | Select the same protocol as that selected by your software. DEC PPL2 printers – IBM Proprinter X24E printers (LA48N) – IBM Proprinter XL24E printers (LA48W) Epson printers using the ESC/P2 protocol The printer automatically senses the active protocol. This is useful when you use various applications in a DOS or network environment and cannot determine the protocol. The efficiency of this function relies on the recognition of control sequences that are protocol specific. If such control sequences are not detected in the data string received, the printer may fail to determine the proper protocol, providing an unexpected result. The printer selects a protocol according to the active interface (parallel, serial or USB). See the next options. |
| <PRTCL SERL> (Protocol Serial) | DEC PPL2 IBM PPX24 EPSON ESCP | Select a protocol for the serial interface. This is invalid and skipped when PORT DEPND is not selected for the <PROTOCOL> option. DEC PPL2 printers (factory setting for Macro 1 and Macro 2). – IBM Proprinter X24E printers (LA48N) – IBM Proprinter XL24E printers (LA48W) Epson printers using the ESC/P2 protocol. |



| Macro1/Macro 2 | Values | Description |
|-------------------------------------|---|---|
| <PRTCL PARL> (Protocol Parallel) | DEC PPL2 IBM PPX24 EPSON ESCP | Select a protocol for the parallel interface. This is invalid and skipped when PORT DEPND is not selected for the <PROTOCOL> option. DEC PPL2 printers – IBM Proprinter X24E printers (LA48N) – IBM Proprinter XL24E printers (LA48W) (Either is selected as factory setting for Macro 2.) Epson printers using the ESC/P2 protocol. (Factorysetting for Macro 1.) |
| <PRTCL USB> (Protocol USB) | DEC PPL2 IBM PPX24 EPSON ESCP | Select a protocol for the USB interface. This is invalid and skipped when PORT DEPND is not selected for the <PROTOCOL> option. DEC PPL2 printers – IBM Proprinter X24E printers (LA48N) – IBM Proprinter XL24E printers (LA48W) (Either is selected as factory setting for Macro 2.) Epson printers using the ESC/P2 protocol. (Factorysetting for Macro 1.) |

| Macro1/Macro 2 | Values | Description |
|------------------------------------|--|--|
| | DRAFT HSDRAFT PICA COURIER PRESTIGE COMPRESSED BOLDFACE TIMELESS NIMBUS-SAN OCR A OCR B | Select a font to be active when the power is turned on. For fixed-spaced fonts, be sure to change the horizontal pitch as well. Draft font (lower resolution than letter quality, 3 times the speed of letter quality) High-impact draft font (lower resolution than letter quality, 1.5 times the speed of letter quality with high copying capability) Pica 10 font Courier 10 font Prestige 12 font Compressed 17 font Boldface PS font Timeless PS font Nimbus-Sans PS font OCR A 10 font OCR B 10 font |
| <HORZ PITCH> (Horizontal Pitch) | ## CPI | 10 , 12, 13.2, 15, 16.5, 17, 18, or 20 (characters per horizontal inch) |
| <VERT PITCH> (Vertical Pitch) | ## LPI ## LPCM | 2, 3, 4, 6 , 8, or 12 (lines per vertical inch) 1, 2, or 4 (lines per centimeter) |
| <FORM LENGH> | ## INCHES No of LINE | Specify the length of the page in inches or by the number of lines per page. 3, 3.5, 4, 5.5, 6, 7, 8, 8.5, 11 (Letter size), 11 2/3 (A4 size), 12, 14, or 15 1 to 256 (66) Number of lines per page |
| <LEFT MARGN> | No of COLM | Specify the left margin by the number of the left column (see "Print Area Definition" in Chapter 3, "Paper Handling"). 1 to 256 Number of the left column |



| Macro1/Macro 2 | Values | Description |
|---|--|--|
| <FORM WIDTH> | 8 IN 13.2 IN 13.6 IN | For LA48W only. Specify the physical right margin. 8-inch page width 13.2-inch page width 13.6-inch page width |
| <TOP OF FRM> (Top-of-Form) <TOP MRGN> (Top Margin) | ## /60 IN ## LINES | Specify the top of form in 1/60 inches (see "Print Area Definition" in Chapter 3, "Paper Handling"). 0 to 99 Number of 1/60 inches 1 to 256 Number of the top line |
| <BOTTOM MRG> (Bottom Margin) | ## LINES | Specify the number of the bottom line (see "Print Area Definition" in Chapter 3, "Paper Handling"). 1 to 256 (66) Number of the bottom line |
| <LINE MODE> | LF = LF CR = CR LF = LF+CR CR = LF+CR | Specify the effect of LF (Line Feed) and CR (Carriage Return) codes. CR=CR: No line feed is added to a carriage return. CR=LF+CR: A line feed is added to each carriage return. LF=LF: No carriage return is added to a line feed. LF=LF+CR: A carriage return is added to each line feed. |
| <PAPER SRC> (Paper Source) | TRACTOR MANUAL RESVD 1 RESVD 2 RESVD 1/2 | Specify the paper input source. This setting is valid immediately after powering on. After that, the paper source follows the setting of the paper select lever. Continuous forms selected Single sheets selected Reserved Reserved Reserved |

| Macro1/Macro 2 | Values | Description |
|--|--|--|
| <PRINT DIR> (Print Direction) | UNIDIR BIDIR SOFT CNTRL (Software Control) | Unidirectional printing. Unidirectional printing is used for printing that needs precise vertical alignment. Unidirectional printing is slower than bidirectional printing. Bidirectional printing. The printer prints in either direction while seeking the next print direction for a shorter print time. The unidirectional command is ignored. The print direction follows a command from the computer. If no command is sent, print direction is bidirectional. |
| <DEC DEFLT> (DEC Defaults) | | The following are the Set-Up options for the DEC PPL2 protocol only. |
| <DEC PRT ID> (DEC Printer ID) | PPL2 LA50 ID LA120 ID LA210 ID | Specify the printer ID to be given in response to DA commands from the computer. |
| <AUTO WRAP> | TRUNCATE WRAP | Characters are received but not stored in the print buffer. End-of-line wrap. Causes a Carriage Return plus a Line Feed. |
| <EOT DISCON> (End of Transmission Disconnect) | NO DISCON DISCONNECT | Specify whether the DSR signal is controlled by the EOT character (DEC-423 serial interface only). EOT character is ignored. DTR signal turns low for five seconds when the EOT character is detected. |
| <INIT REPR> (Initialization Report) | NO YES | Specify whether the status is sent to the computer when the printer is turned on (DEC-423 serial interface only). Status is not sent. Status is sent. |



| Macro1/Macro 2 | Values | Description |
|---|------------------|---|
| <AUTO ANSBK> (Automatic ANSWERBACK) | NO YES | Specify whether the ANSWERBACK message is sent to the computer when printer is turned on. ANSWERBACK message is not sent. ANSWERBACK message is sent. |
| <ANSWER ENQ> (ANSWERBACK on ENQ) | NO YES | Specify whether the ANSWERBACK message is sent to the computer when printer receives an ENQ code. ANSWERBACK message is not sent. ANSWERBACK message is sent. |

| Macro1/Macro 2 | Values | Description |
|----------------|-----------------|---|
| <DEC G0 CST> | | Select a character set (language) for the G0. |
| | US ASCII | American English |
| | BRITISH | British English |
| | D-FINNISH | DEC Finnish |
| | FRENCH | French |
| | D-FRENCH-C | DEC French-Canada |
| | GERMAN | German |
| | I-ITALIAN | ISO Italian |
| | J-ROMAN | JIS Roman |
| | D-NORW/DAN | DEC Norwegian/Danish |
| | I-SPANISH | ISO Spanish |
| | D-SWEDISH | DEC Swedish |
| | NORW/DAN | Norwegian/Danish |
| | D-DUTCH | DEC Dutch |
| | D-SWISS | DEC Swiss |
| | D-PORTGU | DEC Portuguese |
| | LEGAL | Legal |
| | D-SUPPL | DEC Supplemental |
| | D-Graphics | DEC Special Graphics |
| | D-TECH | DEC Technical |
| | D-7 HEBREW | DEC 7-bit Hebrew |
| | D-HEBREW-S | DEC Hebrew Supplement |
| | D-GREEK-S | DEC Greek Supplement |
| | D-7 TURKI | DEC 7-bit Turkish |
| | D-TURKI-S | DEC Turkish Supplement |
| | J-KATAKANA | JIS Katakana |



| Macro1/Macro 2 | Values | Description |
|--|--|---|
| <USER PREF> (User Preference) | D-SUPPL D-GRAPHICS D-TECH D-7 HEBREW D-HEBREW-S D-GREEK-S D-7 TURKI D-TURKI-S J-KATAKANA I-LATIN 1 I-LATIN 2 I-LATIN 5 I-LATIN 9 I-LATIN HB I-LATIN GK I-CYRILLIC | Select a character set (language) for the DEC User Preference supplement. DEC Supplemental DEC Special Graphics DEC Technical DEC 7-bit Hebrew DEC Hebrew Supplement DEC Greek Supplement DEC 7-bit Turkish DEC Turkish Supplement JIS Katakana ISO Latin 1 ISO Latin 2 ISO Latin 5 ISO Latin 9 ISO Latin Hebrew ISO Latin Greek ISO Cyrillic |
| <IBM&EPSON> | | The following are the Set-Up options common to IBM Proprinter X24E and XL24E protocol and Epson ESC/P2 protocol. |
| <DEFLT SET> (Default Character Set) | CP 210 CP 220 CP437 CP 850 CP 851 CP 852 CP 857 CP 858 CP 860 CP 862 CP 863 CP 865 | Select a basic code page. CodePage 210 CodePage 220 CodePage 437 CodePage 850 CodePage 851 CodePage 852 CodePage 857 CodePage 858 CodePage 860 CodePage 862 CodePage 863 CodePage 865 |



| Macro1/Macro 2 | Values | Description |
|-------------------------------------|--|---|
| | CP 866 CP DHN TURKEY ECMA 94 ISO LATIN1 ISO LATIN2 ISO LATIN9 HUNGARY SLOVENY POLAND MAZOWIA KAMENIC CYRILLIC ELOT927 ELOT928 LTN POLISH LITHUANY 1 LITHUANY 2 MIK MACEDONIAN | CodePage 866 CodePage DHN Turkish ECMA 94 ISO Latin 1 ISO Latin 2 ISO Latin 9 Hungarian Slovenian Polish Mazowian Kamenicky Cyrillic ELOT 927 ELOT 928 Latin Polish Lithuanian 1 Lithuanian 2 MIK Macedonian |
| <IBM DEFLT> (IBM Defaults) | | The following are the Set-Up options for the IBM Proprinter X24E or XL24E protocol only. |
| <I-SET 1/2> (IBM Set 1/2) | IBM SET 1 IBM SET 2 | Specify a character set of the IBM Proprinter X24E or XL24E. IBM character set 1 IBM character set 2 |
| <I-DBL HIGT> (IBM Double Height) | NO YES | Specify whether the character height is doubled. If specified, change the vertical pitch also. The base of line spacing is 1/72 inch or 1/216 inch. The base of line spacing is 1/60 inch or 1/180 inch. |



| Macro1/Macro 2 | Values | Description |
|--------------------------------------|--|--|
| <EPSON DFLT> (Epson Defaults) | | The following are the Set-Up options for the Epson ESC/P2 protocol only. |
| <E-CHR SET> (Epson Character-Set) | USA FRANCE GERMANY UK DENMARK1 SWEDEN ITALY SPAIN 1 JAPAN NORWAY DENMARK2 SPAIN 2 LATIN AM KOREA LEGAL | Select a national character set. American English French German British English Danish 1 Swedish Italian Spanish 1 Japanese Norwegian Danish 2 Spanish 2 Latin American Korea Legal |

Changing Install Options

The INSTALL function defines the printer's installation conditions. You can select a language from five that are used to print menu functions and options during the Set-Up operation. You can adjust the start timing of auto loading or auto tear-off feeding. You can also change the operation of the error beep or allocation of the input buffer. If you are using the RS232 serial interface, you must set the serial interface options properly for the printer to function correctly with your system hardware.

The following table describes the INSTALL options and values. Options are listed in the order in which they are printed. The procedure for changing the INSTALL options is detailed in the early sections of this chapter.

Install Options and Values

Overprinted values are the factory settings.

| Install Options | Values | Description |
|-------------------------------------|---|--|
| <LANGUAGE> | ENGLISH DEUTSCH ESPANOL FRANCAIS ITALIANO | Specify a language to be used to print the Set-Up menu functions and options. English German Spanish French Italian |
| <TEAR> | AUTO 1 SEC AUTO 2 SEC AUTO 3 SEC AUTO 4 SEC AUTO 5 SEC MANUAL NO TEAR | Specify the (auto) start timing of tear off feeding. 1 second after data stops from the computer 2 second after data stops from the computer 3 second after data stops from the computer 4 second after data stops from the computer 5 second after data stops from the computer Feed the paper for tear-off when the Pause button is pressed. Tear off feeding is inhibited under any conditions. Specify this setting for labels that tend to peel off during backward feeding. |
| <S-SHEET LD> (Single Sheet-Load) | AUTO 1 SEC AUTO 2 SEC AUTO 3 SEC AUTO 4 SEC AUTO 5 SEC MANUAL | Specify the (auto) start timing of single sheet loading. 1 second after a single sheet is set on the platen 2 second after a single sheet is set on the platen 3 second after a single sheet is set on the platen 4 second after a single sheet is set on the platen 5 second after a single sheet is set on the platen Load a single sheet when the FF/Load button is pressed. |



| Install Options | Values | Description |
|--------------------------------|---|---|
| <ERROR BEEP> | ONE CONTINUOUS OFF | Enable or disable the printer status buzzer when a fault condition occurs. One beep for a period of about 500 ms Buzzer on until the fault condition is cleared Buzzer off under any condition |
| <BUFFER> | 2 KBYTE 8 KBYTE 16 KBYTE 32 KBYTE 64 KBYTE | Assign buffer memory as the input buffer. 2 Kbytes 8 Kbytes 16 Kbytes 32 Kbytes 64 Kbytes NOTE: <i>The larger the input buffer selected, the smaller the download buffer becomes. Even with 64K bytes of input buffer, a minimal download buffer is provided. If you need a larger capacity for downloading fonts, reduce the input buffer.</i> |
| <I/F TYPE> (Interface Type) | PARALLEL SERIAL USB AUTO | Select the type of interface to the computer. Centronics parallel interface RS232 serial interface USB interface All interfaces are ready for communication. The printer communicates with the interface from which it first receives data. The interface is active until the input buffer becomes empty. NOTE: <i>The interface which is not installed (serial or USB) is shaded out in the menu printout.</i> |



| Install Options | Values | Description |
|----------------------------|-----------------|---|
| <AUTO SW> (Auto Switch) | | Specify the timing of regarding the selected protocol or interface as being inactive when AUTO is specified in the <PROTOCOL> or <I/F TYPE> option. |
| | 2 SEC | 2 seconds elapsed after data stops from the computer |
| | 4 SEC | 4 seconds elapsed after data stops from the computer |
| | 6 SEC | 6 seconds elapsed after data stops from the computer |
| | 8 SEC | 8 seconds elapsed after data stops from the computer |
| | 10 SEC | 10 seconds elapsed after data stops from the computer |
| | 12 SEC | 12 seconds elapsed after data stops from the computer |
| | 14 SEC | 14 seconds elapsed after data stops from the computer |
| | 16 SEC | 16 seconds elapsed after data stops from the computer |
| | 18 SEC | 18 seconds elapsed after data stops from the computer |
| | 20 SEC | 20 seconds elapsed after data stops from the computer |
| <BAUD RATE> | | Setting of data transmission speed for the serial interface. The baud rate is in bps (bits per second). Select the same baud rate as that used by your computer or modem. |
| | 600 BPS | |
| | 1200 BPS | |
| | 2400 BPS | |
| | 4800 BPS | |
| | 9600 BPS | |
| | 19200 BPS | |



| Install Options | Values | Description | | | | | | | | | | | | | | | | |
|---------------------------------------|--|---|---------------------|------------|---|------|---|-----|---|---------|---|--------|---|------|---|-----|---|------|
| <BIT&PARITY> | <div>7 EVEN</div> <div>7 ODD</div> <div>7 SPACE</div> <div>7 MARK</div> <div>8 EVEN</div> <div>8 ODD</div> <div>8 NONE</div> | <div>Setting of data format for the serial interface</div> <table><thead><tr><th>Number of data bits</th><th>Parity bit</th></tr></thead><tbody><tr><td>7</td><td>Even</td></tr><tr><td>7</td><td>Odd</td></tr><tr><td>7</td><td>Space *</td></tr><tr><td>7</td><td>Mark *</td></tr><tr><td>8</td><td>Even</td></tr><tr><td>8</td><td>Odd</td></tr><tr><td>8</td><td>None</td></tr></tbody></table> <div>* The mark is logical 1. The space is logical 0.</div> | Number of data bits | Parity bit | 7 | Even | 7 | Odd | 7 | Space * | 7 | Mark * | 8 | Even | 8 | Odd | 8 | None |
| Number of data bits | Parity bit | | | | | | | | | | | | | | | | | |
| 7 | Even | | | | | | | | | | | | | | | | | |
| 7 | Odd | | | | | | | | | | | | | | | | | |
| 7 | Space * | | | | | | | | | | | | | | | | | |
| 7 | Mark * | | | | | | | | | | | | | | | | | |
| 8 | Even | | | | | | | | | | | | | | | | | |
| 8 | Odd | | | | | | | | | | | | | | | | | |
| 8 | None | | | | | | | | | | | | | | | | | |
| <BUFFER CTL> (Buffer Control) | <div>DTR</div> <div>XON/XOF</div> | <div>Setting of data transmission buffer control for the serial interface.</div> <div>The Data Terminal Ready signal is used.</div> <div>The DC1 and DC3 codes are used.</div> | | | | | | | | | | | | | | | | |
| <DISC FAULT> (Disconnect on Fault) | <div>NO</div> <div>DROP DTR</div> <div>PULSE DTR</div> | <div>Specify the disconnect control of the interface when a fault condition occurs.</div> <div>DTR is kept as it was.</div> <div>DTR is turned low and fixed.</div> <div>DTR is turned low for five seconds and returned to the original state.</div> | | | | | | | | | | | | | | | | |
| <AREA CTL> (Area control) | <div>YES</div> <div>NO</div> | <div>Specifies the detection of the right and left edge. In case of YES print data on the left and the right of the edges will be cut.</div> <div>Detect the right and left edge.</div> <div>Does not detect the right and left edge.</div> | | | | | | | | | | | | | | | | |
| <GATHER CTL> (Gather control) | <div>YES</div> <div>NO</div> | <div>Control gathering</div> <div>Does not control gathering.</div> | | | | | | | | | | | | | | | | |
| <TEROFF CTL> (Tear off control) | <div>PRCISIN</div> <div>SPEED</div> | <div>Backward with precision.</div> <div>Backward fast.</div> | | | | | | | | | | | | | | | | |
| <SKIP CTL> (Skip control) | <div>YES</div> <div>NO</div> | <div>Do skip.</div> <div>Do not skip.</div> | | | | | | | | | | | | | | | | |

Adjusting Top-of-Form Origin

Print positions often change gradually when you use the printer over long periods of time. The ADJUST function allows you to adjust these positions by fine-tuning the Top-of-Form origin.

The following table describes the ADJUST options and values. Options are listed in the order they are printed.

Adjust Options and Values

Overprinted values are the factory settings.

| Adjust Options | Values | Description |
|--------------------------------------|---|---|
| <FNFOLD ADJ> (Fanfold Adjustment) | ##/60 IN | Adjust the Top-of-Form origin for continuous forms in increments of 1/60 inch (0.42 mm) from the physical top of the page. -10 to 10 (0) Number of 1/60 inches |
| <MNUAL ADJ> (Manual Adjustment) | ##/60 IN | Adjust the Top-of-Form origin for single sheets in increments of 1/60 inch (0.42 mm) from the physical top of the page. -10 to 10 (0) Number of 1/60 inches |
| <RESVD 1> | | Reserved |
| <RESVD 2> | | Reserved |
| <MNUAL ADJ2> | -21/360 -14/360 -7/360 0/360 7/360 14/360 21/360 GRAPHIC | Accumulative LF adjustment for Cut Sheet |



| Adjust Options | Values | Description |
|----------------|--|--|
| <FNFLD ADJ2> | -28/360 -21/360 -14/360 -7/360 0/360 7/360 14/360 21/360 28/360 GRAPHIC | Accumulative LF adjustment for Continuous Form |
| <FNFLD ADJ3> | -21/360 -14/360 -7/360 0/360 7/360 14/360 21/360 GRAPHIC | Accumulative LF adjustment for Continuous Form (Last page) |
| <RESVD3> | | Reserved |

Changing Menu Access Options

You can restrict the access to the Set-Up functions to avoid accidentally changing the Set-Up options.

Menu Access Option and Values

Overprinted values are the factory settings.

| Menu Access Options | Values | Description |
|---------------------|-------------------------------------|--|
| <MENU-ACCES> | | Specify the type of access to the Set-Up functions from the control panel or from the <FUNCTIONS> menu. |
| | ALL FUNC | All functions are accessible. |
| | MACRO ONLY | Only MACRO 1 and MACRO 2 functions are accessible from the <FUNCTIONS> menu. |
| | NO ACCESS NO PANEL | Set-Up mode is inaccessible. Font, Macro, and Protocol buttons are disabled even in Normal mode. Set-Up mode is also inaccessible. <i>NOTE: You can return to the All Functions Accessible mode by turning the printer on while pressing the Pause, Park and LF buttons at the same time. The printer enters the Set-Up mode with this operation.</i> |

Save Settings and Exit Set-up mode

This section describes how to exit the Set-Up mode while saving any changes you have made.

To exit the Set-Up mode with the settings saved, first select the SAVE&EXIT function and then press the ↓ button or the ↑ button.

Any settings changed while in the Set-Up mode are saved as the new power-on defaults for the printer. The new defaults remain active until you change them again.

CAUTION: *To temporarily use your changes, press the **Set-Up/Quit** button. These changes are lost at the next power-off.*

Recall Factory Settings

Factory settings are those settings preselected at the factory. To recall (reset) the factory Recalling Factory Settings

Factory settings are those settings preselected at the factory. To recall (reset) the factory settings, select the RCALL-FACT function and press the ↓ button or the ↑ button.

Options under the MACRO, INSTALL, and ADJUST functions are all initialized to the factory settings.

Using the Diagnostic Functions

The TESTS function allows you to diagnose the printer with the following two functions:

- PRINT-T (printing test)
- HEX-DUMP (hex dump)

These functions are used for checking print quality and diagnosing printer problems. Hex dump also provides useful information for programmers. There are other options in the TESTS function, but they are restricted to the use of service personnel.

Printing Test

The printing test function prints test pages independently of your computer to check printing operations and quality. It does not check the interface between the computer and the printer.

The printing test prints all of the characters available in the ASCII character set. For color printers with a color ribbon, printing occurs in four colors.

To start the printing test, make sure that continuous forms paper is loaded into the printer. Enter the Set-Up mode, and follow these steps:

1. Start the printing test (select the PRINT-T option).

Check that the red cursor is located under PRINT-T, and then press the ↓ button or the ↑ button. The printer selects (underlines) PRINT-T and starts printing. A short help menu is printed at the top of the page. Note that the printer is not ready for the computer during this printing test.

2. Exit the printing test.

Exit the printing test in either of the following ways after printing a dozen lines:

- To exit the printing test and return to the <TESTS> menu, press the ↓ button or the ↑ button.
- To exit the printing test and return to the <FUNCTIONS> menu, press the **Exit/Save** button.
- To exit the printing test and return to the Normal mode (Ready), press the **Set-Up/Quit** button. The printer temporarily saves any changes made while in the Set-Up mode and then returns to the Ready state.

3. Examine the test page.

Hex Dump Mode

The Hex Dump mode prints data and commands in hexadecimal characters and abbreviated control codes. The ASCII characters are used for printing. No characters are printed for hexadecimal codes 7F to FF. The Hex Dump mode is useful for checking whether your computer is sending the correct commands to the printer and whether the printer is executing the commands correctly. It is also useful for debugging software programs.

To start the Hex Dump mode, make sure that continuous forms paper is loaded into the printer. Enter the Set-Up mode and follow these steps:

1. Start the Hex Dump mode (select the HEX-DUMP option).

Repeatedly press the → button to position the red cursor under HEX-DUMP, and then press the ↓ button or the ↑ button. The printer selects (underlines) HEX-DUMP, enters the Ready state and prints a header at the top of the page.

NOTE: *You cannot switch back to Set-Up mode from Hex Dump mode. Do not change any value before entering Hex Dump mode because your changes will be lost.*

2. Print the hex dump.

To start hex dump printing, send your file or program to the printer. The printer goes online and prints the hex dump. Press the **Pause** button to pause and resume printing in Hex Dump mode. To resume hex dump printing, press the **Pause** button again.

To print another hex dump, send another file to the printer.

3. Exit the Hex Dump mode.

Turn the printer off to exit the Hex Dump mode.

CAUTION: *If you change any settings in the Set-Up mode before starting the Hex Dump mode, these changes will be lost.*



```
*** Hex dump printing ***

Page 1

      0  1  2  3  4  5  6  7  8  9  A  B  C  D  E  F
01  48 65 78 20 64 75 6D 70 20 70 72 69 6E 74 69 6E      Hex dump printin
02  67 2E 0D 0A 0D 0A 9B 3F 32 37 68 41 42 43 44 45      g.???.?27hABCDE
03  46 47 48 49 4A 4B 4C 4D 4E 4F 50 51 52 53 54 55      FGHIJKLMNOPQRSTU
04  56 57 58 59 5A 0D 0A 61 62 63 64 65 66 67 68 69      VWXYZ?abcdefghi
05  6A 6B 6C 6D 6E 6F 70 71 72 73 74 75 76 77 78 79      jklmnopqrstuvwxyz
06  7A 0D 0A 30 31 32 33 34 35 36 37 38 39 0D 0A 9B      z?0123456789?.
07  21 70                                                  !p
```

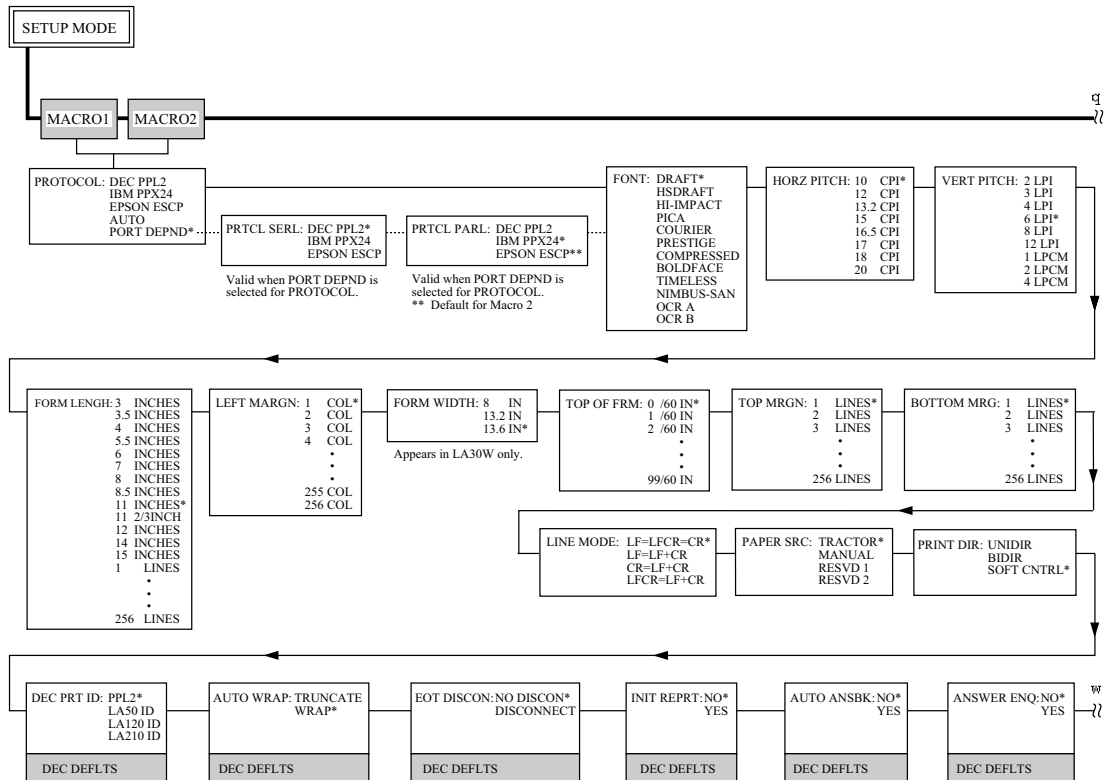
Sample Hex Dump

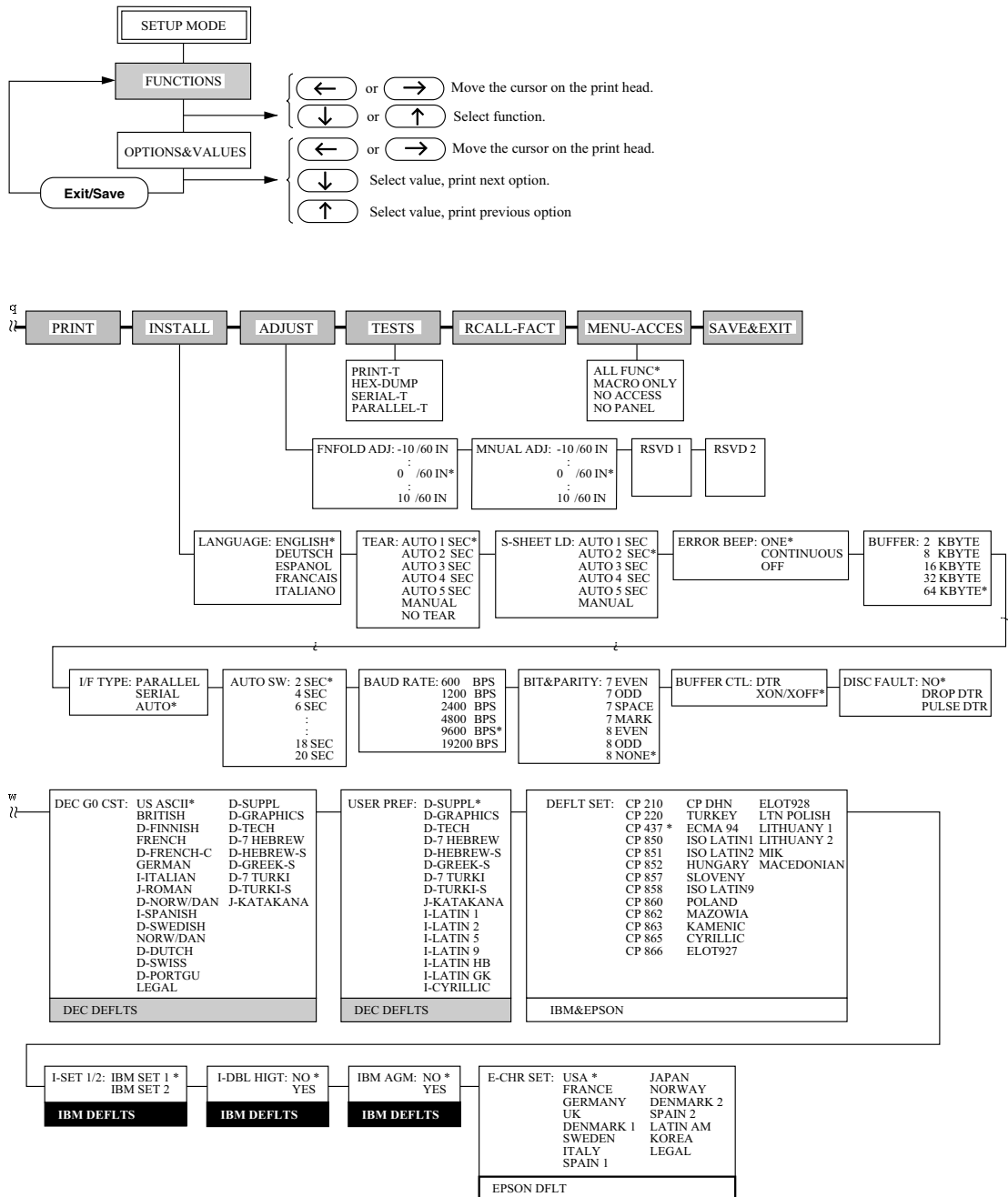


Set-Up Mode Quick Reference

The following flowchart shows how the Set-Up mode is organized.

NOTE: Asterisks (*) indicate factory settings.







Maintenance

Your printer requires very little care. Occasional cleaning and replacement of the ribbon cartridge are all that is required.

Lubrication of the printer is not usually necessary. If the print head carriage does not move smoothly back and forth, clean the printer in the manner described in this chapter. If the problem continues, contact your dealer to determine whether lubrication may be necessary.

Cleaning

The front and back covers and the acoustic cover of the printer help protect it against dust, dirt, and other contaminants. However, paper produces small particles that accumulate inside the printer. This section explains how to clean and vacuum the printer and how to clean the platen.

It is easier to clean the printer when the front cover, the cut sheet stand, and the back cover are removed.

Cleaning and Vacuuming the Printer

If the print head carriage does not move smoothly back and forth or paper particles have accumulated in the printer, clean the printer.

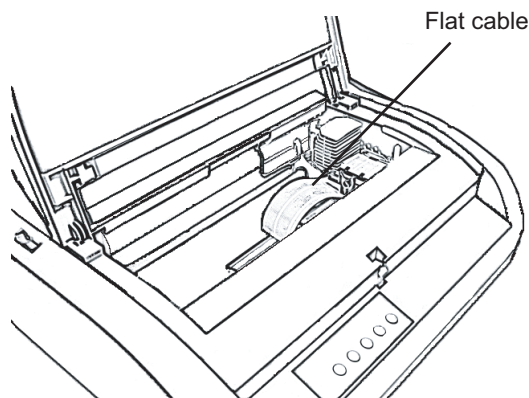
WARNING: To avoid any possibility of injury, before cleaning the printer, turn off the power to both the printer and the computer, and unplug the printer.

To clean and vacuum the printer:

1. Remove any paper from the printer. Make sure that the power is off, and then disconnect the printer power cord.
2. Using a soft vacuum brush, vacuum the exterior of the printer. Be sure to vacuum the air vents at the right and left sides of the printer. Also vacuum the cut sheet stand.
3. Use a soft, damp cloth to wipe the exterior of the printer, including the covers. A mild detergent may be used.

WARNING: Do not use solvents, kerosene, or abrasive cleaning materials that may damage the printer.

4. Open the front cover of the printer and remove the ribbon cartridge. Using a soft vacuum brush, gently vacuum the platen, print head carriage, and surrounding areas. You can easily slide the print head to the left or right when the power is off. Be careful not to press too hard on the flat ribbon cable that extends from the print head carriage.



Printer interior

5. Re-install the ribbon cartridge. Close the front cover.
6. Open the ejection cover. Vacuum the rollers, paper entry slot, and surrounding areas.
7. Raise the cut sheet stand and the back cover. Vacuum the forms tractors and surrounding areas.

Cleaning the Platen

Clean the platen about once a month to remove excess ink. Use the platen cleaner recommended by your supplier and proceed as follows:

1. Apply a small amount of platen cleaner to a soft cloth. Avoid spilling platen cleaner inside the printer.

CAUTION: Do not use alcohol to clean the platen. Alcohol may cause the rubber to harden.

2. Place the cloth against the platen and manually rotate the platen knob.
3. To dry the platen, place a dry cloth against the platen and manually rotate the platen knob.



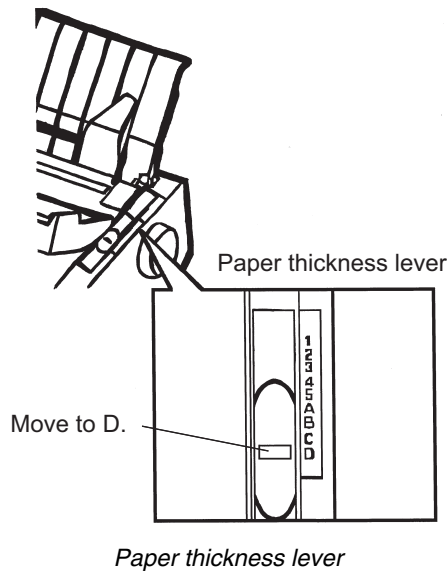
Replacing the ribbon

To replace the ribbon cartridge:

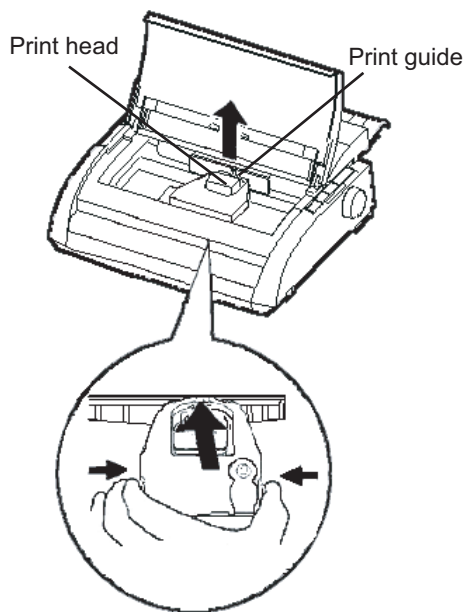
1. Turn off the printer.
2. Open the front cover of the printer. For easy installation, slide the print head carriage to a position where it does not face a roller.

CAUTION: *The print head may be hot if you have been printing recently.*

3. Move the paper thickness lever to position D.

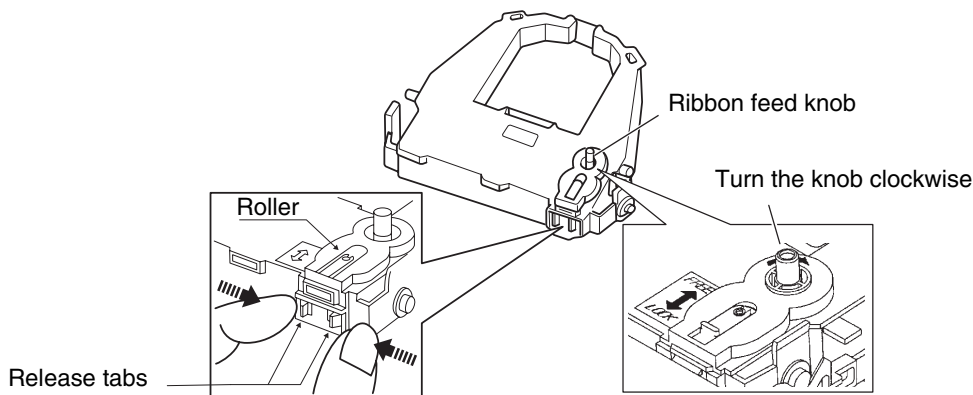


4. To remove the ribbon cartridge, press the ribbon release levers located on either side of the cartridge and carefully lift the cartridge out of the printer.



Removing the ribbon cartridge

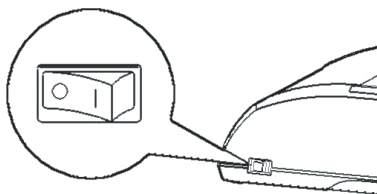
5. Using the procedure below, release the roller from the LOCK position and turn the ribbon feed knob clockwise to take up any ribbon slack. Push in the gray ribbon release tabs on the side of the ribbon cartridge to release them, and slide the roller from the LOCK position to the FREE position.



Preparing the ribbon cartridge

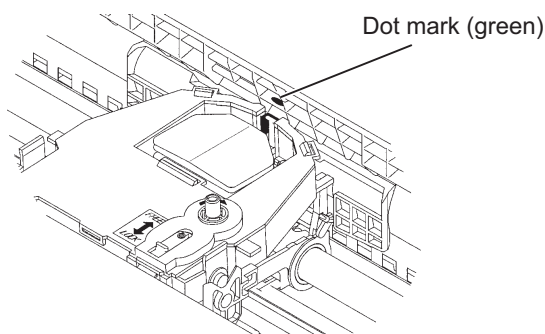
CAUTION: Do not turn the ribbon feed knob in counterclockwise direction.

6. Verify that the power to the printer is off. (Make sure that the circle mark on the power switch is pressed.)



Printer must be off

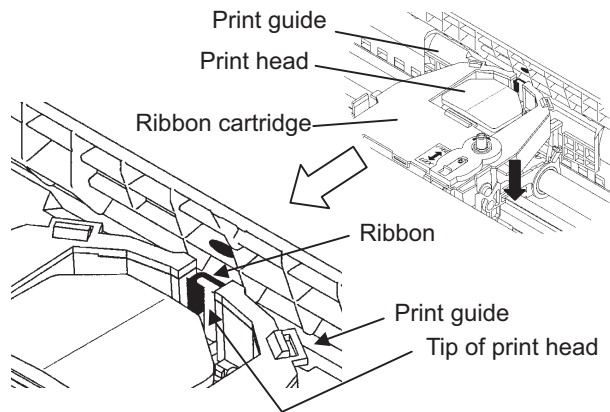
7. Move the paper thickness lever to the D position.
8. Open the front cover.
9. Align the print head position with the dot mark (green) on the printer ejection cover.



Aligning the print head position

WARNING: Avoid touching the print head while using or immediately after using the printer, as doing so may lead to burns. Wait until the print head cools down before touching it.

10. Thread the ribbon between the print head and the print guide, then gently press down on the ribbon cartridge against the printer until it clicks into place. (Make sure that the ribbon feed knob is facing upward.)



Installing the ribbon

11. Turn the ribbon feed knob clockwise to take up any ribbon slack.
12. Move the paper thickness lever back to its original position. For single sheet printing, the correct position is 1. The section “Paper Thickness Lever Positions” in Chapter 3 gives other paper thickness lever settings.
13. Close the front cover of the printer.

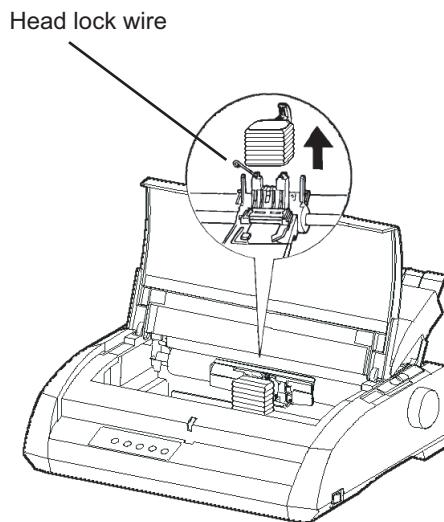
Replacing the Print Head

The print head is easy to replace.

CAUTION: *The print head may be hot if you have been printing recently.*

To remove the print head:

1. Turn off the printer.
2. Open the front cover of the printer and remove the ribbon cartridge.
3. Pull the right end of the head lock wire forward to release it from the hook at the right of the print head carriage. Then release the wire from the center hook.
4. Remove the print head from the connector on the carriage, as shown in the figure below.



Replacing the print head

To install the print head:

1. Carefully fit the mounting guide grooves of the print head on the locating studs on the carriage.
2. Push the print head into the connector and hook the wire into place in the reverse order of removal.



Trouble-Shooting

Your printer is extremely reliable, but occasional problems may occur. You can solve many of these problems yourself, using this chapter. If you encounter problems that you cannot resolve, contact your dealer or service for assistance.

This chapter is organized as follows:

- Solving problems
- Diagnostic functions
- Getting help

Solving Problems

The tables in this section describe common printer problems and their solutions. The following types of problems are considered:

- Print quality problems
- Paper handling problems
- Operating problems
- Printer failures

Print Quality Problems

Poor print quality or other printing problems are often caused by incorrect printer set-up or incorrect software settings. A gradual decrease in print quality usually indicates a worn ribbon. The following table identifies common print quality problems and suggests solutions.

| Problem | Solution |
|--|---|
| <p>Printing is too light or too dark.</p> | <p>Make sure that the ribbon cartridge is properly installed and that the ribbon feeds smoothly.</p> <p>Make sure that the ribbon cartridge properly installed and that the ribbon feeds smoothly. Make sure that the paper thickness lever is set for the thickness of your paper. See “Paper Thickness Lever Positions” in Chapter 3.</p> <p>Check ribbon wear. Replace the ribbon if necessary.</p> |
| <p>Stains or smudges appear on the page.</p> | <p>Make sure that the paper thickness lever is set for the thickness of your paper. See “Paper Thickness Lever Positions” in Chapter 3.</p> <p>Check ribbon wear. Replace the ribbon if necessary.</p> <p>Check whether the tip of the print head is dirty. Clean the head with a soft cloth if necessary. For removing the print head, see the section “Replacing the Print Head” in Chapter 6.</p> |
| <p>The page is blank.</p> | <p>Make sure that the ribbon cartridge is properly installed. See the section “Installing the Ribbon Cartridge” in Chapter 2.</p> |
| <p>Printing is erratic or the wrong characters are printed. Many “?” or unexpected characters are printed.</p> | <p>Make sure that the interface cable is securely connected to both the printer and computer. See the section “Connecting the printer to your computer” in Chapter 2.</p> <p>Make sure that the printer protocol selected in your software is the same as the protocol selected on the printer.</p> <p>If you are using an serial interface, make sure that the serial settings required by your software or computer are the same as the settings on the printer. See the section “Changing Install Options” in Chapter 5.</p> <p>If the PROTOCOL option is set to AUTO, the printer may not detect the proper protocol. Force this option according to your needs. See the section “Changing Macro 1 and Macro 2 Options” in Chapter 5.</p> |

| Problem | Solution |
|---|---|
| Printing is vertically mis-aligned (jagged). | Use the printer's vertical alignment function to check the vertical print alignment. If necessary, adjust the print alignment. See the section "Checking Vertical Alignment" in this chapter. |
| The top margin is wrong. | <p>The top margin is the sum of the printer's top-of-form setting, the software-specified top margin, and the printer's TOP-MRGN setting. Proceed as follows:</p> <ul style="list-style-type: none"> • Make sure that the top-of-form setting is correct. The factory default is 0 mm (0 inch). See the section "Adjusting Top-of-Form Origin" in Chapter 5. • Check the software-specified top margin. Refer to your software documentation. • Check the printer's TOP-MRGN setting. See the section "Changing Macro 1 and Macro 2 Options" in Chapter 5. |
| Lines are double spaced instead of single spaced. | <p>Check the line spacing setting in your software.</p> <p>Change the LINE MODE setting in the printer Set-Up mode to LF=LFCR=CR. See the section "Changing Macro 1 and Macro 2 Options" in Chapter 5.</p> |
| The printer overprints on the same line. | Change the LINE MODE setting in the printer Set-Up mode to CR=LF+CR. See the section "Changing Macro 1 and Macro 2 Options" in Chapter 5. |
| The next print line starts where the previous line ended instead of at the left margin. | Change the LINE MODE setting in the printer Set-Up mode to LF=LF+CR. See the section "Changing Macro 1 and Macro 2 Options" in Chapter 5. |
| The printer overprints on the same line while the next print line starts where the previous line ended instead of at the left margin. | Change the LINE MODE setting in the printer Set-Up mode to LFCR=LF+CR. See the section "Changing Macro 1 and Macro 2 Options" in Chapter 5. |

Paper Handling Problems and Solutions

The following table describes common paper handling problems and suggests solutions. See Chapter 3, “Paper Handling” for detailed procedures on loading and using paper.

| Problem | Solution |
|--------------------------------|--|
| Paper cannot be loaded or fed. | <p>Make sure that the paper select lever located on the top left of the printer is set correctly. Move the lever backward for continuous forms or forward for single sheets.</p> <p>Make sure that the paper covers the paper-out sensor, (i.e., the left paper edge is within 52 mm for single sheets or 41 mm for continuous forms from the left edge of the platen.) This problem cannot occur if you use the forms tractor unit or insert a single sheet with its left edge in contact with the left paper guide.</p> <p>Make sure that the tractor unit is correctly installed and that the tractor shaft gear engages the platen shaft gear. If you are using the tractor unit for rear feeding, open the front cover and make sure that the second stud from the left on the printer bottom frame projects outward.</p> |
| Paper jams while loading. | <p>Turn off the printer and remove the jammed paper. Remove any obstructions from the paper path.</p> <p>Make sure that the paper thickness lever is set for the thickness of your paper. See the section “Paper Thickness Lever Positions” in Chapter 3.</p> <p>Make sure that the left and right tractors are set so that the continuous forms are stretched taut. See the section “Using Continuous Forms” in Chapter 3.</p> |
| Paper jams while printing. | <p>Turn off the printer and remove the jammed paper. Remove any obstructions from the paper path.</p> <p>Make sure that the paper thickness lever is set for the thickness of your paper. See the section “Paper Thickness Lever Positions” in Chapter 3.</p> <p>For continuous forms, make sure that the incoming and outgoing paper stacks are correctly placed. Paper should feed straight. See the section “Positioning the Paper Stack” in Chapter 3.</p> |

| Problem | Solution |
|---|---|
| Paper slips off the forms tractors or the perforated holes of the paper tear during printing. | Make sure that the forms tractors are positioned correctly for the width of your paper and that the perforated holes of the paper fit directly over the tractor sprockets. See the section “Using Continuous Forms” in Chapter 3. |

Operating Problems and Solutions

The following table identifies common operating problems and suggests solutions. If you cannot resolve a problem, contact your dealer or service

| Problem | Solution |
|--|--|
| The power does not turn on. | <p>Make sure that the “I” on the printer power switch is depressed.</p> <p>Make sure that the power cord is securely connected to both the printer and the outlet. Make sure that the power outlet is functional.</p> <p>Turn the power off. Wait a minute and then turn the printer on again. If the printer still has no power, contact your dealer or service.</p> |
| The printer is on but it will not print. | <p>Make sure that the Ready indicator is lit. See the section “Operations of the control panel” in Chapter 2.</p> <p>Make sure that the interface cable is securely connected to both the printer and the computer. See the section “Connecting the printer to your computer” in Chapter 2.</p> <p>If the Fault indicator is lit, load the paper. See the Chapter 3, “Paper Handling”.</p> <p>Run the printer printing test. If the printing test executes normally, the problem is being caused by the interface, the computer, incorrect printer settings, or incorrect software settings. See the section “Printing Test” in Chapter 5.</p> <p>Make sure that the printer protocol selected in your software is the same as the protocol selected on the printer. See the section “Connecting the printer to your computer” in Chapter 2.</p> <p>If you are using an serial interface, make sure that the serial settings required by your software or computer are the same as the settings on the printer. See the section “Changing Install Options” in Chapter 5.</p> |

Printer Failures

A user cannot generally resolve a problem involving defective printer hardware. On detecting a fatal error, the printer will:

- Stop printing
- Beep four times if it is not disabled by the Set-Up mode
- Turn the Online indicator off
- Blink the Paper Out indicator (with a fault indicator lit indicating the error type).

The following errors cause the printer to turn off the power:

- Print head error
- Print head carriage motor
- Line feed motor error
- +34 V overvoltage error

No error condition is displayed if any of these errors occurs.

Turn the printer off and back on, then rerun the same job to check if the error was transient. If the error recurs, contact your dealer or service.

Diagnostic Functions

The printer diagnostic functions are print-test and hex-dump.

- Print-test tells you whether the printer hardware is functioning correctly. It prints the print-test pattern. If the printer hardware is functional, any problems you are having are probably caused by incorrect printer settings, incorrect software settings, the interface, or the computer.
- Hex-dump allows you to determine whether the computer is sending the correct commands to the printer, and whether the printer is executing the commands correctly. This function is useful to programmers or others who understand how to interpret hex dumps.

For details on using these functions, all of which are available in the printer Set-Up mode, see the section “Using the Diagnostic Functions” in Chapter 5.

Besides the above functions, the serial interface loopback test and the parallel interface loopback test are provided in the printer Set-Up mode. These tests are for service engineers.

Checking Vertical Alignment

In bidirectional printing, characters printed from left to right tend to misalign with characters printed from right to left as shown below:

```
| This example shows how printing looks  
| when characters are vertically  
| misaligned. Note that the left  
| margin is not straight.
```

The vertical alignment function corrects the vertical character displacement that sometimes occurs with bidirectional printing and results in a poor appearance especially in printing tables. This function is defined as one of the power-on initiated test functions. If you notice misaligned printing, start this function to check and correct the vertical print alignment.

Make sure that continuous forms paper or single sheet paper is loaded in the printer. If possible, use forms at least 216 mm (8.5 inches) wide for LA48N or 356 mm (14 inches) wide for LA48W to avoid printing on the platen. Then proceed as follows:

1. Start the vertical alignment test.

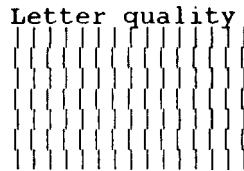
Turn the printer on while pressing the **Protocol** button until the printer beeps. The printer prints the help menu and then starts printing rows of parallel bars at Letter quality speed.



NOTE: Do not press any buttons alone or in combination except for pressing the **Protocol** or the **Set-Up/Quit** button alone when turning the printer on, to avoid initiating unexpected tests not permitted for the user.

2. Adjust the vertical print alignment at Letter quality speed.

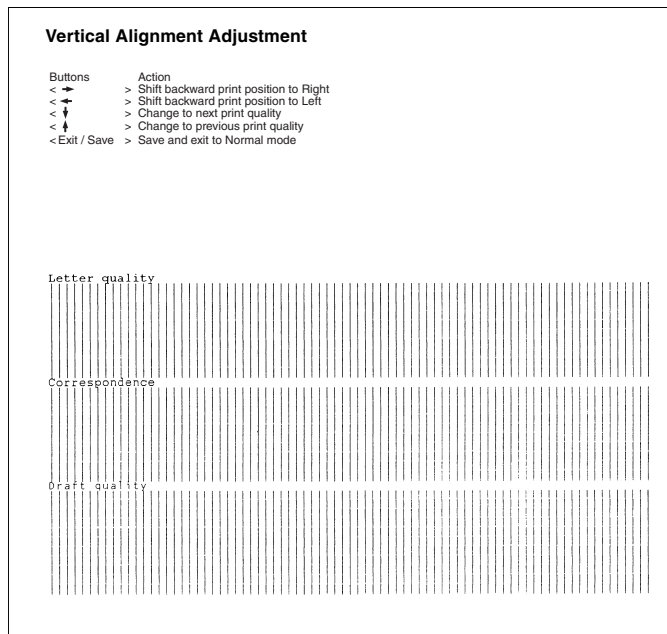
Examine the parallel bars. If the bars are aligned (not jagged), go to step 3. If the bars are offset, repeatedly press the → button or the ← button until the bars are aligned.



3. Adjust the vertical print alignment at Correspondence and Draft quality speed.

Press the → button and the ← button to switch Letter quality to Correspondence and Draft quality.

Examine the parallel bars and adjust the vertical print alignment as described in step 2.



Vertical Alignment

4. Exit the vertical alignment function.

Press the **Exit/Save** button to save the new vertical alignment settings and exit the vertical alignment function.

NOTE: *To exit the vertical alignment function without saving changes, turn the printer off.*

A

Supplies

This appendix lists the accessories and options available for the printer. Contact your dealer for information on ordering any of these items.

Supplies

| Supplies | Order Number |
|------------------------|---------------------|
| Black ribbon cartridge | 043837 |
| Print head | Contact your dealer |





Printer and Paper Specifications

This appendix provides the physical, functional, and performance specifications for the printer. It also contains detailed paper specifications.

Physical Specifications

| | LA48N | LA48W |
|-----------------------|---|--------------------|
| Dimensions | | |
| Height | 120 mm (4.72 inch) | 120 mm (4.72 inch) |
| Width | 415 mm (16.3 inch) | 570 mm (22.5 inch) |
| Depth | 330 mm (13.0 inch) | 330 mm (13.0 inch) |
| Weight approximately | 7.3 kg (16 lb) | 9.7 kg (21.4 lb) |
| AC power requirements | | |
| Low Voltage | 100 to 120 VAC $\pm 10\%$; 50/60 Hz | |
| High Voltage | 220 to 240 VAC -10% , $+6\%$; 50/60 Hz | |
| Power consumption | | |
| Operating | 90 W | 90 W |
| Standby | 10 W | 28 W |
| Heat generation | 251.2 KJ/H (average) | |
| Interface | Centronics parallel and RS-232C serial Centronics parallel and USB Optional LAN Ethernet pocket interface | |
| Data buffer size | 2 Kbytes, 8 Kbytes, 16 Kbytes, 32 Kbytes, 64 Kbytes | |
| Download buffer | Maximum 64 Kbytes (64 minus data buffer size) | |
| Operating environment | 5 to 38°C (41 to 100°F) 30% to 80% RH (no condensation) Wetbulb temperature, less than 29°C (84°F) | |
| Storage environment | -15 to 60°C (-4 to 140°F) 10% to 95% RH (no condensation) | |
| Acoustic noise | Average 49 dBA when printing in letter quality ISO 7779 (Bystander Position Front) | |

Functional Specifications

| | LA48N | LA48W |
|------------------------------|---|-----------------------------------|
| Print method | Impact dot matrix with a 0.2 mm, 24-wire head | |
| Character cell | Horizontal x vertical | |
| Letter (10 cpi) | 36 x 24 dots | |
| Letter (12 cpi) | 30 x 24 dots | |
| High-impact draft | 24 x 24 dots | |
| Correspondence | 18 x 24 dots | |
| Draft | 12 x 24 dots | |
| High-speed draft | 9 x 24 dots | |
| Paper handling | Friction or tractors | |
| Cut sheets | Friction-feed platen | |
| Continuous forms | Push tractors, rear feed | |
| Paper type | 1-to 5-part side-glued or paper-stapled fanfolded continuous forms or label sheets with sprocket holes 1-to 5-part top-glued cut sheets and envelopes | |
| Paper size | | |
| Cut sheets Width | 102 to 266.7 mm (4 to 10.5 inch) | 102 to 420 mm (4 to 16.5 inch) |
| Length | 76 to 364 mm (3 to 14.3 inch) | 76 to 420 mm (3 to 16.5 inch) |
| Continuous Width | 102 to 266.7 mm (4 to 10.5 inch) | 102 to 420 mm (4 to 16.5 inch) |
| Length | 102 mm (4 inch) or greater | 102 mm (4 inch) or greater |
| Paper thickness | Up to 0.35 mm (0.014 inch) | |
| Number of copies | Up to 5, including the original | |
| Command sets (emulations) | DEC PPL2 IBM X24E (LA48N) IBM XL24E (LA48W) EPSON ESC P2 | |
| Fonts | 12 resident fonts available: Draft, High speed Draft, High impact, Courier 10, Pica 10, Prestige 12, Com- pression, Boldface PS, Timeless Normal PS, Nimbus Sans Normal PS, OCR-A, OCR-B | |
| Line spacing | 1, 2, 3, 4, 5, 6, 7, 8 or 12 lines per inch. Programmable in 1/360 inch or various increments for image graphics (ESC/P2) | |



| | LA48N | LA48W |
|---------------------|---|--------------|
| Character pitch | 2.5, 3, 5, 6, 10, 12, 13.2, 15, 16.5, 17, 18 or 20 cpi or proportional spacing. Programmable in 1/360 inch or various increments for image graphics. | |
| Characters per line | 80 cpl | 136 cpl |
| 10 cpi | 96 cpl | 163 cpl |
| 12 cpi | 120 cpl | 204 cpl |
| 15 cpi | 136.8 cpl | 231 cpl |
| 17 cpi | 144 cpl | 244 cpl |
| 18 cpi | 160 cpl | 272 cpl |
| 20 cpi | | |

Performance Specifications

| | | |
|------------------|------------------------------------|------------------------------|
| Print speed | 10 cpi | 12 cpi |
| Letter | 113 cps | 135 cps |
| Draft | 360 cps | 432 cps |
| High-speed draft | 400 cps (80-column printer) | 480 cps (80-column printer) |
| | 448 cps (136-column printer) | 537 cps (136-column printer) |
| Line feed speed | 80 ms per line at 6 lines per inch | |
| Form feed speed | 5.6 inches per second | |
| Ribbon life | Up to 5.0 million characters | |

Certification

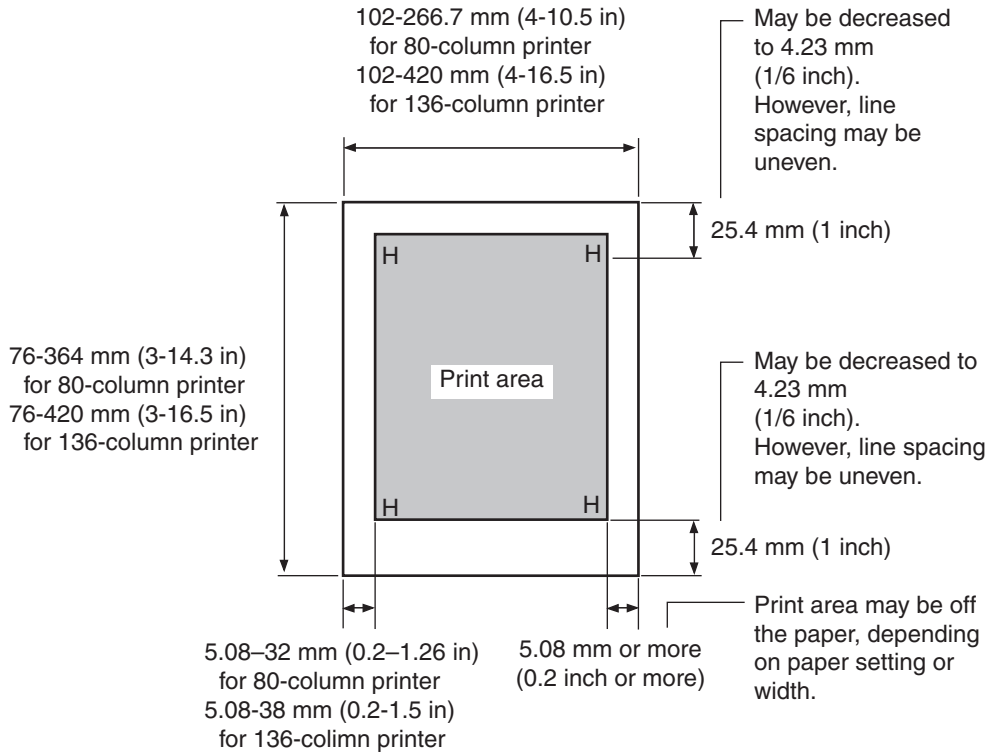
| Item | 100 V Model | 200 V Model |
|-----------------|--|------------------------------|
| Safety standard | CSA-C22.2 No.60950-1-02 UL60950-1-1 st Edition | EN 60 950 (TÜV) |
| EMC | FCC PART 15B class B | EN 55022 class B EN 55024 |



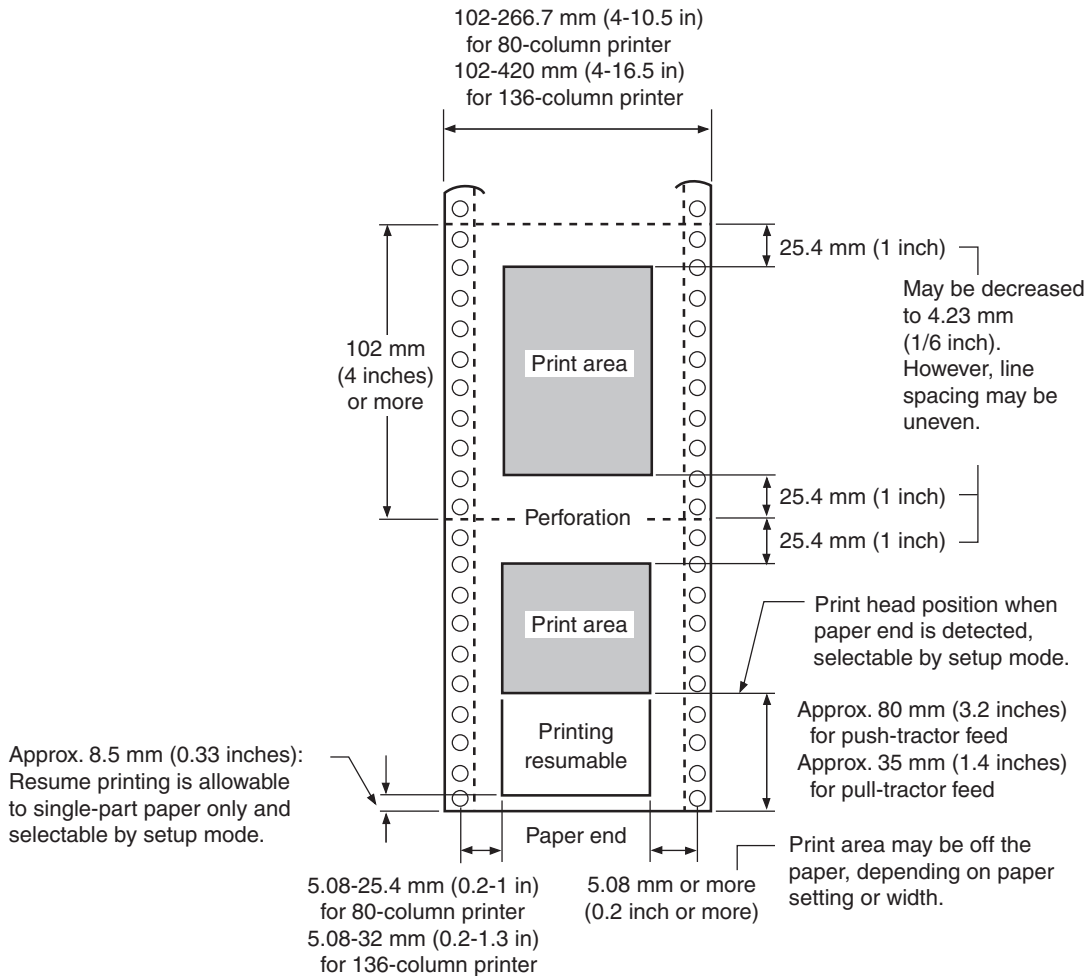
Paper Specifications

Print Area

This section illustrates the recommended print area for single sheets and continuous forms.



Print area for single sheets



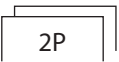
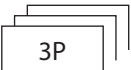
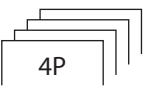
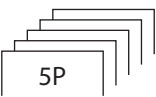
Print area for continuous forms



Paper Thickness

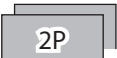
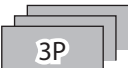




Paper thickness is given by the weight of the paper in either grams per square meter (g/m^2) or in pounds per bond (lbs/bond). The following table shows the allowable paper thickness for one-part paper or for each sheet of multipart paper. The total thickness must not exceed 0.35 mm (0.014 inch).

The weight of carbonless or carbon-backed paper may vary, depending upon the paper manufacturer. When using paper of borderline thickness, test the paper before running a job.

| Type of Paper | Number of Parts | Thickness |
|---|-----------------|---|
| One-part | Single | 52–81 g/m^2 (45–70 kg or 14–22 lb) |
| Carbonless | | |
|  | Top | 40–64 g/m^2 (34–55 kg or 11–17 lb) |
| | Bottom | 40–81 g/m^2 (34–70 kg or 11–22 lb) |
|  | Top | 40–64 g/m^2 (34–55 kg or 11–17 lb) |
| | Middle | 40–64 g/m^2 (34–55 kg or 11–17 lb) |
| | Bottom | 40–81 g/m^2 (34–70 kg or 11–22 lb) |
|  | Top | 40–64 g/m^2 (34–55 kg or 11–17 lb) |
| | Middle | 40–64 g/m^2 (34–55 kg or 11–17 lb) |
| | Middle | 40–64 g/m^2 (34–55 kg or 11–17 lb) |
| | Bottom | 40–81 g/m^2 (34–70 kg or 11–22 lb) |
|  | Top | 40–52 g/m^2 (34–45 kg or 11–17 lb) |
| | Middle | 40–52 g/m^2 (34–45 kg or 11–17 lb) |
| | Middle | 40–52 g/m^2 (34–45 kg or 11–17 lb) |
| | Middle | 40–52 g/m^2 (34–45 kg or 11–17 lb) |
| | Bottom | 40–64 g/m^2 (34–55 kg or 11–17 lb) |

kg: Weight in kilograms of 1000 sheets of 788 x 1091 mm paper (1.16 g/m^2)

lb: Weight in pounds of 500 sheets of 17 x 22 inch paper (3.76 g/m^2)

| Type of Paper | Number of Parts | Thickness |
|---|---|---|
| Carbon-backed | Do not use in high humidity environments. | |
|  | Top | 40–64 g/m ² (34–55 kg or 11–17 lb) |
| | Bottom | 40–81 g/m ² (34–70 kg or 11–22 lb) |
|  | Top | 40–64 g/m ² (34–55 kg or 11–17 lb) |
| | Middle | 40–64 g/m ² (34–55 kg or 11–17 lb) |
| | Bottom | 40–81 g/m ² (34–70 kg or 11–22 lb) |
|  | Top | 40–64 g/m ² (34–55 kg or 11–17 lb) |
| | Middle | 40–64 g/m ² (34–55 kg or 11–17 lb) |
| | Middle | 40–64 g/m ² (34–55 kg or 11–17 lb) |
| | Bottom | 40–81 g/m ² (34–70 kg or 11–22 lb) |
|  | Top | 40–52 g/m ² (34–45 kg or 11–14 lb) |
| | Middle | 40–52 g/m ² (34–45 kg or 11–14 lb) |
| | Middle | 40–52 g/m ² (34–45 kg or 11–14 lb) |
| | Middle | 40–52 g/m ² (34–45 kg or 11–14 lb) |
| | Bottom | 40–64 g/m ² (34–55 kg or 11–17 lb) |
| Carbon-interleaved | Avoid using carbon-interleaved single sheets. | |
|  | Top | 35–64 g/m ² (30–55 kg or 9–17 lb) |
| | Carbon | Counted as one sheet |
| | Bottom | 35–81 g/m ² (30–70 kg or 9–22 lb) |
|  | Top | 35–52 g/m ² (30–45 kg or 9–14 lb) |
| | Carbon | Counted as one sheet |
| | Middle | 35–52 g/m ² (30–45 kg or 9–14 lb) |
| | Carbon | Counted as one sheet |
| | Bottom | 35–64 g/m ² (30–55 kg or 9–17 lb) |

kg: Weight in kilograms of 1000 sheets of 788 x 1091 mm paper (1.16 g/m²)

lb: Weight in pounds of 500 sheets of 17 x 22 inch paper (3.76 g/m²)

Command Sets

This appendix describes printer commands and their parameters.

This printer has the following three resident command sets (emulations):

- DEC PPL2 (DIGITAL ANSI Printer Protocol Level 2)
- IBM Proprinter X24E (LA48N) and IBM Proprinter XL24E (LA48W)
- Epson ESC/P2

Select the same protocol on the printer and in your software. If your software protocols include DEC PPL2, select DEC PPL2 for optimum performance.

DEC PPL2 Quick Reference Guide

This section contains basic information on the DEC PPL2 commands supported in the GENICOM Matrix Printer LA48.

The commands are listed by function, in the following order:

- Positioning Controls
- Sheet size and margins
- Type size and spacing, managing implicit cursor motion
- Font management and attribute selection
- Tabs
- Selecting character sets
- Reports
- Miscellaneous
- Barcode printing
- Graphics

This section is intended for use in conjunction with the *Digital Ansi-compliant Printing Protocol Level 2 Programming Reference Manual* and the *Digital Ansi-compliant Printing Protocol Level 2 Programming Supplement*. These are referred to simply as the *Programming Reference Manual* and the *Programming Supplement*, respectively.

Ask the support of the manufacturer or your dealer in case of need.



Characters used in control functions appear in monospaced type. The following table explains some of the conventions used.

A pair of numbers separated by a slash (/) character indicates Column/Row notation. This notation refers to the location of a character in a standard code table, such as ASCII.

Spaces appear between characters in sequences for clarity; they are not part of the format. Space is designated as “*SP*” when it is part of the format of a command or sequence.

The following conventions are used in the command listings:

Conventions

| Code | Description |
|----------------------|---|
| <i>ESC</i> | Escape (1/11), introduces an escape sequence |
| <i>CSI</i> | Control Sequence Introducer (9/11), introduces a control sequence. CSI can also be represented by the equivalent escape sequence <i>ESC</i> [(1/11 5/11). |
| <i>DCS</i> | Device Control String (9/0), introduces a device control string. DCS can also be represented by the equivalent escape sequence <i>ESC</i> P (1/11 5/0). |
| <i>ST</i> | String Terminator (9/12) indicates the end of a control string. ST can also be represented by the equivalent escape sequence <i>ESC</i> \ (1/11 5/12). |
| <i>Pn</i> | Numeric parameter, or number of units that specify a distance or quantity pertaining to the escape sequence, control function or control string. |
| <i>Ps</i> | Selective parameter, or one which identifies a list of options pertaining to the specif command. If “>” (3/14) or “?” (3/15) occurs at the beginning of a string of parameters, parameters that follow are Digital private parameters. “>” or “?”, if present, must occur only once at the beginning of the parameter string. |
| <i>I_n</i> | Intermediate character — component of an escape sequence, control sequence or control string |
| <i>F</i> | Final character — component of an escape sequence, control sequence or control string |
| <i>SP</i> | Space (2/0) |

C0 Control Characters are given in the figure “Standard 8-bit Code Table (Left Half),” and C1 Control Characters are given in Figure “Standard 8-bit Code Table (Right Half)” in an 8-bit environment.

In the 7-bit environment, C1 Control Characters can be sent with an escape sequence provided in the following tables.

Both numeric and selective parameters are interpreted as unsigned decimal integers, with the most significant digit sent first. For instance, the value 16 is coded as “16” (3/1 3/6). Leading zeros are allowed but are ignored. Plus and minus signs are not allowed.

Positioning Controls

| Mnemonic | Function | Command | Remarks |
|----------|---------------------------------|--------------------------|--|
| BS | Backspace | 0/8 | <i>C0 Control Code</i> |
| CR | Carriage Return | 0/13 | <i>C0 Control Code</i> |
| FF | Form Feed | 0/12 | <i>C0 Control Code</i> |
| HT | Horizontal Tab | 0/9 | <i>C0 Control Code</i> |
| LF | Line Feed | 0/10 | <i>C0 Control Code</i> |
| VT | Vertical Tab | 0/11 | <i>C0 Control Code</i> |
| HTS | Horizontal Tab Set | 8/8 | <i>C1 Control Code</i> 7-bit environment : <i>ESC H</i> |
| IND | Index | 8/4 | <i>C1 Control Code</i> 7-bit environment : <i>ESC D</i> |
| NEL | Next Line | 8/5 | <i>C1 Control Code</i> 7-bit environment : <i>ESC E</i> |
| PLD | Partial Line Down | 8/11 | <i>C1 Control Code</i> 7-bit environment : <i>ESC K</i> Advance paper 1/12 in. |
| PLU | Partial Line Up | 8/12 | <i>C1 Control Code</i> 7-bit environment : <i>ESC L</i> Reverse paper 1/12 in. |
| VTs | Vertical Tab Set | 8/10 | <i>C1 Control Code</i> 7-bit environment : <i>ESC J</i> |
| DECCAHT | Clear All Horizontal Tabs | <i>ESC 2</i> | |
| DECCAVT | Clear All Vertical Tabs | <i>ESC 4</i> | |
| DECSHTS | Set Horizontal Tab Stops | <i>CSI Pn ;...; Pn u</i> | Pn = tabstop position |
| DECSVTS | Set Vertical Tab Stops | <i>CSI Pn ;...; Pn v</i> | Pn = tabstop position |
| DECHTS | Horizontal Tab Set | <i>ESC 1</i> | |
| DECVTS | Vertical Tab Set | <i>ESC 3</i> | |
| HPA | Horizontal Position Absolute | <i>CSI Pn `</i> | Pn = position to move to |



| Mnemonic | Function | Command | Remarks |
|----------|------------------------------|-----------------|-----------------------------|
| HPR | Horizontal Position Relative | <i>CSI Pn a</i> | Pn = number of columns down |
| VPA | Vertical Position Absolute | <i>CSI Pn d</i> | Pn = position to move to |
| VPR | Vertical Position Relative | <i>CSI Pn e</i> | Pn = number of lines down |

Sheet Size and Margins

| Mnemonic | Function | Command | Remarks |
|-----------------------------------|------------------------------------|--------------------------|--|
| DECSLPP | Set Lines per Physical Page | <i>CSI Pn t</i> | Pn = number of lines per pages |
| DECVPLA | Set Vertical Page Length Alignment | <i>CSI Pn1 ; Pn2 - u</i> | Pn1 = position of the origin from top of form (in 1/720 in.). Pn2 = Paper length in 1/720 in. |
| DECSLRM | Set Left and Right Margins | <i>CSI Pn1 ; Pn2 s</i> | Pn1 = left margin Pn2 = right margin |
| DECHPWA | Set Page Width Alignment | <i>CSI Pn1 ; Pn2 " s</i> | Pn1 ⁴ = origin Pn2 ⁴ = paper width |
| DECSTBM | Set Top and Bottom Margins | <i>CSI Pn1 ; Pn2 r</i> | Pn1 = top margin Pn2 = bottom margin |
| ⁴ Units are 1/12 inch. | | | |

Type Size and Spacing, Managing Implicit Cursor Motion

| Mnemonic | Function | Command | Remarks |
|----------|--------------------------------|-------------------|---|
| DECAWM | Autowrap Mode | <i>CSI ? 7 h</i> | Set autowrap mode |
| | | <i>CSI ? 7 l</i> | Reset autowrap mode |
| DECCRNLM | Carriage Return /New Line Mode | <i>CSI ? 40 h</i> | CR acts as New Line |
| | | <i>CSI ? 40 l</i> | CR acts as Carriage Return |
| DECPSP | Proportional Spacing Mode | <i>CSI ? 27 h</i> | Set proportional spacing mode |
| | | <i>CSI ? 27 l</i> | Reset proportional spacing mode |
| DECSHORP | Set Horizontal Pitch | <i>CSI Ps w</i> | Ps = 0: Determined by current font. Ps = 8: 8.25 CPI Ps = 1: 10 CPI Ps = 9: 15 CPI Ps = 2: 12 CPI Ps = 11: 17.1 CPI Ps = 3: 13.2 CPI Ps = 12: 8.55 CPI Ps = 4: 16.5 CPI Ps = 13: 18 CPI Ps = 5: 5 CPI Ps = 14: 9 CPI Ps = 6: 6 CPI Ps = 15: 10 CPI Ps = 7: 6.6 CPI Ps = 16: 20 CPI |
| DECVERP | Set Vertical Pitch | <i>CSI Ps z</i> | Ps = 0: Determined by current font Ps = 1: 6 LPI Ps = 2: 8 LPI Ps = 3: 12 LPI Ps = 4: 2 LPI Ps = 5: 3 LPI Ps = 6: 4 LPI Ps = 21: 4 LPcm ¹ Ps = 22: 2 LPcm Ps = 23: 1 LPcm Ps = 11–16 and 31–33: same as 1–6 and 21–23 |
| LNLM | Line Feed/New Line Mode | <i>CSI 20 h</i> | LF acts as New Line |
| | | <i>CSI 20 l</i> | LF acts as line feed |

¹LPcm = Lines per centimeter

Font Management and Attribute Selection

| Mnemonic | Function | Command | Remarks |
|----------|---|--|--|
| SGR | Select Graphic Rendition - <i>Selecting Fonts</i> | <i>CSI Ps m</i> | Ps = 10 : Courier Ps = 11 : Timeless PS Ps = 12 : Nimbus Sans Ps = 13 : Prestige Ps = 14 : Pica Ps = 15 : Boldface PS Ps = 16 : Courier Ps = 17 : Compressed Ps = 18 : OCR-A Ps = 19 : OCR-B |
| SGR | Select Graphic Rendition - <i>Selecting Attributes</i> | <i>CSI Ps m</i> | Ps = 0: Turn off all attributes Ps = 1: Bold on Ps = 3: Slant on Ps = 4: Underline on Ps = 9: Strike-through on Ps = 21: Double underline on Ps = 22: Bold off Ps = 23: Slant off Ps = 24: Any underline off Ps = 29: Strike-through on Ps = 30: Print Text in back Ps = 31: Print Text in red Ps = 32: Print Text in green Ps = 33: Print Text in yellow Ps = 34: Print Text in blue Ps = 35: Print Text in magenta Ps = 36: Print Text in cyan Ps = 37: Print Text in "white" (no printing) Ps = 39: Print Text in black Ps = 53: Overline on Ps = 55: Overline off Ps = ?4: Superscript on Ps = ?5: Subscript on Ps = ?24: Script off |
| DECDDL | Download Font | <i>DCS parameter_string { D . . . D ST</i> | See the <i>Programming Reference Manual</i> |
| DEC DEN | Printing Density Selection | <i>CSI Ps " z</i> | Ps = 0 or 1: Select draft Ps = 2: Select letter quality Ps = 3: Select high speed draft Ps = 4: Select near letter quality (also called correspondence) Ps = 5: Select high impact draft |

Tabs

| Mnemonic | Function | Command | Remarks |
|----------|---------------------------|------------------------------|---|
| DECCAHT | Clear All Horizontal Tabs | <i>ESC 2</i> | deprecated command |
| DECAVT | Clear All Vertical Tabs | <i>ESC 4</i> | deprecated command |
| DECHTS | Horizontal Tab Set | <i>ESC 1</i> | deprecated command |
| DECSHTS | Set Horizontal Tab Stops | <i>CSI Pn ; . . . ; Pn u</i> | Pn = tab stop |
| DECSVTS | Set Vertical Tab Stops | <i>CSI Pn ; . . . ; Pn v</i> | Pn = tab stop |
| DECVTS | Vertical Tab Set | <i>ESC 3</i> | deprecated command |
| TBC | Tab Clear | <i>CSI Ps ; . . . ; Ps g</i> | Ps = 0: Clear horiz. tab at active position Ps = 1: Clear vert. tab at active position Ps = 2 or 3: Clear all horiz. tabs Ps = 4: Clear all vert. tabs |

Selecting Character Sets

See Figure “Designating and Invoking Character Sets” later in this section.

| Mnemonic | Function | Command | Remarks |
|----------|---|---|--|
| ASCEF | Announce Subset of Code Extension Facilities | <i>ESC SP L</i> <i>ESC SP M</i> <i>ESC SP N</i> | ASCII in G0 and GL. ISO Latin-1 in G1 and GR. Same as <i>ESC SP L</i> ASCII in G0 and GL. |
| DECAUPSS | Assign User Preference Supplemental Set ISO Latin 9 | <i>DCS Ps ! u</i> <i>D . . . D ST</i> <i>DCS I ! u b ST</i> | Ps = 0: 94-char. set Ps = 1: 96-char. set <i>D . . . D</i> : SCS designating sequence. ST = 09/12 or Esc\ |
| SS2 | Single Shift 2 | <i>C1 Control Code</i> 7-bit environment : <i>ESC N</i> | Take the next character from G2 |
| SS3 | Single Shift 3 | <i>C1 Control Code</i> 7-bit environment : <i>ESC O</i> | Take the next character from G3 |
| LS0 | Locking Shift 0 (or Shift In) | <i>SI</i> | Invoke G0 into GL |
| LS1 | Locking Shift 1 (or Shift Out) | <i>SO</i> | Invoke G1 into GL |
| LS2 | Locking Shift 2 | <i>ESC n</i> | Incoke G2 into GL |
| LS3 | Locking Shift 3 | <i>ESC o</i> | Invoke G3 into GL |
| LS1R | Locking Shift 1 Right | <i>ESC ~</i> | Invoke G1 into GR |
| LS2R | Locking Shift 1 Right | <i>ESC }</i> | Invoke G2 into GR |
| LS3R | Locking Shift 1 Right | <i>ESC /</i> | Invoke G3 into GR |
| SCS | Select Character Set | <i>ESC I₁ I₂ F</i> | I ₁ = “(”): Invoke 94-char. set into G0 I ₁ = “)”): Invoke 94-char. set into G1 I ₁ = “*”: Invoke 94-char. set into G2 I ₁ = “+”: Invoke 94-char. set into G3 I ₁ = “-”: Invoke 96-char. set into G1 I ₁ = “.”): Invoke 96-char. set into G2 I ₁ = “/”: Invoke 96-char. set into G3 I ₂ F = final characters from “SCS Final Characters” later in this section |

SCS Final Characters

| Character Set | I ₂ F Designator Characters | |
|--------------------------------|--|-----------|
| 94-Character Sets | | |
| British | A | 4/1 |
| ASCII | B | 4/2 |
| DEC Dutch | 4 | 3/4 |
| DEC Finnish | 5 | 3/5 |
| French | R | 5/2 |
| DEC French-Canadian | 9 | 3/9 |
| German | K | 4/11 |
| DEC Hebrew Supplemental | "4 | 2/2, 3/4 |
| DEC 7-Bit Hebrew | %= | 2/5, 3/13 |
| ISO Italian | Y | 5/9 |
| Legal | %4 | 2/5, 3/4 |
| JIS Katakana | I | 4/9 |
| JIS Roman | J | 4/10 |
| DEC Norwegian/Danish | 6 | 3/6 |
| ISO Spanish | Z | 5/10 |
| DEC Swedish | 7 | 3/7 |
| DEC Swiss | = | 3/13 |
| Norwegian/Danish | ‘ | 6/0 |
| DEC Supplemental | %5 | 2/5, 3/5 |
| DEC Technical | > | 3/14 |
| DEC Special Graphics | 0 | 3/0 |
| DEC Portuguese | %6 | 2/5, 3/6 |
| 7-Bit Turkish | %2 | 2/5, 3/2 |
| DEC 8-Bit Turkish Supplemental | %0 | 2/5, 3/0 |
| DEC 8-Bit Greek Supplemental | "? | 2/2, 3/15 |
| User Preference Supplemental | < | 3/12 |



| Character Set | I ₂ F Designator Characters | |
|---------------------------------|--|------|
| 96-Character Sets | | |
| ISO Latin-1 Supplemental | A | 4/1 |
| ISO Latin-2 Supplemental | B | 4/2 |
| ISO Latin-9 Supplemental | b | 6/2 |
| ISO Latin-Greek Supplemental | F | 4/6 |
| ISO Latin-Hebrew Supplemental | H | 4/8 |
| ISO Latin/Cyrillic Supplemental | L | 4/12 |
| ISO Latin-5 Supplemental | M | 4/13 |
| User Preference Supplemental | < | 3/12 |

Reports

| Mnemonic | Function | Command | Remarks |
|----------|------------------------------------|--|---|
| DA | Device Attributes | <i>CSI c</i> | Request Device Attributes Report |
| DAR | Device Attributes Report | <i>ESC [? ps1 ; Ps2 ; . . . ; Psn c</i> (printer to host) | Ps1 = 72 Ps2–Psn describe extensions. See the Programming Supplement. |
| DA2 | Secondary Device Attributes | <i>CSI > Ps c</i> | Ps must = 0 |
| DA2R | Secondary Device Attributes Report | <i>ESC [> Ps1 ; Ps2 ; Ps3 ; Ps4 ; Ps5 c</i> (printer to host) | Ps1 = 67: model LA30N 68: model LA30W Ps2 = firmware revision x 10 Ps3 = 0 (or 1 reserved) Ps4 = 20 Ps5 = firmware edit revision |
| DECLANS | Load ANSWERBACK Without Password | <i>DCS Ps v encoded_ message_string ST</i> | Message is Hex. encoded. |

| Mnemonic | Function | Command | Remarks |
|----------|-------------------------------------|--|---|
| DECLANS | Load ANSWERBACK With Password | <i>DCS Ps ; Pn2 ; Pn3 v encoded_message_ string ST</i> | Ps = 1 : No password - Do not store message. Ps = 2 : No password - Store message. Ps = 3 : Password - Store message : Pn2 : Old password Pn3 : New password Default password : 0 Password range : 0 - 9999 |
| ENQ | Send ANSWERBACK Message | 0/5 | <i>C0 Control Code</i> |
| DSR | Device Status Request | <i>CSI Ps n</i> | Ps = 0 or 5: Request extended DSR Ps = ?2: Enable brief unsolicited reports, send extended report Ps = ?3: Enable/send extended unsolicited reports |
| DSR | Device Status Report | Brief: <i>CSI Ps n</i> Extended: brief, followed by <i>CSI Pn1 ; Pn2 ; . . . ; Pnn n</i> | Ps = 0: No errors Ps = 3: Error See the <i>Programming Supplement</i> for extended report |

Miscellaneous

| Mnemonic | Function | Command | Remarks |
|------------------|---------------------------------|--|---|
| BEL | Bell | 0/7 | <i>C0 Control Code</i> |
| DECSCL | Select Conformance Level | <i>CSI Ps1 " p</i> | Ps = 0: reset - native level Ps = 71: reset - DEC PPL1 Ps = 72: reset - DEC PPL2 |
| DECSTR | Soft Terminal Reset | <i>CSI ! p</i> | Reset to initial state |
| RIS | Reset to Initial State | <i>ESC c</i> | Reset to initial state |
| DECIPEM | IBM Proprinter Protocol Mode | <i>CSI ? 58 h</i> <i>CSI ? 58 l</i> | Deprecated function |
| ROCS | Return from Other Coding System | <i>ESC % @</i> | Return to DEC PPL2 mode |
| SOCS | Select Other Coding System | <i>ESC % =</i> <i>ESC % SP 2</i> | IBM Proprinter Protocol Epson Protocol |
| CRM | Control Representation Mode | <i>CSI 3 h</i> <i>CSI 3 l</i> | Print hex representation for all characters Reset |
| DECASFC | Automatic Sheet Feeder Control | <i>CSI Ps ! v</i> | Ps = 0: No change Ps = n: Tray n (reserved) Ps = 4 : Tractor feeding Ps = 99: Manual feed |
| DECSITF input | Select Input Tray Failover | <i>CSI Ps1 ; Ps2</i> <i>; . . . ; Psn SP w</i> | Ps1 = 0: Disable all composite trays Ps1 = n: Define composite tray <i>n</i> Ps2–Psn = n: Add tray <i>n</i> to the composite definition |
| DECUPM | Unidirectional Print Mode | <i>CSI ? 41 h</i> <i>CSI ? 41 l</i> | Set unidirectional print mode Reset unidirectional print mode |
| SnC1R /DEC*C1 | C1 Transmit /Receive | <i>ESC SP 6</i> <i>ESC SP 7</i> <i>ESC SP F</i> <i>ESC SP G</i> | Process 7-bit, drop 8th bit Process 7-bit and 8-bit Transmit 8-bit as 7-bit equivalents Transmit 8-bit (not supported) |

Barcode Printing

| Mnemonic | Function | Command | Remarks |
|----------|----------------------------|--------------------------------------|---|
| DECBAR | Start or Stop Bar Codes | <i>ESC % SP 0</i> <i>ESC % @</i> | Start barcode Stop barcode |
| DECSBCA | Select Bar Code Attributes | <i>CSI Ps1 ; Pn2 ; ... ; Ps9 ' q</i> | |
| | | Parameters | Values |
| | | Ps1 | Bar Code System 0, 2 : Code 39 1 : Interleaved 2 of 5 4 : EAN 8 5 : EAN 13 7 : Codabar a/t 8 : Codabar b/n 9 : Codabar c/* 10 : Codabar d/e 11 : UPC-A 13 : Postnet 14 : Industrial 2 of 5 18 : Matrix 2 of 5 |
| | | Pn2 | Width of narrow bars in Decipoints Supported values : 10 (default) - 15 - 20 - 25 - 30. Not applicable to UPC, EAN and Postnet systems. |
| | | Pn3 | Width of quiet zones in Decipoints Supported value : 180 |
| | | Pn4 | Width of wide bars in Decipoints Ignored. Set at 2.5 * Pn2. |
| | | Pn5 | Ignored |
| | | Pn6 | Height of bars in Decipoints Min = 60 Max = 2400 Default = 120 |
| | | Pn7 | Ignored |
| | | Pn8 | Ignored |
| | | Ps9 | Human Readable Characters 0, 1 : No HRC 2, 3, 4 : Print HRC Ignored for Postnet |

Active position after printing a bar code is the same position as before printing bar code.

After printing bar code, appropriate positioning control commands, see “Positioning Controls” earlier in this section, must be sent to print additional barcode strings, text or graphics.

In the following examples, HPA Pn command positions the Active Position at column Pn , VPA Pn command positions the Active Position at line Pn.

1. Two barcodes Code 39 on the same line:

```
DECSBCA CSI 0;;;;;;;;;'q
DECBAR(start) data DECBAR(stop) HPA Pn
DECBAR(start) data DECBAR(stop)
```

2. Two barcodes Code 39 one above the other:

```
DECSBCA CSI 0;;;;;;;;;'q
DECBAR(start) data DECBAR(stop) VPA Pn
DECBAR(start) data DECBAR(stop)
```

Sixel Graphics Device Control String Envelope

| Command | Function | Remarks |
|--------------------------|-------------------|---|
| <i>DCS</i> | String Introducer | |
| <i>Ps1 ; Pn2 ; Pn3 q</i> | Protocol Selector | <p>Ps1 : macro parameter, select horizontal grid size and pixel aspect ratio. See “Sixel Graphics Protocol Selector Ps1” later in this section.</p> <p>Ps2 : ignored.</p> <p>Pn3 : horizontal grid size - overrides Ps1 for horizontal grid size - aspect ratio unchanged. See “Sixel Graphics Grid Size defined by Pn3” later in this section.</p> |
| <i>sixel data</i> | Picture data | Includes sixel printable characters and sixel control codes. See “Sixel Graphics Control Codes” later in this section. |
| <i>ST</i> | String Terminator | Exit Sixel Graphics mode and return to text mode. |

Sixel Graphics Protocol Selector Ps1

| Ps1 Value | Horizontal Grid Size (inches) | Aspect Ratio (Vert : Hor) ¹ |
|--------------|-------------------------------|--|
| 0, 1 or none | 1/144 | 2 |
| 2 | 1/360 | 5 |
| 3, 4 | 1/180 | 2.5 |
| 5, 6, 7, 8 | 1/144 | 2 |
| 9 | 1/72 | 1 |
| > 9 | 1/144 | 2 |

¹Vertical Grid size = 1/72 in., unless modified by Pn3 or DECGRA.

Sixel Graphics Grid Size defined by Pn3

| Pn3 Value | HGS:VGS (dpi) by Aspect Ratio (defined by Ps1) | | | |
|-----------|--|---------|---------|--------|
| | 1:1 | 2:1 | 2.5:1 | 5:1 |
| 0 or none | No change to HGS and VGS defined by Ps1 | | | |
| 1, 2 | 360:360 | 360:180 | 360:144 | 360:72 |
| 3, 4 | 180:180 | 180:90 | 180:72 | 180:36 |
| 5, 6, 7 | 144:144 | 144:72 | 180:72 | 180:36 |
| 8, 9 | 90:90 | 90:45 | 90:36 | 180:36 |
| 10 - 15 | 72:72 | 72:36 | 90:36 | 180:36 |
| 16 - 19 | 45:45 | 72:36 | 90:36 | 180:36 |
| • 20 | 36:36 | 72:36 | 90:36 | 180:36 |

Sixel Graphics Control Codes

| Mnemonic | Function | Command | Remarks |
|----------|-------------------------------|----------------------|--|
| DECGRA | Set Raster Attributes | " (2/2) | Defines the pixel aspect ratio. Followed by parameters <i>Pn1 ; Pn2 ; Pn3 ; Pn4</i> Pn1 : Pixel aspect ratio numerator Pn2 : Pixel aspect ratio denominator Pn3 and Pn4 : ignored |
| DECGRI | Graphics Repeat Introducer | ! (2/1) | Followed by a numeric value Pn and a sixel data to be repeated Pn times. |
| DECGCR | Graphics Carriage Return | \$ (2/4) | Returns active position to graphics left margin. |
| DECGNL | Graphics Next Line | – (2/13) | Returns active position to graphics left margin and increments to next graphics line. |
| DECGCI | Graphics Color Introducer | # (2/3) | Assigns a color to a color number or selects a predefined color number. Followed by parameters <i>Pc ; Pu ; Px ; Py ; Pz</i> Pc : Color number (0 - 255) Pu : Universal coordinate system selector : 1 = HLS 2 = RGB Px , Py , Pz : color coordinates |
| | Parameter Characters | 0 - 9 (3/0 - 3/9) | Numeric parameters - used on the above control codes |
| | Parameter Separator | ; (3/11) | Separates parameters - used on the above control codes |
| | Sixel Data | (3/15 - 7/14) | Sixel printable characters. The printer subtracts the offset (3F hexadecimal) from the received code, assigning each of the remaining low- order six bits to a grid position : LSB = top pixel MSB = bottom pixel Examples : ? (3/15) : blank character @ (4/0) : print only top pixel A (4/1) : print second-from-top pixel ~ (7/14) : print one full column |



Standard 8-bit Code Table (Left Half)

| Standard Left | | | | | | | | | | | | | | | | | |
|-----------------------------|----|-----|---------------|---------------|--------------------|----|----------------|---|----------------|---|-----------------|---|-----------------|---|------------------|-----|------------------|
| C0 Control Set | | | | | Graphics Left (GL) | | | | | | | | | | | | |
| Column | | 0 | 1 | | 2 | | 3 | | 4 | | 5 | | 6 | | 7 | | |
| Row | 0 | NUL | 0 0 0 | DLE | 20 16 10 | SP | 40 32 20 | 0 | 60 48 30 | @ | 100 64 40 | P | 120 80 50 | ` | 140 96 60 | p | 160 112 70 |
| 1 | 1 | SOH | 1 1 1 | DC1 (XON) | 21 17 11 | ! | 41 33 21 | 1 | 61 49 31 | A | 101 65 41 | Q | 121 81 51 | a | 141 97 61 | q | 161 113 71 |
| 2 | 2 | STX | 2 2 2 | DC2 | 22 18 12 | " | 42 34 22 | 2 | 62 50 32 | B | 102 66 42 | R | 122 82 52 | b | 142 98 62 | r | 162 114 72 |
| 3 | 3 | ETX | 3 3 3 | DC3 (XOFF) | 23 19 13 | # | 43 35 23 | 3 | 63 51 33 | C | 103 67 43 | S | 123 83 53 | c | 143 99 63 | s | 163 115 73 |
| 4 | 4 | EOT | 4 4 4 | DC4 | 24 20 14 | \$ | 44 36 24 | 4 | 64 52 34 | D | 104 68 44 | T | 124 84 54 | d | 144 100 64 | t | 164 116 74 |
| 5 | 5 | ENQ | 5 5 5 | NAK | 25 21 15 | % | 45 37 25 | 5 | 65 53 35 | E | 105 69 45 | U | 125 85 55 | e | 145 101 65 | u | 165 117 75 |
| 6 | 6 | ACK | 6 6 6 | SYN | 26 22 16 | & | 46 38 26 | 6 | 66 54 36 | F | 106 70 46 | V | 126 86 56 | f | 146 102 66 | v | 166 118 76 |
| 7 | 7 | BEL | 7 7 7 | ETB | 27 23 17 | ' | 47 39 27 | 7 | 67 55 37 | G | 107 71 47 | W | 127 87 57 | g | 147 103 67 | w | 167 119 77 |
| 8 | 8 | BS | 10 8 8 | CAN | 30 24 18 | (| 50 40 28 | 8 | 70 56 38 | H | 110 72 48 | X | 130 88 58 | h | 150 104 68 | x | 170 120 78 |
| 9 | 9 | HT | 11 9 9 | EM | 31 25 19 |) | 51 41 29 | 9 | 71 57 39 | I | 111 73 49 | Y | 131 89 59 | i | 151 105 69 | y | 171 121 79 |
| 10 | 10 | LF | 12 10 A | SUB | 32 26 1A | * | 52 42 2A | : | 72 58 3A | J | 112 74 4A | Z | 132 90 5A | j | 152 106 6A | z | 172 122 7A |
| 11 | 11 | VT | 13 11 B | ESC | 33 27 1B | + | 53 43 2B | ; | 73 59 3B | K | 113 75 4B | [| 133 91 5B | k | 153 107 6B | { | 173 123 7B |
| 12 | 12 | FF | 14 12 C | FS | 34 28 1C | , | 54 44 2C | < | 74 60 3C | L | 114 76 4C | \ | 134 92 5C | l | 154 108 6C | | 174 124 7C |
| 13 | 13 | CR | 15 13 D | GS | 35 29 1D | - | 55 45 2D | = | 75 61 3D | M | 115 77 4D |] | 135 93 5D | m | 155 109 6D | } | 175 125 7D |
| 14 | 14 | SO | 16 14 E | RS | 36 30 1E | . | 56 46 2E | > | 76 62 3E | N | 116 78 4E | ^ | 136 94 5E | n | 156 110 6E | ~ | 176 126 7E |
| 15 | 15 | SI | 17 15 F | US | 37 31 1F | / | 57 47 2F | ? | 77 63 3F | O | 117 79 4F | _ | 137 95 5F | o | 157 111 6F | DEL | 177 127 7F |
| ASCII Graphic Character Set | | | | | | | | | | | | | | | | | |
| LEGEND | | | | | | | | | | | | | | | | | |
| | | GL | | | | | | | | | | | | | | | |
| | | 4/1 | | Column/Row | | | | | | | | | | | | | |
| A | | 101 | | Octal | | | | | | | | | | | | | |
| | | 65 | | Decimal | | | | | | | | | | | | | |
| | | 41 | | Hex | | | | | | | | | | | | | |

Standard 8-bit Code Table (Left Half)



Standard 8-bit Code Table (Right Half)

Standard Right

| C1 Control Set | | | | Graphics Right (GR) | | | | | | | | | | | |
|----------------|--|------------------|-----|---------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|--|--|--|--|
| Column | | 8 | 9 | 10 | | 11 | 12 | 13 | 14 | 15 | | | | | |
| Row 0 | | 200 128 80 | DCS | 220 144 90 | | | | | 320 208 D0 | 340 224 E0 | 360 240 F0 | | | | |
| 1 | | 201 129 81 | PU1 | 221 145 91 | 240 160 A0 | 260 176 B0 | 280 192 C0 | 300 209 D1 | 320 210 D2 | 340 225 E1 | 360 241 F1 | | | | |
| 2 | | 202 130 82 | BPH | 222 146 92 | 241 161 A1 | 261 177 B1 | 281 193 C1 | 301 210 D1 | 321 211 D2 | 341 226 E2 | 361 242 F2 | | | | |
| 3 | | 203 131 83 | NBH | 223 147 93 | 242 162 A2 | 262 178 B2 | 282 194 C2 | 302 211 D3 | 322 212 D4 | 342 227 E3 | 362 243 F3 | | | | |
| 4 | | 204 132 84 | IND | 224 148 94 | 243 163 A3 | 263 179 B3 | 283 195 C3 | 303 212 D4 | 323 213 D5 | 343 228 E4 | 363 244 F4 | | | | |
| 5 | | 205 133 85 | NEL | 225 149 95 | 244 164 A4 | 264 180 B4 | 284 196 C4 | 304 213 D5 | 324 214 D6 | 344 229 E5 | 364 245 F5 | | | | |
| 6 | | 206 134 86 | SSA | 226 150 96 | 245 165 A5 | 265 181 B5 | 285 197 C5 | 305 214 D6 | 325 215 D7 | 345 230 E6 | 365 246 F6 | | | | |
| 7 | | 207 135 87 | ESA | 227 151 97 | 246 166 A6 | 266 182 B6 | 286 198 C6 | 306 215 D7 | 326 216 D8 | 346 231 E7 | 366 247 F7 | | | | |
| 8 | | 208 136 88 | HTS | 228 152 98 | 247 167 A7 | 267 183 B7 | 287 199 C7 | 307 216 D8 | 327 217 D9 | 347 232 E8 | 367 248 F8 | | | | |
| 9 | | 209 137 89 | HTJ | 229 153 99 | 248 168 A8 | 268 184 B8 | 288 200 C8 | 308 217 D9 | 328 218 DA | 348 233 E9 | 368 249 F9 | | | | |
| 10 | | 210 138 8A | VTS | 230 154 9A | 249 169 A9 | 269 185 B9 | 289 201 C9 | 309 218 DA | 329 219 DB | 349 234 EA | 369 250 FA | | | | |
| 11 | | 211 139 8B | PLD | 231 155 9B | 250 170 AA | 270 186 BA | 290 202 CA | 310 219 DB | 330 220 DC | 350 235 EB | 370 251 FB | | | | |
| 12 | | 212 140 8C | PLU | 232 156 9C | 251 171 AB | 271 187 BB | 291 203 CB | 311 220 DC | 331 221 DD | 351 236 EC | 371 252 FC | | | | |
| 13 | | 213 141 8D | RI | 233 157 9D | 252 172 AC | 272 188 BC | 292 204 CC | 312 221 DD | 332 222 DE | 352 237 ED | 372 253 FD | | | | |
| 14 | | 214 142 8E | SS2 | 234 158 9E | 253 173 AD | 273 189 BD | 293 205 CD | 313 222 DE | 333 223 DF | 353 238 EE | 373 254 FE | | | | |
| 15 | | 215 143 8F | SS3 | 235 159 9F | 254 174 AE | 274 190 BE | 294 206 CE | 314 223 DF | 334 224 EF | 354 239 FF | 374 255 FF | | | | |

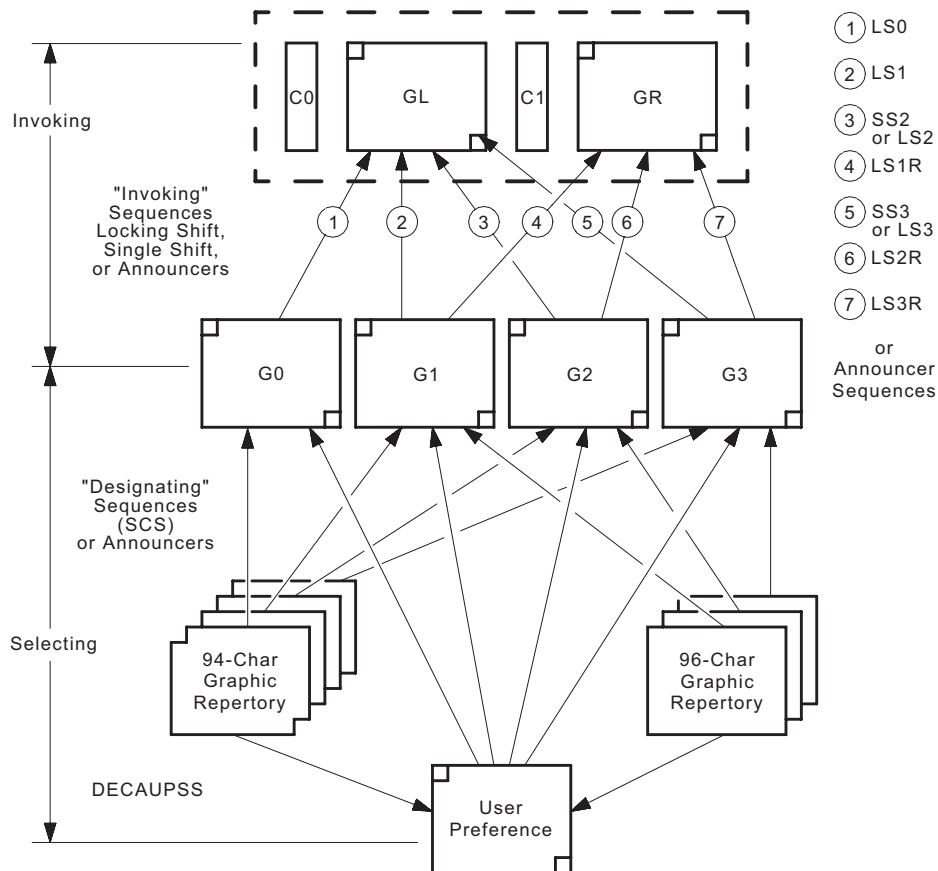
DEC Supplemental Graphic Character Set

LEGEND

| GR | Column/Row |
|------|------------|
| 12/1 | Octal |
| Á | Decimal |
| Á | Hex |

Standard 8-bit Code Table (Right Half)

Designating and Invoking Character Sets



Power-up configuration is as follows:

GL:G0

GR:G2

G0:Value for DEC G0 CST Set-Up option

G1:ASCII G2:User Preference

G3:User Preference

User Preference:Value for USER PREF Set-Up option

Standard 8-bit Code Table (Right Half)



National Replacement Character Sets

| Location | National Replacement Character Sets | | | | | | | |
|----------|-------------------------------------|---------|-------------|--------|-------------------|--------|-------------|-----------|
| | US ASCII | British | DEC Finnish | French | DEC French-Canada | German | ISO Italian | JIS Roman |
| 2/3 | # | £ | | £ | | | £ | |
| 4/0 | @ | | | à | à | § | § | |
| 5/11 | [| | Ä | ° | â | Ä | ° | |
| 5/12 | \ | | Ö | ç | ç | Ö | ç | ¥ |
| 5/13 |] | | Å | § | ê | Ü | é | |
| 5/14 | ^ | | Û | | î | | | |
| 6/0 | ‘ | | é | | ô | | ù | |
| 7/11 | { | | ä | é | é | ä | à | |
| 7/12 | | | ö | ù | ù | ö | ò | |
| 7/13 | } | | å | è | è | ü | è | |
| 7/14 | ~ | | ü | ” | û | ß | ì | — |

| Location | National Replacement Character Sets | | | | | | | |
|----------|-------------------------------------|----------------------|-------------|-------------|------------------|-----------|-----------|----------------|
| | US ASCII | DEC Norwegian-Danish | ISO Spanish | DEC Swedish | Norwegian-Danish | DEC Dutch | DEC Swiss | DEC Portuguese |
| 2/3 | # | | £ | | | £ | ù | |
| 4/0 | @ | Ä | § | É | | 3/4 | à | |
| 5/11 | [| Æ | ı | Ä | Æ | ý | é | Ã |
| 5/12 | \ | Ø | Ñ | Ö | Ø | 1/2 | ç | Ç |
| 5/13 |] | Å | ı | Å | Å | | ê | Õ |
| 5/14 | ^ | Û | | Ü | | | î | |
| 5/15 | _ | | | | | | è | |
| 6/0 | ‘ | ä | | é | | | ô | |
| 7/11 | { | æ | ° | ä | æ | ” | ä | ã |
| 7/12 | | ø | ñ | ö | ø | f | ö | ç |
| 7/13 | } | å | ç | å | å | 1/4 | ü | õ |
| 7/14 | ~ | ü | | ü | | , | û | |

IBM Proprinter X24E and XL24E Quick Reference Guide

This section describes the printer commands for the IBM Proprinter X24E and XL24E protocol. When there is a difference, it is identified by LA48N (X24E) and LA48W (XL24E). Asterisks in the “Function” column indicate extended commands that are not supported by the original printer.

| Function | Command | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|--|-----------|--------|---------|-----------|-----------|-----------|---|--------|-----------|---|--------|-----------|----|-----------|--------|----|--------|--------|----|--------|--------|----|-----------|--------|----|--------|--------|----|--------|--------|
| Print Mode Control | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Double-strike (bold) printing on | ESC G | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Double-strike (bold) printing off | ESC H | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Emphasized (shaded) printing on | ESC E | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Emphasized (shaded) printing off | ESC F | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Single-line double-width characters on | SO or ESC SO | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Single-line double-width characters off | DC4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Double-width characters on/off (on: $n = 1$, off: $n = 0$) | ESC W (n) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Double-height/double-width characters $n_1 = 4, n_2 = 0, m_1 = 0, m_2 = 0$ m_3 controls character height and line spacing: | ESC [@ (n_1)(n_2) (m_1) ... (m_4) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <table><tr><th>m_3</th><th>Height</th><th>Spacing</th></tr><tr><td>0</td><td>Unchanged</td><td>Unchanged</td></tr><tr><td>1</td><td>Normal</td><td>Unchanged</td></tr><tr><td>2</td><td>Double</td><td>Unchanged</td></tr><tr><td>16</td><td>Unchanged</td><td>Single</td></tr><tr><td>17</td><td>Normal</td><td>Single</td></tr><tr><td>18</td><td>Double</td><td>Single</td></tr><tr><td>32</td><td>Unchanged</td><td>Double</td></tr><tr><td>33</td><td>Normal</td><td>Double</td></tr><tr><td>34</td><td>Double</td><td>Double</td></tr></table> | | m_3 | Height | Spacing | 0 | Unchanged | Unchanged | 1 | Normal | Unchanged | 2 | Double | Unchanged | 16 | Unchanged | Single | 17 | Normal | Single | 18 | Double | Single | 32 | Unchanged | Double | 33 | Normal | Double | 34 | Double | Double |
| m_3 | Height | Spacing | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | Unchanged | Unchanged | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | Normal | Unchanged | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | Double | Unchanged | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16 | Unchanged | Single | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 17 | Normal | Single | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 18 | Double | Single | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 32 | Unchanged | Double | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 33 | Normal | Double | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 34 | Double | Double | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| m_4 controls character width: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <table><tr><th>m_4</th><th>Width</th></tr><tr><td>0</td><td>Unchanged</td></tr><tr><td>1</td><td>Normal</td></tr><tr><td>2</td><td>Double</td></tr></table> | | m_4 | Width | 0 | Unchanged | 1 | Normal | 2 | Double | | | | | | | | | | | | | | | | | | | | | | |
| m_4 | Width | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | Unchanged | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | Normal | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | Double | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Condensed characters on | SI or ESC SI | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Condensed and elite characters off | DC2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Subscript or superscript printing on (subscript: $n = 1$, superscript: $n = 0$) | ESC S (n) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Subscript and superscript printing off | ESC T | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Underline on/off (on: $n = 1$, off: $n = 0$) | ESC - (n) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Overline on/off (on: $n = 1$, off: $n = 0$) | ESC _ (n) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |



| Function | Command |
|---|---|
| Horizontal Control | |
| Space | SP |
| Backspace | BS |
| Carriage return | CR |
| Elite characters on | ESC : |
| Proportionally spaced characters on/off (on: $n = 1$, off: $n = 0$) | ESC P (n) |
| Vertical Control | |
| Line feed | LF |
| Form feed | FF |
| Advance paper $n/216$ inch ($1 \leq n \leq 255$) | ESC J (n) |
| Advance paper $n/180$ inch (in AG mode) ($1 \leq n \leq 255$) | ESC J (n) |
| Set line spacing to $1/8$ lines | ESC 0 |
| Set line spacing to $7/72$ inch | ESC 1 |
| Set line spacing to $n/216$ inch ($0 \leq n \leq 255$) | ESC 3 (n) |
| Set line spacing to $n/180$ inch (in AG mode) ($0 \leq n \leq 255$) | ESC 3 (n) |
| Preset line spacing to $n/72$ inch ($1 \leq n \leq 255$) | ESC A (n) |
| Preset line spacing to $n/60$ inch (in AG mode) ($1 \leq n \leq 255$) | ESC A (n) |
| Set line spacing to $1/6$ inch or to the value preset by line spacing command ESC A (n) | ESC 2 |
| Change graphics line spacing base to $1/216$ or $1/180$ inch (for ESC J and ESC 3) $m_1 = 4, m_2 = 0$ $0 \leq t_1 \leq 255, 0 \leq t_2 \leq 255, t_3 = 0$ $t_4 = 180$ or 216 | ESC [\ (m_1) (m_2) (t_1) ... (t_4) |
| Tabulation | |
| Horizontal tab execution | HT |
| Set horizontal tabs The values of n_1 to n_k in this command are the ASCII values of the print columns (at the current character width) at which tabs are to be set. ($1 \leq n \leq 255$) ($1 \leq k \leq 28$) | ESC D (n_1) ... (n_k) NUL |
| Clear all horizontal tabs | ESC D NUL |
| Move print position right by $n/120$ inch ($0 \leq n_1, n_2 \leq 255$) ($n = n_1 + n_2 \times 256$) | ESC d (n_1) (n_2) |

| Function | Command |
|---|--|
| Vertical tab execution | VT |
| Set vertical tabs | ESC B (n_1) ... (n_k) NUL |
| The values of n_1 to n_k in this command are the ASCII values of the lines (at the current line spacing) at which tabs are to be set. ($1 \leq n \leq 255$) ($1 \leq k \leq 64$) | |
| Clear all vertical tabs | ESC B NUL |
| Reset tabs to default values | ESC R |
| Page Formatting | |
| Set left margin at column n and right margin at column m ($0 \leq n, m \leq 255$) | ESC X (n) (m) |
| Set perforation skip by n lines ($1 \leq n \leq 255$) | ESC N (n) |
| Perforation skip off | ESC O |
| Set page length to n lines ($1 \leq n \leq 255$) | ESC C (n) |
| Set page length to n inches ($1 \leq n \leq 22$) | ESC C NUL (n) |
| Set top of form | ESC 4 |
| Color Selection* | |
| Select print color* | ESC r (n) |
| $n = 0$: Black 1: Magenta (red) 2: Cyan (blue) 3: Violet 4: Yellow 5: Orange 6: Green | |
| Character Set Control | |
| Select character set 1 | ESC 7 |
| Select character set 2 | ESC 6 |
| Print $n_1 + n_2$ X 256 characters from all-character set ($chars.$: codes of characters to print, $0 \leq chars. \leq 255$) | ESC \ (n_1) (n_2) ($chars.$) |
| Print a character from all-character set ($char.$: a code of character to print, $0 \leq char. \leq 255$) | ESC ^ ($char.$) |



| Function | Command | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|---|-----------------|--------------|---|---|----------------|---|-----|----------------|---|-----|----------------|---|-----|---------------|---|----|---------------|---|----|----------------|---|----|----------------|---|----|----------------|---|----|-----------------|---|----|---------------|---|----|----------------|---|----|---------------|---|----|---------------|---|----|----------------|----|----|---------------|--|
| Select code page table ($0 \leq n_1, n_2 \leq 255$) ($n = n_1 + n_2 \times 256$) c_1, c_2 : Decimal ($n_1 = 4, n_2 = 0$) | ESC [T (n_1)(n_2) 0 0 (c_1)(c_2) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <table><tr><th>c_1</th><th>c_2</th><th>Code page ID</th></tr><tr><td>0</td><td>0</td><td>Ignore command</td></tr><tr><td>0</td><td>210</td><td>Code page 210*</td></tr><tr><td>0</td><td>220</td><td>Code page 220*</td></tr><tr><td>1</td><td>181</td><td>Code page 437</td></tr><tr><td>3</td><td>82</td><td>Code page 850</td></tr><tr><td>3</td><td>83</td><td>Code page 851*</td></tr><tr><td>3</td><td>84</td><td>Code page 852*</td></tr><tr><td>3</td><td>89</td><td>Code page 857*</td></tr><tr><td>3</td><td>90</td><td>Code page 858**</td></tr><tr><td>3</td><td>92</td><td>Code page 860</td></tr><tr><td>3</td><td>94</td><td>Code page 862*</td></tr><tr><td>3</td><td>95</td><td>Code page 863</td></tr><tr><td>3</td><td>97</td><td>Code page 865</td></tr><tr><td>3</td><td>98</td><td>Code page 866*</td></tr><tr><td>23</td><td>27</td><td>ISO 8859-15**</td></tr></table> | c_1 | c_2 | Code page ID | 0 | 0 | Ignore command | 0 | 210 | Code page 210* | 0 | 220 | Code page 220* | 1 | 181 | Code page 437 | 3 | 82 | Code page 850 | 3 | 83 | Code page 851* | 3 | 84 | Code page 852* | 3 | 89 | Code page 857* | 3 | 90 | Code page 858** | 3 | 92 | Code page 860 | 3 | 94 | Code page 862* | 3 | 95 | Code page 863 | 3 | 97 | Code page 865 | 3 | 98 | Code page 866* | 23 | 27 | ISO 8859-15** | |
| c_1 | c_2 | Code page ID | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | Ignore command | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 210 | Code page 210* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 220 | Code page 220* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | 181 | Code page 437 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | 82 | Code page 850 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | 83 | Code page 851* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | 84 | Code page 852* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | 89 | Code page 857* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | 90 | Code page 858** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | 92 | Code page 860 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | 94 | Code page 862* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | 95 | Code page 863 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | 97 | Code page 865 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | 98 | Code page 866* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 23 | 27 | ISO 8859-15** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Clear input buffer | CAN | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Select printer | DC1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Deselect printer (ignore input) | ESC Q # (forLA48N) ESC Q \$ (for LA48W) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Downloading | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Select resident or downloaded font Ex. $n = 0$: Resident Draft 2: Resident Courier 4: Downloaded Draft 6: Downloaded Courier | ESC I (n) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Create download font | ESC = (n_1) (n_2) ID (m_1) (m_2) ($data$) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bit Image Graphics | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Single-density graphics | ESC K (n_1)(n_2) ($data$) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Double-density graphics | ESC L (n_1)(n_2) ($data$) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| High-speed double-density graphics | ESC Y (n_1)(n_2) ($data$) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Quadruple-density graphics | ESC Z (n_1)(n_2) ($data$) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| High-resolution graphics | ESC [g (n_1)(n_2) (m) ($data$) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Select graphics mode (in AG mode only) | ESC * (m) (c_1) (c_2) ($data$) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

**Code page contains Euro currency symbol



| Function | Command |
|--|--|
| Cut Sheet Feeder Control* | |
| Feed a sheet from bin 1* | ESC EM 1 |
| Feed a sheet from bin 2* | ESC EM 2 |
| Feed a sheet from bin 3* | ESC EM E |
| Eject a page from the printer* | ESC EM R |
| Miscellaneous | |
| Sound the bell | BEL |
| Unidirectional printing on/off (on: $n = 1$, off: $n = 0$) | ESC U (n) |
| Add a carriage return to all line feeds (on: $n = 1$, off: $n = 0$) | ESC 5 (n) |
| Printer offline | ESC j |
| Select default settings | ESC [K (n_1) (n_2) (i) (ID) (p_1) (p_2) |



Epson ESC/P2 Quick Reference Guide

This section describes the printer commands for the Epson ESC/P2 protocol. Asterisks in the “Function” column indicate extended commands that are not supported by the original printer. See the *Programmer’s Reference Manual* for detailed information on using these commands.

| Function | Command |
|--|---|
| Print Mode Control | |
| Double-strike (bold) printing on | ESC G |
| Double-strike (bold) printing off | ESC H |
| Emphasized (shadow) printing on | ESC E |
| Emphasized (shadow) printing off | ESC F |
| Italic printing on | ESC 4 |
| Italic printing off | ESC 5 |
| Select character style | ESC q (n) |
| n = 0: Normal | |
| 1: Outlined | |
| 2: Shaded | |
| 3: Outlined and shadowed | |
| One-line double-width characters on | SO or ESC SO |
| One-line double-width characters off | DC4 |
| Double-width characters on/off | ESC W (n) |
| (on: n = 1, off: n = 0) | |
| Double-height characters on/off | ESC w (n) |
| (on: n = 1, off: n = 0) | |
| Condensed characters on | SI or ESC SI |
| Condensed characters off | DC2 |
| Subscript or superscript printing on | ESC S (n) |
| (subscript: n = 1, superscript: n = 0) | |
| Subscript and superscript printing off | ESC T |
| Underline on/off | ESC - (n) |
| (on: n = 1, off: n = 0) | |
| Select line | ESC (- (n ₁) (n ₂) (d ₁) (d ₂) (d ₃) |
| n ₁ = 3, n ₂ = 0, d ₁ = 1 | |
| d ₂ = 0: Ignore command | |
| 1: Underline | |
| 2: Strike through | |
| 3: Overscore | |
| d ₃ = 0 or 4: Cancel line selection | |
| 1: Single line | |
| 2 or 3: Double line | |
| 5: Single-dotted line | |
| 6 or 7: Double-dotted line | |

| Function | Command |
|---|---------------------------------|
| Select printing style | ESC ! (n) |
| This command allows you to combine various printing styles. The value of n is the sum of the values of the styles you want to combine. | |
| $n = 0$: Pica pitch 1: Elite pitch 2: Proportional spacing 4: Condensed 8: Shadow 16: Bold 32: Double-width 64: Italics 128: Underline | |
| Horizontal Control | |
| Space | SP |
| Backspace | BS |
| Carriage return | CR |
| Set elite pitch | ESC M |
| Set pica pitch | ESC P |
| Set 15 CPI | ESC g |
| Proportionally spaced characters on/off (on: $n = 1$, off: $n = 0$) | ESC p (n) |
| Set inter-character space to $n/120$ inch (for draft) or $n/180$ inch (for letter and proportional) ($0 \leq n \leq 127$) | ESC SP (n) |
| Set character pitch to $(n_1 + n_2 \times 256)/360$ inch ($0 \leq n_1 \leq 255$) ($0 \leq n_2 \leq 4$) | ESC c (n_1) (n_2) |
| Select character pitch (specify unit of pitch) $n_1 = 1, n_2 = 0$ $d = 10$ to 19 : $10/3600$ inch = $1/360$ inch $d = 20$ to 29 : $20/3600$ inch = $1/180$ inch $d = 30$ to 39 : $30/3600$ inch = $1/120$ inch $d = 40$ to 49 : $40/3600$ inch = $1/90$ inch $d = 50$ to 59 : $50/3600$ inch = $1/72$ inch $d = 60$ to 69 : $60/3600$ inch = $1/60$ inch | ESC (U (n_1) (n_2) (d) |

| Function | Command |
|--|---|
| Vertical Control | |
| Line feed | LF |
| Form feed | FF |
| Advance paper $n/180$ inch ($1 \leq n \leq 255$) | ESC J (n) |
| Set line spacing to $1/8$ inch | ESC 0 |
| Set line spacing to $n/180$ inch ($0 \leq n \leq 255$) | ESC 3 (n) |
| Set line spacing to $n/60$ inch ($0 \leq n \leq 127$) | ESC A (n) |
| Set line spacing to $1/6$ inch | ESC 2 |
| Set line spacing to $n/360$ inch ($0 \leq n \leq 255$) | ESC + (n) |
| Tabulation | |
| Horizontal tab execution | HT |
| Set horizontal tabs | ESC D (n_1) ... (n_k) NUL |
| The values of n_1 to n_k in this command are the ASCII values of the print columns (at the current character width) at which tabs are to be set. ($1 \leq n \leq 255$) ($1 \leq k \leq 32$) | |
| Move print position $n/120$ inch (for draft) ^(*) or $n/180$ inch (for letter) ^(*) right from left margin ($n = n_1 + n_2 \times 256$) | ESC \$ (n_1) (n_2) |
| Move print position $n/120$ ^(*) inch (for draft) or $n/180$ ^(*) inch (for letter) left or right from the current position ($n = n_1 + n_2 \times 256$) | ESC \ (n_1) (n_2) |
| Vertical tab execution | VT |
| Set vertical tabs | ESC B (n_1) ... (n_k) NUL |
| The values of n_1 to n_k in this command are the ASCII values of the lines (at the current line spacing) at which tabs are to be set. ($1 \leq n \leq 255$) ($1 \leq k \leq 16$) | |
| Move to dot line ($d_1 + d_2 \times 256$)/360 ^(*) inch $n_1 = 2, n_2 = 0$ ($0 \leq d_1 \leq 255$) ($0 \leq d_2 \leq 127$) | ESC (V (n_1) (n_2) (d_1) (d_2) |
| Vertical relative move by ($d_1 + d_2 \times 256$)/360 ^(*) inch $n_1 = 2, n_2 = 0$ ($0 \leq d_1 \leq 255$) ($0 \leq d_2 \leq 127$) $-32768 \leq d_1 + d_2 \times 256 \leq 32768$ | ESC (v (n_1) (n_2) (d_1) (d_2) |

*1 The value depends on the pitch set by the ESC (U command.

*2 The value depends on the pitch set by the ESC (U command. The default is $1/360$ inch.



| Function | Command |
|---|---|
| Page Formatting | |
| Set right margin to column n ($1 \leq n \leq 255$) | ESC Q (n) |
| Set left margin to column n ($0 \leq n \leq 255$) | ESC l (n) |
| Set top and bottom margins from top of page $n_1 = 4, n_2 = 0$ <ul style="list-style-type: none"> Top margin = $(t_1 + t_2 \times 256)/360^{(*)}$ inch ($0 \leq t_1 \leq 255$) ($0 \leq t_2 \leq 127$) Bottom margin = $(b_1 + b_2 \times 256)/360^{(*)}$ inch ($0 \leq b_1 \leq 255$) ($0 \leq b_2 \leq 127$) | ESC (c (n_1) (n_2) (t_1) (t_2) (b_1) (b_2) |
| Set perforation skip by n lines ($1 \leq n \leq 127$) | ESC N (n) |
| Perforation skip off | ESC O |
| Set page length to n lines ($1 \leq n \leq 127$) | ESC C (n) |
| Set page length to n inches ($1 \leq n \leq 22$) | ESC C NUL (n) |
| Set page length to $(d_1 + d_2 \times 256)/360^{(*)}$ inch $n_1 = 2, n_2 = 0$ ($0 \leq d_1 \leq 255$) ($0 \leq d_2 \leq 127$) | ESC (C (n_1) (n_2) (d_1) (d_2) |
| Color Selection | |
| Select print color $n = 0$: Black 1: Magenta (red) 2: Cyan (blue) 3: Violet 4: Yellow 5: Orange 6: Green | ESC r (n) |
| Character Set Control | |
| Select character set 1 | ESC 7 |
| Select character set 2 | ESC 6 |
| Select the active character set assigned with the ESC (t command ($0 \leq n \leq 3$) | ESC t (n) |

^{*1} The value depends on the pitch set by the ESC (U command. The default is 1/360 inch.



| Function | Command | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|---|------------------------|-------|---------------|---|---|--------|---|---|--------------|---|---|-----------------------|---|---|---------|---|---|-------------------|---|---|------------------------|---|---|-----------------|----|---|---------|----|---|---------|----|---|---------|----|---|----------|----|----|---------------|
| Select international character set $n = 0$: USA 1: France 2: Germany 3: United Kingdom 4: Denmark 1 5: Sweden 6: Italy 7: Spanish 1 8: Japan 9: Norway 10: Denmark 2 11: Spanish 2 12: Latin America 13: Korea 64: Legal | ESC R (n) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Assign a character set to active character set number 0 to 3, $n_1 = 3$, $n_2 = 0$ d_2, d_3 : Decimal $d_1 =$ 0: Active character set number 0, default is Italics 1: Active character set number 1, default is Graphics 2: Active character set number 2, default is DLL 3: Active character set number 3, default is Graphics | ESC (t (n_1) (n_2) (d_1) (d_2) (d_3) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <table><tr><th>d_2</th><th>d_3</th><th>Character Set</th></tr><tr><td>0</td><td>0</td><td>Italic</td></tr><tr><td>1</td><td>0</td><td>PC 437 (USA)</td></tr><tr><td>3</td><td>0</td><td>PC 850 (Multilingual)</td></tr><tr><td>4</td><td>0</td><td>PC 851*</td></tr><tr><td>7</td><td>0</td><td>PC 860 (Portugal)</td></tr><tr><td>8</td><td>0</td><td>PC 863 (Canada-French)</td></tr><tr><td>9</td><td>0</td><td>PC 865 (Norway)</td></tr><tr><td>10</td><td>0</td><td>PC 852*</td></tr><tr><td>11</td><td>0</td><td>PC 857*</td></tr><tr><td>14</td><td>0</td><td>PC 866*</td></tr><tr><td>44</td><td>0</td><td>PC 858**</td></tr><tr><td>29</td><td>15</td><td>ISO 8859-15**</td></tr></table> | | d_2 | d_3 | Character Set | 0 | 0 | Italic | 1 | 0 | PC 437 (USA) | 3 | 0 | PC 850 (Multilingual) | 4 | 0 | PC 851* | 7 | 0 | PC 860 (Portugal) | 8 | 0 | PC 863 (Canada-French) | 9 | 0 | PC 865 (Norway) | 10 | 0 | PC 852* | 11 | 0 | PC 857* | 14 | 0 | PC 866* | 44 | 0 | PC 858** | 29 | 15 | ISO 8859-15** |
| d_2 | d_3 | Character Set | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | Italic | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | 0 | PC 437 (USA) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | 0 | PC 850 (Multilingual) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | 0 | PC 851* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7 | 0 | PC 860 (Portugal) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 | 0 | PC 863 (Canada-French) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9 | 0 | PC 865 (Norway) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10 | 0 | PC 852* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 11 | 0 | PC 857* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 14 | 0 | PC 866* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 44 | 0 | PC 858** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 29 | 15 | ISO 8859-15** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Print $n_1 + n_2$ X 256 characters from all-character set (<i>character codes</i>) ($0 \leq n_1 \leq 255$) ($0 \leq n_2 \leq 127$) ($0 \leq n_1 + n_2$ X 256 ≤ 255) ($0 \leq$ <i>character codes</i> ≤ 254) | ESC (^ (n_1) (n_2) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Function | Command |
|--|---------|
| Clear input buffer | CAN |
| Delete a character | DEL |
| Force most significant bit to 1 | ESC > |
| Force most significant bit to 0 | ESC = |
| Cancel control over most significant bit | ESC # |

**Code page contains Euro currency symbol

Font Selection and Downloading

| | |
|--|---|
| Select font | ESC % (<i>n</i>) |
| <i>n</i> = 0: Resident character set | |
| 1: Downloaded character set | |
| Select letter or draft quality | ESC x (<i>n</i>) |
| <i>n</i> = 0: Draft | |
| 1: Letter | |
| Select type style | ESC k (<i>n</i>) |
| • Bitmap font: | |
| <i>n</i> = 0: Courier | |
| 1: Courier | |
| 2: Courier | |
| 3: Prestige | |
| 4: Courier | |
| 5: OCR-B | |
| 7: Courier | |
| 8: Courier | |
| 9: Courier | |
| • Scalable font: | |
| <i>n</i> = 0: Timeless | |
| 1: Nimbus Sans ® | |
| 2: Courier | |
| 3: Timeless | |
| 4: Timeless | |
| 5: Timeless | |
| 7: Timeless | |
| 8: Timeless | |
| 9: Timeless | |
| Set scalable font mode | ESC X m (<i>n</i> ₁) (<i>n</i> ₂) |
| • m sets character pitch. | |
| m=0: Keep previous pitch | |
| 1: Set proportional space mode | |
| 5: Select character pitch (m/360 inch) | |
| (Reset proportional space mode) | |



| Function | Command |
|---|---|
| <ul style="list-style-type: none"> n_1 and n_2 set point size of font. Point size = $(n_1 + n_2 \times 256) \times 0.5$ point ($0 \leq n_1 \leq 255$) ($0 \leq n_2 \leq 127$) | |
| Copy resident character set to download area | ESC : NUL (n) (s) |
| Create download font | ESC & NUL (n_1) (n_2) (d_0) (d_1) (d_2) ($data$) |
| Bit Image Graphics | |
| Graphics type m graphics | ESC * (m) (n_1) (n_2) ($data$) |
| Bit image mode definition | ESC ? (s) (n) |
| Single-density graphics | ESC K (n_1) (n_2) ($data$) |
| Double-density graphics | ESC L (n_1) (n_2) ($data$) |
| High-speed double-density graphics | ESC Y (n_1) (n_2) ($data$) |
| Quadruple-density graphics | ESC Z (n_1) (n_2) ($data$) |
| Select raster image graphics | ESC (G (n_1) (n_2) (d) |
| $n_1 = 1$, $n_2 = 0$ $d = 1$: Raster image graphics mode | |
| Print raster image graphics | ESC . (c) (v) (h) (m) (n_1) (n_2) ($data$) |
| Cut Sheet Feeder Control | |
| Feed a sheet from bin 1 | ESC EM 1 |
| Feed a sheet from bin 2 | ESC EM 2 |
| Feed a sheet from bin 3 ^(*1) | ESC EM E |
| Eject a page from the printer | ESC EM R |
| Miscellaneous | |
| Sound the bell | BEL |
| Move print head to home position | ESC < |
| Unidirectional printing on/off (on: $n = 1$, off: $n = 0$) | ESC U (n) |
| Initialize printer | ESC @ |

^{*1} This is an extended command not supported by the original protocol.

Interface Information

This printer can communicate with a computer through either a RS-232 serial interface or a Centronics parallel interface. The printer can use both interfaces at the same time when the I/F TYPE option is set to AUTO in the Set-Up mode.

This appendix provides information you may need for wiring your own interface cables or for programming computer-to-printer communications. Most users do not need the information in this appendix.

Parallel Interface

This printer can communicate with the host in two different modes:

- Unidirectional

In this mode, the printer operates an industry standard 8-bit Centronics parallel interface.

- Bidirectional

This printer supports bidirectional communication per IEEE 1284 Standard Nibble mode. This printer can switch between Compatible Centronics and Nibble modes.

The interface connector is 36-pin Amphenol type with ESD protection.

The first table gives the connector pin assignments in Compatible Centronics mode, and the second table those in Nibble mode.

The data transmission rate reaches 5,000 characters per second at the minimum.

Designations of circuit direction are provided to indicate the source of the signals.

Centronics Compatible Signals

| Pin | Direction | Signal | Description |
|-------|--------------|----------------|---|
| 1 | To printer | STROBEL | STROBE pulse low to read data A strobe low signal will raise BUSY line to high. |
| 2 | To printer | DATA BIT 1 | These signals are the 1st to the 8th bits of parallel data. These signals are active high for a logical 1. |
| 3 | To printer | DATA BIT 2 | |
| 4 | To printer | DATA BIT 3 | |
| 5 | To printer | DATA BIT 4 | |
| 6 | To printer | DATA BIT 5 | |
| 7 | To printer | DATA BIT 6 | |
| 8 | To printer | DATA BIT 7 | |
| 9 | To printer | DATA BIT 8 | |
| 10 | From printer | ACKNLGL | ACKNLG pulse low indicates data received and ready to receive more data. Sent at power up or after INIT sequence. |
| 11 | From printer | BUSYH | “high” indicates the printer can not receive data (buffer full). BUSY high occurs when paper is out, an INIT is received, the printer is offline, or an error condition exists. |
| 12 | From printer | PEH | PAPER END high signal indicates paper out. |
| 13 | From printer | SLCTH SLCTL | A high signal indicates the printer is in the select state. Low signal occurs when printer is de selected or an error condition exists. |
| 14 | | | Not used |
| 15 | | | Not used |
| 16 | | | 0 volts. Logic ground. |
| 17 | | | Chassis ground. |
| 18 | | | + 5V. Maximum output current is 50 mA. |
| 19-29 | | TWP returns | 0 volts. All at logic ground. |
| 30 | | INIT ground | 0 volts |
| 31 | To printer | INITL | INIT low resets the printer to its initial state and clears the buffer. Printer must see a pulse > 25 microseconds. |
| 32 | From printer | ERRORL | This signal is low when the printer is out of paper, not selected, or in an error state. |



| Pin | Direction | Signal | Description |
|-----|-----------|--------|----------------------------------|
| 33 | | | 0 volts. Same as pins 14, 19-30. |
| 34 | | | Not used |
| 35 | | | Not used |
| 36 | | | Not used |

IEEE 1284-B Nibble Mode signals

The following table briefly gives connector pin assignments in IEEE 1284 mode.

| Pin | Direction | Signal | Description |
|-------|--------------|-----------------------|---|
| 1 | To printer | HostClk | High in reverse data transfer phase |
| 2 | To printer | DATA BIT 1 | These signals are the 1st to the 8th bits of parallel data. These signals are active high for a logical 1. |
| 3 | To printer | DATA BIT 2 | |
| 4 | To printer | DATA BIT 3 | |
| 5 | To printer | DATA BIT 4 | |
| 6 | To printer | DATA BIT 5 | |
| 7 | To printer | DATA BIT 6 | |
| 8 | To printer | DATA BIT 7 | |
| 9 | To printer | DATA BIT 8 | |
| 10 | From printer | PtrClk | Set to low to qualify data on reverse channel |
| 11 | From printer | PtrBusy | Reverse channel: Data 3 and 7 |
| 12 | From printer | AckDataReq | Reverse channel: Data 2 and 6 |
| 13 | From printer | Xflag | Reverse channel: Data 1 and 5 |
| 14 | To printer | Host Busy | Set to low to indicate that the host can receive data Set to high Host Acknowledge Receipt |
| 15 | | | Not used |
| 16 | | | 0 volts. Logic ground |
| 17 | | | Chassis ground |
| 18 | From printer | Peripheral Logic High | Set to high to indicate the printer is ON and all signals are in valid state. - Max output current 50 mA |
| 19-29 | | | 0 volts. Signal ground |
| 30 | | | 0 volts. Signal ground |

| Pin | Direction | Signal | Description |
|-----|--------------|-------------|---|
| 31 | To printer | Init L | Set to high for Reverse Channel operation |
| 32 | From printer | DataAvail L | Reverse channel: Data 0 and 4 |
| 33 | | | Not used |
| 34 | | | Not used |
| 35 | | | Not used |
| 36 | To printer | SelectIn L | Set to high for Reverse Channel |

Serial Interface

Use the Digital BC16E cable or equivalent. If you prepare a cable separately, the cable connector at the printer side should be a male Modified Modular Jack (MMJ) or the equivalent that conforms to EIA standards.

The following table shows the pin assignments. In the table:

- “Input” denotes a signal from the computer to the printer.
- “Output” denotes a signal from the printer to the computer.
- The signal level for mark state (logical 1) is -5 V to -6 V; for space state (logical 0), it is +5 V to +6 V.

| Pin No. | Signal Name | Direction | Description |
|---------|-----------------|-----------|--|
| 1 | Ready Out | Output | Data Terminal Ready |
| 2 | Transmit Data + | Output | This pin carries information from the printer to the computer. |
| 3 | Transmit Data - | Output | Common signal level. This pin carries information from the printer to the computer. |
| 4 | Receive Data - | Input | Common signal level at the computer side. This pin carries information from the computer to the printer. |
| 5 | Receive Data + | Input | This pin carries information from the computer to the printer. |
| 6 | Ready In | Input | Optional (available as Data Set Ready) |

Serial Options

The serial options for the computer and the printer must match. Use the printer control panel, the computer operating system, or your software to change options specified as “selectable.”

| | |
|---------------------------|--|
| Transmission mode: | Asynchronous, full duplex |
| Speed: | 600, 1200, 2400, 4800, 9600, or 19200 baud (selectable) |
| Data bits: | 7 or 8 bits (selectable) |
| Parity bit: | Even, odd, none, or ignore (selectable) |
| Start bit: | 1 bit |
| Stop bit: | 1 bit |
| Buffer control: | XON/XOFF (DC1/DC3) or DTR (Data Terminal Ready) (selectable) |
| Buffer size: | 2K, 8K, 16K, 32K, or 64K bytes (selectable) |

Cable Wiring

Use a null-modem cable to connect the printer to a computer terminal, as shown below:

| Host | | Cable | Printer | |
|-------------------|---------|-------|-----------|-----------------|
| Ready Out | (Pin 1) | → | (Pin 6) | Ready In |
| Transmit Data + | (Pin 2) | → | (Pin 5) | Receive Data + |
| Transmit Data – # | (Pin 3) | → | (Pin 4) | Receive Data – |
| Receive Data – | (Pin 4) | ← | (Pin 3) # | Transmit Data – |
| Receive Data + | (Pin 5) | ← | (Pin 2) | Transmit Data + |
| Ready In | (Pin 6) | ← | (Pin 1) | Ready Out |

indicates grounding.

Buffer Control

Buffer control is a communication protocol used by the computer terminal and the printer to secure data transmission between the two devices. The buffer control ensures that the computer does not send information to the printer faster than the information can be processed in the printer. By telling the computer when the printer can receive data, the buffer control prevents the printer’s buffer from overflowing.

This printer offers a choice of two different buffer controls for connection to a variety of computers: XON/XOFF and DTR. If you computer documentation does not recommend a particular buffer control, try DTR. The following table describes the buffer control.

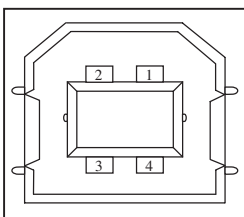
| Buffer Control | Description |
|-------------------|--|
| XON/XOFF(DC1/DC3) | When the printer is ready to receive data, it sends the XON (DC1) code (hex 11). When fewer than 255 bytes of space remain in the buffer (or when the printer is taken offline), the printer sends the XOFF (DC3) code (hex 13). (When the input buffer is configured for 256 bytes, the buffer limit is reduced from 255 bytes to 63 bytes.) The computer must stop transmitting data within 255 (63) characters of receiving the XOFF code, or information may be lost. If the paper runs out, the printer sends an NAK code (hex 15). |
| DTR | DTR is a hardware buffer control; that is, the Ready Out signal on interface cable pin 1 (DTR) is used to control the flow of data rather than the transmission of a character code. When the printer is ready to receive data, pin 1 is high. When fewer than 255 (63) bytes of space remain in the buffer (or when the printer is taken offline), pin 1 is low. The computer must stop transmitting data within 255 (63) characters of DTR being low, or information may be lost. |

USB Interface

Cable

This printer supports the USB 1.1 Full speed specification. To connect to the host, use USB 2.0-compliant INF cables (5 meters/196 inch or shorter). Use shielded cables.

Connector pin alignment



| No. | Signal line name | Function |
|-------|------------------|---------------|
| 1 | vbus | Power supply |
| 2 | D- | Data transfer |
| 3 | D+ | Data transfer |
| 4 | GND | Signal ground |
| Shell | Shield | |

Connector specification

| | |
|---------------------|--|
| Printer side | Type B receptacle (female) Upstream port |
| Cable side | Type B plug (male) |

Specification

Basic specification USB interface compliant

NOTE: *It does not guarantee all operations on hosts.*

Power control Self-power device

Transmission mode Full speed (Maximum 12 Mbps +0.25%)



Character Sets

This appendix provides character sets available for this printer. Available character sets depend on the protocol selected. They are as follows:

- DEC PPL2 protocol
94-Character sets and 96-Character sets
- Common to IBM Proprinter X24E and XL24E protocol and Epson ESC/P2 protocol
Default sets
- IBM Proprinter X24E and XL24E protocol
Set 1 and set 2
- Epson ESC/P2 protocol
National character sets

These character sets include different characters and symbols that are in accordance with the intended languages or usages. Note that some character sets, even if they have the same character set name, may not have certain characters or symbols, depending on the resident fonts selected. For details, see the table at the end of this appendix.

DEC PPL2 Protocol

The ASCII character set as well as the National Replacement Character sets, and the DEC Supplemental Character set are given at the end of the section “DEC PPL2 Quick Reference Guide” in Appendix C.

- ASCII character set
- National Replacement Character sets
British, DEC Finnish, French, DEC French-Canadian, German, ISO Italian, JIS Roman, DEC Norwegian/Danish, ISO Spanish, DEC Swedish, Norwegian/Danish, DEC Dutch, DEC Swiss, and DEC Portuguese
- DEC Supplemental Character set

Below are listed the other character sets for the DEC PPL2 protocol:

- DEC Special Graphics Character Set
- DEC Technical Character Set
- ISO Latin-1 Supplemental Character Set *
- ISO Latin-9 Character Set
- Legal Character Set
- Hebrew Character Sets
 - DEC 7-Bit Hebrew Character Set
 - DEC Hebrew Supplemental Character Set
 - ISO Latin-Hebrew Supplemental Character Set *
- Greek Character Sets
 - DEC 8-Bit Greek Supplemental Character Set
 - ISO Latin-Greek Supplemental Character Set *
- Turkish Character Sets
 - DEC 7-Bit Turkish Character Set
 - DEC 8-Bit Turkish Supplemental Character Set
 - ISO Latin-5 Supplemental Character Set *
- Eastern European Character Sets
 - ISO Latin-2 Supplemental Character Set *
 - ISO Latin-Cyrillic Supplemental Character Set *
- JIS Katakana Character Set

The above character sets followed by an asterisk (*) are 96-character sets. The others are 94-character sets.



DEC Special Graphics Character Set

| | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | |
|-------|--------|----------------|------------------|---|-----------------|------------------|---|-----------------|------------------|---|-----------------|------------------|--------------|------------------|------------------|-------------|------------------|------------------|-------|----|----|--|----|----|--|----|----|--|----|----|--|
| | Column | 2 | 10 | | 3 | 11 | | 4 | 12 | | 5 | 13 | | 6 | 14 | | 7 | 15 | | 8 | 16 | | 9 | 17 | | 10 | 18 | | 11 | 19 | |
| Row 0 | | | | 0 | 60 176 30 | 260 176 B0 | @ | 100 64 C0 | 300 192 C0 | P | 120 80 50 | 320 208 D0 | ◆ | 140 96 60 | 320 240 E0 | — SCAN 3 | 160 112 70 | 360 240 F0 | Row 0 | | | | | | | | | | | | |
| 1 | ! | 41 33 21 | 241 161 A1 | 1 | 61 49 31 | 261 177 B1 | A | 101 65 A1 | 301 193 C1 | Q | 121 81 51 | 321 209 D1 | ▒ | 141 97 61 | 341 225 E1 | — SCAN 5 | 161 113 71 | 361 241 F1 | 1 | | | | | | | | | | | | |
| 2 | " | 42 34 22 | 242 162 A2 | 2 | 62 50 32 | 262 178 B2 | B | 102 66 A2 | 302 194 C2 | R | 122 82 52 | 322 210 D2 | H T | 142 98 62 | 342 226 E2 | — SCAN 7 | 162 114 72 | 362 242 F2 | 2 | | | | | | | | | | | | |
| 3 | # | 43 35 23 | 243 163 A3 | 3 | 63 51 33 | 263 179 B3 | C | 103 67 C3 | 303 195 C3 | S | 123 83 53 | 323 211 D3 | F F | 143 99 63 | 343 227 E3 | — SCAN 9 | 163 115 73 | 363 243 F3 | 3 | | | | | | | | | | | | |
| 4 | \$ | 44 36 24 | 244 164 A4 | 4 | 64 52 34 | 264 180 B4 | D | 104 68 C4 | 304 196 C4 | T | 124 84 54 | 324 212 D4 | C R | 144 100 64 | 344 228 E4 | ┌ | 164 116 74 | 364 244 F4 | 4 | | | | | | | | | | | | |
| 5 | % | 45 37 25 | 245 165 A5 | 5 | 65 53 35 | 265 181 B5 | E | 105 69 C5 | 305 197 C5 | U | 125 85 55 | 325 213 D5 | L F | 145 101 65 | 345 229 E5 | ┐ | 165 117 75 | 365 245 F5 | 5 | | | | | | | | | | | | |
| 6 | & | 46 38 26 | 246 166 A6 | 6 | 66 54 36 | 266 182 B6 | F | 106 70 C6 | 306 198 C6 | V | 126 86 56 | 326 214 D6 | ◦ | 146 102 66 | 346 230 E6 | └ | 166 118 76 | 366 246 F6 | 6 | | | | | | | | | | | | |
| 7 | ' | 47 39 27 | 247 167 A7 | 7 | 67 55 37 | 267 183 B7 | G | 107 71 C7 | 307 199 C7 | W | 127 87 57 | 327 215 D7 | ± | 147 103 67 | 347 231 E7 | ┘ | 167 119 77 | 367 247 F7 | 7 | | | | | | | | | | | | |
| 8 | (| 50 28 2A | 250 168 A8 | 8 | 70 56 38 | 270 184 B8 | H | 110 72 C8 | 310 200 C8 | X | 130 88 58 | 330 216 D8 | N L | 150 104 68 | 350 232 E8 | | 170 120 78 | 370 248 F8 | 8 | | | | | | | | | | | | |
| 9 |) | 51 29 2A | 251 169 A9 | 9 | 71 57 39 | 271 185 B9 | I | 111 73 C9 | 311 201 C9 | Y | 131 89 59 | 331 217 D9 | V T | 151 105 69 | 351 233 E9 | ≤ | 171 121 79 | 371 249 F9 | 9 | | | | | | | | | | | | |
| 10 | * | 52 22 2A | 252 170 AA | : | 72 58 3A | 272 186 BA | J | 112 74 CA | 312 202 CA | Z | 132 90 5A | 332 218 DA | ┐ | 152 106 6A | 352 234 EA | ≥ | 172 122 7A | 372 250 FA | 10 | | | | | | | | | | | | |
| 11 | + | 53 23 2B | 253 171 AB | ; | 73 59 3B | 273 187 BB | K | 113 75 CB | 313 203 CB | [| 133 91 5B | 333 219 DB | ┑ | 153 107 6B | 353 235 EB | π | 173 123 7B | 373 251 FB | 11 | | | | | | | | | | | | |
| 12 | , | 54 24 2C | 254 172 AC | < | 74 60 3C | 274 188 BC | L | 114 76 CC | 314 204 CC | \ | 134 92 5C | 334 220 DC | ┒ | 154 108 6C | 354 236 EC | ≠ | 174 124 7C | 374 252 FC | 12 | | | | | | | | | | | | |
| 13 | - | 55 25 2D | 255 173 AD | = | 75 61 3D | 275 189 BD | M | 115 77 CD | 315 205 CD |] | 135 93 5D | 335 221 DD | ┓ | 155 109 6D | 355 237 ED | £ | 175 125 7D | 375 253 FD | 13 | | | | | | | | | | | | |
| 14 | . | 56 26 2E | 256 174 AE | > | 76 62 3E | 276 190 BE | N | 116 78 CE | 316 206 CE | ^ | 136 95 5E | 336 222 DE | └ | 156 110 6E | 356 238 EE | · | 176 126 7E | 376 254 FE | 14 | | | | | | | | | | | | |
| 15 | / | 57 27 2F | 257 175 AF | ? | 77 63 3F | 277 191 BF | O | 117 79 CF | 317 207 CF | ~ | 137 95 5F | 337 223 DF | — SCAN 11 | 157 111 6F | 357 239 EF | | | | 15 | | | | | | | | | | | | |

LEGEND

| | | | |
|---|-----|------|------------|
| | GL | GR | |
| | 4/1 | 12/1 | Column/Row |
| A | 101 | 301 | Octal |
| | 65 | 193 | Decimal |
| | 41 | C1 | Hex |

MLO-003984



DEC Technical Character Set

| | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | |
|-------|--------|----------------|------------------|---|----------------|------------------|---|-----------------|------------------|------------------|-----------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|-------|
| | Column | 2 | 10 | | 3 | 11 | | 4 | 12 | | 5 | 13 | | 6 | 14 | | 7 | 15 | | |
| Row 0 | | | | } | 60 48 30 | 260 176 B0 | | ∴ | 100 64 40 | 300 192 C0 | Π | 120 80 50 | 320 208 D0 | ¬ | 140 96 60 | 340 224 E0 | π | 160 112 70 | 360 240 F0 | Row 0 |
| 1 | √ | 41 33 21 | 241 161 A1 | ∖ | 61 49 31 | 261 177 B1 | α | 101 65 41 | 301 193 C1 | Ψ | 121 81 51 | 321 209 D1 | α | 141 97 61 | 341 225 E1 | ψ | 161 113 71 | 361 241 F1 | 1 | |
| 2 | ┐ | 42 34 22 | 242 162 A2 | ∠ | 62 50 32 | 262 178 B2 | ∞ | 102 66 42 | 302 194 C2 | ▨ | 122 82 52 | 322 210 D2 | β | 142 98 62 | 342 226 E2 | ρ | 162 114 72 | 362 242 F2 | 2 | |
| 3 | — | 43 35 23 | 243 163 A3 | ∖ | 63 51 33 | 263 179 B3 | ÷ | 103 67 43 | 303 195 C3 | Σ | 123 83 53 | 323 211 D3 | χ | 143 99 63 | 343 227 E3 | σ | 163 115 73 | 363 243 F3 | 3 | |
| 4 | ┌ | 44 36 24 | 244 164 A4 | / | 64 52 34 | 264 180 B4 | Δ | 104 68 44 | 304 196 C4 | ▨ | 124 84 54 | 324 212 D4 | δ | 144 100 64 | 344 228 E4 | τ | 164 116 74 | 364 244 F4 | 4 | |
| 5 | J | 45 37 25 | 245 165 A5 | ┐ | 65 53 35 | 265 181 B5 | ▽ | 105 69 45 | 305 197 C5 | ▨ | 125 85 55 | 325 213 D5 | ε | 145 101 65 | 345 229 E5 | ▨ | 165 117 75 | 365 245 F5 | 5 | |
| 6 | I | 46 38 26 | 246 166 A6 | └ | 66 54 36 | 266 182 B6 | Φ | 106 70 46 | 306 198 C6 | √ | 126 86 56 | 326 214 D6 | φ | 146 102 66 | 346 230 E6 | f | 166 118 76 | 366 246 F6 | 6 | |
| 7 | ┐ | 47 39 27 | 247 167 A7 | └ | 67 55 37 | 267 183 B7 | Γ | 107 71 47 | 307 199 C7 | Ω | 127 87 57 | 327 215 D7 | γ | 147 103 67 | 347 231 E7 | ω | 167 119 77 | 367 247 F7 | 7 | |
| 8 | L | 50 40 28 | 250 168 A8 | ▨ | 70 58 38 | 270 184 B8 | ~ | 110 72 48 | 310 200 C8 | Ε | 130 88 58 | 330 216 D8 | η | 150 104 68 | 350 232 E8 | ξ | 170 120 78 | 370 248 F8 | 8 | |
| 9 | I | 51 41 29 | 251 169 A9 | ▨ | 71 57 39 | 271 185 B9 | ≈ | 111 73 49 | 311 201 C9 | τ | 131 89 59 | 331 217 D9 | ι | 151 105 69 | 351 233 E9 | υ | 171 121 79 | 371 249 F9 | 9 | |
| 10 | J | 52 42 30 | 252 170 AA | ▨ | 72 58 3A | 272 186 BA | Θ | 112 74 4A | 312 202 CA | С | 132 90 5A | 332 218 DA | θ | 152 106 6A | 352 234 EA | ζ | 172 122 7A | 372 250 FA | 10 | |
| 11 | ↖ | 53 43 31 | 253 171 AB | ▨ | 73 59 3B | 273 187 BB | × | 113 75 4B | 313 203 CB | ⌋ | 133 91 5B | 333 219 DB | κ | 153 107 6B | 353 235 EB | ← | 173 123 7B | 373 251 FB | 11 | |
| 12 | ↙ | 54 44 32 | 254 172 AC | ≤ | 74 60 3C | 274 188 BC | Λ | 114 76 4C | 314 204 CC | ∩ | 134 92 5C | 334 220 DC | λ | 154 108 6C | 354 236 EC | ↑ | 174 124 7C | 374 252 FC | 12 | |
| 13 | I | 55 45 33 | 255 173 AD | ≠ | 75 61 3D | 275 189 BD | ↔ | 115 77 4D | 315 205 CD | U | 135 93 5D | 335 221 DD | ▨ | 155 109 6D | 355 237 ED | → | 175 125 7D | 375 253 FD | 13 | |
| 14 | J | 56 46 34 | 256 174 AE | ≥ | 76 62 3E | 276 190 BE | ⇒ | 116 78 4E | 316 206 CE | ^ | 136 94 5E | 336 222 DE | v | 156 110 6E | 356 238 EE | ↓ | 176 126 7E | 376 254 FE | 14 | |
| 15 | { | 57 47 35 | 257 175 AF | ∫ | 77 63 3F | 277 191 BF | ≡ | 117 79 4F | 317 207 CF | ∨ | 137 95 5F | 337 223 DF | ∂ | 157 111 6F | 357 239 EF | | | | 15 | |

LEGEND

| | GL GR | | Column/Row |
|---|-----------------|------------------|-------------------------|
| | 4/1 | 12/1 | |
| α | 101 65 41 | 301 193 C1 | Octal Decimal Hex |

MLO-003985



| | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR |
|-----|--------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|-----|----|--|----|----|
| | Column | 2 | 10 | | 3 | 11 | | 4 | 12 | | 5 | 13 | | 6 | 14 | | 7 | 15 |
| Row | 0 | NBSP | 240 160 A0 | ° | 260 176 B0 | À | 300 192 C0 | Ð | 320 208 D0 | à | 340 224 E0 | ð | 360 240 F0 | Row | 0 | | | |
| 1 | i | 241 161 A1 | ± | 261 177 B1 | Á | 301 193 C1 | Ñ | 321 209 D1 | á | 341 225 E1 | ñ | 361 241 F1 | 1 | | | | | |
| 2 | ¢ | 242 162 A2 | 2 | 262 178 B2 | Â | 302 194 C2 | Ò | 322 210 D2 | â | 342 226 E2 | ò | 362 242 F2 | 2 | | | | | |
| 3 | £ | 243 163 A3 | 3 | 263 179 B3 | Ã | 303 195 C3 | Ó | 323 211 D3 | ã | 343 227 E3 | ó | 363 243 F3 | 3 | | | | | |
| 4 | ¤ | 244 164 A4 | ' | 264 180 B4 | Ä | 304 196 C4 | Ô | 324 212 D4 | ä | 344 228 E4 | ô | 364 244 F4 | 4 | | | | | |
| 5 | ¥ | 245 165 A5 | μ | 265 181 B5 | Å | 305 197 C5 | Õ | 325 213 D5 | å | 345 229 E5 | õ | 365 245 F5 | 5 | | | | | |
| 6 | | 246 166 A6 | ¶ | 266 182 B6 | Æ | 306 198 C6 | Ö | 326 214 D6 | æ | 346 230 E6 | ö | 366 246 F6 | 6 | | | | | |
| 7 | § | 247 167 A7 | • | 267 183 B7 | Ç | 307 199 C7 | × | 327 215 D7 | ç | 347 231 E7 | ÷ | 367 247 F7 | 7 | | | | | |
| 8 | ¨ | 250 168 A8 | ¸ | 270 184 B8 | È | 310 200 C8 | Ø | 330 216 D8 | è | 350 232 E8 | ø | 370 248 F8 | 8 | | | | | |
| 9 | © | 251 169 A9 | 1 | 271 185 B9 | É | 311 201 C9 | Ù | 331 217 D9 | é | 351 233 E9 | ù | 371 249 F9 | 9 | | | | | |
| 10 | ª | 252 170 AA | º | 272 186 BA | Ê | 312 202 CA | Ú | 332 218 DA | ê | 352 234 EA | ú | 372 250 FA | 10 | | | | | |
| 11 | « | 253 171 AB | » | 273 187 BB | Ë | 313 203 CB | Û | 333 219 DB | ë | 353 235 EB | û | 373 251 FB | 11 | | | | | |
| 12 | ¬ | 254 172 AC | ¼ | 274 188 BC | Ì | 314 204 CC | Ü | 334 220 DC | ì | 354 236 EC | ü | 374 252 FC | 12 | | | | | |
| 13 | - | 255 173 AD | ½ | 275 189 BD | Í | 315 205 CD | Ý | 335 221 DD | í | 355 237 ED | ý | 375 253 FD | 13 | | | | | |
| 14 | ® | 256 174 AE | ¾ | 276 190 BE | Î | 316 206 CE | Þ | 336 222 DE | î | 356 238 EE | þ | 376 254 FE | 14 | | | | | |
| 15 | - | 257 175 AF | ¿ | 277 191 BF | Ï | 317 207 CF | ß | 337 223 DF | ï | 357 239 EF | ÿ | 377 255 FF | 15 | | | | | |

| | | |
|---|------|------------|
| | GR | |
| | 12/1 | Column/Row |
| A | 301 | Octal |
| | 193 | Decimal |
| | C1 | Hex |

E-5

Legal

| | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | |
|-----|--------|----------------|------------------|---|----------------|------------------|---|-----------------|------------------|---|-----------------|------------------|---|------------------|------------------|---|------------------|------------------|-------|
| | Column | 2 | 10 | | 3 | 11 | | 4 | 12 | | 5 | 13 | | 6 | 14 | | 7 | 15 | |
| Row | 0 | | | 0 | 60 48 30 | 260 176 B0 | @ | 100 64 40 | 300 192 C0 | P | 120 80 50 | 320 208 D0 | = | 140 96 60 | 340 224 E0 | p | 160 112 70 | 360 240 F0 | Row 0 |
| 1 | ! | 41 33 21 | 241 161 A1 | 1 | 61 49 31 | 261 177 B1 | A | 101 65 41 | 301 193 C1 | Q | 121 81 51 | 321 209 D1 | a | 141 97 61 | 341 225 E1 | q | 161 113 71 | 361 241 F1 | 1 |
| 2 | " | 42 34 22 | 242 162 A2 | 2 | 62 50 32 | 262 178 B2 | B | 102 66 42 | 302 194 C2 | R | 122 82 52 | 322 210 D2 | b | 142 98 62 | 342 226 E2 | r | 162 114 72 | 362 242 F2 | 2 |
| 3 | # | 43 35 23 | 243 163 A3 | 3 | 63 51 33 | 263 179 B3 | C | 103 67 43 | 303 195 C3 | S | 123 83 53 | 323 211 D3 | c | 143 99 63 | 343 227 E3 | s | 163 115 73 | 363 243 F3 | 3 |
| 4 | \$ | 44 36 24 | 244 164 A4 | 4 | 64 52 34 | 264 180 B4 | D | 104 68 44 | 304 196 C4 | T | 124 84 54 | 324 212 D4 | d | 144 100 64 | 344 228 E4 | t | 164 116 74 | 364 244 F4 | 4 |
| 5 | % | 45 37 25 | 245 165 A5 | 5 | 65 53 35 | 265 181 B5 | E | 105 69 45 | 305 197 C5 | U | 125 85 55 | 325 213 D5 | e | 145 101 65 | 345 229 E5 | u | 165 117 75 | 365 245 F5 | 5 |
| 6 | & | 46 38 26 | 246 166 A6 | 6 | 66 54 36 | 266 182 B6 | F | 106 70 46 | 306 198 C6 | V | 126 86 56 | 326 214 D6 | f | 146 102 66 | 346 230 E6 | v | 166 118 76 | 366 246 F6 | 6 |
| 7 | ' | 47 39 27 | 247 167 A7 | 7 | 67 55 37 | 267 183 B7 | G | 107 71 47 | 307 199 C7 | W | 127 87 57 | 327 215 D7 | g | 147 103 67 | 347 231 E7 | w | 167 119 77 | 367 247 F7 | 7 |
| 8 | (| 50 40 28 | 250 168 A8 | 8 | 70 56 38 | 270 184 B8 | H | 110 72 48 | 310 200 C8 | X | 130 88 58 | 330 216 D8 | h | 150 104 68 | 350 232 E8 | x | 170 120 78 | 370 248 F8 | 8 |
| 9 |) | 51 41 29 | 251 169 A9 | 9 | 71 57 39 | 271 185 B9 | I | 111 73 49 | 311 201 C9 | Y | 131 89 59 | 331 217 D9 | i | 151 105 69 | 351 233 E9 | y | 171 121 79 | 371 249 F9 | 9 |
| 10 | * | 52 42 2A | 252 170 AA | : | 72 58 3A | 272 186 BA | J | 112 74 4A | 312 202 CA | Z | 132 90 5A | 332 218 DA | j | 152 106 6A | 352 234 EA | z | 172 122 7A | 372 250 FA | 10 |
| 11 | + | 53 43 2B | 253 171 AB | ; | 73 59 3B | 273 187 BB | K | 113 75 4B | 313 203 CB | [| 133 91 5B | 333 219 DB | k | 153 107 6B | 353 235 EB | § | 173 123 7B | 373 251 FB | 11 |
| 12 | , | 54 44 2C | 254 172 AC | < | 74 60 3C | 274 188 BC | L | 114 76 4C | 314 204 CC | ® | 134 92 5C | 334 220 DC | l | 154 108 6C | 354 236 EC | ¶ | 174 124 7C | 374 252 FC | 12 |
| 13 | - | 55 45 2D | 255 173 AD | = | 75 61 3D | 275 189 BD | M | 115 77 4D | 315 205 CD |] | 135 93 5D | 335 221 DD | m | 155 109 6D | 355 237 ED | † | 175 125 7D | 375 253 FD | 13 |
| 14 | . | 56 46 2E | 256 174 AE | > | 76 62 3E | 276 190 BE | N | 116 78 4E | 316 206 CE | © | 136 94 5E | 336 222 DE | n | 156 110 6E | 356 238 EE | ™ | 176 126 7E | 376 254 FE | 14 |
| 15 | / | 57 47 2F | 257 175 AF | ? | 77 63 3F | 277 191 BF | O | 117 79 4F | 317 207 CF | — | 137 95 5F | 337 223 DF | o | 157 111 6F | 357 239 EF | | | | 15 |

LEGEND

| | GL GR | |
|---|-----------------|------------------|
| | 4/1 | 12/1 |
| A | 101 65 41 | 301 193 C1 |

Column/Row
Octal
Decimal
Hex

MLO-003982



DEC 7-Bit Hebrew Character Set

| | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | 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LEGEND

| | GL | GR | |
|---|-----------------|------------------|-------------------------|
| | 4/1 | 12/1 | Column/Row |
| A | 101 65 41 | 301 193 C1 | Octal Decimal Hex |

MLO-004001



DEC Hebrew Supplemental Character Set

| | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | |
|-------|--------|----------|------------|---|----------|------------|--|-----------|------------|--|-----------|------------|---|------------|------------|---|------------|------------|-------|
| | Column | 2 | 10 | | 3 | 11 | | 4 | 12 | | 5 | 13 | | 6 | 14 | | 7 | 15 | |
| Row 0 | | | | ◦ | 60 48 30 | 260 176 B0 | | 100 64 40 | 300 192 C0 | | 120 80 50 | 320 208 D0 | א | 140 96 60 | 340 224 E0 | י | 160 112 70 | 360 240 F0 | Row 0 |
| 1 | i | 41 33 21 | 241 161 A1 | ± | 61 49 31 | 261 177 B1 | | 101 65 41 | 301 193 C1 | | 121 81 51 | 321 209 D1 | ב | 141 97 61 | 341 225 E1 | כ | 161 113 71 | 361 241 F1 | 1 |
| 2 | ¢ | 42 34 22 | 242 162 A2 | 2 | 62 50 32 | 262 178 B2 | | 102 66 42 | 302 194 C2 | | 122 82 52 | 322 210 D2 | ג | 142 98 62 | 342 226 E2 | ל | 162 114 72 | 362 242 F2 | 2 |
| 3 | £ | 43 35 23 | 243 163 A3 | 3 | 63 51 33 | 263 179 B3 | | 103 67 43 | 303 195 C3 | | 123 83 53 | 323 211 D3 | ד | 143 99 63 | 343 227 E3 | מ | 163 115 73 | 363 243 F3 | 3 |
| 4 | | 44 36 24 | 244 164 A4 | | 64 52 34 | 264 180 B4 | | 104 68 44 | 304 196 C4 | | 124 84 54 | 324 212 D4 | ה | 144 100 64 | 344 228 E4 | נ | 164 116 74 | 364 244 F4 | 4 |
| 5 | ¥ | 45 37 25 | 245 165 A5 | μ | 65 53 35 | 265 181 B5 | | 105 69 45 | 305 197 C5 | | 125 85 55 | 325 213 D5 | ו | 145 101 65 | 345 229 E5 | ס | 165 117 75 | 365 245 F5 | 5 |
| 6 | | 46 38 26 | 246 166 A6 | ¶ | 66 54 36 | 266 182 B6 | | 106 70 46 | 306 198 C6 | | 126 86 56 | 326 214 D6 | ז | 146 102 66 | 346 230 E6 | ע | 166 118 76 | 366 246 F6 | 6 |
| 7 | § | 47 39 27 | 247 167 A7 | • | 67 55 37 | 267 183 B7 | | 107 71 47 | 307 199 C7 | | 127 87 57 | 327 215 D7 | ח | 147 103 67 | 347 231 E7 | פ | 167 119 77 | 367 247 F7 | 7 |
| 8 | ⌘ | 50 40 28 | 250 168 A8 | | 70 56 38 | 270 184 B8 | | 110 72 48 | 310 200 C8 | | 130 88 58 | 330 216 D8 | ט | 150 104 68 | 350 232 E8 | ק | 170 120 78 | 370 248 F8 | 8 |
| 9 | © | 51 41 29 | 251 169 A9 | 1 | 71 57 39 | 271 185 B9 | | 111 73 49 | 311 201 C9 | | 131 89 59 | 331 217 D9 | י | 151 105 69 | 351 233 E9 | ר | 171 121 79 | 371 249 F9 | 9 |
| 10 | ä | 52 42 30 | 252 170 AA | ö | 72 58 40 | 272 186 BA | | 112 74 50 | 312 202 CA | | 132 90 60 | 332 218 DA | ך | 152 106 70 | 352 234 EA | ת | 172 122 80 | 372 250 FA | 10 |
| 11 | « | 53 43 23 | 253 171 AB | » | 73 59 38 | 273 187 BB | | 113 75 45 | 313 203 CB | | 133 91 58 | 333 219 DB | ש | 153 107 67 | 353 235 EB | | 173 123 78 | 373 251 FB | 11 |
| 12 | | 54 44 20 | 254 172 AC | ¼ | 74 60 30 | 274 188 BC | | 114 76 40 | 314 204 CC | | 134 92 50 | 334 220 DC | ל | 154 108 60 | 354 236 EC | | 174 124 70 | 374 252 FC | 12 |
| 13 | | 55 45 25 | 255 173 AD | ½ | 75 61 30 | 275 189 BD | | 115 77 40 | 315 205 CD | | 135 93 50 | 335 221 DD | ם | 155 109 60 | 355 237 ED | | 175 125 70 | 375 253 FD | 13 |
| 14 | | 56 46 20 | 256 174 AE | | 76 62 30 | 276 190 BE | | 116 78 40 | 316 206 CE | | 136 94 50 | 336 222 DE | ן | 156 110 60 | 356 238 EE | | 176 126 70 | 376 254 FE | 14 |
| 15 | | 57 47 20 | 257 175 AF | ז | 77 63 30 | 277 191 BF | | 117 79 40 | 317 207 CF | | 137 95 50 | 337 223 DF | ו | 157 111 60 | 357 239 EF | | | | 15 |

LEGEND

| GL GR | | Column/Row |
|-----------|------------|-------------------------|
| 4/1 | 12/1 | |
| 101 65 41 | 301 193 C1 | Octal Decimal Hex |

MLO-004002



ISO Latin-Hebrew Supplemental Character Set

| | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR |
|--------|---|------|------------------|---|------------------|----|------------------|----|------------------|---|------------------|----|------------------|-----|----|--|----|----|--|----|----|--|----|----|--|----|----|--|----|----|
| Column | | 2 | 10 | | 3 | 11 | | 4 | 12 | | 5 | 13 | | 6 | 14 | | 7 | 15 | | | | | | | | | | | | |
| Row | 0 | NBSP | 240 160 A0 | ° | 260 176 B0 | | 300 192 C0 | | 320 208 D0 | א | 340 224 E0 | י | 360 240 F0 | Row | 0 | | | | | | | | | | | | | | | |
| 1 | | | 241 161 A1 | ± | 261 177 B1 | | 301 193 C1 | | 321 209 D1 | ב | 341 225 E1 | ו | 361 241 F1 | 1 | | | | | | | | | | | | | | | | |
| 2 | | ¢ | 242 162 A2 | 2 | 262 178 B2 | | 302 194 C2 | | 322 210 D2 | ג | 342 226 E2 | ז | 362 242 F2 | 2 | | | | | | | | | | | | | | | | |
| 3 | | £ | 243 163 A3 | 3 | 263 179 B3 | | 303 195 C3 | | 323 211 D3 | ד | 343 227 E3 | ח | 363 243 F3 | 3 | | | | | | | | | | | | | | | | |
| 4 | | ¤ | 244 164 A4 | , | 264 180 B4 | | 304 196 C4 | | 324 212 D4 | ה | 344 228 E4 | ט | 364 244 F4 | 4 | | | | | | | | | | | | | | | | |
| 5 | | ¥ | 245 165 A5 | μ | 265 181 B5 | | 305 197 C5 | | 325 213 D5 | ו | 345 229 E5 | כ | 365 245 F5 | 5 | | | | | | | | | | | | | | | | |
| 6 | | ¦ | 246 166 A6 | ¶ | 266 182 B6 | | 306 198 C6 | | 326 214 D6 | ל | 346 230 E6 | מ | 366 246 F6 | 6 | | | | | | | | | | | | | | | | |
| 7 | | § | 247 167 A7 | • | 267 183 B7 | | 307 199 C7 | | 327 215 D7 | נ | 347 231 E7 | ק | 367 247 F7 | 7 | | | | | | | | | | | | | | | | |
| 8 | | ¨ | 250 168 A8 | ˆ | 270 184 B8 | | 310 200 C8 | | 330 216 D8 | ס | 350 232 E8 | ר | 370 248 F8 | 8 | | | | | | | | | | | | | | | | |
| 9 | | © | 251 169 A9 | 1 | 271 185 B9 | | 311 201 C9 | | 331 217 D9 | ת | 351 233 E9 | ש | 371 249 F9 | 9 | | | | | | | | | | | | | | | | |
| 10 | | × | 252 170 AA | ÷ | 272 186 BA | | 312 202 CA | | 332 218 DA | ך | 352 234 EA | ת | 372 250 FA | 10 | | | | | | | | | | | | | | | | |
| 11 | | « | 253 171 AB | » | 273 187 BB | | 313 203 CB | | 333 219 DB | ץ | 353 235 EB | | 373 251 FB | 11 | | | | | | | | | | | | | | | | |
| 12 | | ¬ | 254 172 AC | ¼ | 274 188 BC | | 314 204 CC | | 334 220 DC | ף | 354 236 EC | | 374 252 FC | 12 | | | | | | | | | | | | | | | | |
| 13 | | - | 255 173 AD | ½ | 275 189 BD | | 315 205 CD | | 335 221 DD | ם | 355 237 ED | | 375 253 FD | 13 | | | | | | | | | | | | | | | | |
| 14 | | ® | 256 174 AE | ¾ | 276 190 BE | | 316 206 CE | | 336 222 DE | ן | 356 238 EE | | 376 254 FE | 14 | | | | | | | | | | | | | | | | |
| 15 | | - | 257 175 AF | | 277 191 BF | | 317 207 CF | = | 337 223 DF | ו | 357 239 EF | | 377 255 FF | 15 | | | | | | | | | | | | | | | | |

LEGEND

| GR | Column/Row |
|------|------------|
| 12/1 | Octal |
| 301 | Decimal |
| 193 | Hex |
| C1 | |

MLO-004003

DEC Greek Supplemental Character Set

| | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | |
|-----|-------------|----------------|------------------|-------------|----------------|------------------|----|-----------------|------------------|-------------|-----------------|------------------|----|------------------|------------------|-------------|------------------|------------------|-----|
| | Column | 2 | 10 | | 3 | 11 | | 4 | 12 | | 5 | 13 | | 6 | 14 | | 7 | 15 | |
| Row | 0 | | | ◦ | 60 48 30 | 260 176 B0 | ι̇ | 100 64 40 | 300 192 C0 | <div></div> | 120 80 50 | 320 208 D0 | ϋ̇ | 140 96 60 | 340 224 E0 | <div></div> | 160 112 70 | 360 240 F0 | Row |
| 1 | i | 41 33 21 | 241 161 A1 | ± | 61 49 31 | 261 177 B1 | Α | 101 65 41 | 301 193 C1 | Π | 121 81 51 | 321 209 D1 | α | 141 97 61 | 341 225 E1 | π | 161 113 71 | 361 241 F1 | 1 |
| 2 | ϕ | 42 34 22 | 242 162 A2 | 2 | 62 50 32 | 262 178 B2 | Β | 102 66 42 | 302 194 C2 | Ρ | 122 82 52 | 322 210 D2 | β | 142 98 62 | 342 226 E2 | ρ | 162 114 72 | 362 242 F2 | 2 |
| 3 | £ | 43 35 23 | 243 163 A3 | 3 | 63 51 33 | 263 179 B3 | Γ | 103 67 43 | 303 195 C3 | Σ | 123 83 53 | 323 211 D3 | γ | 143 99 63 | 343 227 E3 | σ | 163 115 73 | 363 243 F3 | 3 |
| 4 | <div></div> | 44 36 24 | 244 164 A4 | <div></div> | 64 52 34 | 264 180 B4 | Δ | 104 68 44 | 304 196 C4 | Τ | 124 84 54 | 324 212 D4 | δ | 144 100 64 | 344 228 E4 | τ | 164 116 74 | 364 244 F4 | 4 |
| 5 | ¥ | 45 37 25 | 245 165 A5 | μ | 65 53 35 | 265 181 B5 | Ε | 105 69 45 | 305 197 C5 | Υ | 125 85 55 | 325 213 D5 | ε | 145 101 65 | 345 229 E5 | υ | 165 117 75 | 365 245 F5 | 5 |
| 6 | <div></div> | 46 38 26 | 246 166 A6 | ¶ | 66 54 36 | 266 182 B6 | Ζ | 106 70 46 | 306 198 C6 | Φ | 126 86 56 | 326 214 D6 | ζ | 146 102 66 | 346 230 E6 | φ | 166 118 76 | 366 246 F6 | 6 |
| 7 | § | 47 39 27 | 247 167 A7 | • | 67 55 37 | 267 183 B7 | Η | 107 71 47 | 307 199 C7 | Χ | 127 87 57 | 327 215 D7 | η | 147 103 67 | 347 231 E7 | χ | 167 119 77 | 367 247 F7 | 7 |
| 8 | ¤ | 50 40 28 | 250 168 A8 | <div></div> | 70 56 38 | 270 184 B8 | Θ | 110 72 48 | 310 200 C8 | Ψ | 130 88 58 | 330 216 D8 | θ | 150 104 68 | 350 232 E8 | ψ | 170 120 78 | 370 248 F8 | 8 |
| 9 | © | 51 41 29 | 251 169 A9 | 1 | 71 57 39 | 271 185 B9 | Ι | 111 73 49 | 311 201 C9 | Ω | 131 89 59 | 331 217 D9 | ι | 151 105 69 | 351 233 E9 | ω | 171 121 79 | 371 249 F9 | 9 |
| 10 | ₐ | 52 42 2A | 252 170 AA | ₒ | 72 58 3A | 272 186 BA | Κ | 112 74 4A | 312 202 CA | ι̇ | 132 90 5A | 332 218 DA | κ | 152 106 6A | 352 234 EA | ς | 172 122 7A | 372 250 FA | 10 |
| 11 | « | 53 43 2B | 253 171 AB | » | 73 59 3B | 273 187 BB | Λ | 113 75 4B | 313 203 CB | ι̇ | 133 91 5B | 333 219 DB | λ | 153 107 6B | 353 235 EB | ι̇ | 173 123 7B | 373 251 FB | 11 |
| 12 | <div></div> | 54 44 2C | 254 172 AC | ¼ | 74 60 3C | 274 188 BC | Μ | 114 76 4C | 314 204 CC | ι̇ | 134 92 5C | 334 220 DC | μ | 154 108 6C | 354 236 EC | ι̇ | 174 124 7C | 374 252 FC | 12 |
| 13 | <div></div> | 55 45 2D | 255 173 AD | ½ | 75 61 3D | 275 189 BD | Ν | 115 77 4D | 315 205 CD | ι̇ | 135 93 5D | 335 221 DD | ν | 155 109 6D | 355 237 ED | ι̇ | 175 125 7D | 375 253 FD | 13 |
| 14 | <div></div> | 56 46 2E | 256 174 AE | <div></div> | 76 62 3E | 276 190 BE | Ξ | 116 78 4E | 316 206 CE | <div></div> | 136 94 5E | 336 222 DE | ξ | 156 110 6E | 356 238 EE | <div></div> | 176 126 7E | 376 254 FE | 14 |
| 15 | <div></div> | 57 47 2F | 257 175 AF | ζ̇ | 77 63 3F | 277 191 BF | Ο | 117 79 4F | 317 207 CF | ο̇ | 137 95 5F | 337 223 DF | ο | 157 111 6F | 357 239 EF | | | | 15 |

LEGEND

| A | GL GR | | Column/Row |
|---|-------|------|------------|
| | 4/1 | 12/1 | |
| A | 101 | 301 | Octal |
| | 65 | 193 | Decimal |
| A | 41 | C1 | Hex |

MLO-006807



ISO Latin-Greek Supplemental Character Set

| | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | |
|-----|--------|----------------|------------------|----|----------------|------------------|---|-----------------|------------------|---|-----------------|------------------|---|------------------|------------------|---|------------------|------------------|-----|---|
| | Column | 2 | 10 | | 3 | 11 | | 4 | 12 | | 5 | 13 | | 6 | 14 | | 7 | 15 | | |
| Row | | | | | | | | | | | | | | | | | | | | |
| 0 | NBSP | 40 32 20 | 240 160 A0 | ° | 60 48 30 | 260 176 B0 | ı | 100 64 40 | 300 192 C0 | Π | 120 80 50 | 320 208 D0 | ı | 140 96 60 | 340 224 E0 | π | 160 112 70 | 360 240 F0 | Row | 0 |
| 1 | ˘ | 41 33 21 | 241 161 A1 | ± | 61 49 31 | 261 177 B1 | À | 101 65 41 | 301 193 C1 | Ρ | 121 81 51 | 321 209 D1 | α | 141 97 61 | 341 225 E1 | ρ | 161 113 71 | 361 241 F1 | 1 | |
| 2 | ˙ | 42 34 22 | 242 162 A2 | ² | 62 50 32 | 262 178 B2 | Β | 102 66 42 | 302 194 C2 | ⧻ | 122 82 52 | 322 210 D2 | β | 142 98 62 | 342 226 E2 | ς | 162 114 72 | 362 242 F2 | 2 | |
| 3 | £ | 43 35 23 | 243 163 A3 | ³ | 63 51 33 | 263 179 B3 | Γ | 103 67 43 | 303 195 C3 | Σ | 123 83 53 | 323 211 D3 | γ | 143 99 63 | 343 227 E3 | σ | 163 115 73 | 363 243 F3 | 3 | |
| 4 | ⧻ | 44 36 24 | 244 164 A4 | ´ | 64 52 34 | 264 180 B4 | Δ | 104 68 44 | 304 196 C4 | Τ | 124 84 54 | 324 212 D4 | δ | 144 100 64 | 344 228 E4 | τ | 164 116 74 | 364 244 F4 | 4 | |
| 5 | ⧻ | 45 37 25 | 245 165 A5 | ˆ | 65 53 35 | 265 181 B5 | Ε | 105 69 45 | 305 197 C5 | Υ | 125 85 55 | 325 213 D5 | ε | 145 101 65 | 345 229 E5 | υ | 165 117 75 | 365 245 F5 | 5 | |
| 6 | ı | 46 38 26 | 246 166 A6 | ˆA | 66 54 36 | 266 182 B6 | Ζ | 106 70 46 | 306 198 C6 | Φ | 126 86 56 | 326 214 D6 | ζ | 146 102 66 | 346 230 E6 | φ | 166 118 76 | 366 246 F6 | 6 | |
| 7 | § | 47 39 27 | 247 167 A7 | ˙ | 67 55 37 | 267 183 B7 | Η | 107 71 47 | 307 199 C7 | Χ | 127 87 57 | 327 215 D7 | η | 147 103 67 | 347 231 E7 | χ | 167 119 77 | 367 247 F7 | 7 | |
| 8 | ¨ | 50 40 28 | 250 168 A8 | ˆE | 70 60 38 | 270 184 B8 | Θ | 110 72 48 | 310 200 C8 | Ψ | 130 88 58 | 330 216 D8 | θ | 150 104 68 | 350 232 E8 | ψ | 170 120 78 | 370 248 F8 | 8 | |
| 9 | © | 51 41 29 | 251 169 A9 | ˆH | 71 61 39 | 271 185 B9 | Ι | 111 73 49 | 311 201 C9 | Ω | 131 89 59 | 331 217 D9 | ι | 151 105 69 | 351 233 E9 | ω | 171 121 79 | 371 249 F9 | 9 | |
| 10 | ⧻ | 52 42 2A | 252 170 AA | ˆI | 72 62 3A | 272 186 BA | Κ | 112 74 4A | 312 202 CA | İ | 132 90 5A | 332 218 DA | κ | 152 106 6A | 352 234 EA | ı | 172 122 7A | 372 250 FA | 10 | |
| 11 | « | 53 43 2B | 253 171 AB | » | 73 63 3B | 273 187 BB | Λ | 113 75 4B | 313 203 CB | Ŧ | 133 91 5B | 333 219 DB | λ | 153 107 6B | 353 235 EB | ÿ | 173 123 7B | 373 251 FB | 11 | |
| 12 | ¬ | 54 44 2C | 254 172 AC | ˆO | 74 64 3C | 274 188 BC | Μ | 114 76 4C | 314 204 CC | α | 134 92 5C | 334 220 DC | μ | 154 108 6C | 354 236 EC | ο | 174 124 7C | 374 252 FC | 12 | |
| 13 | - | 55 45 2D | 255 173 AD | ½ | 75 65 3D | 275 189 BD | Ν | 115 77 4D | 315 205 CD | ε | 135 93 5D | 335 221 DD | ν | 155 109 6D | 355 237 ED | υ | 175 125 7D | 375 253 FD | 13 | |
| 14 | ⧻ | 56 46 2E | 256 174 AE | ˆT | 76 66 3E | 276 190 BE | Ξ | 116 78 4E | 316 206 CE | η | 136 94 5E | 336 222 DE | ξ | 156 110 6E | 356 238 EE | ω | 176 126 7E | 376 254 FE | 14 | |
| 15 | — | 57 47 2F | 257 175 AF | ˆΩ | 77 67 3F | 277 191 BF | Ο | 117 79 4F | 317 207 CF | ı | 137 95 5F | 337 223 DF | ο | 157 111 6F | 357 239 EF | ⧻ | 177 127 7F | 377 255 FF | 15 | |

LEGEND

| | GL | GR | Column/Row Octal Decimal Hex |
|---|-----------------|------------------|---------------------------------------|
| | 4/1 | 12/1 | |
| A | 101 65 41 | 301 193 C1 | |

MLO-006610

DEC 7-Bit Turkish Character Set

| | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | |
|-----|--------|----------------|------------------|---|----------------|------------------|---|-----------------|------------------|---|-----------------|------------------|---|------------------|------------------|---|------------------|------------------|-----|
| | Column | 2 | 10 | | 3 | 11 | | 4 | 12 | | 5 | 13 | | 6 | 14 | | 7 | 15 | |
| Row | 0 | | | 0 | 60 48 30 | 260 176 B0 | İ | 100 64 40 | 300 192 C0 | P | 120 80 50 | 320 208 D0 | Ğ | 140 96 60 | 340 224 E0 | p | 160 112 70 | 360 240 F0 | Row |
| 1 | ı | 41 33 21 | 241 167 A1 | 1 | 61 49 31 | 261 177 B1 | A | 101 65 41 | 301 193 C1 | Q | 121 81 51 | 321 209 D1 | a | 141 97 61 | 341 225 E1 | q | 161 113 71 | 361 241 F1 | 1 |
| 2 | " | 42 34 22 | 242 162 A2 | 2 | 62 50 32 | 262 178 B2 | B | 102 66 42 | 302 194 C2 | R | 122 82 52 | 322 210 D2 | b | 142 98 62 | 342 226 E2 | r | 162 114 72 | 362 242 F2 | 2 |
| 3 | # | 43 35 23 | 243 163 A3 | 3 | 63 51 33 | 263 179 B3 | C | 103 67 43 | 303 195 C3 | S | 123 83 53 | 323 211 D3 | c | 143 99 63 | 343 227 E3 | s | 163 115 73 | 363 243 F3 | 3 |
| 4 | \$ | 44 36 24 | 244 164 A4 | 4 | 64 52 34 | 264 180 B4 | D | 104 68 44 | 304 196 C4 | T | 124 84 54 | 324 212 D4 | d | 144 100 64 | 344 228 E4 | t | 164 116 74 | 364 244 F4 | 4 |
| 5 | % | 45 37 25 | 245 165 A5 | 5 | 65 53 35 | 265 181 B5 | E | 105 69 45 | 305 197 C5 | U | 125 85 55 | 325 213 D5 | e | 145 101 65 | 345 229 E5 | u | 165 117 75 | 365 245 F5 | 5 |
| 6 | ğ | 46 38 26 | 246 166 A6 | 6 | 66 54 36 | 266 182 B6 | F | 106 70 46 | 306 198 C6 | V | 126 86 56 | 326 214 D6 | f | 146 102 66 | 346 230 E6 | v | 166 118 76 | 366 246 F6 | 6 |
| 7 | ' | 47 39 27 | 247 167 A7 | 7 | 67 55 37 | 267 183 B7 | G | 107 71 47 | 307 199 C7 | W | 127 87 57 | 327 215 D7 | g | 147 103 67 | 347 231 E7 | w | 167 119 77 | 367 247 F7 | 7 |
| 8 | (| 50 40 28 | 250 168 A8 | 8 | 70 56 38 | 270 184 B8 | H | 110 72 48 | 310 200 C8 | X | 130 88 58 | 330 216 D8 | h | 150 104 68 | 350 232 E8 | x | 170 120 78 | 370 248 F8 | 8 |
| 9 |) | 51 41 29 | 251 169 A9 | 9 | 71 57 39 | 271 185 B9 | I | 111 73 49 | 311 201 C9 | Y | 131 89 59 | 331 217 D9 | i | 151 105 69 | 351 233 E9 | y | 171 121 79 | 371 249 F9 | 9 |
| 10 | * | 52 42 2A | 252 170 AA | : | 72 58 3A | 272 186 BA | J | 112 74 4A | 312 202 CA | Z | 132 90 5A | 332 218 DA | j | 152 106 6A | 352 234 EA | z | 172 122 7A | 372 250 FA | 10 |
| 11 | + | 53 43 2B | 253 171 AB | ; | 73 59 3B | 273 187 BB | K | 113 75 4B | 313 203 CB | Ş | 133 91 5B | 333 219 DB | k | 153 107 6B | 353 235 EB | ş | 173 123 7B | 373 251 FB | 11 |
| 12 | , | 54 44 2C | 254 172 AC | < | 74 60 3C | 274 188 BC | L | 114 76 4C | 314 204 CC | Ö | 134 92 5C | 334 220 DC | l | 154 108 6C | 354 236 EC | ö | 174 124 7C | 374 252 FC | 12 |
| 13 | - | 55 45 2D | 255 173 AD | = | 75 61 3D | 275 189 BD | M | 115 77 4D | 315 205 CD | Ç | 135 93 5D | 335 221 DD | m | 155 109 6D | 355 237 ED | ç | 175 125 7D | 375 253 FD | 13 |
| 14 | . | 56 46 2E | 256 174 AE | > | 76 62 3E | 276 190 BE | N | 116 78 4E | 316 206 CE | Ü | 136 94 5E | 336 222 DE | n | 156 110 6E | 356 238 EE | ü | 176 126 7E | 376 254 FE | 14 |
| 15 | / | 57 47 2F | 257 175 AF | ? | 77 63 3F | 277 191 BF | O | 117 79 4F | 317 207 CF | — | 137 95 5F | 337 223 DF | o | 157 111 6F | 357 239 EF | | | | 15 |

LEGEND

| | GL GR | |
|---|-----------|------------|
| | 4/1 | 12/1 |
| A | 101 65 41 | 301 193 C1 |

Column/Row
Octal
Decimal
Hex

MLO-006805



DEC 8-Bit Turkish Supplemental Character Set

| | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR |
|-----|--------|----------------------|------------------|---|----------------------|-------------------------|---|-----------------------|----|-----------------------|----|-----------------------|---|------------------------|----|------------------------|-----|-------------------------|
| | Column | 2 | 10 | | 3 | 11 | | 4 | 12 | | 5 | 13 | | 6 | 14 | | 7 | 15 |
| Row | 0 | | | ° | 60 48 30 B0 | 260 176 92 B0 | À | 100 64 30 C0 | Ā | 120 80 40 D0 | Ė | 120 80 40 D0 | à | 140 96 60 E0 | ă | 160 112 80 F0 | Row | 0 |
| 1 | ı | 41 31 21 A1 | 241 161 A1 | ± | 61 49 31 B1 | 261 177 93 B1 | Á | 101 65 31 C1 | Ā | 121 81 41 D1 | Ė | 121 81 41 D1 | á | 141 97 61 E1 | ă | 161 113 71 F1 | 1 | 361 260 120 F0 |
| 2 | ¢ | 42 32 22 A2 | 242 162 A2 | 2 | 62 50 32 B2 | 262 178 94 B2 | Â | 102 66 32 C2 | Ā | 122 82 42 D2 | Ė | 122 82 42 D2 | â | 142 98 62 E2 | ă | 162 114 72 F2 | 2 | 362 262 122 F2 |
| 3 | £ | 43 33 23 A3 | 243 163 A3 | 3 | 63 51 33 B3 | 263 179 95 B3 | Ã | 103 67 33 C3 | Ā | 123 83 43 D3 | Ė | 123 83 43 D3 | ã | 143 99 63 E3 | ă | 163 115 73 F3 | 3 | 363 263 123 F3 |
| 4 | | 44 34 24 A4 | 244 164 A4 | | 64 52 34 B4 | 264 180 96 B4 | Ä | 104 68 34 C4 | Ā | 124 84 44 D4 | Ė | 124 84 44 D4 | ä | 144 100 64 E4 | ă | 164 116 74 F4 | 4 | 364 264 124 F4 |
| 5 | ¥ | 45 35 25 A5 | 245 165 A5 | μ | 65 53 35 B5 | 265 181 97 B5 | Å | 105 69 35 C5 | Ā | 125 85 45 D5 | Ė | 125 85 45 D5 | å | 145 101 65 E5 | ă | 165 117 75 F5 | 5 | 365 265 125 F5 |
| 6 | | 46 36 26 A6 | 246 166 A6 | ¶ | 66 54 36 B6 | 266 182 98 B6 | Æ | 106 70 36 C6 | Ā | 126 86 46 D6 | Ė | 126 86 46 D6 | æ | 146 102 66 E6 | ă | 166 118 76 F6 | 6 | 366 266 126 F6 |
| 7 | § | 47 37 27 A7 | 247 167 A7 | • | 67 55 37 B7 | 267 183 99 B7 | Ç | 107 71 37 C7 | Ā | 127 87 47 D7 | Ė | 127 87 47 D7 | ç | 147 103 67 E7 | ă | 167 119 77 F7 | 7 | 367 267 127 F7 |
| 8 | ¤ | 50 40 28 A8 | 250 168 A8 | | 70 56 38 B8 | 270 184 100 B8 | È | 110 72 38 C8 | Ā | 130 88 56 D8 | Ė | 130 88 56 D8 | è | 150 104 68 E8 | ă | 170 120 78 F8 | 8 | 370 248 120 F8 |
| 9 | © | 51 41 29 A9 | 251 169 A9 | ı | 71 57 39 B9 | 271 185 101 B9 | É | 111 73 39 C9 | Ā | 131 89 59 D9 | Ė | 131 89 59 D9 | é | 151 105 69 E9 | ă | 171 121 79 F9 | 9 | 371 249 121 F9 |
| 10 | ₹ | 52 42 2A | 252 170 AA | ₹ | 72 58 3A | 272 186 BA | Ê | 112 74 4A | Ā | 132 90 5A | Ė | 132 90 5A | ê | 152 106 6A | ă | 172 122 7A | 10 | 372 250 122 F0 |
| 11 | « | 53 43 2B | 253 171 AB | » | 73 59 3B | 273 187 BB | Ë | 113 75 4B | Ā | 133 91 5B | Ė | 133 91 5B | ë | 153 107 6B | ă | 173 123 7B | 11 | 373 251 123 F0 |
| 12 | | 54 44 2C | 254 172 AC | ¼ | 74 60 3C | 274 188 BC | Ï | 114 76 4C | Ā | 134 92 5C | Ė | 134 92 5C | ï | 154 108 6C | ă | 174 124 7C | 12 | 374 252 124 F0 |
| 13 | | 55 45 2D | 255 173 AD | ½ | 75 61 3D | 275 189 BD | Í | 115 77 4D | Ā | 135 93 5D | Ė | 135 93 5D | í | 155 109 6D | ă | 175 125 7D | 13 | 375 253 125 F0 |
| 14 | İ | 56 46 2E | 256 174 AE | ı | 76 62 3E | 276 190 BE | Î | 116 78 4E | Ā | 136 94 5E | Ė | 136 94 5E | î | 156 110 6E | ă | 176 126 7E | 14 | 376 254 126 F0 |
| 15 | | 57 47 2F | 257 175 AF | ¿ | 77 63 3F | 277 191 BF | Ï | 117 79 4F | Ā | 137 95 5F | Ė | 137 95 5F | ï | 157 111 6F | ă | 177 127 7 | 15 | |

LEGEND

| | | | |
|---|-----|------|------------|
| | GL | GR | |
| | 4/1 | 12/1 | Column/Row |
| ' | 101 | 301 | Octal |
| A | 65 | 193 | Decimal |
| | 41 | C1 | Hex |

MLO-006606

ISO Latin-5 Supplemental Character Set

| | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | |
|-------|--------|----------------|------------------|---|----------------|------------------|---|-----------------|------------------|---|-----------------|------------------|---|------------------|------------------|---|------------------|------------------|-------|
| | Column | 2 | 10 | | 3 | 11 | | 4 | 12 | | 5 | 13 | | 6 | 14 | | 7 | 15 | |
| Row 0 | NBSP | 40 32 20 | 240 160 A0 | ° | 60 48 30 | 260 176 B0 | À | 100 64 40 | 300 192 C0 | Ğ | 120 80 50 | 320 208 D0 | à | 140 96 60 | 340 224 E0 | ğ | 160 112 70 | 360 240 F0 | Row 0 |
| 1 | ı | 41 33 21 | 241 161 A1 | ± | 61 49 31 | 261 177 B1 | Á | 101 65 41 | 301 193 C1 | Ñ | 121 81 51 | 321 209 D1 | á | 141 97 61 | 341 225 E1 | ñ | 161 113 71 | 361 241 F1 | 1 |
| 2 | ¢ | 42 34 22 | 242 162 A2 | 2 | 62 50 32 | 262 178 B2 | Â | 102 66 42 | 302 194 C2 | Ò | 122 82 52 | 322 210 D2 | â | 142 98 62 | 342 226 E2 | ò | 162 114 72 | 362 242 F2 | 2 |
| 3 | £ | 43 35 23 | 243 163 A3 | 3 | 63 51 33 | 263 179 B3 | Ã | 103 67 43 | 303 195 C3 | Ó | 123 83 53 | 323 211 D3 | ã | 143 99 63 | 343 227 E3 | ó | 163 115 73 | 363 243 F3 | 3 |
| 4 | ¤ | 44 36 24 | 244 164 A4 | , | 64 52 34 | 264 180 B4 | Ä | 104 68 44 | 304 196 C4 | Ô | 124 84 54 | 324 212 D4 | ä | 144 100 64 | 344 228 E4 | ô | 164 116 74 | 364 244 F4 | 4 |
| 5 | ¥ | 45 37 25 | 245 165 A5 | μ | 65 53 35 | 265 181 B5 | Å | 105 69 45 | 305 197 C5 | Õ | 125 85 55 | 325 213 D5 | å | 145 101 65 | 345 229 E5 | õ | 165 117 75 | 365 245 F5 | 5 |
| 6 | | 46 38 26 | 246 166 A6 | ¶ | 66 54 36 | 266 182 B6 | Æ | 106 70 46 | 306 198 C6 | Ö | 126 86 56 | 326 214 D6 | æ | 146 102 66 | 346 230 E6 | ö | 166 118 76 | 366 246 F6 | 6 |
| 7 | \$ | 47 39 27 | 247 167 A7 | • | 67 55 37 | 267 183 B7 | Ç | 107 71 47 | 307 199 C7 | × | 127 87 57 | 327 215 D7 | ç | 147 103 67 | 347 231 E7 | ÷ | 167 119 77 | 367 247 F7 | 7 |
| 8 | .. | 50 40 28 | 250 168 A8 | ˆ | 70 58 38 | 270 184 B8 | È | 110 72 48 | 310 200 C8 | Ø | 130 88 58 | 330 216 D8 | è | 150 104 68 | 350 232 E8 | ø | 170 120 78 | 370 248 F8 | 8 |
| 9 | © | 51 41 29 | 251 169 A9 | 1 | 71 57 39 | 271 185 B9 | É | 111 73 49 | 311 201 C9 | Ù | 131 89 59 | 331 217 D9 | é | 151 105 69 | 351 233 E9 | ù | 171 121 79 | 371 249 F9 | 9 |
| 10 | à | 52 42 2A | 252 170 AA | ó | 72 58 3A | 272 186 BA | Ê | 112 74 4A | 312 202 CA | Ú | 132 90 5A | 332 218 DA | ê | 152 106 6A | 352 234 EA | ú | 172 122 7A | 372 250 FA | 10 |
| 11 | « | 53 43 2B | 253 171 AB | » | 73 59 3B | 273 187 BB | Ë | 113 75 4B | 313 203 CB | Û | 133 91 5B | 333 219 DB | ë | 153 107 6B | 353 235 EB | û | 173 123 7B | 373 251 FB | 11 |
| 12 | ┐ | 54 44 2C | 254 172 AC | ¼ | 74 60 3C | 274 188 BC | Ì | 114 76 4C | 314 204 CC | Ü | 134 92 5C | 334 220 DC | ì | 154 108 6C | 354 236 EC | ü | 174 124 7C | 374 252 FC | 12 |
| 13 | - | 55 45 2D | 255 173 AD | ½ | 75 61 3D | 275 189 BD | Í | 115 77 4D | 315 205 CD | İ | 135 93 5D | 335 221 DD | í | 155 109 6D | 355 237 ED | ı | 175 125 7D | 375 253 FD | 13 |
| 14 | ® | 56 46 2E | 256 174 AE | ¾ | 76 62 3E | 276 190 BE | Î | 116 78 4E | 316 206 CE | Š | 136 94 5E | 336 222 DE | î | 156 110 6E | 356 238 EE | š | 176 126 7E | 376 254 FE | 14 |
| 15 | - | 57 47 2F | 257 175 AF | ¿ | 77 63 3F | 277 191 BF | Ï | 117 79 4F | 317 207 CF | ß | 137 95 5F | 337 223 DF | ï | 157 111 6F | 357 239 EF | ÿ | 177 127 7F | 377 255 FF | 15 |

LEGEND

| | GR | Column/Row |
|---|------------------|-------------------------|
| | | |
| Á | 301 193 C1 | Octal Decimal Hex |

MLO-006611



ISO Latin-2 Supplemental Character Set

| | | GL | GR | | | GL | GR | | | GL | GR | | | GL | GR | | | GL | GR | | | GL | GR | | | GL | GR | | | GL | GR |
|--------|------|----------------|------------------|---|--|----------------|------------------|---|--|-----------------|------------------|---|--|-----------------|------------------|---|--|------------------|------------------|---|--|------------------|------------------|--|--|------------------|------------------|--|--|------------------|------------------|
| Column | | 2 | 10 | | | 3 | 11 | | | 4 | 12 | | | 5 | 13 | | | 6 | 14 | | | 7 | 15 | | | 8 | 16 | | | 9 | 17 |
| Row 0 | NBSP | 40 32 20 | 240 160 A0 | ° | | 60 48 30 | 260 176 B0 | Ŕ | | 100 64 40 | 300 192 C0 | Đ | | 120 80 50 | 320 208 D0 | í | | 140 96 60 | 340 224 E0 | đ | | 160 112 70 | 360 240 F0 | | | 180 128 80 | 380 256 F8 | | | 190 144 90 | 390 264 F9 |
| 1 | À | 41 33 21 | 241 161 A1 | à | | 61 49 31 | 261 177 B1 | Á | | 101 65 41 | 301 193 C1 | Ñ | | 121 81 51 | 321 209 D1 | á | | 141 97 61 | 341 225 E1 | ñ | | 161 113 71 | 361 241 F1 | | | 181 129 81 | 381 257 F9 | | | 191 145 91 | 391 265 F9 |
| 2 | Â | 42 34 22 | 242 162 A2 | â | | 62 50 32 | 262 178 B2 | Ă | | 102 66 42 | 302 194 C2 | Ń | | 122 82 52 | 322 210 D2 | â | | 142 98 62 | 342 226 E2 | ň | | 162 114 72 | 362 242 F2 | | | 182 130 82 | 382 258 FA | | | 192 146 92 | 392 266 FA |
| 3 | Ł | 43 35 23 | 243 163 A3 | ł | | 63 51 33 | 263 179 B3 | Ą | | 103 67 43 | 303 195 C3 | Ó | | 123 83 53 | 323 211 D3 | ă | | 143 99 63 | 343 227 E3 | ó | | 163 115 73 | 363 243 F3 | | | 183 131 83 | 383 259 FB | | | 193 147 93 | 393 267 FB |
| 4 | Ǽ | 44 36 24 | 244 164 A4 | Ǽ | | 64 52 34 | 264 180 B4 | Ä | | 104 68 44 | 304 196 C4 | Ô | | 124 84 54 | 324 212 D4 | ä | | 144 100 64 | 344 228 E4 | ö | | 164 116 74 | 364 244 F4 | | | 184 132 84 | 384 260 FC | | | 194 148 94 | 394 268 FC |
| 5 | Ĺ | 45 37 25 | 245 165 A5 | ĺ | | 65 53 35 | 265 181 B5 | Ĺ | | 105 69 45 | 305 197 C5 | Õ | | 125 85 55 | 325 213 D5 | í | | 145 101 65 | 345 229 E5 | õ | | 165 117 75 | 365 245 F5 | | | 185 133 85 | 385 261 FD | | | 195 149 95 | 395 269 FD |
| 6 | Š | 46 38 26 | 246 166 A6 | š | | 66 54 36 | 266 182 B6 | Ć | | 106 70 46 | 306 198 C6 | Ö | | 126 86 56 | 326 214 D6 | ć | | 146 102 66 | 346 230 E6 | ö | | 166 118 76 | 366 246 F6 | | | 186 134 86 | 386 262 FE | | | 196 150 96 | 396 270 FE |
| 7 | Ŝ | 47 39 27 | 247 167 A7 | ŝ | | 67 55 37 | 267 183 B7 | Ç | | 107 71 47 | 307 199 C7 | × | | 127 87 57 | 327 215 D7 | ş | | 147 103 67 | 347 231 E7 | ÷ | | 167 119 77 | 367 247 F7 | | | 187 135 87 | 387 263 FF | | | 197 151 97 | 397 271 FF |
| 8 | ˆ | 50 42 28 | 250 168 A8 | ˆ | | 70 58 38 | 270 184 B8 | Č | | 110 72 48 | 310 200 C8 | Ř | | 130 88 58 | 330 216 D8 | č | | 150 104 68 | 350 232 E8 | ř | | 170 120 78 | 370 248 F8 | | | 190 136 88 | 390 264 FF | | | 210 156 98 | 410 272 FF |
| 9 | Š | 51 43 29 | 251 169 A9 | š | | 71 59 39 | 271 185 B9 | É | | 111 73 49 | 311 201 C9 | Û | | 131 89 59 | 331 217 D9 | é | | 151 105 69 | 351 233 E9 | û | | 171 121 79 | 371 249 F9 | | | 191 137 89 | 391 265 FF | | | 211 157 99 | 411 273 FF |
| 10 | Ş | 52 44 30 | 252 170 AA | ş | | 72 60 40 | 272 186 BA | Ě | | 112 74 4A | 312 202 CA | Ú | | 132 90 5A | 332 218 DA | ş | | 152 106 6A | 352 234 EA | ú | | 172 122 7A | 372 250 FA | | | 192 138 90 | 392 266 FF | | | 212 158 9A | 412 274 FF |
| 11 | Ť | 53 45 31 | 253 171 AB | ť | | 73 61 41 | 273 187 BB | Ě | | 113 75 4B | 313 203 CB | Ů | | 133 91 5B | 333 219 DB | ě | | 153 107 6B | 353 235 EB | ů | | 173 123 7B | 373 251 FB | | | 193 139 91 | 393 267 FF | | | 213 159 9B | 413 275 FF |
| 12 | Ž | 54 46 32 | 254 172 AC | ž | | 74 62 42 | 274 188 BC | Ě | | 114 76 4C | 314 204 CC | Ü | | 134 92 5C | 334 220 DC | ě | | 154 108 6C | 354 236 EC | ü | | 174 124 7C | 374 252 FC | | | 194 140 92 | 394 268 FF | | | 214 160 9C | 414 276 FF |
| 13 | - | 55 47 33 | 255 173 AD | - | | 75 63 43 | 275 189 BD | Í | | 115 77 4D | 315 205 CD | Ý | | 135 93 5D | 335 221 DD | í | | 155 109 6D | 355 237 ED | ý | | 175 125 7D | 375 253 FD | | | 195 141 93 | 395 269 FF | | | 215 161 9D | 415 277 FF |
| 14 | Ž | 56 48 34 | 256 174 AE | ž | | 76 64 44 | 276 190 BE | Î | | 116 78 4E | 316 206 CE | Ĵ | | 136 94 5E | 336 222 DE | î | | 156 110 6E | 356 238 EE | ĵ | | 176 126 7E | 376 254 FE | | | 196 142 94 | 396 270 FF | | | 216 162 9E | 416 278 FF |
| 15 | Ž | 57 49 35 | 257 175 AF | ž | | 77 65 45 | 277 191 BF | Ď | | 117 79 4F | 317 207 CF | Ĥ | | 137 95 5F | 337 223 DF | ď | | 157 111 6F | 357 239 EF | . | | 177 127 7F | 377 255 FF | | | 197 143 95 | 397 271 FF | | | 217 163 9F | 417 279 FF |

LEGEND

| | GL | GR | Column/Row |
|---|-----------------|------------------|-------------------------|
| | 4/1 | 12/1 | |
| À | 101 65 41 | 301 193 C1 | Octal Decimal Hex |

MLO-006608

ISO Latin-Cyrillic Supplemental Character Set

| | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR |
|-------|--------|----------------|------------------|---|----------------|------------------|---|-----------------|------------------|---|-----------------|------------------|---|------------------|------------------|----|------------------|------------------|-------|----|----|--|----|----|--|----|----|--|----|----|
| | Column | 2 | 10 | | 3 | 11 | | 4 | 12 | | 5 | 13 | | 6 | 14 | | 7 | 15 | | 8 | 16 | | 9 | 17 | | 10 | 18 | | 11 | 19 |
| Row 0 | NBSP | 40 32 20 | 240 160 A0 | A | 60 48 30 | 260 176 B0 | P | 100 64 40 | 300 192 C0 | a | 120 80 D0 | 320 208 D0 | p | 140 96 E0 | 340 224 E0 | N° | 160 112 F0 | 360 240 F0 | Row 0 | | | | | | | | | | | |
| 1 | Ё | 41 33 21 | 241 161 A1 | Б | 61 49 31 | 261 177 B1 | С | 101 65 41 | 301 193 C1 | δ | 121 81 E1 | 321 209 D1 | c | 141 97 E1 | 341 225 E1 | ё | 161 113 F1 | 361 241 F1 | 1 | | | | | | | | | | | |
| 2 | Ѣ | 42 34 22 | 242 162 A2 | В | 62 50 32 | 262 178 B2 | Т | 102 66 42 | 302 194 C2 | В | 122 82 E2 | 322 210 D2 | t | 142 98 E2 | 342 226 E2 | ѣ | 162 114 F2 | 362 242 F2 | 2 | | | | | | | | | | | |
| 3 | Ѓ | 43 35 23 | 243 163 A3 | Г | 63 51 33 | 263 179 B3 | У | 103 67 43 | 303 195 C3 | Г | 123 83 E3 | 323 211 D3 | y | 143 99 E3 | 343 227 E3 | ѓ | 163 115 F3 | 363 243 F3 | 3 | | | | | | | | | | | |
| 4 | Є | 44 36 24 | 244 164 A4 | Д | 64 52 34 | 264 180 B4 | Ф | 104 68 44 | 304 196 C4 | д | 124 84 E4 | 324 212 D4 | φ | 144 100 E4 | 344 228 E4 | є | 164 116 F4 | 364 244 F4 | 4 | | | | | | | | | | | |
| 5 | Ѕ | 45 37 25 | 245 165 A5 | Е | 65 53 35 | 265 181 B5 | Х | 105 69 45 | 305 197 C5 | е | 125 85 E5 | 325 213 D5 | х | 145 101 E5 | 345 229 E5 | ѕ | 165 117 F5 | 365 245 F5 | 5 | | | | | | | | | | | |
| 6 | Ї | 46 38 26 | 246 166 A6 | Ж | 66 54 36 | 266 182 B6 | Ц | 106 70 46 | 306 198 C6 | ж | 126 86 E6 | 326 214 D6 | ц | 146 102 E6 | 346 230 E6 | ї | 166 118 F6 | 366 246 F6 | 6 | | | | | | | | | | | |
| 7 | İ | 47 39 27 | 247 167 A7 | З | 67 55 37 | 267 183 B7 | Ч | 107 71 47 | 307 199 C7 | з | 127 87 E7 | 327 215 D7 | ч | 147 103 E7 | 347 231 E7 | ï | 167 119 F7 | 367 247 F7 | 7 | | | | | | | | | | | |
| 8 | Ј | 50 42 28 | 250 168 A8 | И | 70 56 38 | 270 184 B8 | Ш | 110 72 48 | 310 200 C8 | и | 130 88 E8 | 330 216 D8 | ш | 150 104 E8 | 350 232 E8 | ј | 170 120 F8 | 370 248 F8 | 8 | | | | | | | | | | | |
| 9 | Љ | 51 43 29 | 251 169 A9 | Й | 71 57 39 | 271 185 B9 | Щ | 111 73 49 | 311 201 C9 | й | 131 89 E9 | 331 217 D9 | щ | 151 105 E9 | 351 233 E9 | љ | 171 121 F9 | 371 249 F9 | 9 | | | | | | | | | | | |
| 10 | Њ | 52 44 2A | 252 170 AA | К | 72 58 3A | 272 186 BA | Ъ | 112 74 4A | 312 202 CA | к | 132 90 EA | 332 218 DA | ъ | 152 106 EA | 352 234 EA | њ | 172 122 FA | 372 250 FA | 10 | | | | | | | | | | | |
| 11 | Ѡ | 53 45 2B | 253 171 AB | Л | 73 59 3B | 273 187 BB | Ы | 113 75 4B | 313 203 CB | л | 133 91 EB | 333 219 DB | ы | 153 107 EB | 353 235 EB | ѡ | 173 123 FB | 373 251 FB | 11 | | | | | | | | | | | |
| 12 | Ќ | 54 46 2C | 254 172 AC | М | 74 60 3C | 274 188 BC | Ь | 114 76 4C | 314 204 CC | м | 134 92 EC | 334 220 DC | ь | 154 108 EC | 354 236 EC | ќ | 174 124 FC | 374 252 FC | 12 | | | | | | | | | | | |
| 13 | - | 55 47 2D | 255 173 AD | Н | 75 61 3D | 275 189 BD | Э | 115 77 4D | 315 205 CD | н | 135 93 ED | 335 221 DD | э | 155 109 ED | 355 237 ED | ѕ | 175 125 FD | 375 253 FD | 13 | | | | | | | | | | | |
| 14 | Ў | 56 48 2E | 256 174 AE | О | 76 62 3E | 276 190 BE | Ю | 116 78 4E | 316 206 CE | о | 136 94 EE | 336 222 DE | ю | 156 110 EE | 356 238 EE | ў | 176 126 FE | 376 254 FE | 14 | | | | | | | | | | | |
| 15 | Џ | 57 49 2F | 257 175 AF | П | 77 63 3F | 277 191 BF | Я | 117 79 4F | 317 207 CF | п | 137 95 FE | 337 223 DF | я | 157 111 FE | 357 239 FE | ѣ | 177 127 FF | 377 255 FF | 15 | | | | | | | | | | | |

LEGEND

| | | | |
|---|-----|------|------------|
| | GL | GR | |
| | 4/1 | 12/1 | Column/Row |
| C | 101 | 301 | Octal |
| | 65 | 193 | Decimal |
| | 41 | C1 | Hex |

MLO-006609



JIS Katakana Character Set

| | | GL | GR | | | GL | GR | | | GL | GR | | | GL | GR | | | GL | GR | | | GL | GR |
|--------|---|----------------|------------------|---|----------------|------------------|----|---|-----------------|------------------|----|---|-----------------|------------------|----|--|------------------|------------------|----|--|------------------|------------------|-------|
| Column | | 2 | 10 | | | 3 | 11 | | | 4 | 12 | | | 5 | 13 | | | 6 | 14 | | | 7 | 15 |
| Row 0 | | | | ー | 60 48 30 | 260 176 B0 | | ヲ | 100 64 40 | 300 192 C0 | | ヱ | 120 80 50 | 320 208 D0 | | | 140 96 60 | 340 224 E0 | | | 160 112 70 | 360 240 F0 | Row 0 |
| 1 | ・ | 41 33 21 | 241 161 A1 | ア | 61 49 31 | 261 177 B1 | | チ | 101 65 41 | 301 193 C1 | | ム | 121 81 51 | 321 209 D1 | | | 141 97 61 | 341 225 E1 | | | 161 113 71 | 361 241 F1 | 1 |
| 2 | 厂 | 42 34 22 | 242 162 A2 | イ | 62 50 32 | 262 178 B2 | | ツ | 102 66 42 | 302 194 C2 | | メ | 122 82 52 | 322 210 D2 | | | 142 98 62 | 342 226 E2 | | | 162 114 72 | 362 242 F2 | 2 |
| 3 | 丿 | 43 35 23 | 243 163 A3 | ウ | 63 51 33 | 263 179 B3 | | テ | 103 67 43 | 303 195 C3 | | モ | 123 83 53 | 323 211 D3 | | | 143 99 63 | 343 227 E3 | | | 163 115 73 | 363 243 F3 | 3 |
| 4 | 、 | 44 36 24 | 244 164 A4 | エ | 64 52 34 | 264 180 B4 | | ト | 104 68 44 | 304 196 C4 | | ヤ | 124 84 54 | 324 212 D4 | | | 144 100 64 | 344 228 E4 | | | 164 116 74 | 364 244 F4 | 4 |
| 5 | ・ | 45 37 25 | 245 165 A5 | オ | 65 53 35 | 265 181 B5 | | ナ | 105 69 45 | 305 197 C5 | | ユ | 125 85 55 | 325 213 D5 | | | 145 101 65 | 345 229 E5 | | | 165 117 75 | 365 245 F5 | 5 |
| 6 | ヲ | 46 38 26 | 246 166 A6 | カ | 66 54 36 | 266 182 B6 | | ニ | 106 70 46 | 306 198 C6 | | ヨ | 126 86 56 | 326 214 D6 | | | 146 102 66 | 346 230 E6 | | | 166 118 76 | 366 246 F6 | 6 |
| 7 | 尸 | 47 39 27 | 247 167 A7 | キ | 67 55 37 | 267 183 B7 | | ヌ | 107 71 47 | 307 199 C7 | | ラ | 127 87 57 | 327 215 D7 | | | 147 103 67 | 347 231 E7 | | | 167 119 77 | 367 247 F7 | 7 |
| 8 | イ | 50 40 28 | 250 168 A8 | ク | 70 56 38 | 270 184 B8 | | ネ | 110 72 48 | 310 200 C8 | | リ | 130 88 58 | 330 216 D8 | | | 150 104 68 | 350 232 E8 | | | 170 120 78 | 370 248 F8 | 8 |
| 9 | ウ | 51 41 29 | 251 169 A9 | ケ | 71 57 39 | 271 185 B9 | | ノ | 111 73 49 | 311 201 C9 | | ル | 131 89 59 | 331 217 D9 | | | 151 105 69 | 351 233 E9 | | | 171 121 79 | 371 249 F9 | 9 |
| 10 | エ | 52 42 30 | 252 170 AA | コ | 72 58 40 | 272 186 BA | | ハ | 112 74 50 | 312 202 CA | | レ | 132 90 5A | 332 218 DA | | | 152 106 6A | 352 234 EA | | | 172 122 7A | 372 250 FA | 10 |
| 11 | オ | 53 43 31 | 253 171 AB | サ | 73 59 41 | 273 187 BB | | ヒ | 113 75 51 | 313 203 CB | | ロ | 133 91 5B | 333 219 DB | | | 153 107 6B | 353 235 EB | | | 173 123 7B | 373 251 FB | 11 |
| 12 | ヤ | 54 44 32 | 254 172 AC | シ | 74 60 42 | 274 188 BC | | フ | 114 76 52 | 314 204 CC | | ワ | 134 92 5C | 334 220 DC | | | 154 108 6C | 354 236 EC | | | 174 124 7C | 374 252 FC | 12 |
| 13 | ユ | 55 45 33 | 255 173 AD | ス | 75 61 43 | 275 189 BD | | ハ | 115 77 53 | 315 205 CD | | ン | 135 93 5D | 335 221 DD | | | 155 109 6D | 355 237 ED | | | 175 125 7D | 375 253 FD | 13 |
| 14 | ヨ | 56 46 34 | 256 174 AE | セ | 76 62 44 | 276 190 BE | | ホ | 116 78 54 | 316 206 CE | | ハ | 136 94 5E | 336 222 DE | | | 156 110 6E | 356 238 EE | | | 176 126 7E | 376 254 FE | 14 |
| 15 | ツ | 57 47 35 | 257 175 AF | ソ | 77 63 45 | 277 191 BF | | マ | 117 79 55 | 317 207 CF | | 。 | 137 95 5F | 337 223 DF | | | 157 111 6F | 357 239 EF | | | | | 15 |

LEGEND

| | | GL | GR | Column/Row Octal Decimal Hex |
|---|--|-----------------|------------------|---------------------------------------|
| | | 4/1 | 12/1 | |
| チ | | 101 65 41 | 301 193 C1 | |

MLO-003983

ISO Latin-9 Supplemental Character Set

| | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | | GL | GR | |
|-------|--------|----------------|------------------|---|----------------|------------------|---|-----------------|------------------|---|-----------------|------------------|---|------------------|------------------|---|------------------|------------------|--|----|----|--|----|----|--|----|----|--|----|----|--|
| | Column | 2 | 10 | | 3 | 11 | | 4 | 12 | | 5 | 13 | | 6 | 14 | | 7 | 15 | | | | | | | | | | | | | |
| Row 0 | NBSP | 40 32 20 | 240 160 A0 | ° | 60 48 30 | 260 176 B0 | À | 100 64 40 | 300 192 C0 | Ð | 120 80 50 | 320 208 D0 | à | 140 96 60 | 340 224 E0 | ø | 160 112 70 | 360 240 F0 | | | | | | | | | | | | | |
| 1 | ı | 41 33 21 | 241 161 A1 | ± | 61 49 31 | 261 177 B1 | Á | 101 65 41 | 301 193 C1 | Ñ | 121 81 51 | 321 209 D1 | á | 141 97 61 | 341 225 E1 | ñ | 161 113 71 | 361 241 F1 | | | | | | | | | | | | | |
| 2 | Ç | 42 34 22 | 242 162 A2 | ² | 62 50 32 | 262 178 B2 | Â | 102 66 42 | 302 194 C2 | Ò | 122 82 52 | 322 210 D2 | â | 142 98 62 | 342 226 E2 | ò | 162 114 72 | 362 242 F2 | | | | | | | | | | | | | |
| 3 | £ | 43 35 23 | 243 163 A3 | ³ | 63 51 33 | 263 179 B3 | Ã | 103 67 43 | 303 195 C3 | Ó | 123 83 53 | 323 211 D3 | ã | 143 99 63 | 343 227 E3 | ó | 163 115 73 | 363 243 F3 | | | | | | | | | | | | | |
| 4 | € | 44 36 24 | 244 164 A4 | Ž | 64 52 34 | 264 180 B4 | Ä | 104 68 44 | 304 196 C4 | Ô | 124 84 54 | 324 212 D4 | ä | 144 100 64 | 344 228 E4 | ô | 164 116 74 | 364 244 F4 | | | | | | | | | | | | | |
| 5 | ¥ | 45 37 25 | 245 165 A5 | µ | 65 53 35 | 265 181 B5 | Å | 105 69 45 | 305 197 C5 | Õ | 125 85 55 | 325 213 D5 | å | 145 101 65 | 345 229 E5 | ö | 165 117 75 | 365 245 F5 | | | | | | | | | | | | | |
| 6 | Š | 46 38 26 | 246 166 A6 | Ŧ | 66 54 36 | 266 182 B6 | Æ | 106 70 46 | 306 198 C6 | Ö | 126 86 56 | 326 214 D6 | æ | 146 102 66 | 346 230 E6 | ø | 166 118 76 | 366 246 F6 | | | | | | | | | | | | | |
| 7 | Š | 47 39 27 | 247 167 A7 | • | 67 55 37 | 267 183 B7 | Ç | 107 71 47 | 307 199 C7 | × | 127 87 57 | 327 215 D7 | ç | 147 103 67 | 347 231 E7 | ÷ | 167 119 77 | 367 247 F7 | | | | | | | | | | | | | |
| 8 | Š | 50 40 28 | 250 168 A8 | Ž | 70 56 38 | 270 184 B8 | È | 110 72 48 | 310 200 C8 | Ø | 130 88 58 | 330 216 D8 | è | 150 104 68 | 350 232 E8 | ø | 170 120 78 | 370 248 F8 | | | | | | | | | | | | | |
| 9 | © | 51 41 29 | 251 169 A9 | ı | 71 57 39 | 271 185 B9 | É | 111 73 49 | 311 201 C9 | Ù | 131 89 59 | 331 217 D9 | é | 151 105 69 | 351 233 E9 | ù | 171 121 79 | 371 249 F9 | | | | | | | | | | | | | |
| 10 | à | 52 42 2A | 252 170 AA | Q | 72 58 3A | 272 186 BA | Ê | 112 74 4A | 312 202 CA | Ú | 132 90 5A | 332 218 DA | ê | 152 106 6A | 352 234 EA | ú | 172 122 7A | 372 250 FA | | | | | | | | | | | | | |
| 11 | « | 53 43 2B | 253 171 AB | » | 73 59 3B | 273 187 BB | Ë | 113 75 4B | 313 203 CB | Û | 133 91 5B | 333 219 DB | ë | 153 107 6B | 353 235 EB | û | 173 123 7B | 373 251 FB | | | | | | | | | | | | | |
| 12 | ¬ | 54 44 2C | 254 172 AC | Œ | 74 60 3C | 274 188 BC | Ì | 114 76 4C | 314 204 CC | Ü | 134 92 5C | 334 220 DC | ì | 154 108 6C | 354 236 EC | ü | 174 124 7C | 374 252 FC | | | | | | | | | | | | | |
| 13 | - | 55 45 2D | 255 173 AD | œ | 75 61 3D | 275 189 BD | Í | 115 77 4D | 315 205 CD | Ý | 135 93 5D | 335 221 DD | í | 155 109 6D | 355 237 ED | ý | 175 125 7D | 375 253 FD | | | | | | | | | | | | | |
| 14 | ® | 56 46 2E | 256 174 AE | ÿ | 76 62 3E | 276 190 BE | Î | 116 78 4E | 316 206 CE | Þ | 136 94 5E | 336 222 DE | î | 156 110 6E | 356 238 EE | þ | 176 126 7E | 376 254 FE | | | | | | | | | | | | | |
| 15 | — | 57 47 2F | 257 175 AF | ¿ | 77 63 3F | 277 191 BF | Ï | 117 79 4F | 317 207 CF | ß | 137 95 5F | 337 223 DF | ï | 157 111 6F | 357 239 EF | ÿ | 177 127 7F | 377 255 FF | | | | | | | | | | | | | |

LEGEND

| | GR | |
|---|------------------|-------------------------|
| | 12/1 | Column/Row |
| À | 301 193 C1 | Octal Decimal Hex |

MLO-00xxxx



Common to IBM Proprinter X24 and XL24E Protocol and Epson ESC/P2 Protocol

Default Sets

The following thirty two character sets are available.

Code pages 210, 220, 437, 850, 851, 852, 857, 858, 860, 862, 863, 865, and 866, CP DHN, Turkish, ECMA 94, ISO Latin 1, ISO Latin 2, ISO Latin 9, Hungarian, Slovenian, Polish, Mazovian, Kamenicky, Cyrillic, ELOT 927, ELOT 928, Latin Polish, Lithuanian 1, Lithuanian 2, MIK, and Macedonian

Code Page 210

| L/H | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
|-----|---|---|---|---|----|---|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | | | | | | | | | |
| 1 | | ! | " | # | \$ | % | & | ' | (|) | * | + | , | - | . | / |
| 2 | | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E |
| 3 | | @ | A | B | C | D | E | F | G | H | I | J | K | L | M | N |
| 4 | | P | Q | R | S | T | U | V | W | X | Y | Z | [| \ |] | ^ |
| 5 | | ` | a | b | c | d | e | f | g | h | i | j | k | l | m | n |
| 6 | | p | q | r | s | t | u | v | w | x | y | z | { | | } | ~ |
| 7 | | À | Á | Â | Ã | Ä | Å | Æ | Ç | È | É | Ê | Ë | Ì | Í | Î |
| 8 | | Ð | Ñ | Ò | Ó | Ô | Õ | Ö | × | Ø | Ù | Ú | Û | Ü | Ý | Þ |
| 9 | | à | á | â | ã | ä | å | æ | ç | è | é | ê | ë | ì | í | î |
| A | | ð | ñ | ò | ó | ô | õ | ö | × | ø | ù | ú | û | ü | ý | þ |
| B | | À | Á | Â | Ã | Ä | Å | Æ | Ç | È | É | Ê | Ë | Ì | Í | Î |
| C | | Ð | Ñ | Ò | Ó | Ô | Õ | Ö | × | Ø | Ù | Ú | Û | Ü | Ý | Þ |
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Code Page 220

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Code Page 437

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Code Page 850

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Code Page 851

IBM851

[illegible]**Code Page 852**

PG852/PG852-T (Code Page 852)

[illegible]**Code Page 857**[illegible]**Code Page 858**[illegible]

Code Page 860

PAGE860 (Code Page 860(Portugal))

[illegible]**Code Page 862**[illegible]



Code Page 863

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Code Page 865

PAGE865 (Code Page 865(Nordic))

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Code Page 866

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Code Page DHN

PG-DHN (Code Page DHN)

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Turkish

TURKY/TURKY-T (Turkish)

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ECMA 94

ISO8859/ECMA94 (ISO 8859-1/ECMA94)

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ISO Latin 1

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ISO Latin 2

LATIN2/LATN2-T (Latin2)

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ISO Latin 9

ISO-LATIN9

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Hungarian

HUNGARY/HUNG-T (Hungarian)

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Slovenian

SLOV/SLOV-T (Slovenian)

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Polish

POLISH/POLSH-T (Polish)

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Mazowian

MAZOWIA/MAZOW-T (Mazowian)

| L/H | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
|-----|---|----|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | | 0 | @ | P | ^ | p | Ç | Ê | Ł | Ł | Ł | α | ≡ |
| 1 | | ! | 1 | 2 | 1 | A | Q | R | a | q | ř | Ł | Ł | Ł | β | ± |
| 2 | | " | 2 | 3 | 2 | B | R | S | b | r | ś | Ł | Ł | Ł | Γ | ≥ |
| 3 | ♥ | # | 3 | 4 | 3 | C | S | T | c | s | ś | Ł | Ł | Ł | π | ≤ |
| 4 | ♦ | \$ | 4 | 5 | 4 | D | T | E | d | t | ś | Ł | Ł | Ł | Σ | ∫ |
| 5 | ♣ | % | 5 | 6 | 5 | E | U | V | e | u | ŝ | Ł | Ł | Ł | o | + |
| 6 | ♠ | & | 6 | 7 | 6 | F | W | G | f | w | ŝ | Ł | Ł | Ł | μ | ÷ |
| 7 | | ' | 7 | 8 | 7 | G | H | X | g | h | ŝ | Ł | Ł | Ł | τ | ≈ |
| 8 | | (| 8 | 9 | 8 | H | I | Y | h | y | ŝ | Ł | Ł | Ł | θ | • |
| 9 | |) | 9 | A | 9 | I | J | Z | i | z | ŝ | Ł | Ł | Ł | • | • |
| A | | * | A | B | A | J | K | L | j | k | ŝ | Ł | Ł | Ł | • | • |
| B | | + | B | C | B | K | L | M | k | l | ŝ | Ł | Ł | Ł | • | • |
| C | | < | C | D | C | L | M | N | l | m | ŝ | Ł | Ł | Ł | • | • |
| D | | = | D | E | D | M | N | O | m | n | ŝ | Ł | Ł | Ł | • | • |
| E | | . | E | F | E | N | O | | n | | ŝ | Ł | Ł | Ł | • | • |
| F | | / | F | | F | O | | | | | ŝ | Ł | Ł | Ł | • | • |

Kamenicky

KAMENIC/KAMEN-T (Kamenicky)

| L/H | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
|-----|---|----|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | | 0 | @ | P | ^ | p | Ç | Ê | Ł | Ł | Ł | α | ≡ |
| 1 | | ! | 1 | 2 | 1 | A | Q | R | a | q | ř | Ł | Ł | Ł | β | ± |
| 2 | | " | 2 | 3 | 2 | B | R | S | b | r | ś | Ł | Ł | Ł | Γ | ≥ |
| 3 | ♥ | # | 3 | 4 | 3 | C | S | T | c | s | ś | Ł | Ł | Ł | π | ≤ |
| 4 | ♦ | \$ | 4 | 5 | 4 | D | T | E | d | t | ś | Ł | Ł | Ł | Σ | ∫ |
| 5 | ♣ | % | 5 | 6 | 5 | E | U | V | e | u | ŝ | Ł | Ł | Ł | o | + |
| 6 | ♠ | & | 6 | 7 | 6 | F | W | G | f | w | ŝ | Ł | Ł | Ł | μ | ÷ |
| 7 | | ' | 7 | 8 | 7 | G | H | X | g | h | ŝ | Ł | Ł | Ł | τ | ≈ |
| 8 | | (| 8 | 9 | 8 | H | I | Y | h | y | ŝ | Ł | Ł | Ł | θ | • |
| 9 | |) | 9 | A | 9 | I | J | Z | i | z | ŝ | Ł | Ł | Ł | • | • |
| A | | * | A | B | A | J | K | L | j | k | ŝ | Ł | Ł | Ł | • | • |
| B | | + | B | C | B | K | L | M | k | l | ŝ | Ł | Ł | Ł | • | • |
| C | | < | C | D | C | L | M | N | l | m | ŝ | Ł | Ł | Ł | • | • |
| D | | = | D | E | D | M | N | O | m | n | ŝ | Ł | Ł | Ł | • | • |
| E | | . | E | F | E | N | O | | n | | ŝ | Ł | Ł | Ł | • | • |
| F | | / | F | | F | O | | | | | ŝ | Ł | Ł | Ł | • | • |

Cyrillic

CYRILIC (Cyrillic)

| L/H | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
|-----|---|----|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | | 0 | @ | P | ^ | p | | А | Р | а | р | № | |
| 1 | | ! | 1 | 2 | 1 | A | Q | R | a | q | Б | С | б | с | Ѡ | |
| 2 | | " | 2 | 3 | 2 | B | R | S | b | r | Ѣ | В | Г | г | ѡ | |
| 3 | ♥ | # | 3 | 4 | 3 | C | S | T | c | s | Ѥ | Г | У | у | Ѣ | |
| 4 | ♦ | \$ | 4 | 5 | 4 | D | T | E | d | t | Ѧ | У | Ф | ф | ѣ | |
| 5 | ♣ | % | 5 | 6 | 5 | E | U | V | e | u | Ѩ | Ф | Х | х | Ѥ | |
| 6 | ♠ | & | 6 | 7 | 6 | F | W | G | f | w | Ѭ | Х | Ц | ц | Ѧ | |
| 7 | | ' | 7 | 8 | 7 | G | H | X | g | h | Ѯ | Ц | Ч | ч | Ѩ | |
| 8 | | (| 8 | 9 | 8 | H | I | Y | h | y | Ѱ | Ч | Ш | ш | Ѯ | |
| 9 | |) | 9 | A | 9 | I | J | Z | i | z | Ѳ | Ш | Щ | щ | Ѱ | |
| A | | * | A | B | A | J | K | L | j | k | Ѵ | Щ | Ъ | ъ | Ѳ | |
| B | | + | B | C | B | K | L | M | k | l | Ѷ | Ъ | Ы | ы | Ѵ | |
| C | | < | C | D | C | L | M | N | l | m | Ѹ | Ы | Ь | ь | Ѷ | |
| D | | = | D | E | D | M | N | O | m | n | Ѻ | Ь | Э | э | Ѹ | |
| E | | . | E | F | E | N | O | | n | | Ѽ | Э | Ю | ю | Ѻ | |
| F | | / | F | | F | O | | | | | Ѿ | Ю | Я | я | Ѽ | |

ELOT 927

| L/H | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
|-----|---|----|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | | 0 | @ | P | ^ | p | Α | Β | α | β | ω | ≡ | |
| 1 | | ! | 1 | 2 | 1 | A | Q | R | a | q | Γ | Δ | γ | δ | ε | ± |
| 2 | | " | 2 | 3 | 2 | B | R | S | b | r | Ε | Τ | υ | φ | ζ | ≥ |
| 3 | ♥ | # | 3 | 4 | 3 | C | S | T | c | s | Σ | Υ | ψ | χ | η | ≤ |
| 4 | ♦ | \$ | 4 | 5 | 4 | D | T | E | d | t | Φ | Χ | ψ | ω | ι | ∫ |
| 5 | ♣ | % | 5 | 6 | 5 | E | U | V | e | u | Ψ | Ω | φ | ο | μ | ÷ |
| 6 | ♠ | & | 6 | 7 | 6 | F | W | G | f | w | Ω | Π | φ | ύ | ≈ | |
| 7 | | ' | 7 | 8 | 7 | G | H | X | g | h | Ω | Π | φ | ύ | ≈ | |
| 8 | | (| 8 | 9 | 8 | H | I | Y | h | y | Ω | Π | φ | ύ | ≈ | |
| 9 | |) | 9 | A | 9 | I | J | Z | i | z | Ω | Π | φ | ύ | ≈ | |
| A | | * | A | B | A | J | K | L | j | k | Ω | Π | φ | ύ | ≈ | |
| B | | + | B | C | B | K | L | M | k | l | Ω | Π | φ | ύ | ≈ | |
| C | | < | C | D | C | L | M | N | l | m | Ω | Π | φ | ύ | ≈ | |
| D | | = | D | E | D | M | N | O | m | n | Ω | Π | φ | ύ | ≈ | |
| E | | . | E | F | E | N | O | | n | | Ω | Π | φ | ύ | ≈ | |
| F | | / | F | | F | O | | | | | Ω | Π | φ | ύ | ≈ | |

ELOT 928

ELOT928

| L/H | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
|-----|---|----|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | | 0 | @ | P | ^ | p | | ° | í | Π | α | π | |
| 1 | | ! | 1 | 2 | 1 | A | Q | R | a | q | ´ | ± | Α | β | ρ | |
| 2 | | " | 2 | 3 | 2 | B | R | S | b | r | ² | Β | γ | σ | τ | |
| 3 | ♥ | # | 3 | 4 | 3 | C | S | T | c | s | £ | Γ | Δ | υ | φ | |
| 4 | ♦ | \$ | 4 | 5 | 4 | D | T | E | d | t | € | Δ | Τ | ε | υ | |
| 5 | ♣ | % | 5 | 6 | 5 | E | U | V | e | u | ! | Ε | Υ | ε | υ | |
| 6 | ♠ | & | 6 | 7 | 6 | F | W | G | f | w | ! | Α | Ζ | φ | φ | |
| 7 | | ' | 7 | 8 | 7 | G | H | X | g | h | ! | Ε | Θ | χ | ψ | |
| 8 | | (| 8 | 9 | 8 | H | I | Y | h | y | ! | Ε | Θ | ψ | ω | |
| 9 | |) | 9 | A | 9 | I | J | Z | i | z | ! | Ε | Θ | ι | ω | |
| A | | * | A | B | A | J | K | L | j | k | ! | Ε | Θ | κ | ι | |
| B | | + | B | C | B | K | L | M | k | l | ! | Ε | Θ | λ | ι | |
| C | | < | C | D | C | L | M | N | l | m | ! | Ε | Θ | μ | ι | |
| D | | = | D | E | D | M | N | O | m | n | ! | Ε | Θ | ν | ι | |
| E | | . | E | F | E | N | O | | n | | ! | Ε | Θ | ξ | ι | |
| F | | / | F | | F | O | | | | | ! | Ε | Θ | ο | ι | |

Latin Polish

LATIN-P (Latin Polish)

| L/H | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
|-----|---|----|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | | 0 | @ | P | ^ | p | Ç | Ê | Ł | Ł | Ł | α | ≡ |
| 1 | | ! | 1 | 2 | 1 | A | Q | R | a | q | ř | Ł | Ł | Ł | β | ± |
| 2 | | " | 2 | 3 | 2 | B | R | S | b | r | ś | Ł | Ł | Ł | Γ | ≥ |
| 3 | ♥ | # | 3 | 4 | 3 | C | S | T | c | s | ś | Ł | Ł | Ł | π | ≤ |
| 4 | ♦ | \$ | 4 | 5 | 4 | D | T | E | d | t | ś | Ł | Ł | Ł | Σ | ∫ |
| 5 | ♣ | % | 5 | 6 | 5 | E | U | V | e | u | ŝ | Ł | Ł | Ł | o | + |
| 6 | ♠ | & | 6 | 7 | 6 | F | W | G | f | w | ŝ | Ł | Ł | Ł | μ | ÷ |
| 7 | | ' | 7 | 8 | 7 | G | H | X | g | h | ŝ | Ł | Ł | Ł | τ | ≈ |
| 8 | | (| 8 | 9 | 8 | H | I | Y | h | y | ŝ | Ł | Ł | Ł | θ | • |
| 9 | |) | 9 | A | 9 | I | J | Z | i | z | ŝ | Ł | Ł | Ł | • | • |
| A | | * | A | B | A | J | K | L | j | k | ŝ | Ł | Ł | Ł | • | • |
| B | | + | B | C | B | K | L | M | k | l | ŝ | Ł | Ł | Ł | • | • |
| C | | < | C | D | C | L | M | N | l | m | ŝ | Ł | Ł | Ł | • | • |
| D | | = | D | E | D | M | N | O | m | n | ŝ | Ł | Ł | Ł | • | • |
| E | | . | E | F | E | N | O | | n | | ŝ | Ł | Ł | Ł | • | • |
| F | | / | F | | F | O | | | | | ŝ | Ł | Ł | Ł | • | • |

Lithuanian 1

| L/H | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
|-----|---|---|---|---|----|---|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | | | | | | | | | |
| 1 | | ! | " | # | \$ | % | & | ' | (|) | * | + | , | - | . | / |
| 2 | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
| 3 | | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E |
| 4 | | @ | A | B | C | D | E | F | G | H | I | J | K | L | M | N |
| 5 | | P | Q | R | S | T | U | V | W | X | Y | Z | [| \ |] | ^ |
| 6 | | ` | a | b | c | d | e | f | g | h | i | j | k | l | m | n |
| 7 | | ~ | p | q | r | s | t | u | v | w | x | y | z | { | } | ~ |
| 8 | | Р | С | Т | У | Ф | Х | Ц | Ч | Ш | Щ | Ъ | Ы | Э | Ю | Я |
| 9 | | а | б | в | г | д | е | ж | з | и | й | к | л | м | н | о |
| A | | р | с | т | у | ф | х | ц | ч | ш | щ | ъ | ы | э | ю | я |
| B | | Л | л | Т | т | У | у | Ц | ц | Ч | ч | Ш | ш | Щ | щ | Ъ |
| C | | а | б | в | г | д | е | ж | з | и | й | к | л | м | н | о |
| D | | р | с | т | у | ф | х | ц | ч | ш | щ | ъ | ы | э | ю | я |
| E | | ± | ² | ³ | ⁴ | ⁵ | ⁶ | ⁷ | ⁸ | ⁹ | ¹ | ² | ³ | ⁴ | ⁵ | ⁶ |
| F | | ≡ | ≡ | ≡ | ≡ | ≡ | ≡ | ≡ | ≡ | ≡ | ≡ | ≡ | ≡ | ≡ | ≡ | ≡ |

Lithuanian 2

| L/H | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
|-----|---|---|---|---|----|---|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | | | | | | | | | |
| 1 | | ! | " | # | \$ | % | & | ' | (|) | * | + | , | - | . | / |
| 2 | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
| 3 | | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E |
| 4 | | @ | A | B | C | D | E | F | G | H | I | J | K | L | M | N |
| 5 | | P | Q | R | S | T | U | V | W | X | Y | Z | [| \ |] | ^ |
| 6 | | ` | a | b | c | d | e | f | g | h | i | j | k | l | m | n |
| 7 | | ~ | p | q | r | s | t | u | v | w | x | y | z | { | } | ~ |
| 8 | | Р | С | Т | У | Ф | Х | Ц | Ч | Ш | Щ | Ъ | Ы | Э | Ю | Я |
| 9 | | а | б | в | г | д | е | ж | з | и | й | к | л | м | н | о |
| A | | р | с | т | у | ф | х | ц | ч | ш | щ | ъ | ы | э | ю | я |
| B | | Л | л | Т | т | У | у | Ц | ц | Ч | ч | Ш | ш | Щ | щ | Ъ |
| C | | а | б | в | г | д | е | ж | з | и | й | к | л | м | н | о |
| D | | р | с | т | у | ф | х | ц | ч | ш | щ | ъ | ы | э | ю | я |
| E | | ± | ² | ³ | ⁴ | ⁵ | ⁶ | ⁷ | ⁸ | ⁹ | ¹ | ² | ³ | ⁴ | ⁵ | ⁶ |
| F | | ≡ | ≡ | ≡ | ≡ | ≡ | ≡ | ≡ | ≡ | ≡ | ≡ | ≡ | ≡ | ≡ | ≡ | ≡ |

MIK

| L/H | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
|-----|---|---|---|---|----|---|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | | | | | | | | | |
| 1 | | ! | " | # | \$ | % | & | ' | (|) | * | + | , | - | . | / |
| 2 | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
| 3 | | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E |
| 4 | | @ | A | B | C | D | E | F | G | H | I | J | K | L | M | N |
| 5 | | P | Q | R | S | T | U | V | W | X | Y | Z | [| \ |] | ^ |
| 6 | | ` | a | b | c | d | e | f | g | h | i | j | k | l | m | n |
| 7 | | ~ | p | q | r | s | t | u | v | w | x | y | z | { | } | ~ |
| 8 | | Р | С | Т | У | Ф | Х | Ц | Ч | Ш | Щ | Ъ | Ы | Э | Ю | Я |
| 9 | | а | б | в | г | д | е | ж | з | и | й | к | л | м | н | о |
| A | | р | с | т | у | ф | х | ц | ч | ш | щ | ъ | ы | э | ю | я |
| B | | Л | л | Т | т | У | у | Ц | ц | Ч | ч | Ш | ш | Щ | щ | Ъ |
| C | | а | б | в | г | д | е | ж | з | и | й | к | л | м | н | о |
| D | | р | с | т | у | ф | х | ц | ч | ш | щ | ъ | ы | э | ю | я |
| E | | ± | ² | ³ | ⁴ | ⁵ | ⁶ | ⁷ | ⁸ | ⁹ | ¹ | ² | ³ | ⁴ | ⁵ | ⁶ |
| F | | ≡ | ≡ | ≡ | ≡ | ≡ | ≡ | ≡ | ≡ | ≡ | ≡ | ≡ | ≡ | ≡ | ≡ | ≡ |

Macedonian

| L/H | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
|-----|---|---|---|---|----|---|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | | | | | | | | | |
| 1 | | ! | " | # | \$ | % | & | ' | (|) | * | + | , | - | . | / |
| 2 | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
| 3 | | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E |
| 4 | | @ | A | B | C | D | E | F | G | H | I | J | K | L | M | N |
| 5 | | P | Q | R | S | T | U | V | W | X | Y | Z | [| \ |] | ^ |
| 6 | | ` | a | b | c | d | e | f | g | h | i | j | k | l | m | n |
| 7 | | ~ | p | q | r | s | t | u | v | w | x | y | z | { | } | ~ |
| 8 | | Р | С | Т | У | Ф | Х | Ц | Ч | Ш | Щ | Ъ | Ы | Э | Ю | Я |
| 9 | | а | б | в | г | д | е | ж | з | и | й | к | л | м | н | о |
| A | | р | с | т | у | ф | х | ц | ч | ш | щ | ъ | ы | э | ю | я |
| B | | Л | л | Т | т | У | у | Ц | ц | Ч | ч | Ш | ш | Щ | щ | Ъ |
| C | | а | б | в | г | д | е | ж | з | и | й | к | л | м | н | о |
| D | | р | с | т | у | ф | х | ц | ч | ш | щ | ъ | ы | э | ю | я |
| E | | ± | ² | ³ | ⁴ | ⁵ | ⁶ | ⁷ | ⁸ | ⁹ | ¹ | ² | ³ | ⁴ | ⁵ | ⁶ |
| F | | ≡ | ≡ | ≡ | ≡ | ≡ | ≡ | ≡ | ≡ | ≡ | ≡ | ≡ | ≡ | ≡ | ≡ | ≡ |



IBM Proprinter X24E and XL24E Protocol

IBM Set 1/2

IBM character set 1 and IBM character set 2

IBM Set 1

| L\H | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
|-----|------------|----|---|---|---|---|---------|---------|---|---|---|---|----|---|---|---|
| 0 | NUL DLE SP | 0 | @ | P | ˘ | p | NUL DLE | á | : | L | „ | α | ≡ | | | |
| 1 | SOH DC1 | ! | 1 | A | Q | a | q | SOH DC1 | í | ⌈ | ⌋ | β | ± | | | |
| 2 | STX DC2 | " | 2 | B | R | b | r | STX DC2 | ó | ⌈ | ⌋ | Γ | ≥ | | | |
| 3 | ETX DC3 | # | 3 | C | S | c | s | ETX DC3 | ú | ⌈ | ⌋ | π | ≤ | | | |
| 4 | HOT DC4 | \$ | 4 | D | T | d | t | HOT DC4 | ñ | ⌈ | ⌋ | Σ | ∫ | | | |
| 5 | ENQ NAK | % | 5 | E | U | e | u | ENQ NAK | Ñ | ⌈ | ⌋ | o | ∫ | | | |
| 6 | ACK SYN | & | 6 | F | V | f | v | ACK SYN | ä | ⌈ | ⌋ | μ | + | | | |
| 7 | BEL ETB | ' | 7 | G | W | g | w | BEL ETB | ø | ⌈ | ⌋ | τ | ≈ | | | |
| 8 | BS CAN | (| 8 | H | X | h | x | BS CAN | ì | ⌈ | ⌋ | φ | ° | | | |
| 9 | HT EM |) | 9 | I | Y | i | y | HT EM | í | ⌈ | ⌋ | θ | • | | | |
| A | LF SUB | * | : | J | Z | j | z | LF SUB | ı | ⌈ | ⌋ | Ω | √ | | | |
| B | VT ESC | + | ; | K | [| k | { | VT ESC | ı | ⌈ | ⌋ | δ | n | | | |
| C | FF FS | , | < | L | \ | l | | FF FS | ı | ⌈ | ⌋ | ∞ | 2 | | | |
| D | CR GS | - | = | M |] | m | ~ | CR GS | ı | ⌈ | ⌋ | ø | | | | |
| E | SO RS | . | > | N | ^ | n | ˘ | SO RS | ı | ⌈ | ⌋ | ε | ■ | | | |
| F | SI US | / | ? | O | _ | o | DEL | SI US | ı | ⌈ | ⌋ | ü | SP | | | |

IBM Set 2

| L\H | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
|-----|------------|----|---|---|---|---|---|-----|---|---|---|---|---|---|---|----|
| 0 | NUL DLE SP | | | 0 | @ | P | ˘ | p | Ç | É | á | : | L | „ | α | ≡ |
| 1 | SOH DC1 | ! | 1 | A | B | Q | a | q | ü | æ | í | ⌈ | ⌈ | ⌈ | β | ± |
| 2 | STX DC2 | " | 2 | B | A | R | b | r | ë | æ | ó | ⌈ | ⌈ | ⌈ | Γ | ≥ |
| 3 | ETX DC3 | # | 3 | C | B | S | c | s | ä | ö | ú | ⌈ | ⌈ | ⌈ | π | ≤ |
| 4 | END DC4 | \$ | 4 | D | C | T | d | t | ä | ö | ñ | ⌈ | ⌈ | ⌈ | Σ | ∫ |
| 5 | ENQ NAK | % | 5 | E | D | U | e | u | à | ò | Ñ | ⌈ | ⌈ | ⌈ | o | ∫ |
| 6 | ACK SYN | & | 6 | F | E | V | f | v | â | û | ä | ⌈ | ⌈ | ⌈ | μ | + |
| 7 | BEL ETB | ' | 7 | G | F | W | g | w | ç | ù | ø | ⌈ | ⌈ | ⌈ | τ | ≈ |
| 8 | BS CAN | (| 8 | H | G | X | h | x | é | ÿ | ì | ⌈ | ⌈ | ⌈ | φ | ° |
| 9 | HT EM |) | 9 | I | H | Y | i | y | è | ö | í | ⌈ | ⌈ | ⌈ | θ | • |
| A | LF SUB | * | : | J | I | Z | j | z | è | ù | ı | ⌈ | ⌈ | ⌈ | Ω | √ |
| B | VT ESC | + | ; | K | J | [| k | { | ı | ç | ı | ⌈ | ⌈ | ⌈ | δ | n |
| C | FF FS | , | < | L | K | \ | l | | ı | é | ı | ⌈ | ⌈ | ⌈ | ∞ | 2 |
| D | CR GS | - | = | M | L |] | m | ~ | ı | ¥ | ı | ⌈ | ⌈ | ⌈ | ø | |
| E | SO RS | . | > | N | M | ^ | n | ˘ | Ä | Æ | ı | ⌈ | ⌈ | ⌈ | ε | ■ |
| F | SI US | / | ? | O | N | _ | o | DEL | Ä | f | ı | ⌈ | ⌈ | ⌈ | ü | SP |

Epson ESC/P2 Protocol

National Character Sets

The following fifteen character sets are available.

USA, France, Germany, UK, Denmark 1, Sweden, Italy, Spain 1, Japan, Norway,
Denmark 2, Spain 2, Latin America, Korea, and Legal

Common Characters

The following table shows characters common to the fifteen “national” character sets. NR indicates characters that differ with languages.

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

National Characters

The following table shows “national” characters that differ with languages. Character codes correspond to NRs in the preceding table.

| | Character Code(Hex) | | | | | | | | | | | |
|---------------|---------------------|----|----|----|----|----|----|----|----|----|----|----|
| | 23 | 24 | 40 | 5B | 5C | 5D | 5E | 60 | 7B | 7C | 7D | 7E |
| 1: USA | # | \$ | @ | [| \ |] | ^ | ` | { | | } | ~ |
| 2: FRANCE | # | \$ | à | ° | ç | § | ^ | ` | é | ù | è | .. |
| 3: GERMANY | # | \$ | § | Ä | Ö | Ü | ^ | ` | ä | ö | ü | ß |
| 4: U.K. | £ | \$ | @ | [| \ |] | ^ | ` | { | | } | ~ |
| 5: DENMARK | # | \$ | @ | Æ | Ø | Å | ^ | ` | æ | ø | å | ~ |
| 6: SWEDEN | # | ¤ | É | Ä | Ö | Å | Ü | é | ä | ö | å | ü |
| 7: ITALY | # | \$ | @ | ° | \ | é | ^ | ù | à | ò | è | ì |
| 8: SPAIN | R | \$ | @ | í | Ñ | ¿ | ^ | ` | .. | ñ | } | ~ |
| 9: JAPAN | # | \$ | @ | [| ¥ |] | ^ | ` | { | | } | ~ |
| 10: NORWAY | # | ¤ | É | Æ | Ø | Å | Ü | é | æ | ø | å | ü |
| 11: DENMARK 2 | # | \$ | É | Æ | Ø | Å | Ü | é | æ | ø | å | ü |
| 12: SPAIN 2 | # | \$ | á | í | Ñ | ¿ | é | ` | í | ñ | ó | ú |
| 13: LATIN AM. | # | \$ | á | í | Ñ | ¿ | é | ü | í | ñ | ó | ú |
| 14: KOREA | # | \$ | @ | [| ₩ |] | ^ | ` | { | | } | ~ |
| 15: LEGAL | # | \$ | § | ° | ' | " | ¶ | ` | © | ® | † | ™ |



Resident Fonts

This appendix provides print samples of the printer's twelve resident fonts.

| | |
|--------------------------|--|
| Draft | The 24-wire dot-matrix printer prints quality characters and symbols using a variety of sizes and fonts. |
| High-Speed Draft | The 24-wire dot-matrix printer prints quality characters and symbols using a variety of sizes and fonts. |
| High-Impact Draft | The 24-wire dot-matrix printer prints quality characters and symbols using a variety of sizes and fonts. |
| Pica 10 | The 24-wire dot-matrix printer prints quality characters and symbols using a variety of sizes and fonts. |
| Courier 10 | The 24-wire dot-matrix printer prints quality characters and symbols using a variety of sizes and fonts. |
| Prestige Elite 12 | The 24-wire dot-matrix printer prints quality characters and symbols using a variety of sizes and fonts. |
| Compressed 17 | The 24-wire dot-matrix printer prints quality characters and symbols using a variety of sizes and fonts. |
| Boldface PS | The 24-wire dot-matrix printer prints quality characters and symbols using a variety of sizes and fonts. |



Timeless (outline)

The 24-wire dot-matrix printer prints quality characters and symbols using a variety of sizes and fonts.

Nimbus Sans ® (outline)

The 24-wire dot-matrix printer prints quality characters and symbols using a variety of sizes and fonts.

OCR A

The 24-wire dot-matrix printer prints quality characters and symbols using a variety of sizes and fonts.

OCR B

The 24-wire dot-matrix printer prints quality characters and symbols using a variety of sizes and fonts.



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