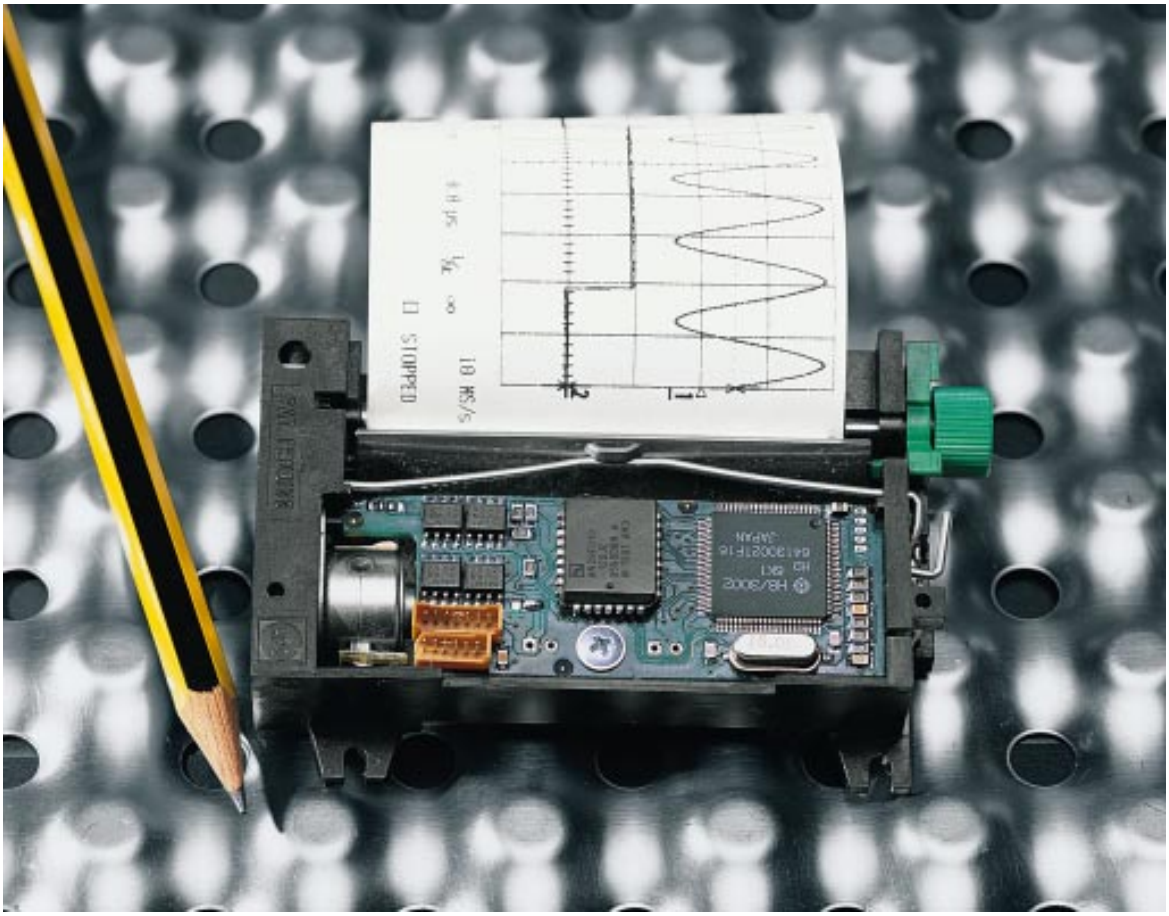
PM 585
User's Manual



COD. DOME-PM585 Revision 1.20

Custom Engineering
Str. Berettine 2 - 43010 Fontevivo (PARMA) - Italy
Tel. : +39 0521-680111 - Fax : +39 0521-610701
http: www.custom.it Email : support@custom.it

GENERAL INFORMATION REGARDING SAFETY

- Read and keep the following instructions.
- Observe all warnings and follow all instructions attached to the printer.
- Before cleaning the printer, disconnect the feed cable.
- Clean the printer with a damp cloth. Do not use liquid or spray products.
- Do not operate the printer near to water.
- Do not place the printer on unsteady surfaces. It could fall and get seriously damaged.
- Use the type of electricity supply marked on the printer label. In the event of uncertainty, contact the seller.
- Position the printer in such a way as to ensure that the cables connected to it will not be damaged.
- Ensure that the maximum absorbed current of the printer does not exceed the maximum acceptable current for the type of feed cable used.
- Do not put objects of any kind inside the printer as they could cause a short circuit or damage parts which could affect its performance.
- Do not spill liquids on the printer.
- Do not carry out technical operations on the printer with the exception of the scheduled maintenance operations specifically indicated in the user's manual.
- Disconnect the printer from the electricity supply and have it repaired by a specialized technician should any of the following conditions occur:
    A. The feed connector has been damaged.
    B. Liquid has penetrated to the inside of the printer;
    C. The printer has been exposed to rain or water;
    D. The printer is not operating normally despite the instructions in the user's manual having been followed.
    E. The printer has been dropped and its case damaged.
    F. The performance of the printer is poor.
    G. The printer does not work.

"CE" Declaration of Conformity

In accordance with standards ISO/IEC Guide 22 and EN 45014 N°: DC0380899

Manufacturer's name:	Custom Engineering s.r.l.
Manufacturer's address:	Strada Berettine 2 Fontevivo (Parma) Italy

Declares that the product:

Product name:	Integrated printing module
Type name:	PM585
Model:	PM585-S, PM585-T

is in conformity with the following directives:

Electromagnetic compatibility directives EEC/89/336; EEC/92/31; EEC/93/68

In accordance with the following standards:

EN 55022 Class B	Limits and methods of measurement of radio disturbance characteristics of information technology equipment	1994
EN 50082-1	Electromagnetic compatibility - General immunity standard. Part 2: Industrial environments.	1992
EN 61000-4-2	Electrostatic discharge requirements 4KV contact discharge, 8KV air discharge	1995
EN 61000-4-4	Fast electrical transient/burst requirements. DC mains 0.5KV	1995
ENV 50140	Radiated radio-frequency electromagnetic fields. Immunity tests. 3V/m, 80MHz-1000MHz, 80% 1KHz AM	1993

February 1999

CHAPTER 1 DESCRIPTION

- INTRODUCTION
- GENERAL FEATURES
- CONTROL
- HEXADECIMAL DUMP
- CHARACTER SET
- INTERFACES
- CHANGING THE PAPER ROLL
- APPLICATION NOTES

CHAPTER 2 ESC/POS COMMAND DESCRIPTION

INTRODUCTION

The PM585 has a wide range of uses in addition to the standard printing ones :

- High printing speed : 20 – 35 mm/sec.
- Power supply : 4.25 – 7.25 V.
- Easy paper change (autoload).
- Paper end sensor.
- ESC/POS™ emulation.
- Bar code UPC-A. UPC-E, EAN13, EAN8, CODE39, ITF, CODABAR, CODE93, CODE128 and CODE32.
- 3 standard and international characters fonts.
- Font completely or partly programmable.
- Double width-height, quadruple width-height, emphasized, script, inched 180°.
- Reception buffer 4Kbytes.
- Definition of macro function for automatic repetition of the operations.
- Internal programmable counter.
- Image mode.
- Print density.
- 2 programmable logo (384 x 341 dots).
- RS232 or TTL serial interface (1200-38400bps).

Options :
- Windows™ Driver.

GENERAL FEATURES :

Resolution	200 dpi (8 dots/mm)		
Paper width	58 mm		
Print method	Termico statico		
Interface	RS232 or TTL		
Reception buffer	4 Kbytes		
Print speed (dotline/sec)	160 - 280		
ESC/POS™ emulation:			
Columns number	27	38	48
Print speed:			
Characters/sec (max)	313	440	556
Lines/sec (max)	11,6	11,6	11,6
Character			
Normal	1,7 x 3	1,2 x 3	1x3
Double height	3,4 x 3	2,4 x 3	2x3
Double width	1,7 x 6	1,2 x 6	1x6
Double height and width	3,4 x 6	2,4 x 6	2x6
Quadruple height	6,8 x 3	4,8 x 3	4x3
Quadruple width	1,7 x 12	1,7 x 12	1x12
Quadruple height and width	6,8 x 12	4,8 x 12	4x12
Print direction	0°, 90°, 180°, 270°		
Character's Set	3		
Power supply	5 Vdc		
Absorption			
Stand by current	80 mA		

Medium current	0,8A
Peak current	3,5 A

Environmental conditions

Operating temperature	0°C - +50°C
Operating humidity	25% - 85%
Storage temperature /humidity	-25°C - +70°C / 10%-90%

CONTROL

The FEED input key and a LED output are on J2.
For a FEED key, the switch must be connected from pin 3 of J2 and GND.
The light indicator (LED) must be connected to pin 2 of J2 (cathode) and to Vcc (anode).

- Pressing the FEED key, printer carries out paper feed which can be used to insert paper in printing mechanism.

- During the switch on phase, if you hold down the FEED key, the printer goes in Print Setup. After graphic test and setup report, the printer waits a button pressed, or characters from serial port ; every 10 chars, prints hex values and ASCII codes (if characters are underline, the receive buffer is in the full state), see Hexadecimal Dump.

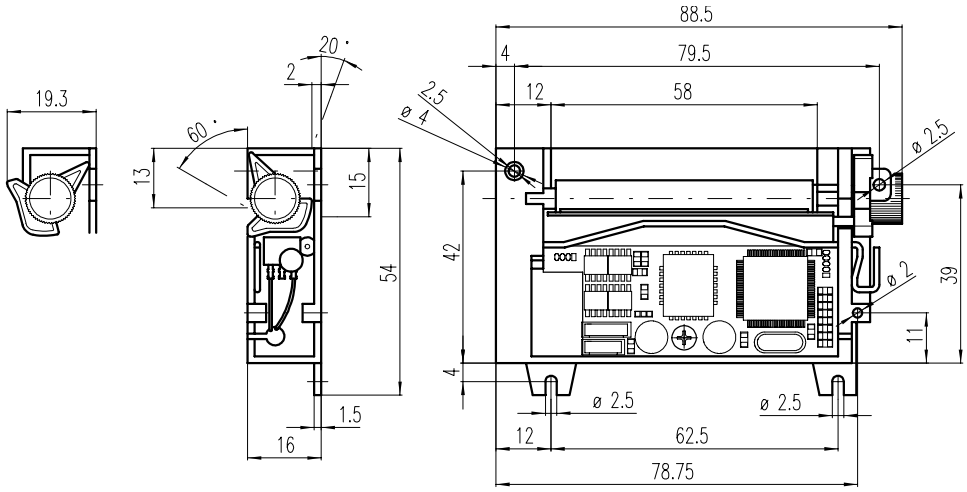
With one time FEED button, the printer skips setup mode and ends Hexadecimal Dump function.
With two time FEED button, the printer goes into the parameters setting mode. The variables are:

- **Baud Rate :** 38400, 19200, 9600, 4800, 2400, 1200.
- **Data lenght :** 7, 8 bits/char.
- **Parity :** None, even or odd.
- **Handshaking :** XON/XOFF or Hardware.
- **Autofeed :** CR disabled or CR enabled.
- **Print mode :** Normal or Reverse.
- **Height mode :** x1, x2 or x4.
- **Width mode :** x1, x2 or x4.
- **Justification :** Left, Center or Right.
- **Chars/line :** A=27 / B=38 cols. or A=38 / B=48 cols.
- **Paperend sens :** Enabled, Disabled.
- **Speed/Current:** Low,Normal.
- **Red Printing :** Disabled or Enabled.
- **Print Density :** Normal, Light, Very light, Dark, Very dark, Double Copy.

- The led output visualizes the hardware error state of the printer. Check is performed “on line”, which is to say, in cases of malfunction the led will start to flash in accordance with the following table:

LED state	Description
Always off	Printer OFF
Always on	Printer ON - no faults
Slow flash (long on)	Paper out message
Slow flash (short on)	Head up
Fast flash	Over temperature or power supply voltage out of range

OVERALL DIMENSIONS



HEXADECIMAL DUMP

This function prints the data transmitted from the host computer in hexadecimal numbers and in their corresponding ASCII characters.

<Example printing from the Printer Setup>

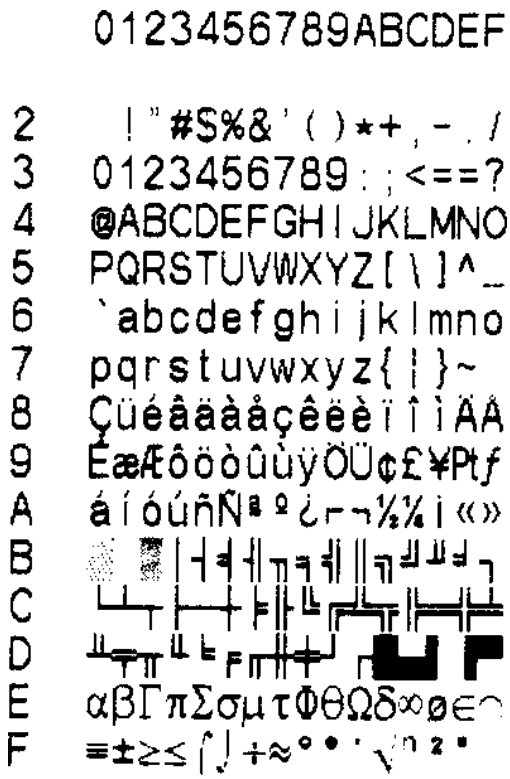
```
Print Density : Normal

[PRINT] key to enter setup
[FEED] key to skip setup

AA 43 55 53 54 4F 4D 20 45 6E   ¬CUSTOM En
67 69 6E 65 65 72 69 6E 67 20   gineering
48 65 78 61 64 65 63 69 6D 61   Hexadecima
6C 20 64 75 6D 70 20 66 75 6E   l dump fun
63 74 69 6F 6E 20 30 31 32 33   ction 0123
34 35 36 37 38 39 61 62 63 64   456789abcd
65 66 67 68 69 6A 6B 6C 6D 6E   efghijKlmn
6F 70 71 72 73 74 75 76 77 78   opqrstuvwx
79 7A                           yz
```

CHARACTER SET

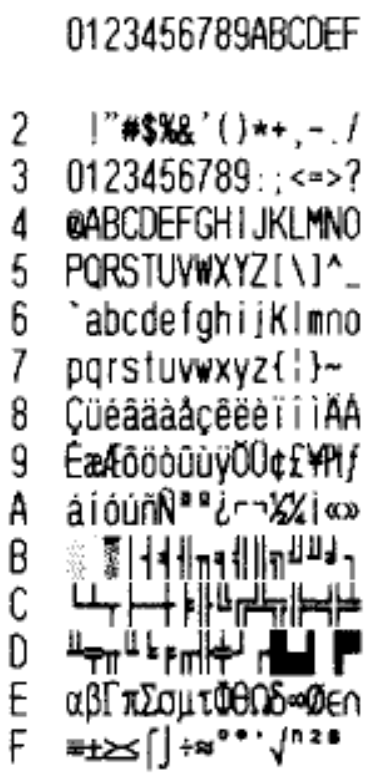
The printer has three fonts of 224 characters (two font for each emulation).

ESC/POS(Emulation (PC437 USA, Standard Europe)

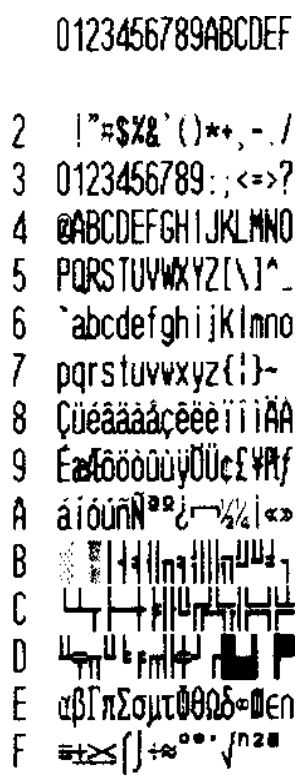
27 col.



38 col.



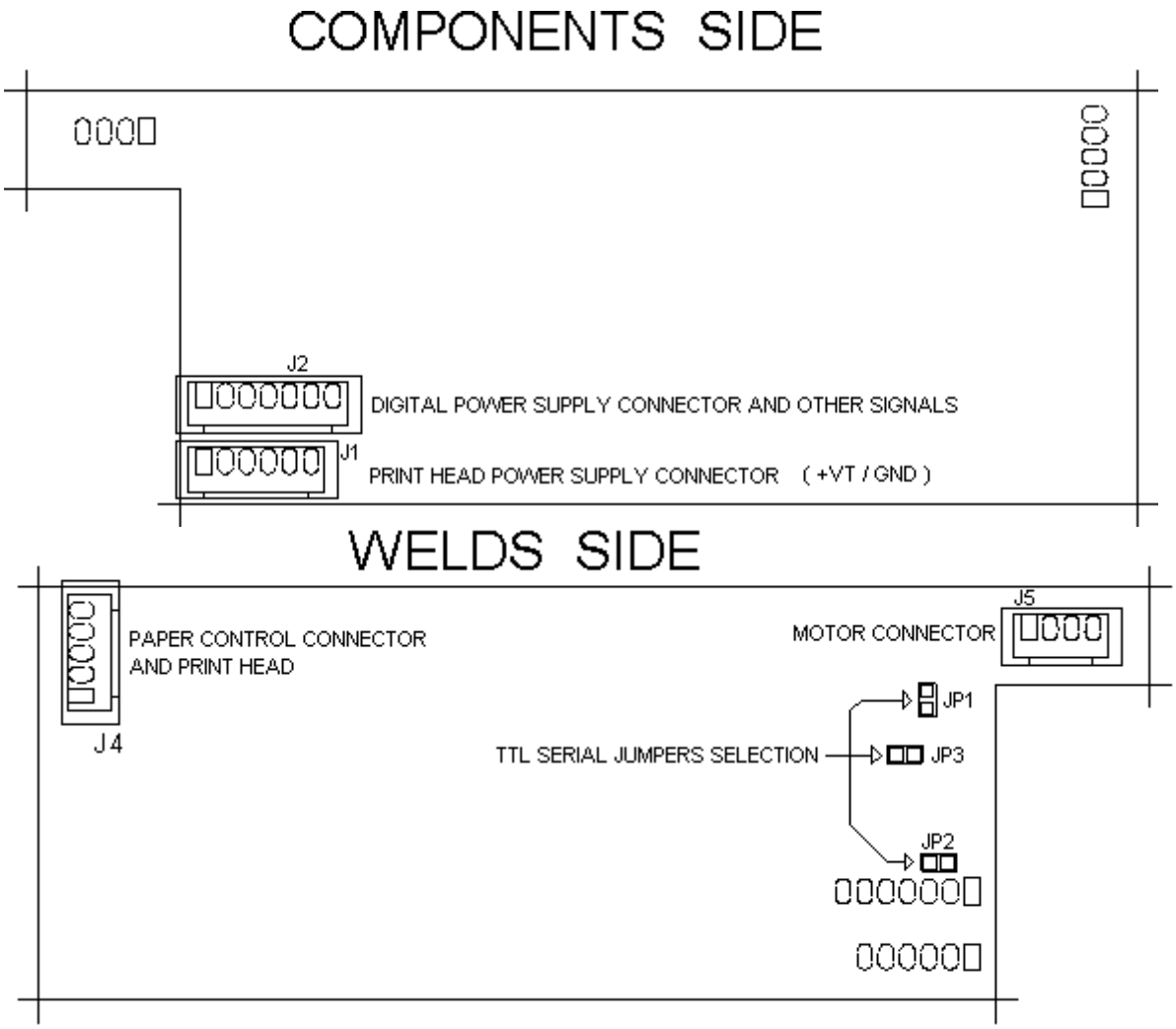
56 col.



INTERFACES

The printer has two connectors, J1 for power supply, and J2 for logic supply and serial interface (RS232 or TTL).

Layout's connector



CONNECTOR J1

PIN	Signal	Direction	To	Description
1	GND	IN		POWER GROUND
2	GND	IN		POWER GROUND
3	GND	IN		POWER GROUND
4	VT	IN		POWER SUPPLY THERMAL HEAD 4.25-7.25V
5	VT	IN		POWER SUPPLY THERMAL HEAD 4.25-7.25V
6	VT	IN		POWER SUPPLY THERMAL HEAD 4.25-7.25V

CONNECTOR J2

PIN	Signal	Direction	To	Description
1	GND	IN	GND	LOGIC GROUND
2	RXD	IN	TXD	Transmit Data. Serial data input (towards Host)
3	TXD	OUT	RXD	Receive Data. Serial output (from Host)
4	RTS	OUT	CTS	Clear To Send. Ready to receive data
5	K-FEED	IN	KEY	INPUT KEY FEED PAPER, FEED WHEN PIN IS GROUNDED BY KEY
6	LED	OUT	LED	STATUS LED THE LED MUST BE CONNECTED DIRECT TO THIS PIN AND VCC
7	VCC	IN		LOGIC SUPPLY + 5V cc +/- 5%

CHANGING THE PAPER ROLL (Autoload)

To change the paper roll, proceed as follows :

1) use the green lever to lower the print head;
2) insert the end of the roll in the print mechanism;
3) wait until the roll autoloads.

APPLICATION NOTES(to apply for correct working)

- To prevent stepper motor thermal overheat, it is required to respect a maximum on/off printing ratio (duty cycle) of 60-70%.
- The printer don't print if power supply voltage is out of operating range 4.25-7.25V. In standby mode, the printer checks the power supply voltage and changes automatically the printing speed from 20 to 35 mm/s (See below table).

Power supply [V]	Paper feed [mm/s]	Printing speed [mm/s]
4.25	25	20
4.50	25	21
4.75	30	22
5.00	35	23
5.25	37	24
5.50	39	25
5.75	41	26
6.00	43	27
6.25	45	28
6.50	47	30
6.75	49	32
7.00	51	33
7.25	53	35

- On board, the printer has two small electrolytic capacitors, but if the power source is not near or if the cables are thin, is necessary add to power supply 470-1000uF 10V on the printed circuit, or on the

cables at few cm from connector J1.

CONTROL CHARACTERS

The following table lists all the commands for function management in ESC/POS™ Emulation of the PM585 printer. The commands can be transmitted to the printer at any moment, but they will only be carried out when the commands previously are executed. There are no commands with priority status; all the commands are carried out when the circular buffer is free to do so.

Command	Name
HT	Horizontal tab
LF	Print and line feed
BS	Back space
CR	Print and carriage return
DLE EOT	Real-time status transmission
CAN	Cancel print data in page mode
ESC SP	Set character right-side spacing
ESC !	Set print mode
ESC $	Set absolute position
ESC %	Select/cancel user-defined character set
ESC &	Define user-defined characters
ESC *	Set bit image mode
ESC -	Turn underline mode on/off
ESC 0	Select 1/8-inch line spacing
ESC 2	Set 1/6-inch line spacing
ESC 3	Set line spacing using minimun units
ESC 4	Set/reset script mode
ESC =	Select device
ESC ?	Cancel user-defined characters
ESC @	Initialize printer
ESC D	Set horizontal tab positions
ESC E	Select emphasized mode
ESC G	Select double-strike mode
ESC J	Print and feed paper using minimum units
ESC R	Select international character set
ESC V	Turn 90° clockwise rotation on/off
ESC \	Set relative print position
ESC a	Select justification
ESC d	Print and feed paper n lines
ESC r	Set/reset red printing mode
ESC t	Select character code table
ESC v	Transmit printer status
ESC x	Select speed/current
ESC {	Set/cancel upside-down character printing
ESC ·	Print graphic bank
ESC ¹	Transmit ram bank to serial port

ESC ³	Transfer flash bank into ram bank
ESC ²	Receive ram bank from serial port
ESC ¦	Transfer ram bank into flash bank
GS !	Select character size
GS :	Set starting/end of macro definition
GS B	Turn white/black reverse printing mode on/off
GS C 0	Select counter print mode
GS C 1	Select count mode (A)
GS C 2	Set counter
GS C ;	Select count mode (B)
GS H	Select printing position of HRI characters
GS I	Transmit printer ID
GS L	Set left margin
GS P	Set horizontal and vertical motion units
GS W	Set printing area width
GS ^	Execute macro
GS c	Print counter
GS f	Select font for HRI characters
GS h	Select height of bar code
GS k	Print bar code
GS r	Transmit status
GS w	Select horizontal size (magnification) of bar code
GS ~	Set exponent/deponent
GS |	Set printing density

Description of the paths:

XXX Command.
[Name] Command name
[Format] Codes sequence.
In this description, < >H is for an hexadecimal number, < >A for an ASCII character, < > is for a decimal number and < >B a binary number.
[ ] k is for the contents of [ ] which can be repeated k times.
[Range] Describes the range of the contents.
[Description] Description of the command function.
[Notes] (Included only if necessary).
[Default] Commands default value.

[Reference] References for linked commands.
[Example] Example for use of command.

HT

[Name] Horizontal tab
[Format] ASCII HT
Hex 09
Decimal 9
[Description] Moves the print position to the next horizzontal tab position.
This command is ignored unless the next horizzontal tab position has been set.
[Notes] • Horizzontal tab positions are set using ESC D.
• If the command is received when the printing position is at right margin, the printer executes print buffer full printing and horizzontal tab processing from the beginning of the next line.
[Default]
[Reference] **ESC D**
[Example]

LF

[Name] Print and line feed
[Format] ASCII LF
Hex 0A
Decimal 10
[Description] Prints the data in the buffer and feeds one line based on the current line spacing.
[Notes] The command set the print position to the beginning of the line.
[Default]
[Reference] **ESC 2, ESC 3**
[Example]

BS

[Name] Back space
[Format] ASCII BS
Hex 08
Decimal 8
[Description] Moves print position to previous character.
[Notes] This command can put two character at the same position.
[Default]
[Reference]
[Example]

CR

[Name] Carriage return

[Format] ASCII CR
Hex 0D
Decimal 13

[Description] When autofeed is 'CR enabled', this command functions in the same way as **LF**, else it is disregarded.

[Notes] The command set the print position to the beginning of the line.

[Default]

[Reference] **LF**

[Example]

DLE EOT n

[Name] Real-time status transmission

[Format]

ASCII	DLE	EOT	n
Hex	10	04	n
Decimal	16	4	n

[Range] $1 \leq n \leq 4$

[Description] Transmits the selected printer status specified by n in real time, according to the following parameters :
n = 1 transmit printer status
n = 2 transmit off-line status
n = 3 transmit error status
n = 4 transmit paper roll sensor status

[Notes]
- This command is executed in receive buffer full state.
- The status is transmitted whenever the data sequence of 10H 04H n($1 \leq n \leq 4$) is received.

[Default]

[Reference] See following tables.

[Example]

n = 1 : Printer status

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Not used. Fixed to Off.
1	On	02	2	Not used. Fixed to On.
2	Off	00	0	Not used. Fixed to Off.
3	Off	00	0	On-line.
	On	08	8	Off-line.
4	On	10	16	Not used. Fixed to On.
5	-	-	-	Undefined.
6	-	-	-	Undefined.
7	Off	0	0	Not used. Fixed to Off.

n = 2 : Off-line status

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Not used. Fixed to Off.
1	On	02	2	Not used. Fixed to On.
2	Off	00	0	Not used. Fixed to Off.
3	Off	00	0	Paper is not being fed by FEED button.
	On	08	8	Paper is being fed by FEED button.
4	On	10	16	Not used. Fixed to On.
5	Off	00	0	No paper end stop.
	On	20	32	Printing stops due to paper end.
6	Off	00	0	No error.
	On	40	64	Error occurs.
7	Off	0	0	Not used. Fixed to Off.

n = 3 : Error status

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Not used. Fixed to Off.
1	On	02	2	Not used. Fixed to On.
2	Off	00	0	Not used. Fixed to Off.
3	-	-	-	Undefined.
4	On	10	16	Not used. Fixed to On.
5	Off	00	0	Not used. Fixed to Off.
6	Off	00	0	No auto-recoverable error.
	On	40	64	Auto recoverable error occurs.
7	Off	0	0	Not used. Fixed to Off.

n = 4 : Paper roll sensor status

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Not used. Fixed to Off.
1	On	02	2	Not used. Fixed to On.
2	Off	00	0	Not used. Fixed to Off.
3	Off	00	0	Not used. Fixed to Off.
4	On	10	16	Not used. Fixed to On.
5,6	On	60	96	Fixed to On.
7	Off	0	0	Paper end is detected by the paper end sensor Not used. Fixed to Off.

CAN

[Name] Cancel print data buffer

[Format]

ASCII	CAN	
Hex	18	
Decimal	24	

[Description] Deletes all the print data in the current print buffer.

[Notes] The command set the print position to the beginning of the line.

[Default]

[Reference]

[Example]

ESC SP n

[Name] Set right-side character spacing

[Format]

ASCII	ESC	SP n
Hex	1B	20 n
Decimal	27	32 n

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

[Description] Set the character spacing for the right side of the character to [n (horizontal or vertical motion units].

[Notes]
- The right character spacing for double-width mode is twice the normal value. When the characters are enlarged, the right side character spacing is m (2 or 4) times the normal value.
- The horizzontal and vertical motion unit are specified by **GS P**. Changing the horizzontal or vertical motion unit does not affect the current right side spacing.
- The **GS P** command can change the horizontal (and vertical) motion unit. However, the value cannot be less than the minimum horizontal movement amount.
- In standard mode, the horizontal motion unit is used.
- The maximum right side spacing is 255/200 inches.

[Default] n = 0

[Reference] **GS P**

[Example]

ESC ! n

[Name] Select print modes

[Format]

ASCII	ESC	!	n
Hex	1B	21	n
Decimal	27	33	n

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

[Description] Select print modes using *n* (see following tables):

[Notes]
- The printer can underline all characters, but can not underline the space set by **HT, ESC $, ESC ** and 90° clockwise rotated characters.
- When characters are enlarged with different heights on one line, the characters are alligned at the baseline or topline (see **GS ~**).

• The command reset left and right margin at default value (see **GS L, GS W**).
• **ESC E** can also turn on/off emphasized mode. Howener, the setting of the last received command is effective.
• **ESC -** can also turn on/off underline mode mode. Howener, the setting of the last received command is effective.
• **ESC 4** can also turn on/off script mode. Howener, the setting of the last received command is effective.
• **GS !** can also select character size. However, the setting of the last received command is effective.

[Default] n = 0
[Reference] **ESC -, ESC E, ESC 4, GS !**
[Example]

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Character font A selected.
	On	01	0	Character font B selected.
1	-	-	-	Undefined.
2	-	-	-	Undefined.
3	Off	00	0	Emphasized mode not selected.
	On	08	8	Emphasized mode selected.
4	Off	00	0	Double heigth mode not selected.
	On	10	16	Double heigth mode selected.
5	Off	00	0	Double width mode not selected.
	On	20	32	Double width mode selected.
6	Off	00	0	Script mode not selected.
	On	40	64	Script mode selected.
7	Off	00	0	Underline mode not selected.
	On	80	128	Underline mode selected.

ESC $ nL nH

[Name] Set absolute print position
[Format]

ASCII	ESC	$	nL	nH
Hex	1B	24	nL	nH
Decimal	27	36	nL	nH

[Range] $0 \leq nL \leq 255$
$0 \leq nH \leq 255$
[Description] Sets the distance from the beginning of the line to the position at which subsequent characters are to be printed.
The distance from the beginning of the line to the print position is [(nL + nH x 256) x (vertical or horizontal motion unit)] inches.
[Notes] • Settings outside the specified printable area are ignored.
• The horizzontal and vertical motion unit are specified by GS P.
• The **GS P** command can change the horizontal (and vertical) motion unit. However, the value cannot be less than the minimum horizontal movement amount.
• In standard mode, the horizontal motion unit (x) is used.

• If setting outside the printing area width, set absolute print position, but left or right margin is set at default value.

[Default]
[Reference] **ESC \, GS P**
[Example]

ESC % n

[Name] Select/Cancel user-defined character set

[Format]

ASCII	ESC	%	n
Hex	1B	25	n
Decimal	27	37	n

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

[Description] Selects or cancels the user-defined character set.
When the Least Significant Bit (LSB) of n is 0, the user-defined character set is canceled.
When the LSB of n is 1, the user-defined character set is selected.

[Notes]
• Only the LSB of n is effective.
• When the user-defined character set is canceled, the internal character set is automatically selected.

[Default] n=0
[Reference] **ESC &, ESC ?**
[Example]

ESC & y c1 c2 [x1 d1...d(y (x1)]...[xkd1...d(y (xk)]

[Name] Defined user-defined characters.

[Format]

ASCII	ESC	&	y	c1	c2
Hex	1B	26	y	c1	c2
Decimal	27	37	y	c1	c2

[Range]
y = 3
$32 \leq c1 \leq c2 \leq 126$
$0 \leq x \leq 14$ (Font 14 X 24)
$0 \leq x \leq 10$ (Font 10 X 24)
$0 \leq x \leq 8$ (Font 8 X 24)
$0 \leq d1 \ldots d (y \times xk) (255$
k = c2 - c1 + 1

[Description] Defined user-defined characters.
y specifies the number of byte in the vertical direction.
c1 specifies the beginning character code for the definition, and c2 specifies the final code.
x specifies the number of dots in the horizontal direction.

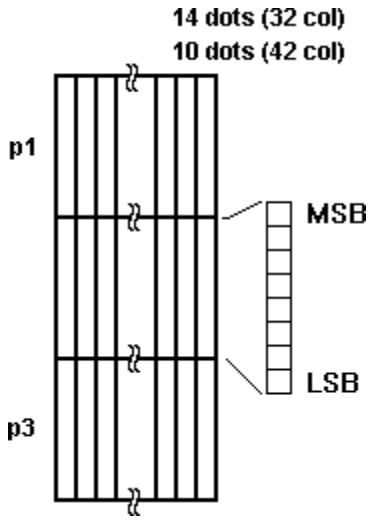
[Notes]
- The allowable character code the range is from ASCII code 20H (32) to 7EH (126) (95 characters).
- It is possible to define multiple character for consecutive character codes. If only one character is desired, use c1 = c2.
- if c2 < c1, the command is not executed.
- d is the dot data for the characters. The dot pattern is in the horizontal direction from the left side. Any remaining dots on the right side are blank.
- the data to define a user-defined character is (x x y) bytes.
- set a corresponding bit to 1 to print a dot or 0 to no print a dot.
- this command can defined different user-defined character patterns by each fonts. To select the font, use **ESC !**.
- A user-defined character and a downloaded bit image cannot be defined simultaneously. When this command is executed, the downloaded bit image is cleared.
- The user-defined character definitions is cleared when :

ESC @ is executed ;
GS * is executed ;
ESC ? is executed ;
The printer is reset or the power is turned off.

[Default] The internal character set.

[Reference] **ESC %, ESC ?**

[Example]



ESC * m nL nH [d1... dk]

[Name] Select bit image-mode.

[Format]

ASCII	ESC	*	m	nL	nH
Hex	1B	2A	m	nL	nH
Decimal	27	42	m	nL	nH

[Range]
m = 0, 1 ,32, 33
$0 \leq nL \leq 255$
$0 \leq nH \leq 1$
$0 \leq d \leq 255$

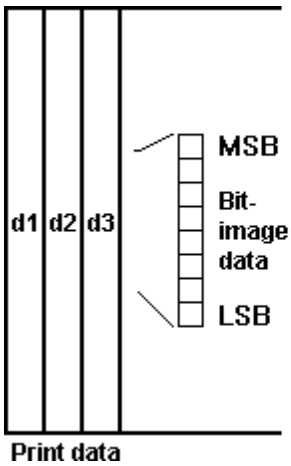
[Description] Selects a bit image-mode usin *m* for the number of dots specified by *nL* and *nH*, as follows :

m	Mode	Vertical Direction		Horizontal Direction (* 1)	
		N. Dots	DPI	DPI	Number of Data (k)
0	8 dot single density	8	67	100	nL + nH x 256
1	8 dot double density	8	67	200	nL + nH x 256
32	24 dot single density	24	200	100	(nL + nH x 256) x 3
33	24 dot double density	24	200	200	(nL + nH x 256) x 3

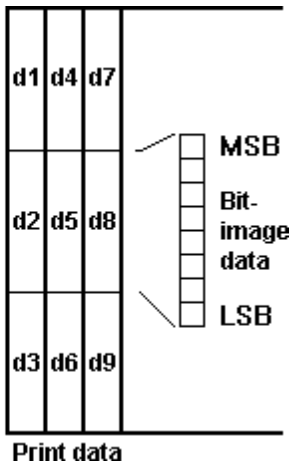
[Notes]

- The *nL* and *nH* indicated the number of dots of the bit image in the horizontal direction. The number of dots is calculated by nL + nH x 256.
- 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 dot or to 0 to not print dot.
- If the values of *m* is out of the specified range, *nL* and data following are processed as normal data.
- If the width of the printing area set by **GS L** and **GS W** less then the widht required by the data sent width the **ESC *** command, the exceed data are ignored.
- To print the bit image use **LF, CR, ESC J** or **ESC d**.
- After printing a bit image, the printer return to normal data processing mode.
- This command is not affected by prints mode emphasized, double-strike, and underline (etc.), except upside down mode.
- The relationship between the image data and the dots to be printed is as follows :

8-dot bit image



24-dot bit image



[Default]
[Reference]
[Example]

ESC - n

[Name] Turn underline mode on/off.

[Format]

ASCII	ESC	-	n
Hex	1B	2D	n
Decimal	27	45	n

[Range] $0 \leq n \leq 2, 48 \leq n \leq 50$

[Description] Turn underline mode on or off, based on the following values of *n* :

n	Function
0, 48	Turns off underline mode
1, 49	Turns on underlined mode (1-dot thick)
2, 50	Turns on underlined mode (2-dot thick)

[Notes]
- The printer can underline all characters, but cannot underline the space set by **HT** and right-side character spacing.
- The printer cannot underline 90° clockwise rotate characters and white/black inverted characters.
- When underline mode is turned off by setting the value of *n* to 0 or 48, the following data is not underlined.
- Underline mode can also be turned on or off by using **ESC !**. Note, however, that the last received command is effective.

[Default] n=0

[Reference] **ESC !**

[Example]

ESC 0

[Name] Select 1/8-inch line spacing.

[Format]

ASCII	ESC	0
Hex	1B	30
Decimal	27	48

[Description] Selects 1/8-inch line spacing.

[Notes]

[Default]

[Reference] **ESC 2, ESC 3**

[Example]

ESC 2

[Name] Select 1/6-inch line spacing.

[Format]

ASCII	ESC	2
Hex	1B	32
Decimal	27	50

[Description] Selects 1/6-inch line spacing.

[Notes]

[Default]

[Reference] **ESC 0, ESC 3**

[Example]

ESC 3 n

[Name] Set line spacing.

[Format]

ASCII	ESC	3	n
Hex	1B	33	n
Decimal	27	51	n

[Range] 0 ≤ n ≤ 255

[Description] Sets the line spacing to [*n* x (vertical or horizontal motion unit)] inches.

[Notes]
- The horizzontal and vertical motion unit are specified by **GS P**. Changing the horizzontal or vertical motion unit does not affect the current line spacing.
- The **GS P** command can change the horizontal (and vertical) motion unit. However, the value cannot be less than the minimum vertical movement amount.
- In standard mode, the vertical motion unit is used.
- The maximum line spacing is *n* = 255 (≅32mm).

[Default] n = 32 (1/6 inch)

[Reference] **ESC 0, ESC 2, GS P**

[Example]

ESC 4 n

[Name] Set / Reset script mode.

[Format]

ASCII	ESC	4	n
Hex	1B	34	n
Decimal	27	52	n

[Range] 0 ≤ n ≤ 1, 48 ≤ n ≤ 49

[Description] Turn script mode on or off, based on the following values of n :

n	Function
0, 48	Turns off script mode
1, 49	Turns on script mode

[Notes]
- The printer can print in script mode all characters.
- When script mode is turned off by setting the value of *n* to 0 or 48, the following data is printed in normal mode.
- Script mode can also be turned on or off by using **ESC !**. Note, however, that the last received command is effective.

[Default] n = 0

[Reference] **ESC !**

[Example]

ESC = n

[Name] Select peripheral device.

[Format]

ASCII	ESC	=	n
Hex	1B	3D	n
Decimal	27	61	n

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

[Description] Select the device to which the host computer sends data, using *n* as follows :

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Printer disabled
	On	01	1	Printer enabled
1	-	-	-	Undefined
2	-	-	-	Undefined
3	-	-	-	Undefined
4	-	-	-	Undefined
5	-	-	-	Undefined
6	-	-	-	Undefined
7	-	-	-	Undefined

[Notes]
- When the printer is disabled, it ignores all transmitted data until the printer is enabled by this command.

[Default] n = 1

[Reference]

[Example]

ESC ? n

[Name] Cancel user-defined characters.

[Format]

ASCII	ESC	?	n
Hex	1B	3F	n
Decimal	27	63	n

[Range] $32 \leq n \leq 126$

[Description] Cancels user-defined characters.

[Notes]
- This command cancels the pattern defined for the character code specified by *n* . After the user-defined characters is canceled, the corresponding pattern for the internal character is printed.
- This command deletes the pattern defined for the specified character code in the font selected by **ESC !**.
- If user-defined character has not been defined for the specified character code, the printer ignores this command.

[Default]

[Reference] **ESC &, ESC %**

[Example]

ESC @

[Name] Initialize printer.

[Format]

ASCII	ESC	@
Hex	1B	40
Decimal	27	64

[Description] Clears the data in the print buffer and reset the printer mode to the mode that was in effect when the power was turned on.

[Notes]
- The data in the receive buffer is not cleared.
- The macro definitions are not cleared.

[Default]

[Reference]

[Example]

ESC D [n1...nk] NUL

[Name] Set horizontal tab positions.

[Format]

ASCII	ESC	D	NUL
Hex	1B	44	00
Decimal	27	68	0

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

$0 \leq K \leq 32$

[Description] Sets horizontal tab positions.

n specifies the column number for setting a horizontal tab position from the beginning of the line.

k indicates the total number of horizontal tab positions to be set.

[Notes] The horizontal tab position is stored as a value of [character width x *n*] measured from the beginning of the line. The character width includes the rigth-side character spacing, and double-width characters are set width twice the width of normal character.
- This command cancel the previous horizontal tab setting.
- When setting *n* = 8, the print position is moved to column 9 by sending **HT**.
- Up to 32 tab position (*k* = 32) can be set. Data exceeding 32 tab positions is processed has normal data.
- Transmit [*n*] *k* in ascending order and place a NUL code 0 at the end.
- When [*n*] *k* is less than or equal to the preceding value [*n*] *k*-1, tab setting is finished and the following data is processed as normal data.
- **ESC D NUL** cancels all horizontal tab position.
- The previously specified horizontal tab position do not change, even if the character width changes.

[Default] The default tab positions are at intervals of 8 characters (columns 9, 17, 25, ...) for Font A when the right-side character spacing is 0.

[Reference] **HT**

[Example]

ESC E n

[Name] Turn emphasized mode On/Off.

[Format]

ASCII	ESC	E	n
Hex	1B	45	n
Decimal	27	69	n

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

[Description] Turns emphasized mode On or Off.
- When the LSB of *n* is 0, emphasized mode is turned off.
- When the LSB of *n* is 1, emphasized mode is turned on.

[Notes]
- Only the LSB of *n* is effective.
- **ESC !** also turns on and off emphasized mode. Hower, the last received command is effective.

[Default] n = 0

[Reference] **ESC !**

[Example]

ESC G n

[Name] Turn double-strike mode On/Off.

[Format]

ASCII	ESC	G	n
Hex	1B	47	n
Decimal	27	71	n

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

[Description] Turns double-strike mode On or Off.
- When the LSB of *n* is 0, double-strike mode is turned off.
- When the LSB of *n* is 1, double-strike mode is turned on.

[Notes]
- Only the LSB of *n* is effective.
- Printer uotput is the same in double-strike mode and emphasized mode.

[Default] n = 0

[Reference] **ESC E**

[Example]

ESC J n

[Name] Print and feed paper.

[Format]

ASCII	ESC	J	n
Hex	1B	4A	n
Decimal	27	74	n

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

[Description] Prints the data in the print buffer and feeds the paper [n x (vertical or horizontal motion unit)] inches.

[Notes]
- After printing is completed, this command sets the print starting position to the beginning of the line.
- The paper feed amount set by this command does not affect the values set by **ESC 2** or **ESC 3**.
- The horizzontal and vertical motion unit are specified by **GS P**.
- The **GS P** command can change the vertical (and horizontal) motion unit. However, the value cannot be less than the minimum vertical movement amount.
- In standard mode, the vertical motion unit is used.
- The maximum paper feed amount 31.8 mm.

[Default]
[Reference] **GS P**
[Example]

ESC R n

[Name] Select an international character set.

[Format]

ASCII	ESC	R	n
Hex	1B	52	n
Decimal	27	82	n

[Range] $0 \leq n \leq 12$

[Description] Select the international character set n from the following table :

	Hex	23	24	40	5B	5C	5D	5E	60	7B	7C	7D	7E
n	Character set												
0	U.S.A.	#	$	@	[	\	]	^	‘	{	|	}	~
1	France	#	$	à	°	ç	§	^	‘	é	ù	è	“
2	Germany	#	$	§	Ä	Ö	Ü	^	‘	ä	ö	ü	β
3	U.K.	£	$	@	[	\	]	^	‘	{	|	}	~
4	Denmark I	#	$	@	Æ	∅	Å	^	‘	æ	ϕ	å	~
5	Sweden	#	¤	É	Ä	Ö	Å	Ü	é	ä	ö	å	ü
6	Italy	#	$	@	°	\	é	^	ù	à	ò	è	ì
7	Spain 1	Pt	$	@	¡	Ñ	¿	^	‘	“	ñ	}	~
8	Japan	#	$	@	[	¥	]	^	‘	{	|	}	~
9	Norway	#	¤	É	Æ	∅	Å	Ü	è	æ	ϕ	å	ü
10	Denmark II	#	$	É	Æ	∅	Å	Ü	è	æ	ϕ	å	ü
11	Spain 2	#	$	à	¡	Ñ	¿	é	‘	í	ñ	ö	ü
12	South America	#	$	à	¡	Ñ	¿	é	ù	í	ñ	ö	ü

[Notes]
[Default] n = 0
[Reference]
[Example]

ESC V n

[Name] Turn 90° clockwise rotation mode On/Off.

[Format]

ASCII	ESC	V	n
Hex	1B	56	n
Decimal	27	86	n

[Range] n = 0,1,48,49

[Description] Turns emphasized mode On or Off.
n is used as follow:
- n=0,48 turns off 90° rotation mode
- n=1,49 turns on 90° rotation mode

[Notes]
- When underline mode is turned on, the printer does not underline 90° clockwise-rotated characters.However, underline mode can be selected.

[Default] n = 0

[Reference] **ESC !, ESC -**

[Example]

ESC \ nL nH

[Name] Set relative print position.

[Format]

ASCII	ESC	\	nL	nH
Hex	1B	5C	nL	nH
Decimal	27	92	nL	nH

[Range] $0 \leq nL \leq 255$
$0 \leq nH \leq 255$

[Description] Sets the print starting position based on the current position by using the horizontal or vertical motion unit.
- This command sets the distance from the current position to [(nL + nH x 256) x (horizontal or vertical motion unit)].

[Notes]
- Any setting that exceeds the printable area is ignored.
- When the starting position is specified by N motion unit to the right :
  nL + nH x 256 = N

When the starting position is specified by N motion unit to the left (negative direction), use the complement of 65536 :
nL + nH x 256 = 65536 - N
- If setting exceeds printing area width, left or right margin is set to default value.
- The horizzontal and vertical motion unit are specified by **GS P**.
- The **GS P** command can change the horizontal (and vertical) motion unit. However, the value cannot be less than the minimum horizontal movement amount.
- In standard mode, the horizontal motion unit is used.

[Default]

[Reference] **ESC $, GS P**

[Example]

ESC a n

[Name] Select justification.

[Format]

ASCII	ESC	a	n
Hex	1B	61	n
Decimal	27	97	n

[Range] $0 \leq n \leq 2, 48 \leq n \leq 50$

[Description] Aligns old the data in one line to the specified position.
n selects the type of justification as follows :

n	Justification
0, 48	Left justification
1, 49	Centering
2, 50	Right justification

[Notes]
- The command is enabled only when input at the beginning of the line.
- Lines are justified within the specified printing area.
- Spaces set by **HT, ESC $** and **ESC ** are old justified.

[Default] n = 0

[Reference]

[Example]

Left justification	Centering	Rigth justification
ABC ABCD ABCDE	ABC ABCD ABCDE	ABC ABCD ABCDE

ESC d n

[Name] Print and feed paper *n* lines.

[Format]

ASCII	ESC	d	n
Hex	1B	64	n
Decimal	27	100	n

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

[Description] Prints the data in the print buffer and feeds the paper *n* lines.

[Notes]
- This comand sets print starting position at the beginning o fthe lines.
- This comand does not affect the line spacing set by **ESC 2** or **ESC 3**.
- The maximum paper feed amount is 200 lines. Even if a paper feed amount of more than 200 lines is set, the printer feeds the paper only 200 lines.

[Default]

[Reference] **ESC 2, ESC 3**

[Example]

ESC r n

[Name] Set/Reset red printing mode.

[Format]

ASCII	ESC	r	n
Hex	1B	72	n
Decimal	27	114	n

[Range] 0 ≤ n ≤ 1, 48 ≤ n ≤ 49

Description] Sets and resets negative mode

n	Function
0, 48	Reset red printing mode
1, 49	Set red printing mode

[Notes] • The printer print red only complete line, not single character.
• The printer print red only if enabled by setup.

[Default] *n* = 0

[Reference]

[Example]

ESC t n

[Name] Select character code table.

[Format]

ASCII	ESC	t	n
Hex	1B	74	n
Decimal	27	116	n

[Range] *n* = 0, 255

[Description] Selects a page *n* from the character code table, as follows :

n	Page
0	0 (PC437 [U.S.A., Standard Europe])
255	Space page

[Notes]

[Default] *n* = 0

[Reference] See Character Code Tables.

[Example]

ESC v

[Name] Transmit paper sensor status.

[Format]

ASCII	ESC	v
Hex	1B	76
Decimal	27	118

[Description] Transmits the current paper sensor status upon receiving this command.

[Notes]
- This command is executed immediately, also when the receive buffer is full (Busy).
- The status to be transmitted is shown in the table below :

Bit	Off/On	Hex	Decimal	Function
0, 1	Off	00	0	Not used.
	On	03	3	Not used.
2, 3	Off	00	0	Paper-end sensor. Paper is present.
	On	(0C)	(12)	Paper-end sensor. Paper is not present.
4	Off	00	0	Not used. Fixed to Off
5	-	-	-	Undefined
6	-	-	-	Undefined
7	Off	00	0	Not used. Fixed to Off

[Default]

[Reference] **DLE EOT**

[Example]

ESC x n

[Name] Select speed /current mode.

[Format]

ASCII	ESC	x	n
Hex	1B	78	n
Decimal	27	120	n

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

[Description] Selects printing speed /current mode.

n	Function
0	Low current
1	Normal mode

[Notes] If the printer shows some problems while printing, select mode 0 (low current).

[Default] $n = 1$

[Reference]

[Example]

ESC { n

[Name] Turns upside-down printing mode on/off.

[Format]

ASCII	ESC	{	n
Hex	1B	7B	n
Decimal	27	123	n

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

[Description] Turns upside-down printing mode on or off.
- When the LSB of *n* is 0, upside-down printing mode is turned to off.
- When the LSB of *n* is 1, upside-down printing mode is turned to on.

[Notes]
- Only the LSB of *n* is effective.
- This command is enabled only when input of the beginning of a line.
- In upside-down printing mode, the printer rotates the line to be printed by 180° and then prints it.

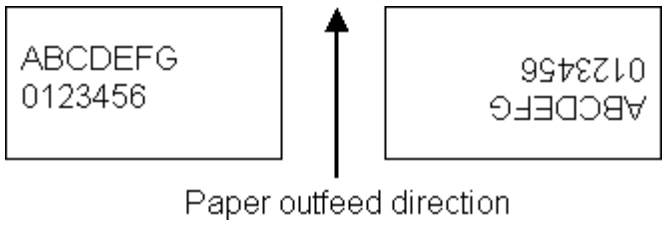
[Default] *n* = 0

[Example]

When upside-down mode is Off

ABCDEFG
0123456

When upside-down mode is Off



E**SC · n xH xL yH yL**

[Name] Print graphic bank (384 x 341 dots).

[Format]

ASCII	ESC	·	n	xH	xL	yH	yL
Hex	1B	FA	n	xH	xL	yH	yL
Decimal	27	250	n	xH	xL	yH	yL

[Range] $0 \leq n \leq 2$

$0 \leq xH, xL, yH, yL \leq 255$

[Description] Print graphic bank from flash or ram.

n selects the bank as follows :

n	Function
0	Print ram bank.
1	Print flash bank logo 1
2	Print flash bank logo 2

xL + *xH* x 256 specifies the starting dot line (1 ÷ 341).

yL + *yH* x 256 specifies the lines number to print.

[Notes] • If (*xL* + (*xH* x 256)) > 341 the printer does not execute the command.
• If(*xL* + (*xH* x 256) + *yL* +(*yH* x 256))> 585 the printer prints only 341 - *xL* + (*xH* x 256) +1 dotlines.
[Default]
[Reference] **ESC ³, ESC ², ESC ¦**
[Example] To print from ram bank dotline 100 to dotline 299, send :

1BH FAH 00H 00H 64H 00H C7H

ESC ¹
[Name] Transmit ram bank to serial port.
[Format]

ASCII	ESC	¹
Hex	1B	FB
Decimal	27	251

[Description] Transmits 16384 bytes of ram bank to serial port.
[Notes] • The size of ram bank for graphic printing is 384 horizontal dots (48 bytes/dotline) (341 vertical dots (16368 bytes).
[Default]
[Reference] **ESC ³, ESC ², ESC ¦**
[Example]

ESC ³ n
[Name] Transfer flash bank into ram bank.
[Format]

ASCII	ESC	³	n
Hex	1B	FC	n
Decimal	27	252	n

[Range] 1 ≤ n ≤ 2
[Description] Transfers flash bank into ram bank (16384 bytes).
n selects the bank as follows :

n	Function
1	Transfer flash bank logo 1 into ram.
2	Transfer flash bank logo 2 into ram.

[Notes]
[Default]
[Reference] ESC ·, ESC ², ESC ¦
[Example]

ESC ² nL nH

[Name] Receive ram bank from serial port.

[Format]

ASCII	ESC	²	nL	nH
Hex	1B	FD	nL	nH
Decimal	27	253	nL	nH

[Range] 0 ≤ *nL*, *nH* ≤ 255

[Description] Receives [*nL* + (*nH* (256)] words from serial port and put them into ram bank.

[Notes]
- The number of data bytes received is [*nL* + (*nH* x 256)] x 2.
- Every word, the printer receives first MSByte and then LSByte
- If [*nL* + (*nH* x 256)] exceeds 8192, the data following are processed as normal data.

[Default]

[Reference] **ESC ·, ESC ³, ESC ¦**

[Example]

ESC ¦ n

[Name] Transfer ram bank into flash bank.

[Format]

ASCII	ESC	¦	n
Hex	1B	FE	n
Decimal	27	254	n

[Range] 1 ≤ n ≤ 2

[Description] Transfers ram bank into flash bank. (16384 bytes).
n selects the bank as follows :

n	Function
1	Transfer ram bank into flash bank logo 1.
2	Transfer ram bank into flash bank logo 2.

[Notes]

[Default]

[Reference] **ESC ·, ESC ², ESC ³**

[Example]

GS ! n

[Name] Select character size.

[Format]

ASCII	GS	!	n
Hex	1D	21	n
Decimal	29	33	n

[Range] 0 ≤ n ≤ 255

[Description] Selects character height and width, as follows :
- Bits 0 to 3 : character height selction (see table 2).
- Bits 4 to 7 : character height selction (see table 1).

Table 1 Character Width selection

Hex	Decimal	Width
00	0	1 (normal)
10	16	2 (double width)
20	32	3 (quadruple width)
30	48	
40	64	
50	80	
60	96	
70	112	

Table 2 Character Height selection

Hex	Decimal	Width
00	0	1 (normal)
01	1	2 (double height)
02	2	3 (quadruple height)
03	3	
04	4	
05	5	
06	6	
07	7	

[Notes]
- This command is effective for all characters (except for HRI characters).
- If *n* is outside of the defined range this command is ignored.
- When characters are enlarged with different heights on one line, the characters are alligned at the baseline or topline (see **GS ~**).
- **ESC !** can also select character size. However, the setting of the last received command is effective.

[Default] n = 0
[Reference] **ESC !**
[Example]

GS :
[Name] Start/end macro definition.
[Format]

ASCII	GS	:
Hex	1D	3A
Decimal	29	58

[Description] Starts or ends macro definition.
[Notes]
- Macro definition starts when this command is receiving during normal operation. Macro definition ends when this command is received during macro definition.
- When **GS ^** is received during macro definition, the printer ends macro definitions and clears all definitions.
- Macro is not defined when the power is turned on.
- The defined contents of the macro are not cleared by **ESC** @. Therefore, **ESC** @ can be included in the contents of the macro defintions.
- If the orinter receives **GS :** again immediately after previously receiving **GS :**, the printer remains in the macro undefined state.
- The contents of the macro can be deifned up to 1024 bytes. If the macro definition exceeds 1024 bytes excess data is not stored.

[Default]
[Reference] **GS ^**
[Example]

GS B n

[Name] Turn white/black reverse printing mode on/off.

[Format]

ASCII	GS	B	n
Hex	1D	42	n
Decimal	29	66	n

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

[Description] Turns white/black reverse printing mode on or off.
- When the LSB of *n* is 0, white/black reverse printing is turned off.
- When the LSB of *n* is 1, white/black reverse printing is turned on.

[Notes]
- Only the LSB of *n* is effective.
- This command is available for built-in character and user-defined character.
- This command does not affect bit image, downloaded bit image, barcode, HRI characters, and spacing skipped by **HT, ESC $** and **ESC **.
- This command does not affect th espace between lines.
- White/black reverse mode has a higher priority than underline mode. Even if underline mode is on, it's disabled (but not canceled) when white/black reverse mode is selected.

[Default] n = 0

[Reference]

[Example]

GS C 0 n m

[Name] Select counter print mode.

[Format]

ASCII	GS	C	0	n	m
Hex	1D	43	30	n	m
Decimal	29	67	48	n	m

[Range] $0 \leq n \leq 5$

m = 0, 1, 2, 48, 49, 50

[Description] Selects a print mode for the serial number counter.
- *n* specifies the number of digit to be printed as follows :
  when *n* = 0, the printer prints the actual digits indicated by the number value.
  When *n* = 1 to 5, this command sets the number of digits to be printed.
- *m* specifies the printing position within the entire range of printed digits, as follows :

m	Printign position	Processing of digits less than those specified
0, 48	Align right	Adds spaces to the left.
1, 49	Align right	Adds '0' to the left.
2, 50	Align left	Adds spaces to the right.

[Notes]
- If *n* or *m* is out of the defined range, the previously set print mode is not changed.
- If *n* = 0, m does not have any meanings.

[Default] *n* = 0, *m* = 0

[Reference] **GS C 1, GS C 2, GS C ;, GS c**

[Example]

n = 3, m = 0	n = 3, m = 1	n = 3, m=2
• •1	001	1• •

• indicates a space

GS C 1 aL aH bL bH n r

[Name] Select count mode (A).

[Format]

ASCII	GS	C	1	aL	aH	bL	bH	n	r
Hex	1D	43	31	aL	aH	bL	bH	n	r
Decimal	29	67	49	aL	aH	bL	bH	n	r

[Range] $0 \leq$ aL, aH ≤ 255
$0 \leq$ bL, bH ≤ 255
$0 \leq$ n, r ≤ 255

[Description] Selects a count mode for the serial number counter.
• *aL, aH* or *bL, bH* specify the counter range.
• *n* indicates the stepping amount when counting up or down.
• *r* indicates the repetition number when the counter value is fixed.

[Notes] • Count-up mode is specified when :
[a*L* + (a*H* x 256)] < [b*L* + (b*H* x 256)] and $n \neq 0$ and $r \neq 0$
• Count-down mode is specified when :
[a*L* + (a*H* x 256)] > [b*L* + (b*H* x 256)] and $n \neq 0$ and $r \neq 0$
• Counting stops when :
[a*L* + (a*H* x 256)] = [b*L* + (b*H* x 256)] or $n = 0$ or $r = 0$
• In setting count-up mode, the minimum value of the counter is [a*L* + (a*H* x 256)] and the maximum value is [b*L* + (b*H* x 256)]. If counting up reaches a value exceeding the maximum, it's resumed with the minimum value.
• In setting count-down mode, the maximum value of the counter is [a*L* + (a*H* x 256)] and the minimum value is [bL + (bH (256)]. If counting down reaches a value less than minimum, it's resumed with the maximum value.
• When this command is executed, the internal count that indicates the repetition number specifies by *r* cleared.

[Default] aL = 1, aH = 0, bL = 255, bH = 255, n = 1, r = 1

[Reference] **GS C 0, GS C 2, GS C ;, GS c**

[Example]

GS C 2 nL nH

[Name] Set counter.

[Format]

ASCII	GS	C	2	nL	nH
Hex	1D	43	32	nL	nH
Decimal	29	67	50	nL	nH

[Range] 0 ≤ nL, nH ≤ 255
[Description] Sets the serial number counter value.
• *nL* and *nH* determine the value of the serial number counter set by [*nL* + (*nH* x 256)].
[Notes] • In count-up mode, if the counter value specified by this command goes out of the counter operation range specified by **GS C 1** or **GS C ;**, it is forced to convert to the minimum value by G**S c**.
• In count-down mode, if the counter value specified by this command goes out of the counter operation range specified by **GS C 1** or **GS C ;**, it is forced to convert to the maximum value by **GS c**.
[Default] nL = 1, nH = 0
[Reference] **GS C 0, GS C 1, GS C ;, GS c**
[Example]

GS C ; sa ; sb ; sn ; sr ; sc ;
[Name] Select count mode.
[Format]

ASCII	GS	C	;	sa	;	sb	;	sn	;	sr	;	sc	;
Hex	1D	43	3B	sa	3B	sb	3B	sn	3B	sr	3B	sc	3B
Decimal	29	67	59	sa	59	sb	59	sn	59	sr	59	sc	59

[Range] 0 ≤ sa, sb, sc ≤ 65535
0 ≤ sn, sr ≤ 255
These values are all character strings.
[Description] Selects a count mode for the serial number counter and specifies the value of the counter.
• *sa, sb, sn, sr* and *sc* are all dispalyed in ASCII character using the codes for ‘O’ to ‘9’.
• *sa* and *sb* specify the counter range.
• *sn* indicates the stepping amount for counting up or down.
• *sr* indicates the repetition number width the counter value fixed.
• *sc* indicates the counter value.
[Notes] • Count-up mode is specified when :
sa < *sb* and *sn* ≠ 0 and s*r* ≠ 0
• Count-down mode is specified when :
sa > *sb* and *sn* ≠ 0 and *sr* ≠ 0
• Counting stops when :
sa = *sb* or *sn* = 0 or *sr* = 0
• In setting count-up mode, the minimum value of the counter is *sa* and the maximum value is *sb*. If counting up reaches a value exceeding the maximum, it’s resumed with the minimum value. If the counter value set by *sc* is outside the counter operation range, the counter value is forced to convert to the minimum value by executing **GS c**.
• In setting count-down mode, the maximum value of the counter is *sa* and the minimum value is *sb*. If counting down reaches a value less than minimum, it’s resumed with the maximum value. If the counter value set by *sc* is outside the counter operation range, the counter value is forced to convert to the maximum value by executing **GS c**.
• Parameter sa to sc can be omitted. If omitted, these argument values are unchanged.
• Parameter sa to sc must not contain characters, exceept ‘0’ to ‘9’.
[Default] sa = 1, sb = 65535, sn = 1, sr = 1, sc = 1
[Reference] **GS C 0, GS C 2, GS C 1, GS c**
[Example]

GS H n

[Name] Select printing position of Human Readable Interpretation (HRI) characters

[Format]

ASCII	GS	H	n
Hex	1D	48	n
Decimal	29	72	n

[Range] 0 ≤ n ≤ 3, 48 ≤ n ≤ 51

[Description] Selects the printing position of HRI characters when printing bar code.
n selects the printing position as follows :

n	Function
0, 48	Not printed.
1, 49	Above the bar code.
2, 50	Below the bar code.
3, 51	Both above and below the bar code.

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

[Default] n = 0

[Reference] **GS f, GS k**

[Example]

GS I n

[Name] Transmit printer ID.

[Format]

ASCII	GS	I	n
Hex	1D	49	n
Decimal	29	73	n

[Range] 1 ≤ n ≤ 3, 49 ≤ n ≤ 51

[Description] Transmits the printer ID specified by n as follows :

n	Printer ID	Specification
1, 49	Printer model ID.	05H (PM585)
2, 50	Type ID.	Refet to table below
3, 51	ROM version ID.	Depends on ROM version (4 char)

n = 2, Type ID

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Two bytes character codes not supported
1	Off	00	0	Autocutter not equipped
				Autocutter equipped
2	Off	00	0	Non-label thermal paper
	On	04	4	Label thermal paper
3	-	-	-	Undefined
4	Off	00	0	Not used. Fixed to Off
5	-	-	-	Undefined
6	-	-	-	Undefined
7	Off	00	0	Not used. Fixed to Off

[Notes] • This command is executed when the data is processed in the receive buffer. Therefore, there may be a time lag between receiving the command and transmitting the status, depending on the receive buffer status.

[Default]

[Reference]

[Example]

GS L nL nH

[Name] Set left margin.

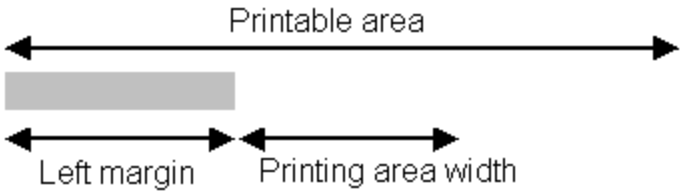
[Format]

ASCII	GS	L	nL	nH
Hex	1D	4C	nL	nH
Decimal	29	76	nL	nH

[Range] 0 ≤ nL, nH ≤ 255

[Description] Sets the left margin.

• The left margin is set to [(nL + nH x 256) x (horizontal motion unit)] inches.



[Notes]

• This command is enabled only of the beginning of the line.
• If the setting exceeds the printable area, the maximum value of the printable area is used.
• If left margin + printing area width is greater than printable area, then printing area width is set at maximum value.
• The horizzontal and vertical motion unit are specified by **GS P**. Changing the horizontal or vertical motion unit does not affect the current left margin.
• The **GS P** command can change the horizontal (and vertical) motion unit.
• However, the value cannot be less than the minimum horizontal movement amount and it must be in even units of the minimum horizontal movement amount.

[Default] If Font A : nL = nH = 0
If Font B : nL =14
nH = 0

[Reference] **GS P, GS W**

[Example]

GS P x y

[Name] Set horizontal and vertical motion units.

[Format]

ASCII	GS	P	x	y
Hex	1D	50	x	
Decimal	29	80	x	y

[Range] x = 100, 200
y = 100, 200

[Description] Sets the horizontal and vertical motion units to 1/x inch and 1/y inch, respectively.
When *x* is set to 0, the default setting value is used.
When *y* is set to 0, the default setting value is used.

[Notes]
- The horizontal direction is perpendicular to the paper feed direction.
- In standard mode, the following commands use x or y, regardless of character rotation (upside-down or 90° clockwise rotation) :

① Command using *x* : **ESC SP, ESC $, ESC \, GS L, GS W**.
② Command using *y* : **ESC 3, ESC J**.

- This command does not affect the previously specified values.
- The calculated result from combining this command with others is truncated to the minimum value of the mechanical pitch or an exact multiple of that value.

[Default] x = 200, y = 200

[Reference] **ESC SP, ESC $, ESC \, ESC 3, ESC J, GS L, GS W**

[Example]

GS W nL nH

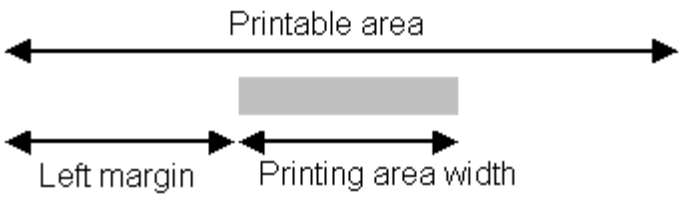
[Name] Set printing area width.

[Format]

ASCII	GS	W	nL	nH
Hex	1D	57	nL	nH
Decimal	29	87	nL	nH

[Range] 0 ≤ nL, nH ≤ 255

[Description] Sets the printing area width to the area specified by nL and nH..
- The left margin is set to [(nL + nH x 256) x (horizontal motion unit)] inches.



[Notes]
- This command is enabled only of the beginning of the line.
- If right margin is greater than printable area, then the printing area width is set at maximum value.
- If printing area width = 0, then is set at maximum value.
- The horizzontal and vertical motion unit are specified by **GS P**. Changing the horizontal or vertical motion unit does not affect the current left margin.
- The **GS P** command can change the horizontal (and vertical) motion unit.
- However, the value cannot be less than the minimum horizontal movement amount and it must be in even units of the minimum horizontal movement amount.

[Default] If Font 14x24: nL = 124
nH = 1
If Font 10x24: nL = 126
nH = 1
If Font 8x24: nL = 0
nH = 0

[Reference] **GS L, GS P**
[Example]

GS ^ r t m

[Name] Execute macro.

[Format]

ASCII	GS	^	r	t	m
Hex	1D	5E	r	t	m
Decimal	29	94	r	t	m

[Range] $0 \leq r, t \leq 255$
$0 \leq m \leq 1$

[Description] Executes a macro.
- *r* specifies the number of times to execute the macro.
- *t* specifies the waiting time for executing the macro.
  The waiting time is *t* x 100 msec. for every macro execution.
- *m* specifies macro executing mode :
  When the LSB of *m* = 0, the macro executes *r* times continuosly at the interval specified by *t*.
  When LSB of *m* = 1, after waiting for the period specified by *t*, the LED indicator blinks and the printer waits for the FEED button to be pressed. After the button is pressed, the printer executes the macro once. The printer repeats the operation *r* times.

[Notes]
- This command for a period of (*t* x 100 msec.) after a macro is executed by *t*.
- If this command is received while a macro is being defined, the macro definitions is aborted and the definitions is cleared.
- If the macro is not defined or if *r* is 0, nothing is executed.
- When the macro is executed by pressing the FEED button (*m* = 1), paper can not be fed by using the FEED button.

[Default]
[Reference] **GS :**
[Example]

GS c

[Name] Print counter.

[Format]

ASCII	GS	c
Hex	1D	63
Decimal	29	99

[Description] Sets the serial counter value in the print buffer and increments or decrements the counter value.

[Notes]
- After setting the current counter value in the print buffer as print data (a character string), the printer counts up or down based on the count mode set. The counter value in the print buffer is printed when the printer receives a print command or is in the buffer full state.
- The counter print mode is set by **GS C 0**.
- The counter mode is set by **GS C 1** or **GS C ;**.
- In count-up mode, if the counter value set by this command goes out of the counter operation range set by **GS C 1** or **GS C ;**, it is forced to convert to the minimum value.
- In count-down mode, if the counter value set by this command goes out of the counter operation range set by **GS C 1** or **GS C ;**, it is forced to convert to the maximum value.

[Default]

[Reference] **GS C 0, GS C1, GS C 2, GS C ;**

[Example]

GS f n

[Name] Select font for HRI characters.

[Format]

ASCII	GS	f	n
Hex	1D	66	n
Decimal	29	102	n

[Range] n = 0, 1, 48, 49

[Description] Selects a font for the HRI characters used when printing a bar code.
n selects a font from the following the table :

n	Font
0, 48	Font A (14 x 24).
1, 49	Font B (10 x 24).

[Notes] HRI character are printed at the position specified by GS H.

[Default] n = 0

[Reference] **GS H, GS k**

[Example]

GS h n

[Name] Set bar code heght

[Format]

ASCII	GS	h	n
Hex	1D	68	n
Decimal	29	104	n

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

[Description] Sets the heigth of the bar code.
n specifies the number of the dots in the vertical direction.

[Notes]

[Default] n = 96 (12 mm)

[Reference] **GS k**

[Example]

① GS k m [d1...dk] NUL **② GS k m n [d1...dn]**

[Name] Print bar code.

[Format]

①	ASCII	GS	k	m	NUL
	Hex	1D	6B	m	00
	Decimal	29	107	m	0
②	ASCII	GS	k	m	n
	Hex	1D	6B	m	n
	Decimal	29	107	m	n

[Range] ① $0 \leq m \leq 6$
② $65 \leq m \leq 73$

[Description] Selects a bar code system and prints the bar code.
m selects a bar code system as follows :

	m	Bar code system	Number of characters	Remarks
①	0	UPC-A	$11 \leq k \leq 12$	$48 \leq d \leq 57$
	1	UPC-E	$11 \leq k \leq 12$	$48 \leq d \leq 57$
	2	EAN13 (JAN)	$12 \leq k \leq 13$	$48 \leq d \leq 57$
	3	EAN8 (JAN)	$7 \leq k \leq 8$	$48 \leq d \leq 57$
	4	CODE39	$1 \leq k$	$48 \leq d \leq 57$, $65 \leq d \leq 90$, 32, 36, 37, 43, 45, 46, 47
	5	ITF	$1 \leq k$ (even number)	$48 \leq d \leq 57$
	6	CODABAR	$1 \leq k$	$48 \leq d \leq 57$, $65 \leq d1 \leq 68$, 36, 43, 45, 46, 47, 58
	7	CODE93	$1 \leq k \leq 255$	$1 \leq d \leq 127$
	8	CODE128	$2 \leq k \leq 255$	$1 \leq d \leq 127$
	20	CODE32	$8 \leq k \leq 9$	$48 \leq d \leq 57$

	m	Bar code system	Number of characters	Remarks
	65	UPC-A	11 ≤ n ≤ 12	48 ≤ d ≤ 57
	66	UPC-E	11 ≤ n ≤ 12	48 ≤ d ≤ 57
	67	EAN13 (JAN)	12 ≤ n ≤ 13	48 ≤ d ≤ 57
	68	EAN8 (JAN)	7 ≤ n ≤ 8	48 ≤ d ≤ 57
	69	CODE39	1 ≤ n ≤ 255	48 ≤ d ≤ 57, 65 ≤ d ≤ 90, 32, 36, 37, 43, 45, 46, 47
②	70	ITF	1 ≤ n ≤ 255	48 ≤ d ≤ 57
	71	CODABAR	1 ≤ n ≤ 255	48 ≤ d ≤ 57, 65 ≤ d1 ≤ 68, 36, 43,45, 46, 47, 58
	72	CODE93	1 ≤ n ≤ 255	0 ≤ d ≤ 127
	73	CODE128	2 ≤ n ≤ 255	0 ≤ d ≤ 127
	90	CODE32	8 ≤ n ≤ 9	48 ≤ d ≤ 57

[Notes]
- If *d* is outside of the specified range, the printer prints the following message : “BAR CODE GENERATOR IS NOT OK !” and processing the following data as normal data.
- If the horizontal size exceeds printing area, the printre only feeds th e paper.
- This command feeds as much paper as is required to print the bar code, regardless of the line spacing specified by **ESC 2** Or **ESC 3**.
- After printing bar code, this command sets the print position to the beginning of the line.
- This commnad is not affected by prints modes (emphasized, double stricke, underline or character size), except for upside-down mode and justification.

[Notes for ①]
- This command ends with a NUL code.
- When the bar code system used is UPC-A or UPC-E, the printer prints the bar code data after receiving 11 (without check digit) or 12 (with check digit) bytes bar code data.
- When the bar code system used is EAN13, the printer prints the bar code after receiving 12 (without check digit) or 13 (with check digit) bytes bar code data.
- When *n* the bar code system used is EAN8, the printer prints the bar code after receiving 7 (without check digit) or 8 (with check digit) bytes bar code data.
- The number of data for ITF bar code must be even numbers. When an odd number of data is input, the printer ignores the last received data.

[Notes for ②]
- If *n* is outside of the specified range, the printer stops command processing and processes the following data as normal data.

When CODE93 is used :
- The printer prints an HRI character (☐) as a start character at the beginning of the HRI character string.
- The printer prints an HRI character (☐) as a stop character at the end of the HRI character string.
- The printer prints an HRI characters (■) as a control character (00H to 1FH and 7FH).

When CODE128 is used

• When using the CODE128 in this printer, take the following points into account for data transmission :

• The top of the bar code data string must be code set selection character (any of CODE A, CODE B or CODE C) which selects the first code set.

• Special characters are defined by combining two characters "{" and one character. The ASCII character "}" is defined by transmitting "{" twice consecutively.

Specific character	Transmit data		
	ASCII	Hex	Decimal
SHIFT	{S	7B, 53	123, 83
CODE A	{A	7B, 41	123, 65
CODE B	{B	7B, 42	123, 66
CODE C	{C	7B, 43	123, 67
FNC1	{1	7B, 31	123, 49
FNC2	{2	7B, 32	123, 50
FNC3	{3	7B, 33	123, 51
FNC4	{4	7B, 34	123, 52
'{'	{{	7B, 7B	123, 123

[Default]
[Reference] **GS H, GS f, GS h, GS w**
[Example]

GS r n

[Name] Transmit status.

[Format]

ASCII	GS	r	n
Hex	1D	72	n
Decimal	29	114	n

[Range] n =1, 49

[Description] Transmits the status specified by *n* as follows :

n	Function
1, 49	Transmits paper sensor status (same as **ESC v**).

Paper sensor status (*n* = 1, 49) :

Bit	Off/On	Hex	Decimal	Function
0, 1	Off	00	0	Not used.
	On	03	3	Not used.
2, 3	Off	00	0	Paper-end sensor. Paper is present.
	On	(0C)	(12)	Paper-end sensor. Paper is not present.
4	Off	00	0	Not used. Fixed to Off
5	-	-	-	Undefined
6	-	-	-	Undefined
7	Off	00	0	Not used. Fixed to Off

[Notes] • This command is executed when the data is processed in the receive buffer. Therefore, there may be a time lag between receiving the command and transmitting the status, depending on the receive buffer status.

[Default]

[Reference] **DLE EOT, ESC u, ESC v**

[Example]

GS w n

[Name] Set bar code width.

[Format]

ASCII	GS	w	n
Hex	1D	77	n
Decimal	29	119	n

[Range] $2 \leq n \leq 6$

[Description] Sets the horizontal size of the bar code.
n specifies the bar code width as follows :

n	Module Width (mm)
2	0.25
3	0.375
4	0.5
5	0.625
6	0.75

[Notes]

[Default] n = 3

[Reference] **GS k**

[Example]

GS ~ n

[Name] Set exponent / deponent.

[Format]

ASCII	GS	~	n
Hex	1D	7E	n
Decimal	29	126	n

[Range] n = 0, 1, 48, 49

[Description] Sets exponent or deponent character position.
n specifies the position as follows :

n	Function
0, 48	Deponent character position.
1, 49	Exponent character position.

[Notes] • This command is executed if there are characters with different height on the same line.
[Default] n = 0
[Reference] **ESC !, GS !**
[Example]

GS | n
[Name] Set printing density.
[Format] ASCII GS | n
Hex 1D 7Cn
Decimal 29 124 n
[Range] $0 \leq n \leq 4$, $48 \leq n \leq 52$
[Description] Sets the printing density.
n specifies the printing density as follows :

n	Printing density
0, 48	Very light
1, 49	Light
2, 50	Normal
3, 51	Dark
4, 52	Very dark

[Notes] • The printing density is cleared at default value when the printer is reset or the power is turned off.
[Default] n = 2
[Reference]
[Example]