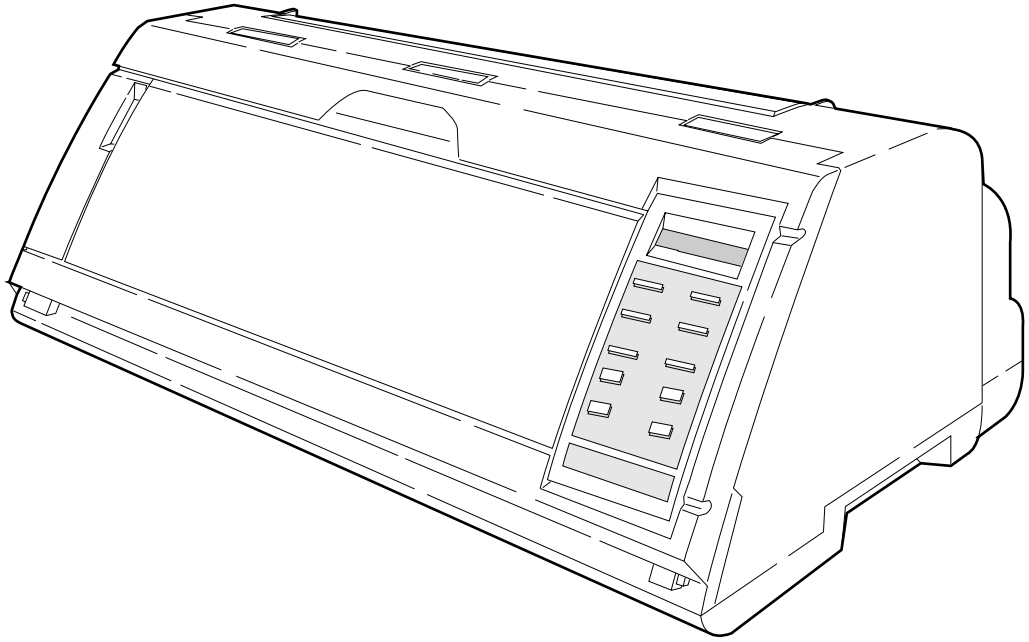
24-pin Dot-matrix Printer

FB-900

OWNER'S MANUAL



SEIKO Precision

Warning

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

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

“It is necessary to use shielded interconnect cables to insure compliance with FCC Class B limits for radio frequency emissions.”

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

1. No part of this manual may be reproduced in any form.
2. This manual is subject to change without notice.
3. This manual was prepared with the greateset care. If you should find any unclear points, mistakes, or omissions, please contact us.
4. We will not bear any responsibility for unsatisfactory results from the use of this printer despite item 3 above.

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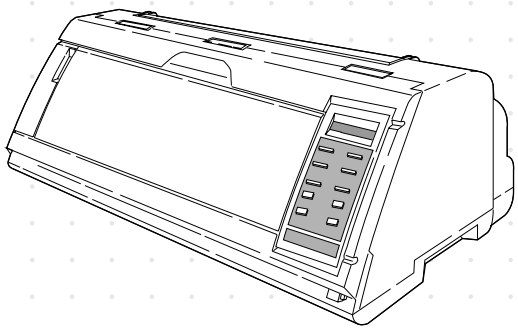
FB-900

OWNER'S MANUAL

24-pin Wide-Carriage Dot Matrix Printer



As an ENERGY STAR Partner, SEIKO Precision Inc. has determined that this product meets the ENERGY STAR guidelines for energy efficiency.

- Outline of the International ENERGY STAR Office Equipment Program -

The International ENERGY STAR Office Equipment Program is an international program that promotes energy saving through the use of computers and other office equipment. The program backs the development and dissemination of products with functions that effectively reduce energy consumption. It is an open system in which business proprietors can participate voluntarily. The targeted products are office equipment such as computers, displays, printers, facsimiles, and copiers. Their standards and logos uniform among participating nations.

SEIKO Precision Inc.

How to use this maunal

This manual describes the operation procedures for the 24-Pin Wide-Carriage Dot Matrix Printer. Read through this manual before using the printer. Keep this manual near the printer and refer to it whenever necessary.

Precautions for use

Sections 1 and 2 describe the basic procedures, including unpacking, setup and key operations. Install and setup the printer as described in these sections.

Section 3 and subsequent sections describe the functions and software commands of the printer. Refer to these sections when necessary.

Organization of this manual

This manual is organized as shown below.

Read this manual thoroughly to use the printer properly.

How to use this maunal

Symbols used in this manual

The symbols used in this manual have the following meanings.

⚠CAUTION

This symbol indicates that **personal injury** may occur if this caution warning is ignored.

★Caution

A caution symbol
Care should be taken in order to operate the printer correctly.

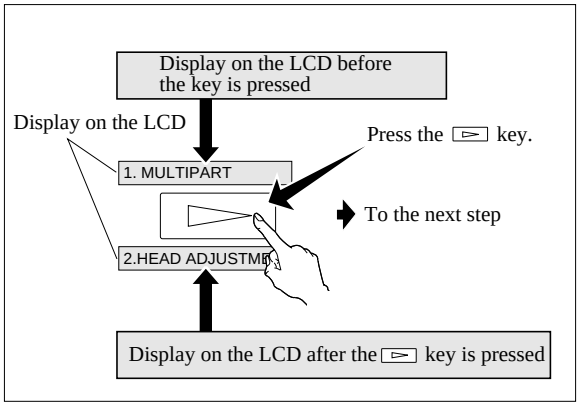
This symbol indicates **a note** that is useful for operation.

1.

2.

These item numbers show **the sequence of operation**. Perform the operations in the order shown.

3.



Contents

Contents

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Contents

● Major functions

This printer provides a wide range of print functions, as shown below:

◆ High-speed printing

Prining mode	Pirnt speed	Throughput
DRAFT (10 cpi)	603 CPS	206 LPM (132 columns)
LQ (10 cpi)	180 CPS	76 LPM (132 columns)
NLQ (10 cpi)	240 CPS	100 LPM (132 columns)
HQDR (10 cpi)	360CPS	135 LPM (132 columns)
S.D. (12 cpi only)	723 CPS	230 LPM (132 columns)
S.S.D. (15 cpi only)	904 CPS	270 LPM (132 columns)

◆ Original plus 8 multipart forms printing

The printer can print data on an original and up to eight copies. Copy density can be enhanced by selecting the DARK 1 (high pressure), DARK 2 (very high pressure) or AUTO (automatic print pressure adjustment by sensing the form set thickness). This setting is made in the MULTIPART function of the SETUP MODE.

✻ : If DARK 1 or DARK 2 is selected, the printing speed is reduced below the normal print speed to compensate for the extra energy required when printing in the high pressure print modes.

◆ Bar code printing function

A variety of bar codes of this printer may be printed. The narrow and wide spaces, narrow and wide bars, HRI, check character, bar code height, and rotation may be controlled with software commands. Customized bar codes may also be printed using the element funcion.

Registered bar code formats: Industrial 2 of 5, Interleaved 2 of 5, Matrix 2 of 5, Codabar, Code11, Code 39 , Code 93, Code 128, EAN-8, EAN-13, UPC-A, UPC-E, and Postnet

◆ Enlarged character printing

Characters can be enlarged (by up to 127 times as large x 127 times as large) using the enlarged character command unique to this printer. Software commands are used for control.

● Major functions

◆ Zooming function (Batch enlargement or reduction printing)

◆ Cut sheet paper manually loading

◆ Skew sensor

A built-in skew sensor detects any cut sheets that are skewed when loaded and ejects them.

◆ Automatic head adjustment

The printer employs an automatic paper thickness detection sensor, instead of the conventional paper thickness adjust lever, for optimum printing on all form sets.

◆ Automatic loading (For fanfold or cut sheet paper)

◆ Perforation cutting (For fanfold paper)

By pressing the TEAR OFF key, the perforation of fanfold paper is automatically fed to the paper cutter position.

◆ Paper parking (Switching fanfold paper and cut sheet paper)

If cut sheet paper is selected while fanfold paper is used, the fanfold paper is automatically fed back to the parking position (i.e., paper parking).

◆ Load adjustment

The pritning start position may be adjusted within a range from approximately 0 to 26.7 mm from the top of the paper. It is recommended that the printing position be in the center of the paper in the range of 4 mm or less from the the top of the paper.

◆ MICRO REVERSE LF and MICRO LF keys

These keys are useful for adjusting the printing start position and paper cutting position.

◆Automatic scroll (For fanfold paper)

If no data input is recived for a preset period (0.5, 1, 5, 10, 15 sec.), the perfpration of the current page of fanfold paper is fed to the paper cutter position.

◆Dual paper parking

If the optional rear tractor is used, two different types of fanfold paper may be used. Software command or the PAPER PATH key can be used for selection.

◆ Large 512KB communication buffer

◆ Setup memory for setting various functions on the LCD

◆ Ten resident fonts

◆ Line feed speed adjustment

Standard, 1/2 or 1/3 line feed speed is selectable for stable paper feeding even when multipart paper is used.

◆ Vertical alignment function

◆ Serial data transfer at a maximum rate of 38.4k bps

◆ Parallel and serial interfaces are standard

Parallel and serial interface are switched automatically.

◆ Printing stops immediately if the printer cover is inadvertently opened during printing.

◆ Enegy Star

● Caution

Safety Cautions

⚠CAUTION

★ Do not touch the print head immediately after printing because it is too hot.

★ Do not put your finger under the tractor cover while loading fanfold paper.

★ Use two hands and hold firmly at each end when lifting the cut sheet feeder. Personal injury can occur if the CSF unit is dropped.

Cautions in setting up

★Caution

★ Unpack the printer. Make sure that the printer body and all accessories are included in the package and no parts are damaged.

★ Do not use the printer in a location exposed to direct sunlight or close to a heater or other heat generating equipment.

★ Do not use the printer in a dusty location or any location subject to sudden changes in temperature and humidity.

★ Place the printer on a rigid, horizontal base in a location that is free of vibration.

★ Before connecting or disconnecting the interface cable, be sure to turn off the printer.

★ Do not connect the printer to a non-standard power source.

Cautions in operation

★Caution

★ Never try to print without a ribbon cassette installed and paper loaded.

★ Push the lock levers of both tractors to the LOCK positions firmly while loading fanfold paper or single sheet paper. It is for the purpose of setting paper path securely.

See page 3-1.

★ Do not turn off the printer during printing, as this may lead to a malfunction.

★ If any foreign matter gets into the printer, turn off the printer immediately and remove the foreign matter.

★ If the case or cover becomes dirty, clean it with a soft cloth moistened with a small quantity of neutral detergent diluted with water. Never use a hard cloth or volatile solvent such as alcohol, thinner, or benzine.

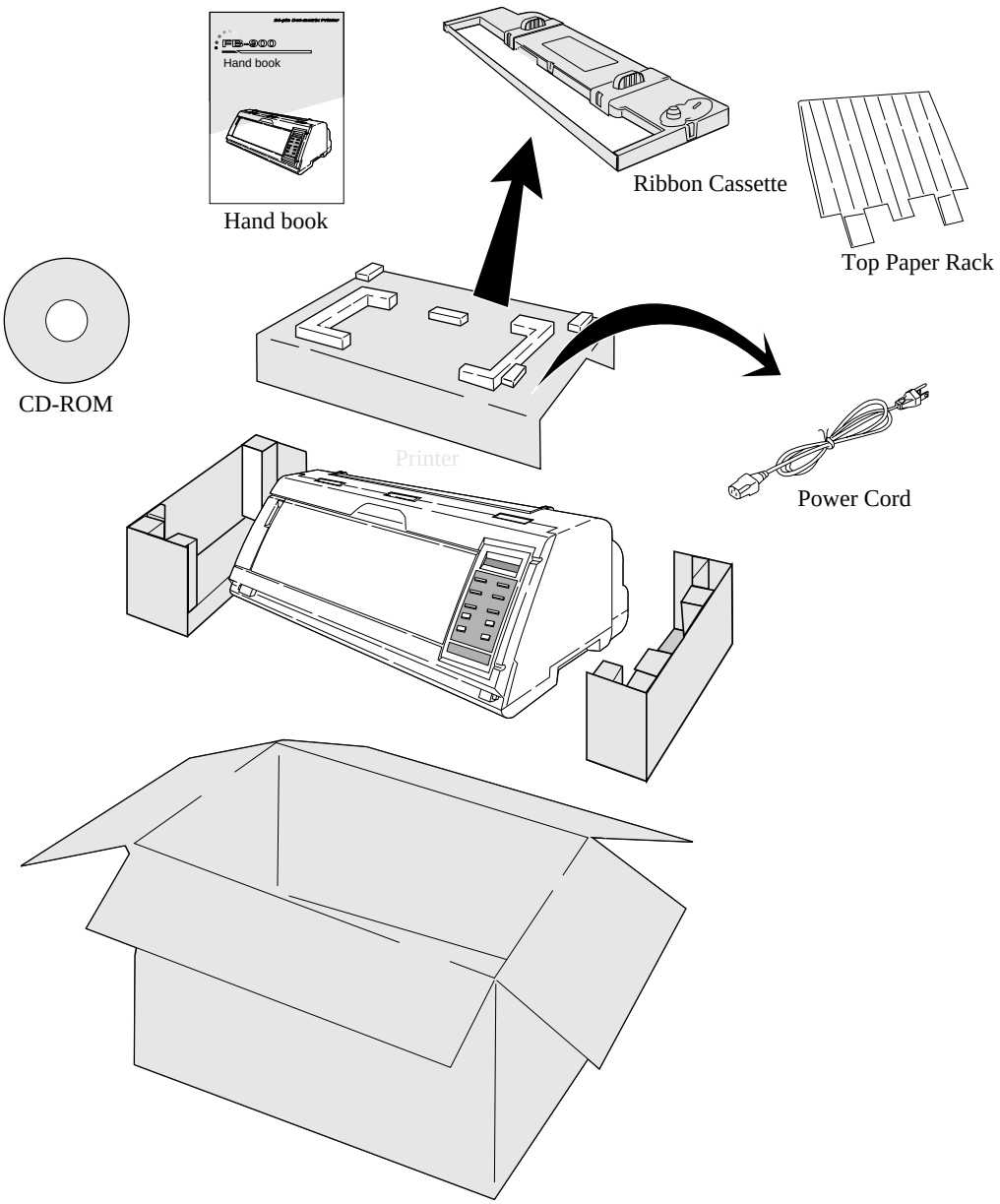
★ Take care not to twist the ribbon while installing the ribbon cassette.

● Unpacking the printer

Unpacking the printer

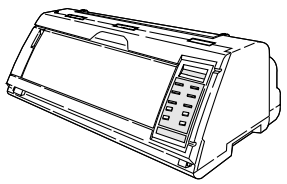
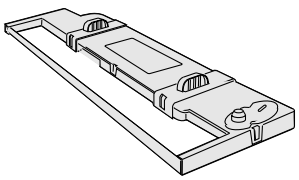
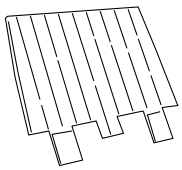
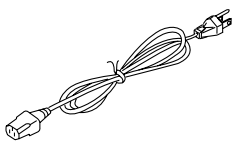
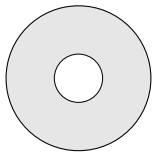
- *The printer body weights approximately **24 kg [52.9 lbs.]**. It should be taken out of the package by two or more persons.*

Make sure that no parts of the printer are damaged.



● Unpacking the printer

● *Check the carton for the following items:*

	**■Printer**
	**■Ribbon cassette** #SBP-1051
	**■Top paper rack** Attach the top paper rack to eject paper to the top of the printer. Sheets of paper are stacked on this rack.
	**■Power cord** Connect this power cord to an AC outlet.
	**■Hand book**
	**■CD-ROM** Driver-CD with Owner's Manual, printer driver software.

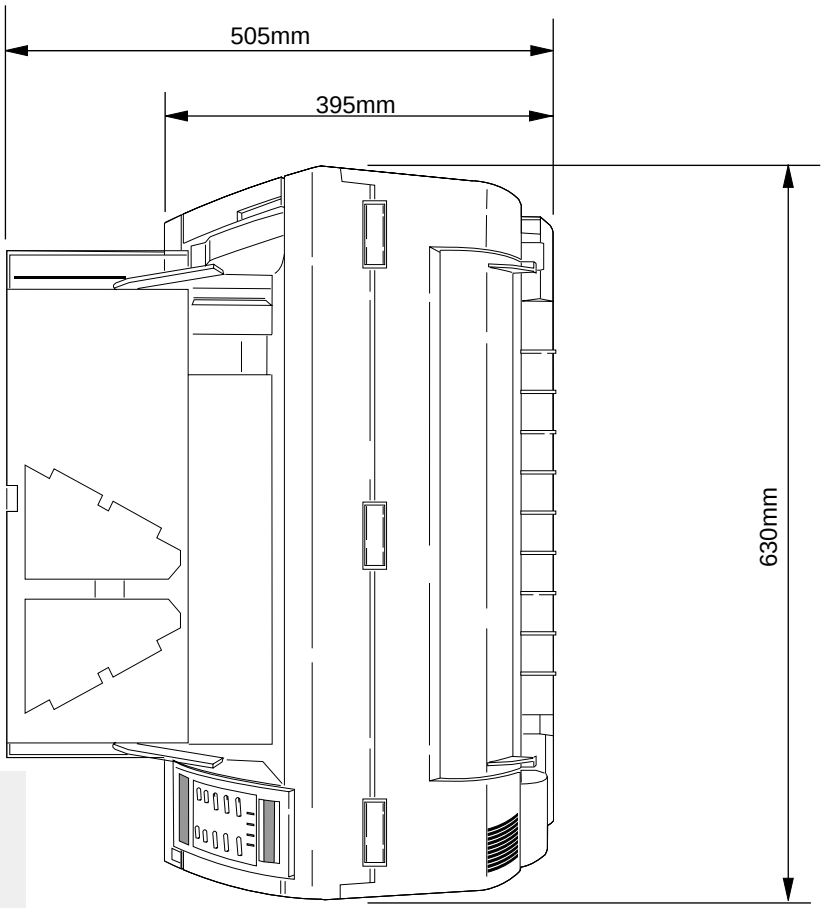
★Caution

If some part is not included in the package, contact the dealer where you purchased the printer.

Keep the carton and packaging material. They are needed for transporting the printer or returning it for service if ever required.

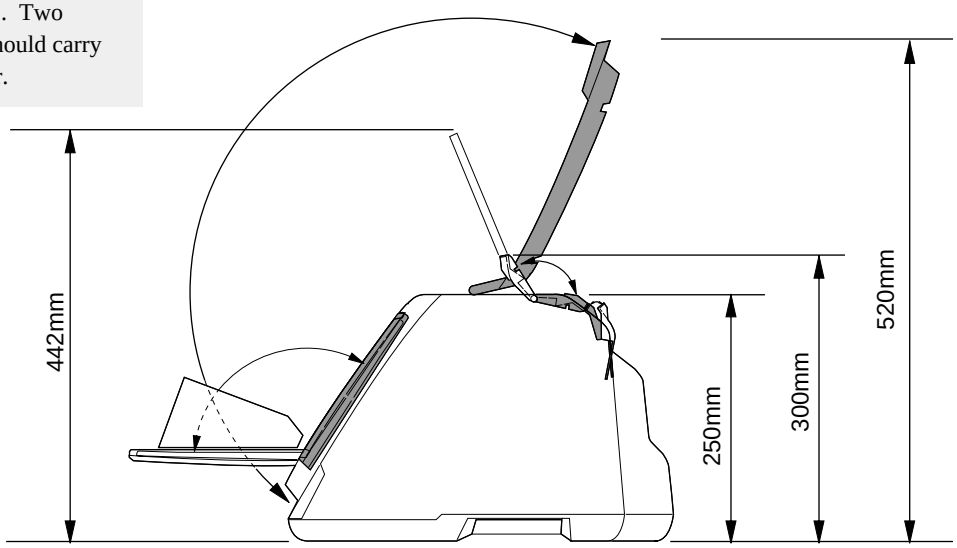
● Dimensions

● *The following drawings show the outside dimensions of the printer.*



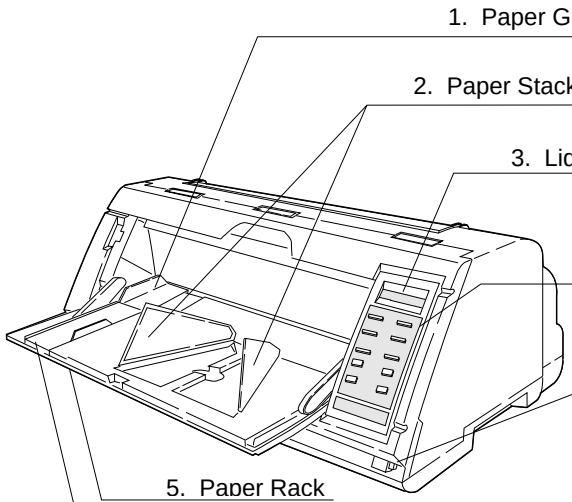
★Caution

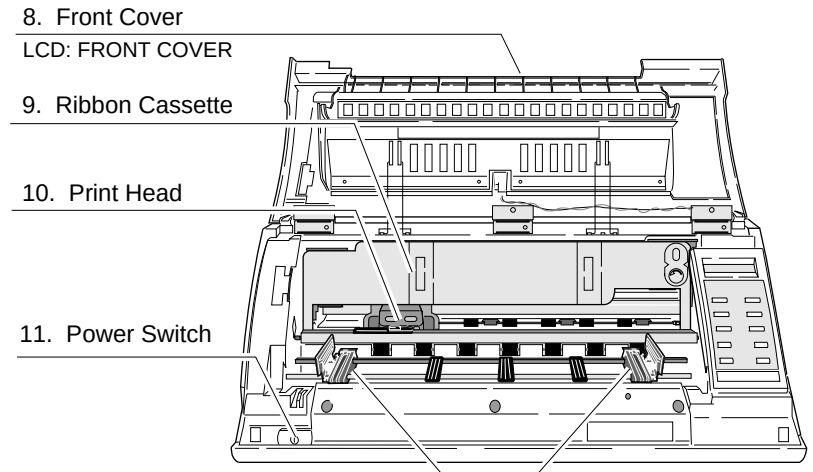
The weight of the printer including the ribbon cassette is approximately 24 kg [52.9 lbs.]. Two persons should carry the printer.

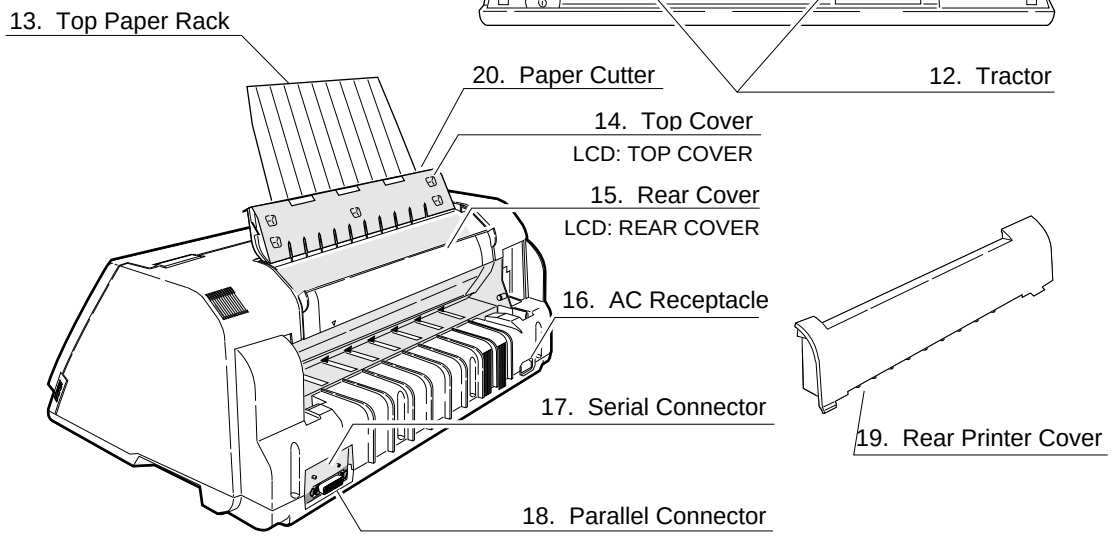


● Components and functions

Appearance of the printer







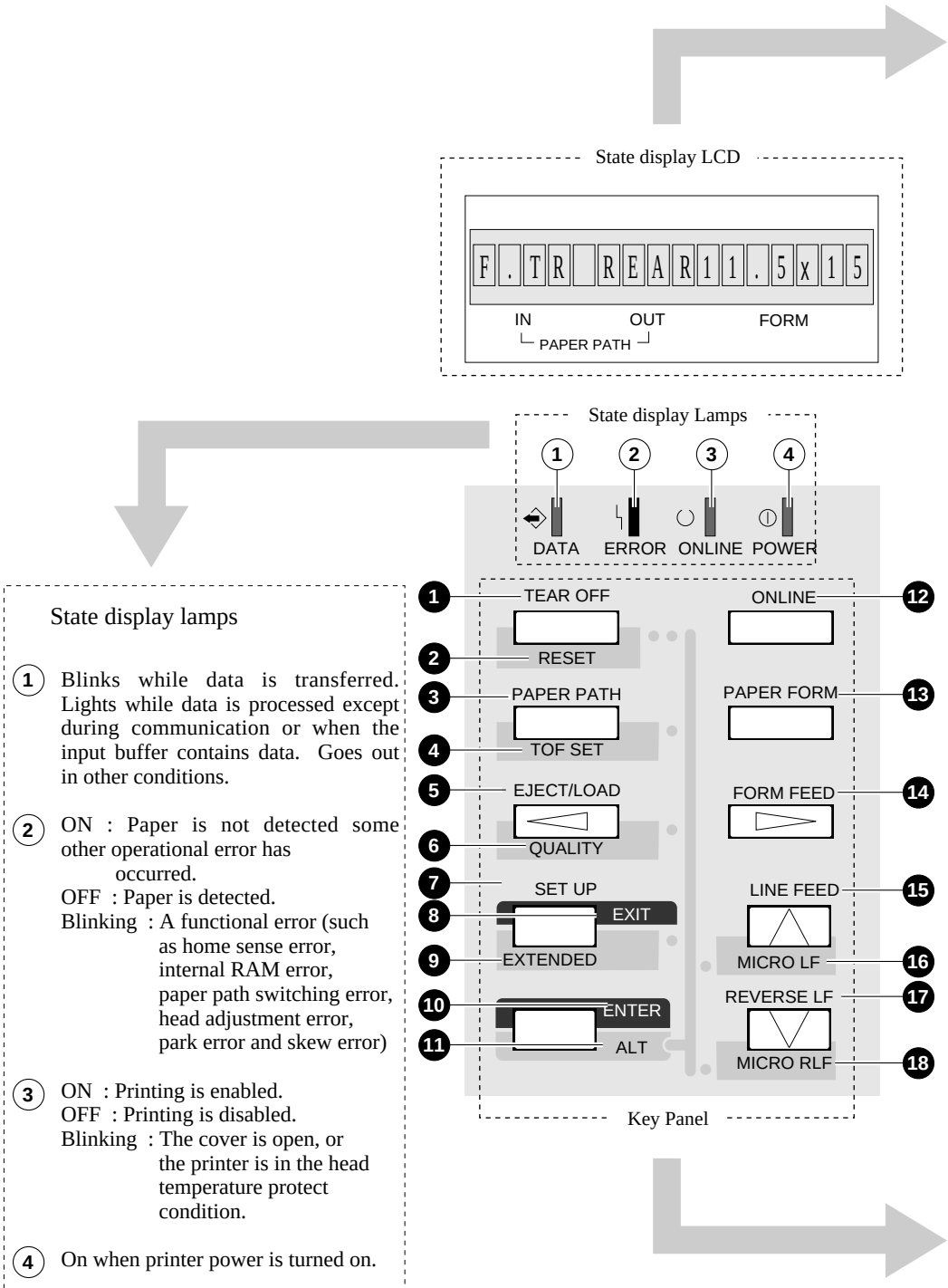
● Components and functions

Components and functions

The names and functions of the printer components are shown below.

Name (See drawing on left.)	Function
1. Paper guide	Adjusts the printing position when feeding paper manually.
2. Paper stacker	When the optional CSF is used, sheets of paper are ejected into this paper stacker. Both sides of the paper stacker should be set up.
3. Liquid crystal display (LCD)	Displays the condition and settings of the printer.
4. Control panel	Displays and sets the printer conditions.
5. Paper rack	If the "OPEN PAPER RACK" message is desplayed on the LCD when setting the paper path, open the paper rack.
6. Paper Support Guide	Guide the cut sheet at manuarl feeding.
7. Front Cover Lock release button 8. Front cover	To open the front cover, push the two buttons located on the lower corners of the front cover. To mount fanfold paper on tractors or replace the ribbon cassette, open the front cover.
9. Ribbon cassette	If printed characters vecome pale, replace the ribbon cassette.
10. Print head	Prints characters on paper.
11. Power switch	Pressing the power switch toggles the power on and off. ON: Switch depressed OFF: Switch released
12. Tractor	The tractor pins engage sprocket holes on both sides of fanfold paper for feeding.
13. Top paper rack	Ejected cut sheets are stacked on the top paper rack.
14. Top cover	Eject fanfold paper to the top of the printer. If the "OPEN TOP COVER" is displayed on the LCD when setting the paepr path, open the top cover.
15. Rear cover	To eject fanfaold paper to the top of the prieter, open the rear cover. If the "OPEN REAR COVER" is displayed on the LCD when setting the paper path, open the rear cover.
16. AC receptacle	Connect the power to this AC receptacle. The power is desigated on the rating plate on the back of the printer.
17. Serial connector	RS-232C interface connector
18. Parallel connector	Parallel interface connector
19. Rear printer cover	When the rear tractor or CSF is used, remove the rear printer cover.
20. Paper Cutter	Cut the paper after pressing the TEAR OFF key.

Control panel explanation 1



State display lamps

(1) Blinks while data is transferred. Lights while data is processed except during communication or when the input buffer contains data. Goes out in other conditions.

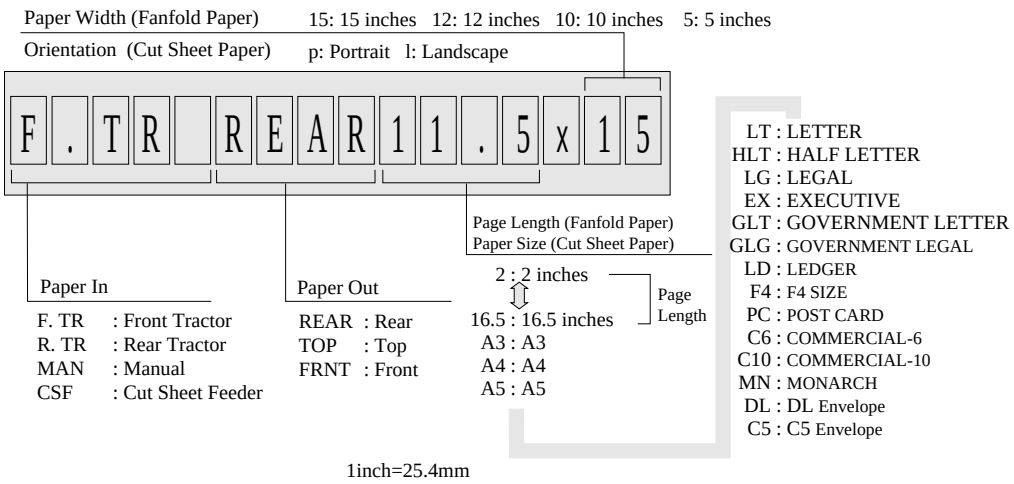
(2) ON : Paper is not detected some other operational error has occurred.
OFF : Paper is detected.
Blinking : A functional error (such as home sense error, internal RAM error, paper path switching error, head adjustment error, park error and skew error)

(3) ON : Printing is enabled.
OFF : Printing is disabled.
Blinking : The cover is open, or the printer is in the head temperature protect condition.

(4) On when printer power is turned on.

Control panel explanation 2

State display LCD



Keys on the panel

1 Feeds the perforation of fanfold paper to the paper cutter poistion. (For fanfold paper only)

2 (ALT + TEAR OFF keys)
Press these keys for two seconds or more. Release the keys when "INITIAL" is displayed on the LCD. The printer will be reset.

3 Changes the paper path display. To select the displayed paper path, press the ENTER key.

4 (ALT + PAPER PATH keys)
When paper is loaded, the current printing position is considered as the TOF position.

5 Loads paper or feed back paper to the parking position when fanfold paper is used. Loads or and ejects paper when cut sheet paper is uesd.

6 (ALT + EJECT/LOAD keys)
Changes the printing quality display. To select the displayed mode, press the ENTER key.

7 Enters the SETUP MODE.

8 Quits the SETUP MODE or EXTENDED SETUP MODE.

9 (ALT + SETUP keys)
Enters the EXTENDED SETUP MODE.

10 Selects an item displayed in the SETUP MODE, the EXTENDED SETUP MODE, setting the paper path, setting the paper form or setting the printing quality.

11 When pressing the corresponding key while you press the ALT key, one of the following functions is executed.

LINE FEED ⇨ MICRO LF
REVERSE LF ⇨ MICRO RLF
SET UP ⇨ EXTENDED SETUP
EJECT/LOAD ⇨ QUALITY
PAPER PATH ⇨ TOF SET
TEAR OFF ⇨ RESET

12 Changes the printing enable (online) state and printing disable (offline) state.

13 Changes the paper form display. To select the displayed paper form, press the ENTER key.

14 Feeds one page.

15 Feeds one line in the forward direction at a pitch of 1/6 inch.

16 (ALT + LINE FEED keys)
Feeds one line in the forward direction at a pitch of 1/360 inch.
(Micro line feed)

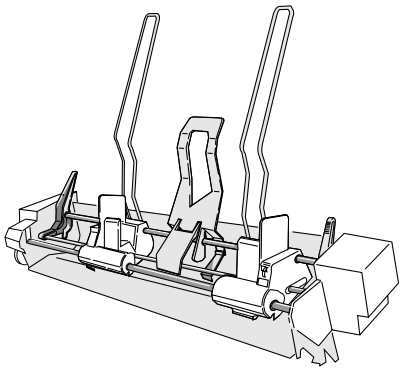
17 Feeds one line in the reverse direction at a pitch of 1/6 inch.

18 (ALT + REVERSE LF keys)
Feeds one line in the reverse direction at a pitch of 1/360 inch.
(Micro reverse line feed)

● Options and consumables

Cut sheet feeder

#FB-84009

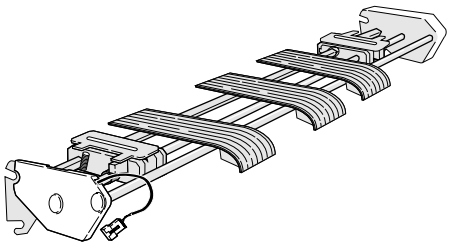


The cut sheet feeder feeds cut sheets automatically and continuously. A maximum of 150 sheets of paper (55 kg paper) may be set in the holder of the cut sheet feeder.

For attaching the cut sheet feeder, see pages 1-22 to 1-26.

Rear tractor

#FB-84008

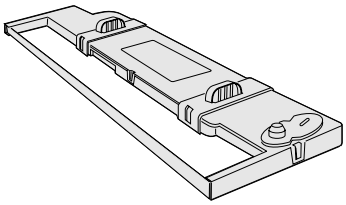


Dual paper parking is available when the rear tractor is used. Two different types of paper may be set onto the front and rear tractors and may be selected by issuing software commands or pressing the PAPER PATH key to change the paper paths.

For attaching the rear tractor, see pages 1-16 to 1-18.

Ribbon cassette

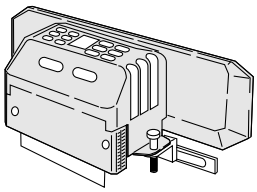
#SBP-1051



For attaching the ribbon cassette, see pages 1-2 and 1-3.

Print head

#FB-90090



For mounting the print head, refer to the manual supplied with the print head.

RS-422A interface unit

#FB-84010

This unit enables data to be transferred through an RS-422A interface. This is a built-in unit that is installed by the dealer. If the RS-422A interface unit is installed, the RS-232C interface cannot be used.

Current loop interface unit

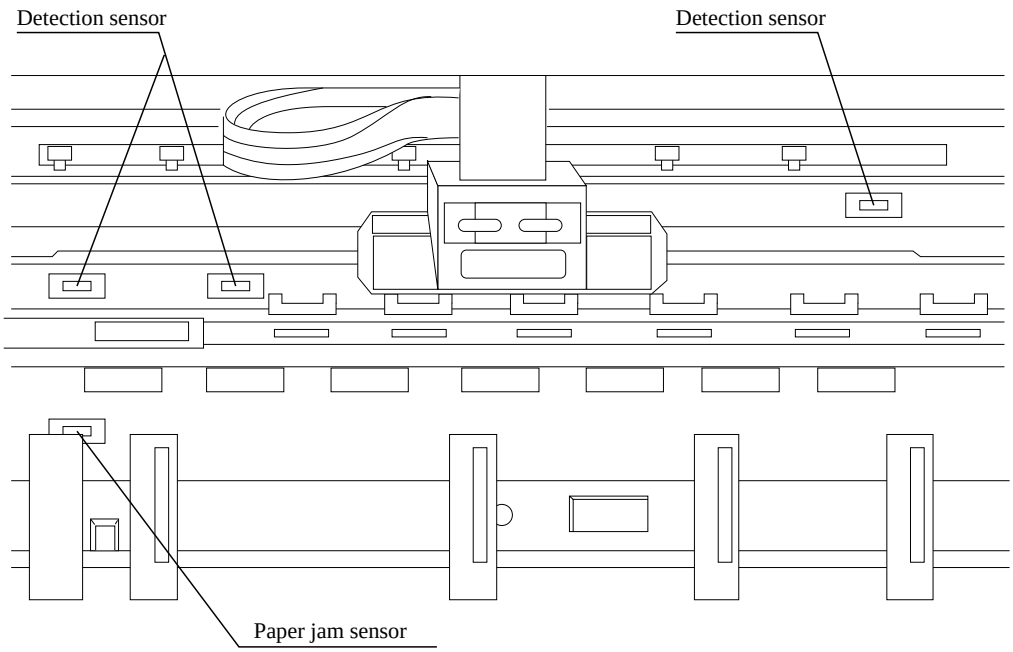
#FB-84011

This unit converts serial data into 20 mA current loop signals. This is a built-in unit that is installed by the dealer. If the current loop interface unit is installed, the RS-232C interface cannot be used.

● Maintenance

Periodic maintenance and inspection is recommended to keep the printer in good condition.

- ***Remove paper particles or dust adhered to the detection sensor cover upper surfaces (three locations) inside the printer and to the paper jam sensor surface (one location), by wiping with a soft clth or a cotton bud. The paper particles or dust on the sensor surfaces may cause faulty operation.***



★Caution *Do not use a hard brush to clean the sensor cover and the sensor surface. The brush may scratch the surface.*

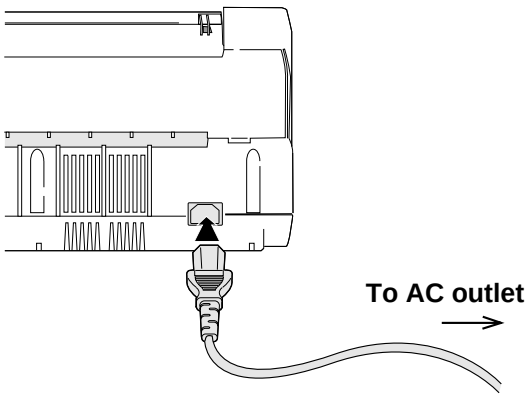
⚠ Caution *When opening the front cover just after the printer has been in operation, do not touch the printer heard which is hot and may cause burns.*

1. Setting up the printer

★Caution *Connect the AC power plug to an AC outlet of the voltage designated on the rating plate on the back of the pirnter.*

● Connecting the printer to Power

● ***Make sure that the power switch is set to off. Connect the printer with the supplied power cord to an AC outlet.***



● ***The AC outlet shall be installed near the printer and shall be easily accessible.***

Once the printer is turned off, wait for three seconds or more before turning it on again. If the printer is turned on again within three seconds after turning it off, it may malfunction due to an initializtion failure.

● Installing the ribbon cassette

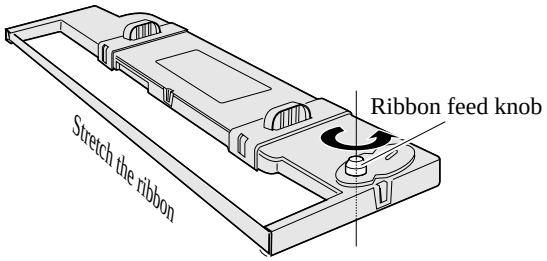
Installing the ribbon cassette

Approximately 15 seconds after the printer is rutned on, the print head will move to the left.

★Caution

Use the specified ribbon cassette . When power is turned off, data in the buffer is lost. Output all data before turning off the printer.

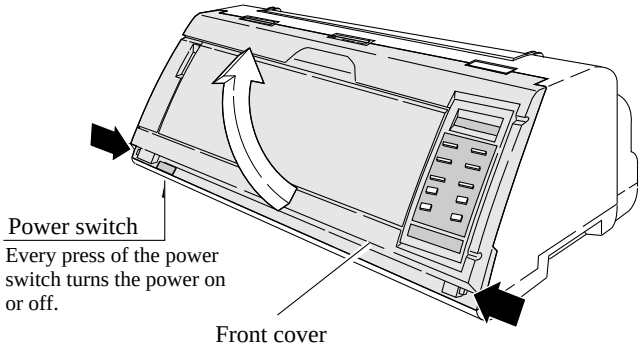
1. ***Turn the ribbon feed knob on the ribbon cassette counterclockwise to stretch the ribbon tight.***



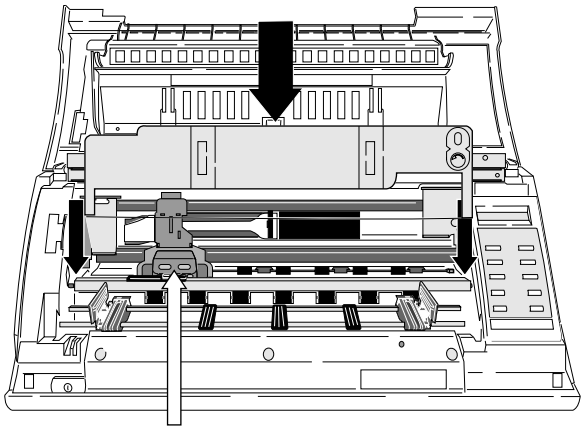
2. ***Turn off the power. Open the front cover.***

★Caution

Open the front cover by pressing both side locks with both hands. Hold both sides with both hands to raise it upward slowly. When closing the front cover, hold both sides with both hands to pull it down slowly. Press the front cover to lock it.



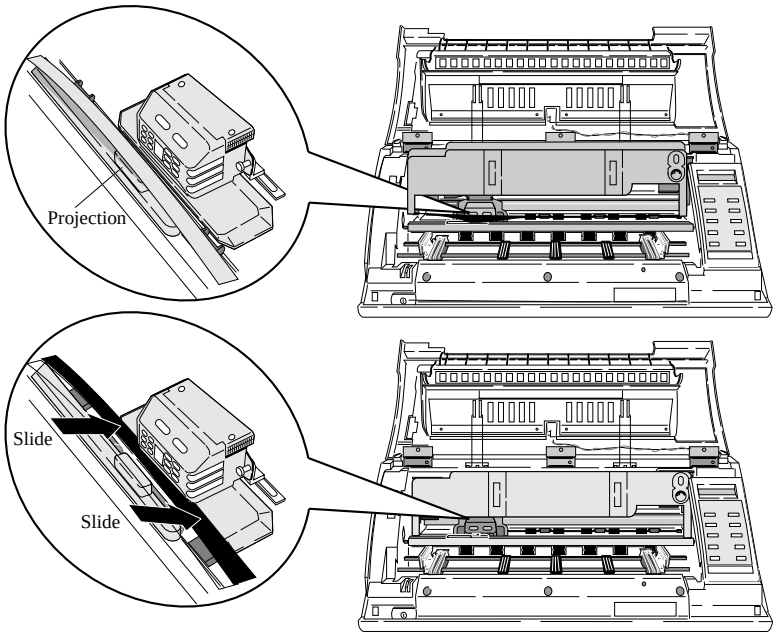
3. ***Attach the ribbon cassette as shown below.***



⚠CAUTION Do not touch the print head immediately after printing becouse it is too hot.

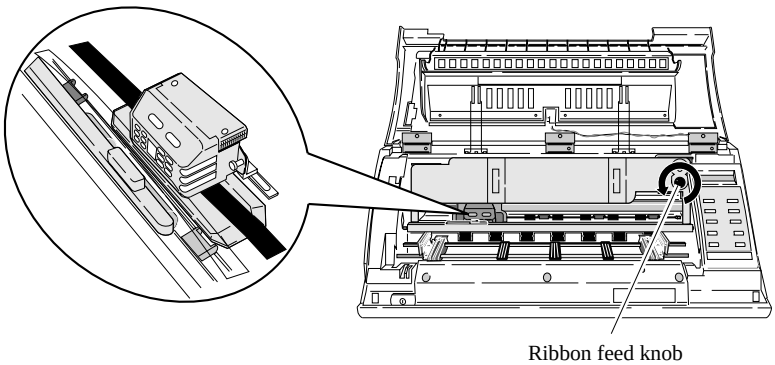
● Installing the ribbon cassette

4. ***Slide the ribbon toward the print head so that the ribbon is lightly in contact with the projection of the print head.***



5. ***Attach the cassette firmly to the mounting plate. Turn the ribbon feed knob counterclockwise.***

Fit the right and left projections on the mounting plate to the holes in the bottom of the ribbon cassette.



6. ***Close the front cover.***

Pull down the front cover slowly toward you with both hands from both sides to close it.

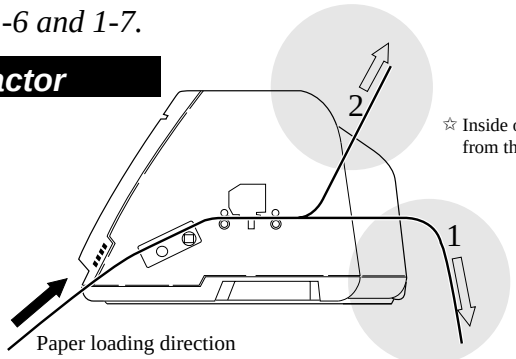
Push down on both sides at the bottom of the front cover to close it firmy. Two hands are required to engage and lockthe front cover on both sides.

● Paper path

Path of fanfold paper

The three fanfold paper paths shown below are available. For selecting a paper path, See pages 1-6 and 1-7.

Front tractor



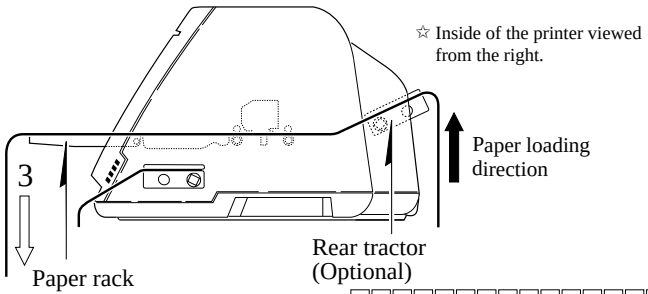
1. Front loading, rear ejection F.TR REAR 11x15

   This paper path applies a smaller load to the paper. This is recommended for printing on thick paper (such as multipart paper or label sheets).

2. Front loading, top ejection F.TR TOP 11x15

   This paper path is recommended if fanfold paper is cut along the perforation frequently.
   The perforation is automatically fed to the paper cutter of the top cover by pressing the TEAR OFF key so that the paper may be torn off easily.
   To cut the paper, hold the upper cover firmly with one hand and tear the paper towards you.

Rear tractor (Option)



3. Rear loading, front ejection R.TR FRNT 11x15

   Dual paper parking is available when the optional rear tractor is used. Two types of fanfold paper of different size and thickness may be used and selected from the control panel or by issuing a software command (ESC EM or software setup*) from the computer.

   * Software setup commands
   The software setup commands are unique to this printer. Most functions available on the SETUP MODE and EXTENDED SETUP MODE can may

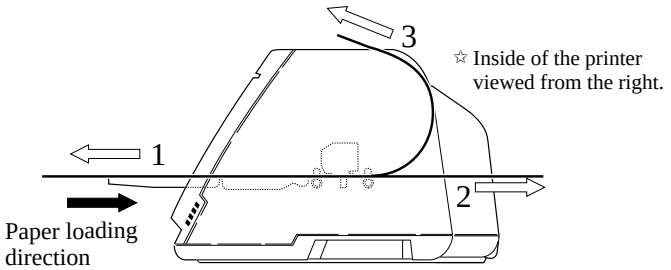
● Paper path

Path of cut sheet paper

The five cut sheet paper paths shown below are available.

Manual paper feeding

●Sheets of paper are loaded manually one at a time.



1. Front loading, front ejection MAN FRNT A4 p

   This paper path applies a lighter load on feeding paper. It is recommended for printing on thick paper (such as multipart paper, postcards, and envelopes).

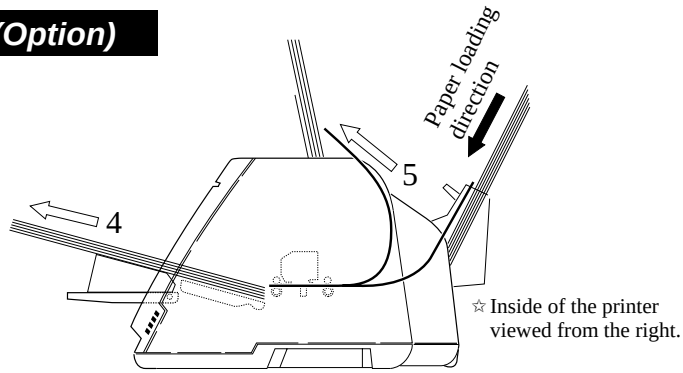
2. Front loading, rear ejection MAN REAR A4 p

   This paper path applies a lighter load on feeding paper. This is recommended for printing on thick paper (such as multipart paper, postcards, and envelopes).

3. Front loading, top ejection MAN TOP A4 p

   This paper path enables face-down stacking.

Cut sheet paper (Option)



4. CSF loading, front ejection CSF FRNT A4 p

   This paper path is suitable for thick paper (such as multipart paper, postcards and so on). Sheets of paper are stacked face-up.

5. CSF loading, top ejection CSF TOP A4 p

   This paper path enables face-down stacking.

● Selecting the Paper path

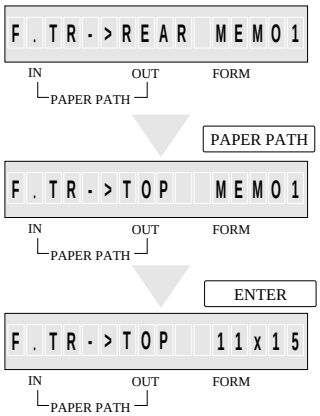
The following shows an example of changing the paper path for reference. The example shown below changes front tractor loading and rear ejection to the front tractor loading and top ejection.

Selecting the paper path

1. Press the PAPER PATH key.

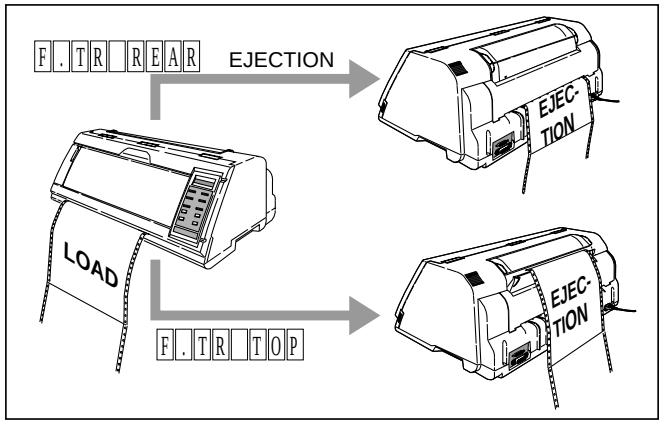
The paper path currently selected is displayed.

2. Continue to press the PAPER PARH key until "PATH: F. TR. -> TOP " is displayed. Press the ENTER key.

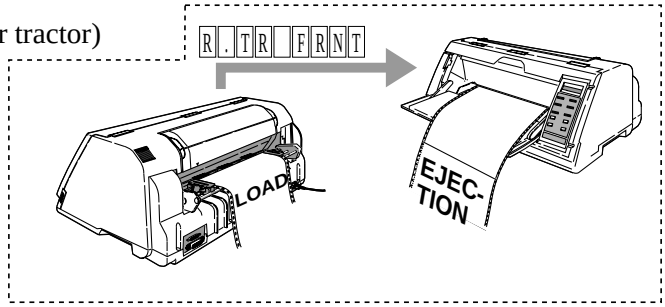


● Selecting the paper path

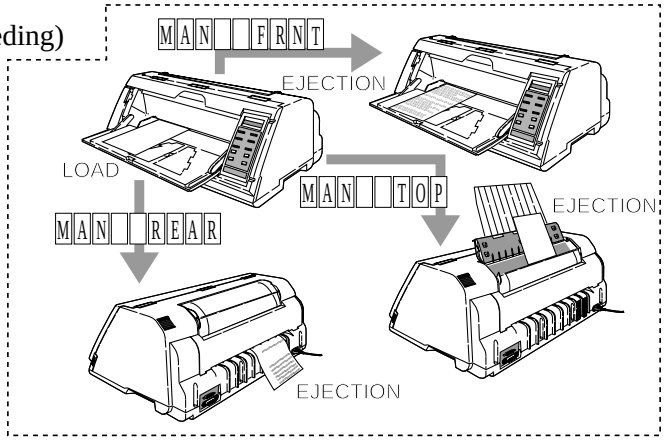
◆Fanfold paper



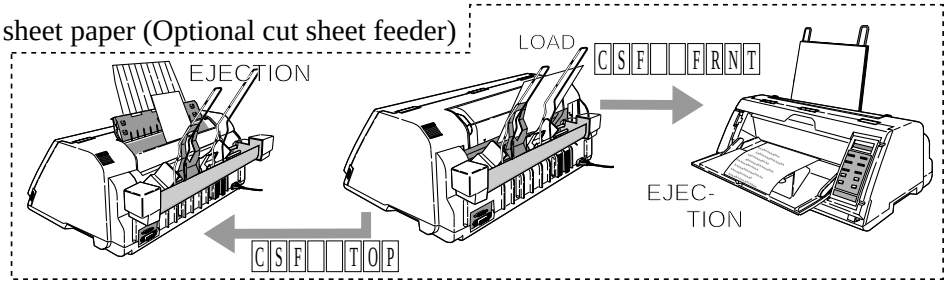
◆Fanfold paper (Optional rear tractor)



◆Cut sheet paper (Manual feeding)



◆Cut sheet paper (Optional cut sheet feeder)

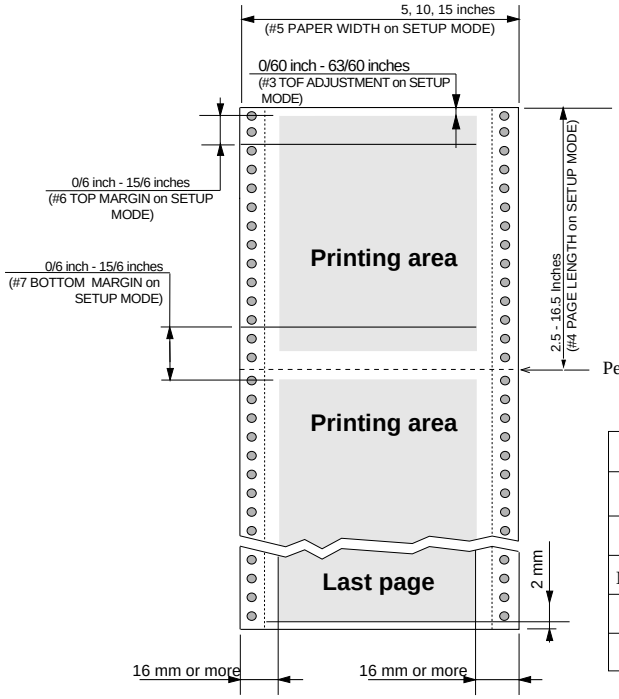


The optional CSF and rear tractor cannot be used together. If the optional CSF or rear tractor is installed, enable it by using the EXTENDED SETUP MODE (#60 option). If the option is not enabled on the EXTENDED SETUP MODE, the paper path cannot be selected.

● Paper

When fanfold paper is used, set the page length (#4 PAGE LENGTH) and paper width (#5 PAPER WIDTH) on the SETUP MODE. For setting, see page 1-12.

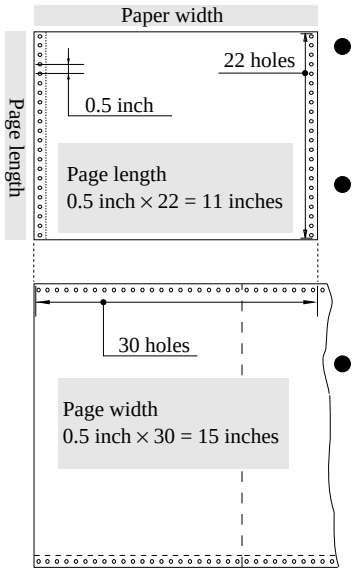
Printing area on fanfold paper



Sizes of fanfold paper are generally shown in inches. One inch is 25.4 mm.

Paper form	Single	Multipart form	Label form
Paper width	Front tractor 3 ~ 16 inches (76 ~ 406mm) Rear tractor 3 ~ 16.5 inches (76 ~ 420mm)		
Paper quality	Wood-free paper		
Number of sheets	1	9 or less	1
Thickness	0.08 ~ 0.12mm	0.12 ~ 0.59mm	0.12 ~ 0.18mm
Paper weight	55 ~ 90kg	34kg x 9P	125kg or less

Calculating sizes of fanfold paper

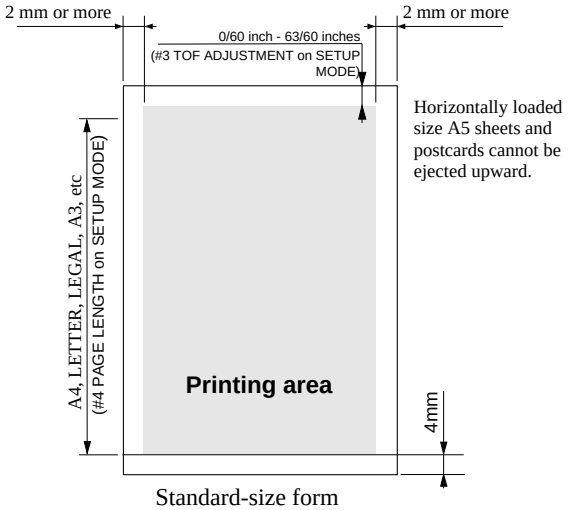


- Sprocket holes are made on both sides of fanfold paper at an interval of 0.5 inch, which can be used to calculate the page length and width.
- The page length can be determined by multiplying the number of sprocket holes per page by 0.5 inch.
- To find the paper width, use another sheet of fanfold paper and count the number of sprocket holes.

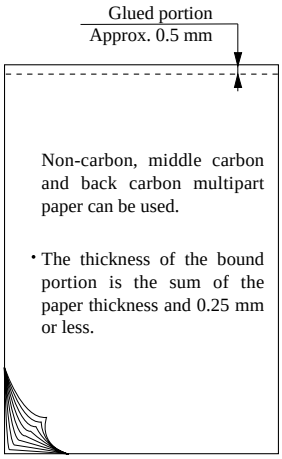
● Paper

Printing area on cut sheet paper

Specify the paper size of cut sheet paper using #4 PAGE LENGTH on the SETUP MODE. For setting, see page 1-19.



Standard-size form



Multipart paper

● Use wood-free paper. Cut sheet paper can be loaded manually or by using the CSF.

Envelopes and horizontally set post cards cannot be printed by using the CSF.

● Manual paper feeding

Paper form	Single	Multipart form	Card	Envelope
Paper quality	Wood-free paper	Carbon or non-carbon	Wood-free paper	
Number of sheets	1	9 or less	1	1
Thickness (mm)	0.08 ~ 0.12	0.12 ~ 0.59	0.08 ~ 0.8	0.5 or less
Paper weight	55 ~ 90kg	34kg x 9P	—	39 ~ 78kg

● CSF paper feeing

Paper form	Single	Multipart form	Card
Paper quality	Wood-free paper	Non-carbon	Wood-free paper
Number of sheets	1	6 or less	1
Thickness (mm)	0.08 ~ 0.11	0.12 ~ 0.39	0.08 ~ 0.22
Paper weight	55 ~ 78Kg	34kg x 6P	55 ~ 165kg
Paper length	140mm and over		

● Available standards-size forms

○

Paper Size			Manual Feeding		CSF Feeding	
			Portrait	Landscape	Portrait	Landscape
Regular size form	A3	(297mm X 420mm)	❋2 ○	○	—	○
	A4	(210mm X 297mm)	○	○	○	○
	A5	(148mm X 210mm)	○	❋1 ○	○	○
	Letter	(8.5" X 11")	○	○	○	○
	Half Letter	(5.5" X 8.5")	○	❋1 ○	○	○
	Legal	(8.5" X 14")	○	○	○	○
	Executive	(7.25" X 10.5")	○	○	○	○
	Government Legal	(8.5" X 13")	○	○	○	○
	Government Letter	(8" X 10.5")	○	○	○	○
	Ledger	(11" X 17")	❋2 ○	—	—	—
	F4	(210mm X 330mm)	○	○	○	○
Post card		(100mm X 148mm)	❋1 ○	❋1 ○	○	—
Envelope	Commercial -6	(6 1/2" X 3 5/8")	○	❋1 ○	—	—
	Commercial -10	(9 1/2" X 4 1/8")	○	❋1 ○	—	—
	Monarch	(3 7/8" X 7 1/2")	○	❋1 ○	—	—
	DL	(110mm X 220mm)	○	❋1 ○	—	—
	C5	(162mm X 229mm)	○	○	—	—

❋1 Paper length 150mm (5.9inch) or less can not be ejected to the top.

❋2 A3 (portrait) or Ledger (portrait) can not be stacked on the top paper rack.

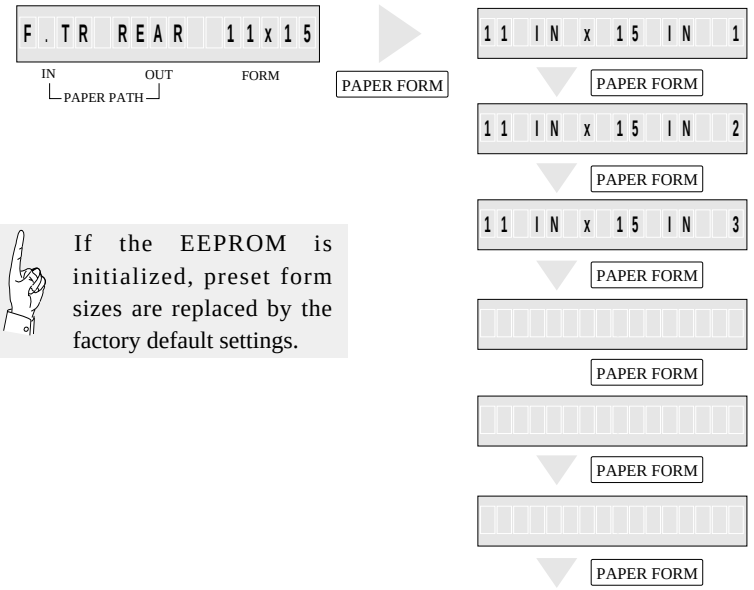
● Selecting the paper form

Paper form selection 1

Sizes of up to six frequently-used forms may be stored in MEMO 1 to MEMO 6 in the internal memory. Any of the stored sizes may be read out of the memory with the PAPER FORM key whenever necessary.

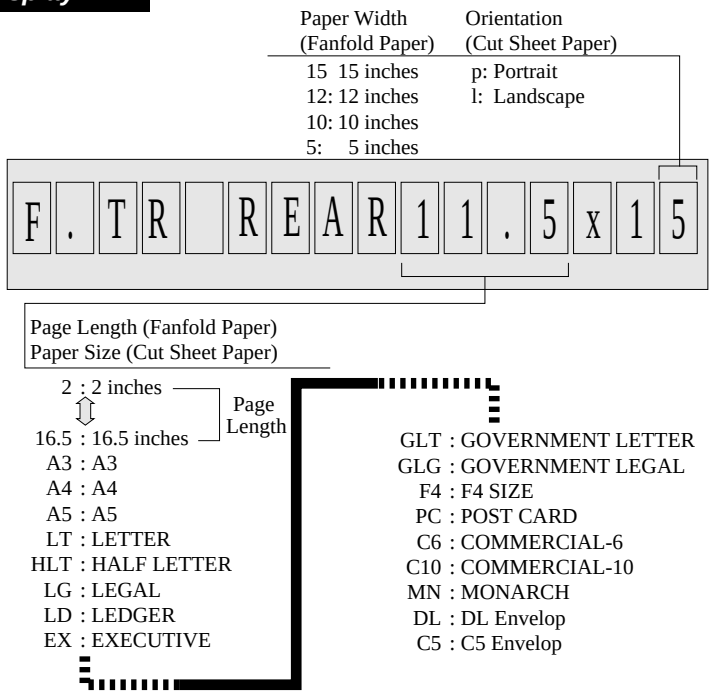
See page 1-31.

Factory default setting



If the EEPROM is initialized, preset form sizes are replaced by the factory default settings.

Liquid crystal display



● Selecting the paper form

Paper form selection 2

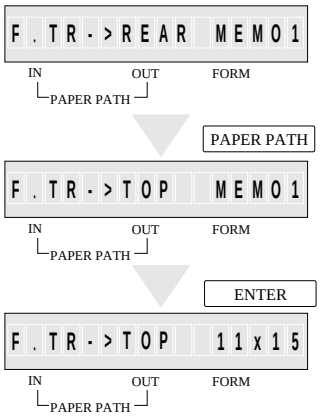
The following shows an example of setting form size for reference. The example below shows how to change the size stored in MEMO 3 (page length: 11 inches, paper width: 15 inches) to an A5 portrait form.

Specifying form size

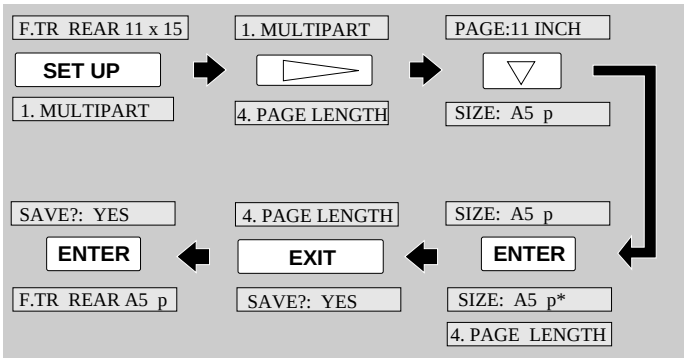
1. ***Press the PAPER FORM key.***

The paper size currently selected is displayed.

2. ***Continue to press the PAPER FORM key to select MEMO 3 as shown below.***



3. ***Specify the intended form size as shown below.***



4. ***The A5 portrait form is set in MEMO 3.***

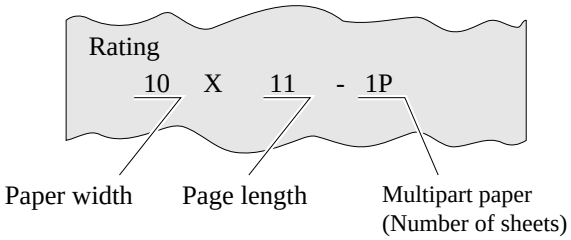
● Loading fanfold paper (Front tractor)

This section describes how to set fanfold paper for front loading and rear ejection or front loading and top ejection. Before setting fanfold paper, it is necessary to specify the page length, paper width, etc. on the SETUP MODE.

Fanfold paper setting procedures 1

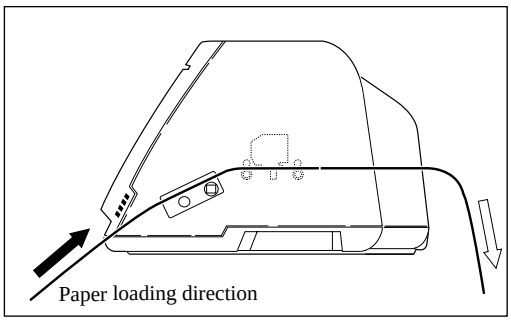
1. Check the rating of the fanfold paper to be used that is marked on the side of the package.

Fanfold paper rating marked on side of package (Example)

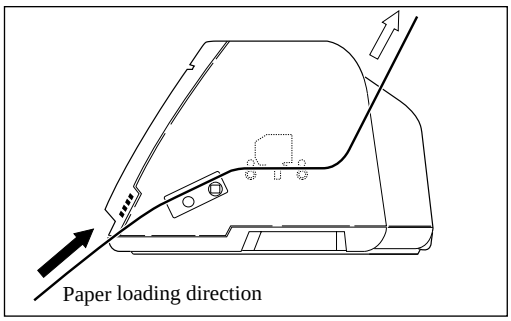


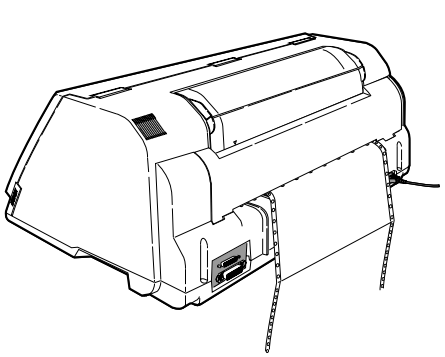
2. Press the PAPER PATH key to select the desired paper path.

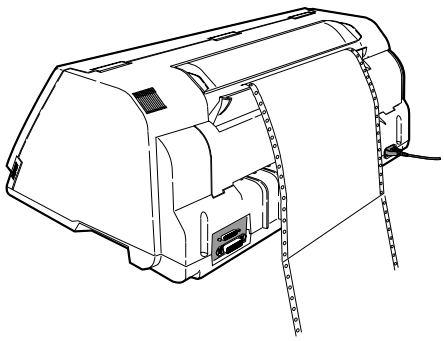
F.TR REAR 11 x 15



F.TR TOP 11 x 15



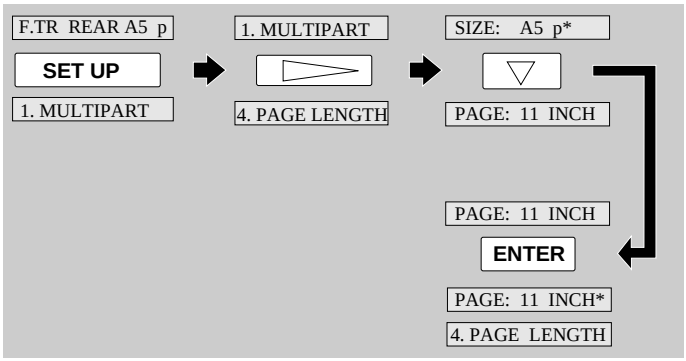




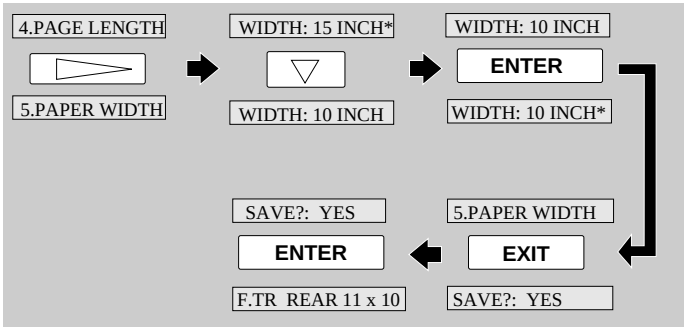
● Loading fanfold paper (Front tractor)

Fanfold paper setting procedures 2

3. ***Specify the page length using #4 PAGE LENGTH on the SETUP MODE as shown below.***



4. ***Then specify the paepr width using #5 PAPER WIDTH on the SETUP MODE as shown below.***



● Loading fanfold paper (Front tractor)

Fanfold paper setting procedures 3

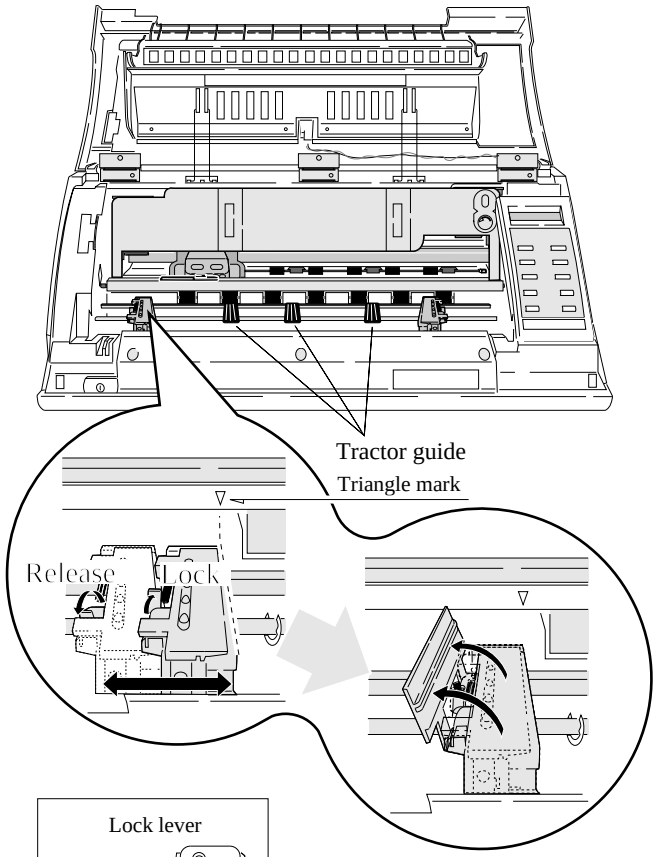
★Caution

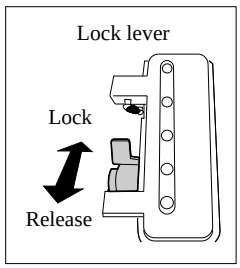
Open the front cover by pressing both side locks with both hands. Hold both sides with both hands to raise it upward slowly. When closing the front cover, hold both sides with both hands to pull it down slowly. Press the front cover to lock it.

In order to load less than 5 inch width fanfold paper, remove one or two tractor guides.

5. ***Open the front cover.***

6. ***Lift to release the tractor lock lever. Move the left tractor to the triangle mark. Then push down on the lever.***





★Caution

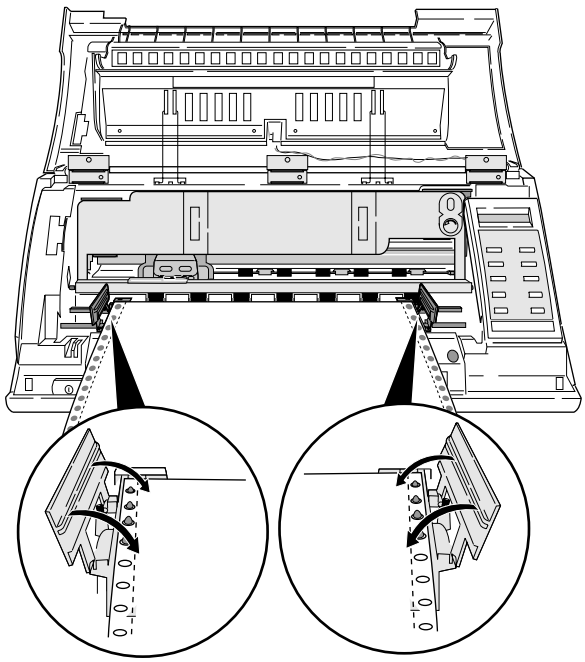
Push the lock levers of both tractors to the LOCK positions firmly. If the lock levers protrude from the tractor covers, paper will not be fed properly, resulting in paper jamming.

⚠CAUTION Do not put your finger under the tractor cover.

● Loading fanfold paper (Front tractor)

Fanfold paper setting procedures 4

7. *Open the tractor covers on both sides. Fit the sprocket holes on both sides of the fanfold paper to the tractor pins. Then close the tractor covers. Push down the lock lever of the right tractor.*



By default, paper is fed to the 14/60 inch (approximately 6 mm) position from the top. This position may be freely adjusted on the SETUP MODE between 0/60 inch (0 mm) and 63/60 inches (approximately 26.7 mm) from the top of paper or the perforation at a pitch of 1/60 inch.

★Caution when setting the paper on the tracter, Take care not to over tighten or allow too much slack. Over tightening deforms the guide holes and the paper may become disconnected from the tracter during printing. Too much slack may cause the paper to become clogged when it is inserted.

★Caution The TOF position can be set from 0/60 inch (0 mm). However, if this position is set to 0/60 to 9/60 inch, paper may jam, depending on the paper condition. Normally, it is recommended that the TOF position be adjusted to the 14/60 inch (approximately 6 mm) position from the top of the paper.

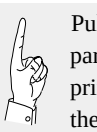
8. *Close the front cover. Hold both sides of the front cover with both hands and pull down the front cover slowly. Press the front cover to lock it.*

● Loading fanfold paper (Rear tractor)

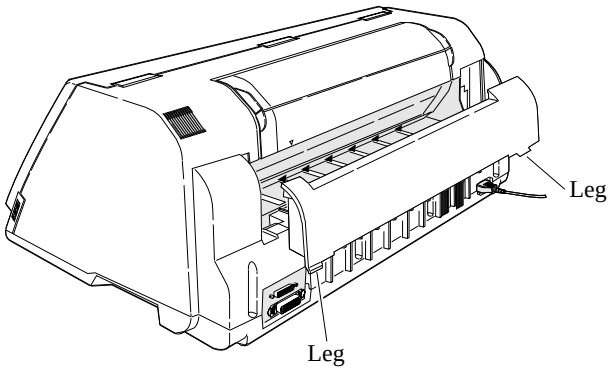
Dual paper parking is available if the optional rear tractor is used. This funcion enables two types of fanfold paper of different formats to be set together and selected with the PAPER PATH key on the printer or by issuing a setup command from the computer.

Paper setting procedures usig rear tarctor 1

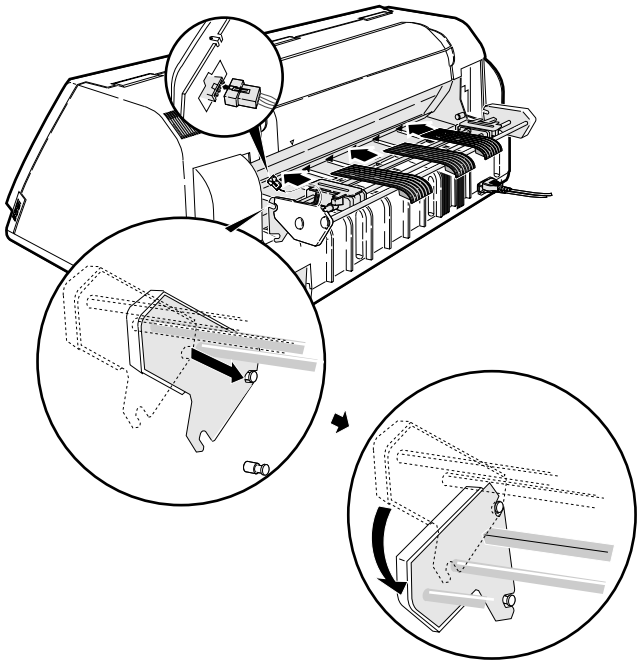
1. ***Detach the rear printer cover from the printer.***



Pull the upper part of the rear printer cover to the front to detach it from the printer. When attaching the rear printer cover, insert the two legs into the printer and then press the rear printer cover to lock it.



2. ***Install the rear tractor, and plug in the connector.***

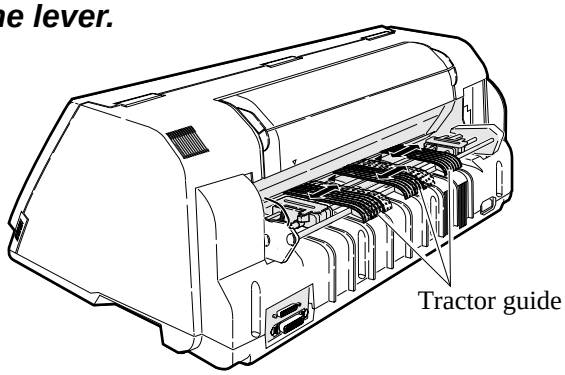


● Loading fanfold paper (Rear tractor)

Paper setting procedures usig rear tarctor 2

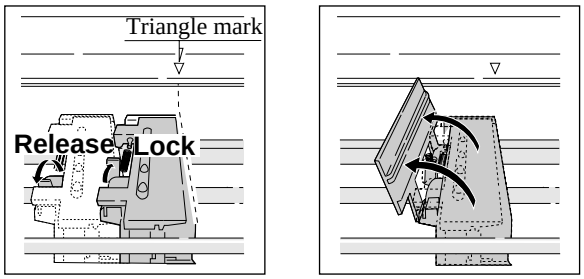
3. ***Adjust the tractor guides so that they are located at almost the same interval. Lift and release the tractor lock levers. Move the left tractor to the triangle mark, then push down the lever.***

In order to load less than 8 inch width fanfold paper, remove one or two tractor guides.



★Caution

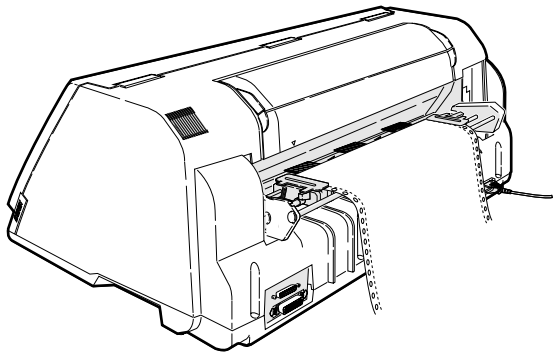
Push the lock levers of both tractors to the LOCK positions firmly.



4. ***Set fanfold paper onto the rear tractor. Push down the lock lever of the right rear tractor.***

⚠CAUTION

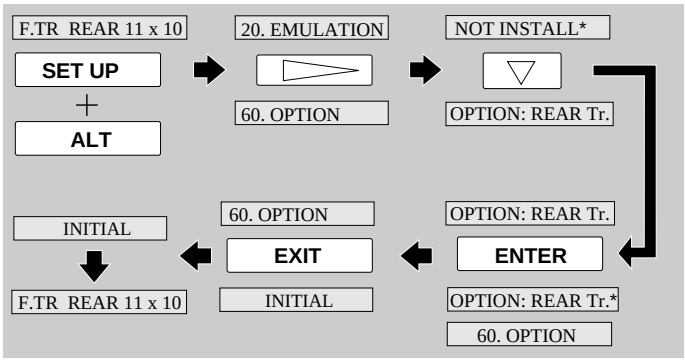
Do not put your finger under the tractor cover.



● Loading fanfold paper (Rear tractor)

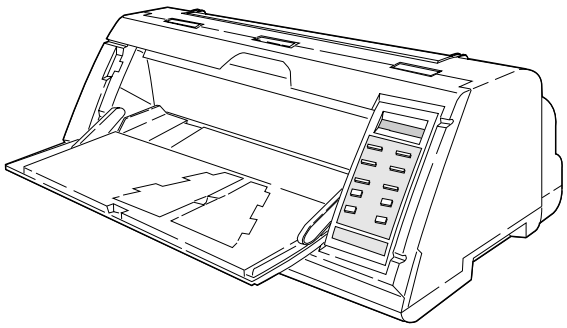
Paper setting procedures usig rear tarctor 3

5. ***Enter the EXTENDED SETUP MODE. Select the rear tractor on this menu so that the printer recognizes that the rear tractor is in use.***



6. ***Press the PAPER PATH key to select REAR Tr FRONT.***

7. ***"OPEN PAPER RACK" will be displayed. Open the paper rack.***

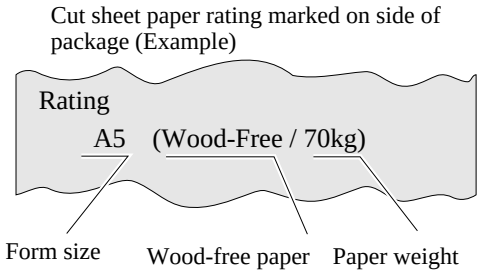


● Loading cut paper *(manual paper feeding)*

Select Manual feeding procedures 1

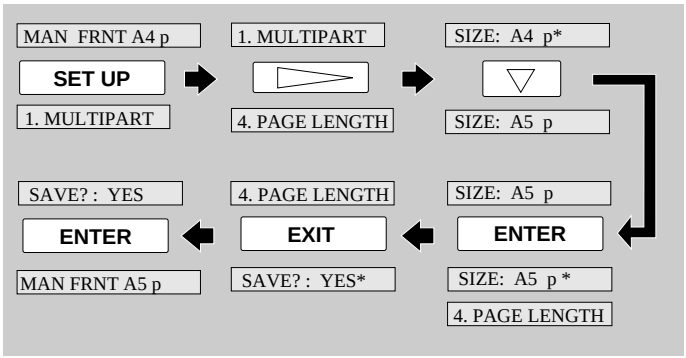
This section describes how to load cut sheet paper, showing an example of using an A5 portrait form. Before loading a cut sheet, it is necessary to specify the paper size on the SETUP MODE. Be sure to load cut sheet paper one sheet at a

1. ***Check the rating of the cut sheet paper to be used that is marked on the side of the package.***



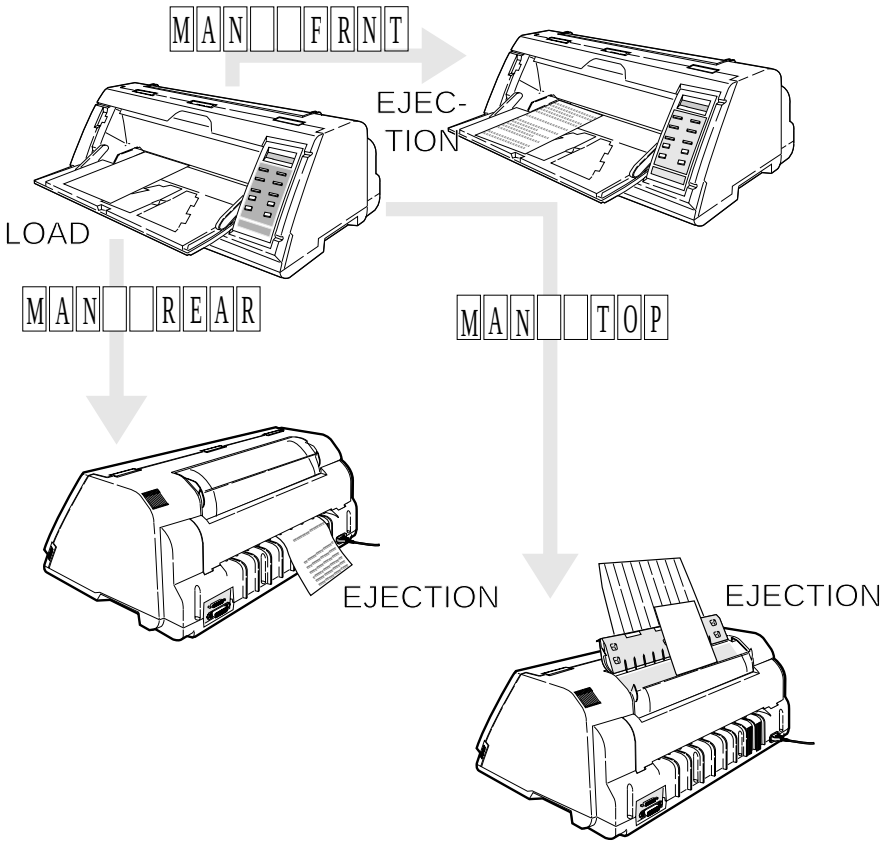
2. ***Press the PAPER PAHTH key to select MANUAL FRONT or MANUAL TOP, or MANUAL REAR .***

3. ***Specify the form size correctly on the SETUP MODE (#4 PAGE LENGTH).***



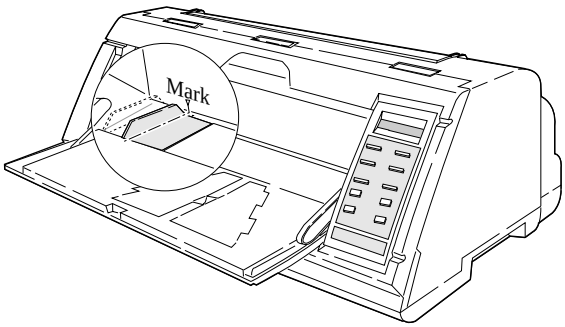
● Loading cut paper *(manual paper feeding)*

Select Manual feeding procedures 2



4. *Adjust the edge of the paper guide to approximately 2 mm left of the triangle mark.*

Refer to page 1-21 regarding use of the paper rack guide.



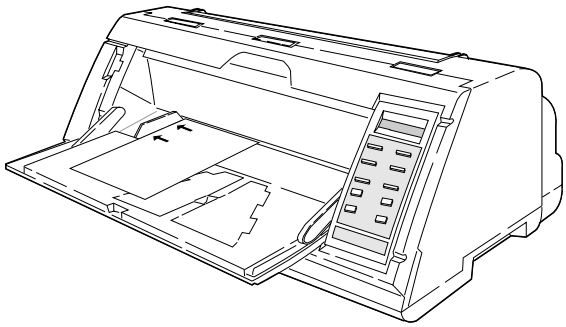
The triangle mark shows the printing start position at the left of the printer.

● Loading cut paper *(manual paper feeding)*

Select Manual feeding procedures 3

5. *Insert a sheet of paper straight along the paper guide.*

If paper is inserted at a skewed angle, the skew sensor detects and the paper is ejected.

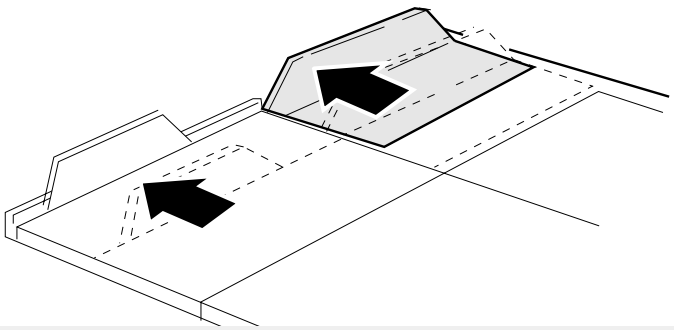


When using wide paper, insert the paper using the paper support guide attached to the left end of the paper rack.

★Caution Insert sheets of paper one at a time along the paper guide. Only one sheet at a time can be set on the paper rack.

★Caution To alternate manual printing and printing with the optional rear tractor or CSF, be sure to move the paper guide to the left end after completion of manual printing. Further, return the paper guide of the paper rack to the left end. If printing is performed using the rear tractor or CSF with the paper guide left in the manual feeding position, paper loaded form the back will hit the paper guide, resulting in paper jamming.

Move the Paper Guide and the Paper Support Guide to the left end.



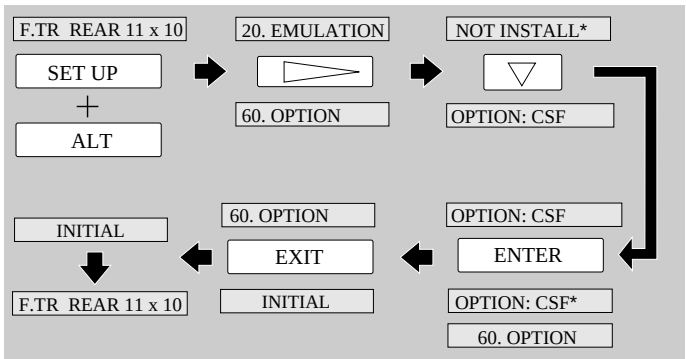
● Printing using the cut sheet feeder (Option)

Printing procedures using CSF 1

An optional cut sheet feeder is available for this printer. The cut sheet feeder is useful for continuous printing on cut sheets.
The paper holder of the cut sheet feeder accommodates a maximum of 150 sheets (of 55 kg paper). Normal paper and multipart paper can be used.

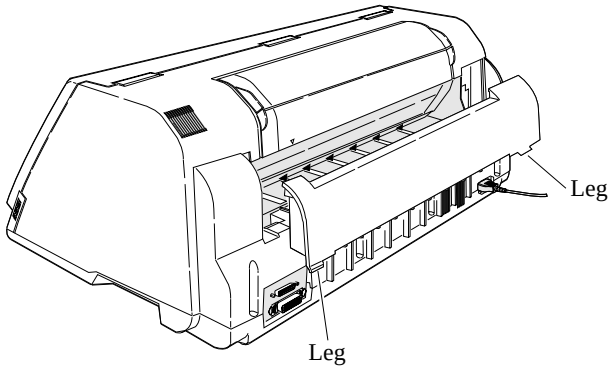
1. ***Press the EJECT/LOAD key to move back the fanfold paper.***

2. ***Enter the EXTENDED SETUP MODE according to the proceures shown below and select #60 OPTION on the menu. Select CSF (cut sheet feeder).***



3. ***Detach the rear printer cover from the printer.***

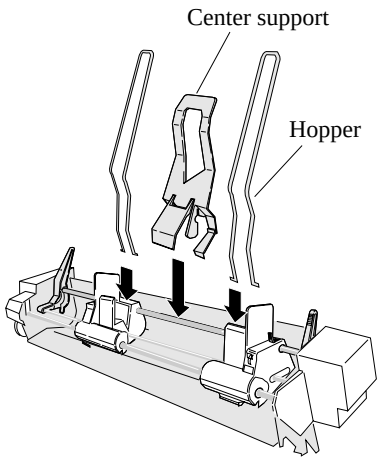
Pull the upper part of the rear printer cover to the front to detach it from the printer. When attaching the rear printer cover, insert the two legs into the printer and then press the rear printer cover to lock it.



● Printing using the cut sheet feeder (Option)

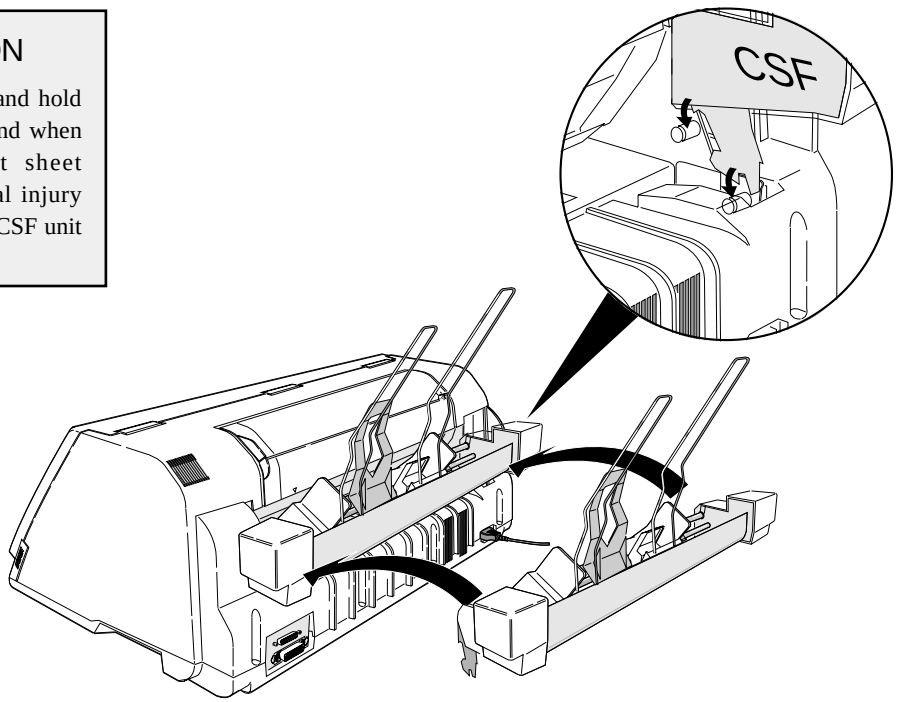
Printing procedures using CSF 2

4. ***Attach the hoppers and center support to the cut sheet feeder.***



5. ***Attach the cut sheet feeder to the back of the printer.***

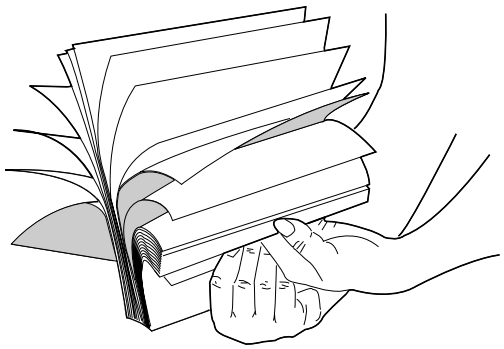
> ⚠CAUTION
>
> Use two hands and hold firmly at each end when lifting the cut sheet feeder. Personal injury can occur if the CSF unit is dropped.



● Printing using the cut sheet feeder (Option)

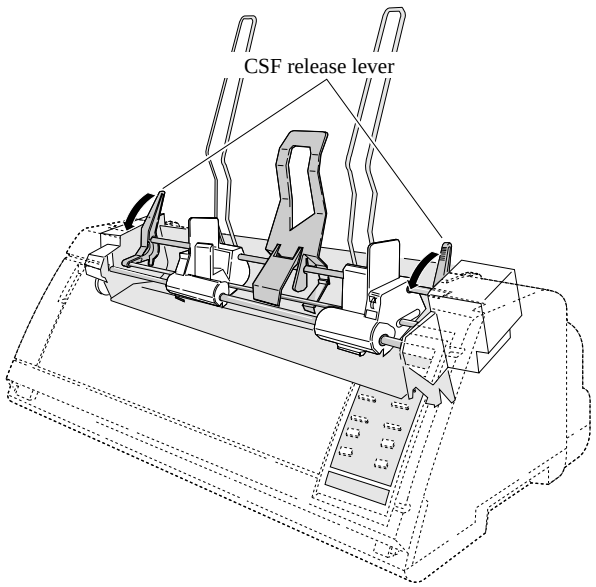
Printing procedures using CSF 3

6. Shuffle the paper as show below.



★Caution Be sure to shuffle sheets sufficiently before setting them. Otherwise, several sheets of paper may be fed at the same time resulting in a paper jam.

7. Turn the CSF release levers to the front to release the paper bins.

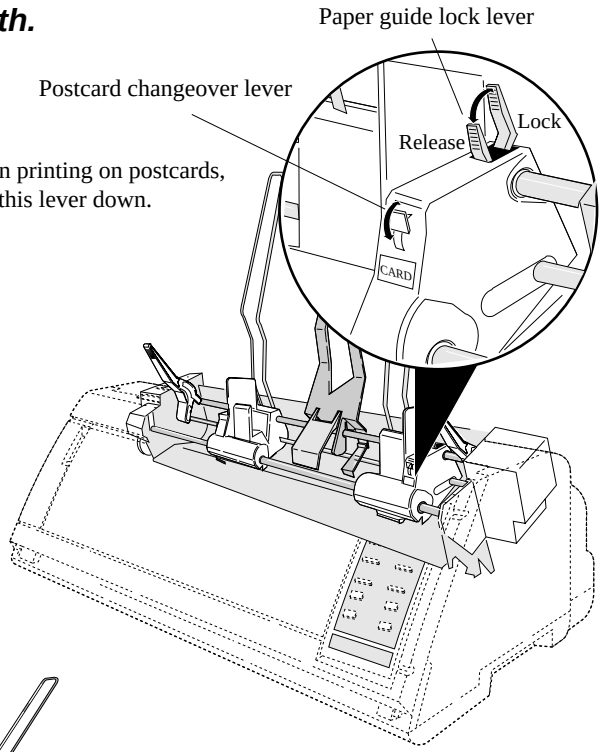


● Printing using the cut sheet feeder (Option)

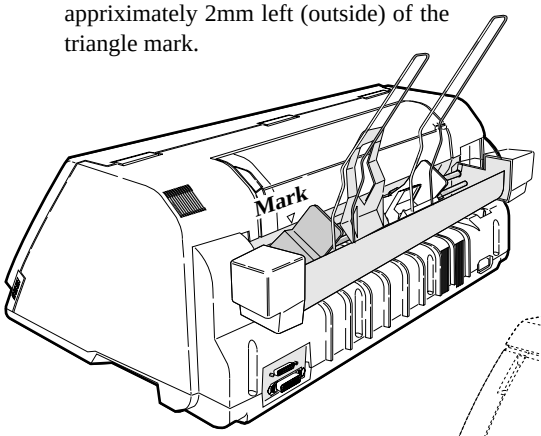
Printing procedures using CSF 4

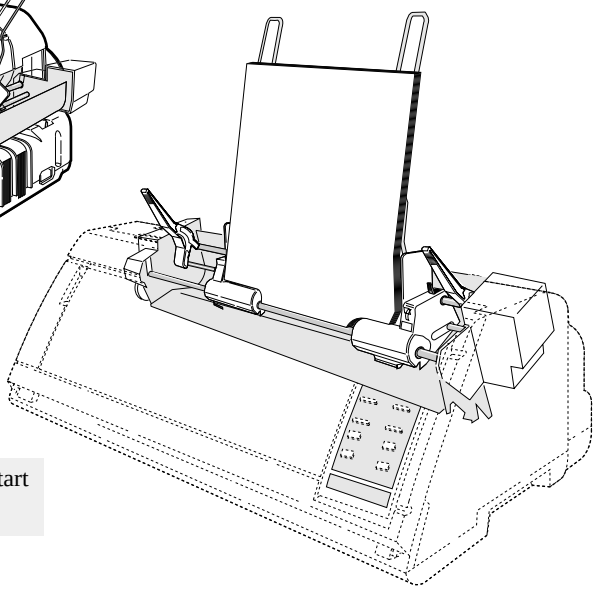
8. Turn the paper guide lock levers to the RELEASE positions to adjust the paper width.

Adjust the paper guide to remove the gap between the paper and the paper guide, ensuring that the paper does not press too tightly against the paper guide to avoide faulty feeding.



Adjust the edge of the paper guide to appriximately 2mm left (outside) of the triangle mark.





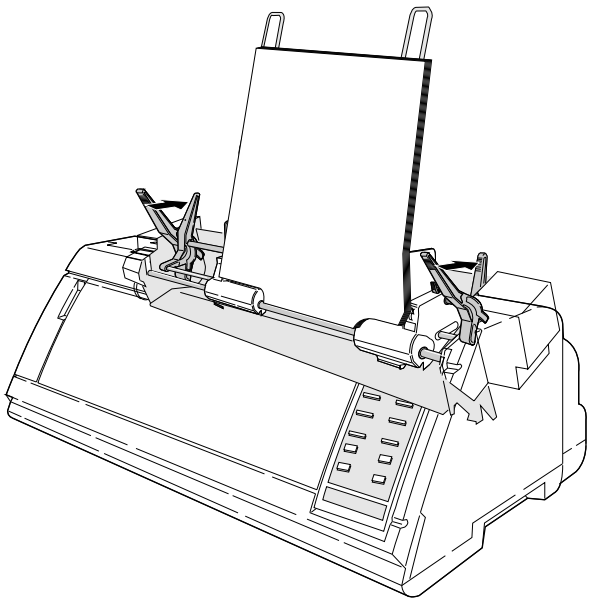
The triangle mark shows the printing start position at the left of the paper.

9. Turn the paper guide lock levers to the LOCK positions.

● Printing using the cut sheet feeder (Option)

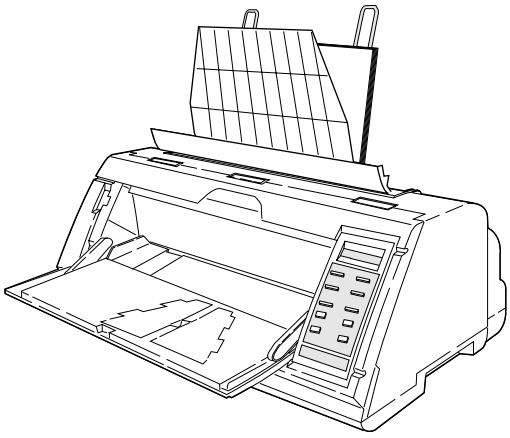
Printing procedures using CSF 5

10. ***Move the CSF release levers to the back to fix the paper bins.***

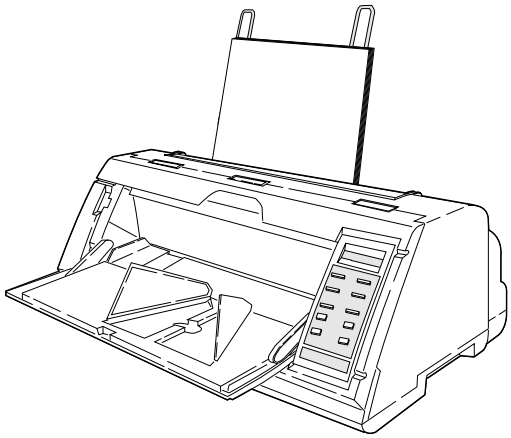


11. ***Press the PAPER PATH key to select CSF FRONT or CSF TOP.***

CSF TOP A4 p



CSF FRNT A4 p



12. ***Press the ENTER key to select the displayed paper path.***

● Running self-test

It is recommended that a self-test of the printer be performed before connecting the printer to the computer. The printer can execute the self-test by itself to check on printing quality, printing pressure, and any printer troubles.

1. Turn on the printer power while keeping the LINE FEED key, or LINE FEED and ONLINE keys depressed.

After initialization, the printer enters the self-test mode and starts the self-test.

Draft self-test printing:	Turn on power while pressing the LINE FEED key.
LQ self-test printing:	Turn on power while pressing the LINE FEED and ONLINE keys.

During printing, the ONLINE lamp blinks at an interval of 0.5 second. The following message is displayed on the LCD.

Draft self-test printing	“SELF TEST DRAFT”
LQ self-test printing	“SELF TEST LQ”

The draft or LQ self-test prints the ASCII character in a rolling pattern.

2. To pause the self-test, press the ONLINE key.
To terminate the self-test, keep the ALT and RESET keys depressed for two seconds or more, or turn the power switch to off.

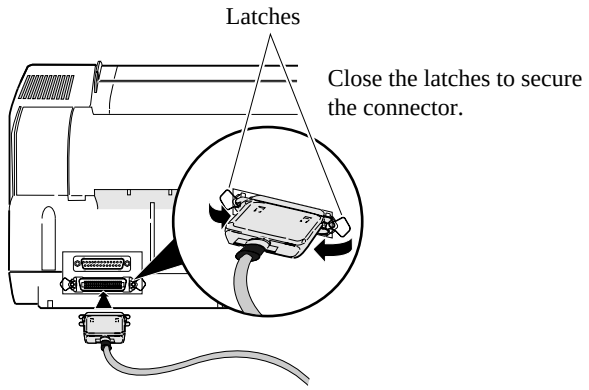
● Connecting the printer to the computer

Connecting the priter to the computer

The printer has a Centronics parallel interface and an RS-232S serial interface as standard features.
Select the appropriate interface according to the computer and application software to be used.

Parallel Interface

1. ***Make sure that the power switch is turned to off. Connect the signal cable to the printer and computer.***



2. ***Specify the following parallel interface parameters on the EXTENDED SETUP MODE.***

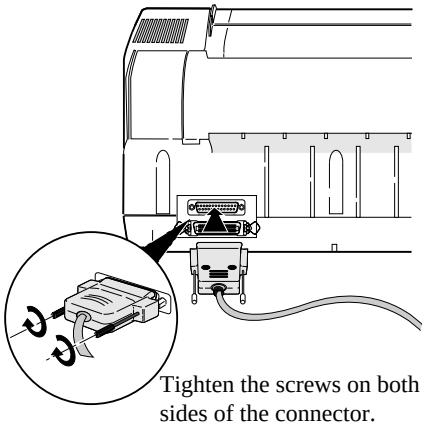
The printer has been set to the normal parallel interface setting before shipment. If the default setting does not provide proper communication, recheck the interface setting shown below.

EXTENDED SETUP MODE	Default setting	page
#70. INTERFACE	Parallel	3-46
#71. SELECT IN ENABLE	0	3-47
#81. BUFFER SIZE	512 KB	3-52
#82. BUSY/ACK TIMING	TYPE 2	3-53
#83. DATA LATCH TIMING	TYPE F.	3-53
#84. ERROR STATUS	YES	3-54

● Connecting the printer to the computer

Serial Interface

1. Make sure that the power switch is turned to off. Connect the signal cable to the printer and computer.



Tighten the screws on both sides of the connector.

2. Specify the following serial interface parameters on the EXTENDED SETUP MODE.

Specify the following serial interface parameters on the EXTENDED SETUP MODE.

EXTENDED SETUP MODE	Default setting	Page
#70. INTERFACE	Parallel	3-46
#71. SELECT IN ENABLE	0	3-47
#72. PARITY BIT	Non	3-47
#73. DATA LENGTH	8 bits	3-48
#74. STOP BIT	1 bit	3-48
#75. PROTOCOL	DTR	3-49
#76. BAUD RATE	9600 bps	3-49
#77. SERIAL ERROR	Print	3-50
#78. CTS ENABLE	No	3-50
#79. CD ENABLE	No	3-51
#80. DSR ENABLE	No	3-51
#81. BUFFER SIZE	512 KB	3-52

● Input data hexadecimal dump

The printer can print an input data hexadecimal dump list, which contains all input data in hexadecimal codes and corresponding ASCII characters. It is possible to use this dump list to check whether data is being transferred in the proper format by the computer to the printer when printing is not performed properly.

Outputting the hexadecimal dump list

1. ***Turn on the printer power while keeping the FORM FEED key or FORM FEED and ONLINE keys depressed.***

Draft printing:	Turn on power while pressing the FORM FEED key.
LQ printing:	Turn on power while pressing the FORM FEED and ONLINE keys.

While printing the hexadecimal dump list, the following message is displayed.

HEX DUMP DRAFT	HEX DUMP LQ

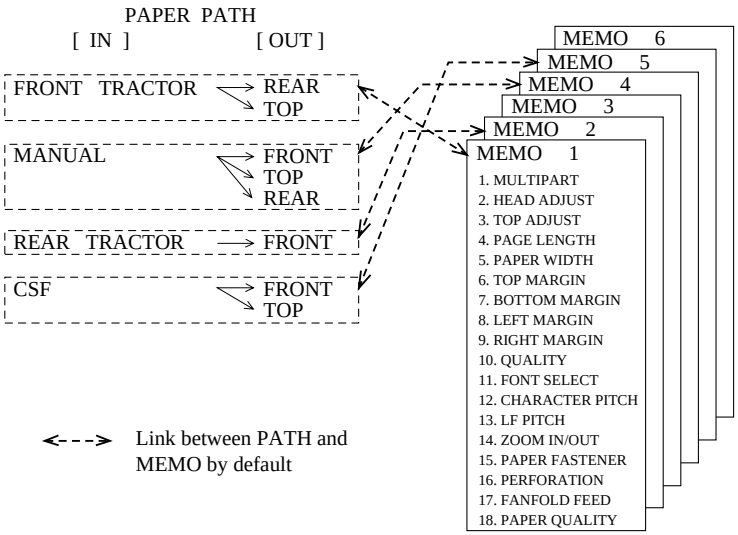
2. ***Output data from the computer to the printer.***

The printer will begin to print the hexadecimal dump list.

3. ***To stop the dump list printing, depress the ALT and RESET keys for approximately two seconds or turn the power switch to off.***

● Link between paper path (PATH) and paper form (MEMO)

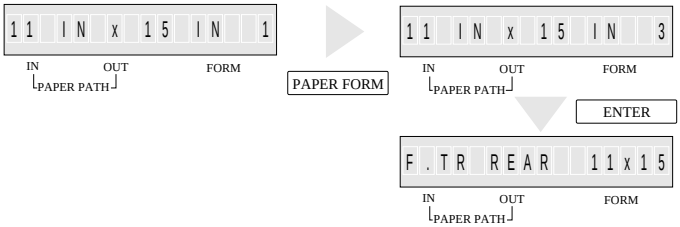
When PATH is changed, MEMO used in a newly set PATH will be changed automatically.
There are six types of MEMO: MEMO1 through MEMO6. Each MEMO stores the settings of #1 to #18 on the SETUP MODE.



Switching links between PATH and MEMO

1. Press the PAPER PATH key to select the PATH you want to use. Press the ENTER key.

2. Press the PAPER FORM key to select the MEMO you want to use. Press the ENTER key.



3. PATH has been linked to MEMO.

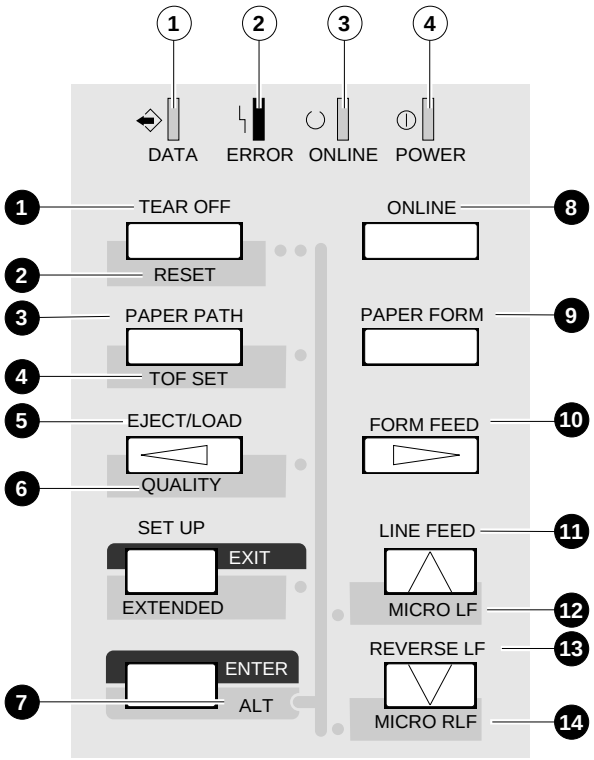
Now, switching to the PATH automatically selects the MEMO linked to it.

Changes of #1 to #17 on the SETUP MODE are reflected only in the MEMO linked to the currently selected PATH.

2. Control panel operations

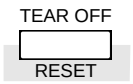
The liquid crystal display (LCD) on the control panel displays the processing conditions of the printer and the settings of the functions. The keys on the control panel provide various functions.

Control Panel



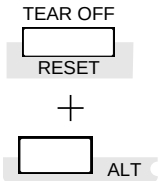
Function Keys 1

1 TEAR OFF



Press the TEAR OFF key, and the printer automatically feeds the perforation of the paper to the paper cutter position (for fanfold paper only).
If the perforation is not adjusted to the cutter position, correct the position with the MICRO LF or MICRO RLF key. The corrected position is saved in memory, and the perforation is fed automatically to the paper cutter position next time.

2 RESET

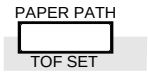


(ALT + TEAR OFF keys)
Press the TEAR OFF key for two seconds or more while you press the ALT key. When an "INITIAL" is displayed on the LCD, release the keys. The printer will be reset immediately.
Even during printing, printing can be stopped immediately by resetting the printer. When the printer is reset, it enters the busy state, the buffer is cleared, and the printer restarts in the condition that was set on the SETUP MODE or EXTENDED SETUP MODE (saved in the EEPROM).

● Control panel operations

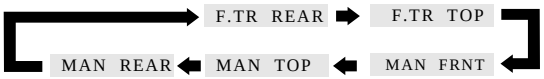
Function Keys 2

❸ PAPER PATH

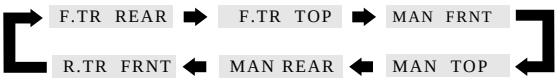


Press the PAPER PATH key to change the paper path.
When the PAPER PATH key is pressed, the currently selected paper path is displayed. Every press of the PAPER PATH key alternates the LCD display as shown below.

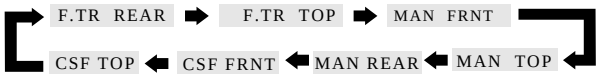
♦When no options are installed



♦When the option rear tractors are installed



♦When the optional CSF is installed



☞ The CSF and rear tractor cannot be used together.

	LOAD	EJECT	PAPER PATH
1.	F.TR	REAR	Fanfold paper: Front →Rear
2.	F.TR	TOP	Fanfold paper: Front →Top
3.	MAN	FRNT	Manual: Front →Front
4.	MAN	TOP	Manual:Front → Top
5.	MAN	REAR	Manual: Front →Rear
6.	R.TR	FRNT	Fanfold paper: Rear → Front
7.	CSF	FRNT	CSF :Rear →Front
8.	CSF	TOP	CSF :Rear →Top

PAPER PATH / PAPER & FEED	Front ⇩ Top	Front ⇩ Rear	Front ⇕ Front	Rear ⇩ Front	Rear ⇩ Top
Fanfold paper, Push tractor	○	○	—	△	—
Cut sheet paper, Manual	○	○	○	—	—
Cut sheet paper, CSF	—	—	—	△	△

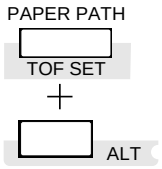
○ Standard △ Option (Rear tractor or CSF)

・To select the displayed paper path, press the ENTER key.
・If the paper path is changed when fanfold paper or cut sheet paper is loaded, the fanfold paper is fed back to the parking position or the cut sheet paper is ejected.

● Control panel operations

Function Keys 3

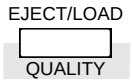
❹ TOF SET



(ALT + PAPER PATH keys)

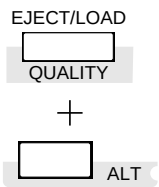
- The TOF SET key is valid only when paper is loaded. When the TOF SET key is pressed, the current printing position is regarded as the TOF position.
- The TOF ADJUST option on the SETUP MODE specifies the position when loading paper. The TOF SET key becomes valid after paper has been loaded.
- If the TOF position is changed when cut sheet paper is used, the changed TOF position is valid only for the paper already loaded.

❺ EJECT/LOAD



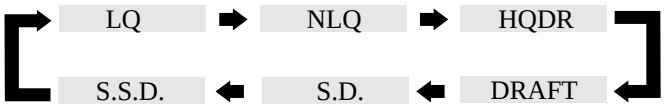
- If the EJECT/LOAD key is pressed when fanfold paper is loaded, the paper is fed back to the parking position. When it is pressed when cut sheet paper is loaded, the paper is ejected.
- When the EJECT/LOAD key is pressed under the condition where fanfold paper is at the parking position, the paper is loaded to the TOF position.
- When the EJECT/LOAD key is pressed with no paper in the manual mode, the key is ignored. When it is pressed with paper loaded in the manual mode, the printer ejects the paper.
- When the EJECT/LOAD key is pressed with no paper in the CSF mode, the printer loads paper. When it is pressed with paper loaded in the CSF mode, the printer ejects the paper.

❻ QUALITY



(ALT + EJECT/LOAD keys)

Press the QUALITY key to display the currently selected printing quality on the LCD. Continue to depress the key to display the printing qualities in the following order.



To select the displayed printing quality, press the ENTER key.

(When in the EPSON mode)

LCD	ESC x 1 LQ is selected.	ESC x 0 Draft is selected.	Graphic speed
LQ	LQ	Draft	Normal
NLQ	NLQ	Draft	High speed 1
HQDR	LQ	HQDR	High speed 2
DRAFT	LQ	Draft	High speed 2
S.D.	S.D.	S.D.	High speed 2
S.S.D.	S.S.D.	S.S.D.	High speed 2

- The #10 QUALITY menu selected from the SETUP MODE provides the same functions as the QUALITY key. Priority is given to the last setting. Thus, if the printing speed is changed on the menu after setting it with the QUALITY key, the changed printing speed on the menu is selected.
- If "YES" is selected with the QUALITY LOCK option on the EXTENDED SETUP MODE, or "S.D." or "S.S.D." is selected with the QUALITY option on the SETUP MODE, all software commands for changing the printing quality are ignored.
- If "S.D." is selected, the draft characters are printed at 12 cpi at a speed 1.2 times as high as the normal speed. If "S.S.D." is selected, the characters are printed at 15 cpi at a speed 1.5 times as high as the normal speed. When "LQ" is not selected, 180/360/120/240-DPI graphics are printed at high speed with lower bit density.

● Control panel operations

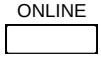
Function Keys 4

❼ ALT

The following functions are executed by pressing the corresponding key while you press the ALT key.

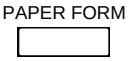
LINE FEED	MICRO LF
REVERSE LF	MICRO RLF
SET UP	EXTENDED SET UP
EJECT/LOAD	QUALITY
PAPER PATH	TOF SET
TEAR OFF	RESET

❽ ONLINE



Press the ONLINE key to change the printing enabled (online) state and printing disabled (offline) state.

❾ PAPER FORM



Press the PAPER FORM key to change the format memory for the currently selected paper path. Each press of the PAPER FORM key changes the format memory as shown below.

Format memory 1
Format memory 2
Format memory 3
Format memory 4
Format memory 5
Format memory 6

The number of the format memory and the paper size stored in the format memory are displayed on the LCD.
To select the displayed paper form, press the ENTER key.

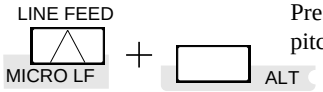
❿ FORM FEED

Press the FORM FEED key to feed the page at the currently set page length.

⓫ LINE FEED

Press the LINE FEED key to feed the line in the forward direction at a pitch of 1/6 inch.

⓬ MICRO LF



(ALT + LINE FEED keys)

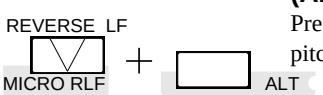
Press the MICRO LF key to feed the line in the forward direction at a pitch of 1/360 inch.

⓭ REVERSE LF

Press the REVERSE LF key to feed the line in the reverse direction at a pitch of 1/6 inch.

- Keep the key depressed for continuous reverse line feeding.

⓮ MICRO RLF

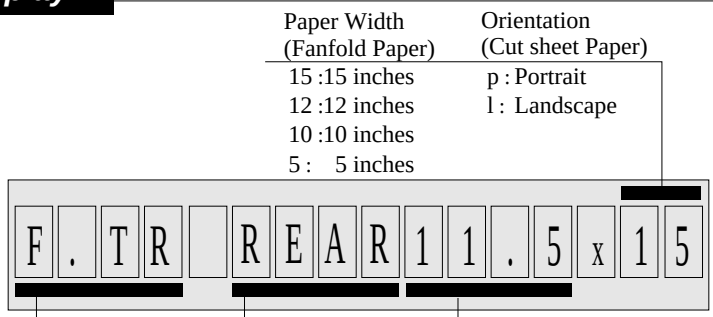


(ALT + REVERSE LF keys)

Press the MICRO RLF key to feed the line in the reverse direction at a pitch of 1/360 inch. (Use this key to adjust the paper position.)

● Control panel operations

Liquid Crystal Display



1 inch = 25.4 mm

Lamps

① DATA (Green)	Blinks while data is transferred. Lights while data is processed except during communication or when the input buffer contains data. Goes out in other state.
② ERROR (Amber)	ON: No paper is detected or other operational error occurs. OFF: No error is detected. Blinking: A functional error has occurred (such as home sense error, internal RAM error, paper path switching error, head adjustment error, park error and skew error).
③ ONLINE (Green)	ON: Printing is enabled. OFF: Printing is disabled. Blinking: The cover is open, or the printer is in the head temperature protect mode.
④ POWER (Green)	Lights when the printer power is on. Goes out when the printer power is turned off.

3.Setup options

The printer has setup modes, i.e., function setting modes that are unique to this printer. The setup modes enable various printer functions to be set up with the function keys on the operation panel.
This section provides an the outline of the setup modes and the details of the setup functions.

Outline of the setup modes

The setup modes consist of the SETUP MODE and EXTENDED SETUP MODE.
The SETUP MODE is used to set the parameters that can be saved in the format memories (memo 1 to memo 6). The EXTENDED SETUP MODE is used to set other parameters.

Available functions in the setup modes

●The following parameters can be set in the SETUP MODE.:

#1. MULTIPART (Printing pressure)
#2. HEAD ADJUSTMENT (Paper thickness adjustment)
#3. TOF ADJUSTMENT (Top-of-form setting)
#4. PAGE LENGTH (Page length of fanfold paper or paper size of cut sheet)
#5. PAPER WIDTH (Fanfold paper)
#6~9. Printing margin setting
#10. QUALITY (Printing quality)
#11. FONT SELECT (Font selection)
#12. CHARACTER PITCH (Character pitch)
#13. LF PITCH (Line feed pitch)
#14. ZOOM IN/OUT (Zooming magnification)
#15. PAPER FASTENER (Paper fastener mode setting)
#16. PERFORATION (Perforation head-up mode setting)
#17. FANFOLD FEED (Fanfold feed setting)
#18. PAPER QUALITY
#19. SELECT SAVE MEMORY (Memo 1 to memo 6)
#20. SELECT LOAD MEMORY (Memo 1 to memo 6)

●The following parameters can be set in the EXTENDED SETUP MODE.:

Menus #20 to #95 are used mainly to set the following parameters:
Emulation, font, paper handling, interface, bar codes, enlarged characters.

Entering the setup modes

●Entering the SETUP MODE:

Press the SET UP key to enter the SETUP MODE. To quit the SETUP MODE, press the EXIT key.

●Entering the EXTENDED SETUP MODE:

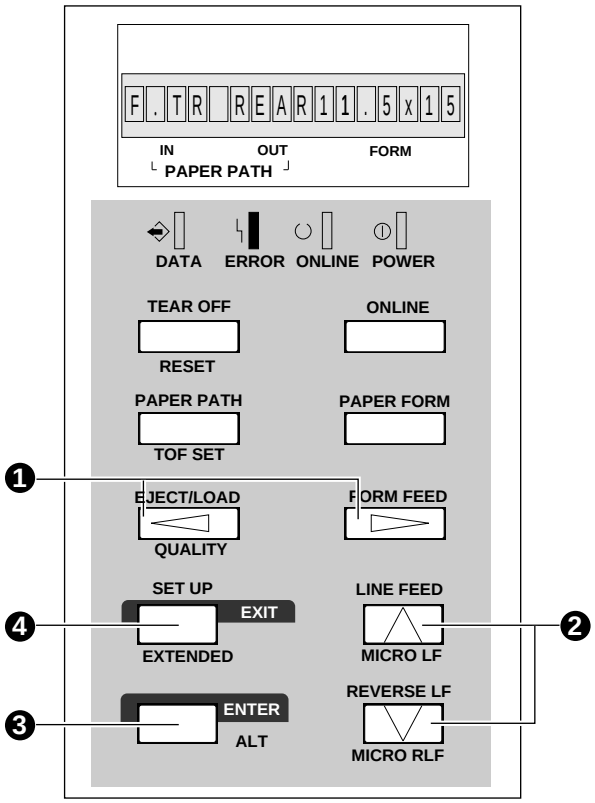
Press the SET UP key and ALT key simultaneously to enter the EXTENDED SETUP MODE. To quit the EXTENDED SETUP MODE, press the EXIT key. The printer is initialized automatically.

While data is input, the printer can enter the panel setup mode only in the OFFLINE state.

● Operations in the setup modes

Keys used for setting

The keys shown below are used in the setup modes.



❶ ► ◄ *Menu selection keys (Used with the EJECT/LOAD or FORM FEED key.)*

These keys are used to change the displayed menus. They change only the display and do not change the setting.
The menus is changed rapidly when the ► or ◄ key is depressed and held for a second or more.

❷ ▲ ▼ *Item selection keys (Used with the LINE FEED or REVERSE LF key.)*

These keys are used to select items displayed vertically in a menu. They change only the display and do not change the setting.

❸ *ENTER key*

To register a displayed menu item, press the ENTER key. When the ENTER key is pressed, the selected item is registered in the printer and marked with an asterisk (*), and the menu reappears.

❹ *EXIT key*

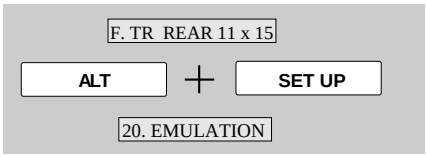
Press the EXIT key to exit the panel setup mode.

● Operations in the setup modes

setting example in the EXTENDED SETUP MODE

The following example shows how to select "OPTION: CSF" in the EXTENDED SETUP MODE.

1. *Press **SET UP** key while depressing the ALT key.*

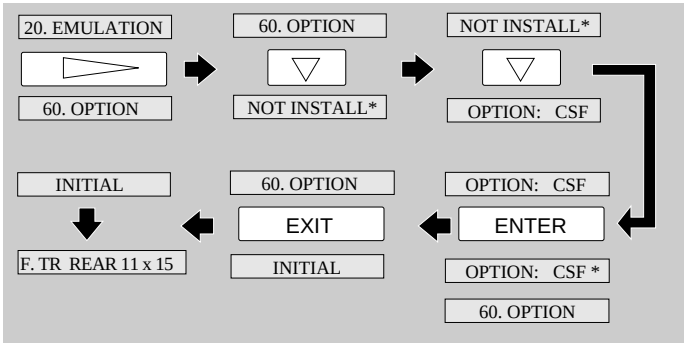


2. *Select #60 OPTION with the ◄ or ► key.*

3. *Press the ▼ key to display "OPTION: **CSF**" on the LCD.*

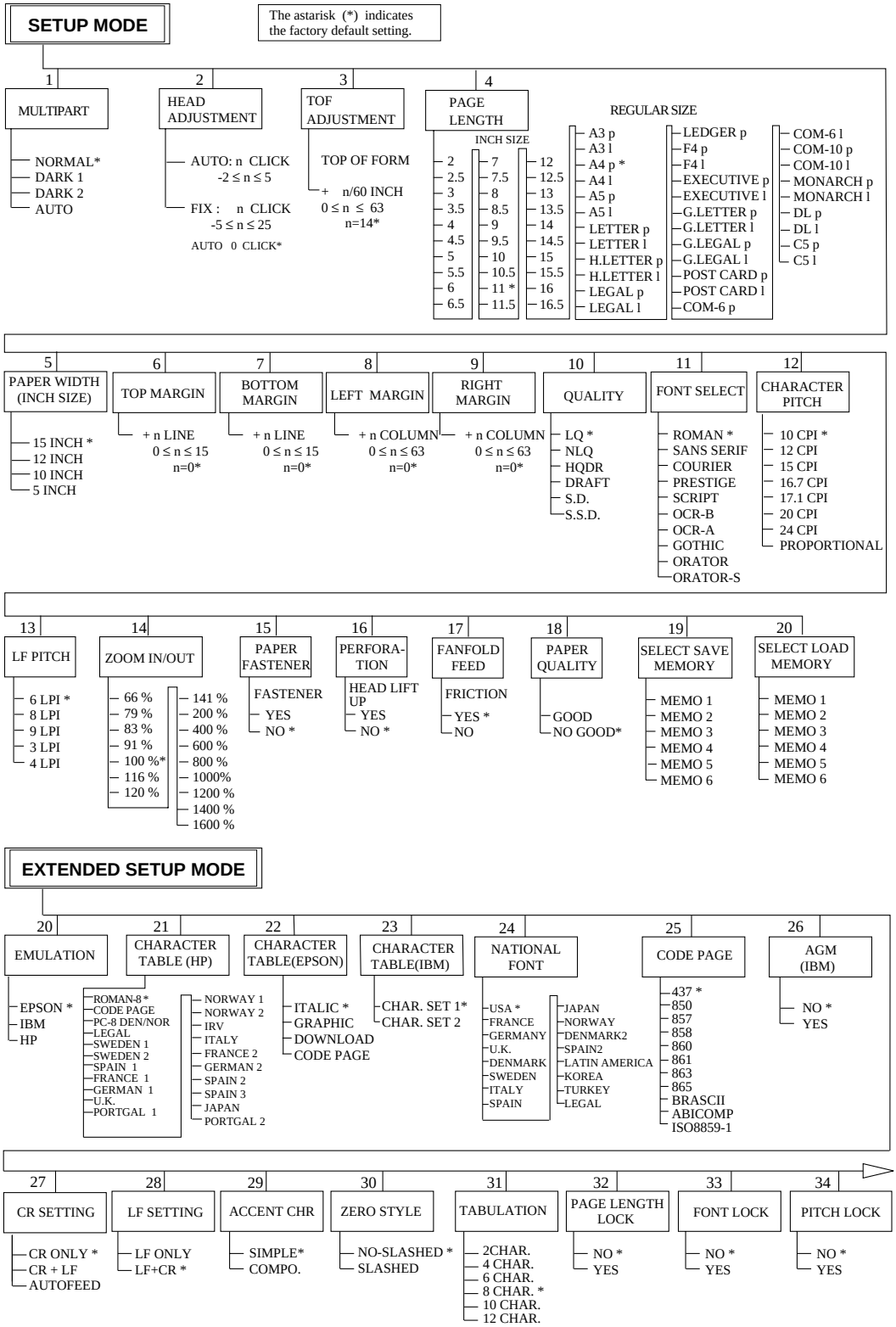
4. *Press the **ENTER** key.*
"CSF" is marked with an asterisk, indicating that the CSF is selected.

5. *Press the **EXIT** key. The setting is automatically saved, and the printer is initialized.*

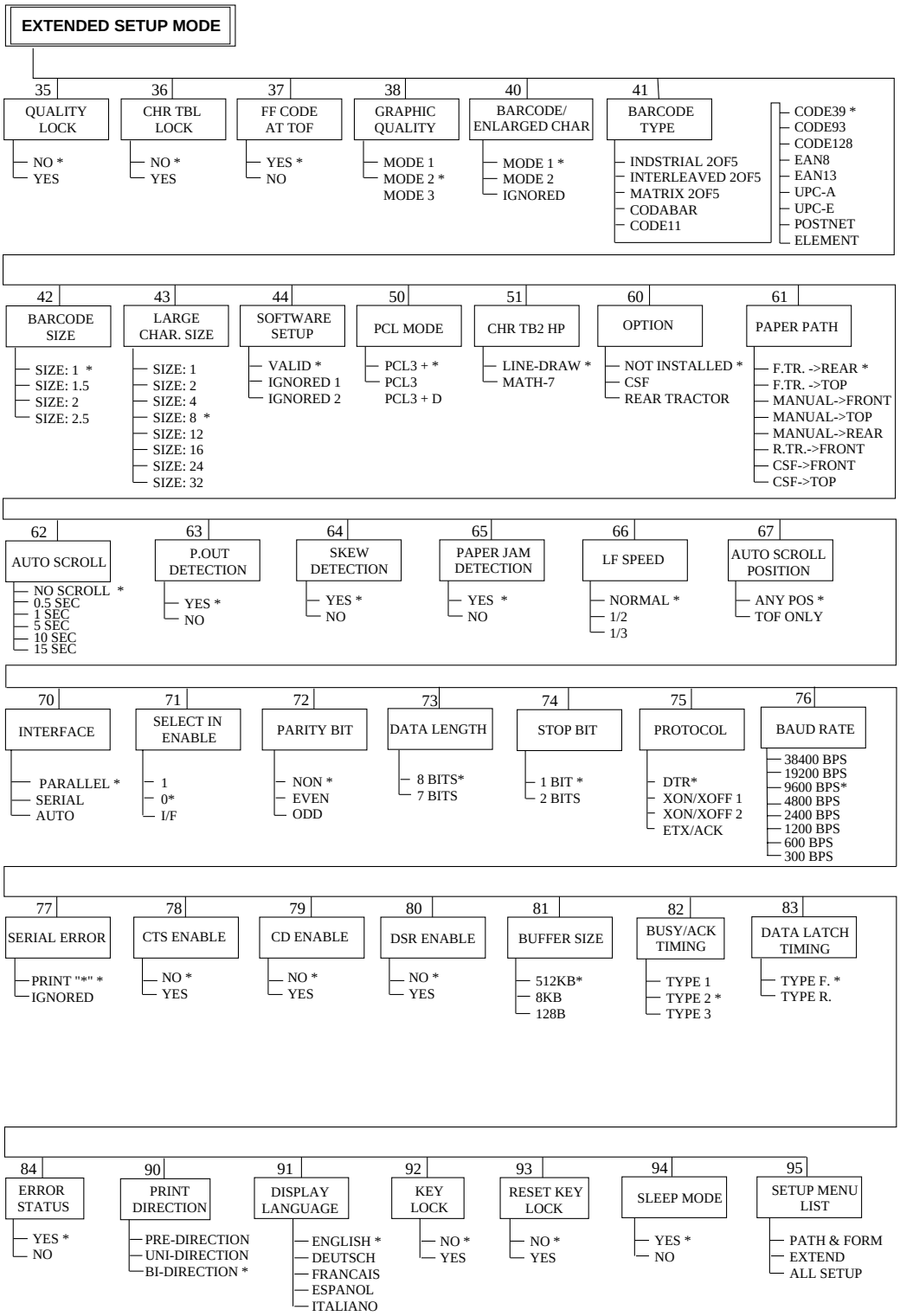


In the SETUP MODE, after pressing the EXIT key select SAVE YES by the ▲ or ▼ key and press the ENTER key. If SAVE NO is selected, any changes made in the SETUP MODE are erased when the printer power is turned off.

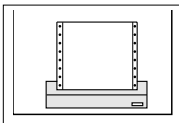
● Setup mode summary(1)



● Setup mode summary(2)

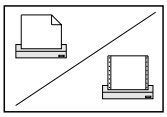


● Factory default setting



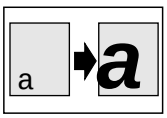
Printing

		Factory Default Setting	Page
#01	: MULTIPART	→ NORMAL	3-8
#02	: HEAD ADJUSTMENT	→ AUTO 0 CLICK	3-9
#15	: PAPER FASTENER	NO	3-22
#16	: PERFORATION	NO	3-22
#17	: FANFOLD FEED	YES	3-23
#18	: PAPER QUALITY	NOT GOOD	3-23
#66	: LF SPEED	NORMAL	3-44



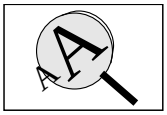
Form selection

#61	: PAPER PATH	→ F.Tr.->REAR	3-40



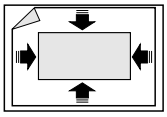
Character

#10	: QUALITY	→ LQ	3-17
#11	: FONT SELECT	→ ROMAN	3-18
#12	: CHARACTER PITCH	→ 10CPI	3-19
#21	: CHARACTER TABLE (HP)	→ ROMAN-8	3-25
#22	: CHARACTER TABLE (EPSON)	→ ITALIC	3-26
#23	: CHARACTER TABLE (IBM)	→ SET 1	3-26
#24	: NATIONAL FONT (EPSON)	→ U.S.A.	3-27
#25	: CODE PAGE	→ 437	3-28
#26	: AGM (Alternate Graphics Mode) (IBM)	→ NO	3-28
#29	: ACCENT CHR	→ SIMPLE	3-30
#30	: ZERO STYLE	→ NO SLASHED	3-30
#38	: GRAPHIC QUALITY	→ MODE2	3-35
#51	: CHRACTER TABLE 2 (HP)	→ LINE DRAW	3-41



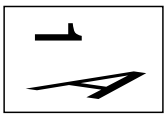
Zooming

#14	: ZOOM IN/OUT	→ 100%	3-21



Printing start position and printing area

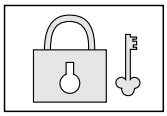
#03	: TOF ADJUSTMENT	→ 14/60 inch	3-10
#04	: PAGE LENGTH	→ (Memo1 ~ 3)11inch (Memo4 ~ 6)A4 p	3-11
#05	: PAPER WIDTH	→ (Memo1 ~ 3)15 inch (Memo4 ~ 6)10inch	3-12
#06	: TOP MARGIN	→ 0 LINE	3-13
#07	: BOTTOM MARGIN	→ 0 LINE	3-14
#08	: LEFT MARGIN	→ 0 COL	3-15
#09	: RIGHT MARGIN	→ 0 COL	3-16



Line feed and carriage return

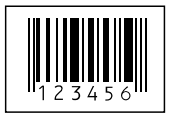
#13	: LF PITCH	→ 6 LPI	3-20
#27	: CR SETTING	→ CR ONLY	3-29
#28	: LF SETTING	→ LF + CR	3-29
#31	: TABULATION	→ 8 CHAR	3-31
#37	: FF CODE AT TOF	→ YES	3-34
#90	: PRINT DIRECTION	→ BI-DIRECTION	3-55

● Factory default setting



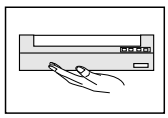
Lock function

	Factory Default Setting	Page
#32 : PAGE LENGTH LOCK	→ NO	3-31
#33 : FONT LOCK	→ NO	3-32
#34 : PITCH LOCK	→ NO	3-32
#35 : QUALITY LOCK	→ NO	3-33
#36 : CHARACTER TABLE LOCK	→ NO	3-33
#92 : KEY LOCK	→ NO	3-56
#93 : RESET KEY LOCK	→ NO	3-56



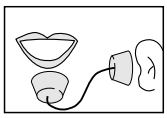
Bar code and enlarged character

#40 : BARCODE/ENLARGED CHARACTER	→ MODE 1	3-36
#41 : BARCODE TYPE	→ CODE 39	3-37
#42 : BARCODE SIZE	→ 1	3-39
#43 : ENLARGED CHARACTER SIZE	→ 8	3-39



Operation condition

#19 : SELECT SAVE MEMORY	→ MEMO 1	3-24
#20 : SELECT LOAD MEMORY	→ MEMO 1	3-24
#20 : EMULATION	→ EPSON	3-25
#44 : SETUP COMMAND	→ VALID	3-40
#50 : PCL MODE (HP)	→ PCL 3+	3-40
#60 : OPTION	→ NOT INSTALL	3-41
#62 : AUTO SCROLL	→ NO SCROLL	3-42
#63 : P.OUT DETECTION	→ YES	3-43
#64 : SKEW DETECTION	→ YES	3-43
#65 : PAPER JAM	→ YES	3-44
#67 : AUTO SCROLL POSITION	→ ANY POS	3-45
#91 : DISPLAY LANGUAGE	→ ENGLISH	3-55
#94 : SLEEP MODE	→ YES	3-57
#95 : SETUP MENU LIST	→ PATH & FORM	3-57



Interface condition

#70 : INTERFACE	→ PARALLEL	3-46
#71 : SELECT IN ENABLE	→ 0	3-47
#72 : PARITY BIT (SERIAL I/F)	→ NON	3-47
#73 : DATA LENGTH (SERIAL I/F)	→ 8 BITS	3-48
#74 : STOP BIT (SERIAL I/F)	→ 1 BIT	3-48
#75 : PROTOCOL (SERIAL I/F)	→ DTR	3-49
#76 : BAUD RATE (SERIAL I/F)	→ 9600 B	3-49
#77 : SERIAL ERROR (SERIAL I/F)	→ PRINT	3-50
#78 : CTS ENABLE (SERIAL I/F)	→ NO	3-50
#79 : CD ENABLE (SERIAL I/F)	→ NO	3-51
#80 : DSR ENABLE (SERIAL I/F)	→ NO	3-51
#81 : BUFFER SIZE	→ 64KB	3-52
#82 : BUSY/ACK TIMING (PARALLEL I/F)	→ TYPE 2	3-53
#83 : DATA LATCH TIMING (PARALLEL I/F)	→ TYPE F.	3-53
#84 : ERROR STATUS (PARALLEL I/F)	→ YES	3-54

Function

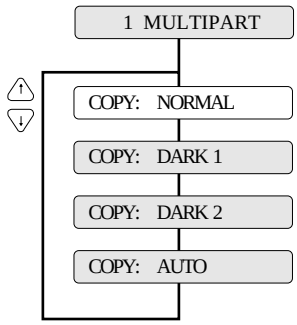
#01

Multipart

This function improves the printing capability on multipart paper.

Use multipart paper consisting of an original plus eight non-carbon sheets or copying paper up to 0.59 mm thick.

Setting procedures



Supplementary notes

Printing capabilities on multipart paper are selectable as shown below.

LCD display	LQ	Draft
NORMAL	ORIGINAL + 5	ORIGINAL + 4
DARK1	ORIGINAL + 7	ORIGINAL + 7
DARK1	ORIGINAL + 8	ORIGINAL + 8
AUTO	Automatically swiches Normal, Dark 1, or Dark 2 according to the paper thickness.	

Function

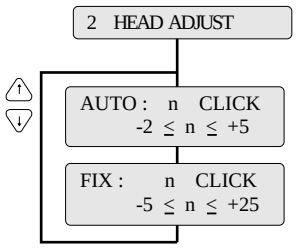
#02

Head adjustment

This function adjusts the gap between the print head and platen.

This function has FIX and AUTO modes: The gap is fixed in the FIX mode, and the gap is automatically adjusted in the AUTO mode.

Setting procedures



DEFAULT : AUTO : 0 CLICK

The smaller the number, the smaller the gap between the head and platen.

Supplementary notes

Every click changes the gap by 0.04 mm.

The recommended gap for 70 kg 1P paper is at the 0 click position in the FIX mode.

●AUTO mode

In the AUTO mode, the gap between the print head and platen is automatically adjusted according to the paper thickness. Since the most appropriate gap differs with the type of paper, select the proper position between -2 and +5 according to the printing results.

●FIX mode

The gap between the print head and platen is fixed as specified.

Select the proper position according to the paper type and thickness by referring to the table below.

In the AUTO mode, the gap is automatically adjusted every time fanfold paper or manually-inserted paper is loaded. When CSF is used, automatic paper thickness adjustment is performed when the paper is first loaded. Thereafter, automatic paper thickness adjustment is performed when the next sheet is fed if printing is not performed within 3 to 4 seconds after the paper is ejected.

Paper type/fixed click position		-1~1	1~3	3~5	5~7	7~9	9~11	11~13	13~15	15~17
Cut sheet	Ream weight: 55 to 90 kg	○								
	Ream weight: 90 to 135 kg		○							
	Ream weight: 180 kg		○							
	Postcard		○							
Multipart paper (Paper weight :34kg)	2sheets	○								
	3sheets		○							
	4sheets			○						
	5sheets				○					
	6sheets				○					
	7sheets					○				
	8sheets						○			
	9sheets							○		
Total paper thickness (mm)		0.08 ≀ 0.16	0.16 ≀ 0.24	0.24 ≀ 0.32	0.32 ≀ 0.4	0.4 ≀ 0.48	0.48 ≀ 0.56	0.56 ≀ 0.64	0.64 ≀ 0.72	0.72 ≀ 0.8

Function

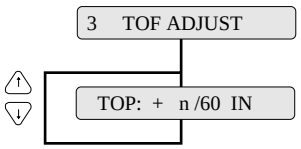
#03

TOF adjustment

This function specifies the top of form (TOF) position.

When paper is loaded, the printer detects the end of the paper and determines the printing start position based on the detected paper end. That position is the top of the form (TOF).

Setting procedures



The value may be changed with the ↑ and ↓ keys.

0 ≤ n ≤ 63

DEFAULT : n=14

Supplementary notes

The TOF position is adjusted in units of 1/60 inch. It can be adjusted between 0/60 inch (minimum) and 63/60 inches (maximum) from the end of paper.

★ Caution Though the TOF position can be set from 0/60 inch (0 mm), paper may jam if it is set to a value between 0/60 inch to 9/60 inch. Normally, it is recommended that the TOF position be set to 14/60 inch (approximately 6 mm) from the paper end.

Function

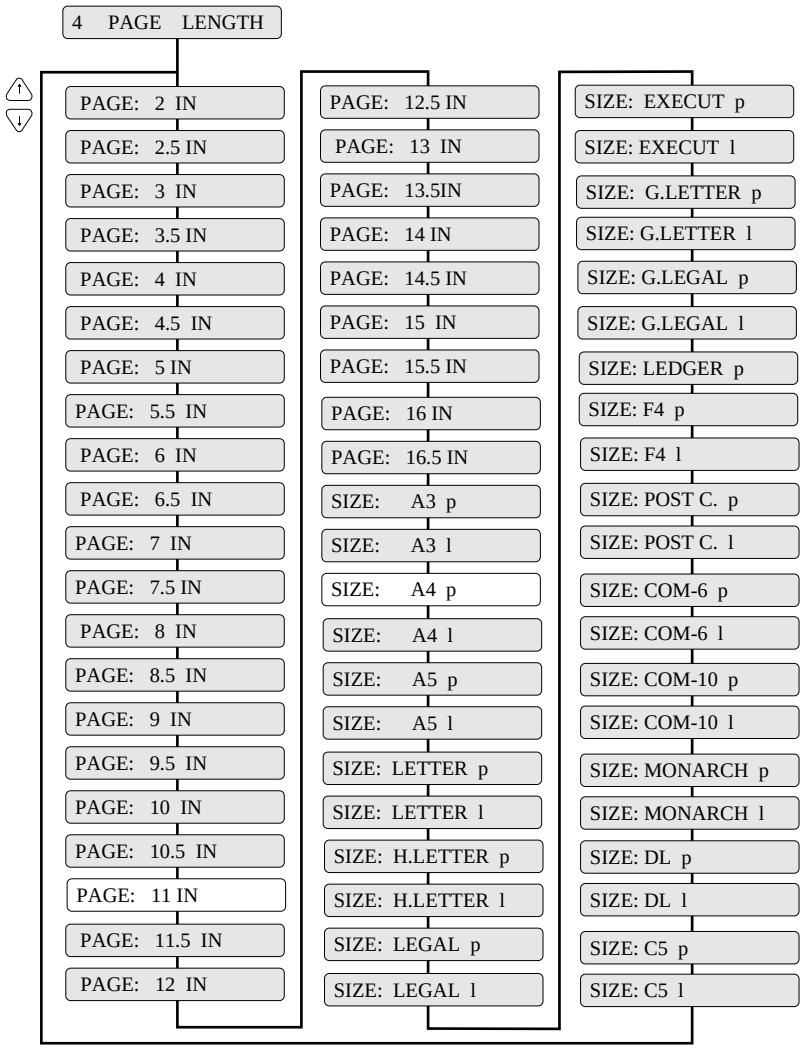
#04

Page length

This function specifies the page length of the form to be used.

Thirty types of page lengths, from 2 to 16.5 inches in 0.5 inch steps, plus seventeen standard sizes are available as shown below.

Setting procedures



If the PAGE LENGTH LOCK option is set to NO in the EXTENDED SETUP MODE, the page length can be changed by a software command. The values available on the menu serve as the default values. If the PAGE LENGTH LOCK option is set to YES in the EXTENDED SETUP MODE, any software command to change the page length is ignored.

Supplementary notes

When fanfold paper is used, the page length set here is used to define the perforation.

The printer loads paper, it regards the end of the paper as the perforation. The TOF (top-of-form) position is determined from the end of the paper based on a preset TOF value.

Function

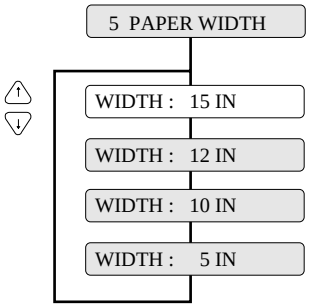
#05

Paper width

This function specifies the width of fanfold paper.

This function specifies the width of fanfold paper in inches.

Setting procedures



Supplementary notes

The following table shows the relationship between the paper width settings in inches and the number of columns printable on each line, when characters are printed at 10 cpi.

Display	Paper width	Max. columns/line
15 IN	15 inches	136
12 IN	12 inches	106
10 IN	10 inches	80
5 IN	5 inches	36

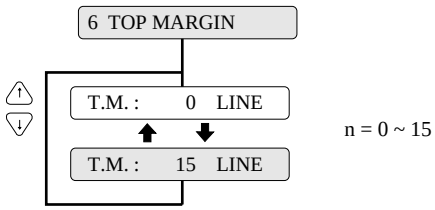
Function

#06

Top margin

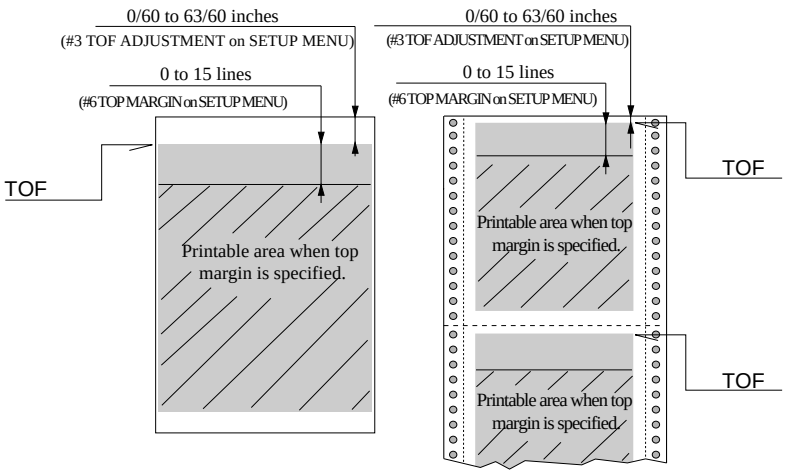
This function specifies the length of the area at the top of the paper where printing is disabled in units of 6 LPI from the TOF position.

Setting procedures



Supplementary notes

The top margin is specified in units of 6 LPI (lines per inch) within the range from 0 (minimum) to 15 (maximum) from the TOF position.



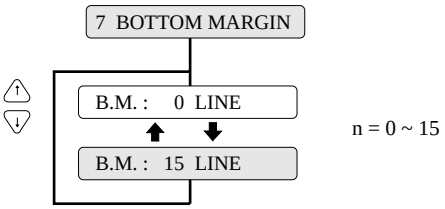
Function

#07

Bottom margin

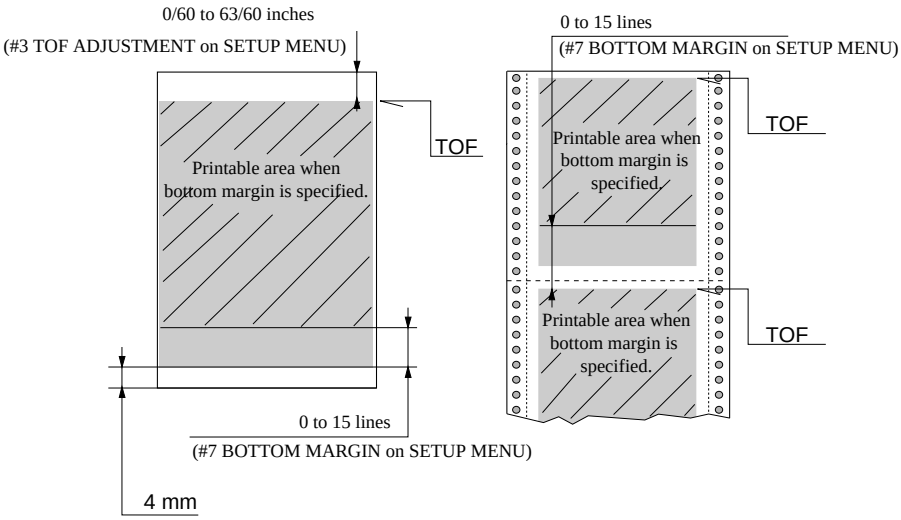
This function specifies the length of the area at the bottom of the paper where printing is disabled in units of 6 LPI from the TOF position of the following page.

Setting procedures



Supplementary notes

The bottom margin of fanfold paper is specified in units of 6 LPI (lines per inch) within the range from 0 to 15 from the TOF position of the following page.
The bottom margin of cut sheet paper is specified within the range from 0 to 15 from the bottom of the printable area.



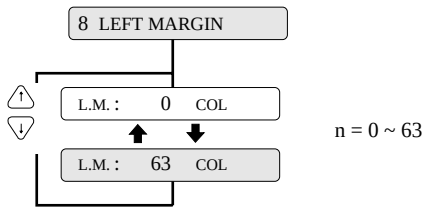
Function

#08

Left margin

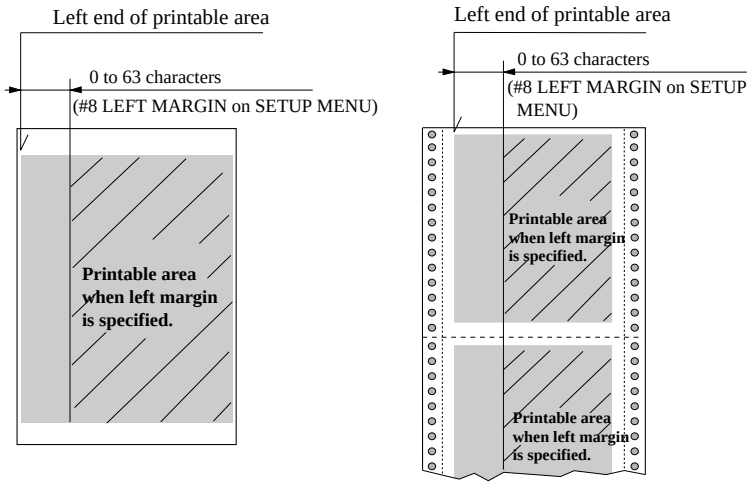
This function specifies the length of the area on the left side of the paper where printing is disabled from the left end of the printable area.

Setting procedures



Supplementary notes

The left margin is specified by the number of columns (1/10") within the range from 0 to 63 columns from the left end of the printable area as shown below.



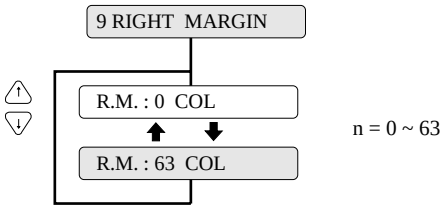
Function

#09

Right margin

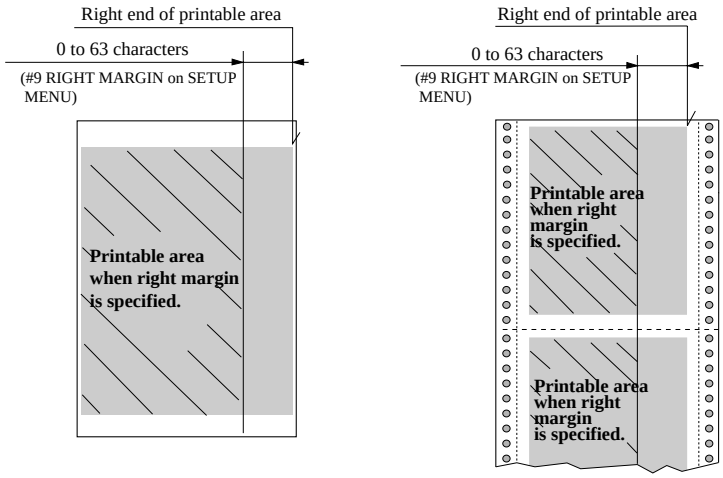
This function specifies the length of the area on the right side of the paper where printing is disabled from the right end of the printable area.

Setting procedures



Supplementary notes

The right margin by specified in the number of columns (1/10") within the range from 0 to 63 from the right end of the printable area as shown below.



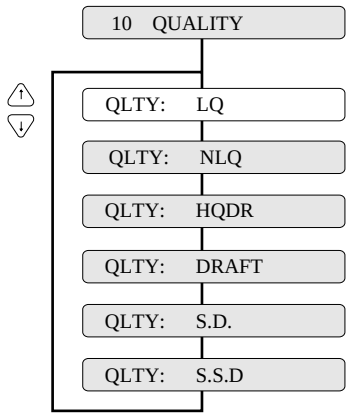
Function

#10

Character quality

This function specifies character quality.

Setting procedures



Supplementary notes

This option has the same function as the QUALITY key (i.e., EJECT/LOAD key while depressing ALT key). Priority is given to the most recent setting made with the QUALITY key or in the SETUP MODE.
When "LQ" is not selected, 180/36/120/240-dpi graphics are printed at high speed with lower bit density.

QUALITY	Graphic speed
LQ	Normal
NLQ	High speed 1
HQDR	High speed 2
DRAFT	High speed 2
S. D.	High speed 2
S. S. D.	High speed 2

Function

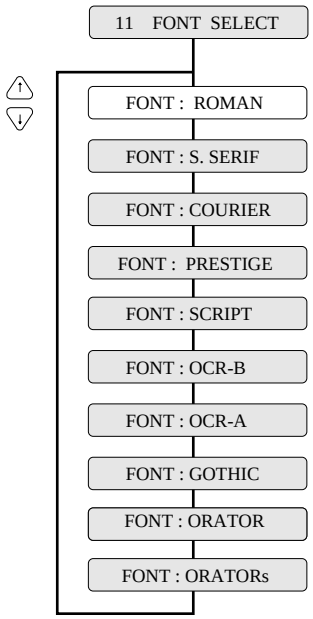
#11

Character font

This function specifies the typeface of the font characters.

The following ten fonts are available: Roman, Sans Serif, Courier, Prestige, Script, OCR-B, OCR-A, Gothic, Orator, and Orator-s.

Setting procedures



Supplementary notes

If the FONT LOCK option is set to NO in the EXTENDED SETUP MODE, the font can be changed by a software command. The font selected on the menu serves as the default font.
If the FONT LOCK option is set to YES in the EXTENDED SETUP MODE, the currently selected font cannot be changed by a software command.

Font	Printing sample
ROMAN	ABCDEFGHIJKLMNOpqrstuvwxyz
SANS SERIF	ABCDEFGHIJKLMNOpqrstuvwxyz
COURIER	ABCDEFGHIJKLMNOpqrstuvwxyz
PRESTIGE	ABCDEFGHIJKLMNOpqrstuvwxyz
SCRIPT	ABCDEFGHIJKLMNOpqrstuvwxyz
OCR-B	ABCDEFGHIJKLMNOpqrstuvwxyz
OCR-A	ABCDEFGHIJKLMNOpqrstuvwxyz
GOTHIC	ABCDEFGHIJKLMNOpqrstuvwxyz
ORATOR	ABCDEFGHIJKLMNOPQRSTUVWXYZ
ORATOR-S	ABCDEFGHIJKLMNOpqrstuvwxyz

Function

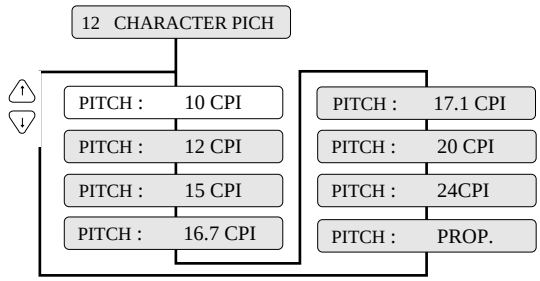
#12

Character pitch

This function specifies the character pitch.

The available pitches are: 10 cpi, 12 cpi, 15 cpi, 16,7 cpi, 17.1 cpi, 20 cpi, 24 cpi, and proportional.

Setting procedures



Supplementary notes

If the PITCH LOCK option is set to NO in the EXTENDED SETUP MODE, the character pitch can be changed by a software command. The pitch selected on the menu serves as the default pitch.
If the PITCH LOCK option is set to YES in the EXTENDED SETUP MODE, the currently selected pitch cannot be changed by a software command.

Character pitch	Printing sample
10 cpi	ABCDEFGHIJKLMNOPQRSTUVWXYZ
12 cpi	ABCDEFGHIJKLMNOPQRSTUVWXYZ
15 cpi	ABCDEFGHIJKLMNOPQRSTUVWXYZ
16.7 cpi	ABCDEFGHIJKLMNOPQRSTUVWXYZ
17.1 cpi	ABCDEFGHIJKLMNOPQRSTUVWXYZ
20 cpi	ABCDEFGHIJKLMNOPQRSTUVWXYZ
24 cpi	ABCDEFGHIJKLMNOPQRSTUVWXYZ
LQ Proprtional	ABCDEFGHIJKLMNOPQRSTUVWXYZ

Function

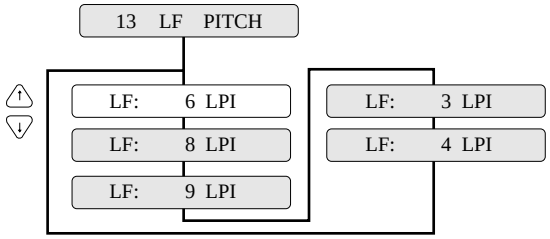
#13

Line feed pitch

This function specifies the line feed pitch as shown below.

LF: 6 LPI..... 1/6 inch pitch
LF: 8 LPI..... 1/8 inch pitch
LF: 9 LPI..... 1/9 inch pitch
LF: 3 LPI..... 1/3 inch pitch
LF: 4 LPI..... 1/4 inch pitch
(LPI = Line Per Inch)

Setting procedures



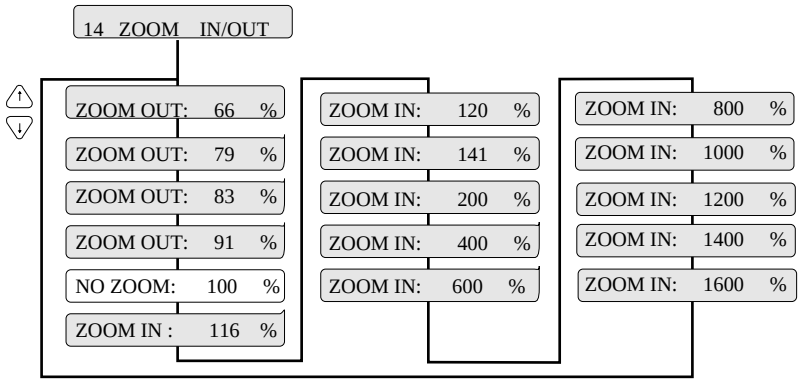
Function #14

Enlarging/Reducing print

This function specifies the magnification enlargement (zoom in) or reduction (zoom out).

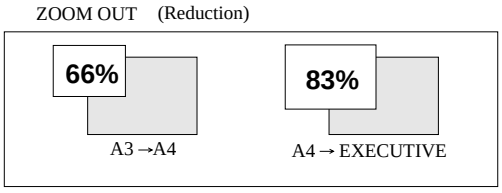
It can enlarge or reduce data as needed according to the form size. It is used, for example, to print documents prepared for the A4 paper on A3 paper.

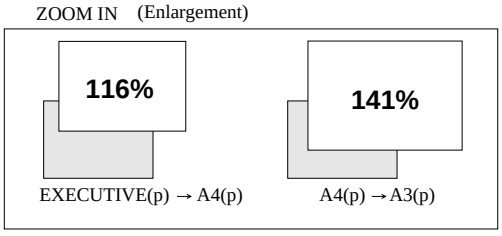
Setting procedures



Supplementary notes

Documents are enlarged or reduced vertically and horizontally by the degree of magnification specified with this function. The following shows the frequently-used magnifications for reference.





(P) : Portrait

The magnification displayed on the LCD has some allowance. Enlarged or reduced characters are printed in a different font from the specified font.

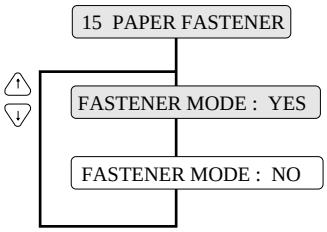
Function #15

Paper fastener mode setting

This function sets the mode for stable paper feeding with multipart fanfold paper bound by paper fasteners.

When the multipart fanfold paper is bound by paper fasteners or paper staples rather than glue, paper slippage or paper jam error may occur. When paper is fed while the print head is stopped on a paper fastener, the fastener will become a load and normal paper feeding will be disabled. When YES is selected, the print head does not stop on a paper fastener.

Setting procedures



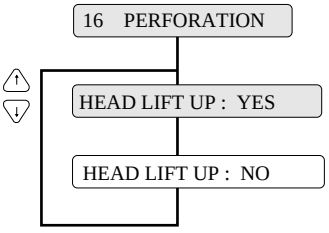
Function #16

Perforation head-up mode setting

This setting is effective when the perforation peak exceeds the range which permits normal paper feeding.

When the perforation peak of the paper which is spread on a flat surface is 1.0 mm or more, paper slippage or paper jam error may occur. This will result in a stress when the printi head passes over the perforation, and normal paper feeding will be disabled.
When YES is selected, the gap between the print head and the platen is widen while the paper is feeding within 0.5 inch of the perforation.

Setting procedures



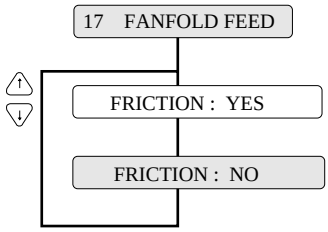
Function #17

Fanfold feed setting

This setting specifies whether or not to also use the friction rollers when feeding fanfold paper.

When multipart forms are used, the friction rollers should be set to be used (FRICTION: YES). When the thin single fanfold paper is used, the friction rollers should be set to be not used (FRICTION: NO).

Setting procedures



Supplementary notes

When the binding method of a multipart form is different on the left and right sides, the friction rollers should be set to be not used (FRICTION: NO).

Function #18

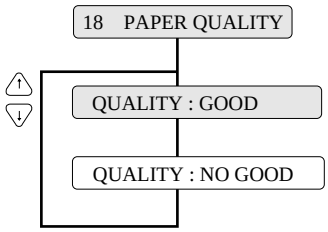
Selection of paper quality

The paper quality is selected.

Select the paper quality according to the condition of the paper edge.

When the paper edge is bent or curled over after printing, select "Paper quality : Bad". In this case, after inserting the paper, it is necessary to straighten the paper edge.

Setting procedures

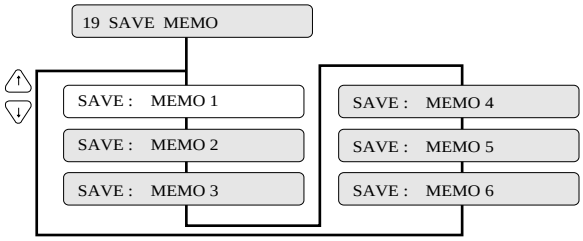


Function #19

Saving data in format memory

This function writes the data of the format memory currently in use to the specified memo.

Setting procedures



Supplementary notes

Format memory

The format memory saves six setup parameters. Optional setup parameters can be saved in the memory and loaded on the printer. If different formats are specified and saved in the memory, you can change setup parameters by using the format memory.

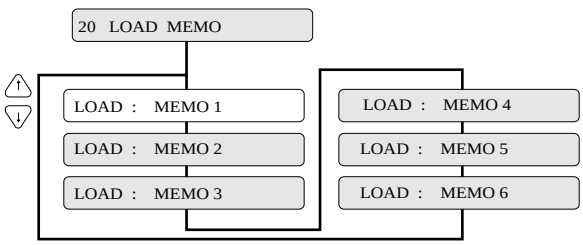
Function #20

Loading data from format memory

This function reads data from the specified format memory into the format memory currently in use.

The user can exchange data in the format memory with data in any of the following memos: memo 1 to memo 6.

Setting procedures



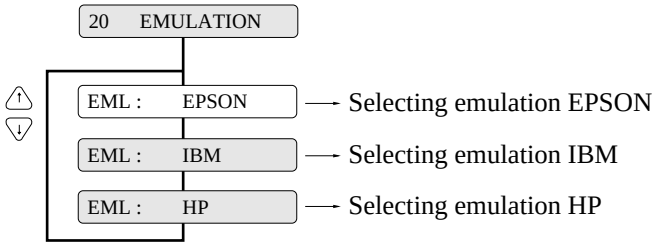
Function #20

Emulation

The printer has three types of emulations shown below.

Emulation compatible with the EPSON LQ-2550 ™
Emulation compatible with the IBM 2391™
Emulation compatible with the Hewlett Packard Rugged Writer 480 ™ (PCL3) ™

Setting procedures

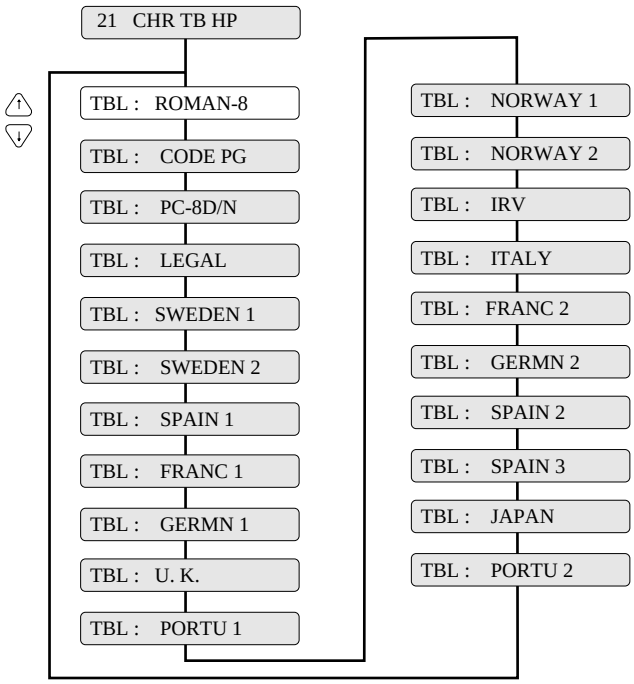


Function #21

Character table (HP)

This function specifies the character table used in the HP mode.

Setting procedures



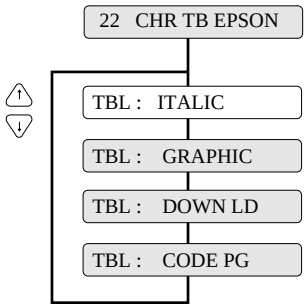
Function

#22

Character table (EPSON)

This function specifies the character table used in the EPSON mode.

Setting procedures



Supplementary notes

The values specified here serve as the default values.

ITALIC	Italic table
GRAPHIC	Extended graphic table
DOWN LD	Download table
CODE PG	Code page

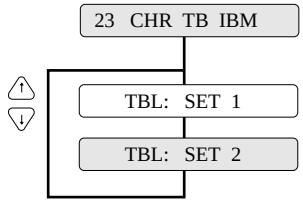
Function

#23

Character table (IBM)

This function specifies the character table used in the IBM mode.

Setting procedures



Supplementary notes

SET1	Character set 1
SET2	Character set 2

Function

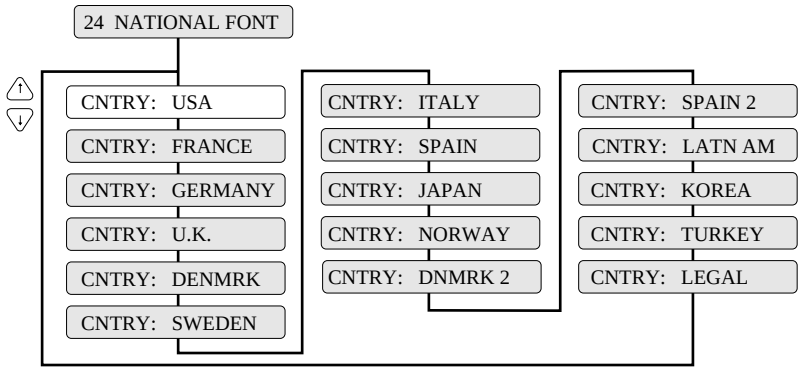
#24

National font (EPSON)

The printer has sixteen national fonts as shown below:

U.S.A., France, Germany, U.K., Denmark, Sweden, Italy, Spain, Japan, Norway, Denmark 2, Spain 2, Latin America, Korea, Turkey, and Legal

Setting procedures



Supplementary notes

These national fonts are not applicable to the IBM or HP mode.
The following table shows the national fonts.

	23	24	40	5B	5C	5D	5E	60	7B	7C	7D	7E
U.S.A.	#	$	@	[	\	]	^	`	{	¦	}	~
France	#	$	à	°	ç	§	^	`	é	ù	è	¨
Germany	#	$	§	Ä	Ö	Ü	^	`	ä	ö	ü	ß
U.K.	£	$	@	[	\	]	^	`	{	¦	}	~
Denmark	#	$	@	Æ	Ø	Å	^	`	æ	ø	å	~
Sweden	#	¤	É	Ä	Ö	Å	Ü	é	ä	ö	å	ü
Italy	#	$	@	°	\	é	^	ù	à	ò	è	ì
Spain	₧	$	@	¡	Ñ	¿	^	`	¨	ñ	}	~
Japan	#	$	@	[	¥	]	^	`	{	¦	}	~
Norway	#	¤	É	Æ	Ø	Å	Ü	é	æ	ø	å	ü
Denmark2	#	$	É	Æ	Ø	Å	Ü	é	æ	ø	å	ü
Spain2	#	$	á	¡	Ñ	¿	é	`	í	ñ	ó	ú
Latin America	#	$	á	¡	Ñ	¿	é	ü	í	ñ	ó	ú
Korea	#	$	@	[	₩	]	^	`	{	¦	}	~
Turkey	#	ı	İ	Ç	Ö	Ş	Ü	ğ	ç	ö	ş	ü
Legal	#	$	§	°	′	″	¶	`	©	®	†	™

If some specific characters are printed in a font of another nation, the code page or national font may be specified improperly. Refer to the manual of the computer or application software used. Use great care with software produced in other countries.

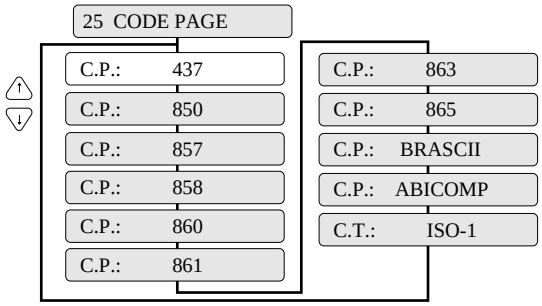
Function #25

Code page

The printer has eleven code pages shown below:

(1) Code page 437: U.S.A.
(2) Code page 850: Multilingual
(3) Code page 857: Turkey
(4) Code page 858: Multilingual (EURO symbol)
(5) Code page 860: Portugal
(6) Code page 861: Icelandic
(7) Code page 863: Canadian-French
(8) Code page 865: Norway
(9) Code page Brascii
(10) Code page Abicomp
(11) ISO-1: Western Europe, ISO-8859-1

Setting procedures

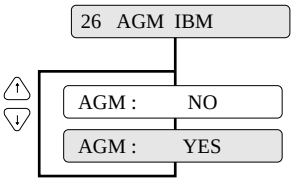


Function #26

Alternate graphics mode (AGM) (IBM)

This function enables the alternate graphics mode (AGM) commands to be used.

Setting procedures



- AGM is invalid.
- AGM is valid.

Supplementary notes

This function enables the IBM mode to use the high-density graphic printing function originally available in the EPSON mode.
When the AGM function is valid, the software command available in the EPSON mode can be used even in the IBM mode.

Command	AGM invalid (NO)	AGM valid (YES)
ESC 3 n	Specifying n/216" line feed pitch	Specifying n/180" line feed pitch
ESC J n	Executing n/216" line feed pitch	Executing n/180" line feed pitch
ESC A n	Registering n/72" line feed pitch that is specified with ESC 2.	Specifying n/60" line feed pitch
ESC * m n1 n2	Unusable	Various graphic modes can be executed.

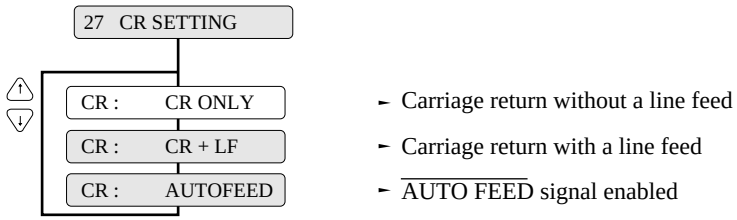
Function

#27

CR code function

This function specifies whether or not to feed a line when the printer receives a carriage return (CR) command.

Setting procedures



Supplementary notes

1. EPSON mode
   If AUTOFEED is selected, the printer checks the AUTO FEED signal during initialization. It executes a carriage return with a line feed when the AUTO FEED signal is low. It executes a carriage return with out a line feed when the AUTO FEED signal is high. The AUTO FEED signal is usable only when the PARALLEL interface or AUTO is selected. A carriage return without a line feed is executed when the SERIAL interface is selected.

2. IBM or HP mode
   If AUTOFEED is selected, a carriage return without a line feed is executed.

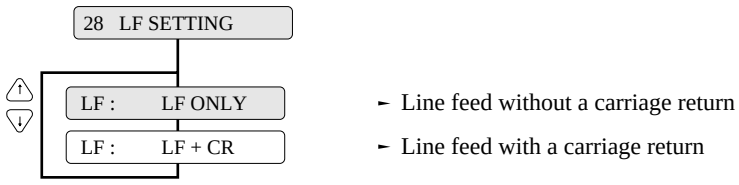
Function

#28

LF code function

This function specifies whether or not to execute a carriage return when the printer receives a line feed (LF) command.

Setting procedures

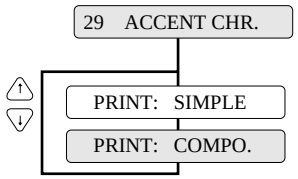


Function #29

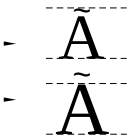
Accent character

This function specifies the method of printing accent characters.

Setting procedures



(Printing Example)



Supplementary notes

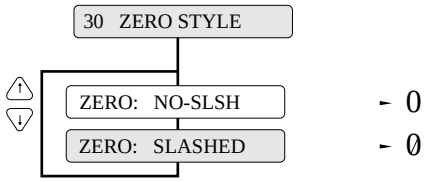
When SIMPLE is selected, the accent character of the resident font is printed. When COMPO. is selected, the accent symbol and the character are printed separately to add the accent symbol in the proper position.

Function #30

Zero font style

Two types of zeros are available: Ø with a slash, and 0 with no slash. This function allows the user to select either font.

Setting procedures



Supplementary notes

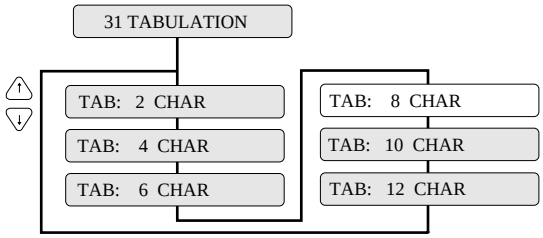
The use of the slashed zero font helps to distinguish zero (0) from the capital alphabetic letter "O".

Function #31

Horizontal tab

The actual position of the horizontal tab depends on the processing of the selected emulation.

Setting procedures



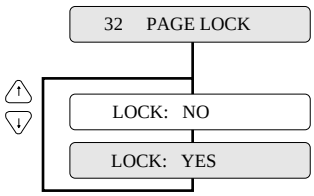
Output data can be printed within the printable area of the form by adjusting the tab when outputting nested program lists.

Function #32

Locking page length

This function specifies whether or not to change the page length specified in the SETUP MODE by a software command.

Setting procedures



- Software command is valid.
- Software command is invalid.

Supplementary notes

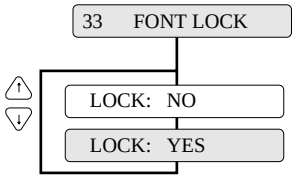
The right and left margins can be changed by software commands regardless of this function. This function can also specify whether or not to change the top and bottom margins by a software commands.

Function #33

Locking font

This function specifies whether or not to change the typeface of font selected in the SETUP MODE by a software command.

Setting procedures



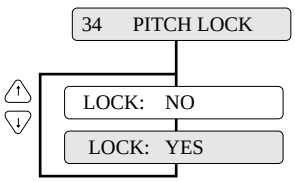
- Software command is valid.
- Software command is invalid.

Function #34

Locking character pitch

This function specifies whether or not to change the character pitch selected in the SETUP MODE by a software command.

Setting procedures



- Software command is valid.
- Software command is invalid.

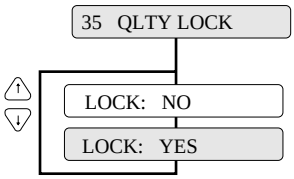
Function

#35

Locking character quality

This function specifies whether or not to change the character quality selected in the SETUP MODE by a software command.

Setting procedures



- Software command is valid.
- Software command is invalid.

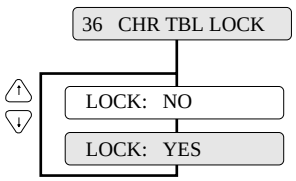
Function

#36

Locking character table

This function specifies whether or not to change the character table selected in the SETUP MODE by a software command.

Setting procedures



- Software command is valid.
- Software command is invalid.

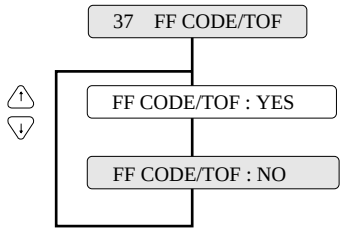
Function

#37

FF code set at TOF position

This function specifies whether or not FF (Form Feed) is executed at TOF.
When “YES” is set, the FF code performs Form Feed even if the present position is at TOF.
When “NO” is set, the FF code is ignored when the present position is at TOF.

Setting procedures



Supplementary notes

Certain kinds of software send commands to feed a blank page without printing. Select "FF CODE/TOF :NO" to neglect this command.

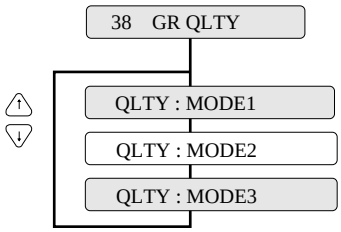
Function

#38

Setting the graphic printing speed

120DPI, 180DPI, 240DPI and 360 DPI graphic printing speeds are set.

Setting procedures



Supplementary notes

Graphic MODE	Printing speed	Quality
MODE 1	Slow	Fine
MODE 2	Normal	Normal
MODE 3	Fast	Coarse

The graphic printing speed setting selects the character quality in the panel setting and is effective only when "Quality : NORMAL LQ" is selected.

Function

#40

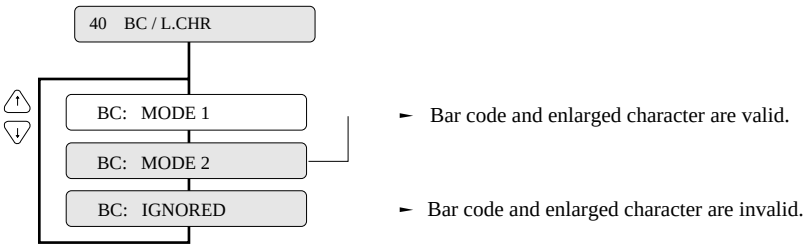
Validity of bar code and enlarged character

This function specifies whether or not to activate the bar code and enlarged character function. If MODE 1 or MODE 2 is selected, the bar code and enlarged character can be printed.

See page 5-1 for details of the bar code.

See page 5-16 for details of the enlarged character.

Setting procedures



If MODE 1 is selected, ESC SI or ESC SO cannot be used for the bar code data start or stop command.
If MODE 2 is selected, ESC SI or ESC SO can be used for the bar code data start or stop command.

Function

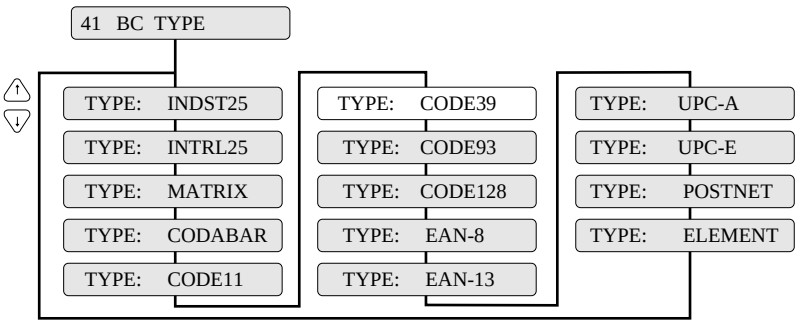
#41

Bar code type

This function specifies one of thirteen available types of bar code.

The bar code type specified here is regarded as the default setting, which can be changed by a software command.

Setting procedures



Industrial 2 of 5

Interleaved 2 of 5

Matrix 2 of 5

CODABAR

CODE 11

CODE 39

CODE 93

CODE 128

EAN-8

EAN-13

UPC-A

UPC-E

POSTNET

Bar code specifications

The table below shows the specifications of thirteen types of bar codes available for the printer. Bar code printing examples are shown on the previous page.

Bar code	Structure	ICG	letters (#)	Check character	Sample data	Remark
Industrial 2/5	5B4S	Yes	0-9	Yes (Mod 10)	1234567	
Interleaved 2/5	5B5S (2 characters as one unit)	No	0-9	Yes (Mod 10)	1234567	Even number, including check character. Data length is variable.
Codabar	4B3S	Yes	0-9, Special characters: 24	Yes (Mod 16)	1234567	Start and end codes are sent by the user.
Matrix 2/5	3B2S	Yes	0-9	Yes (Mod 10)	1234567	
Code 11	3B2S	Yes	0-9,"-"	Yes (Mod 11)	1234567	Start and end codes are (Δ) code. Dual check character
Code 39	5B4S	Yes	0-9, AB,...(43)	Yes (Mod 43)	1234567	Start and end codes are asterisk (*) codes.
Code 93	3B3S	No	ASCII (128)	Yes (Mod 47)	1234567	Two check characters
Code 128	3B3S	No	ASCII (128)	Yes (Mod 103)	1234567	
EAN-8	2B2S	No	0-9	Yes (Mod 10)	4912345	8 digits (2 prefix code +5 data code+Check character)
EAN-13	2B2S	No	0-9	Yes (Mod 10)	491234567890	13 digits (2 prefix code +10 data code+Check character)
UPC-A	2B2S	No	0-9	Yes (Mod 10)	01234500006	12 digits (NSC+10 data+ Check character)
UPC-E	2B2S	No	0-9	Yes (Mod 10)	01234500006	UPC-A (12-digit) data is automatically converted into UPC-E (10-digit) data.
Postnet	2LB3SB	No	0-9	Yes (Mod 10)	123456789	6, 10 or 12 digits (data +Check character)

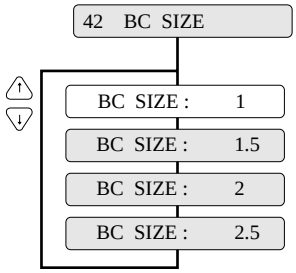
"B" and "S" in the "Structure" column show the number of bars and spaces which consist of one or two characters. LB and SB mean long bar and short bar, respectively.

Function #42

Bar code size

This function specifies the default bar code size.

Setting procedures



Supplementary notes

The tables below show bar code sizes and attributes.

SIZE	1	1.5	2	2.5
NARROW BAR	2/120inch	3/120inch	4/120inch	5/120inch
WIDE BAR	6/120inch	9/120inch	12/120inch	15/120inch
NARROW SPACE	2/120inch	3/120inch	4/120inch	5/120inch
WIDE SPACE	6/120inch	9/120inch	12/120inch	15/120inch
INTER CHARA. GAP	2/120inch	3/120inch	4/120inch	5/120inch
BAR HEIGHT	8/12inch	8/12inch	12/12inch	12/12inch

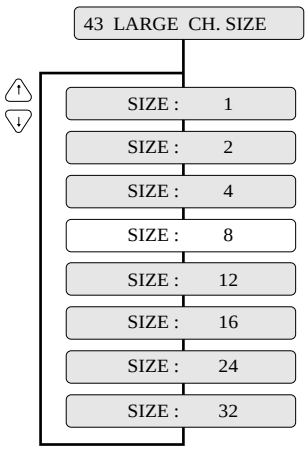
HRI PRINT	BELOW
HRI FONT	OCR-B
CHECK CHARACTER	Added
PRINT DENSITY	1/120 inch

Function #43

Enlarged character size

This function specifies the default size of enlarged characters.

Setting procedures

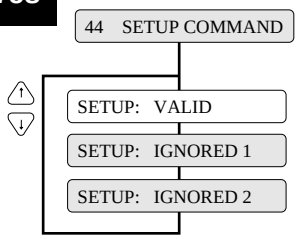


Function #44

Software setup

This function specifies whether or not to accept the software set up command.

Setting procedures



Setup can be specified by a software command.

Supplementary notes

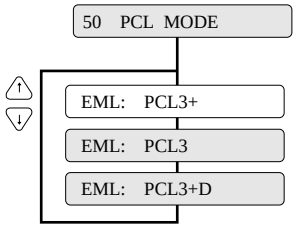
The setup command is ignored when "IGNORED 1" is selected.
The setup command and paper path command are ignored when "IGNORED 2" is selected.

Function #50

PCL mode (HP)

This function specifies the emulation level in the HP mode.

Setting procedures



PCL3:

Fully compatible with the RuggedWriter 480. The character pitches (15,17.1 and 24) and print quality modes (HQDR,NLQ, S.D.,S.S.D.) cannot be selected by software commands.

PCL3+:

Extra capability to the RuggedWriter 480. In this mode, additional character pitches, print quality modes, and raster gaphics resolutions may be selected by software command.

PCL3+D:

Limited DeskJet compatibilty. In this mode, the commands “ESC * P # Y” and “ESC * p # X” define units in 1/360”.

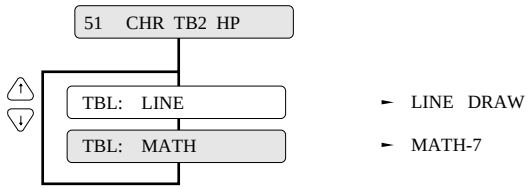
If you want print DeskJet application data,you can make use of PCL3+D. The print position and graphics of the PCL3+D are closer than the other two modes to the DeskJet.

Function #51

Secondary character table (HP)

This function specifies the symbol set of the secondary character set in the HP mode.

Setting procedures

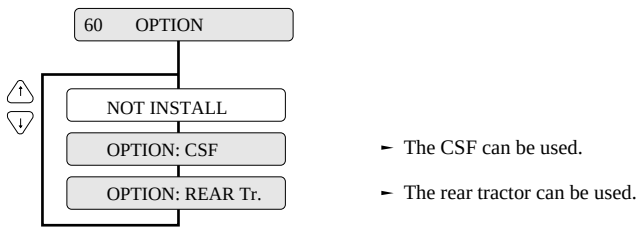


Function #60

Setting option

This function specifies whether or not to install option.

Setting procedures



Supplementary notes

When the CSF (cut sheet feeder) is selected, the rear tractor cannot be used. Similarly, when the rear tractor is selected, the cut sheet feeder cannot be used.

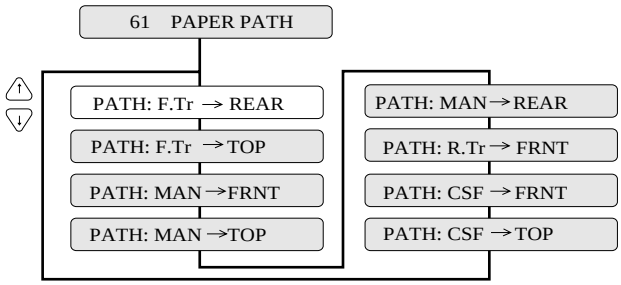
Function #61

Paper path

This function selects the paper path from among eight available selections.

This option has the same function as the PAPER PATH key on the control panel.

Setting procedures



Supplementary notes

Priority is given to the most recent setting made with the PAPER PATH key or in the EXTENDED SETUP MODE.

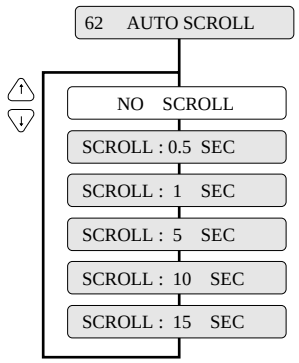
Function #62

Automatic scrolling

This function selects the timeout period for automatic scrolling.

When the preset timeout period has passed after data in the communication buffer is processed, and no new data is received, the perforation of the current page is fed to the paper cutter position, allowing printed data to be examined. This timeout period can be set to 0.5, 1, 5, 10 or 15 seconds.
This function is valid only when printing on fanfold paper.

Setting procedures



Function

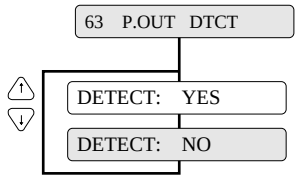
#63

Out-of-paper detection

This function specifies whether or not to perform paper bottom detection.

When NO is selected, printing continues for the page length that is specified and out-of-paper is ignored even when the paper is out.

Setting procedures



- Out-of-paper detection is performed.
- Out-of-paper detection is not performed.

Supplementary notes

This function should be set to NO when printing on paper with binding holes or when using paper on which a pattern is printed on the back.

Function

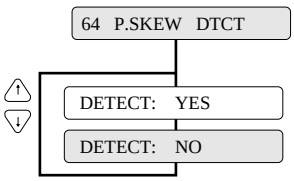
#64

Skew detection

This function specifies whether or not to perform the skew detection for checking whether paper has been loaded manually on the skew.

If YES is selected, the printer ejects the paper loaded on the skew.

Setting procedures



- Skew detection is performed.
- Skew detection is not performed.

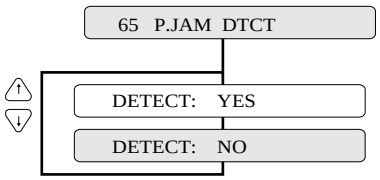
Function #65

Paper jam detection

This function specifies whether or not to perform the paper jam detection.

If YES is selected, the printer automatically stops printing in case of paper jamming.

Setting procedures



- Paper jam detection is performed.
- Paper jam detection is not performed.

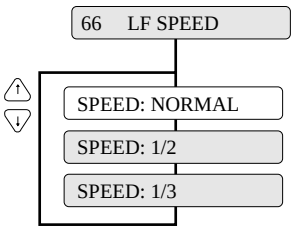
Function #66

Line feed speed

This function specifies the line feed speed.

The 1/2 or 1/3 line feed speed feeds paper more stably. It is useful for thick paper, labeled sheets and multipart paper in continuous printing.

Setting procedures



- Line feeding at normal speed (60 lps)
- Line feeding at half speed (30 lps)
- Line feeding at 1/3 speed (20 lps)

Supplementary notes

With the NORMAL line feed speed selected, the line feed speed is reduced to half (i.e., 30 lps) when the line feed pitch is 1/3 inch and below, or paper is loaded.

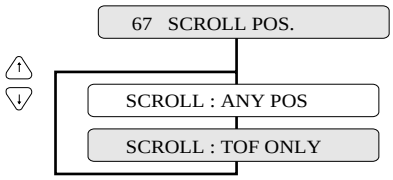
Function

#67

Setting of the auto-scrolling position

Set the position for executing auto-scrolling.
In the case of "TOF ONLY" : Auto-scrolling is performed only when the present position is at TOF .
"ANY POS" : If the perforation is between the paper cutter and printing head position, auto-scroll is performed at any position after a prescribed time after the printing.

Setting procedures



Function

#70

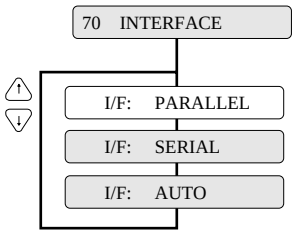
Interface

This function selects the parallel or serial interface.
Setting procedures

See page 7-1 for details of the parallel interface.

See page 7-5 for details of the serial interface.

Setting procedures



- Parallel interface is selected.
- RS-232C serial interface is selected.
- Parallel and serial interfaces are switched automatically.

Supplementary notes

The functions shown below are available according to the interface type.
The printer is set to the standard parallel and serial interface before shipment. If it does not print data properly, recheck the functions shown below. For the settings for the serial interface, refer to the manual of the computer.

Parallel I/F

EXTENDED SETUP MODE	Factory setting	Page
#70.INTERFACE	PARALLEL	3-46
#71.SELECT IN ENABLE	0	3-47
#81.BUFFER SIZE	512 KB	3-52
#82.BUSY/ACK TIMING	TYPE 2	3-53
#83.DATA LATCH TIMING	TYPE F.	3-53
#84.ERROR STATUS	YES.	3-54

Serial I/F

EXTENDED SETUP MODE	Factory setting	Page
#70.INTERFACE	PARALLEL	3-46
#71.SELECT IN ENABLE	0	3-47
#72.PARITY BIT	Non	3-47
#73.DATA LENGTH	8 bits	3-48
#74.STOP BIT	1 bit	3-48
#75.PROTOCOL	DTR	3-49
#76.BAUD RATE	9600 bps	3-49
#77.SERIAL ERROR	Print	3-50
#78.CTS ENABLE	No	3-50
#79.CD ENABLE	No	3-51
#80.DSR ENABLE	No	3-51
#81.BUFFER SIZE	512 KB	3-52

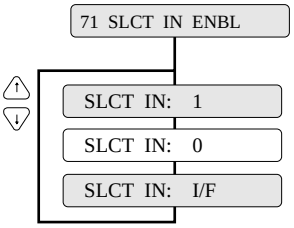
Function

#71

Printer select command

This function specifies whether or not to perform the printer select command.

Setting procedures



- Printer select command is always accepted.
- Printer select command is always ignored.
- Printer select command is accepted when $\overline{\text{SELECT IN}}$ signal is set high. It is ignored when $\overline{\text{SELECT IN}}$ signal is set low.

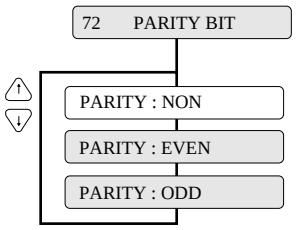
Function

#72

Parity bit (Serial I/F)

This function specifies the parity bit when the serial interface is used.

Setting procedures



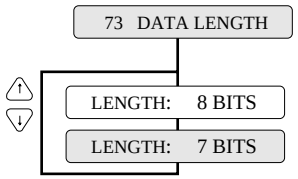
- Parity check is not executed.
- Even number check is executed
- Odd number check is executed.

Function #73

Data length (Serial I/F)

This function specifies the data length when the serial interface is used.

Setting procedures



- Data length is set to 8 bits.
- Data length is set to 7 bits.

Supplementary notes

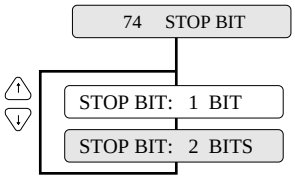
Select the data length: 8 bits or 7 bits.

Function #74

Stop bit (Serial I/F)

This function specifies the stop bit when the serial interface is used

Setting procedures



- Stop bit length is set to 1 bit.
- Stop bit length is set to 2 bits.

Supplementary notes

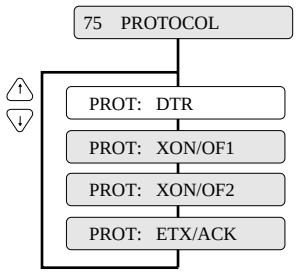
Select the stop bit length: 1 or 2 bits.

Function #75

Protocol (Serial I/F)

This function specifies the protocol for the serial interface.

Setting procedures



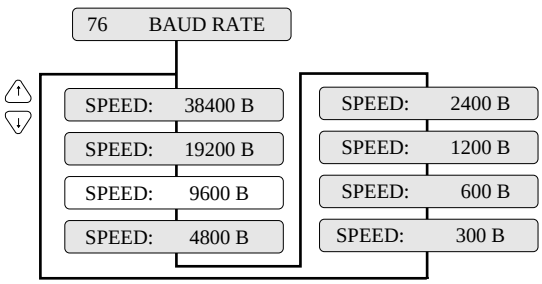
- DRT (ready/busy) protocol is selected.
- X-ON/X-OFF protocol (I) is selected.
- X-ON/X-OFF protocol (II) is selected.
- EXT/ACK protocol is selected.

Function #76

Baud rate (Serial I/F)

This function specifies the data transmission rate for the serial interface..

Setting procedures



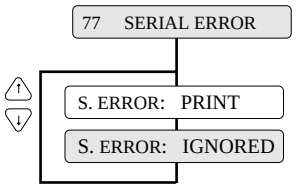
Function #77

Serial error (Serial I/F)

This function specifies whether or not to print asterisk '*' when a serial data transmission error occurs during communication via the serial interface.

The serial data transmission error includes a parity error, framing error and over-run error.

Setting procedures



- Asterisk (*) is printed in case of error.
- Error is ignored.

Supplementary notes

If a serial data transmission error occurs with the SERIAL ERROR option selected to PRINT, the data in error is printed as asterisk "*". If data exceeding the buffer size is sent while the printer is busy, the excess data is ignored. If a serial data transfer error occurs with the SERIAL ERROR option set to IGNORED, the erroneous data is discarded.

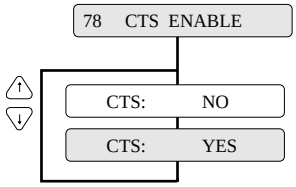
Function #78

CTS signal (Serial I/F)

This function specifies whether or not to validate the CTS (clear to send) signal.

When the X-ON/X-OFF protocol or ETX/ACK protocol is used, the CTS signal is used to output data from the printer to the computer.

Setting procedures



- CTS signal is ignored.
- CTS signal is valid.

Supplementary notes

If this option is set to NO, the printer sends data to the computer regardless of the CTS signal status.
If this option is set to YES, the printer checks the CTS signal status to send data to the computer.

Function

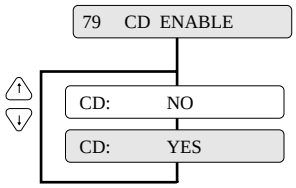
#79

CD signal (Serial I/F)

This function specifies whether or not to validate the CD (carrier detect) signal.

The CD signal indicates whether or not a modem is connected to a communication line.

Setting procedures



- CD signal is ignored.
- CD signal is valid.

Supplementary notes

If this option is set to NO, the printer processes the received data as valid data regardless of the CD signal status.
If this option is set to YES, the printer checks the CD signal status to receive data from the computer.

Function

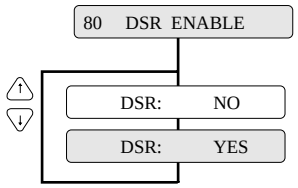
#80

DSR signal (Serial I/F)

This function specifies whether or not to validate the DSR(data set ready) signal.

The DSR signal indicates the status of the modem or computer.

Setting procedures



- DSR signal is ignored.
- DSR signal is valid.

Supplementary notes

If this option is seto to NO, the printer processes the received data as valid data regardless of the DSR signal status.
If this option is set toYES, the printer checks the DSR signal status to receive data from the computer.

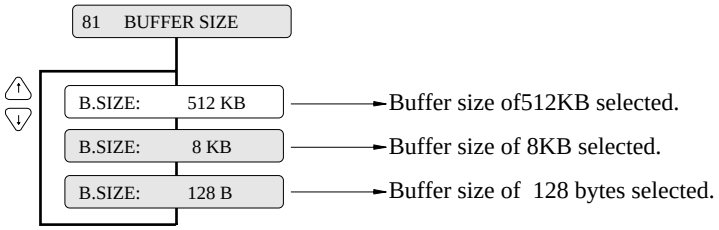
Function

#81

Input buffer size

This function specifies the size of the input buffer. The buffer sizes shown below are provided.

Setting procedures



Supplementary notes

The buffer sizes shown below are provided.

BUFFER SIZE	Parallel I/F		Serial I/F	
	CIN	CRN	CIN	CRN
512K byte	1K byte	2K byte	1K byte	2K byte
8K byte				
128 byte	32byte	64 byte	32 byte	64 byte

CIN : The printer enters the busy state when the available space in the buffer is reduced below the CIN value.

CRN : The printer enters the ready state when the available space in the buffer exceeds the CRN value.

When the serial interface is used, processing differs according to the protocol as shown below when the available space in the buffer is inadequate.

Protocol	CIN processing	CRN processing
DTR (Ready/Busy)	BUSY	READY
X-ON/X-OFF(I) X-ON/X-OFF(II)	Sends X-OFF	Sends X-ON
ETX/ACK	Stops sending ACK	Begins sending ACK

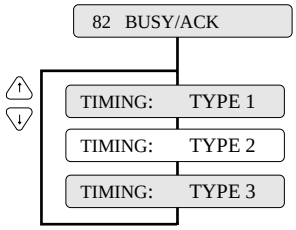
When the printer enters the CIN processing in the parallel interface, data is input at 0.5 seconds intervals.

Function #82

Busy/ACK signal timing (Parallel I/F)

This function specifies the timing of the BUSY and $\overline{\text{ACK}}$ signals transmitted via the parallel interface.

Setting procedures



$\overline{\text{ACK}}$ signal
- Rising edge
- Center
- Falling edge

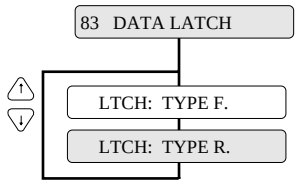
Type	Timimg
TYPE 1	BUSY / $\overline{\text{ACK}}$
TYPE 2	BUSY / $\overline{\text{ACK}}$
TYPE 3	BUSY / $\overline{\text{ACK}}$

Function #83

Data latch timing(Parallel I/F)

This function specifies the timing to latch DATA 1 ~ 8 at the falling edge (TYPE F.) or rising edge (TYPE R.) of the STROBE signal.

Setting procedures



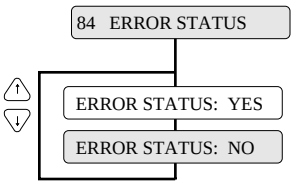
$\overline{\text{STROBE}}$ signal
- Falling edge
- Rising edge

Type	Timimg
TYPE F.	$\overline{\text{STROBE}}$ / DATA 1~8
TYPE R.	$\overline{\text{STROBE}}$ / DATA 1~8

TYPE F.
Data is read in when the $\overline{\text{STROBE}}$ signal goes Low.
TYPE R.
Data is read in when the $\overline{\text{STROBE}}$ signal goes High.

Error status signal output setting (parallel interface)

This function specifies whether or not to output the parallel interface error status signal (PE, $\overline{\text{ERROR}}$, SELECT) when an error occurs.



When NO is selected, the status of the PE, $\overline{\text{ERROR}}$, and SELECT signals does not change even if the printer is in out-of-paper, error, or offline state. This function is effective when the system outputs the printing data again when an error occurs.

Function #90

Printing direction

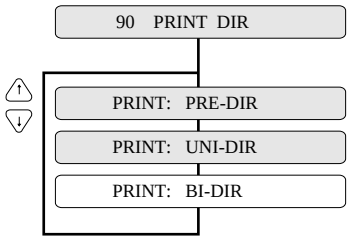
The three printing directions shown below are available.

PRE-DIRECTION: Bi-directional printing 1
Printing is done in the shortest distance through logical seeking. When double striking, vertical double-size character printing, or other special effect printings require several passes, they are carried out in the same direction as the first pass.

BI-DIRECTION: Bi-directional printing 2
Logical seeking is carried out toward the closer printing start position from the current head position to perform printing in the shortest direction.

UNI-DIRECTION: Unidirectional printing
Printing is always done in the same direction, from the left to right.

Setting procedures

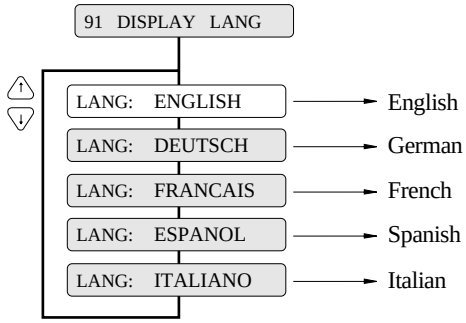


Function #91

Display language on LCD

This function specifies the display language on the LCD.

Setting procedures

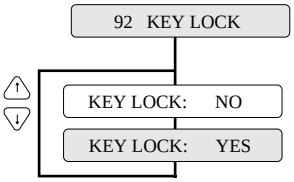


Function #92

Locking panel keys

This function specifies whether or not to validate the keys other than the RESET key (i.e., ALT + TEAR OFF keys) and ONLINE key in the ONLINE state.

Setting procedures



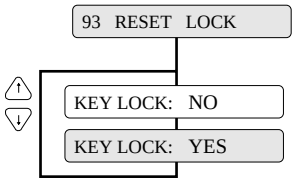
- Pressing a key is valid in the ONLINE state.
- Pressing a key is ignored in the ONLINE state.

Function #93

Locking reset key

This function specifies whether or not to validate the RESET key in the ONLINE state.

Setting procedures



- RESET key is valid in the ONLINE state.
- RESET key is ignored in ONLINE state.

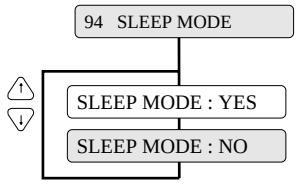
Function

#94

Setting ENERGY STAR

This function sets the power conservation standby mode. When this mode is valid, if the standby mode continues about 14 minutes after printing, the power conservation mode is engaged. The normal mode is effective when any print action is performed.

Setting procedures



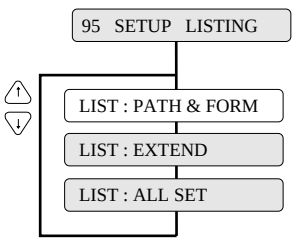
Function

#95

Printing setup list

This function prints the list of the parameters specified in the setup mode.

Setting procedures



Display	Print
PATH&FORM	Selectable paper paths and six format memories.
EXTEND	Parameters specified on the EXTENDED SETUP MODE are printed.
ALL SET	All parameters specified in the setup modes and data in the six memories are printed.

4. Functions

High-speed printing

The printer has both standard and high-speed print modes. The following table shows the print modes.

Selected with the QUALITY key or with #10 QUALITY in the SETUP MODE.

SET UP	ESC x 1 LQ is selected.	ESC x 0 Draft is selected.
LQ	LQ	Draft
NLQ	NLQ	Draft
HQDR	LQ	HQDR
DRAFT	LQ	Draft
S.D.	S.D.	S.D.
S.S.D.	S.S.D	S.S.D

Printing speed

Print mode	LQ (10 cpi)	180 CPS
	NLQ (10 cpi)	240 CPS
	HQDR (10 cpi)	360 CPS
	DRAFT (10 cpi)	603 CPS
	S.D. (12 cpi)	723 CPS
	S.S.D. (15 cpi)	904 CPS

(CPS=Character / Sec.)

When NLQ, HQDR, DRAFT, S. D. or S.S.D. is selected, the graphic is printed at high speed with lower bit density.

Operation procedures

Select a quality with the QUALITY key or with #10 QUALITY in the SETUP MODE.

See pages 2-3 and 3-17.

● Functions

Enhancing the copying capability for multipart forms

The printer has an enhanced printing mode for printing on multipart forms. With this function, the printer can print data on a multipart form consisting of an original sheet and up to eight sheets.

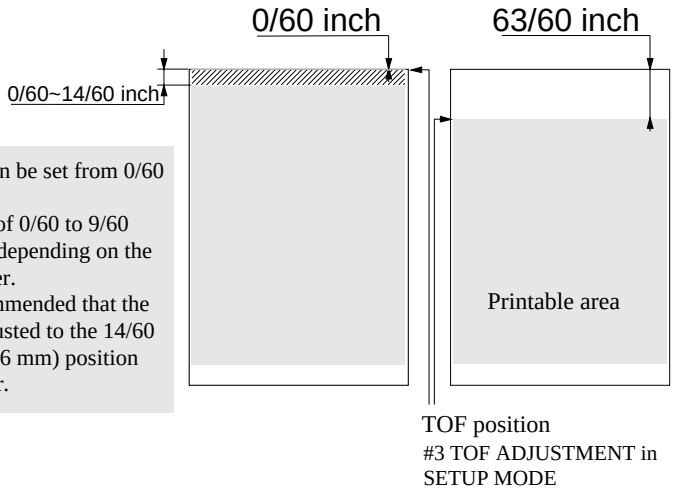
Operation procedures

Select a mode with #1 MULTIPART in the SETUP MODE.

See page 3-8.

Setting the printing start position

This function specifies the printing start position from the top of paper, from 0/60 to 63/60 inches, as shown below.



★Caution The TOF position can be set from 0/60 inch (0 mm).
However, if it is set of 0/60 to 9/60 inch, paper may jamdepending on the condition of the paper.
Normally, it is recommended that the TOF position be adjusted to the 14/60 inch (approximately 6 mm) position from the top of paper.

Operation procedures

See page 3-10.

Specify the TOF position using #3 TOF ADJUSTMENT in the SETUP MODE.

If the TOF position needs to be changed further, press the MICRO LF or MICRO RLF key to adjust the printing start position.
The TOF SET key can also be used for fanfold paper. (Be sure to close the printer cover when adjusting the TOF position.)

Feeding perforation to the cutter position

This function feeds the perforation of paper to the paper cutter position to cut the paper easily. It is useful for ejecting paper to the top of the printer when the front or rear tractor is used.

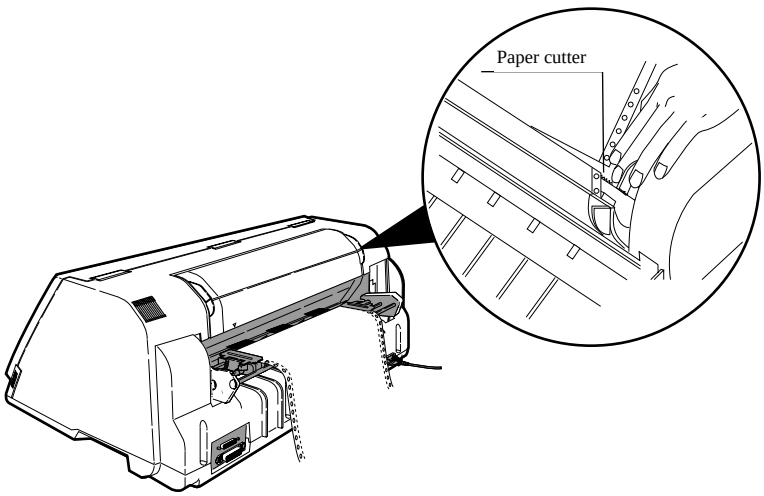
Operation procedures

Press the TEAR OFF key to feed the perforation to the paper cutter. Cut the paper, then press the TEAR OFF key again. The paper is fed back to the previous position.

See page 2-1.

To cut the paper fed out from the front of the tractor, hold the upper cover firmly with one hand and tear the paper towards you down wards.

⚠ Caution	Although safe, take care not to brush your fingers along the edge of the paper cutter.
★ Caution	Use the paper cutter attached to the upper cover to cut the paper. Using another part of the printer to cut the paper forcibly may result in damage to the printer.



● Functions

More stable paper feeding

This function controls the line feed speed to feed thick copying paper more stably.

In the 1/2 or 1/3 mode, line feeding is always carried out at 1/3 or 1/2 speed. This function is useful for printing data on multipart forms.

Operation procedures

Select the mode using #66 LF SPEED in the EXTENDED SETUP MODE.

See page 3-44.

When the multipart forms are bound by paper staples or paper fasteners, select FASTENER MODE: YES in the #15 paper fastener mode setting. When the perforation peak of the multipart fanfold paper is too high, select HEAD LIFT UP: YES in the #16 the head-up mode setting.

Operation procedures

Select the mode using #15 paper fastener mode setting and #16 perforation head-up mode setting in the SETUP MODE.

See page 3-22.

Automatically feeding perforation to the paper cutter position in the standby condition

This automatic scroll function feeds the perforation to the paper cutter position automatically when no data is received for a preset period.

If the input buffer becomes empty in the ONLINE state and no input data is received for a preset period (0.5, 1, 5, 10 or 15 seconds), the printer automatically feeds the perforation at the top of the next page to the paper cutter position and waits in this standby mode until additional input data is received.

When the printer receives additional input data in this standby condition, it reverse feeds paper to the correct print position and resumes printing there.

If the perforation is located at the paper cutter position when the input buffer becomes empty, no paper motion action occurs.

When TOF ONLY is selected together with #67 AUTO SCROLL POISITION, auto scrolling takes place only when the present position of the paper is TOF.

Operation procedures

Select a mode using #62 AUTO SCROLL in the EXTENDED SETUP MODE.

See page 3-42.

EEPROM initialization 1

Used for restoring settings made in the setup mode to the factory default settings.

This operation initializes all parameters on the SETUP MODE and EXTENDED SETUP MODE·

Operation procedures

1. Keep the LINE FEED, EJECT/LOAD, PAPER PATH and PAPER FORM keys depressed, and turn on the printer.

2. The message shown below is displayed on the LCD. The EEPROM is initialized.

```
EEPROM INITIAL 1
```

EEPROM initialization 2

This operation 2 initializes almost all factory default settings.
EEPROM intialization 2 = EEPROM intialization 1 + learning sensor.

Operation procedures

1. Set 15-inch fanfold paper to the front tractors in the parking position.

2. Keep the ALT. REVERSE LF, PAPER PATH and PAPER FORM keys depressed, and turn on the printer.

3. The message shown below is displayed on the LCD. The EEPROM is initialized.

```
EEPROM INITIAL 2
```

Correcting vertical misalignment

The printer has two printing adjustment modes to correct misalignment due to printer instrumentation error or aging deterioration: printing start position adjustment mode (mode A), and bi-directional printing position adjustment mode (mode B). These two modes allow the printing position to be corrected properly.

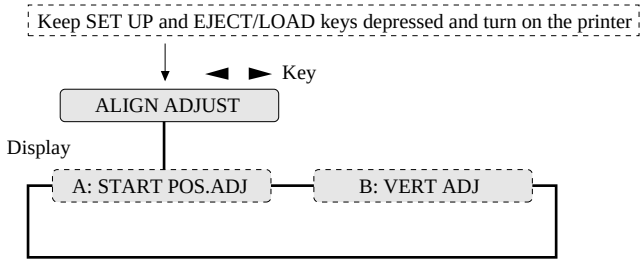
The printing start position adjustment mode (mode A) corrects misalignment in the printing start positions for printing at different speeds. This allows data to be printed at the same start position even at different printing speeds.
The bi-directional printing position adjustment mode (mode B) corrects misalignment in bi-directional printing at the same printing speed. It selects the proper correction value for each printing speed.

A change in mode A has effects mode B. If a change is made in mode A, mode B must also be set properly. The printer starts up in mode A and then enters mode B automatically. If no change is made in mode A, the printing position can be changed in mode B only.

Operation procedures

1. Set fanfold paper that is 10 inches or more in width to the printer. Feed one or more pages of paper and then select this mode.

2. Keep the SET UP and EJECT/LOAD keys depressed and turn on the printer. The printer enters the printing position adjustment mode.



3. Select a mode with the ◄ *or* ► *key,* then press the ENTER key.
The procedures shown below are used for both modes A and B.

4. Press the ENTER key and the timing pattern in mode A (or mode B) will be printed.
   Numbers marked with asterisks indicate the currently set timing numbers. In mode A, modes 1 to 11 are printed. In mode B, modes 0 to 11 are printed.
   In each mode, 13 timing patterns are printed.

5. Select a speed mode number to be changed in the printed patterns.

A-MODE 1: NO.6	Select with ◄ or ► key.
A-MODE 3: NO.6	For example, mode 1 is changed to mode. 3.

6. Select the best aligned pattern in the same speed mode.
   Check the alignment of the two line"H"printing.

7. Then press the ENTER key.

A-MODE 3: NO.6	Select with ▲ or ▼ key.
A-MODE 3: NO.8	For example, mode 6 is changed to mode 8.

   The selected timing is temporarily stored in the printer, and test printing is executed at that timing.

8. Repeat steps 5 to 7 to change the speed modes.

9. Press the EXIT key to finish setting.
   The timing stored temporarily is saved in the setup memory (EEPROM). Therefore, be sure to press the EXIT key to exit the mode.

10. Processing when the EXIT key will be pressed differs according to the mode as shown below.

    a. If mode A is exit, the menu of mode B will be displayed. Press the ENTER key, and the patterns of mode B are printed. Hereinafter, follow step 5 and so on.
    b. If mode B is exit, the printer is reset automatically and exits mode B.

Using various types of paper

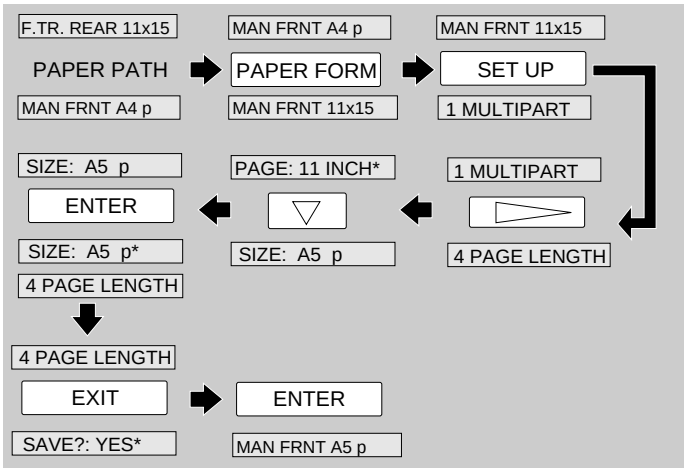
The printer has six memories for saving data on forms: MEMO 1 to MEMO 6. The following shows an example of storing the sizes of three forms used in the manual mode in MEMO 1 to MEMO 3.

Operation procedures

1. Press the PAPER PATH key to select MANUAL → FRONT.

2. Press the PAPER FORM key to select MEMO 1.

3. Specify the A5 portrait form with #4 PAGE LENGTH in the SETUP MODE, then save the setting as shown below.



4. Likewise, specify the Letter portrait form in MEMO 2 and the A3 portrait form in MEMO 3. The following messages will be displayed on the LCD.

MAN FRNT LT p	MAN FRNT A3 p

5. In printing, select the MEMO containing the form size to be used with the PAPER FORM key.

See page 1-11.

● Functions

Executing test printing

The printer can execute test printing.

Operation procedures

1. Keep the ONLINE and REVERSE LF keys depressed and turn on the printer.
2. The following message will be displayed on the LCD. The printer starts test printing.

   DEMO PRINT LQ

3. To terminate test printing, turn the power switch to off.

Key shortcut functions

Key shortcut functions are executed by pressing and holding the corresponding keys while simultaneously turning on the printer power. The following table shows the available shortcut functions.

Operation	ONLINE	FORM FEED	LINE FEED	REVERSE LF	PAPER FORM	PAPER PATH	TEAR OFF	EJECT/LOAD	SET UP	ALT	Power
Self Test Draft			○								●
Self Test LQ	○		○								●
Hex Dump Draft		○									●
Hex Dump LQ	○	○									●
Demo Print Draft				○							●
Demo Print LQ	○			○							●
Vertical Alignment								○	○		●
EEPROM Initialization			○		○	○		○			●

Note that, if the EEPROM is initialized, all the data specified in the EEPROM is deleted.

About Printer driver

Printer Driver is a section of your software that automatically translates instructions from the software to your printer.

For example, when using some application softwares, if you want to boldface or underline a word, the printer driver automatically translates your specific boldface or underline instruction on your application software to printer control command.

Different printers use different control codes for designating print styles. Therefore, it is important that when you install your software, you select the appropriate printer driver designed for your printer.

Printer driver selection

Select a suitable printer driver from the list of supported printers. This would include either the Hewlett Packard RuggedWriter 480, Epson LQ-2550 or IBM 2391. Each of these printer drivers should allow you to access many of the features on your printer.

If this printer is not listed, look for the following printer drivers. While this should allow you to print your document with your printer, it probably will not allow you to access many features of the printer. A few of the choices you may see are given below in order of preferences.

Hewlett Packard	Epson	IBM
RuggedWriter 480	LQ-2500/2550	2390/2391
DeskJet 500	LQ-1050/1000	Proprinter XL24E
	EX-1000	Proprinter XL24
		Proprinter 24P

Notes:

1. Set the emulation type in the extension setup options according to the selection of printer driver. For example, when you select the Epson LQ-2550 printer driver, you should set the emulation type to the Epson mode.
2. If you select the DiskJet 500 printer driver, you should set the #50 PCL MODE to PCL3+D.

Installing the Windows Printer Driver

The diskette provided with your printer contains the software you need to operate your printer with Windows applications. Before you install the printer driver, we recommend you to read the **README.TXT** file on the diskette. The **README.TXT** file contains all the information necessary to install the printer driver, as well as all other pertinent information regarding this software.
The printer driver tells Windows what information to send to the printer, including details about printer features, the printer interface, and fonts.

Follow the next procedure before installing the Windows printer driver.

1. Close all Windows applications. Otherwise you will get an error message when you attempt to install the printer driver.
2. Set the following parameters of Memo 1-6 to the factory default setting in the SETUP MODE.

#3 TOF ADJUSTMENT	14/60 inch
#6 TOP MARGIN	0 LINE
#7 BOTTOM MARGIN	0 LINE
#8 LEFT MARGIN	0 CHAR
#9 RIGHT MARGIN	0 CHAR
#10 QUALITY	LQ
#12 CHARACTER PITCH	10 CPI
#13 LF PITCH	6 LPI
#14 ZOOM IN/OUT	100 %

Set the following parameters to the factory default setting in the EXTENDED SETUP MODE.

#20 EMULATION	EPSON
#27 CR SETTING	CR ONLY
#28 LF SETTING	LF + CR
#32 PAGE LENGTH LOCK	NO
#33 FONT LOCK	NO
#34 PITCH LOCK	NO
#35 QUALITY LOCK	NO
#36 CHARACTER TABLE LOCK	NO
#44 SOFTWARE SETUP	VALID

IMPORTANT INFORMATION

1. COPYING RESTRICTIONS:
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Connecting the printer in the HP environment

Introduction

The HP emulation of the printer provides full compatibility with the HP2235A RuggedWriter 480 printer.

The printer also provides features and capabilities beyond those ever provided by the HP RuggedWriter printer. SEIKO Precision Inc. has provided a means for you to access these extra capabilities for any new applications that you may chose to print on the printer.

The extra capabilities of the printer are enabled for access through a special control panel menu setting entitled "50 PCL MODE".

PCL Mode

- PCL3 MODE -Provides the basic RuggedWriter 480 emulation command set.

- PCL3+ MODE –Provides extra capability to the RuggedWriter 480 command set that allows you to access many printer features through extensions of the command set.

- PCL3+D MODE –Provides all features of PCL3+ and allows the vertical and horizontal positioning to be set in increments of 1/360". This mode provides a "limited" Deskjet capability, and is mainly intended for printing from Windows using the Deskjet 500 driver. Print output from this mode will not be identical to that of a Deskjet printer (300 vs. 360 dpi) but will be closer than the other 2 modes for this type of application.

Setup

The information provided below gives setup information of the basic printer RuggedWriter emulation, details of the command set extensions provided with PCL3+ and PCL3+D Mode, and information on configuring the Serial I/O to the various Term Types used by the HP System.

Refer to the Setup options for details on using the SETUP and EXTENDED SETUP MODE.

Configuring the Printer with the RuggedWriter Emulation

1. Set the #20 EMULATION on EXTENDED SETUP MODE to "HP".
2. Set the #50 PCL MODE on EXTENDED SETUP MODE to "PCL3".

Setting the PCL MODE to "PCL3" provides the command set identical with that of the HP RuggedWriter 480.

Extra Capabilities for new Applications

Listed below is a summary of the expanded command sets available for new applications. Refer to the HP software commands for details of using the expanded command sets.

PCL3+ Mode

This operation mode provides the following extended capabilities:

Escape Command	Description	Added Capability
BEL	Activates the printer's bell	Bell is now active.
ESC & k # W	Controls the print direction	Unidirectional, Bidirectional, Predirectional
ESC (# id	Assign the primary font	PC-850, ISO25, France 2, German2, Spain 3, Legal, Math7, Math-Symbol, ISO84 Portugal 2, ISO85 Spain 2
ESC) # id	Assign the secondary font	PC-850, ISO25, France 2, German2, Spain 3, Legal, Math7, Math-Symbol, ISO84 Portugal 2, ISO85 Spain 2
ESC (s # H	Sets the character pitch	15, 17.1, 24 cpi (primary)
ESC) s # H	Sets the character pitch	15, 17.1, 24 cpi (secondary)
ESC (s # T	Sets the primary typeface	Script, Orator, Orator-s, OCR-A, OCR-B
ESC) s # T	Sets the secondary typeface	Script, Orator, Orator-s, OCR-A, OCR-B
ESC * b # M	Select graphics data compression	Off, Mode1, Mode2, Mode3
ESC * t # R	Designates raster graphics resolution	60, 360 dpi

PCL3+D Mode

This mode provides all of the capabilities described above plus the following:

Escape Command	Description	Added Capability
ESC * p # X	Sets horizontal positioning by dot	1/360"
ESC * p # Y	Sets vertical positioning by dot	1/360"

Serial I/O -Configuring Term Types 18, 19, 21, 22, or 26

The printer may be attached as a spooled printer on your system. It supports I/O status checking by responding to the interrogation string ESC ? DC1 and indicates its status concerning whether paper is loaded, printer covers are closed, and whether or not the printer is ONLINE.

Use the printer's EXTENDED SETUP MODE to configure the following parameters to match your host system settings:

70	INTERFACE	Set to SERIAL
72	PARITY	Set to match your host configuration as NONE, EVEN or ODD match your host setting
73	DATA LENGTH	Set to match your host configuration (Either 7 or 8 BITS)
74	STOP BIT	Set to match your host configuration (Either 1 or 2 BITS)
75	PROTOCOL	Set to XON/XOFF 1
76	BAUD RATE	Set to match your host configuration as 300,600,1200,2400,4800,9600,19200, or 38400

5. Bar code and enlarged character

The printer can print bar codes and enlarged characters.
To activate the bar code and enlarged character function, set #40 BARCODE/ENLARGED CHAR to MODE 1 or MODE 2 in the EXTENDED SETUP MODE.
This function is applicable to the EPSON or IBM or HP mode. This section describes the outline and details of the bar code and enlarged character function.

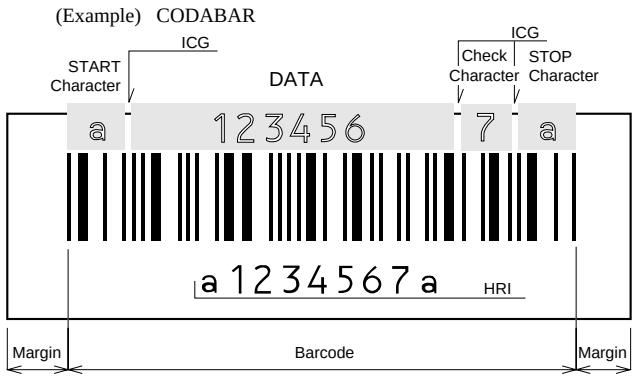
See page 3-36.

Outline of bar code function

The printer has 14 types of bar codes.
Software commands and options #40 to #42 on the EXTENDED SETUP MODE are used to print bar codes and enlarged characters.
The software commands are unique to the printer. See the following pages for details of these commands.

1.Industrial 2 of 5	8.Code 128
2.Interleaved 2 of 5	9.EAN-8
3.Matrix 2 of 5	10.EAN-13
4.Codabar	11.UPC-A
5.Code 11	12.UPC-E
6.Code 39	13.Postnet
7.Code 93	14. Element (Created in elements.)

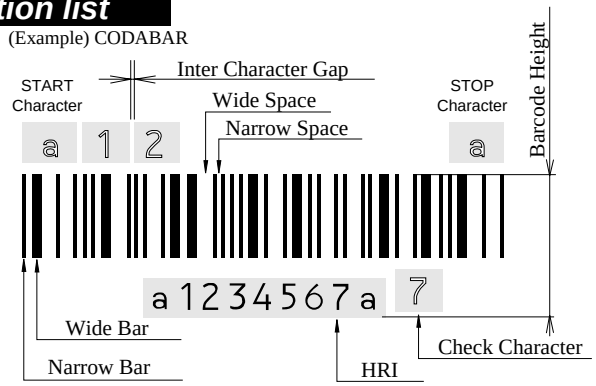
Makeup of bar code



Start Character : Initial character of data
DATA : Alphanumeric data
Check Character : Character for check errors in read data
Stop Character : Last character of data
HRI : Human Readable Interpretation
ICG : Gap between characters (Inter Character Gap)
Margin : Data-free portions must be provided on both sides. Each data-free portion must be approximately ten times as wide as the narrow space (NS).

● Bar code function

Presettable bar code function list



Bar code command list

	Function	Command
1.	Bar code type	DC4 DC4 T
2.	Element width	DC4 DC4 E
3.	Bar code height	DC4 DC4 H
4.	Setting HRI on and off	DC4 DC4 I
5.	HRI font	DC4 DC4 F
6.	Check character	DC4 DC4 C
7.	Starting the bar code data sequence	ESC SI
8.	Ending the bar code data seqence	ESC SO
9.	Bar code data sequence	DC4 DC4 B
10.	Printing density	DC4 DC4 D
11.	Guard bar expansion	DC4 DC4 G
12.	Start and stop characters	DC4 DC4 N
13.	Bar code rotational angle	DC4 DC4 R
14.	Disabling HRI of the start and stop characters	DC4 DC4 S
15.	Value input mode	DC4 DC4 V
16.	Initializing the bar code mode	DC4 DC4 @

See pages 3-37 and 3-38.

(1) DC4 DC4 T Bar code type:

Format:	ASCII	DC4	DC4	T	n
	Hex	14	14	54	n
	Decimal	20	20	84	n

Function: Specifies the bar code type

n = 0	Industrial 2 of 5	7	Code128
1	Interleaved 2 of 5	8	EAN-8
2	Matrix 2 of 5	9	EAN-13
3	Codabar	10	UPC-A
4	Code11	11	UPC-E
5	Code39	12	Postnet
6	Code93	255	Element Print

Parameter 255 (Element print) is used to print a bar code which is input element by element. It can print a bar code which is not supported by the printer and is represented by combining elements. Since data is input by elements, HRI printing is not performed and no check digit is added to the bar code. The start and stop characters is also not added.

(2) Element width: DC4 DC4 E

Format:	ASCII	DC4	DC4	E	n1	n2
	Hex	14	14	45	n1	n2
	Decimal	20	20	69	n1	n2

Function: Specifies the n2/120" or n2/180" width of the element n1.
($1 \leq n2 \leq 127$)
120" or 180" is specified with the DC4 DC4 D command.

n1 = 0: Narrow bar
1: Wide bar
2: Narrow space
3: Wide space
4: Inter-character gap

The narrow bar width or narrow space is used as the element width for Code 93, Code 128, EAN-8, EAN-13, UPC-A, and UPC-E.

One element width of bar 1: Narrow bar width

One element width of space 1: Narrow space width

The midium bar or wide space width is used as the midium element width for Code 11. The wide element width is (wide bar width x 2 - narrow bar width).

This setting is not valid for Postnet.

The inter-character gap means the space between each set of codes of a bar code which begins with a bar and ends with a bar.

(3) Bar code height: DC4 DC4 H

Format:	ASCII	DC4	DC4	H	n
	Hex	14	14	48	n
	Decimal	20	20	72	n

Function: Sets the bar code height to n/12". ($0 \leq n \leq 120$)
The currently set line feed pitch serves as the bar code height when n is set to 0. This setting is not valid for Postnet.

(4) Setting HRI on and off: DC4 DC4 I

Format:	ASCII	DC4	DC4	I	n
	Hex	14	14	49	n
	Decimal	20	20	73	n

See page 5-9.

Function: Specifies whether or not to print an HRI. Also specifies the HRI printing position if an HRI is to be printed.

n = 0: HRI not printed.
1: HRI printed below the bar code symbol.
2: HRI printed above the bar code symbol.

No HRI printed for Postnet or Element regardless of this setting.

(5) HRI font: DC4 DC4 F

Format:	ASCII	DC4	DC4	F	n
	Hex	14	14	46	n
	Decimal	20	20	70	n

Function: Selects the font of printing the HRI.
n = 0: Currently selected font
1: OCR-A
2: OCR-B
This setting is not valid for Postnet or Element.

(6) Check character: DC4 DC4 C *See pages 5-12 and -13.*

Format:	ASCII	DC4	DC4	C	n
	Hex	14	14	43	n
	Decimal	20	20	67	n

Function: Specifies whether to add a check character automatically.
n = 0: No check character is added. (If a check character is needed, the user must send bar code data.)
1: A check character is added. (The check character is not printed in the HRI when Code 93 or Code 128 is selected.)

If the Codabar or Element is selected, no check character is added regardless of this setting.
The following shows the methods of determining the check characters and bar code types. (For details, see "Calculating the check character" below.)

Modulus 10	Industrial 2 of 5, Interleaved 2 of 5, Matrix 2 of 5, EAN, UPC, Postnet
Modulus 11	Code 11 (Dual Check character)
Modulus 16	Codabar
Modulus 43	Code 39
Modulus 47	Code 93 (Dual Check character)
Modulus 103	Code 128

(7) Beginning of the bar code data sequence: ESC SI

Format:	ASCII	ESC	SI
	Hex	1B	0F
	Decimal	27	15

Function: Indicates the beginning of a bar code data sequence.
Data between this and the end command of the bar code data sequence is regarded as bar code data.
This command is valid only when #40 BARCODE/ENLARGED CHAR is set to MODE 2 in the EXTENDED SETUP MODE.

(8) End of the bar code data sequence: ESC SO

Format:

ASCII	ESC	SO
Hex	1B	0E
Decimal	27	14

Function: Indicates the end of a bar code data sequence.
This command is valid only when #40 BARCODE/ENLARGED CHAR is set to MODE 2 in the EXTENDED SETUP MODE.

(9) Bar code data sequence: DC4 DC4 B

Format:

ASCII	DC4	DC4	B	n	d1	d2 ... dk
Hex	14	14	42	n		
Decimal	20	20	66	n		

Function: Specifies the number ("n") of data to be regarded as bar code data.

$00 \leq n \leq 68$
$00 \leq dk \leq 255$
$00 \leq k \leq 68$

If the Element is selected; $0 \leq n, dk, k \leq 255$
This comand is valid when #40 BARCODE/ENLARGED CHAR is set to MODE 1 or MODE 2 in the EXTENDED SETUP MODE.

(10) Printing density: DC4 DC4 D

Format:

ASCII	DC4	DC4	D	n
Hex	14	14	44	n
Decimal	20	20	68	n

Function: Specifies the density of printing bar code symbols (in the horizontal direction).
Specifies the unit of element width.
n = 0: Bar code symbols are printed at 120 dpi. (Default value)
1: Bar code symbols are printed at 180 dpi.

If a bar code is rotated by 90 or 270 degrees using the DC4 DC4 R (bar code rotational angle) command, a bar code is printed at 120 dpi horizontally and 180 dpi vertically.

(11) Guard bar expansion: DC4 DC4 G

Format:

ASCII	DC4	DC4	G	n
Hex	14	14	47	n
Decimal	20	20	71	n

Function: Specifies whether or not to expand EAN or UPC guard bars.
n = 0: Guard bars are not expanded.
1: Guard bars are expanded. (Default value)

(12) Start and stop characters: DC4 DC4 N

Format:	ASCII	DC4	DC4	N	n1	n2
	Hex	14	14	4E	n1	n2
	Decimal	20	20	78	n1	n2

Function: Specifies the Codabar start or stop character. n1 selects the start or stop character. n2 specifies a code of the start or stop character as shown below.

n1 = 0: Start character
1: Stop character

n2 = a, b, c, d, t, n, ✻, or e.

When power is turned on, "a" is selected as the start or stop character.

(13) Bar code rotational angle: DC4 DC4 R

Format:	ASCII	DC4	DC4	R	n
	Hex	14	14	52	n
	Decimal	20	20	82	n

Function: Specifies the rotational angle of the bar code in units of 90 degrees.

n = 0: 0° (Default value)
1: 90°
2: 180°
3: 270°

(14) Disabling HRI of the start and stop characters: DC4 DC4 S

Format:	ASCII	DC4	DC4	S	n
	Hex	14	14	53	n
	Decimal	20	20	83	n

Function: Specifies whether or not to print the start or stop character in the HRI for Codabar, Code 11, Code 39 or Code 93.

n = 0: The start or stop character is printed in the HRI. (Default value)
1: The start or stop character is not printed in the HRI.

(15) Value input mode: DC4 DC4 V

Format:	ASCII	DC4	DC4	V	n
	Hex	14	14	56	n
	Decimal	20	20	86	n

Function: Specifies whether bar code sequence data is regarded as the normal character code or a character value when Code 128 is selected.

n = 0: Data is regarded as normal character code. (Default value)
1: Data is regarded as a character value.

If data is regarded as the normal character code, the printer automatically move the subset or inserts a shift code according to the data.

See page 5-11.

(16) Initializing the bar code mode: DC4 DC4 @

Format:	ASCII	DC4	DC4	@
	Hex	14	14	40
	Decimal	20	20	64

Function: Initializes the bar code mode.

The following show the default settings for bar code.

Bar code type:	SETUP
Narrow bar width:	SETUP
Wide bar width:	SETUP
Narrow space width:	SETUP
Wide space width:	SETUP
Inter- character gap:	SETUP
Bar code height:	SETUP
Setting HRI:	Below the bar code symbol
HRI font	OCR-B
Check character:	Added
Printing density:	1/120”

Data processing in the bar code data sequence

- *In a bar code data sequence, any codes other than the ESC code are regarded as bar code data.*
  In a bar cord sequence following ESC SI, continuous two-byte ESC codes (ESC + ESC) are regarded as a one-byte ESC bar code.

- *In a barcode data sequence following ESC SI, ESC+ SO and ESC + ESC are valid and the other ESC sequence are ingnored. The ESC code and the following data, two bytes in all, are discarded.*

- *When a start or stop character code (e.g., ∗ code of Code 39) is input in a bar code data sequence, the bar code data sequence stops if bar code data has already been input in that sequence. The data that was input is valid and converted into a bar code. If not, the bar code data sequence does not stop and the code is discarded.*

- *When 68 bytes of data is input, the bar code data sequence ends automatically.*
  When Code 93 or Code 128 is selected, the bar code data sequence ends when the amount of input data, including the automatically inserted control character, reaches 68 bytes. (Bar code buffer full)

● Bar code function

Printing bar codes

- *Bar codes are printed at normal LQ 10 cpi (158 cps) print speed when the printing density is 120 dpi or at Dark 1 LQ 10 cpi (79 cps) print speed when the printing density is 180 dpi. This does not apply to printing paths involving HRI printing or duty control.*

- *Bar codes and normal characters are printed separately. When the bar code data sequence is processed, print data other than bar code data contained in the buffer is printed. When print data other than bar code data is input, bar code data contained in the buffer is printed.*

- *Like the right margin overflow processing for character data, data preceding bar code data is printed and the bar code data is printed from the left margin on the following line if the data exceeds the right margin.*
  If bar code data cannot be printed between the left and right margins, the bar code data is ignored.

- *When the number of bar code symbols in the buffer reaches 68, printing starts. (Bar code buffer full printing)*

- *If the vertical line feed pitch is smaller than the bar code height, reverse feeding is performed to move to the following printing position.*

- *If an out-of-paper error is detected in a bar code printing path, the following paths are printed on the following form.*

HRI

- *The HRI is adjusted to the center of the bar code symbol width and printed at 10 cpi unless EAN or UPC guard bar expansion is executed. If EAN or UPC guard bar expansion is executed, an HRI is printed at the equal space between the center guard bar and the left or right guard bar.*
  If the HRI width is greater than the bar code symbol width, the HRI printing pitch is reduced to print the HRI in the same width as the bar code symbol width.

- *The HRI is printed below a bar code symbol, the vertical printing position is lower than the printing start position by (bar code height - 1/6"). If it is printed above the bar code symbol, the vertical printing position is higher than the printing start position by (1/6" - 24/180").*

- *When Code 11 is selected, small triangle (△) and large triangle (△) are printed as the start and stop characters, respectively. (This does not depend on the setting of the check character.)*

- *When Code 93 is selected, white squares (□) are printed as the start and stop characters, and a black square (■) is printed as the control character. A printable character expressed in combination with the control character is printed as is. (For example, 61H is printed as 'a', not '■ A'.)*

- *When Code 128 is selected, black rhombuses (◆) are printed instead of non-printable characters (00H to IFH and 7FH).*

Error processing

- *If a character code that is not valid for the selected bar code type is input, the character code is not converted into a bar code symbol but is printed as a character. If the bar code has a start or stop character added to the HRI, the start or stop character is printed. ‘ ’ is printed instead of an invalid character.* ☒

- *If an incorrect number of data are input to form a bar code which should have a specific number of data, the input data is not converted into a bar code symbol but is printed as a character.*

- *If incorrect data is input in the UPC-A format and cannot be converted into the UPC-E format, the input data is not converted into a bar code symbol but is printed as a character. (For the rules of converting the UPC-A format into the UPC-E format, see “UPC-E conversion rule” below.)*

Code 128 subset transition rule

- *The following shows the transition conditions from subset A to subset B.*
  1. *Input a character code unique to subset B (60H to 7FH) when subset A is selected.*
  2. *Then input a character code unique to subset B (60H to 7FH) without inputting a character code unique to subset A (00H to 1FH). (If a character code unique to subset A is input in this step, subset B is not selected. The character code unique to subset B input in step 1 is expressed with the shift code.)*

- *The following shows the transition conditions from subset B to subset A.*
  1. *Input a character code unique to subset A when subset B is selected.*
  2. *Then input a character code unique to subset A without inputting a character code unique to subset B. (If a character code unique to subset B is input in this step, subset A is not selected. The character code unique to subset A input in step 1 is expressed with the shift code.)*

- *Subset C is selected when four continuous character codes (30H to 39H) are input.*

- *If a code common to subset A and subset B is input when a subset is not determined or subset C is selected, subset B is temporarily selected.*

UPC-E conversion rule

● *NSC, manufacturer's codes (M1 M2 M3 M4 M5), and product item codes (X1 X2 X3 X4 X5) are input data.*

1. *NSC must be 0 or 1.*
2. *When the manufacturer's code data is input, the rule is determined and zero checking of the product item codes is performed.*
   NZ: Non-zero ✻ : 0 to 9

UCP-A Type

	M1	M2	M3	M4	M5	X1	X2	X3	X4	X5
Rule 1	✻	✻	✻	✻	NZ	0	0	0	0	5 ~ 9
Rule 2	✻	✻	✻	NZ	0	0	0	0	0	✻
Rule 3	✻	✻	3 ~ 9	0	0	0	0	0	✻	✻
Rule 4	✻	✻	0 ~ 2	0	0	0	0	✻	✻	✻

3. *The following table shows print data if the rule shown above is met.*

UCP-E Type

Rule 1	M1	M2	M3	M4	M5	X5 (5 ~ 9)
Rule 2	M1	M2	M3	M4	X5	'4'
Rule 3	M1	M2	M3	X4	X5	'3'
Rule 4	M1	M2	X3	X4	X5	M3 (0 ~ 2)

Calculating the check character

- *Modulus 10*

a. The data at the odd-numbered position counted from the right are weighed as 3. The sum of the data character values is determined.. (The sum is determined without weighing for Postnet.)

b. The remainder after dividing the value determined in step a by 10 is determined.

c. The check character is the character value determind by subtracting the remainder in step b from 10.

• *Modulus 11*

a. Data characters are weighed from the right to the left, as, example,1, 2, ..., 10, 1, 2 ... 10, 1, 2 and so forth. The sum of the data character values is determined. (The symbol '-' has a character value of 10.)

b. A character having a character value equal to the remainder of dividing the value determined in step a by 11 is the first check character (C).

c. Data characters are weighed from the right to the left, beginning with C, as, for example, 1, 2, ..., 9, 1, 2 ... , 9, 1, 2 and so forth. The sum of the data character values is determined.

d. The character with a character value equal to the remainder of dividing the value determined in step c by 11 is the second check character (K).

• *Modulus 16*

a. The sum of the all characters including start and stop characters values is determined. The following table shows the conversion of character into value.

Value	Character	Value	Character	Value	Charactr	Value	Character
0	0	1	1	2	2	3	3
4	4	5	5	6	6	7	7
8	8	9	9	10	-	11	$
12	:	13	/	14	.	15	+
16	A	17	B	18	C	19	D

b. The remainder X of deviding the value determined in step a by 16 is determined. The remainder Y of subtracting the remainder X from 16 is determined.

c. Convert the remainder Y into the character Z according to the conversion table in a. The character Z is the check character.

• *Modulus 43*

a. The sum of the data character values is determined.

b. The character with a character value equal to the remainder of dividing the value determined in step a by 43 is the check character.

• Modulus 47

a. Data characters are weighed from the right to the left, as, for example, 1, 2, ..., 20, 1, 2 ... 20, 1, 2 and so forth. The sum of the data character values determined..
b. The character with a character value equal to the remainder of dividing the value determined in step a by 47 is the first check character (C).
c. Data characters are weighed from the right to the left, beginning with C, as, for example, 1, 2, ..., 15, 1, 2 ... , 15, 1, 2 and so forth. The sum of the data character values is determined.
d. The character with a character value equal to the remainder of dividing the value found in step c by 47 is the second check character (K).

• Modulus 103

a. The sum of the products of the data character values and position values is determined. (The leftmost character has a position value of 1.)
b. The start character value is added to the sum determined in step a above.
c. The character with a character value equal to the remainder of dividing the value determined in step c by 103 is the check character.

Other

- After executing a BS command input immediately after bar code data, printing starts from the position by one character to the left of the currently set character pitch.

- When a margin is specified, bar code data in the buffer is cleared.

Element printing

- The element printing function prints bar codes by inputting data element by element.

- This function allows the user to print bar codes which are not supported by the printer but are expressed by combining elements. No HRI is printed, no check digit is added, and a start or stop character is not added, since data is input element by element.

- The following show the codes expressing elements.
  - 00H: Narrow bar
  - 01H: Wide bar
  - 02H: Narrow space
  - 03H: Wide space
  - 04H: Inter-character gap

● Bar code function

Element printing

[Example]

The following shows a BASIC program for printing Code 39 bar codes using the element printing function. This example shows how to print "CODE39". (Replace NB, WB, NS and WS in the data statements in the following example with 0, 1, 2 and 3, respectively.)

```
100 OPEN "LPT1:" AS #1:  WIDTH  #1,255
110 DC4$=CHR$ (&H14): ESC$=CHR$(&H1B)
120 SI$=CHR$(&HF):SO$=CHR$(&HE): ICG=4
130 '
140 PRINT #1, DC4$;DC4$;"@";                          ' Initialize
150 PRINT #1, DC4$;DC4$;"T";CHR$(255);  ' Barcode Type: Element Print
160 PRINT #1, DC4$;DC4$;"E";CHR$(0);CHR$(2);  ' Narrow Bar: 2/120"
170 PRINT #1, DC4$;DC4$;"E";CHR$(1);CHR$(6);  ' Wide Bar: 6/120"
180 PRINT #1, DC4$;DC4$;"E";CHR$(2);CHR$(2);  ' Narrow Space: 2/120"
190 PRINT #1, DC4$;DC4$;"E";CHR$(3);CHR$(6);  ' Wide Space: 6/120"
200 PRINT #1, DC4$;DC4$;"E";CHR$(4);CHR$(2);  ' Inter Char Gap: 2/120"
210 PRINT #1, DC4$;DC4$;"H";CHR$(6);              ' Barcode Height: 6/12"
220 '
230 PRINT #1, DC4$;DC4$;"B";CHR$(9*8+7); ' Barcode Data Sequence Start
240 RESTORE  440
250 FOR I=1 TO 9:READ A:PRINT CHR$(A);:NEXT I
260 PRINT #1, CHR$(ICG);
270 FOR J=1 TO 6
280   IF J=1 THEN RESTORE  450
290   IF J=2 THEN RESTORE  460
300   IF J=3 THEN RESTORE  470
310   IF J=4 THEN RESTORE  480
320   IF J=5 THEN RESTORE  490
330   IF J=6 THEN RESTORE  500
340   FOR I=1 TO 9:READ A: PRINT #1, CHR$(A);:NEXT I
350   PRINT #1, CHR$(ICG);
360 NEXT J
370 RESTORE  440
380 FOR I=1 TO 9:READ A: PRINT #1,  CHR$(A);:NEXT I
400 PRINT #1,CHR$(13);CHR$(10);                  ' CR+LF
410 CLOSE #1
420 END
430 '
440 DATA  0, 3, 0, 2, 1, 2, 1, 2, 0
450 DATA  1, 2, 1, 2, 0, 3, 0, 2, 0
460 DATA  1, 2, 0, 2, 1, 2, 0, 3, 0
470 DATA  0, 2, 0, 2, 1, 3, 0, 2, 1
480 DATA  1, 2, 0, 2, 1, 3, 0, 2, 0
490 DATA  1, 2, 1, 3, 0, 2, 0, 2, 0
500 DATA  0, 2, 1, 3, 0, 2, 1 ,2, 0
```

● Enlarged character function

If #40 BARCODE/ENLARGED CHAR is set to MODE 1 or MODE 2 in the EXTENDED SETUP MODE, enlarged characters can be printed. The enlarged character function is valid for the EPSON or IBM or HP mode.

See page 3-36.

Outline of enlarged character function

When the enlarged character mode is selected with the DC4 DC4 I 1 command, any commands other than those shown below are ignored.

Only three print codes are available: LF, CR and FF. If 521 or more characters of data are sent without inputting a print command, printing is performed automatically.

Enlarged character command list

	Function	Command
1.	Executing backspacing	BS
2.	Executing line feeding	LF
3.	Executing form feeding	FF
4.	Executing carriage return	CR
5.	Initializing the enlarged character mode	DC4 DC4 @
6.	Arrangement of enlarged characters	DC4 DC4 a
7.	Element magnification for enlarged characters	DC4 DC4 c
8.	All-character set for enlarged characters	DC4 DC4 d
9.	Selecting an enlarged character font	DC4 DC4 f
10.	Height expansion for enlarged characters	DC4 DC4 h
11.	HMI for enlarged characters	DC4 DC4 i
12.	VMI for enlarged characters	DC4 DC4 j
13.	Setting and canceling the enlarged character mode	DC4 DC4 l
14.	Enlarged character cell offset	DC4 DC4 o
15.	Enlarged character pitch	DC4 DC4 p
16.	Enlarged character quality	DC4 DC4 q
17.	Enlarged character rotational angle	DC4 DC4 r
18.	Setting and canceling enlarged character smoothing	DC4 DC4 s
19.	Enlarged character top offset	DC4 DC4 t
20.	Setting and canceling underscores for enlarged characters	DC4 DC4 u
21.	Enlarged character width expansion	DC4 DC4 w
22.	Horizontal printing position for enlarged characters	DC4 DC4 x
23.	Vertical printing position for enlarged characters	DC4 DC4 y

● Enlarged character function

(1) Executing backspacing: BS

Format:	ASCII	BS
	Hex	08
	Decimal	08

Function: Executes backspacing.

When the BS command is executed, the printing position moves to the previous character position on the left. The BS command is valid up to the left margin. A BS command issued on the left margin is ignored.
When a BS command is issued when there is a character on the left with proportional printing selected, the printer backspaces to that character. If there is no character or another BS command has just been executed, the printer backspaces by one space.
The part moved by backspacing is not underscored.

(2) Executing line feeding: LF

Format:	ASCII	LF
	Hex	0A
	Decimal	10

Function: Executes line feeding.

After printing data, the printer feeds one line by the enlarged character line feed pitch, which differs depending on whether VMI is valid (by the DC4 DC4 j command) or not.

VMI valid: Preset VMI amount

VMI not valid: (24 + cell offset)/180" x cell expansion

Line feeding involves a carriage return if the LF SETTING option is set to LF + CR in the EXTENDED SETUP MODE.
If the bottom margin is specified and the cell size (i.e., 24/180" x cell expansion) is greater than the printable area in the CSF, cut sheet, or fanfold paper mode, form feeding is executed and then printing is executed. If the printing position is at the TOF position, printing is executed up to the bottom margin without executing form feeding, and excess data is not printed.
The default pitch is "1/6" x cell expansion".

(3) Executing form feeding: FF

Format:	ASCII	FF
	Hex	0C
	Decimal	12

Function: Executes form feeding.

This command feeds the page to the next TOF position. If there are still enlarged characters to be printed, they are printed, then form feeding is executed.

(4) Executing carriage return: CR

Format:	ASCII	CR
	Hex	0D
	Decimal	13

Function: Executes carriage return.

This command moves the printing position to the left margin without printing any characters. If the CR SETTING option is set to CR + LF in the EXTENDED SETUP MODE, a carriage return is executed out after printing.

(5) Initializing the enlarged character mode: DC4 DC4 @

Format:	ASCII	DC4	DC4	@
	Hex	14	14	40
	Decimal	20	20	64

Function: Initializes the enlarged character mode.

The following show the default settings for enlarged characters:

Cell expansion:	SETUP expansion
Height expansion:	SETUP expansion
Width expansion:	SETUP expansion
Font:	SETUP font
Character pitch:	10 cpi
HMI:	Invalid
Cell offset:	6/180”
VMI:	Invalid
Character quality:	Standard
Character layout:	Adjusted to the base line
Rotational angle:	0°
Smoothing:	Valid
Top offset:	0/180”
Underscore:	Canceled
Character set:	Set at enlarged character mode selected
Right and left margins:	Margin at enlarged character mode selected
Page length:	Length at enlarged character mode selected
Top and bottom margins:	Margin at enlarged character mode selected

(6) Arrangement of enlarged characters: DC4 DC4 a

Format:	ASCII	DC4	DC4	a	n
	Hex	14	14	61	n
	Decimal	20	20	97	n

Function: Specifies the standard position for adjusting enlarged characters in the vertical direction.

n = 00H,30H: Base line is adjusted to the N'th dot from the top. (N = 20 x cell expansion)

01H,31H: Descender is adjusted to the N'th dot from the top. (N = 24 x cell expansion)

02H,32H: Center is adjusted to the N'th dot from the top. (N = 12 x cell expansion)

03H,33H: Ascender is adjusted to the N'th dot from the top. (N = 1 x cell expansion)

The MSB of the parameter is masked. Any parameters other than those shown above are ignored.

The arrangement and position specified here are valid if the enlarged character rotational angle is not 0 degree. The default setting is n = 00H,30H.

(7) Cell expansion for enlarged characters: DC4 DC4 c

Format:	ASCII	DC4	DC4	c	n
	Hex	14	14	63	n
	Decimal	20	20	99	n

Function: Specifies cell expansion for enlarged characters.

$0 \leq n \leq 127$

The cell has the size of (24/180" x cell magnification). The MSB of the parameter is masked.

If n = 0, the expansion specified in the setup mode is selected.

The cell expansion is specified at the beginning of the line. If there is character data on the line, it becomes valid on the following line.

Enlarged character cell expansion takes priority over the height expansion. If the height expansion exceeds cell expansion when enlarged character data is input, the characters are enlarged to the cell expansion value.

The default setting is the expansion specified in the setup mode.

● Enlarged character function

(8) All-character set for enlarged characters: DC4 DC4 d

Format:	ASCII	DC4	DC4	d	n	d1	d2...dn
	Hex	14	14	64	n	d1	d2...dh
	Decimal	20	20	100	n	d1	d2...dn

Function: Specifies the all-character set for enlarged characters.

$1 \leq n \leq 255$

$0 \leq d \leq 255$

Data with a number specified with the parameter "n" is processed as character codes. If n = 0, this sequence is ignored.

(9) Selecting an enlarged character font: DC4 DC4 f

Format:	ASCII	DC4	DC4	f	n
	Hex	14	14	66	n
	Decimal	20	20	102	n

Function: Specifies the font (typeface) of enlarged characters as shown below.

n = 0: Roman
1: Sans serif
2: Courier
3: Prestige
4: Script
5: OCT-B
6: OCR-A
7: Gothic
8: Orator
9: Orator-S

The MSB of the parameter is masked. Any parameters other than those shown above are ignored.
If the FONT LOCK option is set to YES in the EXTENDED SETUP MODE, this command is ignored.
The default is the setting selected in the setup mode.

● Enlarged character function

(10) Height expansion for enlarged characters: DC4 DC4 h

Format:	ASCII	DC4	DC4	h	n
	Hex	14	14	68	n
	Decimal	20	20	104	n

Function: Specifies the height expansion of enlarged characters.
$0 \leq n \leq 127$

The MSB of the parameter is masked.
If n = 0, the expansion specified in the setup mode is selected.
Enlarged character cell expansion takes priority over height expansion. If the height expansion exceeds the cell expansion when enlarged character data is input, the characters are enlarged to the cell expansion.
The default expansion is specified in the EXTENDED SETUP MODE.

(11) HMI for enlarged characters: DC4 DC4 i

Format:	ASCII	DC4	DC4	i	n1	n2
	Hex	14	14	69	n1	n2
	Decimal	20	20	105	n1	n2

Function: Specifies the HMI (horizontal motion index) of enlarged characters.
$0 \leq n1 \leq 255$
$0 \leq n2 \leq 15$

The HMI indicates the horizontal distance between two adjacent characters, i.e., the width the print head moves after printing one character.
The HMI is (n1 + n2 x 256)/180".
The high-order four bits of parameter n2 (bit 7 to bit 4) are ignored. The HMI can be set to zero.
After specifed command have priority over DC4 DC4 p or DC4 DC4 i.
If the PITCH LOCK option is set to YES in the EXTENDED SETUP MODE, this command is ignored.
The default setting is "10 cpi x widthwise expansion".

(12) VMI for enlarged characters: DC4 DC4 j

Format:	ASCII	DC4	DC4	j	n1	n2
	Hex	14	14	6A	n1	n2
	Decimal	20	20	106	n1	n2

Function: Specifies the VMI (vertical motion index) of enlarged characters.

$0 \leq n1 \leq 255$

$0 \leq n2 \leq 127$

The VMI indicates the distance between two lines, i.e., the length the print head moves after printing one line.

The VMI is (n1 + n2 x 256)/180". The MSB of parameter n2 is masked. The VMI can be set to zero.

The VMI is not dependent on the length expansion of enlarged characters. After specifed command have priority over DC4 DC4 j or DC4 DC4 o.

The VMI is invalid and the cell offset 6 line feed pitch is selected (i.e., 1/6" x cell expansion) by default.

(13) Setting and canceling the enlarged character mode: DC4 DC4 l

Format:	ASCII	DC4	DC4	l	n
	Hex	14	14	6c	n
	Decimal	20	20	108	n

Function: Sets and cancels the enlarged character mode.

n = 00H,30H: Cancels the enlarged character mode.

01H,31H: Sets the enlarged character mode.

The MSB of the parameter is masked. Any sequences other than the above parameters are ignored.

When the enlarged character mode establish command is issued, the special effects, character pitch, line feed pitch, length and width double-size printing settings specified for the emulation become invalid the enlarged character mode is canceled.

When the enlarged character mode starts, characters are printed in the conditions selected when the enlarged character mode was last canceled.

If there are non-enlarged characters or bar codes when enlarge character data is input the non-enlarged character are printed.

In the enlarged character mode, automatic printing is not performed if the printing position exceeds the right margin. Excess data is abandoned and the printing position is set at the right margin when the right margin is exceeded.

If the right margin is exceeded while a single enlarged character is being printed, the character is printed up to the right margin.

● Enlarged character function

(14) Enlarged character cell offset: DC4 DC4 o

Format:	ASCII	DC4	DC4	o	n
	Hex	14	14	6f	n
	Decimal	20	20	111	n

Function: Specifies the cell offset for enlarged characters.

$0 \leq n \leq 255$

This command specifies the cell offset for the enlarged characters in 1/180". The cell offset is used to execute a line feed (LF) command.

In the enlarged character mode, the line is fed by a pitch of (24 + cell offset)/180" x cell expansion.

The VMI is invalid and the cell offset is 6 by default.

(15) Enlarged character pitch: DC4 DC4 p

Format:	ASCII	DC4	DC4	p	n
	Hex	14	14	70	n
	Decimal	20	20	112	n

Function: Specifies the pitch of enlarged characters.

n = 00H,30H: 10 cpi
01H,31H: 12 cpi
02H,32H: Proportional

The MSB of the parameter is masked. Any sequences other than the above parameters are ignored.

If the fixed pitch is selected, enlarged characters have the following width:

10 cpi: (18 × 180") x widthwise expansion
12 cpi: (15 × 180") x widthwise expansion

In the proportional mode, proportional characters are expanded by the same ratio.

When the rotational angle for enlarged characters is set to 90 or 270 degrees, characters other than graphic character are printed at a pitch of (24/180") x length expansion. If the PITCH LOCK option is set to YES in the EXTENDED SETUP MODE, this command is ignored.

The HMI is invalidated and the character pitch is 10 cpi by default.

● Enlarged character function

(16) Enlarged character quality: DC4 DC4 q

Format:	ASCII	DC4	DC4	q	n
	Hex	14	14	71	n
	Decimal	20	20	113	n

Function: Specifies the quality of enlarged characters as shown below.

n = 00H,30H: Standard quality
01H,31H: High-speed 1 quality
02H,32H: High-speed 2 quality

The MSB of the parameter is masked. Any sequences other than the above parameters are ignored.
The character quality is specified at the beginning of a line. If there is character data on the line, this command is reserved and becomes valid on the following line.
If the QUALITY LOCK option is set to YES in the EXTENDED SETUP MODE, this command is ignored.
The standard quality is selected by default.

(17) Enlarged character rotational angle: DC4 DC4 r

Format:	ASCII	DC4	DC4	r	n
	Hex	14	14	72	n
	Decimal	20	20	114	n

Function: Specifies the rotational angle of enlarged characters as shown below.

n = 00H,30H	0°
01H, 31H	90°
02H, 32H	180°
03H, 33H	270°

Enlarged characters are rotated counterclockwise.
The MSB of the parameter is masked. Any sequences other than the above parameters are ignored.
Printing starts from the position specified with the DC4 DC4 a command shown above.
Unless the rotational angle is set to 0 degree, no characters are underscored even when underscores are input.
Pixels are printed at a rotational angle of 0 degree even if the rotational angle is set to 90, 180, or 270 degrees.
This command is ignored if the PITCH LOCK option is set to YES in the EXTENDED SETUP MODE and the length and width expansion values of enlarged characters are different.
The default rotational angle is 0 degree.

● Enlarged character function

(18) Setting and canceling enlarged character smoothing: DC4 DC4 s

Format:	ASCII	DC4	DC4	s	n
	Hex	14	14	73	n
	Decimal	20	20	115	n

Function: Sets and cancels smoothing of enlarged characters.
n = 00H,30H: Cancels smoothing.
01H,31H: Sets smoothing.

The MSB of the parameter is masked. Any sequences other than the above parameters are ignored.
Smoothing is set by default.

(19) Enlarged character top offset: DC4 DC4 t

Format:	ASCII	DC4	DC4	t	m	n1	n2
	Hex	14	14	74	m	n1	n2
	Decimal	20	20	116	m	n1	n2

Function: Specifies the top offset of enlarged characters.
m = (20)H
$0 \leq n1 \leq 255$
$0 \leq n1 \leq 15$

The top offset refers to the vertical distance between the top of the cell and the top of a character. This determines the character position in the cell.
It is specified by (n1 + n2 x 256)/180".
The high-order four bits of parameter n2 (bit 7 to bit 4) are masked.
The top offset is effective for only one characterafter this sequence.
The top offset is canceled when a line feed (LF) command, form feed (FF) command, or vertical print position (DC4 DC4 y) command is issued.
The top offset is not dependent on the enlarged character arrangement.
It is always based on the top of the cell (corresponding to the ascender-based position).
The top offset is not dependent on cell expansion or length expansion.
The bottom of a character (i.e., 24th pin position, regardless of character type, even for a 30-dot pixel) does not extend beyond the bottom of the cell.
If the top offset is too large and the bottom of the character extends below the bottom of the cell, the top offset is reduced.
Any sequences other than m = 20H are ignored.

● Enlarged character function

(20) Setting and canceling underscores for enlarged characters: DC4 DC4 u

Format:	ASCII	DC4	DC4	u	n
	Hex	14	14	75	n
	Decimal	20	20	117	n

Function: Sets and cancels the underscore function.
n = 00H,30H: Cancels underscoring.
01H,31H: Specifies the underscoring.

The MSB of the parameter is masked. Any sequences other than the above parameters are ignored.
An underscore is drawn on the 25th pin line at a thickness of (1 dot x length expansion of the character).
No underscores are printed if the enlarged character rotational angle is not set to 0 degree. Underscoring is off by default.

(21) Enlarged character width expansion: DC4 DC4 w

Format:	ASCII	DC4	DC4	w	n
	Hex	14	14	77	n
	Decimal	20	20	119	n

Function: Specifies the width expansion of enlarged characters.
$0 \leq n \leq 127$

The MSB of the parameter is masked.
If n is set to 0, the magnification specified in the setup mode is selected.
This command is ignored if the PITCH LOCK option is set to YES in the EXTENDED SETUP MODE.
The expansion specified in the setup mode is set by default.

(22) Horizontal printing position for enlarged characters: DC4 DC4 x

Format:	ASCII	DC4	DC4	x	m	n1	n2
	Hex	14	14	78	m	n1	n2
	Decimal	20	20	120	m	n1	n2

Function: Specifies the horizontal position for printing enlarged characters by (n1 + n2 x 256)/180" as shown below.
m = SP(20)H: Absolute printing position
-(2D)H: Relative lefthand printing position
+(2B)H: Relative righthand printing position
$0 \leq n1 \leq 255$
$0 \leq n2 \leq 15$

The MSB of parameter m and the four high-order bits of n2 (bit 7 to bit 4) are masked.

If parameter m is different than shown above, this sequence is ignored.
The absolute print position is based on the left margin. If the specified position exceeds the right margin, the print position is located at the right margin.
If a relative lefthand printing position to the left of the left margin is specified, left margin becomes the printing position.
If a relative righthand printing position to the right of the right margin is specified, the right margin becomes the printing position.
The movement distance is not dependent on the width expansion of enlarged characters.

(23) Vertical printing position for enlarged characters: DC4 DC4 y

Format:	ASCII	DC4	DC4	y	m	n1	n2
	Hex	14	14	79	m	n1	n2
	Decimal	20	20	121	m	n1	n2

Function: Specifies the vertical position for printing enlarged characters by (n1 + n2 x 256)/180" as shown below.

m = SP(20)H: Absolute printing position
-(2D)H: Relative reverse printing position
+(2B)H: Relative forward printing position

$0 \leq n1 \leq 255$
$0 \leq n2 \leq 127$

The MSBs of parameters m and n2 are masked. If parameter m is other than shown above, this sequence is ignored.
The absolute print position is based on the TOF position. If the specified position extends below the bottom margin, the bottom margin becomes the print position.
If a relative reverse printing position exceeding the TOF position is specified, the TOF position becomes the print position.
If a relative forward printing position that extends below the bottom margin is specified, the print position is located at the bottom margin.
The movement distance is not dependent on the length expansion of enlarged characters.

● Enlarged character function

Enlarged character print samples

This page shows examples of a BASIC program for printing enlarged characters and the printed enlarged characters (actual size).

```
100 OPEN "LPT1:"AS #1
110 DC4$=CHR$(&H14)
120 '
130 PRINT #1, DC4$;DC4$;"@";            ' Initializing
140 PRINT #1,DC4$;DC4$;"c";CHR$(8);     ' Magnification of cell:  x8
150 PRINT #1,DC4$;DC4$;"f";CHR$(4);     ' Font typeface:  SCRIPT
160 PRINT #1,DC4$;DC4$;"p";CHR$(1);     ' Character pitch: 12 CPI
170 PRINT #1,DC4$;DC4$;"l";CHR$(1);     ' Magnification mode on
180 '
190 PRINT #1,"8";                       ' Default size print
200 PRINT #1,DC4$;DC4$;"h";CHR$(2);     ' Vertical magnification: x2
210 PRINT #1,DC4$;DC4$;"w";CHR$(2);     ' Horizontal magnification: x2
220 PRINT #1,DC4$;DC4$;"a";CHR$(3);     ' Alignment: ascender
230 PRINT #1,"ASCE";
240 PRINT #1,DC4$;DC4$;"a";CHR$(2);     ' Alignment: center
250 PRINT #1,"CENT";
260 PRINT #1,DC4$;DC4$;"a";CHR$(1);     ' Alignment: descender
270 PRINT #1,"DESC";
280 PRINT #1,DC4$;DC4$;"a";CHR$(0);     ' Alignment: baseline
290 PRINT #1,"BASE";
300 '
310 PRINT #1,DC4$;DC4$;"w";CHR$(8);     ' Horizontal magnification: x8
320 PRINT #1,"H";
330 PRINT #1,DC4$;DC4$;"w";CHR$(1);     ' Horizontal magnification: x1
340 FOR N=1 TO 8
350 PRINT #1,DC4$;DC4$;"h";CHR$(N);     ' Vertical magnification: xn
360 PRINT #1,RIGHT$;(STR$(N),1);  '
370 NEXT N
380 PRINT #1,DC4$;DC4$;"w";CHR$(8);     ' Horizontal magnification:  x8
390 PRINT #1,DC4$;DC4$;"r";CHR$(1);     ' Rotate: 90 degree
400 PRINT #1, "R" ;
410 PRINT #1,CHR$;(13);CHR$(10);  ' CR+LF
420 '
430 PRINT #1,DC4$;DC4$;"l";CHR$(0);     ' Magnification mode off
440 CLOSE #1
450 END
```

6. Troubleshooting

When the printer is used for continuous printing, its protective function may be invoked to prevent malfunctions. If the printer does not recover from a functional error, please contact the dealer.

Functional error messages (displayed on the LCD)

When a funtional error occurs, the ERROR lamp blinks and the buzzer sounds for five seconds. In this case, turn off the power once and remove the cause of the error.

CARRIAGE ERROR

CARRIAGE ERROR

• The print head is not in place.

Check whether the ribbon or paper was caught by the print head. Recheck the paper thickness adjustment.

NO LCD DISPLAY
The error lamp blinks and the buzzer sounds immediately after turning the power on or after the printer is reset.

INTERNAL RAM ERROR

• An error occurred in the internal RAM.

Turn off the power and then turn it back on. If the printer does not recover from the error, contact the dealer.

FAN ERROR

FAN ERROR

• The fan for cooling the internal circuits stopped.

Turn off the power, then turn it back on. If the printer does not recover from the error, contact the dealer.

F.S. ERROR

F.S. ERROR

• An error occurred in the paper ejection mechanism.

Detach the rear cover, and check whether or not paper is jammed in the paper ejection mechanism in the back of the printer. Remove any paper, turn off the power, and turn it on again. If the printer does not recover from the error, contact the dealer.

T.S. ERROR

T.S. ERROR

• An error occurred in the paper path switching mechanism.

Remove all paper. Turn the power on and off several times.
Turn off the power and then turn it back on. If the printer does not recover from the error, contact the dealer.

HAI.S. ERROR

HEAD ADJUSTMENT ERROR 1

• The print head was not adjusted to the standard position after head adjustment motion.

Turn off the power and then turn it back on. If the printer does not recover from the error, contact the dealer.

● Error messages and countermeasures

HA.S. ERROR

HEAD ADJUSTMENT ERROR 2

• Contact of the print head with the platen or paper when the print head moved from the standard position toward the platen during head adjustment was not confirmed.

Turn off the power then turn it back on. If the printer does not recover from the error, contact the dealer.

HOME S. ERROR

HOME SENSE ERROR

• The home position cannot be detected properly when home sensing is executed.

Check whether the ribbon or paper has been caught by the print head. Recheck the paper thickness adjustment.

PLEASE POWER OFF

ABNORMAL CURRENT ERROR

• An abnormal current was detected.

The printer is automatically turned off after five seconds. Stop using the printer, and contact the dealer.

Operational error messages (displayed on the LCD)

HEAD PROTECTION

PRINT HEAD COOLING

• The print head is being cooled to prevent it from overheating. The ONLINE lamp blinks.

The print head has become too hot during high-density printing. When this message is displayed, the printing speed is reduced or printing stops. When the print head temperature drops, the printer restarts printing.

PARK ERROR

PAPER PARK ERROR

• This error message indicates that fanfold paper is not being retracted properly. The ERROR lamp blinks, the buzzer sounds three times, and the printer enters the offline state.

Check whether paper is jammed in the paper ejection mechanism. This error occurs when paper that cannot be retracted though reverse feeding motion is printed for approximately three pages. If three pages or more have been printed, keep the REVERSE LF key depressed to move back the paper.

● Error messages and countermeasures

Front Tractor

PAPER OUT: F.TR.

Rear Tractor

PAPER OUT: R. TR.

Manual

SET PAPER

CSF

PAPER OUT: CSF

OUT-OF-PAPER ERROR

- This error message indicates that paper feeding has failed in the CSF mode or that no paper is set in the fanfold paper or manual paper loading mode. The ERROR lamp lights, the buzzer sounds for one second, and the printer enters the offline state.
  The ONLINE, PAPER PATH, EJECT/LOAD, FORM FEED, LINE FEED and other keys are effective. Resetting is also effective.

ONLINE key

If there is still print data, paper is fed. If paper is fed properly, the out-of-paper condition is reset and the printer enters the online state. If paper is not fed properly, the printer remains in the out-of-paper condition.
If there is no print data, the out-of-paper condition is reset and the printer enters the online state.

PAPER PATH key

Press the PAPER PATH key to change the paper path. The out-of-paper condition is reset and the printer enters the online state.

EJECT/LOAD, FORM FEED and LINE FEED keys

If paper is fed properly, the no-paper condition is reset and the printer enters the previous (online or offline) state.

If manual feeding is selected, paper is fed only when the paper sensor detects paper. Paper is not fed by pressing the key.

Front Tractor

PAPER JAM : F.TR.

Rear Tractor

PAPER JAM : R.TR.

When paper insertion has failed

SET PAPER AGAIN

When paper ejection has failed

REMOVE PAPER

PAPER JAM ERROR

- This error occurs when fanfold paper is not fed properly, manually-loaded or CSF-loaded paper is not ejected properly, or paper is not properly manually loaded from the front or rear. The ERROR lamp lights, and the buzzer sounds three times.

The LINE FEED and REVERSE LF keys are effective. Remove jammed paper using these keys or by hand.
The ONLINE key is also effective. When "PAPER JAM" is displayed, pressing the ONLINE key will clear the error status.
The paper jam sensor may not function properly if the sensor is exposed to a direct light or sunlight.

● Error messages and countermeasures

SKEW ERROR

PAPER IS SKEWED

• This error occurs if the printer detects that cut sheet paper was loaded on the skew manually. The ERROR lamp blinks, and the buzzer sounds three times. The paper is ejected and the printer enters the offline state.

Load paper again. If it is loaded straight, the printer enters the online state.

FRONT COVER OPEN

COVER OPEN ERROR

• This error occurrs if the front cover is opened. The ERROR lamp lights, and the ONLINE lamp blinks.

Closing the front cover will remove the cause of this error. The printer is in the offline state while the cover is opened.

Single Sheet Top Out
OPEN TOP COVER
Single Sheet Top Out
CLOSE REAR COVER
Fanfold Top Out
OPEN REAR COVER
Single Sheet or Rear Tractor
OPEN PAPER RACK

PAPER PATH ERROR

• This error occurs in paper feeding if the cover that should be opened is not open or the cover that should be closed is not closed. The ERROR lamp lights, and the buzzer sounds three times, and the printer enters the offline state.

The printer is recovered from this error and enters the previous online or offline state by opening or closing the cover, properly according to the message displayed on the LCD.

H.ADJ: FIX ERROR

These messages are displayed alternately at 3 second interval.

PRESS SETUP

FIX: +10CLICK

HEAD ADJUSTING ERROR

• This error occurs if the print head contacts the paper but cannot move to the specified position after paper is loaded in the fixed paper thickness mode. The ERROR lamp lights, and the buzzer sounds three times, and the printer enters the offline state.

The current HEAD ADJUSTMENT setting is dispalyed by pressing the SET UP key. Change the click position with the ▲ or ▼ key and press the ENTER key to move the print head to the currently set position. If the print head moves properly, the printer will enter the offline state. If the print head fails to move properly, the error message reappears.

● Error messages and countermeasures

REMOVE REAR PAP.

These messages are displayed alternately at 3 second interval.

PRESS ONLINE SW

FLAP SWITCHING ERROR

•This error occurs if the flap is not located at the proper position. The ERROR lamp lights, and the buzzer sounds three times, and the printer enters the offline state.

Any keys are ignored except the ONLINE key. When the rear paper is removed and the ONLINE key is pressed, the paper path is changed. When this operation is completed properly, the printer enters the previous online or offline state.

JAM.S LEVEL ERR

JAM SENSOR ERROR

• The jam sensor was found defective when loading fanfold paper. The ERROR lamp lights, and the buzzer sounds three times, and the printer enters the offline state.

Press the ONLINE key to recover the printer from this error. The paper jam detection function is disabled. Remove paper dust from the jam sensor, and load fanfold paper again.

● Troubleshooting

Symptoms	Cause and Solution	
POWER lamp fails to light.	• Power cord not connected. • Malfunction of the power supply in the printer Contact the dealer.	***See page 1-1.***
Error lamp does not light.(Out-of-paper error not detected.)	• The paper sensor is clogged by paper dust. Clean the paper sensor. • Malfunction of the paper sensor Contact the dealer.	***See page 6-3.***
Printer stops or slows down on printing.	• The print head has overheated. Wait until it has cooled down.	***See page 6-3.***
Poor quality printing	• Head adjustment is not set correctly. (*1) • The print head may need to be replaced. • Ribbon cassette may need to be replaced.	***See page 3-9.***
Smudging of the paper	• Head adjustment is not set correctly. (*1) • Ribbon cassette is not properly installed. • The print head may need to be replaced.	***See page 3-9.***
Incorrect character printed	• Check whether the cable connection is faulty or broken. • Host system control and data code may not match the printer's setup. • Check the emulation setting of the EXTENDED SETUP MODE.	***See page 1-2.***
Print position gap occurs over bar code or vertical line.	• Adjust with the vertical alignment function. • The print head may need to be replaced.	***See page 4-6.***
Fanfold paper slips	• Stack of fanfold paper to be fed is placed beside the printer crookedly.	***See page 1-12.***
Extra line feed	• The automatic carriage return option in the extended setup options is set incorrectly. • Change the setting of #27 CR SETTING on the EXTENDED SETUP MODE.	***See page 3-27.***

*1) When the head adjustment is not appropriate,

(1) In the AUTO mode:
Specify the appropriate head adjustment again in the range from -2 to +5. When the appropriate head adjustment cannot be set, carry out this setting in the FIX mode.

(2) In the FIX mode:
Specify the appropriate head adjustment again.

(3) When the appropriate head adjustment cannot be specified, the head adjustment mechanism is faulty. Have it replaced by the dealer.

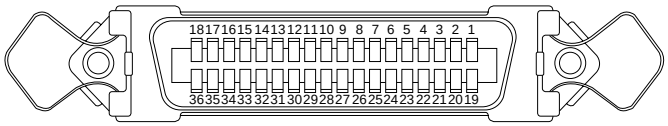
Symptoms	Cause and Solution	
Paper jam	• Paper is curled. Carefully remove the jammed paper. • Head adjustment is not set correctly. (*1) • Push down the lock lever of tractors to the LOCK position. • When using the printer in an environment where it is exposed to a direct light or sunlight, make sure that the paper jam sensor is not directly exposed to the light. • There is some obstruction in the paper path or ejection path. • The paper jam sensor is clogged by paper dust. Clean the paper jam sensor. (*2) • Malfunction of the paper jam sensor Contact the dealer.	*See page xiii.*
Paper jam is not detected.	• Paper jam detection is set to NO in the EXTENDED SETUP MODE. Change the setting of #65 PAPER JAM DETECTION.	*See page 3-44.*
Paper is skewed.	• The skew sensor is clogged by paper dust. Clean the skew sensor. (*2) • Malfunction of the skew sensor Contact the dealer.	*See page xiii.*
Skewing is not detected.	• Skew detection is set to NO in the EXTENDED SETUP MODE. Change the setting of #64 SKEW DETECTION.	*See page 3-43.*
Flap will not change	• Turn the power on and off several times. • Malfunction of the flap mechanism Contact the dealer.	*See page 6-1.*
Tractor mode cannot be changed	• Turn the power on and off several times. • Malfunction of the tractor mechanism Contact the dealer.	*See page 6-1.*
Paper is not ejected to the top.	• The paper ejection path is not set properly. Set the proper ejection path using the PAPER PATH key or #61 PAPER PATH on the EXTENDED SETUP MODE. • Upward ejection cannot be used when paper that has a short page length (150 mm or less) is being used.	*See page 3-42.*

*2) How to clean the paper jam sensor and skew sensor cover
After switching the power off, remove the ink ribbon and clean these sensors using a vacuum cleaner or cotton-swab.

7. Interface specifications

Parallel interface

Input connector (36-pin parallel)



Pin configuration

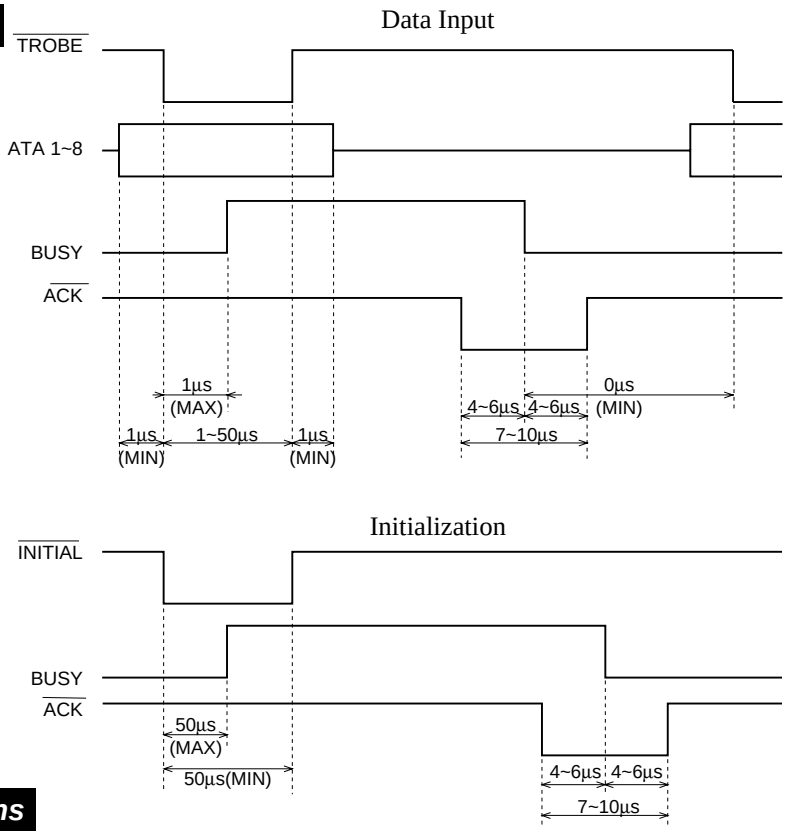
PIN	SIGNAL	IN/OUT	PIN	SIGNAL	IN/OUT
1	STROBE *	IN	19	GND	
2	DATA 1	IN	20	GND	
3	DATA 2	IN	21	GND	
4	DATA 3	IN	22	GND	
5	DATA 4	IN	23	GND	
6	DATA 5	IN	24	GND	
7	DATA 6	IN	25	GND	
8	DATA 7	IN	26	GND	
9	DATA 8	IN	27	GND	
10	ACK *	OUT	28	GND	
11	BUSY	OUT	29	GND	
12	PE	OUT	30	GND	
13	SELECT	OUT	31	INITIAL *	IN
14	AUTO FEED *	IN	32	ERROR *	OUT
15	NC		33	GND	
16	GND		34	NC	
17	GHASSIS GND		35	HIGH	OUT
18	+5V	OUT	36	SELECT IN *	IN

(1) The signals marked with asterisks are negative logic signals.
(2) The High level is raised to +5 V with a 2.2 kΩ resistor.
(3) NC means "not connected".
(4) The CHASSIS GND and GND are connected inside the printer.

Bidirectional (IEEE1284. Nibble mode) is available.

● Parallel interface

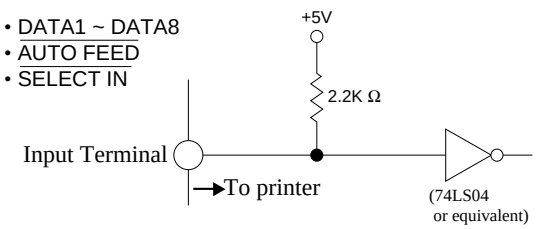
Timing chart



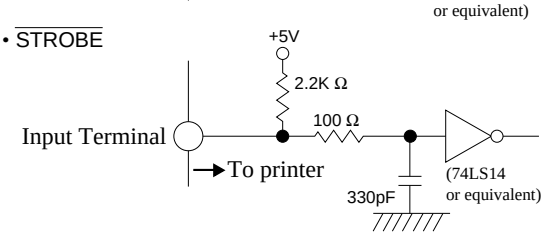
Input/output conditions

Input Signals

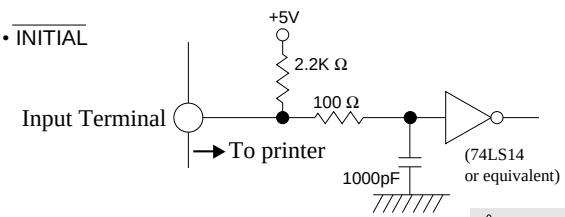
• DATA1 ~ DATA8
• AUTO FEED
• SELECT IN



• STROBE

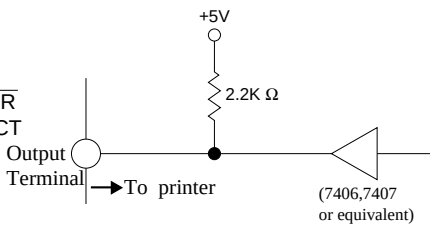


• INITIAL



Output Signals

• BUSY
• ACK
• PE
• ERROR
• SELECT



All signals are TTL-level signals.

HIGH LEVEL	2.4 ~ 5.0 V	At the input terminals of the printer
LOW LEVEL	0 ~ 0.4 V	

● Parallel interface

Signal explanations

Input signals to the printer

[DATA1 to DATA8]

Each of these signals is an 8-bit data signal. It is high when the signal is logic 1 and low when the signal is logic 0. DATA1 is the LSB, and DATA8 is the MSB.

See page 3-53.

[$\overline{\text{STROBE}}$]

This is a strobe signal for reading an 8-bit data signal. Data is read in at the falling or rising edge of the $\overline{\text{STROBE}}$ signal.

See page 3-53.

[$\overline{\text{INITIAL}}$]

This signal initializes the printer to the state in which the printer starts up when the power is turned on. It is normally high. When it is set to low, the printer is reset. When it is set to high again, the printer is initialized.

[$\overline{\text{AUTO FEED}}$]

If this signal is set to low when #27 CR SETTING is set to AUTOFEED in the EXTENDED SETUP MODE, line feeding is performed when the CR command is executed. In the HP mode or IBM mode, it is possible to specify whether to perform line feeding after executing the CR command by using the software command, regardless of the settings of this signal and #27 CR SETTING in the EXTENDED SETUP MODE.

See page 3-29.

[$\overline{\text{SELECT IN}}$]

When this signal is set to high, the control code is validated. Validity of this signal is specified in the extended setup mode. In the HP mode, this signal setting is ignored.

See page 3-47.

Each signal wire must be 2 meters or less in length. It is recommended that a twisted pair of signal and GND wires be used.

● Parallel interface

Output signals from the printer

[BUSY]

This signal indicates that the printer is in the busy state. While it is high, no external data is accepted.
This signal is set to high in any of the following cases:

(1) Initialization is being performed.
(2) The $\overline{\text{STROBE}}$ signal is issued and data is input.
(3) The self-test printing is being performed.
(4) The printer is in the offline state.
(5) The printer cover is open.
(6) The printer is in an error state.

[$\overline{\text{ACK}}$]

This signal is output at the falling edge of the BUSY signal which was set high by the $\overline{\text{STROBE}}$ signal. No $\overline{\text{ACK}}$ signal is output in cases (4), (5), (6) above.

See page 3-53.

[PE]

This signal is set high when no paper is detected. It is set low when paper is detected.

[$\overline{\text{ERROR}}$]

This signal is set low when an out-of-paper error or other error occurs in the IBM mode.
It is set low when printer is in the offline state, in addition to the errors noted above, in the EPSON mode.
This signal is set low when the functional error occurs in the HP mode.

See page 6-3.

[SELECT]

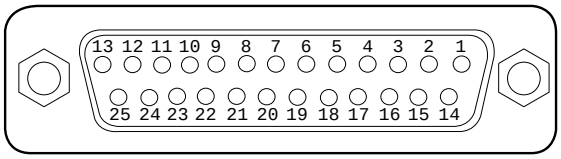
This signal is always set high in the EPSON mode.
In the IBM mode, it is set low when an out-of-paper error, paper error or functional error occurs, the printer cover is opened, the printer is in the offline state, or the deselect command (ESC + Q + (23)H or (B9)H) is executed. It is set high when the printer is in the online state with the ONLINE key or the DC1 (select) command is executed.
In the HP mode, this signal is set low when the printer is in the offline state. It is set high when the printer is in the online state.

When #84 ERROR STATUS is set to NO in the EXTENDED SETUP MODE, PE signal is always set to low and $\overline{\text{ERROR}}$ and SELECT signals are always set to high.

● Serial interface

Serial interface

Input connector (25-pin serial connector)

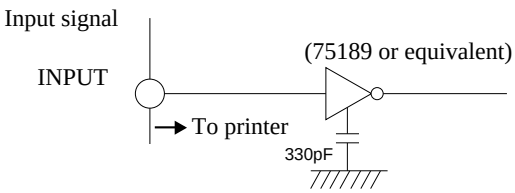


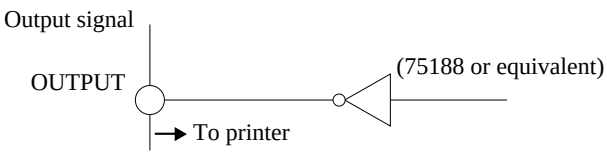
Pin configuration

PIN	SIGNAL	IN/OUT	PIN	SIGNAL	IN/OUT
1	CHASSIS GND		14	NC	
2	TXD	OUT	15	NC	
3	RXD	IN	16	NC	
4	RTS	OUT	17	NC	
5	CTS	IN	18	NC	
6	DSR	IN	19	NC	
7	SIGNAL GND		20	DTR	OUT
8	CD	IN	21	NC	
9	NC		22	NC	
10	NC		23	NC	
11	SRTS	OUT	24	NC	
12	NC		25	NC	
13	NC				

(1) NC means "not connected".
(2) The CHASSIS GND and SIGNAL GND are connected inside the printer.

Input/output conditions





Signal levels
OFF: Indicates "MARK" at a level from -3 to -15 V.
ON: Indicates "SPACE" at a level from +3 to +15 V.

● Serial interface

Input signals to the printer

[RXD (Receive data)]

Serial input data, which consists of a start bit, data bits, (parity bit), and stop bit.
The data length (7 or 8 bits), use of the parity bit, and even or odd parity are specified in the EXTENDED SETUP MODE.

See pages 3-47 and 3-48.

[CTS (Clear to send)]

A data transmission control signal, which indicates that data can be sent to the computer.
Whether or not to use this signal to control data transmission is specified in the setup mode. This signal is not used by default.
If the X-ON/X-OFF or ETX/ACK protocol is selected and the CTS ENABLE option is set to NO in the EXTENDED SETUP MODE, the printer outputs data to the computer, regardless of this signal setting.
If the X-ON/X-OFF or ETX/ACK protocol is selected and the CTS ENABLE option is set to YES in the EXTENDED SETUP MODE, the printer outputs data to the computer according to this signal setting.

See page 3-50.

[DSR (Data set ready)]

This signal indicates the state of the modem or computer.
If data is sent to the printer when this signal is ON, the data is processed as valid data.
Data received when this signal is OFF is ignored as invalid data.
By default, this signal is not used, and all data sent by the computer is processed as valid data (i.e., the default setting causes the same operation as when the DSR signal is ON). Whether or not to use this signal for control is selected in the EXTENDED SETUP MODE.

See page 3-51.

[CD (Carrier detect)]

This signal indicates whether the modem is connected with the communication line. If data is sent to the printer when this signal is active, the data is processed as valid data. Data received when this signal is inactive is ignored as invalid data.
By default, this signal is not used, and all data sent by the computer is processed as valid data (i.e., the default setting causes the same operation as when the CD signal is active). Whether or not to use this signal for control is selected in the EXTENDED SETUP MODE.

See page 3-51.

Output signals from the printer

[TXD (Transmit data)]

Serial output data.
X-ON, X-OFF and ACK signals are output.
The data format is the same as the received data format.

[RTS (Request to send)]

Always held active (space).

[SRTS]

This signal indicates that the printer is ready or busy.
OFF : Indicates that the printer is busy and printer is in the offline state. Data transmission to the printer is disabled.
ON : Indicates that the printer is ready and data can be transmitted to the printer.
This signal is always ON when X-ON/X-OFF(I)or(II)or the ETX/ACK protocol is selected.

[DTR (Data terminal ready)]

This signal indicates that the printer is ready or busy.
OFF: Indicates that the printer is busy and printer is in the offline state. Data transmission to the printer is disabled.
ON: Indicates that the printer is ready and data can be transmitted to the printer.
This signal is always ON when X-ON/X-OFF (I) or (II) or the ETX/ACK protocol is selected.

● Serial interface

Handshaking protocol

Any of four handshaking protocols is selected in the extended setup mode.

See page 3-49.

- DTR protocol
- X-ON/X-OFF (I) protocol
- X-ON/X-OFF (II) protocol
- ETX/ACK protocol

Control of these serial protocols is based on the free area in the data buffer. There are two protocol control points based on the data buffer: CIN, where the ready state changes to the busy state, and CRN, where the busy state changes to the ready state. The values of these points are shown below.

When 512KB or 8KB buffer size is selected,

CIN: 1KB
CRN: 2KB

When 128-byte buffer size is selected,

CIN: 32 bytes
CRN: 64 bytes

When the free space in the data buffer is reduced below the CIN value, the printer enter the busy state and remains there until the free space exceeds the CRN value. When the free space exceeds the CRN value, the printer enters the ready state.

DTR (READY/BUSY) Protocol

In this protocol, the printer state is indicated by the SRTS signal (pin No. 11) and DTR signal (pin No. 20).
When the printer is ready, each signal goes ON (+12 V). When the printer is busy or in the offline state, each signal goes OFF (-12 V).
When the printer is busy or in the offline state, the computer does not send data.
However, data from the computer can be received when the printer is busy or in the offline state.

(1) When the power is turned on,
The SRTS and DTR signals go ready when data input is enabled on completion of initialization after turning on the power.

X-ON/X-OFF (I)/(II) protocol

In this protocol, the printer sends the X-ON(11)H and X-OFF(13)H codes to the computer to indicate the printer state.
In the X-ON/X-OFF protocol, the printer sends X-OFF(13)H to the computer once when the ready state changes to the busy or offline state, once when 64 bytes of data have been received since this point in time, and once when the free area in the buffer becomes zero.
The printer sends X-ON(11)H once to the computer when the busy or offline state changes to the ready state or the power is turned on. If the ONLINE key is pressed in the offline state and the free space in the buffer is greater than the CIN value, the printer sends X-ON and enters the ready state. If the free space in the buffer is less than the CIN value, the printer enters the busy state without any operation. In the busy or offline state, the SRTS and DTR signals remain active. X-ON and X-OFF signals are sent to the computer even if the DSR or CD input signal is inactive. In the X-ON/X-OFF (I) protocol, the X-ON signal is sent when the power is turned on. In the X-ON/X-OFF (II) protocol, the X-ON signal is not sent when the power is turned on.

The X-OFF signal is sent once in any of the following conditions:

(1) The ready state changes to the busy state.
(2) The ready state changes to the offline state.
(3) 64 bytes of data are received in the state shown in (1) or (2) above, provided the free area in the buffer is greater than 64 bytes.
(4) The free area in the buffer becomes zero, regardless of the online or offline state.

The X-ON signal is sent once in any of the following conditions:

(1) The busy state changes into the ready state.
(2) The offline state changes into the online state.
(3) The printer enters the online state when power is turned on, provided the X-ON/X-OFF (I) protocol is selected.

Special notes

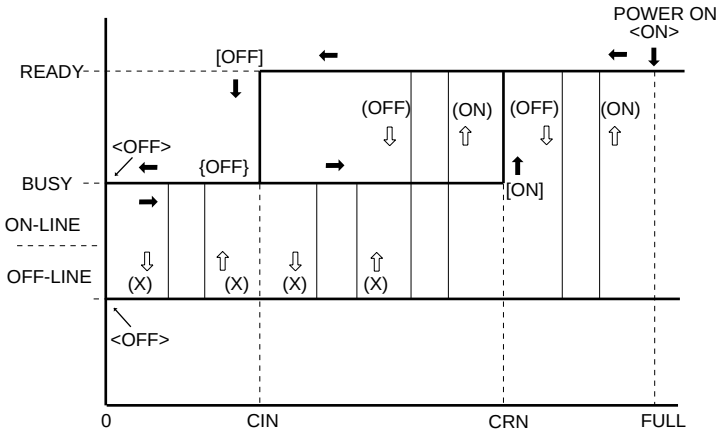
(1) If the ONLINE key is pressed in the offline state and the free area in the buffer is over the CIN value,
   1) The printer sends X-ON and enters the online ready state if it was in the ready state.
   2) The printer sends no signal and enters the online busy state if it was in the busy state.

(2) If the ONLINE key is pressed in the offline state and the free area in the buffer is less than the CIN value, the printer sends no signal and enters the online busy state.

(3) If the ready state is changed into the offline state by pressing the ONLINE key and data is input and the free area in the buffer exceeds the CIN value during data input even though the printer has sent X-OFF once, the printer does not send X-OFF.
   However, if the printer receives the 64th byte of data after entering the offline state, it sends X-OFF once.

(4) The printer sends X-OFF once if the printer enters the offline state due to an out-of-paper error after initialization.

(5) In the X-ON/X-OFF (I) protocol, X-ON is output after power on when initialization is completed and the printer enters the online state.



[ON][OFF]	: X-ON or X-OFF is sent once when the data size changes.
(ON), (OFF)	: X-ON or X-OFF is sent once when the ONLINE key is pressed.
{OFF}	: X-OFF is sent when the 64th byte of data is received after sending X-OFF.
<OFF>	: X-OFF is sent when the free area in the buffer becomes zero.
<ON>	: X-ON is sent when power is turned on and the X-ON/X-OFF (I) protocol is in use.
⬇⬆⬅➡	: No signal is sent. Status transition due to change in the amount of data.
⇩⇧	: Status transition caused by pressing the ONLINE key.

● Serial interface

ETX/ACK protocol

Upon reception of ETX(03)H, the printer sends ACK(06)H to the computer to indicate that it is ready. If the printer is busy, it does not send ACK to indicate that it is busy.
If the free area in the buffer is less than the CIN value when the printer receives ETX, the printer does not send ACK immediately. It sends ACK when the free area in the buffer becomes greater than the CRN value. If the printer is in the offline state, the printer sends ACK when the ONLINE key is pressed and the printer becomes ready.

In the busy or offline state, the SRTS and DTR signals remain ON. The printer sends ACK to the computer even if the CTS input signal is OFF.
The interface does not analyze the (03)H code. Thus, the printer sends ACK in response to (03)H received in an escape sequence or graphic data sequence. The received (03)H code is sent to the emulation as normal data.

Baud rate

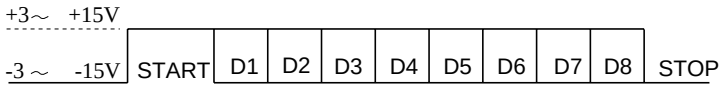
The baud rate can be selected from the values shown below in the extended setup mode:
38400BPS, 19200BPS, 9600BPS, 4800BPS, 2400BPS, 1200BPS, 600BPS, 300BPS,

See page 3-49.

Serial data organization

The data frame has the following organization.
START BIT (1) + DATA BIT (7 or 8) + PARITY BIT (0 or 1) + STOP BIT (1 or 2)

MARK: Logic "1" (-3 to -15 V)
SPACE: Logic "0" (+3 to +15 V)



Automatic serial/parallel selection

If #70 INTERFACE is set to AUTO in the EXTENDED SETUP MODE, the serial or parallel interface is selected automatically.
In the initial condition, both the serial and parallel interfaces are ready. When data is input through either interface, printing is done through that interface. In printing, the other interface is in the busy state. If data is input through the busy interface, the data is ignored.
If no data is input to the first interface, both interfaces are reset to the initial ready state.

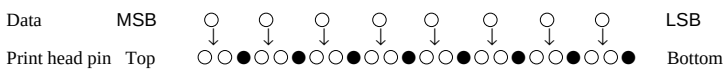
8. Software commands

Symbol	Code		Function
	Decimal	Hex	
BEL	(07)D	(07)H	Activates the printer buzzer.
BS	(08)D	(08)H	Moves the printing position leftward by one character.
HT	(09)D	(09)H	Moves the printing position to the next horizontal tab.
LF	(10)D	(0A)H	Single line feed Causes a carriage return if #28 LF SETTING is set to CR + LF in the EXTENDED SETUP MODE.
VT	(11)D	(0B)H	Vertical tab Causes a carriage return if #28 LF SETTING is set to CR + LF in the EXTENDED SETUP MODE.
FF	(12)D	(0C)H	Form feed Causes a carriage return, regardless of the setting in the EXTENDED SETUP MODE.
CR	(13)D	(0D)H	Carriage return Executes a line feed after a carriage return if #27 CR SETTING is set to CR + LF or #27 CR SETTING is set to AUTOFEED and the parallel $\overline{\text{AUTO FEED}}$ signal is low.
SO	(14)D	(0E)H	Double-width printing on a single line.
SI	(15)D	(0F)H	Specifies condensed mode (from 10 cpi to 17 cpi, 12 cpi to 20 cpi, or proportional to condensed proportional). Valid only when #34 PITCH LOCK is set to NO in the EXTENDED SETUP MODE.
DC1	(17)D	(11)H	Printer select Cancels the input data ignoring condition which is set by the DC3 (deselect) code. Valid when #71 SELECT IN ENABLE is set to 1 in the EXTENDED SETUP MODE or SELECT IN ENABLE is selected to I/F and the SELECT IN signal is high.
DC2	(18)D	(12)H	Cancels condensed mode.
DC3	(19)D	(13)H	Printer deselect Puts the printer into the deselect state. Valid when #71 SELECT IN ENABLE is set to 1 in the EXTENDED SETUP MODE or SELECT IN ENABLE is selected to I/F and the SELECT IN signal is high.
DC4	(20)D	(14)H	Cancels the double-width mode established by the SO command.
CAN	(24)D	(18)H	Cancel Clears all data in the print buffer and printing position specified with the horizontal position move command (HT, ESC $, ESC \, etc.).
DEL	(127)D	(7F)H	Deletes a character.
ESC	(27)D	(1B)H	Designates ESC sequence.
ESC SO	(27)D(14)D	(1B)H (0E)H	Double-width printing on a single line.
ESC SI	(27)D(15)D	(1B)H (0F)H	Specifies condensed mode.
ESC EM n	(27)D(25)D n	(1B)H (19)H n	Specifies the paper path. n="R" : Ejects paper. n="B" : Feeds paper with the rear tractor. n="F" : Feeds paper with the front tractor. n="M" : Feeds manually loaded paper. n="f" : Ejects paper to the front. n="t" : Ejects paper to the top. n="r" : Ejects paper to the rear.

● EPSON Software commands

<table>
<tr><th rowspan="2">Symbol</th><th colspan="2">Code</th><th rowspan="2">Function</th></tr>
<tr><th>Decimal</th><th>Hex</th></tr>
<tr><td>ESC SP
n</td><td>(27)D(32)D
n</td><td>(1B)H (20)H
n</td><td>Specifies the space between characters.(0 ≤ n ≤ 127)
The dot density differs with the printing mode, as shown below.
<table>
<tr><td>Printing mode</td><td>Dot pitch</td></tr>
<tr><td>Draft</td><td>1/120 inch</td></tr>
<tr><td>LQ</td><td>1/180 inch</td></tr>
<tr><td>Proportional</td><td>1/180 inch</td></tr>
</table></td></tr>
<tr><td>ESC !
n</td><td>(27)D(33)D
n</td><td>(1B)H (21)H
n</td><td>Batch selection of the printing mode (0 ≤ n ≤ 255)
<table>
<tr><th>Bit</th><th>"1"</th><th>"0"</th><th>Command having same function</th></tr>
<tr><td>0</td><td>12 cpi</td><td>10 cpi</td><td>ESC M / ESC P</td></tr>
<tr><td>1</td><td>Proportional</td><td>Proportional canceled</td><td>ESC p</td></tr>
<tr><td>2</td><td>Condensed</td><td>Condensed canceled</td><td>SI / DC2</td></tr>
<tr><td>3</td><td>Emphasized</td><td>Emphasized canceled</td><td>ESC E / ESC F</td></tr>
<tr><td>4</td><td>Double strike</td><td>Double strike canceled</td><td>ESC G / ESC H</td></tr>
<tr><td>5</td><td>Double-width</td><td>Double-width canceled</td><td>ESC W</td></tr>
<tr><td>6</td><td>Italic</td><td>Italic canceled</td><td>ESC 4 / ESC 5</td></tr>
<tr><td>7</td><td>Underscoring selected</td><td>Underscoring canceled</td><td>ESC -</td></tr>
</table></td></tr>
<tr><td>ESC #</td><td>(27)D(35)D</td><td>(1B)H (23)H</td><td>Cancels MSB control.</td></tr>
<tr><td>ESC $
n1 n2</td><td>(27)D(36)D
n1 n2</td><td>(1B)H (24)H
n1 n2</td><td>Specifies the absolute printing position.
Distance = n1 + (n2 × 256) (In units of 1/60 inch)</td></tr>
<tr><td>ESC %
n</td><td>(27)D(37)D
n</td><td>(1B)H (25)H
n</td><td>Specifies or cancels the down-load character set.(n = 00, 01, 30, 31)
n = 01, 31: Specifies the down-load character set.
n = 00, 30: Cancels the down-load character set.</td></tr>
<tr><td>ESC &
s, n, m,
[a0, a1,
a2, data]
m-n+1</td><td>(27)D(38)D
s, n, m,
[a0, a1,
a2, data]
m-n+1</td><td>(1B)H (26)H
s, n, m,
[a0, a1,
a2, data]
m-n+1</td><td>Defines the down-load characters.
s: Down-load character set number
n : Define start of ASCII code (00)H ~ (7F)H
m : Define end of ASCII code (00)H ~ (7F)H
a0 : Left space
a1 : Actual character width (Number of dots)
a2 : Right space</td></tr>
<tr><td>ESC *
m
n1 n2
d1 d2
•••dk</td><td>(27)D(42)D
m
n1 n2
d1 d2
••• dk</td><td>(1B)H (2A)H
m
n1 n2
d1 d2
••• dk</td><td>Selects graphic function.
8-pin graphic: n1 + (n2 × 256)
24-pin graphic: (n1 + (n2 × 256)) × 3
<table>
<tr><th>Mode</th><th>Pin</th><th>m</th><th>Horizontal dot density (dot/inch)</th><th>Max. dots per line</th></tr>
<tr><td>Single-density</td><td>8</td><td>0</td><td>60</td><td>816</td></tr>
<tr><td>Double-density</td><td>8</td><td>1</td><td>120</td><td>1632</td></tr>
<tr><td>Double-speed double-density❋</td><td>8</td><td>2</td><td>120</td><td>1632</td></tr>
<tr><td>Quadruple-density ❋</td><td>8</td><td>3</td><td>240</td><td>3264</td></tr>
<tr><td>CRT I</td><td>8</td><td>4</td><td>80</td><td>1080</td></tr>
<tr><td>CRT II</td><td>8</td><td>6</td><td>90</td><td>1224</td></tr>
<tr><td>Single-density</td><td>24</td><td>32</td><td>60</td><td>816</td></tr>
<tr><td>Double-density</td><td>24</td><td>33</td><td>120</td><td>1632</td></tr>
<tr><td>CRT III</td><td>24</td><td>38</td><td>90</td><td>1224</td></tr>
<tr><td>Triple-density</td><td>24</td><td>39</td><td>180</td><td>2488</td></tr>
<tr><td>Hex-density❋</td><td>24</td><td>40</td><td>360</td><td>4896</td></tr>
<tr><td colspan="5">❋Horizontally adjacent dots can not be printed.</td></tr>
</table></td></tr>
</table>

In the 8-pin graphic mode, one bit of data corresponds to two print head pin dots, as shown below.



● EPSON Software commands

Symbol	Code		Function
	Decimal	Hex	
ESC (- n1 n2 m d1 d2	(27,40,45)D n1 n2 m d1 d2	(1B,28,2D)H n1 n2 m d1 d2	Specifies line type. (n1 = 3) (n2 = 0) (m = 1) d1 = 1 Underscore d2 = 1 Single line d1 = 2 Center line d2 = 2 Double lines d1 = 3 Upper line d2 = 5 Single dotted line d2 = 6 Double dotted lines d2 = 0 Cancels the line specification.
ESC (^ n1 n2	(27,40,94)D n1 n2	(1B,28,5E)H n1 n2	All-character set. Prints n1 + n2 x 256 characters in the all-character character set.
ESC (t n1n2 d1 d2 d3	(27,40,116)D n1 n2 d1 d2 d3	(1B,28,74)H n1 n2 d1 d2 d3	Specifies a character set. d1 : Displays ESC t n command table No. d2, d3 : Specifies the character set. d2 = 0, d3=0 : ITALIC d2 = 1, d3=0 : PC-437 d2 = 3, d3=0 : PC-850 d2 = 7, d3=0 : PC-860 d2 = 8, d3=0 : PC-863 d2 = 9, d3=0 : PC-865 d2 = 11, d3=0 : PC-857 d2 = 44, d3=0 : PC-858 d2 = 24, d3=0 : PC-861 d2 = 25, d3=0 : PC-BRASCII d2 = 26, d3=0 : PC-ABICOMP d2 = 17, d3=0 : ISO-8859-1
ESC + n	(27)D(43)D n	(1B)H (2B)H n	Specifies a line feed pitch of n/360 inch. (0 ≤ n ≤ 255)
ESC - n	(27)D(45)D n	(1B)H (2D)H n	Specifies or cancels underscoring. n = 01, 31: Specifies underscoring. n = 00, 30 : Cancels underscoring.
ESC / m	(27)D(47)D m	(1B)H (2F)H m	Selects the vertical tab channel. (0 ≤ n ≤ 7)
ESC 0	(27)D(48)D	(1B)H (30)H	Specifies 1/8 inch line feed pitch.
ESC 2	(27)D(50)D	(1B)H (32)H	Specifies 1/6 inch line feed pitch.
ESC 3 n	(27)D(51)D n	(1B)H (33)H n	Specifies line feed pitch of n/180 inch. (0 ≤ n ≤ 255)
ESC 4	(27)D(52)D	(1B)H (34)H	Specifies the italic font.
ESC 5	(27)D(53)D	(1B)H (35)H	Cancels the italic font.
ESC 6	(27)D(54)D	(1B)H (36)H	Expands the character code area. Makes the area from (80)H to (9F)H the character code area, rather than the control code area, when the graphic character table or down-load character table is selected. This is the initial condition.
ESC 7	(27)D(55)D	(1B)H (37)H	Cancels the expanded character code area.
ESC : NUL n s	(27)D(58)D NUL n s	(1B)H (3A)H NUL n s	Copies the internal character set. (0 ≤ n ≤ 255) Draft mode: n = 0 LQ mode: n = 0 ~ 9 s : Down-load character set number (See ESC &)
ESC <	(27)D(60)D	(1B)H (3C)H	Returns to the home position. Move the print head to the left end without sensing the home position.

● EPSON Software commands

<table>
<tr><th rowspan="2">Symbol</th><th colspan="2">Code</th><th rowspan="2">Function</th></tr>
<tr><th>Decimal</th><th>Hex</th></tr>
<tr><td>ESC =
ESC ></td><td>(27)D(61)D
(27)D(62)D</td><td>(1B)H (3D)H
(1B)H (3E)H</td><td>Specifies MSB 0
Specifies MSB 1</td></tr>
<tr><td>ESC ?
n m</td><td>(27)D(63)D
n m</td><td>(1B)H (3F)H
n m</td><td>Converts the graphic modes.
(n= "K","L","Y","Z", m = 0 ≤ m ≤ 40)
Converts the ESC K, ESC L, ESC Y or ESC Z graphic mode into the ESC * graphic mode.
n : Graphic mode to be converted
m : New graphic mode
<table>
<tr><th>m</th><th>Graphic mode</th><th>Horizontal dot density
dpi (dot/inch)</th></tr>
<tr><td>0</td><td>Single-density</td><td>60 (8PIN)</td></tr>
<tr><td>1</td><td>Double-density</td><td>120 (8PIN)</td></tr>
<tr><td>2</td><td>Double-speed double-density</td><td>120 (8PIN)</td></tr>
<tr><td>3</td><td>Quadruple-density</td><td>240 (8PIN)</td></tr>
<tr><td>4</td><td>CRT I</td><td>80 (8PIN)</td></tr>
<tr><td>6</td><td>CRT II</td><td>90 (8PIN)</td></tr>
<tr><td>32</td><td>Single-density</td><td>60 (24PIN)</td></tr>
<tr><td>33</td><td>Double-density</td><td>120 (24PIN)</td></tr>
<tr><td>38</td><td>CRT III</td><td>90 (24PIN)</td></tr>
<tr><td>39</td><td>Triple-density</td><td>180 (24PIN)</td></tr>
<tr><td>40</td><td>Hex-density</td><td>360 (24PIN)</td></tr>
</table>
The initial setting is as shown below;
ESC K = ESC * 00
ESC L = ESC * 01
ESC Y = ESC * 02
ESC Z = ESC * 03</td></tr>
<tr><td>ESC @</td><td>(27)D(64)D</td><td>(1B)H (40)H</td><td>Initializes the printer.
Resets the print modes and clears command settings, data in the print buffer and printing position.
<table>
<tr><th>Initialization item</th><th>Status</th></tr>
<tr><td>• Line feed pitch</td><td>Specified in setup mode</td></tr>
<tr><td>• Page length</td><td>Specified in setup mode</td></tr>
<tr><td>• TOF</td><td>Regarding current line as TOF</td></tr>
<tr><td>• Bottom margin</td><td>Specified in setup mode</td></tr>
<tr><td>• Vertical tab</td><td>Setting when power is turned on</td></tr>
<tr><td>• Vertical tab channel</td><td>Channel 0</td></tr>
<tr><td>• Right & left margins</td><td>Specified in setup mode</td></tr>
<tr><td>• Horizontal tab</td><td>Specified in setup mode</td></tr>
<tr><td>• Inter-character pitch</td><td>0</td></tr>
<tr><td>• Character pitch</td><td>Specified in setup mode</td></tr>
<tr><td>• Special effect</td><td>Canceled</td></tr>
<tr><td>• Down-load character</td><td>Not cleared</td></tr>
<tr><td>• Character set</td><td>Specified in setup mode</td></tr>
<tr><td>• Single-direction printing</td><td>Specified in setup mode</td></tr>
<tr><td>• MSB control</td><td>Canceled</td></tr>
<tr><td>• According to ESC ?
Graphic mode conversion</td><td>Canceled</td></tr>
<tr><td>• Justification</td><td>Canceled</td></tr>
<tr><td>• International character</td><td>Specified in setup mode</td></tr>
<tr><td>• Character font</td><td>Specified in setup mode</td></tr>
<tr><td>• Print buffer</td><td>Cleared</td></tr>
<tr><td>• Communication buffer</td><td>Not cleared</td></tr>
<tr><td>• Printing position</td><td>Left margin position</td></tr>
</table></td></tr>
</table>

● EPSON Software commands

Symbol	Code		Function
	Decimal	Hex	
ESC A n	(27)D(65)D n	(1B)H (41)H n	Specifies the line feed pitch in n/60 inch. (0 ≤ n ≤ 127)
ESC B n1 n2 ••• nk NUL	(27)D(66)D n1 n2 ••• nk NUL	(1B)H (42)H n1 n2 ••• nk NUL	Specifies the vertical tab position. (1 ≤ nk ≤ 255, 1 ≤ k ≤ 16) This command can specify a maximum of 16 vertical tab positions.
ESC C n	(27)D(67)D n	(1B)H (43)H n	Specifies the page length in number of lines. (1 ≤ n ≤ 127) Valid when #32 PAGE LENGTH LOCK is set to NO in the EXTENDED SETUP MODE.
ESC C NUL n	(27)D(67)D NUL n	(1B)H (43)H NUL n	Specifies the page length in inches. (1 ≤ n ≤ 22) Valid when #32 PAGE LENGTH LOCK is set to NO in the EXTENDED SETUP MODE.
ESC D n1 n2 ••• nk NUL	(27)D(68)D n1 n2 ••• nk NUL	(1B)H (44)H n1 n2 ••• nk NUL	Specifies the horizontal tab position. (1 ≤ nk ≤ 255, 1 ≤ k ≤ 32) This command can specify a maximum of 32 horizontal tab positions.
ESC E	(27)D(69)D	(1B)H (45)H	Specifies emphasized printing.
ESC F	(27)D(70)D	(1B)H (46)H	Cancels emphasized printing.
ESC G	(27)D(71)D	(1B)H (47)H	Specifies the double striking.
ESC H	(27)D(72)D	(1B)H (48)H	Cancels the double striking.
ESC J	(27)D(74)D	(1B)H (4A)H	Executes line feeding at a pitch of n/180 inch. (0 ≤ n ≤ 255)
ESC K n1 n2 d1 d2 ••• dk	(27)D(75)D n1 n2 d1 d2 ••• dk	(1B)H (4B)H n1 n2 d1 d2 ••• dk	Specifies the 8-dot single-density graphic mode. Number of data k= n1 + n2 x 256 Horizontal dot density: 60 dpi Maximum dots per line : 816 dot
ESC L n1 n2 d1 d2 ••• dk	(27)D(76)D n1 n2 d1 d2 ••• dk	(1B)H (4C)H n1 n2 d1 d2 ••• dk	Specifies the 8-dot double-density graphic mode. Number of data k = n1 + n2 x 256 Horizontal dot density: 120 dpi Maximum dots per line : 1632 dot
ESC M	(27)D(77)D	(1B)H (4D)H	Specifies 12 cpi (elite). Valid when #34 PITCH LOCK is set to NO in the EXTENDED SETUP MODE.
ESC N n	(27)D(78)D n	(1B)H (4E)H n	Specifies the bottom margin. (1 ≤ n ≤ 127) This command is ignored in the CSF mode.
ESC O	(27)D(79)D	(1B)H (4F)H	Cancels the bottom margin. This command is ignored in the CSF mode.
ESC P	(27)D(80)D	(1B)H (50)H	Specifies 10 cpi. Valid when #34 PITCH LOCK is set to NO in the EXTENDED SETUP MODE.
ESC Q n	(27)D(81)D n	(1B)H (51)H n	Specifies the right margin. The right margin cannot exceed the paper width specified with #4 or #5 in the SETUP MODE.

● EPSON Software commands

Symbol	Code		Function
	Decimal	Hex	
ESC R n	(27)D(82)D n	(1B)H (52)H n	Selects a national character type. (0 ≤ n ≤ 13, 31, 64)

n	NATION	23	24	40	5B	5C	5D	5E	60	7B	7C	7D	7E
0	U.S.A.	#	$	@	[	\	]	^	`	{	¦	}	~
1	FRANCE	#	$	à	°	ç	§	^	`	é	ù	è	¨
2	GERMANY	#	$	§	Ä	Ö	Ü	^	`	ä	ö	ü	ß
3	U.K.	£	$	@	[	\	]	^	`	{	¦	}	~
4	DENMARK	#	$	@	Æ	Ø	Å	^	`	æ	ø	å	~
5	SWEDEM	#	¤	É	Ä	Ö	Å	Ü	é	ä	ö	å	ü
6	ITALY	#	$	@	°	\	é	^	ù	à	ò	è	ì
7	SPAIN	₧	$	@	¡	Ñ	¿	^	`	¨	ñ	}	~
8	JAPAN	#	$	@	[	¥	]	^	`	{	¦	}	~
9	NORWAY	#	¤	É	Æ	Ø	Å	Ü	é	æ	ø	å	ü
10	DENMARK II	#	$	É	Æ	Ø	Å	Ü	é	æ	ø	å	ü
11	SPAIN II	#	$	á	¡	Ñ	¿	é	`	í	ñ	ó	ú
12	LATIN AMERICA	#	$	á	¡	Ñ	¿	é	ü	í	ñ	ó	ú
13	KOREA	#	$	@	[	₩	]	^	`	{	¦	}	~
31	TURKEY	#	ı	İ	Ç	Ö	Ş	Ü	ğ	ç	ö	ş	ü
64	LEGAL	#	$	§	°	'	"	¶	`	©	®	†	™

ESC S n	(27)D(83)D n	(1B)H (53)H n	Specifies superscript or subscript. n = 00, 30: Specifies superscript. n = 01, 31: Specifies subscript. Characters corresponding to the graphic character sets (B0)H to (DF)H, (F4)H and (F5)H are invalid.
ESC T	(27)D(84)D	(1B)H (54)H	Cancels superscript or subscript.
ESC U n	(27)D(85)D n	(1B)H (55)H n	Specifies or cancels uni-directional printing. n = 00, 30: Cancels uni-directional printing. n = 01, 31: Specifies uni-directional printing.
ESC W n	(27)D(87)D n	(1B)H (57)H n	Specifies or cancels double-width printing. n = 00, 30: Cancels double-width printing. n = 01, 31: Specifies double-width printing.
ESC Y n1 n2 d1 d2 ••• dk	(27)D(89)D n1 n2 d1 d2 ••• dk	(1B)H (59)H n1 n2 d1 d2 ••• dk	Specifies the 8-dot, double-speed, double-density graphic mode. Number of data k = n1 + n2 x 256 Horizontal dot density: 120 dpi Maximum dots per line: 1632 dot Horizontally adjacent dots cannot be printed.
ESC Z n1 n2 d1 d2 ••• dk	(27)D(90)D n1 n2 d1 d2 ••• dk	(1B)H (5A)H n1 n2 d1 d2 ••• dk	Specifies the 8-dot, quadruple-density graphic mode. Number of data k= n1 + n2 x 256 Horizontal dot density: 240 dpi Maximum dots per line : 3264 dot Horizontally adjacent dots cannot be printed.

● EPSON Software commands

Symbol	Code		Function
	Decimal	Hex	

ESC \ n1 n2	(27)D(92)D n1 n2	(1B)H (5C)H n1 n2	Specifies the relative printing position.
			Specifies where to start printing of the next data in relation to the current position as shown below.
			If (n1+n2×256) is less than 32768 [8000H], the printing position moves to the right of the current position by (n1+n2×256).
			If (n1+n2×256) is equal to or more than 32768 [8000H], the printing position moves to the left of the current position by 65536 – (n1+n2 × 256).
			
			Printing mode — Unit of motion
			Draft — 1 / 120 inch
			LQ or proportional — 1 / 180 inch

ESC a n	(27)D(97)D n	(1B)H (61)H n	Selects the printing position adjustment. n = 00, 30 : Left justification n = 01, 31 : Centering n = 02, 32 : Right justification n = 03, 33 : Justification Left justification is selected by default.
ESC b m n1 n2 ••• nk NUL	(27)D(98)D m n1 n2 ••• nk NUL	(1B)H (62)H m n1 n2 ••• nk NUL	Specifies the vertical tab position in each channel. (0 ≤ m ≤ 7, 1 ≤ nk ≤ 255, 1 ≤ k ≤ 16) This command specifies the vertical tab position in channel m. A maximum of 16 vertical tab positions can be specified. m: Channel number If m is equal to or more than 8, three bytes of ESC b m are ignored.
ESC g	(27)D(103)D	(1B)H (67)H	Selects 15CPI. Valid when #34 PITCH LOCK is set to NO.
ESC j n	(27)D(106)D n	(1B)H (6A)H n	Executes reverse feeding at a pitch of n/180 inch. (0 ≤ n ≤ 255)
ESC k n	(27)D(107)D n	(1B)H (6B)H n	Selects the font. n — Font (00)H ROMAN (01)H SANS SERIF (02)H COURIER (03)H PRESTIGE ELITE (04)H SCRIPT (05)H OCR-B (06)H OCR-A (07)H ORATOR (08)H ORATOR-S (14)H GOTHIC

● EPSON Software commands

Symbol	Code		Function
	Decimal	Hex	
ESC l n	(27)D(108)D n	(1B)H (6C)H n	Specifies the left margin. This command sets the left margin at the "n"th character by the character width when the command is executed (including double- width and inter-character SP).
ESC p n	(27)D(112)D n	(1B)H (70)H n	Specifies or cancels proportional printing. n = 00, 30 : Cancels proportional printing. n = 01, 31 : Specifies proportional printing. The draft and LQ modes have no difference for the proportional printing. This command is valid when #34 PITCH LOCK is set to NO.
ESC q n	(27)D(113)D n	(1B)H (71)H n	Selects a special effect. n = 00: Normal character n = 01: Outline character n = 02 : Shadow character n = 03 : Outline with shadow character Normal characters are selected by default. Any characters corresponding to the graphic character sets (B0)H to (DF)H and (F4)H to (F5)H.
ESC t n	(27)D(116)D n	(1B)H (74)H n	Selects a character code table. n = 00, 30 : Selects the italic character table. n = 01, 31 : Selects the graphic character table. n = 02, 32 : Selects the downloaded character table. n = 03, 33 : Selects the graphic character table. If downloaded characters cannot be printed when the downloaded character table is selected, italic characters are printed. The selected character table is changed with the ETS (t command.
ESC w n	27)D(119)D n	(1B)H (77)H n	Specifies or cancels double-height printing. n = 00, 30 : Cancels double-height printing. n = 01, 31 : Specifies double-height printing. Double-height printing does not apply to the graphic data.
ESC x n	(27)D(120)D n	(1B)H (78)H n	Selects character. n = 00, 30 : Selects draft characters. n = 01, 31 : Selects LQ characters.

● IBM Software commands

Symbol	Code		Function
	Decimal	Hex	
BEL	(07)D	(07)H	Activates the printer buzzer.
BS	(08)D	(08)H	Moves the printing position to the left by one character.
HT	(09)D	(09)H	Moves the printing position to the following horizontal tab.
LF	(10)D	(0A)H	Single-line feed Causes carriage return if #28 LF SETTING is set to CR + LF in the EXTENDED SETUP MODE.
VT	(11)D	(0B)H	Vertical tab Moves the printing position to the left margin if #28 LF SETTING is set to CR + LF in the EXTENDED SETUP MODE.
FF	(12)D	(0C)H	Form feed (Always moves the printing position to the left margin.)
CR	(13)D	(0D)H	Carriage return Executes line feeding after carriage return if #27 CR SETTING is set to CR + LF.
SO	(14)D	(0E)H	Double-width printing on a single line.
SI	(15)D	(0F)H	Specifies condensed mode. Valid when #34 PITCH LOCK is set to NO in the EXTENDED SETUP MODE.
DC1	(17)D	(11)H	Printer select Changes the deselect condition established with ESC Q (23)H or (B9)H to the select condition. Valid when #71 SELECT IN ENABLE is set to 1 in the EXTENDED SETUP MODE or SELECT IN ENABLE is set to I/F and the SELECT IN signal is high.
DC2	(18)D	(12)H	Cancels the condensed mode. Valid when #34 PITCH LOCK is set to NO in the EXTENDED SETUP MODE.
DC4	(20)D	(14)H	Cancels the double-width mode established by the SO command.
CAN	(24)D	(18)H	Cancel Clears all data in the print buffer and moves the printing position to the beginning of the next line.
ESC	(27)D	(1B)H	Designates ESC sequence.
ESC EM n	(27)D(25)D n	(1B)H (19)H n	Specifies the paper path. n="R" : Ejects paper. n="B" : Feeds paper with the rear tractor. n="F" : Feeds paper with the front tractor. n="M" : Feeds manually loaded paper. n="f" : Ejects paper to the front. n="t" : Ejects paper to the top. n="r" : Ejects paper to the rear.

● IBM Software commands

<table>
<tr><th rowspan="2">Symbol</th><th colspan="2">Code</th><th rowspan="2">Function</th></tr>
<tr><th>Decimal</th><th>Hex</th></tr>
<tr><td>ESC ✻
m
n1 n2
d1 d2
m (printing density) = 0, 1, 2, 3, 4, 6, 32, 33, 38, 39, 40
... dk</td><td>(27)D (42)D
m
n1 n2
d1 d2

... dk</td><td>(1B)H (2A)H
m
n1 n2
d1 d2

... dk</td><td>Selects a graphic function.
Valid only when #26 AGM (Alternate Graphics Mode) is set to YES in the EXTENDED SETUP MODE.
<table>
<tr><th>Mode</th><th>Pin</th><th>m</th><th>Horizontal dot density dpi (dot/inch)</th><th>Max. dots per line</th></tr>
<tr><td>Single-density</td><td>8</td><td>0</td><td>60</td><td>Same as ESC K</td></tr>
<tr><td>Double-density</td><td>8</td><td>1</td><td>120</td><td>Same as ESC L</td></tr>
<tr><td>Double-speed double-density❋</td><td>8</td><td>2</td><td>120</td><td>Same as ESC Y</td></tr>
<tr><td>Quadruple-density ❋</td><td>8</td><td>3</td><td>240</td><td>Same as ESC Z</td></tr>
<tr><td>CRT I</td><td>8</td><td>4</td><td>80</td><td>CRT I</td></tr>
<tr><td>CRT II</td><td>8</td><td>6</td><td>90</td><td>CRT II</td></tr>
<tr><td>Single-density</td><td>24</td><td>32</td><td>60</td><td>High density of ESC K</td></tr>
<tr><td>Double-density</td><td>24</td><td>33</td><td>120</td><td>High density of ESC L</td></tr>
<tr><td>CRT III</td><td>24</td><td>38</td><td>90</td><td>CRT III</td></tr>
<tr><td>Triple-density</td><td>24</td><td>39</td><td>180</td><td>Triple high density</td></tr>
<tr><td>Hex-density❋</td><td>24</td><td>40</td><td>360</td><td>Quadruple high density</td></tr>
<tr><td colspan="5">❋Horizontally adjacent dots can not be printed.</td></tr>
</table></td></tr>
<tr><td></td><td></td><td></td><td></td></tr>
<tr><td>ESC –
n</td><td>(27)D (45)D
n</td><td>(1B)H (2D)H
n</td><td>Specifies or cancels underscoring. (n = 0, 1)</td></tr>
<tr><td>ESC 0
ESC 1</td><td>(27)D (48)D
(27)D (49)D</td><td>(1B)H (30)H
(1B)H (31)H</td><td>Specifies line feed at a 1/8-inch pitch.
Specifies line feed at a 7/72-inch pitch.</td></tr>
<tr><td>ESC 2</td><td>(27)D (50)D</td><td>(1B)H (32)H</td><td>Executes ESC A.
Sets the line feed pitch to the value specified by ESC A.</td></tr>
<tr><td>ESC 3
n</td><td>(27)D (51)D
n</td><td>(1B)H (33)H
n</td><td>Specifies n/216 -inch line feed pitch. {1 ≤ n ≤ 255}
When n=0, this command is invalid.</td></tr>
<tr><td>ESC 3
n</td><td>(27)D (51)D
n</td><td>(1B)H (33)H
n</td><td>Specifies n/180 -inch line feed pitch. (AGM) {1 ≤ n ≤ 255}
Setting of n = 0 is possible.</td></tr>
<tr><td>ESC 4
ESC 5
n</td><td>(27)D(52)D
(27)D(53)D
n</td><td>(1B)H (34)H
(1B)H (35)H
n</td><td>TOF Specifies.
Specifies or cancels automatic line feeding. {n = 0, 1}
Specifies whether to execute a carriage return and a line feed or a carriage return only when executing the CR code.
n=0 : Carriage return only
n=1 : Carriage return and line feeding</td></tr>
<tr><td>ESC 6
ESC 7
ESC :</td><td>(27)D(54)D
(27)D(55)D
(27)D(58)D</td><td>(1B)H (36)H
(1B)H (37)H
(1B)H (3A)H</td><td>Specifies character set 2.
Specifies character set 1.
Specifies 12 CPI.</td></tr>
<tr><td>ESC =
n1 n2
(I.D.byte)
(adrs-low)
(adrs-high)
data</td><td>(27)D(61)D
n1 n2
(I.D.byte)
(adrs-low)
(adrs-high)
data</td><td>(1B)H (3D)H
n1 n2
(I.D.byte)
(adrs-low)
(adrs-high)
data</td><td>Valid when #34 PITCH LOCK is set to NO in the EXTENDED SETUP MODE.
Specifies downloading.
{0 ≤ n1 ≤ 255} {0 ≤ n2 ≤ 255} {I.D.byte = (23)H}
{(00)H ≤ (adrs-low) ≤ (FF)H} {(00)H ≤ (adrs-high) ≤ (FF)H}
{(00)H ≤ data ≤ (FF)H}
The number of following data: n1+n2 × 256.
When n1=n2=0 , the downloading area is initialized. Two bytes, (adrs-low)(adrs-high) show the memory address in which the first byte of data is stored. The next data is stored in the following address in sequence.</td></tr>
<tr><td>ESC A
n</td><td>(27)D(65)D
n</td><td>(1B)H (41)H
n</td><td>Specifies the line feed pitch in units of n/72 inch. {1 ≤ n ≤ 255}
Specifies the line feed pitch in units of n/72 inch. When n = 0, this command is invalid.</td></tr>
</table>

● IBM Software commands

Symbol	Code		Function
	Decimal	Hex	
ESC A n	(27)D(65)D n	(1B)H (41)H n	Specifies the line feed pitch in units of n/60 inch {1 ≤ n ≤ 255} (AGM) Specifies the line feed pitch in units of n/60 inch. When n = 0 , this command is invalid.
ESC B d1 d2 ••• dk NUL	(27)D(66)D d1 d2 ••• dk (00)D	(1B)H (42)H d1 d2 ••• dk (00)H	Specifies the vertical tabs. A maximum of 64 tabs can be specified. Specify vertical tabs from the lowest tab and end with (00)H.
ESC C n	(27)D(67)D n	(1B)H (43)H n	Specifies the page length in number of lines.{1 ≤ n ≤ 255} The maximum page length is 182 inches. Valid when #32 PAGE LOCK is set to NO in the EXTENDED SETUP MODE.
ESC C NUL n	(27)D(67)D (00)D n	(1B)H (43)H (00)H n	Specifies the page length in inches. {1 ≤ n ≤ 182} Valid when #32 PAGE LOCK is set to NO in the EXTENDED SETUP MODE.
ESC D d1 d2 ••• dk NUL	(27)D (68)D d1 d2 ••• dk (00)D	(1B)H (44)H d1 d2 ••• dk (00)H	Specifies the horizontal tabs. A maximum of 28 tabs can be specified. Specify horizontal tabs from the lowest tab and end with (00)H.
ESC E	(27)D(69)D	(1B)H (45)H	Specifies emphasized printing.
ESC F	(27)D(70)D	(1B)H (46)H	Cancels emphasized printing.
ESC G	(27)D(71)D	(1B)H (47)H	Specifies double-striking.
ESC H	(27)D(72)D	(1B)H (48)H	Cancels double-striking.
ESC I n	(27)D(73)D n	(1B)H (49)H n	Selects a font. n = 0, 2, 3, 4, 6, 7, 8, 10, 12, 14, 16, 18, 20, 22 If the value "n" is not as specified above, this command is invalid.
ESC J n	(27)D(74)D n	(1B)H (4A)H n	Executes line feeding at a pitch of n/216 inches. (1 ≤ n ≤ 255)
ESC J n	(27)D(74)D n	(1B)H (4A)H n	Executes line feeding at a pitch of n/180 inches. (AGM) (1 ≤ n ≤ 255)
ESC K n1 n2 d1 d2 ••• dk	(27)D(75)D n1 n2 d1 d2 ••• dk	(1B)H (4B)H n1 n2 d1 d2 ••• dk	Specifies the 8-dot single- density graphic mode. Number of data k = n1 + n2 x 256 Horizontal dot density : 60dpi Maximum dots per line: 816 dot
ESC L n1 n2 d1 d2 ••• dk	(27)D(76)D n1 n2 d1 d2 ••• dk	(1B)H (4C)H n1 n2 d1 d2 ••• dk	Specifies the 8-dot double-density graphic mode. Number of data k = n1 + n2 x 256 Horizontal dot density : 120dpi Maximum dots per line : 1632 dot

n	Internal/download	Character quality	Character width
0	Internal font	Draft	10 CPI
2	Internal font	LQ	10 CPI
3	Internal font	LQ	Proportional
4	Download	Draft	10 CPI
6	Download	LQ	10 CPI
7	Download	LQ	Proportional
8	Internal font	Draft	12 CPI
10	Internal font	LQ	12 CPI
12	Download	Draft	12 CPI
14	Download	LQ	12 CPI
16	Internal font	Draft	Condensed
18	Internal font	LQ	Condensed
20	Download	Draft	Condensed
22	Download	LQ	Condensed

● IBM Software commands

Symbol	Code		Function
	Decimal	Hex	
ESC N n	(27)D(78)D n	(1B)H (4E)H n	Specifies the bottom margin. (1 ≤ n ≤ 255) The number of lines to be skipped is specified by "n" and the bottom margin is specified in the preset line feed amount.
ESC O	(27)D(79)D	(1B)H (4F)H	Cancels the bottom margin.
ESC P n	(27)D(80)D n	(1B)H (50)H n	Specifies or cancels proportional printing. n = 0 : Cancels proportional printing. n = 1 : Specifies proportional printing. This command is valid when #34 PITCH LOCK is set to NO.
ESC Q n	(27)D(81)D n	(1B)H (51)H n	Printer deselect Brings the printer into the deselect state when n=(23)H,(B9)H. Valid when #71 SELECT IN ENABLE is set to 1 in the EXTENDED SETUP MODE or set to I/F and the SELECT IN signal is high.
ESC R	(27)D(82)D	(1B)H (52)H	Initializes the horizontal and vertical tab positions. Clears the vertical tab position.
ESC S n	(27)D(83)D n	(1B)H (53)H n	Specifies superscript or subscript. n = 0 : Specifies superscript. n = 1 : Specifies subscript.
ESC T	(27)D(84)D	(1B)H (54)H	Cancels superscript or subscript.
ESC U n	(27)D(85)D n	(1B)H (55)H n	Specifies or cancels uni-directional printing. n = 0 : Cancels uni-directional printing. n = 1 : Specifies uni-directional printing.
ESC W n	(27)D(87)D n	(1B)H (57)H n	Specifies or cancels double-width printing. n = 0 : Cancels double-width printing. n = 1 : Specifies double-width printing.
ESC X n m	(27)D(88)D n m	(1B)H (58)H n m	Specifies the right and left margins. {0 ≤ n ≤ 255} {0 ≤ m ≤ 255}
ESC Y n1 n2 d1 d2 ••• dk	(27)D(89)D n1 n2 d1 d2 ••• dk	(1B)H (59)H n1 n2 d1 d2 ••• dk	Specifies the 8-dot double-speed double-density graphic mode. Number of data k = n1 + n2 × 256 Horizontal dot density : 120 dpi Maximum dots per line : 1632 dot Horizontally adjacent dots cannot be printed.
ESC Z n1 n2 d1 d2 ••• dk	(27)D(90)D n1 n2 d1 d2 ••• dk	(1B)H (5A)H n1 n2 d1 d2 ••• dk	Specifies the quadruple-density graphic mode. Number of data k = n1 + n2 × 256 Horizontal dot density : 240 dpi Maximum dots per line : 3264 dot Horizontally adjacent dots cannot be printed.
ESC [- n1 n2 m1 m2	(27,91,45)D n1 n2 m1 m2	(1B, 5B, 2D)H n1 n2 m1 m2	Specifies the line type. Number of data k = n1 + n2 × 256 m1 = 1 : Underscore m2 = 0 : Cancels the line specification. m1 = 2 : Center line m2 = 1 : Single line m1 = 3 : Upper line m2 = 2 : Double lines m2 = 255 : Cancels the line specification.

● IBM Software commands

<table>
<tr><th rowspan="2">Symbol</th><th colspan="2">Code</th><th rowspan="2">Function</th></tr>
<tr><th>Decimal</th><th>Hex</th></tr>
<tr><td>ESC [@
n1 n2

m1 m2
m3 m4</td><td>(27,91,64)D
n1 n2

m1 m2
m3 m4</td><td>(1B, 5B, 40)H
n1 n2

m1 m2
m3 m4</td><td>Specifies or cancels double-width, double-height printing.
n1+n2 × 256 indicates the number of following data.
Normally, n1=4 and n2=0.
{n1 = 4} {n2 = 0} {m1 = 00, 01, 02, 04, 08, 10, 20 H}
{m3 = 00, 01, 02, 10, 11, 12, 20, 21, 22 H}
{m4 = (00)H, (01)H, (02)H)} {m2 = 0}
This command specifies or cancels double-height, double-width printing.
m1 = 1 : Specifies italic characters.
m1 = 2 : Cancels italic characters.
m1 = 4 : Specifies the outline characters.
m1 = 8 : Cancels the outline characters.
m1 = 16 : Specifies shadow characters.
m1 = 32 : Cancels shadow characters.
m2 : Meaningless
m3 : High order half-byte (4 bit) indicates Line Feed.
Low order half-byte (4 bit) indicates High.
m4 : Low order half-byte (4 bit) indicates Width.
Line Feed indicates the mode where the line feed pitch is doubled. High indicates the mode where the height is doubled. Width indicates the mode where the width is doubled.
Setting is;
0 : Not changed
1 : Standard size
2 : Double size
3 or more: Same as 0.
Graphic symbols are printed in the standard size.</td></tr>
<tr><td>ESC [K
n1 n2
m1 m2
m3 m4</td><td>(27,91,75)D
n1 n2
m1 m2
m3 m4</td><td>(1B, 5B, 4B)H
n1 n2
m1 m2
m3 m4</td><td>Software initial
n1+n2 × 256 indicates the number of the next data.
When m1 =00, 04, FE H, initialization is executed without clearing downloading.
m1 =01, 05, FF H, initialization is executed with clearing download area.
m2 = 03, 16, 23, 24, B1, B4 H, the next two bytes of data are valid.
<table>
<tr><th></th><th>m 3</th><th>m 4</th></tr>
<tr><td>bit 7</td><td>0 : m 3 is valid.
1 : m 3 is invalid.</td><td>0 : m 4 is valid.
1 : m 4 is invalid.</td></tr>
<tr><td>bit 6</td><td>————</td><td>Code page
0 : 437
1 : 850</td></tr>
<tr><td>bit 5</td><td>————</td><td>————</td></tr>
<tr><td>bit 4</td><td>LF code
0 : LF only
1 : LF + CR</td><td>————</td></tr>
<tr><td>bit 3</td><td>CR code
0 : C R only
1 : CR + LF</td><td>————</td></tr>
<tr><td>bit 2</td><td>Page length
0 : 11 inches
1 : 12 inches</td><td>————</td></tr>
<tr><td>bit 1</td><td>Zero font
0 : No slash
1 : With slash</td><td>Printing range
0 : 13.6 inches
1 : 8 inches</td></tr>
<tr><td>bit 0</td><td>Character set
0 : Set 1
1 : Set 2</td><td>————</td></tr>
</table></td></tr>
</table>

● IBM Software commands

Symbol	Code		Function
	Decimal	Hex	
ESC [I n1 n2 Hf Lf Hs Ls Sm 00 Hc Lc	(27,91,73)D n1 n2 Hf Lf Hs Ls Sm 00 Hc Lc	(1B, 5B,49)H n1 n2 Hf Lf Hs Ls Sm 00 Hc Lc	Selects the font. n1 + n2 x 256 indicates the number of the next data. Hf, Lf = FONT ID Hs, Ls = Size (pitch & height) Sm = 1 : Font size is specified with Hs, Ls. Sm = 2 or 3 : Specifies proportional printing. Hs, Ls, Sm is valid only when the font ID specified with Hf, Lf is invalid or ignored. Hc, Lc specifies the code page. The following table shows the relationship between the Hf, Lf values and fonts.

Hf	Lf		
(00)H	(0B)H	COURIER	10CPI
(01)H	(EB)H	COURIER	12CPI
(01)H	(EC)H	COURIER	15CPI
(01)H	(ED)H	COURIER	17CPI
(01)H	(EE)H	COURIER	20CPI
(01)H	(1E)H	COURIER	24CPI
(00)H	(AB)H	COURIER	PROP
(00)H	(0C)H	PRESTIGE	10CPI
(01)H	(EF)H	PRESTIGE	12CPI
(01)H	(F0)H	PRESTIGE	15CPI
(01)H	(C9)H	PRESTIGE	17CPI
(01)H	(CA)H	PRESTIGE	20CPI
(01)H	(1F)H	PRESTIGE	24CPI
(00)H	(A4)H	PRESTIGE	PROP
(00)H	(24)H	GOTHIC	10CPI
(01)H	(8F)H	GOTHIC	12CPI
(01)H	(8E)H	GOTHIC	15CPI
(01)H	(8D)H	GOTHIC	17CPI
(01)H	(8C)H	GOTHIC	20CPI
(01)H	(20)H	GOTHIC	24CPI
(00)H	(AE)H	GOTHIC	PROP
(00)H	(19)H	ORATORs	10CPI
(01)H	(D0)H	ORATORs	12CPI
(01)H	(D1)H	ORATORs	15CPI
(01)H	(D2)H	ORATORs	17CPI
(01)H	(D3)H	ORATORs	20CPI
(01)H	(23)H	ORATORs	24CPI
(00)H	(C7)H	ORATORs	PROP
(00)H	(05)H	ORATOR	10CPI
(01)H	(CB)H	ORATOR	12CPI
(01)H	(CC)H	ORATOR	15CPI
(01)H	(CD)H	ORATOR	17CPI
(01)H	(CE)H	ORATOR	20CPI
(01)H	(21)H	ORATOR	24CPI
(00)H	(C6)H	ORATOR	PROP

Hf	Lf		
(01)H	(D4)H	SCRIPT	10CPI
(01)H	(D5)H	SCRIPT	12CPI
(01)H	(D6)H	SCRIPT	15CPI
(01)H	(D7)H	SCRIPT	17CPI
(01)H	(D8)H	SCRIPT	20CPI
(01)H	(24)H	SCRIPT	24CPI
(00)H	(C8)H	SCRIPT	PROP

Hf	Lf			
(00)H	(12)H	COURIER	10CPI	Italic
(00)H	(2E)H	COURIER	10CPI	Emphasized
(00)H	(39)H	COURIER	10CPI	Emphasized italic
(00)H	(55)H	COURIER	12CPI	
(00)H	(5C)H	COURIER	12CPI	Italic
(00)H	(6C)H	COURIER	12CPI	Emphasized
(00)H	(74)H	COURIER	12CPI	Emphasized italic
(00)H	(AC)H	COURIER	PROP	Italic
(00)H	(B8)H	COURIER	PROP	Emphasized
(00)H	(B9)H	COURIER	PROP	Emphasized italic
(00)H	(D6)H	COURIER	15CPI	Emphasized
(00)H	(D7)H	COURIER	15CPI	Italic
(00)H	(D8)H	COURIER	15CPI	Emphasized italic
(00)H	(DF)H	COURIER	15CPI	
(00)H	(F6)H	COURIER	10CPI	Double-width, double-height
(00)H	(F4)H	COURIER	10CPI	Double-width, double-height
(00)H	(F5)H	COURIER	10CPI	Emphasized double-width, double-height
(00)H	(FD)H	COURIER	17.1CPI	Emphasized
(00)H	(FE)H	COURIER	17.1CPI	
(00)H	(3C)H	PRESTIGE	10CPI	Emphasized
(00)H	(56)H	PRESTIGE	12CPI	
(00)H	(6F)H	PRESTIGE	12CPI	Emphasized
(00)H	(70)H	PRESTIGE	12CPI	Italic
(00)H	(DD)H	PRESTIGE	15CPI	
(01)H	(00)H	PRESTIGE	17.1CPI	

Function

Hf	Lf			
(00)H	(57)H	GOTHIC	12CPI	
(00)H	(6D)H	GOTHIC	12CPI	Italic
(00)H	(6E)H	GOTHIC	12CPI	Emphasized
(00)H	(9D)H	GOTHIC	PROP	Emphasized
(00)H	(A2)H	GOTHIC	PROP	Italic
(00)H	(DE)H	GOTHIC	15CPI	
(00)H	(F1)H	GOTHIC	10CPI	Double-width, double-height
(00)H	(F2)H	GOTHIC	10CPI	Emphasized Double-width, double-height
(00)H	(F3)H	GOTHIC	10CPI	Emphasized Double-striking Double-width, double-height
(00)H	(FF)H	GOTHIC	17.1CPI	
(01)H	(19)H	GOTHIC	20CPI	
(32)H	(00)H	ROMAN	10CPI	
(32)H	(01)H	ROMAN	12CPI	
(32)H	(02)H	ROMAN	15CPI	
(32)H	(03)H	ROMAN	17CPI	
(32)H	(04)H	ROMAN	20CPI	
(32)H	(05)H	ROMAN	24CPI	
(32)H	(06)H	ROMAN	PROP	
(32)H	(10)H	SANS SERIF	10CPI	
(32)H	(11)H	SANS SERIF	12CPI	
(32)H	(12)H	SANS SERIF	15CPI	
(32)H	(13)H	SANS SERIF	17CPI	
(32)H	(14)H	SANS SERIF	20CPI	
(32)H	(15)H	SANS SERIF	24CPI	
(32)H	(16)H	SANS SERIF	PROP	
(32)H	(20)H	OCR-A	10CPI	
(32)H	(21)H	OCR-A	12CPI	
(32)H	(23)H	OCR-A	17CPI	
(32)H	(24)H	OCR-A	20CPI	
(32)H	(30)H	OCR-B	10CPI	
(32)H	(31)H	OCR-B	12CPI	
(32)H	(33)H	OCR-B	17CPI	
(32)H	(34)H	OCR-B	20CPI	

The following shows the relationship between the Hs, Ls values and sizes.

Hs,Ls		
00,00-00,41	24CPI	Subscript
00,42-00,4D	20CPI	Subscript
00,4E-00,59	17CPI	Normal
00,5A-00,6B	15CPI	Normal
00,6C-00,83	12CPI	Normal
00,84-00,9B	10CPI	Normal
00,9C-00,B3	17CPI	Double-width
00,B4-00,D7	15CPI	Double-width
00,D8-00,FE	12CPI	Double-width Double-hight
00,FF-FF,FF	10CPI	Double-width Double-hight

The following shows the relationship between the Hc, Lc values and the code page.

Hc	Lc	Dec(Hc,Lc)	CODE PAGE
(01)H	(B5)H	437	CODE PAGE 437
(03)H	(52)H	850	CODE PAGE 850
(03)H	(5C)H	860	CODE PAGE 860
(03)H	(5F)H	863	CODE PAGE 863
(03)H	(61)H	865	CODE PAGE 865
(03)H	(59)H	857	CODE PAGE 857
(03)H	(5A)H	858	CODE PAGE 858
(40)H	(00)H	16384	ISO-8859-1
(03)H	(5d)H	861	CODE PAGE 861
(0F)H	(07)H	3847	CODE PAGE BRASCII
(0F)H	(08)H	3848	CODE PAGE ABICOMP

● IBM Software commands

<table>
<tr><th rowspan="2">Symbol</th><th colspan="2">Code</th><th rowspan="2">Function</th></tr>
<tr><th>Decimal</th><th>Hex</th></tr>
<tr><td>ESC [T
n1 n2
n3 n4
n5 n6</td><td>(27,91,84)D
n1 n2
n3 n4
n5 n6</td><td>(1B, 5B, 54)H
n1 n2
n3 n4
n5 n6</td><td>Selects the code page. (n1=4 n2=0 n3=0 n4=0)
n1 + n2 x 256 indicates the number of the next data.
n5=(01)H n6=(B5)H 437
(03)H (52)H 850
(03)H (59)H 857
(03)H (5A)H 858
(03)H (5C)H 860
(03)H (5F)H 863
(03)H (61)H 865
(40)H (00)H ISO-8859-1
(03)H (5D)H 861
(0F)H (07)H BRASCII
(0F)H (08)H ABICOMP</td></tr>
<tr><td>ESC [\
n1 n2
m1 m2
m3 m4</td><td>(27,91,92)D
n1 n2
m1 m2
m3 m4</td><td>(1B, 5B, 5C)H
n1 n2
m1 m2
m3 m4</td><td>Specifies the basic amount of line feeding.
(n1=4 n2=0 m1=0 m2=0 m3=0,104,180,216 m4=0,1,180,216)
n1 + n2 x 256 indicates the number of the next data.
When m3=0 and m4=216 or m3=216 and m4=0 , the basic line feed pitch is 1/216 inch.
When m3=0 and m4=180 or m3=180 and m4=0 , the basic line feed pitch is 1/180 inch.
When m3=104 and m4=1, the basic line feed pitch is 1/360 inch.
The basic line feed pitch is 1/216 inch (when not in the AGM mode) or 1/180 inch (in the AGM mode) by default.</td></tr>
<tr><td>ESC [d
n1 n2
n3</td><td>(27,91,100)D
n1 n2
n3</td><td>(1B, 5B, 64)H
n1 n2
n3</td><td>Selects character quality. (n1=1 n2=0)
n1 + n2 x 256 indicates the number of the next data.
n3 = 0 : Not changed.
n3 =(01)H - (7F)H Draft
n3 =(80)H - (BF)H LQ
n3 =(C0)H -(FE)H Emphasized LQ
n3 =(FF)H LQ
Valid when #35 QUALITY LOCK is set to NO in the EXTENDED SETUP MODE.</td></tr>
<tr><td>ESC [g
n1 n2
m
d1 d2
••• dk</td><td>(27,91,103)D
n1 n2
m
d1 d2
••• dk</td><td>(1B, 5B, 67)H
n1 n2
m
d1 d2
••• dk</td><td>Graphic mode
n1+n2 × 256 specifies (graphic data + 1).
{0 ≤ n1 ≤ 255}{0 ≤ n2 ≤ 255} {m = 0, 1, 2, 3, 8, 9, 11, 12, 16}
m indicates the graphic mode (density) as shown below.
<table>
<tr><td>m =</td><td>0</td><td>8 pin</td><td>60</td><td>dpi</td></tr>
<tr><td></td><td>1</td><td>8</td><td>120</td><td></td></tr>
<tr><td></td><td>2</td><td>8</td><td>120</td><td>(*)</td></tr>
<tr><td></td><td>3</td><td>8</td><td>240</td><td>(*)</td></tr>
<tr><td></td><td>8</td><td>24</td><td>60</td><td></td></tr>
<tr><td></td><td>9</td><td>24</td><td>120</td><td></td></tr>
<tr><td></td><td>11</td><td>24</td><td>180</td><td></td></tr>
<tr><td></td><td>12</td><td>24</td><td>360</td><td>(*)</td></tr>
<tr><td></td><td>16</td><td>48</td><td>360</td><td>(*)</td></tr>
</table>
In a graphic mode marked with an asterisk (*) horizontally adjacent dots cannot be printed.</td></tr>
</table>

● IBM Software commands

Symbol	Code		Function
	Decimal	Hex	
ESC \ n1 n2 d1 d2 •••dk	(27)D (92)D n1 n2 d1 d2 •••dk	(1B)H (5C)H n1 n2 d1 d2 •••dk	All-character set {0 ≤ n1 ≤ 255}{0 ≤ n2 ≤ 255} Prints n1 + n2 × 256 characters in the all-character character set.
ESC]	(27)D (93)D	(1B)H (5D)H	Reverse line feeding. This command does not execute a carriage return even when an automatic carriage return is specified.
ESC ^ n	(27)D (94)D n	(1B)H (5E)H n	All-character set for a single character. {0 ≤ n ≤ 255} Prints only one character following ESC ^ in the all-character character set.
ESC _ n	(27)D (95)D n	(1B)H (5F)H n	Specifies or cancels the upper line. n = 1 : Specifies the upper line. n = 0 : Cancels the upper line.
ESC d n1 n2	(27)D (100)D n1 n2	(1B)H (64)H n1 n2	Specifies the relative printing position. {0 ≤ n1 ≤ 255}{0 ≤ n2 ≤ 255} Advances the printing position by (n1+n2 × 256)/120 inch.
ESC j	(27)D (106)D	(1B)H (6A)H	Stops printing. After printing, this command activates the buzzer and disables printing.

● HP Software commands

Symbol	Code		Function
	Decimal	Hex	
BEL	(07)D	(07)H	Activates the printer buzzer. (Available in PCL3+ or PCL3+D)
BS	(08)D	(08)H	Backspace one character.
HT	(09)D	(09)H	Moves to next horizontal tab.
LF	(10)D	(0A)H	Linefeeds after printing.
FF	(12)D	(0C)H	Form feeds after printing.
CR	(13)D	(0D)H	Carriage return after printing.
SO	(14)D	(0E)H	Selects secondary font.
SI	(15)D	(0F)H	Selects prinmary font.
ESC	(27)D	(1B)H	Designate start of escape sequence.
SP	(32)D	(20)H	Space one character.
DEL	(127)D	(7F)H	To print the ASCII DEL character.
ESC & a # C	(27,38,97,#, 67)D	(1B,26,61,#, 43)H	Horizontal positioning by column.
ESC & a # H	(27,38,97,#, 72)D	(1B,26,61,#, 48)H	Horizontal positioning by 1/720".
ESC & a # L	(27,38,97,#, 76)D	(1B,26,61,#, 4C)H	Sets left margin.
ESC & a # M	(27,38,97,#, 77)D	(1B,26,61,#, 4D)H	Sets right margin.
ESC & a # R	(27,38,97,#, 82)D	(1B,26,61,#, 52)H	Vertical positioning by line (VMI).
ESC & a # V	(27,38,97,#, 86)D	(1B,26,61,#, 56)H	Vertical positioning by 1/720".
ESC & d # D	(27,38,100,#, 68)D	(1B,26,64,#, 44)H	Designates underline mode.
ESC & d # @	(27,38,100,#, 64)D	(1B,26,64,#, 40)H	Cancels underline mode.
ESC & k # E	(27,38,107,#, 69)D	(1B,26,6B,#, 45)H	Designates/Cancels the auto-cancellation of underline.
ESC & k # F	(27,38,107,#, 70)D	(1B,26,6B,#, 46)H	Designates/Cancels the auto-cancellation of secondary font. If # is seto to "0", current secondary font set changes automatically to primary font when vertical position changes.
ESC & k # G	(27,38,107,#, 71)D	(1B,26,6B,#, 47)H	Designates line termination. # = 0 (30H) :CR=CR, LF=LF, FF=FF # = 1 (31H) :CR=CR+LF, LF=LF, FF=FF # = 2 (32H) :CR=CR, LF=LF+CR, FF=FF+CR # = 3 (33H) :CR=CR+LF, LF=LF+CR, FF+CR
ESC & k # H	(27,38,107,#, 72)D	(1B,26,6B,#, 48)H	Sets HMI (Horizontal motion index). HMI is set by 1/120 inch. HMI is defined as the distance where the print position moves when the character code is input. If # is 12, the input characters are printed in 10 cpi.
ESC & k # S	(27,38,107,#, 83)D	(1B,26,6B,#, 53)H	Designates character pitch. Character pitch is set. # = 0 (30H) :Normal (10 cpi) # = 1 (31H) :Double width (5 cpi) # = 2 (32H) :Compressed (16.7 cpi) # = 4 (34H) :12 cpi

● HP Software commands

Symbol	Code		Function
	Decimal	Hex	
ESC & k # V	(27,38,107,#, 86)D	(1B,26,6B,#, 56)H	Designates/Cancels automatic scroll mode. # =0 (30H) :Designates automatic scroll mode. # =1 (31H) :Cancels automatic scroll mode.
ESC & k # W	(27,38,107,#, 87)D	(1B,26,6B,#, 57)H	Controls print direction. (Available in PCL3+ or PCL3+D) Print direction is set as follows. # = 0 (30H) :Unidirectional Print(left to right) # = 1 (31H) :Bidirectional Print # = 2 (32H) :Pre-directional Print
ESC & l # A	(27,38,108,#, 65)D	(1B,26,6C,#, 41)H	Designates paper size. Paper size is set as follows. # = 0 (30H) :(Setting in the setup mode) # = 2 (32H) :Letter # = 3 (33H) :Legal # = 26 (32H,36H) :A4 # = 81 (38H,31H) :ENVELOP Commercial-10
ESC & l # C	(27,38,108,#, 67)D	(1B,26,6C,#, 43)H	Sets VMI (Vertical motion index). VMI is set by 1/48 inch. VMI is defined as the distance where the print position moves when the LF code is input. If # is 8, the print position moves in 6 LPI vertically.
ESC & l # D	(27,38,108,#, 68)D	(1B,26,6C,#, 44)H	Sets the line spacing. VMI (Vertical motion index) # = The number of LPI (lines per inch). # = 8 (38H) :8 LPI
ESC & l # E	(27,38,108,#, 69)D	(1B,26,6C,#, 45)H	Sets top margin by VMI. (where # = “1,2, ...) When the top margin is set, the text length is set to the default. In case of skip perforation ON Text length = page length- top margin-1/2" (Bottom margin is set to 1/2") In case of skip perforation OFF Text length = page length- top margin (Bottom margin is set to 0")
ESC & l # F	(27,38,108,#, 70)D	(1B,26,6C,#, 46)H	Sets text length. Text length is set by line (VMI).
ESC & l # H	(27,38,108,#, 72)D	(1B,26,6C,#, 48)H	Sets paper path. The mode set as follows. # = 0 (30H) :Ejects Paper. # = 1 (31H) :Feeds paper with the CSF. # = 2 (32H) :Feeds manually loaded paper. # = -1 (2DH,31H) :Feeds paper with the front tractor. # = -2 (2DH,32H) : Feeds paper with the rear tractor. # = -10 (2DH,31H,30H) :Ejects paper to the front. # = -11 (2DH,31H,31H) :Ejects paper to the top # = -11 (2DH,31H,32H) :Ejects paper to the rear. When the "NOT INSTALL" is selected in the" SETUP #60 OPTION," the CSF command is the same as #=0.

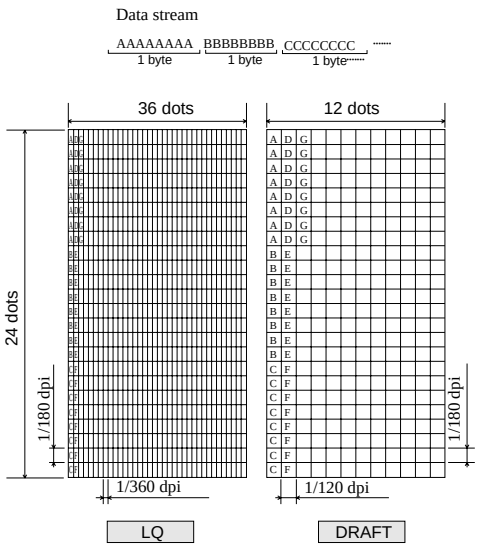
● HP Software commands

<table>
<tr><th rowspan="2">Symbol</th><th colspan="2">Code</th><th rowspan="2">Function</th></tr>
<tr><th>Decimal</th><th>Hex</th></tr>
<tr><td>ESC & l # L</td><td>(27,38,108,#, 76)D</td><td>(1B,26,6C,#, 4C)H</td><td>Designates/Cancels skip perforation mode.
Paper path is set as follows.
= 0 (30H) :Cancels the skip perforation mode
= 1 (31H) :Designates the skip perforation mode</td></tr>
<tr><td>ESC & l # P</td><td>(27,38,108,#, 80)D</td><td>(1B,26,6C,#, 50)H</td><td>Sets page length by VMI.</td></tr>
<tr><td>ESC & p # X</td><td>(27,38,112,#, 88)D</td><td>(1B,26,70,#, 58)H</td><td>Receives data as text.</td></tr>
<tr><td>ESC & s # C</td><td>(27,38,115,#, 67)D</td><td>(1B,26,73,#, 43)H</td><td>Designates/Cancels wraparound.
= 0 (30H) :Designates wraparound
= 1 (31H) :Cancels wraparound</td></tr>
<tr><td>ESC (id
ESC) id</td><td>(27,40,id)D
(27,41,id)D</td><td>(1B,28,id)H
(1B,29,id)H</td><td>Assign font to the primary/secondary font set.
<table>
<tr><th>id</th><th>Font</th><th>id</th><th>Font</th></tr>
<tr><td>0 A</td><td>MATH-SYMBOL ✻</td><td>10U</td><td>PC-8</td></tr>
<tr><td>0 B</td><td>LINE-DRAW</td><td>11U</td><td>PC-8, DENMARK/NORWAY</td></tr>
<tr><td>0 D</td><td>ISO-60, NORWAY 1</td><td>12U</td><td>PC-850</td></tr>
<tr><td>0 E</td><td>ROMAN-EXTENSION</td><td>2 S</td><td>ISO17,SPAIN 1</td></tr>
<tr><td>0 F</td><td>ISO-25, FRANCE 2 ✻</td><td>2 U</td><td>ISO2, IRV</td></tr>
<tr><td>0 G</td><td>GERMANY 2 ✻</td><td>3 S</td><td>ISO10, SWEDEN 2</td></tr>
<tr><td>0 I</td><td>ISO15, ITALY</td><td>4 S</td><td>ISO16, PORTUGAL 1</td></tr>
<tr><td>0 K</td><td>ISO14, JIS, ASCI</td><td>5 S</td><td>ISO84, PORTUGAL 2 ✻</td></tr>
<tr><td>0 L</td><td>LINE-DRAW</td><td>6 S</td><td>ISO85, SPAIN 2 ✻</td></tr>
<tr><td>0 M</td><td>MATH 7 ✻</td><td>8 U</td><td>ROMAN-8</td></tr>
<tr><td>0 N</td><td>ECMA 94, LATIN 1 (ISO-8859-1)</td><td>80U</td><td>CODE PAGE 857 ✻</td></tr>
<tr><td>0 U</td><td>ASCII</td><td>81U</td><td>CODE PAGE 860 ✻</td></tr>
<tr><td>0 S</td><td>ISO11, SWEDEN 1</td><td>82U</td><td>CODE PAGE 863 ✻</td></tr>
<tr><td>1 D</td><td>ISO61, NORWAY 2</td><td>83U</td><td>CODE PAGE 865 ✻</td></tr>
<tr><td>1 E</td><td>ISO4, UK</td><td>93U</td><td>CODE PAGE 858 ✻</td></tr>
<tr><td>1 F</td><td>ISO-69, FRANCE 1</td><td>94U</td><td>CODE PAGE 861 ✻</td></tr>
<tr><td>1 G</td><td>ISO-21, GERMANY 1</td><td>95U</td><td>CODE PAGE BRASCII ✻</td></tr>
<tr><td>1 S</td><td>SPAIN 3 ✻</td><td>96U</td><td>CODE PAGE ABICOMP ✻</td></tr>
<tr><td>1 U</td><td>LEGAL ✻</td><td></td><td></td></tr>
</table>
✻ : Avaliable in PCL3+ or PCL3+D mode</td></tr>
<tr><td>ESC (# @</td><td>(27,40,#, 64)D</td><td>(1B,28,#, 40)H</td><td>Designates primary font.
= 0 or 1 (30H or 31H) :
Copy the default primary symbol set to the current primary symbol set.
= 2 (32H) :
Copy the current primary symbol set to the current primary symbol set.
= 3 (33H) :
Copy the default primary font to the current primary font.</td></tr>
<tr><td>ESC (0 X
ESC) 0 X</td><td>(27,40,48, 88)D
(27,41,48, 88)D</td><td>(1B,28,30, 58)H
(1B,29,30, 58)H</td><td>Assigns the download font to the current primary/secondary font.</td></tr>
</table>

● HP Software commands

Symbol	Code		Function
	Decimal	Hex	
ESC (s # B ESC) s # B	(27,40,115,#, 66)D (27,41,115,#, 66)D	(1B,28,73,#, 42)H (1B,29,73,#, 42)H	Bold or emphasized. Designates/Cancels bold or emphasized attributes as follows. # = 0 (30H) :Bold off/Emphasized off # = 3 (33H) :Bold on /Emphasized off # = 7 (37H) :Bold off/Emphasized on
ESC (s # H ESC) s # H	(27,40,115,#, 72)D (27,41,115,#, 72)D	(1B,28,73,#, 48)H (1B,29,73,#, 48)H	Sets character spacing. (# = Font pitch (CPI)) PCL mode = PCL3+, PCL3+D or PCL3 # = 5 :5 cpi (0.01≤#<5.01) # = 10 :10 cpi (5.01≤#<10.01) # = 12 :12 cpi (10.01≤#<12.01) PCL mode = PCL3+ or PCL3+D # = 15 :15 cpi (12.01≤#<15.01) # = 16.7 :16.7 cpi (15.01≤#<16.71) # = 17.1 :17.1 cpi (16.71≤#<17.11) # = 20 :20 cpi (17.11≤#<20.01) # = 24 :24 cpi (20.01≤#) PCL mode = PCL3 # = 16.7 :16.7 cpi (12.01≤#<16.71) # = 20 :20 cpi (16.71 ≤#)
ESC (s # P ESC) s # P	(27,40,115,#, 80)D (27,41,115,#, 80)D	(1B,28,73,#, 50)H (1B,29,73,#, 50)H	Selects proportional or fixed character spacing. # = 1 (31H) :Proportional pitch # = 0 (30H) :Fixed pitch
ESC (s # Q ESC) s # Q	(27,40,115,#, 81)D (27,41,115,#, 81)D	(1B,28,73,#, 51)H (1B,29,73,#, 51)H	Sets print quality. # = 0 (30H) :Draft # = 2 (32H) :Letter Quality
ESC (s # S ESC) s # S	(27,40,115,#, 83)D (27,41,115,#, 83)D	(1B,28,73,#, 53)H (1B,29,73,#, 53)H	Sets italic character. # = 0 (30H) :Cancels italic character # = 1 (31H) :Designates italic character # = 2 (32H) :Designates italic character
ESC (s # T ESC) s # T	(27,40,115,#, 84)D (27,41,115,#, 84)D	(1B,28,73,#, 54)H (1B,29,73,#, 54)H	Sets typeface. # = 0 (30H) LINE PRINTER DRAFT # = 3 (33H) COURIER # = 4 (34H) SANSERIF # = 5 (35H) ROMAN # = 6 (36H) GOTHIC # = 7 (37H) SCRIPT* # = 8 (38H) PRESTIGE # = 10 (31H,30H) ORATOR* # = 11 (31H,31H) ORATOR-S* # = 20 (32H,30H) OCR-A* # = 21 (32H,31H) OCR-B* *= Available in PCL3+ or PCL3+D

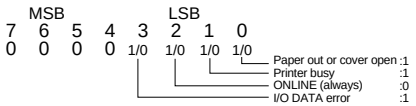
● HP Software commands

Symbol	Code		Function
	Decimal	Hex	
ESC (s # U ESC) s # U	(27,40,115,#, 85)D (27,41,115,#, 85)D	(1B,28,73,#, 55)H (1B,29,73,#, 55)H	Sets super/subscript. # = + 1 (2BH,31H) :Designates superscript # = 0 (30H) :Cancels super/subscript # = - 1 (2DH,31H) :Designates subscript
ESC (s # V ESC) s # V	(27,40,115,#, 86)D (27,41,115,#, 86)D	(1B,28,73,#, 56)H (1B,29,73,#, 56)H	Sets character point size. # = 12 (31H,32H) :Standard font # = 8 (38H) :Micro font
ESC (s # W DATA	(27,40,115,#, 87)D DATA	(1B,28,73,#, 57)H DATA	Download character descriptor and data. The parameter # consists of 3 bytes of the descriptor. <Attribute data format> 1 st 8 (Attribute format) 2 nd 0 (Continuation) 3 rd 1 (Acknowledge for the attribute data) Dot pattern data stream is translated as follows: 
ESC) # @	(27,41,#, 64)D	(1B,29,#, 40)H	Designates secondary font. # = 0(30H) : Copy the default secondary symbol set to the current secondary symbol set. # = 1(31H) : Copy the default primary symbol set to the current secondary symbol set. # = 2(32H) : Copy the current primary symbol set to the current secondary symbol set. # = 3(33H) : Copy the default secondary font to the current secondary font.

● HP Software commands

<table>
<tr><th rowspan="2">Symbol</th><th colspan="2">Code</th><th rowspan="2">Function</th></tr>
<tr><th>Decimal</th><th>Hex</th></tr>
<tr><td>ESC) s
W
DATA</td><td>(27,41,115,#,
87)D
DATA</td><td>(1B,29,73,#,
57)H
DATA</td><td>Download font descriptor.
ESC) s 0 W command resistors a blank LQ font.
The format is as follows.
<table><tr><td>Byte 0-1</td><td>0</td><td>0</td></tr><tr><td>Byte 2-3</td><td>0</td><td>0</td></tr><tr><td>Byte 3-4</td><td>0</td><td>0</td></tr><tr><td>Byte 5-6</td><td>0</td><td>0</td></tr><tr><td>Byte 7-8</td><td>0</td><td>0</td></tr><tr><td>Byte 9-10</td><td>0</td><td>0</td></tr><tr><td>Byte 10-11</td><td>0</td><td>0</td></tr><tr><td>Byte 12-13</td><td>0</td><td>0</td></tr><tr><td>Byte 14-15</td><td colspan="2">[SYMBOL SET (2 BYTES)]</td></tr><tr><td>Byte 16-17</td><td>0</td><td>0</td></tr><tr><td>Byte 18-19</td><td colspan="2">[POINT SIZE (2 BYTES)]</td></tr><tr><td>Byte 20-21</td><td>0</td><td>0</td></tr><tr><td>Byte 22-23</td><td>0</td><td>0</td></tr><tr><td>Byte 24-25</td><td>0</td><td>[TYPEFACE]</td></tr><tr><td>Byte 26-27</td><td>0</td><td>0</td></tr><tr><td>Byte 28-29</td><td>[LQ/DRAFT]</td><td>0</td></tr></table>
Symbol set : Byte 14-15 represent the symbol set # and ID for the download character to be selected by ESC (# id command.
Example:Roman-8
8U”
32 x 8 + 85 - 64 = 277 (01H,15H)
Point size(character height): Point size in decimal is registered.
Typeface:Parameter used in the typeface selection command is registered.
LQ/DRAFT:Print Quality, LQ or Draft is registered by the following definition;
0:DRAFT 1:LQ</td></tr>
<tr><td>ESC * b
M</td><td>(27,42,98,#,
77)D</td><td>(1B,2A,62,#,
4D)H</td><td>Selects format the graphic data compression.
Available in PCL3+ or PCL3+D
Raster graphics data are registered.
= 0 :compression off
= 1 :mode 1
= 2 :mode 2
= 3 :mode</td></tr>
<tr><td>ESC * b
W
DATA</td><td>(27,42,98,#,
87)D
DATA</td><td>(1B,2A,62,#,
57)H
DATA</td><td>Designates raster graphic data transmission.</td></tr>
<tr><td>ESC * b
X</td><td>(27,42,98,#,
88)D</td><td>(1B,2A,62,#,
58)H</td><td>Sets temporary graphics X-offset.</td></tr>
<tr><td>ESC * b
Y</td><td>(27,42,98,#,
89)D</td><td>(1B,2A,62,#,
59)H</td><td>Sets temporary graphics Y-offset.</td></tr>
</table>

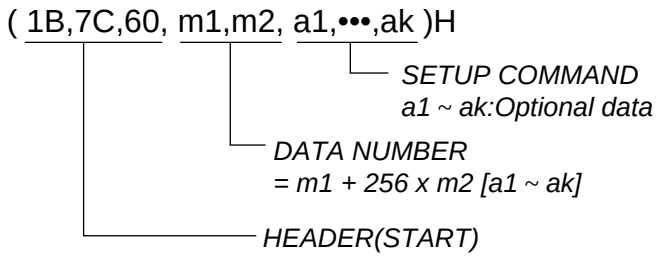
● HP Software commands

Symbol	Code		Function
	Decimal	Hex	
ESC * c # E	(27,42,99,#, 69)D	(1B,2A,63,#, 45)H	Set download character code.
ESC * c # F	(27,42,99,#, 70)D	(1B,2A,63,#, 46)H	Download font control Controls download font as follows. # = 0 (30H) :Delete all download font # = 3 (33H) :Delete data of current download code. # = 6 (36H) :Copy ROM font to download font.
ESC * p # X	(27,42,112,#, 88)D	(1B,2A,70,#, 58)H	Sets Horizontal positioning by dot # = 1/180" units :PCL3 or PCL3+ # = 1/360" units : PCL3+D
ESC * p # Y	(27,42,112,#, 89)D	(1B,2A,70,#, 59)H	Sets Vertocal positioning by dot # = 1/180" units :PCL3 or PCL3+ # = 1/360" units : PCL3+D
ESC * r # A	(27,42,114,#, 65)D	(1B,2A,72,#, 41)H	Sets start raster graphics printing Raster graphics printing starts as follows # = 0(30H) :Prints from the left most printable position # = 1(31H) :Prints from the current position
ESC * r B	(27,42,114, 66)D	(1B,2A,72, 42)H	Sets terminates rastergraphics printing Raster graphics printing is terminated.
ESC * r K	(27,42,114, 75)D	(1B,2A,72, 4B)H	Model number request (Serial I/F only) Model number is requested. The printer sends back the following answer when this data is recognized. “2235A 2712CRLF”
ESC * r # S	(27,42,114,#, 83)D	(1B,2A,72,#, 53)H	Designates raster graphics width. Raster graphics width is defined by dot.
ESC * t # R	(27,42,116,#, 82)D	(1B,2A,74,#, 52)H	Designates raster graphics resolution. Raster graphics resolution is defined as follows. When PCL3+ or PCL3+D is selected. # = 6 , 0 (36H,30H) :60 dpi # = 9 , 0 (39H,30H) :90 dpi # = 1 , 8 , 0 (31H,38H,30H) :180 dpi # = 3 , 6 , 0 (33H,36H,30H) :360 dpi When PCL3 is selected. # = 9 , 0 (39H,30H):90 dpi # = 1 , 8 , 0 (31H,38H,30H) :180 dpi
ESC 9	(27)D (57)D	(1B)H (39)H	Clear left and right margin.
ESC =	(27)D (61)D	(1B)H (3D)H	Half line feed - Half line feed is executed.
ESC ? DC1	(27,63,17)D	(1B,3F,11)H	Request I/O status (Serial I/O only) Printer status is requested. The printer sends back the following data to the host computer as the printer status. 
ESC E	(27)D (69)D	(1B)H (45)H	Reset - The printer is initialized.
ESC Y	(27)D (89)D	(1B)H (59)H	Designates display function - Display function is set on.
ESC Z	(27)D (90)D	(1B)H (5A)H	Cancels display function - Display function is set off.
ESC z	(27)D (122)D	(1B)H (7A)H	Self test - Self test print is executed for 1 page.

9. Software setup functions

The commands shown below are valid only when the software setup function is activated in the setup mode. If the software setup function is not activated in the setup mode, these commands are processed as normal data.
Software setup is activated when the setup start command is issued and deactivated when the setup end command is issued.
When the setup start command is accepted, any other software commands and print data are ignored until the setup end command is accepted.
If the printer setting is frequently changed by setup commands, use the save disable command so as not to exceed the allowable number of retries to write in the EEPROM, which is approximately 100 thousand.

Command format



1. Setup start command HD+DC1 (1B,7C,60,01,00,11)H
2. Setup end command HD+DC2 (1B,7C,60,01,00,12)H
3. Save disable command HD+DEL (1B,7C,60,01,00,7F)H

   If this command is specified between the setup start command and setup end command, the setting is not saved in the EEPROM when the setup end terminates the software setup mode. It is useful when the enlargement, reduction and other functions are frequently used.

HD = 1BH,7CH,60H,m1,m2

** Commands (1) to (19) are not automatically reset when the setup is quit after changing the setting.*

● Command

Control code		Corresponding setup function
Code	Hexadecimal	
HD + EM + n	(1B,7C,60,02,00,19,n)H	(1) Paper path specification (PAPER PATH key) (Setup Function #61) n = 00H Front loading and rear ejection of fanfold paper 01H Front loading and front ejection of manually inserted paper 02H CSF loading and front ejection (Optional) 10H Front loading and upward ejection of fanfold paper 11H Front loading and upward ejection of manually inserted paper 12H Front loading and rear ejection of manually inserted paper 13H CSF loading and upward ejection (Optional) 4H Rear loading and front ejection of fanfold paper (Optional) It is recommended that manual rear ejection not be used together with another paper path application. Paper path switching and the paper path switching mechanism are not guaranteed if there is paper in the paper path switching mechanism. ***See pages 1-6, 1-7 and 3-42.***
HD + F + n	(1B,7C,60,02,00,46,n)H	(2) Paper format selection (PAPER FORM key) n = 0: Selects format memory 1 (Memo 1) n = 1: Selects format memory 2 (Memo 2) n = 2: Selects format memory 3 (Memo 3) n = 3: Selects format memory 4 (Memo 4) n = 4: Selects format memory 5 (Memo 5) n = 5: Selects format memory 6 (Memo 6) This command selects the format memory to be used for the currently selected paper path. ***See pages 1-10 and 1-11.***
HD + x + n	(1B,7C,60,02,00,78,n)H	(3) Character quality setting (QUALITY key) n=0 LQ (Setup Function #10) 1 DRAFT 2 LQ 3 NLQ 4 DRAFT 5 S. D. 6 S. S. D. 7 HQDR This command specifies the character quality in the currently selected format memory. ***See page 3-17.***
HD + +	(1B,7C,60,01,00,2B)H	(4) TOF position setting (TOF SET key) This command is valid only when paper is loaded. It specifies the TOF position of the loaded paper. ***See page 2-3.***

● Command

Control code		Corresponding setup function
Code	Hexadecimal	
HD + @	(1B,7C,60,01,00,40)H	(5) Reset (RESET key) If the printer is reset without saving data, it enters the condition set when power was turned on.
HD + G + n	(1B,7C,60,02,00,47,n)H	(6) Printing pressure adjustment (Setup Function #01) n=0 Normal 1 Normal 2 Dark 1 3 Dark 2 4 Auto *See page3-8.* This command specifies the printing pressure in the currently selected format memory.
HD + c + m+n	(1B,7C,60,03,00,63, m,n)H	(7) Head gap adjustment (Setup Function #02) When m = 0,3 Auto mode n=5 Auto: +5 click : : n=1 Auto: +1 click n=0 Auto: 0 click n=255 Auto: -1 click n=254 Auto: -2 click When m = 1,4 Fixed mode n=25 Fix: +25 click : : n=1 Fix: +1 click n=0 Fix: 0 click n=255 Fix: -1 click n=254 Fix: -2 click : : n=251 Fix: -5 click *See page 3-9.* This command specifies the paper pressure in the currently selected format memory. When m=0,1: Paper thickness adjustment is performed after the printing head moves to the specified position. When m = 3,4: Paper thickness adjustment is performed when the command is processed and the printing head does not move.
HD + p + n1 + n2	(1B,7C,60,03,00,70, n1,n2)H	(8) TOF position adjustment (Setup Function #03) 00 ≤ n ≤ 63 n = n1 + 256 x n2 TOF: + n/60" This command specifies the TOF position in the currently selected format memory. *See page 3-10.*

● Command

Control code		Corresponding setup function
Code	Hexadecimal	
HD + C + m + n	(1B,7C,60,03,00,43,m,n)H	(9) Page length setting (Setup Function #04) *See page 3-11.* m = 0 Fanfold paper m = 1 Cut sheet paper m = 0 n = 00H 11.0" n = 0AH 6.5" 01H 2.0" 0BH 7.0" 02H 2.5" 0CH 7.5" 03H 3.0" 0DH 8.0" 04H 3.5" 0EH 8.5" 05H 4.0" 0FH 9.0" 06H 4.5" 10H 9.5" 07H 5.0" 11H 10.0" 08H 5.5" 12H 10.5" 09H 6.0" 13H 11.0" n = 14H 11.5" n = 1BH 15.0" 15H 12.0" 1CH 15.5" 16H 12.5" 1DH 16.0" 17H 13.0" 1EH 16.5" 18H 13.5" 19H 14.0" 20H 12.0" 1AH 14.5" m = 1 n = 0H A4 PORT 2H A4 PORT n=12H A4 LAND 4H LETTER PORT 14H LETTER LAND 5H LEGAL PORT 15H LEGAL LAND 6H A3 PORT 16H A3 LAND BH HALF LETTER PORT 1BH HALF LETTER LAND CH EXECUTIVE PORT 1CH EXECUTIVE LAND DH GOVERMENT LETTER PORT 1DH GOVERNMENT LETTER PORT EH GOVERMENT LEGAL PORT 1EH GOVERNMENT LEGAL PORT 20H A5 PORT 30H A5 LAND 21H LEDGER PORT 22H POST CARD PORT 32H POST CARD LAND 27H COM-10 PORT 37H COM-10 LAND 28H COM-6 PORT 38H COM-6 LAND 29H DL PORT 39H DL LAND 2AH C5 PORT 3AH C5 LAND 2BH F4 PORT 3BH F4 LAND 2CH MONARCH PORT 3CH MONARCH LAND This command specifies the page length in the currently selected format memory. PORT : Portrait LAND : Landscape

● Command

Control code		Corresponding setup function
Code	Hexadecimal	
HD + W + n	(1B,7C,60,02,00,57,n)H	(10) Width of fanfold paper (Setup Function #05) *See page 3-12.* n=0 15 inches 1 10 inches 2 5 inches 4 12 inches This command is valid when m = 0 or fanfold paper is specified in the page length setting (9) above. This command specifies the paper width in the currently selected format memory.
HD + T + 00H + n	(1B,7C,60,03,00,54, 00, n)H	(11) Top margin (Setup Function #06) 00 ≤ n ≤ 15 (In units of 6 lpi) *See page 3-13.* This command specifies the top margin in the currently selected format memory.
HD + N + n	(1B,7C,60,02,00,4E,n)H	(12) Bottom margin (Setup Function #07) 00 ≤ n ≤ 15 (In units of 6 lpi) *See page 3-14.* The perforation is not skipped when n=0. This command specifies the bottom margin in the currently selected format memory.
HD + Q + ml + mr	(1B,7C,60,03,00,51, ml,mr)H	(13) Right and left margin (Setup Function #08, #09) *See pages 3-15 and 3-16.* 00 ≤ ml ≤ 63 Left margin 00 ≤ mr ≤ 63 Right margin (In units of 10 cpi) This command specifies the right and left margins in the currently selected format memory.

● Command

Control code		Corresponding setup function
Code	Hexadecimal	
HD + k + n	(1B,7C,60,02,00,6B,n)H	(14) Character font selection (Setup Function #11) *See page 3-18.* n = 00H ROMAN 01H ROMAN 02H SANS SERIF 03H COURIER 04H PRESTIGE 05H SCRIPT 06H OCR-B 07H OCR-A 08H LETTER GOTHIC 09H ORATOR 0AH ORATOR-S This command specifies the font in the currently selected format memory.
HD + P + n	(1B,7C,60,02,00,50,n)H	(15) Character pitch selection (Setup Function #12) *See page 3-19.* n=0 10 CPI 1 10 CPI 2 12 CPI 3 15 CPI 4 17.1 CPI 5 20 CPI 6 24 CPI 7 PROPORTIONAL 9 16.7 CPI This command specifies the font in the currently selected format memory.
HD + 3 + n	(1B,7C,60,02,00,33,n)H	(16) Line feed pitch setting (Setup Function #13) *See page 3-20.* n=0 6 LPI 1 8 LPI 2 9 LPI 3 3 LPI 4 4 LPI This command specifies the font in the currently selected format memory.

● Command

Control code		Corresponding setup function
Code	Hexadecimal	
HD + SI + n	(1B,7C,60,02,00,0F,n)H	(17) Zoom in/out (Setup Function #14) n=00H 100% n=10H 200% n=1AH 1200% 01H 91% 02H 83% n=12H 400% n=1CH 1400% 03H 79% 04H 66% n=14H 600% n=1EH 1600% 0AH 116% n=16H 800% 0BH 120% 0CH 141% n=18H 1000% This command specifies the zoom in/out in the currently selected format memory. *See page 3-21.*
HD + 4 + n	(1B,7C,60,02,00,34,n)H	(18) Paper fastener (Setup Function #15) *See page 3-22.* n=0 NO 1 YES This command specifies the paper fastener mode in the currently selected format memory.
HD + ? + n	(1B,7C,60,02,00,3F,n)H	(19) Perforation head-up (Setup Function #16) *See page 3-22.* n=0 NO 1 YES This command specifies the perforation head-up mode in the currently selected format memory.
HD + Z + n	(1B,7C,60,02,00,5A,n)H	(20) Fanfold feed (Setup Function #17) *See page 3-23.* n=0 FRICTION : NO 1 FRICTION : YES This command specifies the fanfold feed in the currently selected format memory.

● Command

Control code		Corresponding setup function
Code	Hexadecimal	
HD + M + 01H + n	(1B,7C,60,03,00,4D, 01,n)H	(21) Saving data in format memory (Setup Function #19) n=0 Saves data in format memory 1. 1 Saves data in format memory 2. 2 Saves data in format memory 3. 3 Saves data in format memory 4. 4 Saves data in format memory 5. 5 Saves data in format memory 6. This command saves data in the currently selected format memory into specified memory. ***See page 3-24.***
HD + M + 02H + n	(1B,7C,60,03,00,4D, 02,n)H	(22) Loading data from format memory (Setup Function #20) n=0 Loads from format memory 1. 1 Loads from format memory 2. 2 Loads from format memory 3. 3 Loads from format memory 4. 4 Loads from format memory 5. 5 Loads from format memory 6. This command loads data from the specified memory into the currently selected format memory. ***See page 3-24.***
HD + E + n	(1B,7C,60,02,00,45,n)H	(23) Emulation selection (Setup Function #20) n=00H EPSON 01H IBM 02 HP ***See page 3-25.***

Control code		Corresponding setup function
Code	Hexadecimal	
HD + t + m + n	(1B,7C,60,03,00,74, m,n)H	(24) Character table selection (Setup Function #21, #22, #23, #51) *See pages 3-25, 3-26 and 3-41.* m = 00H EPSON 01H IBM 03H HP (PRIMARY FONT) 04H HP (SECONDARY FONT) [m=00H: EPSON] [m=01H: IBM] n = 0 Italic n =0 Set 1 1 Code page 1 Set 2 2 Download 3 Code page [m=03H: HP (PRIMARY FONT)] n = 00 ROMAN-8 (8U) 01 CODE PG CODE PAGE 02 PC-8D/N PC-8 DENMARK/NORWAY(11U) 03 ECMA ECMA LATIN 1 (ISO 8859-1, ON) 04 LEGAL (HP SET, 1U) 05 SWEDEN1 (ISO-10, OS) 06 SWEDEN2 (ISO-11, 3S) 07 SPAIN (ISO-17, 2S) 08 FRANCE (ISO-69, 1F) 09 GERMAN (ISO-21, 1G) 0A U.K. (ISO-4, 1E) 0B PORTU PORTUGAL (ISO-16,4S) 0C NORWAY1 (ISO-60, 4S) 0D NORWAY2(ISO-61, 1D) 0E IRV (ISO-2, 2U) 0F ITALY (ISO-15, 0I) 10 FRANC2 FRACE 2 (ISO-25, OF) 11 GERMN2 GERMAN 2 (HP SET, OG) 12 SPAIN2 (ISO-85, 0G) 13 SPAIN3 (HP-SET, 1S) 14 JAPAN (ISO-14, 0K) 15 PORTU2 PORTUGAL (ISO-84, 5S) [m=04H: HP (SECONDARY FONT)] n = 00 LINE-DRAW (0L) 01 MATH-7 (0M)

● Command

Control code		Corresponding setup function
Code	Hexadecimal	
HD + R + n	(1B,7C,60,02,00,52,n)H	(25) National font selection (EPSON) (Setup Function #24) n = 0H USA 8H Japan 1H France 9H Norway 2H Germany AH Denmark2 3H U.K. BH Spain2 4H Denmark CH Latin America 5H Sweden DH Korea 6H Italy EH Turkey 7H Spain FH Legal ***See page 3-27.***
HD + i + n	(1B,7C,60,02,00,69,n)H	(26) Code page selection (Setup Function #25) ***See page 3-28.*** n = 0H 437 (USA) 1H 850 (Multilingual) 3H 860 (Portuguese) 4H 863 (Canadian French) 5H 865 (Nordic) 6H 857 (Turkish) 7H 858 8H 861 9H BRASCII AH ABICOMP 20H ISO 8859-1
HD + Y + n	(1B,7C,60,02,00,59,n)H	(27) Alternate graphics mode (AGM) (IBM) (Setup Function #26) n = 0 Invalid 1 Valid ***See page 3-28.***
HD + 5 + n	(1B,7C,60,02,00,35,n)H	(28) CR code function (Setup Function #27) ***See page 3-29.*** n = 0 CR only 1 CR + LF 2 AUTOFEED
HD + 6 + n	(1B,7C,60,02,00,36,n)H	(29) LF code function (Setup Function #28) ***See page 3-29.*** n = 0 LF only 1 CR + LF
HD + 1 + n	(1B,7C,60,02,00,31,n)H	(30) Accent character (Setup Function #29) n = 0 Simple (Resident Font) 1 Comp. (2 Pass Print) ***See page 3-30.***

● Command

Control code		Corresponding setup function
Code	Hexadecimal	
HD + 0 + n	(1B,7C,60,02,00,30,n)H	(31) Zero font style (Setup Function #30) n = 0 No-slashed "0" 1 Slashed "Ø" ***See page 3-30.***
HD + w + n	(1B,7C,60,02,00,77,n)H	(32) Horizontal tab interval (Setup Function #31) ***See page 3-31.*** n = 0 2 characters 1 4 characters 2 6 characters 3 8 characters 4 10 characters 5 12 characters
HD + > + a + n	(1B,7C,60,03,00,3E, 61, n)H	(33) Page length lock (Setup Function #32) ***See page 3-31.*** n = 0 NO 1 YES
HD + > + b + n	(1B,7C,60,03,00,3E, 62, n)H	(34) Font lock (Setup Function #33) ***See page 3-32.*** n = 0 NO 1 YES
HD + > + c + n	(1B,7C,60,03,00,3E, 63, n)H	(35) Character pitch lock (Setup Function #34) ***See page 3-32.*** n = 0 NO 1 YES
HD + > + d + n	(1B,7C,60,03,00,3E, 64, n)H	(33) Character quality lock (Setup Function #35) ***See page 3-33.*** n = 0 NO 1 YES
HD + > + f + n	(1B,7C,60,03,00,3E, 66, n)H	(36) Character table lock (Setup Function #36) ***See page 3-33.*** n = 0 NO 1 YES
HD +] + m + n	(1B,7C,60,03,00,5D, 6D, n)H	(37) Validity of bar code and enlarged character (Setup Function #40) ***See page 3-36.*** n=0 Mode 2 1 Ignored 2 Mode 1

● Command

Control code		Corresponding setup function
Code	Hexadecimal	
HD +] + n + n	(1B,7C,60,03,00,5D, 6E,n)H	(38) Bar code type (Setup Function #41) *See page 3-37.* n=0H INDSTRAL-2.5 1H INTRLVD-25 2H MATRIX-25 3H CODABAR 4H CODE11 5H CODE39 6H CODE93 7H CODE128 8H EAN-8 9H EAN-13 AH UPC-A BH UPC-E CH POSTNET DH ELENENT
HD +] + x + n	(1B,7C,60,03,00,5D, 78,n)H	(39) Bar code size (Setup Function #42) *See page 3-39.* n=0 1 1 1.5 2 2 3 2.5
HD +] + X + n	(1B,7C,60,03,00,5D, 58,n)H	(40) Enlarged character size (Setup Function #43) *See page 3-39.* n=0 1 1 2 2 4 3 8 4 12 5 16 6 24 7 32
HD + A + n	(1B,7C,60,02,00,41,n)H	(41) Software setup (Setup Function #44) *See page 3-40.* n=0 Valid 1 Ignored 1 2 Ignored 2 The setup command cannot change the ignored setting to the valid setting. The command becomes valid after the setup command mode is quit.

● Command

Control code		Corresponding setup function
Code	Hexadecimal	
HD + < + e + n	(1B,7C,60,03,00,3D, 65,n)H	(42) PCL mode (HP) (Setup Function #50) *See page 3-40.* n=0 PCL3+ 1 PCL 2 PCL3+D
HD + o + m + n	(1B,7C,60,03,00,6F, m,n)H	(43) Setting option (Setup Function #60) *See page 3-41.* m=0 : CSF n =0 : No CSF 1 : CSF used (with no rear tractor) m=0 : Rear tractor n =0 : No rear tractor 1 : Rear tractor used (with no CSF) The CSF and rear tractor cannot be used together. m=2 : Skew detection (Setup Function #64) n =0 : NO (No detection) 1 : YES (Detection) *See page 3-43.* m=3 : Paper jam detection (Setup Function #65) n =0 : NO (No detection) 1 : YES (Detection) *See page 3-44.*
HD + S + n	(1B,7C,60,02,00,53, n)H	(44) Automatic scrolling (Setup Function #62) *See page 3-42.* n=0 No scroll 1 0.5 second 2 1 second 3 5 seconds 4 10 seconds 5 15 seconds
HD + 8 + n	(1B,7C,60,02,00,38,n)H	(45) Out-of-paper detection (Setup Function #63) *See page 3-43.* n=0 No (No detection) 1 Yes (Detection)
HD + f + n	(1B,7C,60,02,00,66,n)H	(46) Line feed speed (Setup Function #66) *See page 3-44.* n=0 Normal 1 1/2 2 1/3

● Command

Control code		Corresponding setup function
Code	Hexadecimal	
HD + I + p + n	(1B,7C,60,03,00,49, 70,n)H	(47) Interface (Setup Function #70) *See page 3-46.* n = 0 Parallel 1 Serial 2 Auto This setting becomes valid after the setup command mode is terminated.
HD + I + 0 + DC0 + n	(1B,7C,60,04,00,49, 30,10,n)H	(48) Printer select command (Setup Function #71) *See page 3-47.* n = 0 Valid 1 Invalid 2 SLCT IN signal This setting becomes valid after the setup command mode is terminated.
HD + I + 1 + 0 + n	(1B,7C,60,04,00,49, 31,30,n)H	(49) Parity bit (SERIAL I/F) (Setup Function #72) *See page 3-47.* n = 0 None 1 Even 2 Odd This setting becomes valid after the setup command mode is terminated.
HD + I + 1 + 1 + n	(1B,7C,60,04,00,49, 31,31,n)H	(50) Data length (SERIAL I/F) (Setup Function #73) *See page 3-48.* n = 0 8 bits 1 7 bits This setting becomes valid after the setup command mode is terminated.
HD + I + 1 + 2 + n	(1B,7C,60,04,00,49, 31,32,n)H	(51) Stop bit (SERIAL I/F) (Setup Function #74) *See page 3-48.* n = 0 1 bit 1 2 bits This setting becomes valid after the setup command mode is terminated.

Control code		Corresponding setup function
Code	Hexadecimal	
HD + I + 1 + 3 + n	(1B,7C,60,04,00,49,31,33,n)H	(52) Protocol (SERIAL I/F) (Setup Function #75) n = 0 DTR 1 X-ON/X-OFF 1 2 X-ON/X-OFF 2 3 ETX/ACK This setting becomes valid after the setup command mode is terminated. *See page 3-49.*
HD + I + 1 + 4 + n	(1B,7C,60,04,00,49,31,34,n)H	(53) Baud rate (SERIAL I/F) (Setup Function #76) n = 0 38400 BPS 1 19200 BPS 2 9600 BPS 3 4800 BPS 4 2400 BPS 5 1200 BPS 6 600 BPS 7 300 BPS This setting becomes valid after the setup command mode is terminated. *See page 3-49.*
HD + I + 1 + 5 + n	(1B,7C,60,04,00,49,31,35,n)H	(54) Operation in case of serial error (SERIAL I/F) (Setup Function #77) n = 0 Print "❋" 1 Ignored This setting becomes valid after the setup command mode is terminated. *See page 3-50.*
HD + I + 1 + DC0 + n	(1B,7C,60,04,00,49,31,10,n)H	(55) CTS signal (SERIAL I/F) (Setup Function #78) n = 0 YES (ENABLE) 1 NO This setting becomes valid after the setup command mode is terminated. *See page 3-50.*

● Command

Control code		Corresponding setup function
Code	Hexadecimal	
HD + I + 1 + DC1 + n	(1B,7C,60,04,00,49, 31,11,n)H	(56) CD signal (SERIAL I/F) (Setup Function #79) n = 0 YES (ENABLE) 1 NO This setting becomes valid after the setup command mode is terminated. *See page 3-51.*
HD + I + 1 + DC2 + n	(1B,7C,60,04,00,49, 31,12,n)H	(57) DSR signal (SERIAL I/F) (Setup Function #80) n = 0 YES (ENABLE) 1 NO This setting becomes valid after the setup command mode is terminated. *See page 3-51.*
HD + I + b + n	(1B,7C,60,03,00,49, 62,n)H	(58) Input buffer size (Setup Function #81) n = 0 64K byte 1 8K byte 2 128 byte This setting becomes valid after the setup command mode is terminated. *See page 3-52.*
HD + I + 0 + 0 + n	(1B,7C,60,04,00,49, 30,30,n)H	(59) BUSY/ACK signal timing (PARALLEL I/F) (Setup Function #82) n = 0 Type 3 1 Type 2 2 Type 1 This setting becomes valid after the setup command mode is terminated. *See page 3-53.*
HD + I + 0 + 1 + n	(1B,7C,60,04,00,49, 30,31,n)H	(60) Input data latch timing (PARALLEL I/F) (Setup Function #83) n = 0 Type F. 1 Type R. This setting becomes valid after the setup command mode is terminated. *See page 3-53.*

● Command

Control code		Corresponding setup function
Code	Hexadecimal	
HD + l + 0 + 3 + n	(1B,7C,60,04,00,49, 30, 33,n)H	(61) Error status signal output (Setup Function #84) n = 0 YES 1 NO *See page 3-54.*
HD + U + n	(1B,7C,60,02,00,55,n)H	(62) Printing direction (Setup Function #90) n = 0 Pre-direction 1 Pre-direction 2 Uni-direction 3 Bi-direction *See page 3-55.*
HD + z + n	(1B,7C,60,02,00,7A,n)H	(63) Display language on LCD (Setup Function #91) n = 0 ENGLISH 1 DEUTSCH 2 FRANCAIS 3 ESPANOL 4 ITALIANO *See page 3-55.*
HD + > + g + n	(1B,7C,60,03,00,3E, 67, n)H	(64) Locking panel keys other than RESET and ONLINE keys in the online state (Setup Function #92) n = 0 NO 1 YES *See page 3-56.*
HD + > + e + n	(1B,7C,60,03,00,3E, 65, n)H	(65) RESET key lock in the online state (Setup Function #93) n = 0 NO 1 YES *See page 3-56.*
HD + SP + n1 + n2	(1B,7C,60,03,00,20, n1, n2)H	(66) Print Head Position n = n1 + n2 x 256 Specifies the print head position in units of 1/360 inch from the leftmost printable position. The print head moves at the time that this command is processed.

● Command

Control code		Corresponding setup function
Code	Hexadecimal	
HD + q + n	(1B,7C,60,02,00,71,n)H	(67) Paper Quality (Setup Function #18) **See page 3-23.** n = 0 GOOD 1 NO GOOD
HD + 2 + n	(1B,7C,60,02,00,32,n)H	(68) FF CODE AT TOF (Setup Function #37) **See page 3-34.** n = 0 NO 1 YES
HD + # + n	(1B,7C,60,02,00,23,n)H	(69) Graphic Quality (Setup Function #38) **See page 3-35.** n = 0 MODE 0 1 MODE 1 2 MODE 2
HD + S + FF + n	(1B,7C,60,03,00,53, FF,n)H	(70) Auto scroll position (Setup Function #67) **See page 3-45.** n = 0 ANY POS 1 TOF ONLT
HD + e + n	(1B,7C,60,02,00,65,n)H	(71) Sleep mode (Setup Function #94) **See page 3-57.** n = 0 YES 1 NO

10. Specifications

Printing specifications

Printing Method	Serial impact dot matrix
Print Head	24-pin movable (Parallel/Staggered orientation)
Emulation	EPSON LQ-2550 ™ IBM 2391 ™ Hewlett Packard Rugged Writer 480 ™ (PCL3) ™ Bar code function Enlarged character mode
Print Mode	10 cpi, 12 cpi, 15 cpi, 16.7 cpi, 17.1 cpi, 20 cpi, 24 cpi Proportional printing 1/2 Proportional printing Emphasized mode Double striking mode Double-width mode Double-hight mode Superscript & subscript mode Italic mode
Download Character	EPSON : 128 characters IBM : 32 KB HP : 128 characters (PCL3), 255 characters (PCL3+, PCL3+D)
Character Table	EPSON : Italic set Extended graphic set IBM : Code Page 437 (USA), 850 (Multilingual), 857 (Turkish), 858, 860 (Portuguese), 861 (Icelandic), 863 (Canadian French), 865 (Nordic), ISO-8859-1 BRASCII, ABICOMP (Code Page can be used in the EPSON or HP mode.) HP : ROMAN-8 (8U), PC-8 (10U), PC-850 (12U), ECMA 94, LATIN 1(ISO-8859-1,0N), PC-8 DENMARK/NORWAY (11U), LINE-DRAW (0L,0B), MATH 7(0A,0M), ROMAN-EXTENSION (0E), SWEDEN 2 (ISO-10,3S), SWEDEN (ISO-11,0S), UK (ISO-4,1E), FRANCE 2 (ISO-25,0F), FRANCE (ISO-69,1F), GERMAN 2 (0G), GERMAN (ISO-21,1G),ITALY (ISO-15,0I), SPAIN 3 (1S), SPAIN (ISO-17,2S), SPAIN 2 (ISO-85,6S) PORTUGAL (ISO-16,4S), PORTUGAL (ISO-84,5S), IRV (ISO-2,2U), JAPAN (ISO-14,0K), ASCII (ISO-6,0U), LEGAL (1U)
Graphic Printing	EPSON : 11 types IBM : 12 types

Max. dots	Dots/inch	Vertical dots
816	60	8/24
1088	80	8
1224	90	8/24
1632	120	8/24
1632❋	120	8
2448	180	24
3264❋	240	8
4896❋	360	24
4896❋	360	48(IBM mode)

❋Horizontally adjacent dots can not be printed.

HP : 4 raster graphic 60dpi, 90dpi, 180dpi, 360dpi

●Print mode specifications

Print mode specifications

Print mode		Mulipart mode	Dot pitch (inch)	Max. No. of Col.	Character Structure (V × H)	Print speed (cps)
Draft	10cpi	Normal	1/120	136	12 × 12	603
		Dark 1	1/120		12 × 12	474
		Dark 2	1/180		12 × 18	316
	12cpi	Normal	1/144	163	12 × 12	569
		Dark 1				432
		Dark 2				432
	15cpi	Normal	1/180	204	12 × 12	712
		Dark 1				473
		Dark 2				473
	16.7cpi	Normal	1/240	227	12×12(+2.4)	526
		Dark 1				399
		Dark 2				399
	17cpi	Normal	1/240	233	12 × 12(+2)	540
		Dark 1				411
		Dark 2				411
	20cpi	Normal	1/240	272	12 × 12	631
		Dark 1				481
		Dark 2				481
	24cpi	Normal	1/360	326	12 × 12(+3)	577
		Dark 1				379
		Dark 2				379
	Proportional (IBM,HP)	Normal	1/180	----	12 × N	----
		Dark 1				
		Dark 2				
Speed Draft (SD)	12cpi	Normal	1/120	163	12 × 8(+2)	723
		Dark 1				569
		Dark 2				569
S.Speed Draft (SSD)	15cpi	Normal	1/120	204	12 × 8	904
		Dark 1				712
		Dark 2				712
Letter Quality (LQ)	10cpi	Normal	1/360	136	24 × 36	180
		Dark 1				79
		Dark 2				59
	12cpi	Normal	1/360	163	24 × 30	216
		Dark 1				95
		Dark 2				71
	15cpi (EPSON)	Normal	1/360	204	24 × 24	270
		Dark 1				118
		Dark 2				89
	15cpi (IBM,HP)	Normal	1/720	204	24 × 36(+12)	237
		Dark 1				118
		Dark 2				89
	16.7cpi	Normal	1/720	227	24 × 36(+7)	263
		Dark 1				131
		Dark 2				98
	17cpi	Normal	1/720	233	24 × 36(+6)	270
		Dark 1				135
		Dark 2				102

( ): Additional space

●Print mode specifications

Print mode		Mulipart mode	Dot pitch (inch)	Max. No. of Col.	Character Structure (V × H)	Print speed (cps)
Letter Quality (LQ)	20cpi	Normal	1/720	272	24 × 30(+6)	315
		Dark 1				158
		Dark 2				119
	24cpi (EPSON)	Normal	1/720	326	24 × 24(+6)	380
		Dark 1				189
		Dark 2				142
	24cpi (IBM,HP)	Normal	1/720	326	24 × 30	380
		Dark 1				189
		Dark 2				142
	Proportional	Normal	1/360	----	24 × N	----
		Dark 1				
		Dark 2				
	1/2 Prop. (EPSON)	Normal	1/720	----	24 × N	----
		Dark 1				
		Dark 2				
NLQ	10cpi	Normal	1/360	136	24 × 36	240
		Dark 1				158
		Dark 2				158
	12cpi	Normal	1/360	163	24 × 30	289
		Dark 1				189
		Dark 2				189
	15cpi (EPSON)	Normal	1/360	204	16 × 24	361
		Dark 1				237
		Dark 2				237
	15cpi (IBM,HP)	Normal	1/720	204	24 × 36(+12)	237
		Dark 1				158
		Dark 2				158
	16,7cpi	Normal	1/720	227	24 × 36(+7)	263
		Dark 1				175
		Dark 2				175
	17cpi	Normal	1/720	233	24 × 36(+6)	270
		Dark 1				180
		Dark 2				180
	20cpi	Normal	1/720	272	24 × 30(+6)	316
		Dark 1				210
		Dark 2				210
	24cpi (EPSON)	Normal	1/720	326	16 × 24(+6)	379
		Dark 1				253
		Dark 2				253
	24cpi (IBM,HP)	Normal	1/720	326	24 × 30	379
		Dark 1				253
		Dark 2				253
	Proportional	Normal	1/360	----	24 × N	----
		Dark 1				
		Dark 2				
	1/2 Prop. (EPSON)	Normal	1/720	----	24 × N	----
		Dark 1				
		Dark 2				

( ): Additional space

●Print mode specifications

Print mode		Mulipart mode	Dot pitch (inch)	Max. No. of Col.	Character structure (V × H)	Print speed (cps)
HQDR	10cpi	Normal	1/120	136	24 × 36	360
		Dark 1				240
		Dark 2				240
	12cpi	Normal	1/144	163	24 × 12(+3)	289
		Dark 1				216
		Dark 2				216
	15cpi	Normal	1/180	204	24 × 12	361
		Dark 1				237
		Dark 2				237
	16.7cpi	Normal	1/240	227	24×12(+2.3)	263
		Dark 1				175
		Dark 2				175
	17cpi	Normal	1/240	233	24 × 12(+2)	270
		Dark 1				180
		Dark 2				180
	20cpi	Normal	1/240	272	24 × 12	316
		Dark 1				210
		Dark 2				210
	24cpi	Normal	1/240	326	24 × 12(+3)	379
		Dark 1				253
		Dark 2				253
	Proportional (IBM,HP)	Normal	1/144	----	24 × N	----
		Dark 1				
		Dark 2				

( ): Additional space

Graphic printing specifications

Graphic type Density	Pins	Horizontal dot pitch	Print pitch	Print speed inch/sec
60dpi	8/24	1/60inch	Normal	31.6
			Dark 1/2	24.0
80dpi	8	1/80inch	Normal	24.0
			Dark 1/2	18.0
90dpi	8/24	1/90inch	Normal	18.0
			Dark 1/2	15.8
120dpi	8/24	1/120inch	Normal	18.0
			Dark 1/2	10.5
120dpi (High speed 1,2)	8/24	1/60inch	Normal	36.0
			Dark 1/2	24.0
120dpi	8	1/60inch	Normal	31.6
			Dark 1/2	24.0
180dpi	24	1/120inch	Normal	18.0
			Dark 1/2	10.5
180dpi (High speed 1)	24	1/90inch	Normal	24.0
			Dark 1/2	18.0
180dpi (High speed 2)	24	1/60inch	Normal	36.0
			Dark 1/2	24.0
240dpi	8	1/120inch	Normal	18.0
			Dark 1/2	10.5
240dpi (High speed 1,2)	8	1/60inch	Normal	36.0
			Dark 1/2	24.0
360dpi	24	1/120inch	Normal	18.0
			Dark 1/2	10.5
360dpi (High speed 1)	24	1/90inch	Normal	24.0
			Dark 1/2	18.0
360dpi (High speed 2)	24	1/60inch	Normal	36.0
			Dark 1/2	24.0

NOTE : High speed 1, Quality : NLQ
High speed 2, Quality : HQDR, DRAFT, S. D., S. S. D.

Throughput

Print Mode	Columns	Throughput
Draft (10cpi)	132	206 LPM
LQ pica (10cpi)	132	76 LPM
NLQ (10cpi)	132	100 LPM
HQDR (10cpi)	132	135 LPM
S. D. (12cpi)	132	230 LPM
S. S. D. (15cpi)	132	270 LPM

●specifications

Paper specifications

Available paper sizes

●Fanfold paper
Paper width: 3 ~ 16 inches (Front tractor)
3 ~ 16.5 inches (Rear tractor)
Paper thickness: 0.08 ~ 0.12 mm
Paper weight: 55 ~ 90 kg
17 ~ 28 lbs
64 ~ 105 g/m²
Paper quality: Wood-free paper

●Fanfold paper (multipart forms)
Number of sheets: 9 or less (Dark 2)
Paper thickness: 0.12 ~ 0.59mm
Paper weight: 34 kg original +8 non-carbon equivalent

●Cut sheet paper
Paper thickness: 0.08 ~ 0.12 mm
Paper weight: 55 ~ 90 kg
17 ~ 28 lbs
64 ~ 105 g/m²
Paper quality: Wood-free paper
Paper sizes: A3, A4, A5, Letter, Half letter, Legal Executive, Ledger, Government legal, Government letter, F4
Max. dimensions: 420× 432 mm (W×L)
Min. dimensions: 76 × 76 mm (W×L)

●Post card

●Envelope
Commercial-6,10
Monarch
DL,C5

Paper loading method

Fanfold paper: Push tractor
Tractor: Front tractor (standard)
Rear tractor (option)

Option: Rear Tractor

Cut sheet paper
Friction type feeding
Manual, CSF (option)

Option: Cut Sheet Feeder

Multipart printing capability (LQ)
Standard mode: Original sheet + 5 sheets
Dark 1 mode: Original sheet + 7 sheets
Dark 2 mode: Original sheet + 8 sheets
These modes are selectable with #1 MULTIPART in the SETUP MODE.

Line feed speed: 83 lines per second (6 lines/inch)
The line feed speed is selectable with #66 LF SPEED in the EXTENDED SETUP MODE.

Line feed pitch: 1/360 inch minimum

Major functions

- High-speed printing
- Original plus 8 multipart forms printing
- Bar code printing
- Enlarged character printing
- Zooming IN/OUT
- Built-in skew sensor
- Automatic head adjustment
- Perforation cutting
- Paper parking
- Automatic perforation feeding (Automatic scroll)
- Dual paper parking (with rear tractor)
- Setup memory setting
- Vertical alignment
- Energy Star

Interfaces

Parallel I/F (Centronics-compatible)
Bidirectional (IEEE1284, Nibble mode)
Serial I/F (RS-232C)
Protocol: DTR, X-ON/X-OFF 1, X-ON/X-OFF 2, ETX/ACK
Baud rate: 38400, 19200, 9600, 4800, 2400, 1200, 600, 300 (bps)

Data buffer size: 512k byte maximum

Other specifications

●Power supply: AC 120V, 60Hz for USA and Canada
AC 230V, 50Hz for Europe and Asia
●Power consumption: 200 watts (Draft, LQ Self Test)
45 watts (Standby)
14 watts (Sleep mode)
●Optional parts power source: 5 V, 1.5 A
●Operating temp.: 5 to 40°C [41 to 104°F]
●Operating humidity: 20 to 80% (No condensation)
●MTBF: 10,000 hours (at 25% duty; Not applicable to print head.)

Dimensions: 630 × 395 × 250 mm (W × D × H)
[24.8 × 15.6 × 9.8 inch]

Weight: Approximately 24 kg [52.9 lbs.]

11. Character set table

EPSON Italic table

H / L	0 (0)	1 (16)	2 (32)	3 (48)	4 (64)	5 (80)	6 (96)	7 (112)	8 (128)	9 (144)	A (160)	B (176)	C (192)	D (208)	E (224)	F (240)
0	NUL		SP	0	@	P	`	p	NUL		SP	*0*	*@*	*P*	*`*	*p*
1		DC1	!	*1*	A	Q	a	q		DC1	*!*	*1*	*A*	*Q*	*a*	*q*
2		DC2	"	2	B	R	b	r		DC2	*"*	*2*	*B*	*R*	*b*	*r*
3		DC3	#	3	C	S	c	s		DC3	*#*	*3*	*C*	*S*	*c*	*s*
4		DC4	$	4	D	T	d	t		DC4	*$*	*4*	*D*	*T*	*d*	*t*
5			%	5	E	U	e	u			*%*	*5*	*E*	*U*	*e*	*u*
6			&	6	F	V	f	v			*&*	*6*	*F*	*V*	*f*	*v*
7	BRL		'	7	G	W	g	w	BRL		*'*	*7*	*G*	*W*	*g*	*w*
8	BS	CAN	(	8	H	X	h	x	BS	CAN	*(*	*8*	*H*	*X*	*h*	*x*
9	HT	EM	)	9	I	Y	i	y	HT	EM	*)*	*9*	*I*	*Y*	*i*	*y*
A	LF		*	:	J	Z	j	z	LF		***	*:*	*J*	*Z*	*j*	*z*
B	VT	ESC	+	;	K	[	k	{	VT	ESC	*+*	*;*	*K*	*[*	*k*	*{*
C	FF		,	<	L	\	l	¦	FF		*,*	*<*	*L*	**	*l*	*¦*
D	CR		−	=	M	]	m	}	CR		*−*	*=*	*M*	*]*	*m*	*}*
E	SO		.	>	N	^	n	~	SO		*.*	*>*	*N*	*^*	*n*	*~*
F	SI		/	?	O	_	o	DEL	SI		*/*	*?*	*O*	*_*	*o*	NUL
	(15)	(31)	(47)	(63)	(79)	(95)	(111)	(127)	(143)	(159)	(175)	(191)	(207)	(223)	(239)	(255)

Select this character table with ESC t 0.

EPSON Extended graphic table

H / L	0 (0)	1 (16)	2 (32)	3 (48)	4 (64)	5 (80)	6 (96)	7 (112)	8 (128)	9 (144)	A (160)	B (176)	C (192)	D (208)	E (224)	F (240)
0	NUL		SP	0	@	P	`	p	Ç	É	á	▒	└	╨	α	≡
1		DC1	!	1	A	Q	a	q	ü	æ	í	▓	┴	╤	β	±
2		DC2	"	2	B	R	b	r	é	Æ	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	å	û	ª	▓	╞	╓	μ	÷
7	BEL		'	7	G	W	g	w	ç	ù	º	▓	╟	╫	τ	≈
8	BS	CAN	(	8	H	X	h	x	ê	ÿ	¿	▓	╚	╪	Φ	°
9	HT	EM	)	9	I	Y	i	y	ë	Ö	⌐	▓	╔	┘	Θ	∙
A	LF		*	:	J	Z	j	z	è	Ü	¬	▓	╩	┌	Ω	·
B	VT	ESC	+	;	K	[	k	{	ï	¢	½	▓	╦	█	δ	√
C	FF		,	<	L	\	l	¦	î	£	¼	▓	╠	▄	∞	n
D	CR		−	=	M	]	m	}	ì	¥	¡	▓	═	▌	ø	²
E	SO		.	>	N	^	n	~	Ä	Pt	«	▓	╬	▐	ε	■
F	SI		/	?	O	_	o	DEL	Å	ƒ	»	▓	╧	▀	∩	SP
	(15)	(31)	(47)	(63)	(79)	(95)	(111)	(127)	(143)	(159)	(175)	(191)	(207)	(223)	(239)	(255)

Select this character table with ESC 6 and ESC t 1.

● Character set table

EPSON international font table

Country \ HEX	23	24	40	5B	5C	5D	5E	60	7B	7C	7D	7E
U.S.A	#	$	@	[	\	]	^	`	{	¦	}	~
FRANCE	#	$	à	°	ç	§	^	`	é	ù	è	¨
GERMANY	#	$	§	Ä	Ö	Ü	^	`	ä	ö	ü	ß
U.K	£	$	@	[	\	]	^	`	{	¦	}	~
DENMARK	#	$	@	Æ	Ø	Å	^	`	æ	ø	å	~
SWEDEN	#	¤	É	Ä	Ö	Å	Ü	é	ä	ö	å	ü
ITALY	#	$	@	°	\	é	^	ù	à	ò	è	ì
SPAIN	₧	$	@	¡	Ñ	¿	^	`	¨	ñ	}	~
JAPAN	#	$	@	[	¥	]	^	`	{	¦	}	~
NORWAY	#	¤	É	Æ	Ø	Å	Ü	é	æ	ø	å	ü
DENMARK2	#	$	É	Æ	Ø	Å	Ü	é	æ	ø	å	ü
SPAIN2	#	$	á	¡	Ñ	¿	é	`	í	ñ	ó	ú
LATIN AMERICA	#	$	á	¡	Ñ	¿	é	ü	í	ñ	ó	ú
KOREA	#	$	@	[	₩	]	^	`	{	¦	}	~
TURKEY	#	ı	İ	Ç	Ö	Ş	Ü	ğ	ç	ö	ş	ü
LEGAL	#	$	§	°	′	″	¶	`	©	®	†	™

Select this character table with ESC R.

IBM character set table 1

H / L	0 (0)	1 (16)	2 (32)	3 (48)	4 (64)	5 (80)	6 (96)	7 (112)	8 (128)	9 (144)	A (160)	B (176)	C (192)	D (208)	E (224)	F (240)
0	NUL		SP	0	@	P	`	p	NUL		á	▒	└	╨	α	≡
1		DC1	!	1	A	Q	a	q		DC1	í	▓	┴	╤	β	±
2		DC2	"	2	B	R	b	r		DC2	ó	▓	┬	╥	Γ	≥
3			#	3	C	S	c	s			ú	▓	├	╙	π	≤
4		DC4	$	4	D	T	d	t		DC4	ñ	▓	─	╘	Σ	⌠
5			%	5	E	U	e	u			Ñ	▓	┼	╒	σ	⌡
6			&	6	F	V	f	v			ª	▓	╞	╓	µ	÷
7	BEL		'	7	G	W	g	w	BEL		º	▓	╟	╫	τ	≈
8	BS	CAN	(	8	H	X	h	x	BS	CAN	¿	▓	╚	╪	Φ	°
9	HT	EM	)	9	I	Y	i	y	HT	EM	⌐	▓	╔	┘	Θ	•
A	LF		*	:	J	Z	j	z	LF		¬	▓	╩	┌	Ω	·
B	VT	ESC	+	;	K	[	k	{	VT	ESC	½	▓	╦	█	δ	√
C	FF		,	<	L	\	l	|	FF		¼	▓	╠	▄	∞	n
D	CR		-	=	M	]	m	}	CR		¡	▓	═	▌	ø	²
E	SO		.	>	N	^	n	~	SO		«	▓	╬	▐	ε	■
F	SI		/	?	O	_	o	NUL	SI		»	▓	╧	▀	∩	SP
	(15)	(31)	(47)	(63)	(79)	(95)	(111)	(127)	(143)	(159)	(175)	(191)	(207)	(223)	(239)	(255)

Select this character table with ESC 7.

● Character set table

IBM character set table 2

H / L	0 (0)	1 (16)	2 (32)	3 (48)	4 (64)	5 (80)	6 (96)	7 (112)	8 (128)	9 (144)	A (160)	B (176)	C (192)	D (208)	E (224)	F (240)
0	NUL		SP	0	@	P	`	p	Ç	É	á	▒	└	╨	α	≡
1		DC1	!	1	A	Q	a	q	ü	æ	í	▒	┴	╤	β	±
2		DC2	"	2	B	R	b	r	é	Æ	ó	▒	┬	╥	Γ	≥
3	♥		#	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	å	û	ª	▒	╞	╓	µ	÷
7	BEL		'	7	G	W	g	w	ç	ù	º	▒	╟	╫	τ	≈
8	BS	CAN	(	8	H	X	h	x	ê	ÿ	¿	▒	╚	╪	Φ	°
9	HT	EM	)	9	I	Y	i	y	ë	Ö	⌐	▒	╔	┘	Θ	∙
A	LF		*	:	J	Z	j	z	è	Ü	¬	▒	╩	┌	Ω	·
B	VT	ESC	+	;	K	[	k	{	ï	¢	½	▒	╦	█	δ	√
C	FF		,	<	L	\	l	|	î	£	¼	▒	╠	▄	∞	n
D	CR		−	=	M	]	m	}	ì	¥	¡	▒	═	▌	ø	²
E	SO		.	>	N	^	n	~	Ä	₧	«	▒	╬	▐	ε	■
F	SI		/	?	O	_	o	NUL	Å	ƒ	»	▒	╧	▀	∩	SP
	(15)	(31)	(47)	(63)	(79)	(95)	(111)	(127)	(143)	(159)	(175)	(191)	(207)	(223)	(239)	(255)

Select this character table with ESC 6.

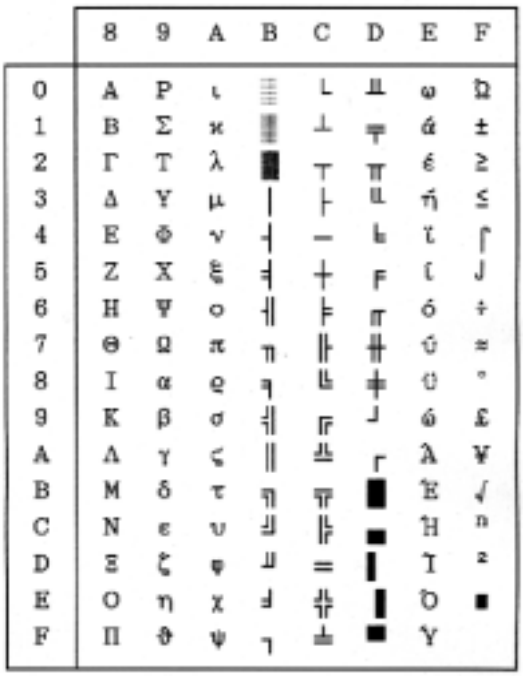
IBM all-character set table

H / L	0 (0)	1 (16)	2 (32)	3 (48)	4 (64)	5 (80)	6 (96)	7 (112)	8 (128)	9 (144)	A (160)	B (176)	C (192)	D (208)	E (224)	F (240)
0	Ø	▶	SP	0	@	P	`	p	Ç	É	á	▒	└	╨	α	≡
1	☺	◀	!	1	A	Q	a	q	ü	æ	í	▒	┴	╤	β	±
2	☻	↕	"	2	B	R	b	r	é	Æ	ó	▒	┬	╥	Γ	≥
3	♥	‼	#	3	C	S	c	s	â	ô	ú	▒	├	╙	π	≤
4	♦	¶	$	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	å	û	ª	▒	╞	╓	µ	÷
7	•	↨	'	7	G	W	g	w	ç	ù	º	▒	╟	╫	τ	≈
8	◘	↑	(	8	H	X	h	x	ê	ÿ	¿	▒	╚	╪	Φ	°
9	○	↓	)	9	I	Y	i	y	ë	Ö	⌐	▒	╔	┘	Θ	∙
A	◙	→	*	:	J	Z	j	z	è	Ü	¬	▒	╩	┌	Ω	·
B	♂	←	+	;	K	[	k	{	ï	¢	½	▒	╦	█	δ	√
C	♀	∟	,	<	L	\	l	|	î	£	¼	▒	╠	▄	∞	n
D	♪	↔	−	=	M	]	m	}	ì	¥	¡	▒	═	▌	ø	²
E	♬	▲	.	>	N	^	n	~	Ä	₧	«	▒	╬	▐	ε	■
F	☼	▼	/	?	O	_	o	⌂	Å	ƒ	»	▒	╧	▀	∩	SP
	(15)	(31)	(47)	(63)	(79)	(95)	(111)	(127)	(143)	(159)	(175)	(191)	(207)	(223)	(239)	(255)

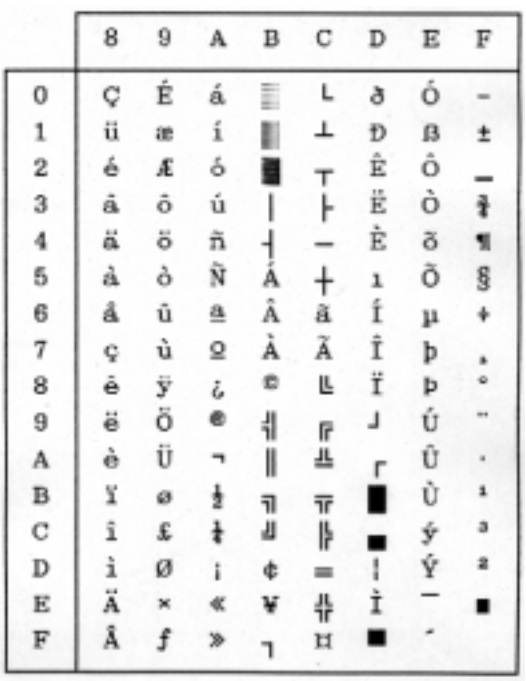
● Character set table

Code 00H ~ 7FH (Common)

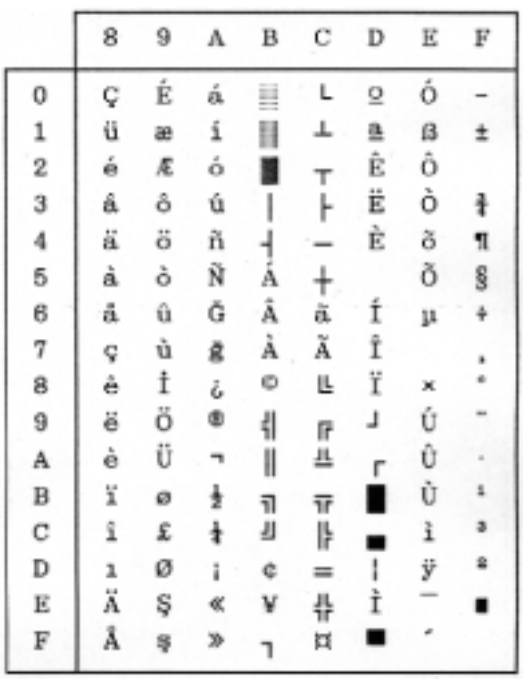
Code page 437 (U.S.A.)



Code page 850 (Multilingual)



Code page 857 (Turkish)

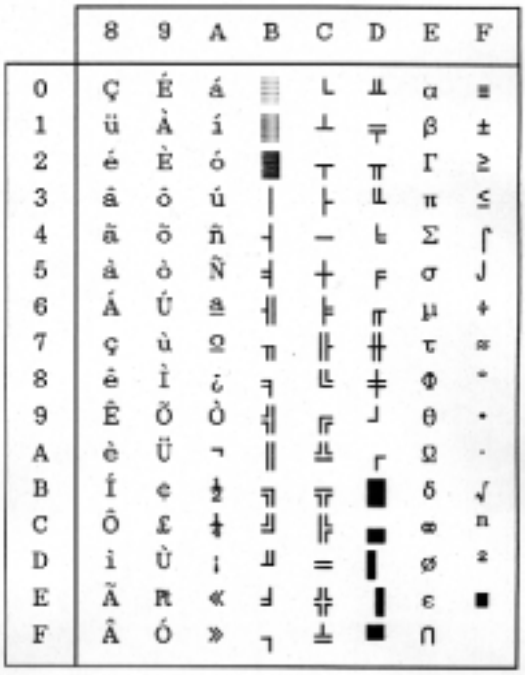


● Character set table

Code page 858 (Multilingual-Euro)

	8	9	A	B	C	D	E	F
0	Ç	É	á	▒	└	ð	Ó	-
1	ü	æ	í	▓	┴	Ð	ß	±
2	é	Æ	ó	█	┬	Ê	Ô	‗
3	â	ô	ú	│	├	Ë	Ò	¾
4	ä	ö	ñ	┤	─	È	õ	¶
5	à	ò	Ñ	Á	┼	€	Õ	§
6	å	û	ª	Â	ã	Í	µ	÷
7	ç	ù	º	À	Ã	Î	þ	¸
8	ê	ÿ	¿	©	╚	Ï	Þ	°
9	ë	Ö	®	╣	╔	┘	Ú	¨
A	è	Ü	¬	║	╩	┌	Û	·
B	ï	ø	½	╗	╦	█	Ù	¹
C	î	£	¼	╝	╠	▄	ý	³
D	ì	Ø	¡	¢	═	¦	Ý	²
E	Ä	×	«	¥	╬	Ì	¯	■
F	Å	ƒ	»	┐	¤	▀	´	

Code page 860 (Portuguese)

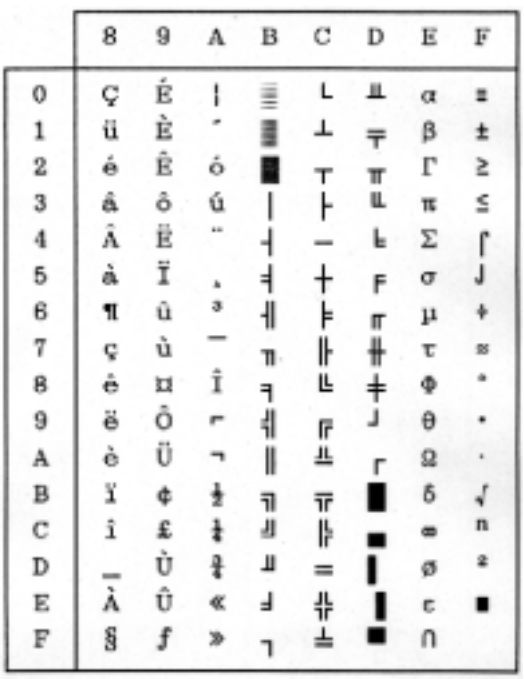


	8	9	A	B	C	D	E	F
0	Ç	É	á	▒	└	╨	α	≡
1	ü	À	í	▓	┴	╤	β	±
2	é	È	ó	█	┬	╥	Γ	≥
3	â	ô	ú	│	├	╙	π	≤
4	ã	õ	ñ	┤	─	╘	Σ	⌠
5	à	ò	Ñ	╡	┼	╒	σ	⌡
6	Á	Ú	ª	╢	╞	╓	µ	÷
7	ç	ù	º	╖	╟	╫	τ	≈
8	ê	Ì	¿	╕	╚	╪	Φ	°
9	Ê	Õ	Ò	╣	╔	┘	Θ	∙
A	è	Ü	¬	║	╩	┌	Ω	·
B	Í	¢	½	╗	╦	█	δ	√
C	Ô	£	¼	╝	╠	▄	∞	ⁿ
D	ì	Ù	¡	╜	═	▌	ø	²
E	Ã	₧	«	╛	╬	▐	ε	■
F	Â	Ó	»	┐	╧	▀	∩	

Code page 861 (Icelandic)

	8	9	A	B	C	D	E	F
0	Ç	É	á	▒	└	╨	α	≡
1	ü	æ	í	▓	┴	╤	β	±
2	é	Æ	ó	█	┬	╥	Γ	≥
3	â	ô	ú	│	├	╙	π	≤
4	ä	ö	Á	┤	─	╘	Σ	⌠
5	à	þ	Í	╡	┼	╒	σ	⌡
6	å	û	Ó	╢	╞	╓	µ	÷
7	ç	Ý	Ú	╖	╟	╫	τ	≈
8	ê	ý	¿	╕	╚	╪	Φ	°
9	ë	Ö	⌐	╣	╔	┘	Θ	∙
A	è	Ü	¬	║	╩	┌	Ω	·
B	Đ	ø	½	╗	╦	█	δ	√
C	ð	£	¼	╝	╠	▄	∞	ⁿ
D	Þ	Ø	¡	╜	═	▌	ø	²
E	Ä	₧	«	╛	╬	▐	ε	■
F	Å	ƒ	»	┐	╧	▀	∩	

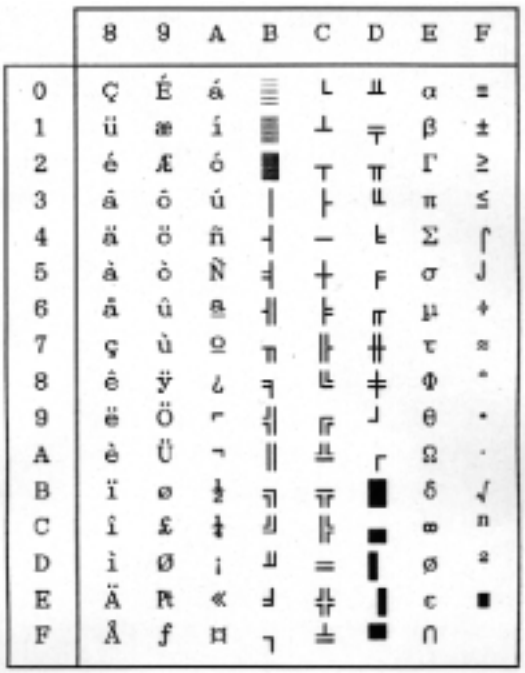
Code page 863 (Canadian French)



	8	9	A	B	C	D	E	F
0	Ç	É	¦	▒	└	╨	α	≡
1	ü	È	‾	▓	┴	╤	β	±
2	é	Ê	ó	█	┬	╥	Γ	≥
3	â	ô	ú	│	├	╙	π	≤
4	Â	Ë	¨	┤	─	╘	Σ	⌠
5	à	Ï	¸	╡	┼	╒	σ	⌡
6	¶	û	³	╢	╞	╓	µ	÷
7	ç	ù	¯	╖	╟	╫	τ	≈
8	ê	¤	Î	╕	╚	╪	Φ	°
9	ë	Ô	⌐	╣	╔	┘	Θ	∙
A	è	Ü	¬	║	╩	┌	Ω	·
B	ï	¢	½	╗	╦	█	δ	√
C	î	£	¼	╝	╠	▄	∞	ⁿ
D	_	Ù	¾	╜	═	▌	ø	²
E	À	Û	«	╛	╬	▐	ε	■
F	§	ƒ	»	┐	╧	▀	∩	

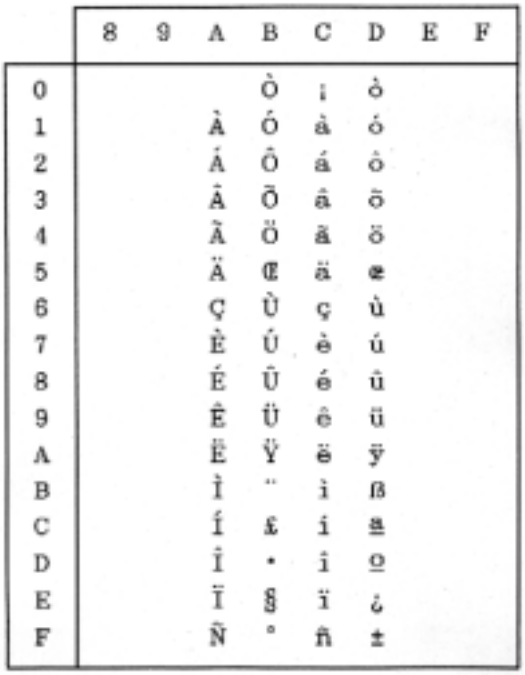
● Character set table

Code page 865 (Nordic)



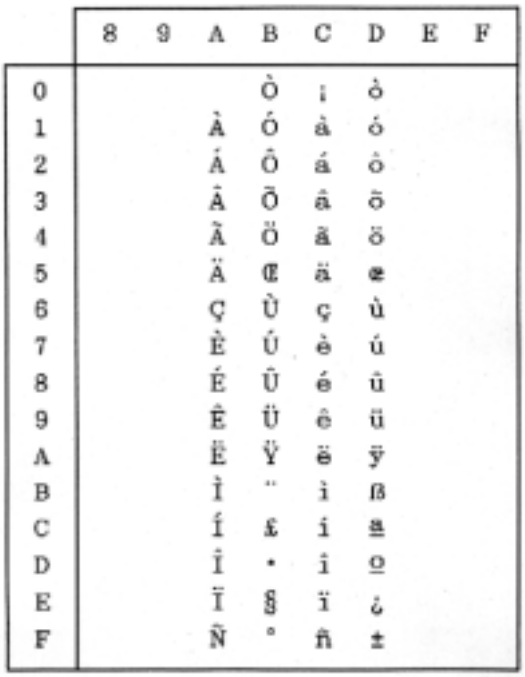
	8	9	A	B	C	D	E	F
0	Ç	É	á	▒	└	╨	α	≡
1	ü	æ	í	▓	┴	╤	ß	±
2	é	Æ	ó	▓	┬	╥	Γ	≥
3	â	ô	ú	▓	├	╙	π	≤
4	ä	ö	ñ	▓	─	╘	Σ	⌠
5	à	ò	Ñ	▓	┼	╒	σ	⌡
6	å	û	ª	▓	╞	╓	µ	÷
7	ç	ù	º	▓	╟	╫	τ	≈
8	ê	ÿ	¿	▓	╚	╪	Φ	°
9	ë	Ö	⌐	▓	╔	┘	Θ	∙
A	è	Ü	¬	▓	╩	┌	Ω	·
B	ï	ø	½	▓	╦	▓	δ	√
C	î	£	¼	▓	╠	▓	∞	n
D	ì	Ø	¡	▓	═	▓	ø	²
E	Ä	₧	«	▓	╬	▓	ε	■
F	Å	ƒ	¤	▓	╧	▓	∩	

BRASCII



	8	9	A	B	C	D	E	F
0				Ò	¡	ò		
1			À	Ó	à	ó		
2			Á	Ô	á	ô		
3			Â	Õ	â	õ		
4			Ã	Ö	ã	ö		
5			Ä	Œ	ä	œ		
6			Ç	Ù	ç	ù		
7			È	Ú	è	ú		
8			É	Û	é	û		
9			Ê	Ü	ê	ü		
A			Ë	Ÿ	ë	ÿ		
B			Ì	¨	ì	ß		
C			Í	£	í	ª		
D			Î	•	î	º		
E			Ï	§	ï	¿		
F			Ñ	°	ñ	±		

ABICOMP



	8	9	A	B	C	D	E	F
0				Ò	¡	ò		
1			À	Ó	à	ó		
2			Á	Ô	á	ô		
3			Â	Õ	â	õ		
4			Ã	Ö	ã	ö		
5			Ä	Œ	ä	œ		
6			Ç	Ù	ç	ù		
7			È	Ú	è	ú		
8			É	Û	é	û		
9			Ê	Ü	ê	ü		
A			Ë	Ÿ	ë	ÿ		
B			Ì	¨	ì	ß		
C			Í	£	í	ª		
D			Î	•	î	º		
E			Ï	§	ï	¿		
F			Ñ	°	ñ	±		

ISO-1 (ISO-8859-1)

	8	9	A	B	C	D	E	F
0				°	À	Ð	à	ð
1			¡	±	Á	Ñ	á	ñ
2			¢	²	Â	Ò	â	ò
3			£	³	Ã	Ó	ã	ó
4			¤	´	Ä	Ô	ä	ô
5			¥	µ	Å	Õ	å	õ
6			¦	¶	Æ	Ö	æ	ö
7			§	·	Ç	×	ç	÷
8			¨	¸	È	Ø	è	ø
9			©	¹	É	Ù	é	ù
A			ª	º	Ê	Ú	ê	ú
B			«	»	Ë	Û	ë	û
C			¬	¼	Ì	Ü	ì	ü
D			-	½	Í	Ý	í	ý
E			®	¾	Î	Þ	î	þ
F			¯	¿	Ï	ß	ï	ÿ

● Character set table

HP mode

ROMAN-8 character set

L/H	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	NUL		SP	0	@	P	`	p				¯	â	Á	Á	Þ
1		DC1	!	1	A	Q	a	q			À	Ý	ê	î	Ã	þ
2			"	2	B	R	b	r			Â	ý	ô	Ø	ã	·
3		DC3	#	3	C	S	c	s			È	°	û	Æ	Đ	µ
4			$	4	D	T	d	t			Ê	Ç	à	å	ð	¶
5			%	5	E	U	e	u			Ë	ç	é	í	í	¼
6			&	6	F	V	f	v			Î	Ñ	ó	ø	Ì	‗
7	BEL		'	7	G	W	g	w			Ï	ñ	ú	æ	Ó	¾
8	BS		(	8	H	X	h	x			´	¡	à	Ä	Ò	¸
9	HT		)	9	I	Y	i	y			`	¿	è	ì	Õ	ª
A	LF		*	:	J	Z	j	z			ˆ	¤	ò	Ö	õ	º
B	VT	ESC	+	;	K	[	k	{			¨	£	ù	Ü	Š	«
C	FF		,	<	L	\	l	|		~	¥	ä	É	š	■
D	CR		-	=	M	]	m	}			Ù	§	ë	ï	Ú	»
E	SO		.	>	N	^	n	~			Û	ƒ	ö	ß	Ÿ	±
F	SI		/	?	O	_	o	DEL			£	¢	ü	Ô	ÿ	

PC-8 (Danish / Norwegian) character set

L/H	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	Ø	▶	SP	0	@	P	`	p	Ç	É		▒	└	┴	α	≡
1	☺	◀	!	1	A	Q	a	q	ü	æ	í	▓	┴	╤	β	±
2	☻	↕	"	2	B	R	b	r	é	Æ	ó	▓	┬	╥	Γ	≥
3	♥	‼	#	3	C	S	c	s	â	ô	ú	│	├	└	π	≤
4	◆	¶	$	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	å	û	ō	╢	╞	╓	µ	÷
7	•	↨	'	7	G	W	g	w	ç	ù	Ō	╖	╟	╫	τ	≈
8	◘	↑	(	8	H	X	h	x	ê	ÿ	¿	╕	╚	╪	Φ	°
9	○	↓	)	9	I	Y	i	y	ë	Ö	⌐	╣	╔	┘	Θ	•
A	◙	→	*	:	J	Z	j	z	è	Ü	¬	║	╩	┌	Ω	·
B	♂	←	+	;	K	[	k	{	ï	ø	½	╗	╦	█	δ	√
C	♀	∟	,	<	L	\	l	|	î	£	¼	╝	╠	▄	∞	ⁿ
D	♪	↔	-	=	M	]	m	}	ì	Ø	¡	╜	═	▌	φ	²
E	♫	▲	.	>	N	^	n	~	Ä	L	»	╛	╬	▐	ε	■
F	☼	▼	/	?	O	_	o	DEL	Å	l	¤	┐	╧	▀	∩	SP

The (00)H-(1FH and (7F)H normally function as control code.

LEGAL character set

L/H	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	NUL		SP	0	@	P	°	p			SP	0	@	P	°	p
1		DC1	!	1	A	Q	a	q			!	1	A	Q	a	q
2			"	2	B	R	b	r			"	2	B	R	b	r
3		DC3	#	3	C	S	c	s			#	3	C	S	c	s
4			$	4	D	T	d	t			$	4	D	T	d	t
5			%	5	E	U	e	u			%	5	E	U	e	u
6			&	6	F	V	f	v			&	6	F	V	f	v
7	BEL		'	7	G	W	g	w			'	7	G	W	g	w
8	BS		(	8	H	X	h	x			(	8	H	X	h	x
9	HT		)	9	I	Y	i	y			)	9	I	Y	i	y
A	LF		*	:	J	Z	j	z			*	:	J	Z	j	z
B	VT	ESC	+	;	K	[	k	§			+	;	K	[	k	§
C	FF		,	‗	L	®	l	¶			,	‗	L	®	l	¶
D	CR		-	=	M	]	m	†			-	=	M	]	m	†
E	SO		.	¢	N	©	n	™			.	¢	N	©	n	™
F	SI		/	?	O	_	o	DEL			/	?	O	_	o	DEL

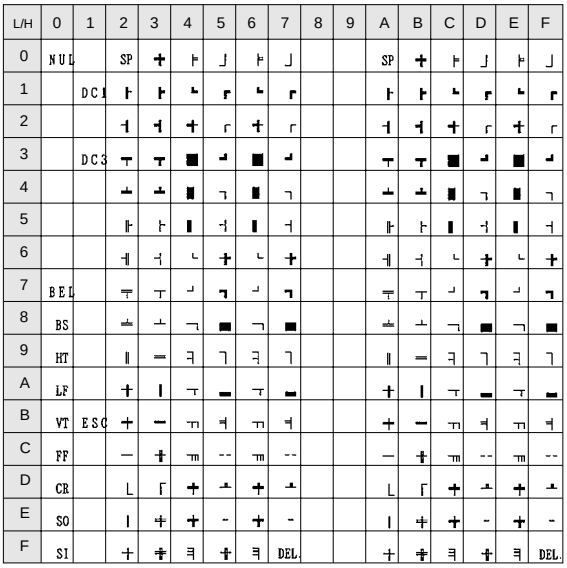
The character of (A0)H-(FF)H are, respectively, the same as those of (20)H -(7F)H.

MATH 7 character set

L/H	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	NUL		SP	0	¶	π	¶	π			SP	0	¶	π	¶	π
1		DC1	√	1	α	γ	α	γ			√	1	α	γ	α	γ
2			|	2	β	θ	β	θ			|	2	β	θ	β	θ
3		DC3	§	3	ψ	σ	ψ	σ			§	3	ψ	σ	ψ	σ
4			▽	4	φ	τ	φ	τ			▽	4	φ	τ	φ	τ
5			±	5	ε	ξ	ε	ξ			±	5	ε	ξ	ε	ξ
6			∝	6	∂	Δ	∂	Δ			∝	6	∂	Δ	∂	Δ
7	BEL		∫	7	λ	δ	λ	δ			∫	7	λ	δ	λ	δ
8	BS		÷	8	η	χ	η	χ			÷	8	η	χ	η	χ
9	HT		≃	9	ι	υ	ι	υ			≃	9	ι	υ	ι	υ
A	LF		Π	Ω	Θ	ζ	Θ	ζ			Π	Ω	Θ	ζ	Θ	ζ
B	VT	ESC	Γ	Λ	κ	↑	κ	↑			Γ	Λ	κ	↑	κ	↑
C	FF		Ψ	∞	ω	→	ω	→			Ψ	∞	ω	→	ω	→
D	CR		≡	J	μ	T	μ	T			≡	J	μ	T	μ	T
E	SO		Φ	†	ν	←	ν	←			Φ	†	ν	←	ν	←
F	SI		Ξ	Σ	ρ	↓	ρ	DEL			Ξ	Σ	ρ	↓	ρ	DEL

The character of (A0)H-(FF)H are, respectively, the same as those of (20)H -(7F)H.

● Character set table



L/H	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	NUL		SP								SP					
1		DC1														
2																
3		DC3														
4																
5																
6																
7	BEL															
8	BS															
9	HT															
A	LF															
B	VT	ESC														
C	FF															
D	CR															
E	SO															
F	SI							DEL								DEL

The character of (A0)H-(FF)H are, respectively, the same as those of (20)H -(7F)H.

	ISO	ID	23	24	40	5B	5C	5D	5E	60	7B	7C	7D	7E
ASCII	6	0U	#	$	@	[	\	]	^	`	{	|	}	~
FRANCE	69	1F	£	ª	à	°	ç	§	^	¨	é	ù	è	¨
FRANCE 2	-	0F	£	$	à	°	ç	§	^	`	é	ù	è	¨
GERMANY	21	1G	#	$	§	Ä	Ö	Ü	^	`	ä	ö	ü	ß
GERMANY 2	-	0G	£	$	§	Ä	Ö	Ü	^	`	ä	ö	ü	ß
U.K.	4	1E	£	$	@	[	\	]	^	`	{	|	}	¯
SWEDEN	11	0S	#	¤	É	Ä	Ö	Å	Ü	é	ä	ö	å	ü
SWEDEN 2	10	3S	#	¤	@	Ä	Ö	Å	^	`	ä	ö	å	¯
ITALY	15	0I	£	$	§	°	ç	é	^	ù	à	ò	è	ì
SPAIN	17	2S	£	$	§	¡	Ñ	¿	^	`	°	ñ	ç	~
SPAIN 2	85	6S	#	$	·	¡	Ñ	Ç	¿	`	´	ñ	ç	¨
SPAIN 3	-	1S	#	$	@	¡	Ñ	¿	°	`	{	ñ	}	~
JAPAN	14	0K	#	$	@	[	¥	]	^	`	{	|	}	¯
NORWAY	60	0D	#	$	@	Æ	Ø	Å	^	`	æ	ø	å	¯
NORWAY 2	61	1D	ß	$	@	Æ	Ø	Å	^	`	æ	ø	å	¦
PORTUGAL	16	4S	#	$	§	Ã	Ç	Õ	^	`	ã	ç	õ	°
PORTUGAL 2	84	5S	#	$	°	Ã	Ç	õ	^	`	ã	ç	õ	~
IRV	2	2U	#	¤	@	[	\	]	^	`	{	|	}	¯

•The character of (A0)H-(FF)H are, respectively, the same as those of (20)H -(7F)H.
•The characters with (20)H-(7F)H codes which are not shown in the International character set above are the same as those of (20)H -(7F)H in ROMAN-8.

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Software command list

Symbol	Code		Function
	Decimal	Hexadecimal	
BEL	(07)D	(07)	Activates the printer buzzer.
BS	(08)D	(08)H	Moves the printing position left by one character
HT	(09)D	(09)H	Moves the printing position to the following horizontal tab
LF	(10)D	(0A)H	Single-line feed
VT	(11)D	(0B)H	Vertical tab
FF	(12)D	(0C)H	Form feed
CR	(13)D	(0D)H	Carriage return
SO	(14)D	(0E)H	Double-width printing on a single line
SI	(15)D	(0F)H	Specifies condensed mode.
DC1	(17)D	(11)H	Printer select
DC2	(18)D	(12)H	Cancels condensed mode.
DC3	(19)D	(13)H	Printer deselect
DC4	(20)D	(14)H	Cancels the double-width mode established by the SO command.
CAN	(24)D	(18)H	Cancel
DEL	(127)D	(7F)H	Deletes a character
ESC	(27)D	(1B)H	Escape
ESC SO	(27)D(14)D	(1B)H (0E)H	Double-width printing on a single line
ESC SI	(27)D(15)D	(1B)H (0F)H	Specifies condensed mode.
ESC EM	(27)D(25)D	(1B)H (19)H	Specifies the paper path.
ESC SP	(27)D(32)D	(1B)H (20)H	Specifies the space between characters.
ESC !	(27)D(33)D	(1B)H (21)H	Batch printing mode selection.
ESC #	(27)D(35)D	(1B)H (23)H	Cancels MSB control.
ESC $	(27)D(36)D	(1B)H (24)H	Specifies the absolute printing position.
ESC %	(27)D(37)D	(1B)H (25)H	Specifies or cancels a downloaded character set.
ESC &	(27)D(38)D	(1B)H (26)H	Defines a downloaded character.
ESC ✻	(27)D(42)D	(1B)H (2A)H	Selects a graphic function.
ESC (-	(27,40,45)D	(1B,28,2D)H	Specifies a line type.
ESC (^	(27,40,94)D	(1B,28,5E)H	All character set
ESC (t	(27,40,116)D	(1B,28,74)H	Specifies a character set.
ESC +	(27)D(43)D	(1B)H (2B)H	Specifies line feed pitch of n/360 inch.
ESC -	(27)D(45)D	(1B)H (2D)H	Specifies or cancels underscoring.
ESC /	(27)D(47)D	(1B)H (2F)H	Selects the vertical tab channel.
ESC 0	(27)D(48)D	(1B)H (30)H	Specifies 1/8-inch line feed pitch.
ESC 2	(27)D(50)D	(1B)H (32)H	Specifies 1/6-inch line feed pitch.
ESC 3	(27)D(51)D	(1B)H (33)H	Specifies line feed pitch of n/180 inch.
ESC 4	(27)D(52)D	(1B)H (34)H	Specifies the italic font.
ESC 5	(27)D(53)D	(1B)H (35)H	Cancels the italic font.
ESC 6	(27)D(54)D	(1B)H (36)H	Expands the character code area.
ESC 7	(27)D(55)D	(1B)H (37)H	Cancels the expanded character code area.
ESC :	(27)D(58)D	(1B)H (3A)H	Copies the internal character set.
ESC <	(27)D(60)D	(1B)H (3C)H	Returns to the home position.
ESC =	(27)D(61)D	(1B)H (3D)H	Specifies MSB 0.
ESC >	(27)D(62)D	(1B)H (3E)H	Specifies MSB 1.
ESC ?	(27)D(63)D	(1B)H (3F)H	Converts graphic modes.
ESC @	(27)D(64)D	(1B)H (40)H	Initializes the printer.
ESC A	(27)D(65)D	(1B)H (41)H	Specifies the line feed pitch in units of n/60 inch.
ESC B	(27)D(66)D	(1B)H (42)H	Specifies the vertical tab position.
ESC C	(27)D(67)D	(1B)H (43)H	Specifies the page length in number of lines.
ESC C NUL	(27,67,00)D	(1B,43,00)H	Specifies the page length in inches.
ESC D	(27)D(68)D	(1B)H (44)H	Specifies the horizontal tab position.

● EPSON command list

Symbol	Code		Function
	Decimal	Hexadecimal	
ESC E	(27)D(69)D	(1B)H (45)H	Specifies emphasized printing.
ESC F	(27)D(70)D	(1B)H (46)H	Cancels emphasized printing
ESC G	(27)D(71)D	(1B)H (47)H	Specifies double-striking.
ESC H	(27)D(72)D	(1B)H (48)H	Cancels double-striking.
ESC J	(27)D(74)D	(1B)H (4A)H	Executes line feeding at a pitch of n/180 inch.
ESC K	(27)D(75)D	(1B)H (4B)H	Specifies the 8-dot single-density graphic mode.
ESC L	(27)D(76)D	(1B)H (4C)H	Specifies the 8-dot double-density graphic mode.
ESC M	(27)D(77)D	(1B)H (4D)H	Specifies 12 cpi (elite).
ESC N	(27)D(78)D	(1B)H (4E)H	Specifies the bottom margin.
ESC O	(27)D(79)D	(1B)H (4F)H	Cancels the bottom margin.
ESC P	(27)D(80)D	(1B)H (50)H	Specifies 10 cpi.
ESC Q	(27)D(81)D	(1B)H (51)H	Specifies the right margin.
ESC R	(27)D(82)D	(1B)H (52)H	Selects a national character type.
ESC S	(27)D(83)D	(1B)H (53)H	Specifies superscript or subscript.
ESC T	(27)D(84)D	(1B)H (54)H	Cancels superscript or subscript.
ESC U	(27)D(85)D	(1B)H (55)H	Specifies or cancels uni-directional printing.
ESC W	(27)D(87)D	(1B)H (57)H	Specifies or cancels double-width printing.
ESC Y	(27)D(89)D	(1B)H (59)H	Specifies the 8-dot double-speed, double-density graphic mode.
ESC Z	(27)D(90)D	(1B)H (5A)H	Specifies the 8-dot quadruple-density graphic mode.
ESC \	(27)D(92)D	(1B)H (5C)H	Specifies the relative printing position.
ESC a	(27)D(97)D	(1B)H (61)H	Selects the printing position adjustment.
ESC b	(27)D(98)D	(1B)H (62)H	Specifies the vertical tab position in each channel.
ESC g	(27)D(103)D	(1B)H (67)H	Selects 15 cpi.
ESC j	(27)D(106)D	(1B)H (6A)H	Executes reverse feeding at a pitch of n/180 inch.
ESC k	(27)D(107)D	(1B)H (6B)H	Selects the font.
ESC l	(27)D(108)D	(1B)H (6C)H	Specifies the left margin.
ESC p	(27)D(112)D	(1B)H (70)H	Specifies or cancels proportional printing.
ESC q	(27)D(113)D	(1B)H (71)H	Selects a special effect.
ESC t	(27)D(116)D	(1B)H (74)H	Selects a character code table.
ESC w	(27)D(119)D	(1B)H (77)H	Specifies or cancels double-length printing.
ESC x	(27)D(120)D	(1B)H (78)H	Selects character quality.

● IBM command list

Symbol	Code		Function
	Decimal	Hexadecimal	
BEL	(07)D	(07)H	Activates the printer buzzer.
BS	(08)D	(08)H	Moves the printing position to the left by one character.
HT	(09)D	(09)H	Moves the printing position to the next horizontal tab.
LF	(10)D	(0A)H	Single-line feeding
VT	(11)D	(0B)H	Vertical tab
FF	(12)D	(0C)H	Form feed (Always moves the printing position to the left margin.)
CR	(13)D	(0D)H	Carriage return
SO	(14)D	(0E)H	Double-width printing on a single line
SI	(15)D	(0F)H	Specifies condensed mode.
DC1	(17)D	(11)H	Printer select
DC2	(18)D	(12)H	Cancels the condensed mode.
DC4	(20)D	(14)H	Cancels the double-width mode set by the SO command.
CAN	(24)D	(18)H	Cancel
ESC	(27)D	(1B)H	Escape
ESC EM	(27)D (25)D	(1B)H (19)H	Specifies the paper path.
ESC *	(27)D (42)D	(1B)H (2A)H	Selects a graphic function.
ESC —	(27)D (45)D	(1B)H (2D)H	Specifies or cancels underscoring.
ESC 0	(27)D (48)D	(1B)H (30)H	Specifies line feeding at 1/8-inch pitch.
ESC 1	(27)D (49)D	(1B)H (31)H	Specifies line feeding at 7/72-inch pitch.
ESC 2	(27)D (50)D	(1B)H (32)H	Executes ESC A.
ESC 3	(27)D (51)D	(1B)H (33)H	Specifies n/216-inch line feed pitch.
ESC 3	(27)D (51)D	(1B)H (33)H	Specifies n/180-inch line feed pitch. (AGM)
ESC 4	(27)D(52)D	(1B)H (34)H	Specifies TOF.
ESC 5	(27)D(53)D	(1B)H (35)H	Specifies or cancels automatic line feeding.
ESC 6	(27)D(54)D	(1B)H (36)H	Specifies character set 2.
ESC 7	(27)D(55)D	(1B)H (37)H	Specifies character set 1.
ESC :	(27)D(58)D	(1B,3A,00)H	Specifies 12 cpi.
ESC =	(27)D(61)D	(1B)H (3D)H	Specifies downloading.
ESC A	(27)D(65)D	(1B)H (41)H	Specifies the line feed pitch in units of n/72 inch.
ESC A	(27)D(65)D	(1B)H (41)H	Specifies the line feed pitch in units of n/60 inch. (AGM)
ESC B	(27)D(66)D	(1B)H (42)H	Specifies the vertical tabs.
ESC C	(27)D(67)D	(1B)H (43)H	Specifies the page length in number of lines.
ESC C NUL	(27,67,00)D	(1B,43,00)H	Specifies the page length in inches.
ESC D	(27)D (68)D	(1B)H (44)H	Specifies the horizontal tabs.
ESC E	(27)D(69)D	(1B)H (45)H	Specifies emphasized printing.
ESC F	(27)D(70)D	(1B)H (46)H	Cancels emphasized printing.
ESC G	(27)D(71)D	(1B)H (47)H	Specifies double-striking.
ESC H	(27)D(72)D	(1B)H (48)H	Cancels double-striking.
ESC I	(27)D(73)D	(1B)H (49)H	Selects the font.
ESC J	(27)D(74)D	(1B)H (4A)H	Executes line feeding at a pitch of n/216 inches.
ESC J	(27)D(74)D	(1B)H (4A)H	Executes line feeding at a pitch of n/180 inches. (AGM)

● IBM command list

Symbol	Code		Function
	Decimal	Hexadecimal	
ESC K	(27)D(75)D	(1B)H (4B)H	Specifies the 8-dot single-density graphic mode.
ESC L	(27)D(76)D	(1B)H (4C)H	Specifies the 8-dot double-density graphic mode.
ESC N	(27)D(78)D	(1B)H (4E)H	Specifies the bottom margin.
ESC O	(27)D(79)D	(1B)H (4F)H	Cancels the bottom margin.
ESC P	(27)D(80)D	(1B)H (50)H	Specifies or cancels proportional printing.
ESC Q	(27)D(81)D	(1B)H (51)H	Printer deselect
ESC R	(27)D(82)D	(1B)H (52)H	Initializes horizontal and vertical tab positions.
ESC S	(27)D(83)D	(1B)H (53)H	Specifies superscript or subscript.
ESC T	(27)D(84)D	(1B)H (54)H	Cancels superscript or subscript.
ESC U	(27)D(85)D	(1B)H (55)H	Specifies or cancels uni-directional printing.
ESC W	(27)D(87)D	(1B)H (57)H	Specifies or cancels double-width printing.
ESC X	(27)D(88)D	(1B)H (58)H	Specifies the right and left margins.
ESC Y	(27)D(89)D	(1B)H (59)H	Specifies the 8-dot double-speed double-density graphic mode.
ESC Z	(27)D(90)D	(1B)H (5A)H	Specifies the 8-dot quadruple-density graphic mode.
ESC [-	(27,91,45)D	(1B, 5B, 2D)H	Specifies the line type.
ESC [@	(27,91,64)D	(1B, 5B, 40)H	Specifies or cancels the double-width, double-height printing.
ESC [K	(27,91,75)D	(1B, 5B, 4B)H	Software initial
ESC [I	(27,91,73)D	(1B, 5B,49)H	Selects the font.
ESC [T	(27,91,84)D	(1B, 5B, 54)H	Selects the code page.
ESC [\	(27,91,92)D	(1B, 5B, 5C)H	Specifies the basic amount of line feeding.
ESC [d	(27,91,100)D	(1B, 5B, 64)H	Selects the character quality.
ESC [g	(27,91,103)D	(1B, 5B, 67)H	Graphic mode
ESC \	(27)D (92)D	(1B)H (5C)H	All-character set
ESC]	(27)D (93)D	(1B)H (5D)H	Reverse line feeding
ESC ^	(27)D (94)D	(1B)H (5E)H	All-character set for a single character
ESC _	(27)D (95)D	(1B)H (5F)H	Specifies or cancels the upper line.
ESC d	(27, 100)D	(1B)H (64)H	Specifies the relative printing position.
ESC j	(27, 106)D	(1B)H (6A)H	Stops printing.

● HPcommand list

Symbol	Code		Function
	Decimal	Hexadecimal	
BEL	(07)D	(07)H	Activates the printer buzzer. (PCL3+ or PCL3+D)
BS	(08)D	(08)H	Backspace one character.
HT	(09)D	(09)H	Moves to next horizontal tab.
LF	(10)D	(0A)H	Linefeeds after printing.
FF	(12)D	(0C)H	Form feeds after printing.
CR	(13)D	(0D)H	Carriage return after printing.
SO	(14)D	(0E)H	Selects secondary font.
SI	(15)D	(0F)H	Selects prinmary font.
ESC	(27)D	(1B)H	Designate start of escape sequence.
SP	(32)D	(20)H	Space one character.
DEL	(127)D	(7F)H	To print the ASCII DEL character.
ESC & a # C	(27,38,97,#,67)D	(1B,26,61,#,43)H	Horizontal positioning by column.
ESC & a # H	(27,38,97,#,72)D	(1B,26,61,#,48)H	Horizontal positioning by 1/720".
ESC & a # L	(27,38,97,#,76)D	(1B,26,61,#,4C)H	Sets left margin.
ESC & a # M	(27,38,97,#,77)D	(1B,26,61,#,4D)H	Sets light margin.
ESC & a # R	(27,38,97,#,82)D	(1B,26,61,#,52)H	Vertical positioning by line (VMI).
ESC & a # V	(27,38,97,#,86)D	(1B,26,61,#,56)H	Vertical positioning by 1/720".
ESC & d # D	(27,38,100,#,68)D	(1B,26,64,#,44)H	Designates underline mode.
ESC & d # @	(27,38,100,#,64)D	(1B,26,64,#,40)H	Cancels underline mode.
ESC & k # E	(27,38,107,#,69)D	(1B,26,6B,#,45)H	Designates/Cancels the auto-cancellation of underline.
ESC & k # F	(27,38,107,#,70)D	(1B,26,6B,#,46)H	Designates/Cancels the auto-cancellation of secondary font.
ESC & k # G	(27,38,107,#,71)D	(1B,26,6B,#,47)H	Designates line termination.
ESC & k # H	(27,38,107,#,72)D	(1B,26,6B,#,48)H	Sets HMI (Horizontal motion index).
ESC & k # S	(27,38,107,#,83)D	(1B,26,6B,#,53)H	Designates character pitch.
ESC & k # V	(27,38,107,#,86)D	(1B,26,6B,#,56)H	Designates/Cancels automatic scroll mode.
ESC & k # W	(27,38,107,#,87)D	(1B,26,6B,#,57)H	Controls print direction. (PCL3+ or PCL3+D)
ESC & l # A	(27,38,108,#,65)D	(1B,26,6C,#,41)H	Designates paper size.
ESC & l # C	(27,38,108,#,67)D	(1B,26,6C,#,43)H	Sets VMI (Vertical motion index).
ESC & l # D	(27,38,108,#,68)D	(1B,26,6C,#,44)H	Sets the line spacing. VMI (Vertical motion index)
ESC & l # E	(27,38,108,#,69)D	(1B,26,6C,#,45)H	Sets top margin by VMI.
ESC & l # F	(27,38,108,#,70)D	(1B,26,6C,#,46)H	Sets text length.
ESC & l # H	(27,38,108,#,72)D	(1B,26,6C,#,48)H	Sets paper path.
ESC & l # L	(27,38,108,#,76)D	(1B,26,6C,#,4C)H	Designates/Cancels skip perforation mode.
ESC & l # P	(27,38,108,#,80)D	(1B,26,6C,#,50)H	Sets page length by VMI.
ESC & p # X	(27,38,112,#,88)D	(1B,26,70,#,58)H	Receives data as text.
ESC & s # C	(27,38,115,#,67)D	(1B,26,73,#,43)H	Designates/Cancels wraparound.
ESC (id ESC) id	(27,40,id)D (27,41,id)D	(1B,28,id)H (1B,29,id)H	Assign font to the primary/secondary font set.
ESC (# @	(27,40,#,64)D	(1B,28,#,40)H	Designates primary font.
ESC (0 X ESC) 0 X	(27,40,48,88)D (27,41,48,88)D	(1B,28,30,58)H (1B,29,30,58)H	Assigns the download font to the current primary/secondary font.
ESC (s # B ESC) s # B	(27,40,115,#,66)D (27,41,115,#,66)D	(1B,28,73,#,42)H (1B,29,73,#,42)H	Bold or emphasized.

● HP command list

Symbol	Code		Function
	Decimal	Hexadecimal	
ESC (s # H ESC) s # H	(27,40,115,#,72)D (27,41,115,#,72)D	(1B,28,73,#,48)H (1B,29,73,#,48)H	Sets character spacing.
ESC (s # P ESC) s # P	(27,40,115,#,80)D (27,41,115,#,80)D	(1B,28,73,#,50)H (1B,29,73,#,50)H	Selects proportional or fixed character spacing.
ESC (s # Q ESC) s # Q	(27,40,115,#,81)D (27,41,115,#,81)D	(1B,28,73,#,51)H (1B,29,73,#,51)H	Sets print quality.
ESC (s # S ESC) s # S	(27,40,115,#,83)D (27,41,115,#,83)D	(1B,28,73,#,53)H (1B,29,73,#,53)H	Sets italic character.
ESC (s # T ESC) s # T	(27,40,115,#,84)D (27,41,115,#,84)D	(1B,28,73,#,54)H (1B,29,73,#,54)H	Sets typeface.
ESC (s # U ESC) s # U	(27,40,115,#,85)D (27,41,115,#,85)D	(1B,28,73,#,55)H (1B,29,73,#,55)H	Sets super/subscript.
ESC (s # V ESC) s # V	(27,40,115,#,86)D (27,41,115,#,86)D	(1B,28,73,#,56)H (1B,29,73,#,56)H	Sets character point size.
ESC (s # W	(27,40,115,#,87)D	(1B,28,73,#,57)H	Download character descriptor and data.
ESC) # @	(27,41,#,64)D	(1B,29,#,40)H	Designates secondary font.
ESC) s # W	(27,41,115,#,87)D	(1B,29,73,#,57)H	Download font descriptor.
ESC * b # M	(27,42,98,#,77)D	(1B,2A,62,#,4D)H	Selects format the graphic data compression.
ESC * b # W	(27,42,98,#,87)D	(1B,2A,62,#,57)H	Designates raster graphic data transmission.
ESC * b # X	(27,42,98,#,88)D	(1B,2A,62,#,58)H	Sets temporary graphics X-offset.
ESC * b # Y	(27,42,98,#,89)D	(1B,2A,62,#,59)H	Sets temporary graphics Y-offset.
ESC * c # E	(27,42,99,#,69)D	(1B,2A,63,#,45)H	Set download character code.
ESC * c # F	(27,42,99,#,70)D	(1B,2A,63,#,46)H	Download font control.
ESC * p # X	(27,42,112,#,88)D	(1B,2A,70,#,58)H	Sets Horizontal positioning by dot.
ESC * p # Y	(27,42,112,#,89)D	(1B,2A,70,#,59)H	Sets Vertocal positioning by dot.
ESC * r # A	(27,42,114,#,65)D	(1B,2A,72,#,41)H	Sets start raster graphics printing.
ESC * r B	(27,42,114,66)D	(1B,2A,72,42)H	Sets terminates rastergraphics printing.
ESC * r K	(27,42,114,75)D	(1B,2A,72,4B)H	Model number request (Serial I/F only).
ESC * r # S	(27,42,114,#,83)D	(1B,2A,72,#,53)H	Designates raster graphics width.
ESC * t # R	(27,42,116,#,82)D	(1B,2A,74,#,52)H	Designates raster graphics resolution.
ESC 9	(27)D (57)D	(1B)H (39)H	Clear left and right margin.
ESC =	(27)D (61)D	(1B)H (3D)H	Half line feed.
ESC ? DC1	(27,63,17)D	(1B,3F,11)H	Request I/O status.
ESC E	(27)D (69)D	(1B)H (45)H	Reset - The printer is initialized.
ESC Y	(27)D (89)D	(1B)H (59)H	Designates display function.
ESC Z	(27)D (90)D	(1B)H (5A)H	Cancels display function - Display function is set off.
ESC z	(27)D (122)D	(1B)H (7A)H	Self test - Self test print is executed for 1 page.

Maschinenlärminformationsverordnung 3. GSGV, 18.01.1991:
Der arbeitsplatzbezogene Schalldruckpegel beträgt 70 dB(A) oder weniger gemäß ISO 7779.

This unit complies with the Low Voltage Directive 73/23/EEC and the EMC Directive 89/336/EEC.
Dies Gerät entspricht den Bedingungen der Niederspannungs-Vorschrift 73/23/EEC und dem EMVG nach 89/336/EEC.

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