thermal line printer

TM-L60

Operator's Manual

400179501

CC CLASS A

FCC COMPLIANCE STATEMENT FOR AMERICAN USERS

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment.

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

WARNING

The connection of a non-shielded printer interface cable to this printer will invalidate the FCC Verification of this device and may cause interference levels which exceed the limits established by the FCC for this equipment. You are cautioned that changes or modifications not expressly approved by the party responsible for compliance could void your authority to operate the equipment.

FOR CANADIAN USERS

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus as set out in the radio interference regulations of the Canadian Department of Communications.

Le present appareil numérique n'émet pas de bruits radioélectriques depassant les limites applicables aux appareils numériques de Class A prescrites dans le règlement sur le brouillage radioélectrique édicté par le Minstère des Communications du Canada.

INTRODUCTION

The TM-L60 is a available as a simplificative bar code printer for the following uses:

- One-station printer for ECR and POS use
- Output device for scaling or measuring
- Ticket issuing device
- Small scale instore-marking

The TM-L60 has the following features:

- Either label paper or thermal paper is selectable.
- A light, ultra-compact printer.
- High speed printing: 12 lines/second (12 X 24 font).
- Low noise thermal printing.
- High reliability due to a stable mechanism.
- Easy maintenance, such as head cleaning.
- The command protocol is based on ESC/POW™, a widely used standard.
- The interface cable, drawer control cable, and power cable can be routed in any of four directions: both sides, underneath, and out the back of the case.
- The power switch is on a panel in front of the printer body, providing easy operation, so both side and the back are still available.
- Barcode (UPC-A, UPC-E, JAN13(EAN), JAN8(EAN), CODE39, ITF, CODABAR) printing is possible using a bar code command.
- Characters can be rotated 90°.
- Repeated operation and copy printing are possible by macro definition.
- 2 drawer controls are possible using the drawer kick-out interface.
- Since label paper can be ejected by label eject command, it is not necessary to feed more paper than required.
- Easy label insertion.
- Serial number is possible on label papers.

Please be sure to read the instructions in this manual carefully before using your new Epson printer.

About this manual

I. SETTING UP

* **Chapter 1** contains information on unpacking the printer, choosing the place for the printer, and names and functions of parts.
* **Chapter 2** and **Chapter** 3 contain information on connecting and setting up the printer.
* **Chapter 4** contains information on testing the printer.

II. REFERENCE

* **Chapter 5** contains information on using the printer.
* **Chapter 6** contains information on software control including printer command descriptions.

APPENDIX

Appendixes contain information on general specifications, character code tables and a list of commands.

CONTENTS

I. SETTING UP

II. REFERENCE

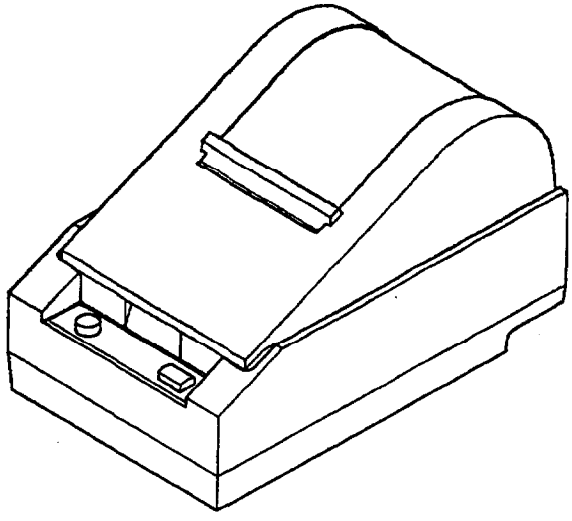
1. SETTING UP

Chapter 1 Unpacking the Printer

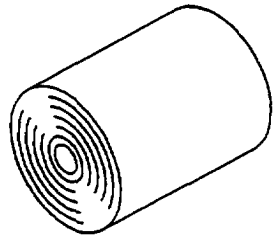
1-1 Checking the Contents of the Box

■ Checking the parts

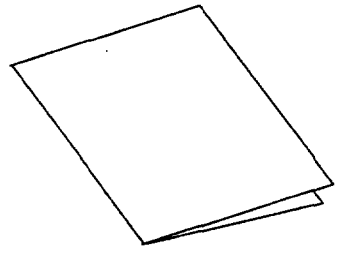
Remove the printer and other parts from the box.



- Printer



- Roll paper



- Operator's Manual

Make sure no parts are missing or damaged.

If you find any damaged or missing parts, please contact your dealer for assistance.

Maintenance

Keep the packing case and packing materials in case you ever need to transport or store your printer.

Optional parts

Power supply (PS-130), Power supply DC cable (1.5 m)

1-2 Choosing a Place for the Printer

Avoid locations that are subject to direct sunlight or excessive heat (near heaters).

Avoid using or storing the printer in places subject to excessive temperatures or moisture.

Do not use or store the printer in a dusty or dirty location.

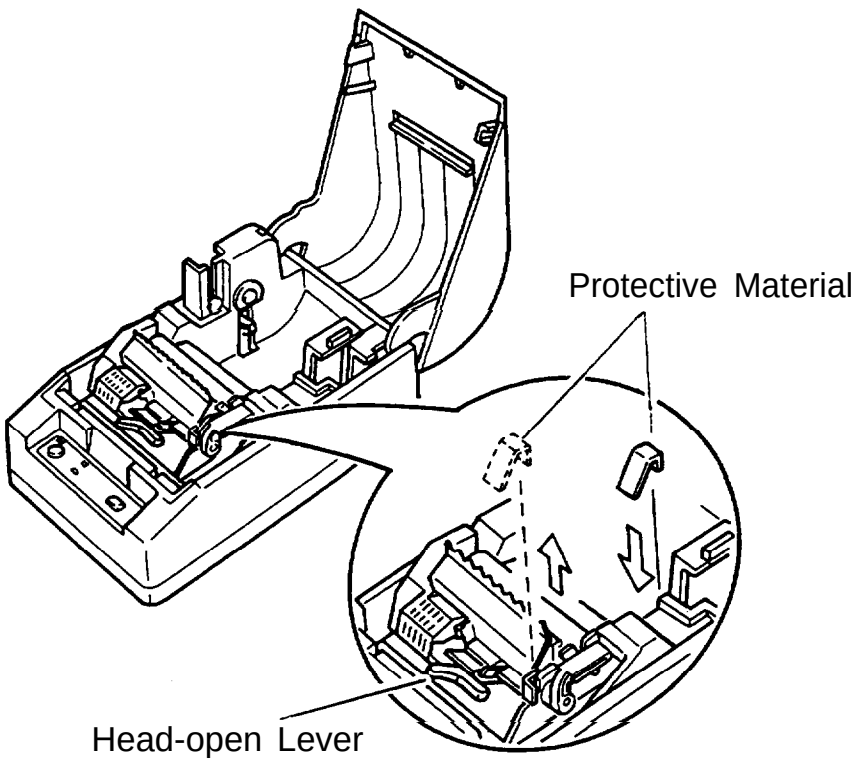
When setting up the printer, choose a stable, horizontal location. Intense vibration or shock may damage the printer.

Ensure the printer has enough space to be used easily.

1-3 Removing the Protective Material

An orange plastic spacer is put into the printing mechanism section to protect the printer from damage during transportation. Before you turn on the printer, be sure to remove the spacer according to the following steps.

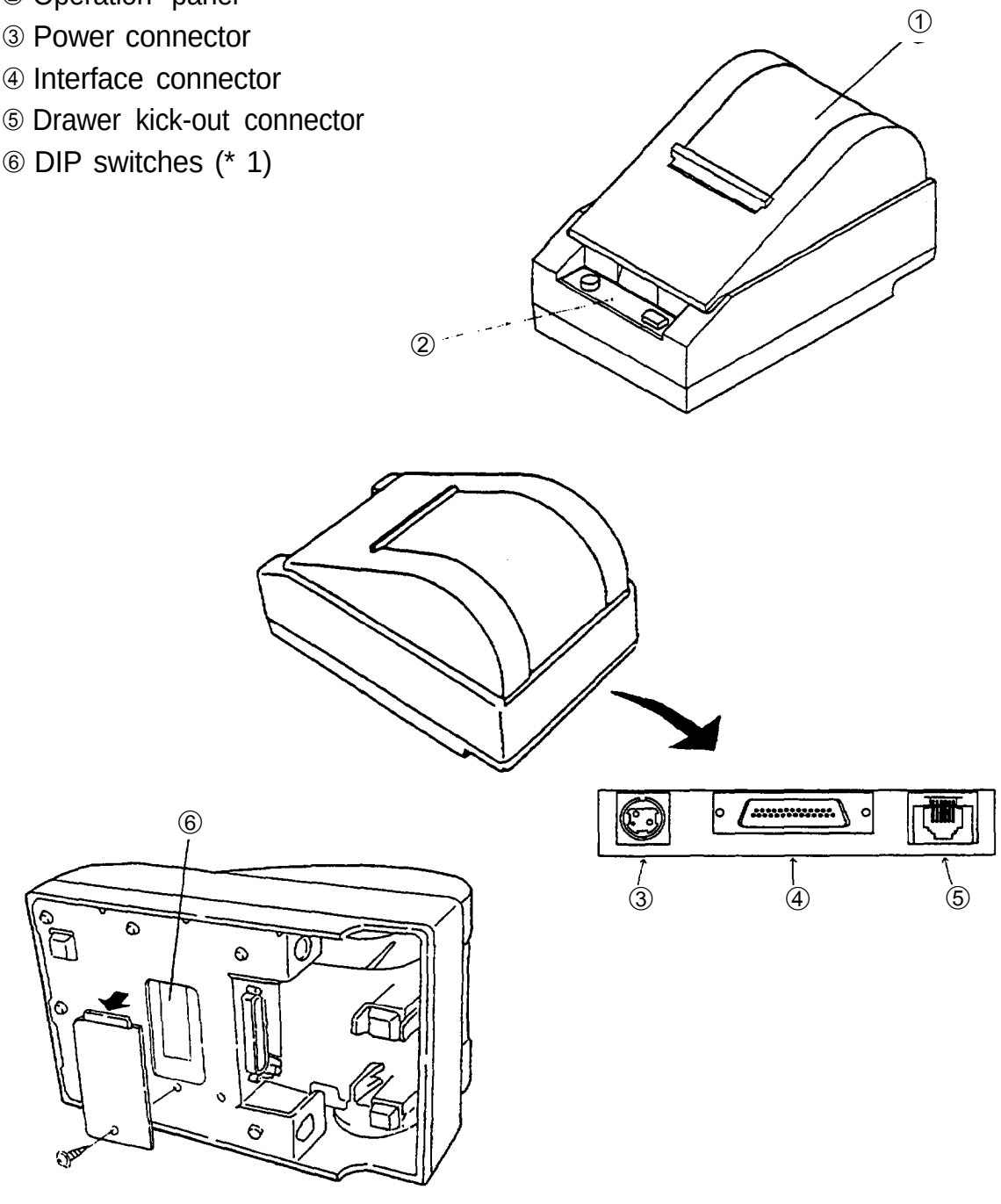
1. Open the printer cover.
2. Raise the head-open lever to remove the spacer.
3. Store it in the hollow space. Reinsert the spacer when transporting.
4. Lower the head-open lever.



1-4 Names and Functions of Parts

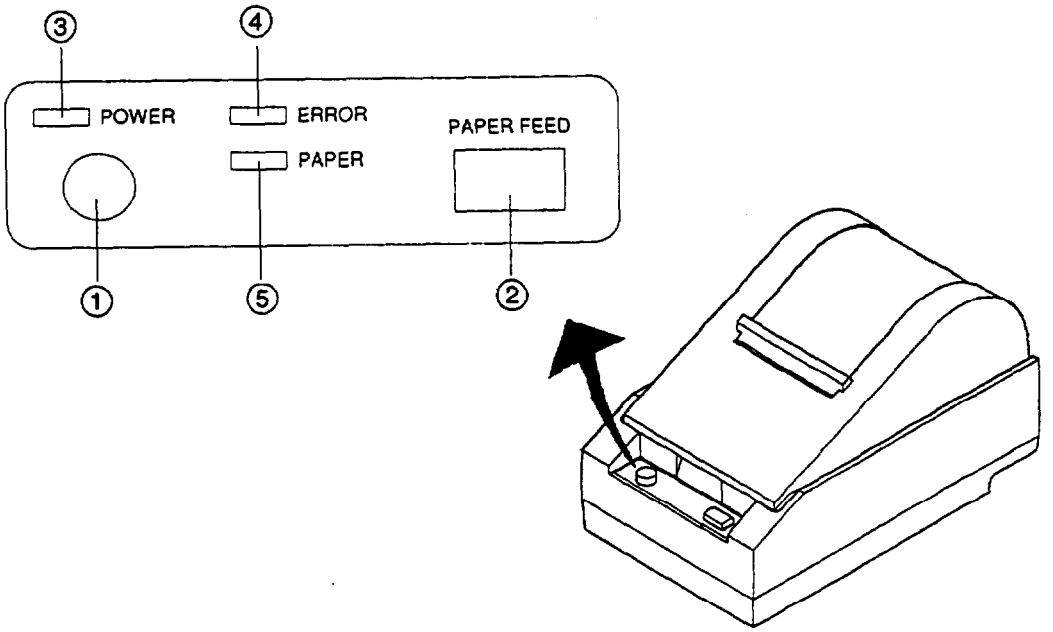
Part names

① Roll-paper cover
② Operation panel
③ Power connector
④ Interface connector
⑤ Drawer kick-out connector
⑥ DIP switches (* 1)



* 1: The DIP switches are located behind the small cover on the bottom of the printer.

Operation panel



Panel switches

①POWER

Press the POWER button to turn the printer ON and OFF. When the button is pushed down, the power is on. When pressed again, the button returns to its original position, turning the power off.

- Do not turn the power off during printing.

②PAPER FEED

Press the PAPER FEED button to feed roll paper.

- Pressing the PAPER FEED button recovers from waiting state of label ejection command (GS **FF)** execution or from self-test printing standby state.
- You cannot feed paper when the printer **cover** is open.

Panel Lights (LED)

③POWER (green)

The POWER light is on when power is turned on.

④ERROR (red)

The ERROR light is on when the roll-paper cover is not closed completely, or when the paper roll is near the end. The light blinks during an error condition, or in the print-waiting state (for macro execution or for self-test printing standby state).

⑤PAPER (red)

The PAPER light is on when roll paper is not loaded, on when the paper roll is near the end.

Chapter 2 Before Setting Up

2-1 Connecting the Power Supply to the Printer

Plugging in AC adapter

The printer must be connected to an external power supply.
Be sure to use a power supply unit that matches the specifications.

CAUTIONS:

- Before connecting the printer to the power supply, make sure that the voltage (24 VDC) and power specifications match the printer's requirements.
- Using an incorrect power supply can cause serious damage to the printer.

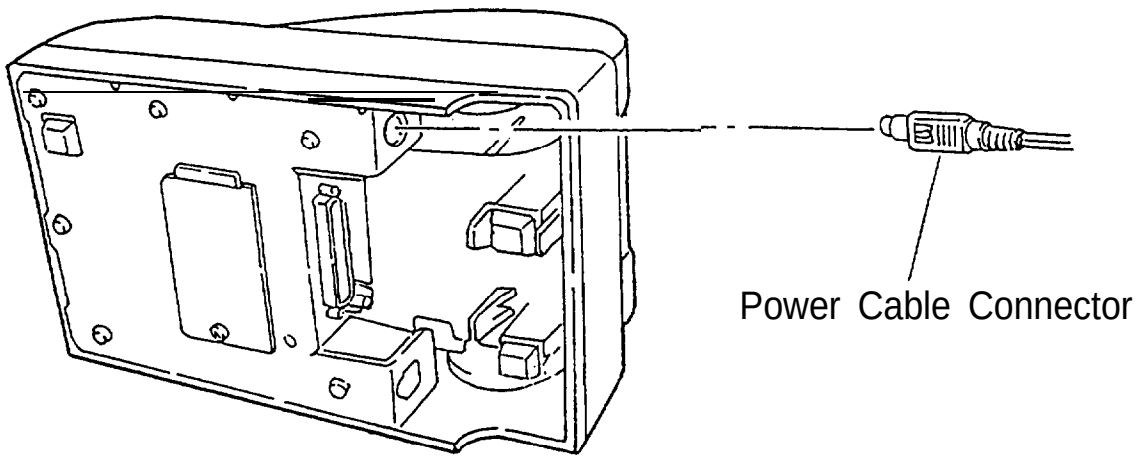
Connect the power unit according to the following procedure.

① Make sure the printer and the power unit are turned off.

② Plug the power cable's connector into the printer's power connector with the arrow mark facing downward.

- Remove the power cable by grasping the connector firmly at the arrow mark and pulling straight out.

③ Plug the power cord into an outlet, and turn on the power unit.



2-2 Connecting the Host Computer to the Printer

Connecting the interface cable

Connect the printer to a host ECR (host computer) using an interface cable matching the specifications of the printer and the host ECR (host computer).

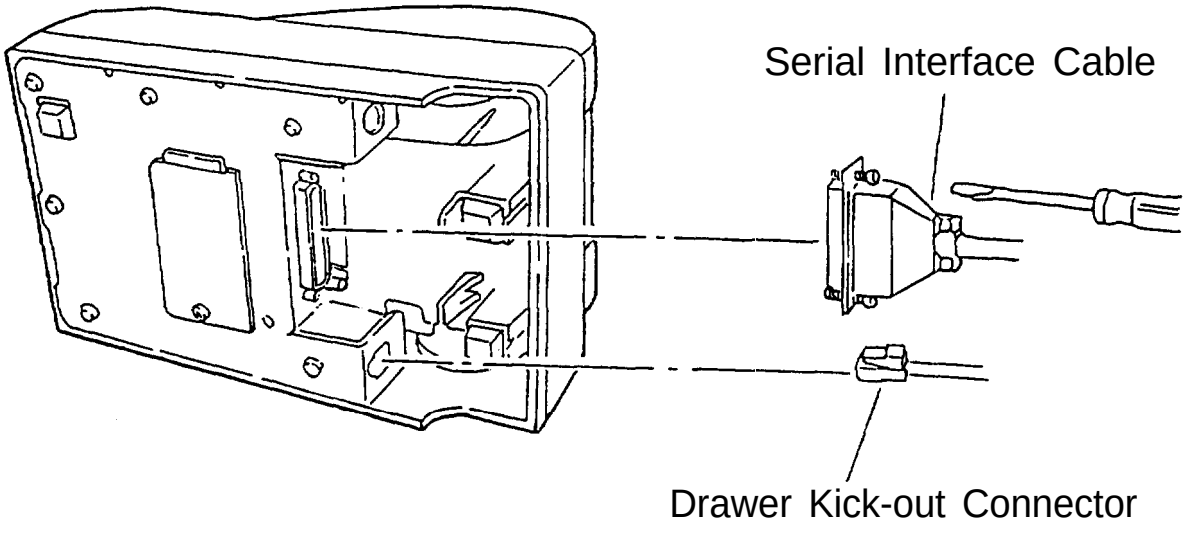
Connect the interface cable according to the following procedure.

① Turn off the printer, power unit, and host computer.

② Plug the interface cable connector into the interface connector on the printer; then insert a screwdriver between the rear rubber feet and fasten the screws on both sides of the connector.

③ Plug the drawer kick-out cable connector into the drawer kick-out connector on the printer (if this connector is covered, you cannot attach a drawer kick-out cable to your printer).

Remove the drawer kick-out cable by pressing in on the connector's clip and pulling out.



Chapter 3 Installing the Parts

3-1 Installing the Roll Paper

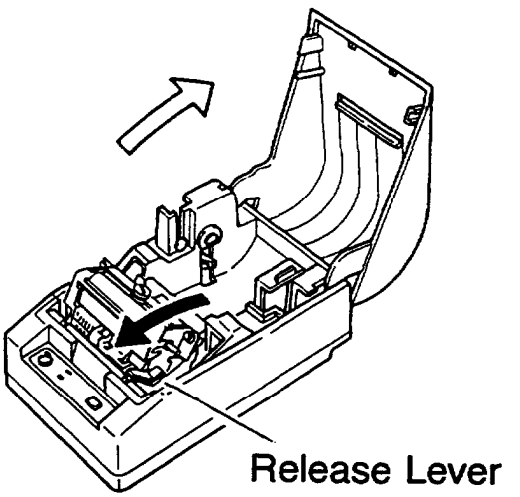
Installing the roll paper

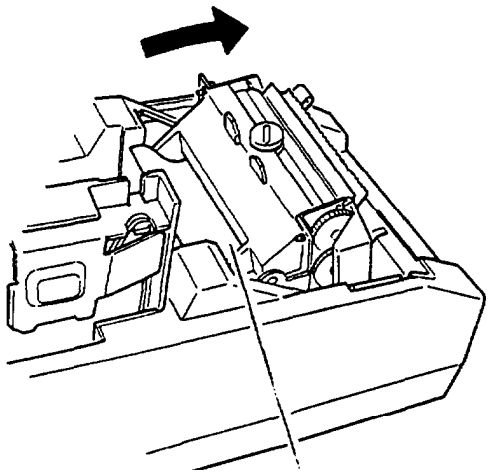
Be sure to use roll paper that matches the printer's specifications.

① Using scissors, cut the leading edge of the roll paper perpendicular to the paper feed direction.

② Open the roll-paper cover and raise the release lever toward you.

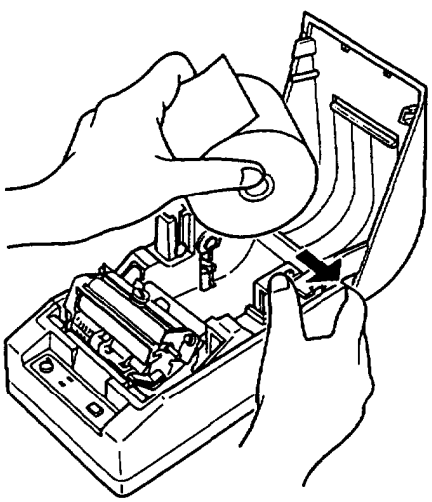
Make sure to pull the release lever out until the paper slot of the printer mechanism will be faced up.

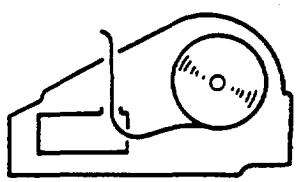


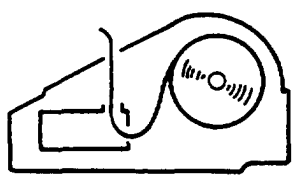


③ Load the roll paper while lightly pressing the right roll paper holder outward. Release the holder after fitting the paper core onto the holder. Make sure the roll paper turns freely.

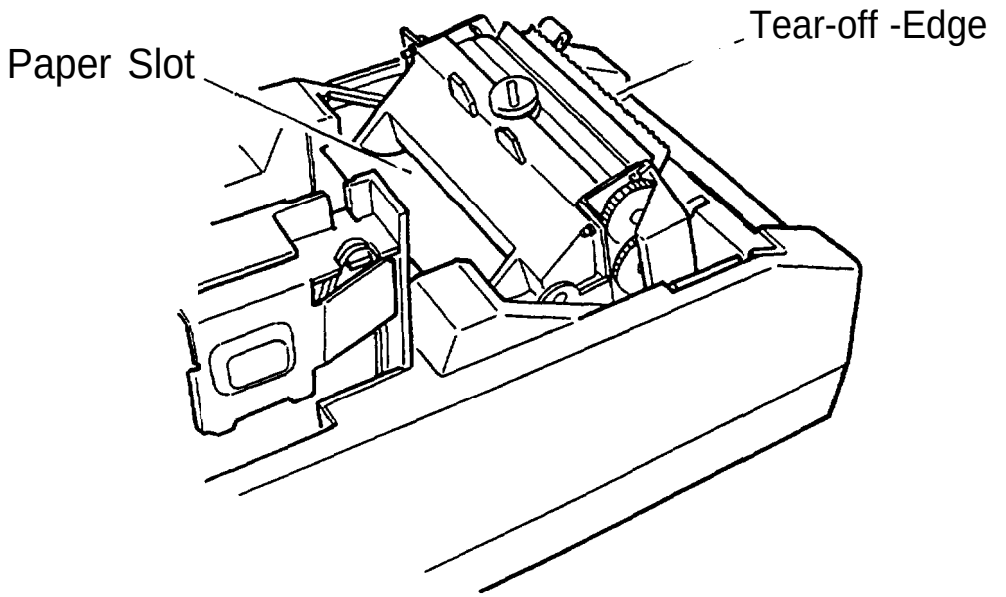
- When loading roll paper, make sure to insert so that it rotates in the correct direction.







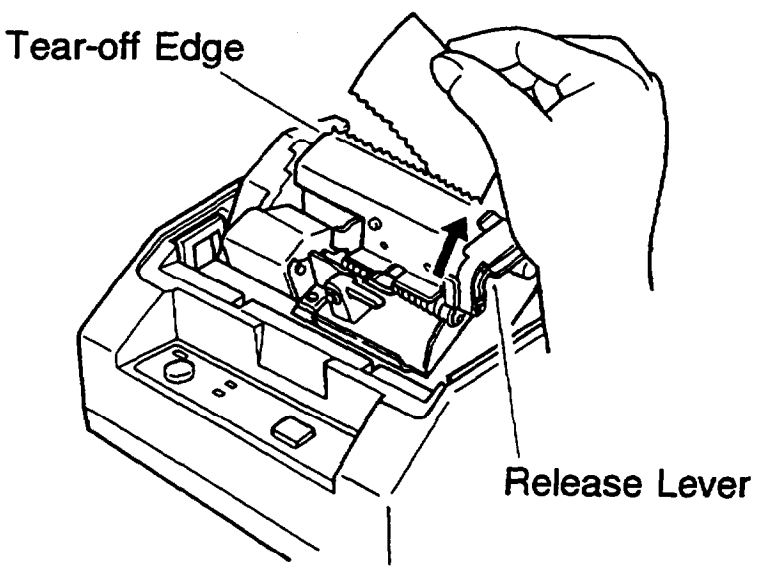
④ Insert the edge of the roll paper into the paper slot and feed the paper 5 cm beyond the tear-off edge.



⑤ Unroll the paper a little and pull lightly from the roll paper side to eliminate twist or misalignment.

Retighten the roll paper to remove any slack. Both edges of the paper should be aligned parallel to the paper roll.

⑥ Push down the release lever. Tear off any extra paper at the tear-off edge by pulling the paper toward you.



⑦Close the roll-paper cover.

3-2 Adjusting the Paper-end Detector

The paper-end detector

The paper-end detector senses when the paper is nearing its end and turns on the PAPER lamp.

The paper-end detector can be adjusted according the thickness of the paper.

How to adjust the paper-end detector

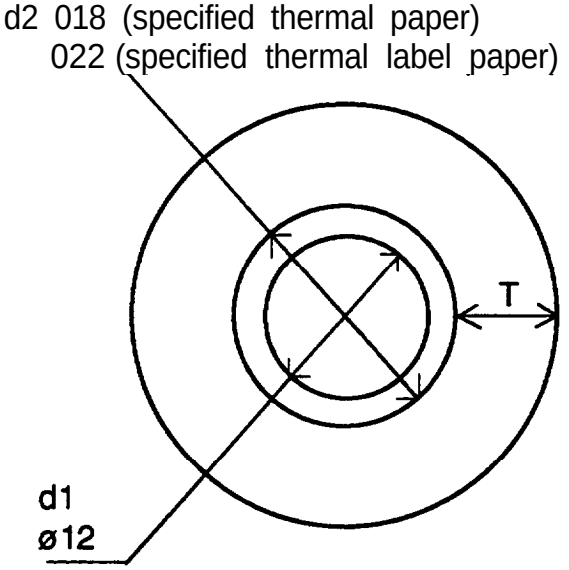
Roll paper may differ in spool size, so it may be necessary to adjust the paper-end detector.

① Use the specified thermal paper roll with a core inside diameter (d1) of 12 mm and an outside diameter (d2) of 18 mm, or the specified thermal label paper with a core inside diameter (d1) of 12 mm and an outside diameter (d2) of 22 mm.

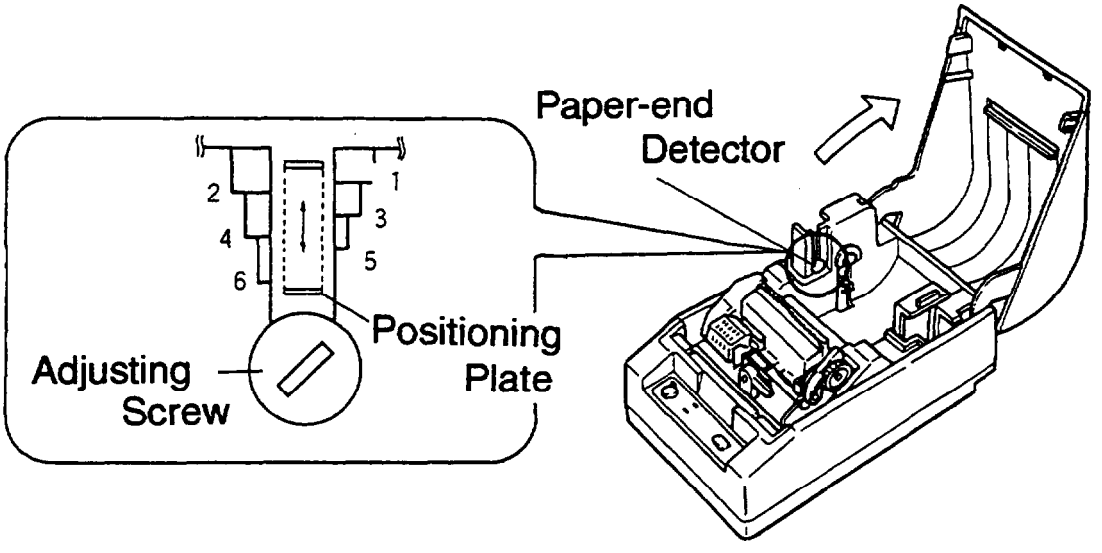
② The thickness of the spool can vary; use the table to determine the paper-end detector adjustment.

Table 3-l. Adjustment Values of the Paper-end Detector

Adjustment Value	Dimension of T (mm)	
	Specified thermal paper	Specified thermal label paper
#I	Approx. 0	Do not use
#2	Approx. 2	Approx. 0
#3	Approx. 4	Approx. 2
#4	Approx. 6	Approx. 4
#5	Approx. 8	Approx. 6
#6	Approx. 10	Approx. 8



③ Loosen the adjusting screw that holds the paper-end detector. Then set the top of the positioning plate to the appropriate adjustment position, and tighten the adjusting screw.



NOTES:

- The T dimensions corresponding to the adjustment values in the table are calculated from standard measurements; some variations in the actual mechanism.
- After adjusting, ensure that the detector operates smoothly.

3-3 Setting the DIP Switches

Locating the DIP switches

On the underside of your printer are a number of DIP switches that can be set to perform a number of different functions.

- You can change the function of your printer by turning DIP switches on or off.
- Current DIP-switch settings are printed out during the self test.
- The switches numbered from left to right are SW1 -1 through SW1 -10 (See figure below).
- Each switch functions as described in the lists on the following page.

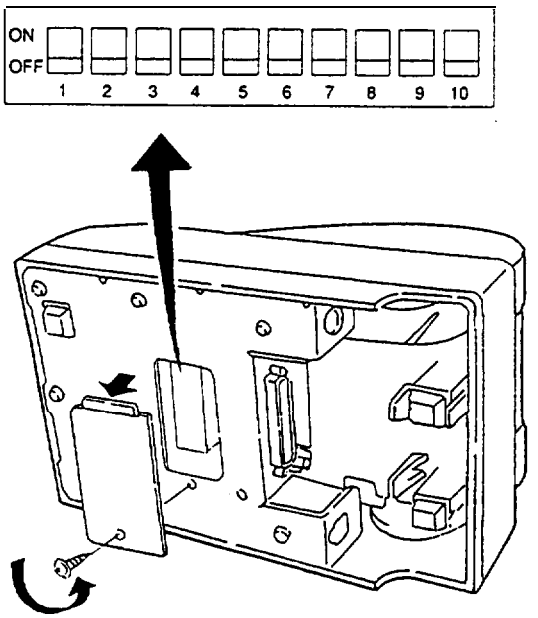
Setting the DIP switches

Follow these steps when changing DIP-switch settings.

① Turn the printer power supply off. Always make DIP-switch setting changes when the power supply is turned off.

② Remove the screw to secure the small cover on the printer's bottom.

③ Flip the DIP switches using tweezers or other narrow-ended tool.
Switches in the up position are ON; those in the down position are OFF.



NOTE:

- Changes made with the power on have no effect until the power supply is turned off and then on again.

DIP-Switch Functions

Table 3-2. DIP-switch Functions

DIP SW	ON	OFF
SW-1	Ignores data reception errors	Prints "?" for data reception errors
SW-2	Data buffer 45 bytes	Data buffer 4 Kbytes
SW-3	XON/XOFF control	DSR/DTR control
SW-4	With parity	without parity
SW-5	Even parity	Odd parity
SW-6	Change baud rate (Refer to Table 3-3)	
SW-7		
SW-8	Change print density (Refer to Table 34)	
SW-9		
SW-10	Thermal label paper	Thermal paper

Table 3-3. Baud Rate Selection

Baud Rate	SW 1-6	SW 1-7
1200 bps	ON	ON
4800	OFF	O N
9600	ON	OFF
19200	OFF	OFF

Table 3-4. Print Density Selection

Print Density	SW 1-8	SW 1-9	Level
LIGHT	ON	ON	1
I	OFF	OFF	2
I	ON	OFF	3
I			
DARK	OFF	ON	4

Chapter 4 The Self Test

4-1 Checking Operation with the Self Test

The purpose of the self test

The self test checks whether the printer has any problems.
When the printer does not function properly, please contact the dealer.

The self test checks the following

- Control circuit functions
- Printer mechanism
- Print quality
- Control ROM version
- DIP-switch settings

Running the self test

Run the self test only when thermal roll paper or label paper is loaded the printer.

① Make sure the roll-paper cover is closed and the roll paper is installed correctly.

② Turn on the power while holding down the FEED switch. The self test begins.

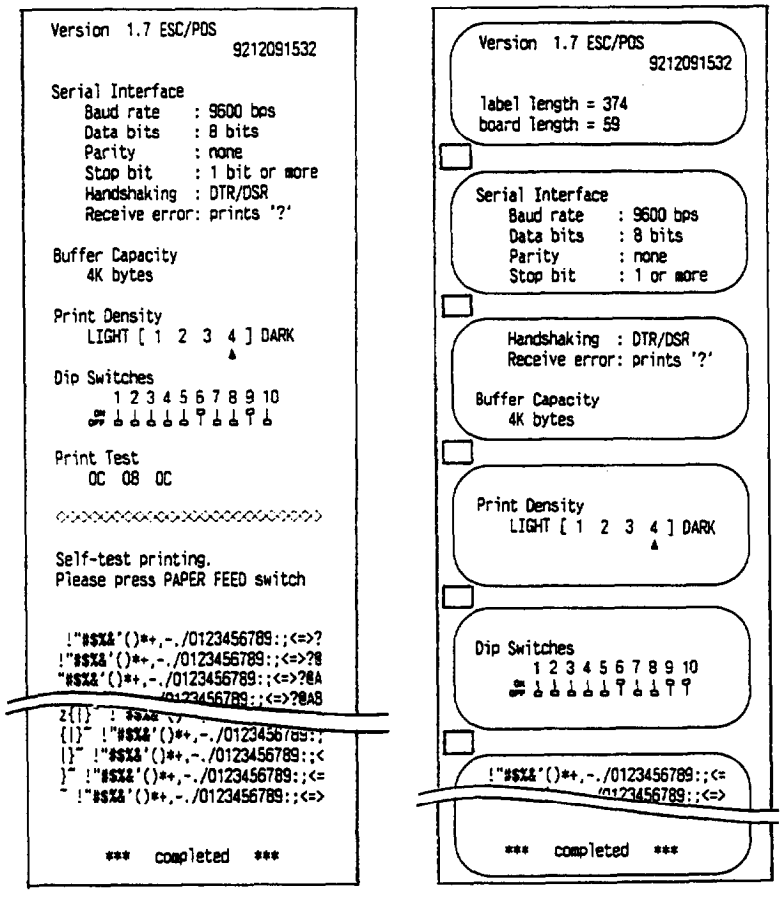
③ The following contents are printed for printer current status printing first.

- Control ROM version
- DIP-switch settings
- Interface settings
- Print density

④ After printing the printer current status, the printer blinks the ERROR LED and enters the test printing standby state.
Press the FEED switch to restart test printing.

After the printer completes a certain number of lines, it prints" *** completed *** ", and stops printing automatically.

* The printer goes off-tine during and after self-test printing. Turn the power off and on again to put the printer on-line before transmitting data from the host computer.



Label paper (44%) **Thermal paper (44%)**

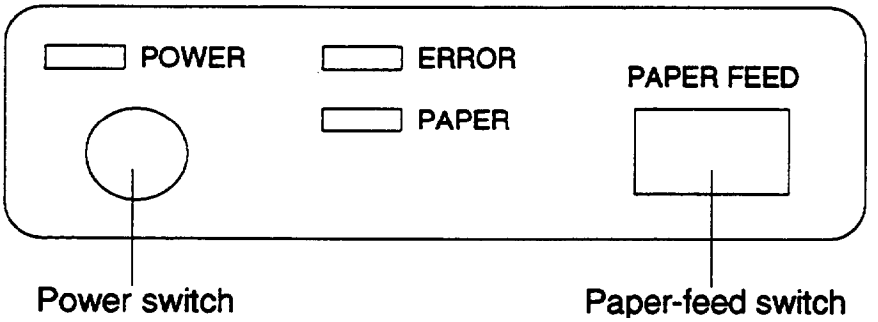
Self test Printing Samples

II. REFERENCE

Chapter 5 Cautions while Using the Printer

5-1 Panel Switches and Commands

Switches



(1) Power switch

[Function] Turns the power supply on/off.

[Note]
- The RAM is initialized after turning off the circuit power supply.
- Do not touch the power supply switch during printing.
- When label paper is used, the printer automatically sets the label at the starting position for printing just after turning the power switch on. When label paper is selected, the printer automatically detects label paper position and performs paper feeding. (Paper feed amount varies by the type of label paper.)

(2) Paper-feed switch

[Function] If this switch is pressed, paper is fed one line based on the currently specified line spacing. If this switch is held for 200 ms or more, paper is fed as long as the switch is pressed, and stops when the switch is released. If line spacing is set to 0, paper is fed while the switch is pressed.
- The defined macro is executed when the switch is pressed in the macro executing command standby state.
- Paper is fed by operating this switch, except during printing, in an error state, and in the macro executing command standby state.
- When label is selected, paper feeding is performed in label units regardless of the predetermined paper feed amount.
- Paper feeding is performed at the paper near-end state.
- Pressing the PAPER FEED button recovers from waiting state of label ejection command (GS **FF)** execution or from self-test printing standby state.

[Note]
- Paper is not be fed when the printer cover is open.
- The paper-feed switch can be enabled or disabled with **ESC** c5 command. When this switch is disabled, you cannot feed paper with the switch.

5-2 Printable Area and Label Paper Conditions

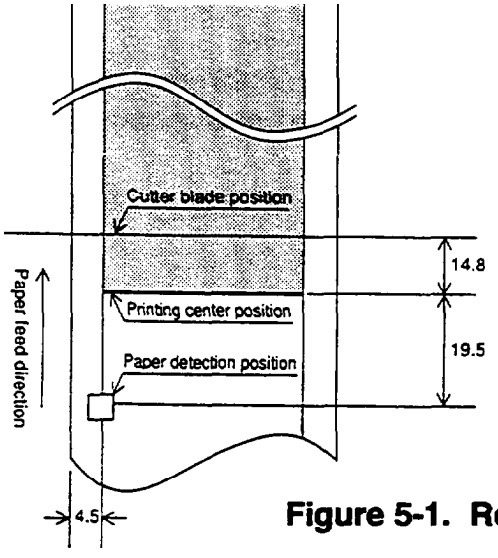
Printable area

The print area must be within the range indicated below.

Roll paper

[Units: mm]

(All the numeric values are typical.)



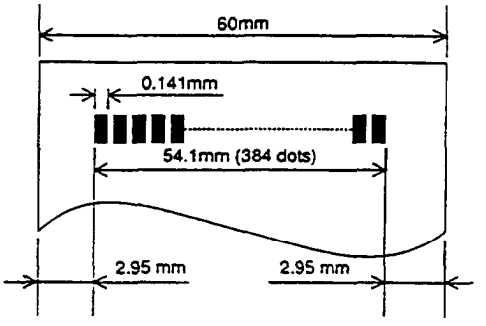
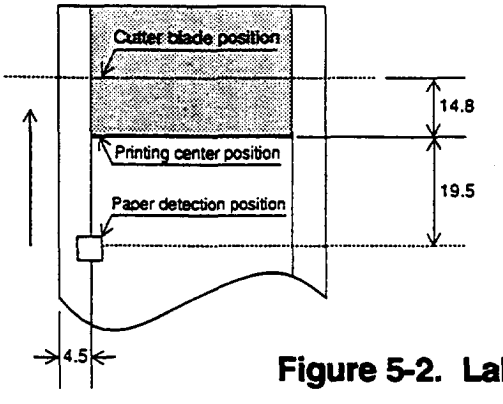


Figure 5-1. Roll Paper Printable Area

Label paper



[Units: mm]

(All the numeric values are typical.)

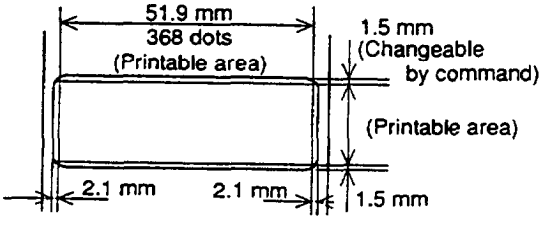
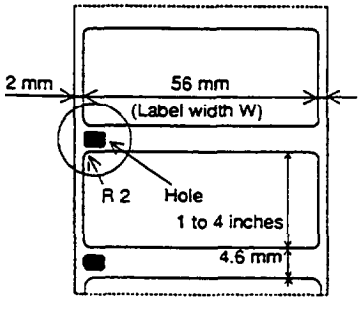


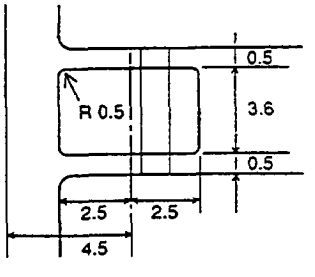
Figure 5-2. Label Paper Printable Area

Label paper conditions

Label paper



Hole dimensions



NOTE: Do not use anything other than label rolls with the dimensions shown above. Do not mix labels with different length in one label.

5-3 Miscellaneous Notes

Notes on printing and paper feeding

(1) Because the TM-L60 is a line printer, it automatically feeds paper after printing the data.

When the line spacing is set to a small value, the paper may be fed more than the set amount to print the data.

For example, when the line spacing is set to 10 dots (10/180 inch), the printer feeds just 10 dots for a carriage return; but 24 dots is fed when printing normal characters using Font A. (Refer to Table 5-l.)

When all the characters on one line are rotated, refer to Table 5-2 for paper feeding.

Table 5-1. Required Paper Feed Amount Dots (When the line spacing is set to 10 dots)

		Required Paper Feed Amount (dots)	
		Underline	
		without	with
Font A	Normal characters	24	32
	Double-height	48	53
	Double-width	24	32
	Quadruple	48	53
Font B	Normal characters	17	24
	Double-height	34	37
	Double-width	17	24
	Quadruple	34	37
Bit image		24	

Table 5-2. Required Paper Feed Amount Dots (When all the characters on one line are rotated)

		Required Paper Feed Amount (dots)
Font A	Normal characters	12
	Double-height	24
	Double-width	12
	Quadruple	24
Font B	Normal characters	9
	Double-height	18
	Double-width	9
	Quadruple	18

(2) When the printer goes to the standby (data-waiting) state during printing, the printer stops printing and feeding paper temporarily. When the printer restarts, the paper may shift 1 to 3 dots at the start of printing. Graphics printing is especially affected by this.

Notes on the power supply

- Turn the external power supply on after connecting it to the power supply connector.
- Be sure you do not connect the external power supply with the wrong polarity. If it is connected incorrectly, the internal circuit fuse may blow or the external power supply may be damaged.
- The power supply voltage should be 24 VDC ±7%. The voltage fluctuation between no-load and printing should be ±2% or less. If the power supply voltage fluctuates more than this, print quality will be poor.

Notes on handling the printer mechanism

- Do not pull paper out (forward/backward directions) while the print head is down.
- The thermal elements of the head and driver IC are liable to be damaged; avoid touching them with anything made of metal.
- The areas around the print head and motor surface are very hot during and just after printing; do not touch directly with your fingers.
- Do not operate the head-open lever except when necessary.
- Do not touch the surface of the head thermal elements directly with your fingers. (Dust and dirt can stick to the surface, which will affect the thermal elements.)
- Thermal paper containing Na^{-}, K^{-}, and Cl^{-} ions will affect the head thermal elements. Be sure to use only the paper specified.

Notes on handling thermal paper and label paper

(1) Notes on using thermal paper

Chemicals and oil that come into contact with the thermal paper may cause discoloration, and can also cause the printing to fade.

Therefore, pay attention to the following:

a) Use water-based paste, starch paste, polyvinyl paste, or CMC paste when gluing thermal paper.

b) Volatile organic solvents such as alcohol, ester, and ketone can cause discoloration.

c) Some adhesive tapes may cause discoloration, and may also cause the printed image to fade.

d) If thermal paper touches anything which includes phthalic acid ester plasticizer for a long period, it can reduce the image formation ability of the paper and can cause the printed image to fade. When storing thermal paper in a card case or sample notebook, be sure to use only products made from polyethylene, polypropylene, or polyester.

e) If thermal paper touches diazo copy paper immediately after copying, the printed surface may discolor.

f) Thermal paper must not be stored with the printed surfaces against each other because the printing may be transferred between the surfaces.

g) If the surface of thermal paper is scratched with a nail or other hard metal object, it may discolor.

(2) Notes on thermal paper storage

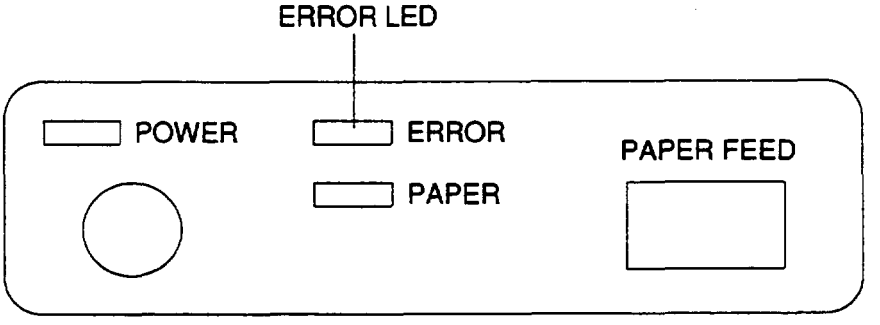
Color development begins at 70°C, so the following precautions should be taken.

a) Store paper away from high temperature and humidity.
Do not store thermal paper near a heater or in direct sunlight.

b) Avoid direct light.
If exposed to direct light for a while, paper color may change or printed images may fade.

5-4 Error Correction

ERROR LED (red)

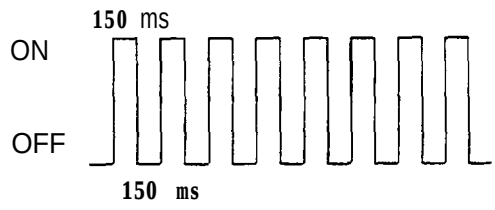
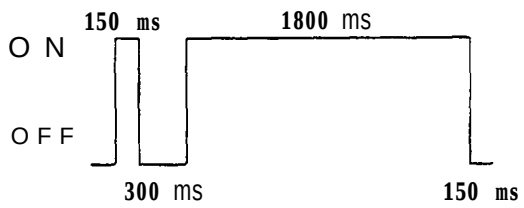
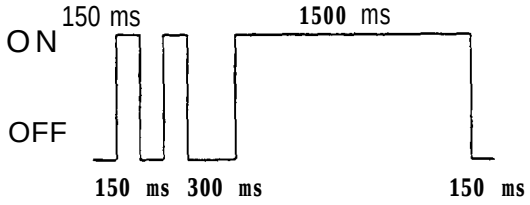
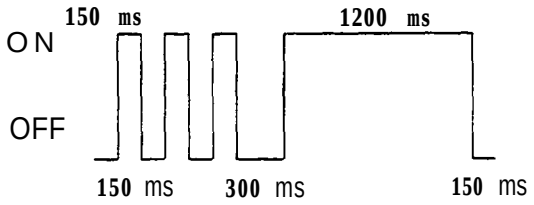
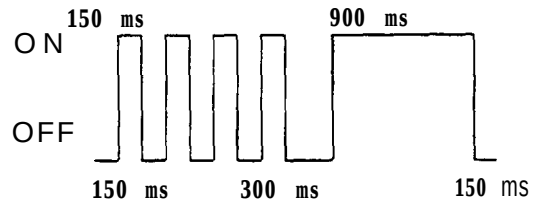
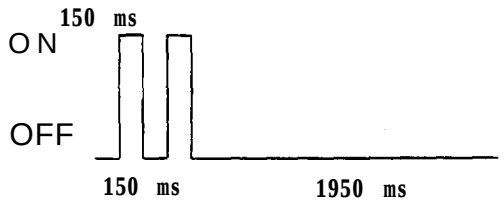
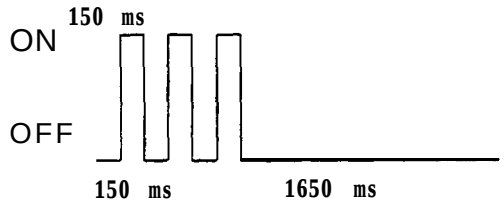


On: If this LED lights when the near-end LED is off, it means the printer cover is not closed.

If this LED lights the near-end LED is on, it means the printer went OFF-LINE after detecting a paper near-end.

Off: Normal mode.

Table 5-3. Error Display

Error	ON/OFF Timing Pattern	Recovery
RAM check error		Impossible to recover.
Transistor error		Impossible to recover.
Power supply, high voltage error		impossible to recover. (Power supply should be inspected.)
Power supply, low voltage error		impossible to recover, (Power supply should be inspected.)
Print head thermistor error		Impossible to recover.
Internal data processing error		Recovered by turning the power off and on.
Print head paper out error		Recovered by closing the cover after inserting paper.

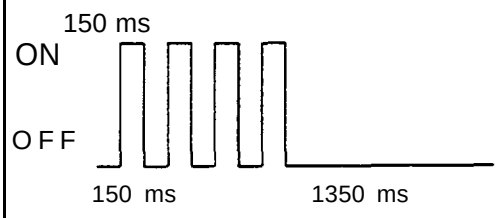
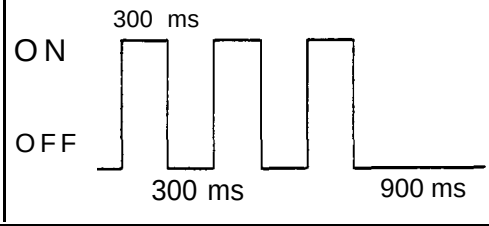
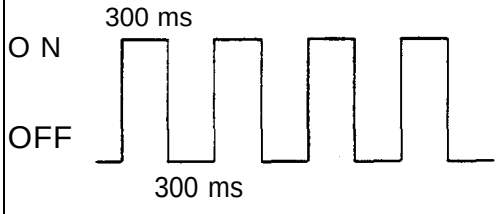
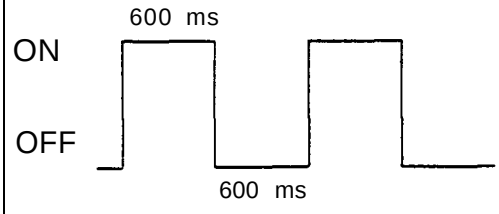
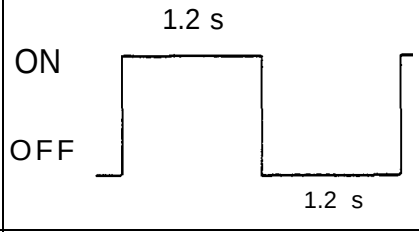
Error	ON/OFF Timing Pattern	Recovery
Print head overheating error		Recovers automatically when the print head temperature drops back down.
Label paper out error		Recovered by closing the printer cover after specified label paper is loaded. (*1)

Table 5-4. Command Standby State Display

Error	ON/OFF Timing Pattern	Recovery
Waiting for macro execution (*2)		Recovered after executing the macro by pressing the paper-feed switch.
Waiting state of label ejection command execution (*2)		Recovered by pressing the paper feed switch to execute label ejection command.
Self-test printing standby state (*3)		Recovered by pressing the paper feed switch to restart printing.

(* 1): The printer automatically detects label paper position and performs paper feeding.

(* 2): See 6-3 Commands for the macro command and the label ejection command.

(* 3): See 4-l Checking Operation with the Self Test for self test printing standby state.

5-5 Cleaning the Head

Cleaning the **head**

Clean the head according to the following procedure.

CAUTION:

. Do not clean the head immediately after printing; the head may be hot.

① Open the roll-paper cover, raise the auto-cutter and the head-open lever. If roll paper is loaded, remove it from the head area.

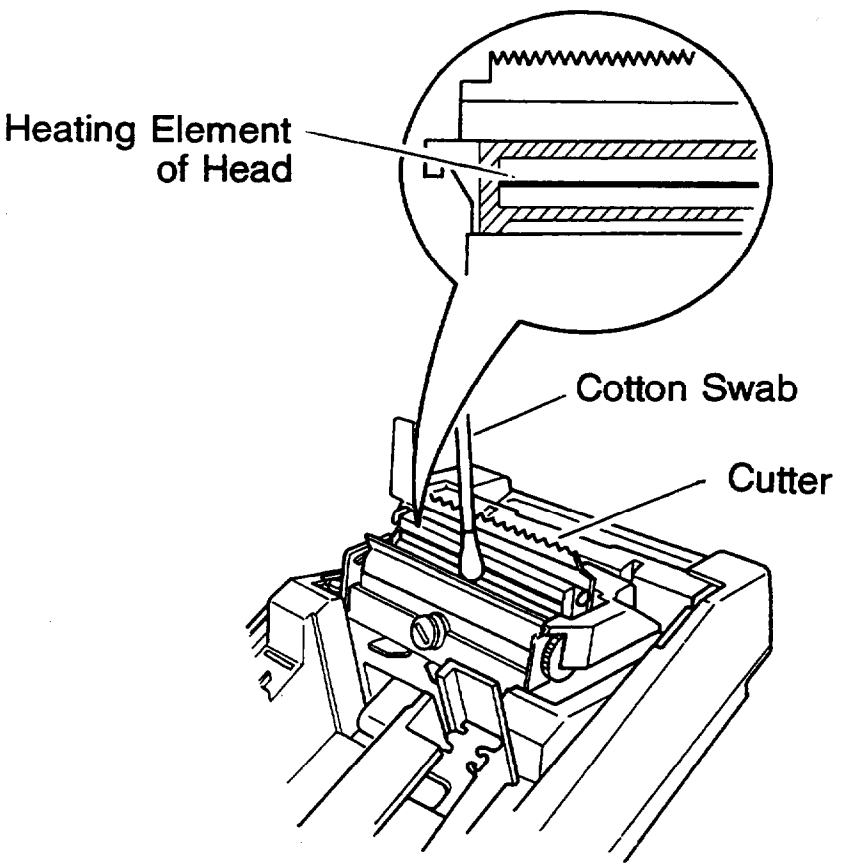
② Clean the heating element of the head with a cotton swab containing an alcohol solvent (ethanol, methanol, or IPA).

. Clean the cutter also with an alcohol solvent.

CAUTION:

. Never touch the head; oils on your skin can damage the head.

③ Push the head-open lever down. Reload roll paper and close the roll-paper cover. See 3-I.



5-6 The Cover-open Detector

The cover-open detector

This unit has an cover-open detector located inside the roll-paper cover.

- Data is not printed when the printer cover is open.
- Opening the cover sets the printer OFF-LINE; data cannot be received when the printer is OFF-LINE.
- Paper cannot be fed with the paper-feed switch when the roll-paper cover is open.
- Closing the cover sets the printer ON-LINE automatically.

NOTE:

The roll-paper cover cannot be closed unless the head-release lever **and** the head-open lever are down.

5-7 Removing Jammed Paper

Remove jammed paper according to the following steps.

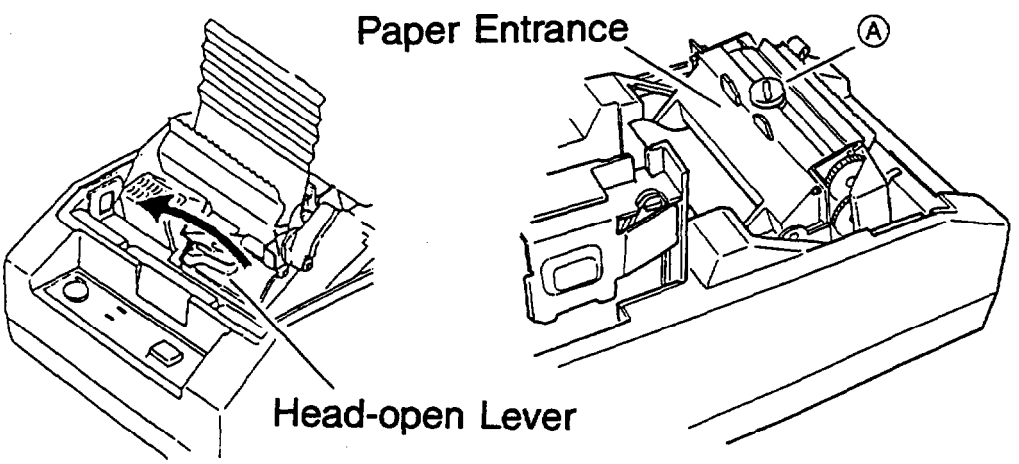
① Open the roll-paper cover and raise the head-open lever.

CAUTION:

- The print head is very hot immediately after printing.
  Always remove jammed paper after the print head has cooled.

② Or remove the screw Ⓐ and take the paper entrance away, instead of step①.

③Remove any jammed paper.



④ Push the head-open lever down. Reload roll paper and close the roll-paper cover. See 3-1① to ⑥.

Chapter 6 Software Control

6-1 Printer Control

Controlling the printer with commands

The printer is controlled by “commands” that can change the size of the characters, and perform other functions.

See the character code table.

There are two types of commands.

① One-byte commands

- **HT** Horizontal tab
- **LF** Print and line feed

② Several-byte commands

- **ESC SP** Set character right-side spacing
- **ESC 3 n** Set line spacing using minimum units

How to use this table.

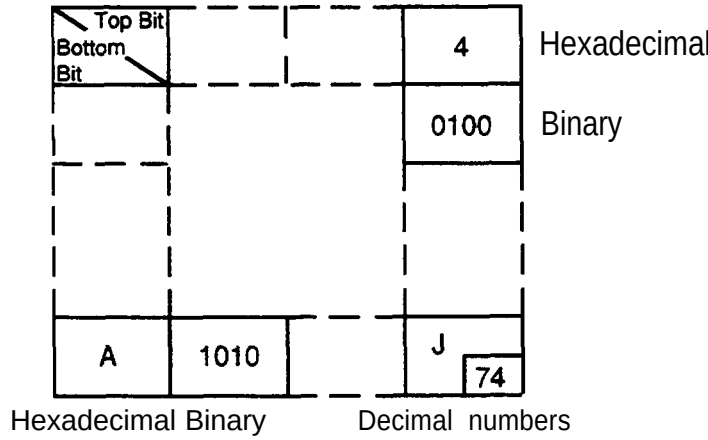
Horizontal by vertical hex

ie. 4A = J

< >H denotes hexadecimal

< > denotes decimal numbers

(Refer to APPENDIX D Character Code Tables)



6-2 Command Descriptions

Command descriptions

XXX Command

[Name]	The name of the command.
[Format]	The code sequence. In this description, < > H denotes hexadecimal numbers, < > denotes decimal numbers and < > B denotes binary numbers. [ ] *k* indicates the contents of the [ ] should be repeated *k* times.
[Range]	The allowable range for the arguments.
[Description]	Description of the command function.
[Notes]	(Included only when necessary.)
[Default]	The default values for the commands.
[Reference]	Related commands.
[Example]	Example of using the commands.

6-3 Commands

HT

[Name]	Horizontal tab
[Format]	<09> H
[Description]	Moves the print position to the next horizontal tab position. • This command is ignored unless the next horizontal tab position has been set.
[Notes]	• Horizontal tab positions are set using ESC D. • The default horizontal tab positions are at intervals of 8 characters (9th column, 17th, 25th ...) for Font A.
[Reference]	**ESC D**

LF

[Name] Print and line feed

[Format] <0A> H

[Description] Prints the data in the print buffer and performs 1 line feed based on the current line spacing.

- Sets the print starting position to the beginning of the line.

[Reference] ESC 2, ESC 3, 5-3 Miscellaneous Notes

FF

[Name] Print and position label to start printing

[Format] <0C> H

[Description] Prints the data in the print buffer and positions the next label for printing.

[Notes]

- This command is effective only when label printing mode is selected.
- This command will not work correctly after a label has been moved manually using the paper feed knob. Position the label using the paper feed switch or issue GS <.
- A FF or GS FF command must be sent after transmitting print data for one label.

[Reference] GS FF

ESC SP *n*

[Name] Set character right-side spacing

[Format] <1B> H <20> H <n>

[Range] 0 ≤ n ≤ 32

[Description] Sets the character right-side spacing in dot units (1/180 inch units).

[Notes]

- The character right-side spacing for double-width mode is twice the set value.

[Default] *n* = ***0***

ESC ! *n*

[Name] Set print mode

[Format] <1B> H <21> H <n>

[Range] 0 ≤ n ≤ 255

[Description] Sets a print mode.

• Each bit of *n* is used as follows:

Bit	Function	Value	
		0	1
0	Character font	Font A	Font B
1	Undefined		
2	Undefined		
3	Emphasized	Canceled	Set
4	Double-height	Canceled	Set
5	Double-width	Canceled	Set
6	Undefined		
7	Underline	Canceled	Set

[Note]
- When both double-height mode and double-width mode are set, quadruple characters are printed.
- Underlines can be printed for all characters, but not for the space skipped by an **HT.**
- Underlines cannot be printed for 90° rotated characters.
- The thickness of an underline is set by **ESC** - (default value = 1.)

[Default] *n* = 0

[Reference] **ESC E, ESC F, ESC -**

ESC $ *n1 n2*

[Name] Set absolute position

[Format] <1B> H <24> H <n1> <n2>

[Range] 0 ≤ n1 ≤ 255

0 ≤ *n2* ≤ 1

[Description] Sets the print starting position to the specified number of dots (1/180 inch units) from the beginning of the line.

- Divide the number of dots by 256. The integer answer is *n2* and the remainder is *n1.* Therefore, the print starting position becomes *n1* + *n2 X* 256 from the beginning of the line.

[Notes]
- Any specification that exceeds the printable area is ignored.

[Default] Not defined

[Reference] **ESC ¥**

ESC % *n*

[Name] Select/cancels user-defined character set.

[Format] <1B> H <25> H <n>

[Range] 0 ≤ *n* ≤ 255

[Description] Selects or cancels the user-defined character set.

- Only the lowest bit of n is valid.

  When *n* = < ******* 1>B, the user-defined character set is selected.

  When *n* = < ******* 0>B, the user-defined character set is canceled (and the internal character set is selected.)

[Notes]
- The user-defined characters and a down-loaded bit image can not be defined at the same time.

[Default] *n = 0*

[Reference] **ESC &**

ESC *& s n m [a[p] s Xa]m-n+l*

[Name] Define user-defined characters

[Format] <1B>H<26>H<s><n><m>[<a><p1><p2>---<psXa>]m-n+1

[Range] s = 3

32 ≤n ≤ m ≤ 126

0 ≤ a ≤ 12 (Font A)

0 ≤ a ≤ 9 (Font B)

0 ≤ p1 ... psXa ≤ 255

[Description] Defines user-defined characters for ANK character codes.

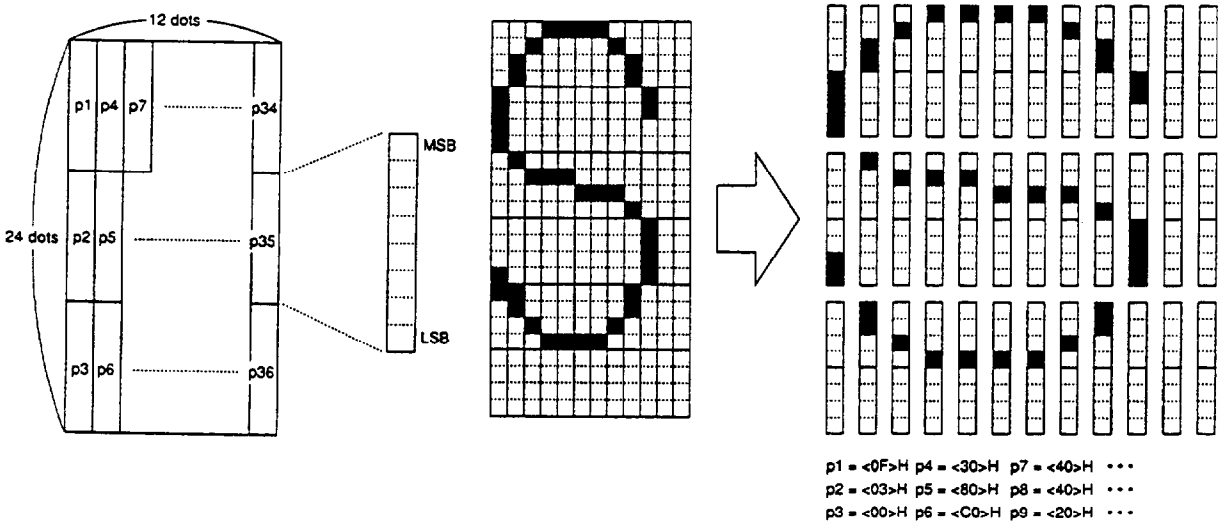
- "s" specifies the number of bytes in the vertical direction.
- "n" specifies the beginning ASCII code for the definition and "m" the final code. If only one character is defined, use *n = m.*
- The allowable character code range is from ASCII code <20> H to <7E> H and the maximum number of characters is 95.
- "a" specifies the number of dots in the horizontal direction.
- "p" is the dot data for the characters. The pattern for a dots is in the horizontal direction from the left side. The remaining dot pattern on the right side is space. The amount of data to be defined is s X a.
- After user-defined characters are defined once, they are available until another definition is made, until **ESC** @ is executed, or until the printer is turned off.

[Notes]
- The user-defined characters and a down-loaded bit image cannot be defined at the same time. If this command is executed, the down-loaded bit image will be cleared.

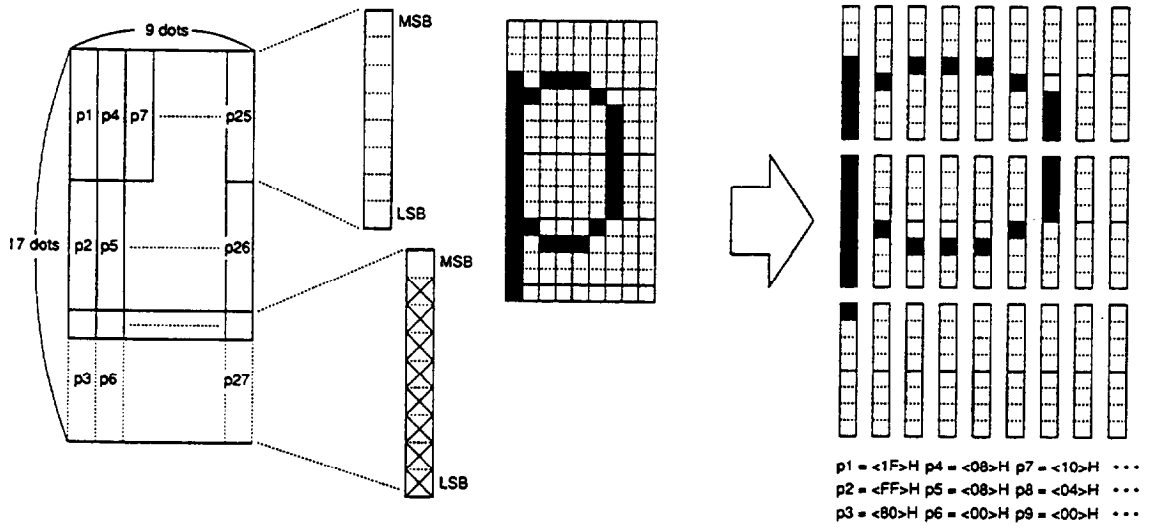
[Default] The same as the internal character set.

[Reference] ESC %

[Example] • Font A is selected:



• Font B is selected.



ESC * *m n1 n2 [d] k*

[Name] Set bit image mode

[Format] <1B>H<2A>H<m><n1><n2>[<d>]k

[Range] m = *0, 1, 32, 33*

$O \leq n1 \leq 255$

$O \leq n2 \leq 3$

$O \leq d \leq 255$

$k = n1 + 256 X n2 (m = 0, 1)$

$k = (n7 + 256 X n2) X 3 (m = 32, 33)$

[Description] Sets the bit-image mode using *m* and the number of dots using *n1* and *n2.*

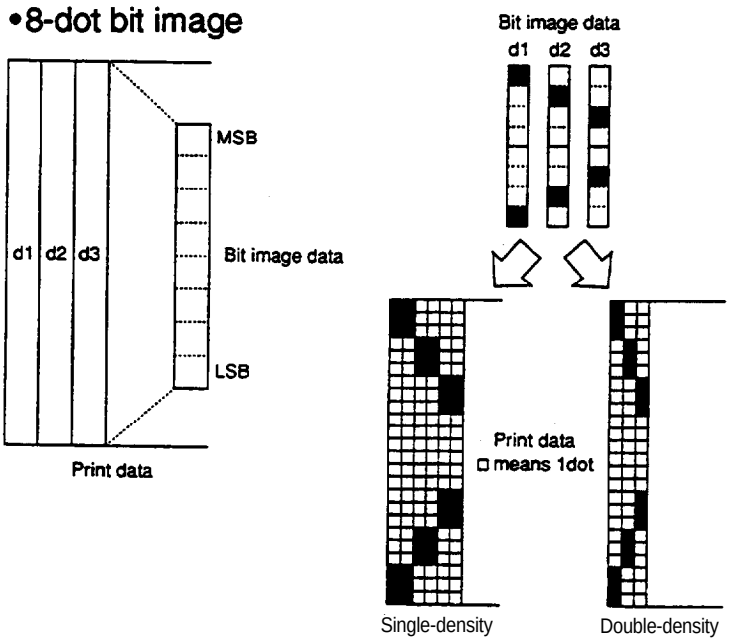
- Divide the number of dots to be printed by 256. The integer answer is *n2* and the remainder is *n1.* Therefore, the number of dots in the horizontal direction is: *n1 + 256 X n2.*
- If the bit-image data input exceeds the number of dots to be printed on a line, the excess data is ignored.
- "d" indicates the bit image data. Set a corresponding bit to 1 to print a dot, otherwise set it to 0.

The bit image modes selectable by *m* are as follows:

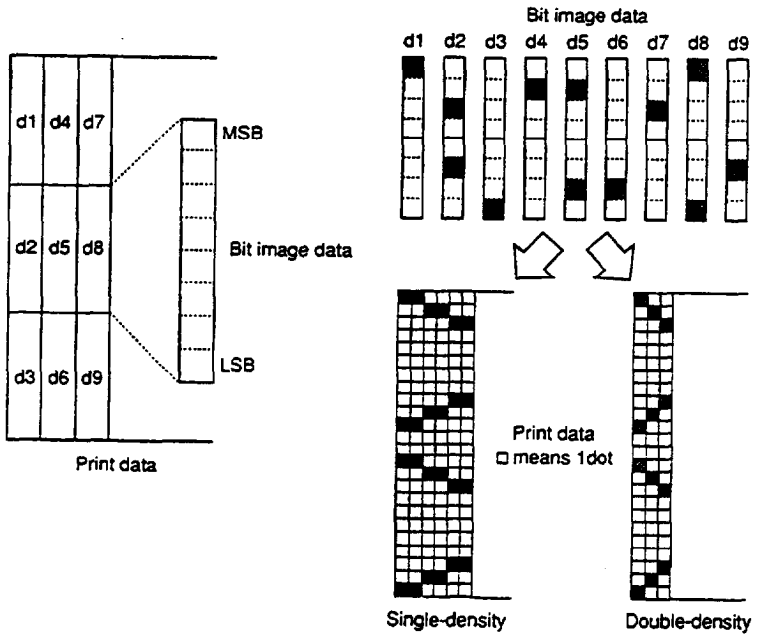
m	*Mode*	Vertical Direction		Horizontal Direction		
		Number of dots	Dot Density	Density	Maximum Number of Dots	
					Normal	Label
0	8-dot single-density	8	60 DPI	90 DPI	192	184
1	8-dot double-density	8	80 DPI	180 DPI	384	368
32	24-dot single-density	24	180 DPI	90 DPI	192	184
33	24-dot double-density	24	180 DPI	180 DPI	384	368

[Notes]

- If *m* is out of range, n1 and the data following will be processed as normal data.
- After printing a bit image, the printer returns to normal data processing mode.
- The relationship between the image data and the dots to be printed is as follows:



- 24-dot bit image



ESC 2

[Name] Set 1/6 inch line spacing
[Format] <1B>H<32>H
[Description] Sets the line spacing to 1/6 of an inch.

ESC 3 n

[Name] Set line spacing using minimum units
[Format] <1B>H<33>H<n>
[Range] 0 ≤ n≤ 255
[Description] Sets the line spacing to *n/360* of an inch.
[Default] *n* = 60 (1/6 inch)
[Reference] 5-3 Miscellaneous Notes

ESC = n

[Name] Select device
[Format] <1B>H<3D>H<n>
[Range] *0 ≤ n≤ 255*
[Description] Selects a device to receive data from the host computer.

. If the printer is not selected, the TM-L60 ignores all received data (the data is lost) until it is selected by this command.

- Each bit of *n* is used as follows:

Bit	Device	Value	
		0	1
0	Printer	Invalid	Valid
1	Undefined		
2	Undefined		
3	Undefined		
4	Undefined		
5	Undefined		
6	Undefined		
7	Undefined		

[Notes]
- Even when the printer is not selected, it may enter the BUSY state due to printer operation.

[Default] n = 1

ESC @

[Name] Initialize printer

[Format] <1B>H<40>H

[Description] Clears the data in the print buffer and resets the printer mode (to the same state as when the power is turned on).

[Note]
- The DIP switches are not read again.
- The data in the receive buffer is not cleared.
- Adjustment amount of the label starting position using < GS A > command is not cleared.

ESC D [n]kNUL

[Name] Set horizontal tab positions

[Format] <1B>H<44>H[<n>]k<00>H

[Range] $1 \leq n \leq 255$

$0 \leq k \leq 32$

[Description] Sets horizontal tab positions.
- "n" specifies the column number from beginning of the line for setting a horizontal tab position.

  [n= (Column number) - 1]. For example, when a tab is to be set at column 9, *n = 8.*
- "k" indicates the total number of horizontal tab positions to be Set.

. A horizontal tab position is stored as the absolute value of (character width X *n*) measured from the beginning of the line. The character width includes the character right-side spacing, and double-width characters should be set with twice the width of normal characters.

. Up to 32 tab positions can be set. Data which exceeds 32 tab positions will be ignored.

. Set <n> k in ascending order and place a NUL code <00> H at the end.

. ESC D NUL clears all tabs. Any HT commands received after clearing will be ignored.

[Notes]

. When a data value <*n*> *k* is less than or equal to the preceding value <n> k-1, the setting is considered to be finished. In this case, the following data is processed as normal data.

. When a data value <*n*> *k* exceeds the number of characters printable on one line, the setting is considered to be finished. In this case, the following data is processed as normal data.

. Horizontal tab positions remain unchanged if the character widths are changed after setting the horizontal tab positions.

[Default] The default tab positions are at interval of 8 characters (9th column, 17th, 25th, ...) for Font A.

[Reference] HT

ESC E *n*

[Name] Select/cancel emphasized mode

[Format] <1B>H<45>H<n>

[Range] *0 ≤ n ≤ 255*

[Description] Prints or cancels the emphasized characters.

. This command is available for all character types.

. When emphasized mode is selected, one dot is added to the right side of the dots in normal mode.

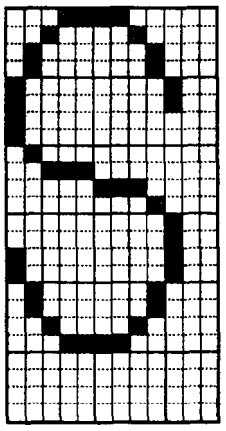
. Only the lowest bit of *n* is valid.

When n = < * * * * * * * 1>B, the emphasized characters are selected.

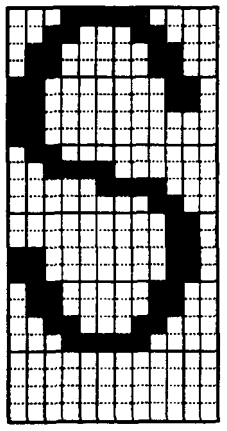
When n = <* * * * * * * 0>B, the emphasized characters are canceled.

[Reference] ESC !

[Example]



Normal character



Emphasized character

ESC G n

[Name] Select/cancel double-strike mode

[Format] <1B>H<47>H<n>

[Range] 0 ≤ n≤ 255

[Description] Selects or cancels double-strike mode.

- This command is available for all character types.
- Only the lowest bit of *n* is valid.

When *n* = < * * * * * * * 1>B, the double-strike mode is s e - lected.

When n =<* * * * * * * 0>B, the double-strike mode is canceled.

[Notes]
- In this printer, double-strike mode has the same function as emphasized mode.

[Reference] ESC E, ESC H

ESC J n

[Name] Print and feed paper using minimum units

[Format] <1B>H<4A>H<n>

[Range] 0 ≤ n≤ 255

[Description] Prints the data in the print buffer and feeds the paper n/360 inches.

- The predetermined line spacing remains unchanged.
- Sets the print starting position to the beginning of the line.
- When the paper-feed amount which specifies over a range of the label paper length is set, the paper is fed to the beginning print position of the next label paper.

[Default]
- Not defined.

[Reference] 5-3 Miscellaneous Notes

ESC R n

[Name] Select international character set

[Format] <1B>H<52>H<n>

[Range] 0 ≤ n ≤ 10

[Description] *n* selects an international character set from the following table.

n	Character Set
0	U.S.A.
1	France
2	Germany
3	U.K.
4	Denmark I
5	Sweden
6	Italy
7	Spain
8	Japan
9	Norway
10	Denmark II

[Default] *n = 0*

[Reference] APPENDIX D Character Code Tables

ESC V n

[Name] Set/cancel 90° cw rotated characters

[Format] <1B>H<56>H<n>

[Range] 0 ≤ n ≤ 1

[Description] Sets or cancels the 90° cw rotation of characters.

- When *n* = 1, 90° cw rotated characters are set.
- When *n* = 0, 90° cw rotated characters are canceled.

[Default] *n = 0*

ESC ¥ *n1 n2*

[Name] Set relative position

[Format] <1B>H<5C>H<nl><n2>

[Range] **0 ≤ n1 ≤ 255**

0 ≤ n2 ≤ 255

[Description] Moves the print starting position to the specified number of dots (1/180 inch units) from the current position.

- A positive number specifies movement to the right, and a negative number specifies movement to the left.
- Negative numbers are specified using the supplement of N: **-N = 65536 - N**
- Divide the number of dots by 256. The integer answer is *n2* and the remainder is *nl.*

[Notes]
- Any specification exceeding the printable area will be ignored.

[Default] Not defined

[Reference] **ESC $**

ESC - n

[Name Turn underline mode on/off

[Format] <1B>H<2D>H<n>

[Range] *0 ≤ n ≤ 2*

[Description] Turns underline mode on/off.

. When *n* = 0, underline mode is turned off.
- When *n* = 1, underline mode (1 -dot line thickness) is selected.
- When *n* = 2, underline mode (2-dot line thickness) is selected.

[Notes]
- Underlines can be printed for all characters, but not for the space skipped by an HT.
- Underlines cannot be printed for *90°* cw rotated characters.

[Default] **ESC !**

ESC a n

[Name] Align positions

[Format] <1B>H<61>H<n>

[Range] **0 ≤ *n* ≤ 2**

[Description] Aligns all the data in one line to the specified position.

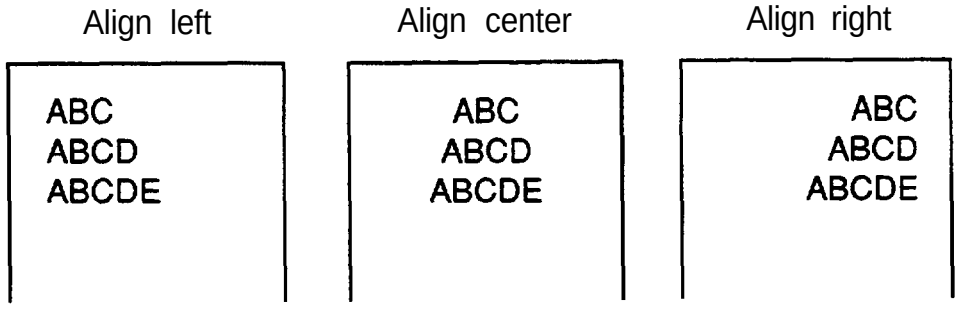
• *n* specifies the alignment as follows:

n	Position
0	Align left
1	Align center
2	Align right

[Notes] • Valid only when input at the beginning of a line.

[Default] n = 0

[Example]



ESC c 4 n

[Name] Select paper detectors to stop printing

[Format] <1B>H<63>H<34>H<n>

[Range] $0 \le n \le 255$

[Description] Selects the paper detectors used to stop printing.

• Each bit of n is used as follows:

Bit	Function	Value	
		0	1
0	Journal near-end	Invalid	Valid
1	Undefined		
2	Undefined		
3	Undefined		
4	Undefined		
5	Undefined		
6	Undefined		
7	Undefined		

- In the TM-L60, only the journal near-end detector can be selected and only the lowest bit of *n* is valid.

[Notes]
- When a paper-end is detected by the journal detector, the printer goes OFF-LINE after printing stops.
- If a paper-end is detected by paper detectors when thermal label paper is selected, the printer goes OFF-LINE after printing data for one label.

[Default] *n = 0*

ESC c 5 n

[Name] Enable/disable panel switches

[Format] <1B>H<63>H<35>H<n>

[Range] **0 ≤ *n* ≤ 255**

[Description] Enables or disables the paper-feed switch.
- Only the lowest bit of *n* is valid.
  When *n* = <* * * * * * * 0>B, the paper feed switch is enabled.
  When *n* = < * * * * * * * 1>B, the paper feed switch is disabled.

[Notes]
- If the panel switches are disabled by this command, the paper feed switch is disabled. Therefore, paper cannot be fed with the paper feed switch.

[Default] *n = 0*

ESC d n

[Name] Print and feed paper *n* lines

[Format] <1B>H<64>H<n>

[Range] **0 ≤ *n* ≤ 255**

[Description] Prints the data in the print buffer and performs *n* lines feeds.
- Sets the print starting position to the beginning of the line.
- The predetermined line spacing remains unchanged.

[Default] Not defined.

[Reference] 5-3 Miscellaneous Notes

ESC p m n1 n2

[Name] Generate pulse

[Format] <1B>H<70>H<m><n1><n2>

[Range] *m = 0*, 1

0 < *n1* ≤ *n2* ≤ 255

[Description] The pulse defined by *nl* and *n2* is output on connector pin *m.*

- *m* is specified as follows:

m	Connector pin
0	Drawer kick-out connector pin 2
1	Drawer kick-out connector pin 5

- ON time is *nl X 2* ms and OFF time is *n2 X 2* ms.
- The circuit on the user side should be designed so that the drawer drive duty is as shown below.

$$\frac{\text{ON time}}{(\text{ON time} + \text{OFF time})} \leq 0.2$$

It is recommended that *n2* be four times as much as *nl* or more.

[Notes] - If *m* is out of range, the printer reads *n1 and n2* but does not output a pulse.

[Default] Neither m, n1, nor *n2* is defined.

ESC t n

[Name] Select character code table

[Format] <1B>H<74>H<n>

[Range] $0 \leq n \leq 1$

[Description] Selects page n from the character code table.

[Default] *n = 0*

[Reference] APPENDIX D Character Code Tables

ESC u *n*

[Name] Transmit printer status

[Format] <1B>H<75>H<n>

[Range] *n = 0*

[Description] Transmit the current status of connector pin.

- *n* is specified as follows:

n	Connector pin
0	Drawer kick-out connector pin 3

[Notes]

- The transmitted status is only one byte and the data is as shown in the following table.
- If nothing is connected with Drawer kick-out connector, bit 0 of *n* is always “1".
- When DTR/DSR control is selected, one byte is transmitted after confirming that the host computer is ready to receive data (DSR is SPACE).
- When XON/XOFF control is selected, one byte is transmitted without checking the DSR signal.
- When DTR/DSR control is selected, if the host computer is not ready to receive data (DSR is MARK), the printer waits until it becomes ready.

Bit	Function	Value	
		0	1
0	Pin 3 level	"LOW"	"HIGH"
1	Undefined		
2	Undefined		
3	Undefined		
4	Unused	Fixed to 0	—
5	Undefined		
6	Undefined		
7	Undefined		

ESC v

[Name] Transmit printer status

[Format] <1B>H<76>H

[Description] The current printer status is transmitted to the host computer.

[Notes]

- The transmitted status is only one byte and the data is as shown in the following table.
- When DTR/DSR control is selected, one byte is transmitted after confirming that the host computer is ready to receive data (DSR is SPACE).
- When XON/XOFF control is selected, one byte is transmitted without checking the DSR signal.
- When DTR/DSR control is selected, if the host computer is not ready to receive data (DSR is MARK), the printer waits until it becomes ready.

Bit	Function	Value	
		0	1
0	Journal near-end	Paper is present	Paper is out
1	Undefined		
2	Unused	Fixed to 0	
3	Undefined		
4	Unused	Fixed to 0	
5	Undefined		
6	Undefined		
7	Undefined		

ESC {n

[Name] Set/cancel upside-down character printing

[Format] <1B>H<7B>H<n>

[Range] $0 \leq n \leq 255$

[Description] Sets or cancels upside-down character printing.

- Only the lowest bit of *n* is valid.

  When *n* = < * * * * * * * 1>B, upside-down character printing is set.

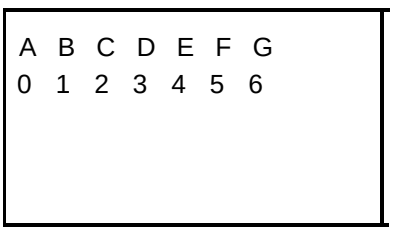
  When *n* = <* * * * * * * 0>B, upside-down character printing is canceled.

[Notes]

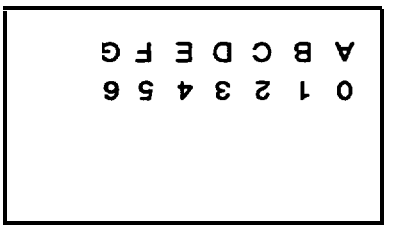
- The upside-down character specification rotates normal characters on the line by 180° and prints them.
- Valid only when input at the beginning of a line.

[Default] *n* = 0

[Example] When upside-down character printing is canceled.



When upside-down character printing is set.



Paper-feed direction

GS FF

[Name] Print and eject label

[Format] <1D>H<OC>H

[Description] Prints the data in the print buffer on the label and ejects it.

- Ejects the label until it can be peeled off by fingers.
- After ejection, an error LED is lit and waits until the paper feed switch is pressed.
- When the paper feed switch is pressed, it is assumed that the label has been peeled off, and then paper feeding is performed in the reverse direction to set the next label at the starting position for printing.

[Notes]

- After checking the error LED is lit, remove the label and then press the paper feed switch once.
- This command is effective only when “label print” is selected.
- A FF or GS FF command must be sent after transmitting print data for one label.

[Reference] FF

[Name] Define down-loaded bit image

[Format] <1D>H<2A>H<n1><n2>[<d]n1Xn2X8

[Range] $1 \leq n1 \leq 255$

$1 \leq n2 \leq 48$

$n1 \times n2 \leq 131$

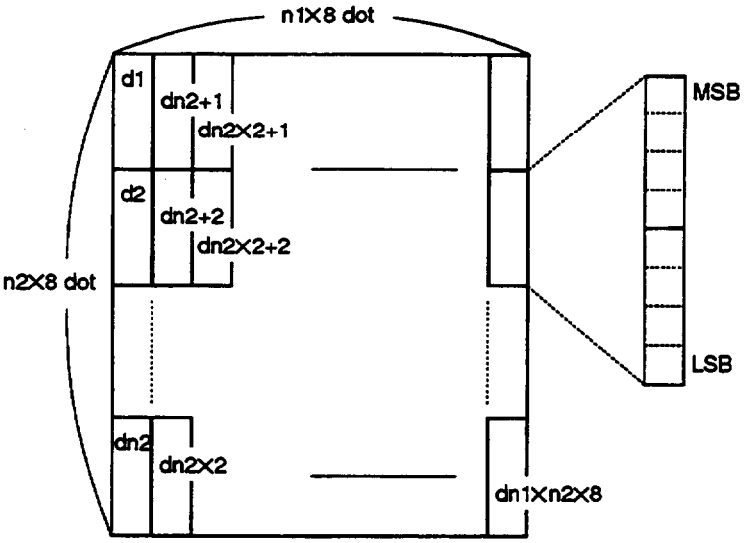
[Description] Defines a down-loaded bit image with the number of dots specified by *nl* and *n2.*

- The number of dots in the horizontal direction is *n* 1 X 8, and in the vertical direction is *n2 X 8.*
- “d" specifies the bit image data.
- After a down-loaded bit image is defined once, it is available until another definition is made, until ESC @ is executed, until ESC & is executed, or the printer is turned off.

[Notes]

- The relationship between the bit image data and the transmitted dots is as follows:
- The user-defined characters and a down-loaded bit image cannot be defined at the same time. If this command is executed, the user-defined characters will be cleared.

[Reference] GS/



GS/m

[Name] Print down-loaded bit image

[Format] <1D>H<2F>H<m>

[Range] $0 \le m \le 3$

[Description] Prints a down-loaded bit image using the mode specified by *m*.

- *m* selects the print mode from the following table.

m	Mode	Vertical Direction Dot Density	Horizontal Direction Dot Density
0	Normal mode	180 DPI	180 DPI
1	Double-width mode	180 DPI	90 DPI
2	Double-height mode	90 DPI	180 DPI
3	Quadruple mode	90 DPI	90 DPI

[Notes]

- If any data is present in the print buffer, this command is ignored.
- If a down-loaded bit image has not been defined, this command is ignored.
- If the down-loaded bit image data exceeds one line, the exceeds image data will not be printed.
- The user-defined characters and a down-loaded bit image cannot be defined at the same time.
- If the down-loaded bit image data exceeds label paper, it is printed on the next label.

[Default] Not defined.

[Reference] G S *

GS :

[Name] Set starting/ending of macro definition

[Format] <1D>H<3A>H

[Description] Specifies the starting or ending of the macro definition.

If this command is received while defining the macro, it ends the definition.

[Notes]
- If the macro range exceeds 2048 bytes, the exceeds data is not defined.
- Even if the ESC @0 command (initialize the printer) is performed, the macro definition is not cleared. Therefore, it is possible to include ESC @ in the macro definition.
- Normal printing operation is possible while defining the macro.

[Default] Macro is not defined.

[Reference] GS

GS <

[Name] Initialize printer mechanism

[Format] <1D>H<3C>H

[Description] Positions the label for printing.

[Notes]
- This command takes effect on the third and following labels. This is because the difference in detection level between label and base sheet is determined using the first label on a sheet and the label length and distance between labels using the second label.
- Because the maximum label length is 4 inches, any labels exceeding 4 inches in length will cause error.
- The contents set by commands will not change.

GS A m n

[Name] Adjust label paper position to start printing

[Format] <1D>H<41>H<m><n>

[Range] 0 £ *m* £ 255

$0 \leq n \leq 255$

[Description] Sets the label position in terms of adjustment amount against default position.

- *"m"* indicates adjusting direction.

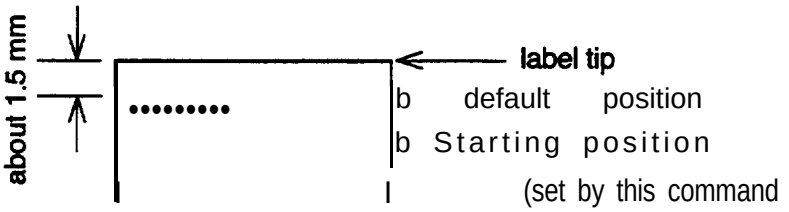
  When *m* = < * * * * * * 0>B, positioning is adjusted in the normal direction.

  When *m* = <* * * * * * 0>B, positioning is adjusted in the reverse direction.
- "n" means the adjustment amount. It is n/360 inches.

[Notes]

- The setting beyond the tip of a label is not available. If the adjustment amount that goes beyond the label tip is specified, the starting position will be set to the label tip.

  Thus, any adjustment amount that will cause the printing width on a label to be narrower than 255/360 inches (see the figure below) cannot be set. Specifying such an amount will cause the starting position to be set at 255/360 inches.
- The default setting for the starting position is about 1.5 mm be low the label tip.
- This command is effective only when 'label print" is selected.
- Make sure to set the starting position by considering the alignment of the starting position will be split out approx. ±1 mm be cause the paper is bent.
- This command is valid only after setting for the starting position by executing commands **(FF,** GS **FF,** GS <), pressing the PAPER FEED switch or turning the power on.
- When position is adjusted in the reverse direction, the position of the first label may shift approx. ±1 mm. To prevent this, feed the first label through the machine without printing on it.



[Default] None

[Reference] **FF, GS FF**

GS C 0 m n

[Name] Select counter print mode

[Format] <1D>H<43>H<30>H<m><n>

[Range] *0 £ m £ 5*

0 £ n £ 2

[Description] Selects print mode for the serial number counter.

- *"m"* indicates the number of digits to be printed.

  m = 0: Prints the actual digits indicated by numerical value. In this case *"n"* has no meaning.

m = 1 to 5: The maximum number of digits to be printed. When the numerical value of the counter value is larger than that specified by this command, prints lower *"m"* digits of the counter value.

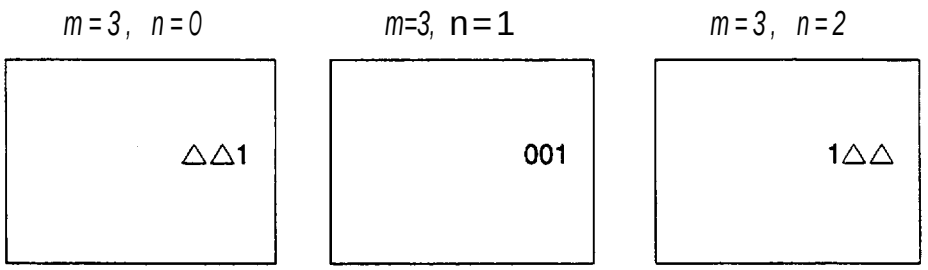
. *"n"* specifies the printing position within the entire range of printed digits.

n = 0: Prints with right adjusted. The empty specified digits will be filled with spaces.

n =1 : Prints with right adjusted. The empty specified digits will be filled with is.

n = 2: Prints with left adjusted. The empty specified digits will be filled with spaces.

[Example]



Δ indicates space

[Notes] . If *"m"* or *"n"* is set outside of the defined range, that setting has no effect.

[Default] *m = 0*

[Reference] **GS Cl, GS C2, GS c, GS C;**

GS C1 *n1 n2 n3 n4 n5 n6*

[Name] Select count mode (A)

[Format] <1D>H<43>H<31>H<n1><n2><n3><n4><n5><n6><

[Range] *0 £ n1 £ 255*

0 £ n2 £ 255

0 £ n3 £ 255

0 £ n4 £ 255,

0 £ n5 £ 255

0 £ n6 £ 255

[Description] Selects count mode for the serial number counter.

With count-up

. Counts up if *n1 + n2x 256* < *n3* + *n4* x 256, *n5* ¹ *0,* and n6 ≠ 0.

. n1 + *n2* x 256 means the minimum counter value and *n3 + n4 x* 256 the maximum counter value.

With count-down

- Counts down n1 + n2 x 256 > n3 + n4 x 256, n5 ≠ 0, and n6 ≠ 0.
- *n1 + n2 x* 256 means the maximum counter value and *n3 + n4 x* 256 the minimum counter value.

To stop counting

- Stops counting if *n1 + n2 x 256 = n3 + n4 x 256, n5 = 0,* or *n6 = 0.*
- *n5* indicates the stepping amount when counting up or down.
- *n6* indicates repetition number with the counter value being fixed.

[Notes]

- When this command is issued, the inner counter that indicates the repetition number specified by *n6* will be cleared.

With count-up

- If counting up reaches a value exceeding the maximum, it is resumed with the minimum value.

With count-down

- If counting down reaches a value less than the minimum, it is resumed with the maximum.

[Default] n1 + n2 x 256 = 1, n3 + n4 x 256 = 65535, n5 = 1, n6 = 1

[Reference] GS CO, GS C2, GS c, GS C;

GS C2 n1 n2

[Name] Set counter

[Format] <1D>H<43>H<32>H<n1><n2>

[Range] *0 £ n1 £ 255*

0 £ n2 £ 255

[Description] Sets the value of the serial number counter.

- n1 + *n2* x 256 is the counter value.

[Notes]

- When this command is issued, the inner counter that counts repetition number with the counter value fixed will be cleared.

With counting up

- If the counter value set by this command goes out of the counter operation range set by GS Cl or GS C;, it will be forced to convert to the minimum value by GS c.

With counting down

- If the counter value set by this command goes out of the counter operation range set by GS Cl or GS C;, it will be forced to convert to the maximum value by GS c.

[Default] *n1 + n2 x 256* = 1

[Reference] GS CO, GS Cl, GS c, GS C;

GSC; N1; N2; N3; N4; N5;

[Name] Select count mode (B)

[Format] <1D>H<43>H<3B>H<N1><3B>H<N2><3B>H<N3><3B>H<N4><3B>H<N5><3B>H

[Range] 0 ≤ N1 ≤ 65535

0 ≤ N2 ≤ 65535

0 ≤ N3 ≤ 255

0 ≤ N4 ≤ 255

0 ≤ N5 ≤ 65535

[Description] Select count mode of the serial number counter and specifies the starting value of the counter.

With counting up

- Counts up if N1<N2, N3 ≠ 0, and N4 ≠ 0.
- N1 means the minimum value of the counter, and N2 the maximum value.

With counting down

- Counts down if N1>N2, N3 # 0, and N4 ≠ 0.
- N1 means the maximum value of the counter, and N2 the minimum value.

To *stop counting*

- Stops counting when N1 = N2, N3 = 0, or N4 = 0.
- N3 indicates stepping amount while counting up or down.
- N4 indicates repetition number with the counter value fixed.
- N5 indicates the counter value.

[Notes]

- When this command is issued, the inner counter that counts the repetition number with counter value fixed will be cleared.
- N7 to N5 can be omitted. If omitted, those parameter values will be kept unchanged.
- N7 to N5 cannot contain characters except O-9.
- If incorrect syntax is used, the corresponding parameter setting will have no effect and the data after that will be processed as normal data.

With counting up

- If the counting up reaches a value exceeding the maximum, it will be resumed with the minimum.

. If the counter value set by N5 goes out of the counter operation range, it will be forced to convert to the minimum by GS c.

With counting down

. If the counting down reaches the value less than the minimum, it will be resumed with the maximum.

. If the counter value set by N5 goes out of the counter operation range, it will be forced to convert to the maximum by G3 c.

[Default] N1 = 1, N2 = 65535, N3 = 1, N5 =1

[Reference] GS CO, GS Cl, GS C2, GS c

GS H n

[Name] Select printing position of HRI characters

[Format] <1D>H<48>H<n>

[Range] *O £ n £ 3*

[Description] Selects the printing position of HRI characters when printing a bar code.

. *n* selects the printing position from the following table.

n	Printing position
0	Not printed
1	Above the bar code
2	Below the bar code
3	Both above and below the bar code

. HRI means Human Readable Interpretation.

[Notes] . HRI characters are printed using the font specified by GS f.

[Default] *n* = 0

[Reference] GS f

GS c

[Name] Print counter

[Format] <1D>H<63>H

[Description] Prints the serial counter.

. Sets the current counter value in the print buffer as a print data (character string) and then counts up or down the counter based on the count mode set.

[Notes]

- The syntax to be used when setting data in the print buffer should be based upon GS CO.
- For count mode, see GS Cl or GS C;.

With counting up

- If the counter value set by this command goes out of the counter operation range set by GS Cl or GS C;, it will be forced to convert to the minimum by GS c.

With counting down

- If the counter value set by this command goes out of the counter operation range set by GS C1 or GS C;, it will be forced to convert to the maximum by GS c.

GS f n

[Name] Select font for HRI characters.

[Format] <1D>H<66>H<n>

[Range] n = 0, 1

[Description] Selects a font for the HRI characters used when printing a bar code.

- *n* selects the font from the following table.

n	Font
0	Font A
1	Font B

- HRI means Human Readable Interpretation.

[Notes]

- HRI characters are printed at the position specified by GS H.

[Default] *n = 0*

[Reference] **GSH**

GS h n

[Name] Select height of bar code

[Format] <1D>H<68>H<n>

[Range] 1 £ *n* ≤ *255*

[Description] Selects the height of the bar code.

- *n* specifies the number of dots in the vertical direction.

[Default] *n*= 162

GS k *n* [d] k NUL

[Name] Print bar code

[Format] <1D>H<6B>H<n> [<d>]k<00>H

[Range] *0 £ n £ 6*

[Description] Selects a bar code system and prints the bar code.

- Sets the print starting position to the beginning of the line.
- *n* selects the bar code system from the following table.
- "d" indicates the characters to be printed and "k" indicates the number of characters to be printed.

n	Bar code system
0	UPC-A
1	UPC-E
2	JAN13 (EAN)
3	JAN8 (EAN)
4	CODE39
5	ITF
6	CODABAR

[Notes]

- When data is present in the print buffer, this command is ignored.
- Performs the paper feeding required for printing the bar code, regardless of the current line spacing.
- In each bar code system, if a character code "d" cannot be printed, the printer prints the processed data and the following data is treated as normal data.
- When a bar code system with a fixed number of printing characters is selected, the number of characters "K" should be agreed with that number.
- If the horizontal size exceeds one line, the excess data is not printed.
- If data exceeds label paper, it is printed on the next label.

[Default] *n = 0*

GS w n

[Name] Select horizontal size (magnification) of bar code.

[Code] <1D>H<77>H<n>

[Range] *2 £ n £ 4*

[Description] Selects the horizontal size of the bar code.

[Default] *n = 3*

GS ^ n1 n2 n3

[Name] Execute macro

[Format] <1D>H<5E>H<n1><n2><n3>

[Range] 0 ≤ n1 ≤ 255

0 ≤ n2 ≤ 255

0 ≤ n3 ≤ l

[Description] Executes a macro.

n1: Specifies the number of times to execute the macro.

n2: Specifies the waiting time for executing the macro.

n2 x 100 msec waiting time is required for one execution.

n3: Specifies the macro executing mode.

- *n3* = 0 Continuous macro execution.

  Executes *n1* times continuously at the interval specified by *n2.*

- *n3* = 1 Executes the macro with the paper feed switch.

  After waiting the period specified by *n2,* the error LED blinks and the printer waits for the paper feed switch to be pressed. After the paper feed switch is pressed, the printer executes the macro once.

  The printer repeats this operation *n1* times.

[Notes]

- If this command is received while defining the macro, the macro definition is aborted, and the definition is cleared.
- If the macro is not defined or if *n1* is 0, nothing is executed.
- Paper cannot be fed with the paper feed switch while executing the macro when *n3* is 1.

[Default] Not defined.

[Reference] GS :

6-4 Program Descriptions

1. Introduction

The TM-L60 is connected to the host computer by an RS-232C Interface. The TM-L60 is easily controlled by sending data and commands from the host computer. The following examples use the main commands from MS-DOS BASIC.

2. Before printing

① Connect TM-L60 to the host computer, power supply, and the drawer while referring to Chapter 2.

② Check that the RS-232C cable is connected properly, and the host computer DIP-switches are set properly.

③ Check the TM-L60 DIP-switches using the self test. To print on roll paper, set the DIP SW-10 to the OFF position. To label paper, set the DIP SW-10 to ON position.

④ Connect the RS-232C cable to the host computer while referring to the computer's manual.

3. How to write program

3-1. Printing on the roll paper

NOTE: Omit step ⑪ and ⑫ if the drawer kick-out connector is covered (the drawer kick-out function is not available).

① For all programs, always first open device RS-232C.

```
100 OPEN "COMl: N81NN" AS #l
```

② Initialize the TM-L60

```
110 PRINT #l, CHR$(27); "@";
```

"PRINT #1", is the order that sends data and commands through the device. This device is opened in step ① .

"CHR$ (27)" is the ESC code.

In order to execute **ESC** @ (Initialize the printer) send "@" following the ESC code. Always write "," at the end of the commands or BASIC will send **a** CR and **LF** code.

③ Send Print Data

```
120 PRINT #1, “ABCDEF”; CHR$( 10);
```

Always send a LF code (CHR$ (10)) after print data. To execute printing, send a LF code or ensure the line is filled.

④ Selecting Character Font B

```
130 PRINT #1, CHR$(27);  "!“; CHR$( 1);
140 PRINT #l , “ABCDEF”; CHR$( 10);
```

The number code that follows “!" alters the font, and also the mode for character size. Therefore, the example above sets character Font B in lines 130 and 140; the style of “ABCDEF” is changed to the style of Font B.

Font	code	size	code	size	code	size	code	size
A	CHR$(0)	Normal	CHR$(16)	Double-height	CHR$(32)	Double-width	CHR$(48)	Quad-ruple
B	CHR$(1)	Normal	CHR$(17)	Double-height	CHR$(33)	Double-width	CHR$(49)	Quad-ruple

Font B and the size are selected until CHR$ (27); “!“; CHR$ (X); is executed again or initialized.

⑤ Selecting character Font A and Double-width

```
150 PRINT #l , CHR$(27); “!"; CHR$(48);
160 PRINT #l , “ABCDEFGHIJK”; CHR$( 10);
```

Font A (normal): 42 character per line

Font A (double-width): 21 characters per line

⑥ Resetting the style to Normal

```
170 PRINT #l, CHR$(27); “!"; CHR$(0);
180 PRINT #l , “ABCDEFGHIJK”; CHR$( 10);
```

170 sets Font A to Normal. 180 sets the characters for printing.

⑦ Selecting the character code table.

```
190 FOR I = 240 TO 255
200       PRINT #l, CHR$(I);
210 NEXT I
220 '
230 PRINT #l , CHR$(27); "t"; CHR$( 1);
240 '
250 FOR I = 240 TO 255
260       PRINT #l, CHR$(I);
270 NEXT I
```

Page 0 characters, 190 to 210.

Page 1 characters, 250 to 270.

Refer to ESC t n.

⑧ Selecting International character codes

```
280 PRINT #l, CHR$(91); CHR$(92); CHR$(93); CHRS(94); CHR$( 10);
290 PRINT #l , CHR$(27); "R"; CHR$( 1);
300 PRINT #l, CHR$(91); CHR$(92); CHR$(93); CHRS(94); CHR$( 10);
```

280 prints 4 U.S.A characters. (default)

300 prints 4 French characters.

Refer to ESC R *n.*

⑨ Resetting printer functions

```
310 PRINT #l , CHR$(27); "@";
```

Initialize printer again.

⑩ Printing bar codes

```
320 PRINT #1, CHR$(29); "H"; CHR$(2);
330 PRINT #l, CHR$(27); "$"; CHR$(40); CHR$(0);
340 PRINT #l , CHR$(29); "k"; CHR$(2); "012345678901"; CHR$(0);
```

In order to print the bar code, you must send the GS code. (Refer to GS code.) CHR$ (29)" is the GS code.
320 prints HRI (Human Readable Interpretation) as bar codes. Refer to **GS H n.**
330 sets the print starting position to the specified number of dots (40). Refer to ESC $ ***n1 n2.***
340 prints the bar code; "K" executes printing. (Refer to GS k n [d] k **NUL.)** "CHR$ (2)" selects the JAN 13 Bar **code** system.

The 12 characters, “012345678901” are print data.
A check-digital is added by the printer because 12 characters are sent, and “012345678901” is printed.
“CHR$ (0)” must always be used as the last command (representing end of data.)

⑪ Using the drawer kick-out

```
350 PRINT #l, CHR$(27); “P”; CHR$(0); CHR$( 10); CHR$( 100);
```

The “p” generates a specified pulse; Refer to ESC p ***m n1 n2.***
In line 350, the module terminal of the drawer kick-out outputs a 20 ms pulse followed by a 200 ms wait.

⑫ How to read the status of the drawer kick-out

```
360 PRINT #l, CHR$(27); “u”; CHR$(0);
370 A$ = INPUT!$(l, #l)
380 IF A$ = CHR$(0) THEN PRINT “DRW: L”
380 IF A$ = CHR$( 1) THEN PRINT “DRW: H”
```

The “u” command in line 360 transmits the status of the drawer kick-out to printer. Refer to ESC u ***n.***
370 receives the data from the printer through RS-232C.
380 and 390 display the status of the drawer kick-out on the CRT.

⑬ Close RS-232C

```
400 CLOSE #l
```

RS-232C must be closed using this command.

■ Sample Program onto thermal paper

```
100 OPEN “COMl : N81 NN” AS #1
110 PRINT #l , CHR$(27); “@ ";
120 PRINT #1, “ABCDEF”; CHR$( 10);
130 PRINT #l, CHR$(27); “!"; CHR$( 1);
140 PRINT #l, “ABCDEF”; CHR$( 10);
150 PRINT #l, CHRS(27), “!“; CHR$(48);
160 PRINT #l, “ABCDEFGHIJK”; CHR$( 10);
170 PRINT #l, CHR$(27); “!“; CHR$(0);
180 PRINT #l, “ABCDEFGHIJK”; CHR$( 10);
190 FOR I = 240 TO 255
200       PRINT #l, CHR$( I);
210 NEXT I
220 ’
230 PRINT #l, CHR$(27); “t”; CHR$( 1);
240 ’
250 FOR I 240 TO 255
260       PRINT # 1, CHR$( I);
270 NEXT I
280 PRINT #l, CHR$(91); CHR$(92); CHR$(93); CHR$(94); CHR$( 10);
290 PRINT #l, CHR$(27); “R”; CHR$( 1);
300 PRINT #l, CHR$(91); CHR$(92); CHR$(93); CHR$(94); CHR$( 10);
310 PRINT #l, CHR$(27); “@“;
320 PRINT #l, CHR$(29); “H”; CHR$(2);
330 PRINT #l, CHR$(27); “$“; CHR$(40); CHRS(0);
340 PRINT #l, CHR$(29); “k”; CHR$(2); “01234567890 1”; CHR$(0);
350 PRINT #l, CHR$(27); “p”; CHR$(0); CHR$( 10); CHR$( 100);
360 PRINT #1, CHR$(27); “u”; CHR$(0);
370 PRINT A$ = INPUT$( 1, #l)
380 If A$ = CHR$(0) THEN PRINT “DRW: L”
380 If A$ = CHR$( 1) THEN PRINT “DRW: H”
400 CLOSE #l
```

3-2. Printing on label paper

① Open device RS-232C.

```
100 OPEN "COM 1: N81NN" AS #l
```

② Initialize the printer mechanism.

```
110 PRINT #1, CHR$(29); "<";
```

③ Send print mode

```
120 PRINT #l, "ABCDEF"; CHR$( 10);
```

④ Position label to start printing

```
130 PRINT#l, CHR$(12);
```

130 positions the next label printing. To position label to start printing, send a **FF** code or GS <.

⑤ Print serial number counter

```
140 PRINT #l, CHR$(29); "CO"; CHR$(3); CHR$(0);
150 PRINT #l, CHR$(29); "Cl "; CHR$( 1); CHR$(0); CHR$( 10); CHR$(0);
    CHR$(1); CHR$(1);
160 PRINT #l, CHR$(29); "C2"; CHR$( 1); CHR$(0);
170 FOR I = 1 TO 10
180 PRINT #l, CHR$(29); "c";
190 PRINT #l, CHR$( 12);
200 NEXT I
```

In lines 140 to 160, it selects the print mode for the serial number counter.
140 selects print format for the serial number counter. CHR$(3) (value of m) indicates the number of digits to be printed. CHR$(0) (value of n) specifies the printing position within the entire range of printed digits. In case *n* = 0, it prints with right adjusted.
150 selects counter operation range for the serial number counter. In this case, it counts up from 1 to 10 by 1.

160 sets the initial value of the counter. It indicates 1.

In line 170 to 190, it executes the serial number counting and to position label to start printing.

Always send a **FF** code after print data.

⑥ Print and eject label

```
210 PRINT #l, “ABCDEF”; CHR$( 10);
220 PRINT #l, CHR$(29); CHR$( 12);
```

210 prints data, then 220 ejects label. After ejection, an ERROR LED is lit and waits until the paper feed switch is pressed. When the paper feed switch is pressed after ejecting label, paper feeding is performed to set the next label at the starting position for printing.

⑦ Close RS-232C

```
230 CLOSE #l
```

RS-232C must be closed using this command.

Sample Program onto thermal label paper

```
100 OPEN “COMl: N81NN” AS #l
110 PRINT #l, CHR$(29); "<”;
120 PRINT #l, “ABCDEF”; CHR$( 10);
130 PRINT #l, CHR§( 12);
140 PRINT #l, CHR$(29); “CO”; CHR$(3); CHR$(0);
150 PRINT #l, CHR$(29); “C1“; CHR$( 1); CHR$(0); CHR$( 10); CHR$(0);
    CHR$( 1); CHR$(1);
160 PRINT #l, CHR$(29); “C2”; CHR$( 1); CHR$(0);
170 FOR I = 1 TO 10
180 PRINT #1, CHR$(29); ”c”;
190 PRINT #l, CHR$(12);
200 NEXT I
210 PRINT #l, “ABCDEF”; CHR$( 10);
220 PRINT #l, CHR$(29); CHR$(12);
230 CLOSE #1
```

APPENDIX

APPENDIX A General Specifications

1. Printing specifications

Printing method:	Thermal line printing
Dot density:	180 dpi
Printing direction:	Uni-directional with friction feed When the GS **FF** command is executed printing is performed in the reverse direction.
Print width:	54 mm, 384-dot positions
Characters per line:	Normal paper: 32 (Font A) 42 (Font B) Label paper: 30 (Font A) 40 (Font B)
Character spacing:	0.28 mm (Font A) 0.28 mm (Font B) Programmable by control command.
Printing speed:	Approx. 12 lines/second (1/6 inch feed) (* 1) Approx. 18 lines/second (1/9 inch feed) (* 1) Approx. 2.0 inches/second (* 1) Printing speed may slow down depending on the data transmission speed and combination of control commands.
Paper feeding speed:	Approx. 2.0 inches/second (* 1) (Approx. 50.0 mm/second)
Line spacing:	1/6 inch (4.23 mm) default Programmable by control command. (Minimum 1/360 inch)

(* 1): These speed values indicate approximate printing and paper feeding speeds between the beginning and ending of a given label.

2. **Characters specifications**

Character sets:	Alphanumeric:	95
	Enlarged graphics:	128 X 2 pages
	International:	32

Character structure:	Font A:	12 x 24 (includes the horizontal 2-dot space)
	Font B:	9 x 17 (includes the horizontal 2-dot space)
	Default:	Font A
Character size:	1.41 mm (W) X 3.39 mm (H) (Font A) 0.99 mm (W) X 2.40 mm (H) (Font B)	

Table A-l. Character Sizes

	Standard		Double-height		Double-Width		Quadruple	
	WXH(mm)	CPL	WXH (mm)	CPL	WXH (mm)	CPL	WXH(mm)	CPL
Font A (12 X 24)	1.41 X 3.39	32 30	1.41 X6.77	32 30	2.82 X 3.39	16 15	2.82 X 6.77	16 15
Font B (9 x 17)	0.99 X 2.40	42 40	0.99 X 4.80	42 40	1.98 X 2.40	21 20	1.98 X 4.80	21 20

Space between characters is not included.
CPL = Character per line.

NOTE: Concerning CPL in the table above, the upper value is for thermal paper and the lower for label paper.

3. Near-end detector

Detection method:	Micro switch	
Roll paper core diameter:		
Specified thermal paper:	Inside diameter:	12 mm
	Outside diameter:	18 mm
Specified thermal label paper:	Inside diameter:	12 mm
	Outside diameter:	22 mm
Adjustment mechanism:	Adjusting screw The near-end detection processing is program table by control command.	
Adjustment units:	Approx. 2 mm/scale division	

4. Paper

4.1 Thermal paper

Paper type:	Specified thermal paper
Paper thickness:	65 ±5 µm
Form:	Roll paper

Paper width:	60 $\pm^{0}_{1}$ mm
Roll size:	Roll diameter Max. ø83 mm
	Taken up paper roll width: 60 $\pm^{0.5}_{1.0}$ mm
Specified paper:	Roll paper model No.: NTP060-80 (NAKAGAWA MFG. Co., Ltd.) [Original paper model No.:TFSOKS-E) (JUJO PAPER CO., LTD)]
Roll paper core:	Inside diameter: 12 mm
	Outside diameter: 18 mm
	Paper should never be pasted to the paper core.

4.2 Thermal label paper

Paper type:	Specified thermal label paper
Paper thickness:	143 ± 15 µm (total)
Form:	Roil paper
Paper width:	60 $\pm^{0}_{1}$ mm
Roll size:	Roll diameter Max. ø83 mm
	Taken up paper roll width: 60 $\pm^{0.5}_{1.0}$ mm
Specified paper:	Thermal label paper: NTLO60-80 (NAKAGAWA MFG. Co., Ltd.)
	Original paper model No.: HD75 (JUJO PAPER CO., LTD)
Roll paper core:	Inside diameter: 12 mm
	Outside diameter: 22 mm
	Paper should never be pasted to the paper core.

NOTES:
- Make sure that it can not be printed in 1.5 mm line spacing in the lower area of the label paper. (See 5-2 Printable Area and Label Paper Conditions)
- It is recommended to issue GS **FF** command to position the cutter to the base sheet of the label paper in order to cut the label paper easily.
- Make sure to issue **FF** or GS FF command just after sending data per label paper.
- Do not use other than specified paper.

5. Receive buffer

Either 4 K or 45 bytes is selectable by a DIP switch

6. Electrical characteristics

Supply voltage:	24 VDC ± 7% (Optional power supply: PS-130)		
Current consumption:	Operating:	Mean:	Approx. 1.3 A (Print duty: 30%)
		Peak:	Approx. 6.0 A (Print duty: 100%)
	Stand-by:	Approx.	100 mA

7. EMI (by using Epson PS-130)

The cables using a shielded wire are used.

FCC:	Class A
VDE:	Class B

8. Reliability

MCBF:	3.5 million lines (equivalent to 0.5 million l-inch labels at Font A)

9. Environmental conditions

Temperature	Operating:	5 to 40°C
	Storage:	-10 to 50°C (except for paper)
Humidity	Operating:	30 to 85% (non-condensing)
	Storage:	30 to 90% (non-condensing, except for paper)

10. External dimensions and weight

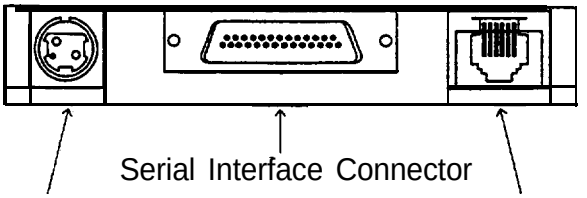
Height:	124 mm
Width:	123 mm
Depth:	201 mm
Weight:	Approx. 0.8 kg

11. Case color

EPSON standard gray

APPENDIX B Connectors

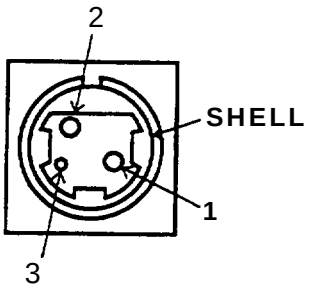
1. Connectors



2. Interface connectors

See APPENDIX C Interfaces

3. Power supply connector



This connector is used to connect an external power source.

1) Pin assignment:

Pin 1:	**+24** VDC
Pin 2:	GND
Pin 3:	Unconnected
SHELL:	Connected to the frame ground **(FG) at** the printer side.

2) Model: User side: Connector: TCP8927-63-1110 (Hoshiden or equivalent)

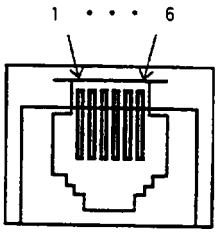
Cable: 2-core shielded (AWG22 X 2)

Printer side: TCS7960-53-2010 (Hoshiden or equivalent)

NOTE: Start the external power supply after connecting the external power supply.

4. Drawer kick-out connector (Modular connector)

1) Pin assignment:



Printer side connector: TM5RJ3-66 (HIROSE) or equivalent

User-side plug: Standard 6-pin modular jack (R11 Telephone jack)

Table B-l. Drawer Kick-out Connector Pin Assignment

Pin Number	Signal Name	Sender	Connected to:	Function
1	FG	-	Cash drawer	Frame ground
2	L1 (-)	Printer	Cash drawer	Drawer kick-out drive signal **L1.**

Pin Number	Signal Name	Sender	Connected to:	Function
3	SW (+)	Cash drawer	**Cash** drawer	Connected to the (+) side of the open/close detection switch on the cash drawer. Pulled up through a 10 k Ω resistor on the printer side.
4	L (+)	Printer	Cash drawer	+24 VDC for drawer kick-out is supplied.
5	L2 (-)	Printer	Cash drawer	Drawer kick-out drive signal L2.
6	SW (-)	-----	Cash drawer	Connected to the (-) side of the open/dose detection switch on the cash drawer. Connected to the signal ground on the printer side.

2) Drawer kick-out drive signal

This signal outputs the pulses specified by the **ESC** p command.

The SW (+) state is checked by the host computer using the **ESC u** command.

Electrical characteristics:

(a) Signal output current: Maximum -1 A (510 ms or less)

(b) Power supply output voltage: 24 VDC (typical)

(c) Power supply output current: Maximum 1 A (510 ms or less)

(d) Output waveform: Refer to Figure B-l

NOTES: 1. These are not output during printing.

2. Drawer kick-out drive signals L1 and L2 cannot be output at the same time.
3. The resistance of the drawer kick-out solenoids should be 24 Ω or more. Otherwise, the overcurrent could damage the solenoids.
4. Be sure to use the power supply (pin 4) of the drawer kick-out connector for the drawer kick-out solenoid power source.

3) Drawer open/close signal

SW (+) signal level: "LOW = 0 to 0.5 V

"HIGH" = 3 to 5 V

NOTE: Do not connect anything otherthan a solenoid to the drive signal terminal of the drawer kick-out connector.

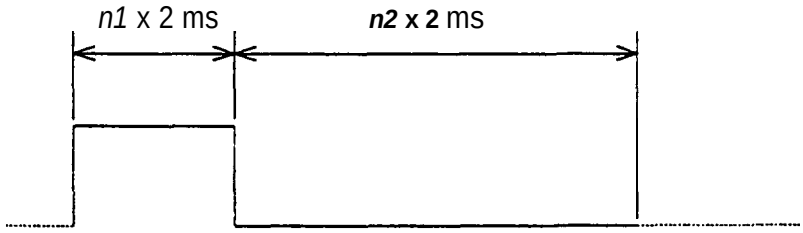


Figure B-1. Drawer Kick-out Drive Signal

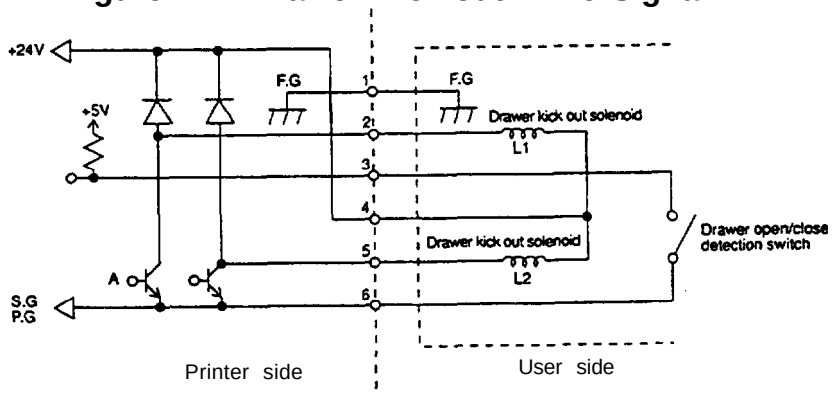


Figure B-2. Drawer Kick-out Signal Interface Circuit

NOTES: . The circuit on the user side should be designed so that the drawer drive duty is as shown below.

$$\frac{\text{ON time}}{\text{ON time + OFF time}} \leq \mathbf{0.2}$$

. The waveform shown in Figure B-l is output at Point A in Figure B-2 *(n1* (ON time) and *n2* (OFF time) depend on the **ESC p** command.)

APPENDIX C Interfaces

1. Specifications (RS-232C compatible)

Data transmission:	Serial
Synchronization:	Asynchronous
Handshaking:	DTR/DSR or XON/XOFF control
Signal level:	MARK = -3 to -15 V: Logic "1"
	SPACE = +3 to + 15 V: Logic "0"
Baud rates:	1200,4800,9600,19200 bps
Bit length:	8 bits
Parity:	Invalid, even, odd
Stop bits:	1 bit or more
Connector:	D-SUB 25 pin connector

2. Interface connector terminal assignments and signal functions

Pin Number	Signal Name	Signal Direction	Function
1	FG	-	Frame ground
2	TXD	output	Transmit data
3	RXD	Input	Receive data
6	DSR	Input	Data set ready
7	GND	-	Signal GND
20	DTR	output	Data terminal ready

3. Serial interface timing

a) Receive data

Either DTR/DSR or XON/XOFF control is selectable. Changes in DTR signal and XON/XOFF transmission are as follows:

[DTR MARK]
- The period from when the power is turned on to when the printer first becomes ready to receive data.
- In an error state.
- When the remaining space in the receive buffer be comes 10 bytes.
- When feeding paper with the paper feed switch.
- In paper feed switch waiting state with <GS FF> command.
- In paper feed switch waiting state during macro execution.
- When printing down-loaded bit image with <GS />.

[DTR SPACE]
- When the printer first becomes ready to receive data after power-on.
- When the remaining space in the receive buffer be comes 20 bytes.

[XON Transmission]
- When DTR becomes SPACE.

[XOFF Transmission]
- When DTR becomes MARK.

b) Transmit data (Status information transmission)

When DTR/DSR control is selected, data is transmitted after confirming that DSR is SPACE. When DTR/DSR control is not selected, data is transmitted regardless of the DSR state.

APPENDIX D Character Code Tables

■ Page 0 (International character set: U.S.A.)

	HEX	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
HEX	BIN	0000	0001	0010	0011	0100	0101	0110	0111	1000	1001	1010	1011	1100	1101	1110	1111
0	0000	NUL 0	16	SP 32	0 48	@ 64	P 80	` 96	p 112	Ç 128	É 144	á 160	▒ 176	└ 192	╨ 208	α 224	≡ 240
1	0001	1	XON 17	! 33	1 49	A 65	Q 81	a 97	q 113	ü 129	æ 145	í 161	▓ 177	┴ 193	╤ 209	β 225	± 241
2	0010	2	18	" 34	2 50	B 66	R 82	b 98	r 114	é 130	Æ 146	ó 162	■ 178	┬ 194	╥ 210	Γ 226	≥ 242
3	0011	3	XOFF 19	# 35	3 51	C 67	S 83	c 99	s 115	â 131	ô 147	ú 163	│ 179	├ 195	╙ 211	π 227	≤ 243
4	0100	4	20	$ 36	4 52	D 68	T 84	d 100	t 116	ä 132	ö 148	ñ 164	┤ 180	─ 196	╘ 212	Σ 228	⌠ 244
5	0101	5	21	% 37	5 53	E 69	U 85	e 101	u 117	à 133	ò 149	Ñ 165	╡ 181	┼ 197	╒ 213	σ 229	⌡ 245
6	0110	6	22	& 38	6 54	F 70	V 86	f 102	v 118	å 134	û 150	ª 166	╢ 182	╞ 198	╓ 214	µ 230	÷ 246
7	0111	7	23	' 39	7 55	G 71	W 87	g 103	w 119	ç 135	ù 151	º 167	╖ 183	╟ 199	╫ 215	τ 231	≈ 247
8	1000	8	24	(40	8 56	H 72	X 88	h 104	x 120	ê 136	ÿ 152	¿ 168	╕ 184	╚ 200	╪ 216	Φ 232	° 248
9	1001	HT 9	25	) 41	9 57	I 73	Y 89	i 105	y 121	ë 137	Ö 153	⌐ 169	╣ 185	╔ 201	┘ 217	θ 233	• 249
A	1010	LF 10	26	* 42	: 58	J 74	Z 90	j 106	z 122	è 138	Ü 154	¬ 170	║ 186	╩ 202	┌ 218	Ω 234	· 250
B	1011	11	ESC 27	+ 43	; 59	K 75	[91	k 107	{ 123	ï 139	¢ 155	½ 171	╗ 187	╦ 203	▀ 219	δ 235	√ 251
C	1100	FF 12	FS 28	, 44	< 60	L 76	\ 92	l 108	| 124	î 140	£ 156	¼ 172	╝ 188	╠ 204	▄ 220	∞ 236	n 252
D	1101	13	GS 29	− 45	= 61	M 77	] 93	m 109	} 125	ì 141	¥ 157	¡ 173	╜ 189	═ 205	▌ 221	∅ 237	² 253
E	1110	14	30	. 46	> 62	N 78	^ 94	n 110	~ 126	Ä 142	₧ 158	« 174	╛ 190	╬ 206	▐ 222	∈ 238	■ 254
F	1111	15	31	/ 47	? 63	O 79	_ 95	o 111	SP 127	Å 143	ƒ 159	» 175	┐ 191	╧ 207	▀ 223	∩ 239	SP 255

■ Page 1 (International character set: U.S.A.)

	HEX	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
HEX	BIN	0000	0001	0010	0011	0100	0101	0110	0111	1000	1001	1010	1011	1100	1101	1110	1111
0	0000	NUL 0	16	SP 32	0 48	@ 64	P 80	` 96	p 112	― 128	144	SP 160	― 176	タ 192	ミ 208	三 224	× 240
1	0001	1	XON 17	! 33	1 49	A 65	Q 81	a 97	q 113	― 129	┬ 145	。 161	ア 177	チ 193	ム 209	┣ 225	円 241
2	0010	2	18	" 34	2 50	B 66	R 82	b 98	r 114	▬ 130	┤ 146	「 162	イ 178	ツ 194	メ 210	╪ 226	年 242
3	0011	3	XOFF 19	# 35	3 51	C 67	S 83	c 99	s 115	▬ 131	├ 147	」 163	ウ 179	テ 195	モ 211	╡ 227	月 243
4	0100	4	20	$ 36	4 52	D 68	T 84	d 100	t 116	▬ 132	‾ 148	、 164	エ 180	ト 196	ヤ 212	◢ 228	日 244
5	0101	5	21	% 37	5 53	E 69	U 85	e 101	u 117	■ 133	― 149	・ 165	オ 181	ナ 197	ユ 213	◣ 229	時 245
6	0110	6	22	& 38	6 54	F 70	V 86	f 102	v 118	■ 134	│ 150	ヲ 166	カ 182	ニ 198	ヨ 214	◥ 230	分 246
7	0111	7	23	' 39	7 55	G 71	W 87	g 103	w 119	■ 135	┃ 151	ァ 167	キ 183	ヌ 199	ラ 215	◤ 231	秒 247
8	1000	8	24	(40	8 56	H 72	X 88	h 104	x 120	▏ 136	┌ 152	ィ 168	ク 184	ネ 200	リ 216	♠ 232	〒 248
9	1001	HT 9	25	) 41	9 57	I 73	Y 89	i 105	y 121	▏ 137	┐ 153	ゥ 169	ケ 185	ノ 201	ル 217	♥ 233	市 249
A	1010	LF 10	26	* 42	: 58	J 74	Z 90	j 106	z 122	▌ 138	└ 154	ェ 170	コ 186	ハ 202	レ 218	♦ 234	区 250
B	1011	11	ESC 27	+ 43	; 59	K 75	[91	k 107	{ 123	▌ 139	┘ 155	ォ 171	サ 187	ヒ 203	ロ 219	♣ 235	町 251
C	1100	FF 12	FS 28	, 44	< 60	L 76	＼ 92	l 108	｜ 124	▌ 140	┌ 156	ャ 172	シ 188	フ 204	ワ 220	● 236	村 252
D	1101	13	GS 29	― 45	= 61	M 77	] 93	m 109	} 125	▌ 141	┐ 157	ュ 173	ス 189	ヘ 205	ン 221	○ 237	人 253
E	1110	14	30	. 46	> 62	N 78	^ 94	n 110	~ 126	■ 142	└ 158	ョ 174	セ 190	ホ 206	゛ 222	／ 238	■ 254
F	1111	15	31	／ 47	? 63	O 79	― 95	o 111	SP 127	＋ 143	┘ 159	ッ 175	ソ 191	マ 207	° 223	＼ 239	SP 255

■ International character set

		ASCII code (Hexadecimal)										
	Country Code	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 I	#	$	@	Æ	Ø	Å	^	`	æ	ø	å	~
5	Sweden	#	¤	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

APPENDIX E Command Summary

Command	Name	Reference Page
HT	Horizontal tab	26
LF	Print and line feed	27
FF	Print and position label to start printing	27
ESC SP	Set character right-side spacing	27
ESC	Set print mode	27
ESC $	Set absolute position	28
ESC %	Select/cancel user-defined character set	29
ESC &	Define user-defined characters	29
ESC *	Set bit image mode	30
ESC 2	Set 1/6 inch line spacing	32
ESC 3	Set line spacing using minimum units	32
ESC =	Select device	32
ESC @	Initialize printer	33
ESC D	Set horizontal tab positions	33
ESC E	Select emphasized mode	34
ESC G	Select double-strike mode	35
ESC J	Print and feed paper using minimum units	35
ESC R	Select international character set	36
ESC V	Set/cancel 90° cw rotated characters	36
ESC ¥	Set relative position	37
ESC -	Turn underline mode on/off	37
ESC a	Align positions	37
ESC c 4	Select paper detectors to stop printing	38
ESC c 5	Enable/disable panel switches	39
ESC d	Print and feed paper *n* lines	39
ESC p	Generate pulse	39

Command	Name	Reference Page
ESC t	Select character code table	40
ESC u	Transmit peripheral device status	40
ESC v	Transmit printer status	41
ESC {	Set/cancel upside-down character printing	42
GS FF	Print and eject label	43
G S *	Define down-loaded bit image	43
GS /	Print down-loaded bit image	44
GS :	Set starting/ending of macro definition	45
GS<	Initialize printer mechanism	45
GS A	Adjust label paper position to start printing	45
GS C 0	Select counter print mode	46
G S C l	Select count mode (A)	47
GS C2	Set counter	48
G S C ;	Select count mode (B)	49
GS H	Select printing position of HRI characters	50
GS c	Print counter	50
G S f	Select font for HRI characters	51
G S h	Select height of bar code	51
G S k	Print bar code	52
G S w	Select horizontal size (magnification) of bar code	52
G S "	Execute macro	53