VERSAJET
MOBILE PRINTER

MP3200 Series Programming Reference

Preliminary Release Rev. 02

cino

Proprietary Statement

The information contained herein is proprietary and is provided sorely for the purpose of allowing customers to operate and maintain the equipment described herein. PC Worth Int'l Co., Ltd. reserves the right to make changes in specifications and other information contained in this document without prior notice.

Liability Disclaimer

PC Worth makes no warranty of any kind with regard to this publication, including, but not limited to, the implied warranty of merchantability and fitness for any particular purpose. PC Worth shall not be liable for technical or editorial errors or omissions contained herein; nor for incidental consequential damages in connection with the furnishing, performance, or use of this publication. This publication contains proprietary information that is protected by copyright. All rights are reserved. No part of this publication may be photocopied, reproduced or translated into any language, in any forms, in an electronic retrieval system or otherwise, without the prior written permission of PC Worth.

No Liability for Consequential Damage

In no event shall PC Worth or anyone else involved in the creation, production, or delivery of the accompanying product (including hardware and software) be liable for any damages whatsoever (including, without limitation, damages for loss of business profits, business interruption, loss of business information, or other pecuniary loss) arising out of the use of or the results of use of or inability to use such product, even if PC Worth has been advised of the possibility of such damages.

Trademarks & Copyright

Table of Contents

Introduction

Thank you for choosing **VERSAJET MP3200 Series Mobile Printer**. The MP3200 series mobile printer is designed with rugged yet lightweight architecture, delivering the ultimate convenience of mobility to meet your on-demand labels and receipts printing requirements.

To meet various wireless communication requirements, the MP3200 series comes with two different models - MP3200 and MP3200BT. RS232C and IrDA communication interfaces are supported on both models. Moreover, the MP3200BT is compatible with most Bluetooth-enabled devices by incorporating Bluetooth 1.2 wireless technology. You can select the most suitable model to fulfill your demand.

This Programming Guide provides complete descriptions on command functions and instruct programmer to configure your MP3200(BT) efficiently. If you need more information, please contact your supplier or visit our web site for details.

This guide is organized into the following chapters:

- Introduction
- Commands Overview
- Commands Descriptions

JCL Command Sets

ESC/POS (Epson Standard Code for Point of Sales) is one of the most world-popular command sets, which was designed to provide the expandability and universal applicability demanded by the market. The JCL (Job Control Language) is the proprietary printer language of Cino mobile printer supporting ESC/POS emulation. This not only shortens user's learning cycle, but also minimizes the system intetration efforts.

Furthermore, the MP3200(BT) possesses more practical and useful command sets than ESC/POS., such as the manipulation on serialization, graphics and 2D bar codes printing. You may refer to "Command Comparison between JCL and ESC/POS " for more details.

Commands Comparison between JCL and ESC/POS

Command	Descriptions	JCL	ESC/POS
HT	Horizontal tab	v	v
LF	Print and line feed	v	v
FF	Print and return to standard mode (in page mode)	v	v
CR	Print and carriage return	v	v
CAN	Cancel print data in page mode	v	v
DLE EOT	Real-time status transmission		v
DLE ENQ	Real-time request to printer		v
ESC FF	Print data in page mode	v	v
ESC SP	Set right-side character spacing	v	v
ESC !	Select print mode(s)	v	v
ESC $	Set absolute print position	v	v
ESC %	Select/cancel user-defined character set	v	v
ESC &	Define user-defined characters	v	v
ESC *	Select bit-image mode	v	v
ESC -	Turn underline mode on/off	v	v
ESC 2	Select default line spacing	v	v
ESC 3	Set line spacing	v	v
ESC =	Select peripheral device		v

Command	Descriptions	JCL	ESC/POS
SC ?	Cancel user-defined characters	v	v
ESC @	Initialize printer	v	v
ESC D	Set horizontal tab positions	v	v
ESC E	Turn emphasized mode on/off	v	v
ESC G	Turn double-strike mode on/off	v	v
ESC J	Print and feed paper	v	v
ESC L	Select page mode	v	v
ESC M	Select character font	v	v
ESC R	Select an international character set	v	v
ESC S	Select standard mode	v	v
ESC T	Select print direction in page mode	v	v
ESC V	Turn 90° colockwise rotation mode on/off	v	v
ESC W	Set printing area in page mode	v	v
**ESC **	Set relative print position	v	v
ESC a	Select justification	v	v
ESC c 3	Select paper sensor(s) to output paper-end signals		v
ESC c 4	Select paper sensor(s) to stop printing		v
ESC c 5	Enable/disable panel buttons		v

Command	Descriptions	JCL	ESC/POS
ESC d	Print and feed n lines	v	v
ESC p	Generate pulse		v
ESC t	Select character code table	v	v
ESC {	Turn upside-down printing mode on/off	v	v
GS (A	Execute test print	v	v
GS !	Select character size	v	v
GS $	Set absolute vertical print position in page mode	v	v
GS *	Define downloaded bit image	v	v
GS /	Print downloaded bit image	v	v
GS :	Start/end macro definition	v	v
GS B	Turn white/black reverse printing mode on/off	v	v
GS H	Select printing position of HRI characters	v	v
GS I	Transmit printer ID	v	v
GS L	Set left margin	v	v
GS P	Set horizontal and vertical motion units	v	v
GS V	Select cut mode and cut paper		v
GS W	Set printing area width	v	v

Command	Descriptions	JCL	ESC/POS
**GS **	Set relative vertical print position in page mode	v	v
GS ^	Execute macro	v	v
GS a	Enable/disable Automatic Status Back（ASB）		v
GS b	Turn smoothing mode on/off		v
GS f	Select font for HRI characters	v	v
GS h	Set bar code height	v	v
GS k	Print bar code	v	v
GS r	Transmit status		v
GS w	Set bar code width	v	v
FS &	Select Kanji character mode	v	v
FS p	Read the image file from flash memory	v	v
FS q	Define image, write to flash memory	v	v
GS v 0	Print raster bit image	v	v
GS C 0	Select counter print mode	v	
GS C 1	Select counter mode	v	
GS C 2	Sets the serial number counter value	v	

Command	Descriptions	JCL	ESC/POS
GS c	Print counter setup	v	
GS (K	Printing density setup	v	
GS (k	Specify and print the symbol	v	
RS m n	Media length measurement setup	v	
RS p	Set printing copies of printing data	v	
RS G	Draw line & Square	v	
RS s	Set starting serial number	v	
RS W	Define serial number region	v	
RS b	Battery check	v	
ESC ESC 00	Communication parameter setup (RS232C)	v	
ESC ESC 04	Pringing mode setup	v	
ESC ESC 05	Printer ID (for IrDA)	v	
ESC ESC 07	Printing position fine adjustment	v	
ESC ESC 08	Sensor setup	v	
ESC ESC 09	Auto power off time setup	v	
ESC ESC 10	Printing intensity setup	v	
ESC ESC 11	IrDA port setup	v	
ESC ESC 12	On-demand setup	v	

Command	Descriptions	JCL	ESC/POS
ESC ESC 13	Radio off time setup	V	
ESC ESC 14	Setting IrDA protocol	V	
ESC ESC D	Restore default value	V	

Command Overview

This chapter covers following topics to present the supported commands that are used with MP3200(BT) series :

- Command Notation
- Explanations of Terms
- Supported Commands

Command Notation

[Name] The name of the command.

[Format] The code sequence.

[Range] Gives the allowable ranges for the arguments.

[Default] Gives the default values, if any, for the command parameters.

[Description] Describes the command's function.

[Notes] Provides important information on setting and using the printer command, if necessary.

Hex indicates the hexadecimal equivalents.

Decimal indicates the decimal equivalents.

[ ]*k* indicates the contents of the **[ ]** should be repeated *k* times.

Explanation of Terms

(1) Receive buffer

The receive buffer is a buffer that stores, as is, the data received from the host (the reception data). The reception data is stored in the receive buffer temporarily, and is then processed sequentially.

(2) Print buffer

The print buffer is a buffer that stores the image data to be printed.

(3) Print buffer full

This is the state where the print buffer is full. If new print data is input while the print buffer is full, the data in the print buffer is printed out and a line feed is executed. This is the same operation as the **LF** operation.

(4) Start of line

The start of line state satisfies the following condition:

- There is no print data (including spaces and portions of data skipped due to bit image data) currently in the print buffer.
- There is no print data (including portions of data skipped due to **HT**)
- The print position is not specified by the **ESC $** or **ESC ** command.

(5) Printable area

The maximum range within which printing is possible under the printer specifications. The printable area for this printer is as follows:

- The length of the horizontal direction in standard mode:
  approximately 48 mm {1.89 "}
- The length of the horizontal direction in page mode:
  approximately 48 mm {1.89 "}
- The length of the vertical direction in page mode:
  approximately 160 mm {6.3 "}

(6) Printing area

Printing range is set by the command. It must be printing area ≤ printable area.

(7) Ignore

The state in which all codes, including parameters, are read in and discarded, and nothing happens.

(8) Inch

A unit of length. One inch is 25.4 mm.

(9) MSB

Most Significant Bit

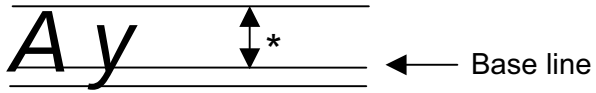
(10) LSB

Least Significant Bit

(11) Base line

Standard position when character data is stored in the print buffer.

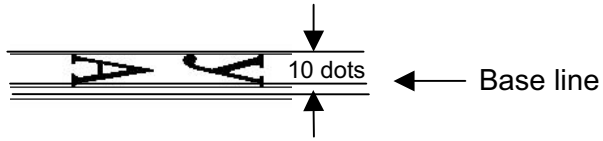
Normal character in standard mode and page mode:



* When font A (12×24 dots) is selected, this height is for 24 dots.

* When font B (9×24 dots) is selected, this height is for 24 dots.

Rotated character in standard mode (only when font A is selected):



Supported Commands

In these tables, click any name to see the command description. Please refer following instructions before you utilize these commands to confiure your MP3200(BT) :

Standard mode

O	:	Enabled.
(O)	:	Enabled only when the command is used at the beginning of command codes.
●	:	Enabled only when data is not present in the printer buffer.
Ignored	:	All command codes including parameters are ignored.

Page mode

O	:	Enabled.
▲	:	Only for value setting.
Disabled	:	Parameters are processed as printable data.
Ignored	:	All command codes including parameters are ignored.

Classification

Executing	:	The changes do not affect the following data.
Setting	:	The changes do affect the following data until power off.

Note : The changes caused by “Flash Command” will be still valid after power on/off.

Commands Listed by Function

Function Type	Command	Description	Classification	Standard Mode	Page Mode
Print	LF	Print and line feed	Executing	O	O
Print	CR	Print and carriage return	Executing	O	O
Print	ESC J	Print and feed paper (distance controlled by “GS P”)	Executing	O	O
Print	FF	Print and return to standard mode (in page mode)	Executing	Ignored	O
Print	ESC d	Print and feed ***n*** lines	Executing	O	O
Print	ESC FF	Print data in page mode	Executing	Ignored	O
Line Spacing	ESC 2	Select default line spacing	Setting	O	O
Line Spacing	ESC 3	Set line spacing	Setting	O	O
Character	ESC SP	Set right-side character spacing	Setting	O	O
Character	ESC %	Select/cancel user-defined character set	Setting	O	O
Character	ESC &	Define user-defined characters	Setting	O	O
Character	ESC ?	Cancel user-defined characters	Setting	O	O
Character	ESC t	Select character code table	Setting	O	O
Character	ESC !	Select print mode(s)	Setting	O	O
Character	ESC –	Turn underline mode on/off	Setting	O	O
Character	ESC E	Turn emphasized mode on/off	Setting	O	O
Character	ESC R	Select an international character set	Setting	O	O

Function Type	Command	Description	Classification	Standard Mode	Page Mode
Character	ESC G	Turn double-strike mode on/off	Setting	O	O
Character	ESC {	Turn upside-down printing mode on/off	Setting	(O)	▲
Character	ESC V	Turn 90° clockwise rotation mode on/off	Setting	O	▲
Character	GS !	Select character size	Setting	O	O
Character	GS B	Turn white/black reverse printing mode on/off	Setting	O	O
Character	CAN	Cancel print data in page mode	Executing	Ignored	O
Character	ESC M	Select character font	Setting	O	O
Print Position	ESC $	Set absolute print position	Executing	O	O
Print Position	ESC \	Set relative print position	Executing	O	O
Print Position	ESC a	Select justification	Setting	(O)	▲
Print Position	HT	Horizontal tab	Executing	O	O
Print Position	ESC D	Set horizontal tab positions	Setting	O	O
Print Position	GS L	Set left margin	Setting	(O)	▲
Print Position	GS W	Set printing area width	Setting	(O)	▲
Print Position	ESC W	Set printing area in page mode	Setting	▲	O
Print Position	ESC T	Select print direction in page mode	Setting	▲	O
Print Position	GS $	Set absolute vertical print position in page mode	Executing	Ignored	O
Print Position	GS \	Set relative vertical print position in page mode	Executing	Ignored	O

Function Type	Command	Description	Classification	Standard Mode	Page Mode
Bit Image	ESC *	Select bit-image mode	Executing	O	O
Bit Image	GS *	Define downloaded bit image	Setting	O	O
Bit Image	GS /	Print downloaded bit image	Executing	●	O
Bit Image	GS v 0	Print raster bit image	Executing	●	Disabled
Macro	GS :	Start/end macro definition	Executing Setting	O	O
Macro	GS ^	Execute macro	Executing	O	O
Kanji	FS &	Select traditional Chinese character mode	Setting	O	O
Miscellaneous	GS P	Set horizontal and vertical motion units	Setting	O	O
Miscellaneous	ESC @	Initialize printer	Executing+ Setting	O	O
Miscellaneous	GS I	Transmit printer ID	Executing	O	O
Miscellaneous	ESC p	Generate pulse	Executing	O	O
Miscellaneous	ESC L	Select page mode	Executing	(O)	Ignored
Miscellaneous	ESC S	Select standard mode	Executing	Ignored	O
Miscellaneous	RS G	Draw line or square (for page mode only)	Executing	Ignored	O
Miscellaneous	RS s	Print Series number n1 = initial value first 2 byte nh = initial value following 2 byte	Setting	Ignored	O

Function Type	Command	Description	Classification	Standard Mode	Page Mode
Miscellaneous	RS W	Clear printing area	Setting	Ignored	O
Miscellaneous	RS b	Battery check	Executing	O	O
Miscellaneous	RS m n	Media length measurement setup	Setting	Ignored	O
Miscellaneous	RS p	Printing copies of printing data setup	Setting	Ignored	O
Miscellaneous	GS (A	Execute Test Print	Executing	O	Disabled
Miscellaneous	GS (K	Printing Density Setup	Executing	O	O
Miscellaneous	GS C 0	Select counter print mode	Setting		
Miscellaneous	GS C 1	Select counter mode	Setting		
Miscellaneous	GS C 2	Sets the serial number counter value	Setting		
Miscellaneous	GS c	Print counter	Executing		
Bar Code	GS (k	Specify and print the symbol	Executing		O
Bar Code	GS f	Select font for HRI characters	Setting	O	O
Bar Code	GS H	Select printing position of Human Readable Interpretation (HRI) characters	Setting	O	O
Bar Code	GS h	Set bar code height	Setting	O	O
Bar Code	GS k	Print bar code	Executing	●	O
Bar Code	GS w	Set bar code width	Setting	O	O
Flash	FS q	Define image, write to flash memory	Executing	O	O
Flash	FS p	Read the image file from flash memory	Executing	O	O

Function Type	Command	Description	Classification	Standard Mode	Page Mode
Flash	ESC ESC 00	Communication parameter setup (RS232C)	Executing	O	O
Flash	ESC ESC 04	Printing mode setup	Executing	O	O
Flash	ESC ESC 05	Printer ID (for IrDA only)	Executing	O	O
Flash	ESC ESC 07	Printing position fine adjustment	Executing	O	O
Flash	ESC ESC 08	Sensor setup	Executing	O	O
Flash	ESC ESC 09	Auto power off time setup	Executing	O	O
Flash	ESC ESC 10	Printing intensity setup	Executing	O	O
Flash	ESC ESC 11	IrDA port setup	Executing	O	O
Flash	ESC ESC 12	On-demand setup	Executing	O	O
Flash	ESC ESC 13	Radio off time setup	Executing	O	O
Flash	ESC ESC 14	Setting IrDA protocol	Executing	O	O
Flash	ESC ESC D	Restore default value	Executing	O	O

Commands Listed in Alphanumeric Order

Command	Function Type	Description	Classification	Standard Mode	Page Mode
CAN	Character	Cancel print data in page mode	Executing	Ignored	O
CR	Print	Print and carriage return	Executing	O	O
ESC 2	Line Spacing	Select default line spacing	Setting	O	O
ESC 3	Line Spacing	Set line spacing	Setting	O	O
ESC a	Print Position	Select justification	Setting	(O)	▲
ESC D	Print Position	Set horizontal tab positions	Setting	O	O
ESC d	Print	Print and feed ***n*** lines	Executing	O	O
ESC E	Character	Turn emphasized mode on/off	Setting	O	O
ESC ESC 00	Flash	Communication prameter Setup (RS232C)	Executing	O	O
ESC ESC 04	Flash	Printing mode setup	Executing	O	O
ESC ESC 05	Flash	Printer ID (for IrDA only)	Executing	O	O
ESC ESC 07	Flash	Printing position fine adjustment	Executing	O	O
ESC ESC 08	Flash	Sensor Setup	Executing	O	O
ESC ESC 09	Flash	Auto pwer of tme stup	Executing	O	O
ESC ESC 10	Flash	Printing intensity setup	Executing	O	O
ESC ESC 11	Flash	IrDA port setup	Executing	O	O
ESC ESC 12	Flash	On-demand setup	Executing	O	O

Command	Function Type	Description	Classification	Standard Mode	Page Mode
ESC ESC 13	Flash	Radio off time setup	Executing	O	O
ESC ESC 14	Flash	Setting IrDA protocol	Executing	O	O
ESC ESC D	Flash	Restore default value	Executing	O	O
ESC FF	Print	Print data in page mode	Executing	Ignored	O
ESC G	Character	Turn double-strike mode on/off	Setting	O	O
ESC J	Print	Print and feed paper (distance controlled by “GS P”)	Executing	O	O
ESC L	Miscellaneous	Select page mode	Executing	(O)	Ignored
ESC M	Character	Select character font	Setting	O	O
ESC p	Miscellaneous	Generate pulse	Executing	O	O
ESC R	Character	Select an international character set	Setting	O	O
ESC S	Miscellaneous	Select standard mode	Executing	Ignored	O
ESC SP	Character	Set right-side character spacing	Setting	O	O
ESC T	Print Position	Select print direction in page mode	Setting	▲	O
ESC t	Character	Select character code table	Setting	O	O
ESC V	Character	Turn 90° clockwise rotation mode on/off	Setting	O	▲
ESC W	Print Position	Set printing area in page mode	Setting	▲	O
ESC \	Print Position	Set relative print position	Executing	O	O
ESC %	Character	Select/cancel user-defined character set	Setting	O	O

Command	Function Type	Description	Classification	Standard Mode	Page Mode
ESC &	Character	Define user-defined characters	Setting	O	O
ESC ?	Character	Cancel user-defined characters	Setting	O	O
ESC !	Character	Select print mode(s)	Setting	O	O
ESC –	Character	Turn underline mode on/off	Setting	O	O
ESC {	Character	Turn upside-down printing mode on/off	Setting	(O)	▲
ESC *	Bit Image	Select bit-image mode	Executing	O	O
ESC @	Miscellaneous	Initialize printer	Executing+ Setting	O	O
FF	Print	Print and return to standard mode (in page mode)	Executing	Ignored	O
FS p	Flash	Read the image file from flash memory	Executing	O	O
FS q	Flash	Define image, write to flash memory	Executing	O	O
FS &	Kanji	Select traditional Chinese character mode	Setting	O	O
GS B	Character	Turn white/black reverse printing mode on/off	Setting	O	O
GS C 0	Miscellaneous	Select counter print mode	Setting		
GS C 1	Miscellaneous	Select counter mode	Setting		
GS C 2	Miscellaneous	Sets the serial number counter value	Setting		
GS c	Miscellaneous	Print counter	Executing		
GS f	Bar Code	Select font for HRI characters	Setting	O	O
GS H	Bar Code	Select printing position of Human Readable Interpretation (HRI) characters	Setting	O	O

Command	Function Type	Description	Classification	Standard Mode	Page Mode
GS h	Bar Code	Set bar code height	Setting	○	○
GS I	Miscellaneous	Transmit printer ID	Executing	○	○
GS k	Bar Code	Print bar code	Executing	●	○
GS L	Print Position	Set left margin	Setting	(○)	▲
GS P	Miscellaneous	Set horizontal and vertical motion units	Setting	○	○
GS v 0	Bit Image	Print raster bit image	Executing	●	Disabled
GS W	Print Position	Set printing area width	Setting	(○)	▲
GS w	Bar Code	Set bar code width	Setting	○	○
GS $	Print Position	Set absolute vertical print position in page mode	Executing	Ignored	○
GS \	Print Position	Set relative vertical print position in page mode	Executing	Ignored	○
GS *	Bit Image	Define downloaded bit image	Setting	○	○
GS /	Bit Image	Print downloaded bit image	Executing	●	○
GS :	Macro	Start/end macro definition	Executing Setting	○	○
GS ^	Macro	Execute macro	Executing	○	○
GS !	Character	Select character size	Setting	○	○
GS (A	Miscellaneous	Execute Test Print	Executing	○	Disabled
GS (K	Miscellaneous	Printing density setup	Executing	○	○
GS (k	Bar Code	Specify and print the symbol	Executing		○

Command	Function Type	Description	Classification	Standard Mode	Page Mode
HT	Print Position	Horizontal tab	Executing	O	O
LF	Print	Print and line feed	Executing	O	O
RS b	Miscellaneous	Battery check	Executing	O	O
RS G	Miscellaneous	Draw line or square (for page mode only)	Executing	Ignored	O
RS G	Miscellaneous	Draw line or square (for page mode only)	Executing	Ignored	O
RS m n	Miscellaneous	Media length measurement setup	Setting	Ignored	O
RS p	Miscellaneous	Printing copies of printing data setup	Setting	Ignored	O
RS s	Miscellaneous	Print series number n1 = initial value first 2 byte nh = initial value following 2 byte	Setting	Ignored	O
RS W	Miscellaneous	Clear printing area	Setting	Ignored	O

Command Descriptions

This section contains the command codes for the MP3200(BT) which allows you to configure your printer for particular application to match your specific requirements. Each command begins on a separate page with its own heading to help you find the key information about each command.

LF

[Name] Print and Line Feed

[Format]

ASCII	LF
Hex	0A
Decimal	10

[Range] None

[Default] None

[Description] Prints the data in the print buffer and feed one line

[Notes]

- The amount of paper fed per line is based on the value set using the line spacing command (ESC 2 or ESC 3).
- After printing, the print position moves to the beginning of the line. When a left margin is set in standard mode, the position of the left margin is the beginning of the line.
- When this command is processed in page mode, only the print position moves, and the printer does not perform actual printing.

CR

[Name] Printing and carriage return

[Format]

ASCII	CR
Hex	0D
Decimal	13

[Range] None

[Default] None

[Description] Executes printing and one line feed as LF.

[Notes]

- After printing, the printing position moves to the beginning of the line.
- When a left margin is set, the position of the left margin is the beginning of the line.
- When this command is processed in page mode, only the printing position moves, and the printer does not perform actual printing.

ESC J

[Name] Print and feed paper

[Format]

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

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

[Default] None

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

[Notes]

- The maximum paper feed amount is 160mm. If the specified amount exceeds 160mm, the paper feed amount is automatically set to 160mm.
- When standard mode is selected, the vertical motion unit is used.
- When page mode is selected, the vertical or horizontal motion unit is used for the print direction set by ESC T.
- When the starting position is set to the upper left or lower right of the printing area using ESC T, the vertical motion unit is used.
- When the starting position is set to the upper right or lower left of the printing area using ESC T, the horizontal motion unit is used.
- After printing, the printing position moves to the beginning of the line.
- When a left margin is set in standard mode, the position of the left margin is the beginning of the line.

- When this command is processed in page mode, only the printing position moves, and the printer does not perform actual printing.
- This command is used to temporarily feed a specific length without changing the line spacing set by other commands.

FF

[Name] Print and return to standard mode

[Format]

ASCII	FF
Hex	0C
Decimal	12

[Range] None

[Default] None

[Description] In page mode, prints the data in the printer buffer collectively and returns to standard mode.

[Notes]

- This command is enabled only in page mode. Page mode can be selected by ESC L.
- The data is deleted in the printing area after being printed.
- This command returns the value set by **ESC W** to the default value.
- The value set by **ESC T** is maintained.
- After printing, the printing position moves to the beginning of the line. When a left margin is set, the position of the left margin is the beginning of the line.

ESC d

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

[Format]

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

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

[Default] None

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

[Notes]

- The amount paper fed per line is based on the value set using the line spacing command (**ESC 2** or **ESC 3**).
- The maximum paper feed amount is 160mm. If the specified amount exceeds 160mm, the paper feed amount is automatically set to 160mm.
- After printing, the printing position moves to the beginning of the line.
- When a left margin is set in standard mode, the position of the left margin is the beginning of the line.
- When this command is processed in page mode, only the printing position moves, and the printer does not perform actual printing.
- This command is used to temporarily feed a specific line without changing the line spacing.

ESC FF

[Name] Print data in page mode

[Format]

ASCII	ESC FF
Hex	1B 0C
Decimal	27 12

[Range] None

[Default] None

[Description] In page mode, prints all buffered data in the printable area collectively.

[Notes]

- This command is enabled only in page mode. Page mode can be selected by **ESC L**.
- After printing, the printer does not clear the buffered data, the printing position, or values set by other command.
- The printer returns to standard mode with **FF**, **ESC S** and **ESC @**. When it returns to standard mode by **ESC @**, all settings are cancelled.

ESC 2

[Name] Select default line spacing

[Format]

ASCII	ESC 2
Hex	1B 32
Decimal	27 50

[Range] None

[Default] None

[Description] Sets the line spacing to the “default line spacing”.

[Notes]

- The line spacing can be independently in standard and page mode.
- In standard mode this command sets the line spacing of standard mode.
- In page mode this command sets the line spacing of page mode.
- Selected line spacing is effective until **ESC 3** or **ESC @** is executed, the printer is reset, or the power is turned off.

ESC 3

[Name] Set line spacing

[Format]

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

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

[Default] Amount of line spacing which corresponds to “default line spacing” (See ESC 2 for the line spacing).

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

[Notes]

- The maximum line spacing is 160mm. If the specified amount exceeds 160mm, the line spacing is automatically set to 160mm. When standard mode is selected, the vertical motion unit is used.When page mode is selected, the vertical or horizontal motion unit is used for the print direction set by **ESC T**.
- When the starting position is set to the upper left or lower right of the printing area using **ESC T**, the vertical motion unit is used.
- When the starting position is set to the upper right or lower left of the printing area using **ESC T**, the horizontal motion unit is used.
- The line spacing can be set independently in standard and page mode.
- In standard mode this command sets the line spacing of standard mode.
- In page mode this command sets the line spacing of page mode.

ESC SP

[Name] Set right-side character spacing

[Format]

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

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

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

[Description] Sets the right-side character spacing to ***n***x (horizontal or vertical motion unit).

[Notes]

- The character spacing set by this command is effective for alphanumeric and user-defined character.
- When characters are enlarged, the character spacing is ***n*** times normal value. The character spacing for double-width mode is twice the normal value.
- When standard mode is selected, the horizontal motion unit is used.
- When page mode is selected, the vertical or horizontal motion unit is used for the print direction set by **ESC T**.
  - When the starting position is set to the upper left or lower right of the printing area using ESC T, the horizontal motion unit is used.
  - When the starting position is set to the upper right or lower left of the printing area using **ESC T**, the vertical motion unit is used.
- Settings of this command are effective until **ESC** @ is executed, the printer is reset, or the printer is turned off.
- It is used to change the spacing between characters.

ESC %

[Name] Select/cancel user-defined character set

[Format]

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

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

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

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

- When the 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]

- When the user-defined character set is canceled, the resident character set is automatically selected.
- Settings of this command are effective until **ESC** @ is executed, the printer is reset, or the printer is turned off.

ESC &

[Name] Define user-defined characters

[Format]

ASCII	ESC & **y c1 c2 [x1 d1 d(y**x **x1)] [xk d1 d(y**x **xk)]**
Hex	1B 26 **y c1 c2 [x1 d1 d(y**x **x1)] [xk d1 d(y**x **xk)]**
Decimal	27 38 **y c1 c2 [x1 d1 d(y**x **x1)] [xk d1 d(y**x **xk)]**

[Range]

y = 3
32≦*c1*≦*c2*≦126
0≦*x*≦12(Font A - 12 x 24)
0≦x≦9(Font B - 9 x 24)
0≦*d*≦255
k = *c2* – *c1* + 1

[Default] None

[Description] Defines user-defined characters from character code check ***c1*** to ***c2***.

- ***y*** specifies the number of bytes in the vertical direction.
- ***x*** specifies the number of dots in the horizontal direction.
- ***d*** is the dot data for the user-defined characters.

[Notes]

- Character codes from the alphanumeric characters 20H (decimal 32) to 7EH(decimal 126)) can be defined.

- Data(***d***) specifies a bit printed to 1 and not printed to 0. 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 (***y*** x ***x***) bytes.
- When the value of ***y***, ***c1***, ***c2***, or ***x*** is out of the range, this command is canceled, and the following data is processed as normal data.
- This command can define user-defined characters for each font independently. To select a font, use **ESC !** or **ESC M**.
- A user-defined character, downloaded graphics, and downloaded bit image cannot be defined simultaneously on some printer models.
  - When this command is executed, the downloaded bit image is cleared.
  - When GS * is executed, the user-defined character data is cleared.
- Once the user-defined characters have been defined, they are available until **ESC ?**, **GS ***, or **ESC** @ is executed; the user-defined characters are redefined; the power is turned off; or the printer is reset.
- The user-defined characters are not defined at the default, and the resident characters are printed.
- The relationship between the definition data and printing result is as follows.

  Example: Downloaded character definition consists of 9 x 7 dots.

d1	d3	d5	d7	d9	d11	d13	MSB LSB
d2	d4	d6	d8	d10	d12	d14	MSB LSB

- Only the MSB can be printed in the third byte for vertical direction of font B. A user-defined character and downloaded bit image cannot be defined simultaneously.

ESC ?

[Name] Cancel user-defined characters

[Format]

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

[Range] 32≦***n***≦126

[Default] None

[Description] Cancels the user-defined characters defined for the character code ***n***.

[Notes]

- After user-defined character are canceled, the resident character set is printed.
- This command can cancel user-defined characters for each font independently. To select a font, use **ESC !** or **ESC M**.

ESC R

[Name] Select an international character set

[Format]

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

[Range] 0≦***n***≦10

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

[Description] Select an international character set ***n*** as follows :

n	Country	ASCII code												
		Hex	23	24	40	5B	5C	5D	5E	60	7B	7C	7D	7E
		Dec	35	36	64	91	92	93	94	96	123	124	125	126
0	U.S.A.		#	$	@	[	\	]	^	`	{	|	}	~
1	France		#	$	à	°	Ç	§	^	`	é	ù	è	¨
2	Germany		#	$	§	Ä	Ö	Ü	^	`	ä	ö	ü	ß
3	U.K.		£	$	@	[	\	]	^	`	{	|	}	~
4	Denmark I		#	$	@	Æ	Ø	Å	^	`	æ	ø	å	~
5	Sweden		#	¤	É	Ä	Ö	Å	Ü	é	ä	ö	å	ü
6	Italy		#	$	@	°	\	é	^	ù	à	ò	è	ì
7	Spain		Pt	$	@	i	Ñ	¿	^	`	¨	ñ	}	~
8	Japan		#	$	@	[	\	]	^	`	{	|	}	~
9	Norway		#	¤	É	Æ	Ø	Å	Ü	é	ä	ö	å	ü
10	Denmark II		#	$	É	Æ	Ø	Å	Ü	é	ä	ö	å	ü

[Notes] The selected international character set is effective until **ESC @** is executed, the printer is reset, or the power is turned off.

ESC t

[Name] Select character code table

[Format]

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

[Range] 0≤ **n** ≤8, 16≤ **n** ≤19, **n** = 254, **n** = 255 (Thai model)
0≤ **n** ≤8, 16≤ **n** ≤26, **n** = 254, **n** = 255 (Other models except Thai model)

[Default] Thai models: **n** = 20; Other models except Thai : **n** = 0

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

n	**Character Code Table**
0	PC437(U.S.A., Standard Europe)
1	Katakana
2	PC850(Multilingual)
3	PC860(Portuguest)
4	PC863(Canadian-French)
5	PC865(Nordick)
16	WPC1252

[Notes]

- When the user-defined character set is canceled, the resident character set is automatically selected.
- Settings of this command are effective until **ESC** @ is executed, the printer is reset, or the printer is turned off.

ESC !

[Name] Select print mode(s)

[Format]

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

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

[Default] n = 0

[Description] Selects print mode(s) using ***n*** as follows:

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Character font A (12 × 24).
	On	01	1	Character font B (9 × 24).
1	-		-	Undefined.
2	-		-	Undefined.
3	Off	00	0	Emphasized mode not selected.
	On	08	8	Emphasized mode selected.
4	Off	00	0	Double-height mode not selected.
	On	10	16	Double-height mode selected.
5	Off	00	0	Double-width mode not selected.
	On	20	32	Double-width mode selected.
6	-		-	Undefined.
7	Off	00	0	Underline mode not selected.
	On	80	128	Underline mode selected.

[Notes]

- When both double-height and double-width modes are selected, quadruple size characters are printed.
- The printer can underline all characters, but can not underline the space set by **HT** or 90° clockwise rotated characters.
- The thickness of the underline is that selected by **ESC -**, regardless of the character size.
- When some characters in a line are double or more height, all the characters on the line are aligned at the baseline.
- **ESC E** can also turn on or off emphasized mode. However, the setting of the last received command is effective.
- **ESC -** can also turn on or off underline mode. However, 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.
- Emphasized mode is effective for alphanumeric and Kanji. All print modes except emphasized mode is effective only for alphanumeric.

ESC -

[Name] Turn underline mode on/off

[Format]

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

[Range] 0 ≤ ***n*** ≤ 2, 48 ≤ ***n*** ≤ 50

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

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

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

[Notes]

- The printer can underline all characters, but cannot underline the space set by **HT**.
- The printer cannot underline 90° clockwise rotated 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, and the underline thickness set before the mode is turned off does not change. The default underline thickness is 1 dot.
- Changing the character size does not affect the current underline thickness.

- Underline mode can also be turned on or off by using **ESC !**. Note, however, that the last received command is effective.
- This command does not affect Kanji printing.

ESC E

[Name] Turn emphasized mode on/ff

[Format]

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

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

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

[Description] Turns emphasized mode on/ff

- 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]

- This mode is effective for alphanumeric, Kana, multilingual and user-defined character.
- The Settings of this command are effective until **ESC !** or **ESC @** is executed, the printer is reset, or the power is turned off.

ESC G

[Name] Turn double-strike mode on/ff

[Format]

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

[Range] 0≦***n***≦255

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

[Description] Turns double-strike mode on/ff

[Notes]

- 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.

ESC {

[Name] Turn upside-down printing mode on/ff

[Format]

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

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

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

[Description] In standard mode, turns upside-down printing mode on/ff

- 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]

- When standard mode is selected, this command is enabled only when processed at the beginning of the line.
- The upside-down printing mode is effective for all data in standard mode except raster bit image from **GS v 0**.
- The settings of this command are effective until **ESC @** is executed, the printer is reset, or the power is turned off.
- When upside-down printing mode is turned on, the printer prints 180°-rotated characters from right to left. The line printing order is not reversed; therefore, be careful of the order of the data transmitted.

ESC V

[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

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

[Description] In standard mode, turns 90° clockwise rotation mode on or off, using ***n*** as follows:

n	**Function**
0, 48	Turns off 90° clockwise rotation mode
1, 49	Turns on 90° clockwise rotation mode

[Notes]

- The 90° clockwise rotation mode is effective for alphanumeric, Kana, multilingual and user-defined characters.
- When underline mode is turned on, the printer does not underline 90° clockwise- rotated characters.
- When character orientation changes in 90° clockwise rotation mode, the relationship between vertical and horizontal directions is reversed.

- The 90° clockwise rotation mode has no effect in page mode. If this command is processed in page mode, an internal flag is activated, and this flag is enabled when the printer returns to standard mode.
- The settings of this command are effective until **ESC @** is executed, the printer is reset, or the power is turned off.

GS !

[Name] Select character size

[Format]

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

[Range] 0≦***n***≦7, 16≦***n***≦23, 32≦***n***≦39, 48≦***n***≦55, 64≦***n***≦71, 80≦***n***≦87, 96≦***n***≦103, 112≦***n***≦119 (1≦height≦8, 1≦width≦8)

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

[Description] Selects the character height (vertical number of times normal font size) using bits 0 to 2 and selects the character width (horizontal number of times normal font size) using bits 4 to 6, as follows :

Character width selection					
Bit 6	**Bit 5**	**Bit 4**	**Hex**	**Decimal**	**Width**
Off	Off	Off	00	0	1(normal)
Off	Off	On	10	16	2(double-width)
Off	On	Off	20	32	3
Off	On	On	30	48	4
On	Off	Off	40	64	5
On	Off	On	50	80	6
On	On	Off	60	96	7
On	On	On	70	112	8

Character height selection					
Bit 2	**Bit 1**	**Bit 0**	**Hex**	**Decimal**	**Height**
Off	Off	Off	00	0	1(normal)
Off	Off	On	01	1	2(double-height)
Off	On	Off	02	2	3
Off	On	On	03	3	4
On	Off	Off	04	4	5
On	Off	On	05	5	6
On	On	Off	06	6	7
On	On	On	07	7	8

[Notes]

- The character size set by this command is effective for alphanumeric, Kana, multilingual and user-defined characters.
- When the characters are enlarged with different heights on one line, all the characters on the line are aligned at the baseline.
- When the characters are enlarged widthwise, the characters are enlarged to the right, base on the left side of the character.
- **ESC !** can also turn double-width and double-height modes on or off.
- In standard mode, the character is enlarged in the paper feed direction when double-height mode is selected, and it is enlarged perpendicular to the paper feed direction when double-width mode is selected. However, when character orientation changes in 90° clockwise rotation mode, the relationship between double-height and double-width is reversed.

- In page mode, double-height and double-width are on the character orientation.
- The setting of the character size of alphanumeric and Katakana is effective until **ESC !** or **ESC @** is executed, the printer is reset, or the power is turned off.
- The setting of the character size of Kanji and multilingual characters is effective until **ESC @** is executed, the printer is reset, or the power is turned off.

GS B

[Name] Turn white/black reverse printing mode on/ff

[Format]

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

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

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

[Description] Turns white/black reverse printing mode on/ff

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

[Notes]

- This mode is effective for alphanumeric, Kana, multilingual and user-defined character.
- When white/black reverse printing mode is turned on, it also affects the right-side characters spacing set by **ESC SP**.
- When white/black reverse printing mode is turned on, it does not affect the space between lines.
- When underline mode is turned on, the printer does not underline white/black reverse characters.
- This command is effective until **ESC @** is executed, the printer is reset, or the power is turned off.
- In white/black reverse printing mode, characters are printed in white on a black background.

CAN

[Name] Cancel printing data in page mode

[Format]

ASCII	CAN
Hex	18
Decimal	24

[Range] None

[Default] None

[Description] In page mode, deletes all the print data for the current printing area.

[Notes]

- This command is only enabled in page mode.
- If data set in the previously specified printing area is set in the currently specified printing area, it is deleted.

ESC M

[Name] Select character font

[Format]

ASCII	ESC M ***n***
Hex	1B 4D ***n***
Decimal	27 77 ***n***

[Range] 0, 1, 48, 49

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

[Description] Selects a character font, using ***n*** as follows:

n	**Function**
0, 48	Font A
1, 49	Font B

[Notes]

- This mode is effective for alphanumeric, Kana, multilingual and user-defined character.
- Configurations of Font A and Font B depend on printer model.
- Settings of this command are effective until **ESC @** is executed, the printer is reset, or the power is turned off.

ESC $

[Name] Set absolute print position

[Format]

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

[Range] 0≦***nL***≦255, 0≦***nH***≦255

[Default] None

[Description] Sets the print starting position to (***nL*** + ***nH*** x256) x (horizontal or vertical motion unit) from the beginning of the line.

[Notes]

- The printer ignores any setting that exceeds the printing area
- When standard mode is selected, the horizontal motion unit is used.
- When page mode is selected, the horizontal or vertical motion unit is used for the print direction set by **ESC T**.
  - When the starting position is set to the upper left or lower right of the printing area using **ESC T**, the horizontal motion unit is used.
  - When the starting position is set to the upper right or lower left of the printing area using **ESC T**, the vertical motion unit is used.
- Even if the vertical or horizontal motion unit is changed after changing the printing position, the setting of the printing position will not be changed.
- Even if underline mode is turned on, the underline will not be printed under the space skipped by this command.

ESC \

[Name] Set relative print position

[Format]

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

[Range] 0≦***nL***≦255, 0≦***nH***≦255

[Description] Moves the print starting position to (***nL*** + ***nH*** x256) x (horizontal or vertical motion unit) from the current position.

[Notes]

- The printer ignores any setting that exceeds the printing area.
- When page mode is selected, the horizontal or vertical motion unit is used for the print direction set by **ESC T**.
- When the starting position is set to the upper left or lower right of the printing area using **ESC T**, the horizontal motion unit is used.
- When the starting position is set to the upper right or lower left of the printing area using **ESC T**, the vertical motion unit is used.
- Even if the vertical or horizontal motion unit is changed after changing the printing position, the setting of the printing position will not be changed.
- Even if underline mode is turned on, the underline will not be printed under the space skipped by this command.

ESC a

[Name] Select justification

[Format]

ASCII	ESC a ***n***
Hex	1B 61 ***n***
Decimal	27 45 ***n***

[Range] 0 ≤ ***n*** ≤ 2, 48 ≤ ***n*** ≤ 50

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

[Description] In standard mode, aligns all the data in one line to a specified position, using ***n*** as follows :

n	**Function**
0, 48	Left justification
1, 49	Centered
2, 50	Right justification

[Notes]

- When standard mode is selected, this command is enabled only when processed at the beginning of the line in standard mode.
- The justification has no effect in page mode. If this command is processed in page mode, an internal flag is activated, and this flag is enabled when the printer returns to standard mode.
- This command executes justifications in printing area set by **GS L** and **GS W**.
- This command justifies printing area(such as character, all graphics, and bar codes) and space area set by **HT**, **ESC $** and **ESC **.
- The settings of this command are effective until **ESC @** is executed, the printer is reset, or the power is turned off.

HT

[Name] Horizontal tab

[Format]

ASCII	HT
Hex	09
Decimal	9

[Range] None

[Default] None

[Description] Moves the printing position to the next horizontal tab.

[Notes]

- This command is ignored unless the next horizontal tab position has been set.
- Horizontal tab positions are bet by **ESC D**.
- If the next horizontal tab position exceeds the printing area, the printer sets the printing position to [Printing area width + 1].
- If this command is processed when the printing position is at [Printing area width + 1], the printer executes print buffer-full printing of the current line and horizontal tab processing from the beginning of the next line. In this case, in page mode, the printer does not execute printing, but the printing position is moved.
- When underline mode is turned on, the underline will not be printed under the tab space skipped by this command.

ESC D

[Name] Set horizontal tab positions

[Format]

ASCII	ESC D	***n ...nk NUL***
Hex	1B 44	***n1...nk 0***
Decimal	27 68	***n1...nk 0***

[Range] $1 \leqq n \leqq 255$
$0 \leqq k \leqq 32$

[Defaltu] ***n*** = 8,16,24,32 (Every eight characters for the default font set by **ESC !** or **ESC M**)

[Description] Sets a horizontal tab to ***n*** columns from the beginning of the line. ***k*** indicates the 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 right-side character spacing, and double-width characters are selected with twice the width of the normal characters.
- The character width should be set before using this command. Settings of character fonts, space width and enlargement affect the setting of character width.
- A maximum of 32 horizontal tab positions can be set. Data exceeding 32 horizontal tab positions is processed as normal data.
- This command cancels any previous horizontal tab settings.
- Transmit ***[n]k*** in ascending order and place a ***NULL*** code at the end. **ESC D *Null*** cancels all horizontal tab positions.

- When [***n***] is less than or equal to the preceding value [***n***]***k***-1, horizontal tab setting is finished, and the following data is processed as normal data.
- ***k*** is not transmission data to the printer.
- Even if the character width is changed after setting the horizontal tab position, the setting of the horizontal tab positions will not be changed.
- Horizontal tab positions setting are effective until **ESC @** is executed, the printer is reset, or the power is turned off.
- Print positions can be changed by **HT**.
- When the left margin setting is changed, the horizontal tab positions is also changed.

GS L

[Name] Set left margin

[Format]

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

[Range] 0≦ (***nL*** + ***nH*** x 256) ≦ 65535 (0≦***nL***≦255, 0≦***nH***≦255)

[Default] (***nL*** + ***nH*** x 256) = 0 (***nL*** = 0, ***nH*** = 0)

[Description] In standard mode, sets the left margin to (***nL*** + ***nH*** x256) x (horizontal motion unit) from the left edge of the printable area.

[Notes]

- When standard mode is selected, this command is enabled only when processed at the beginning of the line.
- The left margin has no effect in page mode. If this command is processed in page mode, the left margin is set and it is enabled when the printer returns to standard mode.
- If the setting exceeds the printable area, the left margin is automatically set to the maximum value of the printable area.
- If this command and **GS W** set the printing area width to less than the width of one character, the printing area width is extended to accommodate one character for the line.
- Horizontal motion unit is used.
- If horizontal motion unit is changed after changing left margin, left margin setting is not changed.

- Left margin setting is effective until **ESC @** is executed, the printer is reset, or the power is turned off.
- Left margin position is left edge of the printable area. If left margin setting is changed, left edge of the printable area will move.

GS W

[Name] Set printable area width

[Format]

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

[Range] 0≦ (***nL*** + ***nH*** x 256) ≦ 65535 (0≦***nL***≦255, 0≦***nH***≦255)

[Default] ***nL*** = 0, ***nH*** = 0

[Description] In standard mode, sets the printable area to (***nL*** + ***nH*** x256) x (horizontal motion unit).

[Notes]

- When standard mode is selected, this command is enabled only when processed at the beginning of the line.
- The left margin has no effect in page mode. If this command is processed in page mode, the left margin is set and it is enabled when the printer returns to standard mode.
- If the [left margin + printable area width] exceeds the printable area, the printable area width is automatically set to [printable area – left margin].
- If this command and **GS L** set the printing area width to less than the width of one character, the printing area width is extended to accommodate one character for the line.
- Horizontal motion unit is used.
- If horizontal motion unit is changed after setting the printable area width, the printable area width setting will not be changed.
- Left margin setting is effective until **ESC @** is executed, the printer is reset, or the power is turned off.

ESC W

[Name] Set printable area in page mode

[Format]

ASCII	ESC W ***xL xH yL yH dxL dxH dyL dyH***
Hex	1B 57 ***xL xH yL yH dxL dxH dyL dyH***
Decimal	27 87 ***xL xH yL yH dxL dxH dyL dyH***

[Range] 0≦ ***xL***, ***xH***, ***yL***, ***yH***≦255 (except for ***dxL*** = ***dxH*** = 0 or ***dyL*** = ***dyH*** = 0)

[Default] Horizontal logical origin and vertical logical origin = 0
xL = 0, **xH** = 0, **yL** = 0, **yH** = 0

[Description] In page mode, sets the size and the logical origin of the printing area as follows:

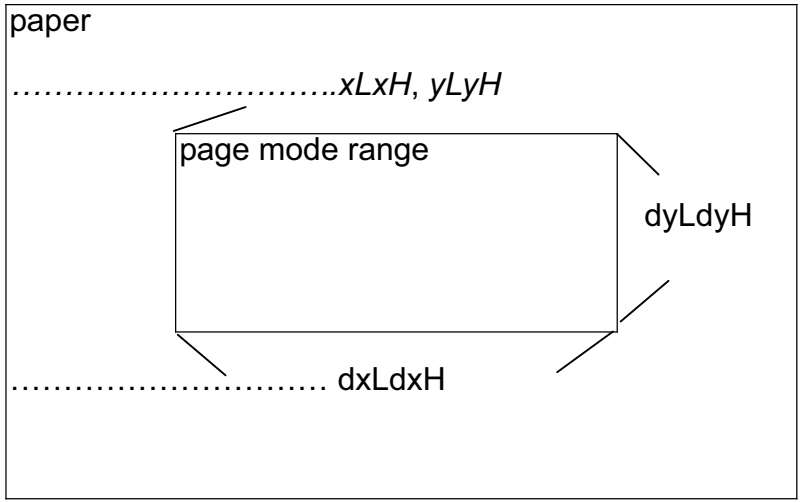
- Horizontal logical origin = (***xL*** + ***xH*** x256) x (horizontal motion unit) from absolute origin.
- Vertical logical origin = (***yL*** + ***yH*** x256) x (vertical motion unit) from absolute origin.
- Printing area width = (***dxL*** + ***dxH*** x256) x (horizontal motion unit)
- Printing area height = (***dyL*** + ***dyH*** x256) x (vertical motion unit)
- Maximum width: 384 dots
- Maximum height: 1280 dots

[Notes]

- Both printing area width and height cannot be set to 0.
- The absolute origin is the upper left of the printable area.

  If the horizontal or vertical logical origin is set outside the printable area, both horizontal and vertical logical origin is set

- If [horizontal logical origin + printing area width] exceeds the printable area, the printing area width is automatically set to [horizontal printable area – horizontal logical origin].
- If [vertical logical origin + printing area height] exceeds the printable area, the printing area height is automatically set to [vertical printable area – vertical logical origin].
- The printing area and the logical origin set by this command are effective only in page mode.
- This command setting has no effect in standard mode. If this command is processed in standard mode, the logical origin and the printing area are set, and they are enabled when the printer selects page mode.
- Horizontal logical origin and printing area width are calculated using the vertical motion unit.
- Vertical logical origin and printing area height are calculated using the horizontal motion unit.
- The printing area and the logical origin set by this command are effective only in page mode.
- Even if the horizontal or vertical motion unit is changed the printable area, the setting of the printable area will not be changed.
- The settings of this command are effective until **FF** is executed, **ESC @** is executed, the printer is reset, or the power is turned off.


paper
……..xLxH, yLyH
page mode range
dyLdyH
…… dxLdxH

ESC T

[Name] Select print direction in page mode

[Format]

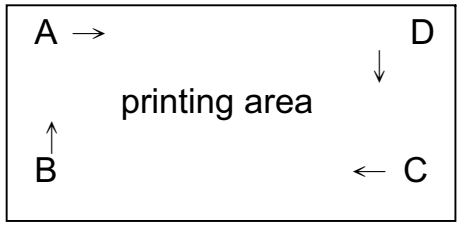
ASCII	ESC T ***n***
Hex	1B 54 ***n***
Decimal	27 84 ***n***

[Range] 0 ≤ ***n*** ≤ 3, 48 ≤ ***n*** ≤ 51

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

[Description] In page mode, selects the print direction and starting position, using ***n*** as follows :

n	**Printing Direction**	**Starting Position**
0, 48	Left to right	Upper left (A in the figure)
1, 49	Bottom to top	Lower left (B in the figure)
2, 50	Right to left	Lower right (C in the the figure)
3, 51	Top to bottom	Upper right (D in the figure)



[Notes]

◆ The print direction set by this command is effective only in page mode.

- This command setting has no effect in standard mode. If this command is processed in standard mode, an internal flag is activated, and this flag is enabled when the printer selects page mode.
- The parameters for the horizontal or vertical motion unit differ, depending on the starting position of the printing area as follows :
  - If the starting position is the upper left or lower right of the printing area :

    These commands use horizontal motion units: **ESC SP**, **ESC $**, **ESC **.

    These commands use vertical motion units: **ESC 3**, **ESC J**, **GS $**, **GS **.
  - If the starting position is the upper right or lower left of the printing area :

    These commands use horizontal motion units: **ESC 3**, **ESC J**, **GS $**, **GS **. **Th**ese commands use vertical motion units: **ESC SP**, **ESC $**, **ESC **.
- The settings of this command are effective until **ESC @** is executed, the printer is reset, or the power is turned off.

GS $

[Name] Set absolute vertical print position in page mode

[Format]

ASCII	GS $ ***nL nH***
Hex	1D 24 ***nL nH***
Decimal	29 36 ***nL nH***

[Range] 0≦***nL***≦255 , 0≦***nH***≦255

[Default] None

[Description] Sets the print starting position to (***nL*** + ***nH*** x256) x (horizontal or vertical motion unit) from the starting position set by **ESC T**.

[Notes]

- This command is only enabled in page mode. If this command is processed in standard mode, it is ignored.
- The printer ignores any setting that exceeds the printing area set by **ESC W**.
- The horizontal or vertical motion unit is used for the print direction set by **ESC T**.
  - When the starting position is set to the upper left or lower right of the printing area using **ESC T**, the vertical motion unit is used.
  - When the starting position is set to the upper right or lower left of the printing area using **ESC T**, the horizontal motion unit is used.
- Even if the vertical or horizontal motion unit is changed after changing the printing position, the setting of the printing position will not be changed.

GS \

[Name] Set relative vertical print position in page mode

[Format]

ASCII	GS \ ***nL nH***
Hex	1D 5C ***nL nH***
Decimal	29 92 ***nL nH***

[Range] 0≦***nL***≦255, 0≦***nH***≦255

[Default] None

[Description] In page mode, moves the vertical printing starting position to (***nL*** + ***nH*** x256) x (horizontal or vertical motion unit) from the current position.

[Notes]

- This command is only enabled in page mode. If this command is processed in standard mode, it is ignored.
- The printer ignores any setting that exceeds the printing area set by **ESC W**.
- The horizontal or vertical motion unit is used for the print direction set by **ESC T**.
  - When the starting position is set to the upper left or lower right of the printing area using **ESC T**, the vertical motion unit is used.
  - When the starting position is set to the upper right or lower left of the printing area using **ESC T**, the horizontal motion unit is used.
- Even if the vertical or horizontal motion unit is changed after changing the printing position, the setting of the printing position will not be changed.

ESC *

[Name] Select bit-image mode

[Format]

ASCII	ESC * ***m nL nH d1dk***
Hex	1B 2A ***m nL nH d1 dk***
Decimal	27 92 ***m nL nH d1 dk***

[Range]

m = 0, 1, 32, 33
0≦***nL***≦255
0≦***nH***≦3
0≦*d*≦255
k = nL + nH x 256 [in case of ***m*** = 0, 1]
k = nL + nH x 256 x 3 [in case of ***m*** = 32, 33]

[Description] Selects a bit-image mode using m for the number of dots specified by (***nL*** + ***nH*** x256) as follows:

m	Mode	Number of bits for vertical data	dot density in horizontal	Amount of data(***k***)
0	8-dot single-density	8	single-density	***nL*** + ***nH*** x 256
1	8-dot double-density	8	double-density	***nL*** + ***nH*** x 256
32	24-dot single-density	24	single-density	***nL*** + ***nH*** x 256 x 3
33	24-dot double-density	24	double-density	***nL*** + ***nH*** x 256 x 3

* ***k*** indicates the bit image data

[Notes]

- Data (***d***) specifies a bit printed to 1 and not printed to 0.
- If the bit image data exceeds the number of dots to be printed on a line, the excess data is ignored.

- The bit-image is not affected by print mode(emphasized, double-strike, underline, character size, white/black reverse printing, or 90° clockwise-rotated), except for upside-down printing mode.
- After printing a bit image, the printer processes normal data.
- This command is used to print a picture or logo.
- The relationship between the bit image data and the print result is as follows:

  8 dot mode (***m*** = 0, 1)

d1	***d2***	***…***	***dk***	MSB LSB

  24 dot mode (***m*** = 32, 33)

d1	***d4***	***…***	***dk-2***	MSB LSB
d2	***d5***	***…***	***dk-1***	MSB LSB
d3	***d6***	***…***	***dk***	MSB LSB

GS *

[Name] Define downloaded bit image

[Format]

ASCII	GS * ***x y d1 d(x*** x ***y*** x ***8)***
Hex	1D 2A ***x y d1 d(x*** x ***y*** x ***8)***
Decimal	29 42 ***x y d1 d(x*** x ***y*** x ***8)***

[Range]

$1 \leqq x \leqq 255$
$1 \leqq y \leqq 48$
$0 \leqq d \leqq 255$
$k = x \times y \times 8$

[Default] None

[Description] Defines a downloaded bit image.

- ***x*** specifies the size of a bit image in horizontal to ***x*** bytes.
- ***y*** specifies the size of a bit image in vertical to ***y*** bytes.
- ***d*** defines the bit image data.
- ***k*** indicates the number of data to be defined. ***k*** is an explanation parameter; therefore it does not need to be transmitted.

[Notes]

- The data for byte ***k*** of ***d1 dk*** is processed as a single item of defined NV graphics data. The defined data(***d***) specifies “1” for corresponding to dots that will be printed and “0” for bits corresponding to dots that will not be printed.
- The downloaded bit image is not defined in the default settings.
- Once a downloaded bit image has been defined, it is maintained until another definition is made, **ESC &** or **ESC @** is executed, the printer is reset, or the power is turned off.

- A downloaded bit image and a user-defined character cannot be defined simultaneously. When this command is executed, the user-defined character is cleared.
- The downloaded bit image is printed by **GS /**.
- The relationship between the bit image data and the printed result is as follow:

d1	***dy+1***	***…***	***:***
d2	***dy+2***	***…***	***dk-2***
:	***:***	***…***	***dk-1***
dy	***dy×2***	***…***	***dk***

GS /

[Name] Print downloaded bit image

[Format]

ASCII	GS / ***n***
Hex	1D 2F ***n***
Decimal	29 47 ***n***

[Range] 0 ≤ ***n*** ≤ 3, 48 ≤ ***n*** ≤ 51

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

[Description] Prints a downloaded bit image using the mode specified by ***n***. ***n*** selects a mode from the table below:

n	**Mode**
0, 48	Normal
1, 49	Double-width
2, 50	Double-height
3, 51	Quadruple

* dpi: dots per inch(25.4mm)

[Notes]

- This command is ignored if a downloaded bit image has not been defined.
- In standard mode, this command is effective only when there is no data in the print buffer.
- This command has no effect in the print modes (emphasized, double-strike, underline, character size, or white/black reverse printing), except for upside-down printing mode.

- If the downloaded bit image to be printed exceeds the printable area, the excess data is not printed.
- If the printing area width set by **GS L** and **GS W** is less than one line in vertical, the following processing is performed only on the line in question:
  - The printing area width is extended to the right up to one line in vertical. In this case, printing does not exceed the printable area.
  - If the printing area width cannot be extended by one line in vertical, the left margin is reduced to accommodate one line in vertical.

GS v 0

[Name] Print raster bit image

[Format]

ASCII	GS v 0 ***n xL xH yL yH d1 dk***
Hex	1D 76 30 ***n xL xH yL yH d1 dk***
Decimal	29 118 48 ***n xL xH yL yH d1 dk***

[Range]

$0 \le n \le 3, 48 \le n \le 51$
$0 \le xL \le 255$
$0 \le xH \le 255$
$0 \le yL \le 255$
$0 \le yH \le 8$
$0 \le d \le 255$
$k = (xL + xH \times 256) \times (yL + yH \times 256) \; (k \neq 0)$

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

[Description] Selects raster bit-image mode. The value of ***n*** selects a mode from the table below:

n	**Mode**
0, 48	Normal
1, 49	Double-width
2, 50	Double-height
3, 51	Quadruple

- dpi: dots per inch(25.4mm)
- ***xL***, ***xH*** select the number of data bytes (***xL***+***xH*** x 256) in the horizontal direction for the bit image.
- ***yL***, ***yH*** select the number of data bytes (***yL***+***yH*** x 256) in the vertical direction for the bit image.

[Notes]

- In standard mode, this command is effective only when there is no data in the print buffer.
- This command has no effect in the print modes (emphasized, double-strike, underline, character size, or white/black reverse printing) for raster bit image.
- If the printing area width set by **GS L** and **GS W** is less than the minimum width, the printing area is extended to the minimum width only on the line in question. The minimum width means 1 dot in normal (***n***=0, 48) and double-height (***n***=2, 50), 2 dots in double-width (***n***=1, 49) and quadruple (***n***=3, 51) modes.
- Data outside the printing area is read in and discarded on a dot-by-dot basis.
- The position at which subsequent characters are to be printed for raster bit image is specified by **HT**(Horizontal Tab), **ESC $**(Set absolute print position), **ESC **(Set relative print position), and **GS L**(Set left margin). If the position at which subsequent characters are to be printed is not a multiple of 8, print speed may decline.
- The **ESC a**(Select justification) setting is also effective on raster bit images.
- When this command is received during macro definition, the printer ends macro definition, and begins performing this command. The definition of this command should be cleared.

GS :

[Name] Start/end macro definition

[Format]

ASCII	GS :
Hex	1D 3A
Decimal	29 58

[Range] None

[Default] None

[Description] Starts or ends macro definition

[Notes]

- Macro definition starts when this command is processed during normal operation and ends when it is processed during macro definition.
- While the macro is defined, the printing is also executed.
- The maximum data size to be defined as a macro is **2 KB**. If the macro definition exceeds the maximum data size, this command will not be processed, and the LED1 indicator blinks red, the LED3 and LED4 indicators blink green (means ‘Command Error’).
- The macro is executed by **GS ^**.
- If the printer processes this command, it will save the macro definition into RAM. The macro can be executed repeatedly after it is defined.
- The defined contents of the macro are not cleared by **ESC @.** Defined content of the macro is effective until the printer is reset, or the power is turned off.
- Macro is not defined when the power is turned on.

- The following commands cannot be contained in a macro. Do not use these commands while the macro is being defined: **FS q**, **GS (A**, **GS ^**, and **GS v 0**.

GS ^

[Name] Execute macro

[Format]

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

[Range]

$1 \leqq r \leqq 255$
$0 \leqq t \leqq 255$
m = 0, 1

[Default] None

[Description] Executes a macro ***r*** times while waiting ***t*** x 100 msec for each macro execution, using the mode specified by ***m*** as follows:

- When ***m*** = 0, the macro executes ***r*** times continuously at the interval specified by ***t***.
- When ***m*** = 1, the printer waits for the period specified by ***t***, blinks the LED, and then waits for the paper feed button to be pressed. After this button is pressed, the printer executes the macro once. The printer repeats this operation ***r*** times.

[Notes]

- If a macro is not defined or if ***r*** is 0, this command is ignored.
- Macro is not defined when the power is turned on.
- This command can not be contained in the macro. Do not use this command when the macro is defined.

- The macro is defined by **GS :**.
- Macro function is useful to print the same data repeatedly. To define a macro definition, send **GS :** just before and after the data desired to be repeated. And then execute macro by using **GS ^** to print the same data repeatedly. Macro function eliminates the need for sending all the print data every time.

FS &

[Name] Select Kanji character mode

[Format]

ASCII	FS &
Hex	1C 26
Decimal	28 38

[Description] Selects Kanji character mode.

[Notes]

- Kanji codes are processed in order of the first byte and the second byte.
- The settings of this command are effective until **ESC @** is executed, the printer is reset, or the power is turned off.
- When Kanji mode is selected, the printer processes a character code that corresponds to the first byte of Kanji code, and then processes a consecutive byte as the second byte of Kanji code. Therefore, when Kanji code is specified, an ASCII code character that corresponds to the first byte of Kanji code cannot be printed.
- Kanji mode is selected at default.

GS P

[Name] Set horizontal and vertical motion units

[Format]

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

[Range] 0 ≤ ***x*** ≤ 255, 0 ≤ ***y*** ≤ 255

[Default] ***x*** = 203, ***y*** = 203

[Description] Sets the horizontal and vertical motion units to 1/***x*** and 1/***y*** inch, respectively.

- When ***x*** = 0, the default setting of the horizontal value is used.
- When ***y*** = 0, the default setting of the vertical value is used.

[Notes]

- The horizontal direction is perpendicular to the paper feed direction and the vertical direction is the paper feed direction.
- The horizontal and vertical motion units indicate the minimum pitch used for calculating the values of related commands.
- In standard mode, the following commands use ***x*** or ***y***.
  - Commands using ***x***: **ESC SP**, **ESC $**, **ESC **, **GS L**, and **GS W**.
  - Commands using ***y***: **ESC 3**, **ESC J**
- In page mode, the following commands use ***x*** or ***y***, when the starting position is set to the upper left or lower right of the printing area using **ESC T**.
  - Commands using **x*:*** **ESC 3, ESC J, ESC W, GS $,** and **GS **
  - Commands using **y*:*** **ESC SP, ESC $, ESC W, ESC **

- The setting of this command is effective until **ESC** @ is executed, the printer is reset, or the power is turned off.
- The calculated result from combining this command with others is truncated to the minimum value of the mechanical pitch.
- This command does not affect the current setting values.

ESC @

[Name] Initialize printer

[Format]

ASCII	ESC @
Hex	1B 40
Decimal	27 64

[Range] None

[Default] None

[Description] The data in the print buffer is cleared, and the printer mode(s) is reset to the mode that was in effect when the power was turned on.

- Any macro definitions are not cleared.
- Contents of user non-volatile memory are not cleared.
- Non-volatile bit image is not cleared.
- Maintenance counter is not cleared.

[Notes]

- The data in the receive buffer is not cleared.
- When this command is processed in page mode, the printer deletes the data in the printing areas, initializes all settings, and selects standard mode.
- This command can cancel all the settings, such as print mode and line feed at the same time.
- The printing position moves to the beginning of the line when this command is executed. When a left margin is set in standard mode, the position of the left margin is the beginning of the line or there is no data in the print buffer.

GS I

[Name] Transmit print IS

[Format]

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

[Range] ***n*** = 2, 65 ≤ ***n*** ≤ 67, 80 ≤ ***n*** ≤ 81

[Default] None

[Description] Transmits 1 byte of printer ID, using ***n*** as follows:

n	Printer ID	Specification
2	Type of character	Double byte = 1 Single byte = 0

Transmits printer information, using ***n*** as follows:

n	Printer ID
65	Firmware version
66	Type ID
67	Printer model ID
80	Printer model(VersaJet)
81	dump all “Flash command” setting

[Notes]

- With a serial interface printer, be sure to use this function when the host can receive data.
- With a parallel interface printer, data(printer ID, printer information) sent with this command is temporarily stored in the printer send buffer like other transmitted data. When the host goes into reverse mode, the printer then sends the data sequentially from the beginning of the send buffer. Send buffer capacity is 99 bytes. Data exceeding this amount is lost; therefore, when using this command, promptly change into reverse mode to start the data receive process.

ESC L

[Name] Select page mode

[Format]

ASCII	ESC L
Hex	1B 4C
Decimal	27 76

[Range] None

[Default] None

[Description] Switches from standard mode to page mode.

[Notes]

- This command is only enabled when processed at the beginning of the line in standard mode. In other cases, this command is ignored.
- The printing position is the starting position specified by **ESC T** within the printing area defined by **ESC W.**
- The following commands switch the settings for page mode because these commands can be set independently in standard and page mode : **ESC SP**, **ESC 2**, and **ESC 3**.
- The following commands are disabled in page mode: **ESC L**, and **FS q**.
- The following commands are not effective in page mode. If these commands are processed in page mode, an internal flag is activated, and this flag is enabled when the printer returns to standard mode: **ESC V**, **ESC a**, **ESC {**, **GS L** and **GS W**.
- The printer returns to standard mode with **ESC S**, **FF**, **ESC @.** When it returns to standard mode by **ESC @**, all settings are canceled.
- Standard mode is selected as the default.

- In page mode, the printer prints the data in the print buffer for the printing area specified by **ESC W** collectively by **FF** or **ESC FF.** When executing the print and paper feed commands, such as **LF**, **CR**, **ESC J** and **ESC d**, only the printing position moves, and the printer does not perform actual printing.

ESC S

[Name] Select standard mode

[Format]

ASCII	ESC S
Hex	1B 53
Decimal	27 76

[Range] None

[Default] None

[Description] Switches from page mode to standard mode.

[Notes]

- This command is only enabled in page mode. Page mode can be selected by **ESC L**.
- When this command is executed, data in all the printing area is cleared, the printing area set by **ESC W** returns to the default value, but the value set by **ESC T** is maintained.
- The following commands switch the settings for standard mode because these commands can be set independently in standard and page mode : **ESC SP**, **ESC 2**, and **ESC 3**.
- In standard mode, **CAN**, **ESC FF**, **GS ** are ignored.
- The settings of **ESC T**, and **ESC W** do not affect printing in standard mode.
- The printer selects page with **ESC L**.
- Standard mode is selected as the default.

GS (A

[Name] Execute test print

[Format]

ASCII	GS (A ***pL pH n m***
Hex	1D 28 41 ***pL pH n m***
Decimal	29 40 65 ***pL pH n m***

[Range] (***pL*** + (***pH*** x 256)) = 2 (***pL*** = 2, ***pH*** = 0)

[Description] Executes a specified test print.

- ***pL*** and ***pH*** specify the number of parameters following ***n*** to (***pL*** + ***pH*** x 256) bytes.

[Notes]

- This command is effective only when processed at the beginning of the line in standard mode.
- If this command is processed while a macro is being defined, the printer cancels macro definition and starts processing this command. At that time, the macro becomes undefined.
- After processing this command, the printer performs a software reset. Executing this command puts the printer in the same status as when the power is turned on. Transmit commands or data after confirming the complete software reset.
- In hexadecimal dump (m=1, 49) is specified, the printer prints a message. Transmit commands or data after the printing.
- When processing printer status printing(m = 2, 50), rolling pattern printing (m = 3, 51), and automatic setting of paper layout (m = 64), real-time commands cannot be used.

- When processing the automatic setting (m = 64) of the paper layout, the printer feeds the current roll paper to measure the paper layout. During this time, the printer does not print. After the measuring, it writes the setting of layout from the measuring to the non-volatile memory. Please note the following points when you use this function.
  - The printer may be BUSY when storing data and will not receive any data. In this case, be sure not to transmit data from the host.
  - Excessive use of this function may destroy the non-volatile memory. As a guideline, do not use any combination of the following commands more than 10 times per day for writing data to the non-volatile memory: **FS q**, and **GS (A.**

RS G

[Name] Draw line or square

[Format]

ASCII	RS G ***n***
Hex	1E 47 ***n***
Decimal	30 71 ***n***

[Range] 1 ≤ ***n*** ≤ 2

[Default] None

[Description] Draws line or square in page mode.

- If ***n*** = 1, draw a line.
- If ***n*** = 2, draw a square.

[Notes]

- This command is only enabled in page mode.
- This command setting is effective until **ESC @** is executed, the printer is reset, or the power is turned off.

RS s

[Name] Print serial number

[Format]

ASCII	RS s ***n1 nh***
Hex	1E 73 ***n1 nh***
Decimal	30 115 ***n1 nh***

[Range] ***nh*** ≧ 0

[Default] ***n1*** = 00, ***nh*** = 00

[Description] Prints serial number.

[Notes]

- This command is only enabled in page mode.
- ***n1*** indicates the first 2 bytes of serial number.
- ***nh*** indicates the following 2 bytes of serial number.
- The counter will be controlled by Macro command "**GS :**".
- This command setting is effective until ESC @ is executed, the printer is reset, or the power is turned off.

RS W

[Name] Clear printable area in page mode

[Format]

ASCII	RS W ***xL xH yL yH dxL dxH dyL dyH***
Hex	1E 57 ***xL xH yL yH dxL dxH dyL dyH***
Decimal	30 87 ***xL xH yL yH dxL dxH dyL dyH***

[Range] 0≦ ***xL***, ***xH***, ***yL***, ***yH***, ***dxL***, ***dxH***, ***dyL***, ***dyH*** ≦255
(except for ***dxL*** = ***dxH*** = 0 or ***dyL*** = ***dyH*** = 0)

[Default] Horizontal logical origin and vertical logical origin = 0
xL=0, ***xH***=0, ***yL***=0, ***yH***=0
dxL = 0, ***dxH*** = 2, ***dyL*** = 126, ***dyH*** = 6

[Description] In page mode, clears the size and the logical origin of the printing area as follows:

- Horizontal logical origin = (***xL*** + ***xH*** x256) x (horizontal motion unit) from absolute origin.
- Vertical logical origin = (***yL*** + ***yH*** x256) x (vertical motion unit) from absolute origin.
- Clearing area width = (***dxL*** + ***dxH*** x256) x (horizontal motion unit).
- Clearing area height = (***dyL*** + ***dyH*** x256) x (vertical motion unit).

[Notes]

- This command must be used with “**RS s**”.
- Both clearing area width and height cannot be set to 0.
- The absolute origin is the upper left of the printable area.

- If the horizontal or vertical logical origin is set outside the printable area, this command is canceled, and the following data is processed as normal data.
- If [horizontal logical origin + printing area width] exceeds the printable area, the clearing area width is automatically set to [horizontal printable area – horizontal logical origin].
- If [vertical logical origin + printing area height] exceeds the printable area, the clearing area height is automatically set to [vertical printable area – vertical logical origin].
- The clearing area and the logical origin set by this command are effective only in page mode.
- This command setting has no effect in standard mode. If this command is processed in standard mode, the logical origin and the printing area are set, and they are enabled when the printer selects page mode.
- Horizontal logical origin and printing area width are calculated using the vertical motion unit.
- Vertical logical origin and printing area height are calculated using the horizontal motion unit.
- Even if the horizontal or vertical motion unit is changed the printable area, the setting of the clearing area will not be changed.
- The settings of this command are effective until FF is executed, ESC @ is executed, the printer is reset, or the power is turned off.

RS b

[Name] Battery check

[Format]

ASCII	RS b
Hex	1E 62
Decimal	30 98

[Range] None

[Default] None

[Description] Battery check, the return value is specified as follows:

0x30→less than 10%
0x31→less than20%
0x32→more than 20%
0x33→more than 30%
0x39→more than 90%
0x3A→100%

[Notes] This command setting is effective until **ESC @** is executed, the printer is reset, or the power is turned off.

RS m n

[Name] Media length measurement setup

[Format]

ASCII	RS m n
Hex	1E 6D n
Decimal	30 109 n

[Range] 0 ≤ ***n*** ≤ 5

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

[Description] You can conduct length measurement by using transmissive sensor for gap label roll or reflective sensor for I-Mark media roll. This command allow you to set up the No. of length measurement.

[Notes] After the printer is reset, it will return on default setting.

RS p

[Name] Set printing copies of printing data

[Format]

ASCII	RS p ***n***
Hex	1E 70 ***n***
Decimal	30 112 ***n***

[Range] 1 ≤ ***n*** ≤ 255

[Default] ***n*** = 1

[Description] Sets printing copies of printing data.

[Notes] This command setting is effective until **ESC @** is executed, the printer is reset, or the power is turned off.

GS (K

[Name] Select printing control

[Description] Selects printing control as follows:

- Function is specified by the function code ***fn***.

fn	Function	
49	Function 49	Selects printing density

- ***pL*** and ***pH*** specify parameter number after ***fn*** to (***pL*** + ***pH*** x 256) bytes.

[Notes]

- This command decides the function according to the function code (***fn***). Performance of the functions differs, depending on the function.
- The settings of this command are effective until **ESC @** is executed, the printer is reset, or the power is turned off.

GS (K <Function 49>

[Name] Selects printing density

[Format]

ASCII	GS (K ***pL pH fn m***
Hex	1D 28 4B 02 00 31 ***m***
Decimal	29 40 75 2 0 49 ***m***

[Range] (***pL*** + ***pH*** x 256) = 2 (***pL*** = 2, ***pH*** = 0**)**
fn = 49, 0 ≤ ***m*** ≤ 15

[Default] ***m*** = 8

[Description] Selects printing control mode by **m**.

m	Function
m < 8	Selects pale density
m = 8	Selects standard density
m > 8	Selects strong density

- The specification of each printing control mode differs, depending on the printer model. See model-dependent variations.

[Notes]

- When a standard mode is selected, all the data in a line is printed in the same density.
- When a page mode is selected, all the data printed collectively by **FF** or **ESC FF** is printed in the same density.

GS C 0

[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 ≤ ***n*** ≤ 5,

0 ≤ ***m*** ≤ 2, 48 ≤ ***m*** ≤ 50

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

[Description] Selects a print mode for the serial number counter (the number of printed digits and the print position within the entire range of printed digits).

- ***n*** specifies the number of digits to be printed.
  - When ***n***=0, the printer prints the actual digits indicated by the number value.
  - When ***n*** ≠ 0, the printer prints the last ***n*** digits of the serial number.
- ***m*** specifies the printing position within the entire range of printed digits, as follows：

m	**Print 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]

- The serial number counter is stored in the print buffer by **GS c**.
- Settings of this command are effective until **ESC @** is executed, the printer is reset, or the power is turned off.

GS C 1

[Name] Select counter mode

[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 ≤ (***aL*** + ***aH*** x 256) ≤65535 (0≤ ***aL*** ≤255, 0≤ ***aH*** ≤255)
0 ≤ (***bL*** + ***bH*** x 256) ≤65535 (0≤ ***bL*** ≤255, 0≤ ***bH*** ≤255)
0 ≤ ***n*** ≤ 255 , 0 ≤ ***r*** ≤255

[Default]

(***aL*** + ***aH*** x 256) = 1(***aL*** = 1, ***aH*** = 0)
(***bL*** + ***bH*** x 256) = 65535 (***bL*** = 255, ***bH*** = 255)
n = 1 , ***r*** = 1

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

Count mode	Conditions	Minimum Value	Maximum value
Count-up	***aL***+***aH*** x 256< ***bL***+***bH*** x 256 and ***n***≠0 and ***r***≠0	***aL***+***aH*** x 256	***bL***+***bH*** x 256
Count-down	***aL***+***aH*** x 256> ***bL***+***bH*** x 256 and ***n***≠0 and ***r***≠0	***bL***+***bH*** x 256	***aL***+***aH*** x 256
Count-stop	***aL***+***aH*** x 256= ***bL***+***bH*** x 256 and ***n***≠0 and ***r***≠0	-	-

* ***aL***, ***aH*** and ***bL***, ***bH*** specify the counter ranges (maximum or minimum value).
* ***n*** specifies the stepping amount when counting up or down.
* ***r*** specifies the repetition number of printing for the same counter value.

[Notes]

- In a count-up setting, when the GS c is executed, the counter value exceeds the maximum value(*bL*+*bH* x 256), restart counting from the minimum value (*aL* + *aH* x 256).
- In a count-down setting, when GS c is executed, the counter value is below minimum value(*bL*+*bH* x 256), restart counting from the maximum value (*aL* + *aH* x 256).
- In a count-stop setting, when executing GS c, the counter value is not changed.
- This command does not change the counter value. The counter value is set by GS C 2.
- Settings of this command are effective until ESC @ is executed, the printer is reset, or the power is turned off.
- The value of the counter is updated when executing GS c.

GS C 2

[Name] Select the serial number counter value

[Format]

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

[Range] 0 ≤ (***nL*** + ***nH*** x 256) ≤65535 (0≤ ***nL*** ≤255, 0≤ ***nH*** ≤255)

[Default] (***nL*** + ***nH*** x **256**) = 1 (***nL*** = 1, ***nH*** = 0)

[Description] Sets the serial number counter value. Specifies the counter value as (***nL*** + ***nH*** x 256).

[Notes] Settings of this command are effective until **ESC @** is executed, the printer is reset, or the power is turned off.

GS c

[Name] Print counter

[Format]

ASCII	GS c
Hex	1D 63
Decimal	29 99

[Range] None

[Default] None

[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 updates counter value based on the count mode set.
  - In count-up mode, the counter value is updated as [counter value + increase and decrease value].
  - In count-down mode, the counter value is updated as [counter value – increase and decrease value].
  - In count-stop mode, the counter value is not updated.
- In count-up mode, if the counter value is the maximum of the specified counter value, it is forced to convert to the minimum value by this command.
- In count-down mode, if the counter value is the minimum of the specified counter value, it is forced to convert to the maximum value by this command.
- The counter print mode is set by GS C 0.

- The counter mode (count-up, count-down, count-stop) and details of counter (maximum value, minimum value, stepping amount of incrementing or decrementing of a counter value, the repetition number of printing) are set by GS C 1.
- The counter value is set by GS C 2.

GS (k

[Name] Specify and print the symbol

[Format]

ASCII	GS (k
Hex	1D 28 6B
Decimal	29 40 107

[Description] Processes the data concerning two-dimensional code. (PDF417, QR Code, MaxiCode).

◆ Symbol type is specified by **cn** ; Function is specified by **fn**.

cn	fn	Function	
48	65	**Function 065**	PDF 417: Specify the number of columns
	66	**Function 066**	PDF 417: Specify the number of rows
	67	**Function 067**	PDF 417: Specify the width of module
	68	**Function 068**	PDF 417: Specify the module height
	69	**Function 069**	PDF 417: Specify the error correction level
	80	**Function 080**	PDF 417: Store the received data in the symbol save area
	81	**Function 081**	PDF 417: Print the symbol data in the symbol save area
49	65	**Function 165**	QR Code: Specify the model
	67	**Function 167**	QR Code: Specify the size of module
	69	**Function 169**	QR Code: Specify the error correction level
	80	**Function 180**	QR Code: Store the received data in the symbol save area
	81	**Function 181**	QR Code: Print the symbol data in the symbol save area
50	65	**Function 265**	MaxiCode: Specifies the mode of the MaxiCode
	80	**Function 280**	MaxiCode: Store the received data in the symbol save area
	81	**Function 280**	MaxiCode: Store the received data in the symbol save area

cn	fn	Function	
55	65	**Function 765**	Datamatrix: Specify the number of columns
	66	**Function 766**	Datamatrix: Specify the number of rows
	67	**Function 767**	Datamatrix: Specify the width of module
	68	**Function 768**	Datamatrix: Specify the Bar Code Type
	69	**Function 769**	Datamatrix: Specify the Data Mode
	80	**Function 780**	Datamatrix: Store the received data in the symbol save area
	81	**Function 781**	Datamatrix: Print the symbol data in the symbol save area
56	65	**Function 865**	RSS-14: Specify the mode of RSS-14
	66	**Function 866**	Specify the RSS- 14 Expanded Stacked Symbol to define its number of segment per row.
	67	**Function 867**	RSS-14: Specify the width of module
	68	**Function 868**	RSS-14: Specify the height of separator
	80	**Function 880**	RSS-14: Store the received data in the symbol save area
	81	**Function 881**	RSS-14: Print the symbol data in the symbol save area
57	67	**Function 967**	Code49: Specify the width of module
	68	**Function 968**	Code49: Specify the module height
	80	**Function 980**	Code49: Store the received data in the symbol save area
	81	**Function 981**	Code49: Print the symbol data in the symbol save area

* ***pL*** and ***pH*** specify the parameter number after ***cn*** to (***pL*** + ***pH*** x 256) bytes.

[Notes]

- The function is specified with the function code (***fn***). Details of the performance differ according to the function.

For processing of PDF417 symbol data (when *cn* = 48)

- The symbol data specified by Function 080 ***d1...dk*** is stored in the printer and is printed by the specification of Function 081. The symbol data in the save area is reserved until the following processing is performed:
  - Function 080 or 180 or 980 is executed.
  - ESC @ is executed.
  - The printer is reset or the power is turned off.
- When processing Function 081 or 082, the setting values of Functions 065 to 070 are used. If the printable area is not large enough, the symbol may not be printed.
- Executing Function 081 after executing Function 080 repeatedly prints the same symbol data.
- By using Functions 065 to 070 combined with Function 081, the same symbol data ***d1...dk*** is printed differently.

For process of QR Code symbol (when *cn* = 49)

- The symbol data specified by Function 080 ***d1...dk*** is stored in the printer and is printed by the specification of Function 081. The symbol data in the save area is reserved until the following processing is performed:
  - Function 080 or 180 or 980 is executed.
  - ESC @ is executed.
  - The printer is reset or the power is turned off.
- Eexcuting function 181 after executing Function 180 respectively prints the same symbol data.
- By using Functions 165, 167, 169 combined with Function 181, the same symbol data ***d1...dk*** is printed differently.
- This model supports two-dimensional code (PDF417). When printing PDF417 with this printer, note the following:
  - The recognition rate of the symbol is affected by the height of the symbol, module height, module width ratio, and the performance of the reader.
  - It is recommended that the module height be set three to five times the width of the module.
  - The module height is specified by Function 068. The width of a module is specified by Function 067. The number of the rows is specified by Function 066.

GS (k PDF417<Function 065>

[Format]

ASCII	GS (k ***pL pH cn fn n***
Hex	1D 28 6B 03 00 30 41 ***n***
Decimal	29 40 107 3 00 48 65 ***n***

[Range]

(***pL*** + ***pH*** x 256) = 3 (***pL*** =3, ***pH*** =0)
cn = 48, ***fn*** = 65
0 ≤ ***n*** ≤ 30

[Default]

n = 0

[Description]

Specifies the number of columns of the data area of PDF417.

- ***n*** = 0 specifies auto processing
- When ***n*** is not 0, specifies the number of columns of the data area as ***n*** code word.

[Notes]

- Settings of this function affect the processing of Functions 081 and 082.
- When auto processing (***n*** = 0) is specified, the maximum number of columns in the data area is 30 columns.
- The following data is not included in the number of columns:
  - Start pattern and stop pattern.
  - Indicator code word of left and right.
- When auto processing (***n*** = 0) is specified, the number of columns is calculated by the printing area when processing Functions 081.
- Settings of this function are effective until **ESC @** is executed, the printer is reset, or the power is turned off.

GS (k PDF417<Function 066>

[Format]

ASCII	GS (k ***pL pH cn fn n***
Hex	1D 28 6B 03 00 30 42 ***n***
Decimal	29 40 107 03 00 48 66 ***n***

[Range]

(***pL*** + ***pH*** x 256) = 3 (***pL*** =3, ***pH*** =0)
cn = 48, ***fn*** = 66
n = 0, 3 ≤ ***n*** ≤90

[Default]

n = 0

[Description]

Specifies the number of rows of the data area of PDF417.

- ***n*** = 0 specifies auto processing
- When ***n*** is not 0, specifies the number of rows of the symbol as ***n*** rows.

[Notes]

- Settings of this function affect the processing of Functions 081.
- When auto processing (**n** = 0) is specified, the maximum number of rows is 90.
- When auto processing (**n** = 0) is specified, the number of rows is calculated by the printing area when processing Functions 081.
- Settings of this function are effective until **ESC @** is executed, the printer is reset, or the power is turned off.

GS (k PDF417<Function 067>

[Format]

ASCII	GS (k ***pL pH cn fn n***
Hex	1D 28 6B 03 00 30 43 ***n***
Decimal	29 40 107 03 00 48 67 ***n***

[Range]

(***pL*** + ***pH*** x 256) = 3 **(*pL* =3, *pH* =0)**
cn = 48**,** ***fn*** = 67
1≤ ***n*** ≤ 5

[Default]

n = 2

[Description]

Specifies the width of a module of PDF417 symbol.

[Notes]

- Settings of this function affect the processing of Functions 081.
- The setting unit differs, depending on the printer models.
- Settings of this function are effective until **ESC @** is executed, the printer is reset, or the power is turned off.
- The setting unit is 1 dot. The width is set in units of 0.125 mm {1/203 inch}.

GS (k PDF417<Function 068>

[Format]

ASCII	GS (k ***pL pH cn fn n***
Hex	1D 28 6B 03 00 30 44 ***n***
Decimal	29 40 107 03 00 48 68 ***n***

[Range] (***pL*** + ***pH*** x256) = 3 (***pL***=3,***pH*** =0)
cn = 48, *fn* = 68, 5 ≤ *n* ≤100

[Default] ***n*** = 5

[Description] Specifies the height of a module of PDF417 symbol.

[Notes]

- Settings of this function affect the processing of Functions 081.
- Settings of this function are effective until ESC @ is executed, the printer is reset, or the power is turned off.
- The module height influences the recognition rate of the symbol.
- The setting unit is 0.1 mm.

GS (k PDF417<Function 069>

[Format]

ASCII	GS (k ***pL pH cn fn m n***
Hex	1D 28 6B 04 00 30 45 ***m n***
Decimal	29 40 107 04 00 48 69 ***m n***

[Range]

(***pL*** + ***pH*** x 256) = 4 (***pL*** = 4, ***pH*** =0)
cn = 48, ***fn*** = 69
m = 48
48 ≦***n*** ≦56 [***m*** = 48]

[Default]

m = 48 , ***n*** = 48

[Description]

Specifies the error correction level of PDF417. The error correction level is specified by “level” when ***m*** = 48.

[Notes]

- Settings of this function affect the processing of Functions 081.
- Error correction level is specified by either “level”.
- Error correction level specified by “level” (***m*** = 48) is as follows. The number of the error correction code word is fixed regardless of the number of code words in the data area.

n	Function	Number of error correction code word
48	Error correction level 0	2
49	Error correction level 1	4
50	Error correction level 2	8
51	Error correction level 3	16
52	Error correction level 4	32
53	Error correction level 5	64
54	Error correction level 6	128
55	Error correction level 7	256
56	Error correction level 8	512

- The error correction code word calculated by modulus 929.
- Settings of this function are effective until **ESC @** is executed, the printer is reset, or the power is turned off.

GS (k PDF417<Function 080>

[Format]

ASCII	GS (k ***pL pH cn fn m d1 dk***
Hex	1D 28 6B ***pL pH*** 30 50 30 ***d1 dk***
Decimal	29 40 107 ***pL pH*** 48 80 48 ***d1 dk***

[Range]

4 ≤ (***pL*** + ***pH*** x 256) ≤ 65535 (0 ≤***pL***≤255, 0 ≤***pH*** ≤255)
cn = 48, ***fn*** = 80, ***m*** = 48, 0 ≤ ***d*** ≤255, ***k*** = (***pL*** + ***pH*** x256) – 3

[Description]

Stores the PDF417 symbol data (***d1***...***dk***) in the symbol save area.

[Notes]

- Data stored in the symbol save area by this function are processed by Function 081 and 082. The data in the symbol save area are reserved after processing Function 081.
- ***k*** bytes of ***d1...dk*** are processed as symbol data.
- Specify only the data code word of the symbol with this function. Be sure not to include the following data in the data ***d1...dk*** because they are added automatically by the printer.
  - Start pattern and stop pattern.
  - Indicator code word of left and right.
  - The descriptor of symbol length (the first code word in the data area).
  - The error correction code word calculated by modulus 929.
- Settings of this function are effective until the following processing is performed:
  - Function 080 is executed. (Function 080 or 180 or 280 or 780 or 880 or 980 is executed)
  - **ESC @** is executed.
  - The printer is reset or the power is turned off.

GS (k PDF417<Function 081>

[Format]

ASCII	GS (k ***pL pH cn fn m***
Hex	1D 28 6B 03 00 30 51 ***m***
Decimal	29 40 107 03 00 48 81 ***m***

[Range]

(***pL*** + ***pH*** x 256) = 3 (***pL*** = 3, ***pH*** = 0)
cn = 48, ***fn*** = 81
m = 48

[Description] Encodes and prints the PDF417 symbol data in the symbol save area.

[Notes]

- If there is any error described below in the data of the symbol save area, it can not be printed.
  - There is no data (Function 080 is not processed).
  - If [(number of columns ×number of rows) < number of code word] when auto processing is specified for number of columns and number of rows.
  - Number of code word exceeds 928 in the data area.
  - This command does not affect printing in standard mode.
- The following data are added automatically by the encode processing.
  - Start pattern and stop pattern.
  - There is no data (Function 080 is not processed).
  - The descriptor of symbol length (the first code word in the data area)
  - The error correction code word calculated by modulus 929.
  - Pad codeword.

- The data area includes the following code words.
  - Data specified by Function 080.
  - The descriptor of symbol length (the first code word in the data area).
  - The error correction code word calculated by modulus 929.
  - Pad codeword.
- This command is effective only in Page mode.

GS (k QR Code<Function 165>

[Format]

ASCII	GS (k ***pL pH cn fn n1 n2***
Hex	1D 28 6B 04 00 31 41 ***n1 n2***
Decimal	29 40 107 04 00 49 65 ***n1 n2***

[Range]

(***pL*** + ***pH*** x256) = 4 (***pL*** = 4, ***pH*** = 0)
cn = 49, ***fn*** = 65
n1 = 49, 50, 51
n2 = 0

[Default]

n1 = 50, ***n2*** = 0

[Description]

Specifies the model of QR Code.

n1	Function
49	Specifies model 1.
50	Specifies model 1.
51	Micro QR

[Notes]

- Settings of this function affect the processing of Functions 181 and 182.
- Settings of this function are effective until **ESC @** is executed, the printer is reset, or the power is turned off.

GS (k QR Code <Function 167>

[Format]

ASCII	GS (k ***pL pH cn fn n***
Hex	1D 28 6B 03 00 31 43 ***n***
Decimal	29 40 107 03 00 49 67 ***n***

[Range]

(***pL*** + ***pH*** X 256) = 3 (***pL*** = 3, ***pH*** = 0)
cn = 49, ***fn*** = 67
2 ≤ ***n*** ≤ 5

[Default]

n = 2

[Description]

Specifies the size of a module of QR Code symbol.

[Notes]

- Settings of this function affect the processing of Functions 181 and 182.
- The setting unit differs, depending on the printer models.
- Settings of this function are effective until **ESC @** is executed, the printer is reset, or the power is turned off.
- ***n*** = width of a module = height of a module (Because the QR code modules are square).
- The setting unit is 1 dot. The size is set in units of 0.125 mm {1/203 inch}.

GS (k QR Code <Function 169>

[Format]

ASCII	GS (k ***pL pH cn fn n***
Hex	1D 28 6B 3 00 31 45 ***n***
Decimal	29 40 107 03 00 49 69 ***n***

[Range]

(***pL*** + ***pH*** x 256) = 3 (***pL*** = 3, ***pH*** =0)
cn = 49, ***fn*** = 69
48 ≤ ***n*** ≤ 51

[Default]

n = 48

[Description]

Specifies the error correction level of QR Code.

n	Function	Recovery Capacity % (approx.)
48	Specify Error correction level L	7
49	Specify Error correction level M	15
50	Specify Error correction level Q	25
51	Specify Error correction level H	30

[Notes]

- Settings of this function affect the processing of Functions 181.
- QR Code employs Reed-Solomon error correction to generate a series of error correction code words.
- Settings of this function are effective until **ESC @** is executed, the printer is reset, or the power is turned off.

GS (k QR Code <Function 180>

[Format]

ASCII	GS (k ***pL pH cn fn m d1 dk***
Hex	1D 28 6B ***pL pH*** 31 50 30 ***d1 dk***
Decimal	29 40 107 ***pL pH*** 49 80 48 ***d1 dk***

[Range]

4 ≤ (***pL*** + ***pH*** x 256) ≤ 7092 (0 ≤***pL***≤255, 0≤***pH*** ≤27)
cn = 49, ***fn*** = 80
m = 48, 0 ≤ ***d*** ≤255
k = (***pL*** + ***pH*** x 256) – 3

[Description]

Stores the QR Code symbol data (***d1...dk***) in the symbol save area.

[Notes]

- Data stored in the symbol save area by this function is processed by Functions 181. The data in the symbol save area are reserved after processing Function 181.
- ***k*** bytes of ***d1...dk*** are processed as symbol data.
- It is possible to encode to a QR Code as follows. Be sure not to include anything except the following data in the data ***d1...dk***.

Category of data	Characters it is possible to specify
Numerical Mode data	“0“ ~ “9“
Alphanumeric Mode data	“0” ~ “9“, “A” ~ “Z“, SP, $, %, *, +, –, . , /, :
Kanji Mode data	Shift JIS value (Shift value from JISX0208)
8-Bit Byte Mode data	00H ~ 7FH or 8EH ~ DFH

- Settings of this function are effective until the following processing is performed:
  - Function 080 or 180 is executed.
  - ESC @ is executed.
  - The printer is reset or the power is turned off.

GS (k QR Code <Function 181>

[Format]

ASCII	GS (k ***p pH cn fn m***
Hex	1D 28 6B 03 00 31 51 ***m***
Decimal	29 40 107 03 00 49 81 ***m***

[Range]

(***pL*** + ***pH*** x256) = 3 (***pL*** = 3, ***pH*** = 0)
cn = 49, ***fn*** = 81
m = 48

[Default]

None

[Description]

Encodes and prints the QR Code symbol data in the symbol save area.

[Notes]

- If there is any error described below in the data of the symbol save area, it cannot be printed.
  - There is no data (Function 180 is not processed).
  - If the data of the symbol save area is more than the data allowed by
  - specified model and data compaction mode. (This case is an abnormal number of data.)
  - The four data compaction modes are listed below (in order of compaction rate). Automatically selects best compaction mode by the data of the symbol save area.
    – Numerical mode
    – Alphanumeric mode
    – Kanji mode
    – 8-Bit Byte Mode
  - This command does not affect printing in standard mode.

- The following data are added automatically by the encode processing.
  - Position Detection Patterns
  - Separators for Position Detection Patterns
  - Timing Patterns
  - Format Information
  - Version Information
  - Error Correction code words (employs the Reed-Solomon Error Detection and Correction algorithm)
  - Pad codeword
  - Number of bits in Character Count Indicator
  - Mode Indicator
  - Terminator
  - Alignment Patterns (when model 2 is selected)
  - Extension Patterns (when model 1 is selected)
- ESC T is not effective for QR Code, Datamatrix, or MaxiCode.
- This command is effective only in Page mode.

GS (k MaxiCode<Function 265>

[Format]

ASCII	GS (k ***k pL pH cn fn n***
Hex	1D 28 6B 03 00 32 41 ***n***
Decimal	29 40 107 03 00 50 65 ***n***

[Range]

(***pL*** + ***pH*** x256) = 3 (***pL*** = 3, ***pH*** = 0)
cn = 50
fn = 65
50 ≤ *n* ≤ 54 (52~54 not support)

[Default]

n = 50

[Description]

Specifies the mode of the MaxiCode

n	
50	Specify to mode 2.
51	Specify to mode 3.
52	Specify to mode 2.
53	Specify to mode 2.
54	Specify to mode 2.

[Notes]

- Settings of this function affect the processing of Functions 281 .
- Settings of this function are effective until **ESC @** is executed, the printer is reset, or the power is turned off.

GS (k MaxiCode <Function 280>

[Format]

ASCII	GS (k ***pL pH cn fn m d1…dk***
Hex	1D 28 6B ***pL pH*** 32 50 30 ***d1…dk***
Decimal	29 40 107 ***pL pH*** 50 80 48 ***d1…dk***

[Range]

4 ≦(***pL*** + ***pH*** x 256) ≦200 (0 ≦***pL***≦n, 0 ≦***pH*** ≦0)
cn = 50
fn = 80
m = 48
0 ≦***d*** ≦255
k = (***pL*** + ***pH*** x 256) – 3

[Description]

Stores the MaxiCode symbol data (***d1...dk***) in the symbol save area.

[Notes]

- Data stored in the symbol save area by this function is processed by Function 281. The data in the symbol save area are reserved after processing Function 281.
- **k** bytes of ***d1...dk*** are processed as the symbol data.
- Settings of this function are effective until the following processing is performed:
  - Function 080 or 180 or 280 or 780 or 880 or 980 is executed
  - **ESC @** is executed
  - The printer is reset or the power is turned off

[Data Format]

Item	Size and Type
ANSI message header	[ ]> <RS>
Transportation Data Format Header	01 <GS> 96
Ship-To Postal Code	5 or 9 digits in the USA (mode2), up to 6 alphanumeric characters in other countries (mode3).
Ship-To Country Code	3 digits (840 for USA)
Class of Service	3 digits
Tracking Number	10-character alphanumeric
UPS Standard Carrier Alpha Code	“UPSN”
UPS Shipper Number	6-character alphanumeric
Julian Day of Pickup	3 digits
Shipment ID Number	1-30 character alphanumeric
Package In Shipment (package N of X total packages)	1-4 digits “/” 1-4 digits
Weight in pounds	1-5 digits
Address Validation	“Y” or “N”
Ship-To Address	1-35 alphanumeric
Ship-To City	1-35 alphanumeric
Ship-To State	2-character alpha
End of format	<RS>
End of transmission	<EOT>

Notes:

(1) RS and GS represents (1EH) and (1DH) respectively.

(2) Background is yellow→Start / End elements (necessary)

(3) Background is blue→ data elements are mandatory

(4) Each item finished adding “GS”

GS (k MaxiCode <Function 281>

[Format]

ASCII	GS (k ***pL pH cn fn m***
Hex	1D 28 6B 03 00 32 51 ***m***
Decimal	29 40 107 03 00 50 81 ***m***

[Range]

(***pL*** + ***pH*** x 256) = 3 (***pL*** = 3, ***pH*** = 0)
cn = 50
fn = 81
m = 48

[Default]

None

[Description]

Encodes and prints the MaxiCode symbol data in the symbol save area.

[Notes]

- f there is any error described below in the data of the symbol save area, it cannot be printed.
  - There is no data (Function 180 is not processed).
  - Follow to the **<Function 280> [Data format]**, If any improper data is included, it will result as a command error .
- ESC T is not effective for QR Code, Datamatrix, or MaxiCode.
- Barcode Size :Width approximately 28mm(1.01inch); Height approximately 25mm(1inch).
- This command is effective only in Page mode.

GS (k Datamatrix<Function 765>

[Format] ASCII GS (k ***pL pH cn fn n***
Hex 1D 28 6B 03 00 37 41 ***n***
Decimal 29 40 107 03 00 55 65 ***n***

[Range] (***pL*** + ***pH*** x 256) = 3 (***pL*** = 3, ***pH*** = 0)
cn = 55
fn = 65

[Default] None

[Description] Specifies the number of columns of the data area of Datamatrix.

Matrix type	Row	Column
1	8	12
2	8	32
3	12	26
4	12	36
5	16	36
6	16	48

[Notes] When you choose Matrix type 1, you have to set up the column and row with the corresponding values.

GS (k Datamatrix <Function 766>

[Format]

ASCII	GS (k ***pL pH cn fn n***
Hex	1D 28 6B 03 00 37 42 ***n***
Decimal	29 40 10703 00 55 66 ***n***

[Range]

(***pL*** + ***pH*** x 256) = 3 (***pL*** = 3, ***pH*** = 0)
cn = 55
fn = 66

[Description] Specifies the number of rows of the data area of Datamatrix.

Matrix type	Row	Column
1	8	12
2	8	32
3	12	26
4	12	36
5	16	36
6	16	48

[Notes] When you choose Matrix type 1, you have to set up the column and row with the corresponding values.

GS (k Datamatrix <Function 767>

[Format] ASCII GS (k ***pL pH cn fn n***
Hex 1D 28 6B 03 00 37 43 ***n***
Decimal 29 40 107 03 00 55 67 ***n***

[Range] (***pL*** + ***pH*** x 256) = 3 (***pL*** = 3, ***pH*** = 0)
cn = 55
fn = 67
1≤ ***n*** ≤ 5

[Default] ***n*** = 1

[Description] Specifies the width of a module of Datamatrix symbol.

[Notes]

- Settings of this function affect the processing of Functions 781.
- The setting unit differs, depending on the printer models.
- Settings of this function are effective until **ESC @** is executed, the printer is reset, or the power is turned off.

[Model-dependent variations] The setting unit is 1 dot. The width is set in units of 0.125 mm {1/203 inch}.

GS (k Datamatrix <Function 768>

[Format]

ASCII	GS (k ***pL pH cn fn n***
Hex	1D 28 6B 03 00 37 44 ***n***
Decimal	29 40 107 03 00 55 68 ***n***

[Range]

(***pL*** + ***pH*** x 256) = 3 (***pL*** = 3, ***pH*** = 0)
cn = 55
fn = 68
n = 0 or 1

n	Bar Code Type
0	Datamatrix (standard square shape)
1	Datamatrix ECC200 Rectangle Shape

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

[Description] Specify the Bar Code Type.

[Notes]

- n = 0 ,Functions 765 and 766 may be omitted.
- Settings of this function affect the processing of Functions 781.
- Settings of this function are effective until **ESC @** is executed, the printer is reset, or the power is turned off.

[Model-dependent variations] The setting unit is 1 dot. The width is set in units of 0.125 mm {1/203 inch}.

GS (k Datamatrix <Function 769>

[Format]

ASCII	GS (k ***pL pH cn fn n***
Hex	1D 28 6B 04 00 37 45 ***n***
Decimal	29 40 107 04 00 55 69 ***n***

[Range]

(***pL*** + ***pH*** x 256) = 3 (***pL*** = 4, ***pH*** = 0)
cn = 55
fn = 69
1 ≤***n*** ≤6

[Default]

n = 6

[Description] Specifies the Data mode of Datamatrix.

n	Data mode	Description
1	Base 11	numeric mode (0~9、space)
2	Base 27	capital alphabet mode (A~Z、space)
3	Base 37	alphanumeric mode (A~Z、0~9、space)
4	Base 41	alphanumeric and symbol mode (A~Z、0~9、space、。、，、- or —、／)
5	ASCII	full ASCII mode
6	8	8 bit mode (default)

Barcode type: Rectangle Shape

Row	Column	Capacity		
		number	alphanumeric	bytes
8	12	10	6	3
8	32	20	13	8
12	26	32	22	14
12	36	44	31	20
16	36	64	46	30
16	48	98	72	47

GS (k Datamatrix <Function 780>

[Format]

ASCII	GS (k ***pL pH cn fn m d1…dk***
Hex	1D 28 6B ***pL pH*** 37 50 30 ***d1…dk***
Decimal	29 40 107 ***pL pH*** 55 80 48 ***d1…dk***

[Range]

4 ≦(***pL*** + ***pH*** x 256) ≦65535 (0 ≦***pL***≦255, 0 ≦***pH*** ≦255)
cn = 55
fn = 80
m = 48
0 ≦***d*** ≦255
k = (***pL*** + ***pH*** x256) – 3

[Description] Stores the Datamatrix symbol data (**d1...dk**) in the symbol save area.

[Notes]

- Data stored in the symbol save area by this function are processed by Function 781. The data in the symbol save area are reserved after processing Function 781 .
- **k** bytes of **d1...dk** are processed as symbol data.
- Specify only the data code word of the symbol with this function. Be sure not to include the following data in the data **d1...dk** because they are added automatically by the printer.
  - Start pattern and stop pattern
  - ndicator code word of left and right
  - The descriptor of symbol length (the first code word in the data area)
  - The error correction code word calculated by modulus 929
- Settings of this function are effective until the following processing is performed:
  - Function 080 or 180 or 280 or 780 or 880 or 980 is executed
  - **ESC @** is executed
  - The printer is reset or the power is turned off

GS (k Datamatrix <Function 781>

[Format]

ASCII	GS (k ***pL pH cn fn m***
Hex	1D 28 6B 03 00 37 51 ***m***
Decimal	29 40 107 03 00 55 81 ***m***

[Range]

(***pL*** + ***pH*** x 256) = 3 (***pL*** = 3, ***pH*** = 0)
cn = 55
fn = 81
m = 48

[Description] Encodes and prints the Datamatrix symbol data in the symbol save area.

[Notes]

- If there is any error described below in the data of the symbol save area, it can not be printed.
  - There is no data (Function 780 is not processed).
  - If [(number of columns ×number of rows) < number of code word] when auto processing is specified for number of columns and number of rows.
  - Number of code word exceeds 928 in the data area.
  - This command does not affect printing in standard mode.
- The following data are added automatically by the encode processing.
  - Start pattern and stop pattern
  - Indicator code word of left and right
  - The descriptor of symbol length (the first code word in the data area)
  - The error correction code word calculated by modulus 929
  - Pad codeword

- The data area includes the following code words.
  - Data specified by Function 780.
  - The descriptor of symbol length (the first code word in the data area).
  - The error correction code word calculated by modulus 929.
  - Pad codeword
- ESC T is not effective for QR Code, Datamatrix, or MaxiCode.
- This command is effective only in Page mode.

GS (k RSS-14<Function 865>

[Format]

ASCII	GS (k ***pL pH cn fn n***
Hex	1D 28 6B 03 00 38 41 ***n***
Decimal	29 40 107 03 00 56 65 ***n***

[Range]

(***pL*** + ***pH*** x 256) = 3 (***pL*** = 3, ***pH*** = 0)
cn = 56
fn = 65
49 ≦ ***n*** ≦ 54 (Hex : 31~36)

[Default]

n = 49

[Description]

Specify the mode of RSS-14.

n	**Description**
49	RSS-14
50	RSS-14 Truncated
51	RSS-14 Stacked
52	RSS-14 Stacked Omnidirectional
53	RSS Limited
54	RSS Expanded and RSS Expanded Stacked

[Notes]

- Settings of this function affect the processing of Functions 881 and .
- Settings of this function are effective until **ESC @** is executed, the printer is reset, or the power is turned off.

GS (k RSS-14<Function 866>

[Format]

ASCII	GS (k ***pL pH cn fn n***
Hex	1D 28 6B 03 00 38 42 ***n***
Decimal	29 40 107 03 00 56 66 ***n***

[Range]

(***pL*** + ***pH*** x 256) = 3 (***pL*** = 3, ***pH*** = 0)
cn = 56
fn = 65
2 ≦ ***n*** ≦ 22

[Default]

n = 22

[Description] Specify the RSS Expanded Stacked Symbol to define its number of segment per row.

[Notes]

- Even number from 2 to 22 should be used. If any odd number is entered, it will be round down to be an even number. If any numbers less than 2 (two) is entered, it will be processed as 2. If any numbers larger than 22 is entered, it will be processed as 22.
- When RSS + 2D CC is used, this ***n*** needs to be set at least 4 (four) or larger.

GS (k RSS-14<Function 867>

[Format]

ASCII	GS (k ***pL pH cn fn n***
Hex	1D 28 6B 03 00 38 43 ***n***
Decimal	29 40 107 03 00 56 67 ***n***

[Range]

(***pL*** + ***pH*** x 256) = 3 (***pL*** = 3, ***pH*** = 0)
cn = 56
fn = 67
1 ≦ ***n*** ≦ 255

[Default]

n = 2

[Description] Specifies the width of narrow element size of a module of RSS-14 symbol.

[Notes]

- Settings of this function affect the processing of Functions 881.
- The setting unit differs, depending on the printer models.
- Settings of this function are effective until **ESC @** is executed, the printer is reset, or the power is turned off.

[Model-dependent variations] The setting unit is 1 dot. The width is set in units of 0.125 mm {1/203 inch}.

GS (k RSS-14<Function 868>

[Format] ASCII GS (k ***pL pH cn fn n***
Hex 1D 28 6B 03 00 38 44 ***n***
Decimal 29 40 107 03 00 56 68 ***n***

[Range] (***pL*** + ***pH*** x 256) = 3 (***pL*** = 3, ***pH*** = 0)
cn = 56
fn = 68
1 ≦ ***n*** ≦ 255

[Default] ***n*** = 2

[Description] Specifies the Height of separator of RSS-14 symbol.

[Notes]

- Settings of this function affect the processing of Functions 881.
- Settings of this function are effective until **ESC @** is executed, the printer is reset, or the power is turned off.
- Settings of this function affect the RSS-14 + Composite(2D) barcode.

[Model-dependent variations] The setting unit is 1 dot. The width is set in units of 0.125 mm {1/203 inch}.

GS (k RSS-14<Function 880>

[Format]

ASCII	GS (k ***pL pH cn fn m d1…dk***
Hex	1D 28 6B ***pL pH*** 38 50 30 ***d1…dk***
Decimal	29 40 107 ***pL pH*** 56 80 48 ***d1…dk***

[Range]

(4 ≦(***pL*** + ***pH*** x 256) ≦2437 (0 ≦***pL***≦255, 0 ≦***pH*** ≦ 9)
cn = 56
fn = 80
m = 48
0 ≦***d*** ≦255
k = (***pL*** + ***pH*** x 256) – 3

[Description] Stores the RSS-14 symbol data (**d1...dk**) in the symbol save area.

[Notes]

- Data stored in the symbol save area by this function is processed by Functions 881. The data in the symbol save area are reserved after processing Function 881.
- **k** bytes of **d1...dk** are processed as symbol data.
- Entering Data for RSS
  Symbols of RSS-14 and RSS Limit can contain 13 digits of numeric data (0 though 9), RSS Expanded can contain up to 20 characters of data in alphanumeric as well as special character, FNC1. In such case, the printer adds Application Identifier, "01", automatically hence not requiring manual data entry.
- Entering Data for RSS + 2D CC
  Within a data use **|** (vertical bar) to separate data for RSS symbol portion, which is in front of the vertical bar, and 2D CC portion after the vertical bar to print data in RSS + 2D CC symbol.

◆ 2D Composite Component
CC-A capacity →56 characters.
CC-B capacity →338 characters.

◆ For RSS-14 and RSS LIMIT, the printer automatically adds a check character at 14th digit when print.

◆ Following table shows data type and data capacity for each RSS symbol.

RSS Symbol Type	Data Type	Data Capacity
· RSS-14 · RSS-14 Truncated · RSS-14 Stacked · RSS-14 Stacked Omnidirectional · RSS LIMIT	Numbers from 0 to 9	13 fixed character
RSS Expanded	· Alphanumeric · Readable Characters (20) · Special Function Character (FNC1)	· 74 character when only numbers are used. · 41 character when alphanumeric and readable characters are used.

◆ Settings of this function are effective until the following processing is performed:
- Function 080 or 180 or 280 or 780 or 880 or 980 is executed
- **ESC @** is executed
- The printer is reset or the power is turned off

GS (k RSS-14<Function 881>

[Format]

ASCII	GS (k ***pL pH cn fn m***
Hex	1D 28 6B 03 00 38 51 ***m***
Decimal	29 40 107 03 00 56 81 ***m***

[Range]

(***pL*** + ***pH*** x 256) = 3 (***pL*** = 3, ***pH*** = 0)
cn = 56
fn = 81
m = 48

[Default] None

[Description] Encodes and prints the RSS-14 symbol data in the symbol save area.

[Notes]

- If there is any error described below in the data of the symbol save area, it cannot be printed.
  - There is no data (Function 880 is not processed).
  - If the data of the symbol save area is more than the data allowed by specified model and data compaction mode.
- This command is effective only in Page mode.

GS (k Code49<Function 967>

[Format]

ASCII	GS (k ***pL pH cn fn n***
Hex	1D 28 6B 03 00 39 43 ***n***
Decimal	29 40 107 3 00 57 67 ***n***

[Range]

(***pL*** + ***pH*** x256) = 3 (***pL*** = 3, ***pH*** = 0)
cn = 57, ***fn*** = 67
1≤ ***n*** ≤ 255

[Default]

n = 2

[Description]

Specifies the width of narrow element.

[Notes]

- Settings of this function affect the processing of Functions 981.
- The setting unit differs, depending on the printer models.
- Settings of this function are effective until **ESC @** is executed, the printer is reset, or the power is turned off.
- The setting unit is 1 dot. The width is set in units of 0.125 mm {1/203 inch}.

GS (k Code49<Function 968>

[Format]

ASCII	GS (k ***pL pH cn fn n***
Hex	1D 28 6B 03 00 39 44 ***n***
Decimal	29 40 107 3 00 57 68 ***n***

[Range] (***pL*** + ***pH*** x 256) = 3 (***pL*** = 3, ***pH*** =0)
cn = 57, ***fn*** = 68
1≤ ***n*** ≤ 255

[Default] **n** = 16

[Description] Specify the height of one row.

[Notes]

- Settings of this function affect the processing of Functions 981.
- Settings of this function are effective until **ESC @** is executed, the printer is reset, or the power is turned off.
- The module height influences the recognition rate of the symbol.
- For Code49, the minimum recommended symbol height is 8X, where X is the width of narrow element (reference <Function 967>).
- The setting unit is 0.1 mm.

GS (k Code49<Function 980>

[Format] ASCII GS (k ***pL pH cn fn m d1 dk***
Hex 1D 28 6B ***pL pH*** 39 50 30 ***d1 dk***
Decimal 29 40 107 ***pL pH*** 57 80 48 ***d1 dk***

[Range] 4 ≤ (***pL*** + ***pH*** x 256) ≤ 81 (1 ≤ ***pL*** **≤81**, ***pH*** **=0**)
cn = 57, ***fn*** = 80
m = 48, 0 ≤ ***d*** ≤255
k = (***pL*** + ***pH*** x 256) – 3

Description] Stores the Code49 symbol data (**d1...dk**) in the symbol save area.

[Notes]

- Data stored in the symbol save area by this function is processed by Functions 981. The data in the symbol save area are reserved after processing Function 981.
- ***k*** bytes of ***d1...dk*** are processed as symbol data.
- Code49 allows a bar code to be printed including all 128 characters of the ASCII character set, and function codes FUNC1, FUNC2, and FUNC3.
- The following table shows the character sequences used to enter the special function codes FUNC1, FUNC2, and FUNC3.

Data code	Input character sequence
@	@@
FUNC1	@A
FUNC2	@B
FUNC3	@C

◆ Data capacity

■ Characters: The characters can't exceed 49 bytes. Following characters will spend one byte, the others will spend two bytes.

Value	Character	Vaule	Character
0	0	25	P
1	1	26	Q
2	2	27	R
3	3	28	S
4	4	29	T
5	5	30	U
6	6	31	V
7	7	32	W
8	8	33	X
9	9	34	Y
10	A	35	Z
11	B	36	-
12	C	37	.
13	D	38	SPACE
14	E	39	$
15	F	40	/
16	G	41	+
17	H	42	%
18	I	43	S1(Shift1)
19	L	44	S2(Shift2)
20	K	45	FNC1(Function1)
21	L	46	FNC2(Function2)
22	M	47	FNC3(Function3)
23	N	48	NS(Numeric Shift)
24	O		

For example:

(1) “123ABC” ; → 6 bytes

(2) “123abc” ; →3 + 3*2 = 9 bytes

- Numeric → The numeric can’t exceed 81 bytes.

◆ Settings of this function are effective until the following processing is performed.

- Function 080 or 180 or 280 or 780 or 880 or 980 is executed
- **ESC @** is executed
- The printer is reset or the power is turned off

GS (k Code49<Function 981>

[Format]

ASCII	GS (k ***pL pH cn fn m***
Hex	1D 28 6B 03 00 39 51 ***m***
Decimal	29 40 107 3 00 57 81 ***m***

[Range]

(***pL*** + ***pH*** x 256) = 3 (***pL*** = 3, ***pH*** = 0)
cn = 57, ***fn*** = 81
m = 48

[Default]

None

[Description]

Encodes and prints the Code49 symbol data in the symbol save area.

[Notes]

- If there is any error described below in the data of the symbol save area, it cannot be printed.
  - There is no data (Function 980 is not processed).
  - If the data of the symbol save area is more than the data allowed by specified model and data compaction mode. (This case is an abnormal number of data.)

GS h

[Name] Set bar code height

[Format]

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

[Range] 1 ≤ ***n*** ≤ 255

[Default] ***n*** = 162

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

[Notes] This command setting is effective until **ESC @** is executed, the printer is reset, or the power is turned off.

GS w

[Name] Set bar code width

[Format]

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

[Range] 1 ≤ ***n*** ≤ 6

[Default] ***n*** = 2

[Description] Sets the horizontal size of a bar code. ***n*** specifies the bar code module width.

[Notes] This command setting is effective until **ESC @** is executed, the printer is reset, or the power is turned off.

GS k

[Name] Print bar code

[Format]

I. ASCII GS k ***m d1 dk NULL***
Hex 1D 6B ***m d1 dk NULL***
Decimal 29 107 ***m d1 dk NULL***

I. II. ASCII GS k ***m n d1 dn***
Hex 1D 6B ***m n d1 dn***
Decimal 29 107 ***m n d1 dn***

[Range]

I. 0 ≤ ***m*** ≤ 6 (***k*** and ***d*** depend on the bar code system used)
II. 65 ≤ ***m*** ≤ 73 (***n*** and ***d*** depend on the bar code system used)

[Default] ***n*** = 162

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

- ***k*** of (1) indicates the number of the bar code data to be printed. ***k*** does not need to be sent.
- ***n*** of (2) indicates the number of the bar code data.
- ***d*** indicates the character code of the bar code data to be printed.
- ***m*** specifies a bar code system as follows (“sp” in the table indicates space).

m		Bar code system	Number of data (k, n)	Number of characters	Characters	Character code (d)
①	0	UPC-A	Fixed	11 ≤ **k** ≤12	0~9	48 ≤ **d** ≤ 57
	1	UPC-E	Fixed	11 ≤ **k** ≤12	0~9	48 ≤ **d** ≤ 57
	2	JAN13 (EAN13)	Fixed	12 ≤ **k** ≤13	0~9	48 ≤ **d** ≤ 57
	3	JAN8 (EAN8)	Fixed	7 ≤ **k** ≤8	0~9	48 ≤ **d** ≤ 57
	4	CODE39	Can be changed	1 ≤ **k**	0~9, A~Z SP, $, %, *, +, -, ., / * (start/stop character)	48 ≤ **d** ≤ 57, 65 ≤ **d** ≤ 90, **d**= 32, 36, 37, 42, 43, 45, 46, 47 **d**= 42 (start/stop character)
	5	ITF (Interleaved 2 of 5)	Can be changed	1 ≤ **k** (even number)	0~9	48 ≤ **d** ≤ 57
	6	CODABAR (NW7)	Can be changed	1 ≤ **k**	0~9, A~D $, +, -, ., /,:	48 ≤ **d** ≤ 57, 65 ≤ **d** ≤ 68, **d**= 36, 43, 45, 46, 47, 58
②	65	UPC-A	Fixed	11 ≤ **n** ≤12	0~9	48 ≤ **d** ≤ 57
	66	UPC-E	Fixed	11 ≤ **n** ≤12	0~9	48 ≤ **d** ≤ 57
	67	JAN13 (EAN13)	Fixed	12 ≤ **n** ≤13	0~9	48 ≤ **d** ≤ 57
	68	JAN8 (EAN8)	Fixed	7 ≤ **n** ≤8	0~9	48≤ **d** ≤57
	69	CODE39	Can be changed	1 ≤ **n** ≤255	0~9, A~Z SP, $, %, *, +, -, ., / * (start/stop character)	48 ≤ **d** ≤ 57, 65 ≤ **d** ≤ 90, **d**= 32, 36, 37, 42, 43, 45, 46, 47 **d**= 42 (start/stop character)
	70	ITF (Interleaved 2 of 5)	Can be changed	1 ≤ **n** ≤255 (even number)	0~9	48 ≤ **d** ≤ 57
	71	CODABAR (NW7)	Can be changed	1 ≤ **n** ≤ 255	0~9, A~D $, +, -, ., /, :	48 ≤ **d** ≤ 57, 65 ≤ **d** ≤ 68, **d**= 36, 43, 45, 46, 47, 58
	72	CODE93	Can be changed	1 ≤ **n** ≤ 255	NUL~SP(7FH)	0 ≤ **d** ≤ 127
	73	CODE128	Can be changed	2 ≤ **n** ≤ 255	NUL~SP(7FH)	0 ≤ **d** ≤ 127

[Notes]

For I and II

- When standard mode is selected, this command is enabled only when the printing position is at the head of a line or when no data exists in the print buffer.
- When page mode is selected, this command develops the bar code data in the print buffer but the printer does not print the bar code data.
- The bar code width that exceeds the printing area cannot be specified.
- This command feeds as much paper as is required to print the bar code, regardless of the line spacing specified by line space setting commands.
- The bar code is not affected by print mode (emphasized, underline, or 90° clockwise-rotated), except for upside-down printing mode.
- After bar code printing, the printing position moves to the left end of the printing area. The printer enters the status of printing position at the head of a line or no data exists in the print buffer.
- The values of **m** from 0 to 6 in ① and from 65 to 71 in ② select the same bar code system, respectively. The printing results are the same.
- This command specifies **m** = 0 to 6 and ends with a **NUL** code.
- When an odd number of data is processed for ITF bar code system (**m** = 5), the printer ignores the last received data.
- The printer processes **n** bytes from the next data as bar code data by this command specifying **m** = 65 to 71.
- Printing area does not include quiet zone (left/right margin) of bar code. Make sure to secure the quiet zone, using this command.

For UPC-A (m = 0, 65) process

- Modular check character is processed as follows:
  - Automatically added when processing data is 11 byte.
  - The 12th byte data is processed as a modular check character when processing data is 12 byte. In this case, modular check character is not checked.
- Left guard bar/center bar/right guard bar are added automatically.

For UPC-E (m = 0, 66) process

- The first data (**d1**) is processed as number system character (NSC) so 0 must be specified.
- If **n** is out of the specified range or if **n** is an odd number when ITF bar code system (**m** = 70) is selected, this command is canceled and the following data is processed as normal data.
- Modular check character is processed as follows:
  - Automatically added when processing data is 11 byte.
  - The 12th byte data is processed as a modular check character when processing data is 12 byte. In this case, modular check character is not checked.
  - Modular check characters are data to decide bar code pattern, they are not included printing data.

◆ Prints a 6-column short code from 10 digit (**d2.d11**) except NSC and modular check characters.

Data of transmitted by host PC										Printing data					
d2	**d3**	**d4**	**d5**	**d6**	**d7**	**d8**	**d9**	**d10**	**d11**						
0~9	0~9	0	0	0	-	-	0~9	0~9	0~9	**d2**	**d3**	**d9**	**d10**	**d11**	0
0~9	0~9	1	0	0	-	-	0~9	0~9	0~9	**d2**	**d3**	**d9**	**d10**	**d11**	1
0~9	0~9	2	0	0	-	-	0~9	0~9	0~9	**d2**	**d3**	**d9**	**d10**	**d11**	2
0~9	0~9	3~9	0	0	-	-	-	0~9	0~9	**d2**	**d3**	**d4**	**d10**	**d11**	3
0~9	0~9	0~9	1~9	0	-	-	-	-	0~9	**d2**	**d3**	**d4**	**d5**	**d11**	4
0~9	0~9	0~9	0~9	1~9	-	-	-	-	5~9	**d2**	**d3**	**d4**	**d5**	**d6**	**d11**

* Specify 0 at indicated data by "-" in the table.

* When 1 ≤ **d6** ≤ 9, be sure to specify (5 ≤ **d11** ≤9).

◆ Left guard bar/right guard bar are added automatically.

For JAN13/EAN13 (m = 2, 67) process

◆ Modular check character is processed as follows:

- Automatically added when processing data is 13 byte.
- The 13th byte data is processed as a modular check character when processing data is 13 byte. In this case, modular check character is not checked.

◆ Left guard bar/center bar/right guard bar are added automatically.

For JAN8/EAN8 (m = 3, 68) process

- Modular check character is processed as follows:
  - Automatically added when processing data is 7 byte.
  - The 8th byte data is processed as a modular check character when processing data is 8 byte. In this case, modular check character is not checked.
- Left guard bar/center bar/right guard bar are added automatically.

For CODE39 (m = 4, 69) process

- The printer processes the start code (ASCII = ***/** Hex = 2Ah/Decimal = 42) as follows:
  - When the first bar code (**d1**) is "*****", the printer processes the data as a first character.
  - If the first bar code (**d1**) is not "*****", the printer adds a start character (*****) automatically.
- The printer processes the start code (ASCII = ***/** Hex = 2Ah/Decimal = 42) as follows:
  - When the last bar code (**dk** or **dn**) is "*****", the printer processes the data as a last character.
  - If the last bar code (**dk** or **dn**) is not "*****", the printer adds a last character (*****) automatically.
  - When "*****" is processed during bar code data processing, the printer processes "*****" as a stop character. The printer prints data preceding "*****" and finishes command processing. Therefore, data following "*****" are processed as normal data.
- Check digits are not calculated and added.

For ITF (Interleaved 2 of 5) (m = 5, 70) process

- Start code and stop code are added automatically.
- Check digits are not calculated and added.

For CODEBAR (NW-7) (m = 6, 71) process

- Start code and stop code are not added automatically. Transmit data including the codes.
  - Specify the start code (ASCII = “A“ ~ “D,” / Hex = 41H ~ 44H, / Decimal = 65 ~ 68) at beginning of the data (***d1***).
  - Specify the stop code (ASCII = “A“ ~ “D,” / Hex = 41H ~ 44H, / Decimal = 65 ~ 68) at end of the data (***dk*** or ***dn***).
  - Start code or stop code (ASCII = “A“ ~ “D,” / Hex = 41H ~ 44H, / Decimal = 65 ~ 68) cannot be specified in bar code data.
- Check digits are not calculated and added.

For CODE93 (m = 72) process

- Start code and stop code are added automatically.
- Check digits (2 character) are calculated and added automatically.
- Special character HRI is processed as follows:
  - The printer prints an HRI character " " as start and stop character.
  - The printer prints HRI characters "■ + an alphabetic character" as a control character (unprinted character).

For CODE128 (m = 73) process

- Make sure to specify start character. The start character must be code set selection character (any of CODE A, CODE B, or CODE C) which selects the first code set.
- Stop character is added automatically.
- In CODE A, following data can be used.
  - Character data: It is specified by ASCII code [in hexadecimal: 20H ~ 5FH in decimal: 32~95]
  - Control character data: It is specified by ASCII code [in hexadecimal: 00H ~ 1FH / in decimal: 0~31]
  - Special character data: (FNC 1, FNC 2, FNC 3, FNC 4, SHIFT, CODE B, CODE C):It is specified “{+ character code" as 2 byte. (It is described separately.)

◆ In CODE B, following data can be used.

- Character data: It is specified by ASCII code [in hexadecimal: 20H ~ 7FH / in decimal: 32~127] when specify "{", transmit “{{“ as 2 byte data (It is described separately).
- Special character data: (FNC 1, FNC 2, FNC 3, FNC 4, SHIFT, CODE A, CODE C): It is specified “{+ character code" as 2 byte.(It is described separately).

◆ In CODE C, following data can be used.

- Numerical data: It is specified each 2 digit as 1 byte by ASCII code

  [in hexadecimal: 00H ~ 63H / in decimal: 0~99]

  Example: When specify "012345", specify [in hexadecimal: 01H, 17H, 2DH / in decimal: 1, 23, 45] as 3 byte.
- Special character data: (FNC 1, CODE A, CODE B) : It is specified “{+ character code" as 2 byte (It is described separately).

◆ Special characters are defined by combining two characters "{+ an alphanumeric 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

- Check digit is calculated and added automatically.
- Special character HRI is processed as follows:
  - The printer does not print HRI characters that correspond to the shift character or code set selection character (CODE A, CODE B, or CODE C).
  - HRI characters of the function characters (FNC1, FNC2, FNC3, or FNC4) and control characters (00H to 1FH and 7FH) are printed as spaces.

GS H

[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

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

[Description] Selects whether the printer prints the HRI character or not and printing position of HRI character when printing a bar code, using ***n*** as follows:

n	**Printing Position**
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**.
- This command is effective until **ESC @** is executed, the printer is reset, or the power is turned off.

GS f

[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

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

[Description] Selects a font for Human Readable Interpretation (HRI) characters when printing a bar code, using ***n*** as follows:

n	**Font of HRI characters**
0, 48	Font A
1, 49	Font B

[Notes]

- The font set by this command is only effective for HRI characters.
- HRI characters are printed at the position specified by **GS H**.
- HRI character is Human Readable Interpretation character indicated with bar code.

FS q

[Name] Define image, write to flash memory

[Format]

ASCII	FS q ***n [xL xH yL yH d1 dk]1 [xL xH yL yH d1 dk] n***
Hex	1C 71 ***n [xL xH yL yH d1 dk]1 [xL xH yL yH d1 dk] n***
Decimal	28 113 ***n [xL xH yL yH d1 dk]1 [xL xH yL yH d1 dk] n***

[Range]

1≤ ***n*** ≤255
1≤ (***xL*** + ***xH*** ×256) ≤48 (0≤ ***xL*** ≤48, ***xH*** = 0)
1≤ (***yL*** + ***yH*** ×256) ≤160 (0≤ ***yL*** ≤160, ***yH*** = 0)
0≤ ***d*** ≤ 255
k = (***xL*** + ***xH*** ×256) × (***yL*** + ***yH*** ×256) × 8
Total defined data area is maximum 60 KB

[Description] Defines NV bit image specified.

- ***n*** specifies the number of defined NV bit images.
- ***xL***, ***xH*** specifies (***xL*** + ***xH*** x 256) bytes in the horizontal direction for the NV bit image you defined.
- ***yL***, ***yH*** specifies (***yL*** + ***yH*** x 256) bytes in the vertical direction for the NV bit image you defined.
- ***d*** specifies the definition data for the NV bit image.
- ***k*** indicates the number of the definition data. ***k*** is a parameter for an explanation; therefore, it does not need to be transmitted.

[Notes]

- NV bit image means a bit image which is defined in a non-volatile memory. The NV bit image defined is effective until the next NV bit image is defined.
- In standard mode, this command is effective only when processed at the beginning of the line.
- ***k*** bytes data of ***d1...dk*** is processed as a defined data of a NV bit image. The defined data (***d***) specifies a bit printed to 1 and not printed to 0.
- All NV bit images previously defined are canceled.
- After processing this command, the printer executes a software reset. Therefore, processing this command enables the printer to be in the correct status when the power is turned on.
- The limitations during processing of this command are as follows:
  - Paper cannot be fed by using PAPER FEED button.
- The NV bit image is printed by **FS p**.
- Bit image data and print result are as follows:

d1	dY+1	...	. .	MSB LSB
d2	dY+2	...	dk-2	MSB LSB
. .	. .	...	dk-1	MSB LSB
dY	dY x 2	...	dk	MSB LSB

Y = yL + yH x256

- Data is written to the non-volatile memory by this command. Note the following when using this command.
  - The printer is BUSY when writing the data to the non-volatile memory. In this case, be sure not to transmit data from the host because the printer does not receive data.
  - Excessive use of this function may destroy the non-volatile memory. As a guideline, do not use any combination of the following commands more than 10 times per day for writing data to the nonvolatile memory: **FS q**, **GS (A** (part of functions), **GS (C** (part of functions), **GS (E** (part of functions), **GS (L** / **GS 8 L** (part of functions), **GS (M** (part of functions), **GS g 0**, and **FS g 1**.

FS p

[Name] Read the image file from flash memory

[Format]

ASCII	FS p ***n m***
Hex	1C 70 n m
Decimal	28 112 n m

[Range] 1≤ ***n*** ≤255
0≤ ***m*** ≤3, 48≤ ***m*** ≤51

[Description] Prints a NV bit image **n** using the mode specified by **m**.

m	Mode	Scaling for horizontal	Scaling for vertical
0, 48	Normal	× 1	× 1
1, 49	Double-width	× 2	× 1
2, 50	Double-height	× 1	× 2
3, 51	Quadruple	× 2	× 2

[Notes] This command is not effective when the NV bit image specified by **n** has not been defined.

ESC ESC 00

[Name] Communication parameter setup (RS232C or IrDA)

[Format]
ASCII ESC ESC 00; ***n***, ***n1 n2 n3 n4, n5***, ***n6***, ***n7***, ***n8***, ***n9***, ***n10***, ***n11***
Hex 1B 1B 00; ***n***, ***n1 n2 n3 n4, n5***, ***n6***, ***n7***, ***n8***, ***n9***, ***n10***, ***n11***
Decimal 27 27 0; ***n***, ***n1 n2 n3 n4, n5***, ***n6***, ***n7***, ***n8***, ***n9***, ***n10***, ***n11***

[Range]
0 ≤ ***n*** ≤ 1
n1~n4= 0096, 0192, 0384
n5 = 8
n6 = N
n7 = 1
n8 = R or X
n9 = 00
n10= 00
n11= 00

[Default]
n1 ~ ***n4***= 0096
n5 = 8
n6 = N
n7 = 1
n8 = R
n9 = 00
n10 = 00
n11= 00

[Description]
Communication parameter setup (RS232C or IrDA)
n : Interface
0→ RS232, 1→ IrDA
n1~n4 : Baud Rate
0096→9600 bps, 0192→19200 bps, 0384→38400 bps

n5 : Data Length (8 bits, fixed)
n6 : Parity (N, fixed)
n7 : Stop Bit (1bit, fixed)
n8 : Communication Protocol
R→RTS/CTS(hardware, use R as a dummy even for IrDA)
X→Xon/Xoff(software)
n9 : Reserve(value:00)
n10 : Reserve(value:00)
n11 : Reserve(value:00)

ESC ESC 04

[Name] Printing Mode Change

[Format]

ASCII	ESC ESC 04 ***n***
Hex	1B 1B 04 ***n***
Decimal	27 27 04 ***n***

[Range] 0≤ ***n*** ≤1

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

[Description] Set up printing mode, using ***n*** as follows:

n	**Function**
0	Standard (line) mode
1	Page mode

ESC ESC 05

[Name] Printer ID (for IrDA only)

[Format]

ASCII	ESC ESC 05 ***nh n1***
Hex	1B 1B 05 ***nh n1***
Decimal	27 27 05 ***nh n1***

[Range]

0 ≤ ***nh*** ≤ 255
0 ≤ ***n1*** ≤ 255

[Default]

nh = 00
n1 = 01

[Description] Prints ID (for IrDA only).

[Notes] This command is only enabled in IrDA communication mode.

ESC ESC 07

[Name] Adjust label printing position

[Format]

ASCII	ESC ESC 07 ***n n1***
Hex	1B 1B 07 ***n n1***
Decimal	27 27 07 ***n n1***

[Range]

n = “+” or “-”

0 ≤ ***n1*** ≤ 160 (0.0 ~ 16.0 mm)

[Default] ***n1*** = 00

[Description] Adjusts label printing position in a selected direction and by a specified amount from the default position.

- ***n*** specifies the adjustment direction as follows:
  - When the LSB of ***n*** is “+”, the label position is adjusted in the normal direction.
  - When the LSB of ***n*** is “-”, the label position is adjusted in the reverse direction.
- ***n*** specifies the adjustment amount.

[Notes]

- This command is only effective when label is selected.
- When executing this command, the paper is fed to adjust the print starting position of the current label.
- Adjustment amounts when the print starting position is out of the label cannot be specified.

ESC ESC 08

[Name] Setup sensor

[Format]

ASCII	ESC ESC 08 ***n n1***
Hex	1B 1B 08 ***n n1***
Decimal	27 27 08 ***n n1***

[Range]

0 ≤ ***n*** ≤1
0 ≤ ***n1*** ≤1

[Default]

n = 00
n1 = 00

[Description] Setups sensor, using ***n*** as follows:

n	**Function**
0	Interruptive sensor (Transmissive)
1	Reflective sensor

n1	**Function**
0	Light source from bottom to up.
1	Light source from up to bottom.

ESC ESC 09

[Name] Setup power off time

[Format]

ASCII	ESC ESC 09 ***n***
Hex	1B 1B 09 ***n***
Decimal	27 27 09 ***n***

[Range] 1≤n≤255

[Default] ***n*** = 05(Hex)

[Description] Setups power off time, the unit is minute.

[Notes] If the power is on, and the printer has had no action for ***n*** minutes, then, the printer will be automatically off.

ESC ESC 10

[Name] Define printing intensity

[Format]

ASCII	ESC ESC 10 ***n***
Hex	1B 1B 0A ***n***
Decimal	27 27 10 ***n***

[Range] 0≤ ***n*** ≤15

[Default] ***n*** = 8

[Description] Defines printing intensity. The more of ***n***, the more intensity.

ESC ESC 11

[Name] Define the using port of IrDA

[Format]

ASCII	ESC ESC 11 ***n***
Hex	1B 1B 0B ***n***
Decimal	27 27 11 ***n***

[Range] 0≤ ***n*** ≤2

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

[Description] Define the using port of IrDA, using n as follows:

n	**Function**
0	Both
1	Port 1 (Upper side of MP3200 body)
2	Port 2 (Side of MP3200 body)

ESC ESC 12

[Name] On-demand Setup

[Format]

ASCII	ESC ESC 12 ***n***
Hex	1B 1B 0C ***n***
Decimal	27 27 12 ***n***

[Range] 1≤ ***n*** ≤2

[Default] ***n*** = 1

[Description] Setup auto linefeed, using **n** as follows:

n	**Function**
1	Motor will not move back
2	Motor will move back and forward

ESC ESC 13

[Name] Setup radio off time

[Format]

ASCII	ESC ESC 13 ***n***
Hex	1B 1B 0D ***n***
Decimal	27 27 13 ***n***

[Range] 1≤n≤255

[Default] ***n*** = 20

[Description] Setup radio off time, the unit is minutes.

[Notes] If the power and radio connection are on, and the printer has had no action for ***n*** minutes, then, the printer will be cut the connection off.

ESC ESC 14

[Name] Define IrDA protocol

[Format]

ASCII	ESC ESC 14 ***n***
Hex	1B 1B 0E ***n***
Decimal	27 27 14 ***n***

[Range] 01≤ ***n*** ≤02

[Default] ***n*** = 01

[Description] Defines IrDA protocol
01: IrOBEX
02: IrCOMM

[Notes] The maximum limit of file which transmits through IrDA protocol is 8K.

ESC ESC D

[Name]	Restore default value	
[Format]	ASCII	ESC ESC D
	Hex	1B 1B 44
	Decimal	27 27 68
[Range]	None	
[Default]	None	
[Description]	Restores all default values.	