



*User's Manual*

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**LINE THERMAL PRINTER**

MODEL **EP-300**

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Sofia 1784 - BULGARIA, tel: +359 2 974 00 55, fax: +359 2 974 11 00,  
**e-mail: [sales@datecs.bg](mailto:sales@datecs.bg)      <http://www.datecs.bg>**  
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## SAFETY PRECAUTIONS ... WHICH SHOULD BE STRICTLY

Before using this product for the first time, carefully read these SAFETY PRECAUTIONS. Incorrect operation may result in unexpected accidents (fire, shock, or injury).

- After having read this Manual, keep it in a safe, readily accessible place for future reference.
- Some of the descriptions contained in this manual may not be relevant to some printer models.

In order to prevent injury hazard to operators, third parties or damage to property, special warning symbols are used in this user's manual to indicate important items to be strictly observed.

The following describes the degree of hazard and damage that could occur if the printer is improperly operated by ignoring the instructions indicated by the warning symbols.



### WARNING

Neglecting precautions indicated by this symbol may result in fatal or serious injury.



### CAUTION

Neglecting precautions indicated by this symbol may result in injury or damage to properties.



This symbol is used to alert your attention to important items.



This symbol is used to alert you to the danger of electric shock or electrostatic damage.



This symbol denotes a request to unplug the printer from the wall outlet.



This symbol is used to indicate the „information“ on the use, or the like.



This symbol is used to indicate prohibited actions.

## PRECAUTIONS ON PRINTER INSTALLATION

### WARNING

Do not use or store this product in a place where it will be exposed to:

- Flames or moist air
- Direct sunlight
- Hot airflow or radiation from a heating device
- Salty air or corrosive gases
- Ill-ventilated atmosphere
- Chemical reactions in a laboratory
- Airborne oil, steel particles, or dust
- Static electricity or strong magnetic field
- **Neglecting these warnings may result in printer failure, overheating, emission of smoke, fire, or electric shock.**



Do not drop any foreign object nor spill liquid into the printer. Do not place any object on the printer either.

- Do not drop any metallic object such as paper clip, pin or screw into the printer.
- Do not place a flower vase, pot or cup containing water on the printer.
- Do not spill coffee, soft drinks or any other liquid into the printer.
- Do not spray insecticide or any other chemical liquid over the printer.
- **A metallic foreign object, if accidentally dropped into the printer, may cause printer failure, fire, or electric shock. Should it occur, immediately turn the printer off, unplug it from the supply outlet, and call your local CBM dealer.**



Do not handle the printer in the following ways:

- Do not allow the printer to sustain strong impacts or hard jolts (e.g., trampling, dropping, striking with a hard edge).
- Never attempt to disassemble or modify the printer.
- **Neglecting to handle properly may result in printer failure, overheating, emission of smoke, fire, or electric shock.**



Install, use, or store the printer out of the reach of children.

- **Electric appliances could cause an unexpected injury or accident if they are handled or used improperly.**
- **Keep the power cord and signal cables out of the reach of children. Also children should not be allowed to gain access to any internal part of the printer.**
- **The plastic bag the printer came in must be disposed of properly or kept away from children. Wearing it over the head may lead to suffocation.**



## ⚠ CAUTION

Place the printer on a flat, stable surface without vibration.

- Otherwise dropping may cause injury.



Do not use the printer under the following conditions.

- A state where the printer ventilation holes are blocked by a nearby wall or something
- A state where any object is placed on the printer
- A state where the printer is covered or wrapped by a cloth or bed clothing
- **Be careful about internal heat buildup, which could cause fire and deform the case.**
- Avoid using the printer near a radio or TV set or from supplying it from the same outlet as these appliances.
- Avoid using the printer interconnected with a cable or cord that has no protection against noise. (For interconnections, use shielded or a twisted pair of cables and ferrite cores, or other anti-noise devices.)
- Avoid using the printer with a device that is a strong source of noise.
- **The printer may have an adverse effect on nearby radio or TV transmissions. There may also be cases when nearby electrical appliances adversely influence the printer, causing data errors or malfunction.**



Use the printer with its grounding post connected to a convenient grounding facility.

- **If leakage occurs electric shock may result.**

Do not connect the printer's grounding post onto any of the following facilities.

- Utility gas piping  
**A gas explosion could result.**
- Telephone line ground
- Lightning rod  
**If lightning strikes a large surge of current may cause fire or shock.**
- Utility water pipes  
**Plastic water pipes should not be used for grounding. (Those approved by a Waterworks Department may be used.)**



Before connecting or disconnecting the grounding lead to or from the printer, always unplug it from supply outlet.

## PRECAUTIONS IN HANDLING THE PRINTER

### WARNING

Please observe the following precautions for power source and power cord:

- Do not plug or unplug the power cord with a wet hand.
- Use the printer only at the specified supply voltage and frequency.
- Use only the specified AC adapter with the printer.
- Check to make sure that the supply outlet from which the printer is powered has a sufficient capacity.
- Do not supply the printer from a power strip or current tap shared with other appliances.
- Do not plug the power cord into a supply outlet with dust or debris
- Do not use a deformed or damaged power cord.
- Do not move the printer while the printer power is on.
- **Neglecting to handle properly may result in printer failure, emission of smoke, fire, or electric shock.**
- **An overload may cause the power cord to overheat or fire or the circuit breaker to trip.**
- Do not allow anything to rest on the power cord. Do not place the printer where the power cord will be trampled on.
- Do not use or carry the printer with its power cord bent, twisted, or pulled.
- Do not attempt to modify the power cord unnecessarily.
- Do not lay the power cord in the neighbor of a heating device.
- **Neglecting these cautions may cause wires or insulation to break, which could result in leakage, electric shock, or printer failure. If a power cord sustains damage contact your CBM dealer.**
- Do not leave things around the supply outlet.
- Supply power to the printer form a convenient wall outlet, readily accessible in an emergency.
- **The printer may not be immediately shut down in an emergency.**
- Insert the power plug fully into the outlet.
- If the printer is not to be used for a long time, leave it disconnected from its supply outlet.
- Hold the plug and connector when plugging or unplugging the power cord or signal cable after turning off the printer and the appliance connected to it.





## ⚠ CAUTION

Caution label is attached on the position shown in the following figure. Carefully read the precautions in handling before using the printer.

**THIS LABEL INDICATES THE RISK OF ANY INJURY DUE TO „HIGH TEMPERATURE“ OF THE PRINT HEAD.**



To prevent possible malfunction or failure observe the following.

- Avoid operating the printer without paper properly loaded.
- Avoid the use of paper not complying with specifications.
  - **May result in poor print quality.**
- Avoid using torn pieces of paper or spliced with plastic adhesive tapes.
- Avoid forcibly pulling already loaded paper by hand.
- Avoid wedging the paper in by the paper cover.
  - **May jam paper. To release, refer to „Removing Jammed Paper“ in this manual.**
- Avoid using a sharp pointed device to operate panel keys.



Be sure to firmly insert the cable plug into its mating socket.

- **A cross connection may damage the printer's internal electronics or the host system's hardware.**

Only use the printer with devices that have designated solenoid specifications for the cash drawer interface connector.

- **Neglecting this caution may result in malfunction or failure.**



To prevent injury and printer failures from worsening, observe the following:

- Do not touch the printing surface of the thermal head.
- Do not touch any of the moving parts (e.g., paper cutter, gears, active electrical parts) while the printer is working.
- In case of trouble do not attempt to repair the printer. Ask CBM service for repair.
- Be careful that the paper cover does not entrap your hands or fingers.
- Be careful with sharp edges on the printer. Don't allow them to injure you or damage property.
  - **May result in electric shock, burn, or injury.**
  - **If the printer emits smoke, an odd smell, or unusual noise while printing, immediately abort the current print session and unplug the printer from the supply outlet.**



## DAILY MAINTENANCE

Observe the following precautions for daily maintenance.

- When cleaning the printer, always turn it off and unplug it from the supply outlet.
- Use a soft, dry cloth for cleaning the surface of the printer case.
- For severe stains, use a soft cloth slightly dampened with water.
- Never use organic cleaning solvent such as alcohol, paint thinner, trichloroethylene, benzene, or ketone. Never use a chemically processed cleaning cloth.
- To remove paper chips, use a soft brush.
- When transporting the printer, remove the roll paper from its paper holder.



### CAUTION

- **The thermal head is at a dangerously high temperature immediately after printing. Allow it to cool off before launching maintenance work.**

## 1. GENERAL OUTLINE

The EP-300 is a thermal line printer designed for use with a broad array of terminal equipment including, data, POS, and kitchen terminals. With extensive features, it can be used in a wide range of applications.

### **1.1 Features**

- ◆ Compact design.
- ◆ Paper drop-in mechanism facilitating paper handling and head cleaning.
- ◆ High speed (100 mm/s) printing.
- ◆ Low-noise printing.
- ◆ Built-in input buffer.
- ◆ Barcode printing.
- ◆ Page mode. Now you can arrange pages freely.
- ◆ Registration of user-defined characters and logos into flash memory.
- ◆ Built-in cash drawer interface.
- ◆ Auto cutter mechanism provided as a standard unit (full cut/partial cut).
- ◆ Can use 80 mm or 58 mm wide paper roll.
- ◆ Replaceable interface board.
- ◆ A variety of functions selectable with memory switch.
- ◆ The printer allows horizontal, vertical, or wall-mounted (optional) installation.
- ◆ Built-in buzzer.
- ◆ Various kinds of customization are permitted.
- ◆ 2-color printing is supported.

## 1.2 Unpacking

When unpacking the printer, confirm that the following are provided:

- ◆ Printer: 1
- ◆ AC adapter (AC adapter type): 1
- ◆ AC power cord: 1
- ◆ Sample paper roll: 1 roll
- ◆ Partition for 58-mm wide paper roll: 1
- ◆ User's manual (This manual): 1



Printer  
(AC adapter type)



AC adapter  
(AC adapter type)



Partition for 58-mm  
wide paper roll



Printer  
(Built-in power supply type)



AC power cord



Sample paper roll



User's manual  
(This manual)

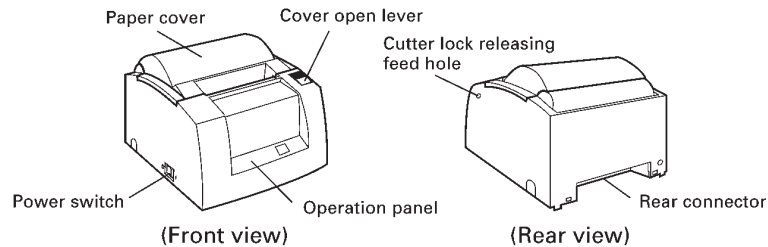
### 1.3 Basic Specifications

Item	Specifications
Print method	Line thermal dot print method
Print width	72 mm/576 dots, (52 mm/416 dots)
Dot density	8 x 8 dots/mm (203 dpi)
Print speed	Max speed 100 mm/s
Number of print columns ( ) shows the value with 58 mm wide paper	Font A: 47 (34) Font B: 63 (46)
Character size	Font A: 12 x 24 Font B: 9 x 16
Character type	CP 437/850/860/852/857/775/856/866/737/ 865, Lithuania, Poland, Latvia, PC/1252/1250 1254/1257/1251/1253/1255
Types of bar code	CODE39, CODE 93, EAN13, EAN8, UPC-A, UPC-E, Interleaved 2 of 5, CODABAR, CODE 128, PDF417
Line spacing	4.23 mm (1/6 inch)
Paper roll	Thermal paper roll: 80 mm/58 mm x $\varnothing$ 83 mm Paper thickness: 65-75 $\mu$ m
Interfacing	Serial (RS-232C compliant), Parallel (IEEE 1284 compliant), USB
Cash drawer interface	1 cash drawers are supported
Input buffer	16K bytes
Supply voltage	DC 24 V $\pm$ 7%
Power consumption	Approx. 70 W (in normal printing)
AC adapter	Rated input: AC 100 to 240 V, 50/60 Hz, 150 VA Rated output: DC 24 V, 2A
Adapter	32AD-U 32AD-E
Auto cutter	ACS-531 (039002)
Weight	Approx. 2 kg
Outside dimensions	145 (W) x 195 (D) x 121 (H) mm
Operating temperature and humidity	5 to 40°C, 35 to 85% RH (No condensation)
Storage temperature and humidity	-20 to 60°C, 10 to 90% RH (No condensation)
Reliability	Print head life: 100 km, 1x 108 pulses (At normal temperature/humidity with commended paper used)  Auto cutter life: 1 million cuts (At normal temperature/humidity with recommended paper used)

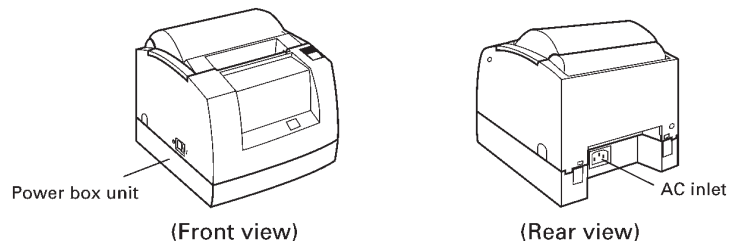
## 2. EXPLANATION OF PRINTER PARTS

### 2.1 Printer Appearance

#### AC Adapter Type

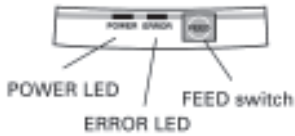


#### Built-in Power Supply Type



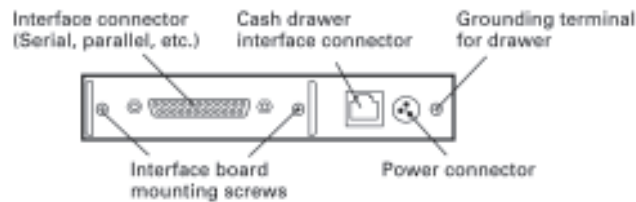
- ◆ Paper cover  
Paper is located inside this cover.
- ◆ Cover open lever  
To refill or replace paper, open the paper cover by pulling this lever fully to the root.
- ◆ Power switch  
This switch turns the printer power ON/OFF.
- ◆ Cutter lock releasing feed hole  
When the cutter blade is kept protruded after abnormal termination or paper jam, the paper cover cannot be opened. Insert a Phillips screwdriver through this hole and adjust the screw to restore the blade.
- ◆ AC inlet (Built-in power supply type)  
Connects to AC cable.

## Operation Panel



- ◆ **POWER LED**  
Lights when the printer power is on and goes off when the printer power is off. May blink or light in a special mode or in case of a failure.
- ◆ **ERROR LED**  
Lights or blinks when paper is empty or in case of a failure. The interval length of blinking shows the type of error.
- ◆ **FEED switch**  
Pressing this switch once causes a paper feed of one line. The longer the switch is pressed, the more the paper is fed.  
In case of auto cutter error, press the FEED switch after removing the cause of the error to clear the error.

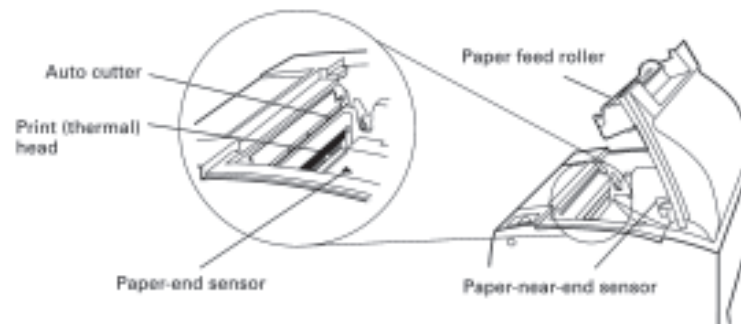
## Rear Connectors



- ◆ **Interface connector (Serial, parallel, etc.)**  
Connects to the interface cable. A DIP switch is provided on the serial interface board.
- ◆ **Cash drawer interface connector**  
Connects to the cable from the cash drawer.
- ◆ **Power connector**  
Connects to the cable from AC adapter.

## 2.2 Paper Cover Inside

- ◆ Paper feed roller  
Feeds paper as part of print mechanism.
- ◆ Paper-near-end sensor  
Changes the setting in accordance with the inner diameter of paper roll or setting status.
- ◆ Auto cutter  
Cuts the paper with a command at the end of printing. Cutting method is selectable between partial cut and full cut with a command.
- ◆ Print (thermal) head  
Prints characters and/or graphic data on thermal paper.
- ◆ Paper-end sensor  
Stops printing when this sensor detects paper end.



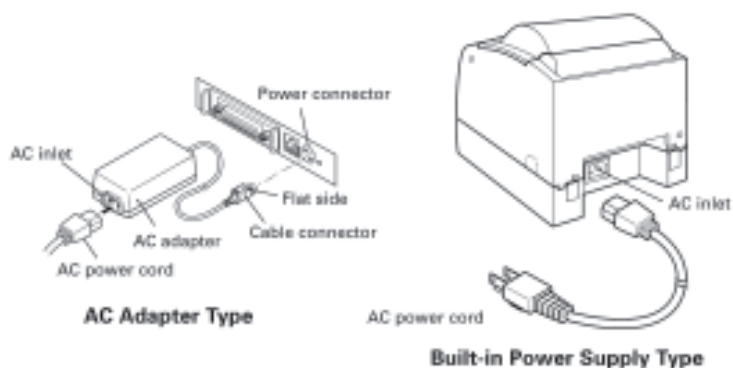
## 2.3 Other Built-in Functions

- ◆ Buzzer  
This printer has a built-in buzzer. It is operated in case of an error, operation, or by a command.
- ◆ User memory  
Allows registration of user-defined characters and logo data on the non-volatile memory. Data registered remains even after the printer power is off.



## 3. PREPARATION

### 3.1 Connecting the AC Adapter and AC Power Cord



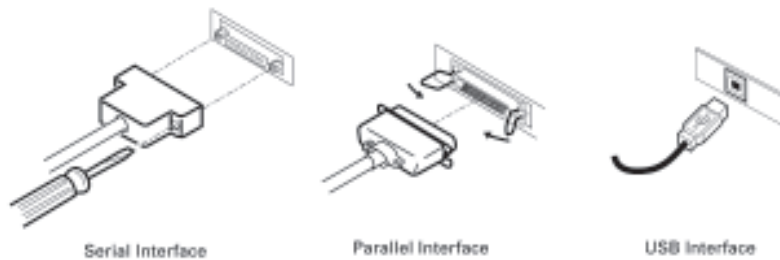
1. Turn off the printer power.
2. For the AC adapter type only: With the flat side of the AC adapter's cable connector facing upward, insert the cable connector into the power connector on the back side of the printer.
3. Connect the AC power cord to the inlet of the printer, and insert the AC power-cord plug into a suitable wall outlet.



#### CAUTION

- Use only the specified AC adapter with the printer.
- When disconnecting a cable, do not pull out by the cable. Always hold the plug.
- Always keep the AC power supply away from other noise generating equipment.
- Do not pull the power cord. Otherwise fire, electric shock, or power disconnection may result.
- If lightning is approaching, unplug the AC power cord from the wall outlet. Otherwise fire or electric shock may result.
- Keep the power cord away from heat generating appliances. Otherwise the shield of power cord may be fused resulting in a fire or electric shock.
- If the printer is not to be used for a long time, leave it disconnected from its supply outlet.

### 3.2 Connecting Interface Cables



Turn off the printer power and unplug the power connector. Then follow the procedure for interface cable connection.

Orient the interface cable terminal correctly and insert it into the interface connector.

In case of a built-in power supply type, remove the power box unit before connection.

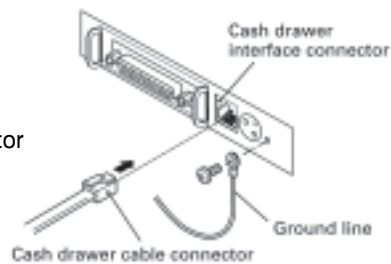
#### CAUTION

When disconnecting the cable, always hold the connector.

For serial interface cable, use the one with the following connection.

### 3.3 Connecting the Cash Drawer

1. Turn off the printer power.
2. Orient the cash drawer cable connector correctly, insert it into the cash drawer interface connector on the back of the printer.
3. Connect the drawer's ground line to the printer's ground terminal with a screw.



For built-in power type, remove the power box unit before connection.

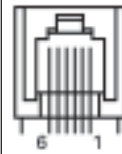
## ⚠ CAUTION

Do not connect any other device than the specified cash drawer to the cash drawer interface connector. (Do not connect a telephone line either.)

In case of a built-in power supply type, remove the power box unit before connection.

### (1) Connector Pin Configuration

No.	Signal	Definition
1	NA	NA
2	VP	Drawer drive power supply (24V)
3	VP	Drawer drive power supply (24V)
4	DRW	Drawer drive signal (output)
5	DRW	Drawer open signal (input)
6	NA	NA

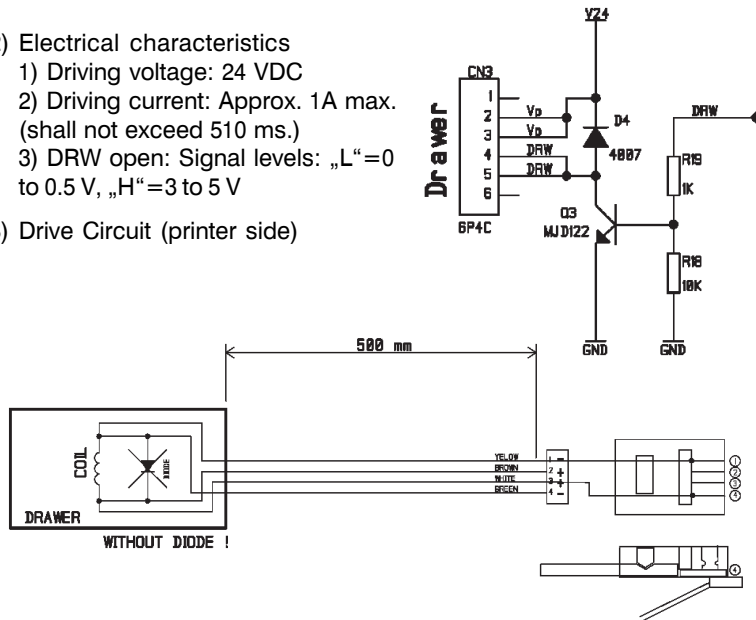


Connector used:  
GPGC

### (2) Electrical characteristics

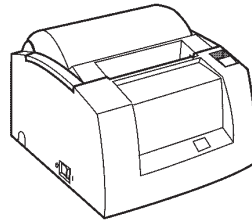
- 1) Driving voltage: 24 VDC
- 2) Driving current: Approx. 1A max.  
(shall not exceed 510 ms.)
- 3) DRW open: Signal levels: „L“=0 to 0.5 V, „H“=3 to 5 V

### (3) Drive Circuit (printer side)

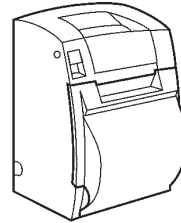


### 3.4 Installing the Printer

The printer can be installed horizontally, vertically, and on the wall. At the time of shipment, the printer is set for horizontal installation. To install the printer vertically or on the wall, the following adjustments are required.



Horizontal position

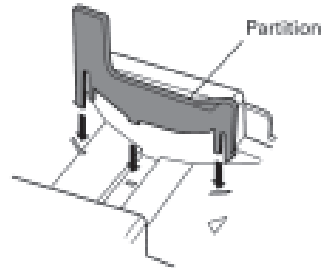


Vertical position

1. Adjustment of paper near-end sensor position (See section 3.7)
2. Anti-slip rubber feet (for vertical setting)
3. Optional wall-mounting kit (for wall-mounting)
4. Optional right-angle AC cable (when installing the printer with built-in power supply vertically)

### 3.5 Partition for 58-mm Wide Paper Roll

1. Turn off the printer power.
2. Open the paper cover.
3. Attach the „Partition“ supplied with the printer to the position shown in the figure.
4. Referring to the section of memory switch setting change the paper width setting to 58 mm.

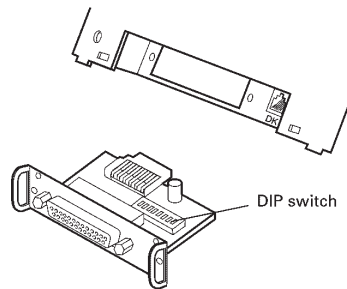


#### CAUTION

When using the 58-mm wide paper always use the printer with 58 mm paper only.

When using in horizontal setting, avoid cutting full. Otherwise, the cut paper may drop into the cutter and may result in double cutting and narrow pieces of paper. This may cause paper jam.

### 3.6 Setting DIP Switch



The DIP switch is present on the serial interface.

Remove the board fixing screws, take out the interface board, and then set the DIP switch.

The function of each switch is as shown below.

Sw1	Sw2	Sw3	Baud Rate (bps)
OFF	OFF	OFF	1200
ON	OFF	OFF	2400
OFF	ON	OFF	4800
ON	ON	OFF	9600
OFF	OFF	ON	19200
ON	OFF	ON	38400
OFF	ON	ON	57600
ON	ON	ON	115200

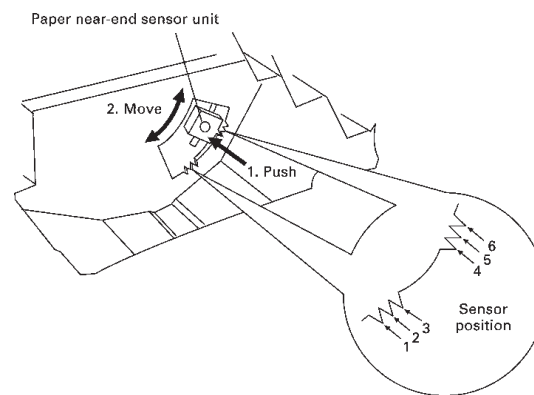
Switch	OFF	ON
Sw4	Hardware protocol	XON / XOFF protocol
Sw5	Standard commands	Extended commands
Sw6	Enable ESC t command	Disable ESC t command
Sw7	Disable the auto-cutter	Enable auto-cutter
Sw8	Narrow paper mode (57 mm)	Wide paper mode (80 mm)



**EP-300's DIP switches are software! For more information see GS ) command.**

### 3.7 Adjusting the Paper Near-end Sensor

1. Push in the paper near-end sensor unit.
2. Move the paper near-end sensor unit to the right and left while pushing it. The position to be set varies in accordance with the setting of the printer, horizontal or vertical, or the diameter of the paper roll as shown in the following figure.



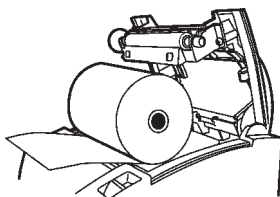
Sensor Position	Installation Method	Paper Roll External Diameter (mm)
1	Horizontal	Ø 22
2		Ø24
3		Ø27
4		Ø27
5	Vertical (Wall-mounted)	Ø24
6		Ø22

#### CAUTION

- Paper remainder (outside diameter of roll) differs by the type of paper roll used.
- The external diameter of the paper roll is only for reference.

## 4. MAINTENANCE AND TROUBLESHOOTING

### 4.1 Setting/Replacing Paper Rolls



1. Pull the cover open lever fully toward you.
2. Open the paper cover.
3. Insert a paper roll with its print area facing down as shown in the figure and pull out the paper end straightforward by several cm out of the printer.
4. Close the paper cover until a click can be heard.



#### CAUTION

- Always use the specified types of paper roll.
- Confirm that the paper roll is set correctly.
- When the paper is skewed and not extended straightforward from under the cover, open the cover and adjust the paper correctly.
- When closing the cover, press on the center part of the cover to close it firmly.



#### WARNING

When opening the paper cover, take care not to touch the print head or cutter blade. Otherwise, burning or injury of hand may result.

## ***4.2 Removing Jammed Paper***

1. Turn the printer power off.
2. Open the paper cover.  
If the cutter blade remains protruded with paper jammed, do not open the paper cover forcibly. Referring to section 4.4, restore the blade to the normal position and then open the cover.
3. Remove the jammed paper including any paper chips remaining. (Also take out the paper roll from the holder.)
4. Turn on the printer. The auto cutter mechanism is initialized and the alarm is cleared.

### **CAUTION**

The print head is hot immediately after printing. Do not touch it with your hand. Do not touch the heating element of the head with a bare hand or metal object either.

## ***4.3 Cleaning the Print Head***

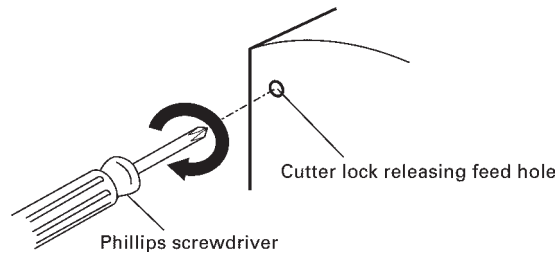
1. Turn the printer power off.
2. Open the paper cover.
3. Wait several minutes. Wipe off any debris on the heating element of the head using a cotton swab soaked in ethyl alcohol.

### **CAUTION**

The print head is hot immediately after printing. Do not touch it with your hand. Do not touch the heating element of the head with a bare hand or metal object either.



#### **4.4 When the Paper Cover Cannot Be Opened**



If the cutter blade remains protruded due to paper jam or for any abnormality, opening the paper cover may be disabled.

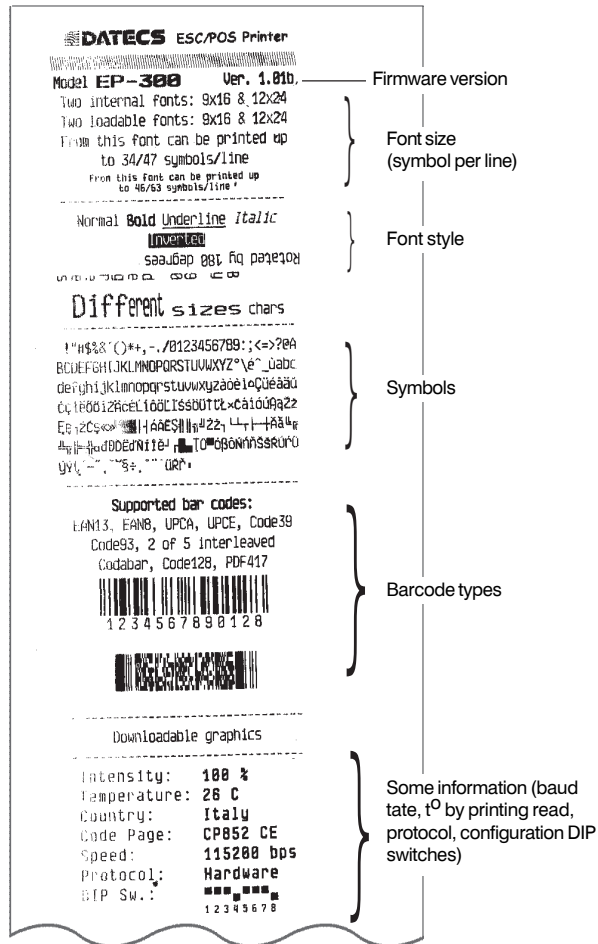
In this case, do not open the paper cover forcibly. Insert a Phillips screwdriver into the cutter lock releasing feed hole and turn it in the direction of arrow (clockwise).

Use a #1 screwdriver.

When you find that both ends of the blade reached the lowest position, stop turning the screwdriver. Open the cover and follow the procedure of removing jam or other cause of trouble.

#### 4.5 Self-printing

Insert paper into the printer. With the FEED switch pressed and held, turn the printer power on. Keep the FEED switch held for about 1 second and „ERROR“ LED blinks. Then release the FEED switch. The printer starts self-printing. The printer prints model name, version, DIP switch setting, memory switch setting, and built-in fonts.



## **4.6 Hexadecimal Dump Printing**

This function is to print all received data in hexadecimal numbers. If problems such as missing data, data duplication, etc. should occur, this function allows checking whether or not the printer is receiving data correctly.

With the FEED switch pressed and held, turn the printer power on. Keep the FEED switch held for 3 sec and after „ERROR“ LED blinks two times the printer prints „hexadecimal dump mode“, followed by the received data printed in hexadecimal numbers and some characters.

Print example

```
HEX DUMP PRINT MODE
1B 21 00 1B 20 04 41 42 43 44 .!.. .ABCD
45 46 47 48 49 4A 4B 4C 4D 4E EFGHIJKLMN
4F 50 0D 0A 31 32 33 0D 0A    OP..123..
```

When you press the FEED switch one time the printer completes the last one or press two times the EP-300 exits „hexadecimal dump mode“ (if the printer is not receiving data or a reset signal from the interface).

HEXADECIMAL DUMP MODE  
PRESS THE FEED ONCE TO COMPLETE THE LAST LINE.  
PRESS TWO MORE TIMES WHEN THE  
PRINTER IS NOT RECEIVING DATA TO EXIT  
HEXADECIMAL DUMP MODE.

\*\*\* COMPLETED \*\*\*

## 4.7 Error Indication

### ◆ Paper end

Paper empty is detected in two steps: paper near-end and paper end. It causes the ERROR LED blinks 1 time per sec.. If paper end is detected, refill the paper.

### ◆ Paper cover open

During printing, do not open the paper cover. If you open the paper cover accidentally, the ERROR LED lights. Confirm the paper and close the over. Printing resumes automatically.

### ◆ Thermal head overheat

When you print dense characters or dark image, the head temperature rises. If the head temperature exceeds a specified level, the printer stops printing operation and waits till the head temperature is lowered. During waiting, the POWER LED blinks. When the head temperature is lowered, printing resumes automatically.

### ◆ Autocutter lock

If the cutter blade stops operating due to paper jam or the like, the ERROR LED blinks 3 time per sec.

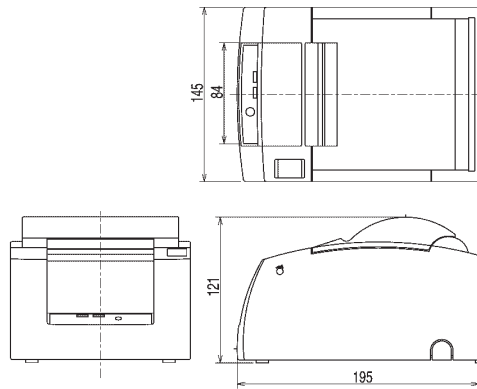
Status	Power LED	ERROR LED
<b>Paper end</b>	Lights	Blinks 1 time per sec.
<b>Paper near end</b>	Lights	Blinks 1 time per sec
<b>Cover open error</b>	Lights	Lights
<b>Auto-cutter error</b>	Lights	Blinks 3 times per sec
<b>Head Overheat error</b>	Blinks	Not Lights

## 5. OTHER

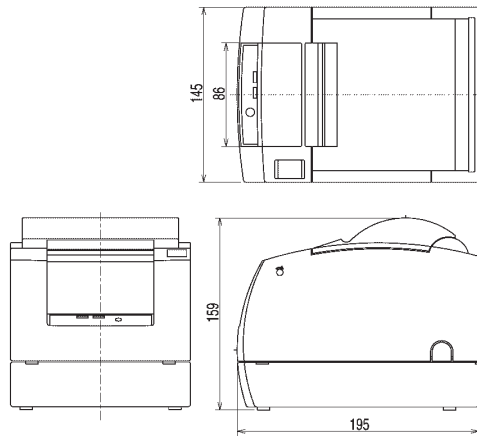
### 5.1 External Views and Dimensions

(Unit: millimeter)

#### AC Adapter Type

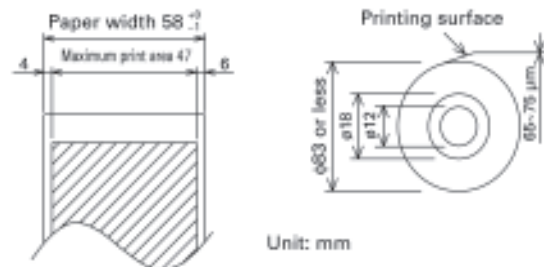


#### Built-in Power Supply Type



## 5.2 Printing Paper

Use the print paper shown in the following table or the paper with equivalent quality.



Paper	Type Product Name
Recommended thermal paper roll	TF50KS-E2D from Nippon Paper KF50-HAD, PD150R, PD160R from Ohji Paper F220VP, HP220A, F230AA from Mitsubishi Paper



### CAUTION

Use the paper with the start of winding to roll core is as shown below.

- No fold line is present and paper is along the inner diameter.
- No turnup is present.
- No pasting to core is present.
- Outer winding (print side out) is used.

## 6. COMMAND LIST

1	<b>BEL</b>	Sounds the beeper	07H
2	<b>HT</b>	Horizontal tab command	09H
3	<b>LF</b>	Printing and paper feed	0AH
4	<b>CR</b>	Print command	0DH
5	<b>ESC RS</b>	Sounds the beeper	1BH 1EH
6	<b>ESC SP</b>	Setting the right space amount of the character	1BH 20H n
7	<b>ESC #</b>	Setting the Euro symbol position	1BH 23H n
8	<b>ESC \$</b>	Specifying the absolute positions	1BH 24H n1 n2
9	<b>ESC %</b>	Selecting user character set	1BH 25H n
10	<b>ESC &amp;</b>	Define user characters	1BH 26H m n1 n2
11	<b>ESC !</b>	Collective specifying printing mode	1BH 21H n
12	<b>ESC *</b>	Specifying the bit image mode	1BH 2AH m n1n2[d]k
13	<b>ESC -</b>	Specifying/cancelling underline	1BH 2DH n
14	<b>ESC .</b>	Self test / demo	
15	<b>ESC ,</b>	Printing diagnostic information	1BH 54H
16	<b>ESC 2</b>	Specifying 1/6-inch line feed rate	1BH 32H
17	<b>ESC 3</b>	Setting line feed rate of minimum pitch	1BH 33H n
18	<b>ESC 8</b>	Temporary store current print settings	1BH 38H
19	<b>ESC 9</b>	Restore saved printer settings	1BH 39H
20	<b>ESC =</b>	Data input control	1BH 3DH n
21	<b>ESC &gt;</b>	Set Factory Defaults	1BH 3EH n
22	<b>ESC @</b>	Initializing the Printer	1BH 40H
23	<b>ESC D</b>	Setting horizontal tab position	1BH 44H [n]k 00H
24	<b>ESC E</b>	Specifying/cancelling highlighting	1BH 45H n
25	<b>ESC G</b>	Specifying/cancelling double printing	1BH 47H n
26	<b>ESC I</b>	Specifying/cancelling italic printing	1BH 49H n
27	<b>ESC J</b>	Printing and feeding paper n/203 inch	1BH 4AH n
28	<b>ESC M</b>	Selecting character font A or B	1BH 4DH n
29	<b>ESC R</b>	Setting the international character set	
30	<b>ESC V</b>	Specifying/canceling 90°-right-turned characters	1BH 56H n
31	<b>ESC X</b>	Select maximal printing speed	
32	<b>ESC Y</b>	Selecting intensity level	1BH 59H n
33	<b>ESC Z</b>	Transmits identification string	1BH 5AH

34	<b>ESC \</b>	Specifying the relative positions	1BH 5CH n1 n2
35	<b>ESC _</b>	Restore factory settings 1BH 5FH	
36	<b>ESC ‘</b>	Transmits current battery voltage and the print head temperature	1BH 60H
37	<b>ESC a</b>	Aligning the characters 1BH 61H n	
38	<b>ESC c5</b>	Enabling/disabling the panel switches	1BH 63H 35H n
39	<b>ESC d</b>	Printing and feeding the paper by n lines	1BH 64H n
40	<b>ESC i</b>	Cutting the paper	
41	<b>ESC m</b>	Cutting the paper	
42	<b>ESC p</b>	Generating a drawer-kick pulse	
43	<b>ESC t</b>	Selecting the character code table	
44	<b>ESC v</b>	Transmitting the printer status	1BH 76H n
45	<b>ESC x</b>	Reversing the print direction	1BH 78H n
46	<b>ESC {</b>	Specifying/canceling the inverted characters	1BH 7BH n
47	<b>GS ( A</b>	Printing a self-test	
48	<b>GS B</b>	Specifying/canceling the black/white inverted printing	
49	<b>GS L</b>	Setting the left margin	1DH 4CH n1 n2
50	<b>GS V</b>	Cutting the paper	
51	<b>GS k</b>	Printing the bar code	1DH 6BH n [d]
52	<b>GS w</b>	Selecting the horizontal size (scale factor) of bar code	1DH 77H n
53	<b>GS h</b>	Selecting the height of the bar code	1DH 68H n
54	<b>GS H</b>	Selecting of print position of HRI code	1DH 48H n
55	<b>GS f</b>	Selecting the font of HRI code	1DH 66H n
56	<b>GS p</b>	Setting bar code PDF-417 parameters	1DH 70H
57	<b>GS v 0</b>	Printing of raster bit image	
58	<b>GS *</b>	Defining the downloaded bit image	1DH2An1n2[d]n1xn2
59	<b>GS /</b>	Printing the downloaded bit image	1DH 2FH m
60	<b>GS :</b>	Starting/ending macro definition	1DH 3AH
61	<b>GS ^</b>	Executing the macro	1DH 5EH n1 n2 n3
62	<b>GS )</b>	Switching ON/OFF a software DIP switch	
63	<b>GS # 0</b>	Send data to external client display	
64	<b>FS p</b>	Printing the downloaded NV bit image	
65	<b>FS q</b>	Defining the downloaded bit image	



## 7. DETAILED DESCRIPTION

### 1. BEL

---

Sounds the beeper

[Code]     **[07h]**

[Outline]    Sounds the beeper.

### 2. HT

---

Horizontal Tab Command

[Code]     **[09h]**

[Outline]    Shifts the printing position to the next horizontal tab position.

- Ignored when the next horizontal tab position has not been set.
- The horizontal tab position is set by **ESC D**.
- Initial setting of the horizontal tab position is each 8 characters in 9th, 17th, 25th, columns.

[See Also]   ESCD

### 3. LF

---

Printing and Paper Feed Command

[Code]     **[0Ah]**

[Outline]    Prints data inside the input buffer and feeds lines based on the line feed amount having been set.

The head of the line becomes the next print starting position.

[See Also]   ESC 2, ESC 3

### 4. CR

---

Print Command

[Code]     **[0Dh]**

This command is ignored.

### 5. ESC RS

---

Sounds the beeper

[Code]     **[1Bh] + [1Eh]**

[Outline]    Sounds the beeper.

## 6. ESC SP n

---

Setting the right space amount of the character

[Code]	<b>[1Bh] + [20h] + n</b>
[Range]	{0 ≤ n ≤ 20h}
[Outline]	The rightward space amount is set in dot unit (1/203 inch unit).
[Caution]	The rightward space amount in double wide mode is made double of the set volume.
[Default]	<b>n = 0</b>

## 7. ESC # n

---

Setting the Euro symbol position

[Code]	<b>[1Bh] + [23h] + n</b>
[Range]	{0 ≤ n ≤ FFh}
[Outline]	This command is provided because most of the old OEM/DOS code pages do not have the euro symbol mapped. This command shows the direct position of the euro symbol in the code table. If n is given value less than 20h the Euro symbol will not be shown.
[Caution]	<p>When the code page is changed the Euro symbol position is cleared! The Euro symbol position must be re-entered any time the code page is changed (see below).</p> <p>Any symbol of the code table could be remapped, with no restrictions. The user must take care not to remap some of the most commonly used symbols.</p> <p>Some of the code pages supported by the printer (Windows code pages) include the Euro symbol, using the command in such case will result in Euro symbol appearing twice in the code table.</p> <p>Code pages 20, 21, 22 and 23 (CP858, CP852 + Euro, CP808 and CP857 + Euro) are not hard-coded code pages, i.e. they do not have the Euro Symbol built in. They are produced by giving the Euro symbol position the proper value. If the command is used with some of these pages the Euro symbol position will be changed, i.e. it will not appear twice.</p> <p>The command ESC &gt; stores the Euro symbol position for further use as a default value.</p>
[Default]	<p><b>n = 0 (Not selected)</b></p> <p>if code page = 20 (CP858), n = D5h;</p> <p>if code page = 21 (CP852 + Euro), n = AAh;</p> <p>if code page = 22 (CP808), n = F2h;</p> <p>if code page = 23 (CP857 + Euro), n = D5h.</p>

## 8. ESC \$ n1 n2

Specifying the Absolute Positions

- [Code]      **[1Bh] + [24h] + n1 + n2**
- [Range]      {0 ≤ n1 ≤ FFh}  
                  {0 ≤ n2 ≤ 2}  
                  {0 ≤ n1+n2\*256 ≤ 415} - if narrow paper is used  
                  {0 ≤ n1+n2\*256 ≤ 575} - if wide paper is used
- [Outline]      The printing start position is specified in the number of dots  
                  (1/203 inch unit) from the beginning of line.  
                  • The number of dots is divided by 256, whose quotient is taken as n2  
                  and the residual as n1.  
                  • Therefore, the printing start position is equal to n1 + n2 x 256 from  
                  the beginning of line..
- [Caution]      • Specifying beyond the line end is ignored.
- [Default]      • The initial value is not specified.
- [See Also]      ESC\

## 9. ESC % n

Select/cancel user defined characters

- [Code]      **[1Bh] + [25h] + n**  
                  • Only bit 0 of n is defined  
                  Value 0: Selected  
                  Value 1: Not selected
- [See also]      ESC&

## 10. ESC & s n1 n2 [a [d] s x a] k

### ESC & m n1 n2 [ d ] k

Define user characters

There are two different types of this command selected by switch 5's position.

**If switch 5 is OFF:**

- [Code]      **[1Bh] + [26h] + s + n + m + [a<sub>1</sub> + D<sub>1</sub>] + ... + [a<sub>m-n+1</sub> + D<sub>m-n+1</sub>]**
- [Range]      {s = 3}

	$\{20h \leq n \leq FFh\}$ $\{n \leq m \leq FFh\}$ $\{0 \leq a \leq 12\}$ $\{0 \leq D_i \leq FFh\}$
[Outline]	<p>Defines a group of downloaded characters where:</p> <p>“s” is the number of bytes in vertical direction - always three.</p> <p>“n” indicates the start character code and “m” indicates the end character code. To define only one character set <math>n=m</math>.</p> <p>“a” is the number of dots in horizontal direction.</p> <p>“D<sub>i</sub>” is the data to be defined. The number of data for each symbol is <math>s \times a</math>. Each symbol defines with three bytes of data in vertical direction followed by the next three bytes that define the next one-dot column, etc. The downloaded font is cleared by <b>ESC @</b> and <b>ESC _</b> commands and when the printer is switched off.</p>
[Default]	<p>The default downloaded font is equal to the default character set. However the downloaded font is not reset when the code page is changed, thus it remains the same as the previous code page.</p>

**If switch 5 is ON:**

[Code]	<b>[1Bh] + [26h] + a + n1 + n2 + D<sub>1</sub> + ... + D<sub>(m-n+1)k</sub></b>
[Range]	$\{m = 0-3 \text{ Subcommand}\}$ $\{20h \leq n1 \leq FFh\}$ $\{n1 \leq n2 \leq FFh\}$ $\{k = (n2-n1+1)*48 \text{ for } m=2 \text{ and } k = (n2-n1+1)*16 \text{ for } m=3\}$
[Outline]	<p>Defines a group of user characters.</p> <p><b>m=0:</b> Copy internal character set A to user character set A (Parameters n1, n2 and d are omitted)</p> <p><b>m=1:</b> Copy internal character set B to user character set B (Parameters n1, n2 and d are omitted)</p> <p><b>m=2:</b> Define character group with ASCII codes between <math>\geq n1</math> and <math>\leq n2</math> for character set A (12x24). Every character is 48 bytes, two bytes for each line. Only the first nibble of the second byte is used.</p> <p><b>m=3:</b> Define character group with ASCII codes between <math>\geq n1</math> and <math>\leq n2</math> for character set B (9x16). Every character is 16 bytes.</p> <p><b>n1</b> is the ASCII code of the first and <b>n2</b> is the ASCII code of the last of <math>(n2-n1+1)</math> consecutive symbols. To define a single symbol <math>n1=n2</math>. <b>d</b> is the data that defines the symbols. Every Font A symbol consists of 48 bytes while every Font B symbol consists of 16 bytes.</p>

A Font A symbol is defined left to right, top to bottom, two bytes for each horizontal line, as only the four most significant bits of the second byte are used. Every bit denotes one dot. A bit set to '1' means black dot.

The most significant bit is the starting.

Every horizontal line of Font B symbol consists of one byte, as the ninth point is always white. The most significant bit is the starting.

The user-defined characters are kept after printer off.

[See Also] ESC %

## 11. ESC ! n

Collective Specifying Printing Mode

[Code] **[1Bh] + [21h] + n**

[Range] {0 ≤ n ≤ FFh}

[Outline] Printing mode is assigned. Each n bit indicates the following:

Bit	Function	Value 0	Value 1
0	Character Font	Font A	Font B
1	Undefined		
2	Undefined		
3	High-lighting	Canceled	Specified
4	Double height	Canceled	Specified
5	Double width	Canceled	Specified
6	Undefined		
7	Underline	Canceled	Specified

- [Caution]
- With double height and double width being specified simultaneously, double wide and double high characters are consisted.
  - An underline is attached to the full character width, which, however, is not attached to the part having been skipped by the horizontal tab. Neither is it attached to 90° right-turned characters.
  - The underline width is as having been specified by <ESC - >. (The default setting is 1 dot width)
  - In case that double wide character and normal character exist in same one line, the layout of underline is consistent one.

[Default] n = 0

[See Also] ESC E, ESC

## 12. ESC \* m n1 n2 [ d ] k

### Specifying the Bit Image Mode

- [Code] **[1Bh] + [2Ah] + m + n1 + n2 + D<sub>1</sub> + ... + D<sub>k</sub>**
- [Range] {m= 0, 1, 32, 33 bit image mode (See the table below.)}  
 {0 ≤ n1 ≤ FFh}  
 {0 ≤ n2 ≤ 3}  
 {0 ≤ d ≤ FFh}  
 {k = n1 + 256 X n2 (m = 0, 1)  
 {k = (n1+256 X n2) X 3} (m = 32, 33)
- [Outline] According to the number of dots specified in n1, n2, specify the bit image of mode m.
- The total number of dots printed in the bit image is equal to n1 + (256 x n2).
  - When bit image data have been input in excess of dot position of one line (384 dots) , the excess data are discarded.
  - d is bit image data, the bits subject to printing are taken as "1" and those not as "0".
  - The bit image modes specified by m are shown as follows:

		Vertical Direction		Horizontal Direction	
m	Mode	Dots	Dot Density	Dot Density	Max. Dots
0	8-dot single density	8	67 DPI	101 DPI	192
1	8-dot double density	8	67 DPI	203 DPI	384
32	24-dot single density	24	203 DPI	101 DPI	192
33	24-dot double density	24	203 DPI	203 DPI	384

- [Caution] • When the values set in m (bit image mode) are out of the above range, the data following after n1 is processed as normal printing data.  
 • After completion of bit image printing, printer returns to normal data processing mode.

The command has another variant with four new modes:

### ESC \* m n[ d ] k

### ESC \* m n a f [ d ] k

Specifying the Bit Image Mode (Sending graphics data horizontally)

- [Code] **[1Bh] + [2Ah] + m + n + { a + [00h] } + D<sub>1</sub> + ... + D<sub>k</sub>**
- [Range] {m = 16, 17, 18, 20 bit image mode }  
 {0 ≤ n ≤ 40h}

{0 <= **d** <= FFh}  
 {**k** = n \* 24 \* 48} (m = 16)  
 {**k** = n \* 24 \* 48} (m = 17) {After decompression}  
 {**k** = n \* h \* 48} (m = 18) {After decompression}  
 {**k** = n \* 24 \* 48} (m = 20) {After decompression}  
 {0 <= **a** <= 24 (Used only for mode 18.)}  
 {f = 0 (Used only for mode 18.)}

[Outline] In these graphics modes is sent a graphics block with variable width n\*8 dots and height 24 dots for modes 16,17 and a dots for mode 18. In mode 17 data is compressed, and the bytes count specified is before the compression. In mode 16 the same data is without compression. Mode 20 is similar to mode 17, but every byte is mirrored before putting in the print buffer (bits 0 and 7, 1 and 6, 2 and 5, 3 and 4 change places). All modes are high resolution (203 x 203 DPI).  
 • When bit image data have been input in excess of dot position of one line (384 dots) , the excess data are discarded.  
 • **d** is bit image data, the bits subject to printing are taken as "1" and those not as "0".

[Caution] • When the values set in m (bit image mode) are out of the above range, the data following after n is processed as normal printing data.  
 • After completion of bit image printing, printer returns to normal data processing mode.

[Compression procedure for mode 17 and 18]  
 A simple RLE encoding like this in PCX files is used. If two most significant bits of the byte are set, the 6 LSB contain a repeat counter (1-63), and the next byte contains the data to be repeated. A single data byte with 2 MSB set must be sent as two bytes.

### 13. ESC - n

Specifying/ Canceling Underline

[Code] **[1Bh] + [2Dh] + n**

[Range] {0 <= **n** <= 2}

[Outline] Specifying/canceling an underline.  
 • Types of underlines by **n** value are shown below:  
   **0** Canceling an underline.  
   **1** Specifying an underline for 1-dot width.  
   **2** Specifying an underline for 2-dots width.

[Caution] • An underline is attached to the full character width. It is, however, not attached to the part having been skipped by horizontal tab command.  
 • An underline is not attached to a 90°- right-turned characters.

[See Also] ESC!

## **14. ESC .**

---

Selftest.

[Code]     **[1Bh] + [2Eh]**

[Outline]   Prints character table, character samples with different attributes and diagnostic information.

[See also]   ESC ,

## **15. ESC ,**

---

Printing diagnostic information

[Code]     **[1Bh] + [2Ch]**

[Outline]   Printing current intensity level, temperature, code tables, communication mode, protocol and serial port speed if a serial communication board is installed.

[See also]   ESC .

## **16. ESC 2**

---

Specifying 1/6-inch line feed rate

[Code]     **[1Bh] + [32h]**

[Outline]   The line feed rate per line is specified by 1/6 inch.

## **17. ESC 3 n**

---

Setting line feed rate of minimum pitch

[Code]     **[1Bh] + [33h] + n**

[Range]    {0 <= n <= FFh}

[Outline]   The line feed rate per line is specified by n/203 inch.

[Default]   The initial value is n = 34 (1/6 inch) (22H), being 4.23 mm line feed rate.

## **18. ESC 8**

---

Temporary store current print settings

[Code]     **[1Bh] + [38h]**

[Outline]   Use command 'ESC 9' to restore the parameters. The parameters stored are:



double height/width symbols, rotated by 90° degrees symbols, font size, underline, emphasize, italic style, downloaded font active, rotated by 180° degrees symbols, black and white inverse symbols, reverse print direction (from right to left), Chinese/Arabic code table selected (only in the Chinese/Arabic printer version), print density, printing speed, left margin, printing width, line height, intercharacter space, country, code page, Euro symbol position, barcode width, barcode height, barcode HRI position.

[Caution] The printer uses this command when printing full and short self-tests. So if a self-test is printed, the printer will store the print settings active at the time the printing starts.

## 19. ESC 9

---

Restore the previously saved settings

[Code] **[1Bh] + [39h]**

[Outline] This command restores the setting saved with ESC 8. If such a command has never been issued, the printer restores the settings as they were at printer power on.

## 20. ESC = n

---

Data Input Control

[Code] **[1Bh] + [3D] + n**

[Range] {0 ≤ n ≤ FFh}

[Outline] Selecting equipment in which data input from the host is effective.

- Only bit 0 is defined

Value 0: Selected

Value 1: Not selected

- When the printer has not been selected, this printer abandons all the received data until it is selected by this command.

[Caution] • Even when the printer has not been selected, it can become BUSY state through printer operation.

- When the printer is deselected, this printer discards all the data until it is selected with this command.

[Default] • The initial value of n is "1".

## 21. ESC > n

---

Set Factory Defaults

[Code]	<b>[1Bh] + [3Eh] + n</b>
[Range]	{0 ≤ n ≤ FFh}
[Outline]	<p>This command writes the current code tables, the intensity level and the current printing speed into the flash memory. These values will be retrieved at first power up or after a power failure.</p> <ul style="list-style-type: none"> <li>• Value of <b>n</b> doesn't matter. It is left for compatibility purpose.</li> </ul>
[Default]	<ul style="list-style-type: none"> <li>• The initial values are: code tables 0 (US American CP437), intensity level 100%, maximum printing speed.</li> </ul>

## 22. ESC @

---

Restore saved to nonvolatile RAM settings

[Code]	<b>[1Bh] + [40h]</b>
[Outline]	<p>Clears data stored in the print buffer and brings various settings to the initial state.</p>
[Caution]	<ul style="list-style-type: none"> <li>• Data inside the internal input buffer are not cleared.</li> <li>• The current code tables, print intensity and printing speed are not reset.</li> <li>• If switch 5 is OFF, the command clears the downloaded font and bit image too.</li> </ul>
[See also]	ESC ^ and ESC _

## 23. ESC D [ n ] k NUL

---

Setting Horizontal Tab Position

[Code]	<b>[1Bh] + [44h] + n<sub>1</sub> + ... + n<sub>k</sub> + [00h]</b>
[Range]	<p>{0 ≤ n ≤ FFh}</p> <p>{0 ≤ k ≤ 20h}.</p>
[Outline]	<p>Specifying a horizontal tab position.</p> <ul style="list-style-type: none"> <li>• “<b>n</b>” indicates the no. of columns from the beginning to the horizontal tab position. At this time, n= set position 1 is to be specified. For example, to set the position at 9th column, n=8 is to be specified.</li> <li>• <b>k</b> denotes the number of horizontal tab positions you want to set.</li> <li>• The tab position is set at position where it is “character width x n” from</li> </ul>

the line beginning. The character width, at this time, includes the rightward space amount. In double wide characters, it is made double of the ordinary case.

- Tab positions can be specified are maximum 32. Specifying exceeding this is ignored.
- $\langle n \rangle k$ , which denotes a setting position, is input in the increasing order and ends at  $\langle 00 \rangle H$ .
- ESC D NUL clears all the set tab positions. Following clearing, horizontal tab command is ignored.

[Caution] When the data,  $\langle n \rangle k$ , is equal to or smaller than its preceding data,  $\langle n \rangle k - 1$ , it is assumed that tab setting is finished. If this is the case, the next data onward will be processed as normal data. When the data,  $\langle n \rangle k$ , exceeds a 1 line print area, set the horizontal tab position, assuming "Set digit position = Maximum print digits + 1." The horizontal tab position does not change even if the character width is altered after setting the horizontal tab position.

[Default] • Initial value is specified for each eight characters (9 th . 17 th . 25 th column).

[See Also] HT

## 24. ESC E n

Specifying/canceling highlighting

[Code] **[1Bh] + [45h] + n**

[Range] {0 ≤ n ≤ FFh}

[Outline] Specifying/canceling the highlighting characters.

- "n" is valid only for the lowest bit (n0).
- Control by the lowest bit (n0) is shown as follows:  
**0** Canceling highlighting.  
**1** Specifying highlighting.
- This is effective to all characters of font A.
- Characters of font B are not highlighted.
- Dot configuration of a highlighted character includes one extra dot added at its side.

[Caution] • The print result of Double printing and highlight character printing is completely same.

[See Also] ESC!

## 25. ESC G n

---

Specifying/canceling Double Printing (ESC G n)

[Code] **[1Bh] + [47h] + n**

[Range] {0 ≤ n ≤ FFh}

[Outline] Specifying/canceling the double printing.

- “n” is valid only for the lowest bit (n0).
- Control by n is shown as follows.
  - 0** Canceling double printing.
  - 1** Specifying double printing.
- This is effective to all characters of font A.
- Characters of font B are not highlighted.

[Caution] • The print result of Double printing and highlight character printing is completely same.

[See Also] ESCE

## 26. ESC I n

---

Specifying/cancelling italic printing (ESC I n)

[Code] **[1Bh] + [49h] + n**

[Range] {0 ≤ n ≤ FFh}

[Outline] Specifying/canceling the double printing.

- “n” is valid only for the lowest bit (n0).
- Control by n is shown as follows.
  - 0** Canceling italic printing.
  - 1** Specifying italic printing.

## 27. ESC J n

---

Printing and feeding paper n/203 inch

[Code] **[1Bh] + [4Ah] + n**

[Range] {0 ≤ n ≤ FFh}

[Outline] Prints data inside the print buffer and feeds paper by n/203 inch. Since an actual mechanical pitch is 1/203 inch, it is internally converted approximate to the value specified with this command.

- Specified volume does not remain.
- The beginning of the line is to be considered as the next printing start position.
- Initial value is not defined.

## 28. ESC M n

Specifying/canceling highlighting

[Code]     **[1Bh] + [4Dh] + n**

[Range]    {0 ≤ n ≤ FFh}

[Outline]   Selects character font.

- “n” is valid only for the lowest bit (n0).
- Control by the lowest bit (n0) is shown as follows:  
**0** Selection of font A (12x24).  
**1** Selection of font B (9x16).

[Caution]   ESC ! can also select fonts, but the setting made by the command processed last is valid.

[See also]   ESC !

## 29. ESC R n

Selecting international character set

[Code]     **[1Bh] + [52h] + n**

[Range]    {0 ≤ n ≤ 10}

[Outline]   Depending on the value of “n”, one of the following character sets is selected:

n	Country	Character Set											
		23h	24h	40h	5Bh	5Ch	5Dh	5Eh	60h	7Bh	7Ch	7Dh	7Eh
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	ó	è	ì
7	Spain I	Pt	\$	@	ı	Ñ	ı	^	`	ñ	ı	}	~
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

### 30. ESC V n

Specifying/Canceling 90° -right- turned Characters

[Code] **[1Bh] + [56h] + n**

[Range] {0 ≤ n ≤ 1}.

[Outline] Specifying/canceling characters 90° -right- turned character.

- “n” means the followings.

- 0 Canceling 90° -right- turned Characters

- 1 Specifying 90° -right- turned Characters

[Caution] • No underlines are attached to 90° -right- turned characters .

[Default] • The initial value of n is “0”.

### 31. ESC X n

Select maximum printing speed

[Code] **[1Bh] + [58h] + n**

[Range] {0 ≤ n ≤ 3}  
{‘0’ ≤ n ≤ ‘3’}

[Outline] Selects the maximum printing speed according to the value of ‘n’:

- 0 or ‘0’ about 100 mm/s

- 1 or ‘1’ about 83 mm/s

- 2 or ‘2’ about 66 mm/s

- 3 or ‘3’ about 50 mm/s

These values are approximate. The real maximum speed depends on the print intensity and the printing head’s temperature.

[Default] The default value is 0 - maximal printing speed.

### 32. ESC Y n

Selecting the intensity level

[Code] **[1Bh] + [59h] + n**

[Range] {0 ≤ n ≤ 5}

[Outline] Set the intensity level.

- “n” means the followings.

- 0 Set intensity 70 %

- 1 Set intensity 80 %
- 2 Set intensity 90 %
- 3 Set intensity 100 %
- 4 Set intensity 120 %
- 5 Set intensity 150 %

[Caution] • Higher intensities can cause a lower speed.

[Default] • The initial value of n is 3.

### 33. ESC Z

Transmits identification string

[Code] **[1Bh] + [5Ah]**

[Outline] The printer transmits 32 bytes of information with the following structure:

- 1 - 22: Printer name complemented with space up to 22 symbols.
- 23 - 25: Firmware version - 3 digits (in ASCII format).
- 26 - 26: Language version - 2 letters.
- 28 - 32: 5 bytes flags. Each bit describes a printer feature, as '1' means that the feature is present, while '0' means its absence. Bits are described as follows:

Bit	Meaning
28.0	Supports IrDA mode
28.1	Supports magnetic card reader
28.2	Supports simultaneous reading of three tracks from a magnetic card
28.3	ASCII codes above 127 contain Katakana symbols
28.4	Supports JIS and Shift-JIS symbols
28.5	Prints when ESC . and ESC T, and transmits when ESC ' the temperature in ° Fahrenheit
28.6	Not Used
28.7	Reserved - always 1
29.0	Supports downloadable fonts and firmware
29.1	Korean support
29.2	Black mark support
29.3	Barcode reader support

29.4	USB A installed
29.5	USB B installed
29.6	Not Used
29.7	Reserved - always 1
30.0	Not Used
30.1	Not Used
30.2	Not Used
30.3	Not Used
30.4	Not Used
30.5	Not Used
30.6	Not Used
30.7	Reserved - always 1
31.0	Not Used
31.1	Not Used
31.2	Not Used
31.3	Not Used
31.4	Not Used
31.5	Not Used
31.6	Not Used
31.7	Reserved - always 1
32.0	Not Used
32.1	Not Used
32.2	Not Used
32.3	Not Used
32.4	Not Used
32.5	Not Used
32.6	Not Used
32.7	Reserved - always 1



## 34. ESC \ n1 n2

Specifying the Relative Positions

[Code] **[1Bh] + [5Ch] + n1 + n2**

[Range] {0 <= n1 <= FFh}  
{0 <= n2 <= FFh}

[Outline] The printing start position is specified in the number of dots(1/203 inch unit) from the current position.

- Rightward direction is taken as plus and leftward direction as minus.
- To specify N dot in minus (left) direction, use a complement of N for assignment.  
- N dots = 65536 - N
- The number of dots is divided by 256, whose quotient is taken as n2 and the residual as n1.
- There are 416 dots per line (positions from 0 to 415) when in "narrow" paper mode
- There are 576 dots per line (positions from 0 to 575) when in "wide" paper mode.

[Caution] • Specifying exceeding the beginning of the line or the end of the line is ignored.

[Default] • The initial value is not specified.

[See Also] ESC \$

## 35. ESC \_

Restore factory defaults and save them to nonvolatile RAM

[Code] **[1Bh] + [5Fh]**

[Outline] Select font A, no bold, no underline, etc. Restore tab defaults. The parameters are read from the flash memory. Downloaded font and downloaded bit image are cleared. Copy internal fonts A and B to user fonts. DIP switches are read again.  
Data in the input buffer is not cleared.

[See also] ESC @

### 36. ESC ‘

---

Transmits the current power supply voltage and the print head temperature.

[Code] <1B>H<60>H

[Outline] The printer transmits two bytes data. First byte is the power supply voltage given as 0.1 mV plus 20h. the second byte is the print head emperature, n degrees Celsius, plus 20h.

[Example] If the battery voltage is 6.4 V, and the print head temperature is 33°C, the printer will transmit <60h><41h>, which is 40h+20h><21h+20h> or **<64+32><33+32>**.

### 37. ESC a n

---

Aligning the characters

[Code] [1Bh] + [61h] + n

[Range] {0 <= n <= 2}  
{4 <= n <= 6 }

[Outline] This command is extended and has the following format:  
All the printed text data, the barcode or the raster bit image (GS v0) within one line are aligned in the specified position. If used before printing a barcode with this command can be specified vertical direction for printing the barcode.  
• Depending on n value, positional alignment is carried out as in the table below:

- 0 Left end alignment
- 1 Centering
- 2 Right end alignment
- 4 Left end aligned vertical barcode
- 5 Centred vertical barcode
- 6 Right end aligned vertical barcode

[Default] • The initial value of n is “0”.

---

### 38. ESC c5 n

Enabling/Disabling Panel Switches

[Code]     **[1Bh] + [63h] + [35h] + n**

[Range]    {0 ≤ n ≤ FFh}

[Outline]   Selecting the LF switch valid/invalid.

- “n” is valid only in the lowest bit (n0).
- “n” bit means the followings.
  - 0 LFSW valid.
  - 1 LFSW invalid.

[Caution]   When the panel switch is disabled with this command, the LF switch is disabled. Therefore, the paper cannot be fed by operating the LF switch.

[Default]   • The initial value of n is “0”.

---

### 39. ESC d n

Printing and Feeding the paper by n lines

[Code]     **[1Bh] + [64h] + n**

[Range]    {0 ≤ n ≤ FFh}

[Outline]   Prints data inside the buffer and feeds paper by n lines.

- Specified line does not remain.
- The beginning of the line is to be considered as the next printing start position.

[Default]   • The initial value is not defined.

---

### 40. ESC i

Cutting the paper

[Code]     **[1Bh] + [69h]**

[Outline]   The command performs a partial cut (one point left uncut). Prior to cutting the paper is fed so the last printed line remains after the cutter's edge.

This command is valid only at the beginning of the line.

## 41. ESC m

Cutting the paper

[Code]      **[1Bh] + [6Dh]**

[Outline]      The command is exactly the same as ESC i.

## 42. ESC p

Generating a drawer-kick pulse

[Code]      **[1Bh] + [70h] + m + n1 + n2**

[Range]      { 0 <= m <= 255 }  
                  { 0 <= n1 <= 255 }  
                  { 0 <= n2 <= 255 }

[Outline]      The value of m is ignored.  
                  The printer generates a **2\*n1** milliseconds long pulse and **2\*n2** milliseconds long rest after the pulse. n2 must be at least four times greater than n1 or the command will be discarded.

## 43. ESC t

Selecting the character code table

[Code]      **[1Bh] + [74h] + n**

[Range]      { 0 <= n <= 19 }

[Outline]      Selects the code table for ASCII codes 80h-FFh.  
                  One of the following supported code tables is selected according to the value of n:

n	Code Table
0	USA (CP437)
1	Litva
2	West Europe Latin I (CP850)
3	Brasil (CP860)
4	Poland
5	Bulgarian (CP856)
6	Central Europe Latin II (CP852)
7	Russian (CP866)
8	Turkish (CP857)

9	Windows English Latin I (CP1252)
10	Baltic (CP775)
11	Latvia
12	Greek (CP737)
13	Hebrew (CP862)
14	Windows Central European Latin II (CP1250)
15	Windows Cyrillic (CP1251)
16	Windows Greek (CP1253)
17	Windows Turkish (CP1254)
18	Windows Hebrew (CP1255)
19	Windows Baltic (CP1257)
20	West Europe Latin I + Euro (CP858)
21	Central Europe Latin II + Euro (CP852 + Euro)
22	Russian + Euro (CP808)
23	Turkish + Euro (CP857 + Euro)

In the **Chinese version** of the printer one of the following supported code tables is selected according to the value of *n*:

<b>n</b>	<b>Code Table</b>
<b>0</b>	USA (CP437)
<b>1</b>	Chinese GB2312

[Caution] In the international version of the printer when the code page is set by the DIP switches the command is disabled and a code page other than this one cannot be set.

In the Chinese version of the printer the code table can be changed regardless of the DIP switch setting.

Code pages 20, 21, 22 and 23 (CP858, CP852 + Euro, CP808 and CP857 + Euro) are not hard-coded code pages, i.e. they do not have the Euro Symbol built in. They are produced by giving the Euro symbol position the proper value. If ESC # is used with some of these pages the Euro symbol position will be changed, i.e. it will not appear twice.

Even if the code page is set by the DIP switches the command ESC > will store this code page into the flash for further use.

The command <ESC t 14h> is equal to the combination of commands <ESC t 02h> + <ESC # D5h>.

The command <ESC t 15h> is equal to the combination of commands <ESC t 06h> + <ESC # AAh>.

The command <ESC t 16h> is equal to the combination of commands <ESC t 07h> + <ESC # F2h>.

The command <ESC t 17h> is equal to the combination of commands <ESC t 08h> + <ESC # D5h>.

[Default] The default value is 0 – USA CP437 code page.

## 44. ESC v

Transmitting the printer status

[Code] **[1Bh] + [76h]**

[Outline] Current printer status is transmitted..  
Status sent out consists of 1 byte whose content is as in the table below.

Bit	Function	Value 0	Value 1
0		Not defined	
1		Not defined	
2	Paper end	With paper	Without paper
3	Head temperature	Normal	Overheated
4		Not defined	
5	Auto-cutter	No error	Error (jam)
6		Not defined	
7		Not defined	

## 45. ESC x n

Reversing the print direction

[Code] **[1Bh] + [78h] + n**

[Outline] This command changes the characters' print direction from left to right to right to left. The character itself is not mirrored horizontally. The command is intended for languages that use right to left scripting, like Hebrew and Arabic.  
Only the lowest bit of "n" is valid with the following meaning:  
**0** – left to right printing  
**1** – right to left printing

[Caution] The command changes only the print direction of the characters - all graphics and barcodes are unaffected.

This command is ignored in the Chinese version of the printer.  
The command reverses all print attributes of the line and the characters, though the characters themselves are not mirrored horizontally.  
Though the command allows mixing reversed and non-reversed characters in one line the print results could be unsatisfactory and unreliable.

[Default]     The default value is 0 – left to right printing.

---

## 46. ESC { n

Specifying/Canceling the Inverted Characters

[Code]        **[1Bh] + [7Bh] + n**

[Range]       {0 <= n <= FFh}

[Outline]      Specifying/canceling inverted characters.

- “n” is valid only for the lowest bit (n0).
- Bit n (n0) means the followings.
  - 0** Canceling inverted characters.
  - 1** Specifying inverted characters.

[Caution]    • Inverted printing means printing the line at 180° turned.  
                  • Valid is the last value specified in a line.

[Default]     • The initial value of n is “0”.

---

## 47. GS (A pL pH n m

Printing a self-test

[Code]        **[1Dh] + [28h] + [41h] + pL + pH + n + m**

[Range]       { 0 <= pL <= 255 }  
                  { 0 <= pH <= 255 }  
                  { 0 <= n <= 255 }  
                  { 2 <= m <= 3 }

[Outline]      This command is intended for compatibility purposes. A “short” or “long” test is printed depending on the value of m.  
                  **m = 2** - printing a “long” test (ESC .)  
                  **m = 3** - printing diagnostic information (“short” test) (ESC ,)

## 48. GS B n

---

Specifying/canceling the black/white inverted printing

[Code] **[1Dh] + [62h] + n**

[Range] { 0 ≤ n ≤ 255 }

[Outline] According to the least significant bit of n (n0) the following modes are possible:

**n0 = 0** - Black/white inverted printing is canceled

**n0 = 1** - Black/white inverted printing is specified

The space skipped by tab command or by positioning commands (ESC \$, ESC \) is not affected.

Both built-in and downloaded character sets are inverted by this command.

The black/white inversion works on the right space defined by ESC SP command.

[Default] The initial value is n=0

## 49. GS L n1 n2

---

Setting the left margin

[Code] **[1Dh] + [4Ch] + n1 + n2**

[Range] {0 ≤ n1 ≤ FFh}  
{0 ≤ n2 ≤ FFh}

[Outline] Sets the position in dots (1/203 inches) from which each line starts. This command works only if entered at the beginning of the line. The start position is equal to **n1+256\*n2** dots from the left end of the printable area.

[Caution] If a value that exceeds the length of the print area is set the left margin is set to 0.

**n1+256\*n2 < 416** when a narrow paper is used

**n1+256\*n2 > 576** when a wide paper is used

[Default] Default value is 0.



**50. (1)GS V m****(2)GS V m n**

Cutting the paper

[Code]	(1)[1Dh] + [56h] + m (2)[1Dh] + [56h] + m + n
[Range]	(1){m=1, m=49} (2){m=66} {0 <= n <= 255}
[Outline]	Depending on the value of m one of the following actions is performed: - if m=1 or m=49 ('1') a partial cut is performed - if m=66 ('B') the paper is fed by n/8 mm and then a partial cut is performed. In both cases the paper is first fed to the cut position so the last printed line remains after the cutter's edge. This means that in case (2) the paper is fed by "cut position + n/8" millimeters prior to cutting.

**51. (1) GS k m [ d ] k NUL****(2) GS k m n [ d ] k****(3) GS k m a [ d ] k NUL****(4) GS k m a xL xH [ d ] k**

Printing the barcode

[Code]	(1)[1Dh] + [6Bh] + m + D <sub>i</sub> + [00h] (2)[1Dh] + [6Bh] + m + n + D <sub>i</sub> (3)[1Dh] + [6Bh] + m + a + D <sub>i</sub> + [00h] (4)[1Dh] + [6Bh] + m + a + xL + xH + D <sub>i</sub>
[Range]	(1){0 <= m <= 6} (2){65 <= m <= 73} (3){m=9; a=0,1} (4){m=74; 256*xH+xL<=3000; a=0,1}
[Outline]	Specifying a type of barcode and printing barcodes. • The beginning of line is considered as the next printing start position. • Depending on the value of m, the following barcode can be selected.

**d** indicates a barcode data to be printed and **k** indicates the number of character to be printed.

**n** indicates indicates number of characters when  $65 \leq m \leq 73$ .

**a** is a setting for PDF-417 barcode. Setting **a=0** will make the printer to automatically choose PDF-417 compression modes, while **a=1** will force byte compression mode.

**xL** and **xH** indicates the number of bytes for PDF-417 barcode when **m=74**. The number of bytes is equal to **256\*xH+xL**.

**m** determines barcode type and it is one of the following:

M(1)	Barcode type	Length	Range of 'd'
0	UPC-A	11	$48 \leq D_i \leq 57$
1	UPC-E	11	$48 \leq D_i \leq 57$
2	EAN13 (JAN13)	12	$48 \leq D_i \leq 57$
3	EAN 8 (JAN8)	7	$48 \leq D_i \leq 57$
4	CODE 39	-	$48 \leq D_i \leq 57, 65 \leq D_i \leq 90, 32, 36, 37, 43, 45, 46, 47$
5	ITF	-	$48 \leq D_i \leq 57$
6	CODABAR (NW-7)	-	$48 \leq D_i \leq 57, 65 \leq D_i \leq 68, 36, 43, 45, 46, 47, 58$
7	CODE 93	-	$1 \leq D_i \leq 127$
8	CODE 128	-	$1 \leq D_i \leq 127$
9	PDF-417	-	$1 \leq D_i \leq 255$

M(2)	Barcode type	Length	Range of 'd'
65	UPC-A	11	$48 \leq D_i \leq 57$
66	UPC-E	11	$48 \leq D_i \leq 57$
67	EAN13 (JAN13)	12	$48 \leq D_i \leq 57$
68	EAN 8 (JAN8)	7	$48 \leq D_i \leq 57$
69	CODE 39	-	$48 \leq D_i \leq 57, 65 \leq D_i \leq 90, 32, 36, 37, 43, 45, 46, 47$
70	ITF	-	$48 \leq D_i \leq 57$
71	CODABAR (NW-7)	-	$48 \leq D_i \leq 57, 65 \leq D_i \leq 68, 36, 43, 45, 46, 47, 58$
72	CODE 93	-	$0 \leq D_i \leq 127$
73	CODE 128	-	$0 \leq D_i \leq 127$
74	PDF-417	-	$0 \leq D_i \leq 255$

- [Caution]
- When data being held in the print buffer, this command is ignored.
  - Regardless of the specified feed pitch, this command feeds the paper hat is required to print a barcode.
  - If the character code **d** cannot be printed in the respective barcode system, the barcode so far will be printed, processing the subsequent data as normal data.

- When a barcode whose number of characters to be printed is fixed has been selected, the number of characters  $k$  have to be always made equal to the number of characters to be printed. (The barcode is not printed when not matching.)
- When the horizontal direction exceeds one line length, the barcode is not printed.

[Default] • The initial value is not specified.

#### [CODE 128 additional information]

Code 128 covers all ASCII codes from 0 to 127, and it has three tables A, B and C that can be used in the same barcode.

**Table A:** contains ASCII symbols with codes 0 to 95 and control symbols FNC1, FNC2, FNC3, FNC4, SHIFT, CODEB, CODEC.

**Table B:** contains symbols with ASCII codes from 32 to 127 and control characters FNC1, FNC2, FNC3, FNC4, SHIFT, CODEA, CODEC.

**Table C:** It is used for coding barcode areas that consist only of numerals. Each symbol gives two digits that are coded with ASCII codes from 0 to 99. Control characters FNC1, CODEA, CODEB are also available.

The barcode must start with one of the symbols CODEA, CODEB or CODEC, that determines which table will be used. If it is necessary the current table could be changed later by inserting one of these symbols in to the barcode. The symbol following SHIFT character is considered to be from table B, if table A is current, or from table A, if table B is current. If a symbol that is not valid for the current table is used, the whole barcode is not printed.

Control symbols are assigned two bytes as follows:

Symbol	Code system		
	Decimal	Hexadecimal	Text
FNC1	123, 49	7B, 31	{1
FNC2	123, 50	7B, 32	{2
FNC3	123, 51	7B, 33	{3
FNC4	123, 52	7B, 34	{4
CODEA	123, 65	7B, 41	{A
CODEB	123, 66	7B, 42	{B
CODEC	123, 67	7B, 43	{C
SHIFT	123, 83	7B, 53	{S
{	123, 123	7B, 7B	{{

## 52. GS w n

---

Selecting the horizontal size (Scale factor) of the barcode

[Code]	<b>[1Dh] + [77h] + n</b>
[Range]	{2 ≤ n ≤ 4}
[Outline]	Selecting barcode width. n denotes the number of dots in fine element width.
[Default]	• The initial value of this width is "3".

## 53. GS h n

---

Selecting the height of the barcode

[Code]	<b>[1Dh] + [68h] + n</b>
[Range]	{1 ≤ n ≤ FFh}
[Outline]	Selecting bar code height. n denotes the number of dots in the vertical direction.
[Default]	• The initial value of n is "162".

## 54. GS H n

---

Selecting of Printing Position of HRI Code

[Code]	<b>[1Dh] + [48h] + n</b>
[Range]	{0 ≤ n ≤ 3}
[Outline]	Selecting printing position of HRI code in printing barcodes. • "n" means the followings. <b>0</b> No printing <b>1</b> Above the barcode <b>2</b> Below the barcode <b>3</b> Both above and below the barcode The HRI code refers to the barcode-turned characters so that you can read them.
[Caution]	The HRI code is printed in the font selected with GS f. Specify before the GS k command.
[Default]	• The initial value of n is "0".
[See Also]	GS f

## 55. GS f n

Selecting the font of HRI code

[Code] **[1Dh] + [66h] + n**

[Range] n = 0, 1

[Outline] Selecting the font of HRI code in printing barcode.  
The type of font can be printed by selecting n is as follows.

**0** Font A

**1** Font B

The HRI code refers to the barcode-turned characters so that you can read them.

[Caution] The HRI code is printed at the position specified with GS h.

[Default] The initial value of n is "0".

[See Also] GSH

## 56. GS p n1 n2 n3

Setting barcode PDF-417 parameters

[Code] **[1Dh] + [70h] + n1 + n2 + n3**

[Range] {0 ≤ n1 ≤ 255}  
{0 ≤ n2 ≤ 30}  
{n3=0; 3 ≤ n3 ≤ 90}

[Outline] n1 selects PDF-417 security level. Setting a security level higher than eight forces the printer to automatically adjust the security level according the following table:

EC level	EC Codewords	Auto Select Level
0	2	-
1	4	0-31
2	8	32-63
3	16	64-127
4	32	128-255
5	64	256-511
6	128	512-928
7	256	-
8	512	-

• Only real data codewords in the security level calculation (any pad codewords are ignored).

**n2** - number of data columns. If **n2**=0 the number of data columns is automatically calculated.

**n3** - number of rows. If **n3**=0 the number of rows is automatically calculated.

[Caution] If any value is out of range this value remains unchanged. Thus the other values are changed.

[Default] The initial value of **n1** is "9" (auto select).  
The initial value of **n2** is "0" (auto select).  
The initial value of **n3** is "0" (auto select).

[See Also] GS k

## 57. GS v0

Printing of raster bit image

[Code] **[1Dh] + [76h] + [30h] + m + xL + xH + yL + yH + D<sub>1</sub> + ... + D<sub>n</sub>**

[Range] {0 <= **m** <= 3; 48 <= m <= 51}  
{0 <= **xL** <= 255}  
{0 <= **xH** <= 255}  
{0 <= **yL** <= 255}  
{0 <= **yH** <= 255}  
{0 <= **D<sub>i</sub>** <= 255}

[Outline] The value of **xH** is ignored.  
Although **yH** could be from 0 to 255 the high four bits are ignored, so **yH** could actually be from 0 to 15.  
**xL** is the number of bytes in horizontal direction (**xL**\*8 dots).  
The number of dots in horizontal direction is equal to **yL+yH\*256**.  
The number of data bytes **k=xL \* (yL+yH\*256)**. However k must not be equal to 0 or the bit image will be discarded.  
**m** defines the printing mode of the bit image according to the following table:

<b>m</b>	<b>Mode</b>	<b>Dot density in vertical direction</b>	<b>Dot density in horizontal direction</b>
<b>0</b>	Normal	203 DPI	203 DPI
<b>1</b>	Double width	203 DPI	101 DPI
<b>2</b>	Double hight	101 DPI	203 DPI
<b>3</b>	Quadruple	101 DPI	101 DPI

The bit image is defined line by line from left to right. The most significant bit of each byte is the leftmost dot and the least significant bit is rightmost dot.

The data that exceeds the printing width of the line is discarded.

The raster bit image could be positioned using the commands ESC \, ESC \$ and GS L.

The raster bit image could be justified using the ESC a command.

If this command is executed during a macro definition, the macro definitions finished and the command is executed.

## 58. GS \*

Defining the Download Bit Image

There are two variants of this command depending of the position of switch 5.

### If switch 5 is OFF:

[Code]      **[1Dh] + [2Ah] + n1 + n2 + D<sub>1</sub> + ... + D<sub>n</sub>**

[Range]      {0 ≤ n1 ≤ 255}  
                  {0 ≤ n2 ≤ 34}  
                  {0 ≤ D<sub>i</sub> ≤ 255}

[Outline]    **n1** denotes the horizontal size of the bit image  
                  **n2** denotes the vertical size of the bit image  
                  There are **n1\*n2\*8** bytes of data in order from top to bottom and from left to right, n1 bytes in each vertical column of dots.  
                  This command defines a bit image with number of dots determined by **n1** and **n2**. There are **n1\*8** dots in horizontal direction and **n2\*8** number of dots in vertical direction.  
                  If **n1** is 0 the downloaded bit image is cleared.  
                  The command GS / is used to print downloaded bit image.

### If switch 5 is ON:

[Code]      **[1Dh] + [2Ah] + n1 + n2 {+ n21 + n22} + D<sub>1</sub> + ... + D<sub>N</sub>**

[Range]      {0 ≤ n1 ≤ 7Fh}  
                  {0 ≤ n2 ≤ F8h}  
                  {0 ≤ D<sub>i</sub> ≤ FFh}  
                  {1 ≤ n21+256\*n22 ≤ 272}

[Outline]    If **n2** is 0 two more bytes are read. These two bytes then determine the vertical size of the bit image. The vertical size then is **N=n21+256\*n22** rows.

If **N** is the vertical size of the bit image, **N=n2** or **N= n21+256\*n22**.  
**D<sub>i</sub>** is the bit image's data. The number of data bytes is **n1\*N**. There are **n1** bytes in the first row then **n1** bytes in the second, etc. There are **N** rows in the bit image, and the number of dots in the bit image is **n1\*N\*8**.  
Each data bit defines one dot, value of "1" corresponds to black.  
If **n1** is 0 the downloaded bit image is cleared.  
The downloaded bit image remains effective even if the printer is switched off.

[See Also] GS /

## 59. GS / m

Printing the Download, Bit Image

[Code] **[1Dh] + [2Fh] + m**

[Range] {0 ≤ m ≤ 3}

[Outline] Prints download bit image in a mode specified by m.

m	Mode Name	Dots in Vertical Direction	Dots in Horizontal Direction
<b>0, 48</b>	Normal mode	203 DPI	203 DPI
<b>1, 49</b>	Double wide mode	203 DPI	101 DPI
<b>2, 50</b>	Double high mode	101 DPI	203 DPI
<b>3, 51</b>	DW / DH mode	101 DPI	101 DPI

[Caution]

- When data exist inside the print buffer, this command is ignored.
- When a download bit image has not been defined, this command is ignored.
- A portion of a download bit image exceeding one line length is not printed.

[Default] • The initial value is not specified.

[See Also] GS \*

## 60. GS :

Starting / Ending Macro Definition

[Code] **[1Dh] + [3Ah]**

[Outline] Specifying starting / ending macro definition. Means termination when received while defining a macro.



- [Caution] Maximum content available for macro definition is 3823 bytes. A portion exceeding 3823 bytes is not defined.
- Even with ESC @ (initialization of the printer) having been executed, defined content is not cleared. Therefore, it is possible to include ESC @ into the content of macro definition.
  - Normal printing operation is carried out even while in macro definition
- [Default] • Initially, Macro is not specified.
- [See Also] GS ^

## 61. GS ^ n1 n2 n3

Executing the Macro

- [Code] **[1Dh] + [5Eh] + n1 + n2 + n3**
- [Range] {0 <= n1 <= FFh}  
{0 <= n2 <= FFh}  
{0 <= n3 <= 1}.
- [Outline] Executing contents defined in macro.
- “n1~n3” indicate as follows:
    - n1** : The number of times of macro execution
    - n2** : Waiting time on macro execution  
Waiting time of n2 x 100 msec is given for every execution.
    - n3** : Macro execution mode
      - 0** Continuous execution
      - 1** Execution by LFSW
- Continuous execution: The Macro is executed n1 times continuously at the time intervals specified by n2.
- Execution by FEED S: After waiting for lapse of time specified by n2, the LF switch is waited to be pressed. When it is pressed, the macro is executed once. This action is repeated n1 times.
- [Caution] • When this command is received while in macro definition, suspension of macro definition is indicated. At this time, the defined content is cleared.
- No execution takes place when macro is held undefined or n1=0.
  - While in macro execution with n3=1, paper feed with the LF SW is not available.
- [Default] • Initially, this command is not specified.
- [See Also] GS :

## 62. GS ) n1 n2

Switching ON/OFF a software DIP switch

[Code] **[1Dh] + [29h] + n1 + n2**

[Range] {1 <= n1 <= 8}  
 {'1' <= n1 <= '8'}  
 {0 <= n2 <= 1}  
 {'0' <= n2 <= '1'}

[Outline] This command switches ON or OFF the given software DIP switch.  
 n1 is the number of the switch.  
 0 or '0' – turns off the switch.  
 1 or '1' – turns on the switch.

[Caution] • The software DIP switches are stored into the flash. They are read at printer power on or execution of ESC \_ command.  
 • Only one switch at a time can be changed by this command, i.e. to change all of the switches you must execute the command eight times.  
 • The change of a switch is immediately saved in the flash. The printer becomes "BUSY" while the command is executed.  
 • Due to command's behaviour it must be executed stand alone, with about a second of spare time after the command during which the printer will be able to execute the operations of flash clearing and rewrite.

## 63. GS # 0 xL xH

Send data to external client display

[Code] **[1Dh] + [23h] + [30h] + xL + xH + D1 + D2 + ... + Dk**

[Range] {0 <= xL <= 255}  
 {0 <= xH <= 255}  
 {0 <= D <= 255}

[Outline] This command sends xH\*256+xL bytes to the external client display

[Caution] • The data is sent at 9600 bps with 8 data bits, 1 stop bit and no parity.  
 • Although any number of bytes may be sent with the command, only last 256 bytes will be actually sent.  
 • During power on self-test the printer's name and model will be displayed on the display.

[See Also] Datecs client display specification

## 64. FS p n m

Printing the downloaded NV bit image

[Code]      **[1Ch] + [70h] + n + m**

[Range]      {0 <= n <= FFh}  
                  {0 <= m <= 3}  
                  {48 <= m <= 51}

[Outline]    Printing the downloaded NV bit image defined by FS q command.

m	Mode Name	Dots in Vertical Direction	Dots in Horizontal Direction
<b>0.48</b>	Normal mode	203 DPI	203 DPI
<b>1.49</b>	Double wide mode	203 DPI	101 DPI
<b>2.50</b>	Double high mode	101 DPI	203 DPI
<b>3.51</b>	DW / DH mode	101 DPI	101 DPI

“n” is discarded - the printer supports only one NV bit image.

“m” is the bit image printing mode.

## 65. FS q n [xL xH yL yH D1 D2 ... Dk]

Defining the downloaded NV bit image

There are two variants of this command depending on the position of switch 5.

**If switch 5 is OFF:**

[Code]      **[1Ch] + [71h] + n + xL + xH + yL + yH + D1 + D2 + ... + Dk**

[Range]      {0 <= n <= FFh}  
                  {0 <= xL <= FFh}  
                  {0 <= xH <= FFh}  
                  {0 <= yL <= FFh}  
                  {0 <= yH <= FFh}  
                  {0 <= D <= FFh}

[Outline]    This command defines the specified NV (non volatile) bit image. The bit image is stored into the flash.

“n” is ignored – the printer supports only one bit image.

xL and xH denote the horizontal size of the NV bit image as  
 (xL + xH x 256) x 8 dots.

yL and yH denote the vertical size of the NV bit image as  
(yL + yH x 256) x 8 dots.

Total amount of data defining the bit image is  
(xL + xH x 256) x (yL + yH x 256) x 8 bytes.

- [Details] The maximum printable size of the NV bit image is 576 x 512 dots. This corresponds to (xL + xH x 256) < 72 and (yL + yH x 256) < 64.  
The exceeding data is read but discarded.  
The order of the data is from top to bottom and then from left to right,  
(yL + yH x 256) bytes in each vertical column of dots.  
The printer will become busy before each writing cycle in the NV memory.  
Any data sent while the printer is busy may not be processed and therefore could be lost.  
xL = xH = yL = yH = 0 clears the downloaded bit image.

#### **If switch 5 is ON:**

[Code] **[1Ch] + [71h] + n + xL + xH + yL + yH + D1 + D2 + ... + Dk**

[Range] {0 <= n <= FFh}  
{0 <= xL <= FFh}  
{0 <= xH <= FFh}  
{0 <= yL <= FFh}  
{0 <= yH <= FFh}  
{0 <= D <= FFh}

[Outline] This command defines the specified NV (non volatile) bit image. The bit image is stored into the flash.

"n" is ignored – the printer supports only one bit image.

xL and xH denote the horizontal size of the NV bit image as  
(xL + xH x 256) x 8 dots.

yL and yH denote the vertical size of the NV bit image as  
(yL + yH x 256) dots.

Total amount of data defining the bit image is  
(xL + xH x 256) x (yL + yH x 256) bytes.

- [Details] The maximum printable size of the NV bit image is 576 x 512 dots. This corresponds to (xL + xH x 256) < 72 and (yL + yH x 256) < 512.  
The exceeding data is read but discarded.  
The order of the data is from left to right and then from top to bottom,  
(xL + xH x 256) bytes in each horizontal row of dots.  
The printer will become busy before each writing cycle in the NV memory.  
Any data sent while the printer is busy may not be processed and therefore could be lost.  
xL = xH = yL = yH = 0 clears the downloaded bit image.