

DASCOM

Tally[®]

User Guide

MIP480 Mobile Impact Printer



FCC Compliance Statement

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference, and
- (2) This device must accept any interference received, including interference that may cause undesired operation.

Canadian Compliance Statement

This digital apparatus is in conformity with standard NMB-003 of Canada.
Cet appareil numérique est conforme à la norme NMB-003 du Canada.

Radio and Television Interference

When installed at a certain location, the machine may cause interference with radio and television reception. If you notice flickering or distorted images or noises on your audio-visual units, your machine maybe causing radio interference.

Switch it off, and if the interference disappears, the machine is the cause of radio interference. Perform the following procedure until the interference is corrected.

- Move the machine and the TV and/or radio away from each other.
- Reposition or reorient the machine and TV and/or radio.
Unplug the machine, TV and/or radio, and re-plug them into outlets that operate on different circuits.
Reorient the TV and/or radio antennas and cables until the interference stops. For an out-door antenna, ask your local electrician for support.
- Use coaxial cable antennas.

FCC warning: Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Notes

1. The use of a non-shielded parallel interface cable with the referenced device is prohibited. The length of the parallel interface cable must be 3 meters (10 feet) or less. The length of the serial interface cable must be 600 meters (1970 feet) or less.
2. The length of the power cord must be 3 meters (10 feet) or less.

Notice to Canadian Users

This digital apparatus does not exceed the class B limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

This equipment is in the 2nd class category (information equipment to be used in a residential area or an adjacent area thereto) and conforms to the standards set by the Voluntary Control Council for Interference by Information Technology Equipment aimed at preventing radio interference in such residential area.

When used near a radio or TV receiver, it may become the cause of radio interference. Read the instructions for correct handling.

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Introduction

Congratulations on purchasing the Tally Mobile Impact Printer 480 (MIP480). This printer is an 80 column, 24 wire, serial dot matrix printer specifically designed as a robust output device for use in vehicular applications. This compact, versatile printer offers maximum compatibility with today's software packages and personal computers. The 24-wire print head provides crisp, clear printing of invoices and documents. This printer is also easy to install and use.



Mobile Impact Printer 480

Features

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

- **Software compatibility.** This printer operates with IBM Proprinter XL24E and Epson-EP2 emulations.
- **Various character sets.** For IBM Mode: IBM Set 1 and Set 2. For EPSON Mode: 15 National Character Sets.
- **Multiple fonts.** The printer has thirteen resident fonts: Draft, Roman, Sans Serif, Courier, Bold, Prestige, Script, Orator, Gothic, OCR-A, OCR-B, Sans Serif H and Roman T. Two scalable fonts – Roman and Sans Serif.
- **High-speed printing.** At 10 cpi, print speed ranges from 400 cps for high-speed draft quality to 133 cps for letter quality.
- **64K bytes of input buffer.** 64K bytes are available for storing input data and downloading custom fonts.
- **Simple switching of paper types.** The ability to “park” continuous forms to switch between continuous forms and single sheets.
- **Two positions capability.** The printer may be mounted vertically on a panel or seat back in a standard transportation vehicle, or horizontally on the passenger seat or other location. The push tractor feeds the continuous forms.
- **Automatic tear-off advancing.** With factory settings of the Set-Up mode, continuous forms’ perforations are automatically advanced up to the tear bar at the end of each job so that forms can be torn off.
- **Auto viewing.** Paper (continuous forms or single sheets) is automatically advanced at the end of each printing so that the last printed line can be read.
- **Maintenance-free.** The printer only requires periodic cleaning and changing of the ribbon cartridge.

Options

Printer configurations are available with:

- 802.11B Wireless Ethernet.

Paper Handling

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

- Getting to know the printer's major parts and the control panel
- Selecting paper
- Overview of paper operations
- Adjusting for paper thickness
- Using single sheets
- Using continuous forms
- 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, invoices, envelopes, or labels.

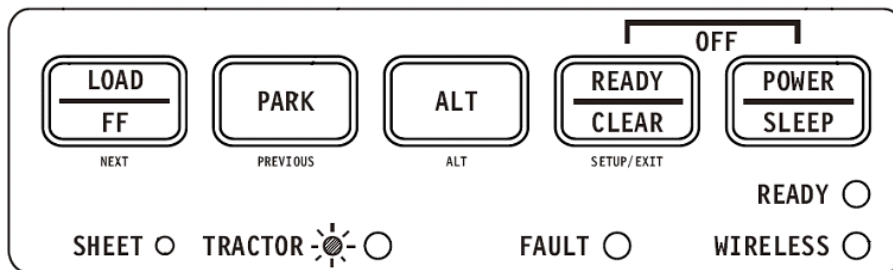
Getting to Know the Printer's Major Parts and the Control Panel

This section describes the major parts and controls of the printer and operations of the control panel. Take a moment to become familiar with the printer.

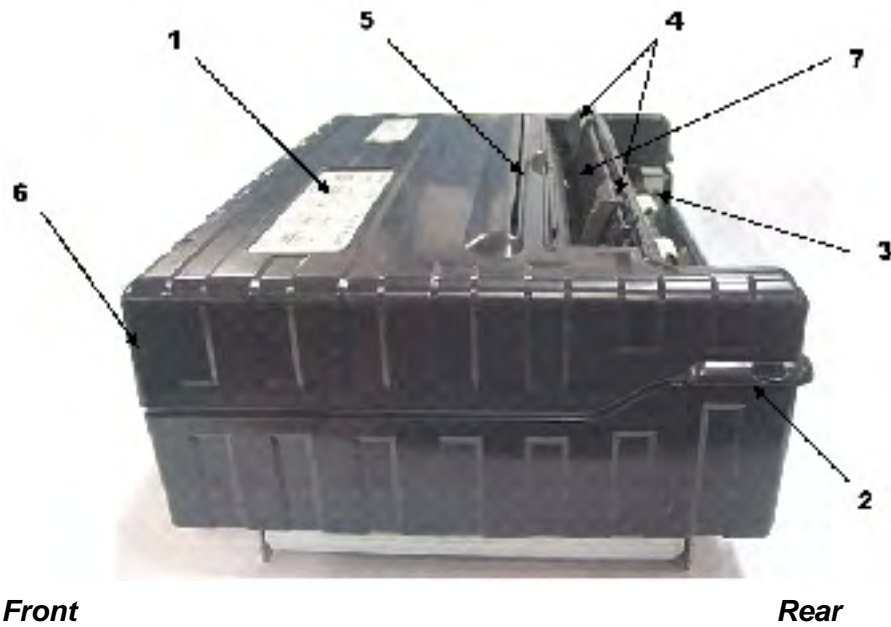


Front View

- 1** Top Cover
- 2** Cut Sheet Edge
- 3** Power Supply Connector (to connect to the vehicle battery)
- 4** Control Panel (to load and feed paper, select print features, or change the printer's optional settings)
- 5** Single Sheet Edge Guides (to adjust location of single sheets)
- 6** Easy Load Platforms
- 7** Tractor Doors (to hold and feed continuous forms)
- 8** Front/Bottom



Control Panel

*Front**Rear*

Left Side View

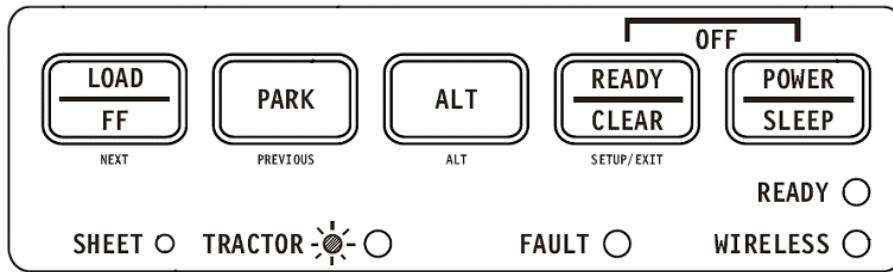
- 1** Power Switch
- 2** Cover Latch (to secure top cover)
- 3** Forms Tractors (to hold and feed continuous forms)
- 4** Paper Guides (to guide single sheets)
- 5** Paper Exit Slot and Tear Edge
- 6** Top Cover – Rear
- 7** Single Sheet Tray (Shown in down Position)

Bottom View

- 8** Interface Connectors (or Wireless Adapters if installed)

*Vertical Position**Bottom View*

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 4, “Using Set-Up Mode.”

Normal mode operation includes everyday operations, such as paper handling, font selection, 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.

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.
Fault	On	The printer is out of paper.
	Blinking slowly	The printer has detected an operational error: paper jam, interface error, carriage error, paper unloading error, etc.
	Blinking fast	The printer detected diagnostic errors at power-up.

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	Paper is automatically detected and advanced (auto-loading) when it is first inserted. In this mode, if the FF key is pushed, the inserted sheet will be ejected from the printer and the Fault LED will light, indicating paper out condition.
Feed paper a page	—	Not printing	Off	Press FF/LOAD.
Advance perforation to tearbar	—	Not printing	Off	Press READY.
Eject single-sheet paper	—	Not printing	Off	Press FF/LOAD. The Fault LED will light, indicating a paper out condition.
Unload continuous-forms paper	—	Not printing	Off	Press Park.
Pause printing	On	Printing	Off	Press READY
Resume printing	Blinking	Not printing	Off	Press READY
Resume printing after a fault	Off	Not printing	On	Clear error and press READY.
Resume printing after paper out	Off	Not printing	On	Load paper.
Place printer in Ready state	Off	Not printing	Off	Press READY
Place printer in pause state	On	—	Off	Press READY
Enter Normal mode	N/A	N/A	N/A	Turn power on without pressing any keys
Enter Sleep mode	N/A	Not printing	N/A	Press POWER/SLEEP for five seconds
Leave Sleep mode	N/A	Not printing	N/A	Press POWER/SLEEP for one second
Printing test	N/A	N/A	N/A	Turn power on while pressing FF/LOAD key.
Use the adjustment temporarily	Off	—	Off	Press ALT-NEXT.
Use the adjustment permanently	Off	—	Off	Press SETUP/EXIT.
Clear the adjustment	Off	—	Off	Press ALT-PREVIOUS.

Operation	Required Conditions ^{*1}			Required Action
	Ready	Printing ^{*2}	Fault	
Enter Set-Up mode	N/A	N/A	N/A	Turn power on while pressing SETUP/EXIT.
Move cursor to select a Set-Up Function or Value	Off	Not printing	Off	Press NEXT or PREVIOUS key.
Move cursor to select a Set-Up Option	Off	Not printing	Off	Press NEXT or PREVIOUS key.
Select a Set-Up Function or Value	Off	Not printing	Off	Press ALT-NEXT or ALT-PREVIOUS key.
Select a Set-Up Value and move cursor to SAVE&EXIT	Off	Not printing	Off	Press SETUP/EXIT.
Clear software-detected errors	—	—	Blinking	Press SETUP/EXIT
Initialize the printer	—	—	—	Turn power off and on again.

*1 In Normal mode operation, all keys except READY 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 READY key is pressed and the printer is awaiting data, or the READY key is pressed during printing.

Selecting Paper

The printer can handle either single sheets or continuous forms. Single sheets, also called cut sheets, include envelopes and non-continuous, 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

Parameter	Fixed Unit	Portable Unit
Width -- Cut Sheet	102 to 267 mm	102 to 248 mm
Width -- Fan-Fold	102 to 216 mm	102 to 216 mm
Length	102 mm or greater	102 to 279 mm
Thickness	Up to 0.35 mm	Up to 0.35 mm

Paper Thickness and Number of Copies

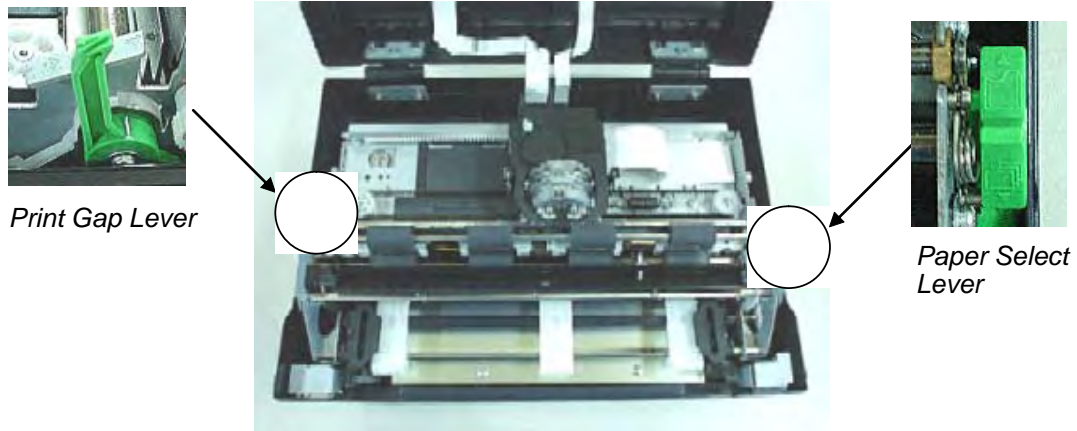
Description	
Thickness	0.35 mm (0.014 in) maximum total thickness.
Copies	1 to 3 copies, including the original. For carbon-inter-leaved paper, the carbon counts as a copy.

Overview of Paper Operations

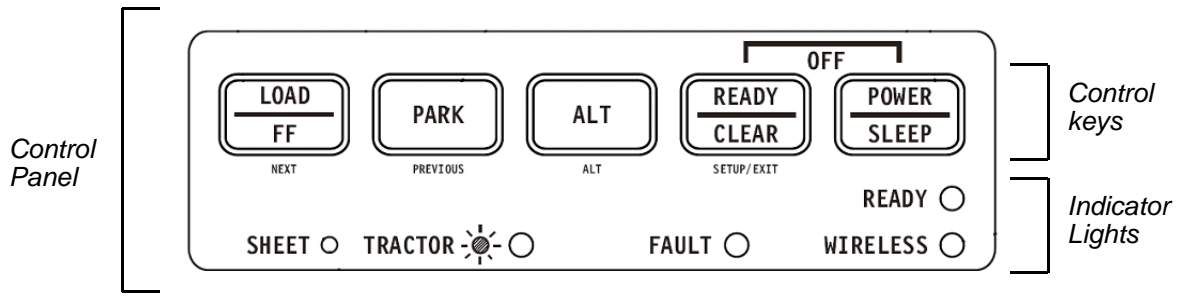
The following levers and keys are used in paper handling. Lift the cover to locate these levers inside the printer.

- Print Gap lever on the left side under the cover
- Paper Select lever on the right side under the cover

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



- All keys on the control panel for primary and alternative functions are labeled below and above respectively.



Printer Controls and keys

The following table summarizes the use of levers and keys 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 keys used for Paper Handling

Lever/key	Purpose	Action
FF/LOAD	Form Feed	Press FF/LOAD to execute a form feed. Continuous forms are fed forward by one page. Single sheets are ejected.
	Load paper	Press FF/LOAD to feed paper to the top of form position.
PARK	Unload forms	Press PARK to retract continuous forms to the “park position.”
SETUP/EXIT + ALT	Enter Top-of-Form (TOF) Adjustment mode	Press SETUP/EXIT and ALT at the same time to enter TOF Adjustment mode where the paper loading position can be adjusted. See Top-of-Form Adjustment later in this chapter.
Paper select lever *	Select paper path	Move the paper select lever backward for continuous sheets. Move the paper select lever forward for single forms.

* The following graphics are engraved on the casing.

Continuous Forms



Single Sheet



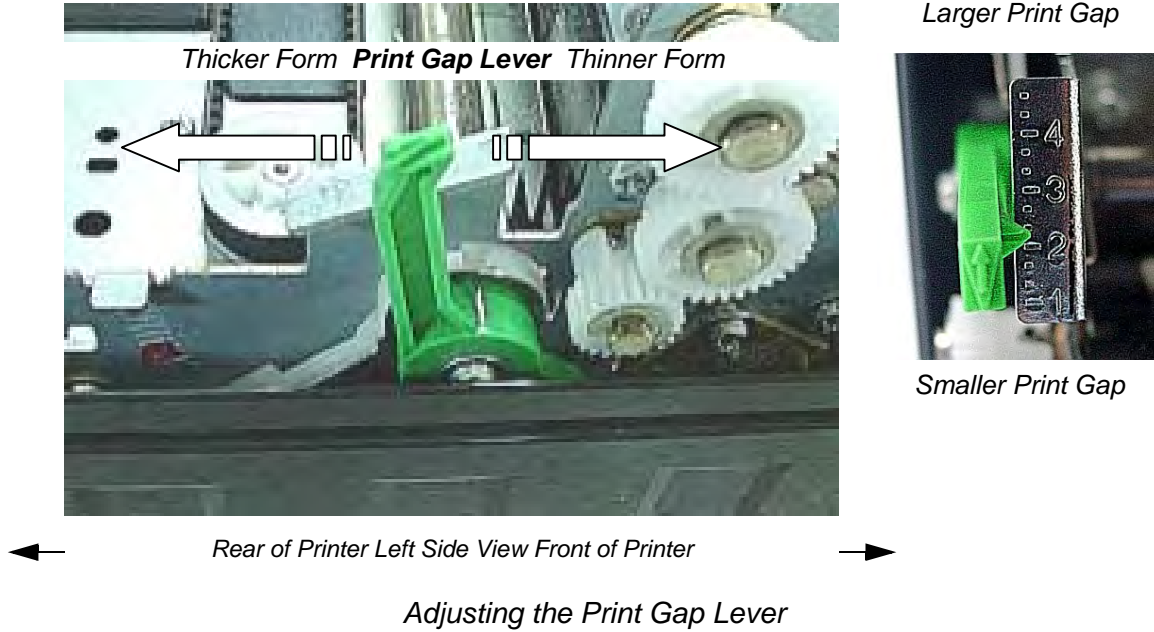
Adjusting for Paper Thickness

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

The Print Gap lever, located on the left under the cover, allows you to adjust for different paper thicknesses. Be sure to adjust the Print Gap lever whenever you change the number of copies being printed.

The print gap lever has twelve settings.

Moving the Print Gap lever to front of printer reduces the Print Gap.



Important: Open Print Gap lever to maximum to replace ribbon.

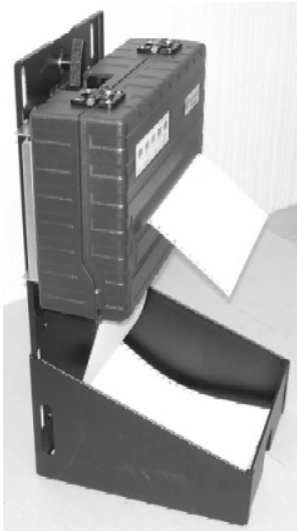
CAUTION: If printing smears, the ribbon misfeeds, or the paper jams, move the lever one position wider.

Using Continuous Forms

Continuous forms paper, fanfolded at the horizontal perforations, is ideal for printing rough drafts, long files, forms and invoices. The paper is fed into the printer using the forms tractor unit. The Push tractor is at the front/bottom of the printer. The paper is loaded and adjusted via keys. The forms may be advanced to tear off position by operator or automatically through a timeout.

Positioning the Paper Stack

Place the stack of continuous forms paper as shown in the picture below.



Side View



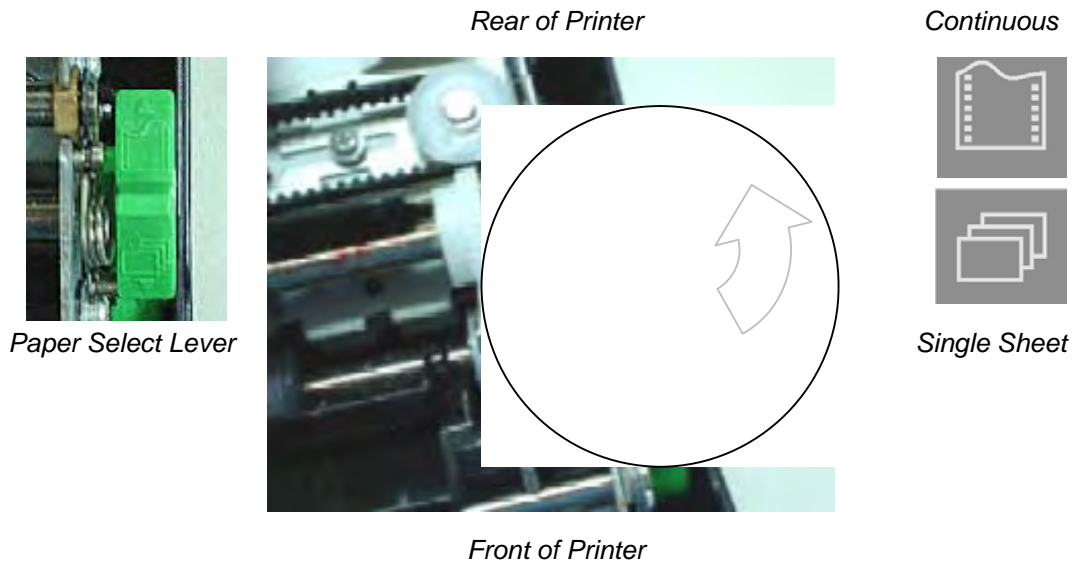
Continuous Form Paper Stack

Loading Continuous Forms (Push Tractor)

This section explains how to use continuous forms with a push tractor at rear (or bottom, depending on printer orientation). Paper is loaded and adjusted via keys. Forms may be advanced to tear off feature by operator or by host.

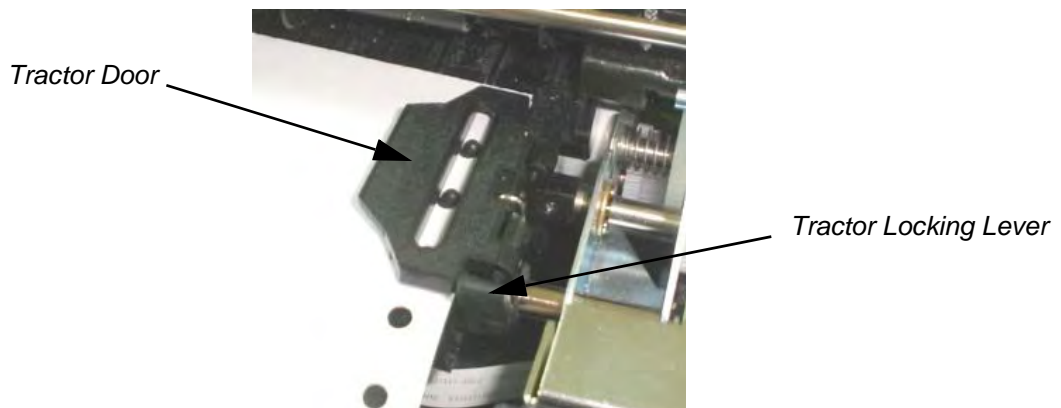
To load continuous forms paper:

- 1 Make sure that the printer is turned on. Remove any single-sheet paper from the printer.
- 2 If necessary, readjust the Print Gap lever for continuous forms. (See the section “Adjusting for Paper Thickness” earlier in this chapter.)
- 3 Move the paper select lever backward to Continuous Paper position.



NOTE: For improved viewing of tractors, you may move the Paper Support to the full-up (Position 3) position. After loading the paper, move it back to the full-down (Position 1) position.

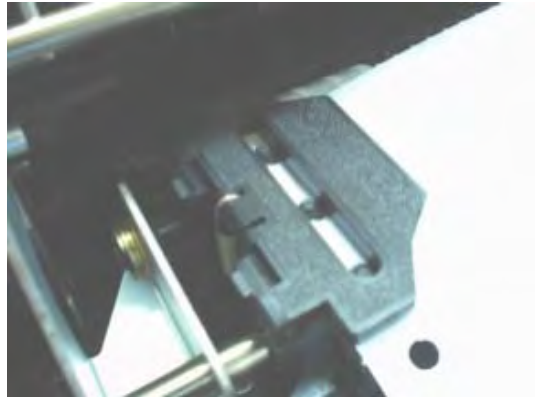
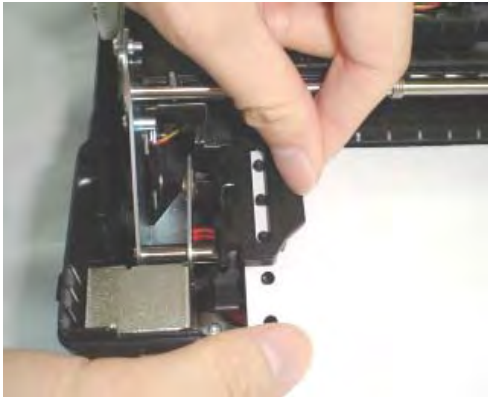
- 4 Release the tractor locking levers by pulling them up. Once the right forms tractor is positioned, lock it by pushing down its locking lever.



- 5** Raise the tractor doors and fit the first two paper feed holes onto the right tractor pins.



- 6** Holding paper against the Easy-Load Platform, fit the paper into the tractor. Close the tractor Door. Repeat the procedure for the left tractor and adjust the left forms tractor to accommodate the width of the form.



- 7** Move the left tractor to make the paper flat. Do not stretch the paper too taut. Push the left locking lever down to secure the tractor in place.
- 8** Press the FF/LOAD key to advance the paper to the top-of-form position from which printing can start. The printer is automatically placed in the Ready State.
- 9** Press the READY key to place the printer on line. Print a sample page and check the page margins. Make the following adjustments, as necessary:
- Horizontal alignment. Move the forms tractors as required with paper parked.
 - Top-of-form setting. Use the printer Set-Up mode (see Chapter 4, “using the Set-Up Mode”).
 - Margin settings. Use your software or the printer Set-Up mode (see Chapter 4, “using Set-Up Mode”).

Unloading Continuous Forms

To unload continuous forms:

- 1 Make sure that the Paper Select lever is set to the continuous forms position.
- 2 Press the PARK key. The continuous forms paper is retracted to the park position. If the paper cannot be retracted in one operation, continue to press the PARK key until the paper is parked.

NOTE: The printer can retract continuous forms-paper by a recommended maximum of 25.4 cm (11 inches) per operation

- 3 To remove the paper, raise the Tractor Doors and lift out the paper.

Recovering from an Unexpected Unloading Operation

If you have accidentally pressed the PARK key, you can cancel this operation in two ways only if this unexpected operation was unsuccessful (the paper was not actually parked, and the Fault indicator is blinking).

- Press the READY key. The printer switches to the Ready state and the paper moves according to the setting of the Set-Up option.
- Press the FF/LOAD key. The paper moves back to the place it was positioned before you pressed the PARK key.

Automatic-Tear-Off Advancing

Your printer has a tear bar that allows you to tear off printed pages without wasting paper. The tear bar is at the rear edge of the paper exit slot.

Your printer is factory-set for automatic tear-off. When a printing job ends (including a form feed command), the bottom perforation of the last printed page is automatically positioned in front of the tear bar. The printed page may now be pulled against the tear bar of the top cover. You can change the positioning delay from one to five seconds, using the Set-Up mode.

Manual Tear-Off Advancing

If you have set the TEAR option of the INSTALL function to MANUAL, tear off the paper by:

- 1 Press the READY to put the printer in pause mode. The printer will position the paper perforation in front of the tear bar.

CAUTION: If the paper perforation is not positioned in front of the tear bar, the length of your paper may not be specified correctly in your software or the Set-Up mode. Check that the paper length is specified correctly. For information on specifying page length using the Set-Up mode, see Chapter 4, "Using Set-Up Mode."

- 2 Tear the paper off at the perforation by pulling the paper to the rear, against the tear edge.



Tearing Off Continuous Forms

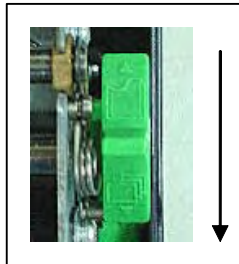
Using Single Sheets

This section describes how to load paper in the Single Sheet Paper Tray. The Single Sheet Paper Tray allows paper to be loaded manually, one sheet at a time.

Loading a Single Sheet of Paper

To load a sheet of paper using the Single sheet Paper Tray:

- 1** Make sure that the printer is turned on. Check that tractor-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 Print Gap lever. (See the section, “Adjusting for Paper Thickness,” earlier in this chapter.)
- 3** Move the Paper Select lever toward front of printer. (This lever is at the right under the cover.)



- 4** Raise the Single Sheet Paper Tray until it locks in Paper Support Position 2.
- 5** Line up the right sliding edge guide with the notch on the Paper Support. Adjust the left sliding edge guide to the width of the paper. Insert the sheet into the raised Paper Support. 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 after paper detection. If you set this option to manual, you will have to press FF/LOAD to feed the paper.



*Paper Support Position 1
Operating and tear-off
using continuous forms*



*Paper Support Position 2
Loading Single Sheets*

- 6** 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 4, “Using Set-Up Mode”).
- Margin settings. Use your software or the printer Set-Up mode (see Chapter 4, “Using Set-Up Mode”).

Ejecting Single Sheets

If you print using software which inserts a form feed at the end of each page, each sheet is ejected automatically upon the completion of the page printing. To manually eject sheets of paper:

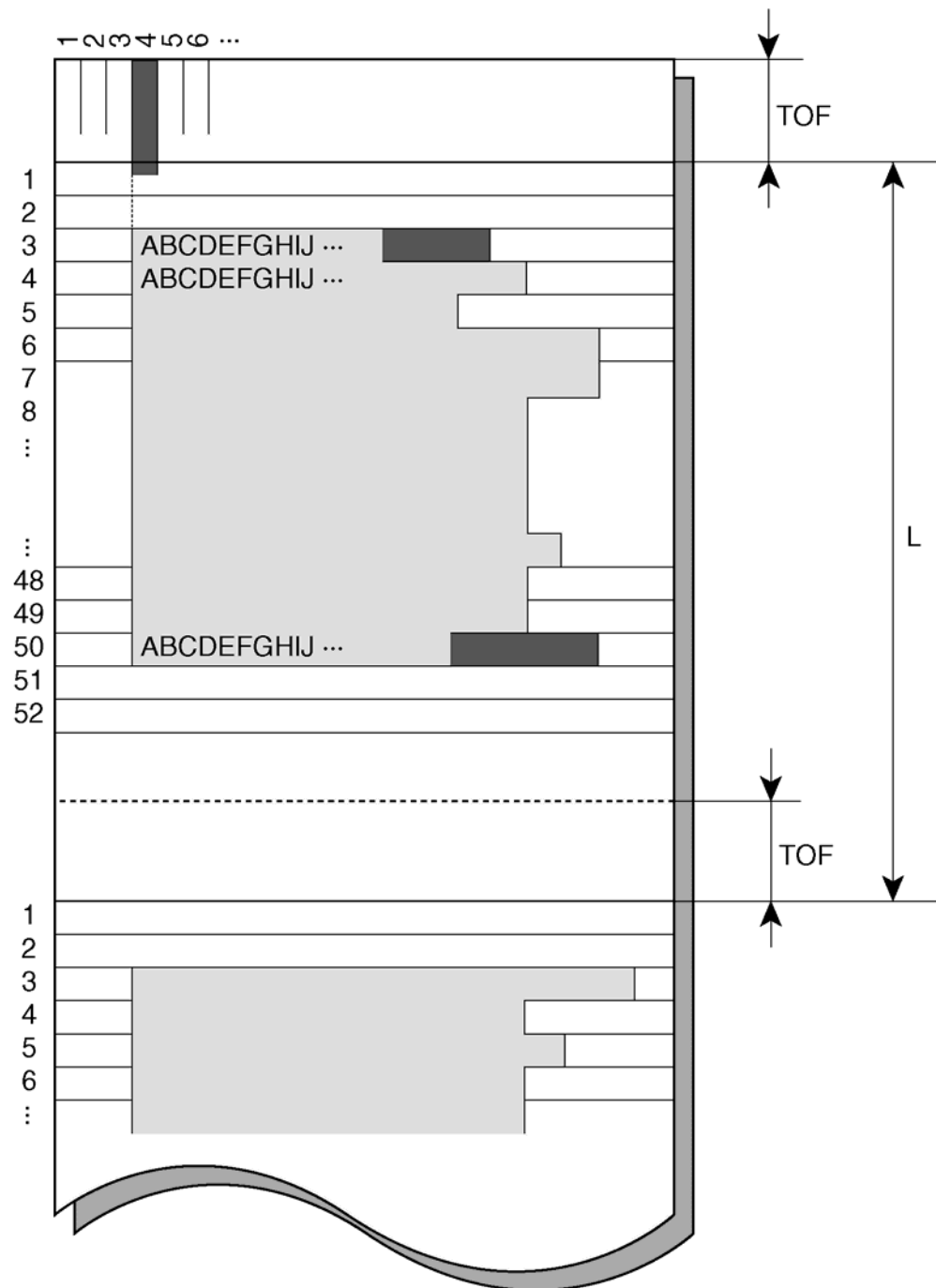
- Press the FF key to execute a forward form feed.

NOTE: If the printing job does not include a form feed command, the paper is automatically fed so that you can see the last printed line.

Feeding and Positioning Paper

Print Area Definition

- **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.
- **Form Length:** Set the corresponding Set-Up option (FORM LENGTH) 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:** 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:** 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:** 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:** Print area defined by the corresponding Set-Up options: Form Length, Top-of-Form, Top Margin, and Bottom Margin.
- **Paper perforation:** The perforation defines the physical page length.



Print Area Definition

Form Feed

Use the 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 FF/LOAD key feeds the paper to the next Top-of-form position.

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.

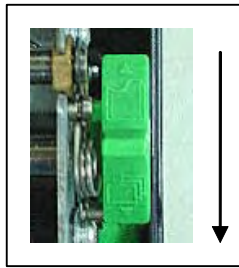
Switching from Continuous Forms to Single Sheets

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 key. The Fault indicator turns on.

CAUTION: Retracting many pages by using the Park key without tearing off may 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 to the single sheet position.



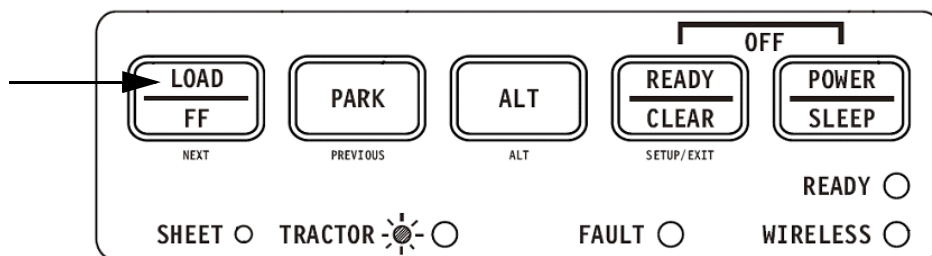
- 4 Raise the Paper tray support and guide to tray position 2. (For details, see the section, “Using Single Sheets,” earlier in this chapter.) Put a sheet of paper on the Paper support and guide with its bottom edge aligned with the platen. The paper is automatically detected and advanced (if the Single Sheet Load Option is set to automatic) when it is first inserted to the top-of-form position. In this mode, if the FF/LOAD key is pushed, the inserted sheet will be ejected from the printer and the Fault LED will light, indicating a paper out condition.

You are now ready to print using single sheets.

Switching from Single Sheets to Continuous Forms

To switch from single sheets to continuous forms:

- 1 If a sheet of paper is loaded, remove the paper by pressing the FF/LOAD key.



- 2 Move the Paper Select lever to the continuous forms position.
- 3 Press the FF/LOAD key. 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.
- 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.

Printing

This chapter describes the following typical printing operations:

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

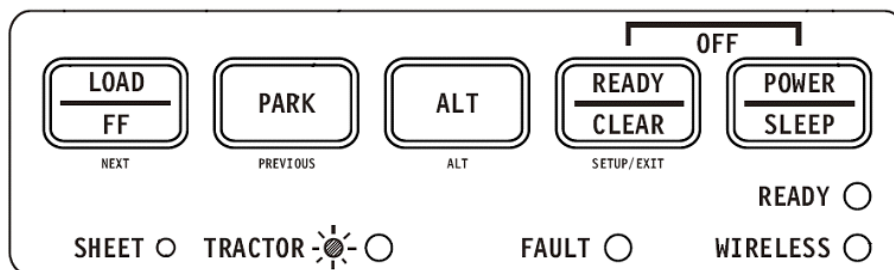
The PARK, LOAD and the READY keys are used for these operations, which are described in detail in this section. For a summary of the operation of these keys, see the section, “Getting to Know the Printer’s Major Parts and the Control Panel,” in Chapter 2, “Paper Handling.”

Instructions for loading and handling paper are also given in Chapter 2, “Paper Handling.”

This chapter also describes how to set the printer into the sleep mode.

Using the Control Panel

Some print features can be selected from the control panel. These features are, two pre-determined sets (macros) of print features, and two emulations.



Printer Control Panel

Starting or Stopping Printing

Starting Printing

Before you start to print, make sure that paper is loaded. Also, verify that the Print Gap lever is set to the appropriate position.

To start printing, make sure that the Ready indicator is lit (the printer is ready). If not so, press the READY key to place the printer in the Ready state. Start your print job.

Stopping and Viewing Printing

To stop printing, press the READY key 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.

CAUTION: 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.

Resuming Printing

To resume printing, press the READY key again. If the paper is advanced for viewing, it is backed up 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.

CAUTION: 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, “Paper Handling.”
- 2** To load the first sheet of paper, press the FF/LOAD key for continuous forms. Single sheets are automatically loaded unless you change the factory default setting. The Fault indicator will turn off and the printer resumes printing.

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 key to execute a form feed.

NOTE: Proper use of the Tear-off function requires the paper be positioned at Top of Form either by software command (form Feed) or by pressing the FF/Load key.

If you have set the TEAR option to MANUAL, use the READY key to control the Tear-Off function.

NOTE: See the section “Tearing Off Continuous Forms” in Chapter 2, “Paper Handling”.

Sleep Mode

The printer has a power saving feature (Sleep Mode). If the printer is in sleep mode state, the power consumption is lowered to 2W instead of 7W in normal mode. This feature is usefull if you want to save energy of the car battery.

If the printer receives data while in sleep mode, it automatically is set to normal mode and ready to print.

NOTE: If any interface is connected to the parallel port of the printer, this interface will be turned off while entering the power saving condition.

Entering Sleep Mode

To enter the Sleep Mode:

- Press and hold depressed the POWER/SLEEP key for five seconds to enter Sleep Mode.

NOTE: You can adjust the duration of time after which the printer automatically enters Sleep Mode in Set-Up mode via the option <PWRDWNHRS>. See the section “INSTALL Options and Values” in Chapter 4, “Using Special Mode”.

While in sleep mode, the READY LED blinks slowly (all 5 seconds), all other LEDs of the control panel are off.

Leaving Sleep Mode

To leave the Sleep Mode:

- Press the POWER/SLEEP key for one second to leave Sleep Mode or send data to the serial, USB or internal Bluetooth module.

Using Special Mode

Your Mobile Printer has two operation modes:

- The Normal mode is used for daily operations like paper handling and printing as explained in Chapter 2, "Paper Handling," and Chapter 3, "Printing."
- The Special mode is used to change the printer settings.

The following table summarizes the purpose of each function.

Special Mode Functions

Function	Purpose
Setup Mode	Change the Printer setting
Print Configuration	Print the Printer Configuration To check your settings by printing a list of all the printer's currently selected values.
Printing Test	Run the printing test
Hex Dump Mode	Hex-dump allows you to determine whether the computer is sending the correct commands to the printer
Printing Alignment Adjustment	Perform adjustment Bi-directional alignment
Top of Form Adjustment	Perform adjustment of Top of Form
Setting of The First Dot Position on The Left Side	Change the left margin fine adjustment
Menu-Access	Restricts access to Set-Up functions from the control panel
Setting Setup Mode to Default Value (Standard)	Resets factory settings in MACRO and INSTALL for standard
Setting Setup Mode to Default Value (6820)	Resets factory settings in MACRO and INSTALL for 6820

Entering Special Mode

To enter Special mode:

- 1** Make sure that the tractors are loaded with continuous feed paper and that the paper select lever is set backward.
- 2** Turn the printer off.
- 3** Turn the printer back on and immediatley press each keys:

Function	Load/ FF	Park	Alt	Ready/ Clear
Setup Mode				•
Print Configuration			•	
Printing Test	•			
Hex Dump Mode			•	•
Printing Alignment Adjustment	•			•
Top Adjustment		•		
Setting of The First Dot Position on The Left Side	•		•	•
Menu-Access	•	•	•	
Setting Setup Mode to Default Value (Standard)		•		•
Setting Setup Mode to Default Value (6820)		•	•	

Set-Up Mode Function

The Set-Up mode allows you:

- To define a user environment, Macro, which is a printer operating environment for your application software. The printer operating environment includes the emulation, font, horizontal and vertical pitches, page length and margins, line mode, and printing direction. It also includes emulation dependent options like the character set.
- 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 recall all the factory settings (including the user environment and installation parameters).
- To define what kind of settings modifications are allowed to avoid accidentally changing of Set-Up values.

NOTE: You may want to use the flowchart at the end of this chapter for quick reference. The flowchart lists all printer Set-Up functions, options, and 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 keys. You can perform all the Set-Up operations by using keys 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).

Entering the Set-Up Mode

To enter the Set-Up mode:

- 1** Make sure that the tractors are loaded with continuous feed paper and that the paper select lever is set backward.
- 2** Turn the printer off.
- 3** Turn the printer back on and immediately press the READY key.

<input type="radio"/>	Buttons	Set-Up Action	<input type="radio"/>
	NEXT	Move cursor Down to the next Function or Value	
	PREVIOUS	Move cursor Up to the next Function or Value	
1	ALT-NEXT	Select the Option or Value and Move cursor Right	<input type="radio"/>
	ALT-PREVIOUS	Select the Option or Value and Move cursor Left	
	SETUP/EXIT	Select the Option or value and Move to SAVE&EXIT	<input type="radio"/>
	<hr/>		
2	FUNCTIONS		<input type="radio"/>
	MACRO		<input type="radio"/>
<input type="radio"/>			<input type="radio"/>
<input type="radio"/>			<input type="radio"/>

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 keys in the Set-Up mode.

The <FUNCTIONS> menu **2** is started from MACRO.

Overview of the Set-Up Mode

Your Mobile Printer has five functions menu in setup mode.

When you press the NEXT KEY or PREVIOUS KEY, the following next or previous <FUNCTIONS> menu is printed:

<FUNCTIONS> MACRO INSTALL SAFE PANEL RCALL-FACT SAVE&EXIT
--

The following table summarizes the purpose of each function.

Set-Up Mode Functions

Function	Description
MACRO	Assigns print features to MACRO
INSTALL	Changes the Set-Up menu language, computer interface, and paper feed control options
SAFE PANEL	READY, PARK and LOAD require the ALT key to be used as a two key operation for these functions
RCALL-FACT	Resets factory settings in MACRO and INSTALL
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 NEXT key or the PREVIOUS key to position the function you require.
- 2** Press the ALT-NEXT key or the ALT-PREVIOUS key to select the function. The printer prints the first option. The MACRO, INSTALL and SAFE PANEL functions contain options that have selectable values. The other functions have neither options nor values. Repeatedly press the NEXT key or the PREVIOUS key to position the option you require.

The first four Macro options are shown below.

```
<FUNCTIONS>
MACRO
    <EMULATIONS>
    <EMUL SERIAL>
    <EMUL USB>
    <EMUL WIRELESS>
```

- 3** Press the ALT-NEXT key or the ALT-PREVIOUS key to select the option. The printer prints the first value. Repeatedly press the NEXT key or the PREVIOUS key to position the value you require.

The EMUL WIRELESS values are shown below.

```
<FUNCTIONS>
MACRO
    <EMULATION>
    <EMUL SERIAL>
    <EMUL USB>
    <EMUL WIRELESS>
                                EPSON-EP2
                                IBM2390+
```


Options with Pre-determined Values

For some options, you can choose among a limited set of pre-determined values. To select such a value:

- 1** Repeatedly press the NEXT key or the PREVIOUS key to position the value you require.
- 2** Press the ALT-PREVIOUS key to select the value. The printer prints the current option.
- 3** After selecting the desired values, press the SETUP/EXIT key to reprint the <FUNCTIONS> SAVE&EXIT.

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 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 READY key.
- 2 Select the Macro function.**
Wait for the printer to stop printing and press the ALT-NEXT key to select the Macro function and print the <EMULATION> option.
- 3 Print the menu of the vertical pitch option.**
Since you only want to change the vertical pitch, press the NEXT key repeatedly until the <VERT PITCH> option is printed. Press the ALT-NEXT key to select the <VERT PITCH> option and print its values.
- 4 Change the vertical pitch from 6 to 8 lines per inch.**
Press the NEXT key once to position the 8 LPI. Press the ALT-PREVIOUS key to select 8 LPI. The option < VERT PITCH > is printed.
- 5 Exit the Macro function.**
Since you do not want to make any other changes in MACRO, press the SETUP/EXIT key. The <FUNCTIONS> SAVE&EXIT is reprinted.
- 6 Exit the Set-Up mode, saving the new vertical pitch.**
Press the SETUP/EXIT key or the ALT-NEXT key or the ALT-PREVIOUS key to save 8 lines per inch as the new power-on default in Macro , and then exit Macro. Press the SETUP/EXIT key again then 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.

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.

Example: Changing the Left Margin

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

1 Enter the Set-Up mode.

Turn the printer off and back on while pressing the READY key.

2 Select the Macro function.

Wait for the printer to stop printing. Then press the ALT-NEXT key to select the Macro function options.

3 Print the menu of the left margin option.

Since you only want to change the left margin, press the NEXT key or the PREVIOUS key until the <LEFT MARGN> option is printed. Press the ALT-NEXT key to select the < LEFT MARGN > option and print its values.

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

Press the NEXT key nineteen times. When the key 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 ALT-NEXT key to select 20 COL. 20 COL is underlined, and the next option value is printed.

5 Exit the Macro function.

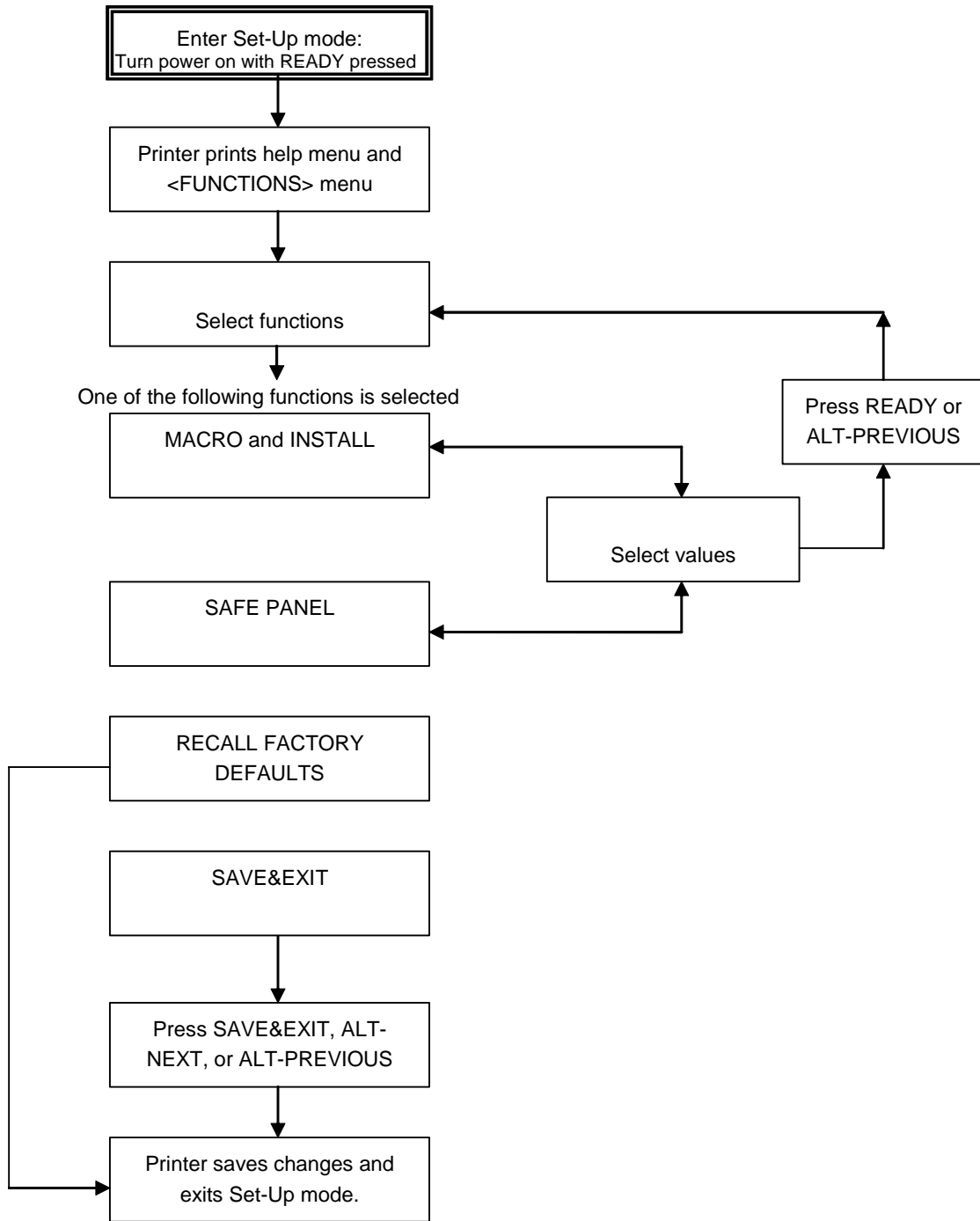
Since you do not want to make any other changes in MACRO, press the SETUP/EXIT key. The <FUNCTIONS> SAVE&EXIT menu is then reprinted.

6 Exit the Set-Up mode, saving the new left margin.

Press the SETUP/EXIT key or the ALT-NEXT key or the ALT-PREVIOUS key to save 20 columns as the new power-on default in Macro and exit Macro.

Press the SETUP/EXIT key again then 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.

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



Points to Remember

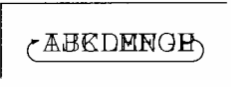
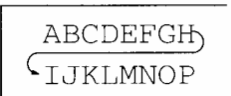
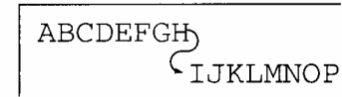
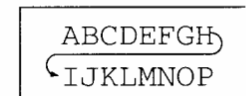
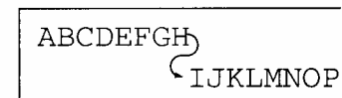
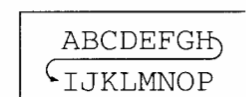
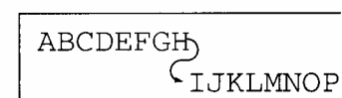
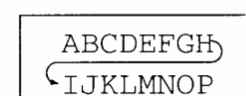
- We recommend that you use continuous forms paper for printing in the Set-Up mode because the output will exceed a single page. To load paper, use the FF/Load key.
- Whenever you enter the Set-Up mode, short help menus are printed at the top of the page. Use the help menus for quick reference while in the Set-Up mode.
- When printing the option for each function, you can move either forward or backward in the option list. To move forward (print the next option), press the NEXT key. To move backward (print the previous option), press the PREVIOUS key.
- While in the <FUNCTIONS> menu or when selecting a function that contains options and selectable values, press the SETUP/EXIT key to reprint the <FUNCTIONS> menu SAVE&EXIT.

Macro Options and Values

- Values in **bold** are the factory settings.
- Some settings are overridden by commands from the computer.
- Options that differ by emulation are described at the end of the table.

MACRO Options	Description
<EMULATION>	Select the same emulation as that selected by your software.
EPSON-EP2	Epson printers using the EP2 emulation
IBM 2390+	IBM 2390+ printers
6820	6820 mode (Standard model doesn't support this functions)
PORT DEPEND	The printer selects emulation according to the active interface (such as serial, USB). See the next options.
<EMUL SERIAL>	Select an emulation for the Serial interface. This is invalid and skipped when PORT DEPEND is not selected for the <EMULATION> option.
Epson-EP2	EP2 (factory setting)
IBM 2390+	IBM Proprinter 2390+ printers
6820	Not valid in Standard model
<EMUL USB>	Select an emulation for USB interface. This is invalid and skipped when PORT DEPEND is not selected for the <EMULATION> option.
Epson-EP2	EP2 (factory setting)
IBM 2390+	IBM Proprinter 2390+ printers
6820	Not valid in Standard model
<EMUL WIRELESS>	Select an emulation for the Wireless interface. This is invalid and skipped when PORT DEPEND is not selected for the <EMULATION> option.
Epson-EP2	EP2 (factory setting)
IBM 2390+	IBM Proprinter 2390+ printers
6820	Not valid in Standard model
<EMUL BLUETOOTH>	Select an emulation for the Bluetooth interface. This is invalid and skipped when PORT DEPEND is not selected for the <EMULATION> option.
Epson-EP2	EP2 (factory setting)
IBM 2390+	IBM Proprinter 2390+ printers
6820	Not valid in Standard model
	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	Draft font (lower resolution than letter quality, 3 times the speed of letter quality)
COURIER	Courier font

MACRO Options	Description
ROMAN	ROMAN font
SANS SERIF	Sans Serif font
SCRIPT	Script font
BOLD	Bold font
GOTHIC	Gothic font
PRESTIGE	Prestige font
ORATOR	ORATOR font
OCR-A	OCR A font
OCR-B	OCR B font
<HORIZONTAL PITCH>## CPI	10,12, 15, 17, 20 or 24 (characters per horizontal inch)
<VERTICAL PITCH>## LPI	1,2, 3, 4, 5, 6 , 7, 8, or 12 (lines per vertical inch)
## LPCM	1, 2, or 4 (lines per centimeter)
<FORM LENGH>	Specify the length of the page in inches or by the number of lines per page.
## INCHES	3, 3.5, 4, 5.5, 6, 7, 8, 8.5, 11 (Letter size), 11 2/3 (A4 size), 12, 14, or 15
No of LINE	1 to 126 (66) Number of lines per page
<LEFT MARGN>	Specify the left margin by the number of the left column (see "Print Area Definition" in Chapter 2, "Paper Handling.")
No of COLM	1 to 256 Number of the left column
<TOP OF FORM>	Specify the top of form in 1/60 inches. See "Print Area Definition" in Chapter 2, "Paper Handling."
## /60 IN	0 to 99 Number of 1/60 inches
<IGNORE FF>	Specify whether to ignore a form feed when the current position is at the top of a form.
NO YES	Always perform a commanded form feed. Ignore the form feed when at the top of a form.
<TOP MRGIN>	Specify the number of the top line. See "Print Area Definition" in Chapter 2, "Paper Handling."
## LINES	1 to 126 (66)
<BOTTOM MRG>	Specify the number of the bottom line. See "Print Area Definition" in Chapter 2, "Paper Handling."
## LINES	1 to 256 (66) Number of the bottom line

MACRO Options	Description
<LINE MODE>	Specify the effect of CR (Carriage Return) and LF (Line Feed) codes.
CR=CR CR=LF+CR LF=LF LF=LF+CR	<p>CR=CR: No line feed is added to a carriage return</p>   <p>CR=LF+CR: A line feed is added to each carriage return.</p>   <p>LF=LF: No carriage return is added to a line feed.</p>   <p>LF=LF+CR: A carriage return is added to each line feed.</p>  

MACRO Options	Description
<PRINT DIR>	
UNIDIR	Unidirectional printing. Unidirectional printing is used for printing that needs precise vertical alignment. Unidirectional printing is slower than bi-directional printing.
BIDIR	Bi-directional printing. The printer prints in either direction while seeking the next print direction for a shorter print time. The unidirectional command is ignored.
SOFT CONTROL (Software Control)	The print direction follows a command from the computer. If no command is sent, print direction is bi-directional.
=IBM&EPSON=====	The following are the Set-Up options for the IBM and EPSON emulation only.
<CODE PAGE>	Selects the character set. Character sets can be used according to the selected emulation.
Code Page	437 , 850, 860, 863, 865, 851, 852, 853, 855, 857, 866, 869, USSR GOST, 864, 437G, 920, 858, 923
=IBM DEFLTS=====	The following are the Set-Up options for the IBM Proprinter 2390+ emulation only.
<IBM SET 1/2>	Specify a character set of the IBM Proprinter 2390+.
IBM SET 1	IBM character set 1
IBM SET 2	IBM character set 2
<IBM DBL HIGH>	Specify whether the character height is doubled. If specified, change the vertical pitch also.
NO	Standard character height
YES	Double character height
<IBM AGM>	Specify whether the Alternate Graphics Mode (AGM) is used; in other words, is the printer compatible with the IBM Graphics printers?
NO	The base of line spacing is 1/72 inch or 1/216 inch.
YES	The base of line spacing is 1/60 inch or 1/180 inch.
=EPSON DFLTS=====	The following are the Set-Up options for the Epson-EP2 emulation only.
<E-CHR SET>	Select a national character set.
USA	American English
FRANCE	French
GERMANY	German
UK	British English
DENMARK1	Danish 1
SWEDEN	Swedish
ITALY	Italian
SPAIN1	Spanish 1
JAPAN	Japanese
NORWAY	Norwegian

MACRO Options	Description
DENMARK2	Danish 2
SPAIN2	Spanish 2
LATIN AM	Latin American
< 6820 SEQ >	Select Parser control
NO	Disable 6820 control sequences
YES	Enable 6820 control sequences
< 6820 PROT >	Select Protocol mode
NO	Disable the 6820 protocol
YES	Enable the 6820 protocol

INSTALL Options and Values

- Overprinted values are the factory settings.

INSTALL Options	Values	Description
<LANGUAGE>		Specify a language to be used to print the Set-Up menu functions and options.
	ENGLISH	English
	DEUTSCH	German
	ESPANOL	Spanish
	FRANCAIS	French
	ITALIANO	Italian
<TEAR>		Specify the (auto) start timing of tear off feeding.
	AUTO 1 SEC	1 second after data stops from the computer
	AUTO 2 SEC	2 seconds after data stops from the computer
	AUTO 3 SEC	3 seconds after data stops from the computer
	AUTO 4 SEC	4 seconds after data stops from the computer
	AUTO 5 SEC	5 seconds after data stops from the computer
	MANUAL	Feed the paper for tear-off when the READY key is pressed changing to pause mode.
	NO TEAR	Tear off feeding is inhibited under any conditions.
<S-SHEET LD>		Specify the (auto) start timing of single sheet loading.
	AUTO 1 SEC	1 second after a single sheet is set on the platen
	AUTO 2 SEC	2 seconds after a single sheet is set on the platen
	AUTO 3 SEC	3 seconds after a single sheet is set on the platen
	AUTO 4 SEC	4 seconds after a single sheet is set on the platen
	AUTO 5 SEC	5 seconds after a single sheet is set on the platen
	MANUAL	Load a single sheet when the FF/Load key is pressed.
	<BUFFER>		Assign buffer memory as the input buffer.
	2 KBYTE	2K bytes
	8 KBYTE	8K bytes
	16 KBYTE	16K bytes

INSTALL Options	Values	Description
	32 KBYTE	32K bytes
	64 KBYTE	64K bytes
		NOTE: 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/F TYPE>		Select the type of interface to the computer.
	AUTO	Both 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.
	SERIAL	RS-232 Serial interface
	USB	USB interface
	WIRELESS	Wireless interface
	BLUETOOTH	Bluetooth interface
<BAUD RATE>		The baud rate is in bps (bits per second). Select the same baud rate as that used by your computer or modem.
	4800 BPS	4800 Bits Per Second
	9600 BPS	9600 Bits Per Second
	19200 BPS	19200 Bits Per Second
	38400 BPS	38400 Bits Per Second
<PARITY>		Parity setting Select the same word parity setting that is used by your computer or modem.
	NONE	None causes transmission in both directions without parity bit
	ODD	The bytes are checked to ensure they have odd parity.
	EVEN	The bytes are checked to ensure they have even parity.
<DATA BIT>		Word Length setting Select the same word length setting that is used by your computer or modem.
	8 BIT	8 Data bits per data byte
	7 BIT	7 Data bits per data byte

INSTALL Options	Values	Description
<STOP BIT>		Word Length setting Select the same word length setting that is used by your computer or modem.
	1 BIT	1 Stop bit per data byte
	2 BIT	2 Stop bits per data byte
<BUFFER CTL>		The ready/busy control method.
	DTR	Hardware control via the DTR lead.
	XON/XOFF	Data control using DC1 and DC3 control characters.
	6820 PROT	For 6820 emulation
<DISC FAULT>		Disconnect on a fault condition
	NO	Do not disconnect.
	DROP DTR	DTR will change to inactive state.
	PULSE DTR	DTR will pulse to inactive and then back to the normal active state.
<PWRDWNHRS>		Sets time after which Sleep Mode is automatically activated
	0	Disables Sleep Mode
	1-96	Hours after which Sleep Mode is automatically activated

Safe Panel

- If the value of safe panel is “YES”, READY, PARK and LOAD require the ALT key to be used as a two key operation for these functions in Normal Operation Mode of printer.
- If the value of safe panel is “NO”, READY, PARK and LOAD key are operated as Normal Operation Mode, ALT key is not required.

Recalling Factory Settings

Factory settings are those settings pre-selected at the factory. To recall (reset) the factory settings, select the RCALL-FACT function and press the ALT-NEXT key or the ALT-PREVIOUS key.

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

Exiting and Saving

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 ALT-NEXT key or the ALT-PREVIOUS key.

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.

Using the Diagnostic Functions

Print Configuration Function

This 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.

- 1** To enter the Printer Configuration mode:
 - a) Make sure that the tractors are loaded with continuous feed paper and that the paper select lever is set backward.
 - b) Turn the printer off.
 - c) Turn the printer back on while pressing the ALT key.
- 2** The printer starts to print a list of the currently selected values. The pre-selected factory settings are shown on the opposite page.
- 3** To exit the Printer Configuration mode: After the printer finishes printing the list of values, press the SETUP/EXIT key.

Printer Configuration

xxxxxxxx

F/W Version V1.00

IPL Version V1.03

CG Version V1.01

1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4

<u>MACRO</u>	<u>INSTALL</u>
Options	Options
Value	Value

EMULATI ON	LANGUAGE
EPSON-EP2	ENGLISH
EMUL SERIAL	TEAR
EPSON-EP2	AUTO 1 SEC
EMUL USB	S-SHEET LD
EPSON-EP2	AUTO 1 SEC
EMUL WIRELESS EPSON-EP2	BUFFER
	64 KBYTE
EMUL BLUETOOTH	I/F TYPE
EPSON-EP2	AUTO
FONT	BAUD RATE
DRAFT	9600 BPS
HORZ PITCH	PARITY
10 CPI	NONE
VERT PITCH	DATA BIT
6 LPI	8 BIT
FORM LENGTH	STOP BIT
11 INCHES	1
LEFT MARGN	BUFFER CTL
1 COL	DTR
TOP OF FORM	DISC FAULT
0 / 60 LN	NO
IGNORE FF	PAPER/INRS
YES	16
TOP MARG N	HOURS)
1 LINES	
BOTTOM MARG N66 LINES	
OR CODE	
OR=CR	<u>SAFE PANEL</u>
LF CODE	Options
LF=LF+CR	Value
PRINT DIR	-----
SOFT CONTRL	SAFE PANEL
	NO
<IBM&EPSON>	<u>MENU ACCES</u>
CODE PAGE	Options
CP 437	Value
<IBM DEFLTS>	-----
I-SET 1/2	MENU ACCES
IBM SET 1	ALL FUNC
I-DBL HIGH	
NO	
IBM AGM	
NO	
<EPSON DEFLTS>	
E-CHR SET	
USA	

Printing Test Function

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.

1 To enter the Printing Test mode:

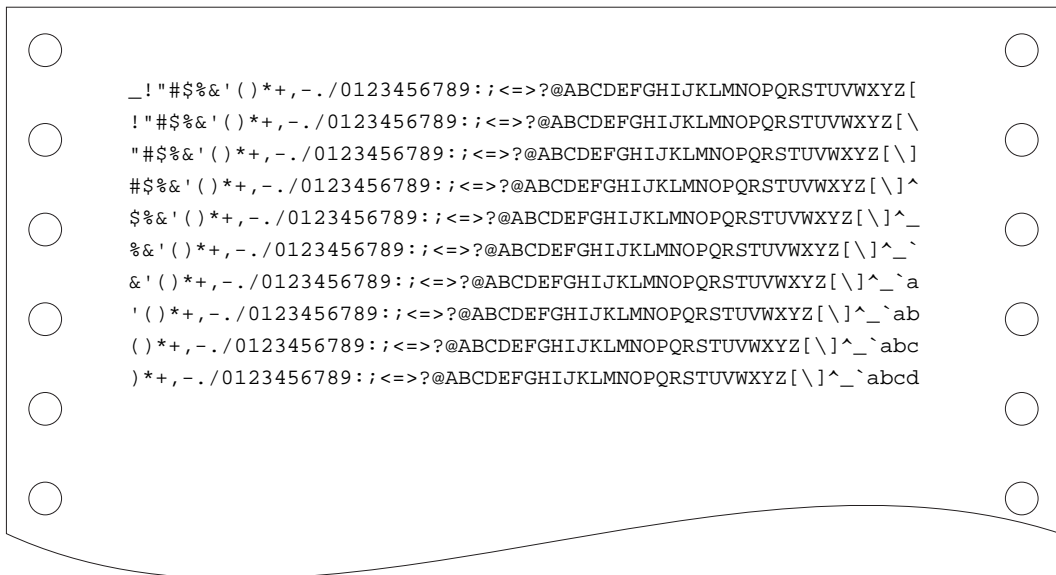
- a) Make sure that the tractors are loaded with continuous feed paper and that the paper select lever is set backward.
- b) Turn the printer off.
- c) Turn the printer back on while pressing the "LOAD/FF" key.

NOTE: Do not press any keys alone or in combination, except for pressing the LOAD key alone when turning the printer on, to avoid initiating unexpected tests not permitted for the user.

2 The printer starts to print rolling ASCII data as shown below.

3 To exit the Printer Configuration mode:

Printing Test mode is continues until power OFF.



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 80 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.

1 To enter the Printing Test mode:

- Make sure that the tractors are loaded with continuous feed paper and that the paper select lever is set backward.
- Turn the printer off.
- Turn the printer back on while simultaneously pressing the “READY/CLEAR” + “ALT” keys.

NOTE: Do not press any keys alone or in combination, except for pressing the READY and ALT keys simultaneously, when turning the printer on, to avoid initiating unexpected tests not permitted for the user.

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 READY key to pause and resume printing in Hex Dump mode. To resume Hex Dump printing, press the READY key again.
- To print another Hex Dump, send another file to the printer.

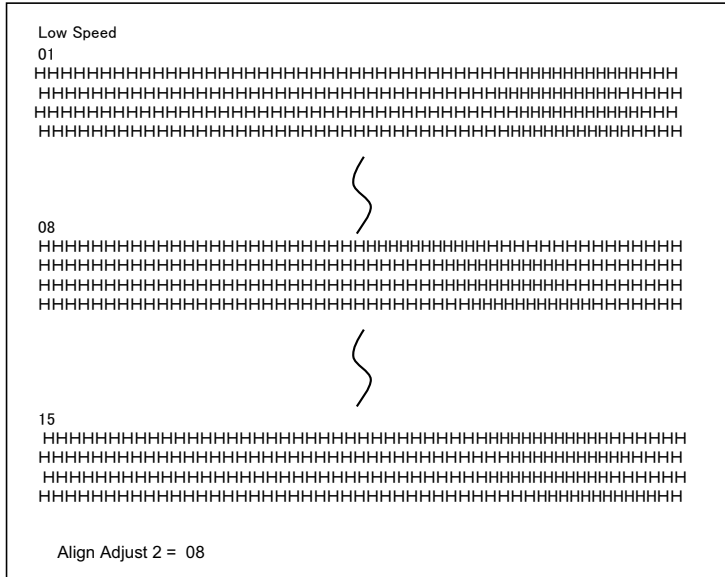
3 Exit the Hex Dump mode:

Turn the printer off to exit the Hex Dump mode.

<input type="radio"/>	<i>Address</i>	<i>Hex data</i>	<i>ASCII</i>	<input type="radio"/>
	0000 00 01 02 03 04 05	0C 0D 0E 0F	.....
	0010 10 11 12 13 14 15	1C 1D 1E 1F	.....
<input type="radio"/>	0020 20 21 22 23 24 25	2C 2D 2E 2F	!"#\$%&'()*+,-./	<input type="radio"/>
	0030 30 31 32 33 34 35	3C 3D 3E 3F	0123456789:;<=>?	
	0040 40 41 42 43 44 45	4C 4D 4E 4F	@ABCDEFGHIJKLMNO	
<input type="radio"/>	0050 50 51 52 53 54 55	5C 5D 5E 5F	PQRSTUVWXYZ[\]^_	<input type="radio"/>
<input type="radio"/>				<input type="radio"/>
<input type="radio"/>				<input type="radio"/>
<input type="radio"/>				<input type="radio"/>

3 Adjust the vertical print alignment at Low Speed.

Adjustment of Bi-directional Alignment for Low Speed is performed immediately, after the adjustment value for High Speed is saved. After Paper is loaded, the format of adjustment for Bi-directional Alignment of Low Speed is printed and the paper will automatically advance for viewing after the printing is complete. The message of "Bi-Dir Align Adjust 2 = xx" is printed.



An adjustment value is chosen using NEXT and PREVIOUS keys. The adjustment range is "01-15", and the center value is "08". By pressing SETUP/EXIT Key, the adjustment value for High Speed is determined and the adjustment value for Low Speed is saved.

4 Printing new settings of alignment and Exit the vertical alignment function.

Press the SETUP/EXIT key to save the new vertical alignment settings. The new adjustment values for Bi-directional Alignment are printed after both High Speed and Low Speed are saved; the paper is automatically advanced for viewing after the printing is completed, then exit the vertical alignment function.

Align Adjust 1 = xx
Align Adjust 2 = xx

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

Top Adjustment Function

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.

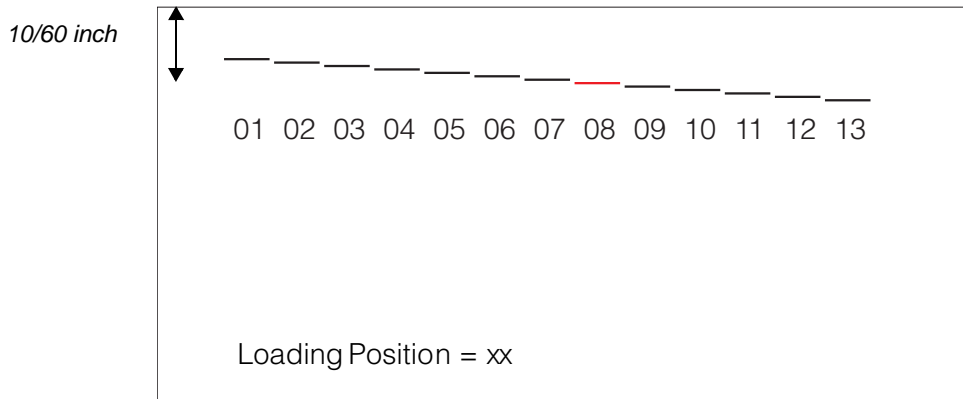
1 To enter Top Adjustment Function:

- a) Make sure that the tractors are loaded with continuous feed paper and that the paper select lever is set backward.
- b) Turn the printer off.
- c) Turn the printer back on while pressing the "PARK" key.

NOTE: Do not press any keys alone or in combination, except for pressing the PARK key alone when turning the printer on, to avoid initiating unexpected tests not permitted for the user.

2 To set Top Adjustment value:

- a) The format of adjustment Loading Position is printed as below, 15 patterns of adjustment Loading Position are printed.

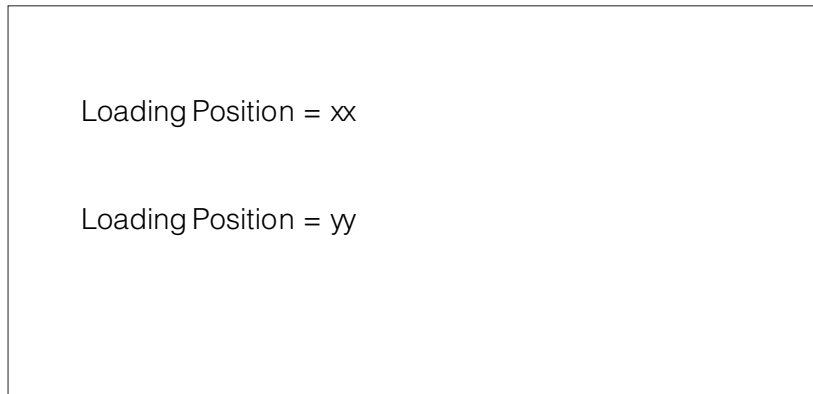


- b) The format of Loading Position is printed and the paper is automatically advanced for viewing after the printing is complete. The message of "Loading Position Pos = xx" is printed.
- c) Use the NEXT and PREVIOUS key to choose the new top position. The adjustment range is "01-15", and the center value is "08". It is possible to set different values for Tractor and Manual.

3 Printing new value:

By pressing SETUP/EXIT Key, the adjustment value for Loading Position is determined and the adjustment value for Loading Position is saved.

The new adjustment values for Loading Position is printed. The paper is automatically advanced for viewing after the printing is complete. After ejecting a form, the message "Loading Position = xx" is printed.



NOTE: "yy" is new adjustment value.

4 Exit the Top Adjustment mode:

Turn the printer off to exit the Top Adjustment mode.

Setting of The First Dot Position on The Left Side Function

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

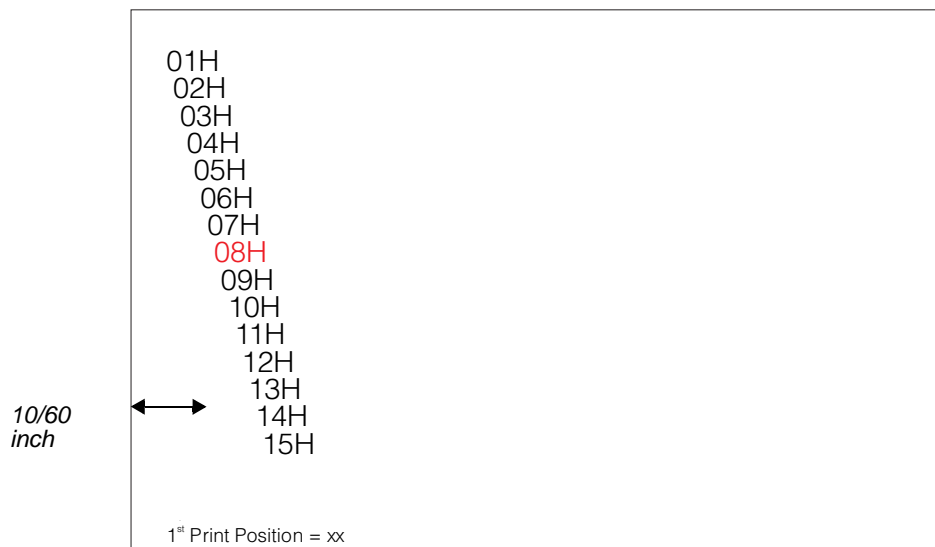
1 To enter Adjustment Function:

- a) Make sure that the tractors are loaded with continuous feed paper and that the paper select lever is set backward.
- b) Turn the printer off.
- c) Turn the printer back on while simultaneously pressing the READY/CLEAR + ALT + LOAD/FF keys.

NOTE: Do not press any keys alone or in combination, except for pressing the "READY/CLEAR" + "ALT" + "LOAD/FF" keys simultaneously, when turning the printer on, to avoid initiating unexpected tests not permitted for the user.

2 To set Adjustment value:

- a) The format of adjustment of setting of the first dot Position on the left side is printed as below, 15 patterns of adjustment Position are printed.



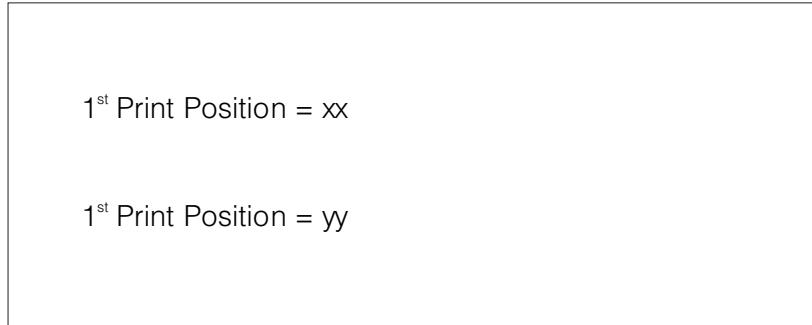
- b) After the format of setting of the first dot Position on the left side is printed, the paper is automatically advanced for viewing after the printing is complete. The message of "1st Print Position Pos = xx" is printed.

- c) Use the NEXT and PREVIOUS keys to choose the new first dot position on the left side. The adjustment range is "01-15", and the center value is "08".

It is possible to set different values for Tractor and Manual

3 Printing new value:

By pressing SETUP/EXIT Key, the adjustment value for the first dot position on the left side is determined and the adjustment value is saved. The new adjustment value of the first dot position on the left side is printed. The paper is automatically advanced for viewing after the printing is complete. After ejecting a form, the message "1st Print Position = xx" is printed.



NOTE: "yy" is new adjustment value.

4 Exit the setting of the first dot position on the left side mode.

Turn the printer off to exit this mode.

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 functions are accessible from the <FUNCTIONS> menu.
	NO ACCESS	Set-Up mode is inaccessible.
	SAFE PANEL	READY, PARK and LOAD require the ALT key to be used as a two key operation for these functions. NOTE: You can return to the All Functions Accessible mode by turning the printer on while pressing the ALT, PARK and LOAD keys at the same time. The printer enters the Set-Up mode with this operation.

1 To enter Menu Access mode:

- Make sure that the tractors are loaded with continuous feed paper and that the paper select lever is set backward.
- Turn the printer off.
- Turn the printer back on while simultaneously pressing the “LOAD/FF” + “PARK” + “ALT” keys.

NOTE: Do not press any keys alone or in combination, except for pressing the LOAD, PARK and ALT keys simultaneously, when turning the printer on, to avoid initiating unexpected tests not permitted for the user.

2 To change Menu Access Option and values:

- Press the NEXT(LOAD/FF) key to move to next option;
- Press the PREVIOUS(PARK) key to move to previous option;
- Press the ALT-NEXT keys to select the Option or value and move down;
- Press the ALT-PREVIOUS keys to select the Option or value and move up;
- Press SETUP/EXIT key to save the value and move to SAVE&EXIT menu.

3 Exit the Menu Access mode:

Turn the printer off to exit the Menu Access mode.

Setting Setup Mode to Default Value (Standard)

This function can initialize the printer to Standard default.

1 To enter setting setup mode to default value (standard):

- a) Turn the printer off.
- b) Turn the printer back on while simultaneously pressing the “PARK” + “READY/CLEAR” keys.

NOTE: Do not press any keys alone or in combination, except for pressing the PARK and READY/CLEAR keys simultaneously, when turning the printer on, to avoid initiating unexpected tests not permitted for the user.

2 Exit the setting setup mode to default value (standard):

After the setting completes, the printer will automatically restart in the power-up state.

Setting Setup Mode to Default Value (6820 Mode)

This function can initialize the printer to 6820 mode default.

1 To enter setting setup mode to default value (6820 mode):

- a) Turn the printer off.
- b) Turn the printer back on while simultaneously pressing the “PARK” + “ALT” keys.

NOTE: Do not press any keys alone or in combination, except for pressing the PARK and ALT keys simultaneously, when turning the printer on, to avoid initiating unexpected tests not permitted for the user.

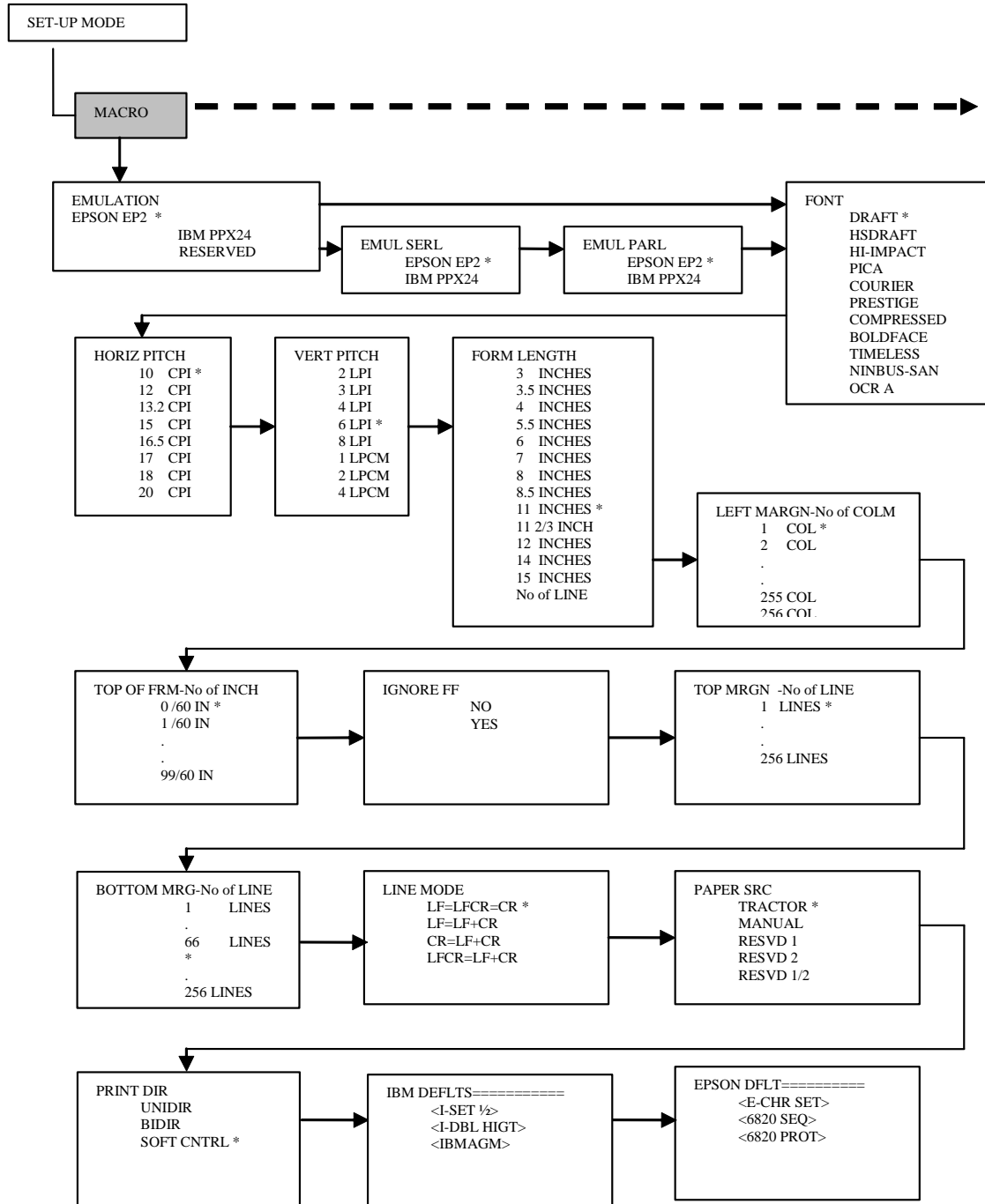
2 Exit the setting setup mode to default value (6820 mode):

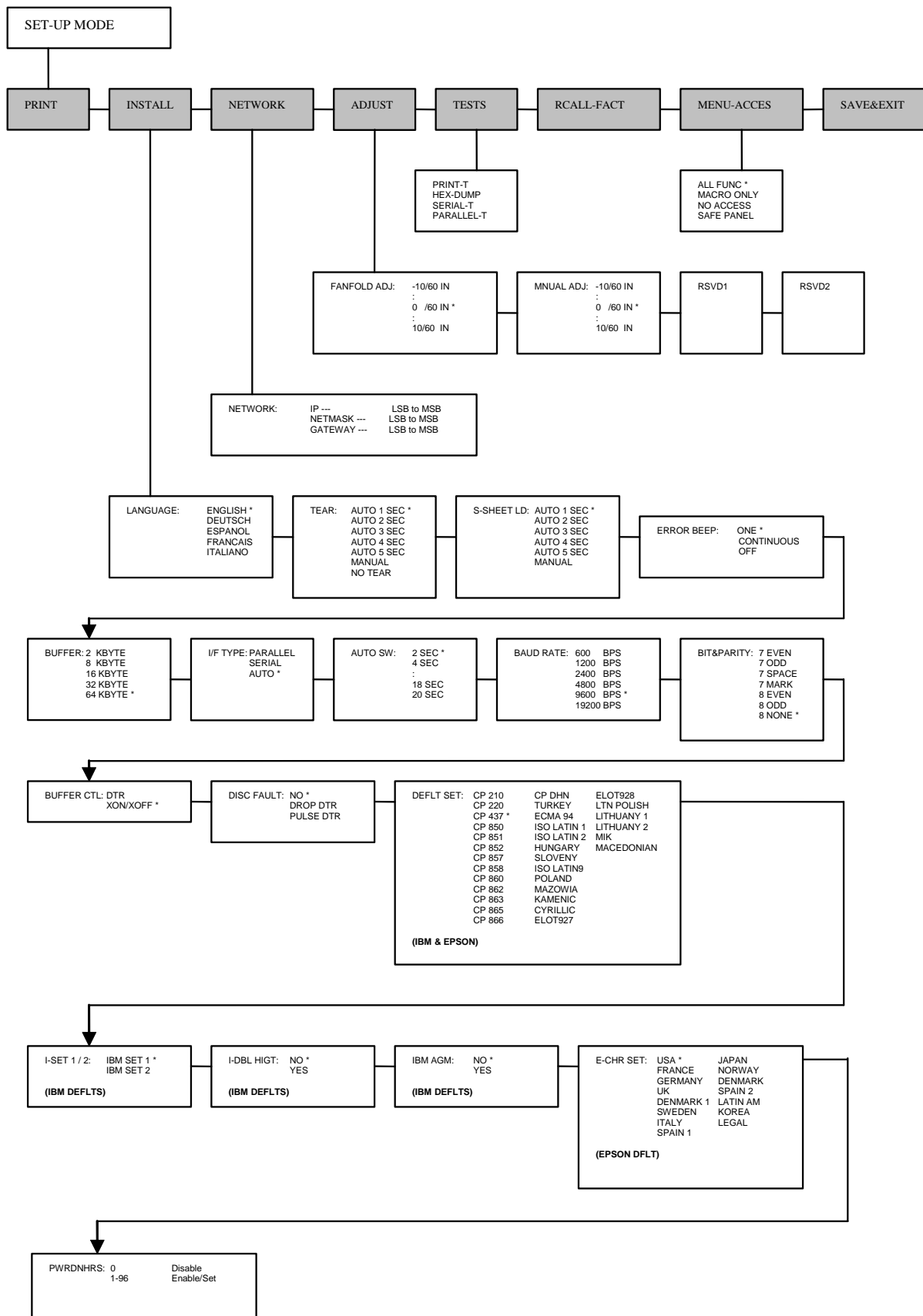
After the setting completes, the printer will automatically restart in the power-up state.

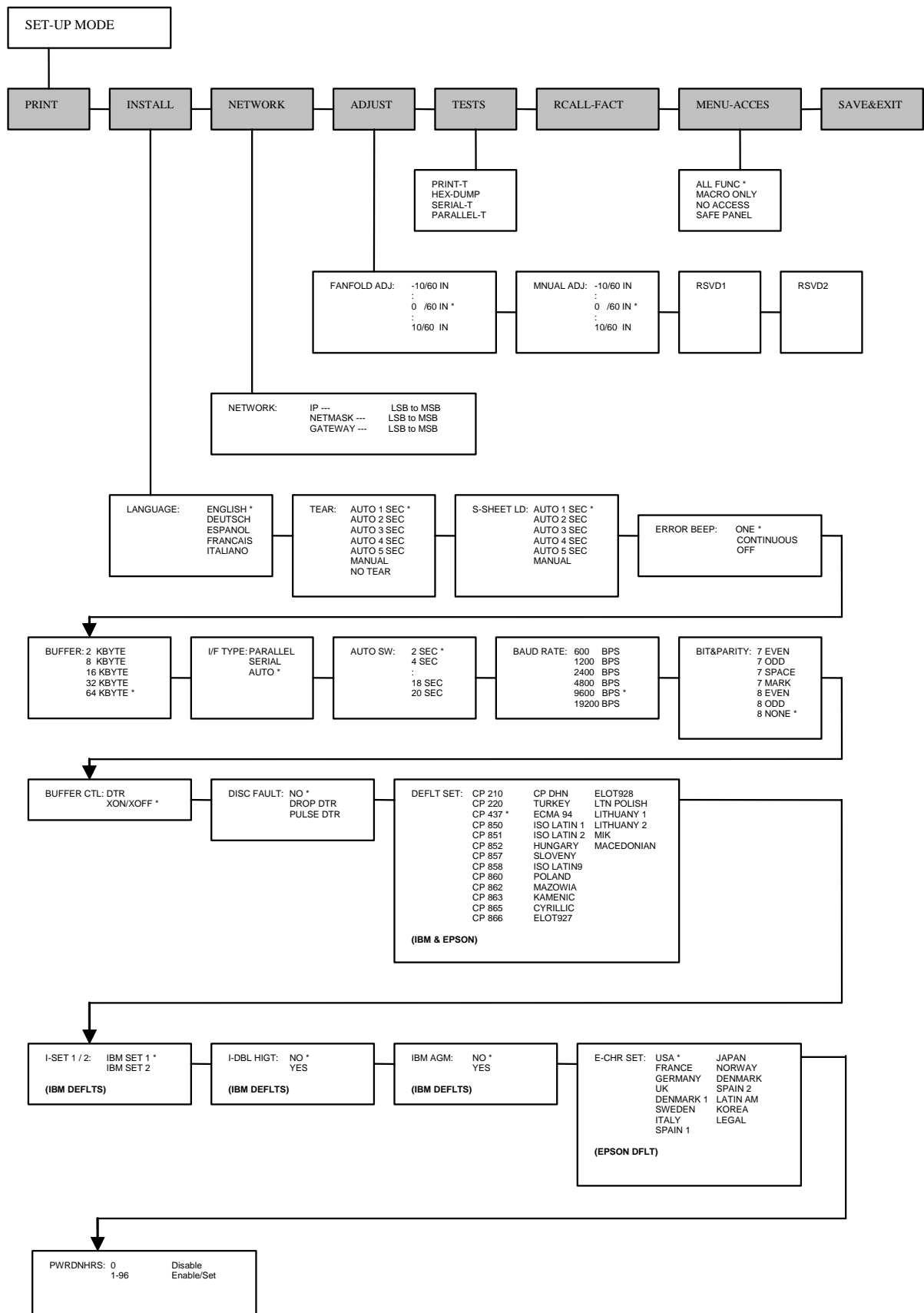
Set-Up Mode Quick Reference

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 paper bail rollers.

It is easier to clean the printer when the cover is open.

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.

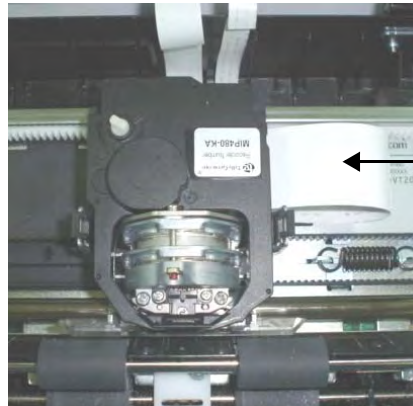
WARNING: To avoid any possibility of injury, before cleaning the printer, turn off the power to both the printer and the computer, and unplug the printer.

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. Also vacuum the cut sheet edge
- 3** Use a soft, damp cloth to wipe the exterior of the printer, including the cover. A mild detergent may be used.

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

- 4 Open the cover of the printer and remove the ribbon cartridge. Using a soft vacuum brush, gently vacuum the platen, the print head carriage and shaft, 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.



Print Head Cable

Printer Interior

- 5 Re-install the ribbon cartridge.
- 6 Open the cover; vacuum the inside of the cover, the bail rollers, the single sheet entry, the form tractors and the surrounding areas.

Cleaning the Paper Bail Rollers

Clean the platen and paper bail rollers once a month or when stains or smudges appear on the paper. Use water as appropriate.

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

To clean the the bail rollers:

- 1 Apply a small amount of water to a soft cloth. Avoid spilling water inside the printer.
- 2 Place the cloth against the rollers and manually rotate the rollers.
- 3 To dry the rollers, place a dry cloth against the platen and manually rotate the rollers.

Cleaning the Print Head

If the paper is smudged or stained by ink, clean the nose of the print head with a dry cloth. For removing and installing the print head, see the section "Replacing the Print Head" in this section.

Replacing the Ribbon Cartridge

If printing is too light because of ribbon wear, replace the ribbon cartridge. Appendix A lists the order number for the ribbon cartridge.

The replacement is almost the same as the installation except that it involves removing the old ribbon cartridge and removing the new ribbon cartridge from the carton.

Removing the Ribbon Cartridge

To remove the ribbon cartridge:

- 1 Turn off the printer.
- 2 Open the top cover. For easy removal, slide the print head carriage between the second and the third bail rollers (from left to right).

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

- 3 Move the print gap lever to the rear.



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



Installing the Ribbon

- 1 Open print-gap lever fully open. To remove the old ribbon, squeeze both of the ribbon's tabs and lift the ribbon straight out of its carriage. Be careful of the print head during this operation.



- 2 When placing the new ribbon cartridge on the carriage, make sure that the thin ribbon does not become bunched or folded at the print head. Readjust the print gap to achieve good print quality.



- 3 Use the printing test function to check printing. See "Printing Test Function" in chapter 4 "Using Special Mode".

Replacing the Print Head

If a specific dot is not printed for all characters, replace the print head.

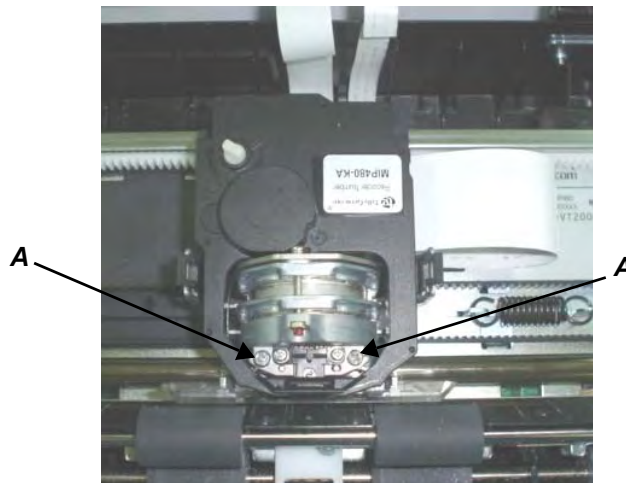
WARNING: The print head may be hot if you have been printing recently.

To remove the print head:

- 1 Turn off the printer.
- 2 Open the cover and remove the ribbon cartridge.
- 3 Remove the two screws **A** from the print head.
- 4 Lift the print head and disconnect the flexible cables.

WARNING: Be careful because the printhead cables can easily be damaged.

NOTE: A technician should preferably handle this procedure.



Removing the Print Head

To install the print head:

- 1 Connect the flexible cables to each connector. Make sure to push them fully into the connectors; do not kink the cables.

WARNING: Be careful because the printhead cables can easily be damaged.

- 2 Ease the new print head down into the mounting. Fasten the two screws **A**.
- 3 Install the ribbon cartridge.

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 for assistance.

This chapter is organized as follows:

- Solving problems
- Diagnostic functions

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 failure

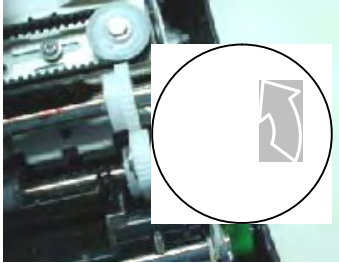
Print Quality Problems and Solutions

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
Printing is too light or too dark.	<p>Make sure that the ribbon cartridge is properly installed and that the ribbon feeds smoothly.</p> <p>Make sure that the Print Gap lever is set for the thickness of your paper. See Chapter 2, Paper Handling</p> <p>Check ribbon wear. Replace the ribbon if necessary.</p>
Smears and stains appear on the page.	<p>Make sure that the Print Gap lever is set for the thickness of your paper. See “Adjusting for Paper Thickness” in Chapter 2, Paper Handling.</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. The print head should be changed by a technician.</p>
Printing is erratic or the wrong characters are printed. Many “?” or unexpected characters are printed.	<p>Make sure that the interface cable is securely connected to both the printer and computer.</p> <p>Make sure that the printer Emulation selected in your software is the same as the Emulation selected on the printer.</p>
Printing is vertically misaligned (jagged).	<p>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.</p>
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). • Check the software-specified top margin. Refer to your software documentation. • Check the printer's TOP-MRGN setting. See Chapter 4, Set-Up Mode.
Lines are double spaced instead of single spaced.	<p>Change the LINE MODE setting in the printer Set-Up mode to CR=LF+CR. See “Changing Macro Options” in Chapter 4, Set-Up Mode.</p>
The printer overprints on the same line	<p>Change the LINE MODE setting in the printer Set-Up mode to CR=LF+CR. See “Changing Macro Options” in Chapter 4, Set-Up Mode.</p>
The next print line starts where the previous line ended instead of at the left margin.	<p>Change the LINE MODE setting in the printer Set-Up mode to LF=LF+CR. See the section, “Changing Macro Options” in Chapter 4, Set-Up Mode.</p>
The printer overprints on the same line while the next print line starts where the previous line ended instead of at the left margin.	<p>Change the LINE MODE setting in the printer Set-Up mode to CR=LF+CR and LF=LF+CR. See the section, “Changing Macro Options” in Chapter 4, Set-Up Mode.</p>

Paper Handling Problems and Solutions

The following table describes common paper handling problems and suggests solutions. See Chapter 2, “Paper Handling” for detailed procedures on loading and using paper.

Problem	Solution
<p>Paper cannot be loaded or fed.</p> 	<p>Make sure that the Print Gap select lever located on the top left of the printer is set correctly. Move the lever to the rear for continuous forms or to the front 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 right edge in contact with the right paper guide.</p>
<p>Paper jams while loading.</p>	<p>Turn off the printer and remove the jammed paper. Remove any obstructions from the paper path. Make sure that the Print Gap lever is set for the thickness of your paper. See “Adjusting for Paper Thickness” in Chapter 2, Paper Handling.</p> <p>Make sure that the paper is not folded, creased, or torn. Make sure that the left and right tractors are set so that the continuous forms are stretched taut. See “Using Continuous Forms” in Chapter 2, Paper Handling.</p>
<p>Paper jams while printing.</p>	<p>Turn off the printer and remove the jammed paper. Remove any obstructions from the paper path. Make sure that the Print Gap lever is set for the thickness of your paper. See the table, “Adjusting for Paper Thickness” in Chapter 2, Paper Handling.</p> <p>For continuous forms, make sure that the incoming and outgoing paper stacks are correctly placed. Paper should feed straight. See “Positioning the Paper Stack” in Chapter 2, Paper Handling.</p>
<p>Paper slips off the forms tractors or the perforated holes of the paper tear during printing.</p>	<p>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 pins. See “Using Continuous Forms” in Chapter 2, Paper Handling.</p>

Operating Problems and Solutions

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

Problem	Solution
The power does not turn on.	<p>Make sure that the power cord is securely connected to both the printer and the battery. 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.</p>
The printer is on but it will not print.	<p>Make sure that the Ready indicator is lit. See "Operation of the Control Panel" in Chapter 2, "Paper Handling".</p> <p>If you use the interface cable make sure it is securely connected to both the printer and the computer. Make sure that the blue tooth is securely set.</p> <p>If the Fault indicator is lit, load the paper. See Chapter 2, "Paper Handling".</p> <p>Run the printer printing test. If the printing test executes normally, the problem is caused by the interface, the computer, incorrect printer settings, or incorrect software settings.</p> <p>Make sure that the printer Emulation selected in your software is the same as the Emulation selected on the printer.</p>

Printer Failures

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

- Stop printing
- Turn the Ready indicator off
- Blink the Paper Out indicator

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

- Print head error
- Space motor 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 power switch on, then rerun the same job to check if the error was transient. If the error recurs, contact your dealer.

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 Special mode, see "Using the Diagnostic Functions" in Chapter 4, "Using Special-Up Mode".

Checking Vertical Alignment

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

```

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

```

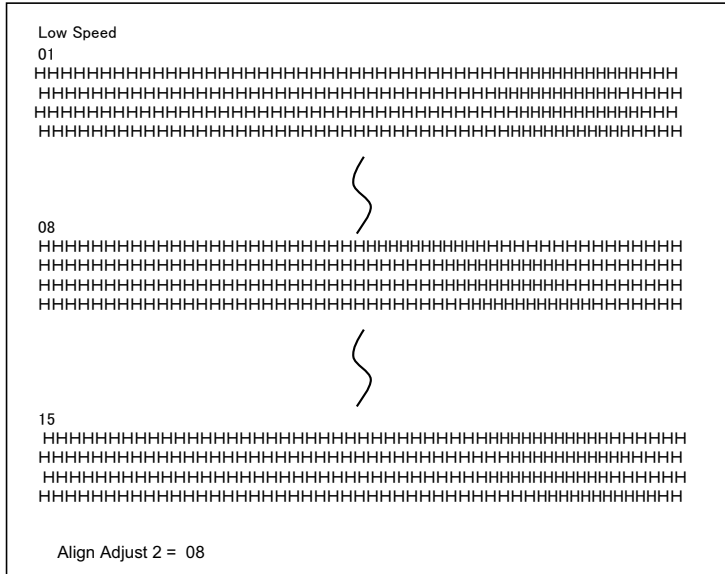
The vertical alignment function corrects the vertical character displacement that sometimes occurs with bidirectional printing and results in a poor appearance especially in printing tables. This function is defined as one of the power-on initiated test functions. If you notice misaligned printing, start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

3 Adjust the vertical print alignment at Low Speed.

Adjustment Bi-directional Alignment for Low Speed is performed immediately, after the adjustment value for High Speed is saved.

After Paper is loaded, the format of adjustment for Bi-directional Alignment of Low Speed is printed and the paper will automatically advance for viewing after the printing is complete. The message of "Bi-Dir Align Adjust 2 = xx" is printed.



An adjustment value is chosen using NEXT and PREVIOUS keys. The adjustment range is "01-15", and the center value is "08". By pressing SETUP/EXIT Key, the adjustment value for High Speed is determined and the adjustment value for Low Speed is saved.

4 Printing new settings of alignment and Exit the vertical alignment function.

Press the SETUP/EXIT key to save the new vertical alignment settings. The new adjustment values of Bi-directional Alignment are printed after both High Speed and Low Speed are saved; the paper is automatically advanced for viewing after the printing is completed, then exit the vertical alignment function.



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

Supplies and Options

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

The installation of options allows you to expand the capabilities of your printer.

Supplies

Supply	Order Number
Black Ribbon Cartridge	MIP480-KA

Options

Options	Order Number	Description
Seat strap option	1A4296K01	For use with the BEVL03 stands when required.
Hardware kit for stand mounting	1A4299K01	Consists of appropriate bolts, nuts and spacers for most applications.
Vertical Telescoping	BCVL03	864 to 1372 mm 34" to 54", adjustable in height.
Vertical Printer Stand	BEVL03	610 mm (24"), with paper box.
Vertical Printer Stand	BUVL03	915 mm (36"), order also kit 1A4299K01 for mounting.
Horizontal Printer Stand	BSVL02	For shelves, or other truck/van locations where a horizontal mounting is required.
110V to 12V Power Converter	MPCONV01	Only needed when running the printer from a 110V wall outlet – not needed when using vehicle power.
220V to 12V Power Converter	MPCONV02	Only needed when running the printer from a 220V wall outlet – not needed when using vehicle power.
12/24 VDC Cable	MPFB06	Car connection cable for 12/24 VDC.
WLAN print server	on request	LAN wireless print server
Bluetooth adapter	on request	Bluetooth wireless interface

Printer and Paper Specifications

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

Printer Specifications

Physical Specifications

Dimensions (vertical orientation)	Height: 320 mm Width: 360 mm Depth: 130 mm Enclosure is injection molded plastic with hinged cover for access to paper loading, print head and ribbon replacement. Enclosure provides edge for paper to tear off.
Color	Night Sky Grey
Weight	Not to exceed 5.0 kg
Power requirements	Automotive, 12 VDC/24VDC (10.5 – 28 VDC) 110/220 VAC as option
Power consumption	Not to exceed 150 Watts
Interface and connectivity	USB2.0 full speed, RS232 and Blue Tooth Class 2 ver1.2 (Standard) IEEE 802.11b (Option)
Data buffer size	64K bytes
Operating environment	-4 °F +140 °F (-20 °C to + 60°C) 30% – 80% Relative Humidity, no condensation
Storage	-22 °F to +149 °F (-30 °C to + 65 °C) 10% – 90% Relative Humidity, no condensation
Shock, Vibration, Acceleration	Units may be vertically mounted using shock mounts to a bracket installed in a vehicle; operated horizontally while located on a passenger seat in a vehicle, or operated in office environments.
Vibration resistance (as tested)	
Operating	Acceleration 0.5G Frequency 5 to 60HZ Sweep Time 2 min/Cycle
Non-Operating	Acceleration 1.5G RMS Frequency 5 to 60HZ Sweep Time 20 min/Cycle

Printer and Paper Specifications

Impact Resistance Operating Non-operating	3G (print quality not guaranteed) 10 G
Dust Proof, Corrosion Resistance	Ingress Protection (IP) rating IP22. No special protection against fluids or immersion.

Functional Specifications

Print method	Impact dot matrix with a 0.23 mm (0.009 in), 24-wire head
Print direction	Bidirectional logic-seeking
Character density	Horizontal X vertical Letter (10 cpi): 36 X 24 dots Letter (12 cpi): 30 X 24 dots Draft: 12 X 24 dots
Paper handling Single Forms	With the Paper Path Select Lever in the Single Sheet position, single sheets or forms may be used. The printer automatically senses that paper has been manually inserted. When paper is detected, the printer will advance the form to the first print line.
Continuous forms	With the Paper Path Lever set to the Continuous Form position, continuous forms may be printed. Paper is loaded and adjusted via keys. Forms may be advanced to tear off feature by operator or by host. Continuous forms are parked while single sheets are used.
Paper type	1-to 4-part side-glued or paper-stapled fanfolded continuous forms or single page top-glued forms.
Paper size Continuous	Width: 102–216 mm (4–10.5 in) Length: 102 mm (4 in) or greater
Cut sheets	Width: 102–267 mm (4–10.5 in) Length: 102 mm (4 in) or greater
Paper thickness	Up to 0.35 mm (0.014 inch)
Paper length By software	Programmable in one line or inch increments
By control panel	3, 3.5, 4, 5.5, 6, 7, 8, 8.5, 11 (Letter), 11 2/3 (A4), 12, 14, or 15 inches (Default is 11 inches.) 1 to 126 lines
Number of copies	Up to 4, including the original
Command sets (emulations)	Epson-EP2 IBM Proprinter XL24E (2390+) Intermec 6820

<p>Character sets IBM Code Page</p>	<p>19 character sets CP 437 (USA) CP 437 (Greek) CP 850 (Multilingual) CP 851 (Greek) CP 852 (East Europe) CP 853 (Turkish) CP 855 (Cyrillic) CP 857 (Turkish) CP 858 (Multilingual) CP 860 (Portugal) CP 862 (Israel) CP 863 (Canada) CP 864 (Arabic) CP 865 (Norway) CP 866 (Cyrillic) CP 869 (Greek) CP 920 (Latin-5) CP 923 (Latin-9) USSR GOST</p>
<p>EPSON</p>	<p>15 character sets USA France Germany UK Denmark 1 Sweden Italy Spain 1 Japan Norway Denmark 2 Spain 2 Latin America Korea Legal</p>
<p>Fonts</p>	<p>Resident 13 fonts available Draft, Roman, Sans Serif, Courier, Bold, Prestige Elite, Script, Orator, Gothic, OCR A, OCR B, Roman T and Sans Serif H</p>
<p>Line spacing</p>	<p>2, 3, 4, 6, 8, or 12 lines per inch (1, 2, or 4 lines per centimeter).</p>
<p>Character pitch</p>	<p>10, 12, 15, 17.1 or 20 characters per inch</p>
<p>Characters per line</p>	<p>10 cpi: 80 cpl 12 cpi: 96 cpl 15 cpi: 120 cpl 17.1 cpi: 136 cpl 20 cpi: 160 cpl cpl = characters per line</p>

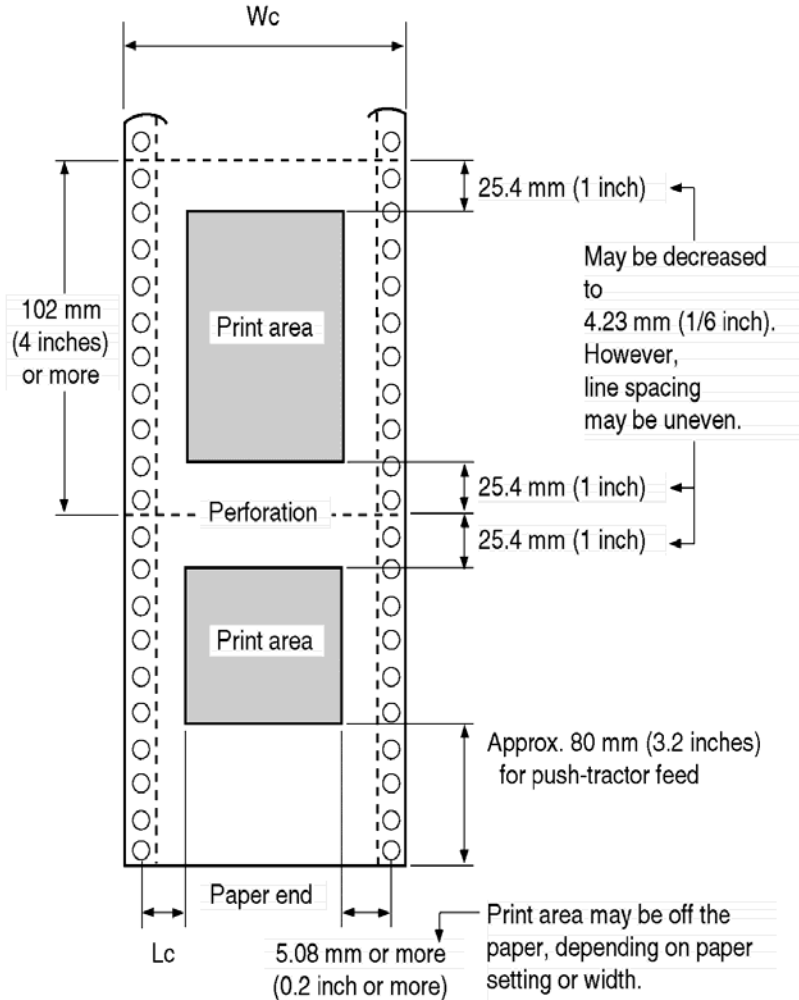
<p>Barcodes</p> <p>IBM</p> <p>EPSON</p>	<p>9 Barcodes available: UPC/A, UPC/E, EAN8, EAN13, CODE39, CODE128, CODABAR (NW7), INTERLEAVED 2 of 5, INDUSTRIAL 2 of 5</p> <p>7 Barcodes available: UPC/A, UPC/E, EAN8, EAN13, CODE39, CODE128, INDUSTRIAL 2 of 5</p>
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Performance Specifications

Print speed	<p>10 cpi 12 cpi Draft: 400 cps 480 cps Letter: 133 cps 160 cps cpi = characters per inch cps = characters per second</p>														
Line feed speed	60 ms per line at 6 lines per inch														
Form feed speed	7 inches per second														
Pages per Hours	<p>ECMA 132 Letter Test Pattern Draft Quality 321 pph Letter Quality 172 pph</p>														
Ribbon service life	4 million characters														
Printer Life	5 million lines or five years														
Print Head Life	300 million impacts														
MTBF	<p>15,000 hours (50 hr/week power-on, 5% power on print duty cycle)</p>														
MTTR	0.5 hours														
<p>Certification Safety</p> <p>RFI regulation</p>	<table> <tr> <td><u>Regulation</u></td> <td><u>Country</u></td> </tr> <tr> <td>UL/C-UL 60950-1</td> <td>United States/Canada</td> </tr> <tr> <td>IEC60950-1</td> <td>International</td> </tr> <tr> <td><u>Regulation</u></td> <td><u>Country</u></td> </tr> <tr> <td>Class B of FCC</td> <td>United States</td> </tr> <tr> <td>Part 15B</td> <td></td> </tr> <tr> <td>CE mark</td> <td>European Union</td> </tr> </table>	<u>Regulation</u>	<u>Country</u>	UL/C-UL 60950-1	United States/Canada	IEC60950-1	International	<u>Regulation</u>	<u>Country</u>	Class B of FCC	United States	Part 15B		CE mark	European Union
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Paper Specifications

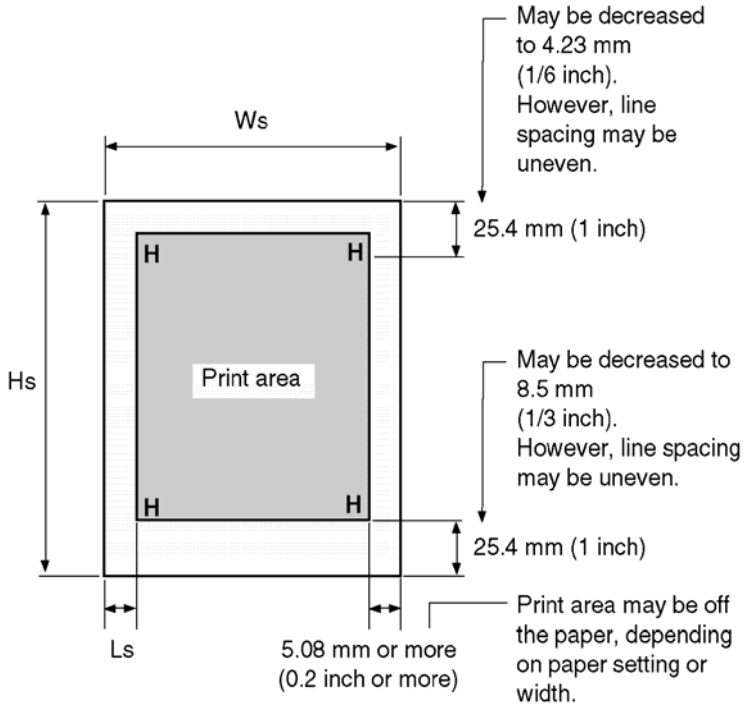
Print Area



Print Area for Continuous Forms

W_c 102 to 267 mm (4 to 10.5 in)

L_c 5.08 to 25.4 mm (0.2 to 1 in)



Print Area for Single Sheets

Ws 102 to 267 mm (4 to 10.5 in)

Hs 76 to 364 mm (3 to 14.3 in)

Ls 5.08 to 32 mm (0.2 to 1.26 in)

Paper Thickness

Paper thickness is given by the weight of the paper in either grams per square meter (g/m²) 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 on 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 Carbonless	Single	47–81 g/m ² (12–22 lbs/bond)
Two-Part Carbonless	Top	40–64 g/m ² (11–17 lbs/bond)
	Bottom	40–81 g/m ² (11–22 lbs/bond)
Three-Part Carbonless	Top	40–64 g/m ² (11–17 lbs/bond)
	Middle	40–64 g/m ² (11–17 lbs/bond)
	Bottom	40–81 g/m ² (11–22 lbs/bond)
Four-Part Carbonless	Top	40–64 g/m ² (11–17 lbs/bond)
	Middle	40–64 g/m ² (11–17 lbs/bond)
	Middle	40–64 g/m ² (11–17 lbs/bond)
	Bottom	40–81 g/m ² (11–22 lbs/bond)
Two-Part Carbon-Backed	Top	40–64 g/m ² (11–17 lbs/bond)
	Bottom	40–81 g/m ² (11–22 lbs/bond)
Three-Part Carbon-Backed	Top	40–64 g/m ² (11–17 lbs/bond)
	Middle	40–64 g/m ² (11–17 lbs/bond)
	Bottom	40–81 g/m ² (11–22 lbs/bond)
Four-Part Carbon-Backed	Top	40–64 g/m ² (11–17 lbs/bond)
	Middle	40–64 g/m ² (11–17 lbs/bond)
	Middle	40–64 g/m ² (11–17 lbs/bond)
	Bottom	40–81 g/m ² (11–22 lbs/bond)

Carbon-backed: Do not use in high humidity environments.

Carbon-interleaved: Avoid using single sheets format in carbon-interleaved.

Type of Paper	Number of Parts	Thickness
Two-Part Carbon-Interleaved	Top	40–64 g/m ² (11–17 lbs/bond)
	Carbon	Counted as one sheet
	Bottom	40–81 g/m ² (11–22 lbs/bond)
Three-Part Carbon-Backed	Top	40–64 g/m ² (11–17 lbs/bond)
	Carbon	Counted as one sheet
	Middle	40–64 g/m ² (11–17 lbs/bond)
	Carbon	Counted as one sheet
	Bottom	40–81 g/m ² (11–22 lbs/bond)

Command Sets

This appendix describes printer commands and their parameters.

This printer has the following two resident command sets (Emulations):

- IBM Proprinter XL24E (2390+)
- Epson-EP2

Select the same Emulation on the printer and in your software.

IBM 2390+ Emulation Quick Reference Guide

This section describes the printer commands for the IBM 2390+ Emulation. 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 border="1"> <thead> <tr> <th>m_3</th> <th>Height</th> <th>Spacing</th> </tr> </thead> <tbody> <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> </tbody> </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 border="1"> <thead> <tr> <th>m_4</th> <th>Width</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Unchanged</td> </tr> <tr> <td>1</td> <td>Normal</td> </tr> <tr> <td>2</td> <td>Double</td> </tr> </tbody> </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																														
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
Score select	ESC [- (n_1) (n_2) (m_1) (m_2)
$n_1 = 2, n_2 = 0$	
m_1 selects score location:	
m_1	Score location
0	Underscore
1	Strikethrough
2	Overscore
m_2 selects score type:	
m_2	Score type
0	Cancel
1	Single
2	Double

Function	Command
Horizontal Control	
Space	SP
Backspace	BS
Carriage return	CR
Select 10cpi	DC2 :
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)
Reverse line feed	ESC]
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
<p>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.</p> <p>($1 \leq n \leq 255$) ($1 \leq k \leq 64$)</p>	
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
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 (<i>chars.</i> : codes of characters to print, $0 \leq \text{chars.} \leq 255$)	ESC \ (n_1) (n_2) (<i>chars.</i>)
Print a character from all-character set (<i>char.</i> : a code of character to print, $0 \leq \text{char.} \leq 255$)	ESC ^ (<i>char.</i>)

Function	Command
----------	---------

Select code page table
 ESC [T (n₁) (n₂) 0 0 (c₁) (c₂)
 (0 ≤ n₁, n₂ ≤ 255) (n = n₁ + n₂ X 256)
 c₁, c₂: Decimal (n₁ = 4, n₂ = 0)

c ₁	c ₂	Code page ID
0	0	Ignore command
1	181	Code page 437
3	82	Code page 850
3	83	Code page 851
3	84	Code page 852
3	87	Code page 855
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	96	Code page 864
3	97	Code page 865
3	98	Code page 866
3	101	Code page 869
3	152	Code page 920
3	155	Code page 923**
40	197	Code page 437G
42	101	Code page 853
42	114	Code page USSR GOST

**Code page contains Euro currency symbol

Clear input buffer	CAN
Select printer	DC1
Deselect printer (ignore input)	ESC Q #
	ESC Q \$

Function	Command
Set font global	ESC [I (n ₁) (n ₂) (H _f) (L _f) (H _s) (L _s) (S _m) 0 (H _c) (L _c)
(0 ≤ n ₁ , n ₂ ≤ 255) (n = n ₁ + n ₂ X 256) H _f , L _f : Font global ID	
H_f, L_f Font global ID	

Normal Font Global ID for Hex (Hf Lf)					
Pitch	Courier	Prestige	Gothic	Orator	Script
10	000B	000C	0024	0005	01D4
12	01EB	01EF	018F	01CB	01D5
15	01EC	01F0	018E	01CC	01D6
17	01ED	01C9	018D	01CD	01D7
20	01EE	01CA	018C	01CE	01D8
24	011E	011F	0120	0121	0124
PS	00AB	01A4	00AE	00C6	00C8

Additional Font Global ID for Hex (Hf Lf)											
Pitch	Courier				Prestige			Gothic			
	Normal	Emph	Italic	Emph /Italic	Normal	Emph	Italic	Normal	Emph	Italic	Emph /D.strike
5	F4/F6	F5						F1	F2		F3
10	0B	2E	12	39	0C	3C		24			
12	1EB/55	6C	5C	74	1EF/56	6F	70	18F/57	6E	6D	
15	1EC/DF	D6	D7	D8	1F0/DD			18E/DE			
17.1	1ED/FF	FD			1C9/100			18D/FF			
20	1EE				1CA			18C/1119*			
24	11E				11F			120			
Prop.	AB	B8	AC	B9	A4			AE	9D	A2	

H_s , L_f , S_m : Size parameters

H_s , L_s , S_m Size parameters

The size parameters (H_s , L_s and S_m) specify the pitch as follows.
 These size parameters are valid when font ID (H_f , L_f) is not valid.
 Null data is ignored.

Dec(H_s, L_s)	Hex (H_s, L_s)	Description
0,0 - 0,65	0000 - 0041	24 CPI Subscript
0,66 - 0,77	0042 - 004D	20 CPI Subscript
0,78 - 0,89	004E - 0059	17 CPI Normal
0,90 - 0,107	005A - 006B	15 CPI Normal
0,108 - 0,131	006C - 0083	12 CPI Normal
0,132 - 0,155	0084 - 009B	10 CPI Normal
0,156 - 0,179	009C-00B3	8.5 CPI(17 CPI double-wide)
0,180 - 0,215	00B4-00D7	7.5 CPI(15 CPI double-wide)
0,216 - 0,254	00D8 - 00FE	6 CPI (12 CPI double-wide, double-high)
0,255 – 256, 256	0100-FFFF	5 CPI (10 CPI double-wide, double-high)

Note: The H_s and L_s Parameters are effective only when hexadecimal 01 (decimal = 1) is specified in the Size Modifier parameter (S_m) and H_f L_f is not found.

Sizemod (S_m) : The binary number that is the size modifier. The valid sizes are:

- 00 -No change
- 01 - Size measures the width in 0.018 mm (1/1440 in.)
- 02, 03 - The font is proportional.
- All other values are regarded as 0.

H_c , L_c : Code page ID

H_c , L_c Code page ID

HC	LC(Hex)	Code Page
01H	B5H	437
03H	52H	850
03H	53H	851
03H	54H	852
03H	57H	855
03H	59H	857
03H	5AH	858
03H	5CH	860
03H	5EH	862
03H	5FH	863
03H	60H	864
03H	61H	865
03H	62H	866
03H	65H	869
03H	98H	920
03H	9BH	923
28H	C5H	437G
2AH	65H	853
2AH	72H	USSR GOST

Function	Command
----------	---------

Set print quality
 ESC [d (n_1) (n_2) (m)
 ($0 \leq n_1, n_2 \leq 255$) ($n = n_1 + n_2 \times 256$)
 m_f : Quality

m	Quality
-----	---------

m(hex)	Quality
00	
01-7F	Draft
80-FE	LQ
FF	Default Font

Downloading

Select resident or downloaded font
 ESC I (n)
 Ex. $n = 0$: Resident Draft
 2:Resident Courier
 4:Downloaded Draft
 6:Downloaded Courier

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) ($data$)

Function	Command
----------	---------

Barcode

Setup barcode parameter

ESC [f (n₁) (n₂) (k) (m) (s) (v₁) (v₂)
(c) (data)

(0 ≤ n₁, n₂ ≤ 255) (n = n₁ + n₂ X 256)

k: Barcode type

k Barcode type

k value	barcode type
B1 hex	CODABAR (NW7)
B2 hex	EAN-13
B3 hex	EAN-8
B4 hex	CODE 39
B5 hex	INDUSTRIAL 2 OF 5
B6 hex	INTERLEAVED 2 OF 5
B7 hex	UPC-A
B8 hex	UPC-E
BA hex	CODE128

m: Module width

m Module width

m	unit module dots
00 hex	default(2 dots)
01 hex	2 dots
02 hex	2 dots
03 hex	3 dots
04 hex	4 dots

s: Space width adjustment

s Space width adjustment

“s” is used for fine adjustment for each “spaces” to match the optical conditions.

There is no effect for the “bar” width adjustment.

Range : -3 ≤ s ≤ 3

v₁, v₂: Bar length

v₁, v₂ Bar length

Bar length is described 2 bytes v1 shows lower byte. v2 shows upper bytes.

And bar length is controlled by multiple value of an unit of 1/2160 inch.

Minimum value of v₁, v₂: 288 dec

vertical pitch : All the input data is rounded to the multiple value.

c: Control flag

c	Control flag
b0:	Check Digit 0: No check code is generated by the printer. The host computer should generate the check code. 1: Check code is generated automatically by the printer.
b1:	Human Readable Character 0 : Print On 1 : Print Off Note: Human readable character is proportionally printed under the barcode in OCR-B font.
b2:	EAN-13, UPC-A flag character position (EAN-13 : 13th digit) (UPC-A : number system character) 0 : Center 1 : Under
b3-b7:	not used

Set barcode data

ESC [p (*n*₁) (*n*₂) (*data*)

*n*₁, *n*₂: Command length

<i>n</i>₁, <i>n</i>₂	Command length
---	-----------------------

“*n*₁, *n*₂” show data quantity followed “ESC [p *n*₁, *n*₂”.
 “*n*₁” is a low byte of command length data in hexadecimal.
 “*n*₂” is a high byte of command length data in hexadecimal.
 “*n*₁,*n*₂” value should be the value in the following tables.
 If undefined value is found in data string, the printer will ignore all the received barcode data which length is defined as “*n*₁, *n*₂”.

1) Case of “automatic check digit generation flag off”

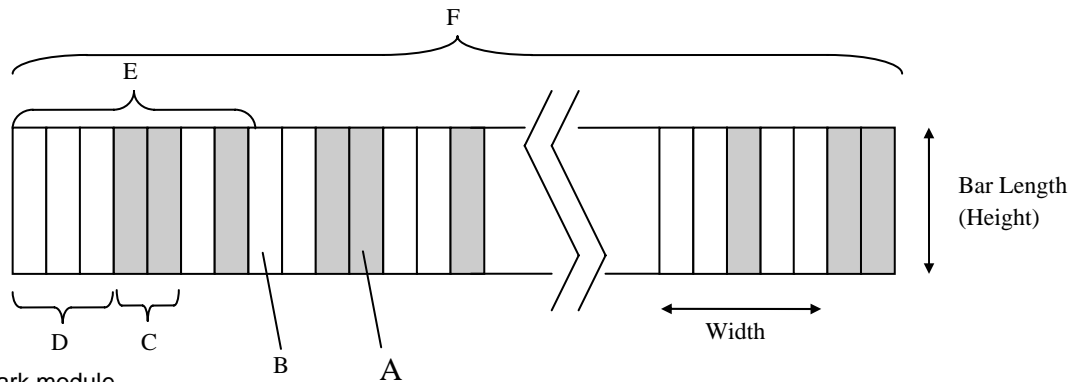
Barcode Style	<i>n</i> ₁ (lowbyte)	<i>n</i> ₂ (high byte)
EAN-13	0D hex	00
EAN-8	08 hex	00
CODE 39	01 to FF hex	00
INTERLEAVED 2 of 5	01 to FF hex	00
UPC-A	0C hex	00
CODE 128	02 to FF hex	00

2) Case of “automatic check digit generation flag on”

Barcode Style	<i>n</i> ₁ (lowbyte)	<i>n</i> ₂ (high byte)
EAN-13	0C hex	00
EAN-8	07 hex	00
CODE 39	01 to FF hex	00
INTERLEAVED 2 of 5	01 to FF hex	00
UPC-A	0B hex	00
CODE 128	02 to FF hex	00

Remarks

1) Definition barcode term



A: Dark module

The concept of module is applied to EAN-13, EAN-8, UPC-A and CODE-128. One or multiple dark module makes bar element.

B: Light module

The concept of module is applied to EAN-13, EAN-8, UPC-A, and COD-128. One or multiple light module makes space element.

C: Bar element

This element is actually printed "dark" by wire dot pins. Bar width is modulated to each barcode symbology method.

D: Space element

This element is not printed i.e. "space" area. Space width is modulated to each barcode symbology method. Combination of multiple bars and spaces makes one barcode character.

E: Barcode character

Encoded pattern from one or two digit(s) of receiving barcode data. Case of CPU, EAN, CODE 39 and Code A/B group of CODE-128, each one byte data corresponds to one barcode character. Case of INTERLEAVED 2 OF 5 and Code C group of CODE-128, two bytes data is encoded to one barcode character.

F: Barcode

Printed result specified by each barcode standard format. Width: width of horizontal direction. Length: length of vertical direction.

- 2) If LF operation is made by an operation switch during printing the barcode, the received barcode data is cleared and the barcode printing is stopped.
- 3) Barcode printing is always performed in a single direction.
- 4) Receiving after the barcode data, page length and right/left margin change may affect barcode printing.
- 5) Barcode data and other print data are controlled independently. So it is necessary to make a space for barcode print area when mixed print is needed. (See Appendix B)
- 6) In the case of Interleaved 2 of 5, if received data strings is an odd number (if check digit flag is on, the check data includes this number) the printer will add a zero to the most digit.
- 7) In the case of CODE 39, the printer will add a start/stop character to the barcode and human readable character automatically.
- 8) In the case of CODE 128, the first byte of barcode data strings defines a character set of its followed data. If undefined character is included for

the first byte except "A", "B", or "C", the printer will ignore all the data for barcode.

Character Set	1st byte	meaning
A	A (41 hex)	Start character set A (Code A)
B	B (42 hex)	Start character set B (Code B)
C	C (43 hex)	Start character set C (Code C)

- 9) In the case of CODE 128 and character set C, if received data strings is an odd number (if check digit flag is on, the check data includes this number) the printer will add a zero "0" character to the most digit.
- 10) In the case of CODE 128, the printer does not print both special function code of CODE 128 and ASCII function code for the human readable character.
- 11) In the case of CODE 128, even if the printer finds undefined code after the character set is changed by the function code, the printer will ignore all the barcode data defened by data length parameter "n1,n2", and no barcode print is performed.
- 12) When a paper empty error is occurred during barcode printing, the printer will stop printing and cancel all the barcode data already received.
- 13) When the module parameter is set to 1(m=1), the printer will always ignore the human readable flag. And also, if the printer finds out there is no space to print the human readable character in the barcode area, the printer may ignore the human readable flag.

Cut Sheet Feeder Control*

Eject a page from the printer* ESC EM R

Miscellaneous

Unidirectional printing on/off ESC U (n)
(on: n = 1, off: n = 0)

Add a carriage return to all line feeds ESC 5 (n)
(on: n = 1, off: n = 0)

Printer offline ESC j

Select default settings ESC [K (n₁) (n₂) (i) (ID) (p₁) (p₂)

Epson EP2 Quick Reference Guide

This section describes the printer commands for the Epson EP2 Emulation. 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 (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 (<i>n</i>)
<i>n</i> = 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 (<i>n</i>)
(on: <i>n</i> = 1, off: <i>n</i> = 0)	
Double-height characters on/off	ESC w (<i>n</i>)
(on: <i>n</i> = 1, off: <i>n</i> = 0)	
Condensed characters on	SI or ESC SI
Condensed characters off	DC2
Subscript or superscript printing on	ESC S (<i>n</i>)
(subscript: <i>n</i> = 1, superscript: <i>n</i> = 0)	
Subscript and superscript printing off	ESC T
Underline on/off	ESC - (<i>n</i>)
(on: <i>n</i> = 1, off: <i>n</i> = 0)	
Select line	ESC (- (<i>n</i> ₁) (<i>n</i> ₂) (<i>d</i> ₁) (<i>d</i> ₂) (<i>d</i> ₃)
<i>n</i> ₁ = 3, <i>n</i> ₂ = 0, <i>d</i> ₁ = 1	
<i>d</i> ₂ = 0:Ignore command	
1:Underline	
2:Strike through	
3:Overscore	
<i>d</i> 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 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	ESC ! (n)
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
<p>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. $(1 \leq n \leq 255)$ ($1 \leq k \leq 32$)</p>	
Move print position $n/120$ inch (for draft) ^(*1)	ESC \$ (n_1) (n_2)
<p>or $n/180$ inch (for letter)^(*1) right from left margin $(n = n_1 + n_2 \times 256)$</p>	
Move print position $n/120$ ^(*1) inch (for draft)	ESC \ (n_1) (n_2)
<p>or $n/180$^(*1) inch (for letter) left or right from the current position $(n = n_1 + n_2 \times 256)$</p>	
Vertical tab execution	VT
Set vertical tabs	ESC B (n_1) ... (n_k) NUL
<p>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. $(1 \leq n \leq 255)$ ($1 \leq k \leq 16$)</p>	
Move to dot line $(d_1 + d_2 \times 256)/360$ ^(*2) inch	ESC (V (n_1) (n_2) (d_1) (d_2)
<p>$n_1 = 2, n_2 = 0$ $(0 \leq d_1 \leq 255)$ ($0 \leq d_2 \leq 127$)</p>	
Vertical relative move by $(d_1 + d_2 \times 256)/360$ ^(*2) inch	ESC (v (n_1) (n_2) (d_1) (d_2)
<p>$n_1 = 2, n_2 = 0$ $(0 \leq d_1 \leq 255)$ ($0 \leq d_2 \leq 127$) $-32768 \leq d_1 + d_2 \times 256 \leq 32768$</p>	

*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 I (n)
Set top and bottom margins from top of page $n_1 = 4, n_2 = 0$	ESC (c (n_1) (n_2) (t_1) (t_2) (b_1) (b_2)
<ul style="list-style-type: none"> Top margin = $(t_1 + t_2 \times 256)/360^{(*1)}$ inch ($0 \leq t_1 \leq 255$) ($0 \leq t_2 \leq 127$) Bottom margin = $(b_1 + b_2 \times 256)/360^{(*1)}$ inch ($0 \leq b_1 \leq 255$) ($0 \leq b_2 \leq 127$) 	
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 $(d_1 + d_2 \times 256)/360^{(*1)}$ 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)
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 Select the same Emulation on the printer and in your software. 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)

d_2	d_3	Character Set
0	0	Italic
1	0	PC 437 (USA)
1	16	PC 437G (Greek)
3	0	PC 850 (Multilingual)
3	16	PC 858 (Multilingual + Euro)**
4	0	PC 851 (Greek)
5	0	PC 853 (Turkish)
6	0	PC 855 (Cyrillic)
7	0	PC 860 (Portugal)
8	0	PC 863 (Canada-French)
9	0	PC 865 (Norway)
10	0	PC 852 (East Europe)
11	0	PC 857 (Turkish)
12	0	PC 862 (Israel)
13	0	PC 864 (Arabic)
14	0	PC 866 (Russian)
15	0	PC 869 (Greek)
16	0	USSR GOST
29	15	PC 923 (Latin-9)**
31	0	PC920 (Latin-5)

**Code page contains Euro currency symbol

Function	Command
Print $n_1 + n_2$ X 256 characters from all-character set (<i>character codes</i>) ($0 \leq n_1 \leq 255$) ($0 \leq n_2 \leq 127$) ($0 \leq n_1 + n_2 \times 256 \leq 255$) ($0 \leq \text{character codes} \leq 254$)	ESC (^ (n_1) (n_2)
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 #
Font Selection and Downloading	
Select font	ESC % (n)
$n = 0$:Resident character set	
1:Downloaded character set	
Select letter or draft quality	ESC x (n)
$n = 0$: Draft	
1: Letter	
Select type style	ESC k (n)
• Bitmap font:	
$n = 0$:Roman	
1:Sans serif*	
2:Courier*	
3:Prestige*	
4:Script*	
5:OCR-B*	
6:OCR-A*	
7:Orator*	
10:Roman T*	
11:Sans serif H*	
12:Bold*	
13:Gothic*	
* On some code pages or point sizes, the Roman font or Sans serif font is selected.	
Set scalable font mode	ESC X m (n_1) (n_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. <p>Point size = $(n_1 + n_2 \times 256) \times 0.5$ point $(0 \leq n_1 \leq 255) (0 \leq n_2 \leq 127)$</p>	
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) ($data$)

Barcode

Barcode setup and print	ESC (B (n_1) (n_2) (k) (m) (s) (v_1) (v_2) (c) ($data$)
-------------------------	---

$(0 \leq n_1, n_2 \leq 255) (n = n_1 + n_2 \times 256)$

k : Barcode type

k Barcode type

k value	barcode type
00 hex	EAN-13
01 hex	EAN-8
02 hex	INDUSTRIAL 2 OF 5
03 hex	UPC-A
04 hex	UPC-E
05 hex	CODE 39
06 hex	CODE128

m : Module width

m Module width

m	unit module dots
02 hex	2 dots(default)
03 hex	3 dots
04 hex	4 dots

s : Space width adjustment

s Space width adjustment

“ s ” is used for fine adjustment for each “spaces” to match the optical conditions.

There is no effect for the “bar” width adjustment.

Range : $-3 \leq s \leq 3$

v_1, v_2 : Bar length

v_1, v_2 Bar length

Bar length is described 2 bytes v_1 shows lower byte. v_2 shows upper bytes.

And bar length is controlled by multiple value of an unit of 1/2160 inch.

Minimum value of v_1, v_2 : 288 dec

vertical pitch : All the input data is rounded to the multiple value.

c : Control flag

c Control flag

b0: Check Digit

0: No check code is generated by the printer.

The host computer should generate the check code.

1: Check code is generated automatically by the printer.

b1: Human Readable Character

0 : Print On

1 : Print Off

Note: Human readable character is proportionally printed under the barcode in OCR-B font.

b2: EAN-13, UPC-A flag character position

(EAN-13 : 13th digit)

(UPC-A : number system character)

0 : Center

1 : Under

b3-b7: not used

Cut Sheet Feeder Control

Eject a page from the printer

ESC EM R

Miscellaneous

Select unidirectional mode 1line

ESC <

Unidirectional printing on/off

ESC U (n)

(on: $n = 1$, off: $n = 0$)

Initialize printer

ESC @

Interface Information

This printer can communicate with a computer through a serial interface, a USB interface, a Blue Tooth wireless interface, an IEEE 802.11B wireless interface. Interfaces may vary from unit to unit depending on which configuration is purchased.

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. This information is most useful to people who specify how to configure and install these printers.

Removing the Connectivity Cover

To connect the printer through an IEEE 802.11B wireless interface , you must first remove the connectivity cover on the bottom side of the printer.



- 1** Locate connectivity cover on the bottom side of the printer.
- 2** Push the top of the connectivity cover slightly inward.
- 3** Pull the connectivity cover slightly downward and out.
- 4** Connect the desired Wireless LAN module.

Serial Interface

Use the cable that comes with the printer or equivalent. If you prepare a cable separately, the cable connector at the printer side should be an equivalent that conforms to EIA standards.

The following table shows the pin assignments that are used.

Pin No.	Signal Name	Description
2	TXD (Transmit Data)	This line is for transmission of data from Printer to PC. The characteristics of the data transmitted are specified by the function menu. The only data that will be transmitted are XON (x'11') and XOFF (x'13') signals. CTS must be high for transmission to take place.
3	RXD (Receive Data)	This line is for receiving data from PC. The serial interface will not accept any data unless DSR is on.
4	RTS (Request to Send)	This line will be set high and will remain high after the serial interface finishes its Reset.
5	CTS (Clear to Send)	This line will be monitored only if the XON/XOFF protocol is selected because CTS must be high in order for the serial interface to transmit data.
6	DSR (Data Set Ready)	DSR is used as another method of providing data integrity. Data will not be accepted unless DSR is high.
7	SG (Signal Ground)	Signal Ground (common return)
20	DTR (Data Terminal Ready)	This line will be set high after the serial interface finishes its Reset sequence. However if Ready/busy handshake protocol is selected, this line is used to indicate to PC whether or not Printer is ready to receive any more data.

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	Asynchronous, full duplex
Speed	4800, 9600, 19200 or 38400 baud (selectable)
Data bits	7 or 8 bits (selectable)
Parity bit	Even, odd, or none (selectable)
Start bit	1 bit
Stop bit	1 or 2 bits (selectable)
Buffer control	XON/XOFF (DC1/DC3) or DTR (Data Terminal Ready) (selectable)
Buffer size	2K, 8K, 16K, 32K, or 64K bytes (selectable)

Buffer Control

Buffer control is a communication emulation 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 your computer documentation does not recommend a particular buffer control, try DTR. The following table describes the buffer control.

NOTE: XON/XOFF is the default setting from the factory.

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 the interface cable. (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, DTR is high. When fewer than 255 (63) bytes of space remain in the buffer (or when the printer is taken offline), DTR is low. The computer must stop transmitting data within 255 (63) characters of DTR being low, or information may be lost.

USB Interface (Universal Serial Bus)

Features

Full compliance with the Universal Serial Bus Specification Revision 2.0.

USB Function Controller with two FIFO-based Endpoints:

- One bidirectional Control Endpoint 0 (8 bytes)
- One receive Endpoint 1 (1*64 bytes)

The signaling bit rate is 12 Mb/s (Full speed).

USB (Universal Serial Bus) Interface Pin Assignment

Pin No.	Signal
1	VBus
2	-Data(D-)
3	+Data(D+)
4	GND

Connector type

Printer side Type B Receptacle

Cable side Type B Plug

Bluetooth Wireless Interface

NOTE: Only for printer models with integrated Bluetooth Interface.

Communication System	Bluetooth Standard Version 1.2 conformity
Output Power	Bluetooth Power Class 2
Frequency	ISM band 2.4 GHz
Communication Range	Line-of-sight distance: Approximately 10m This may vary depending on conditions including Obstacles between devices, signal quality, magnetic fields, static electricity, electromagnetic interference, software, operation system, reception sensitivity, and antenna performance.

IEEE 802.11B/G Wireless Interface (Option)

This interface is supplied as an adaptor that plugs into the 36-pin Amphenol type connector of the printer.

Standards	Wireless IEEE 802.11b/g
Data rate	IEEE 802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps IEEE 802.11b: 1, 2, 5.5, 11 Mbps, Auto Fallback
Frequency	ISM band 2,4 GHz
Power	5 V DC, 2,5 A
OS Support	Windows 95/98 (SE)/ME/NT/2000/XP/2003 Linux, Mac OS
Transport Protocol	TCP/IP, SMB, NetBEUI, AppleTalk

Character Sets

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

- Common to IBM Proprinter XL24E (2390+) emulation and Epson-EP2 emulation: Default sets
- IBM Proprinter XL24E (2390+) emulation: Set 1 and set 2
- Epson-EP2 emulation: 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.

Common to IBM Proprinter Emulation and Epson-EP2 Emulation

The ASCII character set and the National Replacement Character sets are given in the following.

The following eighteen character sets are available: Code pages 437, 437Greek, 850, 851, 852, 853, 855, 857, 858, 860, 863, 864, 865, 866, 869, 920, 923 and USSR GOST.

Code Page 437

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	NUL			0	@	P	`	p	Ç	É	Á	||	L	ll	α	≡
1	DC1	!	1	A	Q	a	q	ú	æ	í	|||	⊥	⌈	β	±	
2	DC2	"	2	B	R	b	r	é	Æ	ó	|||	⌈	π	Γ	≥	
3	DC3	#	3	C	S	c	s	â	ô	ú	|	†	ll	π	≤	
4	DC4	\$	4	D	T	d	t	ä	ö	ñ	†	-	⊥	Σ	∫	
5		%	5	E	U	e	u	à	ò	Ñ	†	†	F	σ	J	
6		&	6	F	V	f	v	á	ú	á	||	†	π	μ	÷	
7	BEL	'	7	G	W	g	w	ç	ù	ø	π	||	||	τ	≈	
8	BS CAN	(	8	H	X	h	x	ê	ÿ	¿	‡	⊥	†	φ	°	
9	HT EM	)	9	I	Y	i	y	ë	ö	¬	||	⌈	J	θ	•	
A	LF	*	:	J	Z	j	z	è	ù	¬	||	⊥	⌈	Ω	·	
B	VT ESC	+	;	K	[	k	{	ÿ	ç	¼	π	⌈	⊥	δ	√	
C	FF FS	,	<	L	\	l	|	í	é	¼	ll	||	⊥	∞	n	
D	CR	-	=	M	]	m	}	ì	¥	ì	ll	=	⊥	φ	²	
E	SO	.	>	N	^	n	~	À	Ð	«	‡	||	⊥	ε	■	
F	SI	/	?	O	_	o	DEL	À	f	»	‡	⊥	⊥	∩		

Code Page 437 Greek

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	NUL			0	@	P	`	p	A	P	ι	||	L	ll	ω	Ω
1	DC1	!	1	A	Q	a	q	B	Σ	κ	|||	⊥	⌈	ά	±	
2	DC2	"	2	B	R	b	r	Γ	T	λ	|||	⌈	π	έ	≥	
3	DC3	#	3	C	S	c	s	Δ	Υ	μ	|	†	ll	ή	≤	
4	DC4	\$	4	D	T	d	t	E	Φ	v	†	-	⊥	ι	∫	
5		%	5	E	U	e	u	Z	X	ξ	†	†	F	ι	J	
6		&	6	F	V	f	v	H	Ψ	ο	||	†	π	ό	÷	
7	BEL	'	7	G	W	g	w	Θ	Ω	π	π	||	||	ύ	≈	
8	BS CAN	(	8	H	X	h	x	I	α	ρ	‡	⊥	†	ύ	°	
9	HT EM	)	9	I	Y	i	y	K	β	σ	||	⌈	J	ώ	ε	
A	LF	*	:	J	Z	j	z	Λ	Υ	ς	||	⊥	⌈	Α	¥	
B	VT ESC	+	;	K	[	k	{	M	δ	τ	π	⌈	⊥	Ε	√	
C	FF FS	,	<	L	\	l	|	N	ε	υ	ll	||	⊥	Η	n	
D	CR	-	=	M	]	m	}	Ξ	ζ	φ	ll	=	⊥	Ι	²	
E	SO	.	>	N	^	n	~	O	η	χ	‡	||	⊥	Ο	■	
F	SI	/	?	O	_	o	DEL	Π	θ	ψ	‡	⊥	⊥	Υ		

Code Page 850

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	NUL			0	@	P	`	p	Ç	É	á	||	L	Ø	Ó	-
1	DC1	!	1	A	Q	a	q	ú	æ	í	|||	||	⊥	Ð	β	±
2	DC2	"	2	B	R	b	r	é	Æ	ó	|||	||	⊥	Ê	Ô	—
3	DC3	#	3	C	S	c	s	â	ô	ú	|	|	⊥	Ë	Ò	¼
4	DC4	\$	4	D	T	d	t	ä	ö	ñ	|	-	⊥	È	Ö	½
5		%	5	E	U	e	u	à	ò	Ñ	Á	†	⊥	Ì	Õ	¾
6		&	6	F	V	f	v	å	û	ä	À	ã	í	μ	÷	
7	BEL	'	7	G	W	g	w	ç	ù	ø	À	Å	í	þ	.	
8	BS	CAN	(	8	H	X	h	x	ê	ÿ	¿	©	⊥	ï	þ	°
9	HT	EM	)	9	I	Y	i	y	ë	ö	©	||	⊥	⊥	Û	”
A	LF	*	:	J	Z	j	z	è	ü	¬	||	||	⊥	⊥	Ü	•
B	VT	ESC	+	;	K	[	k	{	ÿ	ø	½	⊥	⊥	⊥	Û	ˆ
C	FF	FS	,	<	L	\	l	|	í	é	½	⊥	||	⊥	Ÿ	³
D	CR	-	=	M	]	m	}	ì	ø	í	¢	=	|	Ÿ	ˆ	
E	SO	.	>	N	^	n	~	À	x	«	¥	||	⊥	Û	—	■
F	SI	/	?	O	_	o	DEL	À	f	»	⊥	⊥	⊥	⊥	ˆ	

Code Page 851

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	NUL			0	@	P	`	p	Ç	Ï	ÿ	||	L	T	ζ	-
1	DC1	!	1	A	Q	a	q	ú		ÿ	|||	||	⊥	Y	η	±
2	DC2	"	2	B	R	b	r	é	Ø	ó	|||	||	⊥	⊥	θ	υ
3	DC3	#	3	C	S	c	s	â	ô	ú	|	|	⊥	X	ι	φ
4	DC4	\$	4	D	T	d	t	ä	ö	À	†	-	⊥	Ψ	κ	χ
5		%	5	E	U	e	u	à	ÿ	B	K	†	⊥	Ω	λ	§
6		&	6	F	V	f	v	Å	û	Γ	Λ	Π	α	μ	ψ	
7	BEL	'	7	G	W	g	w	ç	ù	Δ	M	P	β	ν	.	
8	BS	CAN	(	8	H	X	h	x	ê	Ω	E	N	⊥	Y	ξ	°
9	HT	EM	)	9	I	Y	i	y	ë	Ö	Z	||	⊥	⊥	o	”
A	LF	*	:	J	Z	j	z	è	Ü	H	||	||	⊥	⊥	ω	
B	VT	ESC	+	;	K	[	k	{	ÿ	á	½	⊥	⊥	⊥	ρ	Û
C	FF	FS	,	<	L	\	l	|	í	é	θ	⊥	||	⊥	σ	Û
D	CR	-	=	M	]	m	}	Ë	é	I	Ξ	=	⊥	δ	ς	ω
E	SO	.	>	N	^	n	~	À	ŋ	«	o	||	⊥	e	τ	■
F	SI	/	?	O	_	o	DEL	H	í	»	⊥	⊥	⊥	⊥	ˆ	

Code Page 852

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	NUL			0	e	P	`	p	Ç	É	á	||	L	d	Ó	-
1		DC1	!	1	A	Q	a	q	ú	í	í	|||	⊥	Đ	ß	~
2		DC2	"	2	B	R	b	r	é	í	ó	|||	⊥	Đ	Ó	.
3		DC3	#	3	C	S	c	s	â	ô	ú	|	⊥	È	Ń	~
4		DC4	\$	4	D	T	d	t	ä	ö	Å	⊥	-	đ	ñ	~
5			%	5	E	U	e	u	û	ł	ą	Å	⊥	Ń	Ń	\$
6			&	6	F	V	f	v	ć	í	ż	Å	Å	í	š	÷
7	BEL		'	7	G	W	g	w	ç	ś	ź	È	ä	í	š	.
8	BS	CAN	(	8	H	X	h	x	ı	ś	ę	\$	⊥	è	ř	o
9	HT	EM	)	9	I	Y	i	y	ë	ö	e	||	⊥	⊥	ú	"
A	LF		*	:	J	Z	j	z	õ	ü		||	⊥	⊥	ı	.
B	VT	ESC	+	;	K	[	k	{	ö	ř	z	⊥	⊥	⊥	ú	ú
C	FF	FS	,	<	L	\	l	|	ı	č	č	⊥	||	⊥	ý	ř
D	CR		-	=	M	]	m	}	ż	Ł	ş	z	=	⊥	ı	ř
E	SO		.	>	N	^	n	~	Å	x	«	z	||	⊥	ı	■
F	SI		/	?	O	_	o	DEL	Ć	ć	»	⊥	⊥	⊥	ı	~

Code Page 853

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	NUL			0	e	P	`	p	Ç	É	á	||	L		Ó	-
1		DC1	!	1	A	Q	a	q	ú	ć	í	|||	⊥		B	
2		DC2	"	2	B	R	b	r	é	ć	ó	|||	⊥	È	Ó	ł
3		DC3	#	3	C	S	c	s	â	ô	ú	|	⊥	È	ò	h
4		DC4	\$	4	D	T	d	t	ä	ö	ñ	⊥	-	È	ó	~
5			%	5	E	U	e	u	à	ò	Ń	Å	⊥	ı	ó	\$
6			&	6	F	V	f	v	ć	ú	Ć	Å	š	í	μ	÷
7	BEL		'	7	G	W	g	w	ç	ù	ğ	À	š	í	π	.
8	BS	CAN	(	8	H	X	h	x	é	ı	ñ	\$	⊥	ı	h	o
9	HT	EM	)	9	I	Y	i	y	ë	ö	h	||	⊥	⊥	ú	"
A	LF		*	:	J	Z	j	z	è	ü		||	⊥	⊥	ı	.
B	VT	ESC	+	;	K	[	k	{	ı	ğ	ı	⊥	⊥	⊥	ü	
C	FF	FS	,	<	L	\	l	|	ı	é	ş	⊥	||	⊥	ü	»
D	CR		-	=	M	]	m	}	ı	Ć	ş	z	=		ü	»
E	SO		.	>	N	^	n	~	Å	x	«	z	||	⊥		■
F	SI		/	?	O	_	o	DEL	Ć	ć	»	⊥	⊥	⊥	ı	~

Code Page 855

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	NUL			0	@	P	`	p	ђ	љ	а	||	L	л	я	-
1		DC1	!	1	A	Q	а	q	Ђ	Љ	А	|||	⊥	Л	Р	М
2		DC2	"	2	B	R	b	r	ђ	љ	Б	|||	⊥	М	Р	Њ
3		DC3	#	3	C	S	c	s	ѓ	Ђ	Б	|	⊥	М	С	З
4		DC4	\$	4	D	T	d	t	ѐ	ћ	ц	⊥	-	н	С	З
5			%	5	E	U	e	u	Ё	Ћ	Ц	х	⊥	Н	Т	Ш
6			&	6	F	V	f	v	ѐ	ќ	д	Х	к	о	Т	Ш
7	BEL		'	7	G	W	g	w	с	ќ	д	и	К	О	У	Э
8	BS	CAN	(	8	H	X	h	x	с	ђ	е	И	ц	п	у	Э
9	HT	EM	)	9	I	Y	i	y	С	ђ	Е	||	⊥	Ј	ж	щ
A	LF		*	:	J	Z	j	z	і	ц	Ф	||	⊥	Г	Ж	Щ
B	VT	ESC	+	;	K	[	k	{	І	Ц	Ф	⊥	⊥	■	В	Ч
C	FF	FS	,	<	L	\	l	|	І	Ю	Г	⊥	⊥	■	В	Ч
D	CR		-	=	M	]	m	}	І	Ю	Г	Й	=	П	Ь	\$
E	SO		.	>	N	^	n	~	ј	ь	«	Й	||	я	Ь	»
F	SI		/	?	O	_	o	DEL	Ј	Ь	»	Ј	■	■	■	■

Code Page 857

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	NUL			0	@	P	`	p	Ç	É	Á	||	L	ø	Ó	-
1		DC1	!	1	A	Q	а	q	ú	æ	í	|||	⊥	ø	В	±
2		DC2	"	2	B	R	b	r	é	Æ	ó	|||	⊥	È	Ô	
3		DC3	#	3	C	S	c	s	â	ô	ú	|	⊥	È	Ò	¼
4		DC4	\$	4	D	T	d	t	ä	ö	ñ	⊥	-	È	ö	¶
5			%	5	E	U	e	u	à	ò	ñ	⊥	⊥		Ö	§
6			&	6	F	V	f	v	á	ú	č	⊥	⊥	á	í	μ
7	BEL		'	7	G	W	g	w	ç	ù	ý	⊥	⊥	⊥	í	,
8	BS	CAN	(	8	H	X	h	x	é	í	ı	⊥	⊥	ı	x	°
9	HT	EM	)	9	I	Y	i	y	ë	ö	•	||	⊥	Ј	ú	”
A	LF		*	:	J	Z	j	z	è	Û	¬	||	⊥	Г	û	•
B	VT	ESC	+	;	K	[	k	{	ı	ø	½	⊥	⊥	■	û	²
C	FF	FS	,	<	L	\	l	|	ı	£	¼	⊥	⊥	■	ı	³
D	CR		-	=	M	]	m	}	ı	ø	ı	⊥	=	ı	ÿ	²
E	SO		.	>	N	^	n	~	Ä	Ş	«	⊥	||	ı	—	■
F	SI		/	?	O	_	o	DEL	Ä	ş	»	Ј	■	■	■	■

Code Page 858

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	NUL			0	e	P	`	p	Ç	É	á	||	L	ø	ó	-
1	DC1	!	1	A	Q	a	q	ú	æ	í	|||	⊥	Đ	β	±	
2	DC2	"	2	B	R	b	r	é	Æ	ó	|||	⊥	Ê	ô	—	
3	DC3	#	3	C	S	c	s	â	ô	ú	|	⊥	Ë	ò	×	
4	DC4	\$	4	D	T	d	t	ä	ö	ñ	⊥	-	È	õ	¶	
5		%	5	E	U	e	u	à	ò	Ñ	À	†	É	Ö	§	
6		&	6	F	V	f	v	á	ú	á	À	á	í	μ	÷	
7	BEL	'	7	G	W	g	w	ç	ù	ø	À	À	í	þ	,	
8	BS CAN	(	8	H	X	h	x	ê	ÿ	¿	ø	⊥	ÿ	þ	o	
9	HT EM	)	9	I	Y	i	y	ë	ö	ø	||	⊥	ÿ	ú	"	
A	LF	*	:	J	Z	j	z	è	Û	¬	||	⊥	⊥	Û	.	
B	VT ESC	+	;	K	[	k	{	ÿ	ø	½	⊥	⊥	⊥	Û	²	
C	FF FS	,	<	L	\	l	|	í	É	¼	⊥	⊥	⊥	ÿ	³	
D	CR	-	=	M	]	m	}	ì	Ø	í	¢	=	!	ÿ	²	
E	SO	.	>	N	^	n	~	À	x	«	¥	||	ì	—	■	
F	SI	/	?	O	_	o	DEL	À	f	»	γ	⊥	⊥	^		

Code Page 860

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	NUL			0	e	P	`	p	Ç	É	á	||	L	⊥	α	≡
1	DC1	!	1	A	Q	a	q	ú	à	í	|||	⊥	⊥	β	±	
2	DC2	"	2	B	R	b	r	é	È	ó	|||	⊥	⊥	Γ	≥	
3	DC3	#	3	C	S	c	s	â	ô	ú	|	⊥	⊥	π	≤	
4	DC4	\$	4	D	T	d	t	ä	ö	ñ	⊥	-	⊥	Σ	∫	
5		%	5	E	U	e	u	à	ò	Ñ	‡	†	⊥	σ	∫	
6		&	6	F	V	f	v	Á	Ú	á	||	⊥	⊥	μ	÷	
7	BEL	'	7	G	W	g	w	ç	ù	ø	⊥	⊥	⊥	τ	≈	
8	BS CAN	(	8	H	X	h	x	ê	ÿ	¿	⊥	⊥	⊥	φ	o	
9	HT EM	)	9	I	Y	i	y	ë	ö	ø	||	⊥	⊥	θ	.	
A	LF	*	:	J	Z	j	z	è	Û	¬	||	⊥	⊥	Ω	.	
B	VT ESC	+	;	K	[	k	{	ÿ	ø	½	⊥	⊥	⊥	δ	√	
C	FF FS	,	<	L	\	l	|	ô	É	¼	⊥	⊥	⊥	∞	∞	
D	CR	-	=	M	]	m	}	ì	Û	í	⊥	=	⊥	φ	²	
E	SO	.	>	N	^	n	~	À	Æ	«	⊥	||	⊥	ε	■	
F	SI	/	?	O	_	o	DEL	À	ó	»	γ	⊥	⊥	∩		

Code Page 863

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	NUL			0	@	P	`	p	Ç	É	!	|||	L	ll	α	≡
1		DC1	!	1	A	Q	a	q	ú	È	'	||||	⊥	ⸯ	β	±
2		DC2	"	2	B	R	b	r	é	Ê	ó	|||||	⊤	π	Γ	≥
3		DC3	#	3	C	S	c	s	â	ô	û	|	⊥	ll	π	≤
4		DC4	\$	4	D	T	d	t	À	Ë	"	⊥	-	⊥	Σ	∫
5			%	5	E	U	e	u	à	Ï	.	⊥	⊥	F	σ	J
6			&	6	F	V	f	v	¶	Ô	'	|||	⊥	π	μ	÷
7	BEL		'	7	G	W	g	w	Ç	Ù	-	π	|||	|||	τ	≈
8	BS	CAN	(	8	H	X	h	x	è	□	†	⊥	⊥	⊥	ø	°
9	HT	EM	)	9	I	Y	i	y	ë	Ô	⌈	|||	ⸯ	J	θ	•
A	LF		*	:	J	Z	j	z	è	Ù	⌈	|||	ll	⌈	Ω	•
B	VT	ESC	+	;	K	[	k	{	ÿ	ç	½	ⸯ	ⸯ	■	δ	√
C	FF	FS	,	<	L	\	l	|	ï	£	¼	ⸯ	|||	■	∞	n
D	CR		-	=	M	]	m	}	—	Û	¾	ll	=	|||	φ	²
E	SO		.	>	N	^	n	~	À	Û	«	⊥	|||	|||	ε	■
F	SI		/	?	O	_	o	DEL	§	f	»	⊥	■	■	∩	

Code Page 864

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	NUL			0	@	P	`	p	°	ß	.	¢	ذ	-	ـ	
1		DC1	!	1	A	Q	a	q	•	∞	-	ٲ	ء	ر	ف	ـ
2		DC2	"	2	B	R	b	r	•	ø	⌈	ٲ	آ	ز	ف	ن
3		DC3	#	3	C	S	c	s	√	±	£	ٲ	أ	س	ك	ه
4		DC4	\$	4	D	T	d	t	|||	½	π	£	ؤ	ش	ل	+
5			%	5	E	U	e	u	-	¼	⌈	ه	ج	ص	م	ل
6			&	6	F	V	f	v	|	≈		ٲ	ل	ض	ن	ب
7	BEL		'	7	G	W	g	w	†	«		ٲ	ا	ط	ع	خ
8	BS	CAN	(	8	H	X	h	x	⊥	»	⌈	ا	ط	ظ	و	ق
9	HT	EM	)	9	I	Y	i	y	ⸯ	لا	ب	ٲ	ة	ع	ى	لا
A	LF		*	:	J	Z	j	z	⊥	لا	ع	ف	ن	غ	ـ	لا
B	VT	ESC	+	;	K	[	k	{	⊥		ع	:	ن	ا	ن	ل
C	FF	FS	,	<	L	\	l	|	ⸯ		،	س	ج	ـ	ك	
D	CR		-	=	M	]	m	}	⌈	لا	ج	ش	ج	÷	ع	ي
E	SO		.	>	N	^	n	~	⌈	لا	ح	م	خ	x	غ	■
F	SI		/	?	O	_	o	DEL	⌈	ل	خ	؟	د	ع	ل	

Code Page 865

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0 NUL			0	@	P	`	p	Ç	É	Á	|||	L	ll	α	≡	
1 DC1 !	1	A	Q	a	q	ú	æ	í	|||	⊥	⌈	β	±			
2 DC2 "	2	B	R	b	r	é	Æ	ó	|||	⌊	⌋	Γ	≥			
3 DC3 #	3	C	S	c	s	â	ô	ú	|	†	ll	π	≤			
4 DC4 \$	4	D	T	d	t	ä	ö	ñ	†	-	⋈	Σ	∫			
5 %	5	E	U	e	u	à	ò	ñ	‡	†	F	σ	J			
6 &	6	F	V	f	v	â	û	ä	|||	‡	π	μ	÷			
7 BEL ' 7	G	W	g	w	ç	ù	ø	π	|||	|||	τ	≈				
8 BS CAN (8	H	X	h	x	ê	ÿ	¿	‡	ll	‡	Φ	°				
9 HT EM) 9	I	Y	i	y	è	ö	¬	|||	ll	J	θ	•				
A LF * :	J	Z	j	z	è	ü	¬	|||	ll	Γ	Ω	•				
B VT ESC + ;	K	[	k	{	ÿ	ø	¿	|||	ll	|||	δ	√				
C FF FS , <	L	\	l	|	í	£	¿	ll	|||	|||	∞	n				
D CR - =	M	]	m	}	í	Ø	í	ll	=	|||	φ	²				
E SO . >	N	^	n	~	À	Æ	«	‡	|||	|||	ε	■				
F SI / ?	O	_	o	DEL	À	f	¤	‡	ll	ll	±	■	∩			

Code Page 866

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0 NUL			0	@	P	`	p	À	Р	а	|||	L	ll	р	È	
1 DC1 !	1	A	Q	a	q	Б	С	б	|||	⊥	⌈	с	è			
2 DC2 "	2	B	R	b	r	В	Т	в	|||	⌊	⌋	т	ε			
3 DC3 #	3	C	S	c	s	Г	У	г	|	†	ll	у	e			
4 DC4 \$	4	D	T	d	t	Д	Ф	д	†	-	⋈	ф	ÿ			
5 %	5	E	U	e	u	Е	Х	e	‡	†	F	х	ÿ			
6 &	6	F	V	f	v	Ж	Ц	ж	|||	‡	π	ц	ÿ			
7 BEL ' 7	G	W	g	w	З	Ч	э	π	|||	|||	ч	ÿ				
8 BS CAN (8	H	X	h	x	И	Ш	и	‡	ll	‡	ш	°				
9 HT EM) 9	I	Y	i	y	Й	Щ	й	|||	ll	J	щ	•				
A LF * :	J	Z	j	z	К	Ь	к	|||	ll	Γ	ь	•				
B VT ESC + ;	K	[	k	{	Л	Ы	л	|||	ll	|||	ы	√				
C FF FS , <	L	\	l	|	М	Ь	м	ll	|||	|||	ь	№				
D CR - =	M	]	m	}	Н	Э	н	ll	=	|||	э	¤				
E SO . >	N	^	n	~	О	Ю	о	‡	|||	|||	ю	■				
F SI / ?	O	_	o	DEL	П	Я	п	‡	ll	ll	±	■	∩			

Code Page 869

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	NUL			0	@	P	`	p		ı	ı	ı	L	T	z	-
1	DC1	!	1	A	Q	a	q		İ	ı	ı	ı	ı	Y	η	±
2	DC2	"	2	B	R	b	r		Đ	ó	ı	ı	ı	ı	9	ı
3	DC3	#	3	C	S	c	s		Ú	|	|	|	X	ı	φ	
4	DC4	\$	4	D	T	d	t		A	|	-	Ψ	κ	χ		
5		%	5	E	U	e	u		Y	B	K	ı	Ω	λ	§	
6		&	6	F	V	f	v	À	Ÿ	Γ	Λ	Π	α	μ	ψ	
7	BEL	'	7	G	W	g	w		ø	Δ	M	P	β	v	"	
8	BS CAN	(	8	H	X	h	x	·	Đ	E	N	ı	Y	ξ	°	
9	HT EM	)	9	I	Y	i	y	¬	²	Z	ı	ı	J	o	"	
A	LF	*	:	J	Z	j	z	|	³	H	ı	ı	ı	ı	ω	
B	VT ESC	+	;	K	[	k	{	'	đ	ı	ı	ı	ı	ı	ı	ı
C	FF FS	,	<	L	\	l	|	'	£	ø	ı	ı	ı	ı	ı	ı
D	CR	-	=	M	]	m	}	È	€	I	Ξ	=	δ	ς	ω	
E	SO	.	>	N	^	n	~	-	ı	«	0	ı	ı	e	τ	ı
F	SI	/	?	O	_	o	DEL	H	ı	»	ı	ı	ı	ı	ı	ı

Code Page 920

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	NUL			0	@	P	`	p			°	À	Ç	à	ç	
1	DC1	!	1	A	Q	a	q			ı	±	Á	Ñ	á	ñ	
2	DC2	"	2	B	R	b	r			ı	²	Â	Ò	â	ò	
3	DC3	#	3	C	S	c	s			ı	³	Ã	Ó	ã	ó	
4	DC4	\$	4	D	T	d	t			ı	'	Ä	Ô	ä	ô	
5		%	5	E	U	e	u			ı	μ	Å	Ö	å	ö	
6		&	6	F	V	f	v			ı	¶	Æ	Ø	æ	ø	
7	BEL	'	7	G	W	g	w			ı	·	Ç	×	ç	÷	
8	BS CAN	(	8	H	X	h	x			ı	.	È	Ø	è	ø	
9	HT EM	)	9	I	Y	i	y			ı	¹	É	Ù	é	ù	
A	LF	*	:	J	Z	j	z			ı	º	Ê	Ú	ê	ú	
B	VT ESC	+	;	K	[	k	{			ı	»	Ë	Û	ë	û	
C	FF FS	,	<	L	\	l	|			ı	¼	İ	Ü	ı	ü	
D	CR	-	=	M	]	m	}			ı	½	Í	İ	ı	ı	
E	SO	.	>	N	^	n	~			ı	¾	Î	Ş	ı	ş	
F	SI	/	?	O	_	o	DEL			ı	¿	Ï	ß	ı	ÿ	

Code Page 923

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	NUL			0	@	P	`	p			°	À	Ð	à	ò	
1		DC1	!	1	A	Q	a	q			ı	±	Á	Ñ	á	ñ
2		DC2	"	2	B	R	b	r			ç	²	Â	Ò	â	ò
3		DC3	#	3	C	S	c	s			£	³	Ã	Ó	ã	ó
4		DC4	\$	4	D	T	d	t			€	´	Ä	Ô	ä	ô
5			%	5	E	U	e	u			¥	µ	Å	Ö	å	ö
6			&	6	F	V	f	v			Š	¶	Æ	Ø	æ	ø
7	BEL		'	7	G	W	g	w			Š	·	Ç	×	ç	÷
8	BS	CAN	(	8	H	X	h	x			š	ž	È	Ø	è	ø
9	HT	EM	)	9	I	Y	i	y			•	ı	É	Ù	é	ù
A	LF		*	:	J	Z	j	z			•	•	Ê	Ú	ê	ú
B	VT	ESC	+	;	K	[	k	{			•	•	Ë	Û	ë	û
C	FF	FS	,	<	L	\	l	|			~	~	Ë	Û	ë	û
D	CR		-	=	M	]	m	}					œ	ı	ı	ı
E	SO		.	>	N	^	n	~			•	•	ÿ	ı	ı	ı
F	SI		/	?	O	_	o	DEL			~	~	ÿ	ı	ı	ı

Code Page USSR GOST

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	NUL			0	@	P	`	p	±	π	Г	А	Р	а	р	Ё
1		DC1	!	1	A	Q	a	q	и	π	Г	Б	С	б	с	ё
2		DC2	"	2	B	R	b	r	т	ш	Д	В	Т	в	т	/
3		DC3	#	3	C	S	c	s	ф	л	Л	Г	У	г	у	\
4		DC4	\$	4	D	T	d	t	||	=	-	Д	Ф	д	ф	/
5			%	5	E	U	e	u	п	||	|	Е	Х	е	х	\
6			&	6	F	V	f	v	т	т	Г	Ж	Ц	ж	ц	→
7	BEL		'	7	G	W	g	w	п	||	†	З	Ч	э	ч	←
8	BS	CAN	(	8	H	X	h	x	и	±	±	И	Ш	и	ш	↑
9	HT	EM	)	9	I	Y	i	y	т	†	†	Й	Щ	й	щ	↓
A	LF		*	:	J	Z	j	z	ф	†	†	К	Ъ	к	ъ	÷
B	VT	ESC	+	;	K	[	k	{	и	||	■	Л	Ы	л	ы	±
C	FF	FS	,	<	L	\	l	|	д	||	■	М	Ь	м	ь	№
D	CR		-	=	M	]	m	}	†	||	■	Н	Э	н	э	и
E	SO		.	>	N	^	n	~	†	||	■	О	Ю	о	ю	■
F	SI		/	?	O	_	o	DEL	π	†	■	П	Я	п	я	

IBM Proprinter Emulation

IBM Set 1 and 2

IBM character set 1 and IBM character set 2

IBM Set 1

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	NUL			0	@	P	`	p	NUL		á	||	L	ll	α	≡
1		DC1	!	1	A	Q	a	q		DC1	í	||	⊥	⊟	β	±
2		DC2	"	2	B	R	b	r		DC2	ó	||	⊤	⊠	Γ	≥
3		DC3	#	3	C	S	c	s		DC3	ú	|	⊥	ll	π	≤
4		DC4	\$	4	D	T	d	t		DC4	ñ	↓	-	⊥	Σ	∫
5			%	5	E	U	e	u			Ñ	↓	†	F	σ	J
6			&	6	F	V	f	v			á	||	⊥	π	μ	÷
7	BEL		'	7	G	W	g	w	BEL		ø	π	||	||	τ	≈
8	BS	CAN	(	8	H	X	h	x	BS	CAN	¿	¶	ll	†	Φ	°
9	HT	EM	)	9	I	Y	i	y	HT	EM	¬	||	¶	J	θ	•
A	LF		*	:	J	Z	j	z	LF		¬	||	ll	Γ	Ω	•
B	VT	ESC	+	:	K	[	k	{	VT	ESC	¼	¶	¶	■	δ	√
C	FF	FS	,	<	L	\	l	|	FF	FS	¼	¶	||	■	∞	n
D	CR		-	=	M	]	m	}	CR		i	ll	=	||	φ	²
E	SO		.	>	N	^	n	~	SO		«	¶	||	||	ε	■
F	SI		/	?	O	_	o	DEL	SI		»	¶	±	■	∩	

IBM Set 2

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	NUL			0	@	P	`	p	Ç	É	á	||	L	ll	α	≡
1		DC1	!	1	A	Q	a	q	û	æ	í	||	⊥	⊟	β	±
2		DC2	"	2	B	R	b	r	é	Æ	ó	||	⊤	⊠	Γ	≥
3		DC3	#	3	C	S	c	s	à	ò	ú	|	⊥	ll	π	≤
4		DC4	\$	4	D	T	d	t	ä	ö	ñ	↓	-	⊥	Σ	∫
5			%	5	E	U	e	u	à	ò	Ñ	↓	†	F	σ	J
6			&	6	F	V	f	v	ä	ó	á	||	⊥	π	μ	÷
7	BEL		'	7	G	W	g	w	ç	ù	ø	π	||	||	τ	≈
8	BS	CAN	(	8	H	X	h	x	á	ý	¿	¶	ll	†	Φ	°
9	HT	EM	)	9	I	Y	i	y	é	Ó	¬	||	¶	J	θ	•
A	LF		*	:	J	Z	j	z	è	Û	¬	||	ll	Γ	Ω	•
B	VT	ESC	+	:	K	[	k	{	í	ø	¼	¶	¶	■	δ	√
C	FF	FS	,	<	L	\	l	|	í	é	¼	¶	||	■	∞	n
D	CR		-	=	M	]	m	}	í	¶	i	ll	=	||	φ	²
E	SO		.	>	N	^	n	~	Ä	Ŕ	«	¶	||	||	ε	■
F	SI		/	?	O	_	o	DEL	Ä	f	»	¶	±	■	∩	

Epson-EP2 Emulation

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	℞	\$	@	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	ú	í	ñ	ó	ú	
14:KOREA	#	\$	@	[₩]	^	~	{		}	~	
15:LEGAL	#	\$	§	°	'	"	¶	~	©	®	†	™	

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