

Chapter 1

Command Interpreter and Command System

1.1	Outline	1-2
1.2	Outline of Command System	1-2
1.3	Outline of Interpreter	1-4
1.4	Outline of Label Format Data	1-5
1.5	Outline of Label Printing Method	1-6
1.6	Control Code Specification	1-7
1.6.1	System Level Immediate Execution Commands	1-8
1.6.2	System Level Occasional Execution Commands	1-13
1.6.3	Label Format Commands	1-46

1.1 Outline

Generally, when labels of graphics and bar codes are printed by a line printer, print data is converted into bit map data in the computer and transmitted to the printer for printing. In this process the host computer has to generate the bit map data and send it to the printer, this reduces throughput leading to slow printing and host computer operation.

This printer incorporate many functions such as a variety of fonts, bar code generators, and graphic commands along with high speed processing, so high-quality labels can be printed easily at high speeds when simple commands are transmitted from the host computer. The computer processing in generating labels is reduced enabling it to undertake more processing.

1.2 Outline of Command System

Commands for this printer consist of a string of ASCII characters and end with a "CR" (decimal: 13, hex: 0D). Generally, commands are classified into two types, that is, system level commands and label format commands.

System level commands are used in system level operations, including printer output, sensor selection and memory card maintenance. Label format commands are used in the definition of printing contents such as character data, bar code data, printing speed, and print density.

System level commands start with ASCII "SOH" (\$01) or ASCII "STX" (\$02).

Commands which start with "SOH" are requested for the realtime execution. When received, they are executed immediately even during printing. Commands which start with "STX" enter the buffer area and are executed in the order of data reception.

Label format commands follow the system level commands' "STX" + "L" and end with a "CR."

(For details, see 1.3 Outline of Interpreter and 1.4 Outline of Label Format Data.)

Fig. 1 Command summary

System level commands	Commands which start with "SOH" Executed as soon as they are received (For example: printing halt, output of printer status, etc.)
Start with "SOH" or "STX"	Commands which start with "STX" Executed in order after they are received into the reception buffer (For example: sensor switching, memory card maintenance, etc.)

"STX" + "L" ↓

↑ "E" (with printing)
"X" (without printing)

Label format commands	Print parameter control
End with "CR"	Character data definition commands
	Bar code definition commands
	Graphic commands
	Other commands

1.3 Outline of Interpreter

Two types of interpreters are used for this printer; system level and label format interpreters. When power is turned on, the system level interpreter is selected and the data received is processed in the system level interpreter and system level commands are executed.

Changing to the label format interpreter to start generating label data is executed with system level commands. When the system level interpreter receives the system level command "STX" + "L," it changes to the label format interpreter. The commands after this are regarded as label format commands and label format starts.

The label format interpreter does not need headers such as "SOH" and "STX." The data for printing data format is delimited by a "CR" and then transmitted.

Changing to the system level interpreter from the label format interpreter is executed by the label format command "E" or "X." When label format ends with "E," defined data is printed and the system level interpreter is started. When label format ends with "X," the system level interpreter is started without printing.

1.4 Outline of Label Format Data

This printer prints label format data by using memory space of the following size.

- Reception buffer area : 32K bytes
- Field register data area : 10K bytes
- Global register area : 2K bytes
- Bit map area : 676K bytes

1 Reception buffer area

The reception buffer area is a ring data buffer area (software FIFO) under software control. Basically, all commands and data transmitted from the host computer are buffered once into this area and then executed in the order of buffering to complete communications from the host computer in the shortest possible time. However, some system level commands (such as those starting with "SOH" for print halt) which require realtime execution are executed immediately after being received.

2 Field register area

A string of character data and bar code data is regarded as one field which includes information such as type, print position, and size. The field register area is an area which encloses the label format field. The label format interpreter analyzes the format data received, stores it once, and then generates a bit map. If there are any problems in the data received, the data which is being analyzed is discarded without being stored in the field register area. The field data is given a control number for every field (1, 2, á á 200) when the data is stored. This printer has a field register area of 10,000 characters and can print a maximum of 200 different types of field data per label.

3 Global register area

The global register area is an area which stores field data that is repeatedly used. A part of the data (character string and bar code data) in the field register is stored in the global register area and used as requested. The data stored in the global register area is given a control number starting with A (A, B, á á , P). The data set in the global register is stored while formatting for one label is performed (until the label format interpreter returns control to the system level interpreter) so it can be reused for data definition within the same label.

4 Bit map area

The bit map area is a buffering area for output data. The data in this area is generated by a rasterizer according to the data in the field data area and corresponds to individual dots which are generated on the label during printing. The data of the bit map area is printed on the label with high quality and at high speed by means of the printer control program and exclusive thermal control circuit.

1.5 Outline of Label Printing Method

This printer has two label printing methods, one is that all label format data received is printed, and the other is that format data which has been received beforehand, is printed or partially modified and printed.

1 All data received method

- ASCII code "STX" + "L" sets the printer to label format mode. The printer clears the field register area and control is transferred from the system level interpreter to the label format interpreter. At this time, use of label format commands is enabled.
- Printing data such as characters, bar codes and graphics is transmitted. Each data set has a special field structure which includes information such as print position and size. The printing data received is checked by the label format interpreter, stored in the field register area, and generation of bit map data is then started. Powerful commands such as specification of the number of copies, characters strings and automatic incrementing or decrementing of bar code data are included in the label format commands. In addition, the format data stored in the global register area can be read out and used.
- After completing label formatting, an ASCII "E" is transmitted. The printer prints the labels specified by the data in the field register area and control is then returned from the label format interpreter to the system level interpreter.

2 Using formatted data

- In this mode, fixed format labels are printed. While label data formatting is completed, an ASCII "X" is transmitted instead of "E." The printer forms the field register area and completes formatting without printing and control is returned to the system level command processor. From this point on, the system level command processor allows the printer to print fixed format labels by using the format data in the field register area.
- If ASCII "STX" + "G" is transmitted to the system level command processor, the labels are printed according to the contents of the specified field register.

In addition, change of data and number of copies is provided. (Only data can be changed. Format information such as print position and size cannot be changed.)

Printing with the "STX" + "G" command can be performed repeatedly.

1.6 Control Code Specification

1 Outline

- This printer is connected to the computer via a serial interface and prints characters and bar codes at the requested print position on the label. It also prints graphic data by using an optional IC card.
- The printer has a data area of 10,000 characters. This character data can be stored in up to 200 different fields. Each field stores attributes such as print position, rotation angle, font specification, and expansion factor (called attribute information). Machine control commands for print density or printing speed setting are used in addition to printing data control commands.
- Basically, this printer prints labels by means of bidirectional communications with the computer via the serial interface. The printer not only prints data, but also transmits information such as label and printer settings to the computer. The computer and printer communicate so that the printer can receive correct data from the computer and perform optimum printing.

Also, the printer has the parallel interface (centronics) as a standard but in this case bidirectional communications are not used, so data cannot be transmitted from the printer.

1.6.1 System Level Immediate Execution Commands

These commands are executed as soon as they are received by the printer. They begin with "SOH," i.e. [01].

Command reset	[01] #
Printer status transmission request (8-byte packet)	[01] A
Pause	[01] B
Stop/cancel	[01] C
SOH command shutdown	[01] D
Transmission of number of remaining sheets to be issued	[01] E
Printer status transmission request (1-byte packet)	[01] F

Command reset

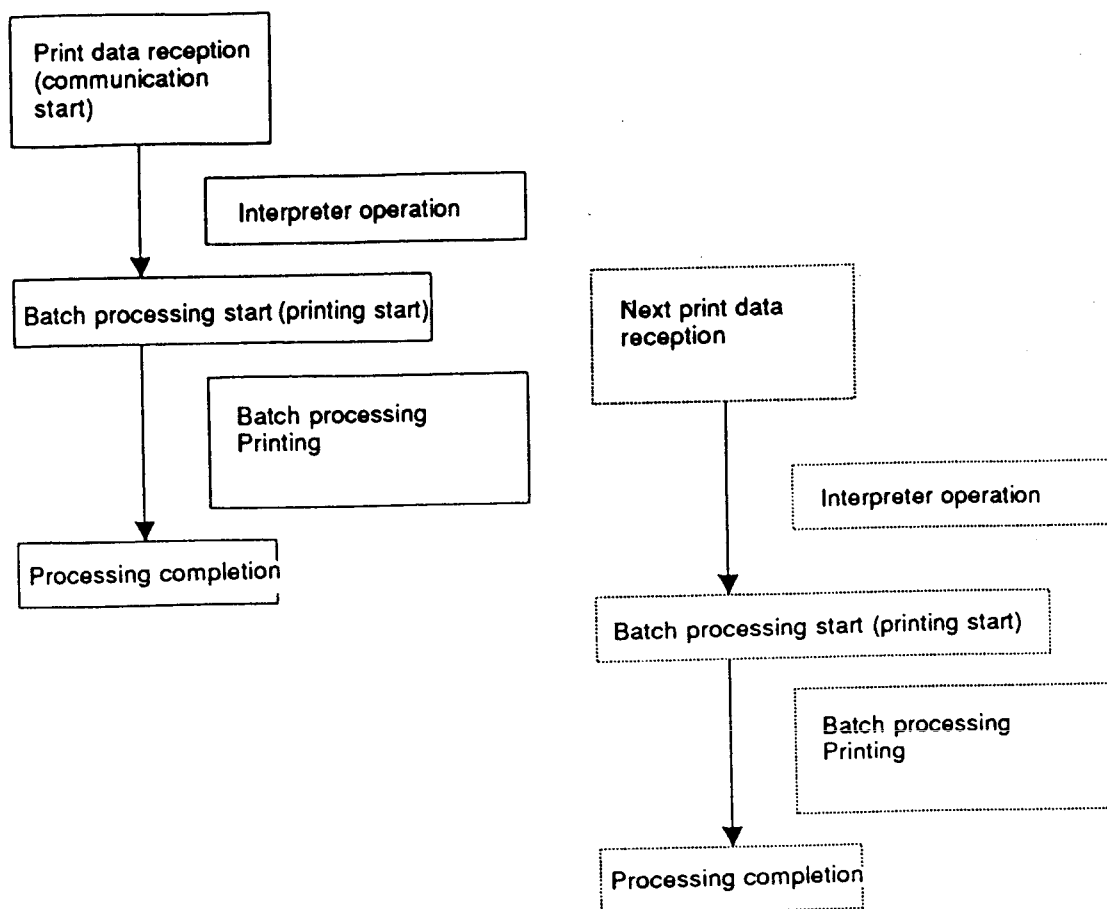
Code	[01] #
Function	Initialized equivalent to power is turned on. Buffer and on-board memory contents are initialized. Command setting for previous commands is initialized.
Transmission data	(XOFF) T (XON) R (XON) for hardware reset.
Caution	Since printer executes reset immediately after receiving this command, it clears unprinted data in the reception buffer. When using this command, you are recommended to check printing completion first, then send this command.

Printer status transmission request (8-byte packet)

Code	[01] A	
Function	If this command is received, printer will send data on current printer status to the computer with the following 8 ASCII characters.	
	1	Command interpreter in action Y or N
	2	Paper end Y or N
	3	Ribbon end Y or N
	4	Batch processing (printing) Y or N
	5	Printing Y or N
	6	Pause Y or N
	7	Waiting for peeling Y or N
	8	Spare N (always)
	After sending 8 ASCII characters, code [0D]hex is added. Y and N each is hex digit and [59]hex and [4E]hex.	
Caution	Printer sends data on printer status to the computer as soon as it receives this command (in a period of approx. 150ms - 250ms). Therefore, the computer must be ready to receive data from the printer immediately after receiving this command.	

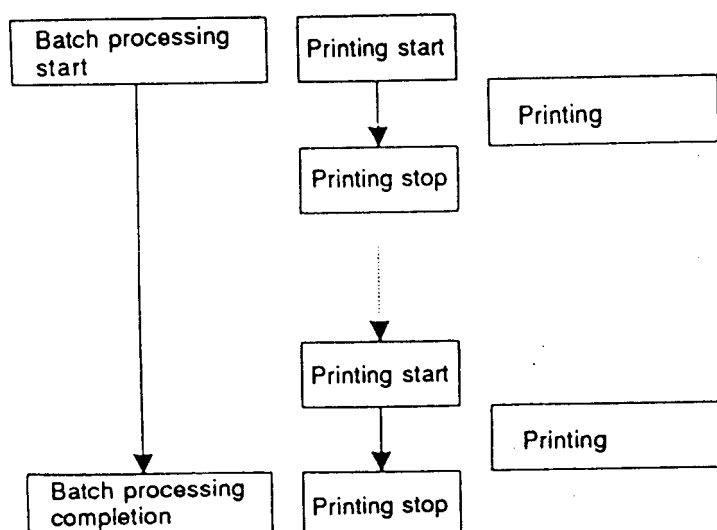
Printer status

Relationship between command interpreter, batch processing and printing



Normal label printing puts the printer in the above status. The printer, however, operates with a double buffer, so if the next printing data is received during batch processing, both interpreter operation and batch processing (printing) may be performed simultaneously.

Difference between batch processing and printing



As shown in the diagram, printing start and stop may be repeated within a single cycle of batch processing. Therefore, use the operations properly (peeling, auto-cutter, etc.) as needed.

Pause

Code	[01] B
Function	Printing temporarily stops and resumes. Toggles printer pause on and off. Pause on and off by using this command is performed in the same way as operated from the control panel. Pause on from the control panel can change to pause off with this command.

Stop/cancel

Code	[01] C
Function	Printing stops. Performed in the same way as operated from the Stop key on the control panel. With this command, printer stops temporarily and if this command is transmitted again, the printer will clear data in the reception buffer.

SOH command shutdown

Code	[01] D
Function	<p>After receiving this command, printer ignores immediate execution commands starting with control code [01] even if those commands are received.</p> <p>The setting can be cancelled by sending [01]B three times at intervals of one second.</p>

Transmission of number of remaining sheets to be issued

Code	[01] E
Function	<p>If this command is received, printer will send data on the number of remaining sheets to be issued for the current printing to the computer with 4 ASCII characters.</p> <p>The [0D]hex code is added to the end of the 4-digit transmission data.</p>
Caution	Printer sends data on the number of remaining sheets to be issued to the computer as soon as it receives this command (in a period of approx. 150ms - 250ms). Therefore, the computer must be ready to receive data from the printer immediately after receiving this command.

Printer status transmission request (1-byte packet)

Code [01] F

Function If this command is received, printer will send 1-byte packet data on current printer status to the computer. The contents of 1-byte packet data transmitting from the printer are as follows:

Bit	Description	YES	NO
1	Command interpreter in action	1	or 0
2	Paper end	1	or 0
3	Ribbon end	1	or 0
4	Batch processing (printing)	1	or 0
5	Printing	1	or 0
6	Pause	1	or 0
7	Waiting for peeling	1	or 0
8	Spare		0 (always)

The [0D]hex code is added to the end of transmission data.

Caution Printer sends data on printer status to the computer as soon as it receives this command. Therefore, the computer must be ready to receive data from the printer immediately after receiving this command.

1.6.2 System Level Occasional Execution Commands

These commands are executed as soon as they are received by the printer. They begin with "STX," i.e. [02].

Setting date and time	[02] A
Setting feedback character transmission validness	[02] a
Date and time transmission request	[02] B
Setting paper length for continuous paper	[02] c
Setting two-page edit mode (double buffer)	[02] d
Changing number of prints for edited format	[02] E
Setting edge sensor selection	[02] e
Label one sheet feed	[02] F
Setting peeling (cutting) position	[02] f
Printing edited or formerly-printed format	[02] G
Graphics data block input command	[02] I
Pause per label printing	[02] J
Extension system command (printer settings)	[02] KD
Extension system command (setting peeling or cutting position)	[02] Kf
Setting Y-code-transmission-to-serial-port request	[02] k
Specifying printing contents setting start	[02] L
Setting maximum label length	[02] M
Changing units from inch to metric system	[02] m
Changing units from metric to inch system	[02] n
Setting printing position	[02] O
Paper cut	[02] o
Setting dump mode start	[02] P
Pause in occasional execution	[02] p
Clearing all memory module contents	[02] Q
Clearing memory module contents	[02] q
Setting reflective paper sensor selection	[02] r
Setting paper feed speed	[02] S
Setting one-page edit mode (single buffer)	[02] s
Printing quality test pattern	[02] T

Rewriting specified format register contents	[02] U
Setting memory switch contents	[02] V
Printer version number transmission request	[02] v
Information-in-memory-module transmission request	[02] W
Testing memory card (flash memory)	[02] w
Default module selection	[02] X
Clearing memory module contents (in file units)	[02] x
Sensor level issued to port	[02] Y
Printing printer status	[02] Z
Packing memory module contents	[02] z
Paper position detection sensor voltage transmission request	[02][1B] S
Head disconnection detection	[02][1B] T
Setting ejection (tear-off)	[02][1B] t

Setting date and time

Code	[02] A, w, mm, dd, yyyy, hh, MM, jjj									
Setting	w	Sun	0	Mon	1	Tue	2	Wed	3	Thu 4 Fri 5 Sat 6
	mm	Month	01	Ð	12					
	dd	Day	01	Ð	31					
	yyyy	Year	4	digits						
	hh	Hour (24-hour display)								
	MM	Minute	00	Ð	59					
	jjj	Spare	000	fixed						
Function	Sets date and time on the calendar stored in the printer.									
Example	Input data below represents 15:30 Saturday 1 July 1995.									
Input data	[02]A6070119951530000									

Setting feedback character transmission validness

Code	[02] a									
Function	With this command, printer transmits [30] every one label printing to the computer and on completion of one batch printing, [31] is transmitted to the computer.									
	After one label printing								[30]	
	On completion of one batch printing								[31]	
	When receiving invalid label format command								[07]	
Caution	The [0D]hex code is not added to the end of the transmission data.									

Date and time transmission request

Code	[02] B
Data format	w, mm, dd, yyy, hh, MM, j j j w Sun 0 Mon 1 Tue 2 Wed 3 Thu 4 Fri 5 Sat 6 mm Month 01 Ð 12 dd Day 01 Ð 31 yyyy Year 4 digits hh Hour (24-hour display) MM Minute 00 Ð 59 j j j Total number of days from the 1st of January
Function	Data on the contents of the calendar (date and time) stored in the printer is transmitted to the computer. Data format transmitted from the printer is described below. The [0D]hex code is added to the end of the transmission data.
Example	Reception data below represents (Saturday) 1 July 1995, which is transmitted from the printer.
Reception data	6070119951530182[0D]

Setting paper length for continuous paper

Code	[02] cnnnn	
Unit	0.01 inch	
Setting	nnnn 4-digit data	Initialization value: 0000
	Inch system	0001 ÷ 9999 (0.01 inch ÷ 99.99 inches)
	Metric system	0001 ÷ 9999 (0.1 mm ÷ 99.9 mm)
Function	Sets label length for continuous paper. Length of label format is specified with this command. Label is cut in the length with this setting when using auto-cutter. When using label paper, 0000 must be set.	
Caution	This command is ignored when a value beyond the range STX "Mnnnn" is set. When a value beyond the default value STX "Mnnnn" is set, specify a value of STX "Mnnnn" larger than that of STX "Cnnnn:"	
	STX "Mnnnn" > STX "Cnnnn."	
Example	Example of input data below represents paper length of 2.5-inch setting.	
Input data	[02] n	Sets units to inch system
	[02] c0250	Sets paper length to 2.5 inches for continuous paper
	[02] L	Starts label format mode
	D11	Sets pixel size
	1F3306000500050490123456789	Sets EAN13 bar code for data "490123456789"
	E	Ends label format mode and prints



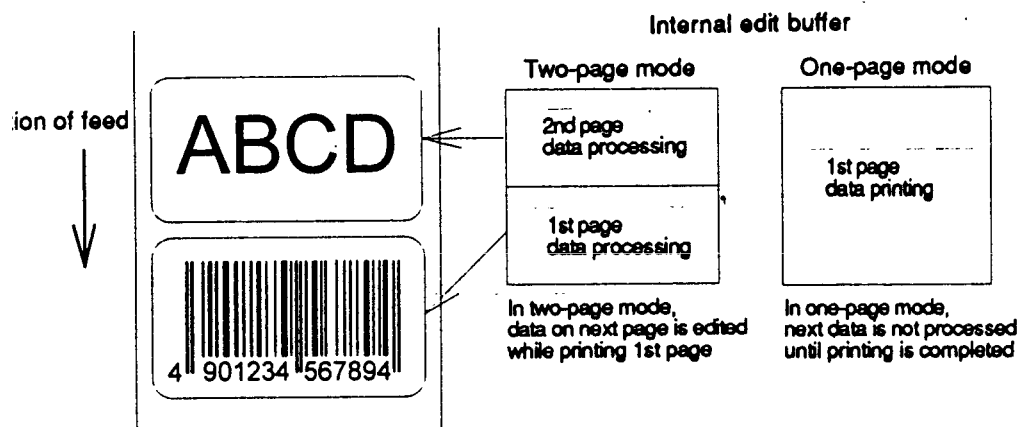
Setting two-page edit mode (double buffer)

Code [02] d

Function After receiving this command, printer divides the internal edit buffer into 2 pages and enters the high-speed edit mode.

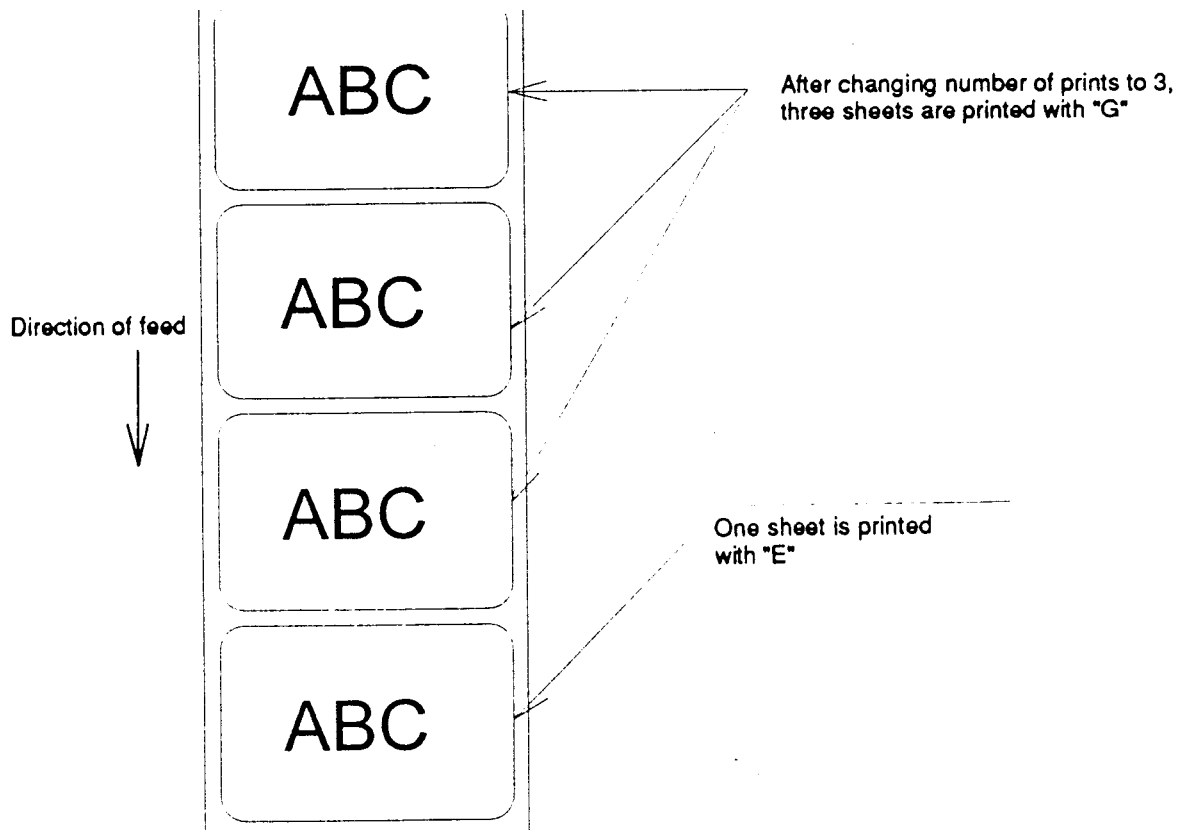
In the high-speed edit mode, printing speed is increased by editing the next page in advance while the current page is being printed.

Caution The printer automatically judges whether the double buffer is needed or not, and the mode is switched accordingly, so this command does not need to be particularly specified. When the printing length is 16 inches or less (one-half of the maximum printing length of 32 inches), the double buffer mode is selected. When it is larger than 16 inches, the single buffer mode is selected.



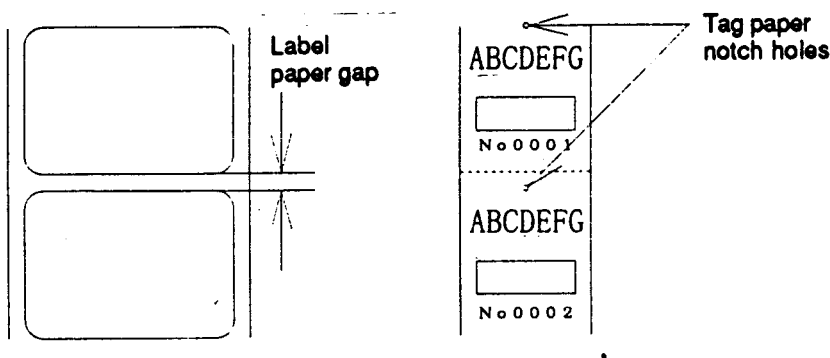
Changing number of prints for edited format

Code	[02] Ennnn	
Setting	nnnn 4-digit numeric	0001 ÷ 9999
Function	Specifies changing of number of prints for formatted or formerly-printed label format.	
Example	Input data below represents that after ending label format printing data "ABC" one sheet, the number of prints is set to 3 by using this command and printing is executed with [02]G command. (In this case, the number of prints is one plus three.)	
Input data	[02] n	Sets units to inch system
	[02] L	Starts label format mode
	D22	Sets pixel size
	190001001000050ABC	Sets character data "ABC" with smooth font 48pt
	E	Ends label format mode and prints
	[02] E0003	Sets 3-sheet printing for edited format
	[02] G	Executes 3-sheet printing for edited format



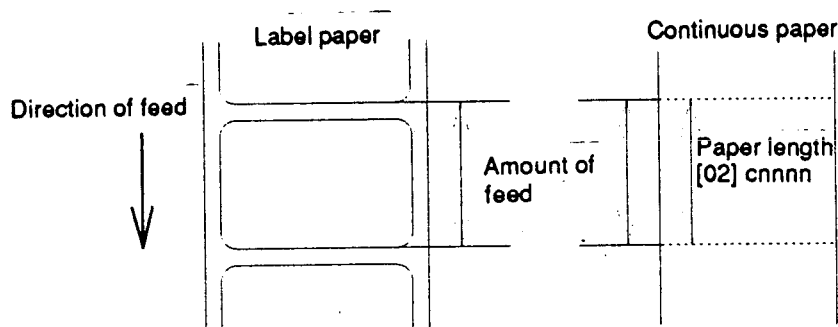
Setting edge sensor selection

Code	[02] e
Function	Changes paper position detection sensor to transparent-type. Used for detecting paper gap between label papers, die-cut paper, notch hole for tag paper, etc. This setting is used as default.
Caution	If not detected properly, check the sensor position.
Example	Paper gap between label papers or notch holes for tag paper in Fig below are detected.



Label one sheet feed

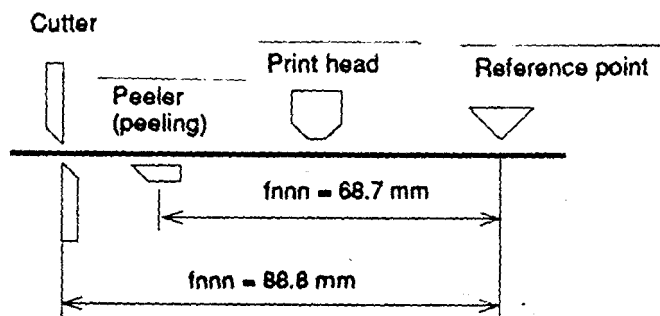
Code	[02] F
Function	Feeds label one sheet. The amount of feed is the length from the bottom of the label paper to the next bottom of the label paper. When using continuous paper, feeds paper the length currently set ([02]cnnnn). Performed in the same way as operated from the Feed key on the control panel.



Setting peeling (cutting) position

Code	[02] fnnn	
Units	0.01 inch	
Initialization value	Standard	2.20 inches (55.8 mm)
	Options	Initialization values vary depending on the specifications of each option (cutter, peeler or ejection)
Setting	nnn	3-digit data
	Inch system	050 $\bar{\text{D}}$ 999 (0.5 inch $\bar{\text{D}}$ 9.99 inches)
	Metric system	127 $\bar{\text{D}}$ 999 (12.7 mm $\bar{\text{D}}$ 99.9 mm)
Function	With the setting above, the distance between paper sensor and cutter or peeler can be specified.	
	When nnn is small, the amount of feed is small, so printed label will be cut.	
	When nnn is appropriate, the label is fed the required amount, then cut at the paper gap.	
	When nnn is large, the amount of feed is large, so the next printing label will be cut.	
Caution	If value less than Min. Value (0.5 inch) is specified, the Min. Value will be set automatically.	
	If optional functions such as cutter, peeler and ejection are turned on from the control panel, their initialization values will be set automatically. These initialization values, however, vary depending on the specifications of each option. For details, see the instruction manuals of each option.	
	Once this command was set, auto-setting function is stopped due to priority for user's specification. Do not set this command if not necessary.	
	When [02]fnnn > [02]fOnnn, backfeed is performed only when printing stops a few seconds (when mounting no options).	

Figure



Printing edited or formerly-printed format

Code	[02] G	
Function	Prints label data for former printing or formatting. Printing, once cancelled halfway, can resume.	
Caution	This command is effective only when label data for former printing or formatting is left in the internal memory. If power is turned off or reset is performed, data in the internal memory will be cleared, so this command will not be effective.	
Example	Input data below represents that after ending label format printing data "ABC" one sheet, printing for the same data is executed again with this command [02]G.	
Input data	[02] n	Sets units to inch system
	[02] L	Starts label format mode
	D22	Sets pixel size
	190001001000050ABC	Sets character data "ABC" with smooth font 48pt
	E	Ends label format mode and prints
	[02] G	Executes 1-sheet printing for edited format

Graphics data block input command

Code [02] I m a f name,data

Transmission data m Storing memory module specification A, B, C

A Memory module A (on-board memory)

B Memory module B (flash memory card)

C Current memory module C

a A 7-bit data (not necessary for 8-bit data)

f Graphics data format

F 7-bit image loading file

I 8-bit image format (image saved in reverse)

i 8-bit image format (image saved in normal)

B 8-bit BMP format (saved in normal)

b 8-bit BMP format (saved in reverse)

P 8-bit PCX format (saved in normal)

p 8-bit PCX format (saved in reverse)

Note: For graphics data format, refer to input data examples.

name File name for graphics data (up to 16 characters ending with CR)

data Graphics data for each format

Function Stores specified format data in the specified memory module.

Caution In the 8-bit BMP format and PCX format, data in colors other than black-and-white (two colors) cannot be used. Color or gray-scale data must be converted to black-and-white before use.

If the same file name as that of the current file is used for storing its data in the memory module, the contents of the current file will be kept in the memory module and the amount of data additionally stored will consume an amount of memory. Therefore, if overwrite is repeated, the data will not be stored due to lack of memory capacity. In this case, packing the data with command [02]z may store the data in the memory module.

In system maintenance mode, if model of mode item is set to Native OFF, respective memory modules A and B are reversed as follows:
A (flash memory card)
B (on-board memory)

Example Each example of input graphics data is described in the following pages.

7-bit image loading file format

7-bit image data uses ASCII format data. In this example, 7-bit image data with the file name of "MARK7" is stored in the memory card and printed out. Value of inside [] is shown in hex format.

```
[02]IBI:MARK7 ----- Graphics data input command
8006000041040000 ----- After this, 7-bit image data follows
80060000C30C0000      Top data "80" is a starting code for image data
80060000186180000     Next data "06" following "80" is the number of data in horizontal direction
8006000030C300000
8006000071C700000
80060000618600000
80060000618600000
80060000618600000
80060000618600000
8006000030C300000
8006000030C300000
80060000186180000
800600001C71C0000
80060000C30C0000
80060000C30C0000
80060000C30C0000
80060030C30CC000
800600F18618F000
800603E186187C00
800607830C301E00
80060701F3CF00E00
80060E1E79E00700
80060C3861800300
80061C0000000380
80061C0000000380
80060C0000000300
80060E0000000700
8006070000000E00
8006078000001E00
800603E000007C00
8006011F80001F800
800600FC0007F000
8006003F803FC000
8006000FFFFF0000
80060003FFFC0000
800600007FE00000
FFFF ----- Graphics data ending code
[02]m
[02]M1500 ----- Sets maximum label length
[02]L ----- Starts label format
D22
1Y1100001000500MARK7 ----- Develops "MARK7" graphics data to specified position
E ----- Starts printing
```


8-bit image format

8-bit image data uses ASCII format data. In this example, 8-bit image data with the file name of "MARK8" is stored in the memory card and printed out. Value of inside [] is shown in hex format. (Note: Data below is described in hex.)

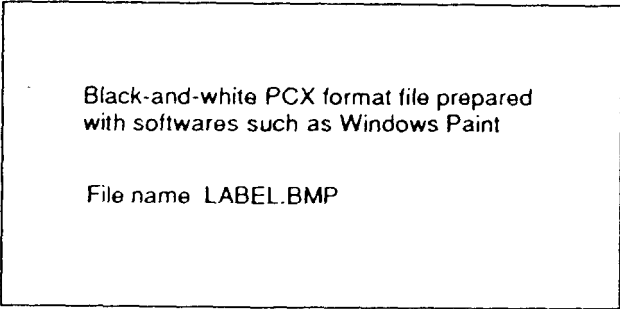
```
[01][41][00]----- Stops immediate execution command (required only for 8-bit image data)
[02][19][12][69][4B][41][52][4B][38][0D]----- Graphics data input command
[00][01][00][08][00][01][00][02][00][7F][00][7F][00][10][00][21]----- Data on header is fixed except for the
[80][06][00][00][41][04][00][00] ----- last 2 bytes, i.e., "00" "24" (36 lines in
[80][06][00][00][C3][0C][00][00]                                         decimal) in this example
[80][06][00][01][86][18][00][00]
[80][06][00][03][0C][30][00][00]
[80][06][00][07][1C][70][00][00]
[80][06][00][06][18][60][00][00]
[80][06][00][06][18][60][00][00]
[80][06][00][06][18][60][00][00]
[80][06][00][06][18][60][00][00]
[80][06][00][03][0C][30][00][00]
[80][06][00][03][0C][30][00][00]
[80][06][00][01][86][18][00][00]
[80][06][00][01][C7][1C][00][00]
[80][06][00][00][C3][0C][00][00]
[80][06][00][00][C3][0C][00][00]
[80][06][00][00][C3][0C][00][00]
[80][06][00][30][C3][0C][C0][00]
[80][06][00][11][86][18][F0][00]
[80][06][03][E1][86][18][7C][00]
[80][06][07][83][0C][30][1E][00]
[80][06][07][0F][3C][F0][0E][00]
[80][06][0F][1E][79][E0][07][00]
[80][06][0C][38][61][80][03][00]
[80][06][1C][00][00][00][03][80]
[80][06][1C][00][00][00][03][80]
[80][06][0C][00][00][00][03][00]
[80][06][0F][00][00][00][07][00]
[80][06][07][00][00][00][0E][00]
[80][06][07][80][00][00][1E][00]
[80][06][03][E0][00][00][7C][00]
[80][06][01][F8][00][01][F8][00]
[80][06][00][FC][00][07][F0][00]
[80][06][00][3F][80][3F][C0][00]
[80][06][00][0F][FF][FF][00][00]
[80][06][00][03][FF][FC][00][00]
[80][06][00][00][7F][E0][00][00]
[46][46][46][46] ----- Graphics data ending code
[02]m[0D]
[02]M1500[0D]----- Sets maximum label length
[02]L[0D] ----- Starts label format
1Y1100001000500MARK8[0D]----- Develops "MARK8" graphics data to specified position
E[0D] ----- Starts printing
```

8-bit BMP format

Graphics data input command is set on the black-and-white bit map file (BMP), which is prepared by Windows Paint Brush for example, and transferred to printer.

The following is the example when file name "LABEL" BMP file is set on the module A in normal saving and transferred.

[02] IABLABEL[0D]



Black-and-white PCX format file prepared
with softwares such as Windows Paint

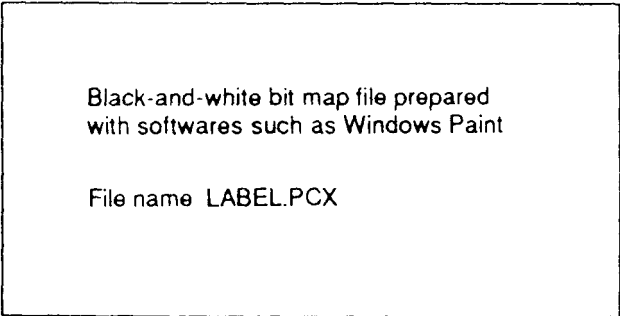
File name LABEL.BMP

8-bit PCX format

Graphics data input command is set on the black-and-white PCX format file, which is prepared by Windows Paint Brush for example, and transferred to printer.

The following is the example when file name "LABEL" PCX file is set on the module A in normal saving and transferred.

[02] IAPLABEL[0D]



Black-and-white bit map file prepared
with softwares such as Windows Paint

File name LABEL.PCX

Pause per label printing

Code [02] J

Function Performs pause each time label is printed one sheet. Used when label peeling detection sensor is not mounted on the printer incorporating peeling function. Pause is cancelled by pressing Pause key on the control panel.

Caution To clear this function, reset the printer.

Extension system command (printer settings)

Code	<p>[02] KDabc</p> <p>Printer setting parameter</p> <p>a Hex notation for the following bit settings</p> <p>bit 0-2 baud rate 0=9600*, 1=600, 2=2400, 3=4800, 5=300, 6=1200, 7=9600 test mode</p> <p>bit 3 character length 0=8 bits*, 1=7 bits</p> <p>bit 4-5 (not used) always 0</p> <p>bit 6 (fixed) always 1</p> <p>bit 7 (fixed) always 0</p> <p>b Hex notation for the following bit settings</p> <p>bit 0 printing method 0=thermal, 1=thermal transfer*</p> <p>bit 1 peeling sensor 0=OFF*, 1=ON</p> <p>bit 2 (not used) always 0</p> <p>bit 3 auto-cutter 0=OFF*, 1=ON</p> <p>bit 4-5 (not used) always 0</p> <p>bit 6 (fixed) always 1</p> <p>bit 7 (fixed) always 0</p> <p>c Hex notation for the following bit settings</p> <p>bit 0-1 type of paper 0=transparent*, 1=reflective, 2=continuous (3 inches)</p> <p>bit 2-5 (not used) always 0</p> <p>bit 6 (fixed) always 1</p> <p>bit 7 (fixed) always 0</p> <p>(*: factory setting)</p>
Function	Provides various printer settings.
Caution	<p>This setting is stored even when the power is turned off. When it is returned to the factory setting, hold down the pause, feed and stop keys for five seconds simultaneously when the power is turned on.</p> <p>A 38400-baud model can only perform 38400 switching from the control panel.</p>
Example	<p>[02]KD@A@[0D]</p> <p>@: 9600 baud, 8-bit length, no parity</p> <p>A: thermal, no peeling sensor, no auto-cutter</p> <p>@: transparent paper</p>

Extension system command (setting of peeling or cutting position)

Code	[02] Kfnnnn	
Units	0.01 inch or 0.1 mm	
Setting	nnnn	4-digit data
	Inch system	0050 Ð 9999 (0.5 Ð 99.99 inches)
	Metric system	0127 Ð 9999 (12.7 Ð 999.9 mm)

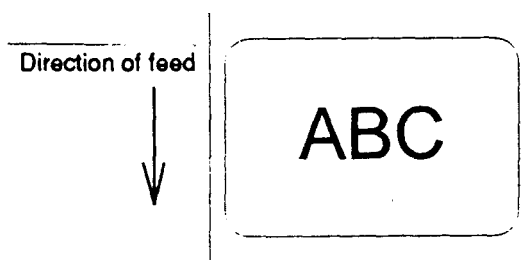
Function, Initialization value, Caution, etc. Same as [02]fnnn. See page 21.

Setting Y-code-transmission-to-serial-port request

Code	[02] k
Function	After receiving this command, printer issues "Y"(59hex) code via serial port. This allows printer and computer to synchronize each other.
Caution	[0D]hex code is not added to the end of the "Y"(59hex) code.

Specifying printing contents setting start

Code	[02] L	
Function	With this command input, printer enters the label format mode and waits for input of printing contents definition and label format commands until it receives "E""s" or "X" code.	
Example	Input data below represents that label format command input is started, data "ABC" is defined as printing contents, label format command input is completed, and label printing command "E" is entered.	
Input data	[02] n	Sets units to inch
	[02] L	Starts label format mode
	D22	Sets pixel size
	190001001000050ABC	Sets character data "ABC" with smooth font 48pt
	E	Ends label format mode and prints

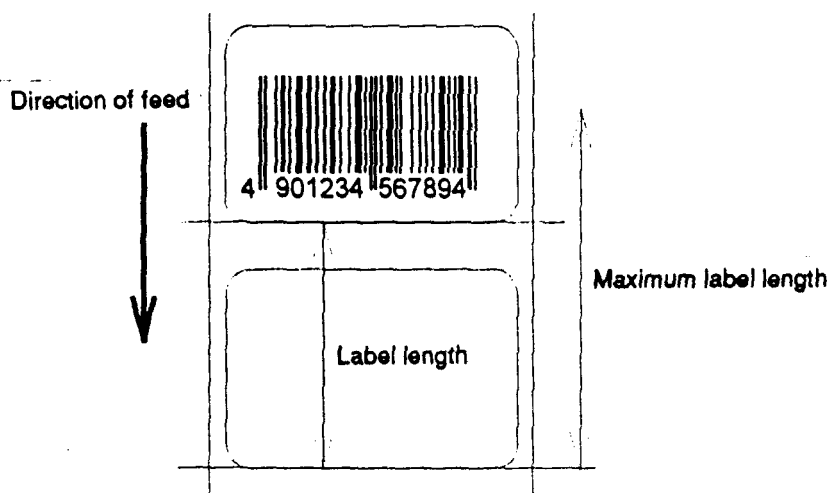


Setting maximum label length

Code	[02] Mnnnn
Units	0.01 inch or 0.1 mm
Setting	nnnn 4-digit data Initialization value: 2000 (20.00 inches) Max. value: Inch system 9999 (99.99 inches) Metric system 9999 (99.9 mm)
Function	Sets maximum label length for detecting label out. If printer cannot detect the next top of the label within the maximum label length which has been set with this command, "M" command error occurs. Set value 2.5 to 3 times as large as the label length to be used.
Example	In figure below, if label length is 2.5 inches, the value more than double 2.5 inches must be set for maximum label length. But if label length is 1.1 inch or less, the value more than triple must be set for maximum label length.

Input data below is for 3.5-inch setting

Input data	[02] n	Sets units to inch system
	[02] M0350	Sets 3.5 inches for maximum label length
	D11	Sets pixel size
	[02] L	Starts label format mode
	1F3306000500050490123456789	Sets EAN13 bar code for data "490123456789"
	E	Ends label format mode and prints

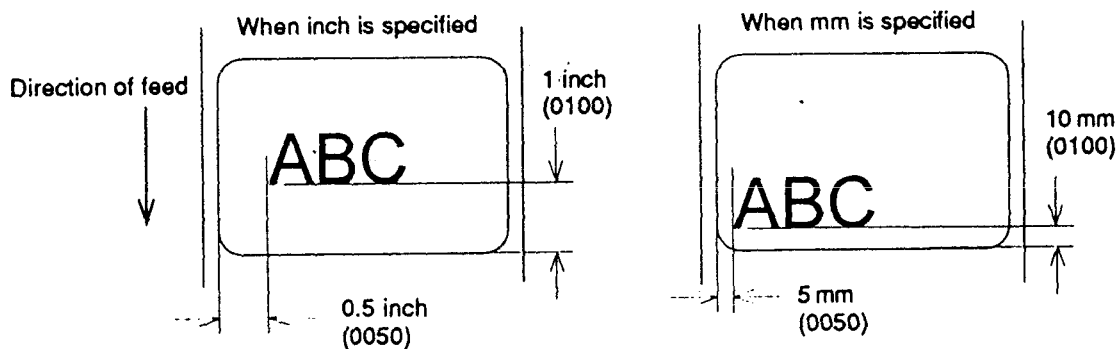


Initialization value for printer maximum label length is set to 20 inches (508 mm). If longer label length is required, the value larger than the length of printing must be set by using the maximum label length command. If the length of printing is larger than the maximum label length, set the M command as follows: maximum label length [02] Mmmm > length of printing

Changing units from inch to metric system

Code	[02] m	
Function	Changes units for all-distance-specified-command-parameters from 0.01 inch to 0.1 mm. With reset, units are set to metric system.	
Example	Input data below represents that data "ABC" is specified with units in metric system.	
Input data	[02] m	Sets units to metric system
	[02] L	Starts label format mode
	D22	Sets pixel size
	190001001000050ABC	Sets character data "ABC" with smooth font 48pt
	E	Ends label format mode and prints

Printing results of the same data with or without units of metric system are as follows:



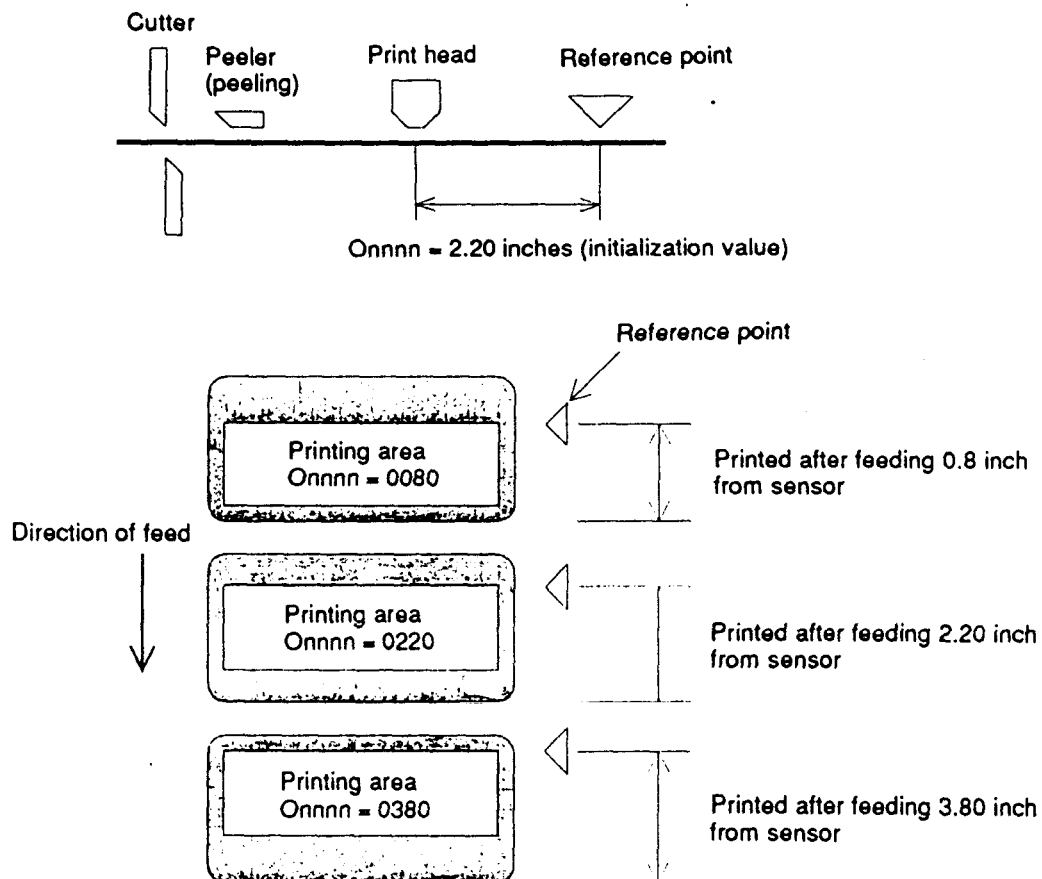
Changing units from metric to inch system

Code	[02] n	
Function	Changes units for all-distance-specified-command-parameters from 0.1 mm to 0.01 inch. With reset, units are set to inch system.	
Example	Input data below represents that data "ABC" is specified with units of inch.	
Input data	[02] n	Sets units to inch
	[02] L	Starts label format mode
	D22	Sets pixel size
	190001001000050ABC	Sets character data "ABC" with smooth font 48pt
	E	Ends label format mode and prints

Setting printing position

Code	[02] Onnnn
Units	0.01 inch or 0.1 mm
Setting	nnnn 4-digit data Initialization value: 0220 (2.20 inches) Inch system 0050 Ð 9999 (0.5 inch Ð 99.99 inches) Metric system 0127 Ð 9999 (12.7 mm Ð 999.9 mm)
Function	Specifies the distance between paper sensor and print head. By changing this value, a physical printing start position can be changed.
Caution	If value less than 0.5 inch (0050) is specified, the initialization value will be set automatically. With the initialization value set, printing starts from the bottom of the label. If the command is used after completing printing, this command setting will not be effective to the first sheet of the label. From the second sheet of the label, this will be effective.

Figure



Paper cut

Code	[02] o
Function	When mounting auto-cutter, if this command is received, the label or paper cutting will be performed once.
Caution	If auto-cutter is not turned to ON, this command will be ignored. Set the cutting sheet number to 0 (zero) with the specified command (Cnn). Otherwise, each label will be cut automatically.

Setting dump mode start

Code	[02] P								
Function	By receiving this command, printer enters the dump mode. After that, all data transmitted from the computer are printed out with hex code. To escape from the dump mode, turn on and off the power.								
Example	Input data below represents that label format command input is started, data "ABC" is defined as printing contents, label format command input is completed, and label printing command "E" is entered.								
Input data	<table><tr><td>[02] P</td><td>Sets dump mode</td></tr><tr><td>[02] L</td><td>Starts label format mode</td></tr><tr><td>190001001000050ABC</td><td>Sets character data "ABC" with smooth font 48pt</td></tr><tr><td>E</td><td>Ends label format mode and prints</td></tr></table>	[02] P	Sets dump mode	[02] L	Starts label format mode	190001001000050ABC	Sets character data "ABC" with smooth font 48pt	E	Ends label format mode and prints
[02] P	Sets dump mode								
[02] L	Starts label format mode								
190001001000050ABC	Sets character data "ABC" with smooth font 48pt								
E	Ends label format mode and prints								

Direction of feed



DUMP LIST

00024C00443131003139313130313030
313030303035304142430D450D

..L. D11. 19110100
1000050ABC. E.

Pause in occasional execution

Code	[02] p
Function	Executes pause occasionally.
Caution	Pause on and off cannot be performed with this command. Cancelling pause must be operated from the Pause key on the control panel.

Clearing all memory module contents

Code	[02] Q
Function	Clears all data in flash and on-board memory modules.
Caution	Clearing of all memory module contents takes about 30 seconds. For models with an LCD, "On Line" appears on the LCD as soon as the module contents are cleared.

Clearing memory module contents

Code	[02] qn
Setting	n Memory module specification parameter A, B, C A Memory module A (on-board memory) B Memory module B (flash memory card) C Default module
Function	Clears all data in memory module.
Caution	Clearing of memory module B (flash memory card) takes about 30 seconds. For models with LCD, "On Line" appears on the LCD as soon as the module contents are cleared. In system maintenance mode, if model of mode item is set to Native OFF, respective memory modules A and B are reversed as follows: A (flash memory card) B (on-board memory)
Input data	[02] qB Sets clearance of module B (flash memory card) contents.

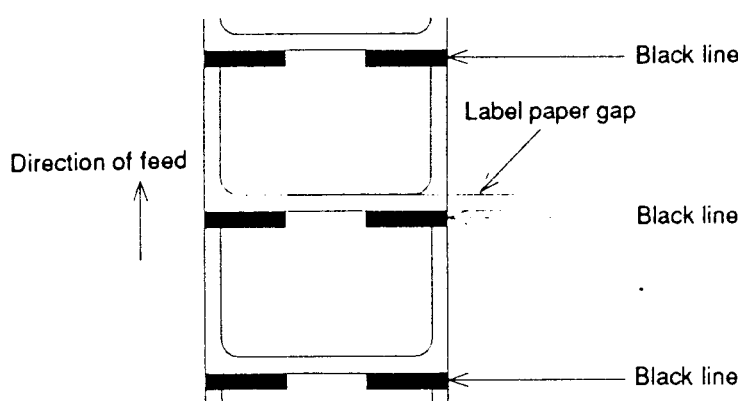
Setting reflective paper sensor selection

Code [02] r

Function Detects label position automatically by reflective paper sensor. Reflective paper sensor detects black lines which are printed on the back of the label and understands the label position. In default, reflective paper sensor is selected.

Caution When detection is not performed properly, check the sensor position.

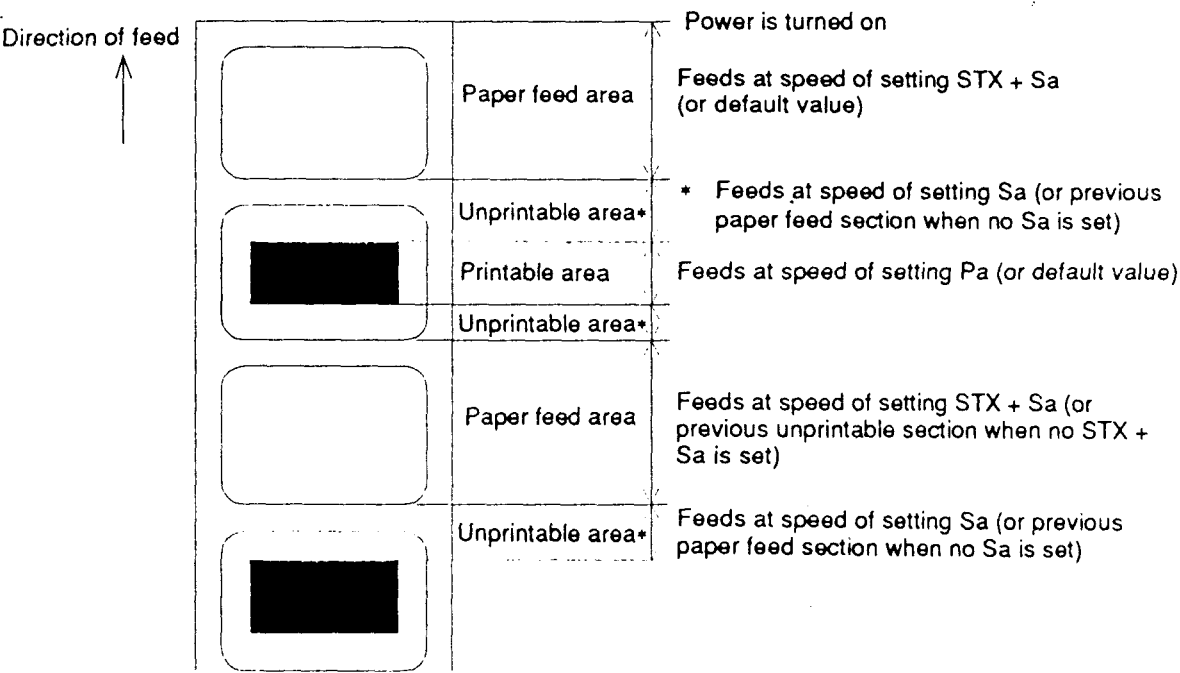
Example As shown in the figure below, label position is detected with the black lines on the back of the label.



* Figure above shows the back of the paper

Setting paper feed speed

Code	[02] Sa	
Setting	a	Paper feed speed specifying character
	C or D	2.0 inches (50.8 mm)/sec
	E or F	3.0 inches (76.2 mm)/sec
	G or H	4.0 inches (101.6 mm)/sec
	I or J	5.0 inches (127.0 mm)/sec
	K	6.0 inches (152.4 mm)/sec* *: Initialization value
	2 - 6	2.0 inches (50.8 mm)/sec - 6.0 inches (152.4 mm)/sec
Function	Sets paper feed speed.	



Setting one-page edit mode (single buffer)

Code [02] s

Function After receiving this command, printer makes the internal edit buffer one page. At this time, the maximum printing length on one page is 32 inches. In initialization after turning on power, this mode is set.

Caution The printer automatically judges whether the single buffer is needed or not, and the mode is switched accordingly, so this command does not need to be particularly specified. When the printing length is 16 inches or more (one-half of the maximum printing length of 32 inches), the single buffer mode is selected. When it is less than 16 inches, the double buffer mode is selected.

Internal edit buffer	
Two page mode	One page mode
Max printig lenght 8 inches	Max printing lenght 16 inches
Max printig lenght 8 inches	

Printing quality test pattern

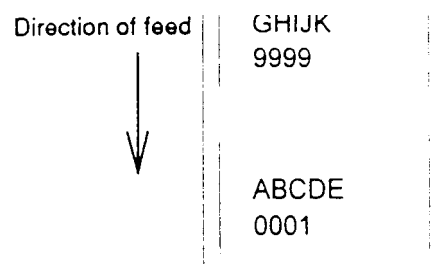
Code [02] T

Function After receiving this command, printer prints out the quality test pattern to check whether printer is in good condition and not involved in troubles such as head disconnection. This test pattern is the same as the print pattern by the self test.

Example

Rewriting specified format register contents

Code	[02] Unnaa..																		
Setting	<p>nn 2-digit format register numbers 01 ÷ 99 Printer sets format register numbers in sequence when label format is executed.</p> <p>aa Input character string data ending with CR code (oDh) instead of old data. Basically the number of characters must be the same as the old data. But if it is small, rewriting can be executed.</p>																		
Function	Changes some part of the formerly-printed label format or formatted label contents and prints it again.																		
Example	Input data below represents that data "0001" and "ABC" are set on the fields No. 01 and No. 02 respectively and label is printed and then with this command, the data contents of the fields No. 01 and No. 02 are changed to "9999" and "GHIJK" and printed.																		
Input data	<table> <tr> <td>[02] n</td><td>Sets units to inch</td></tr> <tr> <td>[02] L</td><td>Starts label format mode</td></tr> <tr> <td>D11</td><td>Sets pixel size</td></tr> <tr> <td>1611000000000500001</td><td>Sets data "0001" on fields No. 01</td></tr> <tr> <td>161100000300050ABCDE</td><td>Sets data "ABCDE" on fields No. 02</td></tr> <tr> <td>E</td><td>Ends label format mode and prints</td></tr> <tr> <td>[02] U019999</td><td>Changes data on fields No. 01 to "9999"</td></tr> <tr> <td>[02] U02GHIJK</td><td>Changes data on fields No. 02 to "GHIJK"</td></tr> <tr> <td>[02] G</td><td>Prints edited format</td></tr> </table>	[02] n	Sets units to inch	[02] L	Starts label format mode	D11	Sets pixel size	1611000000000500001	Sets data "0001" on fields No. 01	161100000300050ABCDE	Sets data "ABCDE" on fields No. 02	E	Ends label format mode and prints	[02] U019999	Changes data on fields No. 01 to "9999"	[02] U02GHIJK	Changes data on fields No. 02 to "GHIJK"	[02] G	Prints edited format
[02] n	Sets units to inch																		
[02] L	Starts label format mode																		
D11	Sets pixel size																		
1611000000000500001	Sets data "0001" on fields No. 01																		
161100000300050ABCDE	Sets data "ABCDE" on fields No. 02																		
E	Ends label format mode and prints																		
[02] U019999	Changes data on fields No. 01 to "9999"																		
[02] U02GHIJK	Changes data on fields No. 02 to "GHIJK"																		
[02] G	Prints edited format																		



Setting memory switch contents

Code [02] Vn

Setting n is hex data expressing switch on and off with binary. Appropriate ASCII codes are used for setting.

	Bit	0	1	2	3	4	5	6	7
Auto-cutter	1		O		O		O		O
Ñ	2								
Peeling sensor	3					O	O	O	O

Function With this command, memory switch contents can be changed temporarily.

Example When auto-cutter is turned to ON, n = 1 (binary 0001), i.e., 1 for hex, so ASCII code 31hex is set. When peeling sensor is turned to ON, n = 4 (binary 0100), i.e., 4 for hex, so ASCII code 34hex is set.

Input data When auto-cutter is turned to ON: [02] V1

When peeling sensor is turned to ON: [02] V4

Printer version number transmission request

Code [02] v

Function After receiving this command, printer transmits the control ROM version number and date to the computer in ASCII code.

Caution Printer sends data on printer status to the computer as soon as it receives this command. Therefore, the computer must be ready to receive data from the printer immediately after receiving this command.

The [0D]hex code is added to the end of the transmission data.

Information-in-memory-module transmission request

Code	[02] Wn
Setting	<p>n F, G, L</p> <p>F Transmits downloading font information.</p> <p>G Transmits graphic image file information.</p> <p>L Transmits format (label printing contents) information.</p>
Function	Transmits file name and memory remaining capacity in the currently-installed memory module to the computer in ASCII code.
Caution	The [0D]hex is added to the end of the transmission code.
Example	Reception data below represents that file name "ABC.DAT" is set on the module A and transmitted by printer.
Input data	[02] WG
Reception data	<p>MODULE: A [0D]</p> <p>AVAILABLE BYTES IN MODULE: 00042699 [0D]</p> <p>ABC.DAT [0D]</p> <p>MODULE: B [0D]</p> <p>AVAILABLE BYTES IN MODULE: 00262143 [0D]</p>

Testing memory card (flash memory)

Code	[02] w
Function	After receiving this command, printer tests flash memory module and transmits capacity and test results (GOOD or BAD).
Caution	<p>The [0D]hex is added to the end of the transmission data. Also, memory card is initialized with this command.</p> <p>If no flash memory card is installed, nothing will be returned. And if the write-protect switch of the flash memory card is turned to ON, the test results are always BAD.</p>
Reception data	MODULE B: xxxxK Flash Tested GOOD (or BAD) [0D]

Default module selection

Code	[02] Xa
Setting	a Default module selection A, B A Memory module A (on-board memory) B Memory module B (flash memory card)
Function	Selects default module. If default is set with other command module parameter, the module selected with this command is used. (e.g., [02]lmfaa, [02]qn, snaa..a, etc.)
Caution	<p>When installing flash memory, if this command is not used, other command default will be the flash memory module B. If only on-board memory is used, this command will not be needed.</p> <p>In system maintenance mode, if model of mode item is set to Native OFF, respective memory modules A and B are reversed as follows: A (flash memory card) B (on-board memory)</p> <p>Also, when installing flash memory, if this command is not used and default module C is specified by other command which has memory module specifying parameter, this will be changed to the module A.</p>
Example	Input data below represents that default module A is selected and default module is cleared.
Input data	[02] XA Selects default module A. [02] qC Clears default module.

Clearing memory module contents (in file units)

Code	[02] xntname
Setting	n Memory module specifying parameter A Memory module A (on-board memory) B Memory module B (flash memory card) C Default module t File format F Downloaded font G Graphic image L Label format Name File name (up to 16 characters ending with CR)
Function	Clears the data in the memory module in file units.
Caution	<p>The LCD-equipped model shows "On Line" on the LCD after completing the clearance of a file. Clearance by this command will make the appropriate file name in the memory module invalid and accessing the file impossible. Therefore, the contents of the file are kept in the memory module and the capacity of the module is not increased. Issuing the memory module contents packing command [02]z deletes the contents of the file specified by this command from the memory module.</p> <p>In system maintenance mode, if model of mode item is set to Native OFF, respective memory modules A and B are reversed as follows: A (flash memory card) B (on-board memory)</p>
Example	MARK8 graphic image file in module B is cleared.
Input data	[02] xBGMARK8 [0D]

Sensor level issued to port

Code	[02] Y
Function	Issues sensor level to the RS232C port in the test mode. If the value of level is required to repeat, "SPACE[20H]" must be transmitted to the printer. To escape from this function, send "ESC[1BH]."
Caution	Entering the test mode must be operated from the control panel.
Example	See reception data below.
Reception data	Thermistor ADC: 0071 Reflective ADC: 0000 Transmissive ADC: 0178 Paper out ADC: 0000

24 Volt ADC:

0000

Battery level:

Good [0d]

Printing printer status

Code	[02] Z
Function	Performs test printing for indicating printer status.

Packing memory module contents (200 dpi 2M byte DRAM-equipped or 400 dpi model only)

Code	[02] zm
Setting	m Memory module specifying parameter A Memory module A (on-board memory) B Memory module B (flash memory card) C Default module
Function	With this command, the file data specified by the file clearance command [02]z and the old file data stored with overrides will be removed from the memory module. Therefore, the empty capacity can be increased by the amount of data occupied by the deleted and old files. Packing required time for memory module B (flash memory card) is about 20 seconds.
Caution	LCD-equipped model shows "On Line" on the LCD as soon as the module packing is completed. In system maintenance mode, if model of mode item is set to Native OFF, respective memory modules A and B are reversed as follows: A (flash memory card) B (on-board memory)
Example	Memory module B packing is executed after the MARK8 graphic file in the module B has been cleared.
Input data	[02] xBGMARK8 [0D] [02] zB

Paper position detection sensor voltage transmission request

Code	[02][1B] S
Function	Transmits voltage of the currently selected paper position (gap) detection sensor to the computer in ASCII code.
Example	Examples of reception data when the paper position (gap) or black line detection sensor is selected are shown below.
Reception data	PE 2.00V[0D] Paper position (gap) detection sensor BL 2.00V[0D] Black line detection sensor
Caution	Not performed when continuous paper is selected.

Head disconnection detection

Code	[02][1B] T
Function	Measures resistance value per dot on head heat-generation part and checks whether head heat-generation part (resistance value) is normal. If it is normal, [01] is transmitted to the computer and if it is abnormal, [00] is transmitted to the computer.
Caution	The [0D]hex code is not added to the end of the transmission data.

Setting ejection (tear-off)

Code	[02][1B] tn
Setting	n 0, 1 0 Ejection is turned to OFF 1 Ejection is turned to ON
Function	Switches ejection ON and OFF. The contents with this command are stored in the backup memory and kept valid even if the power is turned off.
Caution	When the auto-cutter and peeling sensor are turned to ON, any ejection is not performed even if ejection is turned to ON because the auto-cutter and peeling sensor have priority. Setting of ejection, however, is kept valid because it is stored in the backup memory, so ejection will be performed when both auto-cutter and peeling sensor are turned to OFF.
Example	Examples of input data when Ejection ON and OFF are shown below.
Input data	[02][1B] t1 When specifying Ejection ON [02][1B] t0 When specifying Ejection OFF

1.6.3 Label Format Commands

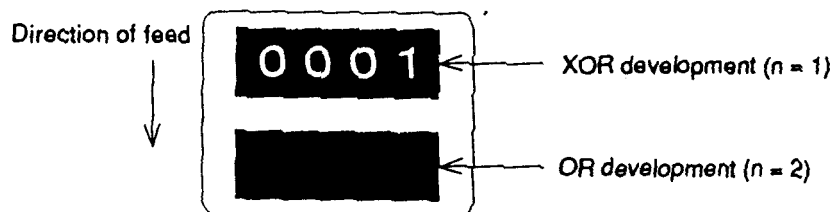
The following commands will be valid if the label format command interpreter is turned on with "STX" + "L," i.e. [02] L.

Specifying development method	A
Specifying development method	[1B]B
Setting offset in direction of column	C
Setting number of cuts (2-digit)	c
Setting pixel size in horizontal and vertical direction	D
Completion of setting printing contents (field preparation) and printing labels	E
Entering previous-defined field character string into global table	G
Setting print density (head heat factor)	H
Changing units from inch to metric system	m
Changing units from metric to inch system	n
Setting printable area speed	P
Setting backfeed speed	p
Specifying space between characters	[1B]P
Setting number of prints	Q
Setting offset in direction of row	R
Calling label format	r
Setting unprintable area speed	S
Storing label format	s
Specifying ending code	T
Setting previous field to character-string-replacement-mode field	U
Completion of setting printing contents (field preparation)	X
Setting addition of previous-defined printing contents (field data) 1	+
Setting subtraction of previous-defined printing contents (field data) 1	Ð
Setting addition of previous-defined printing contents (field data) 2	>
Setting subtraction of previous-defined printing contents (field data) 2	<
Setting number of prints for same label	^

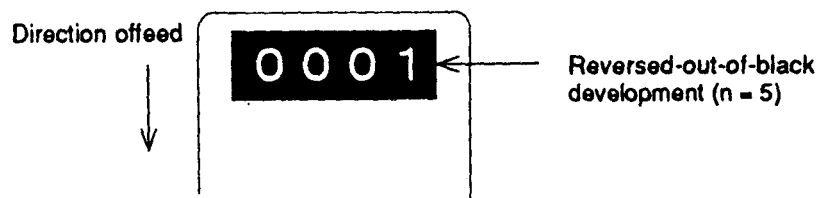
Setting number of cuts (4-digit)	:
Setting slash zero	z
Character field definition	
Bar code field definition	
Ruled line definition	
Box definition	
Graphics printing definition	
Reading out from global register	
Polygon definition	
Circle definition	
Date and time printing definition	

Specifying development method

Code	An
Setting	<p>n 1, 2, 5 Initialization value: 1</p> <p>1 Specifies XOR development and character and bar code overlaid are reversed out of black.</p> <p>2 Specifies OR development and characters and bar code are overlaid.</p> <p>5 Specifies reversed-out-of-black development.</p>
Function	Specifies development method for characters and bar code.
Example	Printing example of XOR or OR development using ruled line (1.5 x 0.6) and character data 0001 is shown below.
Input data	<p>[02] n Sets units to inch</p> <p>[02] L Starts label format mode</p> <p>D22 Sets pixel size</p> <p>A2 Specifies OR development</p> <p>1611000001000600001 Sets character data "0001" with system font 6</p> <p>1X1100000100060L150070 Sets 1.5x0.6 inch ruled line</p> <p>A1 Specifies XOR development</p> <p>1611000001000600001 Sets character data "0001" with system font 6</p> <p>1X1100000100060L150070 Sets 1.5x0.6 inch ruled line</p> <p>E Ends label format mode and prints</p>



Example	The following is the characters reversed out of black.	
Input data	[02] n	Sets units to inch
	[02] L	Starts label format mode
	D22	Sets pixel size
	A5	Specifies development of the characters reversed out of black
	1611000001000600001	Sets character data "0001" with system font 6
	E	Ends label format mode and prints

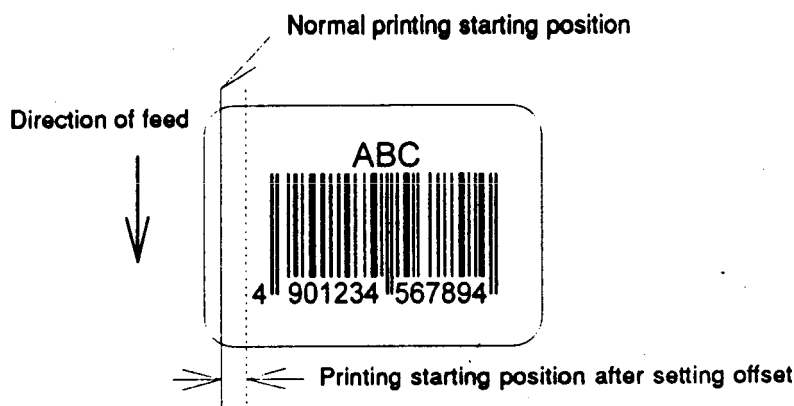


Specifying development method

Code	[1B] Bn	1B is hex code.
Setting	n	0, 1 Initialization value: 0
	0	Specifies XOR development and character and bar code overlaid are reversed out of black.
	1	Specifies OR development and character and bar code are overlaid.
Function	Specifies development method for character and bar code.	
	This command has the same function as A command parameters 1 and 2 are specified. See page 43.	

Setting offset in direction of column

Code	Cnnnn
Units	0.01 inch or 0.1 mm
Setting	nnnn 4-digit data Initialization value: 0000 Inch system 0000 ÷ 9999 (0.00 inch ÷ 99.99 inches) Metric system 0000 ÷ 9999 (0.0 mm ÷ 99.9 mm)
Function	Sets offset value for printing start position in direction of column (paper left and right) to adjust the position of the total printing contents.
Example	Shifts label printing position 1.0 inch (C0100) rightward and prints.
Input data	<div> <div>[02] n</div> <div>Sets units to inch</div> </div> <div> <div>[02] L</div> <div>Starts label format mode</div> </div> <div> <div>D11</div> <div>Sets pixel size</div> </div> <div> <div>C0100</div> <div>Sets column offset to 1.0 inch</div> </div> <div> <div>190000501150090ABC</div> <div>Sets character data "ABC" with smooth font 14pt</div> </div> <div> <div>1F3306000500050490123456789</div> <div>Sets EAN13 bar code for data "490123456789"</div> </div> <div> <div>E</div> <div>Ends label format mode and prints</div> </div>

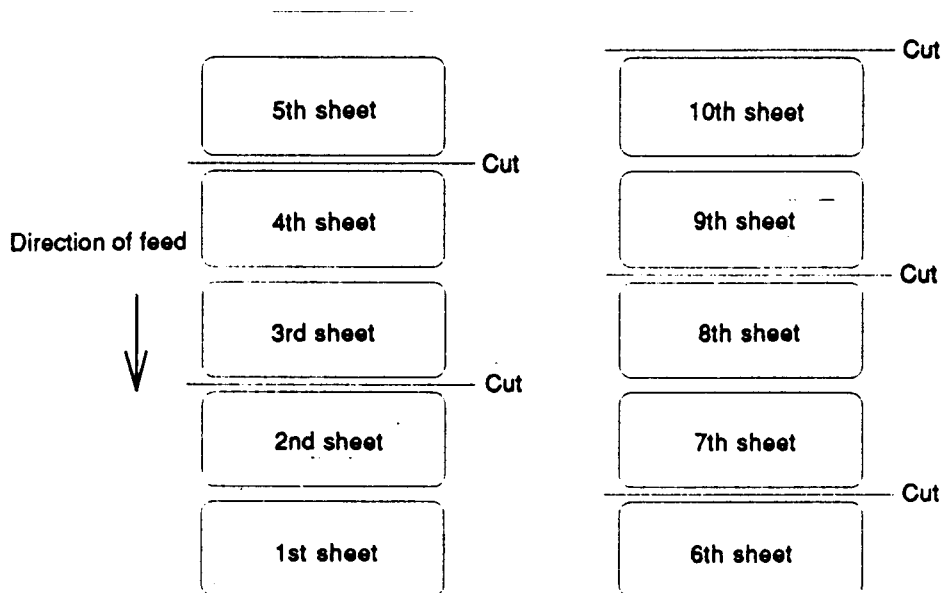


Setting number of cuts (2-digit)

Code	cnn
Setting	nn 00 ÷ 99 Initialization value: 01
Function	After printing specified number of labels, cuts paper.
Caution	This command is invalid unless the auto-cutter is installed and it is turned to ON. Since the initialization value is 01 (one sheet), if the auto-cutter is ON, each label sheet will be cut automatically. When the label is cut by using the paper cut command (o), this must be set to 0 (zero) sheet.

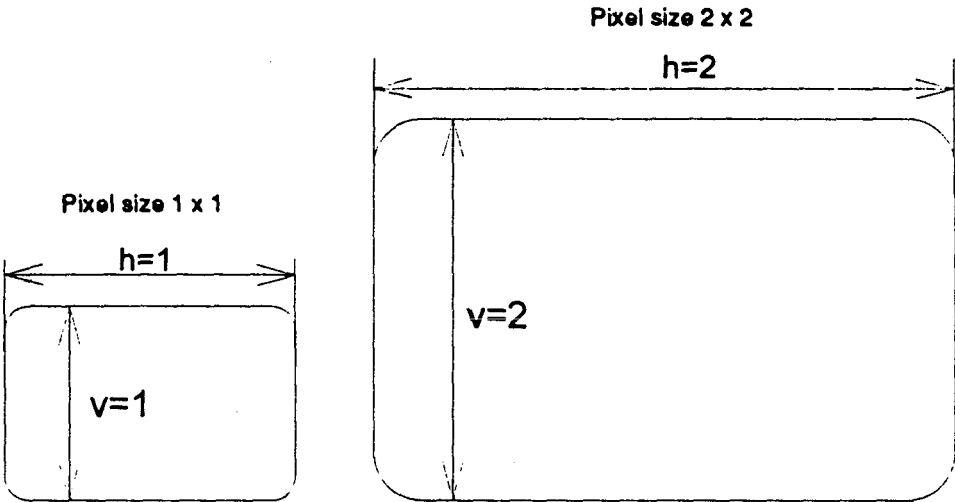
Example Input data below represents that the same contents of the labels are printed ten sheets and cut out every two sheets.

Input data	[02] n	Sets units to inch
	[02] L	Starts label format mode
	D22	Sets pixel size
	Q0010	Sets 10 sheets for same label printing
	190000700500050ABC	Sets character data "ABC" with smooth font 24pt
	c02	Sets 2 sheets for cutting
	E	Ends label format mode and prints



Setting pixel size in horizontal and vertical direction

Code	Dhv		
Units	One dot 0.127 mm or 0.005 inch		
Setting	h	Dot size in horizontal direction 1, 2	Initialization value: 2
	v	Dot size in vertical direction 1, 2, 3	Initialization value: 2
Function	Specifies pixel size (dot formation units) in the range of 1 dot x 1 dot to 2 dots x 3 dots. If dot size in vertical direction is doubled or tripled, the maximum printing length (printing range) will be doubled or tripled.		
Example	The following is that dot size in horizontal direction is set to 1 and dot size in vertical direction is set to 1.		
Input data	[02] n	Sets units to inch	
	[02] L	Starts label format mode	
	D11	Sets pixel size	
	1F3306000500050490123456789	Sets EAN13 bar code for data "490123456789"	
	E	Ends label format mode and prints	



Completion of setting printing contents (field preparation) and printing labels

Code	E
Function	Completes printing contents setting and prints labels. On completion of printing, command interpreter is switched to system level interpreter and system level commands are valid.
Caution	Printer waits for label format command input until it receives the commands such as E and X, so printer cannot advance to the next operation.

Entering previous-defined field character string into global table

Code	G														
Function	Enters a previous-defined label format character string into global table, allocating one character in alphabetical order from A to P. Reading of character string stored in the global table is executed with command "S."														
Example	Input data below represents that data of character string "ABC" is stored in the global table with font 9 and fonts 9 and 5 are printed.														
Input data	<table><tr><td>[02] n</td><td>Sets units to inch</td></tr><tr><td>[02] L</td><td>Starts label format mode</td></tr><tr><td>D22</td><td>Sets pixel size</td></tr><tr><td>190000500800120ABC</td><td>Sets character data "ABC" with smooth font 14pt</td></tr><tr><td>G</td><td>Stores character string "ABC" in global table</td></tr><tr><td>150000502800120[02]SA</td><td></td></tr><tr><td>E</td><td>Ends label format mode and prints</td></tr></table>	[02] n	Sets units to inch	[02] L	Starts label format mode	D22	Sets pixel size	190000500800120ABC	Sets character data "ABC" with smooth font 14pt	G	Stores character string "ABC" in global table	150000502800120[02]SA		E	Ends label format mode and prints
[02] n	Sets units to inch														
[02] L	Starts label format mode														
D22	Sets pixel size														
190000500800120ABC	Sets character data "ABC" with smooth font 14pt														
G	Stores character string "ABC" in global table														
150000502800120[02]SA															
E	Ends label format mode and prints														

Setting print density (head heat factor)

Code	Hnn
Setting	nn 00 ÷ 30 Initialization value: 10
Function	Sets print density (heat energy is applied to print head).

Changing units from inch to metric system

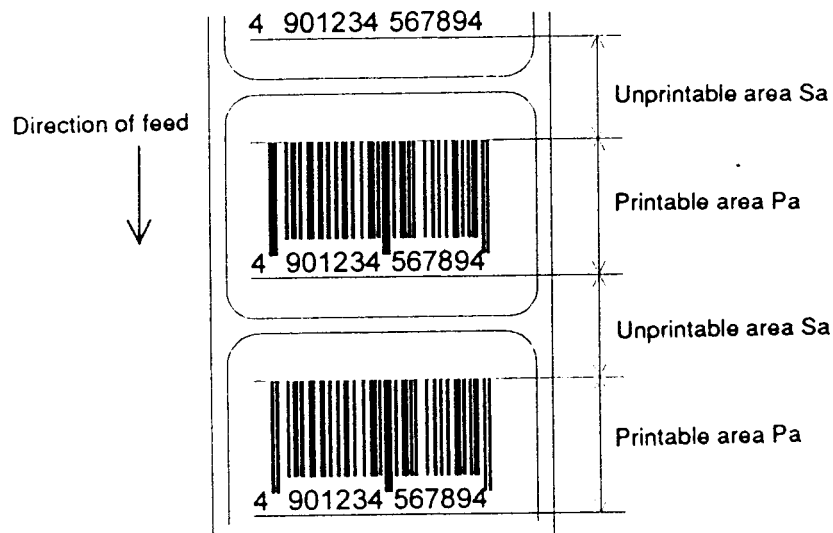
Code	m
Function	Changes units for all-distance-specified-command-parameters from 0.01 inch to 0.1 mm. With reset, units are set to metric system.
Example	Input data below represents that data "ABC" is specified with units in metric system.

Changing units from metric to inch system

Code	n
Function	Changes units for all-distance-specified-command-parameters from 0.1 mm to 0.01 inch. Operation is same as [02]n command. With reset, units are set to inch system.

Setting printable area speed

Code	Pa
Setting	a One alphanumeric character.
	C or D 2.0 inches (50.8 mm)/sec
	E or F 3.0 inches (76.2 mm)/sec
	G or H 4.0 inches (101.6 mm)/sec
	I or J 5.0 inches (127.0 mm)/sec
	K 6.0 inches (152.4 mm)/sec* *: Initialization value
	2 - 6 2.0 inches (50.8 mm)/sec - 6.0 inches (152.4 mm)/sec
Function	Sets printable area speed.



Setting backfeed speed

Code	pa		
Setting	a One alphanumeric character.		
	C or D	2.0 inches (50.8 mm)/sec	
	E or F	3.0 inches (76.2 mm)/sec	
	G or H	4.0 inches (101.6 mm)/sec	
	I or J	5.0 inches (127.0 mm)/sec	
	K	6.0 inches (152.4 mm)/sec*	*: Initialization value
	2 - 6	2.0 inches (50.8 mm)/sec - 6.0 inches (152.4 mm)/sec	
Function	Sets backfeed speed.		

Setting number of prints

Code Qnnnn

Setting nnnn 0001 Ð 9999 Initialization value: 0001

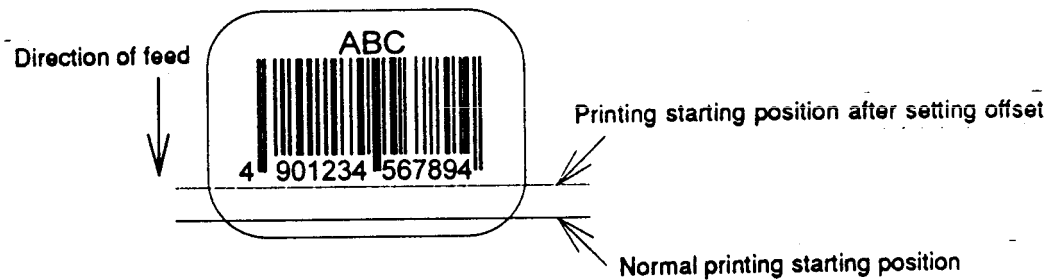
Function Sets number of sheets to be printed.

Example Input data below represents that the same contents of labels are printed ten sheets.

Input data	[02] n	Sets units to inch
	[02] L	Starts label format mode
	D11	Sets pixel size
	Q0010	Setting 10 sheets for same label printing
	1F3306000500050490123456789	Sets EAN13 bar code for data "490123456789"
	E	Ends label format mode and prints

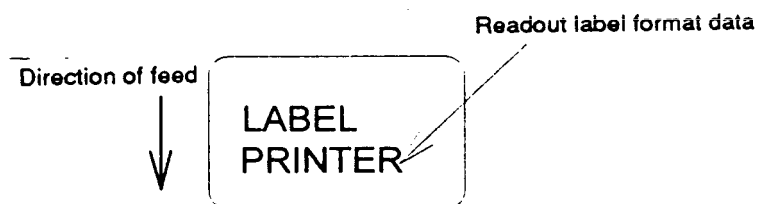
Setting offset in direction of row

Code	Rnnnn
Units	0.01 inch or 0.1 mm
Setting	nnnn 4-digit data Initialization value: 0000 Inch system 0000 ÷ 9999 (0.00 inch ÷ 99.99 inches) Metric system 0000 ÷ 9999 (0.0 mm ÷ 99.9 mm)
Function	Sets offset value for printing start position in direction of row (paper top and bottom) to adjust the position of the total printing contents.
Example	Shifts label printing position 1.0 inch (R0100) upwards and prints.
Input data	<div> <div>[02] n</div> <div>Sets units to inch</div> </div> <div> <div>[02] L</div> <div>Starts label format mode</div> </div> <div> <div>D11</div> <div>Sets pixel size</div> </div> <div> <div>R0100</div> <div>Sets row offset to 1.0 inch</div> </div> <div> <div>190000501150090ABC</div> <div>Sets character data "ABC" with smooth font 14pt</div> </div> <div> <div>1F3306000500050490123456789</div> <div>Sets EAN13 bar code for data "490123456789"</div> </div> <div> <div>E</div> <div>Ends label format mode and prints</div> </div>



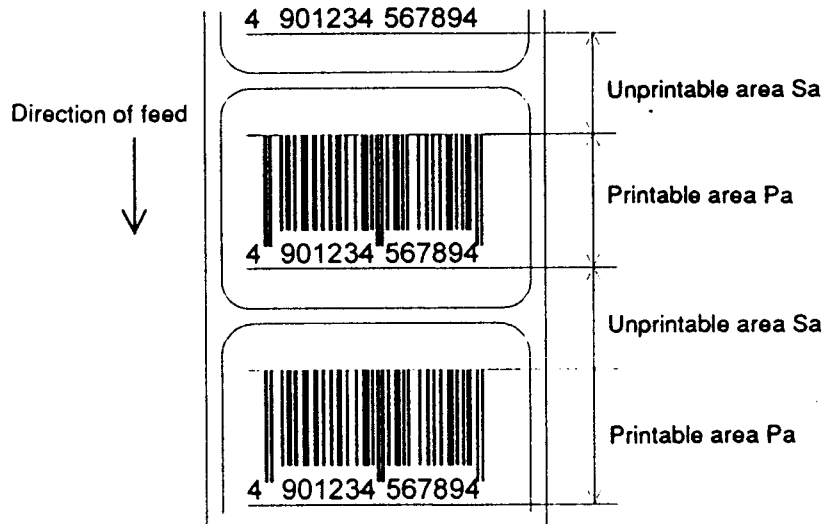
Calling label format

Code	raa..a	
Setting	aa..a code	Maximum 16 characters of format name ending with CR
Function	Calls label format stored in the memory module. Storing of label format into memory module is executed with "s" command.	
Caution	<p>Priority for calling module</p> <p>(1) Default (module B) or STX + Xa setting module</p> <p>(2) Modules other than above</p> <p>In system maintenance mode, if model of mode item is set to Native OFF, default value will designate the module A.</p>	
Example	Input data below represents that label format data is stored in the RAM by using "NAME" and label format is ended once, then put in again and file name "NAME" in the RAM is called and those data together with the current label format data are printed.	
Input data	[02] n	Sets units to inch
	[02] L	Starts label format mode
	D11	Sets pixel size
	190000700500050PRINTER	Sets data "PRINTER" with smooth font 24pt
	sANAME	Stores label format name "NAME" in on-board RAM and ends label format mode
	[02] L	Starts label format mode
	rNAME	Reads out label format "NAME" data
	D11	Sets pixel size
	190000700800050LABEL	Sets data "LABEL" with smooth font 24pt
	E	Ends label format mode and prints



Setting unprintable area speed

Code	Sa
Setting	a One alphanumeric character.
C or D	2.0 inches (50.8 mm)/sec
E or F	3.0 inches (76.2 mm)/sec
G or H	4.0 inches (101.6 mm)/sec
I or J	5.0 inches (127.0 mm)/sec
K	6.0 inches (152.4 mm)/sec* *: Initialization value
2 - 6	2.0 inches (50.8 mm)/sec - 6.0 inches (152.4 mm)/sec
Function	Sets unprintable area speed.



Storing label format

Code	snaa.aa
Setting	n A Memory module A (on-board memory) B Memory module B (flash memory card) C Default module aa..a Maximum 16 characters of format name ending with CR code
Function	Stores label format into memory module and ends label format.
Caution	In system maintenance mode, if model of mode item is set to Native OFF, respective memory modules A and B are reversed as follows: A (flash memory card) B (on-board memory)
Example	Input data below represents that label format data is stored in the on-board memory by using format name "NAME."
Input data	[02] n Sets units to inch [02] L Starts label format mode D11 Sets pixel size 190000700500050PRINTER Sets data "PRINTER" with smooth font 24pt sANAME Stores label format name "NAME" in on-board RAM and ends label format mode

Specifying ending code

Code	Tnn
Setting	nn Two characters of hex ASCII code Initialization value: CR[0D]
Function	Specifies ending code, which is valid for field immediately after this command and after that field ending returns to default CR[0D].
Example	The following shows that ending code uses NULL[00].
Input data	[02] n Sets units to inch [02] L [0D] Starts label format mode D22 Sets pixel size T00 [0D] Sets ending code to 'NULL [00]' 190000500800120ABC [00] Sets character data "ABC" with smooth font 14pt Q0002 [0D] Sets 2-sheet-printing E Ends label format mode and prints

Setting previous field to character-string-replacement-mode field

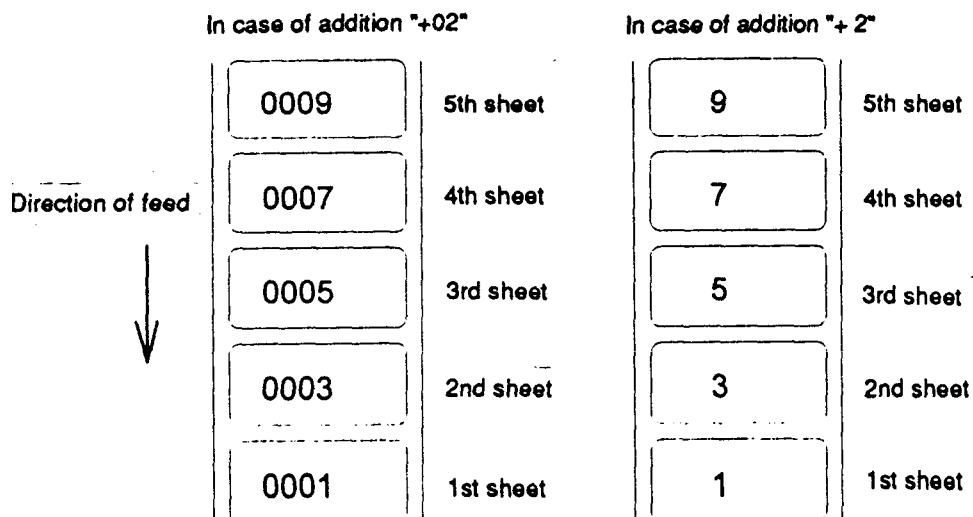
Code	U																		
Function	Changes previous field to character-string-replacement-mode field, i.e., prepares replacement for only changing data. This command is not used when label is totally reconstructed.																		
Caution	Register length is set according to the length of data for generating character string. Therefore, lengths of data for old and new character strings must be the same.																		
Example	The following shows the use of character-string-replacement-mode field.																		
Input data	<table><tr><td>[02] n</td><td>Sets units to inch</td></tr><tr><td>[02] L [0D]</td><td>Starts label format mode</td></tr><tr><td>D22</td><td>Sets pixel size</td></tr><tr><td>161100000100060ABC</td><td>Sets character data "ABC" with system font 6</td></tr><tr><td>161100001100060SUNDAY</td><td>Sets character data "SUNDAY" with system font 6</td></tr><tr><td>U</td><td>Sets character-string-replacement-mode field</td></tr><tr><td>X</td><td>Ends label format mode</td></tr><tr><td>[02] U02MONDAY</td><td>Replaces character data "SUNDAY" with "MONDAY"</td></tr><tr><td>[02] G</td><td></td></tr></table>	[02] n	Sets units to inch	[02] L [0D]	Starts label format mode	D22	Sets pixel size	161100000100060ABC	Sets character data "ABC" with system font 6	161100001100060SUNDAY	Sets character data "SUNDAY" with system font 6	U	Sets character-string-replacement-mode field	X	Ends label format mode	[02] U02MONDAY	Replaces character data "SUNDAY" with "MONDAY"	[02] G	
[02] n	Sets units to inch																		
[02] L [0D]	Starts label format mode																		
D22	Sets pixel size																		
161100000100060ABC	Sets character data "ABC" with system font 6																		
161100001100060SUNDAY	Sets character data "SUNDAY" with system font 6																		
U	Sets character-string-replacement-mode field																		
X	Ends label format mode																		
[02] U02MONDAY	Replaces character data "SUNDAY" with "MONDAY"																		
[02] G																			

Completion of setting printing contents (field preparation)

Code	X
Function	Completes printing contents setting, switches command interpreter into system level interpreter, and system level command is valid.
Caution	Printer waits for label format command input until it receives the commands such as E and X, so printer cannot advance to the next operation.

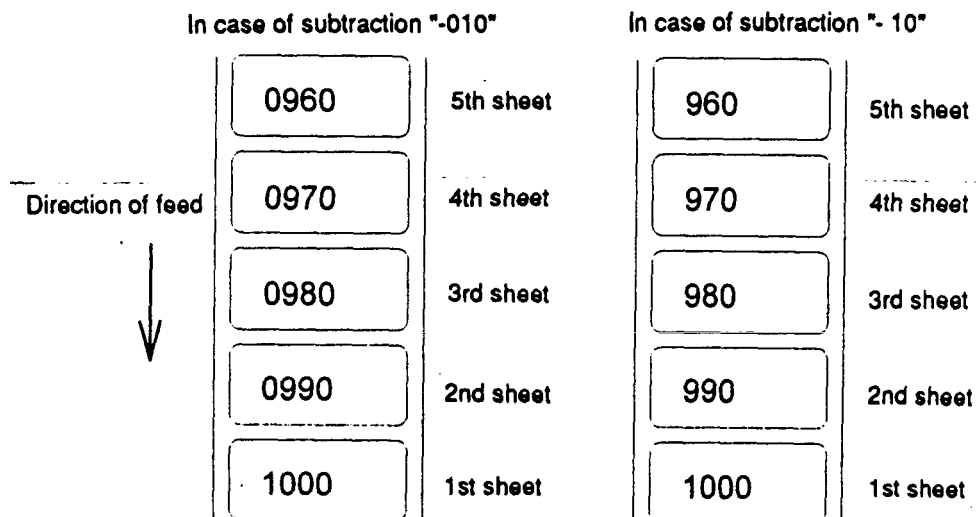
Setting addition of previous-defined printing contents (field data) 1

Code	+pii..
Setting	p Specifies character (all ASCII characters available) for filling zero. ii Amount of addition (decimal)
Function	Adds field data which was defined before this command.
Example	Input data below represents that data "0001" is printed 5 sheets by using this command specifying 2 for the amount of addition.
Input data	<div>[02] n Sets units to inch</div> <div>[02] L Starts label format mode</div> <div>D11 Sets pixel size</div> <div>1900010000000500001 Sets data "0001" with smooth font 48pt</div> <div>+02 Amount of addition: +2</div> <div>Q0005 Specifies 5-sheet printing</div> <div>E Ends label format mode and prints</div>



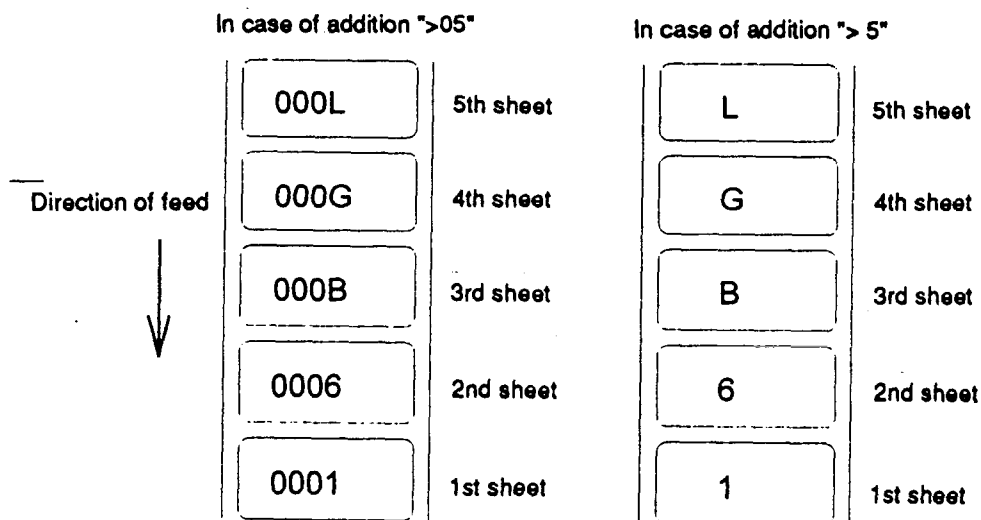
Setting subtraction of previous-defined printing contents (field data) 1

Code	-pii..
Setting	<p>p Specifies character (all ASCII characters available) for filling zero.</p> <p>ii Amount of subtraction (decimal)</p>
Function	Subtracts field data which was defined before this command.
Example	Input data below represents that data "1000" is printed 5 sheets by using this command specifying 2 for the amount of subtraction.
Input data	<p>[02] n Sets units to inch</p> <p>[02] L Starts label format mode</p> <p>D11 Sets pixel size</p> <p>1900010000000501000 Sets data "1000" with smooth font 48pt</p> <p>-010 Amount of subtraction: -10</p> <p>Q0005 Specifies 5-sheet-printing</p> <p>E Ends label format mode and prints</p>



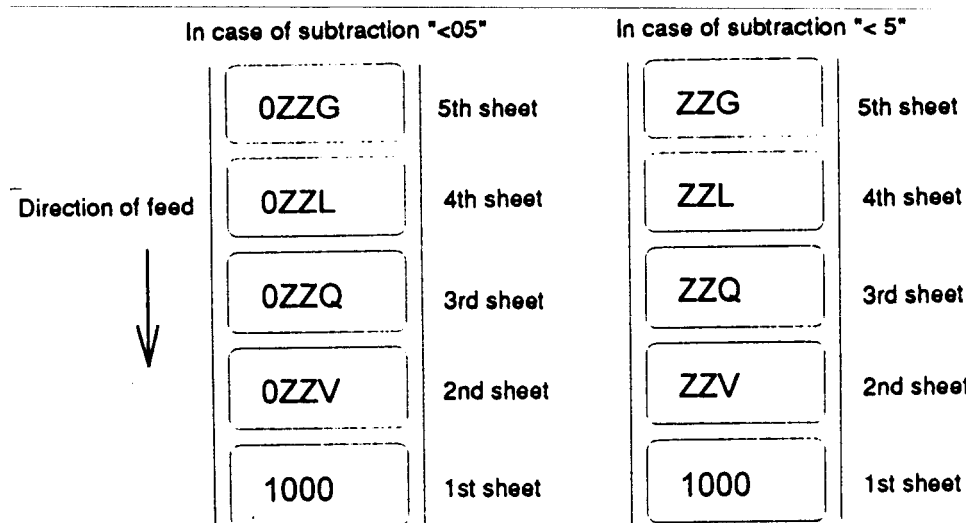
Setting addition of previous-defined printing contents (field data) 2

Code	>pii..	
Setting	p	Specifies character (all ASCII characters available) for filling zero.
	ii	Amount of addition (use of ASCII characters of A Ð Z prohibited)
Function	Adds field data which was defined before this command by using base 36 system of 0 Ð 9, A Ð Z.	
Example	Input data below represents that data "1000" is printed 5 sheets by using this command specifying 5 for the amount of addition.	
Input data	[02] n	Sets units to inch
	[02] L	Starts label format mode
	D11	Sets pixel size
	19000100000000500001	Sets data "0001" with smooth font 48pt
	>05	Amount of addition: +5
	Q0005	Specifies 5-sheet-printing
	E	Ends label format mode and prints



Setting subtraction of previous-defined printing contents (field data) 2

Code	<pii..	
Setting	p	Specifies character (all ASCII characters available) for filling zero.
	ii	Amount of subtraction (use of ASCII characters of A ÷ Z prohibited)
Function	Subtracts field data which was defined before this command by using base 36 system of 0 ÷ 9, A ÷ Z.	
Example	Input data below represents that data "1000" is printed 5 sheets by using this command while specifying 5 for the amount of subtraction.	
Input data	[02] n	Sets units to inch
	[02] L	Starts label format mode
	D11	Sets pixel size
	1900010000000501000	Sets data "1000" with smooth font 48pt
	<05	Amount of subtraction: -5
	Q0005	Specifies 5-sheet-printing
	E	Ends label format mode and prints



Setting number of prints for same label

Code ^nn

Setting nn 2-digit numeric 01 ÷ 99

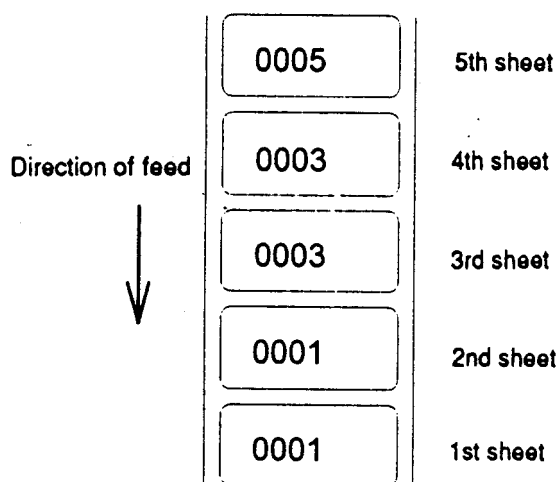
Function Specifies number of prints for same label when addition and subtraction and time printing are specified.

Executes addition, subtraction, etc. after printing number of sheets specified with nn.

Specifies addition and subtraction per field, but if the number of prints for same labels is specified for one label, this specification will be effective to all fields.

Example Input data below represents that data "0001" is printed 5 sheets by using this command while specifying 2 for the amount of addition and 2 sheets of prints for same printing contents.

Input data	[02] n	Sets units to inch
	[02] L	Starts label format mode
	D11	Sets pixel size
	1900010000000500001	Sets data "0001" with smooth font 48pt
	+02	Amount of addition: +2
	^02	Sets 2 sheets for same printing contents
	Q0005	Specifies 5-sheet-printing
	E	Ends label format mode and prints



Setting number of cuts (4-digit)

Code	:nnnn	
Setting	nnnn 0001 Ð 9999 Initialization value: 0001	
Function	Cuts paper after printing same labels by specified number.	
Caution	This command is invalid unless auto-cutter is mounted and cutter is set to ON.	
Example	Input data below represents that same labels are printed 10 sheets and cut every 2 sheets.	
Input data	[02] n	Sets units to inch
	[02] L	Starts label format mode
	D11	Sets pixel size
	Q0010	Sets 10 sheets for printing same labels
	1F3306000050050490123456789	Sets EAN13 bar code for data "490123456789"
	:0002	Sets 2 sheets for number of cuts
	E	Ends label format mode and prints

Setting slash zero

Code	z	
Function	Specifies numeric zero without slash. This setting is valid for system font 0 to 6.	
Caution	This setting is valid within label format.	
Example	Input data below represents that data "0001" is printed by specifying non-slash zero.	
Input data	[02] n	Sets units to inch
	[02] L	Starts label format mode
	D22	Sets pixel size
	z	Specifies non-slash zero
	16000100000000500001	Sets data "0001" with system font 6
	E	Ends label format mode and prints

Character field definition

Code	rotate, font, hexp, vexp, point, row, column, d1, d2,.....	
Setting	rotate	Sets rotation direction for character data 1, 2, 3, 4 1: 0; 2: 90; 3: 180; 4: 270;
	Font	Sets type of character (see table 1)
	hexp	Sets expansion rate in horizontal direction 1 ÷ 9, A ÷ O (A ÷ O corresponding to 10 ÷ 24)
	vexp	Sets expansion rate in vertical direction 1 ÷ 9, A ÷ O (A ÷ O corresponding to 10 ÷ 24)
	point	Sets size of smooth font A06 ÷ A48 (corresponding to 6pt ÷ 48pt) Sets downloading font ID 100 ÷ 999 (see table 2) Setting of this item is valid only when font is set to 9.
	row	Row address 0000 ÷ 9999 Unit: 0.01 inch
	column	Column address 0000 ÷ 0410 Unit: 0.01 inch
	d1, d2,..	Printing character data Character data ending with CR
		By setting [02]Sn (n is a calling character string parameter specifying A ÷ P), character string data stored in the global register is picked out and printed.

Function Prints characters for contents data entered with items such as rotation, vertical and horizontal expansion rate, type of font and printing position.

Example Input data below represents that data "123" is printed with system font 6, vertical and horizontal expansion rate 1 and row and column address 0.5 inch, and data "ABC" is printed with smooth font 30pt and vertical and horizontal expansion rate row address 1.0 inch and column address 0.5 inch.

Input data	[02] n	Sets units to inch
	[02] L	Starts label format mode
	D22	Sets pixel size
	16 11 000 0050 0050 123	Sets data "123" with system font 6
	19 11 A30 0100 0050 ABC	Sets data "ABC" with smooth font 30pt
	E	Ends label format mode and prints

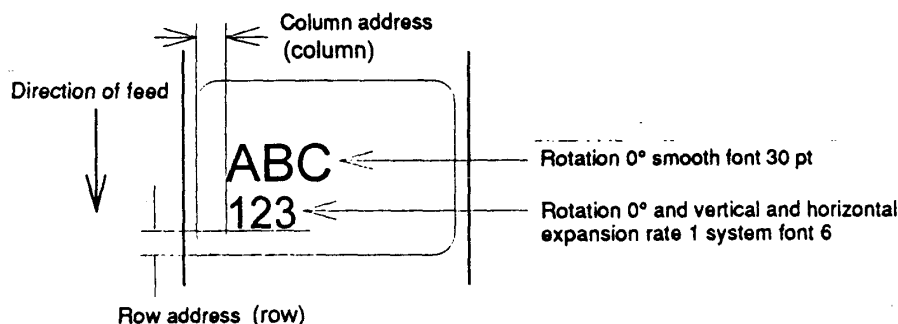


Table 1

Type of character	Font	Dot number			Pixel size horizontal (H) x vertical (V)			Units (mm)
		H	Space	V	1 x 1	2 x 2	2 x 3	
System font	0	5	1	7	0.8 x 0.9	1.5 x 1.8	1.5 x 2.6	2.3 x 1.8
	1	7	2	13	1.1 x 1.6	2.3 x 3.3	2.3 x 4.9	3.4 x 3.3
	2	10	2	18	1.5 x 2.3	3.0 x 4.5	3.0 x 6.8	4.5 x 4.5
	3	14	2	27	2.0 x 3.4	4.0 x 6.8	4.0 x 10.1	6.0 x 6.8
	4	18	3	36	2.6 x 4.5	5.3 x 9.0	5.3 x 13.5	7.9 x 9.0
	5	18	3	52	2.6 x 6.5	5.3 x 13.0	5.3 x 19.5	7.9 x 13.0
	6	32	4	64	4.6 x 8.0	9.0 x 16.0	9.0 x 24.0	13.5 x 16.0
	7	15	5	32	2.5 x 4.0	5.0 x 8.0	5.0 x 12.0	7.5 x 8.0
	8	15	5	28	2.5 x 3.5	5.0 x 7.0	5.0 x 10.5	7.5 x 7.0

Note: *1 represents that character rotation direction is 90° and 270°.

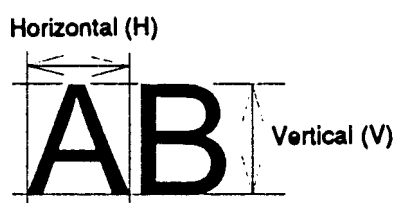


Table 2

Type of character	Font	Point or downloading ID		Point number
Smooth font	9	A06	001	6pt
		A08	002	8pt
		A10	003	10pt
		A12	004	12pt
		A14	005	14pt
		A18	006	18pt
		A24	007	24pt
		A30	008	30pt
		A36	009	36pt
		A48	010	48pt
Downloading font	9	100 Ð 999		Ñ

Bar code field definition

Code	rotate, font, thick, narrow, hight, row, column, d1, d2,.....	
Setting	rotate	Sets rotation direction for bar code 1, 2, 3, 4 1: 0; 2: 90; 3: 180; 4: 270;
	Font	Sets type of bar code (see table 3)
	thick	Sets thick bar width in 1-dot units (0.005 inch) 1 Ð 9, A Ð O (A Ð O corresponding to 10 Ð 24)
	narrow	Sets narrow bar width in 1-dot units (0.005 inch) 1 Ð 9, A Ð O (A Ð O corresponding to 10 Ð 24)
	height	Sets height of bar code data by using 3-digit numeric 001 Ð 999 Unit: 0.01 inch
	row	Row address 0000 Ð 9999 Unit: 0.01 inch
	column	Column address 0000 Ð 0410 Unit: 0.01 inch
	d1, d2,..	Bar code data See table 3
Function	Encodes contents data specified with items such as rotation, size of bar code data and printing position into bar code and prints.	
Example	Input data below is prepared with the following setting and printed.	
	font	EAN-13
	bar ratio (thick:narrow)	3:3
	height	0.6 inch
	row, column	0.5 inch, 0.5 inch
	d1, d2,..	490123456789
Input data	[02] n	Sets units to inch
	[02] L	Starts label format mode
	D11	Sets pixel size
	1F3306000500050490123456789	Sets EAN13 bar code for data "490123456789"
	E	Ends label format mode and prints

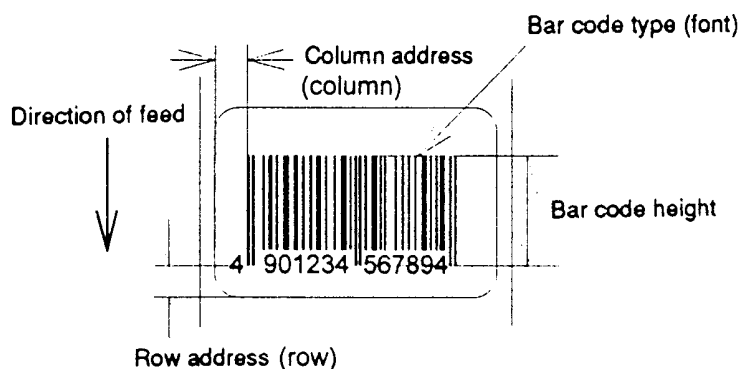


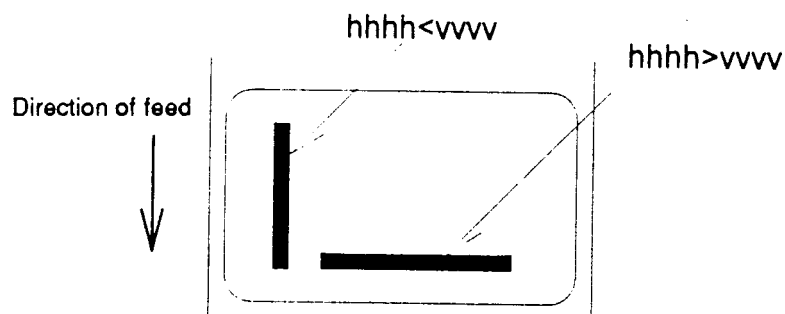
Table 3

Font	Bar code name	Bar ratio (thick:narrow)	No. of valid data
A	Code 3 of 9	3:1	Variable length
B	UPC-A	1:1, 2:2, 3:3, 4:4, 6:6, 8:8	12
C	UPC-E	1:1, 2:2, 3:3, 4:4, 6:6, 8:8	8
D	Interleaved 2 of 5	5:2	Even digit variable length
E	Code 128		Variable length
F	EAN-13 (JAN-13)	1:1, 2:2, 3:3, 4:4, 6:6, 8:8	13
G	EAN-8 (JAN-8)	1:1, 2:2, 3:3, 4:4, 6:6, 8:8	8
H	HIBC (Modulus 43-used Code 3 of 9)	3:1	Variable length
I	CODERBAR (NW-7)	3:1	Variable length
J	Int 2 of 5 (Modulus 10-used Interleaved 2 of 5)	5:2	Odd digit variable length
K	Plessey		Variable length
L	CASE CODE	5:2	14
M	UPC 2DIG ADD (UPC 2-digit supplementary code)		3
N	UPC 5DIG ADD (UPC 5-digit supplementary code)		6
O	Code 93	1:1, 2:2, 3:3, 4:4, 6:6, 8:8	Variable length
p	ZIP		Variable length
Q	UCC/EAN128	1:1, 2:2, 3:3, 4:4, 6:6, 8:8	19*
R	UCC/EAN128 (for K-MART)	1:1, 2:2, 3:3, 4:4, 6:6, 8:8	18*
S	UCC/EAN128 Random Weight	1:1, 2:2, 3:3, 4:4, 6:6, 8:8	34 or more*
T	Telepen		Variable length*
u	UPS MaxiCode		84 or less*
v	FIM		1*
z	PDF417		Variable length

(The number of valid data marked with asterisk is only used for input data length.)

Ruled line definition

Code	1X11, 000, row, column, Lhhhvvv or 1hhhhvvvv	
Setting	1X11	1X11 fixed
	000	000 fixed
	row	row address 0000 Ð 9999
	column	column address 0000 Ð 0398
	L	Specifies line (3-digit)
	hhh	Specifies horizontal width
	vvv	Specifies vertical width
	1	Specifies line (4-digit)
	hhhh	Specifies horizontal width
	vvvv	Specifies vertical width
Units	0.01 inch	
Function	Prints ruled line with specified width. hhhh>vvvv designates horizontal line. hhhh<vvvv designates vertical line.	
Example	Input data below represents that ruled line with horizontal width of hhh 10 and vertical width of vvv 150 and ruled line with horizontal width of hhh 200 and vertical width of vvv 10 are printed.	
Input data	[02] n	Sets units to inch
	[02] L	Starts label format mode
	1X1100000500050L010150	Sets ruled line with 0.1 x 1.5 inch
	1X1100000500100L200010	Sets ruled line with 2.0 x 0.1 inch
	E	Ends label format mode and prints



Box definition

Code 1X11, 000, row, column, Bhhhvvbbbsss or bhhhhvvvvbbbbssss

Setting

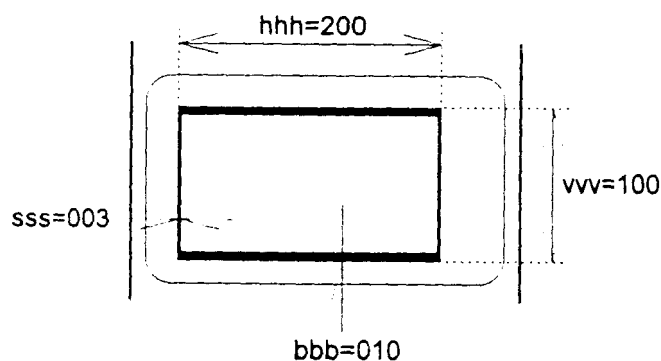
1X11	1X11 fixed
000	000 fixed
row	row address 0000 Ð 9999
column	column address 0000 Ð 0410
B	Specifies box (3-digit)
hhh	Specifies horizontal width of box
vvv	Specifies vertical width of box
bbb	Specifies top and bottom line width
sss	Specifies left and right line width
b	Specifies box (4-digit)
hhhh	Specifies horizontal width of box
vvvv	Specifies vertical width of box
bbbb	Specifies top and bottom line width
ssss	Specifies left and right line width

Units 0.01 inch (0.1 mm)

Function Prints box with specified dimension.

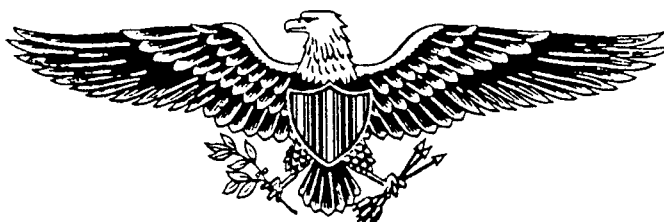
Example Input data below represents that box with horizontal width of hhh 200, vertical width of vvv 100, upper and lower ruled line width of bbb 10 and both side line width of sss 3 is printed.

Input data	[02] n	Sets units to inch
	[02] L	Starts label format mode
	1X1100000500050B200100010003	Sets box with 2.0 (horizontal) x 1.0 (vertical) inch
	E	Ends label format mode and prints



Graphics printing definition

Code	rotate, Y, hexp, vexp, 000, row, column, graphic	
Setting	rotate	Sets graphic data rotation direction to 1 (fixed)
	Y	Y fixed
	hexp	Sets expansion rate in horizontal direction 1 Ð 9, A Ð O (A Ð O corresponding to 10 Ð 24)
	vexp	Sets expansion rate in vertical direction 1 Ð 9, A Ð O (A Ð O corresponding to 10 Ð 24)
	000	000 fixed
	row	Row address 0000 Ð 9999
	column	Column address 0000 Ð 0398
	graphic	Specifies graphic file name to be printed
Function	Picks out file name from the memory module and prints.	
Caution	Graphic file to be printed with this command must be stored in the memory module.	
Example	Input data below represents that file name "IMAGE" in the memory module is printed.	
Input data	[02] n	Sets units to inch
	[02] L	Starts label format mode
	1Y1100000500050IMAGE	Sets graphic file name "IMAGE"
	E	Ends label format mode and prints



Reading out from global register

Code	rotate, font, hexp, vexp, point, row, column, [02], S, a	
Setting	rotate	Sets rotation direction for character data 1, 2, 3, 4 1: 0 _i 2: 90 _i 3: 180 _i 4: 270 _i
	Font	Sets type of character (see table 1)
	hexp	Sets expansion rate in horizontal direction 1 ÷ 9, A ÷ O (A ÷ O corresponding to 10 ÷ 24)
	vexp	Sets expansion rate in vertical direction 1 ÷ 9, A ÷ O (A ÷ O corresponding to 10 ÷ 24)
	point	Sets size of smooth font CG Triumvirate: A06 ÷ A48 (corresponding to 10 types of 6 to 48pt) Setting of this item is valid only when font is set to 9.
	row	Row address 0000 ÷ 9999 Unit: 0.01 inch
	column	Column address 0000 ÷ 0410 Unit: 0.01 inch
	[02]	[02]hex fixed
	S	Specifies reading out of global register
	a	Specifies global register No. Alphabet (from A to P)
Function	Reads out data stored in global register with G command.	
Example	See sample No. 3 in Appendix 5.	

Polygon definition

Code 1X11, ppp, row, column, P ppp bbbb row, column, row, column

Setting

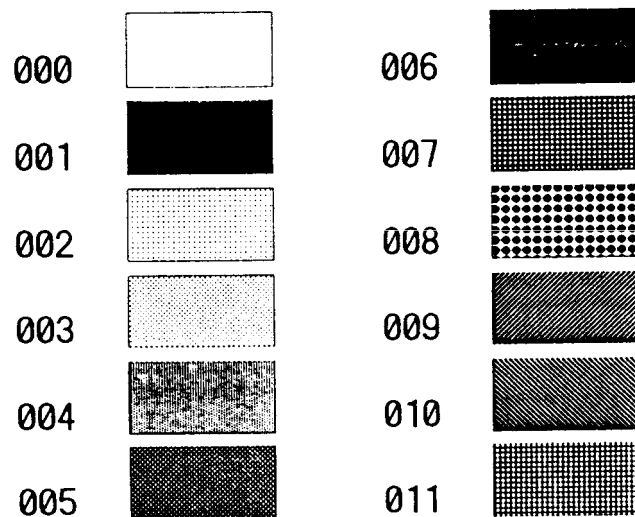
1X11	1X11 fixed
ppp	Dot pattern 000 Ð 011
row	1st point row address 0000 Ð 9999
column	1st point column address 0000 Ð 0398
P	Specifies polygon
ppp	001 fixed
bbbb	0001 fixed
row	2nd point row address 0000 Ð 9999
column	2nd point column address 0000 Ð 0398
row	3rd point row address 0000 Ð 9999
column	3rd point column address 0000 Ð 0398

After this, repeats row and column

Units 0.01 inch

Function Draws polygon with specified point and dots inside with specified pattern.

Dot pattern 12 dot patterns from 0 Ð 11 are shown below.



Example Input data below represents that triangle with three points, row 0.20 inch/column 0.10 inch, row 0.60 inch/column 0.30 inch, and row 0.20 inch/column 0.50 inch, is drawn and inside is dotted with pattern 6 (50% black).

Input data

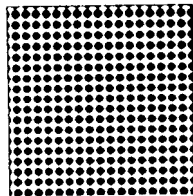
[02] n	Sets units to inch
[02] L	Starts label format mode
D11	Sets pixel size
1X11 006 0020 0010 P 001 0001 0060 0030 0020 0050	
	Sets polygon
E	Ends label format mode and prints



Example Input data below represents that rectangle with four points, row 0.20 inch/column 0.20 inch, row 0.40 inch/column 0.20 inch, row 0.40 inch/column 1.00 inch, and row 0.20 inch/column 1.00 inch, is drawn and inside is dotted with pattern 8 (little circle).

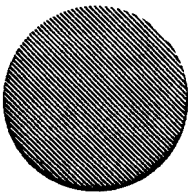
Input data

[02] n	Sets units to inch
[02] L	Starts label format mode
D11	Sets pixel size
1X11 008 0020 0020 P 001 0001 0040 0020 0040 0100 0020 0100	
	Sets polygon
E	Ends label format mode and prints



Circle definition

Code	1X11, ppp, row, column, C ppp bbbb, radius	
Setting	1X11	1X11 fixed
	ppp	Dot pattern 000 Ð 011
	row	Circle center row address 0000 Ð 9999
	column	Circle center column address 0000 Ð 0398
	C	Specifies circle
	ppp	001 fixed
	bbbb	0001 fixed
	radius	Radius 0000 Ð 0398
Units	0.01 inch	
Function	Draws circle with specified center and radius and dots inside with specified pattern.	
Example	Input data below represents that circle with center of row 0.50 inch/column 0.50 inch and radius of 0.30 inch is drawn and inside is dotted with pattern 10 (left diagonal lines).	
Input data	[02] n	Sets units to inch
	[02] L	Starts label format mode
	D11	Sets pixel size
	1X11 010 0050 0050 C 001 0001 0030	
		Sets circle
	E	Ends label format mode and prints



Date and time printing definition

Code	rotate, font, hexp, vexp, point, row, column, [02], T, tdata...
Setting	<p>rotate Sets rotation direction for character data 1, 2, 3, 4 1: 0; 2: 90; 3: 180; 4: 270;</p> <p>Font Sets type of character (see table 1)</p> <p>hexp Sets expansion rate in horizontal direction 1 ÷ 9, A ÷ O (A ÷ O corresponding to 10 ÷ 24)</p> <p>vexp Sets expansion rate in vertical direction 1 ÷ 9, A ÷ O (A ÷ O corresponding to 10 ÷ 24)</p> <p>point Sets size of smooth font A06 ÷ A48 (corresponding to 6 to 48pt) Setting of this item is valid only when font is set to 9.</p> <p>row Row address 0000 ÷ 9999 Unit: 0.01 inch</p> <p>column Column address 0000 ÷ 0410 Unit: 0.01 inch</p> <p>[02] [02]hex fixed</p> <p>T Specifies writing of time data</p> <p>tdata... Specifies date and time printing format by using the following alphabet and spaces</p> <p> A 1-digit day of week 0 ÷ 6 (Sunday to Saturday)</p> <p> BCD Name of day of the week Monday (MON)</p> <p> EF 2-digit month number 1 ÷ 12 (January to December)</p> <p> GHI...NO Name of the month January (JANUARY)</p> <p> PQ 2-digit date 15 (day of 15)</p> <p> RSTU 4-digit year number 1995 (year of 1995)</p> <p> VW 2-digit time 24-hour display</p> <p> XY 2-digit time 12-hour display</p> <p> Za 2-digit minute 50 (minute of 50)</p> <p> bc Morning, Afternoon AM (Morning), PM (Afternoon)</p> <p> def Total number of the days from January 1st</p>
Function	Reads out and prints date and time in the calendar of the printer according to the specified format with this command.
Example	Input data below represents that date and time with specified format of name of day of the week (BCD), name of the month (GHI), date (PQ) and year number (RSTU) are printed.
Input data	<p>[02] n Sets units to inch</p> <p>[02] L Starts label format mode</p> <p>D11 Sets pixel size</p> <p>190000500500050[02]TBCD GHI PQ, RSTU Sets day of the week, month, date and year number</p>

E Ends label format mode and prints

Chapter 2

Fonts and Bar Codes

2.1 Description of Fonts 2-2

2.2 Description of Bar Codes 2-7

Fonts and bar codes for this printer are listed below. Each name is expressed in numeric for fonts and in alphabetic characters for bar codes. Visible or non-visible code is identified with upper-case or lower-case alphabetic characters for the bar code name. Upper-case characters allow printer to print visible code bar code, while lower-case characters allow printer to print non-visible code bar code.

2.1 Description of Fonts

The following print sample is printed with pixel size of 1 dot x 1 dot, and the dot pattern in horizontal and vertical direction is printed with 1 time.

Font 0: Upper- and lower-case alphanumeric characters. Character size: 7 dots (height) x 5 dots (width) x 1 dot (space)

1-800-444-4444
BETHLEHEM, PA. 18015
BETHLEHEM, PA. 18015
BETHLEHEM, PA. 18015
BETHLEHEM, PA. 18015
BETHLEHEM, PA. 18015

Font 1: Upper- and lower-case alphanumeric characters. Character size: 13 dots (height) x 7 dots (width) x 2 dots (space)

```

! " # $ % & ' ( ) * + , - . /
0 1 2 3 4 5 6 7 8 9 : ; < = > ?
@ A B C D E F G H I J K L M N O
P Q R S T U V W X Y Z [ \ ] ^ _ `
' a b c d e f g h i j k l m n o
p q r s t u v w x y z { | } ~ ¡ ¢
£ ¤ ¥ ¦ § ¨ © ª « ¬ ® ¯ ° ±
² ³ ´ µ ¶ · ¸ ¹ º » ¼ ½ ¾
¿ À Á Â Ã Ä Å Æ Ç È É Ê Ë

```

Font 2: Upper- and lower-case alphanumeric characters. Character size: 18 dots (height) x 10 dots (width) x 2 dots (space)

```
!"#$%&'()*+,-./
0123456789:;<=>?
@ABCDEFGHIJKLMNO
PQRSTUVWXYZ[\]^_
`abcdefghijklmnopqrstuvwxyz
{|}~
ÇüëääåäçöøÿııİıÅ
ẼẼŁłóóúúýýÜÜẞẞ×
áíóúññªº¿~¼½¾¿<>
€ ¥
```

Font 3: Upper- and lower-case alphanumeric characters. Character size: 27 dots (height) x 14 dots (width) x 2 dots (space)

!"#\$%&'()*+,-./
0123456789:;<=>?
@ABCDEFGHIJKLMNO
PQRSTUVWXYZ[\]^_
`abcdefghijklmno
pqrstuvwxyz{|}~
ÇüéâäååçêëèìíîÄÅ
ÉæŒðöòóùýÿÖÜø&Ø×ƒ
áíóúñÑªº¿½¼¡«»
¢¥β

Font 4: Upper- and lower-case alphanumeric characters. Character size: 36 dots (height) x 18 dots (width) x 3 dots (space)

!"#\$%&'()*+,-./
0123456789:;<=>?
@ABCDEFGHIJKLMNO
PQRSTUVWXYZ[\]^_
`abcdefghijklmno
pqrstuvwxyz{|}~
ÇüéâäååçêëèìíîÄÅ
ÉæŒðöòóùýÿÖÜø&Ø×ƒ
áíóúñÑªº¿½¼¡«»
¢¥β

Font 5: Upper- and lower-case alphanumeric characters. Character size: 52 dots (height) x 18 dots (width) x 3 dots (space)

!"#\$%&'()*+,-./
0123456789:;<=>?
@ABCDEFGHIJKLMNO
PQRSTUVWXYZ[\]^_
`abcdefghijklmno
pqrstuvwxyz{|}~
ÇüéâäåçêëèïîËÄ
ÉæŁôöòûüÿÖÜø&Øxf
áíóúñÑªº¿®¬½¼¡«»
¢¥β

Font 6: Upper- and lower-case alphanumeric characters. Character size: 64 dots (height) x 32 dots (width) x 4 dots (space)

!"#\$%&'()*+,-./
0123456789:;<=>?
@ABCDEFGHIJKLMNO
PQRSTUVWXYZ[\]^_
`abcdefghijklmno
pqrstuvwxyz{|}~
ÇüéâäåçêëèïîËÄ
ÉæŁôöòûüÿÖÜø&Øxf
áíóúñÑªº¿®¬½¼¡«»
¢¥β

Font 7: Upper-case alphabetic characters and numeric OCR-A font. Character size: 32 dots (height) x 15 dots (width) x 5 dots (space)

!"#\$%&'()*+,-./
0123456789:;<=>?
@ABCDEFGHIJKLMNO
PQRSTUVWXYZ[\]^_`
~abcdefghijklmnopqrstuvwxyz{|}~

Font 8: Upper- and lower-case alphabetic characters and numeric OCR-B font. Character size: 28 dots (height) x 15 dots (width) x 5 dots (space)

!"#\$%&'()*+,-./
0123456789:;<=>?
@ABCDEFGHIJKLMNO
PQRSTUVWXYZ[\]^_
`abcdefghijklmnopqrstuvwxyz{|}~

Font 9: Upper- and lower-case alphabetic characters, numeric and extension font (CG Triumvirate smooth font). Character size is any of 6, 8, 10, 12, 14, 18, 24, 30, 36, or 48 points.

6 pt ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz0123456789

8 pt ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz012345

10 pt ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz

12 pt ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz

14 pt ABCDEFGHIJKLMNOPQRSTUVWXYZ

18 pt ABCDEFGHIJKLMNOPQRST

24 pt ABCDEFGHIJKLMN

30 pt ABCDEFGHIJK

36 pt ABCDEFG

48 pt ABCDE

ABCDEFGHIJKLMNOPQRSTUVWXYZ

XYZ0123456789abcdefghijklmnopqrstuvwxyz

rstuvwxyz !"#\$%&'()*+,-./012345

6789;<=>?@[\\]^_`{|}~Çüéâääå

èïïÄÅÉæÆôöòûÿÖÜø£Ø×fáíóúñ

©½¼¡âÀ©¢¥ãÃðÐÊËÈÍÎÏßÔÕõ

μρÚÛÜÝ±¾÷,°".

2.2 Description of Bar Codes

The following print sample is printed with a pixel size of 1 dot x 1 dot. The dot pattern in horizontal and vertical direction is printed with 1 time.

Bar code A: Code 3 of 9

This bar code consists of upper-case alphanumeric characters. Number of digits is variable in length. Start/stop codes "*" are given automatically by printer. Valid ASCII codes are as follows: 32, 36-37, 43, 45-47, 48-57, 65-90. Standard ratio (ratio of thick bar to thin bar) of Code 3 of 9 is 3 : 1.



Bar code B: UPC-A

This bar code consists of only numeric characters and is 12-digit fixed length. The 11-digit numerics are input from the computer or applications software and the 12th digit is a checksum which is calculated automatically by the printer.

When the 12th digit numeric is sent by the computer, the printer compares the characters with the calculated checksum. If they do not agree, the printer prints all bar codes 0 (zero).

If supplementary code is to be added, refer to item of bar code M and N. Element size is 1 : 1, 2 : 2, 3 : 3, 4 : 4, 6 : 6, and 8 : 8.



Bar code C: UPC-E

This bar code consists of only numeric characters and is 8-digit fixed length. The first digit numbering system character is "0" fixed so it is not transmitted. The 6th or 7th digit numeric excluding numbering system character is sent by the computer or applications software. (Transmit UPC-A shortening code.) The printer automatically calculates the checksum at the end of digit (8th). When the 8th digit numeric is transmitted by the computer, the printer compares the characters with the calculated checksum. If they do not agree, the printer prints all bar codes 0. If supplementary code is to be added, refer to item of bar code M and N. Element size is 1 : 1, 2 : 2, 3 : 3, 4 : 4, 6 : 6, and 8 : 8.



Bar code D: Interleaved 2 of 5

This bar code consists of only numeric characters and even digits are variable in length. When an odd digit code is transmitted, the printer automatically adds one digit with 0 to the top of the transmission code to convert the number of digits to an even number. When even digit code is transmitted, the checksum is not added. Valid ASCII code is 48-57. Standard ratio (ratio of thick bar to thin bar) is 5 : 2.



Bar code E: Code 128

This bar code consists of the full ASCII set of 128 characters and number of digits is variable in length. Checksum is performed through the modulus 103 calculation and added to the end of digit. This printer supports code subsets A, B and C. When one character of either A, B, or C is added to the top of the transmission code, the printer selects the starting order of the code subset. When neither A, B, nor C is added to the top of the transmission code, code subset B is selected.

Code subset A is a bar code which consists of standard upper-case alphabetic characters, numerics, keyboard characters, control characters and special characters. To select code subset A, data must be coded beforehand in ASCII code A (65 decimal, 41 hex).

Code subset B is a bar code which consists of standard upper- and lower-case alphabetic characters, numerics, keyboard characters, control characters and special characters. To select code subset B, data must be coded beforehand in ASCII code B (66 decimal, 42 hex).

Code subset C is a bar code which consists of special characters and 2 digits from 00 to 99. The numeric digit number gets coded twice. To select code subset C, data must be coded beforehand in ASCII code C (67 decimal, 43 hex). When code subset C is selected, the alphabetic characters should not be coded.

Special character processing

Characters of code number 96 or more are special characters. To input these characters, the 2-character input reference table is shown below.

Code	2 characters	Code subset A	Code subset B	Code subset C
96	&A	FNC3	FNC3	- NA -
97	&B	FNC2	FNC2	- NA -
98	&C	SHIFT	SHIFT	- NA -
99	&D	CODEC	CODEC	- NA -
100	&E	CODEB	FNC4	CODEB
101	&F	FNC4	CODEA	CODEA
102	&G	FNC1	FNC1	FNC1

As an example of special character processing, code subset selection is provided:

<Code subset selection>

First select: Either 1-character entry of A, B, or C

Switch in midway: 2-character entry such as &D, &F

[Example] The TEST bar code is first printed with code subset B, and then 123 bar code with code subset A. Data is transmitted in the order of B, TEST, 2-character &F, and 123.

Input code: BTEST&F123

Bar code data: <CODEB>TEST<CODEA>123

Control code

Control characters are coded into code subset A. See the character input reference table below.

Control code	Input character	Control code	Input character	Control code	Input character
NUL	`	VT	k	SYN	v
SOH	a	FF	l	ETB	w
STX	b	CR	m	CAN	x
ETX	c	SO	n	EM	y
EOT	d	SI	o	SUB	z
ENQ	e	DLE	p	ESC	{
ACK	f	DC1	q	FS	|
BEL	g	DC2	r	GS	}
BS	h	DC3	s	RS	~
HT	i	DC4	t	US	DEL
LF	j	NAK	u		



Bar code F: EAN-13 (JAN-13)

This bar code consists of only numeric characters and is 13-digit fixed length. The 12-digit numerics are input from the computer or applications software and the 13th digit is a checksum automatically calculated by the printer. When the 13th digit numeric is sent by the computer, the printer compares the characters with the calculated checksum. If they do not agree, the printer prints all bar codes 0 (zero). If supplementary code is to be added, refer to item of bar code M and N. Element size is 1 : 1, 2 : 2, 3 : 3, 4 : 4, 6 : 6, and 8 : 8.



Bar code G: EAN-8 (JAN-8)

This bar code consists of only numeric characters and is 8-digit fixed length. The 7-digit numerics are input from the computer or applications software and the 8th digit is a checksum automatically calculated by the printer. When the 8th digit numeric is sent from the computer, the printer compares the characters with the calculated checksum. If they do not agree, the printer prints all bar codes 0 (zero). If supplementary code is to be added, refer to item of bar code M and N. Element size is 1 : 1, 2 : 2, 3 : 3, 4 : 4, 6 : 6, and 8 : 8.



Bar code H: HIBC

This is a bar code of the Code 3 of 9 HIBC (modulus 43 checksum) version and consists of upper-case alphanumeric characters. Number of digits is variable in length. Checksum is added to the end of data. To specify the type of data format, enter "+" in the top of data. Start/stop codes "*" are automatically added by the printer. Valid ASCII codes are as follows: 32, 36-37, 43, 45-47, 48-57, 65-90. The standard HIBC ratio (ratio of thick bar to thin bar) is 3 : 1, as same as Code 3 of 9.



Bar code I: CODABAR

Basically, this code consists of only numeric characters and number of digits is variable in length. Valid codes are "0123456789abcd\$+-. /:" Standard ratio is 3 : 1. This bar code needs start/stop codes so either of a, b, c, or d must be added to the transmission code.



Bar code J: Interleaved 2 of 5 W/BARS

This is a bar code of the Interleaved 2 of 5 modulus 10 checksum and even digits including checksum are variable in length. Basically, code must be transmitted in an odd digit. The printer automatically calculates the data and adds the checksum to the end of transmission code. When even digit code is transmitted, the printer automatically adds 0 (zero) to the top of data. Valid ASCII code is 48-57. Standard ratio is 5 : 2.



Bar code K: PLESSEY

This bar code consists of only numeric characters and number of digits is variable in length. Checksum is added to the end of digit through the modulus 10 calculation.



Bar code L: CASE CODE

This is a case code of the Interleaved 2 of 5 modulus 10 checksum and is 14-digit fixed length. Valid ASCII code is 48-57. Standard ratio is 5 : 2. For JIS-based case code, refer to item of command P and Q.



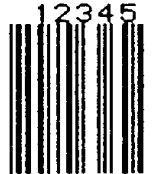
Bar code M: UPC 2DIG ADD

This is a supplementary code of 2 digits for UPC and consists of only numeric characters and is 3-digit fixed length. The 2-digit numerics are input from the computer or applications software and the 3rd digit is a checksum automatically calculated by the printer. When the 3rd digit numeric is sent from the computer, the printer compares the characters with the calculated checksum. If they do not agree, the printer prints all bar codes 0 (zero).



Bar code N: UPC 5DIG ADD

This is a supplementary code of 5 digits for UPC and consists of only numeric characters and is 6-digit fixed length. The 5-digit numerics are input from the computer or applications software and the 6th digit is a checksum automatically calculated by the printer. If the 6th digit numeric is sent from the computer, the printer compares the characters with the calculated checksum. If they do not agree, the printer prints all bar codes 0 (zero).



Bar code O: Code 93

This bar code consists of alphanumeric characters and number of digits is variable in length. Valid ASCII codes are ":", &#@\$%*+—
./ABCDEFGHIJKLMNPOQRSTUVWXYZ
0123456789abcdefghijklmnopqrstuvwxyz." Element size is
1 : 1, 2 : 2, 3 : 3, 4 : 4, 6 : 6, and 8 : 8.



Bar code p: ZIP

This bar code consists of only numeric characters and number of digits is variable in length. Checksum is added to the end of data. The width and height of bar code is specified as same as fonts. Only lower-case characters are valid for setting bar code types.



Bar code Q: UCC/EAN-128

Number of digits is fixed in length and data is input with 19-digit numerics. Ratio depends on the value of thin bar.



Bar code R: UCC/EAN-128 (for K-MART)

Number of digits is fixed in length and data is input with 18-digit numerics. Ratio depends on the value of thin bar.



Bar code S: UCC/EAN-128 Random Weight

Number of digits is fixed in length and data is input with at least 24-digit numerics. Ratio depends on the value of thin bar.



Bar code T: Telepen

Number of digits is fixed in length. Ratio depends on the value of thin bar.

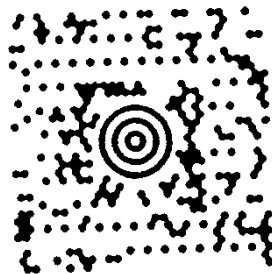


Bar code u: UPS MaxiCode

This bar code consists of alphanumeric characters and number is digits variable in length. Only lower-case characters are valid for setting bar code types.

Input data consists of the following five elements:

- 5-digit Zip code
- 4-digit +4 Zip code
- 3-digit nationality code
- 3-digit class of service code
- 84-digit or less data character string



Bar code v: FIM

This bar code consists of alphabet A, B, C, and D and number of digits is fixed in length. The width and height of bar code is specified as same as fonts. Only lower-case characters are valid for setting bar code types.



Bar code z: PDF-417

This is a two-dimensional bar code and variable in length. Only lower-case characters are valid for setting bar code types.

Input data consists of the following six elements:

- 1-digit Truncate flag: T (omission type) or F (standard type)
- 1-digit Security level: 0 – 8
- 2-digit Ratio (numerator 1st digit and denominator 2nd digit in fraction): 00 – 99
Default: 00 (ratio of 1: 3)
- 2-digit Height: 03 – 90
Default: 00
- 2-digit Width: 01 – 30
Default: 00
- Variable in length Data character string



Chapter 3

Overlay Function

3.1 Outline	3-2
3.2 Type of Memory	3-2
3.3 Storage and Readout Commands	3-2
3.4 Type of Graphic Image Data	3-3
3.5 Font Downloading Commands	3-4

3.1 Outline

This printer once stores the required images, ruled lines and character strings in the on-board RAM or optional IC card, then overlays the data onto the printing data.

3.2 Type of Memory

Two types of memory are available for this printer.

- 1 On-board RAM (standard)
512 K bytes, volatile storage memory
- 2 Memory card: PCMCIA TYPE I (option)
1 M bytes, non-volatile storage memory

3.3 Storage and Readout Commands

Two commands are available for storage and readout.

- 1 System level commands (occasional execution commands starting with 02H)
Graphic image writing commands for on-board RAM or IC card
I (A/B) faa..a
- 2 Label format commands (occasional execution commands without control codes)
Graphic data reading commands for on-board RAM or IC card
1Yaa000aa..a
Commands for reading and writing printing data (such as ruled lines and character strings) in the on-board RAM or IC card
s(A/B) aa..a
raa..a

The user gives the required name to the data to be stored by using these commands and the data is read out with this name.

3.4 Type of Graphic Image Data

The data to be stored in the on-board RAM or IC card with the command "I(A/B)faa..a" above are as follows:

- 1 7-bit image loading file data
Without header
Data in ASCII codes
- 2 8-bit image format data (image saved in reverse)
With header
Data in hex codes
- 3 8-bit image format data (image saved in normal)
With header
Data in hex codes
- 4 PCX format data (saved in normal)
- 5 PCX format data (saved in reverse)
- 6 BMP format data (saved in normal)
- 7 BMP format data (saved in reverse)

For details, refer to 4.6 Graphic Printing in Chapter 4 Printing Command Examples.

3.5 Font Downloading Commands

Font downloading commands are used to transmit the user-specified font (bit map font) to the flash memory card or on-board RAM. The transmission of the downloading font data is in conformity with the HP standard ESC sequence.

Command	Function
ESC*c###D	Font ID specification ### = ID number specified with 3 digits 000 - 099: reserved with on-board fonts 100 - 999: specified among these numbers
ESC)s#Wnn..n	Font structure specification # = number of data following this indicated nn...n: font structure data (font header definition)
ESC*c#E	Character code specification # = ASCII character number specified
ESC(s#Wnn...n	Downloading font data # = number of data following this indicated nn...n: actual bit map data

Chapter 4

Printing Command Examples

- 4.1 Printing Position Specification 4-2
- 4.2 Character Printing 4-3
- 4.3 Ruled Line Printing 4-4
- 4.4 Bar Code Printing 4-5
- 4.5 Increasing and Decreasing Number Printing 4-6
- 4.6 Sample Printing 4-8

This chapter describes the procedure for program preparation and actual program examples for printing data.

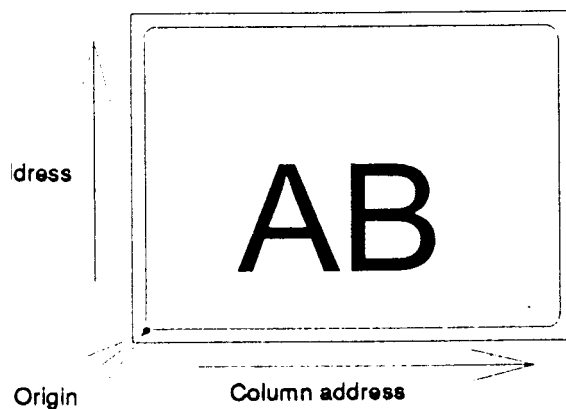
4.1 Printing Position Specification

The origin for positioning bar codes or characters to be printed on labels is at the bottom left of label, and with the distance from that point, the printing position is designated.

The distance upward from the point is called the row address, while the distance rightward from the point is called the column address. Units of 0.01 inch or 0.1 mm are used. Changing units is provided with the m command. In this explanation, the address is specified in 0.1 mm units.

Relevant command: m

After receiving this command, all length specification commands are in 0.1 mm units.



The origin for row address is 2 mm from the top of the paper.

Note: Data in [] is hex.

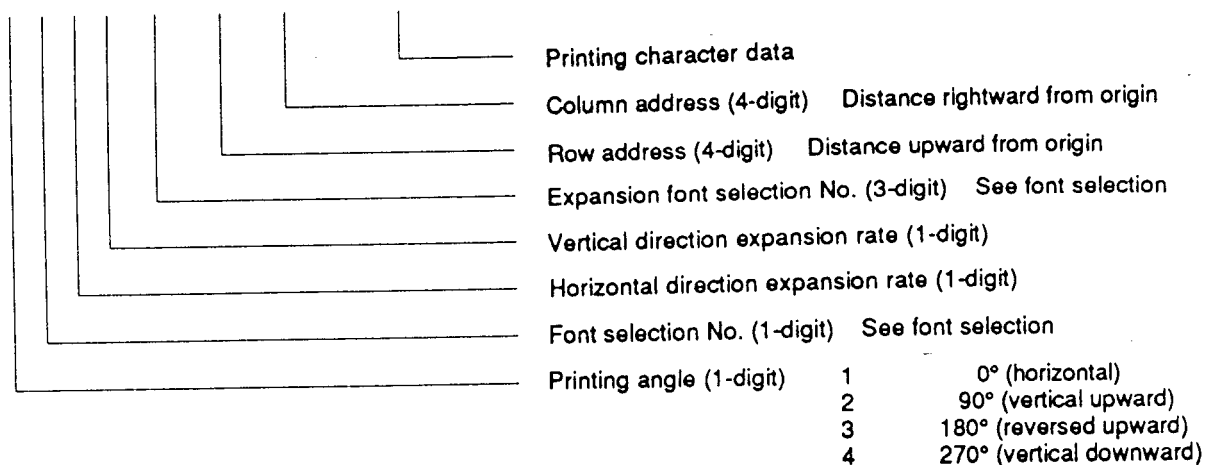
4.2 Character Printing

When characters or strings are to be printed, attribute data such as printing direction and printing position must be added to the top of the strings. With the program example printing "AB" on the previous page, the contents of the character printing are described below.

Program example

[02] m	Sets units to metric system
[02] L	Starts label format mode
D11	Sets pixel size
361100004000800AB	Character data
E	Ends label format mode and prints

3 6 1 1 000 0400 0800 AB



Font selection (ANK/alphabet):

To select the font, specify a font selection number from 1 to 8 or 9. When font number 9 is selected, the expansion font is selected according to the contents of the expansion font selection number.

391100504000800AB

4.3 Ruled Line Printing

When ruled lines are to be printed, attribute data such as printing position and line types must be included in the command.

Ruled line drawing command: Lhhhvvv, lhhhhvvvv

L, l: Specifies line drawing L sets 3-column width and l sets 4-column width

hhh, hhhh: Specifies width of line in horizontal direction

vvv, vvvv: Specifies width of line in vertical direction

Square drawing command: Bhhhvvvbbbsss, bhhhhvvvvbbbbssss

B, b: Specifies box drawing B sets 3-column width and height and b sets 4-column width and height

hhh, hhhh: Specifies width of box in horizontal direction

vvv, vvvv: Specifies width of box in vertical direction

bbb, bbbb: Specifies width of line in horizontal direction

sss, ssss: Specifies width of line in vertical direction

Program examples

1X1100006000200L40008
direction

Thick ruled line in horizontal

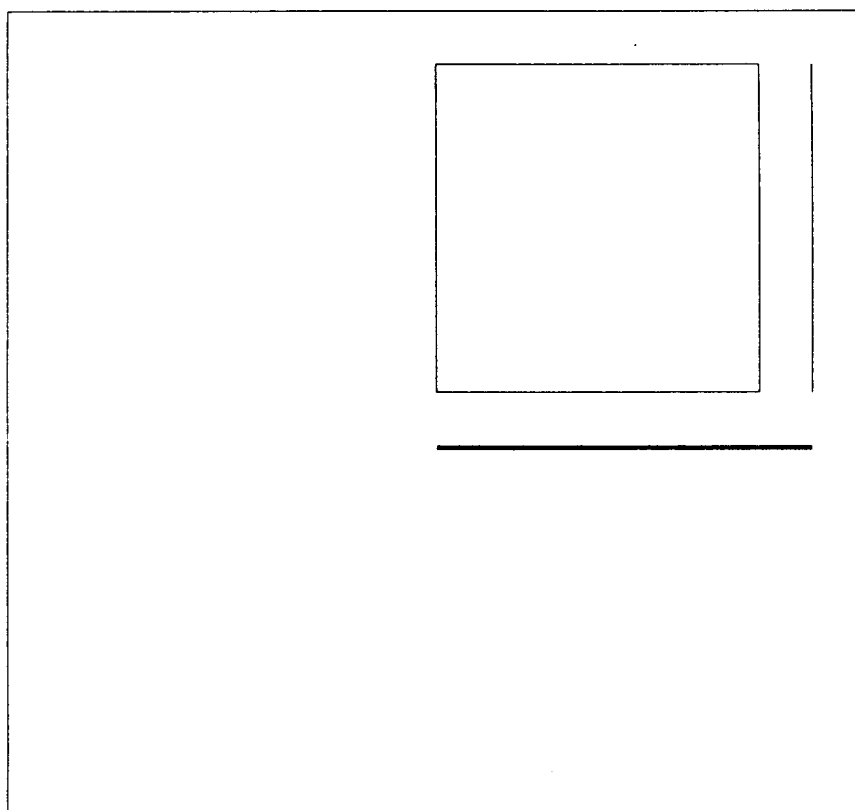
1X1100001000200L002300

Ruled line in vertical direction

1X1100001000300B240320002002

Box printing

Print sample

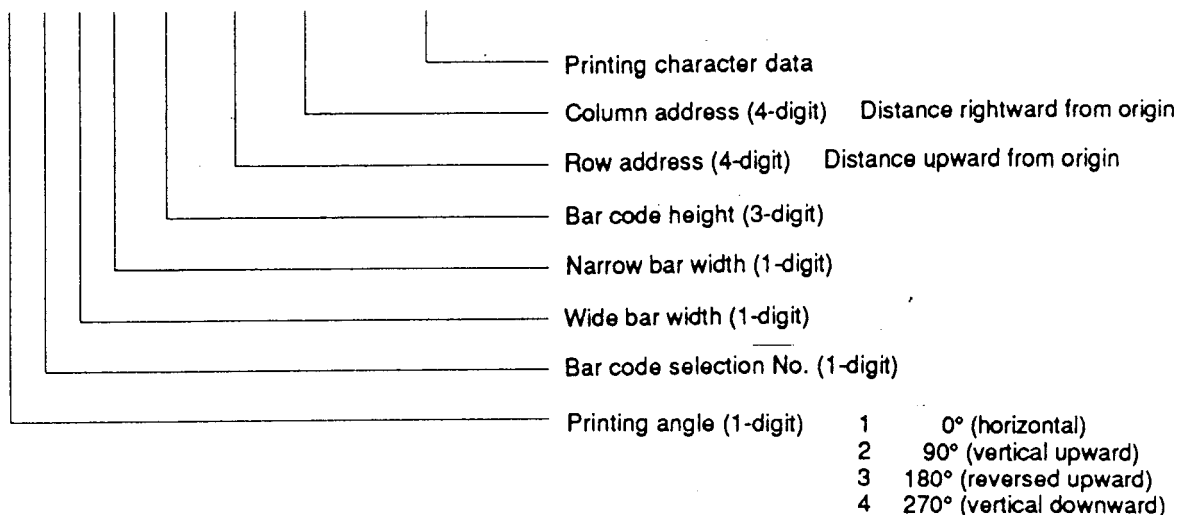


4.4 Bar Code Printing

When bar codes are to be printed, attribute data such as printing position and bar code types must be included in the command.

Program description

3 A 6 2 090 0200 0700 BARCODE



Bar code selection number

Number	Bar code name
A	3 OF 9
D	I 2 OF 5
H	HIBC
I	CODABAR
J	12 OF 5 W/BARS
K	PLESSEY
L	CASECODE
B	UPC-A
C	UPC-E
E	CODE 128 (B)
F	EAN-13
G	EAN-8
M	UPC 2 DIG ADD
N	UPC 5 DIG ADD
O	CODE 93
p	ZIP
Q	UCC/EAN 128
R	UCC/EAN 128 (for KMART)
S	UCC/EAN/128 Random Weight
T	Telepen
u	UPS MaxiCode
v	FIM
z	DF417

4.5 Increasing and Decreasing Number Printing

When continuously increasing and decreasing numbers like serial numbers are to be printed on labels, continuous printing can be performed automatically by the counter in the printer. At this time, the number of steps for increasing and decreasing (addition and subtraction width) and number of prints of the same label can be set.

Command outline is as follows:

+pii : ii decimal ii value is added
-pii : ii decimal ii value is subtracted
>pii : ii base 36 system ii value from 0 to Z is added
<pii : ii base 36 system ii value from 0 to Z is subtracted

Note: p value is zero-fill character

^nn : Prints same number nn times and advances to the next counter

Example 1: One addition (Fig. 1)

[02] m
[02] L
D22
331100003000800100
+01
Q0004
E

Example 2: Two subtractions (Fig. 2)

[02] m
[02] L
D22
331100003000800100
- 2
Q0004
E

Example 3: Three additions and two prints (Fig. 3)

[02] m
[02] L
D22
331100003000800100
+03
^02
Q0004
E

Example 4: Five additions and base 36 system (Fig. 4)

[02] m
[02] L
D22
331100003000800100
>05
Q0004
E

100

101

102

103

Fig.1

100

98

96

94

Fig. 2

100

100

103

103

Fig. 3

100

105

10A

10F

Fig. 4

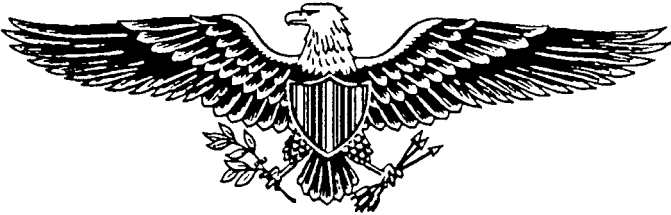

4.6 Sample Printing

The print sample and printing data combining the commands above are as follows:

[02] m	Sets units to metric system
[02] M1500	Max. label length
[02] L	Starts label format mode
PK	Printing speed
SO	Paper feed speed
D11	Sets pixel size
C0000	Offset in direction of column (vertical)
R0000	Offset in direction of row (horizontal)
H10	Printing density (amount of thermal transfer)
1X1100000500050B950900010010	Specifies box field
1X1100008500060L930005	Specifies ruled line field 1
1X1100008550750L005085	Specifies ruled line field 2
1X1100005000060L930005	Specifies ruled line field 3
3a931000800085001234567890123	Specifies bar code field
321100006000930SERIAL	Specifies character field
321100006500880(SN)	Specifies character field
35110000650070001234567890123	Specifies character field
1Y1100001200060washi	Specifies graphics field
E	Ends label format mode and prints

(Note: Data in [] is hex.)

Print sample

	
SERIAL	
(SN)	01234567890123
	

Chapter 5

Interface Functions

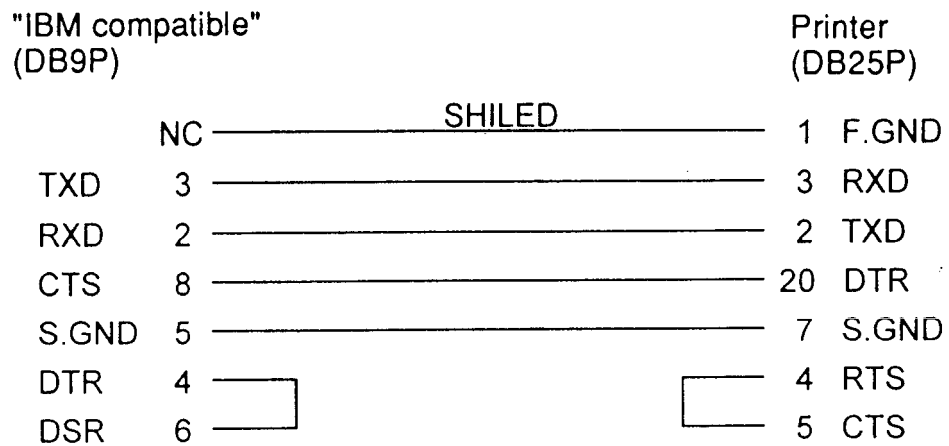
- 5.1 RS-232C Serial Interface 5-2
- 5.2 Parallel Interface 5-6

5.1 RS-232C Serial Interface

1 Example of connection of computer and printer

IBM compatible machines

Communication control: XON/XOFF or CTS/DTR



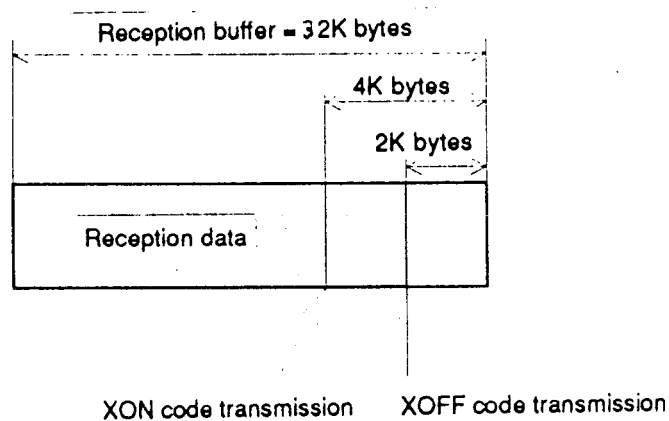
2 XON/XOFF protocol

(a) Conditions for sending XON

- When communication is enabled after power is turned on.
- When the remaining buffer capacity is 2K bytes or less and the remaining buffer capacity after sending XOFF is 4K bytes or more.
- When the printer pause is cleared.
- When the printer returns after sending XOFF due to error occurrence.

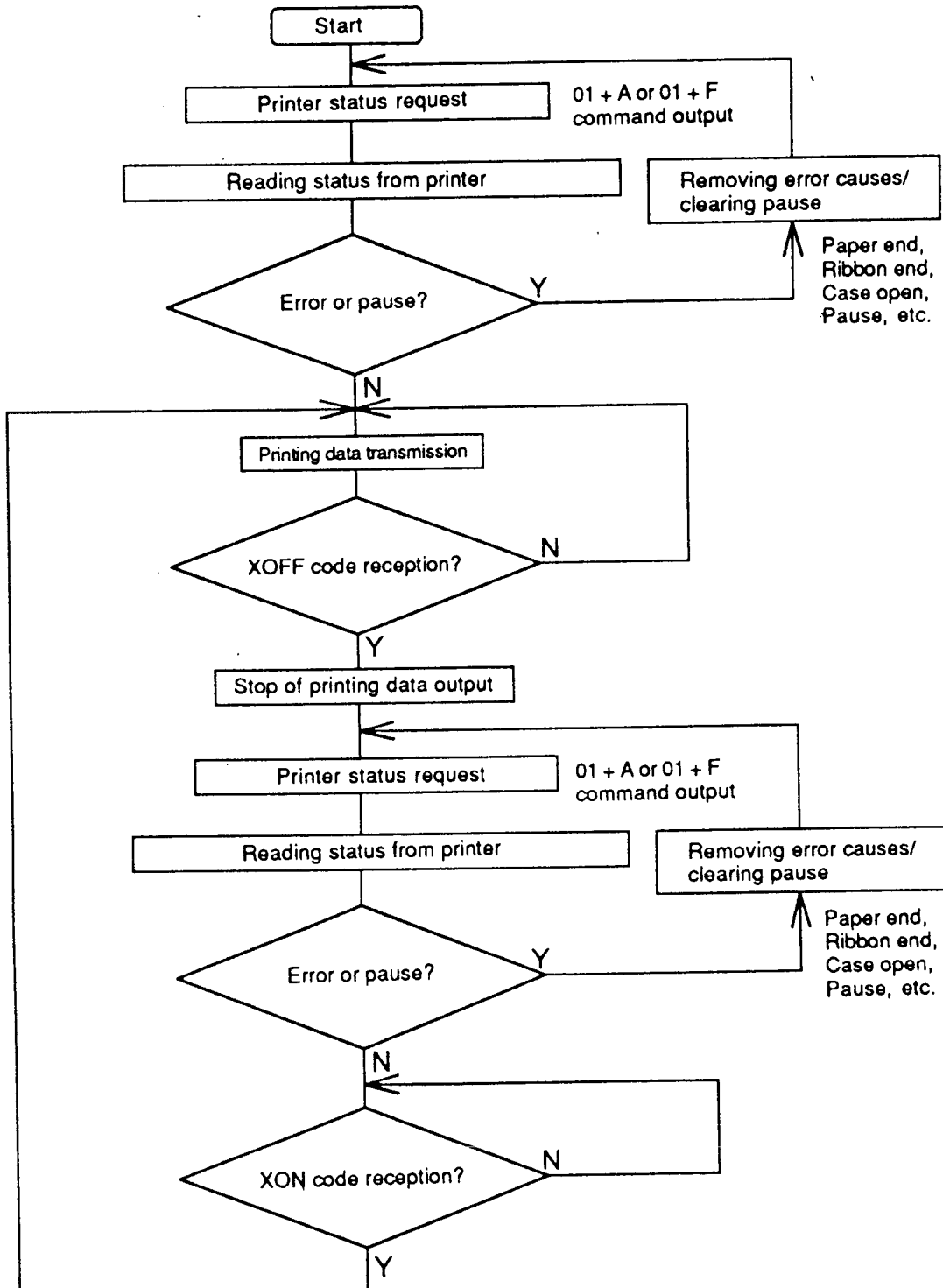
(b) Conditions for sending XOFF

- When the printer error occurs.
- When the printer pause turns on.
- When the remaining buffer capacity is 2K bytes or less.



(c) Communication control flowchart

The following is a reference flowchart for sending and receiving data by using printer transmission request command (01+A, or 01+F). (In XON/XOFF protocol and compatible machine ON mode)



3 DTR protocol

(a) Conditions for making DTR signal Ready (High)

The following must be required:

- When the printer is online.
- When the remaining buffer capacity is 2K bytes or more.

However, when the remaining buffer capacity is 2K bytes or less and DTR turns to BUSY (Low), the BUSY status is retained until the remaining buffer capacity is 4K bytes or more.

(b) Conditions for making DTR signal BUSY (Low)

- When the printer error occurs.
- When the printer pause turns on.
- When the remaining buffer capacity is 2K bytes or less.

5.2 Parallel Interface

1 Specifications

Transmission system: 8 bits parallel
Synchronization: Strobe pulse
Handshake: ACKNLG and BUSY
Signal logic level: TTL

2 Usable interface connector

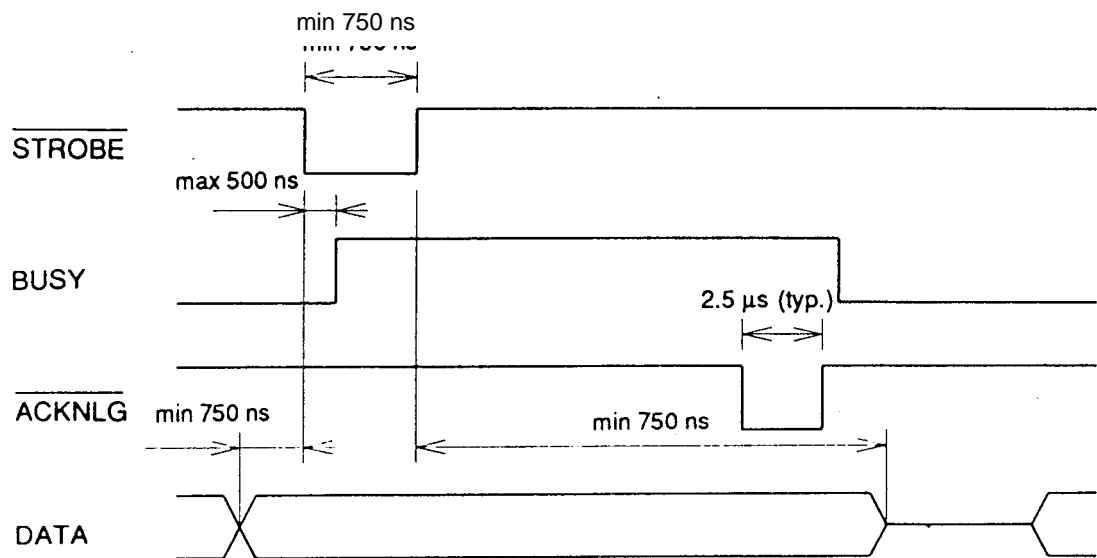
Printer side: 36-pin amphenol type

A standard parallel interface should be used. (The shortest distance should be used for the interface cable.)

3 Connector signal arrangement

Pin No.	Signal name	Input/Output	Function
1	STROBE	Input	Strobe signal to read 8-bit data
2-9	DATA1-8	Input	8-bit parallel signal
10	ACKNLG	Output	8-bit data request signal
11	BUSY	Output	Signal to indicate printer BUSY status
12	PERROR	Output	Signal to indicate paper out
13	SELECT	Output	Signal to indicate whether printer is on-line or off-line
14	AUTOFD	Input	Invalidness (ignorance)
15	NC	—	Not used
16	GND	—	Ground
17	FGND	—	Frame ground
18	P.L.H.	Output	Peripheral Logic High (Pull-up of +5 V at 1.2 k Ω)
19-30	GND	—	Twisted pair return ground
31	INIT	Input	Printer reset
32	FAULT	Output	Signal to indicate printer error
33-35	NC	—	Not used
36	SELECTIN	Input	Invalidness (ignorance)

4 Timing chart



ACKNLG "LOW" indicates that the printer has received data.

The BUSY "HIGH" indicates that the printer is not able to receive data and the "LOW" indicates that the printer is able to receive data.

Appendixes

- A.1 List of Commands A-2
- A.2 List of Font Character codes A-8
- A.3 Error Indications A-10
- A.4 Error Contents and Corrective Actions A-12
- A.5 Printing Edit Function A-15

Appendix 1 List of Commands

System level commands		
SOH	#	Reset
	A	Printer status transmission request (8 bytes)
	B	Pause
	C	Stop/cancel
	D	Stop immediate execution of system level commands
	E	Transmission of number of remaining prints
	F	Printer status transmission request [1 byte]
STX	A	Setting date and time [transmission]
	a	Feedback character transmission validness
	B	Date and time transmission request
	cnnnn	Setting continuous paper length
	d	Setting 2-page edit mode (double buffer)
	Ennnn	Setting number of printing sheets for edited format
	e	Selecting edge sensor for paper position detection
	F	Label one sheet feed
	fnnn	Setting paper position setting when cutting and peeling
	G	Printing edited format
	lmfaa	Writing graphic data
	J	Setting pause per each label printing
	K	Extension system command
	k	"Y" code transmission request
	L	Starting printing contents setting (label format)
	Mnnnn	Setting max. label length (detection miss checking)
	m	Changing units from inch system to metric system
	n	Changing units from metric system to inch system
	Onnnn	Setting printing position (form offset)
	o	Paper cut
	P	Setting dump mode on
	p	Pause in occasional execution
	Q	Clearing all memory modules
	q	Clearing memory module contents q (A/B)
	r	Selecting reflective (black line) sensor for paper position detection
	Sa	Setting paper feed speed

(continued)

(continued)

System level commands		
STX	s	Setting one page edit mode (single buffer)
	T	Printing quality test pattern
	Unnaa	Rewriting specified format register contents
	Vn	Setting memory switch contents
	v	Version number transmission request
	W	Information-in-memory-module transmission request
	w	Testing memory card (flash memory)
	Xa	Selecting default module (A/B)
	x	Clearing memory module contents (in file units)
	Y	Sensor output to port
	Z	Test print for printer status
	z	Packing memory module contents
	"ESC"+S	Paper detection sensor voltage transmission request
	"ESC"+T	Head disconnection detection
	"ESC"+t	Setting ejection (tear-off)

Commands after the print contents definition mode is turned on with "STX" + "L"		
None	"ESC"+#	Resetting label format parameter (excluding m)
	An	Specifying development method
	"ESC"+Bn	Specifying development method
	Cnnnn	Setting column offset
	cnn	Setting number of cuts (2-digit)
	Dhv	Setting horizontal and vertical pixel sizes
	E	Completion of setting printing contents and printing labels
	G	Entering previous character column into global register
	Hnn	Setting print density (heat factor)
	m	Changing units from inch system to metric system
	n	Changing units from metric system to inch system
	Pa	Setting printing speed (printable area)
	pa	Setting backfeed speed
	"ESC"+Pnn	Specifying space between characters
	Qnnnn	Setting number of prints
	Rnnnn	Setting row offset
	r aa..	Calling label format
	S a	Specifying paper feed speed
	s	Label format storage s (A/B)aa..a
	Tnn	Specifying ending code
	U	Setting previous field to character string replacement mode field
	X	Completion of setting printing contents (field preparation)
	+ pii	Specifying previous data increment
	– pii	Specifying previous data decrement
	> pii	Specifying previous data increment (0-9, A-Z)
	< pii	Specifying previous data decrement (0-9, A-Z)
	^ nn	Specifying number of label prints for same contents
	: nnnn	Specifying number of cuts (4-digit)
	z	Using slash zero
	1	Rotation angle: 0 degree
	2	Rotation angle: 90 degrees
	3	Rotation angle: 180 degrees
	4	Rotation angle: 270 degrees
		Definition of character strings, bar codes, ruled lines and graphics. (Each data is a defined form structure including position and other information)

Font downloading commands		
ESC	*C###D	ID assignment
	)S#Wnn..n	Descriptor writing
	*C#E	Character code writing
	(S#Wnn..n	Character data downloading

Font setting field (after the print contents definition mode is turned on with "STX" + "L")				
2nd digit	5th, 6th, 7th digit	Specified font		
0		000	System font 0	(33.83 cpi)
1		000	System font 1	(22.56 cpi)
2		000	System font 2	(16.92 cpi)
3		000	System font 3	(12.69 cpi)
4		000	System font 4	(9.67 cpi)
5		000	System font 5	(9.67 cpi)
6		000	System font 6	(5.64 cpi)
7		000	System font 7 (OCR-A)	(10.15 cpi)
8		000	System font 8 (OCR-B)	(10.15 cpi)
9	A06, 001	Smooth font (CG Triumvirate)	6 pt	
	A08, 002	Smooth font (CG Triumvirate)	8 pt	
	A10, 003	Smooth font (CG Triumvirate)	10 pt	
	A12, 004	Smooth font (CG Triumvirate)	12 pt	
	A14, 005	Smooth font (CG Triumvirate)	14 pt	
	A18, 006	Smooth font (CG Triumvirate)	18 pt	
	A24, 007	Smooth font (CG Triumvirate)	24 pt	
	A30, 008	Smooth font (CG Triumvirate)	30 pt	
	A36, 009	Smooth font (CG Triumvirate)	36 pt	
	A48, 010	Smooth font (CG Triumvirate)	48 pt	

Bar code setting field (after the print contents definition mode is turned on with "STX" + "L")	
2nd digit	Specified bar code (upper-case characters: visible code, lower-case characters: non-visible code)
A	Code 3 of 9
B	UPC-A
C	UPC-E
D	Interleaved 2 of 5
E	Code 128
F	EAN-13 (JAN-13)
G	EAN-8 (JAN-8)
H	HIBC (Modulus 43-used Code 3 of 9)
I	CODERBAR (NW-7)
J	Int 2 of 5 (Modulus 10-used Interleaved 2 of 5)
K	Plessey
L	CASE CODE
M	UPC 2DIG ADD (UPC 2-digit supplementary code)
N	UPC 5DIG ADD (UPC 5-digit supplementary code)
O	Code 93
p	ZIP
Q	UCC/EAN128
R	UCC/EAN128 (for K-MART)
S	UCC/EAN128 Random Weight
T	Telepen
u	UPS MaxiCode
v	FIM
(W)	Not defined
X	Lines, Boxes, Polygons, and Circles
Y	Graphic data readout specifying command
z	PDF-417
STX+Sa	Reading printing contents from global register
STX+T	Printing date and time

Appendix 2 List of Font Character Codes

1 System font 0 - 6

L\H	Binary	0000	0001	0010	0011	0100	0101	0110	0111	1000	1001	1010	1011	1100	1101	1110	1111
Binary	Hex	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0000	0			(SP)	0	@	P	`	p	Ç	È	á					
0001	1			!	1	A	Q	a	q	Ü	æ	í				β	
0010	2			"	2	B	R	b	r	é	Ĥ	ó					
0011	3			#	3	C	S	c	s	à	ô	ú					
0100	4			\$	4	D	T	d	t	ä	ö	ñ					
0101	5			%	5	E	U	e	u	à	ò	Ñ					
0110	6			&	6	F	V	f	v	á	û	ª					
0111	7			'	7	G	W	g	w	ç	ù	º					
1000	8			(	8	H	X	h	x	ê	ÿ	¿					
1001	9			)	9	I	Y	i	y	ë	ö	•					
1010	A			*	:	J	Z	j	z	è	Ù	¬					
1011	B			+	;	K	[	k	{	ï	ø	½					
1100	C			,	<	L	\	l	|	î	£	¼					
1101	D			-	=	M	]	m	}	ı	Ø	ı	¢				
1110	E			.	>	N	^	n	~	Ä	x	«	¥				
1111	F			/	?	O	_	o	■	Å	f	»					

2 System font 7 (OCR-A)

L\H	Binary	0000	0001	0010	0011	0100	0101	0110	0111	1000	1001	1010	1011	1100	1101	1110	1111
Binary	Hex	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0000	0			(SP)	0	@	P	H	p								
0001	1			!	1	A	Q	a	q								
0010	2			"	2	B	R	b	r								
0011	3			#	3	C	S	c	s								
0100	4			\$	4	D	T	d	t								
0101	5			%	5	E	U	e	u								
0110	6			&	6	F	V	f	v								
0111	7			'	7	G	W	g	w								
1000	8			(	8	H	X	h	x								
1001	9			)	9	I	Y	i	y								
1010	A			*	:	J	Z	j	z								
1011	B			+	;	K	[	k	{								
1100	C			,	<	L	\	l	|								
1101	D			-	=	M	]	m	}								
1110	E			.	>	N	^	n	~								
1111	F			/	?	O	_	o	■								

3 System font 8 (OCR-B)

L \ H	Binary	0000	0001	0010	0011	0100	0101	0110	0111	1000	1001	1010	1011	1100	1101	1110	1111
Binary	Hex	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0000	0			(SP)	0	a	P	`	p								
0001	1			!	1	A	Q	a	q								
0010	2			"	2	B	R	b	r								
0011	3			#	3	C	S	c	s								
0100	4			\$	4	D	T	d	t								
0101	5			%	5	E	U	e	u								
0110	6			&	6	F	V	f	v								
0111	7			'	7	G	W	g	w								
1000	8			(	8	H	X	h	x								
1001	9			)	9	I	Y	i	y								
1010	A			*	:	J	Z	j	z								
1011	B			+	;	K	[	k	{								
1100	C			,	<	L	\	l	|								
1101	D			-	=	M	]	m	}								
1110	E			.	>	N	^	n									
1111	F			/	?	O	_	o									

4 Expansion font (CG Triumvirate, Smooth font)

L \ H	Binary	0000	0001	0010	0011	0100	0101	0110	0111	1000	1001	1010	1011	1100	1101	1110	1111
Binary	Hex	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0000	0			(SP)	0	@	P	'	p	Ç	É	á			ø	Ó	
0001	1			!	1	A	Q	a	q	ü	æ	í			Ð	ß	±
0010	2			"	2	B	R	b	r	é	Æ	ó			Ê	Ô	
0011	3			#	3	C	S	c	s	à	ô	ú			Ë	Ò	¾
0100	4			\$	4	D	T	d	t	ä	ö	ñ			È	ó	
0101	5			%	5	E	U	e	u	à	ò	Ñ	Á		ı	Ö	
0110	6			&	6	F	V	f	v	â	û	ª	Â	ä	ı	μ	÷
0111	7			'	7	G	W	g	w	ç	ù	º	À	Ã	İ	þ	.
1000	8			(	8	H	X	h	x	ê	ÿ	ı	°		İ	þ	°
1001	9			)	9	I	Y	i	y	ë	Ö	•				Ú	"
1010	A			*	:	J	Z	j	z	è	Ü					Û	.
1011	B			+	;	K	[	k	{	ï	ø	½				Ü	
1100	C			,	<	L	\	l	|	î	£	¼				ý	
1101	D			-	=	M	]	m	}	ı	Ø	ı	¢			Ý	
1110	E			.	>	N	^	n	~	Ä	x		¥		ı		
1111	F			/	?	O	_	o		Å	ı						

Appendix 3 Error Indications

Item and contents	Indication	LED	Buzzer
Battery dead (for clock and backup RAM)	Battery	Lights up	Long
Low head temperature	ColdHead	Lights up	Long
Low PCB temperature	Cold PCB	Lights up	Long
Abnormal head resistance value Error contents and head information displayed repeatedly Rank: Head resistance value rank Average: Average resistance value (A/D reading value decimal system) Maximum: Max. resistance value Minimum: Min. resistance value	Head Err Rank *** Ave.*** Max.*** Min.***	Lights up	Long
Communication error (buffer overrun)	OverFlow	Lights up	Long
Communication error (parity, framing)	S/I Err	Lights up	--
Pause key pressed	Pause	--	--
Pause command reception (remote control)	Pause	--	--
On-board rewinder full	P Full	Lights up	Short, 3 times
Head overheated	OverHeat Cooling	Blinks	Short, 3 times
Stop key pressed during printing	Stop	Lights up	Short, 3 times
Stop command received (remote control)	Stop	Lights up	--
Mechanism head open	HeadOpen	Lights up	Short, 3 times
Paper end (no paper left)	PaperEnd	Lights up	Short, 3 times
Paper out (paper position cannot be detected) Error contents and sensor information displayed repeatedly M command: Sets detection miss checking length with system command M Maximum: Max. sensor reading voltage value Minimum: Min. sensor reading voltage value	PaperErr M CMND Max*. **V Min*. **V	Lights up	Short, 3 times
Ribbon end	RibonOut	Lights up	Short, 3 times
PCB overheated (PCB or sensor abnormality)	OverHeat	Lights up	Short, 3 times
Option board problem	OP Err	Lights up	Short, 3 times
Auto-cutter problem (such as poor engagement)	Cut Err	Lights up	Short, 3 times

(continued)

(continued)

Item and contents	Indication	LED	Buzzer
ROM checksum error	ROM Err	Lights up	Long
RAM checksum error	RAM Err	Lights up	Long
System error (timer or CPU out of order) After providing system protection, perform reset	--	--	--

Appendix 4 Error Contents and Corrective Actions

Indication	Description	Corrective actions
Battery	Battery dead	<p>Automatically returned after displaying the error for a certain time.</p> <p>Change the lithium battery (CR2032).</p> <p>If the battery runs down, the realtime clock will stop and the contents of memory switch will be lost.</p>
ColdHead	Low head temperature	<p>Automatically returned after displaying the error for a certain time.</p> <p>Raise the temperature around the printer.</p> <p>Print density becomes low and print quality becomes inferior when the head temperature is low.</p>
Cold PCB	Low PCB temperature	<p>Automatically returned after displaying the error for a certain time.</p> <p>Raise the temperature around the printer.</p> <p>Print density becomes low and print quality becomes inferior when the head temperature is low.</p>
Head Err	Abnormal head resistance value	<p>Check the contents and clear with the Stop key.</p> <p>Replace the print head.</p> <p>Print quality is affected in the section with abnormal head resistance value.</p>
OverFlow	Communication error (receiving buffer overrun)	<p>Check the contents and clear with the Stop key.</p> <p>Correct the communication control system or faulty communication cable.</p>
S/I Err	Communication error (parity, framing)	<p>Check the contents and clear with the Stop key.</p> <p>Correct the communication parameter or faulty communication cable.</p>
HostBusy T.D.Full	Communication error (transmitting buffer overflow)	<p>Automatically returned if the computer receives data and the buffer becomes empty.</p>
Pause	Pause key pressed	<p>Press the Pause key once again to resume printing.</p> <p>If the Stop key is pressed, the stored printing contents will be lost and "on line" will turn on.</p>
Pause	Pause command reception (communication control)	<p>Same as above.</p>

(continued)

(continued)

Indication	Description	Corrective actions
OverHeat Cooling	Head overheat	Wait until the head temperature goes down. When the temperature becomes low, the remaining printing resumes.
Stop	Stop key pressed	<p>Enters a pause after displaying the stop by the Stop key.</p> <p>If the Pause key is pressed, the printing will resume.</p> <p>If the Stop key is pressed again, the stored printing contents will be lost and "on line" will turn on.</p>
Cancel	Stop command reception (communication control)	<p>Displays the stop by the stop command, discards the stored printing contents, and enters a pause.</p> <p>If the Pause key is pressed, "on line" will turn on.</p>
HeadOpen	Mechanism head open	Close the mechanism head.
PaperEnd	Paper end (no paper left)	Install the paper.
PaperErr	Paper out (paper position can't be detected)	<p>Check the contents and clear with the Stop key.</p> <p>Correct the faulty setting of the paper detection (paper gap, black line, continuous paper).</p> <p>Correct the faulty parameter for paper (max. length, continuous paper).</p> <p>Adjust the sensor or change for the paper that accepts the paper position detection.</p> <p>Specify the length for the detection miss checking with the M command.</p> <p>When the paper position can't be detected during paper feeding by the specified length, it is judged error. Generally specify the length about three times the label length.</p> <p>In case of the continuous paper, specify the label length with the C command.</p> <p>Difference between the maximum and minimum values of the sensor reading voltage is 0.8 V or more.</p> <p>Sensor adjustment and paper characteristic verification (voltage verification) can be performed with the Maintenance mode.</p>

(continued)

(continued)

Indication	Description	Corrective actions
RibonOut	Ribbon end	Check the contents and clear with the Stop key. Install the ribbon. Check that the ribbon winds fully. Correct the faulty setting of the print mode (direct-thermal or thermal-transfer).
OverHeat	PCB overheat	Turn off the power and reset the printer. If this recurs, contact our service personnel.
Fan stop	Fan stop	Check for the fan stop caused by the problems such as foreign matter entered in the air vent. Automatically returned If the fan turns again. If disassembling is needed to remove foreign matter or the problem can't be identified, contact our service personnel.
OP Err	Option board abnormality	Turn off the power and reset the printer. If this recurs, contact our service personnel.
Cut Err	Auto-cutter abnormality (such as poor engagement)	Check the contents and clear with the Stop key. If this can't be cleared, turn off the power and remove foreign matter from the auto-cutter. If this recurs, contact our service personnel.
ROM Err	ROM checksum error	Turn off the power and reset the printer. If this recurs, contact our service personnel.
RAM Err	RAM checksum error	Turn off the power and reset the printer. If this recurs, contact our service personnel.
--	System error (such as timer or CPU malfunction)	First protect the system, then reset the printer.

Appendix 5 Printing Edit Function

- 1 Unnaa.. : particular printing contents are changed

(see sample No. 1)

(can be used with V0.4 or later)

Printing contents are stored in the field register in order from number 1. The Unnaa.. command replaces the data of "nn" in the field register with "aa.." The transmission data is applied for the changing part and the bit map is regenerated only for the changing part so printing speed is high.

- 2 s, r : label format storage and readout

(see sample No. 2)

Fixed-form printing contents are stored in the memory card. When printing, the fixed-form printing contents are read out from the memory card, and printing contents can be added, so fixed-form printing contents do not need to be transmitted each time they are requested.

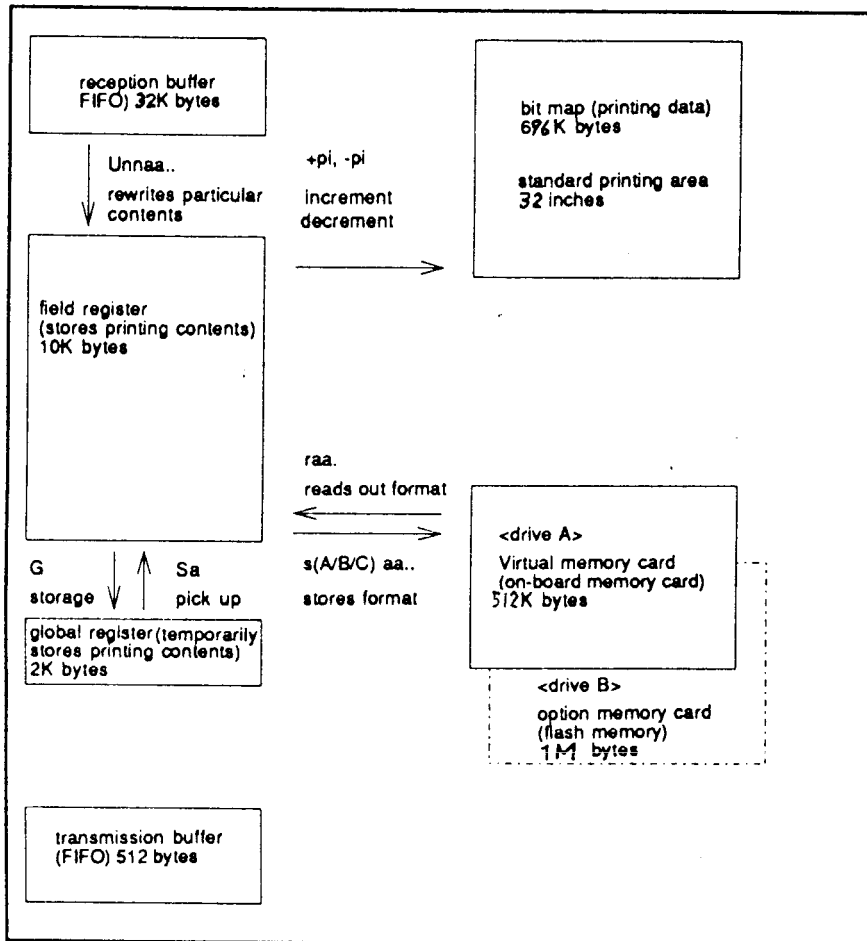
- 3 +pi., >pi. : incrementing and decrementing specified

Any printing contents can be specified. The bit map is generated only for the specified part so printing speed is high.

- 4 G, Sa : printing string storage and readout

(see sample No. 3)

Strings are stored in or read out from the global register. It is useful for printing string contents to be printed on the bar code. When changing printing contents, it is enough to give one place correction.



Sample No. 1

"Unnaa.." command: Specified register contents rewriting

[02] m	Sets units to mm
[02] L	Starts label format
D11	
161200000000050FIX	"FIX" defined to field No 01
1611000000002500001	"0001" defined to field No 02
161100000800250ABCDEF	"ABCDEF" defined to field No 03
E	Ends label format and prints
[02] U020002	Changes 2nd field contents (agrees with number of characters)
[02] U03GHIJKL	Changes 3rd field contents (agrees with number of characters)
[02] G	Prints edited format
[02] U020003	Changes 2nd field contents (agrees with number of characters)
[02] U03MNOPQR	Changes 3rd field contents (agrees with number of characters)
[02] G	Prints edited format

Sample No. 2

"S(A/B)aa.." command: Storage of format to memory card

[02] m	Sets units to mm
[02] L	Starts label format
D11	
161200000000050FIX	"FIX" defined to field No 01
sBfdata	Stores file name "fdata" in RAM and ends label format

[02] L	Starts label format
rfddata	Reads out file name "fdata"
D11	
1611000000002500001	"0001" defined to field No 02
161100000800250LABEL1	"LABEL1" defined to field No 03
E	Ends label format and prints

[02] L	Starts label format
rfddata	Reads out file name "fdata"
D11	
1611000000002500002	"0002" defined to field No 02
161100000800250LABEL2	"LABEL2" defined to field No 03
E	Ends label format and prints

[02] L	Starts label format
rfddata	Reads out file name "fdata"
D11	
1611000000002500003	"0003" defined to field No 02
161100000800250LABEL3	"LABEL3" defined to field No 03
E	Ends label format and prints

Sample No. 3

"G, S" command: Storage and readout of printing contents to global register

[02] m	Sets units to mm
[02] L	Starts label format
D11	
1611000000000500001	"0001" defined to field No 01
G	Stored in global register No A
161100000800050LABEL	"LABEL" defined to field No 02

G	Stored in global register No B
1A6207000000500[02]SA	Read out from global register No A
1A6207001000500[02]SB	Read out from global register No B
E	Ends label format and prints