TOSHIBA

TOSHIBA Bar Code Printer

B-452-R Series

Software Specification

TOSHIBA TEC CORPORATION

TABLE OF CONTENTS

1. SCOPE

This specification applies to the external equipment interface for use with the B-452-R series general-purpose bar code printer.

2. GENERAL DESCRIPTION

The external equipment interface connects the printer to the host computer through a serial interface (RS-232C/USB), parallel interface (Centronics), or a network for making various settings and printing labels.

This specification describes how to use the external equipment interface for the TPCL (TEC Printer Command Language).

The following table shows the system configuration.

Print head type			300 dpi
Memory	Flash ROM		16 MB × 1 = 16 MB
	SDRAM	Whole	16 MB × 1 = 16 MB
		Image buffer of whole SDRAM	1.8 MB (Label length: 999 mm)
Bit map Kanji (Gothic) Bit map Kanji (Mincho)			Standard
RS-232C			Option
Centronics			Standard
USB			Standard
100BASE LAN board			Standard
Cutter module			Option
Strip module			Option
Wireless LAN module			Option
Expansion I/O module			Option

3. INTERFACE

3.1 SERIAL INTERFACE

(1) Type: Conforming to RS-232C

(2) Communication Mode: Full duplex

(3) Transmission Speed: 2400 bps
                                   4800 bps
                                   9600 bps
                                   19200 bps
                                   38400 bps
                                   115200 bps

(4) Synchronization Method: Start-stop synchronization

(5) Start Bit: 1 bit

(6) Stop Bit: 1 bit
                                   2 bits

(7) Data Length: 7 bits
                                   8 bits

(8) Parity: None
                                   Even
                                   Odd

(9) Error Detection: Parity error   Vertical parity error check
                                   Framing error   This error occurs if no stop bit is found in the frame specified starting with the start bit.

(10) Protocol: No-procedure method

(11) Data Input Code: ASCII code
                                   European character set 8 bit code
                                   Graphics 8 bit code
                                   JIS8 code
                                   Shift JIS Kanji code
                                   JIS Kanji code
                                   UTF-8

(12) Receive Buffer: 1 MB
                                   *   The use of the receive buffer is shared between interfaces.

(13) Flow Control: XON/XOFF (DC1/DC3) Protocol
READY/BUSY (DTR) Protocol
XON/XOFF (DC1/DC3) Protocol + READY/BUSY (DTR) Protocol
READY/BUSY (RTS) Protocol

① XON/XOFF (DC1/DC3) Protocol

- When initialized after the power is turned on, this printer becomes ready to receive data and sends an XON code (11H).   (Transmission or non-transmission of the XON code is selectable by means of the parameter setting.)

- The printer sends an XOFF code (13H) when the free space of the receive buffer becomes 10K bytes or less.

- The printer sends an XON code (11H) when the free space of the receive buffer becomes 512K bytes or more.

- After the receive buffer has become full, the printer discards data received, without storing it in the buffer.   (After detecting the XOFF code, the host computer must stop transmission before the printer receive buffer becomes full.)

- The printer sends an XOFF code (13H) when the power is off.   (Transmission or non-transmission of the XOFF code is selectable by means of the parameter setting.)

- The DTR signal is always "High" (READY).

- The RTS signal is always "High".

② READY/BUSY (DTR) Protocol

- When initialized after the power is turned on, this printer becomes ready to receive data and turns the DTR signal to "High" level (READY).

- The printer turns the DTR signal to "Low" level (BUSY) when the free space of the receive buffer becomes 10K bytes or less.

- The printer turns the DTR signal to "High" level (READY) when the free space of the receive buffer becomes 512K bytes or more.

- After the receive buffer has become full, the printer discards data received, without storing it in the buffer.   (After detecting the BUSY signal, the host computer must stop transmission before the printer receive buffer becomes full.)

- The RTS signal is always "High".

③ XON/XOFF (DC1/DC3) Protocol + READY/BUSY (DTR) Protocol

- When initialized after the power is turned on, this printer becomes ready to receive data and turns the DTR signal to "High" level (READY).   The printer also sends an XON code (11H).

- When the free space of the receive buffer becomes 10K bytes or less, the printer turns the DTR signal to "Low" level (BUSY) and sends an XOFF code (13H).

- When the free space of the receive buffer becomes 512K bytes or more, the printer turns the DTR signal to "High" level (READY) and sends an XON code (11H).

- After the receive buffer has become full, the printer discards data received, without storing it in the buffer.   (After detecting the XOFF code or BUSY signal, the host computer must stop transmission before the printer receive buffer becomes full.)

- The printer sends an XOFF code (13H) when the power is off.

- The RTS signal is always "High".

④ READY/BUSY (RTS) Protocol

- When initialized after the power is turned on, this printer turns the RTS signal to "High" (READY).

- The printer turns the RTS signal to "Low" (BUSY) when the free space of the receive buffer becomes 10K bytes or less.

- The printer turns the RTS signal to "High" (READY) when the free space of the receive buffer becomes 512K bytes or more.

- After the receive buffer has become full, the printer discards data received, without storing it in the buffer.   (After detecting the BUSY signal, the host computer must stop transmission before the printer receive buffer becomes full.)

- The DTR signal is always "High" (READY).

- The DSR signal from the host must always be "High".

* When the flow control is performed with a Windows PC, "READY/BUSY (RTS) protocol" should be selected, and "Hardware" should be selected for the flow control in the Windows communication port setting.

> **NOTE:** *For "READY/BUSY (DTR) protocol", data should be sent after 200 ms from when the DTR signal is turned to "High" (READY).   For "READY/BUSY (RTS) protocol", data should be sent after 200 ms from when the RTS signal is turned to "High" (READY).*

(14) Input/Output Signals
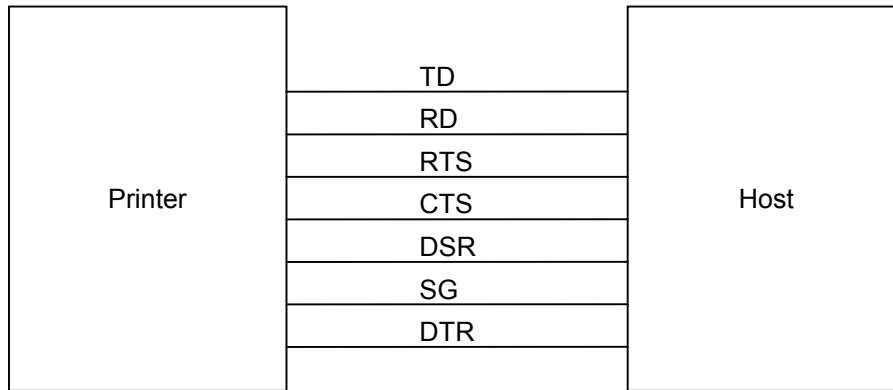
(15) Connector Pin Assignment and Signal Description

Pin No.	Signal Name	Function	Signal Direction
1	(N. C)		
2	TD	• Line for data which the printer sends to the host. • Logic 1 is a Low level, while logic 0 is a High level. • It is in the Low (Mark) state when no transmission is in progress.	Printer →
3	RD	• Line for data which the printer receives from the host. • Logic 1 is a Low level, while logic 0 is a High level. • It is in the Low (Mark) state when no transmission is in progress.	← Host
4	DSR	• Input signal from the host. • For the printer to receive data, it must be at "High" level.	← Host
5	SG	• Ground line for all data and control signals.	
6	DTR	• Output signal to the host. For the READY/BUSY (DTR) protocol or XON/XOFF (DC1/DC3) protocol + READY/BUSY (DTR) protocol: • It indicates the ready state for the received data. • It is at "Low" level when the receive buffer is near full, and at "High" level when near empty. For the XON/XOFF (DC1/DC3) protocol or READY/BUSY (RTS) protocol: • After the power is turned on, it is always at "High".	Printer →
7	CTS	• Input signal from the host. • For the printer to send data, it must be at "High" level.	← Host
8	RTS	• Output signal to the host. For the READY/BUSY (RTS) protocol: • It indicates the ready state for the received data. • It is at "Low" when the receive buffer is nearly full, and at "High" when nearly empty. For protocol other than the READY/BUSY (RTS) protocol: • After the power is turned on, it is always at "High" level.	Printer →

(16) Interface Circuit

- Input Circuit

RD
CTS
DSR

SN75189 or equivalent

- Output Circuit

TD
RTS
DTR
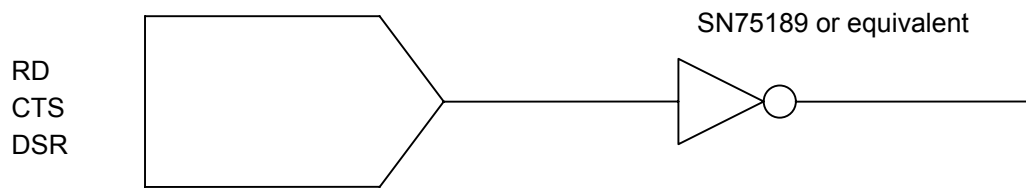
SN75188 or equivalent
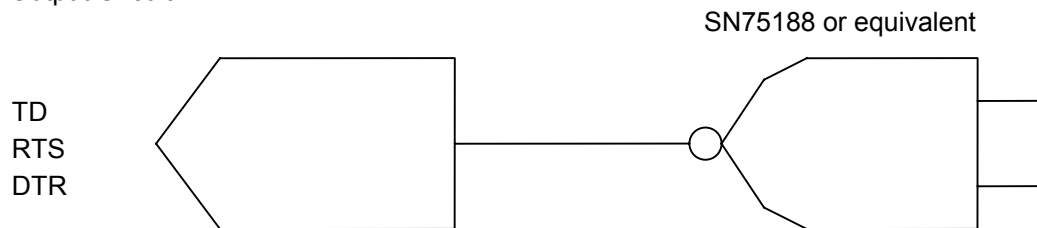
- Signal Levels
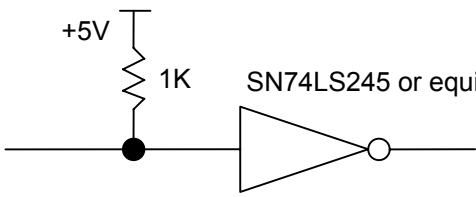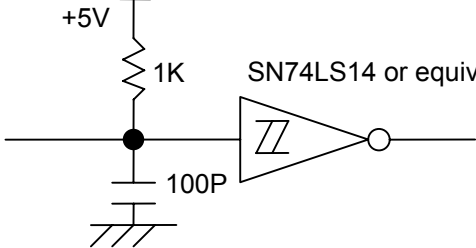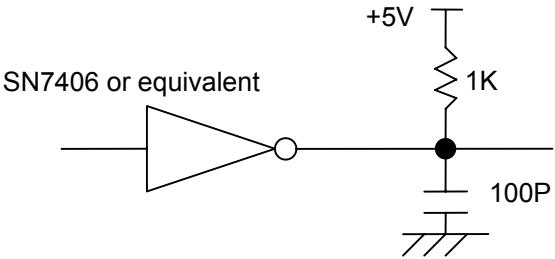
Input Voltage   H ...... +3 ~ +15 V
                 L .... -3 ~ -15 V

Output Voltage   H ...... +6 ~ +13 V
                 L .... -6 ~ -13 V

3.2 PARALLEL INTERFACE

(1) Type: Centronics

(2) Mode: Conforms to IEEE1284 Compatibility mode and Nibble mode

(3) Data Input Method: Parallel 8 bits (DATA1 ~ 8)

(4) Control Signals:

Compatibility mode	Nibble mode
nStrobe	HostClk
nAck	PrtClk
Busy	PtrBusy
PError	AckDataReq
Select	Xflag
nAutoFd	HostBusy
nInit	nInit
nFault	nDataAvail
nSelectIn	IEEE1284Active

(5) Data Input Code: ASCII code
European character set 8 bit code
Graphics 8 bit code
JIS8 code
Shift JIS Kanji code
JIS Kanji code
UTF-8

(6) Receive Buffer: 1 MB
* The use of the receive buffer is shared between interfaces.

(7) Input/Output Circuit Configuration and Input/Output Conditions:

	Signal	Configuration	
Input	DATA1 ~ 8	+5V 1K SN74LS245 or equivalent	Logic level (Input) "1" = 2 ~ 5 V "0" = 0 ~ 0.4 V
	nStrobe/HostClk/HostClk nInit/nInit/ nReverseRequest nAutoFd/HostBusy/ HostAck nSelectIn/IEEE1284Active/ IEEE1284Active	+5V 1K SN74LS14 or equivalent 100P	
Output	Busy/PtrBusy/PeriphAck nFault/nDataAvail/ nPeriphRequest nAck/PtrClk/PeriphClk Select/Xflag/XFlag PError/AckDataReq/ nAckReverse	SN7406 or equivalent +5V 1K 100P	Logic level (Input) "1" = 2.4 ~ 5 V "0" = 0 ~ 0.4 V

(8) Connector: Printer
      Amp. Japan   552742-1 or equivalent
      DDK   57RE-40360-73B or equivalent

      Cable
      Amp. Japan   552470-1 or equivalent
      DDK   57E-30360 or equivalent

(9)   Connector Pin Diagram (IEEE1284-B Connector):

| Pin | Signal Name | |
No.	Compatibility Mode	Nibble mode
1	nStrobe	HostClk
2	Data 1	Data 1
3	Data 2	Data 2
4	Data 3	Data 3
5	Data 4	Data 4
6	Data 5	Data 5
7	Data 6	Data 6
8	Data 7	Data 7
9	Data 8	Data 8
10	nAck	PtrClk
11	Busy	PtrBusy
12	PError	AckDataReq
13	Select	Xflag
14	nAutoFd	HostBusy
15	NC	NC
16	0V	0V
17	CHASSIS GND	CHASSIS GND
18	+5V (for detection)	+5V (for detection)
19	TWISTED PAIR GND (PIN1)	TWISTED PAIR GND (PIN1)
20	TWISTED PAIR GND (PIN2)	TWISTED PAIR GND (PIN2)
21	TWISTED PAIR GND (PIN3)	TWISTED PAIR GND (PIN3)
22	TWISTED PAIR GND (PIN4)	TWISTED PAIR GND (PIN4)
23	TWISTED PAIR GND (PIN5)	TWISTED PAIR GND (PIN5)
24	TWISTED PAIR GND (PIN6)	TWISTED PAIR GND (PIN6)
25	TWISTED PAIR GND (PIN7)	TWISTED PAIR GND (PIN7)
26	TWISTED PAIR GND (PIN8)	TWISTED PAIR GND (PIN8)
27	TWISTED PAIR GND (PIN9)	TWISTED PAIR GND (PIN9)
28	TWISTED PAIR GND (PIN10)	TWISTED PAIR GND (PIN10)
29	TWISTED PAIR GND (PIN11)	TWISTED PAIR GND (PIN11)
30	TWISTED PAIR GND (PIN31)	TWISTED PAIR GND (PIN31)
31	nInit	nInit
32	nFault	nDataAvail
33	0V	0V
34	NC	NC
35	NC	NC
36	nSelectIn	IEEE1284Active

(10) Input/Output Signals:

Compatibility mode

① Data 1 ~ 8 (Printer ← Host)

- Input data signals for the 1st to 8th bits.

- Logic 1 is "High" level.

- Min. data pulse width of 2.5 μsec.

② nStrobe (Printer ← Host)

- Synchronizing signal for reading the above data.

- Normally at "High" level.   The data is read at the rise of the Low level pulse.

- Minimum data pulse width of 0.5 μsec.

③ Busy (Printer → Host)

- This signal indicates that the printer is in a Busy state.

- When initialized after the power is turned on, the printer becomes ready to receive data and turns the signal to "Low" level.

- The signal turns to "High" level (in a Busy state) when data is set from the host (at the fall of the nStrobe signal).

- The signal turns to "Low" level when the printer reads the data.

- When the free space of the receive buffer becomes 512 bytes or less, the printer keeps the signal at "High" level (in a Busy state) for 10 seconds when data is set from the host, to extend the data read interval.

- When the receive buffer has become full, the printer stops reading data.   When data is set from the host, then, it keeps the signal at "High" level (in a Busy state) until the receive buffer has a free space.

- The signal is kept at "High" level (in a Busy state) until one of the following states is cleared.
  - PAUSE state caused by the [PAUSE] key
  - Paper end state
  - Ribbon error state
  - Head open state
  - Printer error state
  - Initialization in progress upon receipt of the nInit signal

④ nAck (Printer → Host)

- This signal indicates that the printer has read the data set by the host and is ready to receive the next data.

- The signal is normally at "High".   It is at "Low" for about 5 μsec. after the fall of the BUSY signal.   The host should usually set data after the ACK signal is turned from "Low" to "High".

- If the nAck signal is ignored and the next data is set while the nAck signal is Low, the "LOW" level continues about further 5 μsec at the fall of the BUSY signal.   However, the data can be received properly.

⑤ nInit (Printer ← Host)

- ● Reset request signal from the host.
- ● Normally at "High" level. An input of this signal at "Low" level causes the printer to be initialized in the same manner as when the power is turned on.

  * When "Reset process when the nInit signal is ON" is set to "OFF" in the parameter setting by the printer setting tool, the printer is not initialized even if it receives this signal at low level.

- ● When the nInit signal is input during printing, the printer completes printing one tag/label which is being printed, cancels the next processing, then is initialized in the same manner as when the power is turned on.

  * When "Reset process when the nInit signal is ON" is set to "OFF" in the parameter setting by the printer setting tool, the next process proceeds without being canceled.

- ● Minimum pulse width of 0.5 μsec.

⑥ Select (Printer → Host)

- ● This is an output signal which indicates whether the printer is in Pause state or placed online.   The printer can receive data while placed online.
- ● The signal is at "Low" level while the printer is in a Pause state.
- ● The signal is kept at "Low" level (in a Pause state) until one of the following states is cleared.
  - • Pause state caused by the [PAUSE] key
  - • Paper end state
  - • Ribbon error state
  - • Head open state
  - • Printer error state
  - • Initialization in progress upon power on or receipt of the nInit signal

⑦ nFault (Printer → Host)

- ● Output signal indicating that the printer is in a Fault state.
- ● At "Low" level while the printer is in a Fault state.
- ● The signal is kept at "Low" level (in a Fault state) until one of the following states is cleared.
  - • Pause state caused by the [PAUSE] key
  - • Paper end state
  - • Ribbon error state
  - • Head open state
  - • Printer error state
  - • Initialization in progress upon power on or receipt of the nInit signal

⑧ PError (Printer → Host)

- ● Output signal indicating a label end or ribbon error state.
- ● At "High" level when the printer is in a label end or ribbon error state.
- ● Turns to "Low" level when the label end or ribbon error state is cleared.

⑨ +5 V

- ● This is not a signal but a +5 V power supply voltage.
- ● The maximum current of 500 mA can be taken out.

⑩ nSelectIn (Printer ← Host)

- ● Not used

⑪ nAutoFd (Printer ← Host)

- ● Not used

① PtrClk (Printer → Host)

- Reverse data transfer phase: It is used for evaluating data sent to the host.

- Reverse idle phase: When the printer changes the signal from Low to High, an interrupt informing the host that the data is available, occurs

② PtrBusy (Printer → Host)

- Reverse data transfer phase: Data bit 3 is used for the first transfer.   Data bit 7 is used for the second transfer.   Indicates the forward channel is in a Busy state.

③ AckDataReq (Printer → Host)

- Reverse data transfer phase: Data bit 2 is used for the first transfer.   Data bit 6 is used for the second transfer.

- Reverse idle phase: This signal is set to high until the data transfer is requested by the host.   Then, the process is performed according to the nDataAvail signal.

④ Xflag (Printer ← Host)

- Reverse data transfer phase: Data bit 1 is used for the first transfer.   Data bit 5 is used for the second transfer.

⑤ HostBusy (Printer ← Host)

- Reverse data transfer phase: It indicates that the host can receive data from the printer by setting the signal to low.   Then, the host sets the signal to high, and sends the Ack indicating that the nibble data is received.   When the signal is set to low after one reverse channel data transfer is performed, the interface phase changes to the idle phase.   At that time, there is no available data on the printer.

- Reverse idle phase: When this signal is set to high according to the low pulse of the PtrClk signal, the host enters the reverse data transfer phase again.   If this signal is set to high when the IEEE1284 Active signal is low, the IEEE1284 idle phase stops, and the interface enters the Compatibility mode.

⑥ nDataAvail (Printer → Host)

- Reverse data transfer phase: When the signal is low, it indicates the printer has data to be sent to the host.   And it is used for sending data bits 0 and 4.

- Reverse idle phase: It is used for indicating that the data is available.

(11) Timing Chart

① When receiving normal data:

For the Compatibility mode, one of two types of timing for BUSY-ACK can be selected.

a) Timing 1 (Default)

● When the USB board has not been installed:

Data 1 ~ 8
(Host → Printer)

Min. 1 μsec

Min. 1 μsec

nStrobe
(Host → Printer)

Min. 0.5 μsec

Busy
(Host ← Printer)

nAck
(Host ← Printer)

Approx. 1 μsec

b) Timing 2

Data 1 ~ 8
(Host → Printer)

Min. 1 μsec

Min. 1 μsec

nStrobe
(Host → Printer)

Min. 0.5 μsec

Busy
(Host ← Printer)

nAck
(Host ← Printer)

Approx. 5 μsec
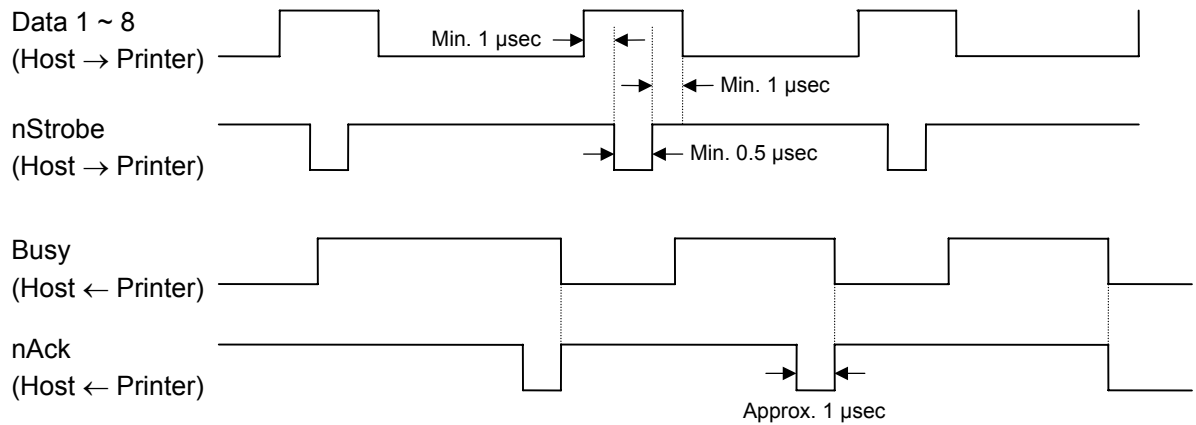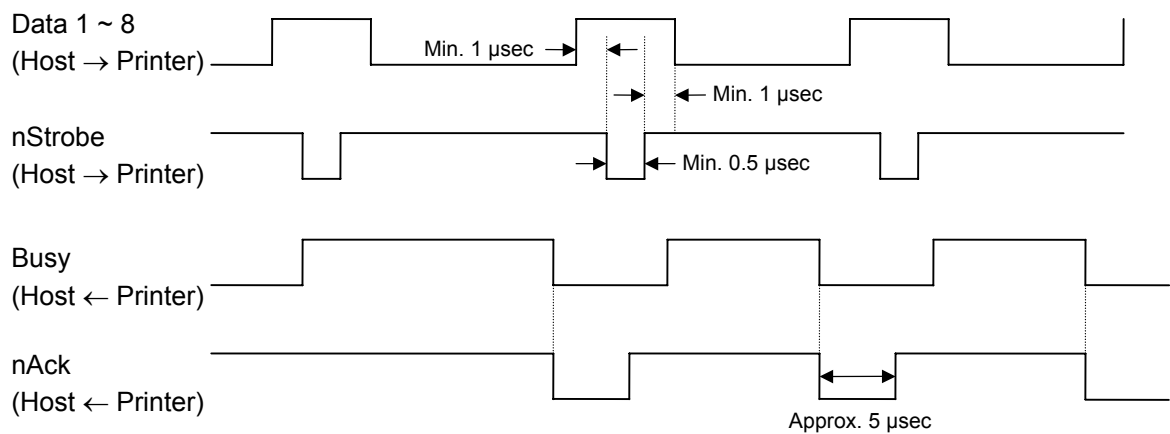
② Receiving data in the Compatibility mode when the free space of the receive buffer is 512 bytes or less:

- When the free space of the receive buffer becomes 512 bytes or less, the printer stores all data already received in the receive buffer, continues to be in a Busy state (Busy signal at "High" level) for 10 seconds to extend the data read interval when data is set from the host, then reads the data 10 seconds later.

- If the free space becomes 513 bytes or more while waiting for reading data, the printer will receive the data with the normal data receive timing.

- When there is no free space in the receive buffer, the printer stops reading data. When data is set from the host, then the printer continues to be in a Busy state (Busy signal at "High" level) until the receive buffer has a free space.
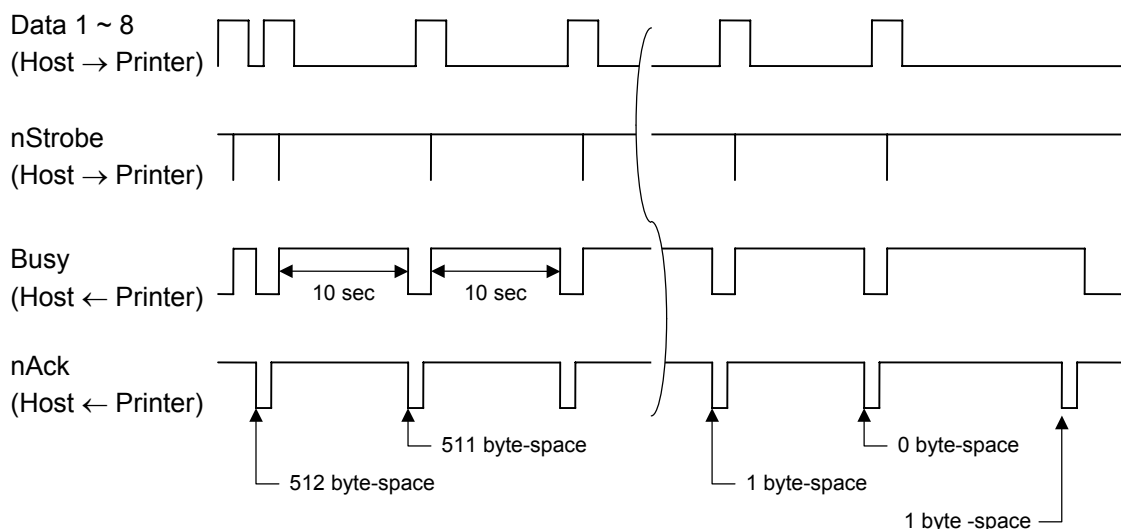
(12) Relationship between Printer Setting and PC Setting and Their Operation Modes

Host setting / Printer setting	Windows95/98/Me		WindowsNT4.0		Windows2000/XP	
	Compatibility	ECP	Compatibility	ECP	Compatibility	ECP
Compatibility mode (SPP)	SPP	SPP	SPP	SPP	SPP	SPP

* SPP mode operations include support for the Nibble mode.

* The printer returns the following 13 byte-status to the Nibble mode negotiation immediately after the [ESC] WS [LF] [NUL] is received. The printer returns 23 bytes (described in *(13) Status with the receive buffer free space information* on the next page) to the Nibble mode negotiation immediately after the [ESC] WB [LF] [NUL] is received.

Status to be returned immediately after the [ESC] WS [LF] [NUL] is received (13 bytes):

SOX	STX	Status			Remaining count				ETX	EOT	CR	LF
01H	02H	3XH	3XH	3XH	3XH	3XH	3XH	3XH	03H	04H	0DH	0AH

(13) Status with the receive buffer free space information

The printer should return a status with the receive buffer free space information to the Nibble mode negotiation immediately after [ESC] WB [LF] [NUL] is received, as described below.

Status to be returned immediately after [ESC] WB [LF] [NUL] is sent   (23 bytes):

SOH	01H	Indicates the header of the status block
STX	02H	
Status	3XH	Printer status
	3XH	* Details are described later.
Status type	33H	Indicates that the status includes the receive buffer free space information.
Remaining count	3XH	Remaining number of labels to be printed
	3XH	* Details are described later.
	3XH	
	3XH	
Length	3XH	Total number of bytes of this status block.
	3XH	
Free space of receive buffer	3XH	Free space of the receive buffer
	3XH	"00000" (0K byte) to "99999" (99999K bytes)
	3XH	However, the maximum value should be the receive buffer
	3XH	capacity.
	3XH	
Receive buffer capacity	3XH	Receive buffer capacity
	3XH	"00000" (0K byte) to "99999" (99999K bytes)
	3XH	However, the maximum value differs depending on the models.
	3XH	
	3XH	
CR	0DH	Indicates the footer of the status block.
LF	0AH	

3.3 USB INTERFACE

(1) Standard: Conforming to USB Standard Rev. 1.1

(2) Data Transfer Type: Control transfer, Bulk transfer

(3) Transfer Rate: Full speed (12 Mbps)

(4) Transfer Control Method: Status with the receive buffer free space information is sent in response to a read request immediately after [ESC]WB[LF][NUL], as described in Section 3.2 PARALLEL INTERFACE, (13).
Based on this status response, the host computer can transmit data to prevent the buffer from becoming full.

3.4 NETWORK INTERFACE

(1) Configuration
     ① 100BASE LAN
     ② Wireless LAN module

(2) Protocol: TCP/IP

(3) Network Specifications
     ① LPR server function
     ② WEB printer function
     ③ Socket communication function

* For more details on the network, refer to the Network Specification (EAA-2167).

4. KEY OPERATION FUNCTIONS

4.1 SELF-DIAGNOSIS MODE FUNCTIONS

(For details, refer to Section 10.)

(1) Self-diagnosis and test print
- Maintenance counter/various parameters printouts
- Automatic self-diagnosis
- Slant line printing

4.2 MAINTENANCE MODE FUNCTIONS

(For details, refer to Section 10.)

(1) RAM clear
- Maintenance counter clear
- Parameter clear

(2) Enabling/disabling the LAN interface

(3) Enabling/disabling the BASIC interpreter

4.3 ONLINE MODE FUNCTIONS

(For details, refer to Section 10.)

(1) Issuing labels (by external equipment interface commands)

(2) Paper feed (by the [FEED] key)

(3) Pause (Temporarily stops issuing labels by the [PAUSE] key)

(4) Restart (Reissues labels by the [PAUSE] key after temporarily stopping issuing labels or after the occurrence of an error.)

(5) Reset (Enters a usual initial state which is obtained after the power is turned on, using the [PAUSE] key.)

4.4 DOWNLOAD MODE SETTING FUNCTIONS

When the printer power is turned on while holding down the [FEED] and [PAUSE] keys at the same time and these two keys are released within 3 seconds, the printer enters the download mode which disables normal operation.

5. TRANSMISSION SEQUENCE

This section describes the outline of the transmission sequence.

5.1 INITIAL SETTING

Writable characters, logos, and PC interface commands must be stored before the label issue operation.

(1) Storing writable characters and logos

```
                          ┌─────────────┐
                          │  Power ON   │
                          └──────┬──────┘
              No                 │
        ┌───────────────── <New>
        │                        │ Yes
  (Add/change)           ┌───────┴───────┐          [ESC] J1: Formats the flash memory.
        │                │Format Command │
        │                └───────┬───────┘
        │                        ▼
        │              ─────────►▼
        │                        │
        │                ┌───────┴────────┐         [ESC] XD: Stores  writable  characters  or
        │                │ Bit Map Writable│                   logos on the flash memory.
        │                │ Character Command│
        │                └───────┬────────┘
        │        No  ╱ Completion of storing ╲
        └───────────╲    all characters      ╱
                     ╲───────────┬──────────╱
                                 │ Yes
              ┌──────────────────┴──────────────────┐
              │ • Storing PC interface commands      │
              │ • Label issue operation              │
              └──────────────────────────────────────┘
```
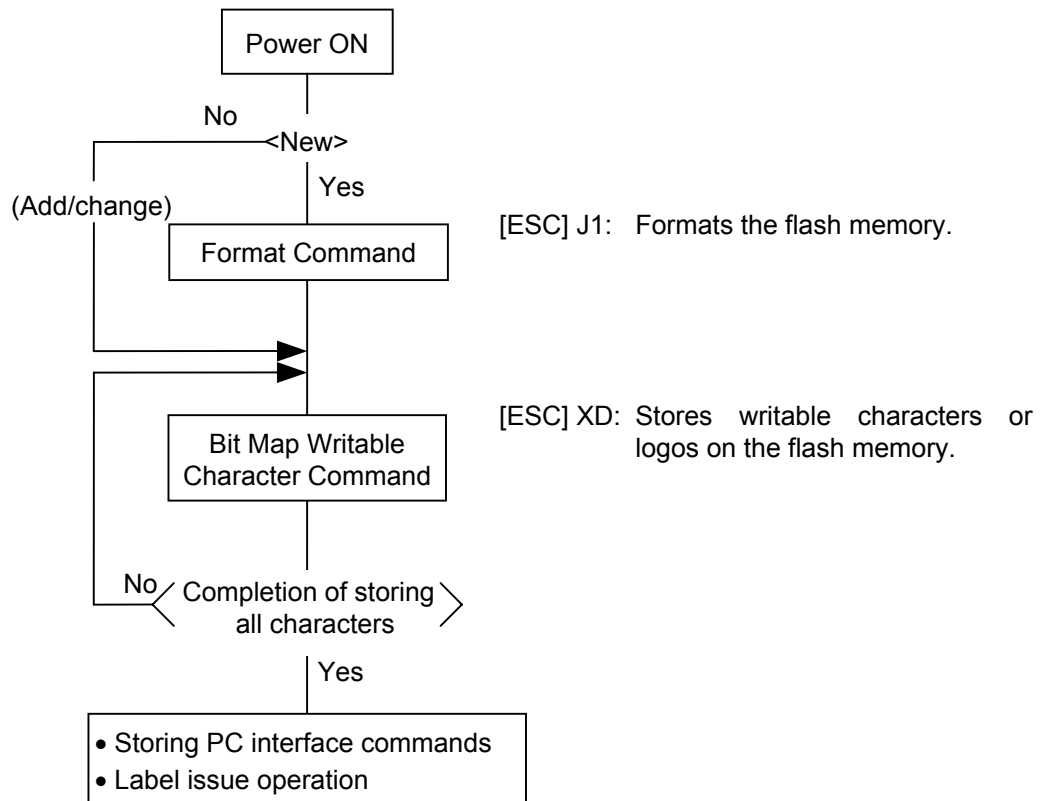
> **NOTES:** (1) Store writable characters or logos only when it is required to do so.
>
> (2) When the flash memory is used, the memory will be taken up with every such storing if the Format Command is not sent before storing already stored writable characters or logos.
>
> (3) When the flash memory is used, and another operation (storing PC interface commands or label issue operation) is performed after storing writable characters or logos, the image buffer will be cleared automatically.
>
> (4) If further storing operation does not take place after storing writable characters or logos, the printer automatically enters the online mode (label issue operation) in about 10 seconds. In this case, when the flash memory is used, the image buffer will be cleared automatically.

(2) Storing PC interface commands

```
                    ┌──────────────┐
                    │   Power ON   │
                    └──────┬───────┘
          No                │
      ┌───────────────── <New>
  (Add/change)            │ Yes
      │           ┌────────┴─────────┐     [ESC] J1:  Formats the flash memory.
      │           │  Format Command  │
      │           └────────┬─────────┘
      └──────────────────►
      ┌──────────────────►
      │           ┌──────────────────────┐   [ESC] XO:  Declares the start of saving PC interface
      │           │  Save Start Command  │               commands.
      │           └──────────┬───────────┘
      │           ┌──────────────────────────┐   [ESC] D:   Sets the label size.
      │           │  Label Size Set Command  │
      │           └──────────┬───────────────┘
      │           ┌──────────────────────────────┐   [ESC] AX:  Adjusts the feed amount, cut position, and
      │           │  Position Fine Adjust Command │               back feed amount.
      │           └──────────┬────────────────────┘
      │           ┌──────────────────────────┐   [ESC] AY:  Adjusts the print density.
      │           │  Print Density Fine Adjust│
      │           │         Command          │
      │           └──────────┬───────────────┘
      │           ┌──────────────────────────────┐   [ESC] C:   Clears the image buffer.
      │           │  Image Buffer Clear Command   │
      │           └──────────┬────────────────────┘
      │           ┌──────────────────────────┐   [ESC] LC:  Sets the line format and draws it.
      │           │  Line Format Command      │
      │           └──────────┬───────────────┘
      │           ┌────────────────────────────────┐   [ESC] PC:  Sets the bit map font format.
      │           │  Bit Map Font Format Command    │
      │           └──────────┬─────────────────────┘
      │           ┌────────────────────────────────┐   [ESC] PV:  Sets the outline font format.
      │           │  Outline Font Format Command    │
      │           └──────────┬─────────────────────┘
      │           ┌──────────────────────────────┐   [ESC] XB:  Sets the bar code format.
      │           │  Bar Code Format Command       │
      │           └──────────┬────────────────────┘
      │           ┌────────────────────────────────┐   [ESC] RC:  Draws data of the bit map font.
      │           │  Bit Map Font Data Command      │
      │           └──────────┬─────────────────────┘
      │           ┌──────────────────────────────┐   [ESC] XP:  Declares the termination of saving PC
      │           │  Save Terminate Command        │               interface commands.
      │           └──────────┬────────────────────┘
      │    No      ◇ Completion of storing ◇
      └──────────── all commands
                            │ Yes
          ┌─────────────────────────────────────────┐
          │ • Storing writable characters or logos   │
          │ • Label issue operation                   │
          └─────────────────────────────────────────┘
```

NOTES: *(1) Store the PC commands only when it is required to do so.*

(2) When the flash memory is used, the memory will be taken up with every such storing if the Format Command is not sent before storing already stored PC interface commands.

(3) When the flash memory is used, and another operation (storing writable characters or logos, label issue operation) is performed after storing PC interface commands, the image buffer will be cleared automatically.

(4) Select commands to be stored as the occasion demands.

(5) If further storing operation does not take place after storing PC interface commands, the printer enters the online mode (label issue operation) in about 10 seconds.   In this case, the image buffer will be cleared automatically.

5.2 LABEL ISSUE OPERATION

An example of the label issue operation is described below.

(1) When the Saved Data Call Command is not used:

Flow	Command	Description
Power ON		
Set the labels.		
Label Size Set Command	[ESC] D:	Sets the label size.
Position Fine Adjust Command	[ESC] AX:	Adjusts the feed amount, cut position, and back feed amount.
Print Density Fine Adjust Command	[ESC] AY:	Adjusts the print density.
Feed Command	[ESC] T:	Feeds one label to align with the print start position.
Image Buffer Clear Command	[ESC] C:	Clears the image buffer.
Line Format Command	[ESC] LC:	Sets the line format and draws it.
Bit Map Font Format Command	[ESC] PC:	Sets the bit map font format.
Outline Font Format Command	[ESC] PV:	Sets the outline font format.
Bar Code Format Command	[ESC] XB:	Sets the bar code format.
Bit Map Font Data Command	[ESC] RC:	Draws bit map font data.
Outline Font Data Command	[ESC] RV:	Draws outline font data.
Bar Code Data Command	[ESC] RB:	Draws bar code data.
Issue Command	[ESC] XS:	Issues (prints) the label.

Yes — <Data change>
  No
Yes — <Format change>
  No
Yes — <Label change>
  No

Power OFF

NOTES: *(1) When loading new type paper, the Label Size Set Command and the Feed Command must always be sent. When using the same paper after the power is turned off and on, the Label Size Set Command and the Feed Command may be omitted.*

(2) After the power is turned off and on, the Bit Map Font Format Command, the Outline Font Format Command, and the Bar Code Format Command should be sent as occasion demands because they are not stored in memory.

(2) When the Saved Data Call Command is used:

```
                    ┌──────────────┐
                    │   Power ON   │
                    └──────┬───────┘
                           │
            ┌──────────────▼───────────┐
            │      Set the labels.     │        [ESC] XQ:  Calls the label format stored in the flash
            └──────────────┬───────────┘                    memory.
            ┌──────────────▼───────────┐
            │  Saved Data Call Command │
            └──────────────┬───────────┘
            ┌──────────────▼───────────┐
            │      Feed Command        │        [ESC] T:   Feeds one label to align with the print start
            └──────────────┬───────────┘                    position.
            ┌──────────────▼───────────┐
            │ Bit Map Font Data Command│        [ESC] RC:  Draws bit map font data.
            └──────────────┬───────────┘
            ┌──────────────▼───────────┐
            │ Outline Font Data Command│        [ESC] RV:  Draws outline font data.
            └──────────────┬───────────┘
            ┌──────────────▼───────────┐
            │  Bar Code Data Command   │        [ESC] RB:  Draws bar code data.
            └──────────────┬───────────┘
            ┌──────────────▼───────────┐
            │     Issue Command        │        [ESC] XS:  Issues (prints) the label.
            └──────────────┬───────────┘
                           │
     Yes                   │
     ──────────── <Data change>
                           │ No
     Yes                   │
     ──────────── <Label change>
                           │ No
                    ┌──────▼───────┐
                    │  Power OFF   │
                    └──────────────┘
```
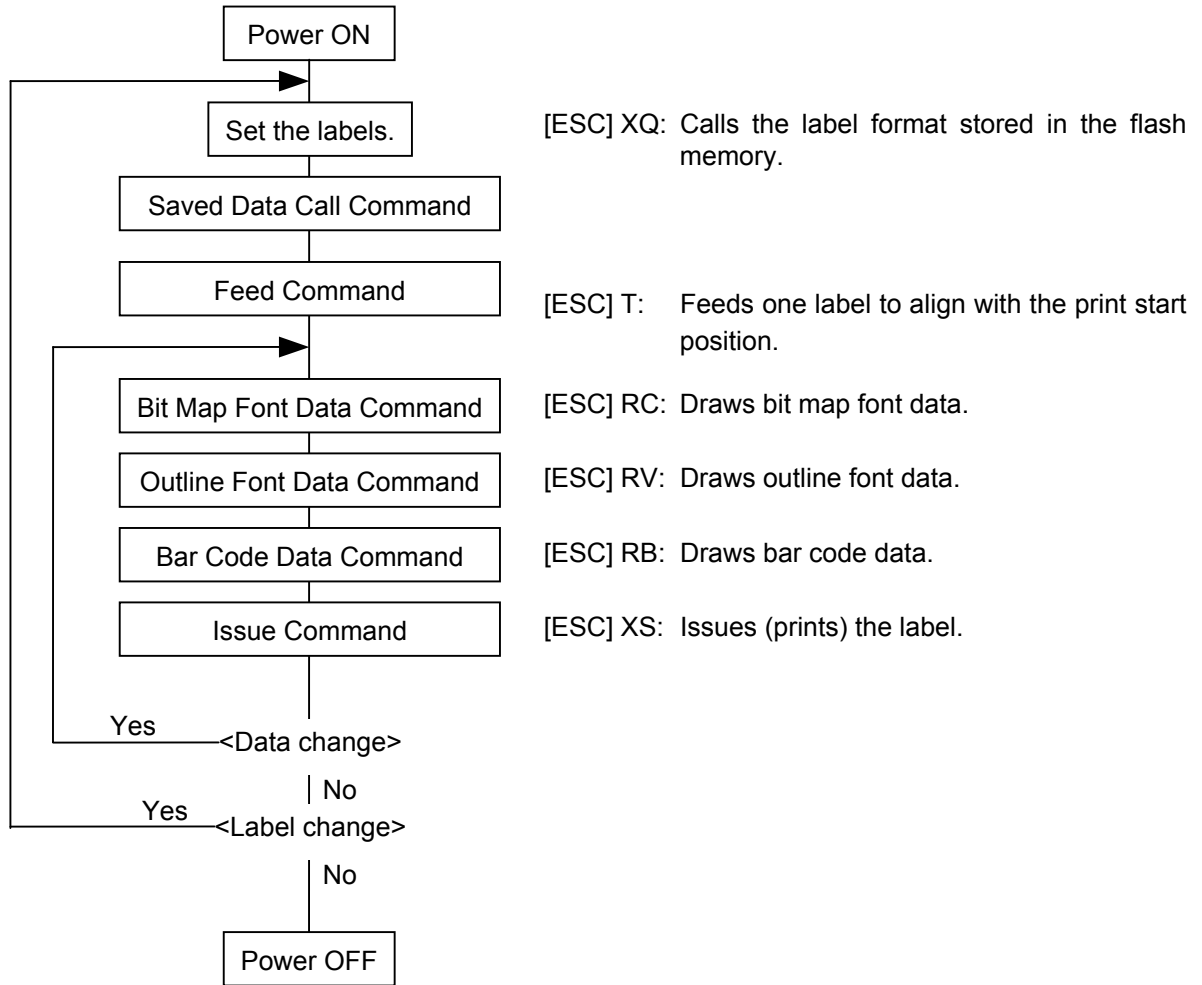
NOTES: *(1)* *When loading new type paper, the Feed Command must always be sent. When using the same paper after the power is turned off and on, the Feed Command may be omitted.*

    (2) *If the option for "automatic call at power on" for the Saved Data Call Command has previously been selected, the Saved Data Call Command may be omitted after the power is turned off and on.*

    (3)   When the XML data is used:

    Print data in XML format can be sent to the printer.

  *   For details, refer to the XML Data Print Specification (TAA-1320).

6. INTERFACE COMMANDS

6.1 OUTLINE OF COMMANDS

(1) Format of Interface command

ESC	Command & Data	LF	NUL

- The length from [ESC] to [LF] [NUL] must be as specified by each command.
- There are the following three kinds of control codes:
  ① ESC (1BH), LF (0AH),   NUL (00H)
  ② { (7BH), | (7CH), } (7DH)
  ③ Code set by the printer setting tool

(2) How to use reference

Function	Describes the outline of the function of the command.

Format	Shows the format of the command.

The format designation method should conform to the following rules:

- Each set of small letters (such as aa, bbbb) indicates a parameter item.
- An item enclosed in parentheses may be omitted.
- "…" indicates the repetition of an item.
- Brackets and parentheses are used only in coding, and must not be transmitted in practice.
- Other symbols must always be inserted at designated positions when transmitted.

Term	Explains the term(s) used in the format.

* "0 to 999" described in the entry range indicates that up to 3-digit variable-length entry is allowed.   (Entry of "001" or "009" is also possible.)   "000 to 999" indicates that the entry must be fixed as 3 digits.

Explanation	Explains the command in detail.

Note	Supplementary explanation of the command.

Refer to	Related commands

Examples	Explains the command examples.

[ESC] T20C30 [LF] [NUL]

The above corresponds to the transfer of the following:

1B	54	32	30	43	33	30	0A	00
[ESC]	T	2	0	C	3	0	[LF]	[NUL]

(3) Precautions

> The commands and parameters described in this specification must always be used. If any command or parameter other than those covered in this specification are used, the printer's operation will not be guaranteed. The commands must be used in the online mode.   If any command is transmitted in the system setting mode, the printer will not operate.   However, only the Reset Command can be used.

6.2 LIST OF COMMANDS

6.3 COMMANDS FOR CREATING APPLICATION

6.3.1 LABEL SIZE SET COMMAND   [ESC] D

Function	Sets the size of a label or tag paper.

Format	[ESC] Daaaa, bbbb, cccc (, dddd) [LF] [NUL]

Term	

aaaa: Pitch length of the label or tag
    4 and 5 digits (in 0.1 mm units)
      4 digits: 0100 (10.0 mm) to 9999 (999.9 mm)
      5 digits: 00100 (10.0 mm) to 09990 (999.0 mm)

bbbb: Effective print width
    Fixed as 4 digits (in 0.1 mm units)
      0100 (10.0 mm) to 1057 (105.7 mm)

cccc: Effective print length
    4 and 5 digits (in 0.1 mm units)
      4 digits: 0060 (6.0 mm) to 9970 (997.0 mm)
      5 digits: 00060 (6.0 mm) to 09970 (997.0 mm)

dddd: Backing paper width
(Omissible.   When omitted, the initial value is used as the effective print width.)
    Fixed as 4 digits (in 0.1 mm units)
      0300 (30.0 mm) to 1120 (112.0 mm)

Explanation	

[Labels]

[Printing direction: Bottom first]   [Printing direction: Top first]

[Tag paper]

Black mark (Back side of the paper)

Tag

Origin of coordinates (0, 0)

Effective print length

Tag pitch

0

X

Y

Effective print width

Paper feed direction

[Printing direction: Bottom first]

Black mark (Back side of the paper)

Tag

Effective print length

Tag pitch

Origin of coordinates (0, 0)

Y

X

0

Effective print width

Paper feed direction

[Printing direction: Top first]

[Setting range]

Stop position

Cut position

I

E

Origin ①

H

B

A

Origin ②

G

D

C

Paper feed direction

[Labels]

Black mark (Back side of the paper)

Tag

Stop position

Cut position

I

F

Origin ①

H

A

Origin ②

G

C

[Tags]

[Effective print area]   [mm]

Model / Issue mode / Item			B-452-R		
			Batch	Strip	Cut
Thermal head dot density			11.8 dots/mm (300 dpi)		
Thermal head width			105.7 mm		
Range of values which can be set on the software					
A: Label pitch Tag pitch	Label	Min	15.0	25.4	37.0
		Max.	999.0		
	Tag	Min.	15.0	---	25.4
		Max.	999.0	–	999.0
B: Label length		Min.	13.0	23.4	31.0
		Max.	997.0		993.0
C: Backing paper width Tag width		Min.	25.4	25.4	25.4
		Max.	114.0		
D: Label width		Min.	22.4	22.4	22.4
		Max.	111.0		
E: Label-to-label gap		Min.	2.0	2.0	6.0
		Max.	20.0	5.0	20.0
F: Black mark length		Min.	2.0		
		Max.	10.0		
G: Effective print width		Min.	10.0		
		Max.	105.7		
H: Effective print length	Label	Min.	11.0	21.4	29.0
		Max.	500.0		
	Tag	Min.	13.0	–	23.4
		Max.	500.0	–	500.0
I: Slow up/ down interval	Slow-up		1.0		
	Slow-down		1.0		

When a cut issue is performed, label length B should be as follows:

Label length $B \geq 33.0 \text{ mm} - \left(\dfrac{\text{Label-to-label gap}}{2} \right)$

Notes

(1) Before changing the label size or type of sensor, the Label Size Set Command must first be transmitted.

(2) The Label Size Set Command is stored in memory (retained even if the power is turned off).

(3) After sending the Label Size Set Command, the Feed Command ([ESC] T) must be transmitted prior to printing, to feed one piece of paper so that the print head position aligns with the print start position.

(4) The origin of drawing coordinates, print stop position (print head position when printing stops), and cut position are determined according to the parameters of the Label Size Set Command as shown in the figure on the preceding page. For the print stop position in strip issue mode, refer to the section of the Position Fine Adjust Command. The effective print area is centered on the label/tag.

(5) Printing cannot be performed in the slow up (1 mm) and slow down (1 mm) areas. Consequently, [A : Label pitch/Tag pitch] – [H: Effective print length] $\geq$ 2 mm must be assumed.

(6) The origin of drawing coordinates, print stop position (print head position when printing stops), and cut position are adjustable by the Fine Adjust Commands and according to the fine adjustment settings by the printer setting tool.

(7) The tag rotation designation of the Issue Command ([ESC] XS) causes the origin of drawing coordinates to be origin ① in the case of "bottom first" and to be origin ② in the case of "top first", as shown in the figure.

(8) The parameters must be as shown in the figure and table. Any value or paper outside the range results in a failure of printing or an error.

(9) Where an effective print length is specified within the range of "max. effective print length for on-the-fly", non-stop printing is possible even if the data to be printed is different one by one because printing and drawing of the next label are processed at the same time. [On-the-fly issue]

However, printing may stop every label depending on the volume of drawing data.

. | Examples | (1) Labels   (2) Tags

Effective print area
Label
50.8 mm
46.8 mm
76.0 mm
Backing paper
82.0 mm

Black mark (Back side of the paper)
76.2 mm
72.2 mm
Effective print area
Tag
99.6 mm
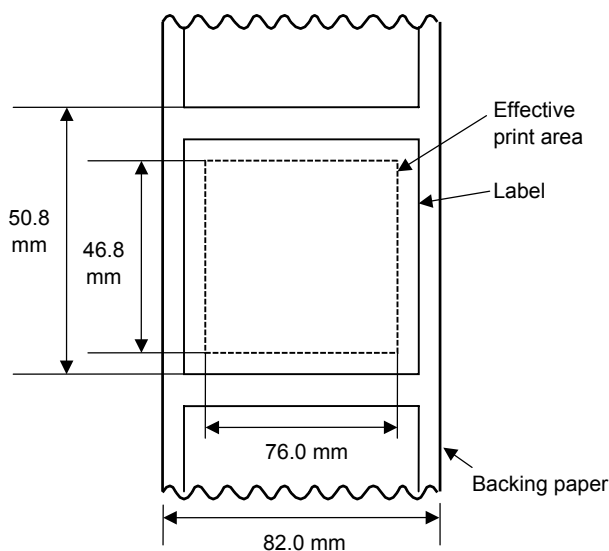
[ESC] D0508, 0760, 0468, 0820 [LF] [NUL]   [ESC] D0762, 0996, 0722 [LF] [NUL]
[ESC] T20C40 [LF] [NUL]   [ESC] T10C40 [LF] [NUL]
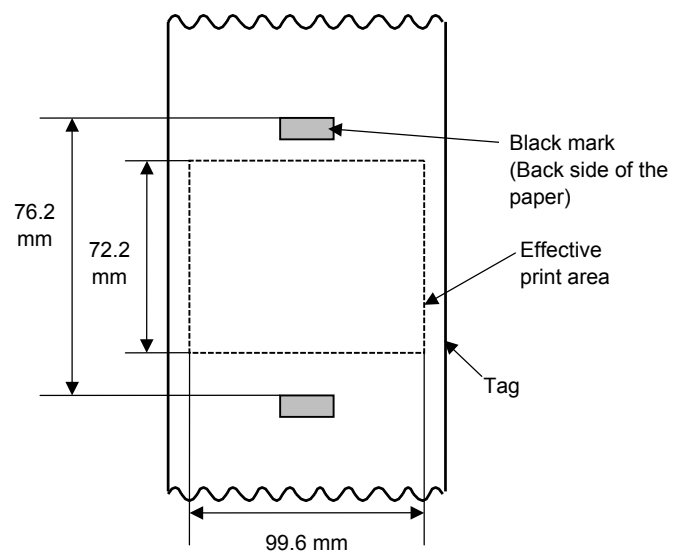
6.3.2 POSITION FINE ADJUST COMMAND   [ESC] AX

Function	① Adjusts the feed amount so that the label stops at the position in front of or behind the automatically set print start position.

① Adjusts the feed amount so that the label stops at the position in front of or behind the automatically set print start position.

② Adjusts the cut position so that the label is cut at a position in front of or behind the automatically set cut position, or adjusts the strip position so that the label stops at the position in front of or behind the automatically set strip position.

③ Adjusts the reverse feed amount to the home position after a cut, or adjusts the reverse feed amount to the home position after a strip operation.

Format

[ESC] AX; abbb, cddd, eff [LF] [NUL]

Term

a: Indicates the direction of the print start position fine adjustment
          +: Front
          −: Behind

bbb: Fine adjustment value
          000 to 500 (in 0.1 mm units)

c: Indicates the direction of the cut position (or strip position) fine adjustment
          +: Front
          −: Behind

ddd: Cut position (or strip position) fine adjustment value
          000 to 500 (in 0.1 mm units)

e: Indicates whether the reverse feed amount is to be increased or decreased.
          +: Increase
          −: Decrease

ff: Reverse feed amount fine adjustment value
          00 to 99 (in 0.1 mm units)

[Print Start Position Fine Adjustment]
(To finely adjust the print start position so that it shifts backward or forward)

0.0 mm

Print start position

One label

+3.0 mm

Print start position

One label

−3.0 mm

Paper feed direction

One label

Print start position
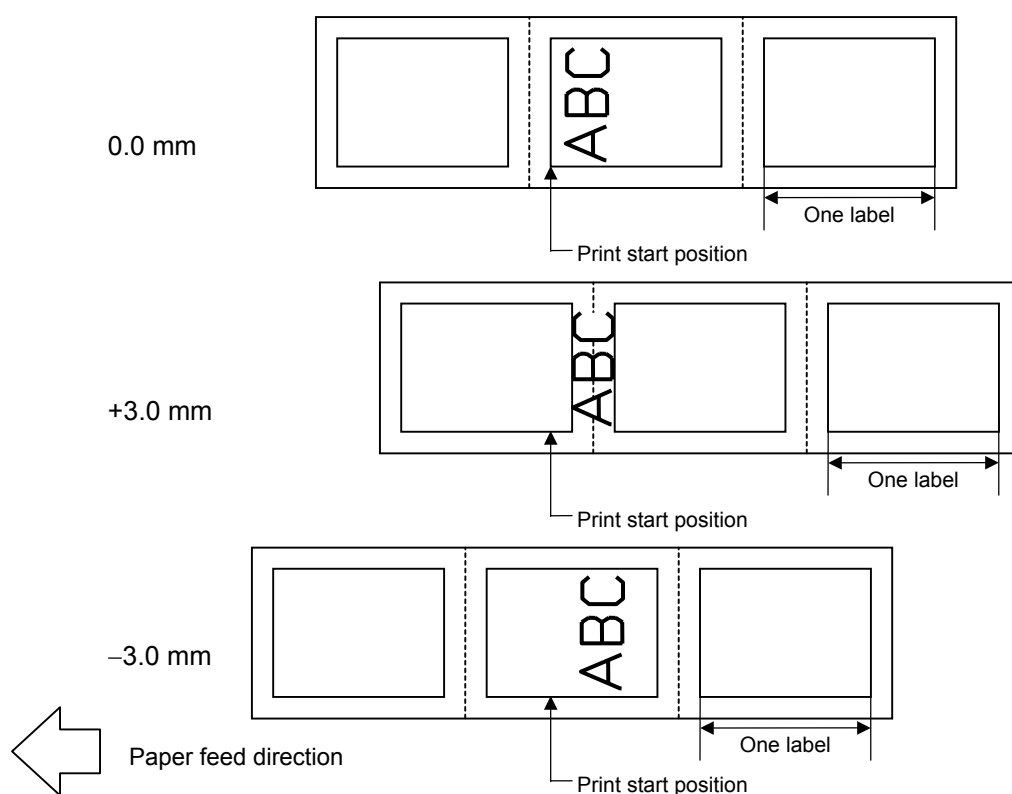
[Cut Position Fine Adjustment] (To finely adjust the cut position backward or forward)

0.0 mm

Cut position

+3.0 mm

Cut position

− 3.0 mm

Cut position

Paper feed direction

[Strip Position Fine Adjustment]

0.0 mm

+3.0 mm

−3.0 mm

4 mm
3 mm

2 mm
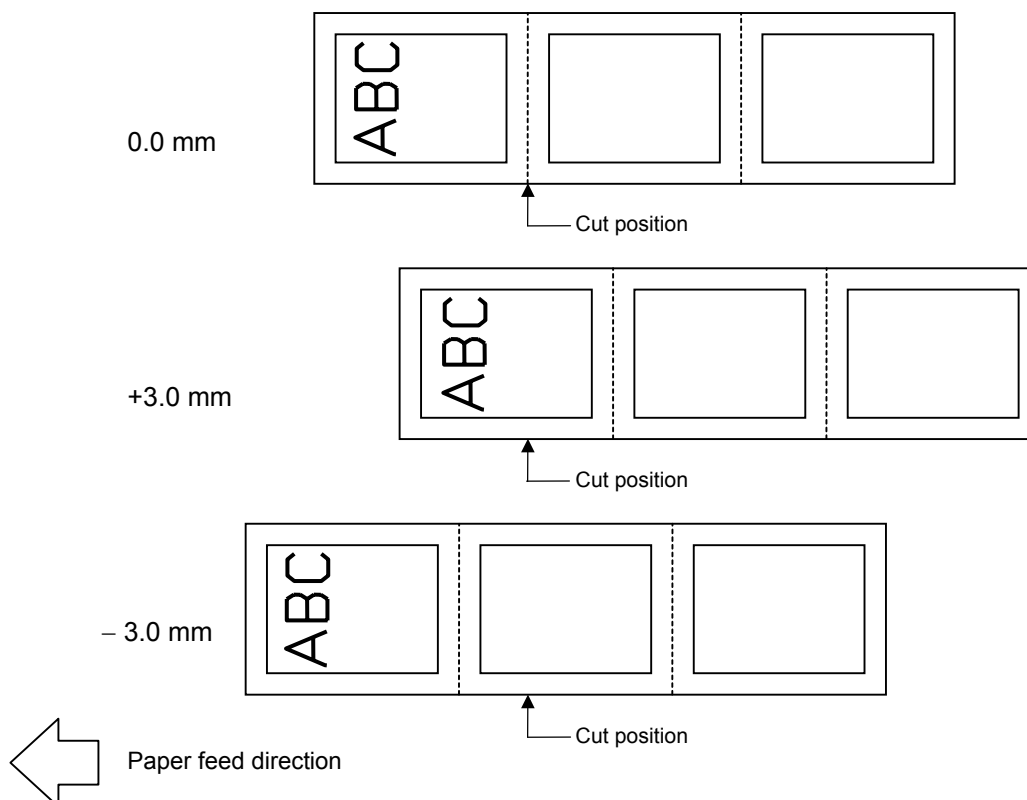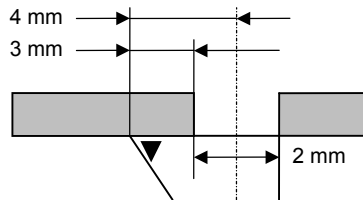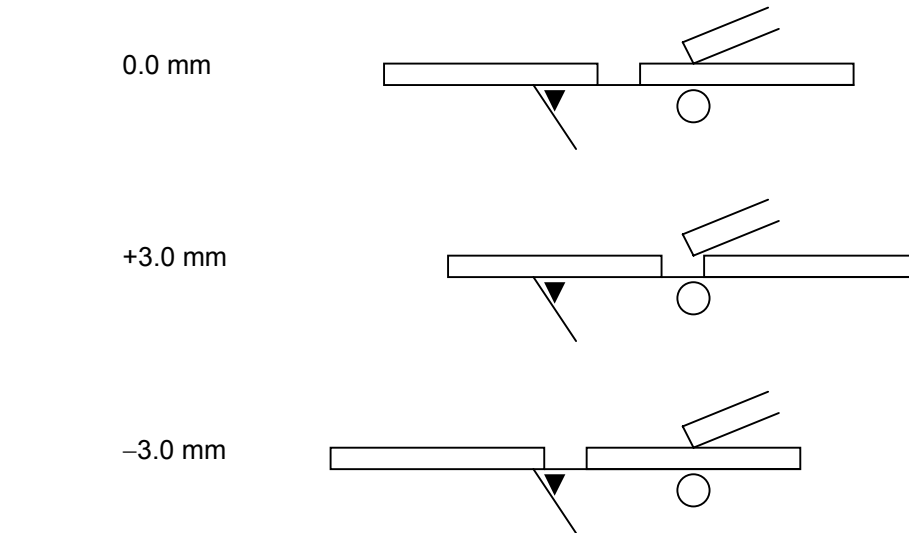
- In strip issue mode, a label is stopped at the position where the distance between the middle point of the label-to-label gap and the edge of the strip shaft is 4 mm, since the label-to-label gap is assumed to be 2 mm.
- When the print start position is not proper, it should be adjusted using the strip position fine adjustment function.
- When the label-to-label gap is 5 mm or more, the effective print length should be set to the maximum (label pitch -2 mm). Then, the print start position should be adjusted using the strip position fine adjust function.

[Reverse Feed Amount Fine Adjustment]
(To finely adjust the reverse feed amount so that the print start position shifts backward or forward)

0.0 mm

Print start position (home position after reverse feed)

+3.0 mm

Print start position (home position after reverse feed)

- 3.0 mm

Print start position (home position after reverse feed)

Paper feed direction
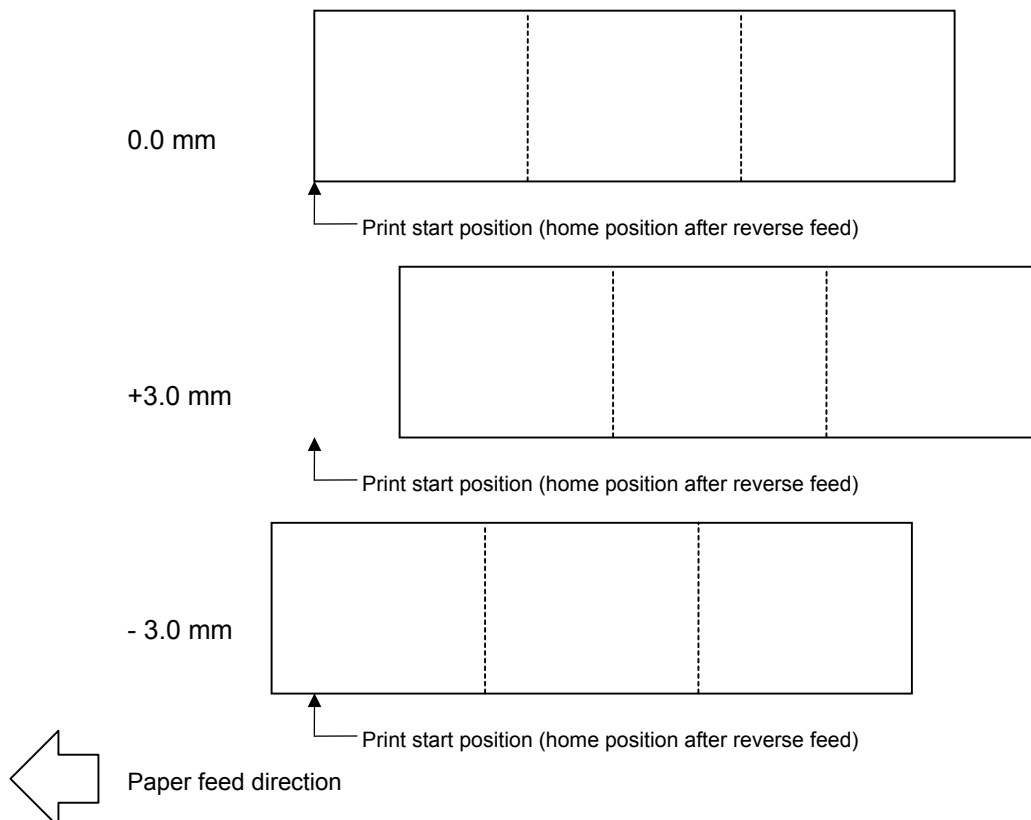
(1) If the print start position fine adjustment (feed amount fine adjustment), cut position (or strip position) fine adjustment or reverse feed amount fine adjustment has been set by using the B-452-R printer setting tool, the fine adjustment value will be the sum of the values set by this command and the setting tool. Each maximum fine adjustment value is as follows. However, the maximum print start position fine adjustment (feed amount fine adjustment) value must be within the label pitch.

Print start position fine adjustment...±50.0 mm
Cut position (or strip position) fine adjustment............................±50.0 mm
Reverse feed amount fine adjustment ....±9.9 mm

(2) After changing the fine adjustment value by this command, one label must be fed by the Feed Command ([ESC] T) to adjust the print start position.

(3) Each fine adjustment value is stored in memory (retained even if the power is turned off).

(4) If a fine adjustment value is improper, printing will not be performed correctly.

> For example, if the reverse feed amount fine adjustment value is not properly set, the print position differs between the labels to be cut and those not to be cut. If the label is excessively fed backward, it will not be fed correctly during printing.
> In the strip issue mode, the print start position may differ between the first label and the second label. The reverse feed amount fine adjustment for the strip issue is used to adjust the feed amount so that a label is stopped at the correct position where the automatic forward feed is ready to be performed.

(5) The cut position (or the strip position) fine adjustment and the reverse feed amount fine adjustment are effective only when the printer is in cut issue or strip issue mode.

(6) How the labels with the label pitch of 22 mm or less are handled in the cut issue mode:
The minimum label pitch for the normal cut issue is 22 mm. When a label with the label pitch of less than 22 mm is used (though it is out of specifications), the edge of the label may be caught on the edge of the thermal head during a reverse feed to the home position, after the gap between labels is cut. Therefore, the label may not be return to the proper home position.

(7) Labels may not be returned to the home position depending on the print conditions, even if the same amount of reverse feed is performed. When the media sensor is used and if the label pitch is almost the same size as the distance between the print head and the media sensor (123.0 mm), a label/tag may not be returned to the home position by a reverse feed after a cut issue, a strip issue, or an automatic forward feed standby function. It may result in an error. In such cases, increasing the reverse feed amount (fine adjusting the reverse feed amount in the + direction) can prevent this error.

Examples   (1)   Cut issue

3.5 mm ◄ Cut

Pre-print

2.0 mm

2.0 mm

- Fine adjust the print position by +2.0 mm.
- Fine adjust the cut position by +3.5 mm.
- Finely adjust the reverse feed amount by +1.0 mm. (3.0 - 2.0 = 1.0)

3.0 mm

◄ Cut

Paper feed direction

[ESC] AX; +020, +035, +10 [LF] [NUL]
[ESC] T21C40 [LF] [NUL]

(2)   Strip issue

1.0 mm

3.0 mm

- Fine adjust the strip position by +2.0 mm.
- Fine adjust the print position by +1.0 mm.

A B C

A B C

1.0 mm

Paper feed direction

[ESC] AX; +010, +020, +00 [LF] [NUL]
[ESC] T20D40 [LF] [NUL]

6.3.3 PRINT DENSITY FINE ADJUST COMMAND   [ESC] AY

Function	Adjusts the print density which was automatically set.

Format	[ESC] AY; abb, c [LF] [NUL]

Term	

a: Indicates whether to increase or decrease the density.
           +: Increase (darker)
           −: Decrease (lighter)

bb: Print density fine adjustment value
           00 to 10 (in units of 1 step)

c: Indicates the print mode (thermal transfer or direct thermal)
           0: Thermal transfer
           1: Direct thermal

Explanation	

(1) The print density fine adjustment is performed by adjusting the length of time to apply voltage to the thermal head.

(2) If the print density fine adjustment value has been set by the printer setting tool, the fine adjustment value will be the sum of the values set by this command and the setting tool. The maximum fine adjustment value for each of the thermal transfer and direct thermal print modes is ±10.

(3) The fine adjustment values in thermal transfer print mode and direct thermal print mode can be set independently.

(4) The Print Density Fine Adjust Command is stored in memory (retained even if the power is turned off).

(5) The factory default of the fine adjustment value is 00, for both the fine adjust command and the fine adjustment by the printer setting tool.

(6) The maximum adjustment value differs depending on the print speed.   When the value exceeds the maximum, it is automatically corrected to the maximum value.

Print speed	Direct thermal	Thermal transfer
2 ips	+10 step	+10 step
4 ips	+8 step	+10 step

Examples	

To set the print density to "–2" for the thermal transfer mode.
   [ESC] AY; -02, 0 [LF] [NUL]

To set the print density to "+3" for the direct thermal mode.
   [ESC] AY; +03, 1 [LF] [NUL]

6.3.4 RIBBON MOTOR DRIVE VOLTAGE FINE ADJUST COMMAND [ESC] RM

| Function | Fine adjusts the drive voltage of the ribbon motor. |

| Format | [ESC] RM; abbcdd [LF] [NUL] |

| Term | a: Direction of the ribbon take-up motor voltage fine adjustment
-: Negative (The voltage is lowered.)

bb: Fine adjustment value for the ribbon take-up motor
00 to 15 (in units of 1 step)

c: Direction of the ribbon feed motor voltage fine adjustment
-: Negative (The voltage is lowered.)

dd: Fine adjustment value for the ribbon feed motor
00 to 15 (in units of 1 step) |

| Explanation | (1) If the ribbon wrinkles, it can be solved by a find adjustment of the ribbon motor drive voltage by this command.

(2) -1 step is equivalent to -5% of the standard drive voltage.

(3) The ribbon motor drive voltage fine adjustment value is stored in memory (retained even if the power is turned off).

(4) If the ribbon motor drive voltage fine adjustment value has been set by the printer setting tool, the fine adjustment value will be the sum of the values set by this command and the setting tool. The maximum fine adjustment values are as shown below.

Take-up side		Feed side	
Min.	Max.	Min.	Max.
-15	-0	-15	-0

(5) When a RAM clear is performed, the fine adjustment value for each of the command (take-up/feed) and the printer setting tool will be reset to 00.

(6) The factory default of the fine adjustment values is 00, for both command (take-up/feed) and the printer setting tool. |

| Example | To set the value for the ribbon take-up motor to "−3", and the value for the ribbon feed motor to "−2".

[ESC] RM; -03-02 [LF] [NUL] |

6.3.5   IMAGE BUFFER CLEAR COMMAND   [ESC] C

| Function | Clears the image buffer for drawing characters, lines, bar codes, and graphics. |

| Format | [ESC] C [LF] [NUL] |

| Explanation | (1)   After changing the label size, the image buffer must be cleared. |

(2)   The increment/decrement designation (described later) is effective until the Image Buffer Clear Command is transmitted.

(3)   The link field designation (described later) is effective until the Image Buffer Clear Command is transmitted.

| Examples | [ESC] D0508, 0760, 0468 [LF] [NUL] |

[ESC] T20C41 [LF] [NUL]
[ESC] C [LF] [NUL]
[ESC] RC000; ABC [LF] [NUL]
[ESC] RC001; DEF [LF] [NUL]
[ESC] XS; I, 0001, 0002C41000 [LF] [NUL]

6.3.6   CLEAR AREA COMMAND   [ESC] XR

| Function | Clears the designated area or reverses the white/black dot pattern in the designated area in the drawing area. |

| Format | [ESC] XR; aaaa, bbbb, cccc, dddd, e [LF] [NUL] |

| Term | aaaa: X-coordinate of the designated area start point
Fixed to 4 digits   (in 0.1 mm units)

bbbb: Y-coordinate of the designated area start point
4 or 5 digits   (in 0.1 mm units)

cccc: X-coordinate of the designated area end point
Fixed to 4 digits   (in 0.1 mm units)

dddd: Y-coordinate of the designated area end point
4 or 5 digits   (in 0.1 mm units)

e: Type of clear
A: Clears the contents in the designated area to zero.
B: Reverses the white/black dot pattern in the designated area. |

| Explanation |

[Printing direction: Bottom first]   [Printing direction: Top first]

| Notes | (1)   Print result will be the same even if the start and end point coordinates are reversed.

(2)   Print result will be the same even if the start point is set to the upper right and the end point is set to the lower left, respectively.

(3)   The start and end point coordinates of the designated area must be set within the effective print area set by the Label Size Set Command ([ESC] D). |

[Effective print area]   [mm]

Item \ Model \ Issue mode			B-452-R		
			Batch	Strip	Cut
Thermal head dot density			11.8 dots/mm (300 dpi)		
Thermal head width			105.7 mm		
G: Effective print width		Min.	10.0		
		Max.	105.7		
H: Effective print length	Label	Min.	11.0	21.4	29.0
		Max.	500.0		
	Tag	Min.	13.0	–	23.4
		Max.	500.0	–	500.0

Example
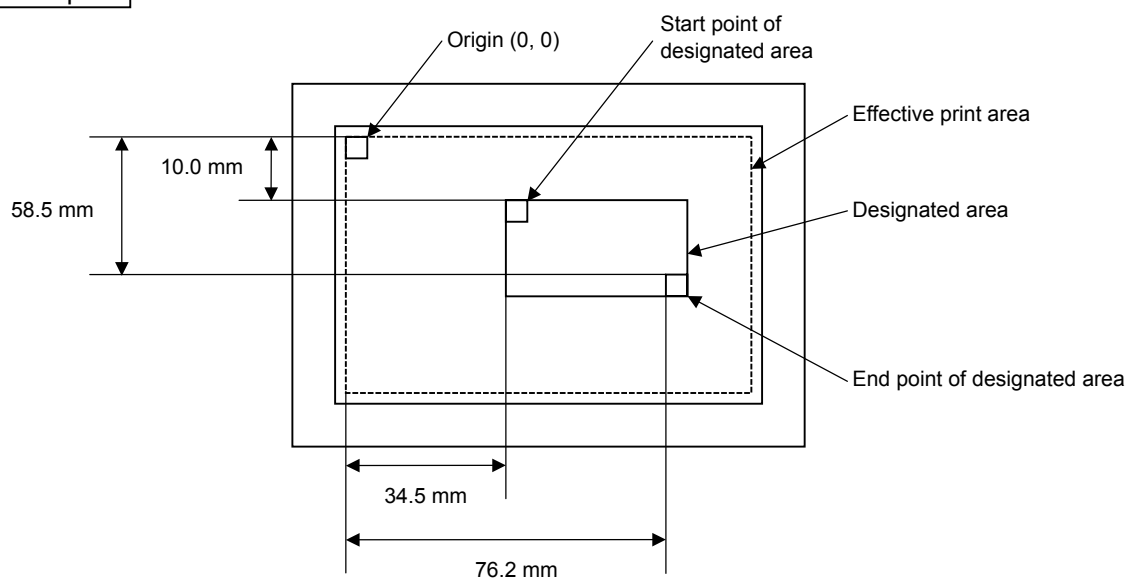
[ESC] XR; 0345, 0100, 0762, 0585, A [LF] [NUL]
[ESC] RC000; ABC [LF] [NUL]
[ESC] RC001; DEF [LF] [NUL]
[ESC] XS; I, 0001, 0002C4000 [LF] [NUL]

6.3.7 LINE FORMAT COMMAND   [ESC] LC

Function	Sets the line format and draws the line.

Format	[ESC] LC; aaaa, bbbb, cccc, dddd, e, f (, ggg) [LF] [NUL]

Term	

aaaa: X-coordinate of the start point
                Fixed to 4 digits (in 0.1 mm units)

bbbb: Y-coordinate of the start point
                4 or 5 digits (in 0.1 mm units)

cccc: X-coordinate of the end point
                Fixed to 4 digits (in 0.1 mm units)

dddd: X-coordinate of the end point
                4 or 5 digits (in 0.1 mm units)

e: Type of line
                0: Line (horizontal, vertical, or slant)
                1: Rectangle
                2: Line with dots skipped (horizontal line, vertical line)
                3: Rectangle with dots skipped

f: No. of line width dots
                1 to 9 or 01 to 99 (in 0.1 mm units)

ggg: Radius of rounded corners of a rectangle
                (Omissible.   If omitted, the chamfering process for rectangle corners is not
                performed.)
                Fixed as 3 digits (in 0.1 mm units)

Explanation	

[Printing direction: Bottom first]   [Printing direction: Top first]

- 39 -
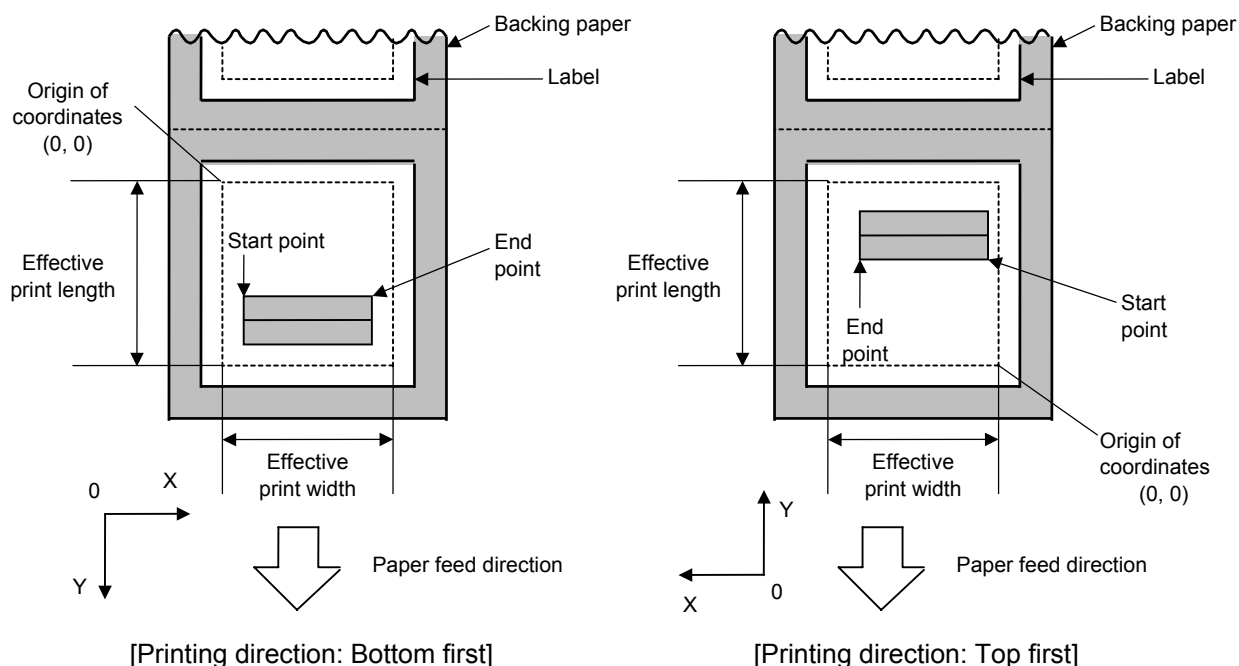
[Line]

(1) Horizontal line (In the case of $|Y_2 - Y_1| = 0$)

(X_1,Y_1) (X_2,Y_2)

Line width
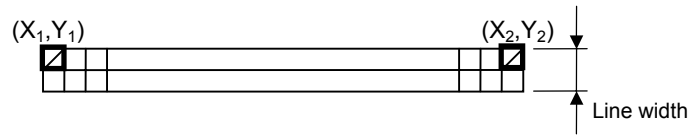
(2) Vertical line (In the case of $|X_2 - X_1| = 0$)
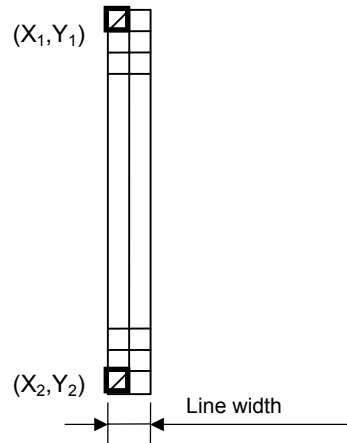
(X_1,Y_1)

(X_2,Y_2)

Line width

(3) Slant line A ($|X_2 - X_1| \leq |Y_2 - Y_1|$)

(X_1,Y_1) (X_1,Y_1)

(X_2,Y_2) Line width (X_2,Y_2) Line width

(4) Slant line B ($|X_2 - X_1| > |Y_2 - Y_1|$)

(X_1,Y_1)

(X_2,Y_2) Line width

(X_2,Y_2)
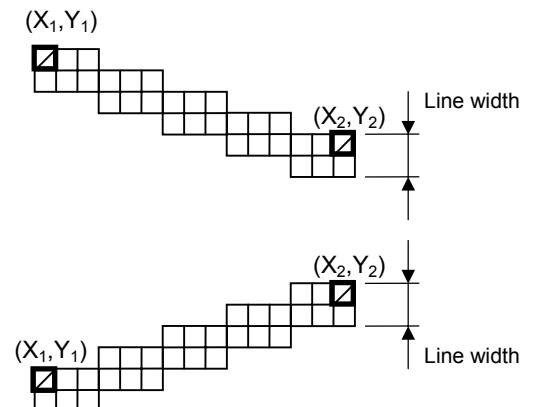
(X_1,Y_1) Line width

[Rectangle]

(1)   Radius of rounded corners = 000, or parameter is omitted
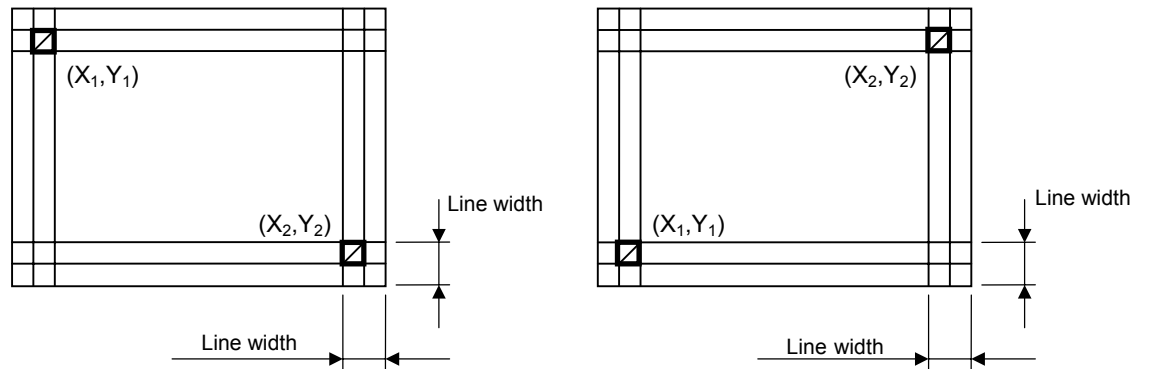
(2)   Radius of rounded corners $\neq$ 000
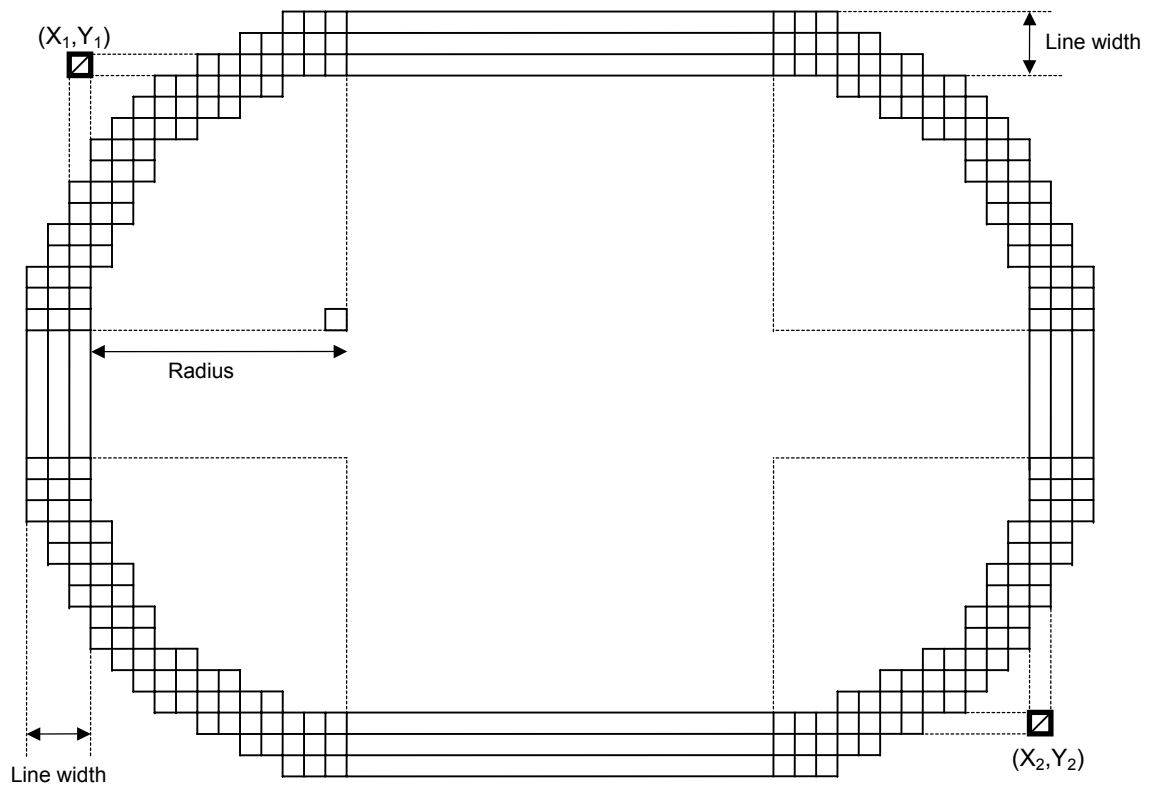
[Line with some dots skipped]

   (1) Horizontal line

(X_1,Y_1) (X_2,Y_2)
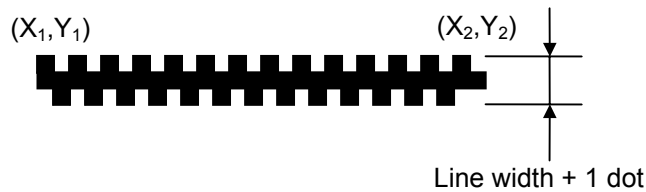
Line width + 1 dot

Dots are skipped at the top and bottom areas only, which means that the thicker the line width is, the thicker the middle area of the line becomes.

   (2) Vertical line

(X_1,Y_1)

(X_2,Y_2) Line width + 1 dot
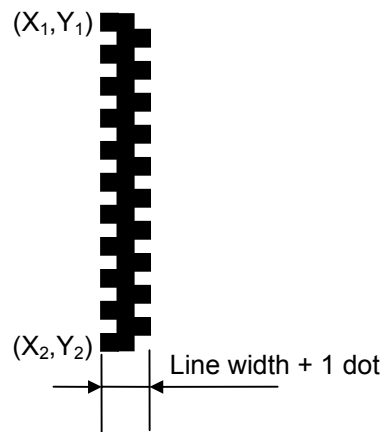
Dots are skipped at the leftmost and rightmost areas only, which means that the thicker the line width is, the thicker the middle area of the line becomes.

[Rectangle]

   (1) Radius of rounded corners = 000, or parameter is omitted

Line width + 1 dot

(X_1,Y_1)

(X_2,Y_2)
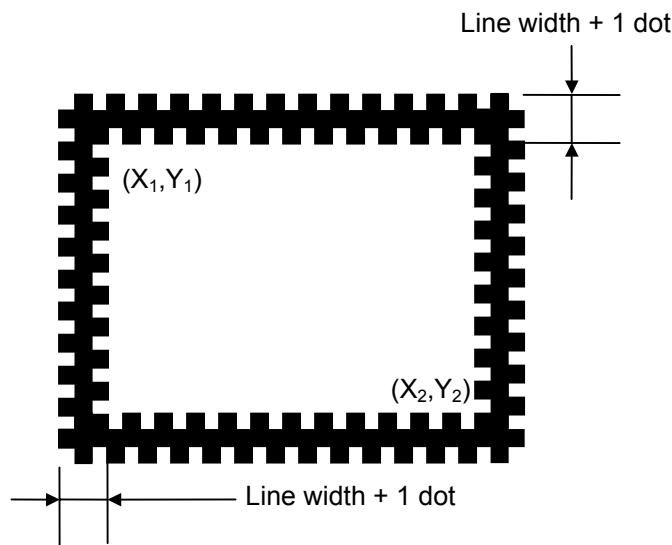
Line width + 1 dot

Dots are skipped at the top, bottom, leftmost and rightmost areas only, which means that the thicker the line width is, the thicker the middle area of the line becomes.

(2) Rounded corners of a rectangle ≠ 000

(X_1, Y_1)

Line width + 1 dot

Radius

Line width + 1 dot

(X_2, Y_2)
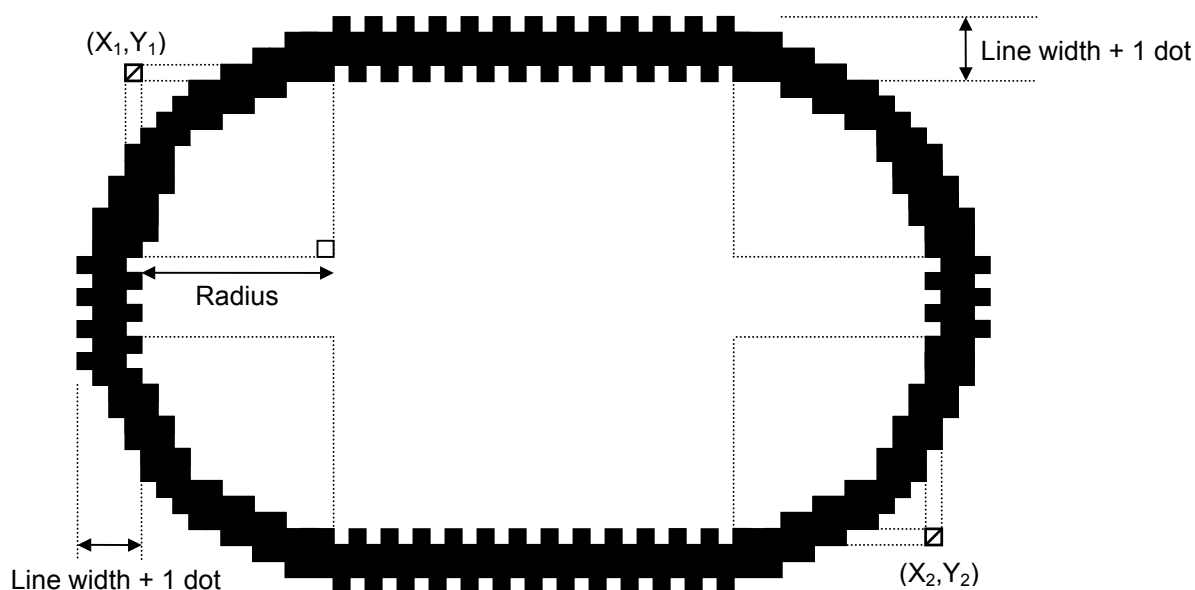
Notes

(1) In case of line designation, a horizontal line, vertical line, or slant line A/B is drawn according to the start and end point coordinates.

(2) Print result will be the same even if the start and end point coordinates are reversed.

(3) The start and end point coordinates must be set so that the result of line drawing will be within the effective print area set by the Label Size Set Command ([ESC] D).

(4) Designation of the radius of the rounded corner is effective only when the type of line is set to 1 (rectangle) or 3 (rectangle with dots skipped). When the type of line is set to 0 or 2, designation of the radius is ignored. When the type of line is set to 1 or 3 and the radius of the rounded corner is set to 000 or omitted, a normal rectangle is drawn.

(5) On the following condition, a circle is supposed to be drawn:

$$\frac{|X_2 - X_1|}{2} = \frac{|Y_2 - Y_1|}{2} \leq [\text{Radius of rounded corners}]$$

[Effective print area]   [mm]

Item \ Issue mode \ Model			B-452-R		
			Batch	Strip	Cut
Thermal head dot density			11.8 dots/mm (300 dpi)		
Thermal head width			105.7 mm		
G: Effective print width	Min.		10.0		
	Max.		105.7		
H: Effective print length	Label	Min.	11.0	21.4	29.0
		Max.	500.0		
	Tag	Min.	13.0	–	23.4
		Max.	500.0	–	500.0

- 43 -

Origin (0, 0)

Effective print area

5.0 mm

28.0 mm

0.4 mm

20.0 mm

0.4 mm

30.5 mm

[ESC] C [LF] [NUL]
[ESC] LC; 0200, 0350, 0305, 0050, 0, 4 [LF] [NUL]
[ESC] LC; 0200, 0050, 0200, 0280, 0, 4 [LF] [NUL]
[ESC] XS; I, 0001, 0002C4000 [LF] [NUL]

6.3.8 BIT MAP FONT FORMAT COMMAND   [ESC] PC

Function	Sets the format indicating where and how the bit map font is to be printed on a label.

Format

① [ESC] PCaaa; bbbb, cccc, d, e, ff (, ghh), ii, j (, Jkkll) (, Mm) (, nooooooooooo)
(, Zpp) (, Pq) (=rrr------rrr) [LF] [NUL]

② [ESC] PCaaa; bbbb, cccc, d, e, ff (, ghh), ii, j (, Jkkll) (, Mm) (, nooooooooooo)
(, Zpp) (, Pq) (; ss$_1$, ss$_2$, ss$_3$, ------, ss$_{20}$) [LF] [NUL]

Term

aaa: Character string number
        000 to 199 (two digits, 00 to 99, also acceptable)

bbbb: X-coordinate of the print origin of character string
        Fixed as 4 digits (in 0.1 mm units)

cccc: Y-coordinate of the print origin of character string
        4 or 5 digits (in 0.1 mm units)

d: Character horizontal magnification
        1 to 9 (in magnifications)

      * Two-digit designation enables the magnifications in 0.5 units
        (05 ~ 95: 0.5 to 9.5 magnifications).
        The magnification can be designated in 0.1 units between 0.5 to 1.
        (06 ~ 09: 0.6 to 0.9 magnifications).

      d d
           └──── Designation in 0.5 magnification units : 0 or 5 (5 to 9, up to 1 magnification)
         └──── Designation in magnifications   : 0 to 9

e: Character vertical magnification
        1 to 9 (in magnifications)

      * Two-digit designation enables the magnifications in 0.5 units
        (05 ~ 95: 0.5 to 9.5 magnifications).

       The magnification can be designated in 0.1 units between 0.5 to 1.
        (06 ~ 09: 0.6 to 0.9 magnifications).

      e e
           └──── Designation in 0.5 magnification units : 0 or 5 (5 to 9, up to 1 magnification)
         └──── Designation in magnifications   : 0 to 9

ff: Type of font

A:	Times Roman (Medium)	8 point
B:	Times Roman (Medium)	10 point
C:	Times Roman (Bold)	10 point
D:	Times Roman (Bold)	12 point
E:	Times Roman (Bold)	14 point
F:	Times Roman (Italic)	12 point
G:	Helvetica (Medium)	6 point
H:	Helvetica (Medium)	10 point
I:	Helvetica (Medium)	12 point
J:	Helvetica (Bold)	12 point
K:	Helvetica (Bold)	14 point
L:	Helvetica (Italic)	12 point
M:	Presentation (Bold)	18 point
N:	Letter Gothic (Medium)	9.5 point
O:	Prestige Elite (Medium)	7 point
P:	Prestige Elite (Bold)	10 point

Q:	Courier (Medium)	10 point
R:	Courier (Bold)	12 point
S:	OCR-A	12 point
T:	OCR-B	12 point

U(a): Kanji (16 x 16 dots)(Square Gothic) or writable character 41 (16 x 16 dots)

V(a): Kanji (24 x 24 dots)(Square Gothic) or writable character 42 (24 x 24 dots)

W(a): Kanji (32 x 32 dots)(Square Gothic) or writable character 43 (32 x 32 dots)

X(a): Kanji (48 x 48 dots)(Square Gothic) or writable character 44 (48 x 48 dots)

a to p: Reserved

q: Gothic 725 Black

v: Kanji (24 x 24 dots) (Mincho)

w: Kanji (32 x 32 dots) (Mincho)

01 (a): Writable character 1 (1×1 dot to 720×720 dots)

⋮

40 (a): Writable character 40 (1×1 dot to 720×720 dots)

51 (a): 2-byte code set writable character 1 (1×1 dot to 720×720 dots)

⋮

55 (a): 2-byte code set writable character 5 (1×1 dot to 720×720 dots)

    a: Drive

      (Omissible. If omitted, flash ROM on the CPU board is selected.)

        0: Flash ROM on the CPU board

  * Fonts A to L, and q are proportional fonts.

ghh: Fine adjustment of character-to-character space

(Omissible. If omitted, space is adjusted according to the designated font.)

  g: Designates whether to increase or decrease the character-to-character space.

    +: Increase

    −: Decrease

  hh: No. of space dots between characters

    00 to 99 (in units of dots)

ii: Rotational angles of a character and character string

Code	Character	Character string
00:	0° (char.)	0° (char.-string)
11:	90° (char.)	90° (char.-string)
22:	180° (char.)	180° (char.-string)
33:	270° (char.)	270° (char.-string)
01:	0° (char.)	90° (char.-string)
12:	90° (char.)	180° (char.-string)
23:	180° (char.)	270° (char.-string)
30:	270° (char.)	0° (char.-string)

Available only to the font type of U, V, W, X, v, and w.

j: Character attribution

    B: Black character

    W (aabb): Reverse character

        aa: No. of dots from the character string to the end of the black background in the horizontal direction

        bb: No. of dots from the character string to the end of the black background in the vertical direction

           aa: 01 to 99 (in units of dots)

           bb: 01 to 99 (in units of dots)

    F (aabb): Boxed character

        aa: No. of dots from the character string area to the box in the horizontal direction

        bb: No. of dots from the character string area to the box in the vertical direction

           aa: 01 to 99 (in units of dots)

           bb: 01 to 99 (in units of dots)

    C (aa):   Stroked out character

        aa: No. of dots from the character string area to the end of the stroke

           aa: 01 to 99 (in units of dots)

    * Descriptions in parentheses are omissible.
    (If omitted, it is character magnification (horizontal or vertical magnifications, whichever is larger) × 6 dots.)

Jkkll: Bold character designation
(Omissible. If omitted, this process is not performed.)

    kk: No. of horizontal shift dots
        00 to 16 (in units of dots)

    ll: No. of vertical shift dots
        00 to 16 (in units of dots)

Mm: Type of check digits to be attached.
(Omissible. If omitted, this process is not performed)

    m: Type of check digit

     0: Modulus 10 (Draws data and check digit)
     1: Modulus 43 (Draws data and check digit)
     2: DBP Modulus 10 (Draws data and check digit)

nooooooooooo: Increment and decrement

        (Omissible. When omitted, incrementing/decrementing is not performed.)

        n: Designates whether to increment or decrement.

        +: Increment
        -: Decrement

   oooooooooo: Skip value
        0000000000 to 9999999999

Zpp: Zero suppression
(Omissible. When omitted, zero suppression is not performed.)
　pp: No. of digits after zero suppression
　　00 to 20

Pq: Alignment (Omissible, When omitted, the alignment is set to left.)
　q: Designates the character position

　　1: Left
　　2: Center
　　3: Right
　　4aaaa: Justification

　　　aaaa: Character string area of X direction
　　　　0050 to 1040 (in 0.1 mm units)

　　5aaaabbbcc: Automatic line feed
　　　aaaa: Character string area of X direction
　　　　0050 to 1040 (in 0.1 mm units)
　　　bbb: Line feed spacing
　　　　010 to 500 (in 1 mm units)
　　　cc: Number of lines
　　　　01 to 99

rrr------rrr: Data string to be printed (Omissible)
　Max. 255 digits

ss_1, ss_2, ss_3, ------, ss_{20}: Link field No. (Omissible)
　　01 to 99 (1 to 99 can be also used.)
　　Up to 20 fields can be designated using commas.

| Explanation | (1) | Character string number |

When drawing by the Data Command ([ESC] RC), the format designated by the character string number is selected.

(2) Print origin of coordinates
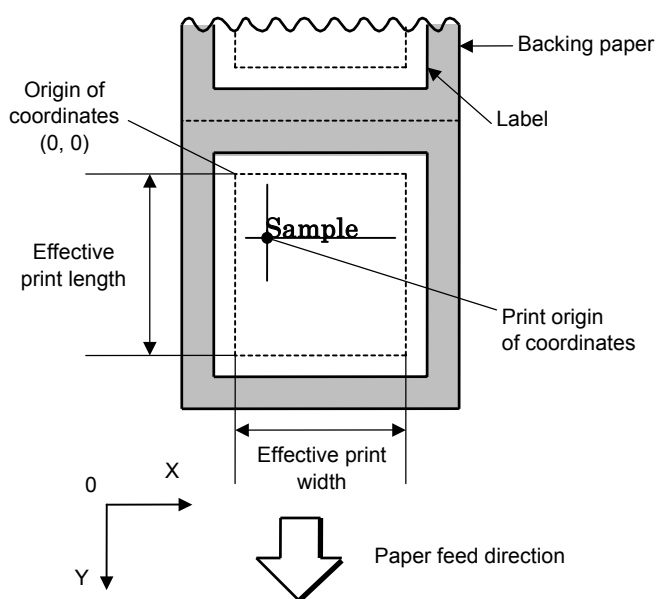
[Printing direction: Bottom first]   [Printing direction: Top first]
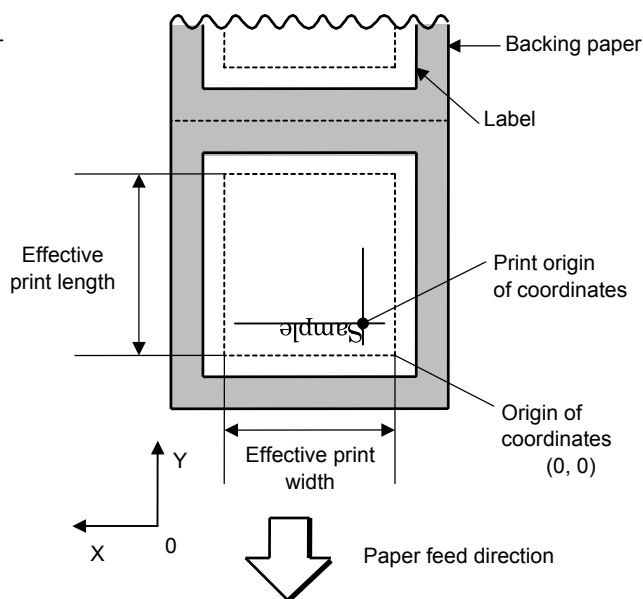
The print origin of coordinates must be set so that the characters are drawn within the effective print area set by the Label Size Set Command ([ESC] D).

[Effective print area]   [mm]

Item		Model	B-452-R		
		Issue mode	Batch	Strip	Cut
Thermal head dot density			11.8 dots/mm (300 dpi)		
Thermal head width			105.7 mm		
G: Effective print width		Min.	10.0		
		Max.	105.7		
H: Effective print length	Label	Min.	11.0	21.4	29.0
		Max.	500.0		
	Tag	Min.	13.0	–	23.4
		Max.	500.0	–	500.0

(3) Horizontal magnification and vertical magnification

Vertical magnification

Horizontal magnification

Horizontal magnification

Vertical magnification
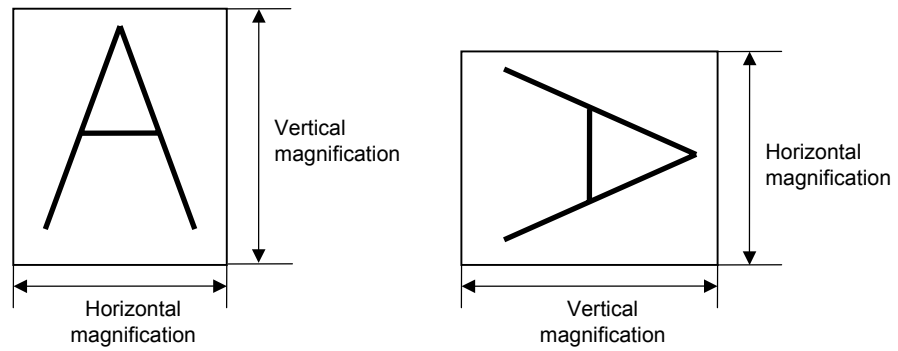
[Relationship between drawing coordinates and magnification]

Char. height

Point of origin

Left offset

Char. width

Point of origin of next char.

Horizontal spacing/ proportional spacing

Enlarge

Char. height × Vertical magnification

Point of origin

Char. Width × Horizontal magnification

(Horizontal spacing/proportional spacing) × Horizontal magnification

Point of origin of next char.
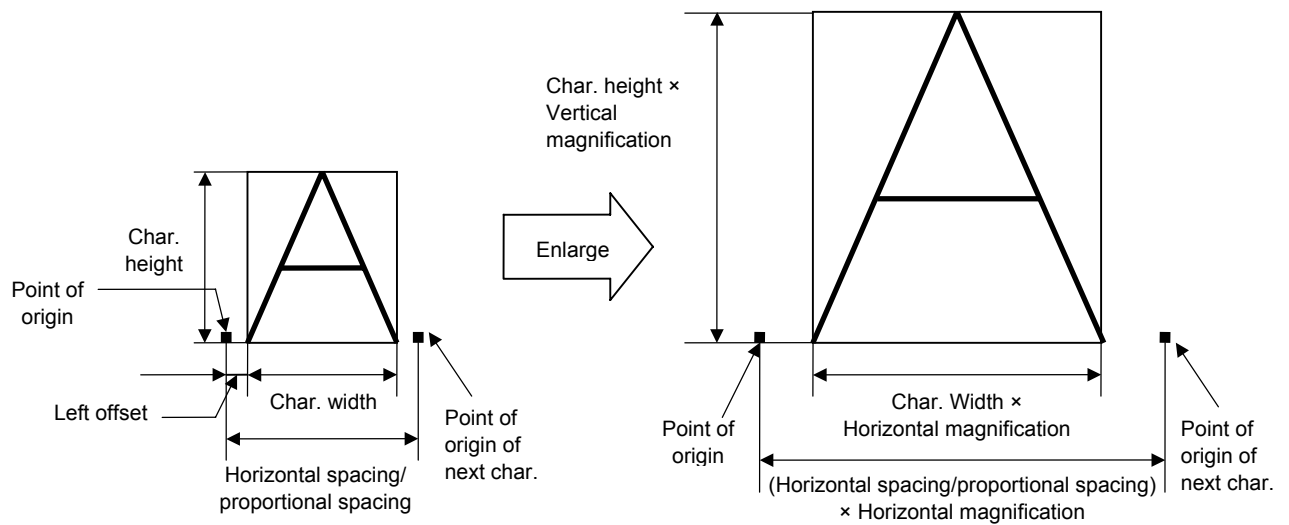
(4)　Type of font

A: Times Roman: !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMabcdefghijklmÅîØÆåìÆ

B: Times Roman   !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGabcdefgÅîØÆåìÆ

C: Times Roman   !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGabcdefgÅîØÆåìÆ

D: Times Roman   !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGabcdefgÅîØÆåìÆ

E: Times Roman   !"#$%&'()*+,-./0123456789@ABCDEFGabcdefgÅîØÆåìÆ

F: Times Roman   *!"#$%&'()*+,-./0123456789@ABCDEFGabcdefgÅîØÆåìÆ*

G: Helvetica   !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVabcdefghijklmnopqrstuvwÅîØÆåìÆ

H: Helvetica   !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHabcdefghÅîØÆåìÆ

I: Helvetica   !"#$%&'()*+,-./0123456789@ABCDEFGabcdefÅîØÆåìÆ

J: Helvetica   !"#$%&'()*+,-./0123456789@ABCDEFGabcdeÅîØÆåìÆ

K: Helvetica   !"#$%&0123456789@ABCDEFabcdefÅîØÆåìÆ

L: Helvetica   *!"#$%&'()*+,-./0123456789@ABCDEFGHabcdeÅîØÆåìÆ*

M: Presentation   !"#$%&0123456789@ABCDEFABCDE

N: Letter Gothic   !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPabcdefghijklmnopÅîØÆåìÆ

O: Prestige Elite   !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPabcdefghijklmnopÅîØÆåìÆ

P: Prestige Elite   !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFabcdefÅîØÆåìÆ

Q: Courier   !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFabcdefÅîØÆåìÆ

R: Courier   !"#$%&'()*+,-./0123456789@ABCDEabcdeÅîØÆåìÆ

S: OCR-A   !"#$%&'()*+,-./0123456789:;<=>?@ABCDEabcdef

T: OCR-B   !"#$%&'()*+,-./0123456789:;<=>?@ABCDEabcdef

U: Kanji (16 x 16 dots)   あいう亜唖娃阿哀愛ＡＢＣ１２３ABC123苺澤弐壹遙瑤％＃＆ａｂｃアイウ ⅠⅡⅢ春夏秋冬かきくけこサシスセソ以伊位依右宇鳥羽ＸＹＺ８９０ＸＺ８９※＠§☆★○●◎◇◆□■

V: Kanji (24 x 24 dots)   あいう亜唖娃阿哀愛ＡＢＣ１２３ABC123苺澤弐壹遙瑤％＃＆ａｂｃアイウ ⅠⅡⅢ春夏秋冬かきくけこサシスセソ以伊位依

W: Kanji (32 x 32 dots)   あいう亜唖娃阿哀愛ＡＢＣ１２３ABC123苺澤弐壹遙瑤％＃＆ａｂｃアイウ ⅠⅡⅢ春夏秋冬

X: Kanji (48 x 48 dots)   あいう亜唖娃阿哀愛ＡＢＣ１２３ABC123苺澤弐壹遙瑤％＃＆

q: Gothic 725 Black   !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyzÇüéâäàåçêëèïîìÄÅÉæÆôöòûùÿÖÜø£¥₧ƒáíóúñÑ°¿⌐¬½

v: Kanji (24 x 24 dots)   あいう亜唖娃阿哀愛ＡＢＣ１２３ABC123苺澤弐壹遙瑤％＃＆ａｂｃアイウ ⅠⅡⅢ春夏秋冬かきくけこサシスセソ以伊位依

w: Kanji (32 x 32 dots)   あいう亜唖娃阿哀愛ＡＢＣ１２３ABC123苺澤弐壹遙瑤％＃＆ａｂｃアイウ ⅠⅡⅢ春夏秋冬

To print U, V, W, X, v, and w, Kanji character generator is required.

(5) Fine adjustment of character-to-character space

If no character-to-character space is specified or the number of space dots between characters is 0, drawing will take place according to the horizontal spacing/proportional spacing determined for each character. When character-to-character space is specified, drawing will take place according to the value obtained by adding the character spacing/proportional spacing to the specified value.

Point of origin

Point of origin of next char.

(Horizontal spacing/proportional spacing) × Horizontal magnification

No. of fine adjust space dots between characters

(6) Rotational angles of a character and character string

Origin

0° (00)   90° (11)   180° (22)   270° (33)
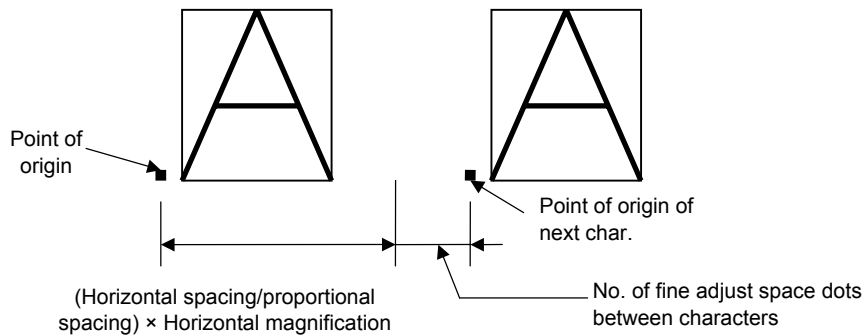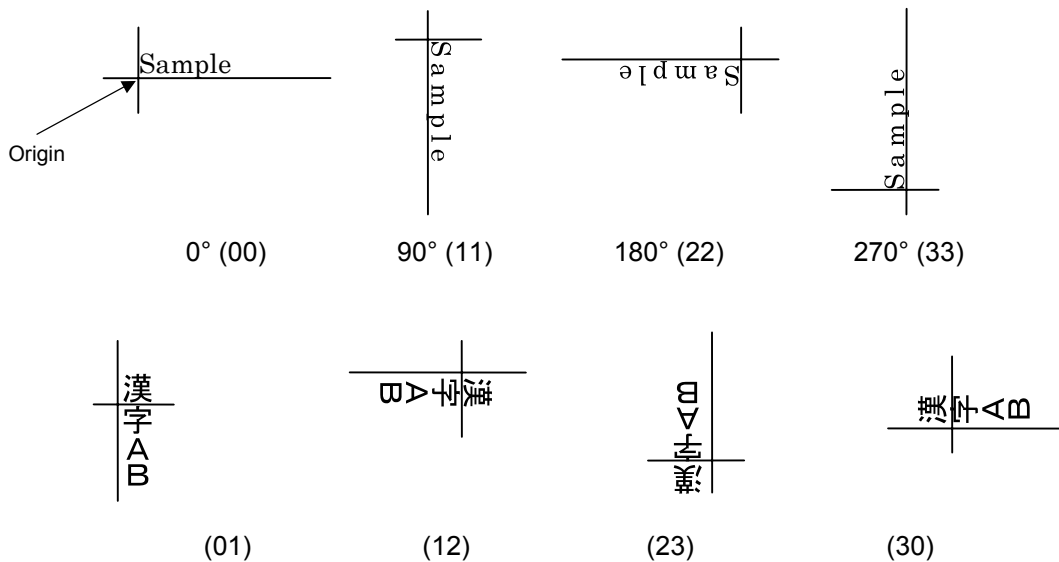
(01)   (12)   (23)   (30)

01, 12, 23, and 30 are available only when the font type is U, V, W, X, v, or w. In other cases, an error occurs.

(7) Selection of character attribution

Black characters

No. of dots in the horizontal direction

No. of dots in the vertical direction

Reverse characters

No. of dots in the horizontal direction

No. of dots in the vertical direction

Boxed characters

No. of dots in the horizontal direction

Stroked out characters

- 52 -

(8) Bold character designation

| Horizontally bold | Vertically bold | Vertically/ horizontally bold | | Horizontally bold | Vertically bold | Vertically/ horizontally bold |
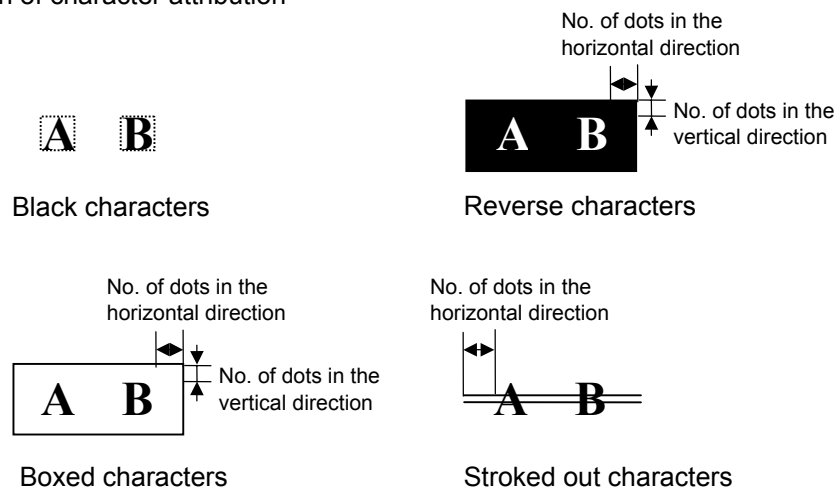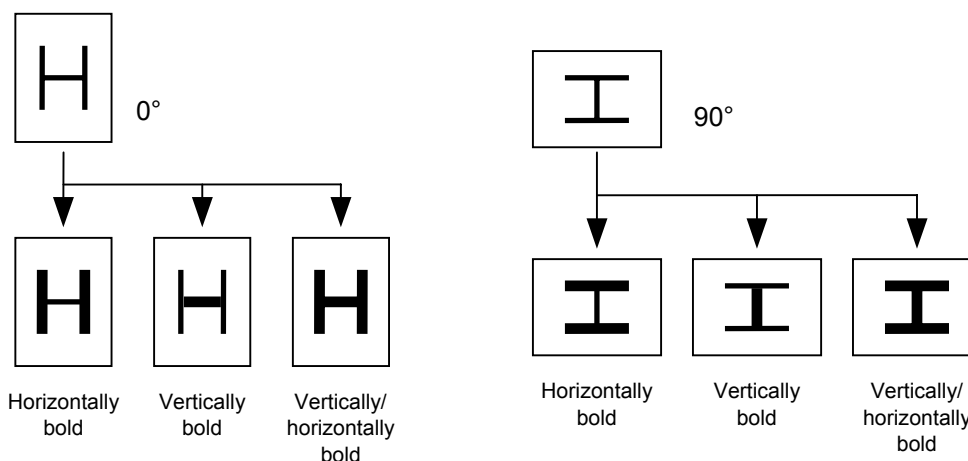
(9) Check digit to be attached

When Modulus 10 or Modulus 43 is selected, the check digit of a data row is calculated and attached to the data row for drawing.
In case of Modulus 10, when the data includes any data other than numerals, drawing is not performed. In case of Modulus 43, when the data includes any data other than CODE39, drawing is not performed, either.

When DBP Modulus 10 is selected, the check digit of a data row is calculated and only the check digit is drawn. When the data includes any data other than numerals, drawing is not performed. When the font type is U, V, W, X, v, or w, the check digit cannot be designated. (Even if it is designated, it is ignored, and the printer operates as if there was no designation.)

* DBP Modulus 10 is Modulus 10 for Deutsche Bundespost Postdienst only.

(10) Increment/decrement

Printing is performed while the data is incremented or decremented every time a label is issued. When the data row exceeds the maximum number of digits (40), the data row will not be drawn. When the font type is U, V, W, X, e, j, v, w, 51, 52, 53, 54, or 55, the incrementing/decrementing cannot be designated. (Even if it is designated, it is ignored, and the printer operates as if there was no designation.)

Initial value	0000	0000	0000	0000	999999
INC/DEC	+10	+10	+10	+10	+1
Zero suppression	Not designated	5	3	0	3
1st label	0000	0000	‿000	0000	999999
2nd label	0010	0010	‿010	0010	‿‿‿000
3rd label	0020	0020	‿020	0020	‿‿‿001
4th label	0030	0030	‿030	0030	‿‿‿002
5th label	0040	0040	‿040	0040	‿‿‿003

Letters and numerals for increment/decrement

For the data string, up to 40 digits (including letters, numerals, and symbols) are possible. Only the numerals are picked up and calculated for incrementing/decrementing, and then are returned to the previous position to draw the data.

Example of increment/decrement calculation

Initial value	00000	A0A0A	7A8/9	A2A0A
INC/DEC	+1	+1	+3	-3
1st label	00000	A0A0A	7A8/9	A2A0A
2nd label	00001	A0A1A	7A9/2	A1A7A
3rd label	00002	A0A2A	7A9/5	A1A4A
4th label	00003	A0A3A	7A9/8	A1A1A
5th label	00004	A0A4A	8A0/1	A0A8A

(11) Zero suppression

No. of digits after zero suppression	0	1	2	2	3	4	5
Data	0000	0000	0000	0A12	0123	0123	0123
Print	0000	␣␣␣0	␣␣00	␣A12	␣123	0123	0123

Zero(s) in a data row is replaced with a space(s) from the upper digits, according to the designated number of digits. However, if the number of digits after zero suppression is greater than the data row, the data row will be drawn without performing zero suppression. Where the data row exceeds the maximum number of digits (40), the data row will not be drawn. When the font type is U, V, W, X, v, w, 51, 52, 53, 54 or 55, zero suppression is not designated. (Even if it is designated, it is ignored, and the printer operates as if there was no designation.)

(12) Alignment
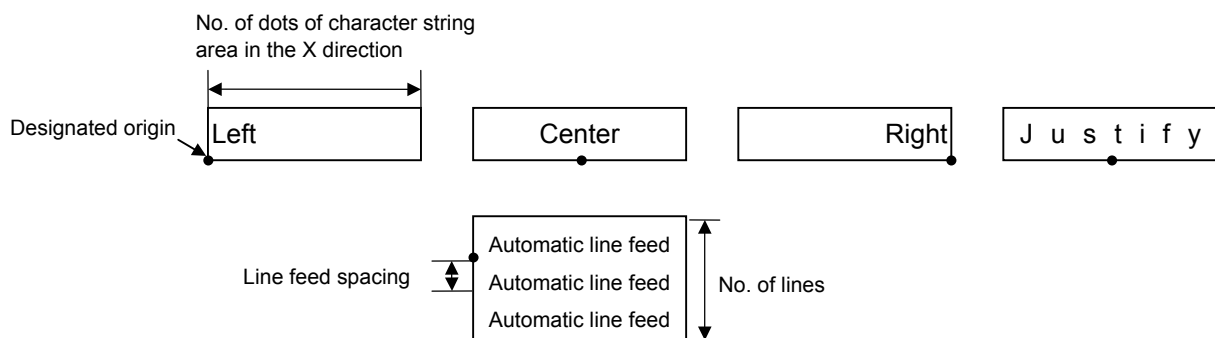
If characters are not placed on one line when the justification and the automatic line feed are designated, the following steps are performed.

Decrease the value of the character-to-character space. When characters are not placed on one line even if the value is set to 0, return the value to its default, and then reduce the horizontal magnification for a character by 0.5.

If characters are still not placed on one line, repeatedly decrease the value of the character-to-character space, and then reduce the horizontal magnification. When characters are not placed on one line if the character magnification is set to 0.5 and the character-to-character space is set to 0, the field is not drawn. (The same previous field is also not drawn.)

When the character and character string rotation is set to 01, 12, 23, or 30, the designation of centering, right-alignment, justification, or automatic line feed is ignored.

(13) Data string to be printed

Drawing data can be programmed by designating the number of digits after the symbol "=." Up to 255 digits of characters can be printed. When the type of font is U, V, W, X, v, or w, the maximum number of characters is 127. If the number of digits exceeds the maximum number of characters, the excessive data will be discarded.

For the character code table, refer to the character code table mentioned later.

(14) Link field No.

The link field No. can be programmed by designating it after the symbol ";". After the link field No. is designated using the Format Command, the data strings are linked by the Link Field Data Command to draw an image.

Up to 20 fields can be linked.

The following shows an example of linked fields on the two continuous labels.

[Format Command]

[ESC] PC01;........................	; 01 [LF] [NUL]	: Link field No. 1 is designated.
[ESC] PC02;........................	; 03 [LF] [NUL]	: Link field No. 3 is designated.
[ESC] PC03;........................	; 04 [LF] [NUL]	: Link field No. 4 is designated.
[ESC] XB01;...................	; 03, 04 [LF] [NUL]	: Link fields No. 3 and No. 4 are designated.
[ESC] PC04;........................	; 02 [LF] [NUL]	: Link field No. 2 is designated.
[ESC] PC05;........................	; 03 [LF] [NUL]	: Link field No. 3 is designated.
[ESC] PC06;........................	; 04 [LF] [NUL]	: Link field No. 4 is designated.
[ESC] XB02;...................	; 03, 04 [LF] [NUL]	: Link fields No. 3 and No. 4 are designated.

└──── Designating link field No.

[Data Command]

[ESC] RC; A [LF] B [LF] ABCD [LF] 001 [LF] [NUL]

                                  └── Link field No. 4

                         └── Link field No. 3

                └── Link field No. 2

        └── Link field No. 1

```
┌──────────────────────────┬──────────────────────────┐
│                      A   │                      B   │
│  ABCD    ║│║│║│║         │  ABCD    ║│║│║│║         │
│  001     ║│║│║│║         │  001     ║│║│║│║         │
│          *ABCD001*       │          *ABCD001*       │
└──────────────────────────┴──────────────────────────┘
```
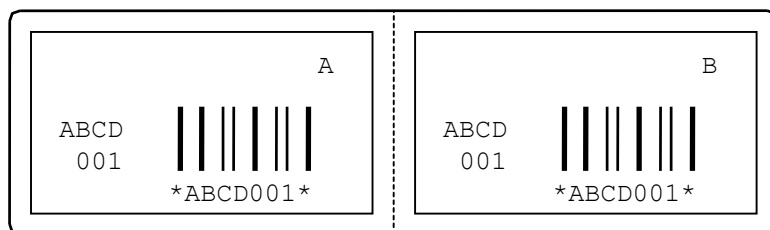
(1) Attachment of the check digit, increment/decrement, and zero suppression are performed according to the following priority. If any of the conditions is improper, no drawing will take place.

> For example, the zero(s) is replaced with a space(s) as a result of zero suppression, but the modulus 10 designated to be attached cannot be calculated.

Increment/decrement > zero suppression > attachment of check digit

(2) Up to 32 fields for which incrementing/decrementing has been designated can be drawn. If the total of bit map font, outline font or bar code increment/decrement fields exceeds 32, drawing will take place without incrementing/decrementing any excessive field. The field to be incremented or decremented is kept incremented or decremented until the Image Buffer Clear Command ([ESC] C) is transmitted.

[Example]

1) Format Command (Increment character string No. 001 (+1))
2) Format Command (No incrementing for character string No. 002)
3) Format Command (Increment character string No. 003 (+2))
4) Image Buffer Clear Command
5) Data Command (Character string No. 001 "0001")
6) Data Command (Character string No. 002 "AB-")
7) Data Command (Character string No. 003 "0100")
8) Issue Command (2 labels)

```
0001


AB - 0100
```

```
0002


AB - 0102
```

9) Issue Command (1 label)

```
0003


AB - 0104
```

10) Image Buffer Clear Command
11) Data Command (Character string No. 002 "00000")
12) Issue Command (1 label)

```



00000
```

(3) The Bit Map Font Format Command may be connected to the Outline Font Format Command when transmitted.

[ESC] P   C001; 0100, 0150, 1, 1, A, 00, B [LF]
           C002; 0350, 0180, 1, 1, A, 00, B [LF]
           C005; 0200, 0300, 25, 2, C, +05, 00, B, +0000000001 [LF]
           V01; 0500, 0400, 0100, 0100, A, 00, B [LF] [NUL]

(4) In case that the drawing data differs for every label, the field of the drawing data for the previous label is automatically cleared using the character string number, then the next drawing data is printed. Therefore, the character string number should be designated so that they differ according to the drawing fields. Since the automatic field clear is not performed between the Clear Command ([ESC] C) and Issue Command ([ESC] XS), the fixed data may be drawn using the same character string number. In this case, the Format Command and Data Command should be sent alternately. (After the Issue Command is sent, the fields with the same character string number are automatically cleared until the Clear Command is sent.)

(5) The link field designation is cleared by omitting the link field designation using the same character string No. and reformatting data.
The link field designation can be also cleared by the Image Buffer Clear Command.

(6) A print data string and link field No. cannot be programmed at the same time.

| Refer to |

Bit Map Font Data Command ([ESC] RC)
Outline Font Format Command ([ESC] PV)
Bar Code Format Command ([ESC] XB)

Examples

(1)

Origin (0, 0)

12.5 mm

30.0 mm

Sample

A B C D

55.0 mm

Effective print area

20.0 mm

65.0 mm
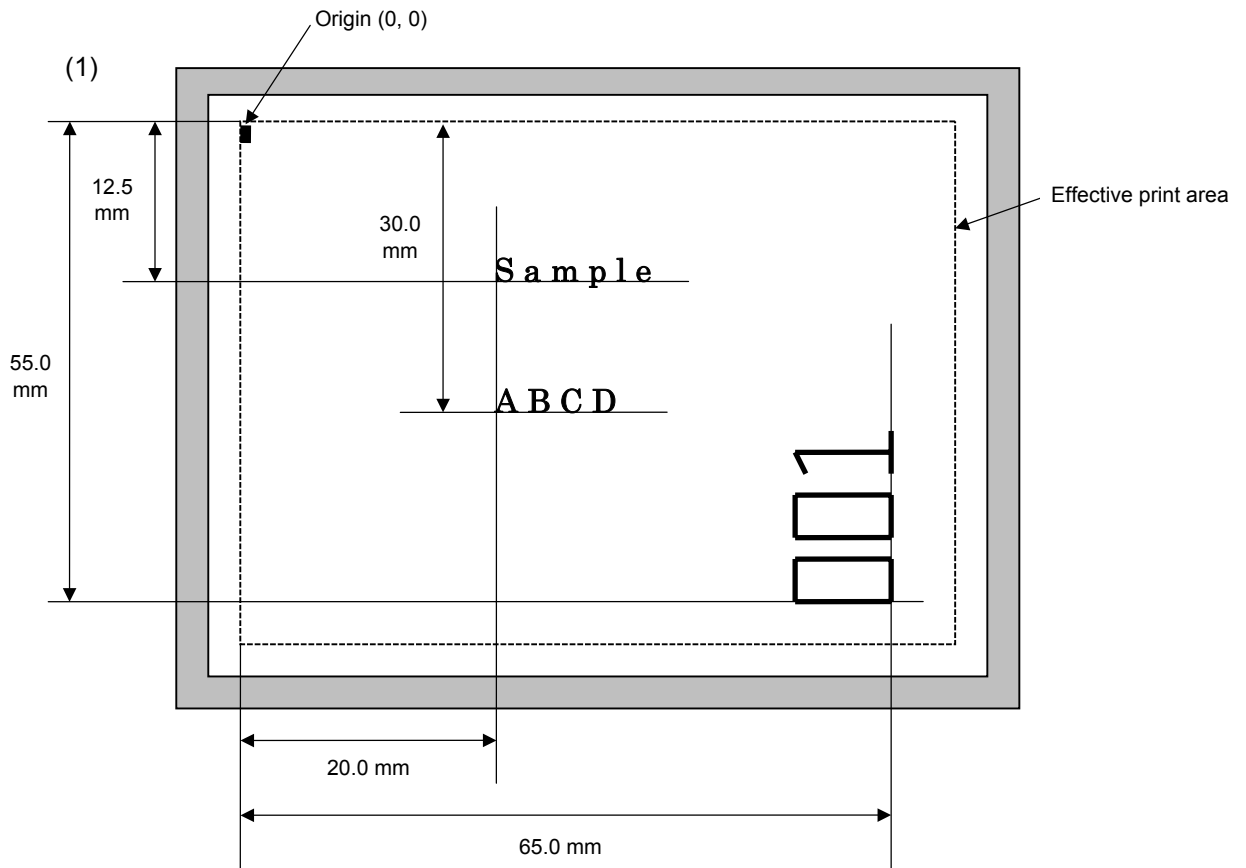
[ESC] C [LF] [NUL]
[ESC] PC000; 0200, 0300, 1, 1, A, 00, B=ABCD [LF] [NUL]
[ESC] PC001; 0200, 0125, 1, 1, C, 00, B [LF] [NUL]
[ESC] PC002; 0650, 0550, 2, 2, G, 33, B, +0000000001 [LF] [NUL]
[ESC] RC001; Sample [LF] [NUL]
[ESC] RC002; 001 [LF] [NUL]
[ESC] XS; I, 0002, 0002C4000 [LF] [NUL]

(2)

Origin (0, 0)

Effective print area

30.0 mm

55.0 mm

S 0 0 1

20.0 mm

65.0 mm
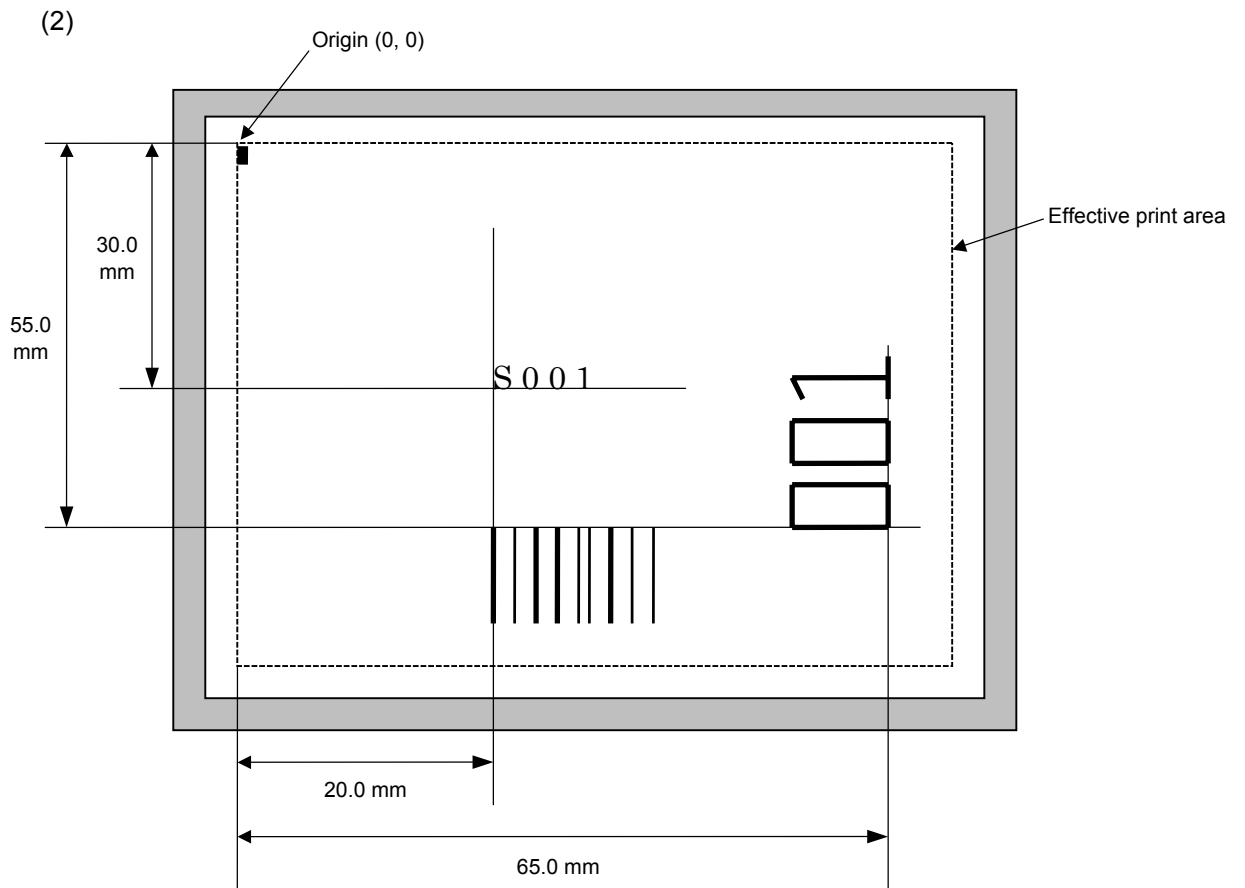
[ESC] C [LF] [NUL]
[ESC] PC001; 0200, 0300, 1, 1, C, 00, B; 01, 02 [LF] [NUL]
[ESC] PV01; 0650, 0550, 0200, 0150, B, 33, B; 02 [LF] [NUL]
[ESC] XB01; 0200, 0550, 3, 1, 03, 03, 08, 08, 03, 0, 0150; 01, 02 [LF] [NUL]
[ESC] RC; S [LF] 001 [LF] [NUL]
[ESC] XS; I, 0002, 0002C4000 [LF] [NUL]

6.3.9 OUTLINE FONT FORMAT COMMAND [ESC] PV

| Function | Sets the format to indicate where and how the outline font is to be printed. |

⊙ Fonts other than TrueType font

| Format | ① [ESC] PVaa; bbbb, cccc, dddd, eeee, f (, ghhh), ii, j (, Mk) (, lmmmmmmmmmm) (, Znn) (, Po) (=ppp------ppp) [LF] [NUL] |

② [ESC] PVaa; bbbb, cccc, dddd, eeee, f (, ghhh), ii, j (, Mk) (, lmmmmmmmmmm) (, Znn) (, Po) (; qq_1, qq_2, qq_3, ------, qq_{20}) [LF] [NUL]

| Term | aa: | Character string number |
| | | 00 to 99 |

bbbb: X-coordinate of the print origin of character string
Fixed to 4 digits (in 0.1 mm units)

cccc: Y-coordinate of the print origin of character string
4 or 5 digits (in 0.1 mm units)

dddd: Character width
0020 to 0850 (in 0.1 mm units)

eeee: Height of the character
0020 to 0850 (in 0.1 mm units)

f: Type of font
A: TEC FONT1 (Helvetica [bold])
B: TEC FONT1 (Helvetica [bold] proportional)
E: Price Font 1
F: Price Font 2
G: Price Font 3
H: DUTCH801 Bold (Times Roman Proportional)
I: BRUSH738 Regular (Pop Proportional)
J: GOTHIC725 Black (Proportional)

ghhh: Fine adjustment of character-to-character space
(Omissible. When omitted, the space is adjusted according to the designated font.)

g: Designates whether to increase or decrease the character-to-character space.
+: Increase
−: Decrease

hhh: No. of space dots between characters
000 to 512 (in units of dots)

ii: Rotational angles of a character and character string
00: 0° (char.) 0° (char.-string)
11: 90° (char.) 90° (char.-string)
22: 180° (char.) 180° (char.-string)
33: 270° (char.) 270° (char.-string)

j: Character attribution
  B: Black character
  W (aabb): Reverse character
    aa: No. of dots from the character string to the end of the black background in the horizontal direction.
    bb: No. of dots from the character string to the end of the black background in the vertical direction.
     aa: 01 to 99 (in units of dots)
     bb: 01 to 99 (in units of dots)

  F (aabb): Boxed character
    aa: No. of dots from the character string area to the box in the horizontal direction.
    bb: No. of dots from the character string area to the box in the vertical direction.
     aa: 01 to 99 (in units of dots)
     bb: 01 to 99 (in units of dots)

  C (aa): Stroked out character
    aa: No. of dots from the character string area to the end of the stroke
     aa: 01 to 99 (in units of dots)

  * Parameter in parentheses are omissible.
  (If omitted, it is character size (the character width or height, whichever is greater) ÷ 8 dots.)

Mk: Type of the check digit to be attached
 (Omissible. When omitted, the check digit is not drawn.)
  k: Type of check digit
   0: Modulus 10 (Draws data and check digit)
   1: Modulus 43 (Draws data and check digit)
   2: DBP Modulus 10 (Draws check digit only)

Immmmmmmmmm: Increment and decrement
      (Omissible. When omitted, incrementing/decrementing is not performed.)
      l: Designates whether to increment or decrement.
       +: Increment
       −: Decrement
      mmmmmmmmmm: Skip value
          0000000000 to 9999999999

Znn: Zero suppression
 (Omissible. When omitted, zero suppression is not performed.)
  nn: No. of digits after zero suppression
   00 to 20

Po: Alignment (Omissible.   When omitted, the alignment is set to the left.)

        o: Designates the character position.

            1: Left

            2: Center

            3: Right

            4aaaa: Justification

              aaaa: X direction of character string area

                     0050 to 1040 (in 0.1 mm units)

ppp------ppp: Data string to be printed (Omissible)

            Max. 255 digits

qq_1, qq_2, qq_3, ------, qq_{20}:   Link field No. (Omissible)

                  01 to 99 (1 to 99 can also be used.)

                  Up to 20 fields can be designated using commas.

⊙ TrueType font

| Format | [ESC] PVaa; bbbb, cccc, dddd, eeee, ff, g (, hiii), jj, k (=ppp ------ ppp) [LF] [NUL] |

| Term | aa: | Character string number |

aa: Character string number
       00 to 99

bbbb: X-coordinate of the print origin of character string
       Fixed to 4 digits (in 0.1 mm units)

cccc: Y-coordinate of the print origin of character string
       4 or 5 digits (in 0.1 mm units)

dddd: Character width
       0020 to 0850 (in 0.1 mm units)

eeee: Height of the character
       0020 to 0850 (in 0.1 mm units)

ff: Type of font
     01: BalloonPExtBol   (File name: Ballp_eb.ttf)
     02: BlacklightD   (File name: Blklt_rg.ttf)
     03: BrushScrD   (File name: Brush_rg.ttf)
     04: CG Times   (File name: Tec_cgt.ttf)
     05: CG Times Bold   (File name: Tec_cgtb.ttf)
     06: CG Times Italic   (File name: Tec_cgti.ttf)
     07: Clarendon Condensed Bold   (File name: Tec_clcd.ttf)
     08: FlashPBol   (File name: Flash_bd.ttf)
     09: Garamond Kursiv Halbfett   (File name: Tec_gmkh.ttf)
     10: GoudyHeaP   (File name: Gdyhp_rg.ttf)
     11: GilliesGotDBol   (File name: Gilli_bd.ttf)
     12: GilliesGotLig   (File name: Gilli_lt.ttf)
     13: NimbusSanNovTUltLigCon   (File name: Nsnct_ul.ttf)
     14: Ryahd   (File name: ryahd.ttf)
     15: Ryahd Bold (File name: ryahdbd.ttf)
     16: CG Triumvirate   (File name: Trium.ttf)
     17: CG Triumvirate Condensed Bold   (File name: Triumcb.ttf)
     18: Univers Medium   (File name: Tec_uni.ttf)
     19: Univers Bold   (File name: Tec_unib.ttf)
     20: Univers Medium Italic   (File name: Tec_unii.ttf)
     21: add_on TrueTypeFont 1
     22: add_on TrueTypeFont 2
     23: add_on TrueTypeFont 3
     24: add_on TrueTypeFont 4
     25: add_on TrueTypeFont 5
     26: Reserved.
     27: Reserved.
     28: Reserved.
     29: Reserved.
     30: Reserved.

(*1)   The font types 21 to 30 are the fonts to be added by the user.

(*2)   For the fonts stored in flash ROM on the CPU board, parameter "ff" for the type of font corresponds to the font type according to the setting made when fonts are stored.

g: Drive
(Omissible.   When omitted, files are stored in the flash ROM on the CPU board.)
Indicates where the TrueType font files are stored.

   0: Flash ROM on the CPU board

hiii: Fine adjustment of character-to-character space
(Omissible.   When omitted, the space is adjusted according to the designated font.)

   h: Designates whether to increase or decrease the character-to-character space.
     +: Increase
     −: Decrease

   iii: No. of space dots between characters
     000 to 512 (in units of dots)

jj: Rotational angles of a character and character string
    00:     0° (char.)   0° (char.-string)
    11:    90° (char.)   90° (char.-string)
    22: 180° (char.)   180° (char.-string)
    33: 270° (char.)   270° (char.-string)

k: Character attribution
   B: Black character

ppp------ppp: Data string to be printed (Omissible)
        Max. 255 digits

* TrueType fonts are not included in the standard character generator data.   Therefore, they must be installed in flash ROM on the CPU board.
For installation of TrueType font and details, refer to the TrueType Font Specification (TAA-1416).

* If Arabic is selected as the character code, letters are written from right to left.

0° (00)   90° (11)   180° (22)   270° (33)
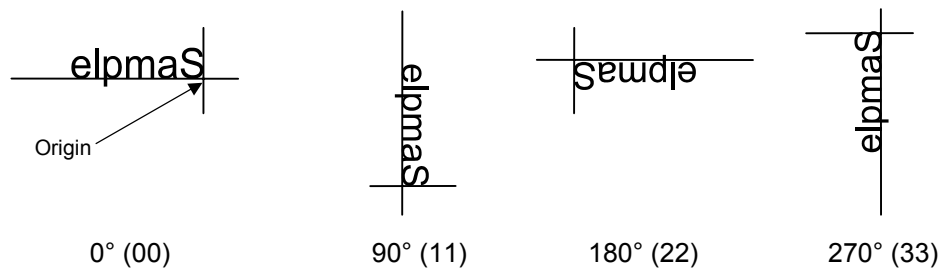
(1) Character string number

When drawing by the Data Command ([ESC] RV), the format designated by the character string number is selected.

(2) Print origin of coordinates

[Printing direction: Bottom first]　　　　　　　[Printing direction: Top first]

• The print origin of coordinates must be set so the character drawing result will be within the effective print area set by the Label Size Set Command ([ESC] D).

[Effective print area]   [mm]

Item \ Issue mode \ Model			B-452-R		
			Batch	Strip	Cut
Thermal head dot density			11.8 dots/mm (300 dpi)		
Thermal head width			105.7 mm		
G: Effective print width		Min.	10.0		
		Max.	105.7		
H: Effective print length	Label	Min.	11.0	21.4	29.0
		Max.	500.0		
	Tag	Min.	13.0	–	23.4
		Max.	500.0	–	500.0

(3)   Character width and character height

Standard size
(256 × 256 dots)
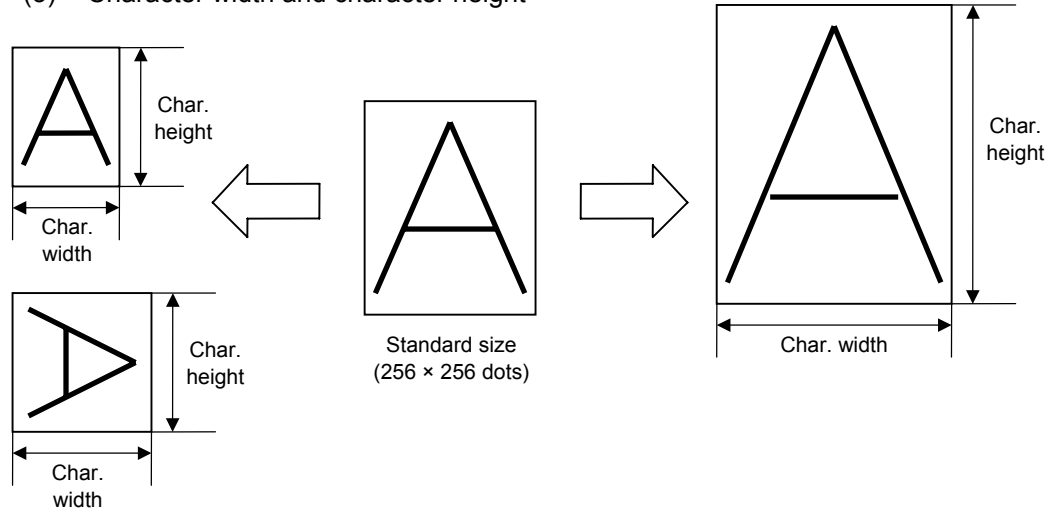
(4)   Type of font

A: TEC FONT1 (Helvetica [bold])

! ” # $ % & ’ ( ) ✳ + , − . ∕
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
‘ a b c d e f g h i j k l m n o
Ç ü é â ä à å ç ê ë è ï î ì Ä Å

B: TEC FONT1 (Helvetica [bold] proportional)

!”#$%&’()✳+,−.∕
0123456789:;⟨=⟩?
@ABCDEFGHIJKLMNO
‘abcdefghijklmno
ÇüéâäàåçêëèïîìÄÅ

E: Price font 1 (POP font)

$%,~./

0123456789

円¥~

F: Price font 2 (POP font)

$%,-./

0123456789

円¥~

G: Price font 3 (POP font)

$%,-./

0123456789

円¥~

H: DUTCH801 Bold (Times Roman　Proportional)

!"#$%&'()*+,-./
0123456789:;<=>?
@ABCDEFGHIJKLMNO
`abcdefghijklmno
ÇüéâäàåçêëèïîìÄÅ
ÉæÆôöòûùÿÖÜø£Ø×ƒ

I: BRUSH 738 Regular (Pop   Proportional)

!"#$%&'()*+,-./
0123456789:;<=>?
@ABCDEFGHIJKLMNO
`abcdefghijklmno
ÇüéâäàåçêëèïîìÄÅ
ÉæÆôöòûùÿÖÜø£Ø×ƒ

J: GOTHIC725 Black

!"#$%&'()*+,-./
0123456789:;<=>?
@ABCDEFGHIJKLMNO
`abcdefghijklmno
ÇüéâäàåçêëèïîìÄÅ
ÉæÆôöòûùÿÖÜø£Ø×ƒ

(5) Fine adjustment of character-to-character space

If no character-to-character space is specified or the number of space dots between characters is 0, drawing will take place according to the horizontal spacing/proportional spacing determined for each character.   If character-to-character space is specified, drawing will take place according to the value obtained by adding the character spacing/proportional spacing to the specified value.   When justify is selected for the alignment, the character-to-character space setting is invalid.   (The horizontal spacing/proportional spacing is increased or decreased depending on the character size.)
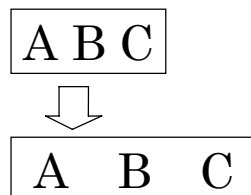
┌─────────┐
│ A B C │
└─────────┘
     ⇩
┌─────────────┐
│ A   B   C │
└─────────────┘

(6) Rotational angles of a character and character string

0° (00)   90° (11)   180° (22)   270° (33)

(7) Selection of character attribution

Black characters   Reverse characters

Boxed characters   Stroked out characters
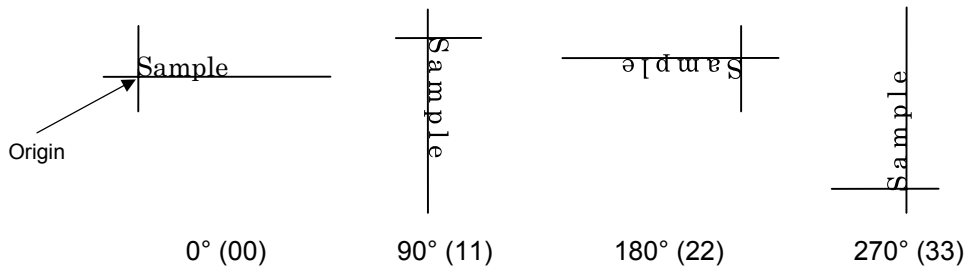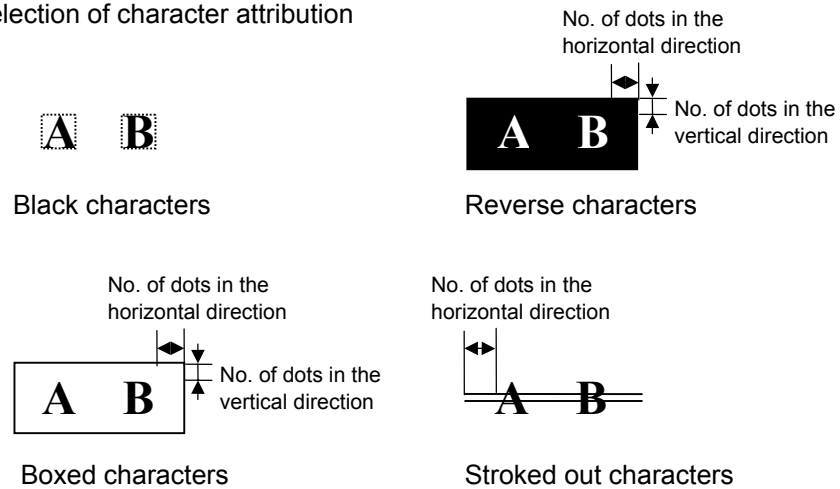
(8) Check digit to be attached

When Modulus 10 or Modulus 43 is selected, the check digit of a data row is calculated and attached to the data row for drawing. In case of Modulus 10, when the data includes any data other than numerals, drawing is not performed. In case of Modulus 43, when the data includes any data other than CODE39, drawing is not performed, either.

When DBP Modulus 10 is selected, the check digit of a data row is calculated and only the check digit is drawn. When the data includes any data other than numerals, drawing is not performed.

* DBP Modulus 10 is Modulus 10 for Deutsche Bundespost Postdienst only.

(9) Increment/decrement

Printing is performed while the data is incremented or decremented each time a label is issued.   Where the data row exceeds the maximum number of digits (40), the data row will not be drawn.

Initial value	0000	0000	0000	0000	999999
INC/DEC	+10	+10	+10	+10	+1
Zero suppression	Not designated	5	3	0	3
1st label	0000	0000	␣000	0000	999999
2nd label	0010	0010	␣010	0010	␣␣␣000
3rd label	0020	0020	␣020	0020	␣␣␣001
4th label	0030	0030	␣030	0030	␣␣␣002
5th label	0040	0040	␣040	0040	␣␣␣003

Letters and numerals for increment/decrement

For the data string, up to 40 digits (including letters, numerals, and symbols) are possible.   Only the numerals are selected and calculated for incrementing/ decrementing, and then are returned to the previous position to draw the data.

Example of increment/decrement calculation

Initial value	00000	A0A0A	7A8/9	A2A0A
INC/DEC	+1	+1	+3	-3
1st label	00000	A0A0A	7A8/9	A2A0A
2nd label	00001	A0A1A	7A9/2	A1A7A
3rd label	00002	A0A2A	7A9/5	A1A4A
4th label	00003	A0A3A	7A9/8	A1A1A
5th label	00004	A0A4A	8A0/1	A0A8A

(10) Zero suppression

No. of digits after zero suppression	0	1	2	2	3	4	5
Data	0000	0000	0000	0A12	0123	0123	0123
Print	0000	␣␣␣0	␣␣00	␣A12	␣123	0123	0123

Zero(s) in a data row is replaced with a space(s) from the upper digits, according to the designated number of digits.   However, if the number of digits after zero suppression is greater than the data row, the data row will be drawn without performing zero suppression.   Where the data row exceeds the maximum number of digits (40), the data row will not be drawn.

Character string length in the X direction (in 0.1 mm units)

(11) Alignment

Origin | Left | | Center | | Right | | J u s t i f y |

If characters are not placed on one line when justification is designated, the width is calculated automatically.   When the width is less than the limit value (2 mm) for the outline font, that field is not drawn.   (The same previous field is not drawn.)

(12) Data string to be printed

Drawing data can be programmed by designating the number of digits after the symbol "=." Up to 255 digits can be printed. When the type of font is 26, 27, 28, 29, or 30, the maximum number of characters is 127. When the number of digits exceeds the maximum value, the excessive data will be discarded. For the character code table, refer to chapter 12 "CHARACTER CODE TABLE".

(13) Link field No.

The link field No. can be programmed by designating it after the symbol ";." After the link field No. is designated using the Format Command, the data strings are linked by the Link Field Data Command to draw an image.
Up to 20 fields can be linked.

The following shows an example of linked fields on the two continuous labels.

[Format Command]

[ESC] PV01;	; 01 [LF] [NUL]	: Link field No. 1 is designated.
[ESC] PV02;	; 03 [LF] [NUL]	: Link field No. 3 is designated.
[ESC] PV03;	; 04 [LF] [NUL]	: Link field No. 4 is designated.
[ESC] XB01;	; 03, 04 [LF] [NUL]	: Link fields No. 3 and No. 4 are designated.

[ESC] PV04;	; 02 [LF] [NUL]	: Link field No. 2 is designated.
[ESC] PV05;	; 03 [LF] [NUL]	: Link field No. 3 is designated.
[ESC] PV06;	; 04 [LF] [NUL]	: Link field No. 4 is designated.
[ESC] XB02;	; 03, 04 [LF] [NUL]	: Link fields No. 3 and No. 4 are designated.

Designating the link field No.

[Data Command]

[ESC] RV; A [LF] B [LF] ABCD [LF] 001 [LF] [NUL]
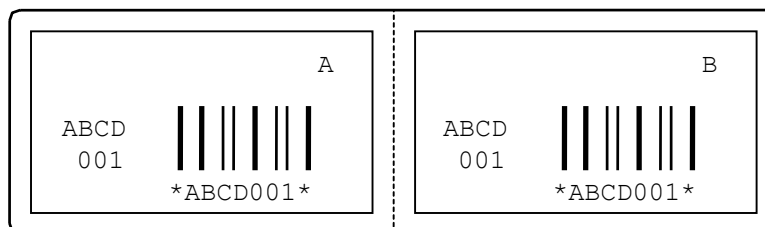
Link field No. 4
Link field No. 3
Link field No. 2
Link field No. 1

(1) The check digit attachment, increment/decrement, and zero suppression are performed according to the following priority. If any of the conditions are improper, no drawing will take place.

⌈ For example, the zero(s) is replaced by a space(s) as a result of zero
⌊ suppression, but the modulus 10 designated to be attached cannot be calculated. ⌋

Increment/decrement > zero suppression > attachment of check digit

(2) Up to 32 fields for which incrementing/decrementing has been designated can be drawn. If the total bit map font, outline font, and bar code increment/decrement fields exceeds 32, drawing will take place without incrementing/decrementing any excessive field. The field to be incremented or decremented is incremented or decremented until the Image Buffer Clear Command ([ESC] C) is transmitted.

[Examples]

1) Format Command (Increment character string No. 01 (+1))
2) Format Command (No incrementing for character string No. 02)
3) Format Command (Increment character string No. 03 (+2))
4) Image Buffer Clear Command
5) Data Command (Character string No. 01 "0001")
6) Data Command (Character string No. 02 "AB-")
7) Data Command (Character string No. 03 "0100")
8) Issue Command (2 labels)

```
0001

AB-0100
```

```
0002

AB-0102
```

9) Issue Command (1 label)

```
0003

AB-0104
```

10) Image Buffer Clear Command
11) Data Command (Character string No. 02 "00000")
12) Issue Command (1 label)

```


00000

```

(3) The Outline Font Format Command may be connected to the Bit Map Font Format Command when transmitted.

[ESC] PC001; 0100, 0150, 1, 1, A, 00, B [LF]
    C002; 0350, 0180, 1, 1, A, 00, B [LF]
  C005; 0200, 0300, 25, 2, C, +05, 00, B, +0000000001 [LF]
  V01; 0500, 0400, 0100, 0100, A, 00, B [LF] [NUL]

(4)   When the drawing data differs for every label, the drawing data field for the previous label is automatically cleared using the character string number, then the next drawing data is printed.   Therefore, the character string number should be designated so that they differ according to the drawing fields.   Since the automatic field clear is not performed between the Clear Command ([ESC] C) and Issue Command ([ESC] XS), the fixed data may be drawn using the same character string number.   In this case, the Format Command and Data Command should be sent alternately.   (After the Issue Command is sent, the fields with the same character string number are automatically cleared until the Clear Command is sent.)

(5)   When characters overlap due to the character-to-character space fine adjustment, the outline font is not painted properly.   Program the fine adjustment value so that characters will not overlap.   Also, when drawings such as lines or characters are positioned over the outline font area, the outline font is not painted properly. For font types A and B, the fine adjustment value should be set so that other drawings do not overlap the area in which the outline font is to be drawn.   For font types C, E, F and G, the fine adjustment value should be set so that other drawings do not overlap the area of the designated character width and height.

(6)   The link field designation can be cleared by omitting the link field designation using the same character string No. and reformatting data.
The link field designation can also be cleared by the Image Buffer Clear Command.

(7)   A print data string and the link field No. cannot be programmed at the same time.

| Refer to |

Outline Font Data Command ([ESC] RV)
Bit Map Font Format Command ([ESC] PC)
Bar Code Format Command ([ESC] XB)

Origin (0, 0)

(1)

12.5
mm

30.0
mm

S a m p l e

55.0
mm

A B C D

Effective print area

20.0 mm

65.0 mm
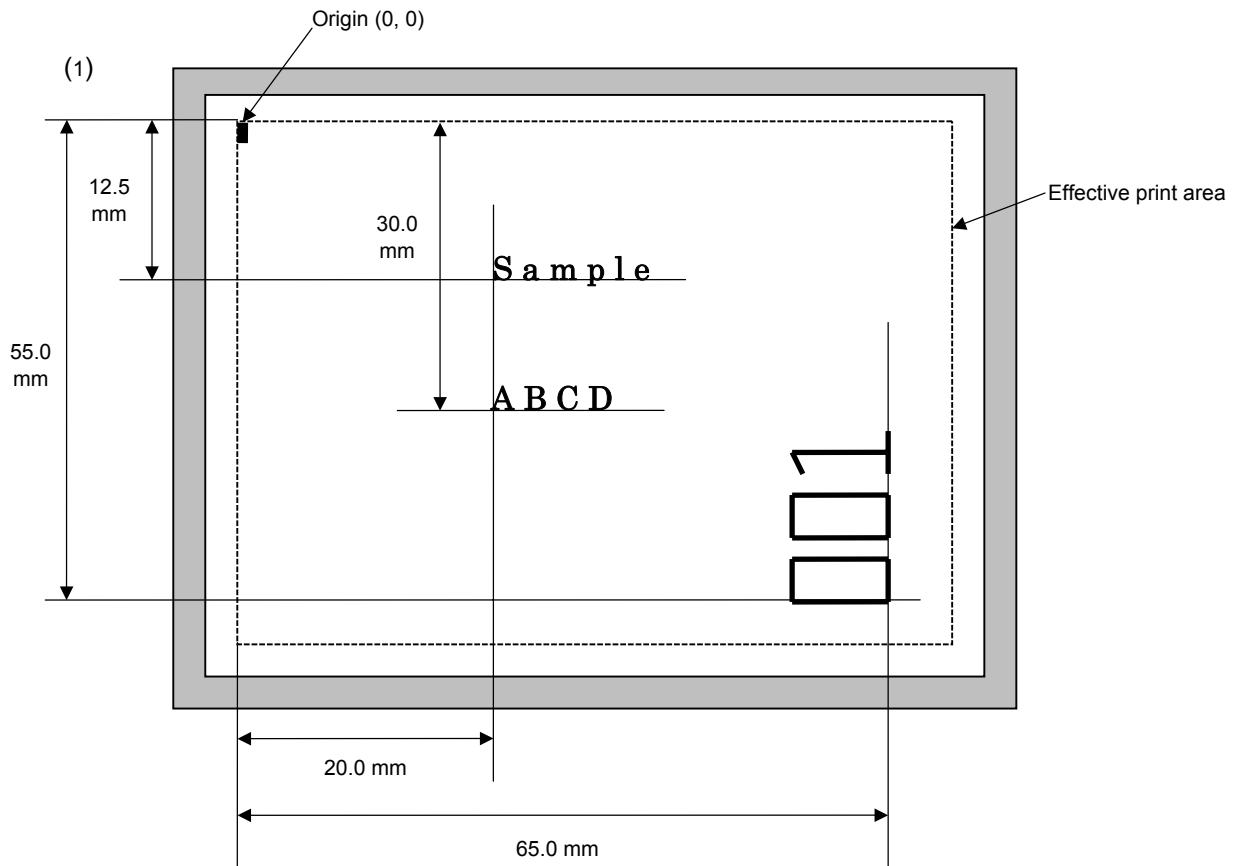
[ESC] C [LF] [NUL]
[ESC] PV00; 0200, 0300, 0080, 0080, B, 00, B=ABCD [LF] [NUL]
[ESC] PV01; 0200, 0125, 0100, 0100, B, 00, B [LF] [NUL]
[ESC] PV02; 0650, 0550, 0200, 0150, B, 33, B, +0000000001 [LF] [NUL]
[ESC] RV01; Sample [LF] [NUL]
[ESC] RV02; 001 [LF] [NUL]
[ESC] XS; I, 0002, 0002C4000 [LF] [NUL]

(2)

Origin (0, 0)

Effective print area

30.0 mm

55.0 mm

S 0 0 1

20.0 mm

65.0 mm
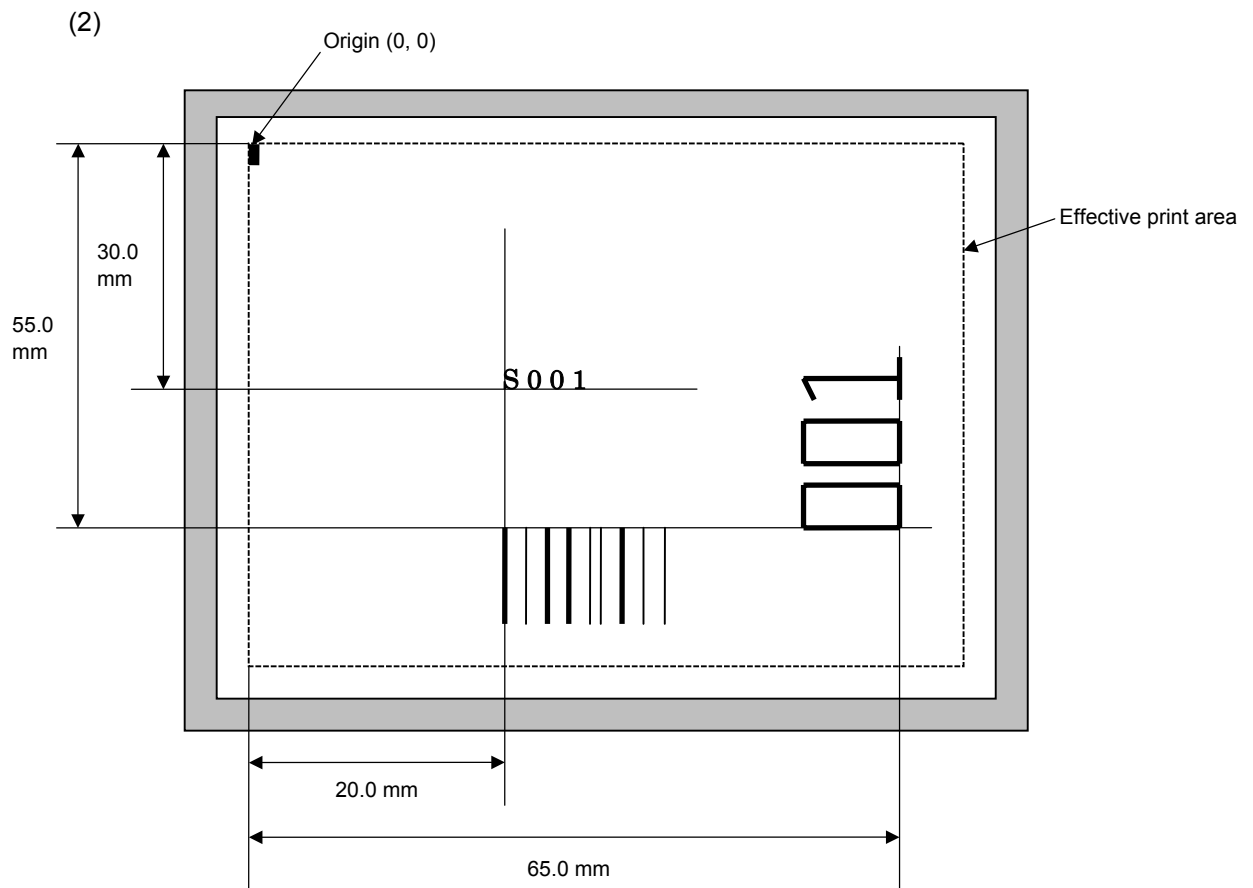
[ESC] C [LF] [NUL]
[ESC] PC001; 0200, 0300, 1, 1, C, 00, B; 01, 02 [LF] [NUL]
[ESC] PV01; 0650, 0550, 0200, 0150, B, 33, B; 02 [LF] [NUL]
[ESC] XB01; 0200, 0550, 3, 1, 03, 03, 08, 08, 03, 0, 0150; 01, 02 [LF] [NUL]
[ESC] RV; S [LF] 001 [LF] [NUL]
[ESC] XS; I, 0002, 0002C4000 [LF] [NUL]

6.3.10 BAR CODE FORMAT COMMAND [ESC] XB

| Function | Sets the format to indicate where and how the bar code is to be printed and how it is to be printed. |

⊙ In the case of WPC, CODE93, CODE128, UCC/EAN128, Customer bar code, POSTNET, RM4SCC, KIX CODE
(WPC is the generic name for bar codes of JAN, EAN and UPC.)

| Format | ① [ESC] XBaa; bbbb, cccc, d, e, ff, k, llll (, mnnnnnnnnnn, ooo, p, qq) (= sss ------ sss) [LF] [NUL] |

② [ESC] XBaa; bbbb, cccc, d, e, ff, k, llll (, mnnnnnnnnnn, ooo, p, qq)
(; tt_1, tt_2, tt_3, ------, tt_{20}) [LF] [NUL]

| Term | aa: Bar code number |

       00 to 31

bbbb: X-coordinate of the print origin of bar code
      Fixed to 4 digits (in 0.1 mm units)

cccc: Y-coordinate of the print origin of bar code
      4 or 5 digits (in 0.1 mm units)

d: Type of bar code
    0: JAN8, EAN8
    5: JAN13, EAN13
    6: UPC-E
    7: EAN13 + 2 digits
    8: EAN13 + 5 digits
    9: CODE128 (with auto code selection)
    A: CODE128 (without auto code selection)
    C: CODE93
    G: UPC-E + 2 digits
    H: UPC-E + 5 digits
    I: EAN8 + 2 digits
    J: EAN8 + 5 digits
    K: UPC-A
    L: UPC-A + 2 digits
    M: UPC-A + 5 digits
    N: UCC/EAN128
    R: Customer bar code (Postal code for Japan)
    S: Highest priority customer bar code (Postal code for Japan)
    U: POSTNET (Postal code for U.S)
    V: RM4SCC (ROYAL MAIL 4 STATE CUSTOMER CODE)
          (Postal code for U.K)
    W: KIX CODE (Postal code for Belgium)

e: Type of check digit

    1: Without attaching check digit

    2: Check digit check

WPC	Modulus 10
CODE93	Modulus 47
CODE128	PSEUDO 103

    3: Check digit automatic attachment (1)

WPC	Modulus 10
CODE93	Modulus 47
CODE128	PSEUDO 103
UCC/EAN128	Modulus 10 + Modulus 103
Customer code	Special check digit
POSTNET	Special check digit
RM4SCC	Special check digit

    4: Check digit automatic attachment (2)

WPC	Modulus 10 + Price C/D 4 digits

    5: Check digit automatic attachment (3)

WPC	Modulus 10 + Price C/D 5 digits

    * For the Customer bar code, POSTNET, and RMC4SCC, only "3: Check digit auto attachment (1)" is effective.

ff: 1-module width
    01 to 15 (in units of dots)

k: Rotational angle of bar code
    0: 0°
    1: 90°
    2: 180°
    3: 270°

llll: Height of the bar code
    0000 to 1000 (in 0.1 mm units)

    For the Customer bar code, POSTNET, RMC4SCC, and KIX CODE, the height of the long bar is specified.

mnnnnnnnnnn: Increment/decrement
    (Omissible. When omitted, incrementing/decrementing is not performed.)

    m: Indicates whether to increment or decrement
      +: Increment
      −: Decrement

  nnnnnnnnnn: Skip value
      0000000000 to 9999999999

ooo: Length of WPC guard bar
    (Omissible. When omitted, the guard bar is not extended.)
    000 to 100 (in 0.1 mm units)

p: Selection of print or non-print of numerals under bars
    (Omissible. When omitted, the numerals under the bars are not printed.)
    0: Non-print
    1: Print

qq: No. of digits after zero suppression
(Omissible.   When omitted, zero suppression is not performed.)
00 to 20

sss ------ sss: Data string to be printed (Omissible)
Max. 126 digits.   However, it varies depending on the type of bar code.

$tt_1, tt_2, tt_3,$ ------. tt_{20}:   Link field No. (Omissible)
01 to 99 (1 to 99 can also be used.)
Up to 20 fields can be designated using commas.

* Omissible parameters (such as "Increment/decrement", "Selection of print or non-print of numerals under bars" and "No. of digits after zero suppression") cannot be set when the Customer bar code, POSTNET, RM4SCC, or KIX CODE is selected.

⊙ In the case of MSI, Interleaved 2 of 5, CODE39, NW7, Industrial 2 of 5, MATRIX 2 of 5 for NEC

<table>
<tr><td>Format</td><td>① [ESC] XBaa; bbbb, cccc, d, e, ff, gg, hh, ii, jj, k, llll (, mnnnnnnnnnn, p, qq) (, r) (=sss------sss) [LF] [NUL]</td></tr>
<tr><td></td><td>② [ESC] XBaa; bbbb, cccc, d, e, ff, gg, hh, ii, jj, k, llll (, mnnnnnnnnnn, p, qq) (, r) (; tt_1, tt_2, tt_3, ------, tt_{20}) [LF] [NUL]</td></tr>
</table>

Term		
aa:	Bar code number	
	00 to 31	
bbbb:	X-coordinate of the print origin of bar code	
	Fixed to 4 digits (in 0.1 mm units)	
cccc:	Y-coordinate of the print origin of bar code	
	4 or 5 digits (in 0.1 mm units)	

d: Type of bar code
    1: MSI
    2: Interleaved 2 of 5 (ITF)
    3: CODE39 (standard)
    4: NW7
    B: CODE39 (full ASCII)
    O: Industrial 2 of 5
    a: MATRIX 2 of 5 for NEC

e: Type of check digit
    1: Without attaching check digit

    2: Check digit check

CODE39	Modulus 43
MSI	IBM modulus 10
ITF	Modulus 10
Industrial 2 of 5	Modulus check character
MATRIX 2 of 5 for NEC	Modulus check character

    3: Check digit automatic attachment (1)

CODE39	Modulus 43
MSI	IBM modulus 10
ITF	Modulus 10
Industrial 2 of 5	Modulus check character
MATRIX 2 of 5 for NEC	Modulus check character

    4: Check digit automatic attachment (2)

MSI	IBM modulus 10 + IBM modulus 10
ITF	DBP Modulus 10

    5: Check digit automatic attachment (3)

MSI	IBM modulus 11 + IBM modulus 10

ff: Narrow bar width
    01 to 99 (in units of dots)

gg: Narrow space width
    01 to 99 (in units of dots)

    * In the case of industrial 2 of 5, designate an element-to-element space.

hh: Wide bar width
    01 to 99 (in units of dots)

ii: Wide space width
             01 to 99 (in units of dots)

        * In the case of industrial 2 of 5, the value is fixed to 00.

jj: Character-to-character space width
             01 to 99 (in units of dots)

        * In the case of MSI and ITF, character-to-character space width is fixed to 00.

k: Rotational angle of bar code
             0: 0°
             1: 90°
             2: 180°
             3: 270°

llll: Height of bar code
             0000 to 1000 (in 0.1 mm units)

mnnnnnnnnnn: Increment/decrement
             (Omissible.   When omitted, incrementing/decrementing is not
             performed.)

        m: Indicates whether to increment or decrement
             +:   Increment
             -: Decrement

    nnnnnnnnnn: Skip value
                 0000000000 to 9999999999

p: Selection of print or non-print of numerals under bars
             (Omissible.   When omitted, the numerals under the bars are not printed.)
             0: Non-print
             1: Print

qq: No. of digits after zero suppression
             (Omissible.   When omitted, zero suppression is not performed.)
             00 to 20

r: Designates the attachment of start/stop code
             (Omissible.   When omitted, the start/stop code is automatically attached.)
             T: Attachment of start code only
             P: Attachment of stop code only
             N: Start/stop code unattached

sss------sss: Data string to be printed (Omissible)

             Max. 126 digits.   However, the number of digits varies depending on
             the type of bar code.

$tt_1, tt_2, tt_3, ------, tt_{20}$:   Link field No. (Omissible)

                 01 to 99 (1 to 99 can also be used.)
                 Up to 20 fields can be designated using commas.

○ In the case of GS1 DataBar

① [ESC] XBaa; bbbb, cccc, d, e, ff, g, hhhh (, ijjjjjjjjjj, kk) (= sss ------ sss) [LF] [NUL]

② [ESC] XBaa; bbbb, cccc, d, e, ff, g, hhhh (, ijjjjjjjjjj, kk) (; tt$_1$, tt$_2$, tt$_3$, ------, tt$_{20}$) [LF] [NUL]

Term

aa: Bar code number
        00 to 31

bbbb: X-coordinate of the print origin of bar code
        Fixed to 4 digits (in 0.1 mm units)

cccc: Y-coordinate of the print origin of bar code
        4 or 5 digits (in 0.1 mm units)

d: Type of bar code
        b: GS1 DataBar family

e: Version (Type of GS1 DataBar)
        1:   GS1 DataBar Omnidirectional/GS1 DataBar Truncated
        2:   GS1 DataBar Stacked
        3:   GS1 DataBar Stacked Omnidirectional
        4:   GS1 DataBar Limited
        5:   GS1 DataBar Expanded
        6:   GS1 DataBar Expanded Stacked

ff: 1-module width
        01 to 15 (in units of dots)

g: Rotational angle of bar code
        0: 0°
        1: 90°
        2: 180°
        3: 270°

hhhh: Height of bar code
        0000 to 1000 (in 0.1 mm units)

        In the case of GS1 DataBar Truncated, set a value obtained by multiplying one module width by 13.

ijjjjjjjjjj: Increment/decrement
        (Omissible.   When omitted, incrementing/decrementing is not performed.)

        i: Indicates whether to increment or decrement
            +: Increment
            -: Decrement

        jjjjjjjjjj: Skip value
            0000000000 to 9999999999

kk: No. of digits after zero suppression
        (Omissible.   When omitted, zero suppression is not performed.)
        00 to 20

sss ------ sss: Data string to be printed (Omissible)
        Max. 126 digits.   However, it varies depending on the type of bar code.

tt$_1$, tt$_2$, tt$_3$, ------. tt$_{20}$:   Link field No. (Omissible)
        01 to 99 (1 to 99 can also be used.)
        Up to 20 fields can be designated using commas.

⊙ In the case of Data Matrix (Two-dimensional code)

① [ESC] XBaa; bbbb, cccc, d, ee, ff, gg, h (, Ciiijjj) (, Jkkllmmmnnn) (= ooo ------ooo)
[LF] [NUL]

② [ESC] XBaa; bbbb, cccc, d, ee, ff, gg, h (, Ciiijjj) (, Jkkllmmmnnn)
(; pp_1, pp_2, pp_3, ------, pp_{20}) [LF] [NUL]

aa: Bar code number
00 to 31

bbbb: X-coordinate of the print origin of bar code
Fixed to 4 digits (in 0.1 mm units)

cccc: Y-coordinate of the print origin of bar code
4 or 5 digits (in 0.1 mm units)

d: Type of bar code
Q: Data Matrix (Two-dimensional code)

ee: ECC type
00: ECC0
01: ECC50
04: ECC50
05: ECC50
06: ECC80
07: ECC80
08: ECC80
09: ECC100
10: ECC100
11: ECC140
12: ECC140
13: ECC140
14: ECC140
20: ECC200

ff: 1-cell width
00 to 99 (in units of dots)

gg: Format ID
01: Format ID 1
02: Format ID 2
03: Format ID 3
04: Format ID 4
05: Format ID 5
06: Format ID 6

* When ECC200 is designated as ECC type, the format ID designation is ignored.
When format ID of 11 through 16 is designated, ECC200 is automatically selected (to
ensure compatibility with the old model).

h: Rotational angle of bar code

         0:   0°

         1:   90°

         2:   180°

         3:   270°

Ciiijjj: No. of cells

         (Omissible.   When omitted, it is automatically set.)

         iii: No. of cells in the X direction   000 to 144

         jjj: No. of cells in the Y direction   000 to 144

         *   Cell setting method varies according to the ECC type.

	ECC0 to ECC140	ECC200
No. of cells to be designated	Odd numbers only	Even numbers only
Min./Max. No. of cells	9 × 9 to 49 × 49	10 × 10 to 144 × 144
Rectangular code	None	18 × 8 32 × 8 26 × 12 36 × 12 36 × 16 48 × 16

      •   When this parameter is omitted, the number of cells is automatically set.   Also, when any data other than the above values are designated for the number of cells in the X and Y directions, the number of cells are automatically set.

Jkkllmmmnnn: Connection setting

         (Omissible.   When omitted, connection is not made.)

         kk: Code number   01 to 16

         ll: No. of divided codes   02 to 16

         mmm: ID number 1   001 to 254

         nnn: ID number 2   001 to 254

ooo ------ ooo: Data string to be printed (Omissible)

         Max. 2000 digits.

pp_1, pp_2, pp_3, ------, pp_{20}:   Link field No. (Omissible)

               01 to 99 (1 to 99 can also be used.)

               Up to 20 fields can be designated using commas.

⊙ In the case of PDF417 (Two-dimensional code)

<table>
<tr><td>Format</td><td>① [ESC] XBaa; bbbb, cccc, d, ee, ff, gg, h, iiii (=jjj------jjj) [LF] [NUL]</td></tr>
<tr><td></td><td>② [ESC] XBaa; bbbb, cccc, d, ee, ff, gg, h, iiii (; kk$_1$, kk$_2$, kk$_3$, ------, kk$_{20}$) [LF] [NUL]</td></tr>
</table>

Term

aa: Bar code number
00 to 31

bbbb: X-coordinate of the print origin of bar code
Fixed to 4 digits (in 0.1 mm units)

cccc: Y-coordinate of the print origin of bar code
4 or 5 digits (in 0.1 mm units)

d: Type of bar code
P: PDF417 (Two-dimensional code)

ee: Security level
00: Level 0
01: Level 1
02: Level 2
03: Level 3
04: Level 4
05: Level 5
06: Level 6
07: Level 7
08: Level 8

ff: 1-module width
01 to 10 (in units of dots)

gg: No. of columns (strings)
01 to 30

h: Rotational angle of bar code
0: 0°
1: 90°
2: 180°
3: 270°

iiii: Bar height
0000 to 0100 (in 0.1 mm units)

jjj-----jjj: Data string to be printed (Omissible)
Max. 2,000 digits

kk$_1$, kk$_2$, kk$_3$, ------, kk$_{20}$: Link field No. (Omissible)
01 to 99 (1 to 99 can also be used.)
Up to 20 fields can be designated using commas.

⊙ In the case of MicroPDF417 (Two-dimensional code)

Format	① [ESC] XBaa; bbbb, cccc, d, ee, ff, gg, h, iiii (=jjj------jjj) [LF] [NUL]
	② [ESC] XBaa; bbbb, cccc, d, ee, ff, gg, h, iiii (; kk_1, kk_2, kk_3, ------, kk_{20}) [LF] [NUL]

Term	aa:	Bar code number
		00 to 31

bbbb: X-coordinate of the print origin of bar code
　　　　Fixed to 4 digits (in 0.1 mm units)

cccc: Y-coordinate of the print origin of bar code
　　　　4 or 5 digits (in 0.1 mm units)

d: Type of bar code
　　X: MicroPDF417 (Two-dimensional code)

ee: Security level
　　00: Fixed

ff: 1-module width
　　01 to 10 (in dots)

gg: No. of columns/rows
　　00 to 38

h: Rotational angle of bar code
　　0: 0°
　　1: 90°
　　2: 180°
　　3: 270°

iiii: Bar height
　　0000 to 0100 (in 0.1 mm units)

jjj-----jjj: Data string to be printed (Omissible)
　　　　Max. 366 digits

kk_1, kk_2, kk_3, ------, kk_{20}: Link field No. (Omissible)
　　　　　　01 to 99 (1 to 99 can also be used.)
　　　　　　Up to 20 fields can be designated using commas.

The maximum number of columns and rows for the MicroPDF417

Parameter (gg)	No. of columns	No. of rows	Max. number of digits for binary mode	Max. number of digits for upper case letter/space mode	Max. number of digits for numeric mode
00	–	–	150	250	366
01	1	–	22	38	55
02	2	–	43	72	105
03	3	–	97	162	237
04	4	–	150	250	366
05	1	11	3	6	8
06		14	7	12	17
07		17	10	18	26
08		20	13	22	32
09		24	18	30	44
10		28	22	38	55
11	2	8	8	14	20
12		11	14	24	35
13		14	21	36	52
14		17	27	46	67
15		20	33	56	82
16		23	38	64	93
17		26	43	72	105
18	3	6	6	10	14
19		8	10	18	26
20		10	15	26	38
21		12	20	34	49
22		15	27	46	67
23		20	39	66	96
24		26	54	90	132
25		32	68	114	167
26		38	82	138	202
27		44	97	162	237
28	4	4	8	14	20
29		6	13	22	32
30		8	20	34	49
31		10	27	46	67
32		12	34	58	85
33		15	45	76	111
34		20	63	106	155
35		26	85	142	208
36		32	106	178	261
37		38	128	214	313
38		44	150	250	366

"–" for parameter 00 to 04 indicates the numbers of columns/rows which are automatically set by the printer. In this case, the pattern which has a smaller number of code words is automatically selected. When the numbers of code words is equal, the smaller number of columns are selected.

⊙ In the case of QR code (Two-dimensional code)

<table>
<tr><td>Format</td><td>① [ESC] XBaa; bbbb, cccc, d, e, ff, g, h (, Mi) (, Kj) (, Jkkllmm) (= nnn --- nnn) [LF] [NUL]</td></tr>
</table>

② [ESC] XBaa; bbbb, cccc, d, e, ff, g, h (, Mi) (, Kj) (, Jkkllmm) (; oo_1, oo_2, oo_3 ------ oo_{20}) [LF] [NUL]

<table>
<tr><td>Term</td><td></td></tr>
</table>

aa: Bar code number
        00 to 31

bbbb: X-coordinate of the print origin of bar code
        Fixed to 4 digits (in 0.1 mm units)

cccc: Y-coordinate of the print origin of bar code
        4 or 5 digits (in 0.1 mm units)

d: Type of bar code
        T: QR code (Two-dimensional code)

e: Designation of error correction level
        L: High density level
        M: Standard level
        Q: Reliability level
        H: High reliability level

ff: 1-cell width
        00 to 52 (in units of dots)

g: Selection of mode
        M: Manual mode
        A: Automatic mode

h: Rotational angle of the bar code
        0: 0°
        1: 90°
        2: 180°
        3: 270°

Mi: Selection of model
        (Omissible.   When omitted, Model 1 is automatically selected.)
        i = 1: Model 1
           2: Model 2

Kj: Mask number
        (Omissible.   When omitted, the number is automatically set.)
        j = 0 to 7: Mask number 0 to 7
           8:      No mask

Jkkllmm: Connection setting
        (Omissible.   When omitted, connection is not made.)
        kk = 01 to 16:   Value indicating which divided code is connected.
        ll = 01 to 16:   Number of divided codes
        mm = 00 to FF: A value for all print data (before divided) which have
                         been XORed in units of bytes.

nnn --- nnn: Data string to be printed (Omissible)
        Max. 2000 digits

oo_1 --- oo_{20}: Link field No. (Omissible)
        01 to 99 (1 to 99 can also be used.)
        Up to 20 digits can be designated using commas.

⊙ In the case of MaxiCode Code (Two-dimensional code)

Format   ① [ESC] XBaa; bbbb, cccc, d (, e) (, Jffgg) (, Zh) [LF] [NUL]

Term

aa: Bar code number
       00 to 31

bbbb: X-coordinate of the print origin of bar code
       Fixed to 4 digits (in 0.1 mm units)

cccc: Y-coordinate of the print origin of bar code
       4 or 5 digits (in 0.1 mm units)

d: Type of bar code
       Z: MaxiCode (Two-dimensional code)

e: Mode selection (Omissible)

- When the MaxiCode specification is set to "TYPE1: Compatible with the current version" by the printer setting tool.
  Omitted: Mode 2
  0:       Mode 2
  1:       Mode 4
  2:       Mode 2
  3:       Mode 3
  4:       Mode 4
  5:       Mode 2
  6:       Mode 6
  7:       Mode 2
  8:       Mode 2
  9:       Mode 2

- When the MaxiCode specification is set to "TYPE2: Special specification" by the printer setting tool.
  Omitted: Mode 2 or Mode 3(*)
  0:       Mode 2 or Mode 3(*)
  1:       Mode 4
  2:       Mode 2
  3:       Mode 3
  4:       Mode 4
  5:       Mode 2 or Mode 3 (*)
  6:       Mode 6
  7:       Mode 2 or Mode 3 (*)
  8:       Mode 2 or MODE 3 (*)
  9:       Mode 2 or MODE 3 (*)

- *: Mode 2 or Mode 3 should be determined depending on the country code of the data command. When the country code is 840, Mode 2 should be selected. For other codes than 840, Mode 3 should be selected.

Jffgg: Connection setting   (Omissible. When omitted, connection is not made.)
       ff: Code number   01 to 08
       gg: No. of divided codes   01 to 08

Zh: Attachment of Zipper block and Contrast block
       (Omissible. When omitted, they are not attached.)
       h= 0: No attachment of Zipper block and Contrast block
           1: Attachment of Zipper block and Contrast block
           2: Attachment of Zipper block
           3: Attachment of Contrast block

⊙ In the case of CP code (Two-dimensional code)

① [ESC] XBaa; bbbb, cccc, d, e, ff, g, h (, Ciijj) (= kkkk --- kkk) [LF] [NUL]

② [ESC] XBaa; bbbb, cccc, d, e, ff, g, h (, Ciijj) (; ll$_1$, ll$_2$, ll$_3$, --- ll$_{20}$) [LF] [NUL]

aa: Bar code number
    00 to 31

bbbb: X-coordinate of the print origin of bar code
    Fixed to 4 digits (in 0.1 mm units)

cccc: Y-coordinate of the print origin of bar code
    4 or 5 digits (in 0.1 mm units)

d: Type of bar code
    Y: CP code (Two-dimensional code)

e: Designation of ECC (Error Correction Code) level
    0: No designation
    1: 10%
    2: 20%
    3: 30%
    4: 40%
    5: 50%

    Only when the number of code characters are specified, "0" (No designation) can be selected.   If "0 (No designation)" is selected without specifying the number of code characters, the CP code is not printed.   When the number of code characters are specified, blank code areas created after the characters are encoded should all be filled with ECC characters.

ff: 1-cell width
    00 to 99 (in units of dots)

g: No. of character bits
    0: Automatically set
    A: 8 bits

    Designates how many bits are used for representing a character.
    When "0" is designated, the optimal value is automatically set, according to data.

h: Rotational angle of the bar code
    0: 0°
    1: 90°
    2: 180°
    3: 270°

Ciijj: No. of code characters
    (When omitted, it is automatically set.)
    ii = No. of characters in the X direction: 03 to 22
    jj = No. of characters in the Y direction: 02 to 22

    "Character" is a unit of code for encoding the CP code.

    1 character occupies a 3×3-square block.
    When the value for "jj" is larger than that for "ii", an error occurs.

    The number of cells for the code is as follows.
        (No. of characters × 3 +2)

kkkk --- kkk: Data string to be printed (Omissible)
                     Max. 473 digits

ll₁, ll₂, ll₃, --- ll₂₀: Link field No. (Omissible)
                     01 to 99 (1 to 99 can also be used.)
                     Up to 20 digits can be designated using commas.

Explanation (1) Bar code number

When drawing by the Data Command ([ESC] RB), the format designated by the bar code number is selected.

(2) Print origin of coordinates

[Printing direction: Bottom first]   [Printing direction: Top first]
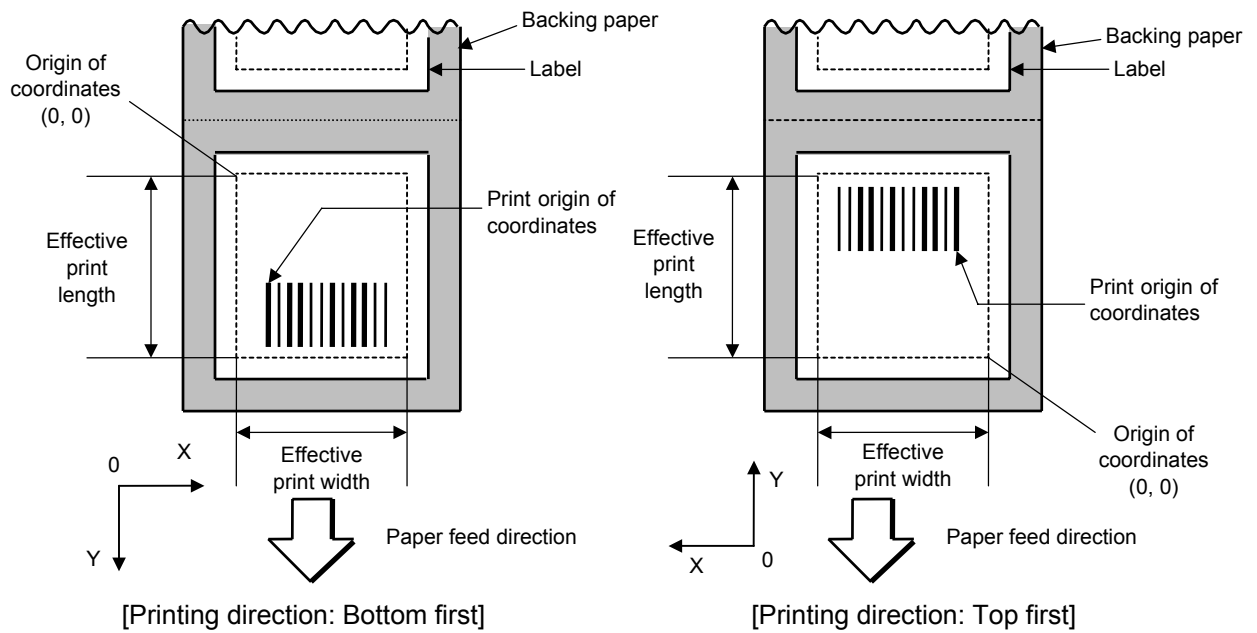
The print origin of coordinates must be set so that the bar code drawing result will be within the effective print area set by the Label Size Set Command ([ESC] D).

[Effective print area]   [mm]

Item		Model / Issue mode	B-452-R		
			Batch	Strip	Cut
Thermal head dot density			11.8 dots/mm (300 dpi)		
Thermal head width			105.7 mm		
G: Effective print width		Min.	10.0		
		Max.	105.7		
H: Effective print length	Label	Min.	11.0	21.4	29.0
		Max.	500.0		
	Tag	Min.	13.0	–	23.4
		Max.	500.0	–	500.0

- 90 -

(3) Type of bar code

0: JAN8, EAN8

`|||| 4940 || 0458 ||`

1: MSI

`1 2 3 4 5 6 7 8 9 0 3`

2: Interleaved 2 of 5

`0 1 2 3 4 5 6 7 8 9 0 5`

3: CODE39 (standard)

`* A B C D E F G 1 2 3 4 *`

4: NW7

`a 1 2 3 4 5 6 7 8 9 0 a`

5: JAN13, EAN13

`4 || 901480 || 079516 ||`

6: UPC-E

`0 || 123456 || 5`

7: EAN13 + 2 digits

`1 2`
`9 || 780123 || 456786 ||`

8: EAN13 +5 digits

`1 2 3 4 5`
`9 || 780123 || 456786 ||`

9: A: CODE128

`A B C D E F G H I`

B: CODE39 (Full ASCII)

`* A B C D a b c d 1 2 3 4 *`

C: CODE93

`A B C a b c 1 2 3`

G: UPC-E + 2 digits

`1 2`
`0 || 123456 || 5`

H: UPC-E + 5 digits

`1 2 3 4 5`
`0 || 123456 || 5`

I: EAN8 + 2 digits

`1 2`
`|||| 4940 || 0458 ||`

J: EAN8 + 5 digits

`1 2 3 4 5`
`|||| 4940 || 0458 ||`

K: UPC-A

`0 || 12345 || 67890 || 5`

L: UPC-A + 2 digits

`1 2`
`0 || 12345 || 67890 || 5`

M: UPC-A + 5 digits

1 2 3 4 5

0 12345 67890 5

N: UCC/EAN128

00000174571740159067

O: Industrial 2 of 5

1 2 3 4 5 6 9

P: PDF417

Q: Data Matrix

R: Customer bar code

S: Highest priority customer bar code

T: QR code

U: POSTNET

V: RM4SCC

W: KIX code

X: MicroPDF417

Y: CP Code

Z: MaxiCode
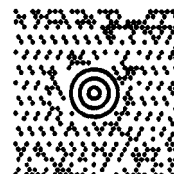
b: GS1 DataBar family

GS1 DataBar Omnidirectional   GS1 DataBar Stacked
GS1 DataBar Truncated

GS1 DataBar Stacked Omnidirectional   GS1 DataBar Limited

GS1 DataBar Expanded

GS1 DataBar Expanded Stacked

(4) Type of check digit

① When no check digit is attached, a bar code of the data row will be drawn.

② In the case of the check digit check, when each check digit check is performed according to the type of bar code and results in normal, a bar code will be drawn. If the check digit is not proper, the bar code will not be drawn.

③ In case that the check digit is automatically attached, each check digit is attached according to the type of bar code when a bar code is drawn.

④ If the type of bar code is CODE93, CODE128 (with auto code selection), or UCC/EAN128, the check digit will always be attached regardless of the designation of the type of check digit.

⑤ If the type of bar code is JAN, EAN, or UPC, the designation of no check digit attachment automatically assumes the check digit check.

⑥ DBP Modulus 10 is Modulus 10 for Deutsche Bundespost Postdienst only.

(5) Bar width, space width, and character-to-character space

Designate the bar, space, and character-to-character space widths according to the type of bar code. Note that the proper value differs according to the rotational angle of bar code, type, number of digits, print speed, paper used, etc. Examples of such designations are listed below.

In case of JAN, EAN, UPC, CODE93, CODE128, UCC/EAN128, PDF417, or MicroPDF417, the width of 2 to 6 modules is automatically calculated by designating a 1-module width.

[Example of setting]

(1 dot = 1/11.8 mm)

Type of bar code	1 module		2 modules		3 modules		4 modules		5 modules		6 modules	
	Bar	Space	Bar	Space	Bar	Space	Bar	Space	Bar	Space	Bar	Space
JAN, EAN, UPC	4		8		12		16		-		-	
CODE93	3		6		9		12		-		-	
CODE128, EAN128	3		6		9		12		-		-	
PDF417	3		6		9		12		15		18	
MicroPDF417	2		4		6		8		10		12	

Type of bar code	Narrow		Wide		Character-to-character space
	Bar	Space	Bar	Space	
MSI	3	3	8	8	0
ITF	3	3	8	8	0
CODE39	3	3	8	8	3
NW7	3	3	8	8	3
Industrial 2 of 5	3	3	8	0	3
MATRIX 2 of 5	3	3	8	8	3

When NW7 is used, transmission of the space character assumes a space equals to 'a narrow space ×12 dots'. In this case, the space is max. 255 dots.

In the case of Data Matrix or CP code

1-cell width
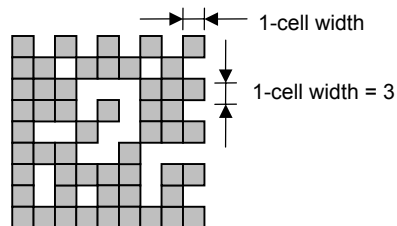
1-cell width = 3

When 1-cell width is set to 00 for the Data Matrix or CP code, a two-dimensional code is not drawn. However, the bar code printed on the previous label is cleared.

In the case of QR code
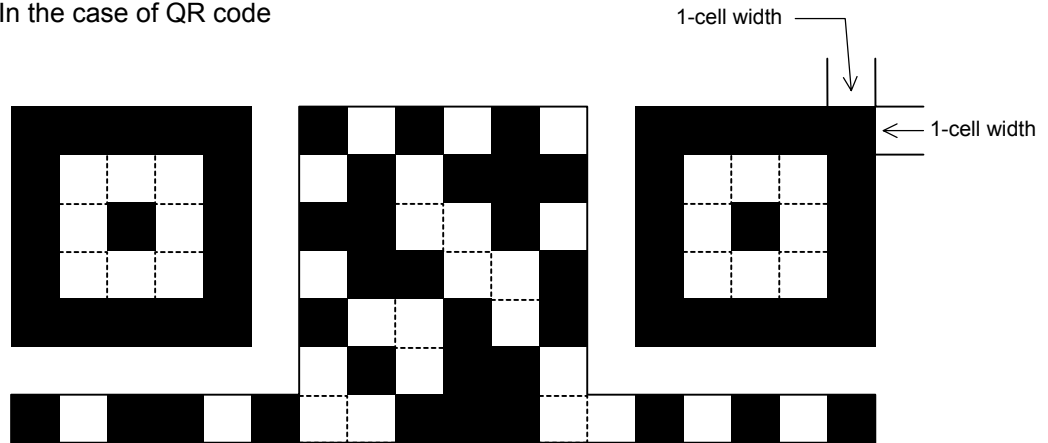
1-cell width

1-cell width

When the 1-cell width is set to 0, a two-dimensional code is not drawn.   However, the bar code printed on the previous label is cleared.

In the case of a customer code

1-module width

(6)   Rotational angle of bar code

Point of origin

0°   90°   180°   270°

Point of origin

0°   90°   180°   270°
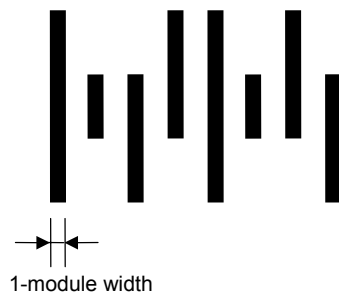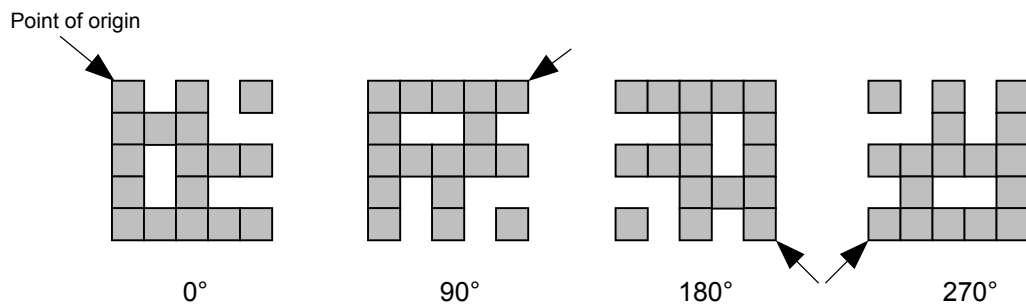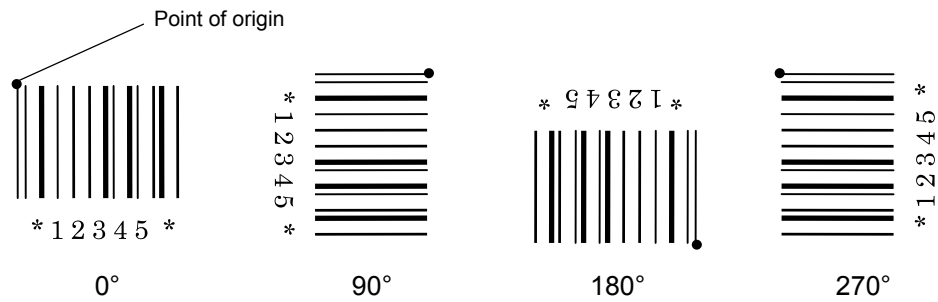
(7)　Bar code height

Height

Height

[PDF417, MicroPDF417]
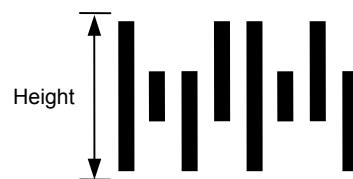
Height

Height

[Postal code]

Height

[GS1 DataBar Omnidirectional/GS1 DataBar Truncated]

Height

[GS1 DataBar Stacked]

Height　(The height of the bottom row is 7/5 of the specified height.)

[GS1 DataBar Stacked Omnidirectional]

Height　(The height of the bottom row is the same as the specified height.)
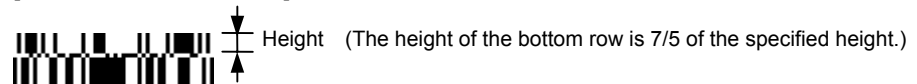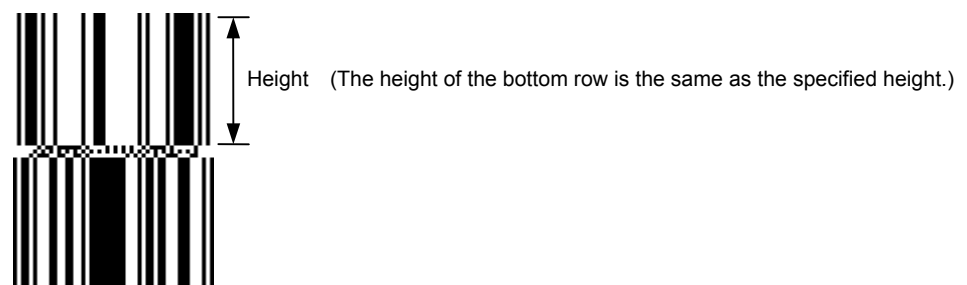
[GS1 DataBar Limited]

 Height

[GS1 DataBar Expanded]

 Height

When the bar code height is set to 0000, a bar code (including guard bars) and numerals under bars are not drawn. However, the bar code printed on the previous label is cleared.

(8) Length of guard bar

The length of guard bar is valid only when the type of bar code is WPC.
It is ignored in all other cases.

Height of bar code

Length of guard bar
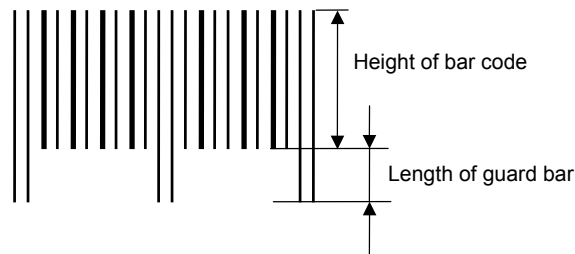
(9) Numerals under bars

Numerals are/are not provided under bars according to the parameter for print/non print of numerals under bars. The numerals under bars to be printed vary according to the type of bar code.   The font of numerals under bars is OCR-B.   These numerals are enlarged or reduced only horizontally according to the width of the bar code. When they are drawn vertically, no enlargement or reduction is applied.

[Drawing positions of numerals under bars]

① In the case of JAN and EAN
   (Example) EAN13 + 2 digits

9 780123 456786   1 2

(Example) EAN8

4940 0458

② In the case of UPC
(Example) UPC-A + 2 digits

0 12345 67890 5 1 2

(Example) UPC-E

0 123456 5

③ In the case of bar codes other than JAN, EAN, and UPC
(Example) CODE39

* A B C D E F G 1 2 3 4 F *

(Example) UCC/EAN128

0 0 0 0 0 1 7 4 5 7 1 7 4 0 1 5 9 0 6 7

(10) Start/Stop Code

- This parameter is valid only when the type of bar code is CODE39 and NW7.

- When the parameter is designated, whether or not the stop code and the start code are attached to the print data to be sent is not checked.

- When the parameter is omitted in the case of CODE39 and NW7, a start/stop code will be attached. The code to be added is "*" in the case of CODE39, and "a" in the case of NW7.

- For details, refer to chapter 15 "AUTOMATIC ADDITION OF START/STOP CODES".

(11) Increment/decrement

Printing is performed while the data is incremented or decremented each time a label is issued. Where the data row exceeds the maximum number of digits (40), the data row will not be drawn.

When CODE128 (without auto code selection) is used, the number of the start code (code A, code B, and code C) digits is regarded as 2.

Initial value	0000	0000	0000	0000	999999
INC/DEC	+10	+10	+10	+10	+1
Zero suppression	Not designated	5	3	0	3
1st label	0000	0000	␣ 000	0000	999999
2nd label	0010	0010	␣ 010	0010	␣␣␣ 000
3rd label	0020	0020	␣ 020	0020	␣␣␣ 001
4th label	0030	0030	␣ 030	0030	␣␣␣ 002
5th label	0040	0040	␣ 040	0040	␣␣␣ 003

Letters and numerals for increment/decrement

For CODE39 (standard), CODE39 (full ASCII), NW-7, CODE93, CODE128, even if a data string other than numerals are included in the data, increment/decrement is performed. However, if any code which does not exist in each bar code table is contained in the data, increment/decrement is not performed.

Up to 40 digits (including letters, numerals, and symbols) are possible. Only the numerals are selected and calculated for incrementing/decrementing, and then are returned to the previous position to draw the data.

Example of increment/decrement calculation

Initial value	00000	A0A0A	7A8/9	A2A0A
INC/DEC	+1	+1	+3	-3
1st label	00000	A0A0A	7A8/9	A2A0A
2nd label	00001	A0A1A	7A9/2	A1A7A
3rd label	00002	A0A2A	7A9/5	A1A4A
4th label	00003	A0A3A	7A9/8	A1A1A
5th label	00004	A0A4A	8A0/1	A0A8A

Example of increment/decrement of data including the special codes of CODE128

Increment/decrement calculation starts from the lowest digit in the data strings.   If the data string to be calculated is numeric and the next (upper) digit is ">", this data is a special code (underlined digits shown in the table below). In such case, these two digits are skipped, and the next digit is calculated.

Example of increment/decrement calculation of CODE128

Initial value	00000	00>08	0A>08	0A9>08
INC/DEC	+1	+1	+1	+1
1st label	00000	00>08	0A>08	0A9>08
2nd label	00001	00>09	0A>09	0A9>09
3rd label	00002	01>00	1A>00	1A0>00
4th label	00003	01>01	1A>01	1A0>01
5th label	00004	01>02	1A>02	1A0>02

(12) Zero suppression

No. of digits after zero suppression	0	1	2	2	3	4	5
Data	0000	0000	0000	0A12	0123	0123	0123
Print	0000	␣␣␣0	␣␣00	␣A12	␣123	0123	0123

Zero(s) in a data row is replaced with a space(s) from the upper digits, according to the designated number of digits.   However, if the number of digits after zero suppression is greater than the data row, the data row will be drawn without performing zero suppression.   Where the data row exceeds the maximum number of digits (40), the data row will not be drawn.

When the print data including start/stop codes are sent, the start/stop codes are also counted as a digit each.   When the bar code type is JAN, EAN, UPC, or UCC/EAN 128, the data will be drawn without performing zero suppression.

(13) Data string to be printed

Drawing data can be programmed by designating the number of digits after the symbol "=."   The maximum number of digits to be printed varies according to the types of bar codes.   For codes, refer to chapter 13 "BAR CODE TABLE".

(14) Link field No.

The link field No. can be programmed by designating it after the symbol ";."   After the link field No. is designated using the Format Command, the data string are linked by the Link Field Data Command to draw an image.
Up to 20 fields can be linked.

The following shows an example of linked fields on the two continuous labels.

[Format Command]

[ESC] PC01;........................	; 01 [LF] [NUL]	: Link field No. 1 is designated.
[ESC] PC02;........................	; 03 [LF] [NUL]	: Link field No. 3 is designated.
[ESC] PC03;........................	; 04 [LF] [NUL]	: Link field No. 4 is designated.
[ESC] XB01;...................	; 03, 04 [LF] [NUL]	: Link fields No. 3 and No. 4 are designated.
[ESC] PC04;........................	; 02 [LF] [NUL]	: Link field No. 2 is designated.
[ESC] PC05;........................	; 03 [LF] [NUL]	: Link field No. 3 is designated.
[ESC] PC06;........................	; 04 [LF] [NUL]	: Link field No. 4 is designated.
[ESC] XB02;...................	; 03, 04 [LF] [NUL]	: Link fields No. 3 and No. 4 are designated.

└──── Designating the link field No.

[Data Command]

[ESC] RB; A [LF] B [LF] ABCD [LF] 001 [LF] [NUL]

```
                                    └──── Link field No. 4
                           └──── Link field No. 3
                  └──── Link field No. 2
          └──── Link field No. 1
```

```
┌──────────────────────────────────────────────────────────┐
│  ┌─────────────────────┐ ┊ ┌─────────────────────┐        │
│  │                 A   │ ┊ │                 B   │        │
│  │  ABCD  ||||||||     │ ┊ │  ABCD  ||||||||     │        │
│  │   001               │ ┊ │   001               │        │
│  │      *ABCD001*      │ ┊ │      *ABCD001*      │        │
│  └─────────────────────┘ ┊ └─────────────────────┘        │
└──────────────────────────────────────────────────────────┘
```
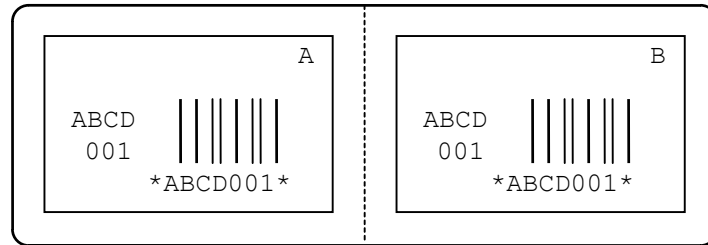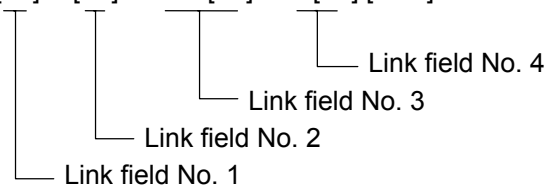
(15) Explanation for Data Matrix

① ECC type

Data Matrix contains a function to correct a code reading error using an error correction code (ECC) and restore normal data.   The ECC should be chosen from several types of ECCs according to usage.   The general correction ability is as follows.   However, it may vary according to the error conditions.

ECC type	Error Correction Ability	Overhead by ECC
ECC0	Low ⟵⟶ High	0%
ECC50		25%
ECC80		33%
ECC100		50%
ECC140		75%
ECC200		Approx. 30%

② Format ID

Data Matrix can handle all codes including alphanumerics, symbols and Kanji.   Since data compression rate varies according to codes, a code to be used is designated using the format ID.

Format ID	Code	Details
1	Numerics	0 to 9 space
2	Letters	A to Z space
3	Alphanumerics, symbols	0 to 9 A to Z space . , - /
4	Alphanumerics	0 to 9 A to Z space
5	ASCII (7 bit)	00H to 7FH
6	ISO (8 bit)	00H to FFH (Kanji)

③ Maximum number of digits

The maximum number of digits varies according to the ECC type or format ID.
Since a Kanji character uses 2 bytes, its maximum number of digits becomes half of the following values.

	ECC0	ECC50	ECC80	ECC100	ECC140
Format ID 1	500	457	402	300	144
Format ID 2	452	333	293	218	105
Format ID 3	394	291	256	190	91
Format ID 4	413	305	268	200	96
Format ID 5	310	228	201	150	72
Format ID 6	271	200	176	131	63

	Numeric	Alphanumeric	8 bit
ECC200	2000	2000	1556

For the maximum number of digits in cell units, see the next page.

④ Connection setting

The connection setting is used when the data cannot be expressed with a two-dimensional code. Data is comprised of more than one two-dimensional code. When three two-dimensional codes are used to comprise data, for example, identification information of 1/3, 2/3, and 3/3 is inserted into each two-dimensional code. The ID number is assigned to identify the proper combination of two-dimensional codes when plural connecting symbols are printed on one label. For example, when there are two kinds of data containing identification information for 1/2 and 2/2 in the same label, combination of two-dimensional codes is unclear. By adding the ID number, the combination is made clearer.

Cell size and the effective data capacity

Symbol size		ECC000			ECC050			ECC080			ECC100			ECC140		
Row	Col	Numeric capacity	Alphanum capacity	8-bit byte capacity	Numeric capacity	Alphanum capacity	8-bit byte capacity	Numeric capacity	Alphanum capacity	8-bit byte capacity	Numeric capacity	Alphanum capacity	8-bit byte capacity	Numeric capacity	Alphanum capacity	8-bit byte capacity
9	9	3	2	1	–	–	–	–	–	–	–	–	–	–	–	–
11	11	12	8	5	1	1	–	–	–	–	–	–	–	–	–	–
13	13	24	16	10	10	6	4	4	3	2	1	1	–	–	–	–
15	15	37	25	16	20	13	9	13	9	6	8	5	3	–	–	–
17	17	53	35	23	32	21	14	24	16	10	16	11	7	2	1	1
19	19	72	48	31	46	30	20	36	24	16	25	17	11	6	4	3
21	21	92	61	40	61	41	27	50	33	22	36	24	15	12	8	5
23	23	115	76	50	78	52	34	65	43	28	47	31	20	17	11	7
25	25	140	93	61	97	65	42	82	54	36	60	40	26	24	16	10
27	27	168	112	73	118	78	51	100	67	44	73	49	32	30	20	13
29	29	197	131	86	140	93	61	120	80	52	88	59	38	38	25	16
31	31	229	153	100	164	109	72	141	94	62	104	69	45	46	30	20
33	33	264	176	115	190	126	83	164	109	72	121	81	53	54	36	24
35	35	300	200	131	217	145	95	188	125	82	140	93	61	64	42	28
37	37	339	226	148	246	164	108	214	143	94	159	106	69	73	49	32
39	39	380	253	166	277	185	121	242	161	106	180	120	78	84	56	36
41	41	424	282	185	310	206	135	270	180	118	201	134	88	94	63	41
43	43	469	313	205	344	229	150	301	201	132	224	149	98	106	70	46
45	45	500	345	226	380	253	166	333	222	146	248	165	108	118	78	51
47	47	500	378	248	418	278	183	366	244	160	273	182	119	130	87	57
49	49	500	413	271	457	305	200	402	268	176	300	200	131	144	96	63

Symbol size		ECC200		
Row	Col	Numeric capacity	Alphanum capacity	8-bit byte capacity
10	10	6	3	1
12	12	10	6	3
14	14	16	10	6
16	16	24	16	10
18	18	36	25	16
20	20	44	31	20
22	22	60	43	28
24	24	72	52	34
26	26	88	64	42
32	32	124	91	60
36	36	172	127	84
40	40	228	169	112
44	44	288	214	142
48	48	348	259	172
52	52	408	304	202
64	64	560	418	278
72	72	736	550	366
80	80	912	682	454
88	88	1152	862	574
96	96	1392	1042	694
104	104	1632	1222	814
120	120	2000	1573	1048
132	132	2000	1954	1302
144	144	2000	2000	1556

Rectangular code

Symbol size		ECC200		
Row	Col	Numeric capacity	Alphanum capacity	8-bit byte capacity
8	18	10	6	3
8	32	20	13	8
12	26	32	22	14
12	36	44	31	20
16	36	64	46	30
16	48	98	72	47

(16) Explanation for the PDF417 and MicroPDF417

① Security level

The PDF417 contains a function to correct a code reading error using an error correcting code word and restore normal data. The security level should be designated according to usage.

For the MicroPDF417, the printer sets the security level automatically.

Security level	Error Correction Ability	No. of error correction code words
Level 0		0
Level 1	Low	2
Level 2		6
Level 3		14
Level 4		30
Level 5		62
Level 6		126
Level 7	High	254
Level 8		510

② No. of columns (strings)

The number of rows and the row length (No. of data strings) are variable in the PDF417. Therefore, the form of the symbol can be changed in the proportion of the height and width in accordance with the paper to be used.
The number of columns (the number of data strings) is varied between 1 and 30.
If the number of columns is set to too small though the data volume is large and the security level is high, drawing may not be performed. This is because the number of rows may exceed 90 when the number of columns is too small. (When the PDF417 is used, the number of rows of symbols is limited in a range from 3 to 90.)

For the MicroPDF417, not only the number of columns (data strings) but also the number of rows (data lines) can be designated. When these are to be designated, see the table. Note that the max. number of digits for the set parameter (gg) varies according to the character type. If data over the max. number of digits for the set parameter (gg) is set, a bar code is not printed. The number of columns (data strings) is varied in a range from 1 to 4.

Though the max. number of lines is 44, it depends on the number of columns.

(17) Explanation for QR code

① Error correction level

The QR code contains functions to detect and correct an error. If one of the data characters is damaged, the data can be restored when this code is read.
There are 4 levels of error correction. The level should be specified according to usage. The general correction ability is as follows.

| Level	Error correction ability	Overhead by correcting an error
High density level	Low	7%
Standard level		15%
Reliability level		25%
High reliability level	High	30%
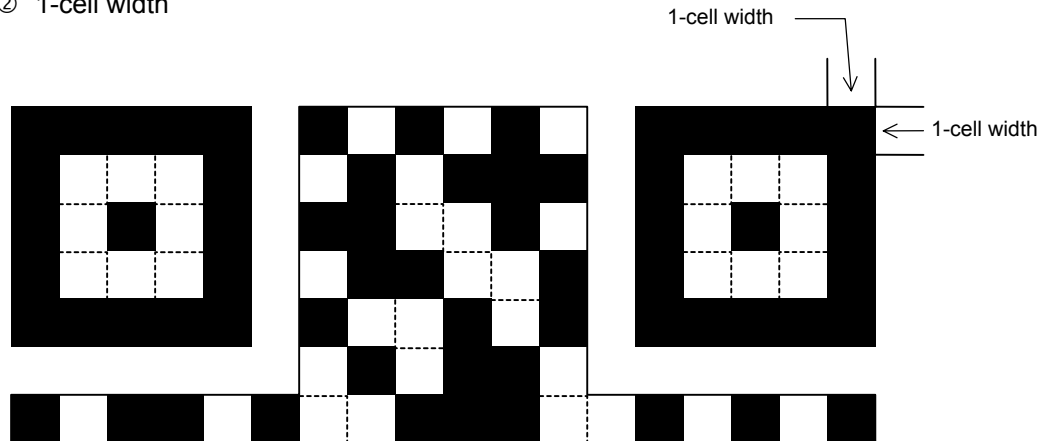
② 1-cell width

1-cell width

When the 1-cell width is set to 0, a two-dimensional code is not drawn.   However, the bar code printed on the previous label is cleared.
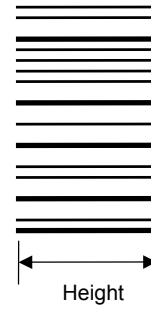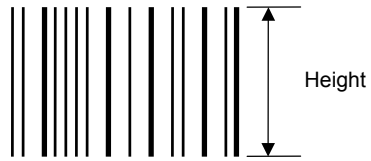
③ Selection of mode

All codes including alphanumerics, symbols, and Kanji can be used in one QR code. Manual mode or automatic mode can be selected to perform the operation.

④ Selection of model

Model 1:   Original specification

Model 2:   Extended specification which enhances the function of position correction and can contain a large amount of data.

⑤ Mask number

It is preferable that the black and white modules are arranged in well-balanced manner so that a QR code is read for sure.   The mask number prevents the bit pattern "1011101", which is characteristically seen in the position detecting pattern, from appearing in the symbol as much as possible.

The mask number is ranging from 0 to 7.   The pattern of the code is determined by placing each masking pattern for the mask number over the module pattern.   When the mask number is set to 8, masking is not performed.   When the parameter is omitted, the most appropriate mask number is automatically selected to perform masking.

⑥ Connection setting

For QR code, data can be divided into several codes.   Even though the print space is limited, divided codes can be printed there.   The data can be divided into a max. of 16 codes.   Parity data is obtained by XORing all input data in units of bytes before dividing.   The input data is calculated based on shift JIS for Kanji, or on JIS 8 for others.   Examples are shown below:

"0123456789日本" is divided into "0123", "4567", and "89日本".

Code No. 1   No. of divided codes: 3   Parity data: 85   Data "0123"
Code No. 2   No. of divided codes: 3   Parity data: 85   Data "4567"
Code No. 3   No. of divided codes: 3   Parity data: 85   Data "89日本"

* The parity data is the XORed value for "0123456789日本".
   30   31   32   33   34   35   36   37   38   39   93   FA   96   7B   =   85

(18) Explanation for MaxiCode

    ① Connection setting

       For MaxiCode, data can be divided into a max. of 8 codes.

(19) Explanation for CP code

    ① ECC (Error Correction Code) level

       The CP code contains a function to correct a code reading error using an error correcting code word and restore normal data.   The error correction level should be selected according to usage.
The higher the percentage of the error correcting code word is, the higher the error correcting ability is.
For the CP code, the program is designed so that all remaining areas are used for correcting errors when the number of code characters is specified by a user.   When the number of code characters is specified, "0" (No designation) can be used.
When the number of code characters is not specified by a user, a value must be selected from a range of 10 to 50%.   The printer automatically determines the number of code characters so that the error correcting code word exceeds the percentage specified by user.

    ② The number of bits per character

       Data is compressed by using the 8-bit compression method.   Even if "0" is specified, the data will be compressed in the same way.

       Character set for 8 bits

        8 bits: ISO   00H to FFH (for Kanji)

    ③ The number of code characters

       For the CP code, a 3×3-cell is used for one block, and a CP code consists of these blocks.
The numbers of characters in the X and Y directions can be set by a user.
If "0" is specified, the printer automatically sets the smallest code size that can contain the data set by the user.
The rectangular code can be also specified.   In that case, the value for the Y direction must be smaller than the X direction.
The number of cells per code is as follows.
(No. of code characters) × 3 + 2

| Notes |

(1) The check digit attachment, increment/decrement, and zero suppression are performed according to the following priority.   If any of the conditions is improper, no drawing will take place.

    ⌈ For example, the zero(s) is replaced with a space(s) as a result of zero suppression, but ⌉
    ⌊ the modulus 10 designated to be attached cannot be calculated. ⌋

    Increment/decrement > zero suppression > attachment of check digit

(2) Up to 32 fields for which incrementing/decrementing has been designated can be drawn.   If the total bit map font, outline font, and bar code increment/decrement fields exceeds 32, drawing will take place without incrementing/decrementing any excessive field.   The field to be incremented or decremented is incremented or decremented until the Image Buffer Clear Command ([ESC] C) is transmitted.

[Example]
- ① Format Command (Increment bar code No. 01 (+1))
- ② Format Command (Increment bar code No. 02 (+2))
- ③ Image Buffer Clear Command
- ④ Data Command (Bar code No. 01 "0001")
- ⑤ Data Command (Bar code No. 02 "0100")
- ⑥ Issue Command (2 labels)

- ⑦ Issue Command (1 label)
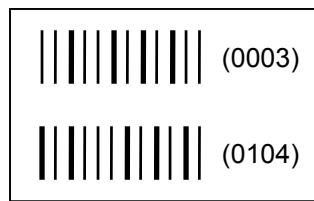
- ⑧ Image Buffer Clear Command
- ⑨ Data Command (Bar code No. 02 "3000")
- ⑩ Issue Command (1 label)
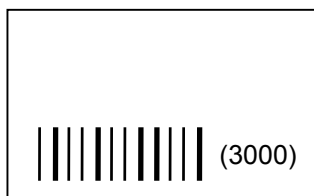
(3) More than one Bar Code Format Command can be connected when transmitted.

   [ESC]   XB01; 0100, 0150, 3, 1, 02, 02, 06, 06, 02, 0, 0150 [LF]
              B02; 0350, 0150, 3, 1, 02, 02, 06, 06, 02, 0, 0150 [LF] [NUL]

(4) When the drawing data differs for every label, the field of the drawing data for the previous label is automatically cleared using the bar code number, then the next drawing data is printed.   Therefore, the bar code number should be designated so that they differ according to the drawing fields.   Since the automatic field clear is not performed between the Clear Command ([ESC] C) and Issue Command ([ESC] XS), the fixed data may be drawn using the same bar code number.   In this case, the Format Command and Data Command should be sent alternately.   (After the Issue Command is sent, the fields with the same bar code number are automatically cleared until the Clear Command is sent.)

(5) The link field designation is cleared by omitting the link field designation using the same bar code No. and reformatting data.
The link field designation can also be cleared by the Image Buffer Clear Command.

(6) A print data string and the link field No. cannot be programmed at the same time.

| Refer to |

Bit Map Font Format Command ([ESC] PC)
Outline Font Format Command ([ESC] PV)
Bar Code Data Command ([ESC] RB)

| Examples |

(1)
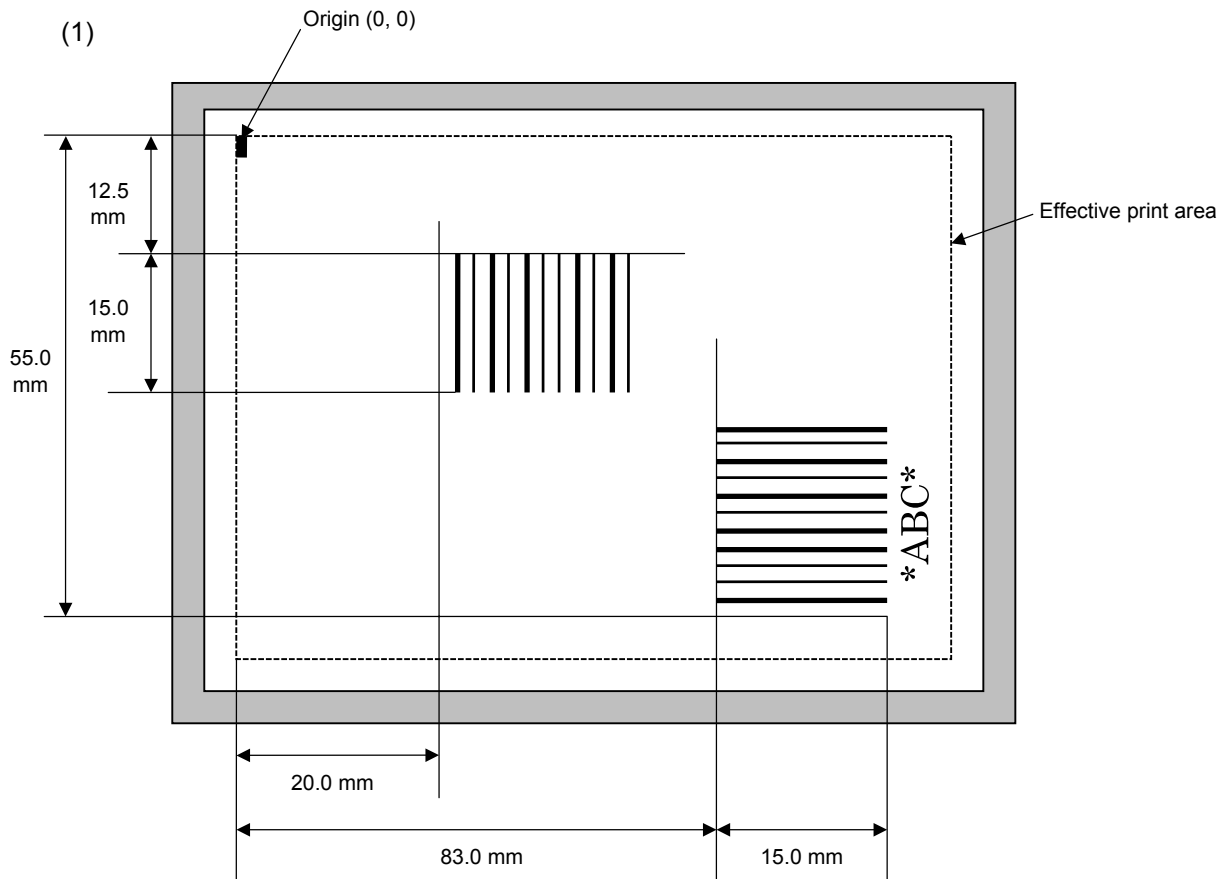
[ESC] C [LF] [NUL]
[ESC] XB01; 0200, 0125, 3, 1, 03, 03, 08, 08, 03, 0, 0150=12345 [LF] [NUL]
[ESC] XB02; 0830, 0550, 3, 1, 02, 04, 07, 08, 04, 3, 0150, +0000000000, 1, 00, N [LF] [NUL]
[ESC] RB02; *ABC* [LF] [NUL]
[ESC] XS; I, 0002, 0002C4000 [LF] [NUL]
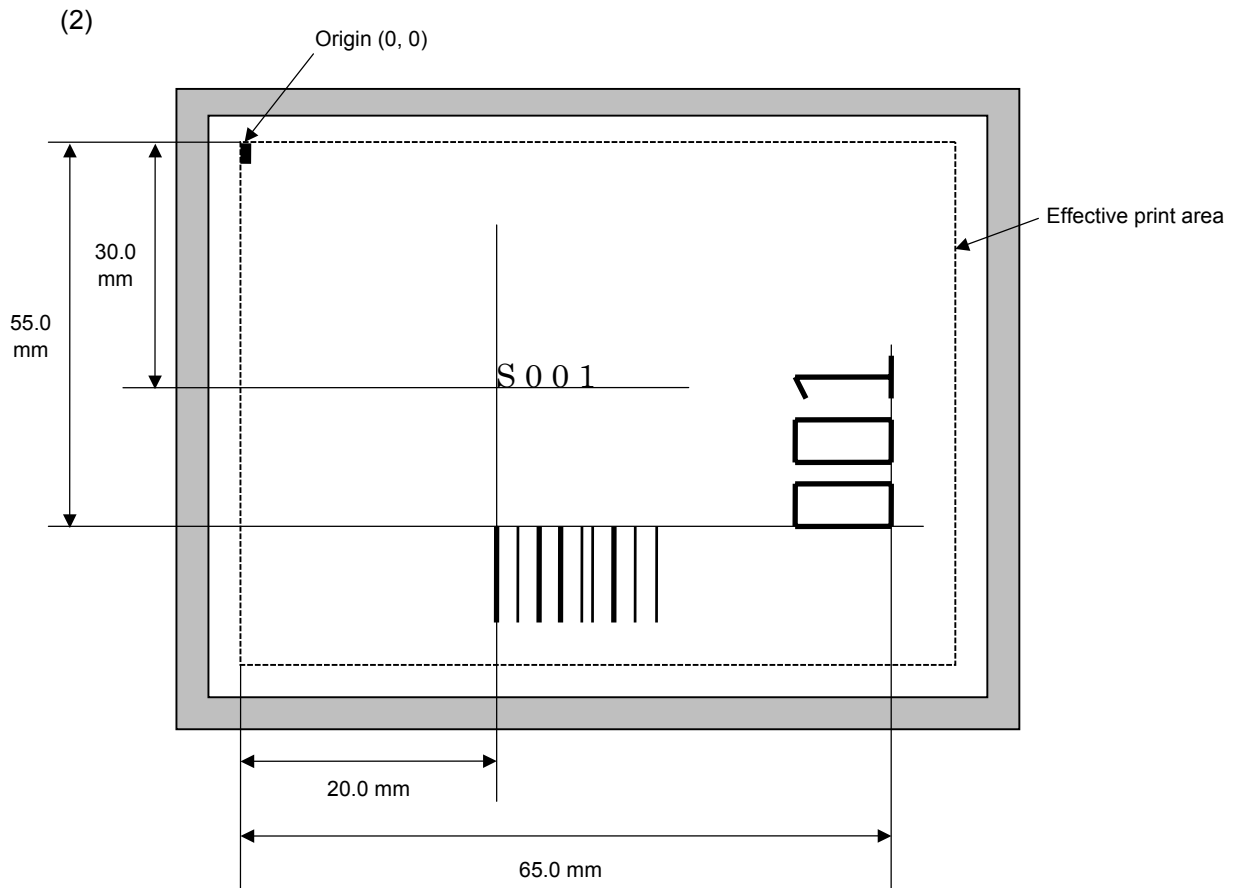
(2)

Origin (0, 0)

Effective print area

30.0
mm

55.0
mm

S 0 0 1

20.0 mm

65.0 mm

[ESC] C [LF] [NUL]
[ESC] PC001; 0200, 0300, 1, 1, C, 00, B; 01, 02 [LF] [NUL]
[ESC] PV01; 0650, 0550, 0200, 0150, B, 33, B; 02 [LF] [NUL]
[ESC] XB01; 0200, 0550, 3, 1, 03, 03, 08, 08, 03, 0, 0150; 01, 02 [LF] [NUL]
[ESC] RB; S [LF] 001 [LF] [NUL]
[ESC] XS; I, 0002, 0002C4000 [LF] [NUL]

(3)
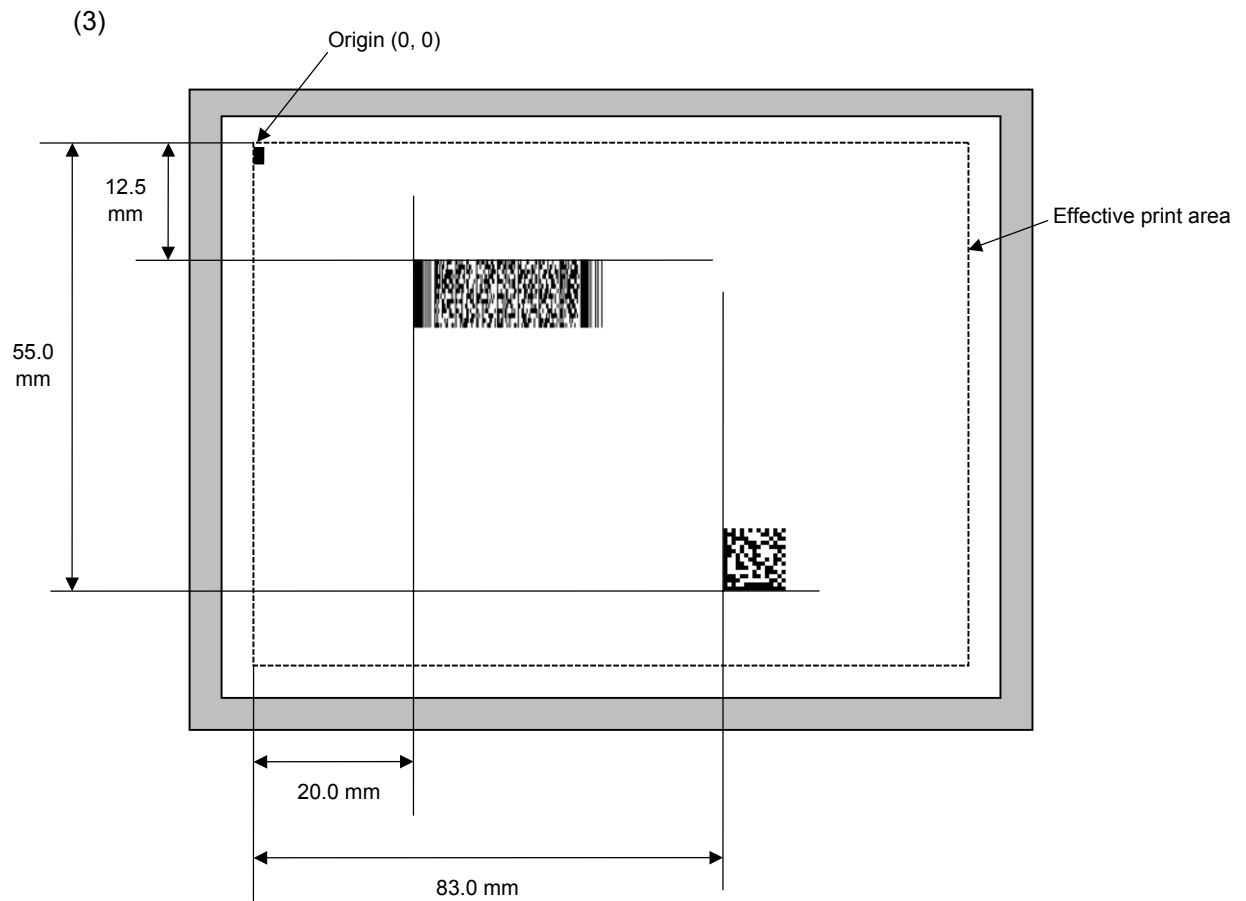
[ESC] C [LF] [NUL]
[ESC] XB01; 0200, 0125, P, 04, 02, 03, 0, 0010 [LF] [NUL]
[ESC] XB02; 0830, 0550, Q, 08, 03, 05, 3 [LF] [NUL]
[ESC] RB01; PDF417 [LF] [NUL]
[ESC] RB02; Data Matrix [LF] [NUL]
[ESC] XS; I, 0002, 0002C4000 [LF] [NUL]

6.3.11 BIT MAP FONT DATA COMMAND   [ESC] RC

Function	Provides data for the bit map font row.

Format	① [ESC] RCaaa; bbb ------ bbb [LF] [NUL] ② Link Field Data Command [ESC] RC; ccc ------ ccc [LF] ddd ------ ddd [LF] ------ [LF] xxx ------ xxx [LF] [NUL]

Term

aaa: Character string number
              000 to 199 (Two digits, 00 to 99, also acceptable.)

bbb ------ bbb: Data string to be printed
              Max. 255 digits
              (Max. 127 digits when the font type is U, V, W, X, v, w, 51, 52, 53, 54, or 55.)
              Any excess data will be discarded.
              For the character codes, refer to chapter 12 "CHARACTER CODE TABLE".

ccc ------ ccc: Data string of link field No. 1

ddd ------ ddd: Data string of link field No. 2
           to

xxx ------ xxx: Data string of link field No. 99

Explanation

(1) Link field data string

- After the link field No. is designated in the Format Command, data strings are linked using the Link Field Data Command to draw an image.

- Up to 255 digits of data strings can be linked.   However, when the font type is U, V, W, X, v, w, 51, 52, 53, 54, or 55, only up to 127 digits can be linked. When the number of digits exceeds the maximum value, excess data will be discarded.

- Up to 99 data strings can be linked.

- Up to 2048 bytes can be used as the command length ([ESC] to [NUL]) of the Link Field Data Command.

- When the data string is omitted in the Link Field Data Command, the following process is performed:

   ① No process will be performed for the field which contains no print data due to the omission.

   ② When the field partially loses print data due to the omission, the only remaining data will be processed as print data.

- The Link Field Data Command can be used for the bit map font fields, outline font fields, and bar code fields.
  (The same result is obtained when any of the "RC," "RV" or "RB" command code is designated.)

(2) Data string of Kanji code

  • When the font type is U, V, W, X, v, or w, Japanese Kanji is used.   non-Kanji JIS, JIS level 1, JIS level 2, special characters, half-size alpha-numerals can be printed.

  • Character code of Shift JIS, JIS hexadecimal, JIS 8, or the mixture of these codes can be used.

(3) Kanji code selection

  • The character code is automatically selected in the manner described below.

① Shift JIS or JIS8

Code of 20h to 7Fh or A0h to DFh are considered as half-size characters (alphanumeric).   Others are considered as SHIFT JIS code.

A: Kanji (東京)

  [93h] [8Ch]   [8Bh] [9Eh]

  東   京

B: Kanji + Half-size character (東 ABC 京 abc)

  [93h] [8Ch]   [41h] [42h] [43h]   [8Bh] [9Eh]   [61h] [62h] [63h]

  東   A   B   C   京   a   b   c

C: Half-seize character [123 アイウ]

  [31h] [32h] [33h] [B1h] [B2h] [B3h]

  1   2   3   ア   イ   ウ

② JIS hexadecimal

 • Data between [ESC]K and [ESC]H are considered as JIS hexadecimal code. Data before [ESC]K or data between [ESC]H and [ESC]K are considered as half-size characters (alphanumeric).

A: Kanji (東京)

       [1Bh] [4Bh] [45h] [6Ch] [35h] [7Eh] [1Bh] [48h]

  [ESC] K   東   京   [ESC]   H

B: Kanji + Half-size character (東 ABC 京 abc)

  [1Bh] [4Bh] [45h] [6Ch] [1Bh] [48h] [41h] [42h] [43h] [1Bh] [4Bh] [35h] [7Eh]

  [ESC] K   東   [ESC]   H   A   B   C [ESC]   K   京

  [1Bh] [48h] [61h] [62h] [63h]

  [ESC] H   a   b   c

- 113 -

- Data between [FS]& and [FS]. are considered as JIS hexadecimal code.   Data before [FS]& or data between [FS]. and [FS]& are considered as half-size characters (alphanumeric).

A: Kanji (東京)
[1Ch] [26h] [45h] [6Ch] [35h] [7Eh] [1Ch] [2Eh]
　[FS] 　&　　 東　　　 京 　　[FS] 　　.

B: Kanji + Half-size character (東 ABC 京 abc)
[1Ch] [26h] [45h] [6Ch] [1Ch] [2Eh] [41h] [42h] [43h] [1Ch] [26h] [35h] [7Eh]
　[FS] 　&　　 東 　　[FS] 　. 　A 　B 　C 　[FS] 　& 　　 京
[1Ch] [2Eh] [61h] [62h] [63h]
　[FS] 　.　 a 　b 　c

- Data between [ESC]$@ and [ESC](J are considered as JIS hexadecimal code.   Data before [ESC]$@ or data between [ESC](J and [ESC]$@ are considered as half-size characters (alphanumeric).

A: Kanji (東京)
[1Bh] [24h] [40h] [45h] [6Ch] [35h] [7Eh] [1Bh] [28h] [4Ah]
　[ESC] 　$ 　@ 　　 東 　　　 京 　　[ESC] 　(　J

B: Kanji + Half-size character (東 ABC 京 abc)
[1Bh] [24h] [40h] [45h] [6Ch] [1Bh] [28h] [4Ah] [41h] [42h] [43h]
　[ESC] 　$ 　@ 　　 東 　　[ESC] 　(　J 　A 　B 　C
[1Bh] [24h] [40h] [35h] [7Eh] [1Bh] [28h] [4Ah] [61h] [62h] [63h]
　[ESC] 　$ 　@ 　　 京 　　[ESC] 　(　J 　a 　b 　c

(4) To mix Kanji and writable characters on the same field
- The character code should be specified in the manner described below.

① Shift JIS or JIS8

Code of 20h to 7Fh or A0h to DFh are considered as half-size characters (alphanumeric).   Others are considered as SHIFT JIS code.   Code of F040H to F07EH and F080H to F0FCH are considered as writable characters.

A: Kanji + Writable character (東京 (writable character code F040h))
[93h] [8Ch]　 [8Bh] [9Eh]　 [F0h] [40h]
　 東 　　　 京 　　(Writable character)

B: Kanji + Half-size character + Writable character
(東 ABC 京 abc (writable character code F05Ah))
[93h] [8Ch]　 [41h] [42h] [43h]　 [8Bh] [9Eh]　 [61h] [62h] [63h]　 [F0h] [5Ah]
　 東 　　A 　B 　C 　　 京 　　a 　b 　c 　　(Writable character)

C: Half-size character + Writable character
(123 アイウ (Writable character code F05Ah))
[31h] [32h] [33h] [B1h] [B2h] [B3h] [F0h] [FCh]
　1 　2 　3 　 ア 　 イ 　 ウ 　(Writable character)

| Refer to | Bit Map Font Format Command ([ESC] PC) |
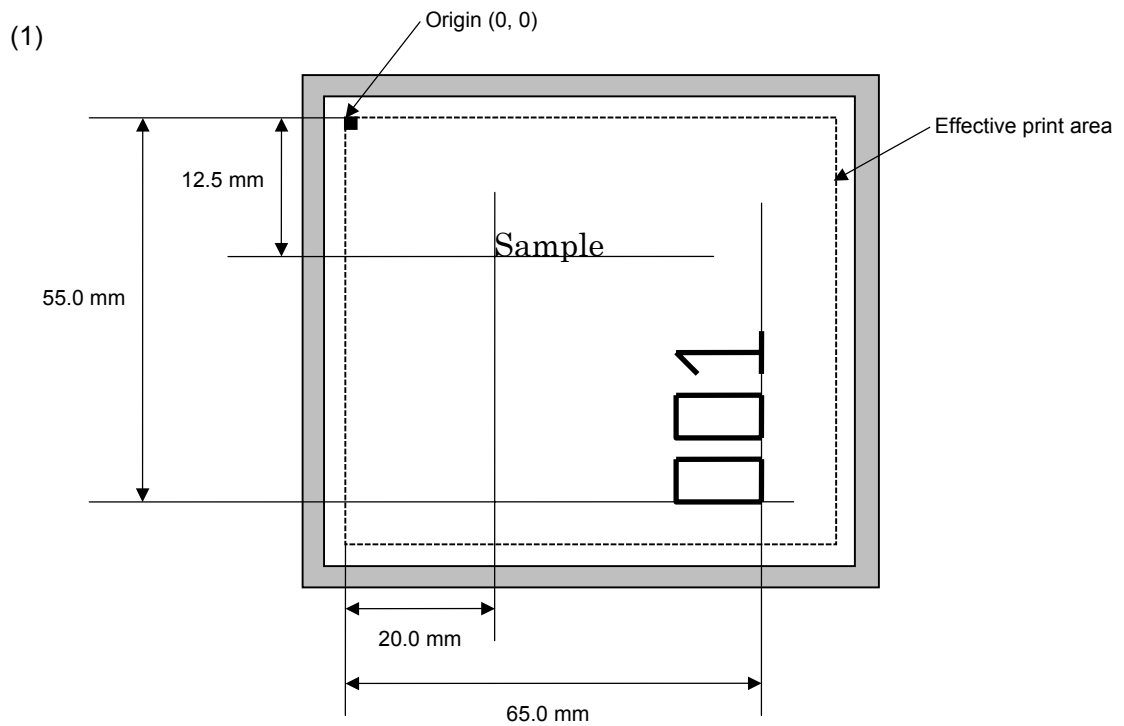
(1)

Origin (0, 0)

Effective print area

12.5 mm

55.0 mm

Sample

20.0 mm

65.0 mm

[ESC] C [LF] [NUL]
[ESC] PC001; 0200, 0125, 1, 1, C, 00, B [LF] [NUL]
[ESC] PC002; 0650, 0550, 2, 2, G, 33, B, +0000000001 [LF] [NUL]
[ESC] RC001; Sample [LF] [NUL]
[ESC] RC002; 001 [LF] [NUL]
[ESC] XS; I, 0002, 0002C4000 [LF] [NUL]

(2)

Origin (0, 0)

Effective print area

30.0 mm

55.0 mm

20.0 mm

65.0 mm

S 0 0 1

[ESC] C [LF] [NUL]
[ESC] PC001; 0200, 0300, 1, 1, C, 00, B; 01, 02 [LF] [NUL]
[ESC] PV01; 0650, 0550, 0200, 0150, B, 33, B; 02 [LF] [NUL]
[ESC] XB01; 0200, 0550, 3, 1, 03, 03, 08, 08, 03, 0, 0150; 01, 02 [LF] [NUL]
[ESC] RC; S [LF] 001 [LF] [NUL]
[ESC] XS; I, 0002, 0002C4000 [LF] [NUL]

(3)

Origin (0, 0)

Effective print area

12.5 mm

30.0 mm

20.0 mm

漢字AB

漢
字
A
B
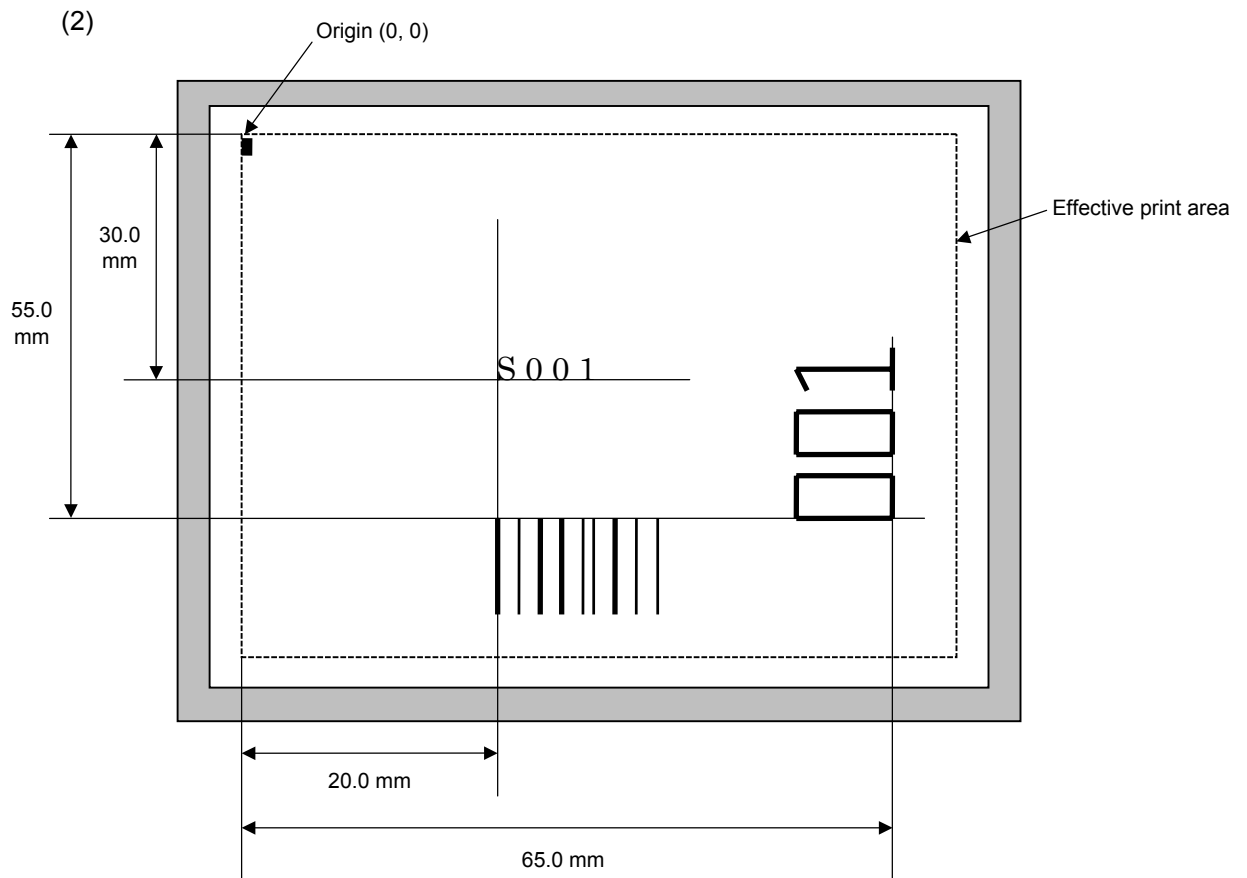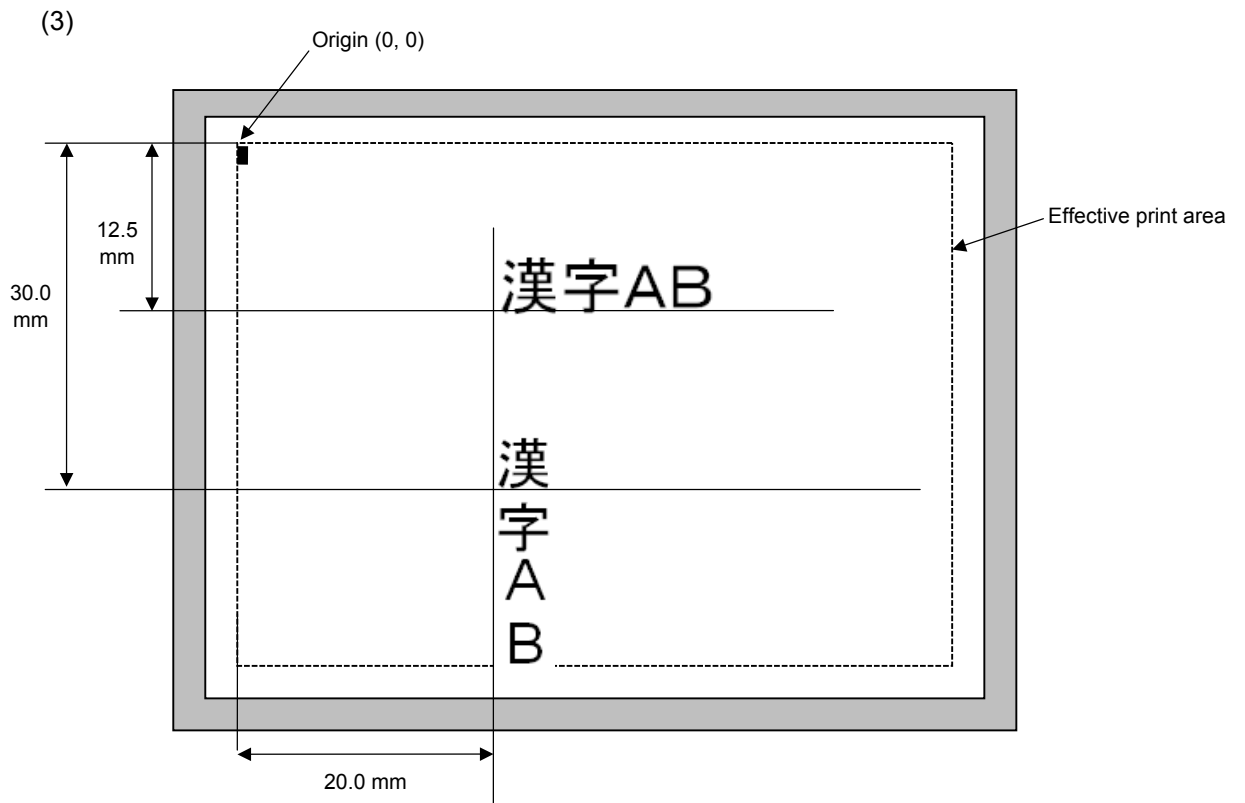
[ESC] C [LF] [NUL]
[ESC] PC000; 0200, 0125, 1, 1, X, 00, B [LF] [NUL]
[ESC] PC001; 0200, 0300, 1, 1, X, 01, B [LF] [NUL]
[ESC] RC000; 漢字AB [LF] [NUL]
[ESC] RC001; 漢字AB [LF] [NUL]
[ESC] XS; I, 0002, 0002C4000 [LF] [NUL]

6.3.12 OUTLINE FONT DATA COMMAND   [ESC] RV

| Function | Provides data for the outline font row. |

| Format | ① [ESC] RVaa; bbb ------ bbb [LF] [NUL]

② Link Field Data Command
[ESC] RV; ccc ------ ccc [LF] ddd ------ ddd [LF] ------ [LF] xxx ------ xxx [LF] [NUL] |

| Term | aa: Character string number
         00 to 99

bbb ------ bbb: Data string to be printed
        Max. 255 digits
        Any excess data will be discarded.
        For the character codes, refer to chapter 12 "CHARACTER CODE TABLE".

ccc ------ ccc: Data string of link field No. 1

ddd ------ ddd: Data string of link field No. 2
         to
xxx ------ xxx: Data string of link field No. 99 |

| Explanation | (1) Link field data string

• After the link field No. is designated in the Format Command, data strings are linked using the Link Field Data Command to draw an image.

• Up to 255 digits of data strings can be linked. Data exceeding the max. number of digits will be discarded.

• Up to 99 data strings can be linked.

• Up to 2048 bytes can be used as the command length ([ESC] to [NUL]) of the Link Field Data Command.

• When the data string is omitted in the Link Field Data Command, the following process is performed:

① No process will be performed for the field which contains no print data due to the omission.

② When the field partially loses print data due to the omission, the only remaining data will be processed as print data.

• The Link Field Data Command can be used for the bit map font fields, outline font fields, and bar code fields.
(The same result is obtained when any of the "RC," "RV" or "RB" command code is designated.) |

| Refer to | Outline Font Format Command ([ESC] PV) |

Examples

(1)

Origin (0, 0)

12.5 mm

55.0 mm

Sample

Effective print area

20.0 mm

65.0 mm

[ESC] C [LF] [NUL]
[ESC] PV01; 0200, 0125, 0100, 0100, B, 00, B [LF] [NUL]
[ESC] PV02; 0650, 0550, 0200, 0150, B, 33, B, +0000000001 [LF] [NUL]
[ESC] RV01; Sample [LF] [NUL]
[ESC] RV02; 001 [LF] [NUL]
[ESC] XS; I, 0002, 0002C4000 [LF] [NUL]

(2)

[ESC] C [LF] [NUL]
[ESC] PC001; 0200, 0300, 1, 1, C, 00, B; 01, 02 [LF] [NUL]
[ESC] PV01; 0650, 0550, 0200, 0150, B, 33, B; 02 [LF] [NUL]
[ESC] XB01; 0200, 0550, 3, 1, 02, 02, 06, 06, 02, 0, 0150; 01, 02 [LF] [NUL]
[ESC] RC; S [LF] 001 [LF] [NUL]
[ESC] XS; I, 0002, 0002C4000 [LF] [NUL]

6.3.13 BAR CODE DATA COMMAND   [ESC] RB

| Function | Provides data for the bar code. |

| Format | ① [ESC] RBaa; bbb ------ bbb [LF] [NUL] |

② Link Field Data Command
[ESC] RB; ccc ------ ccc [LF] ddd ------ ddd [LF] ------ [LF] xxx ------ xxx [LF] [NUL]

| Term | aa: | Bar code number |

                   00 to 31

bbb ------ bbb: Data string to be printed
                      The maximum number of digits varies according to the type of bar code.

ccc ------ ccc: Data string of link field No. 1

ddd ------ ddd: Data string of link field No. 2

             to

xxx ------ xxx: Data string of link field No. 99

The Data Command for the MaxiCode is described later.

| Explanation | (1) Data check |

If the data row contains data which does not meet the type of bar code, a bar code will not be drawn. If wrong code selection takes place in the data row of CODE128 (without auto code selection), the bar code will not be drawn.

In case of Data Matrix, if there is data different from the one designated using the format ID, a symbol is not drawn.

(2) No. of digits of data

When data exceeding the maximum number of digits is sent, the excess data will be discarded. For the maximum number of digits for each bar code, see below.

Data Matrix, PDF417, QR code:	2000 digits
CP code:	473 digits
MicroPDF417:	366 digits
MaxiCode:	93 digits
Customer bar code:	20 digits
Highest priority customer bar code:	19 digits
POSTNET:	5, 9, 11 digits
ROYAL MAIL 4 STATE CUSTOMER CODE:	12 digits
KIX CODE:	18 digits
Bar codes other than the above	126 digits

When the number of digits does not correspond to the bar code type, the bar code is not drawn.

For the MaxiCode, the maximum number of digits varies according to the mode. In mode 2 or mode 3, the maximum number of digits is 84. In mode 4 or mode 6, the maximum number of digits is 93, respectively.

The maximum number of digits for Data Matrix varies according to the settings for ECC type, format ID, and the cell size.   In the case of Kanji, the maximum number of digits becomes half of the values described below since a Kanji character occupies 2 bytes.

Maximum number of digits for Data Matrix

	ECC0	ECC50	ECC80	ECC100	ECC140
Format ID 1	500	457	402	300	144
Format ID 2	452	333	293	218	105
Format ID 3	394	291	256	190	91
Format ID 4	413	305	268	200	96
Format ID 5	310	228	201	150	72
Format ID 6	271	200	176	131	63

	Numeric	Alphanumeric	8 bit
ECC200	2000	2000	1556

Cell Size and Effective Data Capacity

Symbol size		ECC000			ECC050			ECC080			ECC100			ECC140		
Row	Col	Numeric capacity	Alphanum capacity	8-bit byte capacity	Numeric capacity	Alphanum capacity	8-bit byte capacity	Numeric capacity	Alphanum capacity	8-bit byte capacity	Numeric capacity	Alphanum capacity	8-bit byte capacity	Numeric capacity	Alphanum capacity	8-bit byte capacity
9	9	3	2	1	–	–	–	–	–	–	–	–	–	–	–	–
11	11	12	8	5	1	1	–	–	–	–	–	–	–	–	–	–
13	13	24	16	10	10	6	4	4	3	2	1	1	–	–	–	–
15	15	37	25	16	20	13	9	13	9	6	8	5	3	–	–	–
17	17	53	35	23	32	21	14	24	16	10	16	11	7	2	1	1
19	19	72	48	31	46	30	20	36	24	16	25	17	11	6	4	3
21	21	92	61	40	61	41	27	50	33	22	36	24	15	12	8	5
23	23	115	76	50	78	52	34	65	43	28	47	31	20	17	11	7
25	25	140	93	61	97	65	42	82	54	36	60	40	26	24	16	10
27	27	168	112	73	118	78	51	100	67	44	73	49	32	30	20	13
29	29	197	131	86	140	93	61	120	80	52	88	59	38	38	25	16
31	31	229	153	100	164	109	72	141	94	62	104	69	45	46	30	20
33	33	264	176	115	190	126	83	164	109	72	121	81	53	54	36	24
35	35	300	200	131	217	145	95	188	125	82	140	93	61	64	42	28
37	37	339	226	148	246	164	108	214	143	94	159	106	69	73	49	32
39	39	380	253	166	277	185	121	242	161	106	180	120	78	84	56	36
41	41	424	282	185	310	206	135	270	180	118	201	134	88	94	63	41
43	43	469	313	205	344	229	150	301	201	132	224	149	98	106	70	46
45	45	500	345	226	380	253	166	333	222	146	248	165	108	118	78	51
47	47	500	378	248	418	278	183	366	244	160	273	182	119	130	87	57
49	49	500	413	271	457	305	200	402	268	176	300	200	131	144	96	63

Symbol size		ECC200		
Row	Col	Numeric capacity	Alphanum capacity	8-bit byte capacity
10	10	6	3	1
12	12	10	6	3
14	14	16	10	6
16	16	24	16	10
18	18	36	25	16
20	20	44	31	20
22	22	60	43	28
24	24	72	52	34
26	26	88	64	42
32	32	124	91	60
36	36	172	127	84
40	40	228	169	112
44	44	288	214	142
48	48	348	259	172
52	52	408	304	202
64	64	560	418	278
72	72	736	550	366
80	80	912	682	454
88	88	1152	862	574
96	96	1392	1042	694
104	104	1632	1222	814
120	120	2000	1573	1048
132	132	2000	1954	1302
144	144	2000	2000	1556

Rectangular code

Symbol size		ECC200		
Row	Col	Numeric capacity	Alphanum capacity	8-bit byte capacity
8	18	10	6	3
8	32	20	13	8
12	26	32	22	14
12	36	44	31	20
16	36	64	46	30
16	48	98	72	47

When PDF417 or MicroPDF417 is used, the number of symbol characters, called code words, is limited to 928 or less. Moreover, the data compression rate varies according to the data. Therefore, the maximum number of digits according to modes is as follows.

When letters and numerics are mixed in data in EXC mode, for example, the maximum values become smaller than the values below, since the internal mode selection code is used.

To correct a reading error by designating the security level, the maximum value becomes further smaller, since the error correction code words below are used.

When the number of the code words exceeds 928, or when the number of rows exceeds 90, a symbol is not drawn.

For the MicroPDF417, the numbers of rows and columns can be specified.
The maximum number of digits varies according to the setting.

In the case of PDF417

• Extended Alphanumeric Compaction (EXC) mode: 1850 digits
• Binary/ASCII Plus mode: 1108 digits
• Numeric compaction mode: 2000 digits

In the case of MicroPDF417

• Binary mode: 150 digits
• Upper case letter/space mode: 250 digits
• Numeric compaction mode: 366 digits

No. of Error Correction Code Words of PDF417   [For the MicroPDF417, the printer sets the security level automatically.]

Security level	Error Correction Ability	No. of error correction code words
Level 0		0
Level 1	Low	2
Level 2	↑	6
Level 3		14
Level 4		30
Level 5		62
Level 6	↓	126
Level 7	High	254
Level 8		510

The maximum number of columns and rows for the MicroPDF417

Parameter (gg)	No. of columns	No. of rows	Max. number of digits for binary mode	Max. number of digits for upper case letter/space mode	Max. number of digits for numeric mode
00	–	–	150	250	366
01	1	–	22	38	55
02	2	–	43	72	105
03	3	–	97	162	237
04	4	–	150	250	366
05	1	11	3	6	8
06		14	7	12	17
07		17	10	18	26
08		20	13	22	32
09		24	18	30	44
10		28	22	38	55
11	2	8	8	14	20
12		11	14	24	35
13		14	21	36	52
14		17	27	46	67
15		20	33	56	82
16		23	38	64	93
17		26	43	72	105
18	3	6	6	10	14
19		8	10	18	26
20		10	15	26	38
21		12	20	34	49
22		15	27	46	67
23		20	39	66	96
24		26	54	90	132
25		32	68	114	167
26		38	82	138	202
27		44	97	162	237
28	4	4	8	14	20
29		6	13	22	32
30		8	20	34	49
31		10	27	46	67
32		12	34	58	85
33		15	45	76	111
34		20	63	106	155
35		26	85	142	208
36		32	106	178	261
37		38	128	214	313
38		44	150	250	366

(3) CODE128 code selection

In the case of CODE128 (with auto code selection), code selection is performed in the following manner.   (Conforming to USS-128 APPENDIX-G)

① Determining the start character

   (a) If the data begins with four or more consecutive numerals, the start code to be used is (CODE C).

   (b) In any case other than (a) in ①, if a control character appears before a small letter (see ④.) or four or more consecutive numerals, the start code is (CODE A).

   (c) In none of the above cases, the start code is (CODE B).

② If the data begins with an odd number of digits in (a), ①:

   (a) Insert the (CODE A) or (CODE B) character just before the last numeric data.   When (FNC1), if found in the number, breaks a pair of digits in the number, insert the (CODE A) or (CODE B) character before the numeric data preceding the (FNC1).   Selection of (CODE A) or (CODE B) should conform to (b) and (c) in ①.

③ If four or more digits of numeric data continue in (CODE A) or (CODE B).

   (a) When the numeric data is an even number of digits, insert the (CODE C) character just before the first numeric data.

   (b) When the numeric data is an odd number of digits, insert the (CODE C) character immediately after the first numeric data.

④ If a control character appears in (CODE B):

   (a) In the subsequent data, when a small letter appears before the next control character or four or more consecutive digits, insert the (SHIFT) character before the first control character.

   (b) When not so, insert the (CODE B) character just before the first control character.

⑤ If a small letter appears in (CODE A):

   (a) In the subsequent data, when a control character appears before the next small letter or four or more consecutive digits, insert the (SHIFT) character before the first small letter.

   (b) When not so, insert the (CODE B) character just before the first small letter.

⑥ If any data other than the numerals appears in (CODE C):

   (a) Insert the (CODE A) or (CODE B) character just before the data other than the numerals.   Selection of (CODE A) or (CODE B) should conform to (b) and (c) in ①.

(4)   CODE128 code selection check

Check if selection of (CODE A), (CODE B), or (CODE C) of CODE128 has been set correctly.   If an error is found, the bar code will not be drawn.

[Conditions causing an error]

① No start code is designated.

② A small letter (including { , | , } , ~, _) is found in (CODE A).

③ A control character is found in (CODE B).

④ Any data other than the numerals, (FNC1), (CODE A), and (CODE B) is found in (CODE C).

⑤ There are two or more consecutive (SHIFT) characters.

⑥ The number in (CODE C) is an odd number of digits.

⑦ (SHIFT) is followed by (CODE A), (CODE B) or (CODE C).

(5)   Kanji code selection

• In the case of Data Matrix, PDF417, and QR code, Kanji codes can be printed. Shift JIS, JIS hexadecimal, JIS 8, or the mixture of these codes can be used.

• Character code is automatically selected in the following manner.

① Shift JIS or JIS8
Code of 20h to 7Fh or A0h to DFh are considered as half-size characters (alphanumeric).   Other codes are considered as SHIFT JIS code.
A: Kanji (東京)
   [93h] [8Ch]   [8Bh] [9Eh]
      東   京

B: Kanji + Half-size character (東 ABC 京 abc)
   [93h] [8Ch]   [41h] [42h] [43h]   [8Bh] [9Eh]   [61h] [62h] [63h]
      東   A B C   京   a   b   c

C: Half-seize character [123 アイウ]
   [31h] [32h] [33h] [B1h] [B2h] [B3h]
    1   2   3   ア   イ   ウ

② JIS hexadecimal

• Data between [ESC]K and [ESC]H are considered as JIS hexadecimal code. Data before [ESC]K or data between [ESC]H and [ESC]K are considered as half-size characters (alphanumeric).
A: Kanji (東京)
      [1Bh] [4Bh] [45h] [6Ch] [35h] [7Eh] [1Bh] [48h]
   [ESC] K   東   京   [ESC]   H

B: Kanji + Half-size character (東 ABC 京 abc)
   [1Bh] [4Bh] [45h] [6Ch] [1Bh] [48h] [41h] [42h] [43h] [1Bh] [4Bh] [35h] [7Eh]
   [ESC] K   東   [ESC] H A   B   C [ESC]   K   京
   [1Bh] [48h] [61h] [62h] [63h]
   [ESC] H   a   b   c

- 127 -

- Data between [FS]& and [FS]. are considered as JIS hexadecimal code.   Data before [FS]& or data between [FS]. and [FS]& are considered as half-size characters (alphanumeric).

A: Kanji (東京)

[1Ch] [26h] [45h] [6Ch] [35h] [7Eh] [1Ch] [2Eh]
 [FS]   東   京   [FS]   .

B: Kanji + Half-size character (東 ABC京 abc)

[1Ch] [26h] [45h] [6Ch] [1Ch] [2Eh] [41h] [42h] [43h] [1Ch] [26h] [35h] [7Eh]
 [FS] &   東   [FS] . A B C [FS] &   京

[1Ch] [2Eh] [61h] [62h] [63h]
 [FS] . a b c

- Data between [ESC]$@ and [ESC](J are considered as JIS hexadecimal code.   Data before [ESC]$@ or data between [ESC](J and [ESC]$@ are considered as half-size characters (alphanumeric).

A: Kanji (東京)

[1Bh] [24h] [40h] [45h] [6Ch] [35h] [7Eh] [1Bh] [28h] [4Ah]
[ESC] $ @   東   京   [ESC] (J

B: Kanji + Half-size character (東 ABC京 abc)

[1Bh] [24h] [40h] [45h] [6Ch] [1Bh] [28h] [4Ah] [41h] [42h] [43h]
[ESC] $ @   東   [ESC] (J A B C

[1Bh] [24h] [40h] [35h] [7Eh] [1Bh] [28h] [4Ah] [61h] [62h] [63h]
[ESC] $ @   京   [ESC] (J a b c

③ Others

- "[FS]+ data other than &" are discarded.
- "[ESC]+ data other than K or &" are discarded.
- "[ESC]$+ data other than @" are discarded.

(6)   Link field data string

- After the link field No. is designated in the Format Command, data strings are linked using the Link Field Data Command to draw an image.
- Up to 2000 digits of data strings of Data Matrix or PDF417 can be linked.   For other bar code types, up to 126 digits can be linked.   (The value varies according to the type of bar code.)
  When the number of digits exceeds the maximum value, excess data will be discarded.
- Up to 99 data strings can be linked.
- Up to 2048 bytes can be used as the command length ([ESC] to [NUL]) of the Link Field Data Command.

- When the data string is omitted in the Link Field Data Command, the following process is performed:
  - ① No process will be performed for the field which contains no print data due to the omission.
  - ② When the field partially loses print data due to the omission, the only remaining data will be processed as print data.
- The Link Field Data Command can be used for the bit map font fields, outline font fields, and bar code fields.
  (The same result is obtained when any of the "RC," "RV", or "RB" command code is designated.)

(7) When manual mode is selected in the Format Command for a QR code
  ① Numeric mode, alphanumeric and symbol mode, Kanji mode

Mode selection	Data to be printed

② Binary mode

Mode selection	No. of data strings (4 digits)	Data to be printed

③ Mixed mode

Data	"," (comma)	Data	"," (comma)	Data

The QR code can contain all codes including alphanumerics, symbols and Kanji. Since data compression rate varies according to codes, the code to be used is designated when the mode is selected.

Mode	Code	Details
N	Numerals	0 to 9
A	Alphanumerics, symbols	A to Z 0 to 9 space $ % * + - . / :
B	Binary (8-bit)	00H to FFH
K	Kanji	Shift JIS, JIS hexadecimal

If mixed mode is selected, up to 200 modes can be selected in a QR code.

(8) When the automatic mode is selected in the Format Command for a QR code.

Data to be printed

(9) How to transmit the control code data

NUL (00H)   =   > @ (3EH, 40H)
　　SOH (01H)   =   > A (3EH, 41H)
　　STX (02H)   =   > B (3EH, 42H)

　　GS (1DH)   =   >] (3EH, 5DH)
　　RS (1EH)   =   > ^ (3EH, 5EH)
　　US (1FH)   =   > _ (3EH, 5FH)

  * How to transmit the special codes

  > (3EH)   =   > 0 (3EH, 30H)

(10) Transfer code for QR code

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	NUL	DLE	SP	0	@	P	`	p								
1	SOH	DC1	!	1	A	Q	a	q								
2	STX	DC2	"	2	B	R	b	r								
3	ETX	DC3	#	3	C	S	c	s								
4	EOT	DC4	$	4	D	T	d	t								
5	ENQ	NAK	%	5	E	U	e	u								
6	ACK	SYN	&	6	F	V	f	v								
7	BEL	ETB	'	7	G	W	g	w								
8	BS	CAN	(	8	H	X	h	x								
9	HT	EM	)	9	I	Y	i	y								
A	LF	SUB	*	:	J	Z	j	z								
B	VT	ESC	+	;	K	[	k	{								
C	FF	FS	,	<	L	\	l	|								
D	CR	GS	-	=	M	]	m	}								
E	SO	RS	•	>	N	^	n	~								
F	SI	US	/	?	O	_	o	DEL								

* The shaded parts are Japanese.
  They are omitted here.

(11) Examples of data designation

  ① Alphanumeric mode: ABC123

    A A B C 1 2 3
     ↑   └── Data to be printed
     └── Designation of mode

  ② Binary mode: 01H, 03H, 05H

    B 0 0 0 6 > A > C > E
     ↑   │   └── Data to be printed
     │   └── No. of data strings
     └── Designation of mode

③ Mixed mode

Numeric mode   :   123456
Kanji mode   :   Kanji data
Binary mode   :   aアiイuウeエoオ
Alphanumeric mode :   ABC

N <u>1 2 3 4 5 6</u>, K <u>Kanji data</u>, B <u>0 0 1 0</u> <u>a アi イu ウe エo オ</u>, A <u>A B C</u>

    ↑ Data to be   ↑ Data to be   ↑ No. of   Data to be printed   ↑ Data to be
      printed   printed   data strings   printed

                                       ——— Designation of mode ———
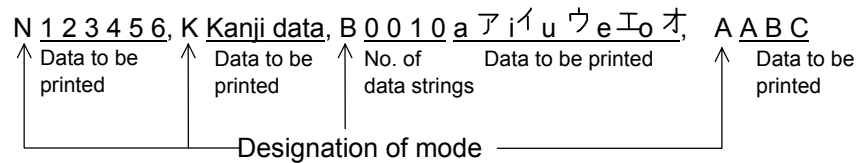
④ Automatic mode

When the data above (③) is designated in automatic mode:

<u>1 2 3 4 5 6 Kanji data aアi イu ウeエoオA B C</u>
Data to be printed

(12) MaxiCode data

For mode 2 or 3:
[ESC] RBaa; bbbbbbbbbcccdddeeeee --- eeeee [LF] [NUL]

For mode 4 or 6:
[ESC] RBaa; ffffffffffggggg --- ggggg [LF] [NUL]

① bbbbbbbbb: Postal code   Fixed as 9 digits
• Mode 2:
   $b_1b_2b_3b_4b_5$:   Zip code   Fixed as 5 digits (Numerics)
   $b_6b_7b_8b_9$:   Zip code extension   Fixed as 4 digits (Numerics)
• Mode 3:
   $b_1b_2b_3b_4b_5b_6$:   Zip code   Fixed as 6 digits (Character of code set A)

   $b_7b_8b_9$:   Vacant   Fixed as 3 digits (20H)
② ccc: Class of service   Fixed as 3 digits (Numerics)
③ ddd: Country code   Fixed as 3 digits (Numerics)
④ eee --- eee: Message data strings   84 digits
⑤ fffffffff: Primary message data strings 9 digits
⑥ ggg --- ggg: Secondary message data strings 84 digits

NOTES: *1. When any data other than numerics is included in the data string of zip code (mode 2), zip code extension, class of service, or country code, a MaxiCode is not drawn.*

2. If the message data is less than 84 digits when mode 2 or 3 is selected, the printer adds one digit of CR (000000) at the end of the data, and the remaining digits will be filled with FSs (011100). When message data exceeding 84 digits is received, the excess data will be discarded before drawing a MaxiCode.

3. If the message data is less than 93 digits (9 digits + 84 digits) when mode 4 or 6 is selected, the printer adds one digit of CR (000000) at the end of the data, and the remaining digits will be filled with FSs (011100). When message data exceeding 93 digits is received, the excess data will be discarded before drawing a MaxiCode.

4. *Mode 6 should not be used for usual operation since it is used for scanner programming.*

5. *When "TYPE2: Special specification" is set for MaxiCode specification setting by the setting tool and when Mode 2 is selected, the country code must be 840.   Otherwise, a MaxiCode will not be drawn.*

6. *When "TYPE2: Special specification" is set for MaxiCode specification setting by the setting tool and when Mode 3 is selected, the country code must be other than 840.   Otherwise, a MaxiCode will not be drawn.*

Examples

(1)
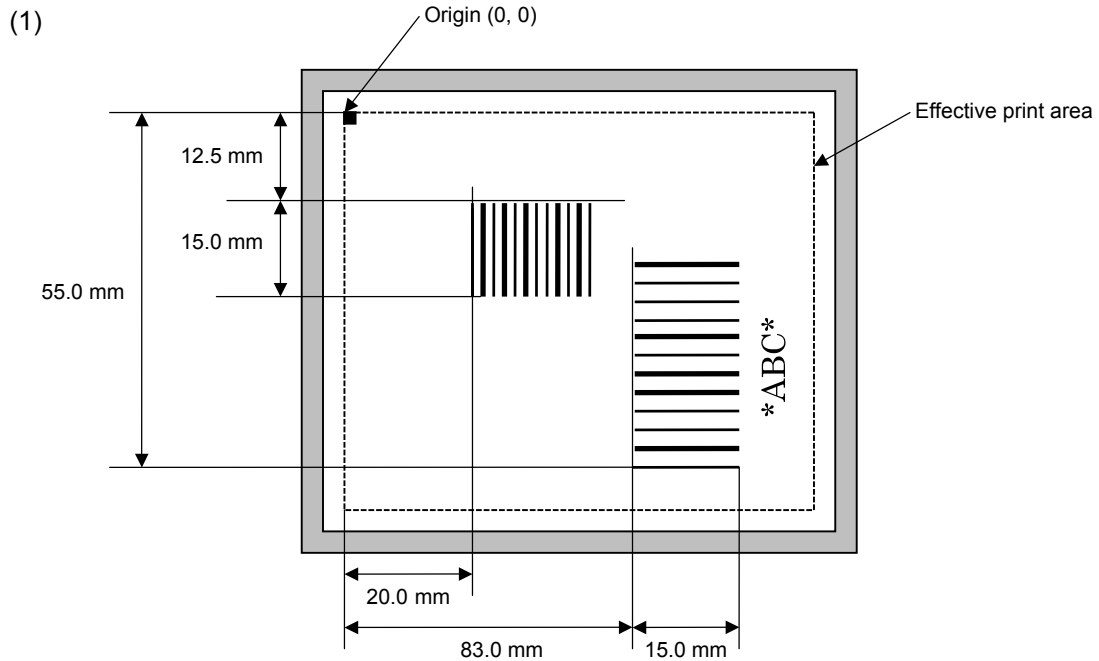
[ESC] C [LF] [NUL]
[ESC] XB01; 0200, 0125, 3, 1, 02, 02, 06, 06, 02, 0, 0150 [LF] [NUL]
[ESC] XB02; 0830, 0550, 3, 1, 02, 04, 07, 08, 04, 3, 0150, +0000000000, 1, 00, N [LF] [NUL]
[ESC] RB01; 12345 [LF] [NUL]
[ESC] RB02; *ABC* [LF] [NUL]
[ESC] XS; I, 0002, 0002C4000 [LF] [NUL]
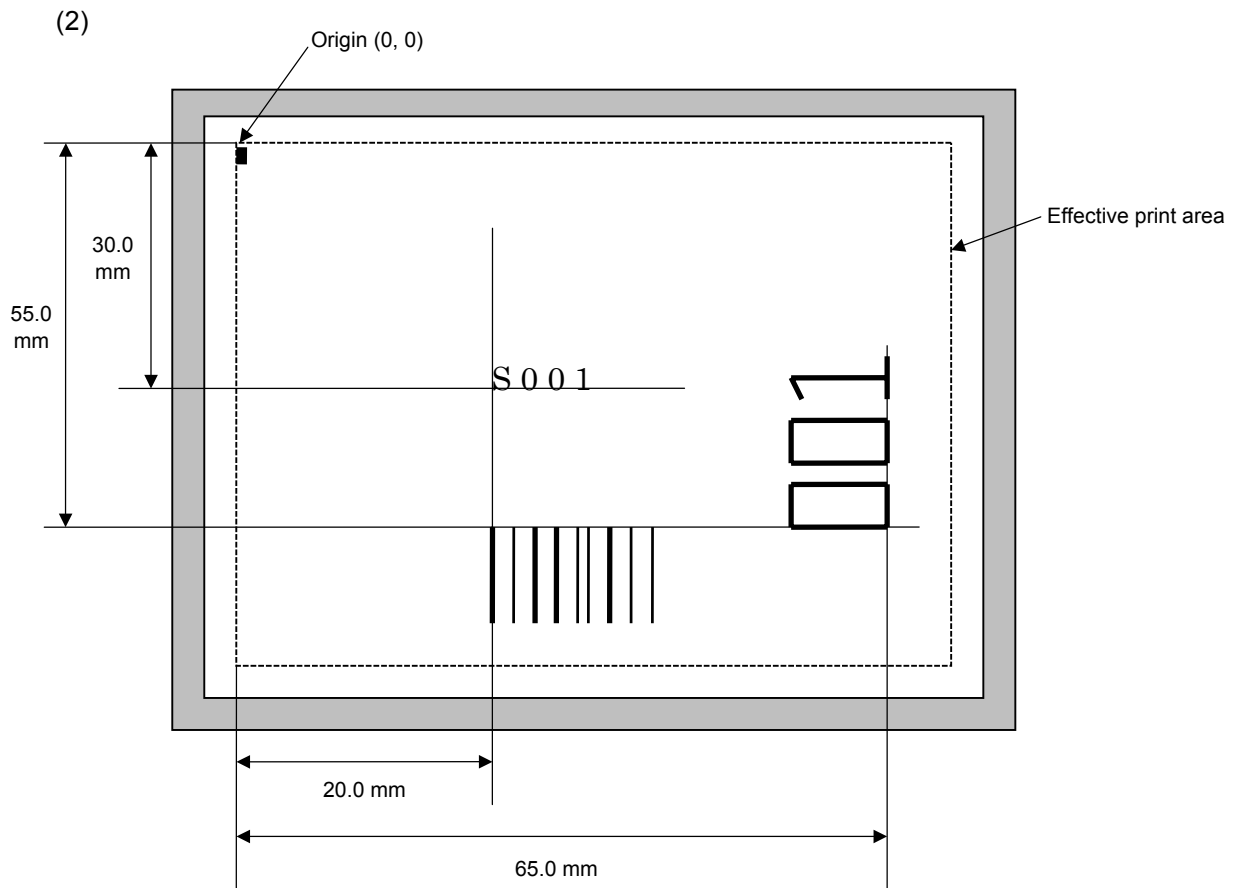
(2)

[ESC] C [LF] [NUL]
[ESC] PC001; 0200, 0300, 1, 1, C, 00, B; 01, 02 [LF] [NUL]
[ESC] PV01; 0650, 0550, 0200, 0150, B, 33, B; 02 [LF] [NUL]
[ESC] XB01; 0200, 0550, 3, 1, 02, 02, 06, 06, 02, 0, 0150; 01, 02 [LF] [NUL]
[ESC] RB; S [LF] 001 [LF] [NUL]
[ESC] XS; I, 0002, 0002C4000 [LF] [NUL]

(3)

Origin (0, 0)

Effective print area

12.5 mm

55.0 mm

20.0 mm

83.0 mm
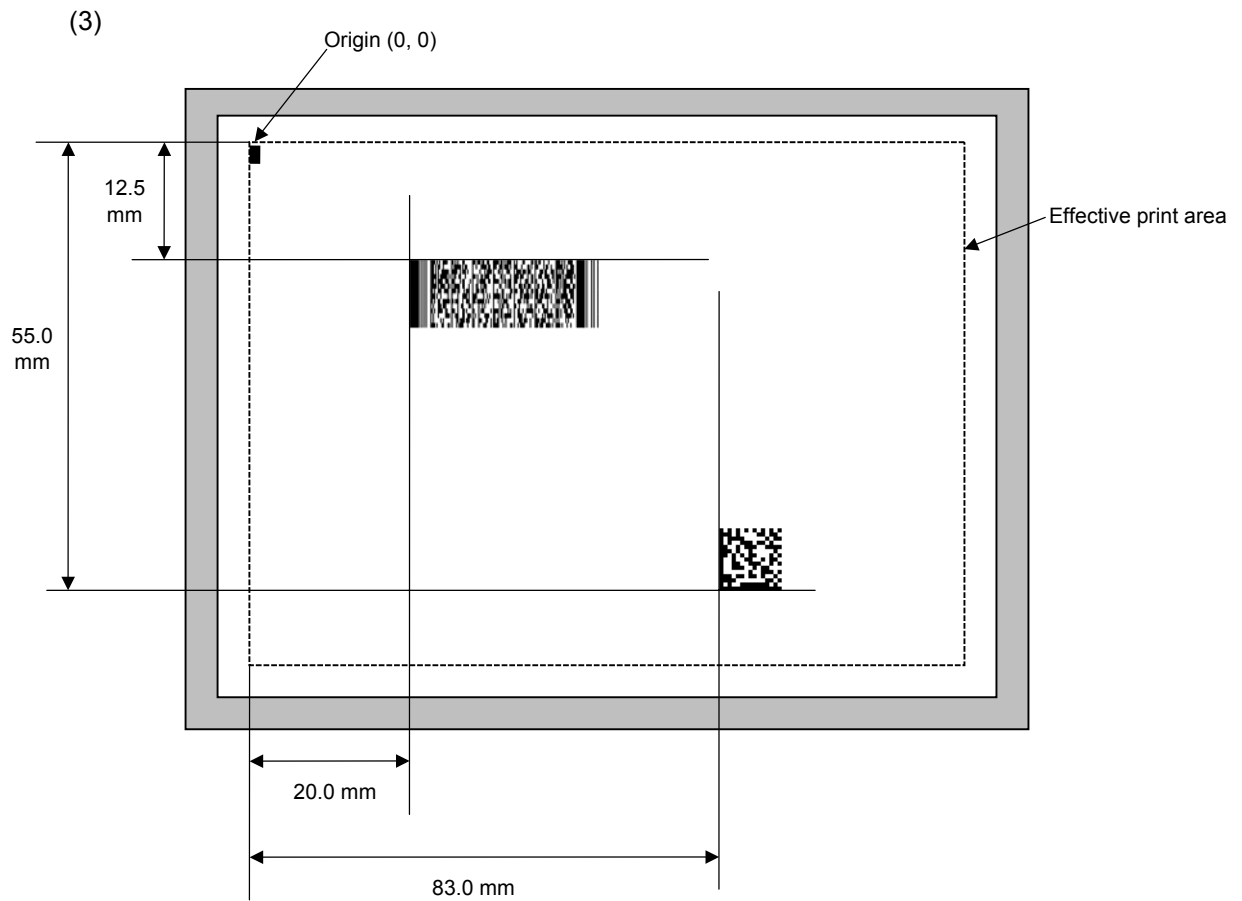
[ESC] C [LF] [NUL]
[ESC] XB01; 0200, 0125, P, 04, 02, 03, 0, 0010 [LF] [NUL]
[ESC] XB02; 0830, 0550, Q, 08, 03, 05, 3 [LF] [NUL]
[ESC] RB01; PDF417 [LF] [NUL]
[ESC] RB02; Data Matrix [LF] [NUL]
[ESC] XS; I, 0002, 0002C4000 [LF] [NUL]

6.3.14 ISSUE COMMAND   [ESC] XS

| Function | Issues labels according to the print conditions programmed. |

| Format | [ESC] XS; I, aaaa, bbbcdefgh [LF] [NUL] |

| Term |

aaaa: Number of labels to be issued
        0001 to 9999

bbb: Cut interval.   Designates the number of pieces to be printed before a cut
        operation is performed.
        000 to 100 (000 when no cut)

c: Type of sensor
        0: No sensor
        1: Reflective sensor
        2: Transmissive sensor
        3: Transmissive sensor (when using manual threshold value)
        4: Reflective sensor (when using manual threshold value)

d: Issue mode
        C: Batch mode
        D: Strip mode   (with reverse feed, the strip sensor is activated.)
        E: Strip mode   (with reverse feed, the strip sensor is ignored,
                         supporting an applicator.)

e: Print speed
        2: 2 ips
        4: 4 ips

f: Use of ribbon
        0: No ribbon
        1: Ribbon is used.
        2: Ribbon is used.

g: Print orientation and mirror printing
        0: Bottom first printing
        1: Top first printing
        2: Bottom first mirror printing
        3: Top first mirror printing

h: Type of status response
        0: No status response
        1: Status response is returned.

(1) Number of labels to be issued

    ① If increment/decrement is not specified, the same data will be printed on the designated number of labels.

    ② If increment/decrement is specified, the designated number of labels will be printed while incrementing/decrementing the designated drawing area one by one.

      * The increment/decrement designation is valid until the Image Buffer Clear Command ([ESC] C) is transmitted.

(2) Cut interval

The cut interval is valid only when the cutter has been installed and the issue mode is set to "C". If an error occurs during an issue after the cut interval is designated, and then printing is restarted, the printer ejects the printed paper, then resumes printing from the paper on which the error occurred.

When the automatic forward feed standby function is enabled by the printer setting tool, the printer automatically performs an approximately 16.7-mm forward feed if no subsequent command is sent from the PC in 1 second after issuing the last label. However, if the label pitch length is 20 mm or less, the edge of the label is caught on the head, when the label is fed backward to the home position. Therefore, even if the automatic forward feed standby is specified, a forward feed is not performed.

When receiving the Issue Command during the automatic forward feed standby, the printer starts issuing the label after feeding it backward to the print start position.

If any command is sent and processed after the Issue Command is sent, the automatic forward feed is not performed. Therefore, a command should not be sent after the Issue Command is sent. Before the automatic forward feed is performed, the printer should not be turned off then on, or placed in a pause state and reset. Doing so and pressing the [FEED] key prevents the automatic forward feed from being performed.

If the paper is fed by pressing the [FEED] key of the printer during the forward feed standby, the printer feeds one label, cuts, performs the automatic forward feed, and then stops.

(3) Type of sensor

    ① No sensor: Printing takes place according to the parameter designated by the Label Size Set Command.

    ② Reflective sensor:

      Printing takes place according to the parameter designated by the Label Size Set Command. However, the black mark provided on the back side of the tag paper is automatically detected by the reflective sensor and the paper position is finely adjusted for every piece.

    ③ Transmissive sensor:

      Printing takes place according to the parameter designated by the Label Size Set Command. However, the label-to-label gap is automatically detected by the transmissive sensor and the paper position is finely adjusted for every piece.

④ Transmissive sensor (when using manual threshold value):

Printing takes place according to the parameter designated by the Label Size Set Command.   However, the label-to-label gap is automatically detected by the transmissive sensor and the paper position is finely adjusted for every piece according to the value set by the threshold setting operation (key operation).

⑤ Reflective sensor (when using manual threshold value)

Printing takes place according to the parameters designated by the Label Size Set Command.   However, the black mark provided on the back of the tag paper is automatically detected by the reflective sensor and the paper position is finely adjusted for every piece, according to the value set by the threshold setting operation (key operation).

(4) Issue mode

[C: Batch mode (Cut interval: 0, Issue count: 3)]

• "Automatic forward feed standby" has been set to OFF.

Print head position

```
                    ▼
                  ┌───────┐
                  │       │   (1)  Idling (at the print start position)
                  └───────┘
            ┌───────┬───────┐
            │   A   │       │   (2)  Prints the 1st label (A).
            └───────┴───────┘
        ┌───────┬───────┬───────┐
        │   A   │   B   │       │   (3)  Prints the 2nd label (B).
        └───────┴───────┴───────┘
    ┌───────┬───────┬───────┬───────┐
    │   A   │   B   │   C   │       │   (4)  Prints the 3rd label (C).
    └───────┴───────┴───────┴───────┘
```

[C: Batch mode (Cut interval: 0, Issue count: 3)]

• "Automatic forward feed standby" has been set to ON.

Print head position

```
                    ▼
                  ┌───────┐
                  │       │   (1)  Idling (during the forward feed standby)
                  └───────┘
                  ┌───────┐
                  │       │   (2)  Reverse feed to the print start position.
                  └───────┘
            ┌───────┬───────┐
            │   A   │       │   (3)  Prints the 1st label (A).
            └───────┴───────┘
        ┌───────┬───────┬───────┐
        │   A   │   B   │       │   (4)  Prints the 2nd label (B).
        └───────┴───────┴───────┘
    ┌───────┬───────┬───────┬───────┐
    │   A   │   B   │   C   │       │   (5)  Prints the 3rd label (C).
    └───────┴───────┴───────┴───────┘
┌───────┬───────┬───────┬───────┐
│   A   │   B   │   C   │       │   (6)  Performs 16.7-mm automatic forward feed
└───────┴───────┴───────┴───────┘          in 1 second.
```

[C: Batch mode (Cut interval: 1, Issue count: 2)]
• "Automatic forward feed standby" has been set to OFF.

Cut position   Print head position

(1)   Idling

(2)   Completes printing the 1st label (A).

(3)   Feeds the 1st label (A) to the cut position.

(4)   Cuts the 1st label (A).

(5)   Reverse feed to the print start position.

(6)   Completes printing the 2nd label (B).

(7)   Feeds the 2nd label (B) to the cut position.

(8)   Cuts the 2nd label (B).

(9)   Reverse feed to the print start position.

[C: Batch mode (Cut interval: 1, Issue count: 2)]

• "Automatic forward feed standby" has been set to ON.

Cut position   Print head position

(1) Idling (during the forward feed standby)

(2) Reverse feed to the print start position.

(3) Completes printing the 1st label (A).

(4) Feeds the 1st label (A) to the cut position.

(5) Cuts the 1st label (A).

(6) Reverse feed to the print start position.

(7) Completes printing the 2nd label (B).

(8) Feeds the 2nd label (B) to the cut position.

(9) Cuts the 2nd label (B).

(10) Reverse feed to the print start position.

(11) Performs 16.7-mm automatic forward feed in 2 second.

[D: Strip mode (Issue count: 3)]

Strip position   Print head position

(1) Idling

(2) Reverse feed to the print start position.

(3) Completes printing the 1st label (A).

(4) Remove the 1st label (A).

(5) Reverse feed to the print start position.

(6) Completes printing the 2nd label (B).

(7) Remove the 2nd label (B).

(8) Reverse feed to the print start position.

(9) Completes printing the 3rd label (C)

* The next label is not printed until the 3rd label
  (C) is removed.

[E: Strip mode (Issue mode: E)]

The expansion I/O device is installed:

The strip sensor is ignored.　An issue is performed by checking a PAUSE signal of the expansion I/O interface.

Strip position　　Print head position

(1) Idling
The PAUSE signal of the expansion I/O is turned ON.

(2) The PAUSE signal of the expansion I/O is turned OFF.
Reverse feed to the print start position.

(3) Completes printing the 1st label (A).
The PAUSE signal of the expansion I/O is turned ON.

(4) Remove the 1st label (A).
The PAUSE signal of the expansion I/O is turned OFF.

(5) Reverse feed to the print start position.

(6) Completes printing the 2nd label (B).
The PAUSE signal of the expansion I/O is turned ON.

(7) Remove the 2nd label (B).
The PAUSE signal of the expansion I/O is turned OFF.

(8) Reverse feed to the print start position.

(9) Completes printing the 3rd label (C).
The PAUSE signal of the expansion I/O is turned ON.

* While the PAUSE signal of the expansion I/O is on, a label is not printed.

The expansion I/O device is not installed:

The strip sensor is ignored.

Strip position   Print head position

(1) Idling

(2) Reverse feed to the print start position.

A   (3) Completes printing the 1st label (A).

(4) Reverse feed to the print start position.

B   (5) Completes printing the 2nd label (B).

(6) Reverse feed to the print start position.

C   (7) Completes printing the 3rd label (C).

* The next label is printed regardless of whether the label (C) is removed or not.

*1   This issue mode differs from the issue mode D in the operation that the next label is issued regardless of whether the label is removed or not.

*2   A peripheral device, such as an applicator, must control the PAUSE signal of the expansion I/O.

*3   When the issue count is set to 2 or more when the expansion I/O has been installed, the printer continues to issue the specified number of labels as long as the PAUSE signal of the expansion I/O is off.

*4   When the issue count is set to 2 or more when the expansion I/O has not been installed, the specified number of labels are issued.

(5) Print speed

- Printing takes place at the designated speed.
  However, the reverse feed speed in cut mode and strip mode is 3 ips. This can be changed to 2 ips by the printer setting tool.
- The available issue speed varies according to types and sizes of the paper supply. For details, refer to the Supply Specification.

Model Parameter	
1	
2	2 ips
3	
4	
5	
6	
7	4 ips
8	
9	
A	

(6) Use of ribbon

No ribbon: Thermal paper is used. (Thermal direct issue mode)
Ribbon is used.: The ribbon is used. (Thermal transfer issue mode)

(7) Print orientation and mirror printing

The origin of coordinates and printing direction vary according to the designation of print orientation.

① Bottom first printing
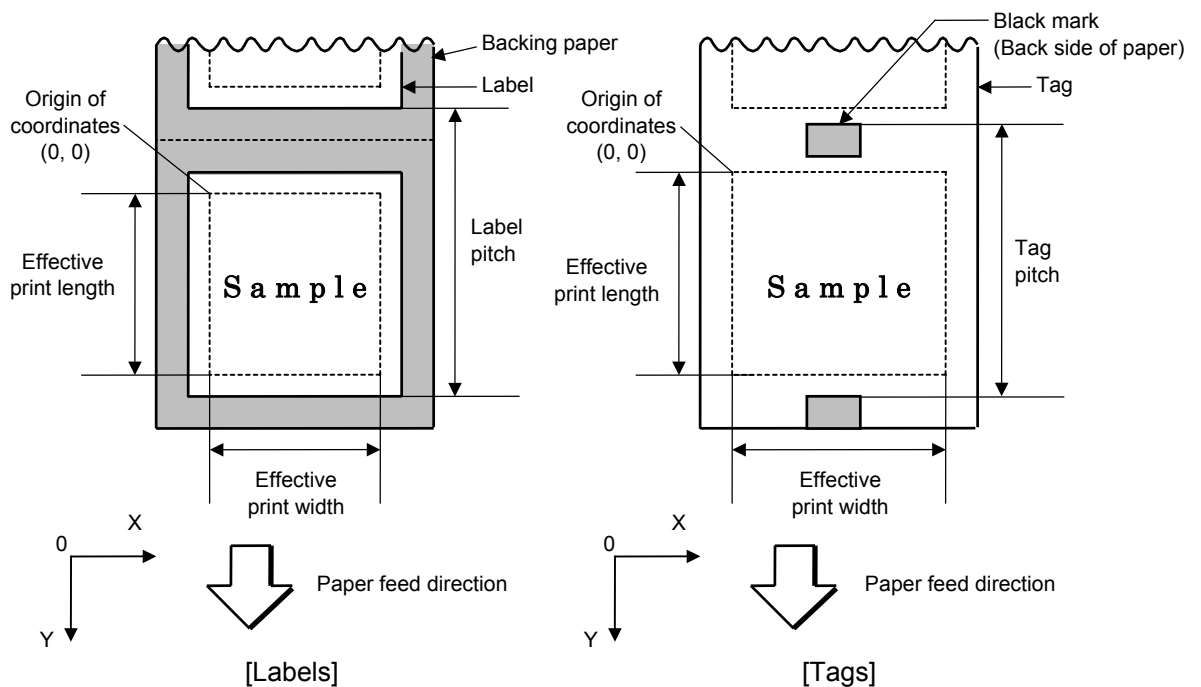
[Labels]   [Tags]

- 143 -

② Top first printing

[Labels]

[Tags]

③ Bottom first mirror printing

[Labels]

[Tags]

④ Top first mirror printing

Backing paper
Label
Label pitch
Effective print length
Origin of coordinates (0, 0)
Effective print width
Y
0
X
Paper feed direction
[Labels]

Black mark (Back side of paper)
Tag
Tag pitch
Effective print length
Origin of coordinates (0, 0)
Effective print width
Y
0
X
Paper feed direction
[Tags]
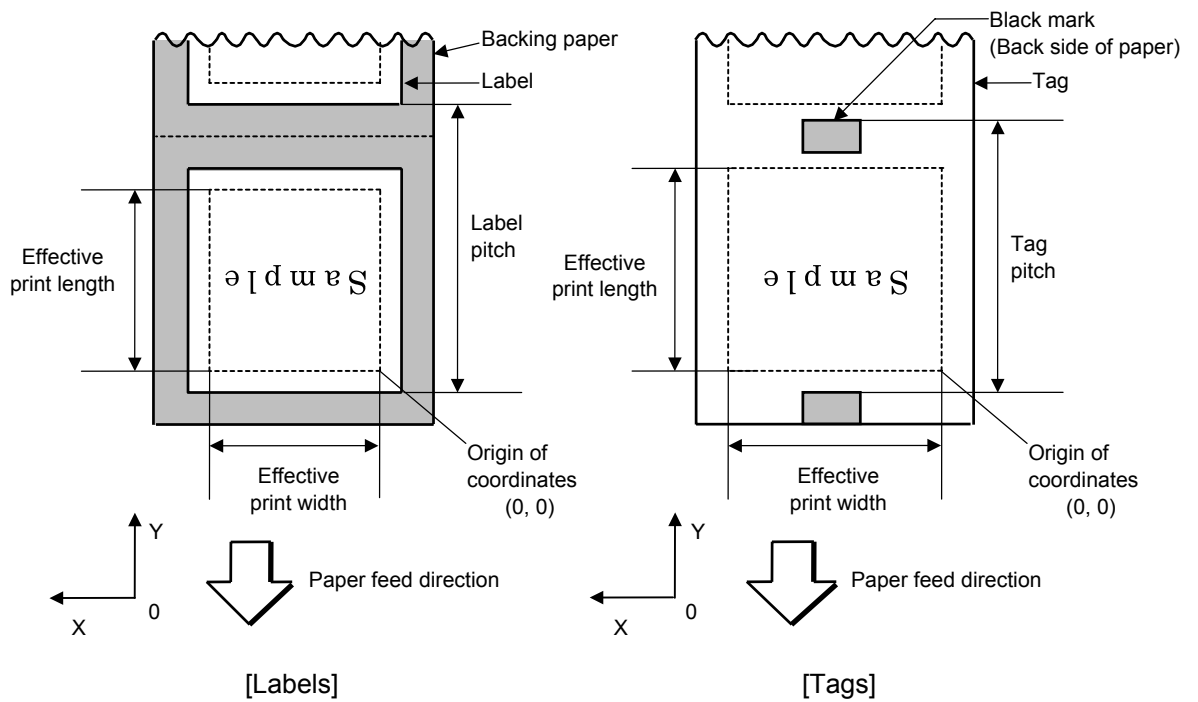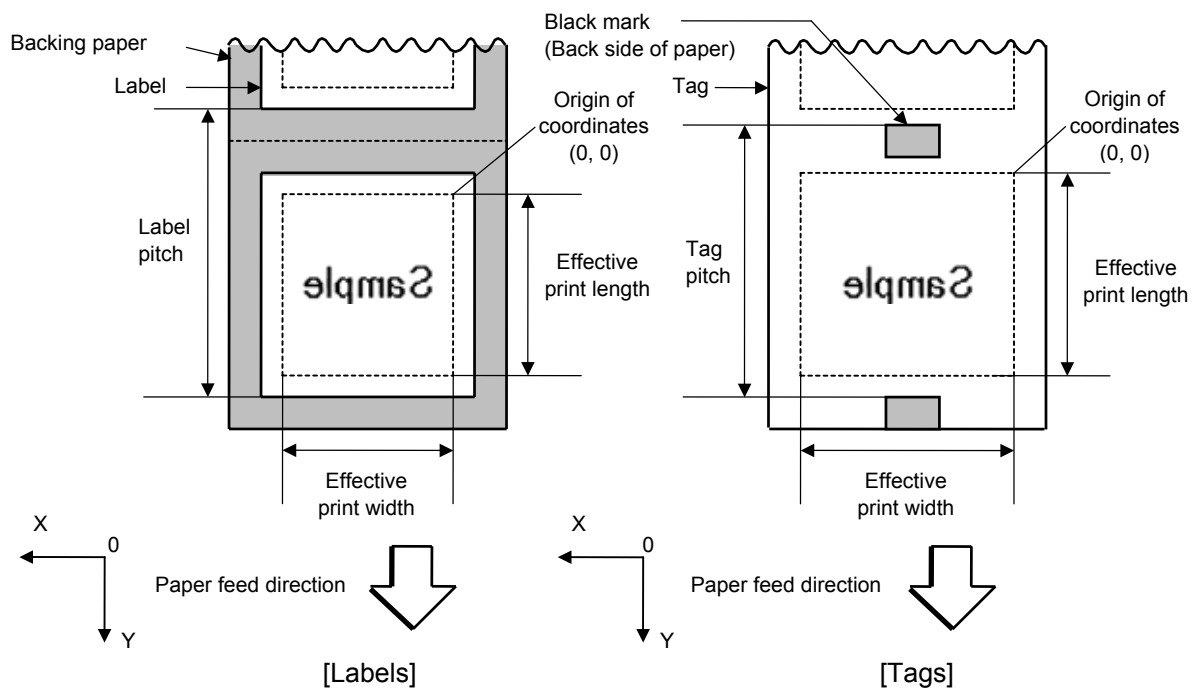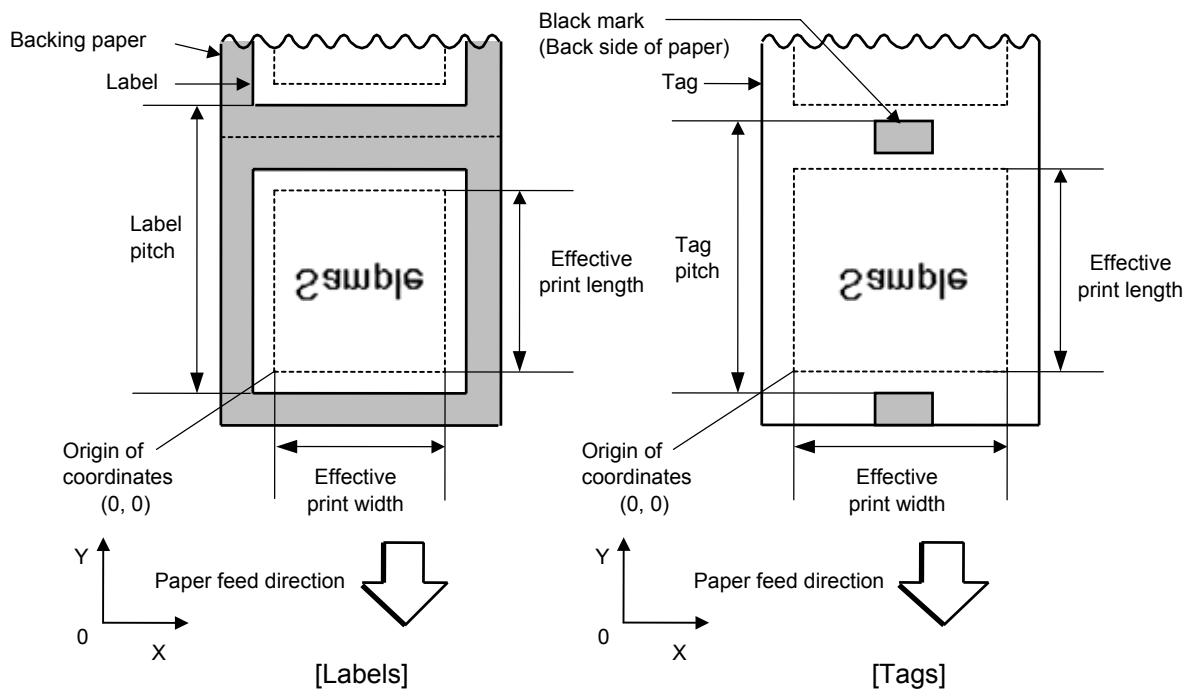
(8)   Status response

When the option "Status response is returned." has been selected, a status response is returned at the end of printing or if an error occurs.
In the batch mode or the cut mode, the print end status response is returned after the designated number of labels have been printed.
In the strip mode, a status response is returned after one label has been printed.

*   Do not change the setting of the status response parameter during printing. Otherwise the status response may not be returned properly.
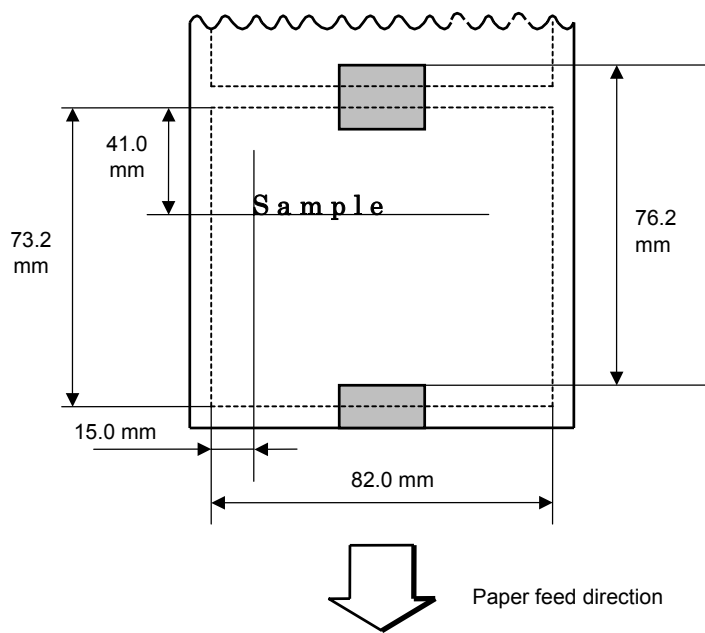
- Issue count: 4 pieces
- Cut interval: 1 piece
- Paper: Tag paper (Reflective sensor is used.)
- Issue mode: Cut issue
- Print speed: 4"/sec.
- Ribbon: Use
- Status response: On

Paper feed direction

[ESC] D0762, 0820, 0732 [LF] [NUL]
[ESC] T11C40 [LF] [NUL]
[ESC] C [LF] [NUL]
[ESC] PC001; 0150, 0410, 1, 1, A, 00, B [LF] [NUL]
[ESC] RC001; Sample [LF] [NUL]
[ESC] XS; I, 0004, 0011C4101 [LF] [NUL]

⊙ Process to stop the label at the home position after a head-open state is detected:

When a gap between labels (or a black mark) is detected during a head open state, the value is set again to stop each label positioned between the sensor and the print head at the home position.

Stop position   Sensor

A   B   C

|← 77 mm →|

|← 92 mm →|
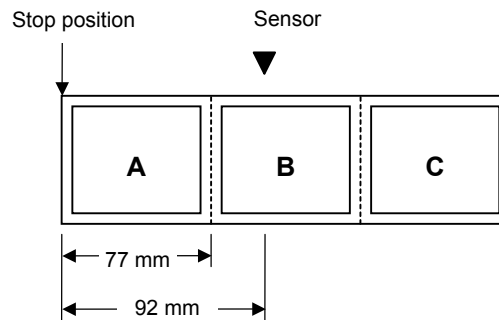
- The labels are moved on the above condition.

Stop position   Sensor

A   B   C
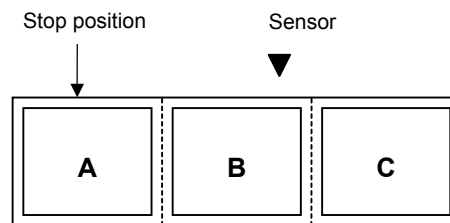
- Stop position after feeding one label

+15 mm after detection   Stop position   Sensor
of gap between B and C

A   B   C   D
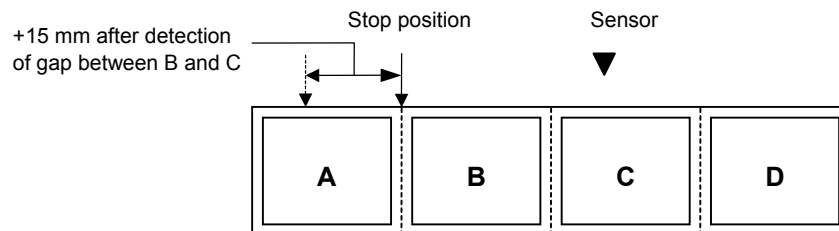
* However, an error will result when feed jam conditions are satisfied.

Paper feed direction

6.3.15 FEED COMMAND   **[ESC] T**

Function	Feeds the paper.

Format	[ESC] Tabcde [LF] [NUL]

Term	a:	Type of sensor

a: Type of sensor
      0: No sensor
      1: Reflective sensor
      2: Transmissive sensor
      3: Transmissive sensor (when using manual threshold value)
      4: Reflective sensor (when using manual threshold value)

b: Cut or non-cut
      0: Non-cut
      1: Cut

c: Feed mode
      C: Batch mode   (Cut and feed when "1 (Cut)" is selected for parameter b.)
      D: Strip mode   (with reverse feed)
      E: Strip mode   (with reverse feed, the strip sensor is ignored, supporting an applicator.)

d: Feed speed
      2: 2 ips
      4: 4 ips

e: Use of ribbon
      0: No ribbon
      1: Ribbon is used.
      2: Ribbon is used.

Explanation	(1) Type of sensor

    ① No sensor:
    Paper is fed according to the parameter designated by the Label Size Set Command.

    ② Reflective sensor:
    Paper is fed according to the parameter designated by the Label Size Set Command. However, the black mark provided on the back side of the tag paper is automatically detected by the reflective sensor and the stop position is finely adjusted.

    ③ Transmissive sensor:
    Paper is fed according to the parameter designated by the Label Size Set Command. However, the label-to-label gap is automatically detected by the transmissive sensor and the stop position is finely adjusted.

④ Transmissive sensor (when using manual threshold value):

Paper is fed according to the parameter designated by the Label Size Set Command. However, the label-to-label gap is automatically detected by the transmissive sensor and the stop position is finely adjusted according to the value set by the threshold set operation (key operation).

⑤ Reflective sensor (when using manual threshold value)

Paper is fed according to the parameters designated by the Label Size Set Command. However, the black mark provided on the back of the tag paper is automatically detected by the reflective sensor and the paper position is finely adjusted for every piece, according to the value set by the threshold set operation (key operation).

(2) Cut/non-cut

This option is valid in the batch mode only.   (Non-cut is automatically selected for the strip mode.)   When the automatic forward feed standby function has been set to ON, the printer automatically performs an approximately 16.7-mm forward feed if no subsequent command is sent from the PC in 1 second.

When the Feed Command is received in the forward feed standby state, the printer performs a reverse feed to the original position.

* Refer to the section regarding the Issue Command for precautions.

(3) Feed mode

[C: Batch (Non-cut)]

Print head position

(1) Load the paper.

(2) Completes a paper feed.
(Feed to the print start position is completed and stops.)

[C: Batch (Cut)]

• "Automatic forward feed standby" has been set to OFF.

Cut position   Print head position

(1) Load the paper.

(2) Completes a paper feed.
(Feed to the print start position is completed.)

(3) Feeds the paper to the cut position.

(4) Cuts unnecessary paper.

(5) Reverse feed to the print start position.

[C: Batch (Cut)]
 • "Automatic forward feed standby" has been set to ON.

Cut position   Print head position

(1) Load the paper.

(2) Completes a paper feed.
     (Feed to the print start position is completed.)

(3) Feeds the paper to the cut position.

(4) Cuts unnecessary paper.

(5) Reverse feed to the print start position.

(6) Performs 16.7-mm automatic forward feed in 1
     second.

[D: Strip]

Strip position   Print head position

(1) Load the paper.

(2) Reverse feed to the print start position.

(3) Starts a paper feed.

(4) Completes the paper feed.
     (The next label is fed regardless of whether the
     previous label is removed or not.)

[E: Strip (Feed mode: E)]

Expansion I/O device has been installed:
The strip sensor is ignored.   A feed is performed by checking the PAUSE signal of the expansion I/O interface.

Strip position   Print head position

(1)   Load the paper.
      The PAUSE signal of the expansion I/O is turned ON.

(2)   Remove the label.
      The PAUSE signal of the expansion I/O is turned OFF.

(3)   Reverse feed to the print start position.

(4)   Completes a paper feed.
      (Feed to the print start position is completed and stops.)
      The PAUSE signal of the expansion I/O is turned ON.

Expansion I/O device is not installed:
The strip sensor is ignored.   A feed is performed.

Strip position   Print head position

(1)   Load the paper.

(2)   Reverse feed to the print start position

(3)   Feed to the print start position is completed and stopped.

*1   The feed mode E differs from the feed mode D in the operation that the next label is fed regardless of whether the label is removed or not.

*2: A peripheral device, such as an applicator, must control the PAUSE signal of the expansion I/O interface.

- 151 -

(4) Feed speed

- A paper feed is performed at the designated speed.
  However, the reverse feed speed in the cut mode or the strip mode is 2 ips.

- The available issue speed varies according to types and sizes of the paper supply.   For details, refer to the Supply Specification.

Parameter ＼ Model	
1	
2	2 ips
3	
4	
5	
6	
7	4 ips
8	
9	
A	

(5) Use of ribbon

No ribbon: The ribbon motors are not operated during paper feed.

Ribbon is used.: The ribbon motors are operated during paper feed.

| Notes |

(1)   If the label size, type of sensor, feed amount fine adjustment, cut position fine adjustment (or strip position fine adjustment), or reverse feed amount fine adjustment is changed, the Feed Command must be sent to adjust the print start position prior to printing by feeding one label.

(2)   The parameter of the Feed Command is stored in memory (retained even if the power is turned off).

(3)   When "status response is returned." has been selected in the Issue Command parameter setting, a status response is returned after the end of feed or when an error occurs.

(4)   For explanation of the process to stop the label at the print start position, refer to the section regarding the Issue Command.

(5)   When "Automatic forward feed standby" has been set to ON, the printer automatically performs 16.7-mm forward feed if no subsequent command is sent from the PC in 1 second after the last label has been fed.   When the Feed Command is received during the forward feed standby, the printer feeds the label backward to the print start position.
   * Refer to the section regarding the Issue Command for precautions.

Examples

41.0
mm

73.2
mm

76.2 mm

S a m p l e

15.0 mm

82.0 mm

Paper feed direction
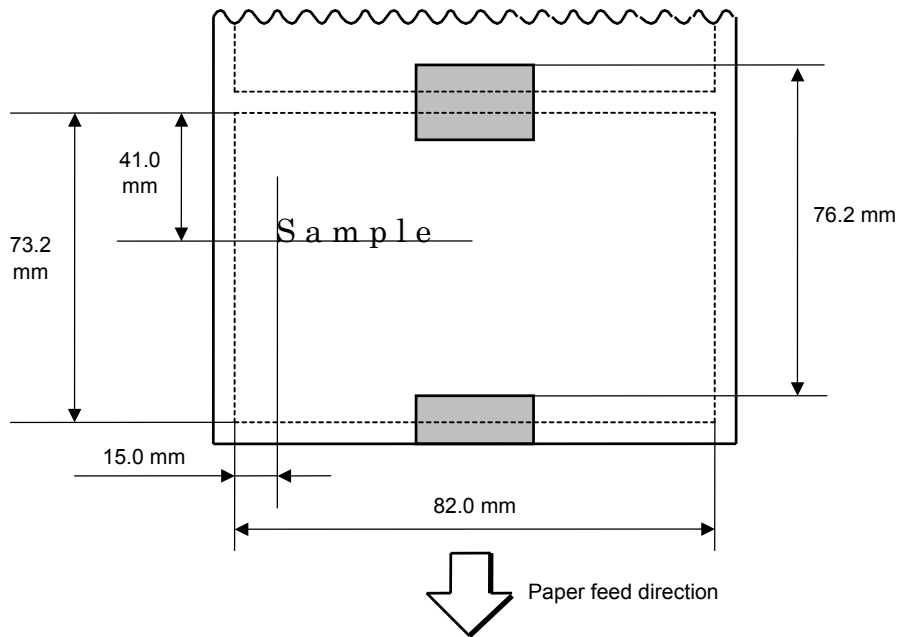
[ESC] D0762, 0820, 0732 [LF] [NUL]
[ESC] AX; +010, +000, +10 [LF] [NUL]
[ESC] T11C40 [LF] [NUL]
[ESC] C [LF] [NUL]
[ESC] PC001; 0150, 0410, 1, 1, A, 00, B [LF] [NUL]
[ESC] RC001; Sample [LF] [NUL]
[ESC] XS; I, 0004, 0011C43001 [LF] [NUL]

6.3.16 EJECT COMMAND   [ESC] IB

| Function | Ejects (cuts off) the label remaining between the print head and the cutter, and returns to the original position. |

| Format | [ESC] IB [LF] [NUL] |

| Notes | When "Automatic forward feed standby" has been set to ON, the printer automatically performs 16.7-mm forward feed if no subsequent command is sent from the PC in 1 second after an ejection of paper. |

When the Eject Command is received in the forward feed standby state, the printer feeds the label backward to the print start position first, and then ejects it.

*   Refer to the section regarding the Issue Command for precautions.

| Examples |

Cut position   Print head position

(1) Idling

(2) Completes printing the 1st label (A).

(3) Completes printing the 2nd label (B).

(4) Completes printing the 3rd label (C).

(5) Feeds the labels to the cut position by the Eject Command.

(6) Completes cutting labels.

(7) Reverse feed to the print start position.
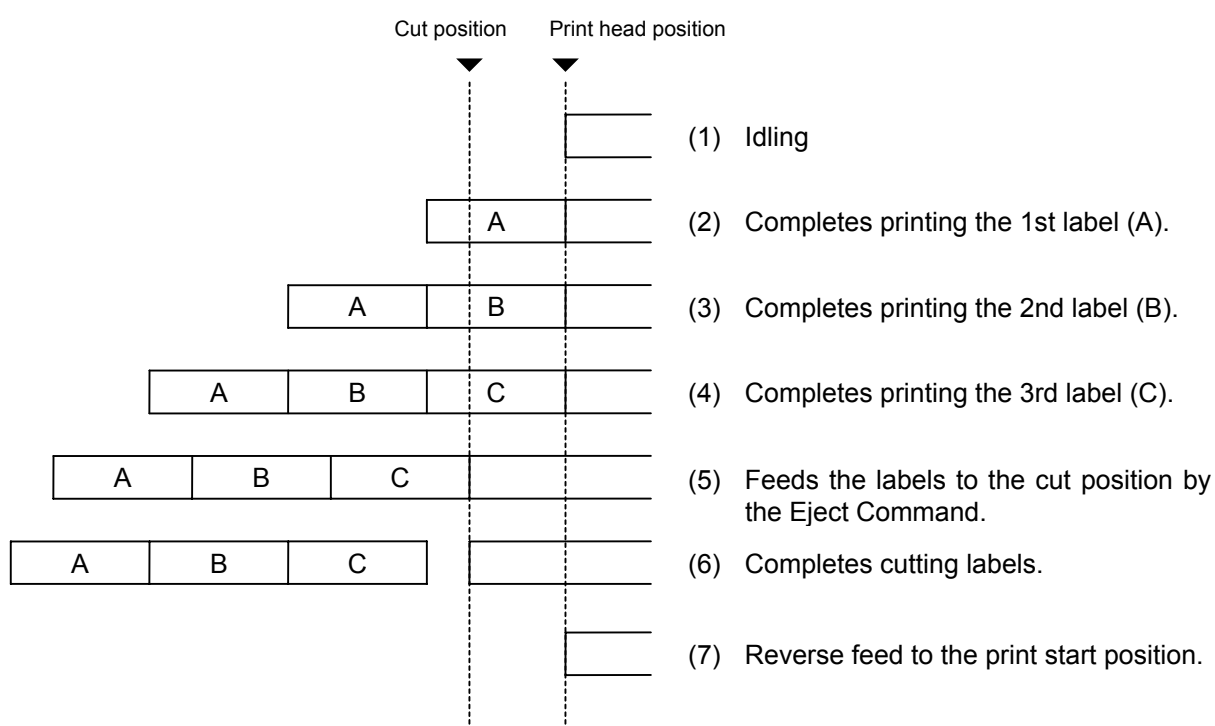
6.3.17 FORWARD/REVERSE FEED COMMAND   [ESC] U1, [ESC] U2

| Function | After printing or feeding the paper, feeds the paper to the position where the paper can be cut manually.
When the next label is to be printed, feeds the paper backward to the print start position. |

Format Forward Feed

      [ESC] U1; aaaa [LF] [NUL]

Reverse Feed

      [ESC] U2; aaaa [LF] [NUL]

Term aaaa: Forward/reverse feed amount

        0030 to 2000 (in 0.1 mm units)

Notes

(1) When the [FEED] key is pressed after the Forward Feed Command has been transmitted, one label is fed.   And then, the printer automatically feeds the labels by the designated forward feed amount.

(2) The Forward/Reverse Feed Command is stored in memory (retained even if the power is turned off).

(3) The Forward/Reverse Feed Command is ignored in the strip mode and the cut issue mode.

(4) The forward feed is performed at the speed designated by the Issue Command or Feed Command.   The reverse feed is performed at the same speed with the forward feed.   However, it can be changed by using the printer setting tool.

(5) A reverse feed may not be performed as specified, depending on the print conditions.   When the media sensor is used and if the label/tag pitch is almost same as the distance between the print head and the media sensor (123.0 mm), a label/tag may not be returned to the print start position, even if the same value is specified for both forward feed and reverse feed.   It may result in an error.   In such case, making the reverse feed amount larger than the forward feed amount can prevent this error.

Examples

(1) Idling

(2) Feeds one label.

(3) Feeds the labels to the position where the label can be cut manually.

(4) Cut the label manually.

(5) Standby

(6) Reverse feed to the print start position.

(7) Prints three pieces of label A.

(8) Feeds the labels to the position where labels A can be cut manually.

(9) Cut labels A manually.

(10) Standby

(11) Reverse feed to the print start position.

(12) Prints one piece of label B.

(13) Feeds the labels to the position where label B can be cut manually.

(14) Cut label B manually.

(15) Standby

[ESC] T20C40 [LF] [NUL]
[ESC] U1; 0120 [LF] [NUL]
Cut manually.
[ESC] U2; 0120 [LF] [NUL]
[ESC] RC001; A [LF] [NUL]
[ESC] XS; I, 0003, 0002C4001 [LF] [NUL]
[ESC] U1; 0120 [LF] [NUL]
Cut manually.
[ESC] U2; 0120 [LF] [NUL]
[ESC] RC001; B [LF] [NUL]
[ESC] XS; I, 0001, 0002C4001 [LF] [NUL]
[ESC] U1; 0120 [LF] [NUL]

6.3.18 STORAGE AREA ALLOCATE COMMAND   [ESC] XF

| Function | Allocates the storage area in the flash ROM on the CPU board. |

| Format | [ESC] XF; aa, bb, cc [LF] [NUL] |

Term

aa: Size of the TrueType font storage area
  00 to 24 (0 KB to 3,072 KB)   (in units of 128 KB)

bb: Size of bit map writable character storage area
  00 to 24 (0 KB to 3,072 KB)   (in units of 128 KB)

cc: Size of BASIC file storage area
  00 to 14 (0 KB to 1,792 KB)   (in units of 128 KB)
  AA: The current BASIC file storage area and contents are retained.

Explanation

(1) The total capacity of the storage area in flash ROM is variable.   The minimum capacity is 3,072 KB.

⊙ In the case that the size of BASIC file storage area is set in a range of "00" to "14":

(2) When this command is received, the entire area in flash ROM on the CPU board is cleared.

(3) If this command is not sent, the storage area in flash ROM on the CPU board cannot be used.

(4) The storage areas are allocated in the following order of precedence – the TrueType font storage area, the bit map writable character storage area, and the BASIC file storage area.   After these storage areas are allocated, the remaining area is used for the PC save area.

(5) If the sum of the TrueType font storage area, the bit map writable character storage area, and the BASIC file storage area, specified by this command, is 3,072 KB, the TrueType font storage area, the bit map writable character storage area, and the BASIC file storage area are allocated as specified, respectively.   In this case, however, there is no PC save area.

(6) If the sum of TrueType font storage area, the bit map writable character storage area, and the BASIC file storage area, specified by this command, exceeds 3,072 KB, the TrueType font storage area is allocated as specified with the highest priority.   Then, the remaining area is allocated to the bit map writable character storage area.   If there is still remaining area after the TrueType font storage area and the bit map writable character storage area are allocated, it is used for the BASIC file storage area.   There is no PC save area.

(7) When "00" (0 KB) is specified for each of the TrueType font storage area, the bit map writable character storage area, and the BASIC file storage area, the storage area is not allocated.

(8) When "24" (3,072 KB) is specified for either of the TrueType font storage area or the bit map writable character storage area, the entire storage area is occupied by that area.   For example, if "24" is specified for the TrueType Font storage area, the entire storage area is used only for the TrueType Font storage area.   The bit map writable character storage area, the BASIC file storage area, and the PC save area cannot be allocated.

⊙ In the case that the size of BASIC file storage area is set to "AA":

(9) When this command is received, the BASIC file storage area is reserved and the other areas in flash ROM on the CPU board are cleared.

(10) If this command is not sent, the storage area in flash ROM on the CPU board cannot be used.
If "AA" is set for the size of the BASIC file storage area with the BASIC file storage area being unallocated, the BASIC file storage area remains unallocated.

(11) The storage areas except for the BASIC file storage area are allocated in the following order of precedence – the TrueType font storage area, and the bit map writable character storage area. After these storage areas are allocated, the remaining area is used for the PC save area.

(12) If the sum of the TrueType font storage area and the bit map writable character storage area, specified by this command, is equal to the size of '3,072 KB minus the BASIC file storage area size', the TrueType font storage area and the bit map writable character storage area are allocated as specified. In this case, however, there is no PC save area.

(13) If the sum of TrueType font storage area and the bit map writable character storage area, specified by this command, exceeds the size of '3,072 KB minus the BASIC file storage area size', the TrueType font storage area is allocated as specified with the highest priority. Then, the remaining area is allocated to the bit map writable character storage area. There is no PC save area.

(14) When "00" (0 KB) is specified for each of the TrueType font storage area and the bit map writable character storage area, the storage area is not allocated.

(15) If the size of '3,072 KB minus the BASIC file storage area size' or more is specified for either the TrueType font storage area or the bit map writable character storage area, each area other than the BASIC file storage area is allocated as specified.
For example, when setting "20" or "21" for the size of the TrueType font storage area while the BASIC file storage area secures "4" (512KB), the entire storage areas except the BASIC file storage area are allocated to the TrueType font storage area. There is no bit map writable character storage area or PC save area.

| Refer to |
- Bit Map Writable Character Command ([ESC] XD)
- Save Start Command ([ESC] XO)
- Flash Memory Format Command ([ESC] J1)
- 2-byte Writable Character Code Range Command ([ESC] XE)

| Example |
The TrueType font storage area and bit map writable character storage area are set to 768 KB and 512 KB, respectively.
(PC save area: 3,072 KB − 768KB − 512 KB = 1,792 KB)
[ESC] XF; 05, 04, 00 [LF] [NUL]

6.3.19 FLASH MEMORY FORMAT COMMAND   [ESC] J1

| Function | Formats (initializes) the flash ROM on the CPU board for storage. |

| Format | [ESC] J1; a (, b) [LF] [NUL] |

| Term |

a: Formatting (initializing) range
- A: Entire areas of the flash memory (PC save area + writable character area)
- B: PC save area of the flash memory
- C: Writable character storage area of the flash memory

b: Drive (Omissible.   When omitted, the flash ROM on the CPU board is selected.)
- 0: Flash ROM on the CPU board

| Explanation |

(1) When using a new flash memory, the area to be used must be formatted (initialized) before the PC interface command or writable characters are stored.

(2) After the flash memory is formatted, the remaining memory capacity is displayed on the LCD.

(3) When the already stored data (PC interface commands, writable characters, logos) is stored again, the memory is consumed every time data is stored, unless the Flash Memory Format Command ([ESC] J1) is transmitted.

(4) When a label issue operation is performed after the Flash Memory Format Command is sent, the image buffer is automatically cleared.

(5) When storing of writable characters, logos, or PC interface commands is not continued for about 10 seconds, the printer automatically enters the online mode (label issue operation).   At this time, the image buffer is automatically cleared.

| Refer to |
- Bit Map Writable Character Command ([ESC] XD)
- Save Start Command ([ESC] XO)
- Save Terminate Command ([ESC] XP)

| Example | [ESC] J1; A, 0 [LF] [NUL] |

6.3.20 2-BYTE WRITABLE CHARACTER CODE RANGE COMMAND   [ESC] XE

| Function | Sets the code range when a 2-byte writable character code is stored in the flash ROM on the CPU board. |

Format [ESC] XE; $a_1a_1a_1a_1$, $b_1b_1b_1b_1$, $a_2a_2a_2a_2$, $b_2b_2b_2b_2$ ------, $a_na_na_na_n$, $b_nb_nb_nb_n$ [LF] [NUL]

Term

aaaa: First character code for each range
    2020 to FFFF (Indicates the hex. data in ASCII code.)

bbbb: No. of characters for each range
    0001 to 4000 (Indicates the hex. data in ASCII code.)

xx: Font type
    51 to 55 (When omitted, 51 is set.)

Explanation

(1) For a 2-byte character code such as Kanji, the character code range may be divided into two or more. As the control information area for the unnecessary codes can be deleted by designating the character code range, the capacity of flash memory can be used efficiently.

(2) The total number of characters for each range must not exceed 0x4000 (16384 characters).

(3) Up to 2700 ranges can be designated.

(4) It is not possible to store the character codes which are not conforming to the setting for this command.

(5) The first character code for each area should be sent in the ascending order. The areas must not overlap.   If these conditions are not satisfied, the operation is not guaranteed.

Refer to
- Flash Memory Format Command ([ESC] J1)
- Bit Map Writable Character Command ([ESC] XD)

Example In case that Shift JIS 8140H to 83DFH: ▨ Character data is present.
          □ Character data is not present.

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
8140	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨
:																
81F0	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨			
:																
8240	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨
:																
82F0	▨	▨	▨	▨	▨	▨	▨									
:																
8340	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨
:																
83D0	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨			

[ESC] XE; 8140, 00BD, 8240, 00B7, 8340, 00BD [LF] [NUL]

6.3.21 BIT MAP WRITABLE CHARACTER STORE COMMAND   [ESC] XD

| Function | Stores writable characters and logos in the flash ROM on the CPU board. |

| Format | [ESC] XD; (Sj,) aa, b, ccc, ddd, eee, fff, ggg, h, iii ------ iii [LF] [NUL] |

| Term |

Sj: Drive in which writable characters or logos are stored
(Omissible.   When omitted, the flash ROM on the CPU board is selected.)

    j: Drive
        0: Flash ROM on the CPU board

aa: Writable character types
    01 to 40
    41   16 × 16 (dots)
    42   24 × 24 (dots)
    43   32 × 32 (dots)
    44   48 × 48 (dots)
    51 to 55   2-byte code character

b(b): Writable character code
    20H to FFH (Set in hex.)
    40H to 7EH, 80H to FCH (When the writable character set is 41 to 44)
    2020H to FFFFH (When the writable character type is 51 to 55.)

ccc: Left offset
    000 to 719 (in units of dots)

ddd: Top offset
    000 to 719 (in units of dots)

eee: Character width
    001 to 720 (in units of dots)

fff: Character height
    001 to 720 (in units of dots)

ggg: Character-to-character spacing/proportional spacing
    000 to 999 (in dots)

h: Type of writable character data
    0: Nibble mode (4 bits/byte)
    1: Hex. mode (8 bits/byte)

iii --- iii: Writable character data to be stored

*   When the writable character type is 41 to 44, left offset, top offset, character width, character height, and character-to-character spacing/proportional spacing are fixed to "000".   Any settings are ignored.

(1) Type of writable character

Up to 44 types of writable character sets can be stored.   However, the maximum number of characters varies depending on the writable character size and number of characters because of the limited memory capacity.   For writable character types 41 to 44, each writable character size is fixed.

(2) Character code

Up to 224 characters can be stored per character type.   The maximum number of characters are 40 types × 224 characters = 8960 characters.   It varies depending on the writable character size and the number of characters because of the limited memory capacity.   A character code of the character types 41 to 44 is stored in 1 byte.   However, when it is called up, F0H is added to the upper digit, so a character code consists of 2 bytes.   In this case, up to 188 characters can be stored per character type.

(3)

(4)   Writable character types: 01 to 40, 51 to 55
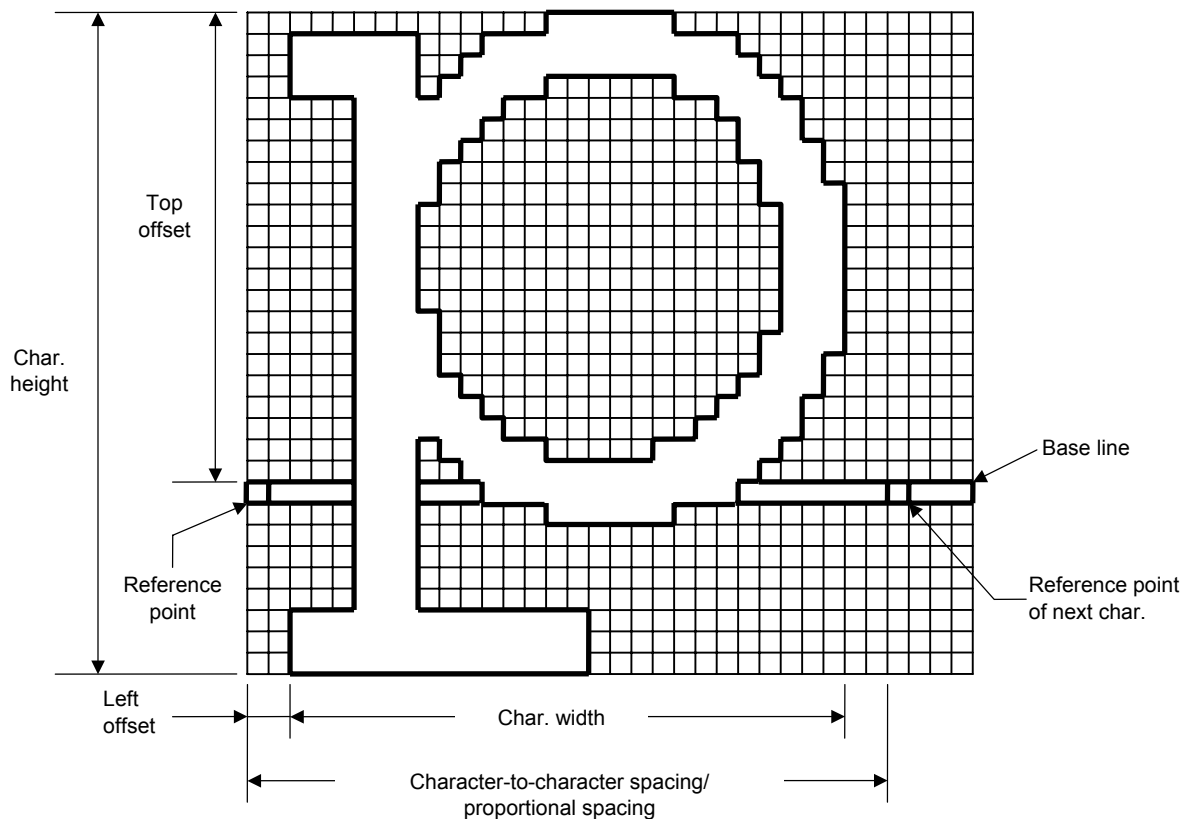
Char. width 26 dots

Char. height 31 dots

4 4 4 4 4 4 4 4

8 8 8 8

Nibble mode															
1	30H	*2*	30H	*3*	30H	*4*	3FH	*5*	3CH	*6*	30H	*7*	30H	*8*	30H
9	3FH	*10*	3CH	*11*	37H		•								
							•								
							•								
							•								
							•								
							•								
							•						*240*	30H
241 3FH		*242* 3FH		*243* 3FH		*244* 3CH		*245* 30H		*246* 30H		*247* 30H		*248* 30H	

Hex. mode							
1	00H	*2*	0FH	*3*	C0H	*4*	00H
5	FCH	*6*	7FH		•		
					•		
					•		
					•		
					•		
					•		
					•		
					•	*120*	00H
121 FFH		*122* FCH		*123* 00H		*124* 00H	

[Nibble mode]

(1)   The writable character data to be stored is separated into four dot units and sent in above-mentioned order (*1* → *248*).   (The upper digit: "3")

(2)   The data of writable characters to be stored is 30H to 3FH.

(3)   The minimum unit in the X direction is 8 dots.   Dots with no data are transmitted as data 0.

(4)   The data count of writable characters to be stored must be as follows:
Data count of writable characters to be stored =
   {(No. of char. width dots + 7)/8} × No. of char. height dots × 2
* The value in the brackets is rounded down to the nearest whole number.

[Hex. mode]

(1)   The writable character data to be stored is separated into eight dot units and sent in above-mentioned order (*1* → *124*).

(2)   The data of writable characters to be stored is 00H to FFH.

(3)   The minimum unit in the X direction is 8 dots.   Dots with no data are transmitted as data 0.

(4)   The data count of writable characters to be stored must be as follows:
Data count of writable characters to be stored =
   {(No. of char. width dots + 7)/8} × No. of char. height dots
      * The value in the brackets is rounded down to the nearest whole number.

(1) Different character width and character height can be designated for the same writable character type, according to the writable character codes.   In other words, character size can be changed by each character, thus memory can be saved.

(2) Proportional spacing and descending characters are possible depending on the parameters of character-to-character spacing/proportional spacing, left offset, and top offset.

(3) When top offset is 000, the reference coordinate is positioned at the upper left when drawing because the base line is at the top.   (Coordinate setting is facilitated for logos.)

(5)   Writable character type: 41 (16 dots ×16 dots)
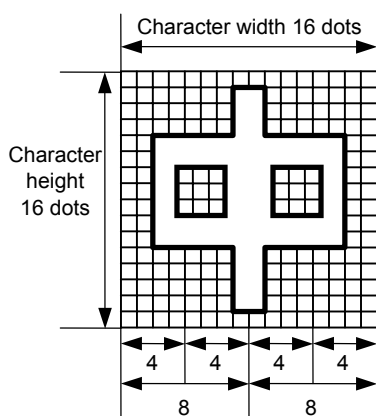
Nibble mode							
1 30H	*2* 30H	*3* 30H	*4* 30H				
5 30H	*6* 31H	*7* 38H					
•							
•							
•							
58 31H	*59* 38H	*60* 30H					
61 30H	*62* 30H	*63* 30H	*64* 30H				

Hex. mode							
1 00H	*2* 00H	*3* 01H	*4* 80H				
5 01H	*6* 80H	*7* 01H					
•							
•							
•							
26 80H	*27* 01H	*28* 80H					
29 01H	*30* 80H	*31* 00H	*32* 00H				

[Nibble mode]

(1) The writable character data to be stored is separated into four dot units and sent in above-mentioned order (*1* → *64*).   (Upper digit: "3")

(2) The data of writable characters to be stored is 30H to 3FH.

(3) The data count of writable characters to be stored should be 64 bytes.

[Hex. mode]

(1) The writable character data to be stored is separated into eight dot units and sent in above-mentioned order (*1* → *32*).

(2) The data of writable characters to be stored is 00H to FFH.

(3) The data count of writable characters to be stored should be 32 bytes.

* When writable character type 41 is designated, the width and height of the character are both 16 dots.

(6) Writable character type: 42 (24 dots ×24 dots)
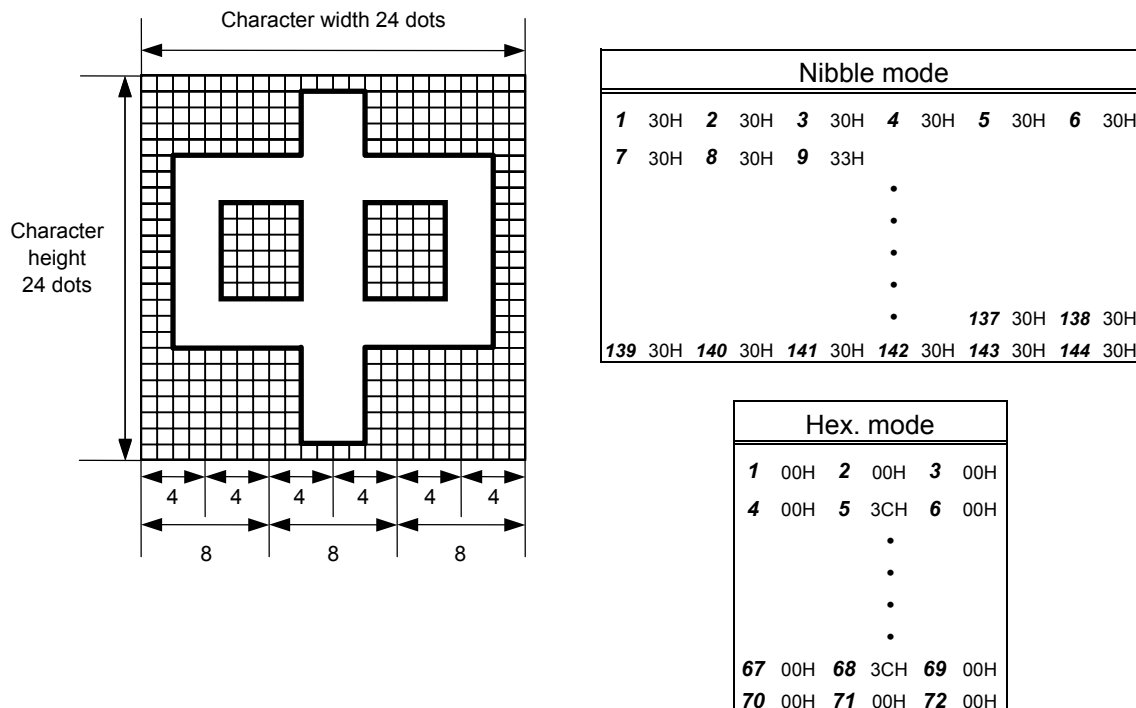
Character width 24 dots

Character height 24 dots

4 4 4 4 4 4

8 8 8

Nibble mode											
1 30H	*2* 30H	*3* 30H	*4* 30H	*5* 30H	*6* 30H
7 30H	*8* 30H	*9* 33H			
					•
					•
					•
					•
			•	*137* 30H	*138* 30H
139 30H	*140* 30H	*141* 30H	*142* 30H	*143* 30H	*144* 30H

Hex. mode		
1 00H	*2* 00H	*3* 00H
4 00H	*5* 3CH	*6* 00H
	•	
	•	
	•	
	•	
67 00H	*68* 3CH	*69* 00H
70 00H	*71* 00H	*72* 00H

[Nibble mode]

(1) The writable character data to be stored is separated into four dot units and sent in above-mentioned order (*1* → *144*).   (Upper digit: "3")

(2) The data of writable characters to be stored is 30H to 3FH.

(3) The data count of writable characters to be stored should be 144 bytes.

[Hex. mode]

(1) The writable character data to be stored is separated into eight dot units and sent in above-mentioned order (*1* → *72*).

(2) The data of writable characters to be stored is 00H to FFH.

(3) The data count of writable characters to be stored should be 72 bytes.

* When writable character type 42 is designated, the width and height of the character are both 24 dots.

(7) Writable character type: 43 (32 dots ×32 dots)

Character width 32 dots

Character height 32 dots

4 4 4 4 4 4 4 4

8 8 8 8

Nibble mode													
1	30H	*2*	30H	*3*	30H	*4*	30H	*5*	30H	*6*	30H	*7*	30H
8	30H	*9*	30H	*10*	30H	*11*	30H	*12*	37H				
						•							
						•							
						•							
						•							
						•			*248*	30H	*249*	30H
250	30H	*251*	30H	*252*	30H	*253*	30H	*254*	30H	*255*	30H	*256*	30H

Hex. mode							
1	00H	*2*	00H	*3*	C0H	*4*	00H
5	00H	*6*	07H	*7*	C0H		
				•			
				•			
				•			
				•			
		123	C0H	*124*	00H		
125	00H	*126*	00H	*127*	00H	*128*	00H

[Nibble mode]

    (1) The writable character data to be stored is separated into four dot units and sent in above-mentioned order (*1* → *256*). (Upper digit: "3")

    (2) The data of writable characters to be stored is 30H to 3FH.

    (3) The data count of writable characters to be stored should be 256 bytes.

[Hex. mode]

    (1) The writable character data to be stored is separated into eight dot units and sent in above-mentioned order (*1* → *128*).

    (2) The data of writable characters to be stored is 00H to FFH.

    (3) The data count of writable characters to be stored should be 128 bytes.

* When writable character type 43 is designated, the width and height of the character are both 32 dots.

(8) Writable character type: 44 (48 dots ×48 dots)

Nibble mode					
1 30H	*2* 30H	*3* 30H	*4* 30H	*5* 30H	*6* 30H
7 30H	*8* 30H	*9* 30H	*10* 30H		
		•			
		•			
		•			
		•			
		•		*569* 30H	*570* 30H
571 30H	*572* 30H	*573* 30H	*574* 30H	*575* 30H	*576* 30H

Nibble mode					
1 00H	*2* 00H	*3* 00H	*4* 00H	*5* 00H	*6* 00H
7 00H	*8* 00H	*9* 07H	*10* E0H		
		•			
		•			
		•			
		•			
		•		*281* 00H	*282* 00H
283 00H	*284* 00H	*285* 00H	*286* 00H	*287* 00H	*288* 00H

[Nibble mode]
(1) The writable character data to be stored is separated into four dot units and sent in above-mentioned order (*1* → *576*).   (Upper digit: "3")

(2) The data of writable characters to be stored is 30H to 3FH.

(3) The data count of writable characters to be stored should be 576 bytes.

[Hex. mode]
(1) The writable character data to be stored is separated into eight dot units and sent in above-mentioned order (*1* → *288*).

(2) The data of writable characters to be stored is 00H to FFH.

(3) The data count of writable characters to be stored should be 288 bytes.

* When writable character type 44 is designated, the width and height of the character are both 48 dots.

(1) No matter what character type or character code is selected, no memory will be wasted.

(2) When a new writable character is stored, the Flash Memory Format Command ([ESC] J1) must be transmitted.

(3) A character code already stored can be stored in the flash memory again by sending the Bit Map Writable Character Store Command ([ESC] XD, but memory will be consumed each time the code is stored. The memory can be efficiently used if the Flash Memory Format Command ([ESC] J1) is sent in advance.

(4) If the flash memory is used, and a label issue operation is performed after sending the Bit Map Writable Character Command ([ESC] XD), the image buffer is cleared automatically.

(5) When further storing operation is not continued for about 10 seconds after storing the writable character and logos, the printer automatically enters the online mode (label issue operation). In this case, when the flash memory was used, the image buffer will be cleared automatically.

Flash Memory Format Command ([ESC] J1)

Writable character type:　　03
Writable character code:　　70H
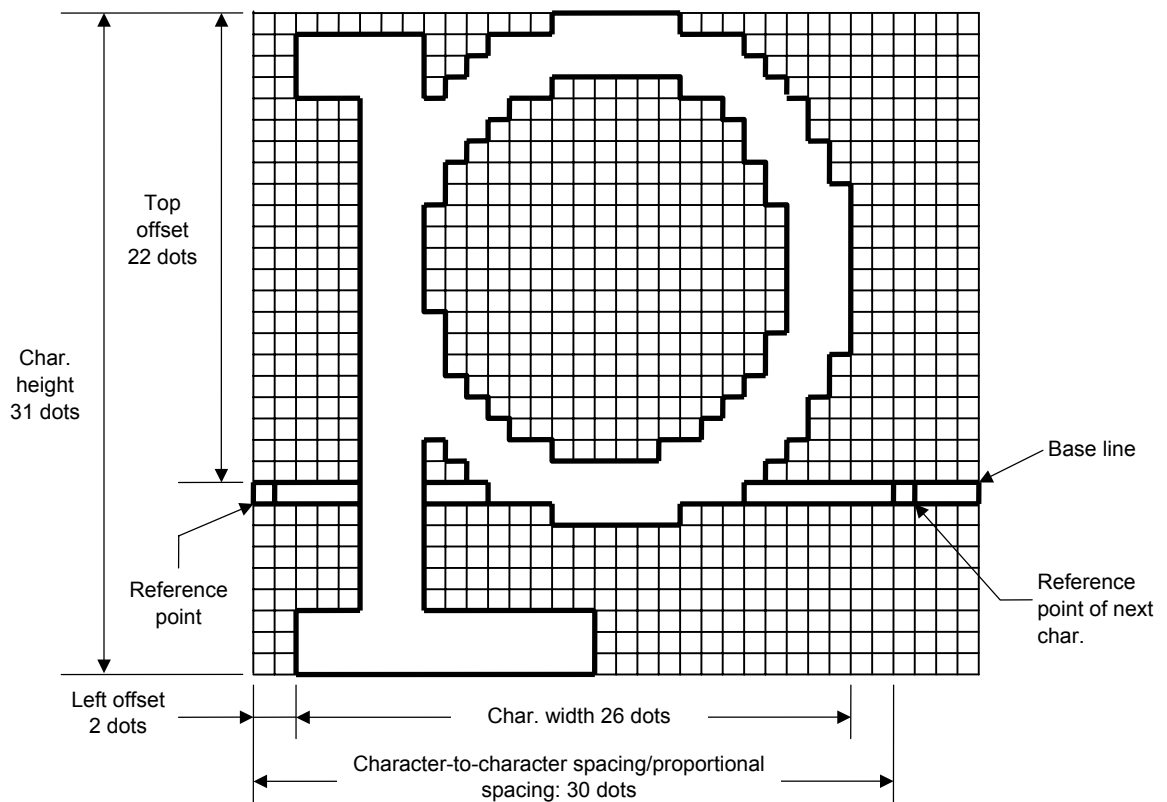
[ESC] J1; C [LF] [NUL]
[ESC] XD; 03, p, 002, 022, 026, 031, 030, 0, 000?<000?<7??800?<???<00?=?03>001?
<00?001?8007001?0007801>0003801>0003<01<0001<01<0001<01<0001<01<0001<01>
0001<01>0003<01>0003801?0007801?800?001?<01?001=?07>001<???<001<7??8001<0?<
0001<0000001<0000001<0000001<000000???<0000???<0000???<0000 [LF] [NUL]

* 30H = "0"
　31H = "1"
　32H = "2"
　33H = "3"
　34H = "4"
　35H = "5"
　36H = "6"
　37H = "7"
　38H = "8"
　39H = "9"
　3AH = ":"
　3BH = ";"
　3CH = "<"
　3DH = "="
　3EH = ">"
　3FH = "?"

6.3.22 GRAPHIC COMMAND   [ESC] SG

| Function | Draws graphic data. |

| Format | [ESC] SG; aaaa(D), bbbb(D), cccc, dddd, e, ggg --- ggg [LF] [NUL]
or
[ESC] SG0; aaaa(D), bbbb(D), cccc, dddd, e, ffff, ggg --- ggg [LF] [NUL] |

| Term |

aaaa(D): X-coordinate of the print origin for drawing graphic data
Fixed to 4 digits (in 0.1 mm units)
* If "D" is attached after a 4-digit value, the coordinate is specified in dots.
0000D or greater

bbbb(D): Y-coordinate of the print origin for drawing graphic data
4 or 5 digits (in 0.1 mm units)
* If "D" is attached after a 4- or 5-digit value, the coordinate is specified in dots.
0000D or greater

cccc: No. of graphic width dots
Fixed to 4 digits (in units of dots)

However, when the graphic data "2: BMP file" or "6: PCX file" is selected, this designation is ignored.   (The information of the graphic width is contained in the graphic data.)

dddd: No. of graphic height dots
4 or 5 digits (in units of dots)

However, when the graphic data "2: BMP file" or "6: PCX file" is selected, this designation is ignored.   (The information of the graphic width is contained in the graphic data.)

When "3: TOPIX compression mode" is selected for the type of graphic data:

Resolution of graphic data: *only two types
⎧ 0150:   150 DPI (The data is drawn in double resolution.)
⎨
⎩ 0300:   300 DPI (The data is drawn in single resolution.)

e: Type of graphic data

When the command starts with "[ESC] SG;":
0: Nibble mode (4 dots/byte)   Overwrite drawing
1: Hex. mode (8 dots/byte)   Overwrite drawing
2: BMP file mode   Overwrite drawing
3: TOPIX compression mode   Overwrite drawing
4: Nibble mode (4 dots/byte)   OR drawing
5: Hex. mode (8 dots/byte)   OR drawing
6: PCX file mode   Overwrite drawing
7: TOPIX compression mode   XOR drawing

When the command starts with "[ESC] SG0;":
A: Printer driver compression mode   Overwrite drawing

ffff: Data count (Effective only for the command starting with "[ESC] SG0;")
Fixed to 4 digits
Represents the total number of bytes for the compressed graphic data by
32-bit hex. code.
Range: 0 to 4,294,967,295 bytes
(00H, 00H, 00H, 00H to FFH, FFH, FFH, FFH)

ggg --- ggg: Graphic data

Explanation (1) When the graphic data "0", "1", "2", "3", "6", or "A" is selected, the graphic data is drawn by overwriting the image buffer.

(2) When the graphic data "4" or "5" is selected, the graphic data is drawn by carrying out OR between the graphic data and the data in the image buffer.

[Print direction: Bottom first]   [Print direction: Top first]

Nibble mode					
1 30H	**2** 30H	**3** 33H	**4** 30H	**5** 30H	**6** 30H
7 30H	**8** 30H				
		•			
		•			
		•			
		•			
		•			
		•			
		•		**126** 30H	
127 33H	**128** 3FH	**129** 30H	**130** 30H	**131** 30H	**132** 30H
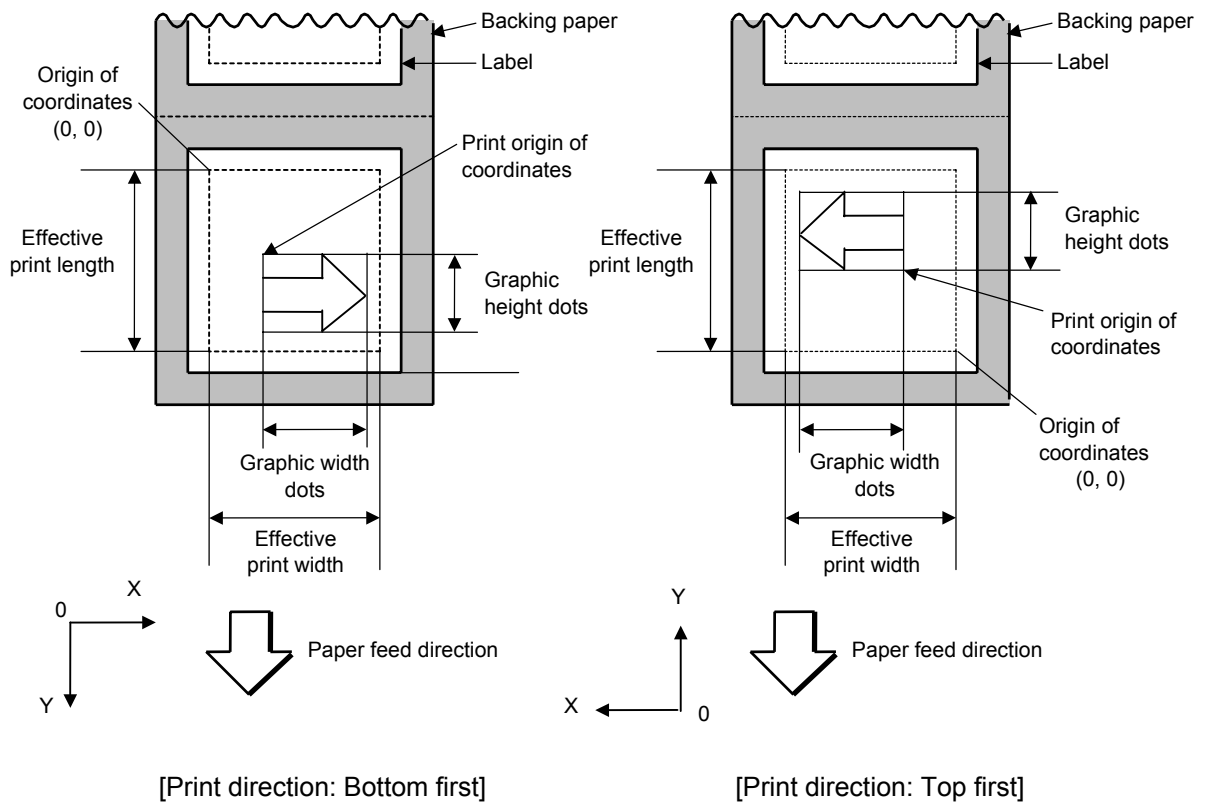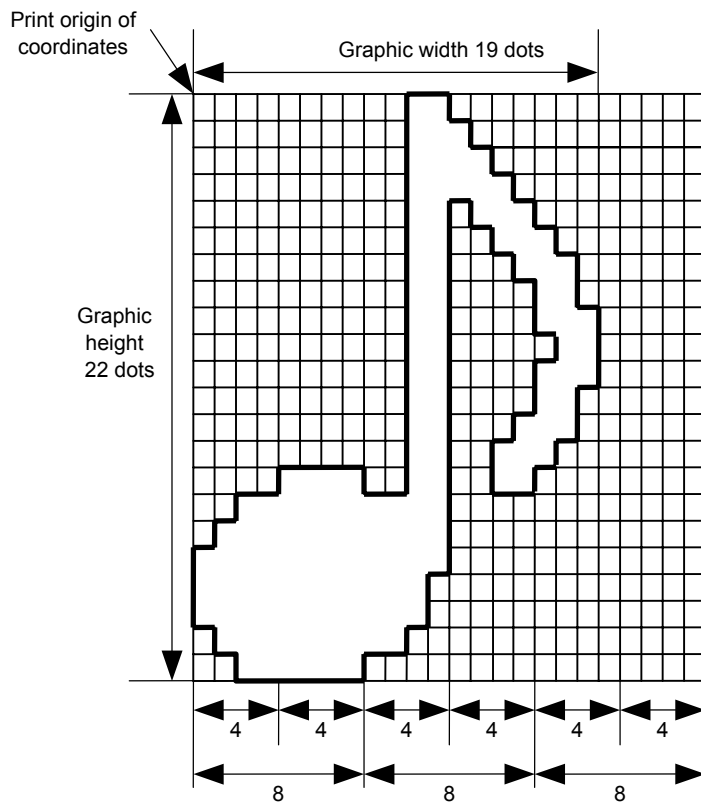
Hex. mode		
1 00H	**2** 30H	**3** 00H
4 00H	**5** 38H	
	•	
	•	
	•	
	•	
	•	
	63 00H	
64 3FH	**65** 00H	**66** 00H

[Nibble mode]

(1) The graphic data is separated into four dot units and sent in above-mentioned order (**1** → **132**).   (Upper digit: "3")

(2) The graphic data is 30H to 3FH.

(3) The minimum unit in the X direction is 8 dots. Dots with no data are transmitted as data 0.

(4) The graphic data count must be as follows:
Graphic data count = {(No. of graphic width dots + 7)/8} × No. of graphic height dots × 2

* The value in the brackets is rounded down to the nearest whole number.

[Hex. mode]

(1) The graphic data is separated into eight dot units and sent in above-mentioned order (**1** → **66**).

(2) The graphic data is 00H to FFH.

(3) The minimum unit in the X direction is 8 dots. Dots with no data are transmitted as data 0.

(4) The graphic data count must be as follows:
Graphic data count = {(No. of graphic width dots + 7)/8} × No. of graphic height dots

* The value in the brackets is rounded down to the nearest whole number.

[When TOPIX compression mode is selected]
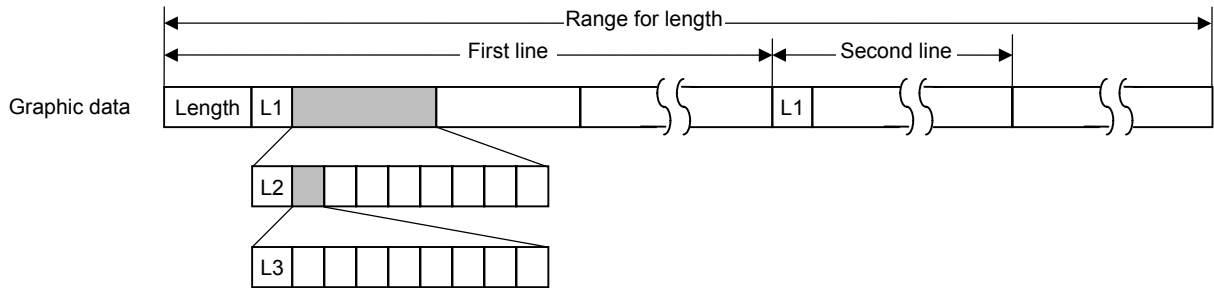
(1) Length: Total number of bytes of the graphic data (0001H ~)

Example. Length = 20 bytes: | 0 0 | 1 4 |

(2) L1 parameter: Shows in which large block (512 dots/block) the changed data is contained.

$\begin{bmatrix} 0: \text{Not present} \\ 1: \text{Present} \end{bmatrix}$
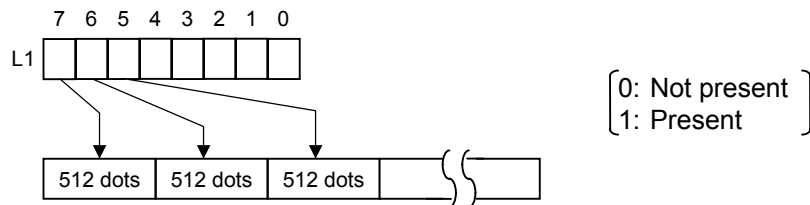
(3) L2 parameter: Shows in which medium block (64 dots/block) the changed data is contained (of the L1 large block).

$\begin{bmatrix} 0: \text{Not present} \\ 1: \text{Present} \end{bmatrix}$
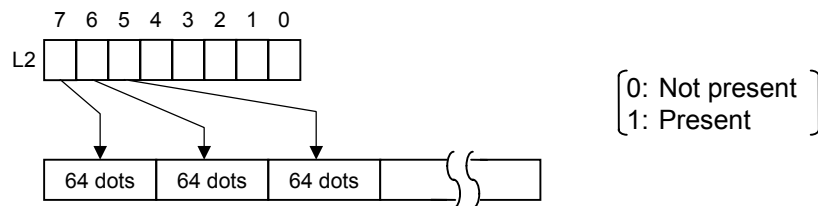
(4) L3 parameter: Shows in which small block (8 dots/block) the changed data is contained (of the L2 medium block).

$\begin{bmatrix} 0: \text{Not present} \\ 1: \text{Present} \end{bmatrix}$
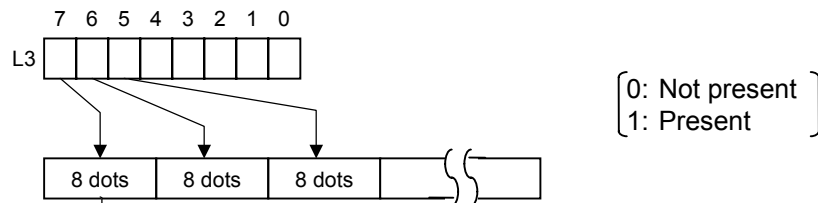
Exclusive-OR is carried out between the current image data and the image data one line previous. Only the changed bit is set to ON (1). The alignment of dots is MSB (left dots) and LSB (right dots).

* The graphic width for only the smaller value of either the designated value or the max. buffer size (512 KB) is drawn. The minimum unit of the data drawing is 8 dots (1 byte). If the graphic width is set to 3 dots, it will be reset to 8 dots (1 byte).

[When the printer driver compression mode is selected]

(1) For the command starting with "[ESC] SG0;", only "A: Printer driver compression mode" can be selected for the type of graphic data.   The parameter for the data count is attached after the parameter for the type of graphic data.   When the total number of data cannot be provided by the printer driver, "00H, 00H, 00H, 00H" should be specified for the number of graphic data.   However, in this case, the printer diver cannot support printing through a serial interface (RS-232C).

(2) How to compress data

Compression is performed for every data of one line specified for the number of graphic width dots.

The data is made up in units of 8 dots.   A repeated value is encoded in 2 bytes.   The first byte is a numeric value "n" indicating that a value is repeated (-n + 1) times.

The range is between -127 and -1.   The second byte is the repeated value.

If a value is not repeated, the first byte is the numeric value "m".   The length of the values is indicated by (m+1).   The range of "m" is between 0 and 126.   The length of the repetition of the value "n" should not exceed 127, and "m" should not exceed 126, respectively.

If it exceeds the specified value, it should be divided into blocks of repetition.

When a line of the same contents appears repeatedly, the number of such lines is encoded in 2 bytes.   The first byte is fixed as 127.   The second byte indicates "N" times that the line of the same contents is repeated.   Its range is between 1 and 255.   "N" should not exceed 255.   If it exceeds 255, one-line data should be newly compressed, and the remaining number of repetitions should be encoded.

[Example]

Data before being compressed   (Width: 120 dots, Height: 300 lines)

Line No.	Graphic data
1	AAh AAh AAh AAh AAh AAh AAh BBh CCh DDh EEh FFh FFh FFh FFh
2	AAh AAh AAh AAh AAh AAh AAh BBh CCh DDh EEh FFh FFh FFh FFh
299	AAh AAh AAh AAh AAh AAh AAh BBh CCh DDh EEh FFh FFh FFh FFh
300	AAh AAh AAh AAh AAh AAh AAh BBh CCh DDh EEh FFh FFh FFh FFh

Data after being compressed

Line No.	Graphic data
1	FAh AAh 03h BBh CCh DDh EEh FEh FFh
2 to 256	7FH FFH
257	FAh AAh 03h BBh CCh DDh EEh FEh FFh
258 to 300	7FH 2BH

FEh = -2
-(-2) + 1 = 3
FFh is repeated 3 times.

03h = 3
3 + 1 = 4
4-byte data (BBh CCh DDh EEh) without repetition

FAh = -6
-(-6) + 1 = 7
AAh is repeated 7 times.

(1) The print origin of coordinates must be set so that the result of drawing the graphic data will be within the effective print area set by the Label Size Set Command ([ESC] D).

(2) The number of graphic width dots and the number of graphic height dots must also be set so that the result of drawing the graphic data will be within the effective print area set by the Label Size Set Command ([ESC] D) in the same manner as the above.

(3) Both width and height are 8 dots/mm in case of the 203 dpi-print head model, and 11.8 dots/mm in case of the 300 dpi-print head model, respectively.

(4) The actual result of drawing may deviate within ±0.33 mm in the X direction with respect to the designated print origin of the X-coordinate.

> To draw the received graphic data at high speed, the data is directly developed in the image buffer without applying correction to each bit with respect to the designated X-coordinate.   Consequently, an error of up to 4 bits occurs.

[Effective print area]   [mm]

Item \ Model \ Issue mode			B-452-R		
			Batch	Strip	Cut
Thermal head dot density			11.8 dots/mm (300 dpi)		
Thermal head width			105.7 mm		
G: Effective print width	Min.		10.0		
	Max.		105.7		
H: Effective print length	Label	Min.	11.0	21.4	29.0
		Max.	500.0		
	Tag	Min.	13.0	–	23.4
		Max.	500.0	–	500.0

[ESC] C [LF] [NUL]
[ESC] SG; 0100, 0240, 0019, 0022, 0, 003000003800003<00003>000037000033800031
<00030<00030>00030600030>00030<00031<00033800?33003??0007??000???000??
>000??>0007? <0003?0000 [LF] [NUL]
[ESC] XS; I, 0001, 0002C3000 [LF] [NUL]

* 30H = "0"	38H = "8"
31H = "1"	39H = "9"
32H = "2"	3AH = ":"
33H = "3"	3BH = ";"
34H = "4"	3CH = "<"
35H = "5"	3DH = "="
36H = "6"	3EH = ">"
37H = "7"	3FH = "?"

[TOPIX compression mode]

10.0 mm

Origin
(0, 0)

24.0 mm

Graphic width 19 dots

Graphic
height
22 dots
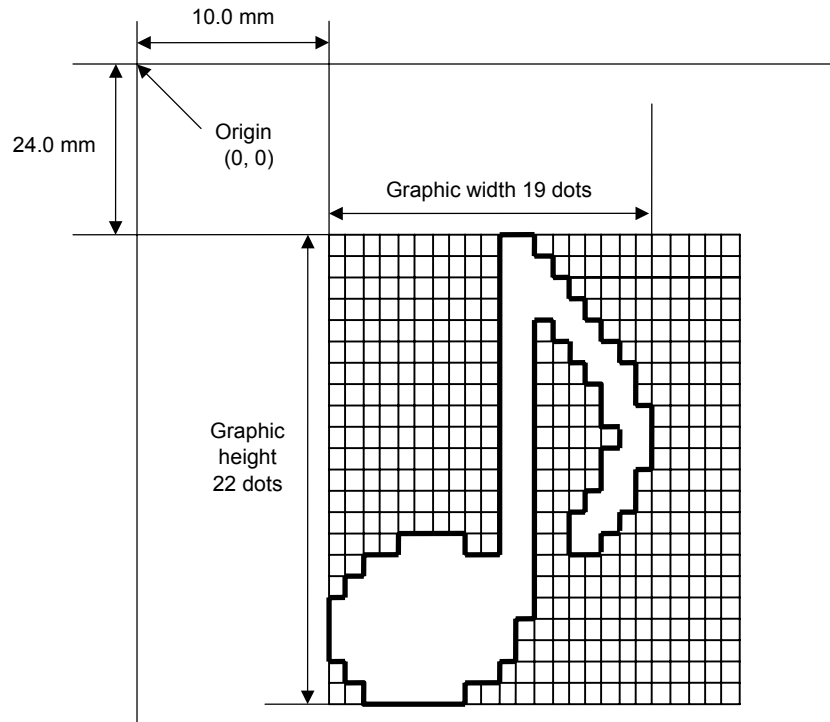
[ESC] SG; 0100, 0240, 0019, 0300, 3, 00 5C 80 80 40 30
   Length   L1   L2 L3 Data   (1st line)

80 80 40 08   80 80 40 04   80 80 40 02   80 80 40 09
 (2nd line)   (3rd line)   (4th line)   (5th line)

80 80 60 04 80   80 80 60 02 40   80 80 40 01   80 80 20 20
 (6th line)   (7th line)   (8th line)   (9th line)

80 80 20 80   80 80 20 80   80 80 20 20   80 80 40 01
 (10th line)   (11th line)   (12th line)   (13th line)

80 80 60 02 40   80 80 A0 0F 80   80 80 C0 30 C3   80 80 80 40
 (14th line)   (15th line)   (16th line)   (17th line)

80 80 80 80   80 80 40 10   00   80 80 C0 80 20   80 80 C0 40 C0   [LF] [NUL]
 (18th line)   (19th line)(20th line) (21st line)   (22nd line)

6.3.23 SAVE START COMMAND   **[ESC] XO**

| Function | Declares the start of saving PC interface commands.
(Places the printer in the mode where PC interface commands are written in the flash memory.) |

| Format | [ESC] XO; aa, (Sb,) c [LF] [NUL] |

| Term | aa: Identification number to be used for saving in flash memory or calling
     01 to 99 |

Sb: Drive in which the PC interface command is stored
    (Omissible.   If omitted, the flash ROM on the CPU board is selected.)

   b: Drive

      0: Flash ROM on the CPU board

c: Status response at save time
   0: No status response
   1: Status response is returned.

| Notes | (1)   After sending the Save Start Command ([ESC] XO), any command other than the following will be saved into flash memory without being analyzed. |

- Save Start Command ([ESC] XO)
- Save Terminate Command ([ESC] XP)
- Saved Data Call Command ([ESC] XQ)
- Bit Map Writable Character Command ([ESC] XD)
- Reset Command ([ESC] WR)
- Status Request Command ([ESC] WS)
- Flash Memory Format Command ([ESC] J1)

(2)   No error check is made for the commands when saving them.

(3)   Up to 64 KB can be saved per save.

| Refer to | • Save Terminate Command ([ESC] XP) |

- Flash Memory Format Command ([ESC] J1)

| Examples | [ESC] J1; B [LF] [NUL] |

[ESC] XO; 01, 0 [LF] [NUL]
[ESC] D0508, 0760, 0468 [LF] [NUL]
[ESC] T20C30 [LF] [NUL]
[ESC] C [LF] [NUL]
[ESC] PC001; 0200, 0125, 1, 1, A, 00, B [LF] [NUL]
[ESC] PC002; 0650, 0550, 2, 2, G, 33, B, +0000000001 [LF] [NUL]
[ESC] XP [LF] [NUL]

6.3.24 SAVE TERMINATE COMMAND   [ESC] XP

| Function | Declares the termination of saving PC interface commands. |

| Format | [ESC] XP [LF] [NUL] |

| Note | If the storing operation is not continued for about 10 seconds after the PC interface command is stored, the printer enters the online mode (label issue operation).   In this case, the image buffer will be cleared automatically. |

| Refer to | Save Start Command ([ESC] XO) |

6.3.25 SAVED DATA CALL COMMAND   [ESC] XQ

| Function | Calls PC interface commands saved in flash memory. |

| Format | [ESC] XQ; aa, (Sb,) c, d [LF] [NUL] |

| Term | aa: | Identification number of the file to be called from the flash memory |

aa: Identification number of the file to be called from the flash memory
01 to 99

Sb: Drive from which the command is called
(Omissible.   When omitted, the flash ROM on the CPU board is selected.)

b: Drive
0: Flash ROM on the CPU board

c: Status response when the data is called up
0: No status response
1: Status response is returned.

d: Automatic call at power on time
L: Automatic call
M: No automatic call

| Notes |

(1)   If the relevant save identification number is not found, an error will result.

(2)   If no save identification number is found at power on time when the automatic call has been specified, the setting of the automatic call will change to 'No automatic call', causing no error.

(3)   If a command error is found in the PC interface command that was called by the Saved Data Call Command or the automatic call at power on time, a command error will result.   After an error has occurred, the power must be turned off. When the power is turned on again, the setting for the automatic call at power on time changes to 'No automatic call'.

(4)   The printer enters the online mode (label issue operation) when the Save Data Call Command is sent after the Save Terminate Command.

| Refer to | • Save Start Command ([ESC] XO) |
| | • Save Terminate Command ([ESC] XP) |

Examples	[ESC] XQ; 01, 0, L [LF] [NUL]
	[ESC] RC001; Sample [LF] [NUL]
	[ESC] RC002; 100 [LF] [NUL]
	[ESC] XS; I, 0002, 0002C3000 [LF] [NUL]

6.3.26 HEAD BROKEN DOTS CHECK COMMAND [ESC] HD

Function	Checks the thermal head for broken elements.

Format

[ESC] HD001 (, a) [LF] [NUL]...... The all thermal elements are checked.

[ESC] HD003, $s_1s_1s_1s_1$, $e_1e_1e_1e_1$, $s_2s_2s_2s_2$, $e_2e_2e_2e_2$,--- $s_8s_8s_8s_8$, $e_8e_8e_8e_8$ (, a) [LF] [NUL]
.... The thermal elements are partially checked.

Term

a: Check result status response (Omissible)
   A: Status is returned.
     (When omitted, the check result status is not returned.)

$s_1s_1s_1s_1$ --- $s_8s_8s_8s_8$:   Area start coordinate   Fixed to 4 digits (in units of 0.1 mm)

$e_1e_1e_1e_1$ --- $e_8e_8e_8e_8$:   Area end coordinate   Fixed to 4 digits (in units of 0.1 mm)

Explanation

(1) The Head Broken Dots Check Command is subject to batch processing. If the Label Issue Command to issue 100 labels is transmitted before the Head Broken Dots Check Command, the head broken dots check will be executed after 100 labels have been issued.

(2) In the case of the all thermal elements check, the all thermal elements of the thermal head will be checked.

(3) When the check result is found to be normal under the condition that the check result status is not returned, the next command is processed. If the check result is found to be abnormal, an error occurs. Whether or not the status is returned when an error occurs depends on the Issue Command setting.
When the check result is found to be normal under condition that the check result status is returned, a status indicating the normal end of the head broken elements check is sent. After that, the next command is processed. If the check result is found to be abnormal, a status indicating the head broken elements error is sent, and then the printer stops.

Status for normal end
   [SOH] [STX] "0020000" [EXT] [EOT] [CR] [LF]

Status for head broken elements error
   [SOH] [STX] "1720000" [EXT] [EOT] [CR] [LF]

(4) The all thermal elements check takes approximately 1 second.

(5) Partial thermal elements check:
   • Up to 8 areas can be designated. If the number of designated areas is less than 8, the rest is omissible.
   • When the value set for the start coordinate is larger than the value set for the end coordinate, the end coordinate is handled as the start coordinate, and the start coordinate is handled as the end coordinate.
   • Areas can overlap each other.
   • Even if a coordinate is specified beyond the print head width, it will be regarded as the maximum value, therefore, a command error does not occur.

Examples

[ESC] C [LF] [NUL]
[ESC] RC001; Sample [LF] [NUL]
[ESC] RC002; 001 [LF] [NUL]
[ESC] XS; I, 0002, 0002C3000 [LF] [NUL]
[ESC] HD001 [LF] [NUL]

6.3.27 RESET COMMAND   **[ESC] WR**

| Function | Returns the printer to its initial state. |

| Format | [ESC] WR [LF] [NUL] |

| Explanation | The printer is returned to the same state as when the power is turned on.   When the printer receives this command during printing, it returns to its initial state after issuing the label which is being printed.   The next command must not be sent while the printer is performing initial processing. |

| Notes | (1) In the system setting mode, any commands except the Reset Command cannot be processed.

(2) If a command error or communication error occurs when receiving the Reset Command, an error is indicated in the online mode.

(3) After the code of the Bit Map Writable Character Command ([ESC] XD) or the Graphic Command ([ESC] SG) is received, the Reset Command is not processed until the printer receives the data specifying the type of data. |

| Example | [ESC] WR [LF] [NUL] |

6.3.28 STATUS REQUEST COMMAND   **[ESC] WS**

Function	Sends the printer status to the host computer.

Format	[ESC] WS [LF] [NUL]

Explanation	This command makes the printer send its status regardless of the setting of the status response parameter. The status to be transmitted is the current printer status, and indicates the latest status only. The remaining count indicates the remaining print count of the batch currently being printed only. No remaining count of the batch waiting to be printed is transmitted.

Notes	(1) This command is available for the RS-232C, USB, and socket communications. (2) The status is returned only to the interface which sent this command. (3) After the code of the Bit Map Writable Character Command ([ESC] XD) or Graphic Command ([ESC] SG) is received, the Status Request Command is not processed until the printer receives the data specifying the type of data. (4) After receiving the Status Request Command, there may be a maximum of 20-msec. delay until the printer sends a status. (5) At least, a 20-msec. interval must be given between the transmissions of the Status Request Command. If the next Status Request Command is transmitted within 20 msec., the printer may fail to receive it.

Example	[ESC] WS [LF] [NUL]

6.3.29 RECEIVE BUFFER FREE SPACE STATUS REQUEST COMMAND　　　[ESC] WB

Function	Sends information on the printer status and the free space of the receive buffer to the host.

Format	[ESC] WB [LF] [NUL]

Explanation	(1) This command makes the printer send information on its status and free space of the receive buffer, regardless of the setting of the Status Response parameter. The status to be transmitted is the current printer status, and indicates the latest status only. The remaining count indicates the remaining print count of the batch currently being printed only. No remaining count of the batch waiting to be printed is transmitted. Free space of the receive buffer for the interface which sent this command, is returned to the host.

Notes	(1) This command is available for the RS-232C, USB, Centronics interfaces, and socket communications. However, in case of the Centronics interface, the printer returns a status to the Nibble mode negotiation immediately after this command is received.
	(2) The printer returns the status only for the interface which sent this command.
	(3) After the code of the Bit Map Writable Character Command ([ESC] XD) or Graphic Command ([ESC] SG) is received, the Status Request Command is not processed until the printer receives the data specifying the type of data.
	(4) After receiving the Status Request Command, there may be a maximum of 20-msec. delay until the printer sends the status.
	(5) At least, a 20-msec. interval must be given between the transmissions of the Status Request Command. If the next Status Request Command is transmitted within 20 msec, the printer may fail to receive it.

Example	[ESC] WB [LF] [NUL]

6.3.30 VERSION INFORMATION ACQUIRE COMMAND   [ESC] WV

Function	Sends information such as the program version of the printer.

Format	[ESC] WV [LF] [NUL]

Explanation (1) The format of the program version data (27-byte data in total) to be returned to the host is as follows.

SOH		01H	
STX		02H	
Creation date	"0"	30H	Creation date of the program: 9-byte data indicated in order of Day-Month-Year
	"1"	31H	
	"N"	48H	
	"O"	49H	
	"V"	56H	
	"2"	32H	
	"0"	30H	
	"0"	30H	
	"2"	32H	
Model	"B"	42H	Model: 7-byte ASCII code indicating the model
	"-"	2DH	
	"4"	34H	
	"5"	35H	
	"0"	30H	
	"SP"	20H	
	SP	20H	
Version	"V"	56H	Program version: 5-byte data: Vx.xx
	"1"	31H	
	"."	2EH	
	"0"	30H	
	"A"	41H	
ETX		03H	
EOT		04H	
CR		0DH	
LF		0AH	

Program version:
5-byte data: Vx.xx
  └─Revision
  └─Version

(2) This command is processed in order of receipt. This command is not processed until the processing of the commands sent prior to this command is completed. Therefore, if this command is sent while the printer is in the state other than idle, the program version data may not be returned immediately.

Notes	(1) This command is effective only for the serial interface (RS-232C).

6.3.31 IP ADDRESS SET COMMAND   **[ESC] IP**

| Function | Sets the IP address to be required for the network connection. |

| Format | [ESC] IP; a, bbb, ccc, ddd, eee [LF] [NUL] |

| Term | a: IP address to be set |

              2: Printer IP address   (Initial value: 192.168.10.20)
              3: Gateway IP address   (Initial value: 0.0.0.0)
              4: Subnet mask   (Initial value: 255.255.255.0)

bbb: First 8 bits: 000 to 255

ccc: Second 8 bits: 000 to 255

ddd: Third 8 bits: 000 to 255

eee: Last 8 bits: 000 to 255

| Explanation | The IP address setting can also be made by the printer setting tool.   The setting which was last made takes effect. |

| Example | To set the printer IP address to "157.69.9.78". |

[ESC] IP; 2, 157, 069, 009, 078 [LF] [NUL]

6.3.32 SOCKET COMMUNICATION PORT SET COMMAND   [ESC] IS

Function	Enables or disables the socket communication, and sets the communication port number to be used.
Format	[ESC] IS; a, bbbbb [LF] [NUL]

Term	a: 0: Socket communication is disabled.
	          1: Socket communication is enabled.
	
	bbbbb: Port number (It must be set in 5 digits.)
	           00000 to 65535

Explanation	These settings can also be made by the printer setting tool.　The setting which was last made takes effect.
Example	To enable the socket communication and set the port number to "8000". [ESC] IS; 1, 08000 [LF] [NUL]

6.3.33 DHCP FUNCTION SET COMMAND [ESC] IH

| Function | Enables or disables the DHCP function, and sets the DHCP client ID. |

| Format | [ESC] IH; a, bbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbb (, cccccccccccccccc) [LF] [NUL] |

| Term | a: 0: DHCP function is disabled.
                1: DHCP function is enabled. |

bbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbb: DHCP client ID
16-byte data is described in 32-byte hexadecimal.)

cccccccccccccccc: DHCP client host name
16-byte data is described in 16 byte ASCII.

| Explanation | • These settings can also be made by using the printer setting tool.   The setting which was last made takes effect. |

• "FFH" in the client ID is assumed as a terminator.   Therefore, "FFH" must not be used in data.

• If "FFH" is specified as the first byte of the DHCP client ID, the printer assumes the DHCP client ID has not been specified.   So the printer uses the MAC address of the LAN board installed on the printer as the DHCP client ID instead.

| Example | To enable the DHCP function and set the DHCP client ID to "12H56HCDH". |

[ESC] IH; 1, 1256CDFFFFFFFFFFFFFFFFFFFFFFFFFFFF [LF] [NUL]

6.3.34 INTERNAL SERIAL INTERFACE PARAMETER SET COMMAND   [ESC] IZ

| Function | Sets communication parameters for the internal serial interface. |

| Format | [ESC] IZ; a, b, c, d [LF] [NUL] |

| Term |

a: Communication speed
     0: 2400 bps
     1: 4800 bps
     2: 9600 bps
     3: 19200 bps

b: Data length
     0: 7 bits
     1: 8 bits

c: Stop bit length
     0: 1 bit
     1: 2 bits

d: Parity
     0: None
     1: Even
     2: Odd

| Explanation | The settings by this command take effect immediately after this command has been analyzed. (A restart of the printer is not required.) This command is stored into memory and is retained even if the power is turned OFF.

When a communication error occurs on the internal serial interface, the ON LINE LED goes off and the ERROR LED goes ON.

| Example | To set the communication speed, the data length, the stop bit length, and the parity to 9600 bps, 8 bits, 1 bit, and even parity, respectively.

   [ESC] IZ; 2, 1, 0, 1 [LF] [NUL]

6.3.35 PARAMETER SET COMMAND   [ESC] Z2; 1

Function	Sets each parameter on the printer.

Format	[ESC] Z2; 1, abcdefghijjkllmmnnopqrrstuuvwxyzabcd [LF] [NUL]

Term	a:	Character code selection

a: Character code selection
- 0: PC-850
- 1: PC-852
- 2: PC-857
- 3: PC-8
- 4: PC-851
- 5: PC-855
- 6: PC-1250
- 7: PC-1251
- 8: PC-1252
- 9: PC-1253
- A: PC-1254
- B: PC-1257
- C: LATIN9
- D: Arabic
- E: PC-866
- F: UTF-8

b: Character "0" selection
- 0: 0 (without slash)
- 1: 0̸ (with slash)

c: RS-232C communication speed
- 0: 2400 bps
- 1: 4800 bps
- 2: 9600 bps
- 3: 19200 bps
- 4: 38400 bps
- 5: 115200 bps

d: RS-232C data length
- 0: 7 bits
- 1: 8 bits

e: Stop bit length
- 0: 1 bit
- 1: 2 bits

f: RS-232C parity check
- 0: NONE
- 1: EVEN
- 2: ODD

g: RS-232C flow control
  0: XON/XOFF protocol
    (XON is not output at a power on time, and XOFF is not output at a power off time.)
  1: READY/BUSY (DTR) protocol
    (XON is not output at a power on time, and XOFF is not output at a power off time.)
  2: XON/XOFF + READY/BUSY (DTR) protocol:
    (XON is output at a power on time, and XOFF is output at a power off time.)
  3: XON/XOFF protocol:
    (XON is output at a power on time, and XOFF is output at a power off time.)
  4: RTS protocol
    (XON is not output at a power on time, and XOFF is not output at a power off time.)

h: Automatic forward feed standby after an issue
  0: OFF (Not performed)
  1: ON (Performed)

i: Forward feed standby fine adjustment direction
  +: Increases the amount of the forward feed
  −: Decrease the amount of the forward feed

jj: Fine adjustment value for the forward feed standby
  00 to 50 (in units of 0.1 mm, in steps of 0.5 mm) [*1]

k: Type of control code
  0: Automatic selection
  1: ESC, LF, NUL mode
  2: {, |, } mode
  3: Any set code mode

ll: 1st byte code of the control code [*2]
  "00" to "FF" (Specify the hex code in 2-byte ASCII code.) [*3]

mm: 2nd byte code of the control code [*2]
  "00" to "FF" (Specify the hex code in 2-byte ASCII code.) [*3]

nn: 3rd byte code of the control code [*2]
  "00" to "FF" (Specify the hex code in 2-byte ASCII code.) [*3]

o: Strip wait status selection
  0: OFF (No selection)
  1: ON (with selection)

p: [FEED] key function
  0: FEED: Feeds one label.
  1: PRINT: Prints data of the image buffer on one label.

q: Kanji code selection
  0: TYPE1
  1: TYPE2

rr: Euro code setting
  "20" to "FF" (Specify the hexadecimal code in 2-byte ASCII code) [*3]

s: Automatic head broken dots check

     0: OFF (An automatic broken dots check is not performed when the power is turned on.)

     1: ON   (An automatic broken dots check is performed when the power is turned on.)

t: Centronics ACK/BUSY timing setting

     0: TYPE1

     1: TYPE2

u: Web printer function setting

     0: OFF (Web printer function is disabled.)

     1: ON   (Web printer function is enabled.)

y: Reset process when the nInit signal is ON

     0: OFF (Reset process is not performed.)

     1: ON   (Reset process is performed.)

w: Ribbon near end detection setting

     0: Not detected.

     1: Detected when the remaining length of the ribbon is 30 m.

     2: Detected when the remaining length of the ribbon is 70 m.

x: Expansion I/O operation mode setting

     0: Standard mode

     1: In-line mode

y: Plug-and-play operation mode setting

     0: OFF (Plug-and-play operation is disabled.)

     1: ON   (Plug-and-play operation is enabled.)

z: Label end/ribbon error process setting

     0: TYPE1 (When the label end state is detected, the printer stops even if it is printing a label.)

     1: TYPE2 (When the label end state is detected, the printer stops after it completes printing a label.)

a: Pre-strip process setting

     0: OFF (The pre-strip process is not performed.)

     1: ON   (The pre-strip process is performed.)

b: Reverse feed speed setting

     0: 3 ips

     1: 2 ips

c: MaxiCode specification setting

     0: TYPE1 (Compatible with the current version)

     1: TYPE2 (Special specification)

d: Strip motor torque

     0: Low

     1: ↑

     2: ↓

     3: High

(1)   This command is not executed until the printer enters an idle state.

(2)   With some exceptions, the parameters set by this command take effect when the power is turned on or the printer is reset.

*1:   This fine adjustment value is set only when parameter "h" (Forward feed standby after an issue) is set to "1" (Performed).   If it is set to "0" (Not performed), this value is discarded.

*2   This fine adjustment value is set only when parameter "k" (Type of the control code) is set to "3" (Any set code mode).   If it is set to any value other than "3", this value is discarded.

*3   The hexadecimal codes are set in 2-byte ASCII code as shown below:
    Example 1: To set 36H: "36" (33H, 36H)
    Example 2: To set 42H: "42" (34H, 32H)
    Example 3: To set FFH: "FF" (46H, 46H)

6.3.36 FINE ADJUSTMENT VALUE SET COMMAND [ESC] Z2; 2

| Function | Sets various fine adjustment values on the printer. |

| Format | [ESC] Z2; 2, abbbcdddeffghhhijjkllmnnoppqqrr [LF] [NUL] |

| Term |

a: Indicates the direction, forward or backward, in which a feed amount fine adjustment is to be made.
   +: Backward
   −: Forward

bbb: Feed amount fine adjustment value
   000 to 500 (in units of 0.1 mm, in steps of 0.5 mm)

c: Indicates the direction, forward or backward, in which a cut position (or strip position) fine adjustment is to be made.
   +: Backward
   −: Forward

ddd: Fine adjustment value for the cut position (or strip position)
   000 to 500 (in units of 0.1 mm, in steps of 0.5 mm)

e: Indicates whether the reverse feed is to be increased or decreased.
   +: Increase
   −: Decrease

ff: Reverse feed amount fine adjustment value
   00 to 95 (in units of 0.1 mm, in steps of 0.5 mm)

g: Indicates the direction, left or right, in which the X-coordinate fine adjustment is to be made.
   +: Positive direction (Right)
   −: Negative direction (Left)

hhh: X-coordinate fine adjustment value
   000 to 995 (in units of 0.1 mm, in steps of 0.5 mm)

i: Indicates whether to increase or decrease the density in the thermal transfer print mode.
   +: Increase (darker)
   −: Decrease (lighter)

jj: Print density fine adjustment value (for the thermal transfer print mode)
   00 to 10 (in units of 1 step)

k: Indicates whether to increase or decrease the density in the direct thermal print mode.
   +: Increase (darker)
   −: Decrease (lighter)

ll: Print density fine adjustment value (for the direct thermal print mode)
   00 to 10 (in units of 1 step)

m: Fine adjustment direction for the ribbon take-up motor voltage
   −: Fixed as Negative   (The voltage is lowered.)

nn: Fine adjustment value for the ribbon take-up motor voltage
   00 to 15 (in units of 1 step)

o: Fine adjustment direction for the ribbon feed motor voltage
   −: Negative   (The voltage is lowered.)

pp: Fine adjustment value for the ribbon feed motor voltage
   00 to 15 (in units of 1 step)

qq: Reflective sensor manual threshold fine adjustment value
   00 to 40 (in units of 0.1 V)

rr: Transmissive sensor manual threshold fine adjustment value
   00 to 40 (in units of 0.1 V)

Explanation (1) This command is not executed until the printer enters an idle state.

(2) With some exceptions, the parameters set by this command take effect when the power is turned on or the printer is reset.

6.3.37 BATCH RESET COMMAND [ESC] Z0 ^(zero)

Function	Resets the printer.

Format	[ESC] Z0 [LF] [NUL]

Explanation	• This command is not executed until the printer enters an idle state.

• Some values in the Parameter Set Command ([ESC] Z2;1) and the Fine Adjustment Value Set Command ([ESC] Z2;2), will take effect when the printer is initialized. This command should be sent after the Parameter Set Command ([ESC] Z2;1) or Fine Adjustment Value Set Command ([ESC] Z2;2) is sent.

7. CONTROL CODE SELECTION

(1) Automatic Selection

This printer automatically selects [ESC] (1BH). [LF] (0AH). [NUL] (00H) or {(7BH). | (7CH).} (7DH) as an interface command control code.   After the power is turned on, the program checks the data from the host for [ESC] and { and assumes the code whichever has been sent first to be a control code.

For example, if [ESC] is sent first after the power is turned on, [ESC]. [LF]. [NUL] becomes a control code, and if "{" is sent first, { | } becomes a control code.   Control code selection is made for every command.   If the control code of the first command is [ESC] ~ [LF] [NUL], followed by [ESC], the control code becomes [ESC]. [LF]. [NUL].   In the same way, if the first command is followed by "{", the control code for the next command becomes { | }.   When { | } is the control code, the data of 00H to 1FH between "{" and "| }" is ignored.   However, the data of 00H to 1FH becomes valid while processing the Graphic Command or the Bit Map Writable Character Command in hexadecimal mode.   When { | } is the control code, { | } cannot be used in the data of the Data Command or the Message Display Command.
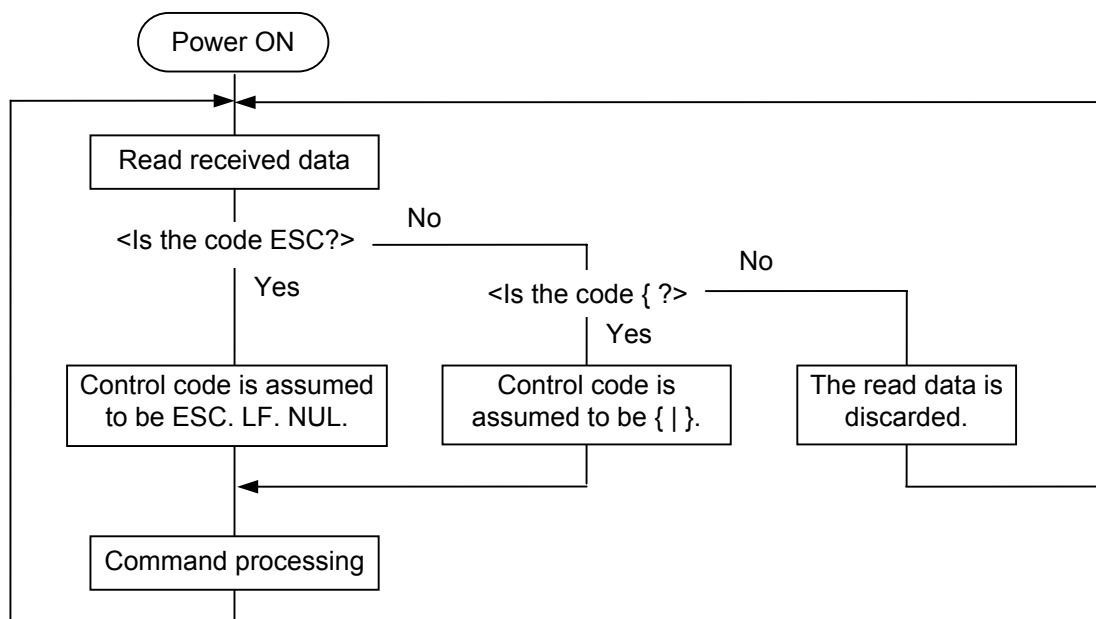
(2) Manual Selection (ESC. LF. NUL)

The control code of the command is [ESC] (1BH). [LF] (0AH). [NUL] (00H), and the control code selection is not performed.

(3) Manual Selection ({ | })

The control code of the command is {(7BH). | (7CH).} (7DH), and the control code selection is not performed.   Data of 00H to 1FH is ignored and discarded in this mode.   However, data of 00H to 1FH becomes valid while processing the Graphic Command or the Bit Map Writable Character Command in hexadecimal mode.   When { | } is used as the control code, { | } cannot be used in the data of the Data Command or the Message Display Command.

(4) Manual Selection (Any set code)

The control code of the command is the code set by using the printer setting tool, and the control code selection is not performed.   The code used in each command should not be set as the control code.

In the Data Command or the Message Display Command, the code set as the control code cannot be used.

8. ERROR PROCESSING

If the printer detects any of the following errors, it indicates the error message (LCD, LED), returns status response (serial interface, parallel interface), and stops its operation.

8.1 COMMUNICATION ERRORS

(1) Command Errors

An error results if a command length error, command transmission sequence error, command format error, or parameter designation error is found in analyzing the command. An error also results if the Format Command of a field is not transmitted and its Data Command is transmitted. An attempt to call a PC Save Command of an unsaved save identifier results in an error. An undefined command is not detected as an error, and data is discarded until [ESC] or [{] is received.

(2) Hardware Errors

A hardware error results if a framing error or parity error is found when receiving data through the serial interface (RS-232C).

* At the moment when a command error or hardware error occurs, the printer shows the error message and returns a status response before it stops. Any commands except the Status Request Command and Reset Command are not processed. When the printer is restored by the [RESTART] key, the printer enters the initial state which is obtained after the power is turned on.

8.2 ERRORS IN ISSUING OR FEEDING

(1) Paper Jam

① When the relation between the programmed label (or tag) pitch (A) and the label (or tag) pitch detected by the sensor (B) is not applicable to the following formula, an error will result:

(A) × 50% ≤ (B) ≤ (A) × 150%

   • A paper jam has occurred during paper feed.
   • The paper has not been placed properly.
   • The label used does not match the type of the sensor.
   • The reflective sensor position is not aligned with the black mark.
   • The actual label size does not meet the designated label length.
   • Label-to-label gap cannot be detected due to a preprint.
   • The sensor has not been properly adjusted.
     (The sensor has not been adjusted using the label to be used.)

② If the stripped label is not detected by the strip sensor when printing or feeding is completed in the strip mode, an error will result.

(2) Cutter Error

If the status of the cutter home position sensor has not changed for 1.5 sec. or more since the cutter motor was driven, an error will result.

⌈ • A paper jam has occurred at the cutter.   (The cutter does not return to the home position.)
⌊ • The cutter does not move from the home position.

(3) Label End

Error processing differs depending on the setting of label end/ribbon error process specified by using the printer setting tool.

When TYP1 is selected (default):

① When the transmissive sensor or the reflective sensor detects a continuous 3-mm long label end state, an error will result.

② When an issue, a feed, or an ejection is attempted in a printer stop state while the transmissive sensor or the reflective sensor is detecting the label end state, an error will result.

When TYP2 is selected:

① When the transmissive sensor or the reflective sensor detects a continuous 3-mm long label end state, the printer completes the printing in progress, and then an error will result when the next label comes to the home position.

② When an issue, a feed, or an ejection is attempted in a printer stop state while the transmissive sensor or the reflective sensor is detecting the label end state, an error will result.

(4) Ribbon Error

When the ribbon rotational speed, detected by the ribbon take-up motor sensor and the ribbon feed motor sensor, is abnormal, an error will result.

- An error occurred in the sensor which determines the torque for the ribbon motor.
- A ribbon jam occurred.
- The ribbon has been broken/torn.
- A ribbon is not installed.

The printer stops in accordance with the label end/ribbon error handling setting specified by using the printer setting tool.

① When TYP1 is selected (default):

With the ribbon being selected, an error will result when the ribbon rotational speed is abnormal.

② When TYP2 is selected:

With the ribbon being selected, the printer operation differs depending on the unfinished label length at the moment the ribbon rotational speed is abnormal:

If the unfinished label length is 30 mm or more, the printer prints the label for 20 mm before the error takes place.

If the unfinished label length is less than 30 mm, the printer completes the unfinished label and stops printing when the next label comes to the home position.

(5) Head Open Error

① If the head open sensor detects continuous 5-mm head open state, an error will result.

② If the head open sensor detects a head open state when an issue, a feed, or an ejection is attempted in a printer stop state, an error will result.

③ If the head open sensor detects continuous 5-mm head up state, an error will result.

④ If the head open sensor detects a head up state when an issue, a feed, or an ejection is attempted in a printer stop state, an error will result.   However, a feed operation using the [FEED] key or an issue or feed by an expansion I/O device is excluded.

(6) Thermal Head Error

① A broken element error has occurred on the thermal head.

② An error has occurred on the thermal head driver.

(7) Thermal Head Excessive High Temperature

① When the ambient temperature detection thermistor detects an excessively high temperature (61 °C or more), an error will result.

② When the thermal head temperature detection thermistor detects an excessively high temperature (80°C or more), an error will result.

(8) Front Cover Open Error

① If the front cover open sensor detects continuous 5-mm cover open state, an error will result.

② If the front cover open sensor detects the cover open state when an issue, a feed, or an ejection is attempted in a printer stop state, an error will result.

* At the moment an error occurs, the error LED lights up, a printer status is sent, and the printer stops.   Only the Status Request Command and the Reset Command can be processed.   Other commands are not processed.   Restoration by the [PAUSE] key is possible except in case of a thermal head excessive temperature error.   (The printer resumes printing the label at which the error had occurred.)

8.3 ERRORS IN WRITABLE CHARACTER AND PC COMMAND SAVE MODES

(1) Write Error

• An error has occurred in writing data in the flash memory.

(2) Format Error

• An erase error has occurred in formatting the flash memory.

(3) Memory Full

• Further data storing is impossible because of insufficient space in the flash memory.

* At the moment when an error occurs, the error LED lights up, a printer status is sent, and the printer stops.   The Status Request Command and the Reset Command only can be processed and other commands are not processed.   Restoration by the [PAUSE] key is impossible.

8.4 SYSTEM ERRORS

(1) Momentary Power Interruption Error

• A momentary power interruption has occurred.

(2) Address error

• A command has been fetched from an odd address.
• Word data has been accessed from a place other than the boundary of the word data.
• Long word data has been accessed from a place other than the boundary of the long word data.

(3) General invalid command exception

• An undefined command in a place other than the delay slot has been decoded.

(4) Slot invalid exception

• An undefined command in the delay slot has been decoded.
• A command which rewrites the data in the delay slot has been decoded.

* At the moment when an error occurs, the error LED lights up and the printer stops.   (None of the commands and key operations will be processed.)

(5) EEPROM Error

• The back-up EEPROM cannot be read/written properly.

8.5 RESET PROCESSING

When the [PAUSE] key is held down for more than 3 seconds during an error which is restorable by the [PAUSE] key or during a pause state, the printer returns to the initial status which is obtained after the power is turned on.

9. STATUS RESPONSE

9.1 FUNCTIONS

There are three kinds of status response functions.

(1) Status transmission at the end of a normal issue or the occurrence of an error (automatic status transmission)

This function is available for the RS-232C interface, socket communication (during connection).

If the option "status response is returned." has been selected, the printer sends the status to the host computer when the printer performs a feed or completes an issue normally. (For the batch/cut mode: after the designated number of labels has been printed. For the strip mode: after one label has been printed.) In the online mode, a head-up or head-down status is sent to the host computer.

When an error occurs, the status is sent to the host computer.

The remaining print count included in the status response indicates the number of unprinted labels of the batch currently in progress only. No remaining count of the batch waiting to be printed is transmitted.

(2) Status transmission in response to a status request (Status Request Command)

This function is available for the RS-232C, USB, and socket communications.

Upon receipt of the Status Request Command, the printer sends the latest status indicating its current state to the host computer, regardless of the status response parameter setting. The remaining print count included in the status response indicates the number of unprinted labels of the batch currently in progress only. No remaining count of the batch waiting to be printed is transmitted. This command is not stored in the receive buffer, but executed immediately after received.

(3) Receive buffer free space status transmission in response to a status request
(Receive Buffer Free Space Status Request Command)

This function is available for the RS-232C, USB, and socket communications.

Upon receipt of the Receive Buffer Free Space Status Request Command, the printer sends the latest status indicating its current state to the host computer, regardless of the status response parameter setting. The remaining print count included in the status response indicates the number of unprinted labels of the batch currently in progress only. No remaining count of the batch waiting to be printed is transmitted. This command is not stored in the receive buffer, but executed immediately after received.

• Strip wait status

The strip wait status (05H) returned to the Status Request Command depends on the selection by the printer setting tool.

When the strip wait status is set to "1 (OFF)":

If the Status Request Command is sent while a label is on the strip shaft (for example, while idling, after feeding a label, or after printing all specified number of labels), the printer returns (00H) to the host.

When the strip wait status is set to "2 (ON)" :

If the Status Request Command is sent while a label is on the strip shaft (for example, while idling, after feeding a label, or after printing all specified number of labels), the printer returns (05H) to the host.

If the Status Request Command is sent while a label is being printed or issued, the strip wait status (05H) is returned regardless of the strip wait status setting.

9.1.1 STATUS FORMAT

SOH	STX	Status			Remaining count				ETX	EOT	CR	LF
01H	02H	3XH	3XH	3XH	3XH	3XH	3XH	3XH	03H	04H	0DH	0AH

Remaining count
- 0000 to 9999
  (Fixed to 0000 in the save mode)

Type of status
- "1" (31H) (In response to a Status Request Command)
- "2" (32H) (Automatic status transmission)
- "3" (33H) (Receive buffer free space status request)

Detail status
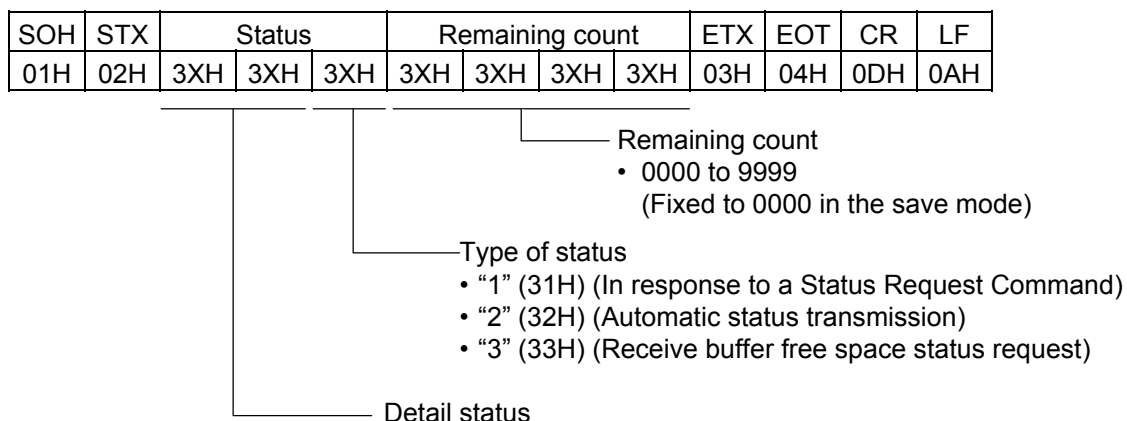
Status to be returned in response to the Receive Buffer Free Space Status Request Command

SOH	01H	Header of the status block
STX	02H	
Status	3XH	Printer status
	3XH	* Details are described later.
Status type	33H	Indicates the receive buffer free space capacity is included.
Remaining count	3XH	Remaining print count
	3XH	* Details are described later.
	3XH	
	3XH	
Length	3XH	Total number of bytes of this status block.
	3XH	
Free space of receive buffer	3XH	Free space of the receive buffer
	3XH	"00000" (0K byte) to "99999" (99999K bytes)
	3XH	However, the maximum value should be equal to the receive
	3XH	buffer capacity.
	3XH	
Receive buffer capacity	3XH	Receive buffer capacity
	3XH	"00000" (0K byte) to "99999" (99999K bytes)
	3XH	However, the maximum value differs depending on the models.
	3XH	
	3XH	
CR	0DH	Footer of the status block.
LF	0AH	

9.1.2   DETAIL STATUS

Printer Status	Detail Status	
	Auto Status Transmission	Status Request Command
The print head is closed in the head open state.	00	00
The print head is opened in the online mode.	01	01
Operating (Analyzing command, drawing, printing, feeding)	–	02
In a pause state	–	04
A label is waiting to be stripped.	–	05
A command error has been found in analyzing the command.	06	06
A parity error or framing error has occurred during communication by RS-232C	07	07
A paper jam has occurred during a paper feed.	11	11
An abnormal condition has occurred at the cutter.	12	12
The paper has run out.	13	13
An attempt was made to feed or issue with the print head opened (except the [FEED] key).	15	15
A broken element has been found on the print head.	17	17
The print head temperature has become excessively high.	18	18
An abnormal condition has occurred in the sensor which determines the torque of the ribbon motor.	21	21
Ribbon near end state (Online)	–	27
Ribbon near end state (In a pause state)	–	28
Ribbon near end state (Operating)	–	29
A label issue has been completed normally.	40	–
A feed has been completed normally.	41	–
A head broken dots check has been completed normally.	00	–
In writable character or PC command save mode	–	55
An error has occurred in writing data into the flash memory.	50	50
An erase error has occurred in formatting the flash memory.	51	51
Saving failed because of insufficient space in the flash memory.	54	54

9.1.3   SUMMARY OF STATUS RESPONSE

Interface	Status transmission timing	Status size
RS-232C	Automatic status transmission	13 bytes
	Reception of [ESC] WS [LF] [NUL]	13 bytes
	Reception of [ESC] WB [LF] [NUL]	23 bytes
USB	Automatic status transmission	N/A
	Reception of [ESC] WS [LF] [NUL]	13 bytes
	Reception of [ESC] WB [LF] [NUL]	23 bytes
Socket communications	Automatic status transmission	13 bytes
	Reception of [ESC] WS [LF] [NUL]	13 bytes
	Reception of [ESC] WB [LF] [NUL]	23 bytes

9.2 PARALLEL INTERFACE SIGNALS

9.2.1 COMPATIBILITY MODE

Printer Status	Output Signal			
	Busy	Select	nFault	PError
In the online mode	L	H	H	L
In the online mode (communicating)	L, H	H	H	L
The print head is opened in the online mode.	H	L	L	L
In a pause state	H	L	L	L
Data has been set from the host while the receive buffer is full.	H	H	H	L
After data was set from the host with the receive buffer full, some data was processed and the buffer has free space.	L	H	H	L
Initialize process is in progress. (After the power is turned on or the nInit signal is received.)	H	H	H	L
A command error has occurred in analyzing the command.	H	L	L	L
A paper jam has occurred during a paper feed.	H	L	L	L
An abnormal condition has occurred at the cutter.	H	L	L	L
The paper has run out.	H	L	L	H
A feed or an issue was attempted with the print head opened (except the [FEED] key).	H	L	L	L
A broken element has been found on the print head.	H	L	L	L
The print head temperature has become excessively high.	H	L	L	L
An abnormal condition has occurred on the sensor which determines the torque of the ribbon motor.	H	L	L	L
Ribbon near end state (Online)	L	H	H	L
Ribbon near end state (In a pause state)	H	L	L	L
Ribbon near end state (Operating)	L	H	H	L
In writable character or PC command save mode	L	H	H	L
An error has occurred in writing data into the flash memory.	H	L	L	L
An erase error has occurred in formatting the flash memory.	H	L	L	L
Saving failed because of insufficient space in the flash memory.	H	L	L	L
The flash memory is being initialized. (Initialization is carried out for approximately 15 seconds.)				
A momentary power interruption has occurred.	H	L	L	L
A back-up EEPROM cannot be read/written properly.	H	L	L	L
(a) A command has been fetched from an odd address. (b) Word data has been accessed from a place other than the boundary of the word data. (c) Long word data has been accessed from a place other than the boundary of the long word data. (d) An undefined command in a place other than the delay slot has been decoded. (e) An undefined command in the delay slot has been decoded. (f) A command which rewrites the data in the delay slot has been decoded.	H	L	L	L

10. KEY OPERATION

10.1 OPERATION PANEL
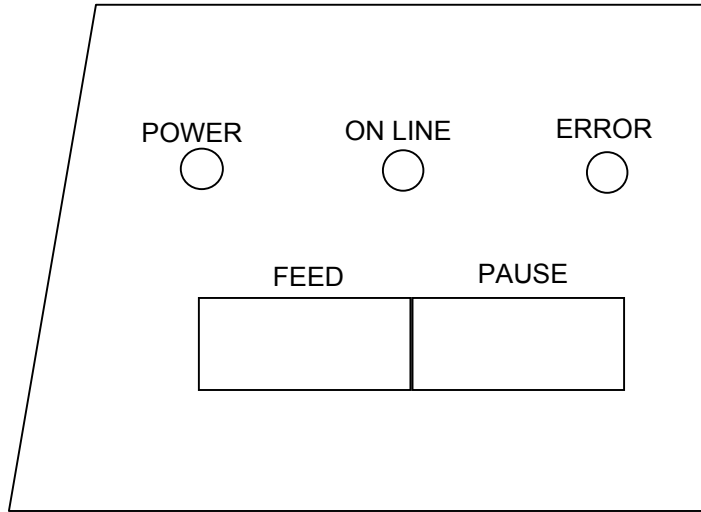
10.2 ONLINE MODE

10.2.1 Key Function

[FEED] key: Feeds or ejects one label.   This key is also used to adjust a label to a proper position.   When the label is not properly positioned, feed one or two blank labels using this key before printing so that the printer can start printing at the proper position.

[PAUSE] key: Stops printing temporarily, resumes printing after a pause or an error.

10.2.2 LED Functions

[POWER] LED: Indicates that the printer power is on.

[ON LINE] LED: Indicates that the printer is ready for communication.

[ERROR] LED: Indicates that the printer is in an error state.

10.2.3 Example of ON LINE Mode Operation
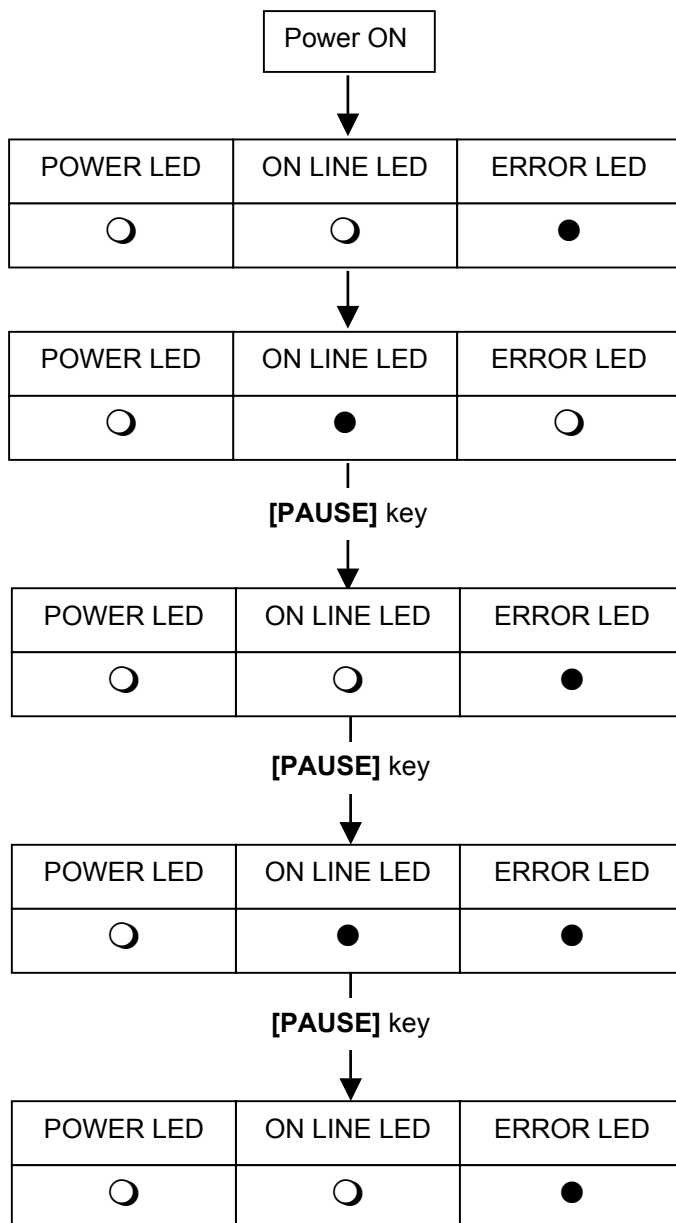
```
┌─────────────┐
│  Power ON   │
└─────────────┘
       │
       ▼
```

POWER LED	ON LINE LED	ERROR LED
○	○	●

The printer is in idle state or printing.

An error occurs.

POWER LED	ON LINE LED	ERROR LED
○	●	○

When an error occurs while issuing labels, the LED state changes as indicated on the left and the printer stops.

[PAUSE] key

Re-load the label roll, and press the [PAUSE] key.

POWER LED	ON LINE LED	ERROR LED
○	○	●

The label issue is restarted.

[PAUSE] key

Press the [PAUSE] key.

POWER LED	ON LINE LED	ERROR LED
○	●	●

When the [PAUSE] key is pressed while issuing labels, the LED state changes as indicated on the left, and the printer enters the pause state.

[PAUSE] key
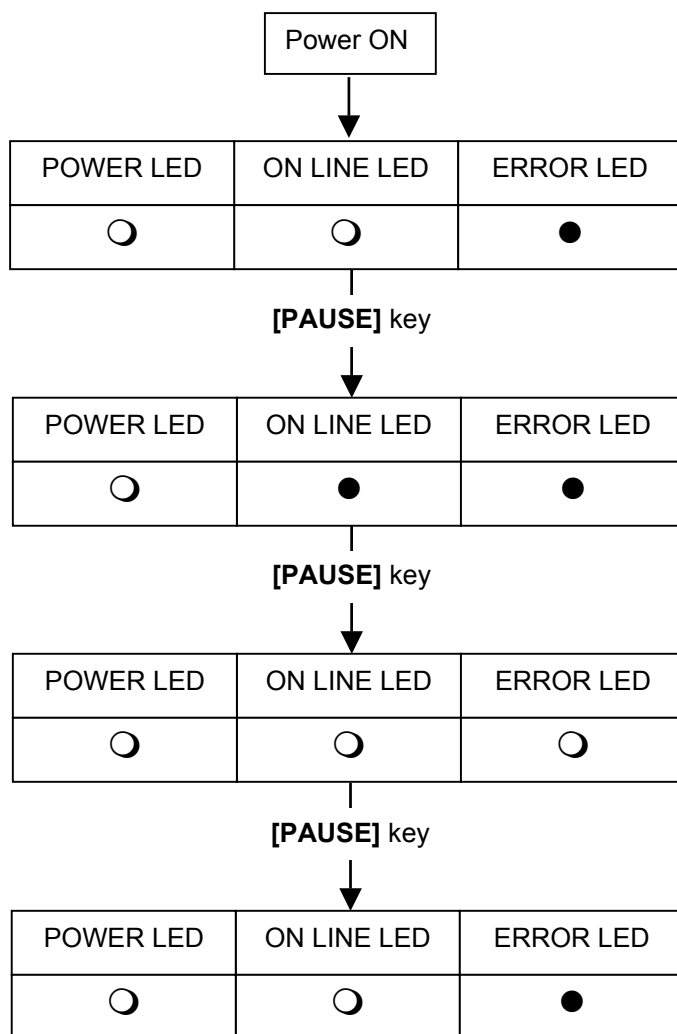
Press the [PAUSE] key.

POWER LED	ON LINE LED	ERROR LED
○	○	●

The label issue is restarted.

○： The LED is illuminated.

◉: The LED is flashing.

●： The LED is unlit.

10.2.4 Reset

Power ON

↓

POWER LED	ON LINE LED	ERROR LED
○	○	●

(1) The printer is in idle state or printing.

[PAUSE] key

↓

(2) Press the [PAUSE] key.

POWER LED	ON LINE LED	ERROR LED
○	●	●

(3) The printer enters the pause state. When the [PAUSE] key was pressed while the printer was issuing labels, the label issue is stopped.

[PAUSE] key

↓

(4) Hold down the [PAUSE] key for 3 seconds or more.

POWER LED	ON LINE LED	ERROR LED
○	○	○

(5) The printer enters the reset mode.

[PAUSE] key

↓

(6) Press the [PAUSE] key.

POWER LED	ON LINE LED	ERROR LED
○	○	●

(7) The printer returns to the initial state of right after a power ON.

NOTES:
1. When the printer is in a state recoverable by pressing the [PAUSE] key, hold down the [PAUSE] key for 3 seconds or more.   The printer enters a reset mode.
2. During an erroneous state or pause state, holding down and releasing the [PAUSE] key within 3 seconds causes the printer to restart printing. (Printer does not become Reset mode.)
   However, in the case of a communication error or command error, pressing the [PAUSE] key causes the printer to return to the state right after a power on.
3. After resetting the printer using the printer keys, data stored by a PC save command cannot be called automatically.

10.3 LED INDICATION

Symbols in the message

○: The LED is illuminated. ⊙: The LED is flashing. ●: The LED is unlit.

No.	LED Indication			Printer Status	Restoration by PAUSE key Yes/No	Acceptance of Status Request Reset Command Yes/No
	POWER	ONLINE	ERROR			
1	○	○	●	Online mode	-----	Yes
	○	⊙	●	Online mode (communicating)	-----	Yes
2	○	●	●	The print head block is opened in online mode.	-----	Yes
3	○	●	●	Pause state	Yes	Yes
4	○	●	○	A parity, overrun, or framing error has occurred during a communication by RS-232C.	Yes	Yes
5	○	●	○	A paper jam has occurred during paper feed.	Yes	Yes
6	○	●	○	A problem has occurred at the cutter module.	Yes	Yes
7	○	●	○	The media has run out, or the media is not loaded properly.	Yes	Yes
8	○	●	○	A feed or an issue was attempted with the print head block opened. (Except when the [FEED] key is pressed or a feed or issue order from an expansion I/O device.)	Yes	Yes
9	○	●	○	The print head has broken elements.	Yes	Yes
10	○	●	○	The print head is overheated.	No	Yes
11	○	●	○	A problem has occurred with the sensor that determines the torque for the ribbon motor.	Yes	Yes
12	○	○	●	In writable character or PC command save mode	-----	Yes
13	○	●	○	An error has occurred in writing to the flash ROM.	No	Yes
14	○	●	○	An error has occurred in formatting the flash ROM.	No	Yes
15	○	●	○	Saving failed because of an insufficient capacity of the flash ROM.	No	Yes
16	○	●	○	A command error has occurred in analyzing the command.	Yes	Yes
17	○	●	○	A momentary power failure has occurred.	No	No
18	○	●	●	The flash ROM is being initialized.	-----	-----
19	○	●	○	Data cannot be read from/written to a backup EEPROM properly.	-----	-----

No.	LED Indication			Printer Status	Restoration by PAUSE key Yes/No	Acceptance of Status Request Reset Command Yes/No
	POWER	ONLINE	ERROR			
20	❍	●	❍	When the following abnormal operations are performed, a system error occurs: (a) Command fetch from an odd address (b) Access to word data at an odd address (c) Access to long-word data at an odd address (d) Access to the area of 80000000H to FFFFFFFFH in the logic space in user mode. (e) An undefined instruction in an area other than a delay slot was decoded. (f) An undefined instruction in a delay slot was decoded. (g) An instruction to rewrite a delay slot was decoded.	No	No

10.4 DIAGNOSTIC TEST OPERATION AND TEST PRINT

10.4.1 Example of Diagnostic Test and Test Print Operations

Power ON	**[PAUSE]** key

↓

POWER LED	ON LINE LED	ERROR LED
◗	⊙	●

|

[FEED] key or **[PAUSE]** key

↓

POWER LED	ON LINE LED	ERROR LED
◗	⊙	●

[FEED] key

↓

POWER LED	ON LINE LED	ERROR LED
◗	⊙	●
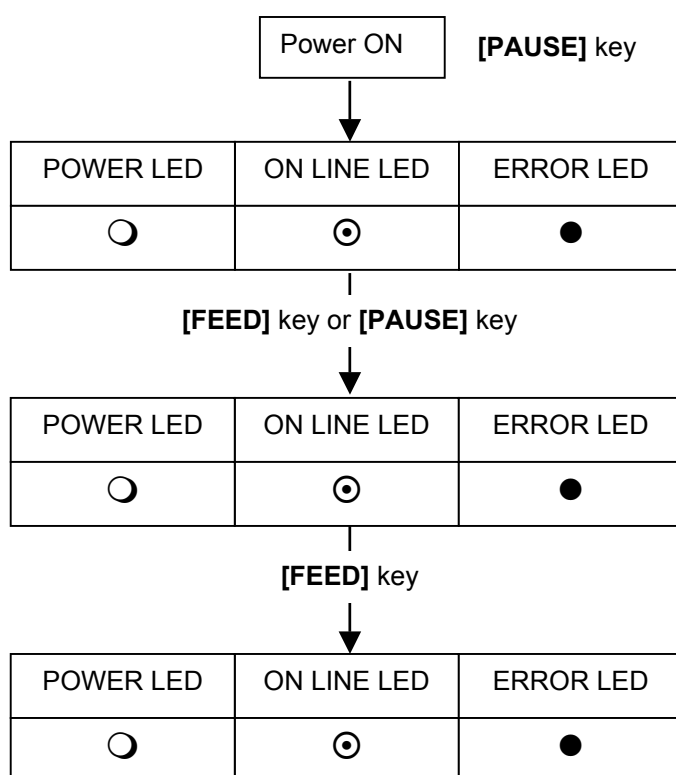
(1) The printer power is off.

(2) Turn on the power while holding down the [PAUSE] key.

(3) A diagnostic test is started.

(4) The diagnostic test is finished.

(5) Select the print method.
   [FEED] key: Thermal transfer print
   [PAUSE] key: Thermal direct print

(6) The result of the diagnostic test is printed.

(7) Press the [FEED] key.

(8) A test print is started.

(9) Turn off the printer.

Print condition

Sensor type: None

Print speed: 2"/sec.

Print count: 1

Issue mode: Batch

NOTES:

1. If an error occurs while printing the result of a self-test, an error LED lights up and printing stops.   The error is cleared by pressing the [PAUSE] key, but printing is not automatically resumed after the error is cleared.

2. Even if the printer is in an auto forward wait condition when a self-test is started, the printer does not feed the media in the reverse direction to a print start position.

3. Even if the printer is in an auto forward wait condition when a self-test is started, the printer does not feed the media for standby after the printer returns to the online mode.

4. Opening and closing the print head bock cancels the auto forward wait function.

10.4.2 Self-test Items

(1) Printing of maintenance counter values and various parameter values

① Maintenance counter values
- Total label distance covered (cannot be cleared)
- Label distance covered
- Print distance
- Cut count
- Ribbon motor drive time
- RS-232C hardware error count
- System error count
- Momentary power interruption count

② Various parameter values

[Value programmed by commands]
- Feed amount fine adjustment value
- Cut (strip) position fine adjustment value
- Reverse feed amount fine adjustment value
- Print tone fine adjustment value (Thermal transfer print mode)
- Print tone fine adjustment value (Direct thermal print mode)
- Ribbon motor drive voltage fine adjustment (Take-up)
- Ribbon motor drive voltage fine adjustment (Feed)

[Value programmed using the printer setting tool]
- Feed amount fine adjustment value
- Cut (strip) position fine adjustment value
- Reverse feed amount fine adjustment value
- Print tone fine adjustment value (Thermal transfer print mode)
- Print tone fine adjustment value (Direct thermal print mode)
- Ribbon motor drive voltage fine adjustment (Take-up)
- Ribbon motor drive voltage fine adjustment (Feed)
- Reflective sensor manual threshold fine adjustment
- Transmissive sensor manual threshold fine adjustment
- X-coordinate fine adjustment value

- Character code
- Font "0"
- communication speed
- Data length
- Stop bit length
- Parity
- Flow control method
- Forward feed standby after an issue (When this parameter is set to ON, a feed amount becomes fine adjustable.)
- Control code type
- Strip wait status
- [FEED] key function
- Kanji code
- Euro code
- Automatic head broken dots check
- Centronics ACK/BUSY timing
- Web printer function
- Reset process when the nInit signal is ON
- Expansion I/O operation mode
- Plug-and-play operation
- Label end/ribbon error process
- Pre-strip process (When this parameter is set to ON, a feed amount becomes fine adjustable.)
- Reverse feed speed
- MaxiCode specification

- Keyboard I/F
- LAN enable/disable
- IP address
- MAC address
- Storage area allocation
- Socket communication port number
- BASIC interpreter
- DHCP
- Strip motor torque

(2) Automatic diagnostic test
① Memory check
- Main area (Creation date, version, checksum)
- Boot area (Creation date, version, checksum)
- HTML area (Creation date, version, checksum)
- Font area checksum
- Bit map Kanji ROM checksum
- EEPROM check
- RAM check
② Sensor check
- Strip sensor
- Thermal head open sensor
- Cutter home position sensor
- Ribbon take-up motor sensor
- Ribbon feed motor sensor
- Thermal head thermistor
- Ambient temperature sensor
- Reflective sensor
- Transmissive sensor
- No paper level
- Manual threshold level
③ Thermal head check
- Thermal head resistance rank
- Resolution
④ Expansion I/O loop back check
⑤ Internal serial interface loop back check
⑥ SIO loop back check
⑦ Strip sensor check

10.4.3 Sample Print of Maintenance counter and parameter Settings

(1) Maintenance counter values and various parameter values

```
TOTAL FEED              1.1km       [QM]
FEED                    1.1km
PRINT                   0.5km
CUT                     96
RIBBON                  3h
232C ERR                0
SYSTEM ERR              0
POWER FAIL              0
[PC]                         [KEY]
FEED          +2.0mm         FEED          +0.0mm
CUT           +0.0mm         CUT           +1.0mm
BACK          +0.0mm         BACK          +0.0mm
TONE(T)       +0 step        TONE(T)       +0 step
TONE (D)      +0 step        TONE(D)       +0 step
RBN(FW)       -10            RBN (FW)      -8
RBN (BK)      +0             RBN (BK)      +0
X ADJ.        +0.0mm
THRESHOLD (R)           1.0V
THRESHOLD (T)           1.4V
FONT                    [PC-850]    [0]
SPEED                   [9600]
DATA LENG.              [8]
STOP BIT                [1]
PARITY                  [EVEN]
CONTROL                 [XON+READY AUTO]
FORWARD WAIT            [ON]+0.0mm
CODE                    [AUTO]
PEEL OFF STATUS         [ON]
FEED KEY                [FEED]
KANJI                   [TYPE1]
EURO CODE               [B0]
AUTO HD CHK             [OFF]
ACK/BUSY                [TYPE1]
WEB PRINTER             [OFF]
INPUT PRIME             [ON]
RIBBON NEAR END         [OFF]
EX. I/O MODE            [TYPE1]
PLUG & PLAY             [OFF]
LBL/RBN END             [TYPE1]
PRE PEEL OFF            [OFF] +0.0mm
BACK SPEED              [STD]
MAXI CODE SPEC.         [TYPE1]
KB I/F                  [OFF]
LAN                     [ON]
PRTR IP ADDRESS         [192.168.010.020]
GATE IP ADDRESS         [000.000.000.000]
SUBNET MASK             [255.255.255.000]
MAC ADDRESS             [00-80-91-34-00-CC]
TTF AREA                [1280KB]
EXT CHR AREA            [256KB]
BASIC AREA              [128KB]
PC SAVE AREA            [128KB]
SOCKET PORT             [OFF][08000]
BASIC                   [OFF]
DHCP                    [OFF]
DHCP ID                 [FFFFFFFFFFFFFFFFFFFF]
                        [FFFFFFFFFFFF]
DHCP HOST NAME          [ABCDEFGHIJKLMNOP]
PEEL OFF TRQ            [R0]
```

NOTES: *Print conditions:*

*Label length of 220 mm, thermal transfer/direct thermal print mode[*1], no sensors used, 4 ips, one-label issue, batch issue*

   (*1)Depends on the print type setting.

(2) Automatic self-test

```
PROGRAM    B-450-R
   MAIN    15OCT2005 V1.0A: 1A00
   BOOT    20SEP2005 V1.0: 8500
   HTML    20SEP2005 V1.0:   8500
FONT       AE00
KANJI      GOTHIC: 9900
           MINCHO: 1E00
EEPROM     OK
SDRAM      16MB
SENSOR1    00000000, 00000111
SENSOR2    [H]23°C        [A]22°C
           [R]4.2V        [T]2.5V
PE LV.     [R]1.2V        [T]4.3V
M THRE.    [R]5.0V        [T]5.0V
           [RANK]1        300DPI
EXP.I/O    NG
EX.232C    NG
SIO        NG   NG
STRIP      NG
```

NOTES: 1. Print conditions: *Label length of 87 mm, thermal transfer/direct thermal print mode[*1], no sensors used, 4 ips, one-label issue, batch issue*

*(*1) Depends on the ribbon setting.*

2. *"°" used for "°C" may not be printed correctly, depending on the type of the character code selected.*

10.4.4 Details of Self-test Result

(1) Maintenance counter values

Item	Description	Range
TOTAL FEED	Total label distance covered (cannot be cleared)	0.0 to 3200.0 km
FEED	Label distance covered	0.0 to 3200.0 km
PRINT	Print distance	0.0 to 200.0 km
CUT	Cut count	0 to 1000000
RIBBON	Ribbon motor drive time	0 to 2000 hours
232C ERR	RS-232C hardware error count	0 to 255
SYSTEM ERR	System error count	0 to 15
POWER FAIL	Momentary power interruption count	0 to 15

Maintenance Counter	Count Conditions
Total label distance covered Label distance covered	Counts whenever the paper feed motor is driven to feed or print a label. (Counts also during a reverse feed operation.) When the power is turned off, a label distance of up to 50.0 cm may be rounded down and backed up.
Print distance	Counts while printing. (Counting is not performed during a backfeed operation.) When the power is turned off, a print distance of 5.5 m or less is rounded down and backed up.
Cut count	Every cut operation is counted. When the power is turned off, a cut count of 31 or less is rounded down and backed up.
Ribbon motor drive time	Counts when the ribbon motor is driven to feed or print a label. (Counts also during a backfeed operation.) When the power is turned off, a drive time of 27 seconds or less is rounded down and backed up.
RS-232C hardware error count	Counts when a parity error, an overrun error, or a framing error occurs. * When data of several bytes is transmitted continuously, counting is performed per byte.
System error count	Counts when a system error occurs.
Momentary power interruption count	Counts when a momentary power interruption occurs.

(2) Various parameters values

Item	Description	Specification
[Command] **FEED**	Feed amount fine adjustment	-50.0 mm to +50.0 mm
CUT	Cut (strip) position fine adjustment	-50.0 mm to +50.0 mm
BACK	Reverse feed amount fine adjustment	-9.9 mm to +9.9 mm
TONE(T)	Print tone fine adjustment (Thermal transfer print mode)	-10 to +10 step
TONE(D)	Print tone fine adjustment (Direct thermal print mode)	-10 to +10 step
RBN(FW)	Ribbon motor drive voltage fine adjustment (Take-up)	-15 to +0 step
RBN(BK)	Ribbon motor drive voltage fine adjustment (Feed)	-15 to +0 step
[Setting Tool] **FEED**	Feed amount fine adjustment	-50.0 mm to +50.0 mm
CUT	Cut (strip) position fine adjustment	-50.0 mm to +50.0 mm
BACK	Reverse feed amount fine adjustment	-9.9 mm to +9.9 mm
TONE(T)	Print tone fine adjustment (Thermal transfer print mode)	-10 to +10 step
TONE(D)	Print tone fine adjustment (Direct thermal print mode)	-10 to +10 step
RBN(FW)	Ribbon motor drive voltage fine adjustment (Take-up)	-15 to +0 step
RBN(BK)	Ribbon motor drive voltage fine adjustment (Feed)	-15 to +0 step
X ADJ.	X-coordinate fine adjustment	-99.9 mm to +99.9 mm
THRESHOLD\<R\>	Reflective sensor manual threshold fine adjustment	0.0 V to 4.0 V
THRESHOLD\<T\>	Transmissive sensor manual threshold fine adjustment	0.0 V to 4.0 V
FONT	Character code	PC-850: PC-850 PC-852: PC-852 PC-857: PC-857 PC-8: PC-8 PC-851: PC-851 PC-855: PC-855 PC-866: PC-866 PC-1250: PC-1250 PC-1251: PC-1251 PC-1252: PC-1252 PC-1253: PC-1253 PC-1254: PC-1254 PC-1257: PC-1257 LATIN9: LATIN9 Arabic: Arabic UTF-8: UTF-8
	Character "0"	0 : Without slash Ø : With slash

Item	Description	Specification
SPEED	RS232C communication speed	2400: 2400 bps 4800: 4800 bps 9600: 9600 bps 19200: 19200 bps 38400: 38400 bps 115200: 115200 bps
DATA LENG.	RS232C data length	7: 7 bits 8: 8 bits
STOP BIT	RS232C stop bit length	1: 1 bit 2: 2 bits
PARITY	RS232C parity	NONE: None parity ODD: ODD parity EVEN: EVEN parity
CONTROL	RS232C flow control method	XON/XOFF: XON/XOFF protocol (XON is not output when the power is on and XOFF is not output when the power is off.) READY/BUSY: READY/BUSY (DTR) protocol (XON is not output when the power is on and XOFF is not output when the power is off.) XON+READY AUTO: XON/XOFF + READY/BUSY (DTR) protocol (XON is output when the power is on and XOFF is output when the power is off.) XON/XOFF AUTO: XON/XOFF protocol (XON is output when the power is on and XOFF is output when the power is off.)) READY/BUSY RTS: RTS protocol (XON is not output when the power is on and XOFF is not output when the power is off.)
FORWARD WAIT	Forward feed standby after an issue	ON: Enabled (A fine adjustment value for the stop position is also printed.) OFF: Disabled
CODE	Control code	AUTO: Automatic selection ESC LF NUL: ESC LF NUL method { | }: { | } method ××○○△△ Any code set (Described in hex. code) IBM HOST: ⌐|⌐ method *Only for the Japan model*
PEEL OFF STS	Strip wait status	ON: Enabled OFF: Disabled

Item	Description	Specification
FEED KEY	[FEED] key function	FEED: Feeds one label. PRINT: Prints data in the image buffer on one label.
KANJI	Kanji code	TYPE1: For Windows codes TYPE2: For original codes
EURO CODE	Euro code	Optional
AUTO HD CHK	Automatic head broken dots check	ON: A head broken dots check is automatically performed when the power is turned on. OFF: A head broken dots check is not automatically performed when the power is turned on.
ACK/BUSY	Centronics ACK/BUSY timing	TYPE 1: BUSY goes low at the same time as when ACK goes high. TYPE 2: BUSY goes low at the same time as when ACK goes low.
WEB PRINTER	Web printer function	ON: Web printer function is enabled. OFF: Web printer function is disabled.
INPUT PRIME	Reset process when the nInit signal is ON	ON: The reset process is performed. OFF: The reset process is not performed.
RIBBON NEAR END	Ribbon near end detection	30 m: A ribbon near end state is detected when the remaining ribbon length is approximately 30 m. 70 m: A ribbon near end state is detected when the remaining ribbon length is approximately 70 m. OFF: A ribbon near end state is not detected.
EX.I/O MODE	Expansion I/O operation mode	TYPE1: Standard mode TYPE2: In-line mode
PLUG & PLAY	Plug-and-play operation	ON: A plug-and-play operation is performed. OFF: A plug-and-play operation is not performed.
LBL/RBN END	Label end/ribbon error process	TYPE1: When a label end or ribbon error state is detected, the printer stops even if it is printing. TYPE2: When a label end or ribbon error state is detected, the printer prints the current label as far as possible, then stops.

Item	Description	Specification
PRE PEEL OFF	Pre-strip process	ON: A pre-strip operation is performed. (When ON is selected, a feed amount is fine adjustable.) OFF: A pre-strip operation is not performed.
BACK SPEED	Reverse feed speed	STD: 3 ips LOW: 2 ips
MAXI CODE SPEC.	MaxiCode specification	TYPE1: Compatible with a current version TYPE2: Special specification
KB I/F	Keyboard I/F	OFF: Disabled KB60(1): KB-60 Old version KB60(2): KB-60 Current version KB80: KB-80
LAN	Enabling or disabling the LAN	ON: Enabled OFF: Disabled
PRTR IP ADDRESS	Printer IP address	***.***.***.***
GATE IP ADDRESS	Gateway IP address	***.***.***.***
SUBNET MASK	Subnet mask	***.***.***.***
MAC ADDRESS	MAC address	**-**-**-**-**-**
TTF AREA	TrueType font storage area size	0 KB to 3072 KB (in units of 128 KB)
EXT CHR AREA	Writable character storage area size	0 KB to 3072 KB (in units of 128 KB)
BASIC AREA	BASIC file storage area size	0 KB to 3072 KB (in units of 128 KB)
PC SAVE AREA	PC saving area size	0 KB to 3072 KB (in units of 128 KB)
SOCKET PORT	Socket communication port number	ON: Socket communication function is enabled. OFF: Socket communication function is disabled. Port number: 0 to 65535
BASIC	BASIC interpreter	ON: BASIC interpreter function is enabled. OFF: BASIC interpreter function is disabled.
DHCP	DHCP	ON: DHCP function is enabled. OFF: DHCP function is disabled.
DHCP ID	DHCP ID	Max. 16 characters
DHCP HOST NAME	DHCP HOST NAME	Max. 16 characters
PEEL OFF TRQ	Strip motor torque	R0: Low R1: ↑ R2: ↓ R3: High

(3) Memory check

Model name

PROGRAM B-450-R

MAIN 15OCT2002 V1.0A:1A00

— Checksum
— Version
— Creation date (Day-Month-Year)
— Name PROGRAM: Program area

BOOT 20SEP2002 V1.0 :8500

— Checksum
— Version
— Creation date (Day-Month-Year)
— Name BOOT: Boot area

FONT 5600

— Checksum of font area

KANJI NONE :0000 — Checksum of bit map Kanji ROM for Gothic font
NONE: No Kanji ROMs installed
GOTHIC: Bit map Kanji ROM for Gothic font installed

NONE :0000 — Checksum of bit map Kanji ROM for Mincho font (or Chinese Kanji)
NONE: No Kanji ROMs installed
MINCHO: Bit map Kanji ROM for Mincho font installed

EEPROM OK

— OK: Data in the check area can be properly read/written.
NG: Data in the check area cannot be properly read/written.

— Backup memory (EEPROM)

SDRAM 16MB

— Capacity of SDRAM
— Memory for the system and drawing

- 222 -

(4)   Sensor check

SENSOR1 00000000,00000000

      Thermal head open sensor
         1: The head is closed.
         (If the head is opened, printing is not performed.)

      Blank (Fixed to 0.)

      Cutter home position sensor
         0: Home position
         1: Outside the home position

      Blank (Fixed to 0)

      Ribbon take-up motor sensor
         0: Outside the slit
         1: Inside the slit

      Ribbon feed motor sensor
         0: Outside the slit
         1: Inside the slit

      Blank (Fixed to 0)

      Strip sensor (Peel-off sensor)
         0: Label is not present.
         1: Label is present.

      Blank (Fixed to 0)

SENSOR2 [H]20°C [A]22°C

      Ambient temperature sensor status
         (0 to 86 °C, --°C if the temperature cannot be detected)

      Thermal head thermistor status (0 to 86 °C)

[R]4.2V [T]2.5V

      Transmissive sensor status (0.0 to 5.0 V)

      Reflective sensor status (0.0 to 5.0 V)

PE LV. [R]1.2V [T]4.3V

      No paper level of the transmissive sensor (0.0 to 5.0 V)

      No paper level of the reflective sensor no paper level (0.0 to 5.0 V)

M THRE. [R]5.0V [T]5.0V

      Transmissive sensor manual threshold level (0.0 to 5.0 V)

      Reflective sensor manual threshold level (0.0 to 5.0 V)

[RANK]1 300DPI

      Resolution of head installed

      Thermal head resistance rank (0 to 15)

Thermal head resistance rank

Print Head Resistance Rank	Average Resistance (ohm)
0	1731 to 1759
1	1703 to 1730
2	1674 to 1702
3	1645 to 1673
4	1617 to 1644
5	1588 to 1616
6	1559 to 1587
7	1531 to 1558
8	1502 to 1530
9	1473 to 1501
10	1444 to 1472
11	1416 to 1443
12	1387 to 1415
13	1358 to 1386
14	1330 to 1357
15	1301 to 1329

(5) Expansion I/O check

EXP.I/O NG

OK: Normal data
NG: Abnormal data, or the loop-back jig is not connected.

Expansion I/O

* Connect the cable as illustrated below, then check the following cases: high output/high input, low output/low input.

R = 300 ohms
Connector: FCN-781P024-G/P
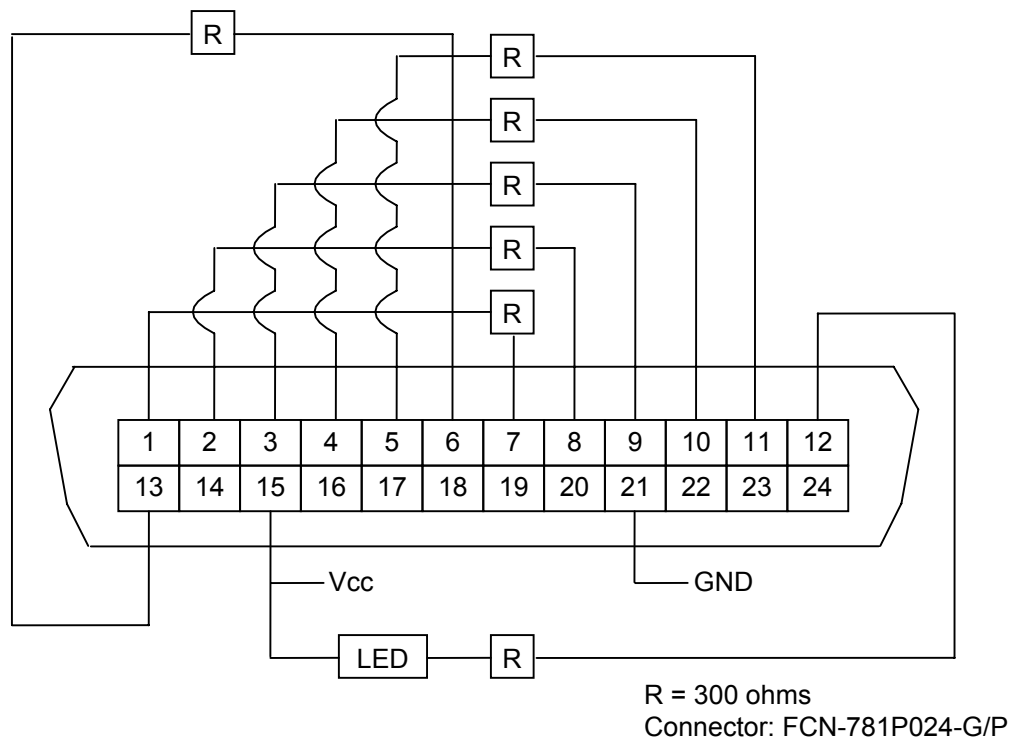
(6) Internal serial I/F check

```
EX.232C NG
          └── OK:  Normal data
              NG:  Abnormal data, or the loop-back jig is not connected.
      └── Internal serial I/F
```

(7) SIO I/F check

```
SIO NG  NG
         └── DIN   OK: Normal data
                   NG: Abnormal data, or the loop-back jig is not connected.

      └── DSUB   OK: Normal data
                 NG: Abnormal data, or the loop-back jig is not connected.

  └── SIO I/F
```

(8) Strip sensor check

```
Strip NG
        └── OK:  Normal state
            NG:  Erroneous state, or the loop-back jig is not connected.
    └── Strip sensor
```
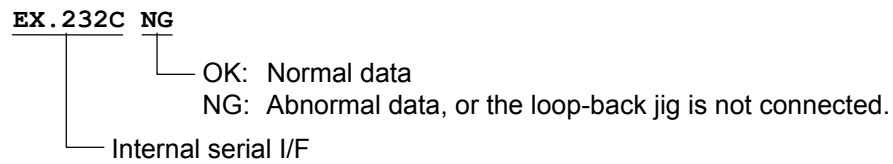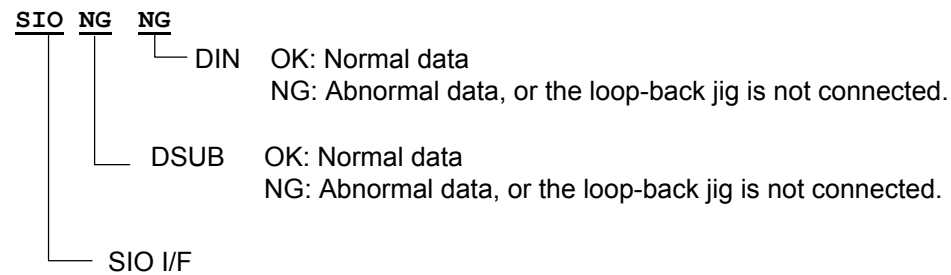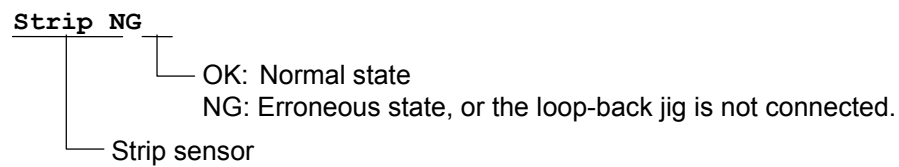
10.4.5 Test Print Samples
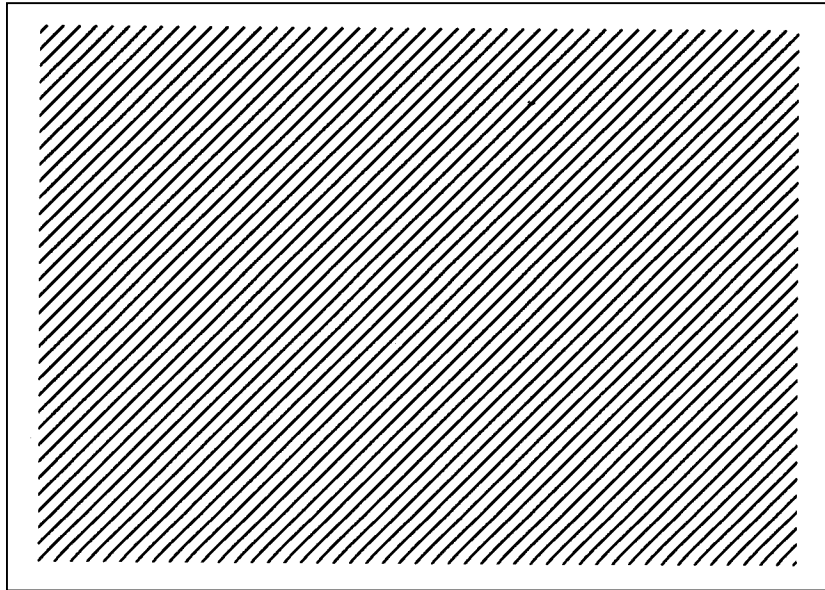
3-dot slant line print
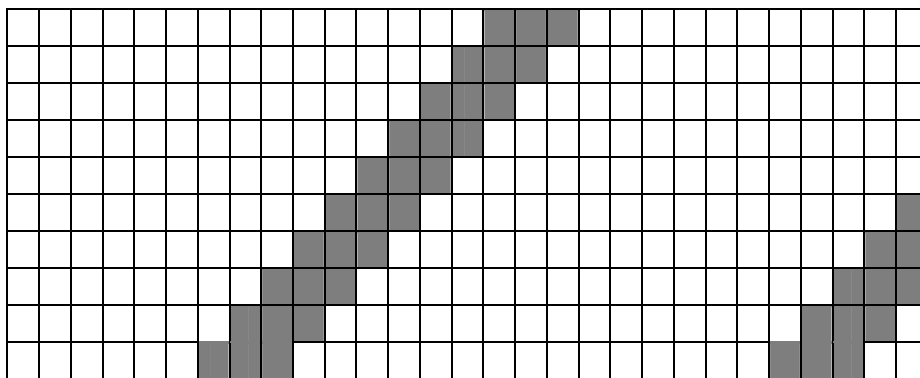
(Magnified view: Black area ratio 16.7%)

10.5 RAM CLEAR

10.5.1 Example of RAM Clear Operation

(1) Parameter Clear

Power ON	**[FEED]** key **[PAUSE]** key

↓

POWER LED	ON LINE LED	ERROR LED
○	○	○

[PAUSE] key

↓

POWER LED	ON LINE LED	ERROR LED
○	⊙	⊙

↓

Power OFF
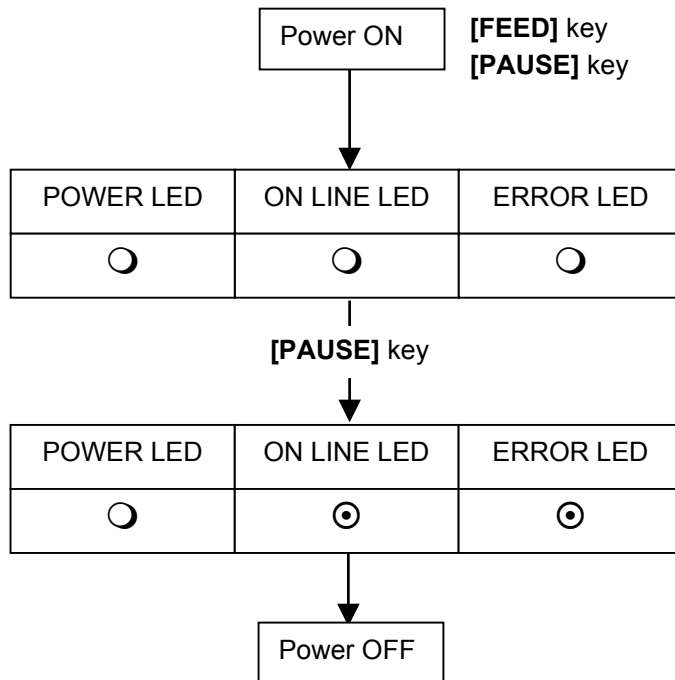
(1) The printer power is off.
(2) Turn on the printer while holding down the [FEED] and [PAUSE] keys at the same time, more than 3 seconds.
   NOTE: If the keys are released within 3 seconds, the printer enters the download mode.

(3) The printer enters the RAM clear mode.

(4) Press the [PAUSE] key.
   Parameter clear is started.

(5) Parameter clear is completed.

(6) Turn off the power.

(2) Maintenance Counter Clear

Power ON	**[FEED]** key **[PAUSE]** key

↓

POWER LED	ON LINE LED	ERROR LED
○	○	○

[FEED] key

↓

POWER LED	ON LINE LED	ERROR LED
○	⊙	⊙

↓

Power OFF
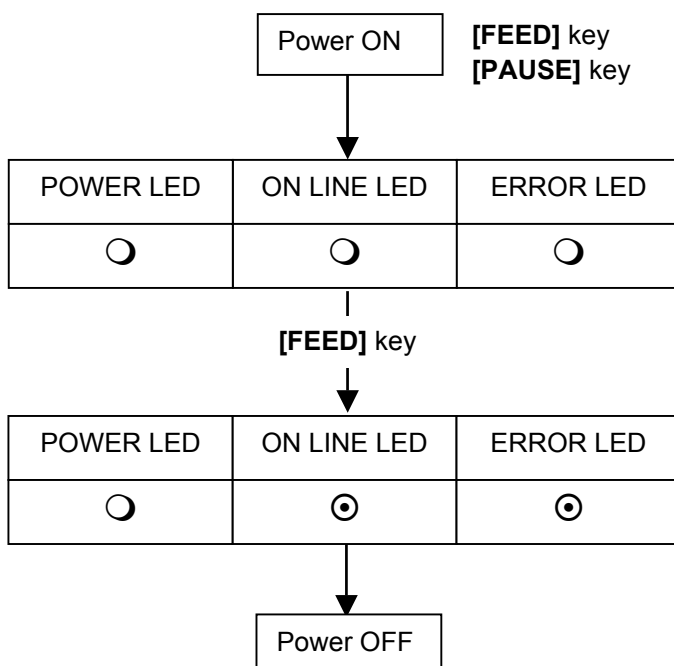
(1) The printer power is off.
(2) Turn on the printer while pressing the [FEED] and [PAUSE] keys at the same time, more than 3 seconds.
   NOTE: If the keys are released within 3 seconds, the printer enters the download mode.
(3) The printer enters the RAM clear

(4) Hold down the [FEED] key, more than 3 seconds.
   Maintenance counter clear is started

(5) Maintenance counter clear is completed.

(6) Turn off the power.

10.5.2 Details of RAM Clear

(1) Notice

- After a RAM clear is completed, turn off the printer.
- The total label distance covered, sensor adjustment values, manual threshold values, the IP address setting and data in the flash memory are not cleared by a RAM clear.

(2) Initial values after performing a RAM clear

① Initial values after maintenance counter clear

Item	Value
Label distance covered	0 km
Print distance	0 km
Cut count	0
Ribbon motor drive time	0 hours
RS-232C hardware error count	0
System error count	0
Momentary power interruption count	0

② Initial values after parameter clear

Parameter	Value
Feed amount fine adjustment (Command)	0 mm
Cut (strip) position fine adjustment (Command)	0 mm
Reverse feed amount fine adjustment (Command)	0 mm
Print tone fine adjustment: Thermal transfer print mode (Command)	0
Print tone fine adjustment: Direct thermal print mode (Command)	0
Ribbon motor drive voltage fine adjustment (Take-up) (Command)	0
Ribbon motor drive voltage fine adjustment (Feed) (Command)	0
Feed amount fine adjustment (Setting tool)	0 mm
Cut (strip) position fine adjustment (Setting tool)	0 mm
Reverse feed amount fine adjustment (Setting tool)	0 mm
Print tone fine adjustment: Thermal transfer print mode (Setting tool)	0
Print tone fine adjustment: Direct thermal print mode (Setting tool)	0
Ribbon motor drive voltage fine adjustment (Take-up) (Setting tool)	0
Ribbon motor drive voltage fine adjustment (Feed) (Setting tool)	0
X-coordinate fine adjustment (Setting tool)	0 mm
Transmissive sensor manual threshold fine adjustment value	1.4 V
Reflective sensor manual threshold fine adjustment value	1.0 V
Character code	PC-850

Character "0"	"0" (without slash)
Control code	Auto
RS232C communication speed	9600 bps
RS232C data length	8 bits
RS232C stop bit length	1 bit
RS232C parity	NONE
RS232C flow control method	XON/XOFF + READY/BUSY (DTR) protocol: (XON is output when the power is on, XOFF is output when the power is off.)
Forward feed standby after an issue	ON
Strip wait status	OFF
[FEED] key function	FEED (Feeds one label.)
Kanji code	TYPE1
Euro code	B0H
Automatic head broken dots check	OFF
Centronics ACK/BUSY timing	TYPE1
Web printer function	OFF
Reset process when the nInit signal is ON	OFF
Ribbon near end detection	OFF
Expansion I/O operation mode	Normal
Plug-and-play operation mode	OFF
Label end/ribbon error process	The printer stops an issue operation.
Pre-strip process	OFF
Reverse feed speed	2 ips
MaxiCode specification	TYPE1
Keyboard I/F	OFF
LAN enable/disable	Enable
Status response	ON
Label pitch	76.2 mm
Effective print length	74.2 mm
Effective print width	105.7 mm
Print method	Thermal transfer print mode
Sensor type	Transmissive sensor
Feed speed	4"/sec.
Issue mode	Batch
PC-save automatic call	ON
BASIC interpreter setting	OFF
DHCP setting	OFF
Strip motor torque	R0

10.6 EXTENDED FUNCTIONS SETTING

(1) Enabling/disabling the LAN Interface

(2) Enabling/disabling the BASIC Interpreter

Power ON	**[FEED]** key

POWER LED	ON LINE LED	ERROR LED
○	●	◉

POWER LED	ON LINE LED	ERROR LED
○	○	○

[PAUSE] key

POWER LED	ON LINE LED	ERROR LED
○	●	●

[FEED] key

POWER LED	ON LINE LED	ERROR LED
○	●	◉

POWER LED	ON LINE LED	ERROR LED
○	●	○
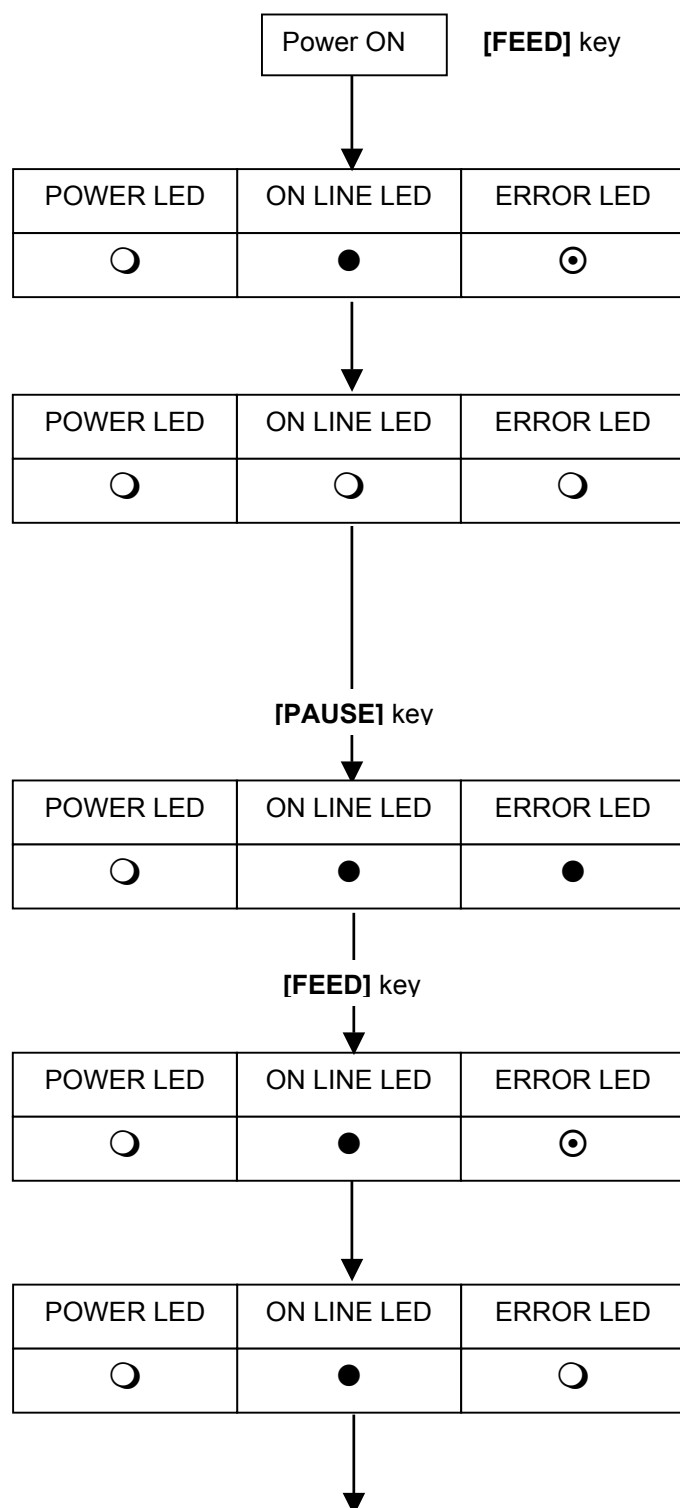
(1) The printer power is off.

(2) Turn the power ON while holding down the [FEED] key for 3 seconds or more.

(3) The printer enters the extended functions setting mode.

(4) When the [FEED] key is released, the current LAN interface status is indicated by the LEDs. (The LED status on the left indicates that the LAN and SNMP are both ON.)

	ON LINE LED	ERROR LED
LAN OFF	●	●
LAN ON SNMP ON	○	○
LAN ON SNMP OFF	●	○

(5) Use the [PAUSE] key to change the LAN and SNMP settings. The LED status changes accordingly.

(6) For example, pressing the [PAUSE] key once enables the LAN and disables the SNMP.

(7) Hold down the [FEED] key for more than 3 seconds to save the setting.

(8) Saving the changed setting is completed.

(9) When the [FEED] key is released, the current BASIC setting status is indicated by the LEDs. (The LED status on the left indicates that the BASIC interpreter is OFF.)

	ON LINE LED	ERROR LED
BASIC ON	●	●
BASIC OFF	●	○

|
[PAUSE] key
↓

POWER LED	ON LINE LED	ERROR LED
◗	●	●

|
[FEED] key
↓

POWER LED	ON LINE LED	ERROR LED
◗	●	⊙

↓

Turn the Power OFF
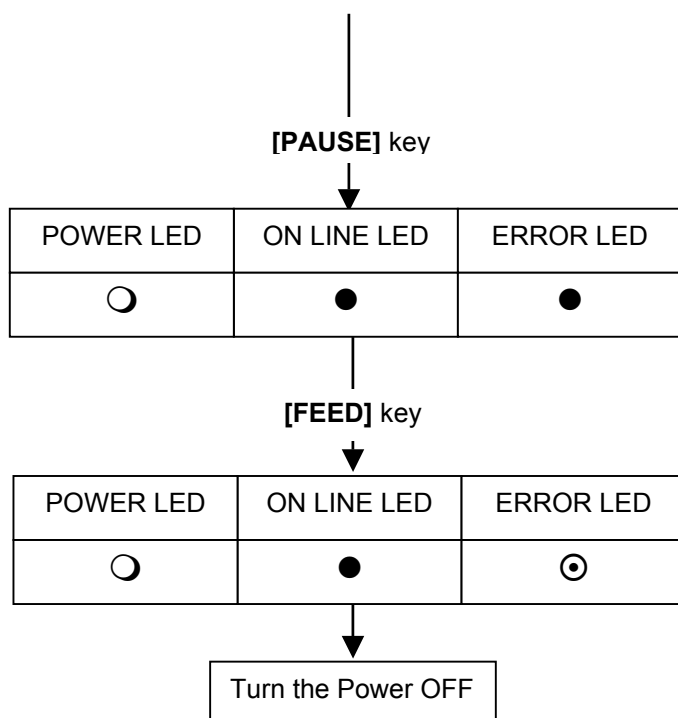
(10) Use the [PAUSE] key to change the BASIC interpreter settings.   The LED status changes accordingly.

(11) For example, pressing the [PAUSE] key once enables the BASIC interpreter.

(12) Hold down the [FEED] key for more than 3 seconds to save the setting.

(13) Saving the changed setting is completed.

(14) Turn off the power.

11. CHARACTER CODE TABLE

The followings are the character code tables. However, the characters which can be printed are different according to the character type.

11.1 TIMES ROMAN, HELVETICA, LETTER GOTHIC, PRESTIGE ELITE, COURIER, GOTHIC725 BLACK

(Bit map font type: A, B, C, D, E, F, G, H, I, J, K, L, N, O, P, Q, R, q)

(1) PC-850

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	`	p	Ç	É	á	€		ð	Ó	-
1			!	1	A	Q	a	q	ü	æ	í			Đ	ß	±
2			"	2	B	R	b	r	é	Æ	ó			Ê	Ô	=
3			#	3	C	S	c	s	â	ô	ú			Ë	Ò	¾
4			$	4	D	T	d	t	ä	ö	ñ			È	õ	¶
5			%	5	E	U	e	u	à	ò	Ñ	Á		ı	Õ	§
6			&	6	F	V	f	v	å	û	ª	Â	ã	Í	µ	÷
7			'	7	G	W	g	w	ç	ù	º	À	Ã	Î	þ	¸
8			(	8	H	X	h	x	ê	ÿ	¿	©		Ï	Þ	°
9			)	9	I	Y	i	y	ë	Ö	®				Ú	¨
A			*	:	J	Z	j	z	è	Ü	¬				Û	•
B			+	;	K	[	k	{	ï	ø	½				Ù	¹
C			,	<	L	\	l	|	î	£	¼				ý	³
D			–	=	M	]	m	}	ì	Ø	¡	¢		¦	Ý	²
E			.	>	N	^	n	~	Ä	×	«	¥		Ì	¯	■
F			/	?	O	_	o	▒	Å	ƒ	»		¤		´	

The Euro code (B0H) can be changed in the parameter setting in the system mode.

(2) PC-8

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	`	p	Ç	É	á	€			α	≡
1			!	1	A	Q	a	q	ü	æ	í				β	±
2			"	2	B	R	b	r	é	Æ	ó				Γ	≥
3			#	3	C	S	c	s	â	ô	ú				π	≤
4			$	4	D	T	d	t	ä	ö	ñ				Σ	⌠
5			%	5	E	U	e	u	à	ò	Ñ				σ	⌡
6			&	6	F	V	f	v	å	û	ª				µ	÷
7			'	7	G	W	g	w	ç	ù	º				τ	≈
8			(	8	H	X	h	x	ê	ÿ	¿				Φ	°
9			)	9	I	Y	i	y	ë	Ö	⌐				Θ	•
A			*	:	J	Z	j	z	è	Ü	¬				Ω	•
B			+	;	K	[	k	{	ï	¢	½				δ	√
C			,	<	L	\	l	|	î	£	¼				∞	n
D			–	=	M	]	m	}	ì	¥	¡				∅	²
E			.	>	N	^	n	~	Ä	Pt	«				ε	■
F			/	?	O	_	o	▒	Å	∫	»				∩	

The Euro code (B0H) can be changed in the parameter setting in the system mode.

(3) PC-852

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	`	p	Ç	É	á	€			Ó	-
1			!	1	A	Q	a	q	ü		í			Đ	ß	
2			"	2	B	R	b	r	é		ó				Ô	
3			#	3	C	S	c	s	â	ô	ú			Ë		
4			$	4	D	T	d	t	ä	ö						
5			%	5	E	U	e	u				Á				§
6			&	6	F	V	f	v				Â		Í		÷
7			'	7	G	W	g	w	ç					Î		¸
8			(	8	H	X	h	x								°
9			)	9	I	Y	i	y	ë	Ö					Ú	¨
A			*	:	J	Z	j	z		Ü	¬					•
B			+	;	K	[	k	{								
C			,	<	L	\	l	|	î						ý	
D			–	=	M	]	m	}							Ý	
E			.	>	N	^	n	~	Ä	×	«					■
F			/	?	O	_	o	▒			»		¤			

The Euro code (B0H) can be changed in the parameter setting in the system mode.

(4) PC-857

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	`	p	Ç	É	á	€		º	Ó	-
1			!	1	A	Q	a	q	ü	æ	í			ª	ß	±
2			"	2	B	R	b	r	é	Æ	ó			Ê	Ô	
3			#	3	C	S	c	s	â	ô	ú			Ë	Ò	¾
4			$	4	D	T	d	t	ä	ö	ñ			È	õ	¶
5			%	5	E	U	e	u	à	ò	Ñ	Á			Õ	§
6			&	6	F	V	f	v	å	û		Â	ã	Í	µ	÷
7			'	7	G	W	g	w	ç	ù		À	Ã	Î		¸
8			(	8	H	X	h	x	ê		¿	©		Ï	×	°
9			)	9	I	Y	i	y	ë	Ö	®				Ú	¨
A			*	:	J	Z	j	z	è	Ü	¬				Û	•
B			+	;	K	[	k	{	ï	ø	½				Ù	¹
C			,	<	L	\	l	|	î	£	¼				ì	³
D			–	=	M	]	m	}		Ø	¡	¢		¦	ÿ	²
E			.	>	N	^	n	~	Ä		«	¥		Ì	¯	■
F			/	?	O	_	o	▒	Å		»		¤		´	

The Euro code (B0H) can be changed in the parameter setting in the system mode.

- 233 -

(5) PC-851

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	`	p	Ç			€				
1			!	1	A	Q	a	q	ü							±
2			"	2	B	R	b	r	é							
3			#	3	C	S	c	s	â	ô						
4			$	4	D	T	d	t	ä	ö						
5			%	5	E	U	e	u	à							§
6			&	6	F	V	f	v		û						
7			'	7	G	W	g	w	ç	ù						¸
8			(	8	H	X	h	x	ê							°
9			)	9	I	Y	i	y	ë	Ö						¨
A			*	:	J	Z	j	z	è	Ü						
B			+	;	K	[	k	{	Ï		½					
C			,	<	L	\	l	|	î	£						
D			−	=	M	]	m	}								
E			.	>	N	^	n	~	Ä			«				■
F			/	?	O	_	o	▒				»				

The Euro code (B0H) can be changed in the parameter setting in the system mode.

(6) PC-855

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	`	p				€				
1			!	1	A	Q	a	q								
2			"	2	B	R	b	r								
3			#	3	C	S	c	s								
4			$	4	D	T	d	t								
5			%	5	E	U	e	u								
6			&	6	F	V	f	v								
7			'	7	G	W	g	w								
8			(	8	H	X	h	x								
9			)	9	I	Y	i	y								
A			*	:	J	Z	j	z								
B			+	;	K	[	k	{								
C			,	<	L	\	l	|								
D			−	=	M	]	m	}								§
E			.	>	N	^	n	~				«				■
F			/	?	O	_	o	▒				»		¤		

The Euro code (B0H) can be changed in the parameter setting in the system mode.

(7) PC-1250

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	`	p				€				
1			!	1	A	Q	a	q				±	Á		á	
2			"	2	B	R	b	r					Â		â	
3			#	3	C	S	c	s						Ó		ó
4			$	4	D	T	d	t			¤	´	Ä	Ô	ä	ô
5			%	5	E	U	e	u				µ				
6			&	6	F	V	f	v			¦	¶		Ö		ö
7			'	7	G	W	g	w			§	·	Ç	×	ç	÷
8			(	8	H	X	h	x			¨	¸				
9			)	9	I	Y	i	y			©		É		é	
A			*	:	J	Z	j	z						Ú		ú
B			+	;	K	[	k	{			«	»	Ë		ë	
C			,	<	L	\	l					¬		Ü		ü	
D			–	=	M	]	m	}					Í	Ý	í	ý
E			.	>	N	^	n	~			®		Î		î	
F			/	?	O	_	o	▨						ß		

The Euro code (B0H) can be changed in the parameter setting in the system mode.

(8) PC-1251

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	`	p				€				
1			!	1	A	Q	a	q				±				
2			"	2	B	R	b	r								
3			#	3	C	S	c	s								
4			$	4	D	T	d	t			¤					
5			%	5	E	U	e	u				µ				
6			&	6	F	V	f	v			¦	¶				
7			'	7	G	W	g	w			§	·				
8			(	8	H	X	h	x								
9			)	9	I	Y	i	y			©					
A			*	:	J	Z	j	z								
B			+	;	K	[	k	{			«	»				
C			,	<	L	\	l					¬					
D			–	=	M	]	m	}								
E			.	>	N	^	n	~			®					
F			/	?	O	_	o	▨								

The Euro code (B0H) can be changed in the parameter setting in the system mode.

(9) PC-1252

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	`	p				€	À	Ð	à	ð
1			!	1	A	Q	a	q			¡	±	Á	Ñ	á	ñ
2			"	2	B	R	b	r			¢	²	Â	Ò	â	ò
3			#	3	C	S	c	s	ƒ		£	³	Ã	Ó	ã	ó
4			$	4	D	T	d	t			¤	´	Ä	Ô	ä	ô
5			%	5	E	U	e	u			¥	µ	Å	Õ	å	õ
6			&	6	F	V	f	v			¦	¶	Æ	Ö	æ	ö
7			'	7	G	W	g	w			§	·	Ç	×	ç	÷
8			(	8	H	X	h	x	^	~	¨	¸	È	Ø	è	ø
9			)	9	I	Y	i	y			©	¹	É	Ù	é	ù
A			*	:	J	Z	j	z			ª	º	Ê	Ú	ê	ú
B			+	;	K	[	k	{			«	»	Ë	Û	ë	û
C			,	<	L	\	l	|			¬	¼	Ì	Ü	ì	ü
D			–	=	M	]	m	}				½	Í	Ý	í	ý
E			.	>	N	^	n	~			®	¾	Î	Þ	î	þ
F			/	?	O	_	o	▒				¿	Ï	ß	ï	ÿ

The Euro code (B0H) can be changed in the parameter setting in the system mode.

(10) PC-1253

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

The Euro code (B0H) can be changed in the parameter setting in the system mode.

(11) PC-1254

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	`	p				€	À		à	
1			!	1	A	Q	a	q			¡	±	Á	Ñ	á	ñ
2			"	2	B	R	b	r			¢	²	Â	Ò	â	ò
3			#	3	C	S	c	s	ƒ		£	³	Ã	Ó	ã	ó
4			$	4	D	T	d	t			¤	´	Ä	Ô	ä	ô
5			%	5	E	U	e	u			¥	µ	Å	Õ	å	õ
6			&	6	F	V	f	v			¦	¶	Æ	Ö	æ	ö
7			'	7	G	W	g	w			§	·	Ç	×	ç	÷
8			(	8	H	X	h	x	^	~	¨	¸	È	Ø	è	ø
9			)	9	I	Y	i	y			©	¹	É	Ù	é	ù
A			*	:	J	Z	j	z			ª	º	Ê	Ú	ê	ú
B			+	;	K	[	k	{			«	»	Ë	Û	ë	û
C			,	<	L	\	l	|			¬	¼	Ì	Ü	ì	ü
D			–	=	M	]	m	}				½	Í		í	¹
E			.	>	N	^	n	~			®	¾	Î		î	
F			/	?	O	_	o	▓			¿		Ï	ß	ï	ÿ

The Euro code (B0H) can be changed in the parameter setting in the system mode.

(12) PC-1257

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	`	p				€				
1			!	1	A	Q	a	q				±				
2			"	2	B	R	b	r			¢	²				
3			#	3	C	S	c	s			£	³		Ó		ó
4			$	4	D	T	d	t			¤	´	Ä		ä	
5			%	5	E	U	e	u				µ	Å	Õ	å	õ
6			&	6	F	V	f	v			¦	¶		Ö		ö
7			'	7	G	W	g	w			§	·		×		÷
8			(	8	H	X	h	x			Ø	ø				
9			)	9	I	Y	i	y			©	¹	É		é	
A			*	:	J	Z	j	z								
B			+	;	K	[	k	{			«	»				
C			,	<	L	\	l	|			¬	¼		Ü		ü
D			–	=	M	]	m	}	¨	—		½				
E			.	>	N	^	n	~			®	¾				
F			/	?	O	_	o	▓	¸		Æ	æ		ß		

The Euro code (B0H) can be changed in the parameter setting in the system mode.

- 237 -

(13) LATIN9

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	`	p				€	À	Ð	à	ð
1			!	1	A	Q	a	q			¡	±	Á	Ñ	á	ñ
2			"	2	B	R	b	r			¢	²	Â	Ò	â	ò
3			#	3	C	S	c	s			£	³	Ã	Ó	ã	ó
4			$	4	D	T	d	t			€		Ä	Ô	ä	ô
5			%	5	E	U	e	u			¥	µ	Å	Õ	å	õ
6			&	6	F	V	f	v				¶	Æ	Ö	æ	ö
7			'	7	G	W	g	w			§	·	Ç	×	ç	÷
8			(	8	H	X	h	x					È	Ø	è	ø
9			)	9	I	Y	i	y			©	¹	É	Ù	é	ù
A			*	:	J	Z	j	z			ª	º	Ê	Ú	ê	ú
B			+	;	K	[	k	{			«	»	Ë	Û	ë	û
C			,	<	L	\	l	|			¬		Ì	Ü	ì	ü
D			–	=	M	]	m	}					Í	Ý	í	ý
E			.	>	N	^	n	~			®		Î	Þ	î	þ
F			/	?	O	_	o	▒			¿		Ï	ß	ï	ÿ

The Euro code (B0H) can be changed in the parameter setting in the system mode.

(14) Arabic

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	`	p				€				
1			!	1	A	Q	a	q								
2			"	2	B	R	b	r								
3			#	3	C	S	c	s								
4			$	4	D	T	d	t								
5			%	5	E	U	e	u								
6			&	6	F	V	f	v								
7			'	7	G	W	g	w								
8			(	8	H	X	h	x								
9			)	9	I	Y	i	y								
A			*	:	J	Z	j	z								
B			+	;	K	[	k	{								
C			,	<	L	\	l	|								
D			–	=	M	]	m	}								
E			.	>	N	^	n	~									
F			/	?	O	_	o	▒								

The Euro code (B0H) can be changed in the parameter setting in the system mode.

11.2 PRESENTATION (Bit map font type: M)

(1) PC-850, PC-857

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	`	p				€				-
1			!	1	A	Q	a	q								
2			"	2	B	R	b	r								
3			#	3	C	S	c	s								
4			$	4	D	T	d	t								
5			%	5	E	U	e	u								
6			&	6	F	V	f	v								
7			'	7	G	W	g	w								
8			(	8	H	X	h	x								
9			)	9	I	Y	i	y								
A			*	:	J	Z	j	z								
B			+	;	K	[	k	{								
C			,	<	L	\	l	|								
D			–	=	M	]	m	}								
E			.	>	N	^	n	~				¥				
F			/	?	O	_	o	▦								

The Euro code (B0H) can be changed in the parameter setting in the system mode.

(2) PC-8

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	`	p				€				
1			!	1	A	Q	a	q								
2			"	2	B	R	b	r								
3			#	3	C	S	c	s								
4			$	4	D	T	d	t								
5			%	5	E	U	e	u								
6			&	6	F	V	f	v								
7			'	7	G	W	g	w								
8			(	8	H	X	h	x								
9			)	9	I	Y	i	y								
A			*	:	J	Z	j	z								
B			+	;	K	[	k	{								
C			,	<	L	\	l	|								
D			–	=	M	]	m	}		¥						
E			.	>	N	^	n	~								
F			/	?	O	_	o									

The Euro code (B0H) can be changed in the parameter setting in the system mode.

(3) PC-852

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

The Euro code (B0H) can be changed in the parameter setting in the system mode.

(4) PC-851, PC-855, PC-1250, PC-1251, PC-1257, Arabic

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

The Euro code (B0H) can be changed in the parameter setting in the system mode.

(5) PC-1252, PC-1254

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	`	p				€				
1			!	1	A	Q	a	q								
2			"	2	B	R	b	r								
3			#	3	C	S	c	s								
4			$	4	D	T	d	t								
5			%	5	E	U	e	u			¥					
6			&	6	F	V	f	v								
7			'	7	G	W	g	w								
8			(	8	H	X	h	x	^	~						
9			)	9	I	Y	i	y								
A			*	:	J	Z	j	z								
B			+	;	K	[	k	{								
C			,	<	L	\	l	|								
D			–	=	M	]	m	}								
E			.	>	N	^	n	~								
F			/	?	O	_	o	∎								

The Euro code (B0H) can be changed in the parameter setting in the system mode.

(6) PC-1253

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	`	p				€				-
1			!	1	A	Q	a	q								
2			"	2	B	R	b	r								
3			#	3	C	S	c	s								
4			$	4	D	T	d	t								
5			%	5	E	U	e	u			¥					
6			&	6	F	V	f	v								
7			'	7	G	W	g	w								
8			(	8	H	X	h	x								
9			)	9	I	Y	i	y								
A			*	:	J	Z	j	z								
B			+	;	K	[	k	{								
C			,	<	L	\	l	|								
D			–	=	M	]	m	}								
E			.	>	N	^	n	~								
F			/	?	O	_	o	∎								

The Euro code (B0H) can be changed in the parameter setting in the system mode.

(7) LATIN9

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	`	p				€				
1			!	1	A	Q	a	q								
2			"	2	B	R	b	r								
3			#	3	C	S	c	s								
4			$	4	D	T	d	t			€					
5			%	5	E	U	e	u			¥					
6			&	6	F	V	f	v								
7			'	7	G	W	g	w								
8			(	8	H	X	h	x								
9			)	9	I	Y	i	y								
A			*	:	J	Z	j	z								
B			+	;	K	[	k	{								
C			,	<	L	\	l										
D			–	=	M	]	m	}								
E			.	>	N	^	n	~								
F			/	?	O	_	o	■								

The Euro code (B0H) can be changed in the parameter setting in the system mode.

11.3 OCR-A (Bit map font type: S)

(1) PC-850, PC-857

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	⊓	p								–
1			!	1	A	Q	a	q								
2			"	2	B	R	b	r								
3			#	3	C	S	c	s								
4			$	4	D	T	d	t								
5			%	5	E	U	e	u								
6			&	6	F	V	f	v								
7			'	7	G	W	g	w								
8			(	8	H	X	h	x								
9			)	9	I	Y	i	y								
A			*	:	J	Z	j	z								
B			+	;	K	[	k	{								
C			,	<	L	\	l										
D			–	=	M	]	m	}								
E			.	>	N	^	n	⌐				¥				
F			/	?	O	Ψ	o	∎								

(2) PC-8

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	⊓	p								
1			!	1	A	Q	a	q								
2			"	2	B	R	b	r								
3			#	3	C	S	c	s								
4			$	4	D	T	d	t								
5			%	5	E	U	e	u								
6			&	6	F	V	f	v								
7			'	7	G	W	g	w								
8			(	8	H	X	h	x								
9			)	9	I	Y	i	y								
A			*	:	J	Z	j	z								
B			+	;	K	[	k	{								
C			,	<	L	\	l										
D			–	=	M	]	m	}		¥						
E			.	>	N	^	n	⌐								
F			/	?	O	Ψ	o	∎								

(3) PC-852

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	⌐	p								–
1			!	1	A	Q	a	q								
2			"	2	B	R	b	r								
3			#	3	C	S	c	s								
4			$	4	D	T	d	t								
5			%	5	E	U	e	u								
6			&	6	F	V	f	v								
7			'	7	G	W	g	w								
8			(	8	H	X	h	x								
9			)	9	I	Y	i	y								
A			*	:	J	Z	j	z								
B			+	;	K	[	k	{								
C			,	<	L	\	l	|								
D			–	=	M	]	m	}								
E			.	>	N	^	n	⌐⌐								
F			/	?	O	Ч	o	▮								

(4) PC-851, PC-855, PC-1250, PC-1251, PC-1257, Arabic

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	⌐	p								
1			!	1	A	Q	a	q								
2			"	2	B	R	b	r								
3			#	3	C	S	c	s								
4			$	4	D	T	d	t								
5			%	5	E	U	e	u								
6			&	6	F	V	f	v								
7			'	7	G	W	g	w								
8			(	8	H	X	h	x								
9			)	9	I	Y	i	y								
A			*	:	J	Z	j	z								
B			+	;	K	[	k	{								
C			,	<	L	\	l	|								
D			–	=	M	]	m	}								
E			.	>	N	^	n	⌐⌐								
F			/	?	O	Ч	o	▮								

(5)　PC-1252, PC-1254

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	┌	p								–
1			!	1	A	Q	a	q								
2			"	2	B	R	b	r								
3			#	3	C	S	c	s								
4			$	4	D	T	d	t								
5			%	5	E	U	e	u			¥					
6			&	6	F	V	f	v								
7			'	7	G	W	g	w								
8			(	8	H	X	h	x	^	~						
9			)	9	I	Y	i	y								
A			*	:	J	Z	j	z								
B			+	;	K	[	k	{								
C			,	<	L	\	l	|								
D			–	=	M	]	m	}								
E			.	>	N	^	n	⌐								
F			/	?	O	Ψ	o	■								

(6)　PC-1253

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	┌	p								–
1			!	1	A	Q	a	q								
2			"	2	B	R	b	r								
3			#	3	C	S	c	s								
4			$	4	D	T	d	t								
5			%	5	E	U	e	u			¥					
6			&	6	F	V	f	v								
7			'	7	G	W	g	w								
8			(	8	H	X	h	x								
9			)	9	I	Y	i	y								
A			*	:	J	Z	j	z								
B			+	;	K	[	k	{								
C			,	<	L	\	l	|								
D			–	=	M	]	m	}								
E			.	>	N	^	n	⌐								
F			/	?	O	Ψ	o	■								

(7) LATIN9

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	⊓	p								
1			!	1	A	Q	a	q			-					
2			"	2	B	R	b	r								
3			#	3	C	S	c	s								
4			$	4	D	T	d	t								
5			%	5	E	U	e	u			¥					
6			&	6	F	V	f	v								
7			'	7	G	W	g	w								
8			(	8	H	X	h	x								
9			)	9	I	Y	i	y								
A			*	:	J	Z	j	z								
B			+	;	K	[	k	{								
C			,	<	L	\	l	|								
D			−	=	M	]	m	}								
E			.	>	N	^	n	⌐								
F			/	?	O	Ψ	o	█								

11.4 OCR-B   (Bit map font type: T)

(1) PC-850, PC-857

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

The size of the numerals of codes 80h ~ 89h are reduced to 80%.

(2) PC-8

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

The size of the numerals of codes 80h ~ 89h are reduced to 80%.

(3) PC-852

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	`	p	0							–
1			!	1	A	Q	a	q	1							
2			"	2	B	R	b	r	2							
3			#	3	C	S	c	s	3							
4			$	4	D	T	d	t	4							
5			%	5	E	U	e	u	5							
6			&	6	F	V	f	v	6							
7			'	7	G	W	g	w	7							
8			(	8	H	X	h	x	8							
9			)	9	I	Y	i	y	9							
A			*	:	J	Z	j	z								
B			+	;	K	[	k	{								
C			,	<	L	\	l	|								
D			–	=	M	]	m	}								
E			.	>	N	^	n	~								
F			/	?	O	_	o	█								

The size of the numerals of codes 80h ~ 89h are reduced to 80%.

(4) PC-851, PC-855, PC-1250, PC-1251, PC-1257, Arabic

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

The size of the numerals of codes 80h ~ 89h are reduced to 80%.

(5)   PC-1252, PC-1254, LATIN9

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

The size of the numerals of codes 80h ~ 89h are reduced to 80%.

(6)   PC-1253

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	`	p	0							
1			!	1	A	Q	a	q	1							
2			"	2	B	R	b	r	2							
3			#	3	C	S	c	s	3							
4			$	4	D	T	d	t	4							
5			%	5	E	U	e	u	5		¥					
6			&	6	F	V	f	v	6							
7			'	7	G	W	g	w	7							
8			(	8	H	X	h	x	8							
9			)	9	I	Y	i	y	9							
A			*	:	J	Z	j	z								
B			+	;	K	[	k	{								
C			,	<	L	\	l	|								
D			–	=	M	]	m	}								
E			.	>	N	^	n	~								
F			/	?	O	_	o									

The size of the numerals of codes 80h ~ 89h are reduced to 80%.

11.5 TEC OUTLINE FONT 1 (Outline font type: A, B)

(1) PC-850

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	`	p	Ç	É	á	€				-
1			!	1	A	Q	a	q	ü	æ	í	€			ß	±
2			"	2	B	R	b	r	é	Æ	ó					
3			#	3	C	S	c	s	â	ô	ú					
4			$	4	D	T	d	t	ä	ö	ñ				õ	
5			%	5	E	U	e	u	à	ò	Ñ					§
6			&	6	F	V	f	v	å	û	ª		ã		µ	÷
7			'	7	G	W	g	w	ç	ù	º					
8			(	8	H	X	h	x	ê	ÿ	¿					°
9			)	9	I	Y	i	y	ë	Ö						
A			*	:	J	Z	j	z	è	Ü	¬					•
B			+	;	K	[	k	{	ï	ø	½					
C			,	<	L	\	l	|	î	£	¼					
D			–	=	M	]	m	}	ì	Ø	¡	¢				²
E			.	>	N	^	n	~	Ä		«	¥				■
F			/	?	O	_	o	△	Å	ƒ	»		¤			

The Euro code (B0H) can be changed in the parameter setting in the system mode.

(2) PC-8

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	`	p	Ç	É	á	€			α	≡
1			!	1	A	Q	a	q	ü	æ	í	€			β	±
2			"	2	B	R	b	r	é	Æ	ó				Γ	≥
3			#	3	C	S	c	s	â	ô	ú				π	≤
4			$	4	D	T	d	t	ä	ö	ñ				Σ	⌠
5			%	5	E	U	e	u	à	ò	Ñ				σ	⌡
6			&	6	F	V	f	v	å	û	ª				µ	÷
7			'	7	G	W	g	w	ç	ù	º				τ	≈
8			(	8	H	X	h	x	ê	ÿ	¿				Φ	°
9			)	9	I	Y	i	y	ë	Ö					Θ	•
A			*	:	J	Z	j	z	è	Ü	¬				Ω	•
B			+	;	K	[	k	{	ï	¢	½				δ	√
C			,	<	L	\	l	|	î	£	¼				∞	ⁿ
D			–	=	M	]	m	}	ì	¥	¡				∅	²
E			.	>	N	^	n	~	Ä	Pt	«				ε	■
F			/	?	O	_	o	△	Å	∫	»				∩	

The Euro code (B0H) can be changed in the parameter setting in the system mode.

(3) PC-852

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	`	p	Ç	É	á	€				-
1			!	1	A	Q	a	q	ü		í	€			ß	
2			"	2	B	R	b	r	é		ó					
3			#	3	C	S	c	s	â	ô	ú					
4			$	4	D	T	d	t	ä	ö						
5			%	5	E	U	e	u								§
6			&	6	F	V	f	v								÷
7			'	7	G	W	g	w	ç							
8			(	8	H	X	h	x								°
9			)	9	I	Y	i	y	ë	Ö						
A			*	:	J	Z	j	z		Ü	¬					•
B			+	;	K	[	k	{								
C			,	<	L	\	l	|	î							
D			–	=	M	]	m	}								
E			.	>	N	^	n	~	Ä		«					■
F			/	?	O	_	o	△			»		¤			

The Euro code (B0H) can be changed in the parameter setting in the system mode.

(4) PC-857

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	`	p	Ç	É	á	€		º		-
1			!	1	A	Q	a	q	ü	æ	í	€		ª	ß	±
2			"	2	B	R	b	r	é	Æ	ó					
3			#	3	C	S	c	s	â	ô	ú					
4			$	4	D	T	d	t	ä	ö	ñ				õ	
5			%	5	E	U	e	u	à	ò	Ñ					§
6			&	6	F	V	f	v	å	û			ã		µ	÷
7			'	7	G	W	g	w	ç	ù						
8			(	8	H	X	h	x	ê		¿					°
9			)	9	I	Y	i	y	ë	Ö						
A			*	:	J	Z	j	z	è	Ü	¬					•
B			+	;	K	[	k	{	ï	ø	½					
C			,	<	L	\	l	|	î	£	¼				ì	
D			–	=	M	]	m	}		Ø	¡	¢			ÿ	2
E			.	>	N	^	n	~	Ä		«	¥				■
F			/	?	O	_	o		Å		»		¤			

The Euro code (B0H) can be changed in the parameter setting in the system mode.

(5) PC-851

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	`	p	Ç			€				
1			!	1	A	Q	a	q	ü			€				±
2			"	2	B	R	b	r	é							
3			#	3	C	S	c	s	â	ô						
4			$	4	D	T	d	t	ä	ö						
5			%	5	E	U	e	u	à							§
6			&	6	F	V	f	v		û						
7			'	7	G	W	g	w	ç	ù						
8			(	8	H	X	h	x	ê							°
9			)	9	I	Y	i	y	ë	Ö						
A			*	:	J	Z	j	z	è	Ü						
B			+	;	K	[	k	{	Ï		½					
C			,	<	L	\	l	|	î	£						
D			–	=	M	]	m	}								
E			.	>	N	^	n	~	Ä		«					■
F			/	?	O	_	o	△			»					

The Euro code (B0H) can be changed in the parameter setting in the system mode.

(6) PC-855

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	`	p				€				
1			!	1	A	Q	a	q				€				
2			"	2	B	R	b	r								
3			#	3	C	S	c	s								
4			$	4	D	T	d	t								
5			%	5	E	U	e	u								
6			&	6	F	V	f	v								
7			'	7	G	W	g	w								
8			(	8	H	X	h	x								
9			)	9	I	Y	i	y								
A			*	:	J	Z	j	z								
B			+	;	K	[	k	{								
C			,	<	L	\	l	|								
D			–	=	M	]	m	}								§
E			.	>	N	^	n	~			«					■
F			/	?	O	_	o	△			»		¤			

The Euro code (B0H) can be changed in the parameter setting in the system mode.

(7) PC-1250

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	`	p				€				
1			!	1	A	Q	a	q				€			á	
2			"	2	B	R	b	r							â	
3			#	3	C	S	c	s								ó
4			$	4	D	T	d	t			¤		Ä		ä	ô
5			%	5	E	U	e	u				µ				
6			&	6	F	V	f	v						Ö		ö
7			'	7	G	W	g	w			§	·	Ç		ç	÷
8			(	8	H	X	h	x								
9			)	9	I	Y	i	y					É		é	
A			*	:	J	Z	j	z								ú
B			+	;	K	[	k	{			«	»			ë	
C			,	<	L	\	l	|			¬			Ü		ü
D			−	=	M	]	m	}							í	
E			.	>	N	^	n	~							Î	
F			/	?	O	_	o	△						ß		

The Euro code (B0H) can be changed in the parameter setting in the system mode.

(8) PC-1251

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	`	p				€				
1			!	1	A	Q	a	q				€				
2			"	2	B	R	b	r								
3			#	3	C	S	c	s								
4			$	4	D	T	d	t			¤					
5			%	5	E	U	e	u				µ				
6			&	6	F	V	f	v								
7			'	7	G	W	g	w			§	·				
8			(	8	H	X	h	x								
9			)	9	I	Y	i	y								
A			*	:	J	Z	j	z								
B			+	;	K	[	k	{			«	»				
C			,	<	L	\	l	|			¬					
D			−	=	M	]	m	}								
E			.	>	N	^	n	~								
F			/	?	O	_	o	△								

The Euro code (B0H) can be changed in the parameter setting in the system mode.

(9) PC-1252

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	`	p				€			à	
1			!	1	A	Q	a	q			¡	€		Ñ	á	ñ
2			"	2	B	R	b	r			¢	²			â	ò
3			#	3	C	S	c	s	ƒ		£				ã	ó
4			$	4	D	T	d	t			¤		Ä		ä	ô
5			%	5	E	U	e	u			¥	µ	Å		å	õ
6			&	6	F	V	f	v					Æ	Ö	æ	ö
7			'	7	G	W	g	w			§	·	Ç		ç	÷
8			(	8	H	X	h	x	^	~				Ø	è	ø
9			)	9	I	Y	i	y							é	ù
A			*	:	J	Z	j	z			ª				ê	ú
B			+	;	K	[	k	{			«	»			ë	û
C			,	<	L	\	l	|			¬	¼		Ü	ì	ü
D			–	=	M	]	m	}				½			í	
E			.	>	N	^	n	~							î	
F			/	?	O	_	o	△				¿		ß	ï	ÿ

The Euro code (B0H) can be changed in the parameter setting in the system mode.

(10) PC-1253

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	`	p			€					
1			!	1	A	Q	a	q			€					
2			"	2	B	R	b	r			²					
3			#	3	C	S	c	s	ƒ		£					
4			$	4	D	T	d	t			¤					
5			%	5	E	U	e	u			¥	µ				
6			&	6	F	V	f	v								
7			'	7	G	W	g	w			§	·				
8			(	8	H	X	h	x								
9			)	9	I	Y	i	y								
A			*	:	J	Z	j	z			ª					
B			+	;	K	[	k	{			«	»				
C			,	<	L	\	l	|			¬					
D			–	=	M	]	m	}				½				
E			.	>	N	^	n	~								
F			/	?	O	_	o	△								

The Euro code (B0H) can be changed in the parameter setting in the system mode.

- 254 -

(11) PC-1254

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	`	p				€			à	
1			!	1	A	Q	a	q			¡	€		Ñ	á	ñ
2			"	2	B	R	b	r			¢	²			â	ò
3			#	3	C	S	c	s	ƒ		£				ã	ó
4			$	4	D	T	d	t			¤		Ä		ä	ô
5			%	5	E	U	e	u			¥	µ	Å		å	õ
6			&	6	F	V	f	v					Æ	Ö	æ	ö
7			'	7	G	W	g	w			§	·	Ç		ç	÷
8			(	8	H	X	h	x	^	~				Ø	è	ø
9			)	9	I	Y	i	y					É		é	ù
A			*	:	J	Z	j	z			ª	º			ê	ú
B			+	;	K	[	k	{			«	»			ë	û
C			,	<	L	\	l	|			¬	¼		Ü	ì	ü
D			−	=	M	]	m	}				½			í	
E			.	>	N	^	n	~							î	
F			/	?	O	_	o	△				¿			ß	Ï	ÿ

The Euro code (B0H) can be changed in the parameter setting in the system mode.

(12) PC-1257

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	`	p			€					
1			!	1	A	Q	a	q			€					
2			"	2	B	R	b	r			¢	²				
3			#	3	C	S	c	s			£					ó
4			$	4	D	T	d	t			¤		Ä		ä	
5			%	5	E	U	e	u				µ	Å		å	õ
6			&	6	F	V	f	v						Ö		ö
7			'	7	G	W	g	w			§	·				÷
8			(	8	H	X	h	x			Ø	ø				
9			)	9	I	Y	i	y					É		é	
A			*	:	J	Z	j	z								
B			+	;	K	[	k	{			«	»				
C			,	<	L	\	l	|			¬	¼		Ü		ü
D			−	=	M	]	m	}				½				
E			.	>	N	^	n	~								
F			/	?	O	_	o	△			Æ	æ		ß		

The Euro code (B0H) can be changed in the parameter setting in the system mode.

(13) LATIN9

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	`	p				€			à	
1			!	1	A	Q	a	q			¡	€		Ñ	á	ñ
2			"	2	B	R	b	r			¢	²			â	ò
3			#	3	C	S	c	s			£				ã	ó
4			$	4	D	T	d	t			¤		Ä		ä	ô
5			%	5	E	U	e	u			¥	µ	Å		å	õ
6			&	6	F	V	f	v					Æ	Ö	æ	ö
7			'	7	G	W	g	w			§	·	Ç		ç	÷
8			(	8	H	X	h	x						Ø	è	ø
9			)	9	I	Y	i	y					É		é	ù
A			*	:	J	Z	j	z			ª	º			ê	ú
B			+	;	K	[	k	{			«	»			ë	û
C			,	<	L	\	l	|			¬			Ü	ì	ü
D			–	=	M	]	m	}							í	
E			.	>	N	^	n	~							î	
F			/	?	O	_	o				¿			ß	Ï	ÿ

The Euro code (B0H) can be changed in the parameter setting in the system mode.

(14) Arabic

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	`	p				€				
1			!	1	A	Q	a	q				€				
2			"	2	B	R	b	r								
3			#	3	C	S	c	s								
4			$	4	D	T	d	t								
5			%	5	E	U	e	u								
6			&	6	F	V	f	v								
7			'	7	G	W	g	w								
8			(	8	H	X	h	x								
9			)	9	I	Y	i	y								
A			*	:	J	Z	j	z								
B			+	;	K	[	k	{								
C			,	<	L	\	l	|								
D			–	=	M	]	m	}								
E			.	>	N	^	n	~								
F			/	?	O	_	o	△								

The Euro code (B0H) can be changed in the parameter setting in the system mode.

11.6 PRICE FONT 1, 2, 3 (Outline font type: E, F, G)

(1) All types of character codes

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	円											-
1				1												
2				2												
3				3												
4			$	4												
5			%	5												
6				6												
7				7												
8				8												
9				9												
A																
B																
C			,			¥										
D			–													
E			.					~								
F			/													

11.7 TEC OUTLINE FONT 2, 3, GOTHIC725 BLACK (Outline font type: H, I, J)

(1) PC-850

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	`	p	Ç	É	á	€		ð	Ó	-
1			!	1	A	Q	a	q	ü	æ	í			Ð	ß	±
2			"	2	B	R	b	r	é	Æ	ó			Ê	Ô	=
3			#	3	C	S	c	s	â	ô	ú			Ë	Ò	¾
4			$	4	D	T	d	t	ä	ö	ñ			È	õ	¶
5			%	5	E	U	e	u	à	ò	Ñ	Á		Ì	Õ	§
6			&	6	F	V	f	v	å	û	ª	Â	ã	Í	µ	÷
7			'	7	G	W	g	w	ç	ù	º	À	Ã	Î	þ	¸
8			(	8	H	X	h	x	ê	ÿ	¿	©		Ï	Þ	°
9			)	9	I	Y	i	y	ë	Ö	®			Ú		¨
A			*	:	J	Z	j	z	è	Ü	¬			Û		·
B			+	;	K	[	k	{	ï	ø	½			Ù		¹
C			,	<	L	\	l	|	î	£	¼				ý	³
D			–	=	M	]	m	}	ì	Ø	¡	¢		¦	Ý	²
E			.	>	N	^	n	~	Ä	×	«	¥		Ì	¯	■
F			/	?	O	_	o		Å	ƒ	»		¤		´	

The Euro code (B0H) can be changed in the parameter setting in the system mode.

(2) PC-8

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	`	p	Ç	É	á	€				
1			!	1	A	Q	a	q	ü	æ	í					±
2			"	2	B	R	b	r	é	Æ	ó					
3			#	3	C	S	c	s	â	ô	ú					
4			$	4	D	T	d	t	ä	ö	ñ					
5			%	5	E	U	e	u	à	ò	Ñ					
6			&	6	F	V	f	v	å	û	ª				µ	÷
7			'	7	G	W	g	w	ç	ù	º					
8			(	8	H	X	h	x	ê	ÿ	¿					°
9			)	9	I	Y	i	y	ë	Ö						
A			*	:	J	Z	j	z	è	Ü	¬					·
B			+	;	K	[	k	{	ï	¢	½					
C			,	<	L	\	l	|	î	£	¼					
D			–	=	M	]	m	}	ì	¥	¡					²
E			.	>	N	^	n	~	Ä		«					■
F			/	?	O	_	o		Å	ƒ	»					

The Euro code (B0H) can be changed in the parameter setting in the system mode.

(3) PC-852

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	`	p	Ç	É	á	€		đ	Ó	-
1			!	1	A	Q	a	q	ü	Ĺ	í			Đ	ß	˝
2			"	2	B	R	b	r	é	Í	ó			Ď	Ô	˛
3			#	3	C	S	c	s	â	ô	ú			Ë	Ń	ˇ
4			$	4	D	T	d	t	ä	ö	Ą			ď	ń	˘
5			%	5	E	U	e	u	ů	Ĺ	ą	Á		Ň	ň	§
6			&	6	F	V	f	v	ć	ľ	Ž	Â	Ă	Í	Š	÷
7			'	7	G	W	g	w	ç	Ś	ž	Ě	ă	Î	š	¸
8			(	8	H	X	h	x	ł	ś	Ę	Ş		ě	Ŕ	°
9			)	9	I	Y	i	y	ë	Ö	ę				Ú	¨
A			*	:	J	Z	j	z	Ő	Ü	¬				ŕ	·
B			+	;	K	[	k	{	ő	Ť	ź				Ű	ű
C			,	<	L	\	l	|	î	ť	Č				ý	Ř
D			–	=	M	]	m	}	Ź	Ł	ş	Ż		Ţ	Ý	ř
E			.	>	N	^	n	~	Ä	×	«	ż		Ů	ţ	■
F			/	?	O	_	o		Ć	č	»		¤			

The Euro code (B0H) can be changed in the parameter setting in the system mode.

(4) PC-857

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	`	p	Ç	É	á	€		º	Ó	-
1			!	1	A	Q	a	q	ü	æ	í			ª	ß	±
2			"	2	B	R	b	r	é	Æ	ó			Ê	Ô	
3			#	3	C	S	c	s	â	ô	ú			Ë	Ò	¾
4			$	4	D	T	d	t	ä	ö	ñ			È	õ	¶
5			%	5	E	U	e	u	à	ò	Ñ	Á			Õ	§
6			&	6	F	V	f	v	å	û	Ğ	Â	ã	Í	µ	÷
7			'	7	G	W	g	w	ç	ù	ğ	À	Ã	Î		¸
8			(	8	H	X	h	x	ê	İ	¿	©		Ï	×	°
9			)	9	I	Y	i	y	ë	Ö	®				Ú	¨
A			*	:	J	Z	j	z	è	Ü	¬				Û	·
B			+	;	K	[	k	{	ï	ø	½				Ù	¹
C			,	<	L	\	l	|	î	£	¼				ì	³
D			–	=	M	]	m	}	¹	Ø	¡	¢		¦	ÿ	²
E			.	>	N	^	n	~	Ä	Ş	«	¥		Ì		■
F			/	?	O	_	o		Å	ş	»		¤		´	

The Euro code (B0H) can be changed in the parameter setting in the system mode.

(5) PC-851

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	`	p	Ç			€				
1			!	1	A	Q	a	q	ü							±
2			"	2	B	R	b	r	é							
3			#	3	C	S	c	s	â	ô						
4			$	4	D	T	d	t	ä	ö						
5			%	5	E	U	e	u	à							§
6			&	6	F	V	f	v		û						
7			'	7	G	W	g	w	ç	ù						¸
8			(	8	H	X	h	x	ê							°
9			)	9	I	Y	i	y	ë	Ö						¨
A			*	:	J	Z	j	z	è	Ü						
B			+	;	K	[	k	{	ï		½					
C			,	<	L	\	l	|	î	£						
D			−	=	M	]	m	}								
E			.	>	N	^	n	~	Ä		«					■
F			/	?	O	_	o				»					

The Euro code (B0H) can be changed in the parameter setting in the system mode.

(6) PC-855

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	`	p				€				
1			!	1	A	Q	a	q								
2			"	2	B	R	b	r								
3			#	3	C	S	c	s								
4			$	4	D	T	d	t								
5			%	5	E	U	e	u								
6			&	6	F	V	f	v								
7			'	7	G	W	g	w								
8			(	8	H	X	h	x								
9			)	9	I	Y	i	y								
A			*	:	J	Z	j	z								
B			+	;	K	[	k	{								
C			,	<	L	\	l	|								
D			−	=	M	]	m	}								§
E			.	>	N	^	n	~			«					■
F			/	?	O	_	o				»		¤			

The Euro code (B0H) can be changed in the parameter setting in the system mode.

(7) PC-1250

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	`	p				€	Ŕ	Đ	ŕ	ð
1			!	1	A	Q	a	q			ˇ	±	Á	Ń	á	ń
2			"	2	B	R	b	r			˘	˛		Ň	â	ň
3			#	3	C	S	c	s			Ł	ł		Ó		ó
4			$	4	D	T	d	t			¤	´	Ä	Ô	ä	ô
5			%	5	E	U	e	u			Ą	µ	Ĺ	Ő	Í	ő
6			&	6	F	V	f	v			¦	¶	Ć	Ö	ć	ö
7			'	7	G	W	g	w			§	·	Ç	×	ç	÷
8			(	8	H	X	h	x			¨	¸	Č	Ř	č	ř
9			)	9	I	Y	i	y				ą	É	Ů	é	ů
A			*	:	J	Z	j	z	Š	š	Ş	ş	Ę	Ú	ę	ú
B			+	;	K	[	k	{	Ś	ś	«	»	Ë	Ű	ë	ű
C			,	<	L	\	l	|	Ť	ť	¬	Ľ	Ě	Ü	ě	ü
D			–	=	M	]	m	}			-	˝	Í	Ý	í	ý
E			.	>	N	^	n	~	Ž	ž	®	Ĭ	Î	Ţ	î	ţ
F			/	?	O	_	o	Ż	Ź	ź		ż	Ď	ß		

The Euro code (B0H) can be changed in the parameter setting in the system mode.

(8) PC-1251

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	`	p				€				
1			!	1	A	Q	a	q				±				
2			"	2	B	R	b	r								
3			#	3	C	S	c	s								
4			$	4	D	T	d	t			¤					
5			%	5	E	U	e	u				µ				
6			&	6	F	V	f	v			¦	¶				
7			'	7	G	W	g	w			§	·				
8			(	8	H	X	h	x								
9			)	9	I	Y	i	y								
A			*	:	J	Z	j	z								
B			+	;	K	[	k	{			«	»				
C			,	<	L	\	l	|			¬					
D			–	=	M	]	m	}			-					
E			.	>	N	^	n	~			®					
F			/	?	O	_	o									

The Euro code (B0H) can be changed in the parameter setting in the system mode.

(9) PC-1252

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	`	p				€		Ð	à	ð
1			!	1	A	Q	a	q			¡	±	Á	Ñ	á	ñ
2			"	2	B	R	b	r				²		Ò	â	ò
3			#	3	C	S	c	s	ƒ		£	³		Ó		ó
4			$	4	D	T	d	t			¤	´	Ä	Ô	ä	ô
5			%	5	E	U	e	u				µ	Å	Õ	å	õ
6			&	6	F	V	f	v			¦	¶	Æ	Ö	æ	ö
7			'	7	G	W	g	w			§		Ç	×	ç	÷
8			(	8	H	X	h	x	^	~	¨	¸	È	Ø	è	ø
9			)	9	I	Y	i	y				¹	É	Ù	é	ù
A			*	:	J	Z	j	z	Š	š	ª	º	Ê	Ú	ê	ú
B			+	;	K	[	k	{			«	»	Ë	Û	ë	û
C			,	<	L	\	l	|			¬	¼	Ì	Ü	ì	ü
D			–	=	M	]	m	}			-	½	Í	Ý	í	ý
E			.	>	N	^	n	~	Ž	ž	®		Î		î	
F			/	?	O	_	o					¿	Ï	ß	ï	ÿ

The Euro code (B0H) can be changed in the parameter setting in the system mode.

(10) PC-1253

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

The Euro code (B0H) can be changed in the parameter setting in the system mode.

(11) PC-1254

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	`	p				€			à	
1			!	1	A	Q	a	q			¡	±	Á	Ñ	á	ñ
2			"	2	B	R	b	r				²		Ò	â	ò
3			#	3	C	S	c	s	ƒ		£	³		Ó		ó
4			$	4	D	T	d	t			¤	´	Ä	Ô	ä	ô
5			%	5	E	U	e	u				µ	Å	Õ	å	õ
6			&	6	F	V	f	v			¦	¶	Æ	Ö	æ	ö
7			'	7	G	W	g	w			§	·	Ç	×	ç	÷
8			(	8	H	X	h	x	^	~	¨	¸	È	Ø	è	ø
9			)	9	I	Y	i	y				¹	É	Ù	é	ù
A			*	:	J	Z	j	z	Š	š	ª	º	Ê	Ú	ê	ú
B			+	;	K	[	k	{			«	»	Ë	Û	ë	û
C			,	<	L	\	l	|			¬	¼	Ì	Ü	ì	ü
D			–	=	M	]	m	}			-	½	Í		í	¹
E			.	>	N	^	n	~			®		Î	Ş	î	ş
F			/	?	O	_	o				-	¿	Ï	ß	ï	ÿ

The Euro code (B0H) can be changed in the parameter setting in the system mode.

(12) PC-1257

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	`	p				€	Ą	Š	ą	š
1			!	1	A	Q	a	q				±		Ń		ń
2			"	2	B	R	b	r				²				
3			#	3	C	S	c	s			£	³	Ć	Ó	ć	ó
4			$	4	D	T	d	t			¤	´	Ä		ä	
5			%	5	E	U	e	u				µ	Å	Õ	å	õ
6			&	6	F	V	f	v			¦	¶	Ę	Ö	ę	ö
7			'	7	G	W	g	w			§	·		×		÷
8			(	8	H	X	h	x			Ø	ø	Č		č	
9			)	9	I	Y	i	y				¹	É	Ł	é	ľ
A			*	:	J	Z	j	z					Ź	Ś	ź	ś
B			+	;	K	[	k	{			«	»				
C			,	<	L	\	l	|			¬	¼	Ü			ü
D			–	=	M	]	m	}	¨	—	-	½	Ż			ż
E			.	>	N	^	n	~	ˇ	'	®		Ž			ž
F			/	?	O	_	o		¸		Æ	æ	ß			

The Euro code (B0H) can be changed in the parameter setting in the system mode.

(13) LATIN9

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	`	p				€		Ð	à	ñ
1			!	1	A	Q	a	q			¡	±	Á	Ñ	á	ò
2			"	2	B	R	b	r				²		Ò	â	ó
3			#	3	C	S	c	s			£	³		Ó		ô
4			$	4	D	T	d	t			ð	Ž	Ä	Ô	ä	õ
5			%	5	E	U	e	u				µ	Å	Õ	å	ö
6			&	6	F	V	f	v			Š	¾	Æ	Ö	æ	÷
7			'	7	G	W	g	w			§		Ç	×	ç	ø
8			(	8	H	X	h	x			š	ž	È	Ø	è	ù
9			)	9	I	Y	i	y				¹	É	Ù	é	ú
A			*	:	J	Z	j	z			ª	º	Ê	Ú	ê	û
B			+	;	K	[	k	{			«	»	Ë	Û	ë	ü
C			,	<	L	\	l	|			¬		Ì	Ü	ì	ý
D			–	=	M	]	m	}			-		Í	Ý	í	
E			.	>	N	^	n	~			®		Î		î	ÿ
F			/	?	O	_	o					¿	Ï	ß	ï	

The Euro code (B0H) can be changed in the parameter setting in the system mode.

(14) Arabic

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	`	p				€				
1			!	1	A	Q	a	q								
2			"	2	B	R	b	r								
3			#	3	C	S	c	s								
4			$	4	D	T	d	t								
5			%	5	E	U	e	u								
6			&	6	F	V	f	v								
7			'	7	G	W	g	w								
8			(	8	H	X	h	x								
9			)	9	I	Y	i	y								
A			*	:	J	Z	j	z								
B			+	;	K	[	k	{								
C			,	<	L	\	l	|								
D			–	=	M	]	m	}								
E			.	>	N	^	n	~								
F			/	?	O	_	o									

The Euro code (B0H) can be changed in the parameter setting in the system mode.

11.8 JAPANESE KANJI (16 x 16, 24 x 24, 32 x 32, 48 x 48)

(1) JIS8 (Half-size characters)

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	`	p				−	タ	ミ		
1			!	1	A	Q	a	q			。	ア	チ	ム		
2			″	2	B	R	b	r			「	イ	ツ	メ		
3			#	3	C	S	c	s			」	ウ	テ	モ		
4			$	4	D	T	d	t			、	エ	ト	ヤ		
5			%	5	E	U	e	u			・	オ	ナ	ユ		
6			&	6	F	V	f	v			ヲ	カ	ニ	ヨ		
7			'	7	G	W	g	w			ァ	キ	ヌ	ラ		
8			(	8	H	X	h	x			ィ	ク	ネ	リ		
9			)	9	I	Y	i	y			ゥ	ケ	ノ	ル		
A			∗	:	J	Z	j	z			ェ	コ	ハ	レ		
B			+	;	K	[	k	{			ォ	サ	ヒ	ロ		
C			,	<	L	¥	l	|			ャ	シ	フ	ワ		
D			−	=	M	]	m	}			ュ	ス	ヘ	ン		
E			.	>	N	^	n	~			ョ	セ	ホ	゛		
F			/	?	O	_	o				ッ	ソ	マ	゜		

(2) Shift JIS

Omitted

(3) JIS Hexadecimal

							第2バイト b7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
							b6	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
							b5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
							b4	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
							b3	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1
							b2	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1
							b1	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1
第1バイト b7	b6	b5	b4	b3	b2	b1	区／点	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
0	1	0	0	0	0	1	1	(SP)	、	。	，	．	・	：	；	？	！	゛	゜	´	`	¨	^	￣	_	ヽ	ヾ	ゝ	ゞ	〃	仝	々	〆	〇	ー	―	‐	／
0	1	0	0	0	1	0	2	◆	□	■	△	▲	▽	▼	※	〒	→	←	↑	↓	=											∈	∋	⊆	⊇	⊂	⊃
0	1	0	0	0	1	1	3																0	1	2	3	4	5	6	7	8	9						
0	1	0	0	1	0	0	4	ぁ	あ	ぃ	い	ぅ	う	ぇ	え	ぉ	お	か	が	き	ぎ	く	ぐ	け	げ	こ	ご	さ	ざ	し	じ	す	ず	せ	ぜ	そ	ぞ	た
0	1	0	0	1	0	1	5	ァ	ア	ィ	イ	ゥ	ウ	ェ	エ	ォ	オ	カ	ガ	キ	ギ	ク	グ	ケ	ゲ	コ	ゴ	サ	ザ	シ	ジ	ス	ズ	セ	ゼ	ソ	ゾ	タ
0	1	0	0	1	1	0	6	Α	Β	Γ	Δ	Ε	Ζ	Η	Θ	Ι	Κ	Λ	Μ	Ν	Ξ	Ο	Π	Ρ	Σ	Τ	Υ	Φ	Χ	Ψ	Ω							
0	1	0	0	1	1	1	7	А	Б	В	Г	Д	Е	Ё	Ж	З	И	Й	К	Л	М	Н	О	П	Р	С	Т	У	Ф	Х	Ц	Ч	Ш	Щ	Ъ	Ы	Ь	Э
0	1	0	1	0	0	0	8	─	│	┌	┐	┘	└	├	┬	┤	┴	┼	━	┃	┏	┓	┛	┗	┣	┳	┫	┻	╋	┠	┯	┨	┷	┿	┝	┰	┥	┸
0	1	0	1	0	0	1	9																															
0	1	0	1	0	1	0	10																															
0	1	0	1	0	1	1	11																															
0	1	0	1	1	0	0	12																															
0	1	0	1	1	0	1	13																															
0	1	0	1	1	1	0	14																															
0	1	0	1	1	1	1	15																															
0	1	1	0	0	0	0	16	亜	唖	娃	阿	哀	愛	挨	姶	逢	葵	茜	穐	悪	握	渥	旭	葦	芦	鯵	梓	圧	斡	扱	宛	姐	虻	飴	絢	綾	鮎	或
0	1	1	0	0	0	1	17	院	陰	隠	韻	吋	右	宇	烏	羽	迂	雨	卯	鵜	窺	丑	碓	臼	渦	嘘	唄	欝	蔚	鰻	姥	厩	浦	瓜	閏	噂	云	運
0	1	1	0	0	1	0	18	押	旺	横	欧	殴	王	翁	襖	鴬	鴎	黄	岡	沖	荻	億	屋	憶	臆	桶	牡	乙	俺	卸	恩	温	穏	音	下	化	仮	何
0	1	1	0	0	1	1	19	魁	晦	械	海	灰	界	皆	絵	芥	蟹	開	階	貝	凱	劾	外	咳	害	崖	慨	概	涯	碍	蓋	街	該	鎧	骸	浬	馨	蛙
0	1	1	0	1	0	0	20	粥	刈	苅	瓦	乾	侃	冠	寒	刊	勘	勧	巻	喚	堪	姦	完	官	寛	干	幹	患	感	慣	憾	換	敢	柑	桓	棺	款	歓
0	1	1	0	1	0	1	21	機	帰	毅	気	汽	畿	祈	季	稀	紀	徽	規	記	貴	起	軌	輝	飢	騎	鬼	亀	偽	儀	妓	宜	戯	技	擬	欺	犠	疑
0	1	1	0	1	1	0	22	供	侠	僑	兇	競	共	凶	協	匡	卿	叫	喬	境	峡	強	彊	怯	恐	恭	挟	教	橋	況	狂	狭	矯	胸	脅	興	蕎	郷
0	1	1	0	1	1	1	23	掘	窟	沓	靴	轡	窪	熊	隈	粂	栗	繰	桑	鍬	勲	君	薫	訓	群	軍	郡	卦	袈	祁	係	傾	刑	兄	啓	圭	珪	型
0	1	1	1	0	0	0	24	検	権	牽	犬	献	研	硯	絹	県	肩	見	謙	賢	軒	遣	鍵	険	顕	験	鹸	元	原	厳	幻	弦	減	源	玄	現	絃	舷
0	1	1	1	0	0	1	25	后	喉	坑	垢	好	孔	孝	宏	工	巧	巷	幸	広	庚	康	弘	恒	慌	抗	拘	控	攻	昂	晃	更	杭	校	梗	構	江	洪
0	1	1	1	0	1	1	27	察	拶	撮	擦	札	殺	薩	雑	皐	鯖	捌	錆	鮫	皿	晒	三	傘	参	山	惨	撒	散	桟	燦	珊	産	算	纂	蚕	讃	賛
0	1	1	1	0	1	0	26	此	頃	今	困	坤	墾	婚	恨	懇	昏	昆	根	梱	混	痕	紺	艮	魂	些	佐	叉	唆	嵯	左	差	査	沙	瑳	砂	詐	鎖
0	1	1	1	1	0	0	28	次	滋	治	爾	璽	痔	磁	示	而	耳	自	蒔	辞	汐	鹿	式	識	鴫	竺	軸	宍	雫	七	叱	執	失	嫉	室	悉	湿	漆
0	1	1	1	1	0	1	29	宗	就	州	修	愁	拾	洲	秀	秋	終	繍	習	臭	舟	蒐	衆	襲	讐	蹴	輯	週	酋	酬	集	醜	什	住	充	十	従	戎
0	1	1	1	1	1	0	30	勝	匠	升	召	哨	商	唱	嘗	奨	妾	娼	宵	将	小	少	尚	庄	床	廠	彰	承	抄	招	掌	捷	昇	昌	昭	晶	松	梢
0	1	1	1	1	1	1	31	拭	植	殖	燭	織	職	色	触	食	蝕	辱	尻	伸	信	侵	唇	娠	寝	審	心	慎	振	新	晋	森	榛	浸	深	申	疹	真
1	0	0	0	0	0	0	32	澄	摺	寸	世	瀬	畝	是	凄	制	勢	姓	征	性	成	政	整	星	晴	棲	栖	正	清	牲	生	盛	精	聖	声	製	西	誠
1	0	0	0	0	0	1	33	繊	羨	腺	舛	船	薦	詮	賎	践	選	遷	銭	銑	閃	鮮	前	善	漸	然	全	禅	繕	膳	糎	噌	塑	岨	措	曾	曽	楚
1	0	0	0	0	1	0	34	臓	蔵	贈	造	促	側	則	即	息	捉	束	測	足	速	俗	属	賊	族	続	卒	袖	其	揃	存	孫	尊	損	村	遜	他	多
1	0	0	0	0	1	1	35	叩	但	達	辰	奪	脱	巽	竪	辿	棚	谷	狸	鱈	樽	誰	丹	単	嘆	坦	担	探	旦	歎	淡	湛	炭	短	端	箪	綻	耽
1	0	0	0	1	0	0	36	帖	帳	庁	弔	張	彫	徴	懲	挑	暢	朝	潮	牒	町	眺	聴	脹	腸	蝶	調	諜	超	跳	銚	長	頂	鳥	勅	捗	直	朕
1	0	0	0	1	0	1	37	邸	鄭	釘	鼎	泥	摘	擢	敵	滴	的	笛	適	鏑	溺	哲	徹	撤	轍	迭	鉄	典	填	天	展	店	添	纏	甜	貼	転	顛
1	0	0	0	1	1	0	38	董	薄	藤	討	謄	豆	踏	逃	透	鐙	陶	頭	騰	闘	働	動	同	堂	導	憧	撞	洞	瞳	童	胴	萄	道	銅	峠	鴇	匿
1	0	0	0	1	1	1	39	如	尿	韮	任	妊	忍	認	濡	禰	祢	寧	葱	猫	熱	年	念	捻	撚	燃	粘	乃	廼	之	埜	嚢	悩	濃	納	能	脳	膿
1	0	0	1	0	0	0	40	函	箱	硲	箸	肇	筈	櫨	幡	肌	畑	畠	八	鉢	溌	発	醗	髪	伐	罰	抜	筏	閥	鳩	噺	塙	蛤	隼	伴	判	半	反
1	0	0	1	0	0	1	41	鼻	柊	稗	匹	疋	髭	彦	膝	菱	肘	弼	必	畢	筆	逼	桧	姫	媛	紐	百	謬	俵	彪	標	氷	漂	瓢	票	表	評	豹
1	0	0	1	0	1	0	42	福	腹	複	覆	淵	弗	払	沸	仏	物	鮒	分	吻	噴	墳	憤	扮	焚	奮	粉	糞	紛	雰	文	聞	丙	併	兵	塀	幣	平
1	0	0	1	0	1	1	43	法	泡	烹	砲	縫	胞	芳	萌	蓬	蜂	褒	訪	豊	邦	鋒	飽	鳳	鵬	乏	亡	傍	剖	坊	妨	帽	忘	忙	房	暴	望	某
1	0	0	1	1	0	0	44	漫	蔓	味	未	魅	巳	箕	岬	密	蜜	湊	蓑	稔	脈	妙	粍	民	眠	務	夢	無	牟	矛	霧	鵡	椋	婿	娘	冥	名	命
1	0	0	1	1	0	1	45	諭	輸	唯	佑	優	勇	友	宥	幽	悠	憂	揖	有	柚	湧	涌	猶	猷	由	祐	裕	誘	遊	邑	郵	雄	融	夕	予	余	与
1	0	0	1	1	1	0	46	荊	蕙	裏	裡	里	離	陸	律	率	立	葎	掠	略	劉	流	溜	琉	留	硫	粒	隆	竜	龍	侶	慮	旅	虜	了	亮	僚	両
1	0	0	1	1	1	1	47	蓮	連	錬	呂	魯	櫓	炉	賂	路	露	労	婁	廊	弄	朗	楼	榔	浪	漏	牢	狼	篭	老	聾	蟹	郎	六	麓	禄		

第2バイト

	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62
b7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
b6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
b5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1
b4	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1
b3	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1
b2	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1
b1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0

第1バイト（区ごとのビットパターン）

区	b7	b6	b5	b4	b3	b2	b1
1	0	1	0	0	0	0	1
2	0	1	0	0	0	1	0
3	0	1	0	0	0	1	1
4	0	1	0	0	1	0	0
5	0	1	0	0	1	0	1
6	0	1	0	0	1	1	0
7	0	1	0	0	1	1	1
8	0	1	0	1	0	0	0
9	0	1	0	1	0	0	1
10	0	1	0	1	0	1	0
11	0	1	0	1	0	1	1
12	0	1	0	1	1	0	0
13	0	1	0	1	1	0	1
14	0	1	0	1	1	1	0
15	0	1	0	1	1	1	1
16	0	1	1	0	0	0	0
17	0	1	1	0	0	0	1
18	0	1	1	0	0	1	0
19	0	1	1	0	0	1	1
20	0	1	1	0	1	0	0
21	0	1	1	0	1	0	1
22	0	1	1	0	1	1	0
23	0	1	1	0	1	1	1
24	0	1	1	1	0	0	0
25	0	1	1	1	0	0	1
26	0	1	1	1	0	1	0
27	0	1	1	1	0	1	1
28	0	1	1	1	1	0	0
29	0	1	1	1	1	0	1
30	0	1	1	1	1	1	0
31	0	1	1	1	1	1	1
32	1	0	0	0	0	0	0
33	1	0	0	0	0	0	1
34	1	0	0	0	0	1	0
35	1	0	0	0	0	1	1
36	1	0	0	0	1	0	0
37	1	0	0	0	1	0	1
38	1	0	0	0	1	1	0
39	1	0	0	0	1	1	1
40	1	0	0	1	0	0	0
41	1	0	0	1	0	0	1
42	1	0	0	1	0	1	0
43	1	0	0	1	0	1	1
44	1	0	0	1	1	0	0
45	1	0	0	1	1	0	1
46	1	0	0	1	1	1	0
47	1	0	0	1	1	1	1

文字表（区 × 点 32〜62）

区＼点	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62
1	＼	〜	‖	｜	…	‥	‘	’	“	”	（	）	〔	〕	［	］	｛	｝	〈	〉	《	》	「	」	『	』	【	】	＋	－	±
2	∪	∩									∧	∨	¬	⇒	⇔	∀	∃												∠	⊥	⌒
3		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				
4	だ	ち	ぢ	っ	つ	づ	て	で	と	ど	な	に	ぬ	ね	の	は	ば	ぱ	ひ	び	ぴ	ふ	ぶ	ぷ	へ	べ	ぺ	ほ	ぼ	ぽ	ま
5	ダ	チ	ヂ	ッ	ツ	ヅ	テ	デ	ト	ド	ナ	ニ	ヌ	ネ	ノ	ハ	バ	パ	ヒ	ビ	ピ	フ	ブ	プ	ヘ	ベ	ペ	ホ	ボ	ポ	マ
6		α	β	γ	δ	ε	ζ	η	θ	ι	κ	λ	μ	ν	ξ	ο	π	ρ	σ	τ	υ	φ	χ	ψ	ω						
7	Ю	Я																а	б	в	г	д	е	ё	ж	з	и	й	к	л	м
8	╂																														
9																															
10																															
11																															
12																															
13																															
14																															
15																															
16	粟	袷	安	庵	按	暗	案	闇	鞍	杏	以	伊	位	依	偉	囲	夷	委	威	尉	惟	意	慰	易	椅	為	畏	異	移	維	緯
17	雲	荏	餌	叡	営	嬰	影	映	曳	栄	永	泳	洩	瑛	盈	穎	頴	英	衛	詠	鋭	液	疫	益	駅	悦	謁	越	閲	榎	厭
18	伽	価	佳	加	可	嘉	夏	嫁	家	寡	科	暇	果	架	歌	河	火	珂	禍	禾	稼	箇	花	苛	茄	荷	華	菓	蝦	課	嘩
19	垣	柿	蛎	鈎	劃	嚇	各	廓	拡	撹	格	核	殻	獲	確	穫	覚	角	赫	較	郭	閣	隔	革	学	岳	楽	額	顎	掛	笠
20	汗	漢	澗	潅	環	甘	監	看	竿	管	簡	緩	缶	翰	肝	艦	莞	観	諌	貫	還	鑑	間	閑	関	陥	韓	館	舘	丸	含
21	祇	義	蟻	誼	議	掬	菊	鞠	吉	吃	喫	桔	橘	詰	砧	杵	黍	却	客	脚	虐	逆	丘	久	仇	休	及	吸	宮	弓	急
22	鏡	響	饗	驚	仰	凝	尭	暁	業	局	曲	極	玉	桐	粁	僅	勤	均	巾	錦	斤	欣	欽	琴	禁	禽	筋	緊	芹	菌	衿
23	契	形	径	恵	慶	慧	憩	掲	携	敬	景	桂	渓	畦	稽	系	経	継	繋	罫	茎	荊	蛍	計	詣	警	軽	頚	鶏	芸	迎
24	言	諺	限	乎	個	古	呼	固	姑	孤	己	庫	弧	戸	故	枯	湖	狐	糊	袴	股	胡	菰	虎	誇	跨	鈷	雇	顧	鼓	五
25	浩	港	溝	甲	皇	硬	稿	糠	紅	紘	絞	綱	耕	考	肯	肱	腔	膏	航	荒	行	衡	講	貢	購	郊	酵	鉱	砿	鋼	閤
26	裟	坐	座	挫	債	催	再	最	哉	塞	妻	宰	彩	才	採	栽	歳	済	災	采	犀	砕	砦	祭	斎	細	菜	裁	載	際	剤
27	酸	餐	斬	暫	残	仕	仔	伺	使	刺	司	史	嗣	四	士	始	姉	姿	子	屍	市	師	志	思	指	支	孜	斯	施	旨	枝
28	疾	質	実	蔀	篠	偲	柴	芝	屡	蕊	縞	舎	写	射	捨	赦	斜	煮	社	紗	者	謝	車	遮	蛇	邪	借	勺	尺	杓	灼
29	柔	汁	渋	獣	縦	重	銃	叔	夙	宿	淑	祝	縮	粛	塾	熟	出	術	述	俊	峻	春	瞬	竣	舜	駿	准	循	旬	楯	殉
30	樟	樵	沼	消	渉	湘	焼	焦	照	症	省	硝	礁	祥	称	章	笑	粧	紹	肖	菖	蒋	蕉	衝	裳	訟	証	詔	詳	象	賞
31	神	秦	紳	臣	芯	薪	親	診	身	辛	進	針	震	人	仁	刃	塵	壬	尋	甚	尽	腎	訊	迅	陣	靭	笥	諏	須	酢	図
32	誓	請	逝	醒	青	静	斉	税	脆	隻	席	惜	戚	斥	昔	析	石	積	籍	績	脊	責	赤	跡	蹟	碩	切	拙	接	摂	折
33	狙	疏	疎	礎	祖	租	粗	素	組	蘇	訴	阻	遡	鼠	僧	創	双	叢	倉	喪	壮	奏	爽	宋	層	匝	惣	想	捜	掃	挿
34	太	汰	詑	唾	堕	妥	惰	打	柁	舵	楕	陀	駄	騨	体	堆	対	耐	岱	帯	待	怠	態	戴	替	泰	滞	胎	腿	苔	袋
35	胆	蛋	誕	鍛	団	壇	弾	断	暖	檀	段	男	談	値	知	地	弛	恥	智	池	痴	稚	置	致	蜘	遅	馳	築	畜	竹	筑
36	沈	珍	賃	鎮	陳	津	墜	椎	槌	追	鎚	痛	通	塚	栂	掴	槻	佃	漬	柘	辻	蔦	綴	鍔	椿	潰	坪	壷	嬬	紬	爪
37	点	伝	殿	澱	田	電	兎	吐	堵	塗	妬	屠	徒	斗	杜	渡	登	菟	賭	途	都	鍍	砥	砺	努	度	土	奴	怒	倒	党
38	得	徳	涜	特	督	禿	篤	毒	独	読	栃	橡	凸	突	椴	届	鳶	苫	寅	酉	瀞	噸	屯	惇	敦	沌	豚	遁	頓	呑	曇
39	農	覗	蚤	巴	把	播	覇	杷	波	派	琶	破	婆	罵	芭	馬	俳	廃	拝	排	敗	杯	盃	牌	背	肺	輩	配	倍	培	媒
40	叛	帆	搬	斑	板	氾	汎	版	犯	班	畔	繁	般	藩	販	範	釆	煩	頒	飯	挽	晩	番	盤	磐	蕃	蛮	匪	卑	否	妃
41	廟	描	病	秒	苗	錨	鋲	蒜	蛭	鰭	品	彬	斌	浜	瀕	貧	賓	頻	敏	瓶	不	付	埠	夫	婦	富	冨	布	府	怖	扶
42	弊	柄	並	蔽	閉	陛	米	頁	僻	壁	癖	碧	別	瞥	蔑	箆	偏	変	片	篇	編	辺	返	遍	便	勉	娩	弁	鞭	保	舗
43	棒	冒	紡	肪	膨	謀	貌	貿	鉾	防	吠	頬	北	僕	卜	墨	撲	朴	牧	睦	穆	釦	勃	没	殆	堀	幌	奔	本	翻	凡
44	明	盟	迷	銘	鳴	姪	牝	滅	免	棉	綿	緬	面	麺	摸	模	茂	妄	孟	毛	猛	盲	網	耗	蒙	儲	木	黙	目	杢	勿
45	誉	輿	預	傭	幼	妖	容	庸	揚	揺	擁	曜	楊	様	洋	溶	熔	用	窯	羊	耀	葉	蓉	要	謡	踊	遥	陽	養	慾	抑
46	寮	料	梁	涼	猟	療	瞭	稜	糧	良	諒	遼	量	陵	領	力	緑	倫	厘	林	淋	燐	琳	臨	輪	隣	鱗	麟	瑠	塁	涙
47	論	倭	和	話	歪	賄	脇	惑	枠	鷲	亙	亘	鰐	詫	藁	蕨	椀	湾	碗	腕											

第2バイト (second-byte bit pattern)

第2バイト	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94
b7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
b6	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
b5	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
b4	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1
b3	1	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1
b2	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1
b1	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0

第1バイト／区・点 (character table, 点 63–94)

b7	b6	b5	b4	b3	b2	b1	区	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94
0	1	0	0	0	0	1	1	×	÷	=	≠	<	>	≦	≧	∞	∴	♂	♀	°	′	″	℃	¥	＄	¢	£	％	＃	＆	＊	＠	§	☆	★	○	●	◎	◇
0	1	0	0	0	1	0	2	∂	∇	≡	≒	≪	≫	√	∽	∝	∵	∫	∬							Å	‰	♯	♭	♪	†	‡	¶						◯
0	1	0	0	0	1	1	3			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				
0	1	0	0	1	0	0	4	み	む	め	も	ゃ	や	ゅ	ゆ	ょ	よ	ら	り	る	れ	ろ	ゎ	わ	ゐ	ゑ	を	ん											
0	1	0	0	1	0	1	5	ミ	ム	メ	モ	ャ	ヤ	ュ	ユ	ョ	ヨ	ラ	リ	ル	レ	ロ	ヮ	ワ	ヰ	ヱ	ヲ	ン	ヴ	ヵ	ヶ								
0	1	0	0	1	1	0	6																																
0	1	0	0	1	1	1	7	н	о	п	р	с	т	у	ф	х	ц	ч	ш	щ	ъ	ы	ь	э	ю	я													
0	1	0	1	0	0	0	8																																
0	1	0	1	0	0	1	9																																
0	1	0	1	0	1	0	10																																
0	1	0	1	0	1	1	11																																
0	1	0	1	1	0	0	12																																
0	1	0	1	1	0	1	13																																
0	1	0	1	1	1	0	14																																
0	1	0	1	1	1	1	15																																
0	1	1	0	0	0	0	16	胃	萎	衣	謂	違	遺	医	井	亥	域	育	郁	磯	一	壱	溢	逸	稲	茨	芋	鰯	允	印	咽	員	因	姻	引	飲	淫	胤	蔭
0	1	1	0	0	0	1	17	円	園	堰	奄	宴	延	怨	掩	援	沿	演	炎	焔	煙	燕	猿	縁	艶	苑	薗	遠	鉛	鴛	塩	於	汚	甥	凹	央	奥	往	応
0	1	1	0	0	1	0	18	貨	迦	過	霞	蚊	俄	峨	我	牙	画	臥	芽	蛾	賀	雅	餓	駕	介	会	解	回	塊	壊	廻	快	怪	悔	恢	懐	戒	拐	改
0	1	1	0	0	1	1	19	樫	橿	梶	鰍	潟	割	喝	恰	括	活	渇	滑	葛	褐	轄	且	鰹	叶	椛	樺	鞄	株	兜	竃	蒲	釜	鎌	噛	鴨	栢	茅	萱
0	1	1	0	1	0	0	20	岸	巌	玩	癌	眼	岩	翫	贋	雁	頑	顔	願	企	伎	危	喜	器	基	奇	嬉	寄	岐	希	幾	忌	揮	机	旗	既	期	棋	棄
0	1	1	0	1	0	1	21	救	朽	求	汲	泣	灸	球	究	窮	笈	級	糾	給	旧	牛	去	居	巨	拒	拠	挙	渠	虚	許	距	鋸	漁	禦	魚	亨	享	京
0	1	1	0	1	1	0	22	襟	謹	近	金	吟	銀	九	倶	句	区	狗	玖	矩	苦	躯	駆	駈	駒	具	愚	虞	喰	空	偶	寓	遇	隅	串	櫛	釧	屑	屈
0	1	1	0	1	1	1	23	鯨	劇	戟	撃	激	隙	桁	傑	欠	決	潔	穴	結	血	訣	月	件	倹	倦	健	兼	券	剣	喧	圏	堅	嫌	建	憲	懸	拳	捲
0	1	1	1	0	0	0	24	互	伍	午	呉	吾	娯	後	御	悟	梧	檎	瑚	碁	語	誤	護	醐	乞	鯉	交	佼	侯	候	倖	光	公	功	効	勾	厚	口	向
0	1	1	1	0	0	1	25	降	項	香	高	鴻	剛	劫	号	合	壕	拷	濠	豪	轟	麹	克	刻	告	国	穀	酷	鵠	黒	獄	漉	腰	甑	忽	惚	骨	狛	込
0	1	1	1	0	1	0	26	在	材	罪	財	冴	坂	阪	堺	榊	肴	咲	崎	埼	碕	鷺	作	削	咋	搾	昨	朔	柵	窄	策	索	錯	桜	鮭	笹	匙	冊	刷
0	1	1	1	0	1	1	27	止	死	氏	獅	祉	私	糸	紙	紫	肢	脂	至	視	詞	詩	試	誌	諮	資	賜	雌	飼	歯	事	似	侍	児	字	寺	慈	持	時
0	1	1	1	1	0	0	28	爵	酌	釈	錫	若	寂	弱	惹	主	取	守	手	朱	殊	狩	珠	種	腫	趣	酒	首	儒	受	呪	寿	授	樹	綬	需	囚	収	周
0	1	1	1	1	0	1	29	淳	準	潤	盾	純	巡	遵	醇	順	処	初	所	暑	曙	渚	庶	緒	署	書	薯	藷	諸	助	叙	女	序	徐	恕	鋤	除	傷	償
0	1	1	1	1	1	0	30	醤	鉦	鍾	鐘	障	鞘	上	丈	丞	乗	冗	剰	城	場	壌	嬢	常	情	擾	条	杖	浄	状	畳	穣	蒸	譲	醸	錠	嘱	埴	飾
0	1	1	1	1	1	1	31	厨	逗	吹	垂	帥	推	水	炊	睡	粋	翠	衰	遂	酔	錐	錘	随	瑞	髄	崇	嵩	数	枢	趨	雛	据	杉	椙	菅	頗	雀	裾
1	0	0	0	0	0	0	32	設	窃	節	説	雪	絶	舌	蝉	仙	先	千	占	宣	専	尖	川	戦	扇	撰	栓	栴	泉	浅	洗	染	潜	煎	煽	旋	穿	箭	線
1	0	0	0	0	0	1	33	掻	操	早	曹	巣	槍	槽	漕	燥	争	痩	相	窓	糟	総	綜	聡	草	荘	葬	蒼	藻	装	走	送	遭	鎗	霜	騒	像	増	憎
1	0	0	0	0	1	0	34	貸	退	逮	隊	黛	鯛	代	台	大	第	醍	題	鷹	滝	瀧	卓	啄	宅	托	択	拓	沢	濯	琢	託	鐸	濁	諾	茸	凧	蛸	只
1	0	0	0	0	1	1	35	蓄	逐	秩	窒	茶	嫡	着	中	仲	宙	忠	抽	昼	柱	注	虫	衷	註	酎	鋳	駐	樗	瀦	猪	苧	著	貯	丁	兆	凋	喋	寵
1	0	0	0	1	0	0	36	吊	釣	鶴	亭	低	停	偵	剃	貞	呈	堤	定	帝	底	庭	廷	弟	悌	抵	挺	提	梯	汀	碇	禎	程	締	艇	訂	諦	蹄	逓
1	0	0	0	1	0	1	37	冬	凍	刀	唐	塔	塘	套	宕	島	嶋	悼	投	搭	東	桃	梼	棟	盗	淘	湯	涛	灯	燈	当	痘	祷	等	答	筒	糖	統	到
1	0	0	0	1	1	0	38	鈍	奈	那	内	乍	凪	薙	謎	灘	捺	鍋	楢	馴	縄	畷	南	楠	軟	難	汝	二	尼	弐	迩	匂	賑	肉	虹	廿	日	乳	入
1	0	0	0	1	1	1	39	梅	楳	煤	狽	買	売	賠	陪	這	蝿	秤	矢	萩	伯	剥	博	拍	柏	泊	白	箔	粕	舶	薄	迫	曝	漠	爆	縛	莫	駁	麦
1	0	0	1	0	0	0	40	庇	彼	悲	扉	批	披	斐	比	泌	疲	皮	碑	秘	緋	罷	肥	被	誹	費	避	非	飛	樋	簸	備	尾	微	枇	毘	琵	眉	美
1	0	0	1	0	0	1	41	敷	斧	普	浮	父	符	腐	膚	芙	譜	負	賦	赴	阜	附	侮	撫	武	舞	葡	蕪	部	封	楓	風	葺	蕗	伏	副	復	幅	服
1	0	0	1	0	1	0	42	鋪	圃	捕	歩	甫	補	輔	穂	募	墓	慕	戊	暮	母	簿	菩	倣	俸	包	呆	報	奉	宝	峰	峯	崩	庖	抱	捧	放	方	朋
1	0	0	1	0	1	1	43	盆	摩	磨	魔	麻	埋	妹	昧	枚	毎	哩	槙	幕	膜	枕	鮪	柾	鱒	桝	亦	俣	又	抹	末	沫	迄	侭	繭	麿	万	慢	満
1	0	0	1	1	0	0	44	餅	尤	戻	籾	貰	問	悶	紋	門	匁	也	冶	夜	爺	耶	野	弥	矢	厄	役	約	薬	訳	躍	靖	柳	薮	鑓	愉	愈	油	癒
1	0	0	1	1	0	1	45	欲	沃	浴	翌	翼	淀	羅	螺	裸	来	莱	頼	雷	洛	絡	落	酪	乱	卵	嵐	欄	濫	藍	蘭	覧	利	吏	履	李	梨	理	璃
1	0	0	1	1	1	0	46	累	類	令	伶	例	冷	励	嶺	怜	玲	礼	苓	鈴	隷	零	霊	麗	齢	暦	歴	列	劣	烈	裂	廉	恋	憐	漣	煉	簾	練	聯
1	0	0	1	1	1	1	47																																

第2バイト（ビットパターン／点 1〜31）:

ビット	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
b7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
b6	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
b5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
b4	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
b3	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1
b2	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1
b1	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1

第1バイト／区 と 点 1〜31:

b7	b6	b5	b4	b3	b2	b1	区	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
1	0	1	0	0	0	0	48	弌	丐	丕	个	丱	丶	丼	丿	乂	乖	乘	亂	亅	豫	亊	舒	弍	于	亞	亟	亠	亢	亰	亳	亶	从	仍	仄	仆	仂	仗
1	0	1	0	0	0	1	49	僉	僊	傳	僂	僖	僞	僥	僭	僣	僮	價	僵	儉	儁	儂	儖	儕	儔	儚	儡	儺	儷	儼	儻	儿	兀	兒	兌	兔	兢	竸
1	0	1	0	0	1	0	50	辨	劬	劭	劼	劵	勁	勍	勗	勞	勣	勦	飭	勠	勳	勵	勸	勹	匆	匈	甸	匍	匐	匏	匕	匚	匣	匯	匱	匳	匸	區
1	0	1	0	0	1	1	51	咫	哂	咤	咾	咼	哘	哥	哦	唏	唔	哽	哮	哭	哺	哢	唹	啀	啣	啌	售	啜	啅	啖	啗	唸	唳	啝	喙	喀	咯	喊
1	0	1	0	1	0	0	52	圈	國	圍	圓	團	圖	嗇	圜	圦	圷	圸	坎	圻	址	坏	坩	埀	垈	坡	坿	垉	垓	垠	垳	垤	垪	垰	埃	埖	埆	埔
1	0	1	0	1	0	1	53	奸	妁	妝	佞	侫	妍	妖	妗	妛	妓	妒	妨	妬	妯	妲	妸	妾	姆	姨	姜	姙	姚	娥	娟	娑	娜	娉	娚	婀	婬	婉
1	0	1	0	1	1	0	54	屐	屏	孱	屬	屮	乢	屶	屹	岌	岑	岔	妛	岫	岻	岶	岼	岷	峅	岾	峇	峙	峩	峽	峺	峭	嶌	峪	崋	崕	崗	嵜
1	0	1	0	1	1	1	55	廖	廣	廝	廚	廛	廢	廡	廨	廩	廬	廱	廳	廰	廴	廸	廾	弃	弉	彝	彜	弋	弑	弖	弩	弭	弸	彁	彈	彎	弯	彑
1	0	1	1	0	0	0	56	悄	悛	悖	悗	悒	悧	悋	惡	悸	惠	惓	悴	忰	悽	惆	悵	惘	慍	愕	愆	惶	惷	愀	惴	惺	愃	愡	惻	惱	愍	愎
1	0	1	1	0	0	1	57	戞	戡	截	戮	戰	戲	戳	扁	扎	扞	扣	扛	扠	扨	扼	抂	抉	找	抒	抓	抖	拔	抃	抔	拗	拑	抻	拏	拿	拆	擔
1	0	1	1	0	1	0	58	據	擒	擅	擇	撻	擘	擂	擱	擧	舉	擠	擡	抬	擣	擯	攬	擶	擴	擲	擺	攀	擽	攘	攜	攅	攤	攣	攫	攴	攵	攷
1	0	1	1	0	1	1	59	曄	暸	曖	曚	曠	昿	曦	曩	曰	曵	曷	朏	朖	朞	朦	朧	霸	朮	朿	朶	杁	朸	朷	杆	杞	杠	杙	杣	杤	枉	杰
1	0	1	1	1	0	0	60	楷	楜	楸	楫	楔	楾	楮	椹	楴	椽	楙	椰	楡	楞	楝	榁	楪	榲	榮	槐	榿	槁	槓	榾	槎	寨	槊	槝	榻	槃	榱
1	0	1	1	1	0	1	61	槭	櫻	欄	櫺	欞	欟	欸	欷	盜	欹	飮	歇	歃	歉	歐	歙	歔	歛	歟	歡	歸	歹	歿	殀	殄	殃	殍	殘	殕	殞	殤
1	0	1	1	1	1	0	62	油	泛	泯	泙	泪	洟	衍	洶	洫	洽	洸	洙	洵	洳	洒	洌	浣	涓	浤	浚	浹	浙	涎	涕	濤	涅	淹	渕	渊	涵	淇
1	0	1	1	1	1	1	63	漿	漓	滷	澆	潺	潸	澁	澀	潯	潛	濳	潭	澂	潼	潘	澎	澑	濂	潦	澳	澣	澡	澤	澹	濆	澪	濟	濕	濬	濔	濘
1	1	0	0	0	0	0	64	燎	燠	燬	燧	燵	燼	燹	燿	爍	爐	爛	爨	爭	爬	爰	爲	爻	爼	爿	牀	牆	牋	牘	牴	牾	犂	犁	犇	犒	犖	犢
1	1	0	0	0	0	1	65	瓠	瓣	瓧	瓩	瓮	瓲	瓰	瓱	瓸	瓷	甃	甅	甌	甎	甍	甕	甓	甞	甦	甬	甼	畄	畍	畊	畉	畛	畆	畚	畩	畤	畧
1	1	0	0	0	1	0	66	癩	癪	癧	癬	癰	癲	癶	癸	發	皀	皃	皈	皋	皎	皖	皓	皙	皚	皰	皴	皸	皹	皺	盂	盍	盖	盒	盞	盡	盥	盧
1	1	0	0	0	1	1	67	磧	磚	磽	磴	礇	礎	礑	礙	礬	礫	祀	祠	祗	祟	祚	祕	祓	祺	祿	禊	禝	禧	齋	禪	禮	禳	禹	禺	秉	秕	秋
1	1	0	0	1	0	0	68	簀	簇	簓	篳	篷	簗	簍	篶	簣	簧	簪	簟	簷	簫	簺	簽	籌	籃	籔	籏	籀	籐	籘	籟	籤	籖	籥	籬	籵	粃	粐
1	1	0	0	1	0	1	69	紆	紂	紜	紕	紊	絅	絋	紮	紲	紿	紵	絆	絳	絖	絎	絲	絨	絮	絏	絣	經	綉	絛	綏	絽	綛	綺	綮	綣	綵	緇
1	1	0	0	1	1	0	70	繆	繦	縻	縵	縹	繃	縷	縲	縺	繧	繝	繖	繞	繙	繚	繹	繪	繡	繩	繼	繻	纃	緕	繽	辮	繿	纈	纉	續	纒	纐
1	1	0	0	1	1	1	71	隋	腆	脾	腓	腑	胼	腱	腮	腥	腦	腴	膃	膈	膊	膀	膂	膠	膕	膤	膣	腟	膓	膩	膰	膵	膾	膸	膽	臀	臂	膺
1	1	0	1	0	0	0	72	茵	茴	茖	茲	茱	荀	茹	荐	荅	茯	茫	茗	茘	莅	莚	莪	莟	莢	莖	茣	莎	莇	莊	荼	莵	荳	荵	莠	莉	莨	菴
1	1	0	1	0	0	1	73	蕁	蘂	蕋	蕕	薀	薤	薈	薑	薊	薨	蕭	薔	薛	藪	薇	薜	蕷	蕾	薐	藉	薺	藏	薹	藐	藕	藝	藜	藹	蘊	蘓	蘋
1	1	0	1	0	1	0	74	蝓	蝣	蝪	蠅	螢	螟	螂	螯	蟋	螽	蟀	蟐	雖	螫	蟄	螳	蟇	蟆	螻	蟯	蟲	蟠	蠏	蠍	蟾	蟶	蟷	蠎	蟒	蠑	蠖
1	1	0	1	0	1	1	75	襦	襤	襭	襪	襯	襴	襷	襾	覃	覈	覊	覓	覘	覡	覩	覦	覬	覯	覲	覺	覽	覿	觀	觚	觜	觝	觧	觸	訃	訖	訐
1	1	0	1	1	0	0	76	謀	謌	謔	謇	謚	謄	謖	謐	謗	謠	謳	鞫	謦	謫	謾	謨	譁	譌	譏	譎	證	譖	譛	譚	譫	譟	譬	譯	譴	譽	讀
1	1	0	1	1	0	1	77	躓	躑	躔	躙	躪	躡	躬	躰	軆	躱	躾	軅	軈	軋	軛	軣	軼	軻	軫	軾	輊	輅	輕	輒	輙	輓	輜	輟	輛	輌	輦
1	1	0	1	1	1	0	78	遏	遐	遑	遒	逎	遉	逾	遖	遘	遞	遨	遯	遶	隨	遲	邂	遽	邁	邀	邊	邉	邏	邨	邯	邱	邵	郢	郤	扈	郛	鄂
1	1	0	1	1	1	1	79	鎰	錢	鋺	鏆	錚	錣	錺	錵	錻	鍜	鍠	鍼	鍮	鍖	鎰	鎬	鎭	鎔	鎹	鏖	鏗	鏨	鏥	鏘	鏃	鏝	鏐	鏷	鐃	鐇	鐐
1	1	1	0	0	0	0	80	陝	陟	陦	陲	陬	隍	隘	隕	隗	險	隧	隱	隲	隰	隴	隶	隸	隹	雎	雋	雉	雍	襍	雜	霍	雕	雹	霄	霆	霈	霓
1	1	1	0	0	0	1	81	顛	顴	顳	颪	颯	颱	颶	飄	飃	飆	飩	飫	餃	餉	餒	餔	餘	餡	餝	餞	餤	餠	餬	餮	餽	餾	饂	饉	饐	饋	饑
1	1	1	0	0	1	0	82	饒	饕	髻	鬆	鬪	鬥	鬧	鬨	鬩	鬮	鬯	鬲	魄	魃	魏	魍	魎	魑	魘	魴	鮓	鮃	鮑	鮖	鮗	鮟	鮠	鮨	鮴	鯀	鯊
1	1	1	0	0	1	1	83	鵝	鵞	鵤	鵑	鵐	鵙	鵲	鶉	鶇	鶫	鵯	鵺	鶚	鶤	鶩	鶲	鷄	鷁	鶻	鶸	鶺	鷆	鷏	鷂	鷙	鷓	鷸	鷦	鷭	鷯	鷽
1	1	1	0	1	0	0	84	堯	槇	遙	瑤																											
1	1	1	0	1	0	1	85																															
1	1	1	0	1	1	0	86																															
1	1	1	0	1	1	1	87																															
1	1	1	1	0	0	0	88																															
1	1	1	1	0	0	1	89																															
1	1	1	1	0	1	0	90				·																											
1	1	1	1	0	1	1	91																															
1	1	1	1	1	0	0	92																															
1	1	1	1	1	0	1	93																															
1	1	1	1	1	1	0	94																															

第2バイト

b7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
b6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
b5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
b4	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1
b3	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1
b2	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1
b1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0
点区	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62

第1バイト

b7	b6	b5	b4	b3	b2	b1	区	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62
1	0	1	0	0	0	0	48	仍	佀	仟	价	伉	佚	估	佛	佝	佗	佇	佶	侈	佚	佗	佻	佩	佰	侑	佯	來	侖	儘	倪	俟	俎	俘	俛	俑	俚	俐
1	0	1	0	0	0	1	49	兩	俞	兮	冀	冂	冏	册	冉	冏	冑	冓	冤	一	冕	冠	冢	冩	冖	冫	决	冱	冲	冰	况	冽	凅	凜	几	處	凩	凭
1	0	1	0	0	1	0	50	犂	卅	世	卉	卍	凖	卜	卞	卮	夘	奐	玄	厂	厖	厠	厦	厥	厮	厰	厶	參	簒	雙	叟	曼	燮	叮	叨	叭	叺	吁
1	0	1	0	0	1	1	51	吽	呀	听	吭	吼	吮	吶	吩	吝	呎	咏	呵	咎	呟	呱	呷	呰	咒	呻	咀	呶	咄	咐	咆	哇	咢	咸	咥	咬	哄	哈
1	0	1	0	1	0	0	52	埖	堊	埆	埔	埒	埓	堝	堡	塢	塋	塰	毀	塒	堽	塹	墅	墹	墟	墫	墺	壞	墻	墸	墮	壅	壓	壗	壙	壘	壥	壜
1	0	1	0	1	0	1	53	媽	嫣	嫗	嫦	嫩	嫖	嫺	嫻	嫵	嬌	嬋	嬖	嬲	嫐	嬪	嬶	嬾	孃	孅	孀	孑	孕	孚	孛	孥	孩	孰	孳	孵	學	斈
1	0	1	0	1	1	0	54	崟	崛	崑	崔	崢	崚	崙	崘	嵌	嵒	嵎	嵋	嵬	嵳	嵶	嶇	嶄	嶂	嶢	嶝	嶬	嶮	嶽	嶷	巉	巍	巓	巒	巖	巛	巫
1	0	1	0	1	1	1	55	互	彖	彗	彙	彡	彭	彳	彷	徃	徂	彿	徊	很	徑	徇	從	徙	徘	徠	徨	徭	徼	忖	忻	忤	忸	忱	忝	悳	忿	怡
1	0	1	1	0	0	0	56	恠	悚	悄	愧	慊	愿	愼	愬	愴	愽	慂	慅	慫	慹	慥	慱	慟	慝	慓	慵	憙	憖	憇	憬	憔	憚	憊	憑	憫	憮	懌
1	0	1	1	0	0	1	57	拈	拜	拌	拊	拂	拇	抛	拉	挌	拮	拱	挧	挂	挈	拯	拵	捐	挾	捍	搜	捏	掖	掎	掀	掫	捶	掣	掏	掉	掟	掵
1	0	1	1	0	1	0	58	收	攸	畋	效	敖	敕	敍	敘	敞	敝	敲	數	斂	斃	變	斛	斟	斫	斷	旃	旆	旁	旄	旌	旒	旛	旙	无	旡	旱	杲
1	0	1	1	0	1	1	59	杁	杙	杣	杤	枉	杰	枩	杼	杪	枌	枋	枦	枡	枅	枷	柯	枴	柬	枳	柩	枸	柤	柞	柝	柢	柮	枹	柎	柆	柧	檜
1	0	1	1	1	0	0	60	框	栩	桀	桍	栲	桎	梳	栫	桙	档	桷	桿	梟	梏	梭	梔	條	梛	梃	檮	梹	桴	梵	梠	梺	椏	梍	桾	椁	棊	椈
1	0	1	1	1	0	1	61	棘	椢	椦	棡	椌	棍	棔	棧	棕	椶	椒	椄	棗	棣	椥	棹	棠	棯	椨	椪	椚	椣	椡	棆	楹	楷	楜	楸	楫	楔	楾
1	0	1	1	1	1	0	62	楮	椹	楴	椽	楙	椰	楡	楞	楝	榁	楪	榲	榮	槐	榿	槁	槓	榾	槎	寨	槊	槝	榻	槃	榧	樮	榑	榠	榜	榕	榴
1	0	1	1	1	1	1	63	濱	濮	濛	瀉	瀋	濺	瀑	瀁	瀏	濾	瀛	瀚	潴	瀝	瀘	瀟	瀰	瀾	瀲	灑	灣	炙	炒	炯	烱	炬	炸	炳	炮	烟	烋
1	1	0	0	0	0	0	64	狒	狢	狠	狡	狹	狷	倏	猗	猊	猜	猖	猝	逑	猴	瑞	猩	猥	猾	獎	獏	默	獗	獪	獨	獰	獸	獵	獻	獺	珈	玳
1	1	0	0	0	0	1	65	珎	玻	珀	珥	珮	珞	璢	琅	瑯	琥	珸	琲	琺	瑕	琿	瑟	瑙	瑁	瑜	瑩	瑰	瑣	瑪	瑶	瑾	璋	璞	璧	瓊	瓏	瓔
1	1	0	0	0	1	0	66	眄	眩	眤	眞	眥	眦	眛	眷	眸	睇	睚	睨	睫	睛	睥	睿	睾	睹	瞎	瞋	瞑	瞠	瞞	瞰	瞶	瞹	瞿	瞼	瞽	瞻	矇
1	1	0	0	0	1	1	67	秬	秡	秣	稈	稍	稘	稙	稠	稟	禀	稱	稻	稾	稷	穃	穗	穉	穡	穢	穩	龝	穰	穹	穽	窈	窗	窕	窘	窖	窩	竈
1	1	0	0	1	0	0	68	簓	篳	篷	簗	簍	篶	簣	簧	簪	簟	簷	簫	簽	籌	籃	籔	籏	籀	籐	籘	籟	籤	籖	籥	籬	籵	粃	粐	粤	粭	粢
1	1	0	0	1	0	1	69	綾	綺	綯	綰	絲	絨	絮	絏	絣	經	綉	絛	綏	絽	綛	綺	綮	綣	綵	緇	綽	綫	總	綢	綯	緜	綸	綟	綰	緘	緝
1	1	0	0	1	1	0	70	臙	臺	臻	臾	舁	舂	舅	與	舊	舍	舐	舖	舩	舫	舸	舳	艀	艙	艘	艝	艚	艟	艤	艢	艨	艪	艫	舮	艱	艷	艸
1	1	0	0	1	1	1	71	臉	膣	腴	膃	膈	膊	膀	膂	膃	膊	膀	膂	膠	膕	膤	膣	腟	膓	膩	膰	膵	膾	膸	膽	臀	臂	膺	臉	臍	臑	臙
1	1	0	1	0	0	0	72	萱	董	菎	荻	萃	菘	萋	菁	菷	萇	菠	菲	萍	范	萠	莽	莇	菽	萸	蔆	菻	葭	萪	萼	蕚	蒄	葷	葫	蒭	葮	蒂
1	1	0	1	0	0	1	73	蘋	藾	薗	蘆	龍	蘚	薐	蘿	虍	乕	虔	號	虧	虱	蚓	蚣	蚩	蚪	蚋	蚌	蚶	蚯	蛄	蛆	蚰	蛉	蠣	蚫	蛔	蛞	蛩
1	1	0	1	0	1	0	74	蠕	蠢	蠡	蠱	蠶	蠹	衄	衂	衒	衙	衞	衢	衫	袁	衾	袞	衵	衽	袵	衲	袂	袗	袒	袮	袙	袢	袍	袤	袰	袿	袱
1	1	0	1	0	1	1	75	訐	訌	訛	訝	訥	訶	詁	詛	詒	詆	詈	詼	詭	詬	詢	誅	誂	誄	誨	誡	誑	誥	誦	誚	誣	諄	諍	諂	諚	諫	諳
1	1	0	1	1	0	0	76	貔	犹	獏	賊	賈	貪	貽	貲	貳	貮	貶	賈	貴	賤	賣	賚	賽	賺	賻	贐	齎	贓	賍	贔	贖	赧	赭	赱	赳	趁	趙
1	1	0	1	1	0	1	77	雖	雋	軋	軛	軣	軼	軻	軫	軾	輊	輅	輕	輒	輙	輓	輜	輟	輛	輌	輦	輳	輻	輹	轅	轂	輾	轌	轉	轆	轎	轗
1	1	0	1	1	1	0	78	鄒	鄙	鄲	鄰	酊	酖	酘	酣	酥	酩	酳	酲	醋	醉	醂	醢	醫	醯	醪	醵	醴	醺	釀	釁	釉	釋	釐	釖	釟	釡	釛
1	1	0	1	1	1	1	79	鐚	鐔	鐓	鐃	鐇	鐐	鐶	鐫	鐵	鐡	鐺	鑁	鑒	鑄	鑛	鑠	鑢	鑤	鑥	鑪	鈩	鑰	鑵	鑷	鑽	鑚	鑼	鑾	钁	鑿	閂
1	1	1	0	0	0	0	80	贐	霤	霽	霰	霾	霾	霸	靂	靃	靉	靈	靂	靆	靜	靠	靤	靦	靨	勒	靫	靱	靹	鞅	靼	鞁	靺	鞆	鞋	鞏	鞐	鞜
1	1	1	0	0	0	1	81	饉	饒	饌	饕	馗	馘	馥	馭	馮	馼	駟	駛	駝	駘	駑	駭	駮	駱	駲	駻	駸	騁	騏	騅	駢	騙	騫	騷	驅	驂	驀
1	1	1	0	0	1	0	82	鮓	鮃	鮑	鮖	鮗	鮟	鮠	鮨	鮴	鯀	鯊	鮹	鯆	鯏	鯑	鯒	鯣	鯢	鯤	鯔	鯡	鰺	鯲	鯱	鯰	鰕	鰔	鰉	鰓	鰌	鰆
1	1	1	0	0	1	1	83	鶚	鶤	鶩	鹵	鹹	鹽	麁	麈	麋	麌	麒	麕	麑	麝	麥	麩	麸	麪	麭	靡	黌	黎	黏	黐	黔	黜	點	黝	黠	黥	黨
1	1	1	0	1	0	0	84																															
1	1	1	0	1	0	1	85																															
1	1	1	0	1	1	0	86																															
1	1	1	0	1	1	1	87																															
1	1	1	1	0	0	0	88																															
1	1	1	1	0	0	1	89																															
1	1	1	1	0	1	0	90																															
1	1	1	1	0	1	1	91																															
1	1	1	1	1	0	0	92																															
1	1	1	1	1	0	1	93																															
1	1	1	1	1	1	0	94																															

						第2バイト b7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
						b6	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
						b5	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
						b4	1	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
						b3	1	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1
						b2	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1
						b1	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0
b7	b6	b5	b4	b3	b2	b1 (第1バイト)	点/区	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94
1	0	1	0	0	0	0	48	佛	伸	倚	倨	倔	倪	倥	倅	伜	俶	倡	倩	倬	俾	俯	們	倆	偃	假	會	偕	偐	做	偖	偬	偸	傀	傚	傅	傴	傲	傳
1	0	1	0	0	0	1	49	僉	僊	傳	僂	僖	僞	僥	僭	僣	僮	價	僵	儉	儁	儂	儖	儕	儔	儚	儡	儺	儷	儼	儻	儿	兀	兒	兌	兔	兢	竸	兩
1	0	1	0	0	1	0	50	吽	呀	听	吭	吼	吮	吶	吩	吝	呎	咏	呵	咎	呟	呱	呷	呰	咒	呻	咀	呶	咄	咐	咆	哇	咢	咸	咥	咬	哄	哈	咨
1	0	1	0	0	1	1	51	噫	噤	嗔	嘔	嗷	嘖	嗾	嗽	嘛	嗹	噎	噎	營	嘴	嘶	嘲	嘸	噫	噤	嚔	嚊	嚠	嚔	嚥	嚮	嚶	嚴	囂	嚼	囁	囃	囀
1	0	1	0	1	0	0	52	罎	壞	壤	型	壯	壺	壹	塙	壼	壽	夂	夊	夐	夛	梦	夥	夫	天	本	夸	夾	竒	奕	奐	奎	奚	奘	奢	奠	奧	奬	奩
1	0	1	0	1	0	1	53	宀	它	宦	宸	寃	寇	寉	寔	寐	寤	實	寢	寞	寥	寫	寰	寶	寳	尅	將	專	對	尓	尠	尢	尨	尸	尹	屁	屆	屎	屓
1	0	1	0	1	1	0	54	巛	巫	已	巵	帋	帚	帙	帑	帛	帶	帷	幄	幃	幀	幎	幗	幔	幟	幢	幤	幇	幵	并	幺	麼	广	庠	廁	廂	廈	廐	廏
1	0	1	0	1	1	1	55	恠	怙	怐	怩	怎	怱	怛	怕	怫	怦	快	怏	怺	恚	恁	恪	恷	恟	恊	恑	恖	恢	恍	恣	恃	恤	恂	恬	恫	恙	悁	悍
1	0	1	1	0	0	0	56	憚	憊	憑	憫	憮	懌	懊	應	懷	懈	懃	懆	憺	懋	罹	懍	懦	懣	懶	懺	懴	懿	懽	懼	懾	戀	戈	戉	戍	戌	戔	戛
1	0	1	1	0	0	1	57	捫	捩	掾	揩	揀	揆	揣	揉	插	揶	揄	搖	搴	搆	搓	搦	搶	攝	搗	搨	搏	摧	摯	摶	摎	攪	撕	撓	撥	撩	撈	撼
1	0	1	1	0	1	0	58	杲	杳	杆	杞	呢	昶	昴	昜	晏	晄	晉	晁	晞	晝	晤	晧	晨	晟	晢	晰	暃	暈	暎	暉	暄	暘	暝	曁	暹	曉	暾	暼
1	0	1	1	0	1	1	59	桎	梳	栫	桙	档	桷	桿	梟	梏	梭	梔	條	梛	梃	檮	梹	桴	梵	梠	梺	椏	梍	桾	椁	棊	椈	棘	椢	椦	棡	椌	棍
1	0	1	1	1	0	0	60	樺	榭	槧	樅	榱	樞	槭	樔	槫	樊	樒	櫁	樣	樓	橄	樌	橲	樶	橲	橸	橇	橢	橙	橦	橈	樸	樢	檐	檍	檠	檄	檢	檣
1	0	1	1	1	0	1	61	毯	麾	氈	氓	气	氛	氤	氣	汞	汕	汢	汪	沂	沍	沚	沁	沛	汾	汨	汳	沒	沐	泄	泱	泓	沽	泗	泅	泝	沮	沱	沾
1	0	1	1	1	1	0	62	渤	滿	渝	游	溂	溪	溘	滉	溷	滓	溽	溯	滄	溲	滔	滕	溏	溥	滂	溟	潁	漑	灌	滬	滸	滾	漿	滲	漱	滯	漲	滌
1	0	1	1	1	1	1	63	烝	焙	焉	烽	焜	焙	煥	煕	熈	煦	煢	煌	煖	煬	熏	燻	熄	煩	熨	熬	燗	熹	熾	燒	燉	燔	燎	燠	燬	燧	燵	燼
1	1	0	0	0	0	0	64	珎	玻	珀	珈	珥	珞	璢	琅	瑯	琥	珸	琲	琺	瑕	琿	瑟	瑙	瑁	瑜	瑩	瑰	瑣	瑪	瑤	瑾	璋	璞	璧	瓊	瓏	瓔	珱
1	1	0	0	0	0	1	65	瘘	瘤	瘴	瘢	瘠	癇	瘰	瘻	癊	癧	瘻	癈	癆	癜	癘	癡	癢	癨	癩	癪	癧	癬	癰	癲
1	1	0	0	0	1	0	66	瓣	瓦	瞎	矜	矣	矮	矼	砌	砒	礦	砠	礪	硅	碎	硴	碆	硼	碚	碌	碣	碵	碪	碯	磑	磆	磋	磔	碾	碼	磅	磊	磬
1	1	0	0	0	1	1	67	竄	竅	竇	竊	竍	竏	竕	竓	站	竚	竝	竡	竢	竦	竭	竰	笂	笏	笊	笆	笳	笘	笙	笞	笵	笨	笑	笊
1	1	0	1	0	0	0	68	篏	箝	篩	簑	簔	篦	篥	籠	簀	簇	簓	篳	篷	簗	簍	篶	簣	簧	簪	簟	簷	簫	簽	籌	籃	籔	籏	籀	籐	籘	籟	籤
1	1	0	1	0	0	1	69	縷	繧	繝	繞	繖	繞	繙	繚	繹	繪	繩	繼	繻	纃	綵	綸	繽	辮	繿	纈	纉	續	纒	纐	纓	纔	纖	纎	纛	纜	缸	缺
1	1	0	1	0	1	0	70	罅	罌	罍	罎	罐	網	罕	罔	罘	罟	罜	罠	罨	罩	罧	罸	羂	羆	羃	羈	羇	羌	羔	羞	羝	羚	羣	羯	羲	羹	羮	羶
1	1	0	1	0	1	1	71	艤	艜	艙	艘	艝	艚	艟	艤	艨	艪	艫	舮	艱	艷	艸	艾	芍	芒	芫	芟	芻	芬	苡	苣	苟	苒	苴	苳	苺	莓	范	苻	苹	苞	茆	苜	茉	苙	茵
1	1	0	1	1	0	0	72	萓	菜	菁	菷	萇	菠	菲	萍	萢	萠	莽	萸	蔆	菻	葭	萪	萼	蕚	蒄	葷	葫	蒭	葮	蒂	葩	葆	萬	葯	葹	萵	蓊	葢
1	1	0	1	1	0	1	73	蛟	蛛	蛯	蜒	蜆	蜈	蜀	蜃	蛻	蜑	蜉	蜍	蛹	蜊	蜴	蜿	蜷	蜻	蜥	蜩	蜚	蝠	蝟	蝸	蝌	蝎	蝴	蝗	蝨	蝮	蝙
1	1	0	1	1	1	0	74	袿	袱	裃	裄	裔	裘	裙	裝	裹	褂	裼	裴	裨	裲	褄	褌	褊	褓	襃	褞	褥	褪	褫	襁	襄	褻	褶	褸	襌	褝	襠	襞
1	1	0	1	1	1	1	75	諧	諤	諱	謔	諠	諢	諷	諞	諛	謌	謇	謚	諡	謖	謐	謗	謠	謳	鞫	謦	謫	謾	謨	譁	譌	譏	譎	證	譖	譛	譚	譫
1	1	1	0	0	0	0	76	赧	赭	赱	赳	趁	趙	跂	趾	趺	跏	跚	跖	跌	跛	跋	跪	跫	跟	跣	跼	踈	踉	跿	踝	踞	踐	踟	蹂	踵	踰	踴	蹊
1	1	1	0	0	0	1	77	轆	轗	轜	轢	轣	轤	辜	辟	辣	辭	辯	辷	迚	迥	迢	迪	迯	邇	迴	逅	迹	迺	逑	逕	逡	逍	逞	逖	逋	逧	逶	逵
1	1	1	0	0	1	0	78	釗	釞	釛	釼	釵	釵	釵	鈞	釿	鈔	鈬	鈕	鈑	鉞	鉗	鉅	鉈	鉉	鉤	鉈	銕	鈿	鉋	鉐	銜	銖	銓	銛	鉚	鋏	銹	銷	鋩	錏	鋺	鍄	錮
1	1	1	0	0	1	1	79	閊	閈	閧	閭	閼	閻	閼	閾	闊	濶	闃	闍	闌	闕	闔	闖	關	闡	闥	闢	阡	阨	阮	阯	陂	陌	陏	陋	陷	陜	陞	陝
1	1	1	0	1	0	0	80	鞏	鞐	鞳	鞴	韃	韆	韈	韋	韜	韭	齏	韲	竟	韶	韵	頏	頌	頸	頤	頡	頷	頽	顆	顏	顋	顫	顯	顰
1	1	1	0	1	0	1	81	騾	驥	驕	驍	驛	驗	驟	驢	驥	驤	驩	驫	驪	骭	骰	骼	髀	髏	髑	髓	體	髞	髟	髢	髣	髦	髯	髫	髮	髴	髱	髷
1	1	1	0	1	1	0	82	鰡	鱒	鱗	鱣	鱧	鱶	鱸	鳧	鳬	鳰	鴉	鴈	鳫	鴃	鴆	鴪	鴦	鶯	鴣	鴟	鵄	鴕	鴒	鵁	鴿	鴾	鵆	鵈
1	1	1	0	1	1	1	83	黷	黹	黻	黼	黽	鼇	鼈	皷	鼕	鼡	鼬	鼾	齊	齒	齔	齣	齟	齠	齡	齦	齧	齬	齪	齷	齲	齶	龕	龜	龠
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11.9 TrueType FONT

(1) PC-850

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(2) PC-8

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(8) PC-1251

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5	%	5	E	U	e	u	…	•	Ґ	µ	Е	Х	е	х
6	&	6	F	V	f	v	†	–	¦	¶	Ж	Ц	ж	ц
7	'	7	G	W	g	w	‡	—	§	·	З	Ч	з	ч
8	(	8	H	X	h	x	€		Ё	ё	И	Ш	и	ш
9	)	9	I	Y	i	y	‰	™	©	№	Й	Щ	й	щ
A	*	:	J	Z	j	z	Љ	љ	Є	є	К	Ъ	к	ъ
B	+	;	K	[	k	{	‹	›	«	»	Л	Ы	л	ы
C	,	<	L	\	l	|	Њ	њ	¬	ј	М	Ь	м	ь
D	-	=	M	]	m	}	Ќ	ќ		Ѕ	Н	Э	н	э
E	.	>	N	^	n	~	Ћ	ћ	®	ѕ	О	Ю	о	ю
F	/	?	O	_	o	▒	Џ	џ	Ї	ї	П	Я	п	я

(9) PC-1252

	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0		0	@	P	`	p	€			°	À	Ð	à	ð
1	!	1	A	Q	a	q		'	¡	±	Á	Ñ	á	ñ
2	"	2	B	R	b	r	‚	'	¢	²	Â	Ò	â	ò
3	#	3	C	S	c	s	ƒ	"	£	³	Ã	Ó	ã	ó
4	$	4	D	T	d	t	„	"	¤	´	Ä	Ô	ä	ô
5	%	5	E	U	e	u	…	•	¥	µ	Å	Õ	å	õ
6	&	6	F	V	f	v	†	–	¦	¶	Æ	Ö	æ	ö
7	'	7	G	W	g	w	‡	—	§	·	Ç	×	ç	÷
8	(	8	H	X	h	x	ˆ	˜	¨	¸	È	Ø	è	ø
9	)	9	I	Y	i	y	‰	™	©	¹	É	Ù	é	ù
A	*	:	J	Z	j	z	Š	š	ª	º	Ê	Ú	ê	ú
B	+	;	K	[	k	{	‹	›	«	»	Ë	Û	ë	û
C	,	<	L	\	l	|	Œ	œ	¬	¼	Ì	Ü	ì	ü
D	-	=	M	]	m	}				½	Í	Ý	í	ý
E	.	>	N	^	n	~	Ž	ž	®	¾	Î	Þ	î	þ
F	/	?	O	_	o	▓		Ÿ	¯	¿	Ï	ß	ï	ÿ

(10) PC-1253

	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0		0	@	P	`	p	€			°	ϊ	Π	ϋ	π
1	!	1	A	Q	a	q		'	΅	±	Α	Ρ	α	ρ
2	"	2	B	R	b	r	‚	'	Ά	²	Β		β	ς
3	#	3	C	S	c	s	ƒ	"	£	³	Γ	Σ	γ	σ
4	$	4	D	T	d	t	„	"	¤	΄	Δ	Τ	δ	τ
5	%	5	E	U	e	u	…	•	¥	µ	Ε	Υ	ε	υ
6	&	6	F	V	f	v	†	–	¦	¶	Ζ	Φ	ζ	φ
7	'	7	G	W	g	w	‡	—	§	·	Η	Χ	η	χ
8	(	8	H	X	h	x			¨	Έ	Θ	Ψ	θ	ψ
9	)	9	I	Y	i	y	‰	™	©	Ή	Ι	Ω	ι	ω
A	*	:	J	Z	j	z			ª	Ί	Κ	Ϊ	κ	ϊ
B	+	;	K	[	k	{	‹	›	«	»	Λ	Ϋ	λ	ϋ
C	,	<	L	\	l	|			¬	Ό	Μ	ά	μ	ό
D	-	=	M	]	m	}				½	Ν	έ	ν	ύ
E	.	>	N	^	n	~			®	Ύ	Ξ	ή	ξ	ώ
F	/	?	O	_	o	▓			—	Ώ	Ο	ί	ο	

(11) PC-1254

	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0		0	@	P	`	p	€			°	À	Ğ	à	ğ
1	!	1	A	Q	a	q		'	¡	±	Á	Ñ	á	ñ
2	"	2	B	R	b	r	,	'	¢	²	Â	Ò	â	ò
3	#	3	C	S	c	s	ƒ	"	£	³	Ã	Ó	ã	ó
4	$	4	D	T	d	t	„	"	¤	´	Ä	Ô	ä	ô
5	%	5	E	U	e	u	…	•	¥	µ	Å	Õ	å	õ
6	&	6	F	V	f	v	†	–	¦	¶	Æ	Ö	æ	ö
7	'	7	G	W	g	w	‡	—	§	·	Ç	×	ç	÷
8	(	8	H	X	h	x	ˆ	~	¨	¸	È	Ø	è	ø
9	)	9	I	Y	i	y	‰	™	©	¹	É	Ù	é	ù
A	*	:	J	Z	j	z	Š	š	ª	º	Ê	Ú	ê	ú
B	+	;	K	[	k	{	‹	›	«	»	Ë	Û	ë	û
C	,	<	L	\	l	|	Œ	œ	¬	¼	Ì	Ü	ì	ü
D	-	=	M	]	m	}				½	Í	İ	í	ı
E	.	>	N	^	n	~			®	¾	Î	Ş	î	ş
F	/	?	O	_	o	▓		Ÿ	¯	¿	Ï	ß	ï	ÿ

(12) PC-1257

	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0		0	@	P	`	p	€			°	Ą	Š	ą	š
1	!	1	A	Q	a	q		'		±	Į	Ń	į	ń
2	"	2	B	R	b	r	,	'	¢	²	Ā	Ņ	ā	ņ
3	#	3	C	S	c	s		"	£	³	Ć	Ó	ć	ó
4	$	4	D	T	d	t	„	"	¤	´	Ä	Ō	ä	ō
5	%	5	E	U	e	u	…	•		µ	Å	Õ	å	õ
6	&	6	F	V	f	v	†	–	¦	¶	Ę	Ö	ę	ö
7	'	7	G	W	g	w	‡	—	§	·	Ē	×	ē	÷
8	(	8	H	X	h	x			Ø	ø	Č	Ų	č	ų
9	)	9	I	Y	i	y	‰	™	©	¹	É	Ł	é	ł
A	*	:	J	Z	j	z			Ŗ	ŗ	Ź	Ś	ź	ś
B	+	;	K	[	k	{	‹	›	«	»	Ė	Ū	ė	ū
C	,	<	L	\	l	|			¬	¼	Ģ	Ü	ģ	ü
D	-	=	M	]	m	}	¨			½	Ķ	Ż	ķ	ż
E	.	>	N	^	n	~		ˇ	®	¾	Ī	Ž	ī	ž
F	/	?	O	_	o	▓	¸		Æ	æ	Ļ	ß	ļ	˙

(13) LATIN9

	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0		0	@	P	`	p				°	À	Ð	à	ð
1	!	1	A	Q	a	q			¡	±	Á	Ñ	á	ñ
2	"	2	B	R	b	r			¢	²	Â	Ò	â	ò
3	#	3	C	S	c	s			£	³	Ã	Ó	ã	ó
4	$	4	D	T	d	t			€	Ž	Ä	Ô	ä	ô
5	%	5	E	U	e	u			¥	µ	Å	Õ	å	õ
6	&	6	F	V	f	v			Š	¶	Æ	Ö	æ	ö
7	'	7	G	W	g	w			§	·	Ç	×	ç	÷
8	(	8	H	X	h	x			š	ž	È	Ø	è	ø
9	)	9	I	Y	i	y			©	¹	É	Ù	é	ù
A	*	:	J	Z	j	z			ª	º	Ê	Ú	ê	ú
B	+	;	K	[	k	{			«	»	Ë	Û	ë	û
C	,	<	L	\	l	|			¬	Œ	Ì	Ü	ì	ü
D	–	=	M	]	m	}			-	œ	Í	Ý	í	ý
E	.	>	N	^	n	~			®	Ÿ	Î	Þ	î	þ
F	/	?	O	_	o	▨			¯	¿	Ï	ß	ï	ÿ

(14) Arabic

	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0		،	،	ت	١	هـ				ى	ؤ	.	ً	
1	آ	-	=	ث	‎ل	ح			ل	ى	لا	ٌ	ٍ	
2	أ	.	٬	ث	،	ع			ل	ء	لا	ٔ	ٕ	
3	ٱ	/	؟	ج	-	غ			ه	ئـ	لأ	ٖ	ٗ	
4	ٰ	،	ــ	ج	ز	غ			م	ئ	لأ	٘	ٙ	
5	!	١	‎ا	ح	س	غ			ن	0	لآ	ٚ		
6	"	٢	ا	ح	س	غ			ه	1	لآ	ٛ	الله	
7	«	٣	أ	ح	ش	ف			۴	2	لإ	ٜ	ن	
8	»	٤	أ	ح	ش	ف			،	3	لإ	ٝ		
9	٪	٥	آ	خ	ص	ف			ه	4	ٞ	٠		
A	×	٦	آ	خ	ص	ق			و	5	ٟ	٠		
B	÷	٧	إ	خ	ض	ة			ي	6	٠	٠		
C	(	٨	إ	د	ض	ق			ي	7	٠	٠		
D	)	٩	ب	ذ	ط	ك			ي	8	٠			
E	*	:	ب	ر	ظ	ك			ة	9	٠	٠		
F	+	،	ت	‎ا	ع				ة	ئ	٠			

- 278 -

12. BAR CODE TABLE

(1) WPC (JAN, EAN, UPC)
ITF, MSI, UCC/EAN128, Industrial 2 of 5
GS1 DataBar Omnidirectional/GS1 DataBar Truncated
GS1 DataBar Stacked
GS1 DataBar Stacked Omnidirectional
GS1 DataBar Limited

(2) CODE39 (Standard)

	2	3	4	5	6	7
0		0				
1		1				
2		2				
3		3				
4		4				
5		5				
6		6				
7		7				
8		8				
9		9				
A						
B						
C						
D						
E						
F						

	2	3	4	5	6	7
0	SP	0		P		
1		1	A	Q		
2		2	B	R		
3		3	C	S		
4	$	4	D	T		
5	%	5	E	U		
6		6	F	V		
7		7	G	W		
8		8	H	X		
9		9	I	Y		
A	*		J	Z		
B	+		K			
C			L			
D	–		M			
E	•		N			
F	/		O			

(3) CODE39 (Full ASCII)

[Transfer code]

[Drawing code]

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

	2	3	4	5	6	7
0	SP	0	%V	P	%W	+P
1	/A	1	A	Q	+A	+Q
2	/B	2	B	R	+B	+R
3	/C	3	C	S	+C	+S
4	/D	4	D	T	+D	+T
5	/E	5	E	U	+E	+U
6	/F	6	F	V	+F	+V
7	/G	7	G	W	+G	+W
8	/H	8	H	X	+H	+X
9	/I	9	I	Y	+I	+Y
A	/J	/Z	J	Z	+J	+Z
B	/K	%F	K	%K	+K	%P
C	/L	%G	L	%L	+L	%Q
D	–	%H	M	%M	+M	%R
E	.	%I	N	%N	+N	%S
F	/O	%J	O	%O	+O	%T

(4) NW-7

	2	3	4	5	6	7
0	SP	0				
1		1	A		a	
2		2	B		b	
3		3	C		c	
4	$	4	D		d	t
5		5			e	
6		6				
7		7				
8		8				
9		9				
A	*	:				
B	+					
C						
D	−					
E	•				n	
F	/					

(5) CODE93

[Transfer code]

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

[Drawing code]

	2	3	4	5	6	7
0	SP	0	%V	P	%W	+P
1	/A	1	A	Q	+A	+Q
2	/B	2	B	R	+B	+R
3	/C	3	C	S	+C	+S
4	/D	4	D	T	+D	+T
5	/E	5	E	U	+E	+U
6	/F	6	F	V	+F	+V
7	/G	7	G	W	+G	+W
8	/H	8	H	X	+H	+X
9	/I	9	I	Y	+I	+Y
A	/J	/Z	J	Z	+J	+Z
B	+	%F	K	%K	+K	%P
C	/L	%G	L	%L	+L	%Q
D	−	%H	M	%M	+M	%R
E	.	%I	N	%N	+N	%S
F	/	%J	O	%O	+O	%T

(6) CODE128

[Transfer code]

	–	–	2	3	4	5	6	7
0	NUL	DLE	SP	0	@	P	`	p
1	SOH	DC1	!	1	A	Q	a	q
2	STX	DC2	"	2	B	R	b	r
3	ETX	DC3	#	3	C	S	c	s
4	EOT	DC4	$	4	D	T	d	t
5	ENQ	NAK	%	5	E	U	e	u
6	ACK	SYN	&	6	F	V	f	v
7	BEL	ETB	'	7	G	W	g	w
8	BS	CAN	(	8	H	X	h	x
9	HT	EM	)	9	I	Y	i	y
A	LF	SUB	*	:	J	Z	j	z
B	VT	ESC	+	;	K	[	k	{
C	FF	FS	,	<	L	\	l	|
D	CR	GS	–	=	M	]	m	}
E	SO	RS	.	>	N	^	n	~
F	SI	US	/	?	O	_	o	△

⇒ [Drawing code]

Value Code Table

① How to transmit control code data:

NUL (00H) → >@ (3EH, 40H)
SOH (01H) → >A (3EH, 41H)
STX (02H) → >B (3EH, 42H)
to
GS (1DH) → >] (3EH, 5DH)
RS (1EH) → > ^ (3EH, 5EH)
US (1FH) → >_ (3EH, 5FH)

② How to transmit special codes:

Value
30 (Character >) → >0
95 → >1
96 → >2
97 → >3
98 → >4
99 → >5
100 → >6
101 → >7
102 → >8

③ Designation of start code:

START (CODE A) → >7
START (CODE B) → >6
START (CODE C) → >5

Value Code Table

VALUE	CODE A	CODE B	CODE C	VALUE	CODE A	CODE B	CODE C	VALUE	CODE A	CODE B	CODE C
0	SP	SP	00	36	D	D	36	72	BS	h	72
1	!	!	01	37	E	E	37	73	HT	i	73
2	"	"	02	38	F	F	38	74	LF	j	74
3	#	#	03	39	G	G	39	75	VT	k	75
4	$	$	04	40	H	H	40	76	FF	l	76
5	%	%	05	41	I	I	41	77	CR	m	77
6	&	&	06	42	J	J	42	78	SO	n	78
7	'	'	07	43	K	K	43	79	SI	o	79
8	(	(	08	44	L	L	44	80	DLE	p	80
9	)	)	09	45	M	M	45	81	DC1	q	81
10	*	*	10	46	N	N	46	82	DC2	r	82
11	+	+	11	47	O	O	47	83	DC3	s	83
12	,	,	12	48	P	P	48	84	DC4	t	84
13	–	–	13	49	Q	Q	49	85	NAK	u	85
14	.	.	14	50	R	R	50	86	SYN	v	86
15	/	/	15	51	S	S	51	87	ETB	w	87
16	0	0	16	52	T	T	52	88	CAN	x	88
17	1	1	17	53	U	U	53	89	EM	y	89
18	2	2	18	54	V	V	54	90	SUB	z	90
19	3	3	19	55	W	W	55	91	ESC	{	91
20	4	4	20	56	X	X	56	92	FS	¦	92
21	5	5	21	57	Y	Y	57	93	GS	}	93
22	6	6	22	58	Z	Z	58	94	RS	~	94
23	7	7	23	59	[	[	59	95	US	DEL	95
24	8	8	24	60	\	\	60	96	FNC3	FNC3	96
25	9	9	25	61	]	]	61	97	FNC2	FNC2	97
26	:	:	26	62	^	^	62	98	SHIFT	SHIFT	98
27	;	;	27	63	_	_	63	99	CODE C	CODE C	99
28	<	<	28	64	NUL	`	64	100	CODE B	FNC4	CODE B
29	=	=	29	65	SOH	a	65	101	FNC4	CODE A	CODE A
30	>	>	30	66	STX	b	66	102	FNC1	FNC1	FNC1
31	?	?	31	67	ETX	c	67				
32	@	@	32	68	EOT	d	68	103	START CODE A		
33	A	A	33	69	ENQ	e	69	104	START CODE B		
34	B	B	34	70	ACK	f	70	105	START CODE C		
35	C	C	35	71	BEL	g	71				

(7) Data Matrix

The code to be used is designated using the format ID.

Format ID	Code	Details
1	Numerics	0 to 9 space
2	Letters	A to Z space
3	Alphanumerics, symbols	0 to 9 A to Z space . , - /
4	Alphanumerics	0 to 9 A to Z space
5	ASCII (7-bit)	00H to 7FH
6	ISO (8-bit)	00H to FFH (Kanji)

[Transfer Code]

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	NUL	DLE	SP	0	@	P	`	p								
1	SOH	DC1	!	1	A	Q	a	q								
2	STX	DC2	"	2	B	R	b	r								
3	ETX	DC3	#	3	C	S	c	s								
4	EOT	DC4	$	4	D	T	d	t								
5	ENQ	NAK	%	5	E	U	e	u								
6	ACK	SYN	&	6	F	V	f	v								
7	BEL	ETB	'	7	G	W	g	w								
8	BS	CAN	(	8	H	X	h	x								
9	HT	EM	)	9	I	Y	i	y								
A	LF	SUB	*	:	J	Z	j	z								
B	VT	ESC	+	;	K	[	k	{								
C	FF	FS	,	<	L	\	l										
D	CR	GS	–	=	M	]	m	}								
E	SO	RS	.	>	N	^	n	~								
F	SI	US	/	?	O	_	o	△								

① How to send control code data:

```
NUL  (00H)    →      >@    (3EH, 40H)
SOH  (01H)    →      >A    (3EH, 41H)
STX  (02H)    →      >B    (3EH, 42H)
     to
GS   (1DH)    →      >]    (3EH, 5DH)
RS   (1EH)    →      >^    (3EH, 5EH)
US   (1FH)    →      >_    (3EH, 5FH)
```

② How to send a special code:

```
>    (3EH)    →      >0    (3EH, 30H)
```

③ How to send a Kanji code:

Shift JIS
JIS hexadecimal
(For details, refer to the section for the Bar Code Data Command.)

(8)　PDF417

The following modes are automatically selected according to the code used.

Mode	Code	Details
EXC mode	Alphanumerics, symbol	0 to 9　A to Z　a to z　space　!　" # $ % & ' ( ) * + , - . / : ; < = > ? @ [\ ] ^ _ ` { | △ ~　　CR　HT
Binary/ASCII Plus mode	Binary International Character Set	00H to FFH (Kanji)
Numeric Compaction mode	Numerics	0 to 9

[Transfer Code]

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	NUL	DLE	SP	0	@	P	`	p								
1	SOH	DC1	!	1	A	Q	a	q								
2	STX	DC2	"	2	B	R	b	r								
3	ETX	DC3	#	3	C	S	c	s								
4	EOT	DC4	$	4	D	T	d	t								
5	ENQ	NAK	%	5	E	U	e	u								
6	ACK	SYN	&	6	F	V	f	v								
7	BEL	ETB	'	7	G	W	g	w								
8	BS	CAN	(	8	H	X	h	x								
9	HT	EM	)	9	I	Y	i	y								
A	LF	SUB	*	:	J	Z	j	z								
B	VT	ESC	+	;	K	[	k	{								
C	FF	FS	,	<	L	\	l	|								
D	CR	GS	–	=	M	]	m	}								
E	SO	RS	.	>	N	^	n	~								
F	SI	US	/	?	O	_	o	△								

① How to send control code data:

　NUL　(00H)　　　→　　　　>@　(3EH, 40H)
　SOH　(01H)　　　→　　　　>A　(3EH, 41H)
　STX　(02H)　　　→　　　　>B　(3EH, 42H)
　　　to
　GS　(1DH)　　　→　　　　>]　(3EH, 5DH)
　RS　(1EH)　　　→　　　　>^　(3EH, 5EH)
　US　(1FH)　　　→　　　　>_　(3EH, 5FH)

② How to send a special code:

　>　(3EH)　　　→　　　　>0　(3EH, 30H)

③ How to send a Kanji code:

　Shift JIS
　JIS hexadecimal
　(For details, refer to the section for the Bar Code Data Command.)

(9) MicroPDF417

The following modes are automatically selected according to the code used.

Mode	Details
Upper case letters, space	A to Z, space
Binary International Character Set	00H to FFH (Kanji)
Numerics	0 to 9

[Transfer Code]

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	NUL	DLE	SP	0	@	P	`	p								
1	SOH	DC1	!	1	A	Q	a	q								
2	STX	DC2	”	2	B	R	b	r								
3	ETX	DC3	#	3	C	S	c	s								
4	EOT	DC4	$	4	D	T	d	t								
5	ENQ	NAK	%	5	E	U	e	u								
6	ACK	SYN	&	6	F	V	f	v								
7	BEL	ETB	’	7	G	W	g	w								
8	BS	CAN	(	8	H	X	h	x								
9	HT	EM	)	9	I	Y	i	y								
A	LF	SUB	*	:	J	Z	j	z								
B	VT	ESC	+	;	K	[	k	{								
C	FF	FS	,	<	L	\	l	|								
D	CR	GS	–	=	M	]	m	}								
E	SO	RS	.	>	N	^	n	~								
F	SI	US	/	?	O	_	o	△								

① How to send control code data:

NUL (00H)   →   >@ (3EH, 40H)
SOH (01H)   →   >A (3EH, 41H)
STX (02H)   →   >B (3EH, 42H)
     to
GS   (1DH)   →   >] (3EH, 5DH)
RS   (1EH)   →   >^ (3EH, 5EH)
US   (1FH)   →   >_ (3EH, 5FH)

② How to send a special code:

>   (3EH)   →   >0 (3EH, 30H)

③ How to send a Kanji code:

Shift JIS
JIS hexadecimal
(For details, refer to the section for the Bar Code Data Command.)

(10) QR code

When manual mode is selected in the Format Command

• Numeric mode, alphanumeric and symbol mode, Kanji mode

Mode selection	Data to be printed

• Binary mode

Mode selection	No. of data strings (4 digits)	Data to be printed

• Mixed mode

Data	"," (comma)	Data	"," (comma)	Data

The QR code can handle all codes including alphanumerics, symbols, and Kanji. However, since the data compression rate varies according to codes, the code to be used should be designated by selecting the mode.

Mode	Code	Details
N	Numerals	0 to 9
A	Alphanumerics, symbols	A to Z 0 to 9 space $ % * + - . / :
B	Binary (8-bit)	00H to FFH
K	Kanji	Shift JIS, JIS hexadecimal

If mixed mode is selected, up to 200 modes can be selected in a QR code.

When the automatic mode is selected in the Format Command for a QR code:

Data to be printed

[Transfer code for QR code]

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	NUL	DLE	SP	0	@	P	`	p								
1	SOH	DC1	!	1	A	Q	a	q								
2	STX	DC2	"	2	B	R	b	r								
3	ETX	DC3	#	3	C	S	c	s								
4	EOT	DC4	$	4	D	T	d	t								
5	ENQ	NAK	%	5	E	U	e	u								
6	ACK	SYN	&	6	F	V	f	v								
7	BEL	ETB	'	7	G	W	g	w								
8	BS	CAN	(	8	H	X	h	x								
9	HT	EM	)	9	I	Y	i	y								
A	LF	SUB	*	:	J	Z	j	z								
B	VT	ESC	+	;	K	[	k	{								
C	FF	FS	,	<	L	\	l										
D	CR	GS	-	=	M	]	m	}								
E	SO	RS	•	>	N	^	n	~								
F	SI	US	/	?	O	_	o	DEL								

* The shaded parts are Japanese.   They are omitted here.

① How to send control code data:

NUL　(00H)　→　>@　(3EH, 40H)
SOH　(01H)　→　>A　(3EH, 41H)
STX　(02H)　→　>B　(3EH, 42H)
　　　to
GS　　(1DH)　→　>]　(3EH, 5DH)
RS　　(1EH)　→　>^　(3EH, 5EH)
US　　(1FH)　→　>_　(3EH, 5FH)

② How to send a special code:

>　　　(3EH)　→　>0　(3EH, 30H)

③ How to send a Kanji code:

Shift JIS
JIS hexadecimal
(For details, refer to the section for the Bar Code Data Command.)

Examples of data designation for QR code

① Alphanumeric mode: ABC123

A A B C 1 2 3
↑　　└─ Data to be printed
└─ Designation of mode

② Binary mode: 01H, 03H, 05H

B 0 0 0 6 > A > C > E
↑　└─── └─ Data to be printed
　└─ No. of data strings
└─ Designation of mode

③ Mixed mode

Numeric mode　　　　　　　　　: 123456
Kanji mode　　　　　　　　　　: Kanji data
Binary mode　　　　　　　　　 : aアiイuウeエoオ
Alphanumeric and symbol mode : ABC

N 1 2 3 4 5 6, K Kanji data, B 0 0 1 0 aアiイuウeエoオ,　A A B C
↑ Data to be　　↑ Data to be　↑ No. of data Data to be printed　↑ Data to be
　printed　　　　　printed　　　　strings　　　　　　　　　　　　　　　printed

└─────────── Designation of mode ───────────┘

④ Automatic mode

When the same data as ③ above is designated in automatic mode:
1 2 3 4 5 6 Kanji data aアiイuウeエoオABC
　　　Data to be printed

(11) Postal code

Customer bar code

	2	3	4	5	6	7
0		0		P		
1		1	A	Q		
2		2	B	R		
3		3	C	S		
4		4	D	T		
5		5	E	U		
6		6	F	V		
7		7	G	W		
8		8	H	X		
9		9	I	Y		
A			J	Z		
B			K			
C			L			
D	–		M			
E			N			
F			O			

POSTNET

	2	3	4	5	6	7
0		0				
1		1				
2		2				
3		3				
4		4				
5		5				
6		6				
7		7				
8		8				
9		9				
A						
B						
C						
D						
E						
F						

RM4SCC

	2	3	4	5	6	7
0		0		P		
1		1	A	Q		
2		2	B	R		
3		3	C	S		
4		4	D	T		
5		5	E	U		
6		6	F	V		
7		7	G	W		
8	(	8	H	X		
9	)	9	I	Y		
A			J	Z		
B			K			
C			L			
D			M			
E			N			
F			O			

KIX CODE

	2	3	4	5	6	7
0		0		P		p
1		1	A	Q	a	q
2		2	B	R	b	r
3		3	C	S	c	s
4		4	D	T	d	t
5		5	E	U	e	u
6		6	F	V	f	v
7		7	G	W	g	w
8		8	H	X	h	x
9		9	I	Y	i	y
A			J	Z	j	z
B			K		k	
C			L		l	
D			M		m	
E			N		n	
F			O		o	

* "(" or ")" can be designated only as a start/stop code.
  These should not be entered in data.
  If these are entered between data, no bar code is drawn.

(12) MaxiCode

Symbol Character Value		Code Set A		Code Set B		Code Set C		Code Set D		Code Set E	
Decimal	Binary	Character	Decimal	Character	Decimal	Character	Decimal	Character	Decimal	Character	Decimal
0	000000	CR	13	'	96	À	192	à	224	NUL	0
1	000001	A	65	a	97	Á	193	á	225	SOH	1
2	000010	B	66	b	98	Â	194	â	226	STX	2
3	000011	C	67	c	99	Ã	195	ã	227	ETX	3
4	000100	D	68	d	100	Ä	196	ä	228	EOT	4
5	000101	E	69	e	101	Å	197	å	229	ENQ	5
6	000110	F	70	f	102	Æ	198	æ	230	ACK	6
7	000111	G	71	g	103	Ç	199	ç	231	BEL	7
8	001000	H	72	h	104	È	200	è	232	BS	8
9	001001	I	73	i	105	É	201	é	233	HT	9
10	001010	J	74	j	106	Ê	202	ê	234	LF	10
11	001011	K	75	k	107	Ë	203	ë	235	VT	11
12	001100	L	76	l	108	Ì	204	ì	236	FF	12
13	001101	M	77	m	109	Í	205	í	237	CR	13
14	001110	N	78	n	110	Î	206	î	238	SO	14
15	001111	O	79	o	111	Ï	207	ï	239	SI	15
16	010000	P	80	p	112	Ð	208	ð	240	DLE	16
17	010001	Q	81	q	113	Ñ	209	ñ	241	DC1	17
18	010010	R	82	r	114	Ò	210	ò	242	DC2	18
19	010011	S	83	s	115	Ó	211	ó	243	DC3	19
20	010100	T	84	t	116	Ô	212	ô	244	DC4	20
21	010101	U	85	u	117	Õ	213	õ	245	NAK	21
22	010110	V	86	v	118	Ö	214	ö	246	SYN	22
23	010111	W	87	w	119	×	215	÷	247	ETB	23
24	011000	X	88	x	120	Ø	216	ø	248	CAN	24
25	011001	Y	89	y	121	Ù	217	ù	249	EM	25
26	011010	Z	90	z	122	Ú	218	ú	250	SUB	26
27	011011	[EC]		[EC]		[EC]		[EC]		[EC]	
28	011100	FS	28	FS	28	FS	28	FS	28	[Pad]	
29	011101	GS	29	GS	29	GS	29	GS	29	[Pad]	
30	011110	RS	30	RS	30	RS	30	RS	30	ESC	27
31	011111	[NS]		[NS]		[NS]		[NS]		[NS]	
32	100000	Space	32	(	123	Û	219	û	251	FS	28
33	100001	[Pad]		[Pad]		Ü	220	ü	252	GS	29
34	100010	"	34	)	125	Ý	221	ý	253	RS	30
35	100011	#	35	~	126	Þ	222	þ	254	US	31
36	100100	$	36	DEL	127	ß	223	ÿ	255	{C159}	159
37	100101	%	37	;	59	ª	170	¡	161	NBSP	160
38	100110	&	38	<	60	¬	172	¨	168	¢	162
39	100111	'	39	=	61	±	177	«	171	£	163
40	101000	(	40	>	62	²	178	¯	175	¤	164
41	101001	)	41	?	63	³	179	°	176	¥	165
42	101010	"	42	[	91	µ	181	´	180	¦	166
43	101011	+	43	\	92	¹	185	·	183	§	167
44	101100	,	44	]	93	º	186	¸	184	©	169
45	101101	-	45	^	94	¼	188	»	187	SHY	173
46	101110	.	46	_	95	½	189	¿	191	®	174
47	101111	/	47	Space	32	¾	190	{C138}	138	¶	182
48	110000	0	48	,	44	{C128}	128	{C139}	139	{C149}	149
49	110001	1	49	.	46	{C129}	129	{C140}	140	{C150}	150
50	110010	2	50	/	47	{C130}	130	{C141}	141	{C151}	151
51	110011	3	51	:	58	{C131}	131	{C142}	142	{C152}	152
52	110100	4	52	@	64	{C132}	132	{C143}	143	{C153}	153
53	110101	5	53	!	33	{C133}	133	{C144}	144	{C154}	154
54	110110	6	54			124	{C134}	134	{C145}	145	{C155}	155
55	110111	7	55	[Pad]		{C135}	135	{C146}	146	{C156}	156
56	111000	8	56	[2 Shift A]		{C136}	136	{C147}	147	{C157}	157
57	111001	9	57	[3 Shift A]		{C137}	137	{C148}	148	{C158}	158
58	111010	:	58	[Pad]		[Latch A]		[Latch A]		[Latch A]	
59	111011	[Shift B]		[Shift A]		Space	32	Space	32	Space	32
60	111100	[Shift C]		[Shift C]		[Lock In C]		[Shift C]		[Shift C]	
61	111101	[Shift D]		[Shift D]		[Shift D]		[Lock In D]		[Shift D]	
62	111110	[Shift E]		[Shift E]		[Shift E]		[Shift E]		[Lock In E]	
63	111111	[Latch B]		[Latch A]		[Latch B]		[Latch B]		[Latch B]	

① How to send control code data:

SOH (01H) → >A (3EH, 41H)
STX (02H) → >B (3EH, 42H)
        to
GS   (1DH) → >] (3EH, 5DH)
RS   (1EH) → >^ (3EH, 5EH)
US   (1FH) → >_ (3EH, 5FH)

② How to send a special code:

>   (3EH) → >0 (3EH, 30H)

③ How to send a Kanji code:

Shift JIS
JIS hexadecimal
(For details, refer to the section for the Bar Code Data Command.)

NOTE: *"NUL" code in the table cannot be used, however, it can be designated.*
If it is designated, data following "NUL" code is not printed.

When the MaxiCode specification setting is set to "TYPE2: Special specification" in the system mode:

[Transfer code for MaxiCode]

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	NUL	DLE	SP	0	@	P	`	p								
1	SOH	DC1	!	1	A	Q	a	q								
2	STX	DC2	"	2	B	R	b	r								
3	ETX	DC3	#	3	C	S	c	s								
4	EOT	DC4	$	4	D	T	d	t								
5	ENQ	NAK	%	5	E	U	e	u								
6	ACK	SYN	&	6	F	V	f	v								
7	BEL	ETB	'	7	G	W	g	w								
8	BS	CAN	(	8	H	X	h	x								
9	HT	EM	)	9	I	Y	i	y								
A	LF (Note1)	SUB	*	:	J	Z	j	z								
B	VT	ESC	+	;	K	[	k	{								
C	FF	FS	,	<	L	\	l	|								
D	CR	GS	-	=	M	]	m	}								
E	SO	RS	•	>	N	^	n	~								
F	SI	US	/	?	O	_	o	DEL								(Note2)

The all codes (00H to FFH) can be used.   In the following cases, however, the codes will become special codes.   For the transfer method, refer to the following.

(Note 1) In case of LF (0AH) data:

LF (0AH) → ☐   J (FFH, 4AH)

(Note 2) In case of ☐   (FFH) data:

☐   (FFH) → ☐☐   (FFH, FFH)

ESC (1BH) and NUL (00H) can be used as they are.

(13) CP code

[Transfer Code]

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	NUL	DLE	SP	0	@	P	`	p								
1	SOH	DC1	!	1	A	Q	a	q								
2	STX	DC2	"	2	B	R	b	r								
3	ETX	DC3	#	3	C	S	c	s								
4	EOT	DC4	$	4	D	T	d	t								
5	ENQ	NAK	%	5	E	U	e	u								
6	ACK	SYN	&	6	F	V	f	v								
7	BEL	ETB	'	7	G	W	g	w								
8	BS	CAN	(	8	H	X	h	x								
9	HT	EM	)	9	I	Y	i	y								
A	LF	SUB	*	:	J	Z	j	z								
B	VT	ESC	+	;	K	[	k	{								
C	FF	FS	,	<	L	\	l	|								
D	CR	GS	–	=	M	]	m	}								
E	SO	RS	.	>	N	^	n	~								
F	SI	US	/	?	O	_	o	△								

① How to send control code data:

NUL	(00H)	→	>@	(3EH, 40H)
SOH	(01H)	→	>A	(3EH, 41H)
STX	(02H)	→	>B	(3EH, 42H)
	to			
GS	(1DH)	→	>]	(3EH, 5DH)
RS	(1EH)	→	>^	(3EH, 5EH)
US	(1FH)	→	>_	(3EH, 5FH)

② How to send a special code:

>	(3EH)	→	>0	(3EH, 30H)

③ How to send a Kanji code:

Shift JIS
JIS hexadecimal
(For details, refer to the section for the Bar Code Data Command.)

(14) GS1 DataBar Expanded

[Transfer Code]

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0			SP	0		P		p								
1			!	1	A	Q	a	q								
2			”	2	B	R	b	r								
3			FNC1	3	C	S	c	s								
4				4	D	T	d	t								
5			%	5	E	U	e	u								
6			&	6	F	V	f	v								
7			’	7	G	W	g	w								
8			(	8	H	X	h	x								
9			)	9	I	Y	i	y								
A			*	:	J	Z	j	z								
B			+	;	K		k									
C			,	<	L		l									
D			–	=	M		m									
E			.	>	N		n									
F			/	?	O	_	o									

13. DRAWING OF BAR CODE DATA

——————— : Field to be incremented/decremented
(The absence of a solid line invalidates incrementing/decrementing.)

——————— : Field subject to printing numerals under bars.

Type of Bar Code: JAN8, EAN8

(1) No affix

No. of Input Digits		
8 digits	Input Data	D_1 D_2 D_3 D_4 D_5 D_6 D_7 D_8 └─ To be checked as modulus 10 C/D
	Drawing Data	D_1 D_2 D_3 D_4 D_5 D_6 D_7 D_8
Other than 8 digits		Not to be drawn

(2) Modulus 10 check

No. of Input Digits		
8 digits	Input Data	D_1 D_2 D_3 D_4 D_5 D_6 D_7 D_8 └─ To be checked as modulus 10 C/D
	Drawing Data	D_1 D_2 D_3 D_4 D_5 D_6 D_7 D_8
Other than 8 digits		Not to be drawn

(3) Auto affix of modulus 10

No. of Input Digits		
7 digits	Input Data	D_1 D_2 D_3 D_4 D_5 D_6 D_7
	Drawing Data	D_1 D_2 D_3 D_4 D_5 D_6 D_7 C/D └─ Affix a modulus 10 C/D.
Other than 7 digits		Not to be drawn

Type of Bar Code: JAN13, EAN13

(1) No affix

No. of Input Digits		
13 digits	Input Data	D_1 D_2 D_3 D_4 D_5 D_6 D_7 D_8 D_9 D_{10} D_{11} D_{12} D_{13} To be checked as modulus 10 C/D
	Drawing Data	D_2 D_3 D_4 D_5 D_6 D_7 D_8 D_9 D_{10} D_{11} D_{12} D_{13}
Other than 13 digits		Not to be drawn

(2) Modulus 10 check

No. of Input Digits		
13 digits	Input Data	D_1 D_2 D_3 D_4 D_5 D_6 D_7 D_8 D_9 D_{10} D_{11} D_{12} D_{13} To be checked as modulus 10 C/D
	Drawing Data	D_2 D_3 D_4 D_5 D_6 D_7 D_8 D_9 D_{10} D_{11} D_{12} D_{13}
Other than 13 digits		Not to be drawn

(3) Auto affix of modulus 10

No. of Input Digits		
12 digits	Input Data	D_1 D_2 D_3 D_4 D_5 D_6 D_7 D_8 D_9 D_{10} D_{11} D_{12}
	Drawing Data	D_2 D_3 D_4 D_5 D_6 D_7 D_8 D_9 D_{10} D_{11} D_{12} C/D Affix a modulus 10 C/D.
Other than 12 digits		Not to be drawn

(4) Auto affix of modulus 10 + Price C/D 4 digits

No. of Input Digits		
11 digits	Input Data	D_1 D_2 D_3 D_4 D_5 D_6 D_7 D_8 D_9 D_{10} D_{11}
	Drawing Data	D_2 D_3 D_4 D_5 D_6 D_7 P/CD D_8 D_9 D_{10} D_{11} C/D Affix a modulus 10 C/D. Affix price C/D 4 digits.
Other than 11 digits		Not to be drawn

(5) Auto affix of modulus 10 + Price C/D 5 digits

No. of Input Digits		
11 digits	Input Data	D_1 D_2 D_3 D_4 D_5 D_6 D_7 D_8 D_9 D_{10} D_{11}
	Drawing Data	D_2 D_3 D_4 D_5 D_6 P/CD D_7 D_8 D_9 D_{10} D_{11} C/D Affix a modulus 10 C/D. Affix price C/D 5 digits.
Other than 11 digits		Not to be drawn

Type of Bar Code: UPC-A

(1) No affix

No. of Input Digits		
12 digits	Input Data	D₁ D₂ D₃ D₄ D₅ D₆ D₇ D₈ D₉ D₁₀ D₁₁ D₁₂ To be checked as modulus 10 C/D
	Drawing Data	D₁ D₂ D₃ D₄ D₅ D₆ D₇ D₈ D₉ D₁₀ D₁₁ D₁₂
Other than 12 digits		Not to be drawn

(2) Modulus 10 check

No. of Input Digits		
12 digits	Input Data	D₁ D₂ D₃ D₄ D₅ D₆ D₇ D₈ D₉ D₁₀ D₁₁ D₁₂ To be checked as modulus 10 C/D
	Drawing Data	D₁ D₂ D₃ D₄ D₅ D₆ D₇ D₈ D₉ D₁₀ D₁₁ D₁₂
Other than 12 digits		Not to be drawn

(3) Auto affix of modulus 10

No. of Input Digits		
11 digits	Input Data	D₁ D₂ D₃ D₄ D₅ D₆ D₇ D₈ D₉ D₁₀ D₁₁
	Drawing Data	D₁ D₂ D₃ D₄ D₅ D₆ D₇ D₈ D₉ D₁₀ D₁₁ C/D — Affix a modulus 10 C/D.
Other than 11 digits		Not to be drawn

(4) Auto affix of modulus 10 + Price C/D 4 digits

No. of Input Digits		
10 digits	Input Data	D₁ D₂ D₃ D₄ D₅ D₆ D₇ D₈ D₉ D₁₀
	Drawing Data	D₁ D₂ D₃ D₄ D₅ D₆ P/CD D₇ D₈ D₉ D₁₀ C/D — Affix a modulus 10 C/D. — Affix price C/D 4 digits.
Other than 10 digits		Not to be drawn

(5) Auto affix of modulus 10 + Price C/D 5 digits

No. of Input Digits		
10 digits	Input Data	D₁ D₂ D₃ D₄ D₅ D₆ D₇ D₈ D₉ D₁₀
	Drawing Data	D₁ D₂ D₃ D₄ D₅ P/CD D₆ D₇ D₈ D₉ D₁₀ C/D — Affix a modulus 10 C/D. — Affix price C/D 5 digits.
Other than 10 digits		Not to be drawn

Type of Bar Code: UPC-E

(1) No affix

No. of Input Digits		
7 digits	Input Data	D₁ D₂ D₃ D₄ D₅ D₆ D₇ └─ To be checked as modulus 10 C/D
	Drawing Data	0 D₁ D₂ D₃ D₄ D₅ D₆ D₇
Other than 7 digits		Not to be drawn

(2) Modulus 10 check

No. of Input Digits		
7 digits	Input Data	D₁ D₂ D₃ D₄ D₅ D₆ D₇ └─ To be checked as modulus 10 C/D
	Drawing Data	0 D₁ D₂ D₃ D₄ D₅ D₆ D₇
Other than 7 digits		Not to be drawn

(3) Auto affix of modulus 10

No. of Input Digits		
6 digits	Input Data	D₁ D₂ D₃ D₄ D₅ D₆ Calculate and reflect modulus 10 in the bar code.
	Drawing Data	0 D₁ D₂ D₃ D₄ D₅ D₆ C/D
Other than 6 digits		Not to be drawn

Type of Bar Code: JAN8 + 2 digits, EAN8 + 2 digits

(1) No affix

No. of Input Digits		
10 digits	Input Data	D_1 D_2 D_3 D_4 D_5 D_6 D_7 D_8 D_9 D_{10} └ To be checked as modulus 10 C/D
	Drawing Data	D_1 D_2 D_3 D_4 D_5 D_6 D_7 D_8 D_9 D_{10}
Other than 10 digits		Not to be drawn

(2) Modulus 10 check

No. of Input Digits		
10 digits	Input Data	D_1 D_2 D_3 D_4 D_5 D_6 D_7 D_8 D_9 D_{10} └ To be checked as modulus 10 C/D
	Drawing Data	D_1 D_2 D_3 D_4 D_5 D_6 D_7 D_8 D_9 D_{10}
Other than 10 digits		Not to be drawn

(3) Auto affix of modulus 10

No. of Input Digits		
9 digits	Input Data	D_1 D_2 D_3 D_4 D_5 D_6 D_7 D_8 D_9
	Drawing Data	D_1 D_2 D_3 D_4 D_5 D_6 D_7 C/D D_8 D_9 └ Affix a modulus 10 C/D.
Other than 9 digits		Not to be drawn

Type of Bar Code: JAN8 + 5 digits, EAN8 + 5 digits

(1) No affix

No. of Input Digits		
13 digits	Input Data	D_1 D_2 D_3 D_4 D_5 D_6 D_7 D_8 D_9 D_{10} D_{11} D_{12} D_{13} └ To be checked as modulus 10 C/D
	Drawing Data	D_1 D_2 D_3 D_4 D_5 D_6 D_7 D_8 D_9 D_{10} D_{11} D_{12} D_{13}
Other than 13 digits		Not to be drawn

(2) Modulus 10 check

No. of Input Digits		
13 digits	Input Data	D_1 D_2 D_3 D_4 D_5 D_6 D_7 D_8 D_9 D_{10} D_{11} D_{12} D_{13} └ To be checked as modulus 10 C/D
	Drawing Data	D_1 D_2 D_3 D_4 D_5 D_6 D_7 D_8 D_9 D_{10} D_{11} D_{12} D_{13}
Other than 13 digits		Not to be drawn

(3) Auto affix of modulus 10

No. of Input Digits		
12 digits	Input Data	D_1 D_2 D_3 D_4 D_5 D_6 D_7 D_8 D_9 D_{10} D_{11} D_{12}
	Drawing Data	D_1 D_2 D_3 D_4 D_5 D_6 D_7 C/D D_8 D_9 D_{10} D_{11} D_{12} └ Affix a modulus 10 C/D.
Other than 12 digits		Not to be drawn

Type of Bar Code: JAN13 + 2 digits, EAN13 + 2 digits

(1) No affix

No. of Input Digits		
15 digits	Input Data	D_1 D_2 D_3 D_4 D_5 D_6 D_7 D_8 D_9 D_{10} D_{11} D_{12} D_{13} D_{14} D_{15} To be checked as modulus 10 C/D
	Drawing Data	D_2 D_3 D_4 D_5 D_6 D_7 D_8 D_9 D_{10} D_{11} D_{12} D_{13} D_{14} D_{15}
Other than 15 digits		Not to be drawn

(2) Modulus 10 check

No. of Input Digits		
15 digits	Input Data	D_1 D_2 D_3 D_4 D_5 D_6 D_7 D_8 D_9 D_{10} D_{11} D_{12} D_{13} D_{14} D_{15} To be checked as modulus 10 C/D
	Drawing Data	D_2 D_3 D_4 D_5 D_6 D_7 D_8 D_9 D_{10} D_{11} D_{12} D_{13} D_{14} D_{15}
Other than 15 digits		Not to be drawn

(3) Auto affix of modulus 10

No. of Input Digits		
14 digits	Input Data	D_1 D_2 D_3 D_4 D_5 D_6 D_7 D_8 D_9 D_{10} D_{11} D_{12} D_{13} D_{14}
	Drawing Data	D_2 D_3 D_4 D_5 D_6 D_7 D_8 D_9 D_{10} D_{11} D_{12} C/D D_{13} D_{14} Affix a modulus 10 C/D.
Other than 14 digits		Not to be drawn

(4) Auto affix of modulus 10 + Price C/D 4 digits

No. of Input Digits		
13 digits	Input Data	D_1 D_2 D_3 D_4 D_5 D_6 D_7 D_8 D_9 D_{10} D_{11} D_{12} D_{13}
	Drawing Data	D_2 D_3 D_4 D_5 D_6 D_7 P/CD D_8 D_9 D_{10} D_{11} C/D D_{12} D_{13} Affix a modulus 10 C/D. Affix price C/D 4 digits.
Other than 13 digits		Not to be drawn

(5) Auto affix of modulus 10 + Price C/D 5 digits

No. of Input Digits		
13 digits	Input Data	D_1 D_2 D_3 D_4 D_5 D_6 D_7 D_8 D_9 D_{10} D_{11} D_{12} D_{13}
	Drawing Data	D_2 D_3 D_4 D_5 D_6 P/CD D_7 D_8 D_9 D_{10} D_{11} C/D D_{12} D_{13} Affix a modulus 10 C/D. Affix price C/D 5 digits.
Other than 13 digits		Not to be drawn

Type of Bar Code: JAN13 + 5 digits, EAN13 + 5 digits

(1) No affix

No. of Input Digits		
18 digits	Input Data	D_1 D_2 D_3 D_4 D_5 D_6 D_7 D_8 D_9 D_{10} D_{11} D_{12} D_{13} D_{14} D_{15} D_{16} D_{17} D_{18} To be checked as modulus 10 C/D
	Drawing Data	D_2 D_3 D_4 D_5 D_6 D_7 D_8 D_9 D_{10} D_{11} D_{12} D_{13} D_{14} D_{15} D_{16} D_{17} D_{18}
Other than 18 digits		Not to be drawn

(2) Modulus 10 check

No. of Input Digits		
18 digits	Input Data	D_1 D_2 D_3 D_4 D_5 D_6 D_7 D_8 D_9 D_{10} D_{11} D_{12} D_{13} D_{14} D_{15} D_{16} D_{17} D_{18} To be checked as modulus 10 C/D
	Drawing Data	D_2 D_3 D_4 D_5 D_6 D_7 D_8 D_9 D_{10} D_{11} D_{12} D_{13} D_{14} D_{15} D_{16} D_{17} D_{18}
Other than 18 digits		Not to be drawn

(3) Auto affix of modulus 10

No. of Input Digits		
17 digits	Input Data	D_1 D_2 D_3 D_4 D_5 D_6 D_7 D_8 D_9 D_{10} D_{11} D_{12} D_{13} D_{14} D_{15} D_{16} D_{17}
	Drawing Data	D_2 D_3 D_4 D_5 D_6 D_7 D_8 D_9 D_{10} D_{11} D_{12} C/D D_{13} D_{14} D_{15} D_{16} D_{17} Affix a modulus 10 C/D.
Other than 17 digits		Not to be drawn

(4) Auto affix of modulus 10 + Price C/D 4 digits

No. of Input Digits		
16 digits	Input Data	D_1 D_2 D_3 D_4 D_5 D_6 D_7 D_8 D_9 D_{10} D_{11} D_{12} D_{13} D_{14} D_{15} D_{16}
	Drawing Data	D_2 D_3 D_4 D_5 D_6 D_7 P/CD D_8 D_9 D_{10} D_{11} C/D D_{12} D_{13} D_{14} D_{15} D_{16} Affix a modulus 10 C/D. Affix price C/D 4 digits.
Other than 16 digits		Not to be drawn

(5) Auto affix of modulus 10 + Price C/D 5 digits

No. of Input Digits		
16 digits	Input Data	D_1 D_2 D_3 D_4 D_5 D_6 D_7 D_8 D_9 D_{10} D_{11} D_{12} D_{13} D_{14} D_{15} D_{16}
	Drawing Data	D_2 D_3 D_4 D_5 D_6 P/CD D_7 D_8 D_9 D_{10} D_{11} C/D D_{12} D_{13} D_{14} D_{15} D_{16} Affix a modulus 10 C/D. Affix price C/D 5 digits.
Other than 16 digits		Not to be drawn

Type of Bar Code: UPC-A + 2 digits

(1) No affix

No. of Input Digits		
14 digits	Input Data	D₁ D₂ D₃ D₄ D₅ D₆ D₇ D₈ D₉ D₁₀ D₁₁ D₁₂ D₁₃ D₁₄ To be checked as modulus 10 C/D
	Drawing Data	D₁ D₂ D₃ D₄ D₅ D₆ D₇ D₈ D₉ D₁₀ D₁₁ D₁₂ D₁₃ D₁₄
Other than 14 digits		Not to be drawn

(2) Modulus 10 check

No. of Input Digits		
14 digits	Input Data	D₁ D₂ D₃ D₄ D₅ D₆ D₇ D₈ D₉ D₁₀ D₁₁ D₁₂ D₁₃ D₁₄ To be checked as modulus 10 C/D
	Drawing Data	D₁ D₂ D₃ D₄ D₅ D₆ D₇ D₈ D₉ D₁₀ D₁₁ D₁₂ D₁₃ D₁₄
Other than 14 digits		Not to be drawn

(3) Auto affix of modulus 10

No. of Input Digits		
13 digits	Input Data	D₁ D₂ D₃ D₄ D₅ D₆ D₇ D₈ D₉ D₁₀ D₁₁ D₁₂ D₁₃
	Drawing Data	D₁ D₂ D₃ D₄ D₅ D₆ D₇ D₈ D₉ D₁₀ D₁₁ C/D D₁₂ D₁₃ Affix a modulus 10 C/D.
Other than 13 digits		Not to be drawn

(4) Auto affix of modulus 10 + Price C/D 4 digits

No. of Input Digits		
12 digits	Input Data	D₁ D₂ D₃ D₄ D₅ D₆ D₇ D₈ D₉ D₁₀ D₁₁ D₁₂
	Drawing Data	D₁ D₂ D₃ D₄ D₅ D₆ P/CD D₇ D₈ D₉ D₁₀ C/D D₁₁ D₁₂ Affix a modulus 10 C/D. Affix price C/D 4 digits.
Other than 12 digits		Not to be drawn

(5) Auto affix of modulus 10 + Price C/D 5 digits

No. of Input Digits		
12 digits	Input Data	D₁ D₂ D₃ D₄ D₅ D₆ D₇ D₈ D₉ D₁₀ D₁₁ D₁₂
	Drawing Data	D₁ D₂ D₃ D₄ D₅ P/CD D₆ D₇ D₈ D₉ D₁₀ C/D D₁₁ D₁₂ Affix a modulus 10 C/D. Affix price C/D 5 digits.
Other than 12 digits		Not to be drawn

Type of Bar Code: UPC-A + 5 digits

(1) No affix

No. of Input Digits		
17 digits	Input Data	D_1 D_2 D_3 D_4 D_5 D_6 D_7 D_8 D_9 D_{10} D_{11} D_{12} D_{13} D_{14} D_{15} D_{16} D_{17} To be checked as modulus 10 C/D
	Drawing Data	D_1 D_2 D_3 D_4 D_5 D_6 D_7 D_8 D_9 D_{10} D_{11} D_{12} D_{13} D_{14} D_{15} D_{16} D_{17}
Other than 17 digits		Not to be drawn

(2) Modulus 10 check

No. of Input Digits		
17 digits	Input Data	D_1 D_2 D_3 D_4 D_5 D_6 D_7 D_8 D_9 D_{10} D_{11} D_{12} D_{13} D_{14} D_{15} D_{16} D_{17} To be checked as modulus 10 C/D
	Drawing Data	D_1 D_2 D_3 D_4 D_5 D_6 D_7 D_8 D_9 D_{10} D_{11} D_{12} D_{13} D_{14} D_{15} D_{16} D_{17}
Other than 17 digits		Not to be drawn

(3) Auto affix of modulus 10

No. of Input Digits		
16 digits	Input Data	D_1 D_2 D_3 D_4 D_5 D_6 D_7 D_8 D_9 D_{10} D_{11} D_{12} D_{13} D_{14} D_{15} D_{16}
	Drawing Data	D_1 D_2 D_3 D_4 D_5 D_6 D_7 D_8 D_9 D_{10} D_{11} C/D D_{12} D_{13} D_{14} D_{15} D_{16} Affix a modulus 10 C/D.
Other than 16 digits		Not to be drawn

(4) Auto affix of modulus 10 + Price C/D 4 digits

No. of Input Digits		
15 digits	Input Data	D_1 D_2 D_3 D_4 D_5 D_6 D_7 D_8 D_9 D_{10} D_{11} D_{12} D_{13} D_{14} D_{15}
	Drawing Data	D_1 D_2 D_3 D_4 D_5 D_6 P/CD D_7 D_8 D_9 D_{10} C/D D_{11} D_{12} D_{13} D_{14} D_{15} Affix a modulus 10 C/D. Affix price C/D 4 digits.
Other than 15 digits		Not to be drawn

(5) Auto affix of modulus 10 + Price C/D 5 digits

No. of Input Digits		
15 digits	Input Data	D_1 D_2 D_3 D_4 D_5 D_6 D_7 D_8 D_9 D_{10} D_{11} D_{12} D_{13} D_{14} D_{15}
	Drawing Data	D_1 D_2 D_3 D_4 D_5 P/CD D_6 D_7 D_8 D_9 D_{10} C/D D_{11} D_{12} D_{13} D_{14} D_{15} Affix a modulus 10 C/D. Affix price C/D 5 digits.
Other than 15 digits		Not to be drawn

Type of Bar Code: UPC-E + 2 digits

(1)　No affix

No. of Input Digits		
9 digits	Input Data	D_1 D_2 D_3 D_4 D_5 D_6 D_7 D_8 D_9 └─ To be checked as modulus 10 C/D
	Drawing Data	0　D_1 D_2 D_3 D_4 D_5 D_6 D_7　D_8 D_9
Other than 9 digits		Not to be drawn

(2)　Modulus 10 check

No. of Input Digits		
9 digits	Input Data	D_1 D_2 D_3 D_4 D_5 D_6 D_7 D_8 D_9 └─ To be checked as modulus 10 C/D
	Drawing Data	0　D_1 D_2 D_3 D_4 D_5 D_6 D_7　D_8 D_9
Other than 9 digits		Not to be drawn

(3)　Auto affix of modulus 10

No. of Input Digits		
8 digits	Input Data	D_1 D_2 D_3 D_4 D_5 D_6 D_7 D_8　Calculate and reflect modulus 10 C/D in the bar code.
	Drawing Data	0　D_1 D_2 D_3 D_4 D_5 D_6 C/D　D_7 D_8
Other than 8 digits		Not to be drawn

Type of Bar Code: UPC-E + 5 digits

(1) No affix

No. of Input Digits		
12 digits	Input Data	D_1 D_2 D_3 D_4 D_5 D_6 D_7 D_8 D_9 D_{10} D_{11} D_{12} └─ To be checked as modulus 10 C/D
	Drawing Data	0 D_1 D_2 D_3 D_4 D_5 D_6 D_7 D_8 D_9 D_{10} D_{11} D_{12}
Other than 12 digits		Not to be drawn

(2) Modulus 10 check

No. of Input Digits		
12 digits	Input Data	D_1 D_2 D_3 D_4 D_5 D_6 D_7 D_8 D_9 D_{10} D_{11} D_{12} └─ To be checked as modulus 10 C/D
	Drawing Data	0 D_1 D_2 D_3 D_4 D_5 D_6 D_7 D_8 D_9 D_{10} D_{11} D_{12}
Other than 12 digits		Not to be drawn

(3) Auto affix of modulus 10

No. of Input Digits		
11 digits	Input Data	D_1 D_2 D_3 D_4 D_5 D_6 D_7 D_8 D_9 D_{10} D_{11} Calculate and reflect modulus 10 C/D in the bar code.
	Drawing Data	0 D_1 D_2 D_3 D_4 D_5 D_6 C/D D_7 D_8 D_9 D_{10} D_{11}
Other than 11 digits		Not to be drawn

Type of Bar Code: MSI

(1) No affix

No. of Input Digits		
Max. 15 digits	Input Data	D_1 D_2 D_3 D_4 D_5 D_6 D_7 D_8 D_9 — Not recognized as a check digit.
	Drawing Data	D_1 D_2 D_3 D_4 D_5 D_6 D_7 D_8 D_9
16 digits or more		Not to be drawn

(2) IBM modulus 10 check

No. of Input Digits		
Min. 2 digits Max. 15 digits (including C/D)	Input Data	D_1 D_2 D_3 D_4 D_5 D_6 D_7 D_8 D_9 D_{10} — To be checked as IBM modulus 10
	Drawing Data	D_1 D_2 D_3 D_4 D_5 D_6 D_7 D_8 D_9 D_{10}
1 digit 16 digits or more		Not to be drawn

(3) Auto affix of IBM modulus 10

No. of Input Digits		
Max. 14 digits	Input Data	D_1 D_2 D_3 D_4 D_5 D_6 D_7 D_8 D_9
	Drawing Data	D_1 D_2 D_3 D_4 D_5 D_6 D_7 D_6 D_9 C/D — Affix IBM modulus 10.
15 digits or more		Not to be drawn

(4) IBM modulus 10 + Auto affix of IBM modulus 10

No. of Input Digits		
Max. 13 digits	Input Data	D_1 D_2 D_3 D_4 D_5 D_6 D_7 D_8 D_9
	Drawing Data	D_1 D_2 D_3 D_4 D_5 D_6 D_7 D_6 D_9 C/D$_1$ C/D$_2$ — Affix IBM modulus 10. — Affix IBM modulus 10.
14 digits or more		Not to be drawn

(5) IBM modulus 11 + Auto affix of IBM modulus 10

No. of Input Digits		
Max. 13 digits	Input Data	D_1 D_2 D_3 D_4 D_5 D_6 D_7 D_8 D_9
	Drawing Data	D_1 D_2 D_3 D_4 D_5 D_6 D_7 D_6 D_9 C/D$_1$ C/D$_2$ — Affix IBM modulus 10. — Affix IBM modulus 11.
14 digits or more		Not to be drawn

Type of Bar Code: Interleaved 2 of 5

(1) No affix

No. of Input Digits		
Max. 126 digits	Input Data	D_1 D_2 D_3 D_4 D_5 D_6 D_7 D_8 D_9 └ Not recognized as a check digit.
	Drawing Data	0 D_1 D_2 D_3 D_4 D_5 D_6 D_7 D_8 D_9
127 digits or more		Not to be drawn

(2) Modulus 10 check

No. of Input Digits		
Min. 2 digits Max. 126 digits (including C/D)	Input Data	D_1 D_2 D_3 D_4 D_5 D_6 D_7 D_8 D_9 └ To be checked as modulus 10 C/D
	Drawing Data	0 D_1 D_2 D_3 D_4 D_5 D_6 D_7 D_8 D_9
1 digit 127 digits or more		Not to be drawn

(3) Auto affix of modulus 10

No. of Input Digits		
Max. 125 digits	Input Data	D_1 D_2 D_3 D_4 D_5 D_6 D_7 D_8 D_9
	Drawing Data	D_1 D_2 D_3 D_4 D_5 D_6 D_7 D_6 D_9 C/D └ Affix a modulus 10 C/D.
126 digits or more		Not to be drawn

(4) Auto affix of DBP modulus 10

No. of Input Digits		
Max. 125 digits	Input Data	D_1 D_2 D_3 D_4 D_5 D_6 D_7 D_8 D_9
	Drawing Data	D_1 D_2 D_3 D_4 D_5 D_6 D_7 D_6 D_9 C/D └ Affix a DBP modulus 10 C/D.
126 digits or more		Not to be drawn

Type of Bar Code: Industrial 2 of 5

(1) No affix

No. of Input Digits		
Max. 126 digits	Input Data	D_1 D_2 D_3 D_4 D_5 D_6 D_7 D_8 D_9 └ Not recognized as a check digit.
	Drawing Data	D_1 D_2 D_3 D_4 D_5 D_6 D_7 D_8 D_9
127 digits or more		Not to be drawn

(2) Modulus check character check

No. of Input Digits		
Min. 2 digits Max. 126 digits (including C/D)	Input Data	D_1 D_2 D_3 D_4 D_5 D_6 D_7 D_8 D_9 └ To be checked as a modulus check character
	Drawing Data	D_1 D_2 D_3 D_4 D_5 D_6 D_7 D_8 D_9
1 digit 127 digits or more		Not to be drawn

(3) Auto affix of modulus check character

No. of Input Digits		
Max. 125 digits	Input Data	D_1 D_2 D_3 D_4 D_5 D_6 D_7 D_8 D_9
	Drawing Data	D_1 D_2 D_3 D_4 D_5 D_6 D_7 D_6 D_9 C/D └ Affix a modulus check character.
126 digits or more		Not to be drawn

Type of Bar Code: CODE39 (Standard)

(1) No affix

No. of Input Digits		
Max. 123 digits	Input Data	St D₁ D₂ D₃ D₄ D₅ D₆ D₇ D₈ D₉ Sp — Start code — Stop code — Not recognized as a check digit.
	Drawing Data	St D₁ D₂ D₃ D₄ D₅ D₆ D₇ D₈ D₉ Sp
124 digits or more		Not to be drawn

(2) Modulus 43 check

No. of Input Digits		
Min. 2 digits Max. 123 digits (including C/D)	Input Data	St D₁ D₂ D₃ D₄ D₅ D₆ D₇ D₈ D₉ Sp — Start code — Stop code — To be checked as modulus 43 C/D
	Drawing Data	St D₁ D₂ D₃ D₄ D₅ D₆ D₇ D₈ D₉ Sp
1 digit 124 digits or more		Not to be drawn

(3) Auto affix of modulus 43

No. of Input Digits		
Max. 122 digits	Input Data	St D₁ D₂ D₃ D₄ D₅ D₆ D₇ D₈ D₉ Sp — Start code — Stop code
	Drawing Data	St D₁ D₂ D₃ D₄ D₅ D₆ D₇ D₈ D₉ C/D Sp — Affix a modulus 43 C/D.
123 digits or more		Not to be drawn

Type of Bar Code: CODE39 (Full ASCII)

(1) No affix

No. of Input Digits		
Max. 60 digits	Input Data	St D₁ D₂ D₃ D₄ D₅ D₆ D₇ D₈ D₉ Sp — Start code — Stop code — Not recognized as a check digit.
	Drawing Data	St D₁ D₂ D₃ D₄ D₅ D₆ D₇ D₈ D₉ Sp
61 digits or more		Not to be drawn

(2) Modulus 43 check

No. of Input Digits		
Min. 2 digits Max. 60 digits (including C/D)	Input Data	St D₁ D₂ D₃ D₄ D₅ D₆ D₇ D₈ D₉ Sp — Start code — Stop code — To be checked as modulus 43 C/D
	Drawing Data	St D₁ D₂ D₃ D₄ D₅ D₆ D₇ D₈ D₉ Sp
1 digit 61 digits or more		Not to be drawn

(3) Auto affix of modulus 43

No. of Input Digits		
Max. 60 digits	Input Data	St D₁ D₂ D₃ D₄ D₅ D₆ D₇ D₈ D₉ Sp — Start code — Stop code
	Drawing Data	St D₁ D₂ D₃ D₄ D₅ D₆ D₇ D₈ D₉ C/D Sp — Affix a modulus 43 C/D.
61 digits or more		Not to be drawn

NOTE: *Numerals under bars are not characters corresponding to the bars but the characters of the codes received are drawn.*

Type of Bar Code: NW7

(1) No affix
    C/D check
    Auto affix

No. of Input Digits		
Max. 125 digits	Input Data	St D₁ D₂ D₃ D₄ D₅ D₆ D₇ D₈ D₉ Sp — Start code — Stop code
	Drawing Data	St D₁ D₂ D₃ D₄ D₅ D₆ D₇ D₈ D₉ Sp
126 digits or more		Not to be drawn

Type of Bar Code: No auto selection of CODE128 (Character ">" to be also counted as a digit)

(1) No affix
   PSEUDO103 check
   Auto affix of PSEUDO103

No. of Input Digits		
Min. 3 digits Max. 125 digits (including start code)	Input Data	St D₁ D₂ D₃ D₄ D₅ D₆ D₇ D₈ D₉ D₁₀ D₁₁
	Drawing Data	St D₁ D₂ D₃ D₄ D₅ D₆ D₇ D₈ D₉ D₁₀ D₁₁ C/D Sp — Affix PSEUDO103 C/D.
2 digits or less 126 digits or more		Not to be drawn

NOTE: *The following characters are not drawn as numerals under bars.*
NUL (00H) to US (1FH), FNC1, FNC2, FNC3, SHIFT, CODE A, CODE B, CODE C

Type of Bar Code: Auto selection of CODE128

(1) No affix
   C/D check
   Auto affix of C/D

No. of Input Digits		
Max. 60 digits	Input Data	D₁ D₂ D₃ D₄ D₅ D₆ D₇ D₈ D₉ D₁₀ D₁₁
	Drawing Data	St D₁ D₂ D₃ D₄ AD D₅ D₆ D₇ AD D₈ D₉ D₁₀ D₁₁ C/D Sp — Stop code; Start code; Selection code; Affix PSEUDO103 C/D.
61 digits or more		Not to be drawn

NOTE: *The following characters are not drawn as numerals under bars.*
NUL (00H) to US (1FH), FNC1, FNC2, FNC3, SHIFT, CODE A, CODE B, CODE C

Type of Bar Code: CODE93

(1) No affix
   C/D check
   Auto affix of C/D

No. of Input Digits		
Max. 60 digits	Input Data	D₁ D₂ D₃ D₄ D₅ D₆ D₇ D₈ D₉
	Drawing Data	St D₁ D₂ D₃ D₄ D₅ D₆ D₇ D₈ D₉ C/D₁ C/D₂ Sp Start code Affix a modulus 47 "C" C/D. Affix a modulus 47 "K" C/D. Stop code
61 digits or more		Not to be drawn

NOTE: *Numerals under bars are not characters corresponding to the bars but the characters of the codes received are drawn.*

Type of Bar Code: UCC/EAN128

(1) No affix
   C/D check
   Auto affix of C/D

No. of Input Digits		
19 digits	Input Data	D₁ D₂ D₃ D₄ D₅ D₆ --- D₁₄ D₁₅ D₁₆ D₁₇ D₁₈ D₁₉
	Drawing Data	St FNC1 D₁ D₂ D₃ D₄ D₅ D₆ --- D₁₄ D₁₅ D₁₆ D₁₇ D₁₈ D₁₉ C/D₁ C/D₂ Sp Start code Affix a modulus 10 C/D. Affix a modulus 11 C/D. Stop code
Other than 19 digits		Not to be drawn

Type of Bar Code: POSTNET

(1) Auto affix of dedicated C/D

No. of Input Digits		
5 digits	Input Data	D_1 D_2 D_3 D_4 D_5
	Drawing Data	St D_1 D_2 D_3 D_4 D_5 C/D Sp — St: Start code, Sp: Stop code, C/D: Dedicated check digit
9 digits	Input Data	D_1 D_2 D_3 D_4 D_5 D_6 D_7 D_8 D_9
	Drawing Data	St D_1 D_2 D_3 D_4 D_5 D_6 D_7 D_8 D_9 C/D Sp — St: Start code, Sp: Stop code, C/D: Dedicated check digit
11 digits	Input Data	D_1 D_2 D_3 D_4 D_5 D_6 D_7 D_8 D_9 D_{10} D_{11}
	Drawing Data	St D_1 D_2 D_3 D_4 D_5 C/D Sp Fr D_6 D_7 D_8 D_9 D_{10} D_{11} C/D Fr — St: Start code, Sp: Stop code, C/D: Dedicated check digit, Fr: Frame
Other than 5, 9, and 11 digits		Not to be drawn

Type of Bar Code: RM4SCC

(1) Auto affix of dedicated C/D

No. of Input Digits		
12 digits	Input Data	(St) D_1 D_2 D_3 D_4 D_5 D_6 D_7 D_8 D_9 D_{10} D_{11} D_{12} (Sp) — (St): Start code, (Sp): Stop code
	Drawing Data	St D_1 D_2 D_3 D_4 D_5 D_6 D_7 D_8 D_9 D_{10} D_{11} D_{12} C/D Sp — St: Start code, Sp: Stop code, C/D: Dedicated check digit
13 digits or more		Not to be drawn

Type of Bar Code: KIX CODE

(1) No affix

No. of Input Digits		
18 digits	Input Data	D_1 D_2 D_3 D_4 D_5 D_6 D_7 D_8 D_9 D_{10} D_{11} D_{12} D_{13} D_{14} D_{15} D_{16} D_{17} D_{18}
	Drawing Data	D_1 D_2 D_3 D_4 D_5 D_6 D_7 D_8 D_9 D_{10} D_{11} D_{12} D_{13} D_{14} D_{15} D_{16} D_{17} D_{18}
19 digits or more		Not to be drawn

Type of Bar Code: Customer bar code

(1) Auto affix of dedicated C/D

No. of Input Digits		
20 digits	Input Data	D₁ D₂ D₃ D₄ D₅ D₆ D₇ D₈ D₉ D₁₀ D₁₁ D₁₂ D₁₃ D₁₄ D₁₅ D₁₆ D₁₇ D₁₈ D₁₉ D₂₀
	Drawing Data	St D₁ D₂ D₃ D₄ D₅ D₆ D₇ D₈ D₉ D₁₀ D₁₁ D₁₂ D₁₃ D₁₄ D₁₅ D₁₆ D₁₇ D₁₈ D₁₉ D₂₀ C/D Sp └ Start code Dedicated check digit ┘ Stop code ┘
21 digits or more		Data of up to 20 digits is drawn. Data of 21 digits or more is discarded.

Type of Bar Code: Highest priority customer bar code

(1) Auto affix of dedicated C/D

No. of Input Digits		
19 digits	Input Data	D₁ D₂ D₃ D₄ D₅ D₆ D₇ D₈ D₉ D₁₀ D₁₁ D₁₂ D₁₃ D₁₄ D₁₅ D₁₆ D₁₇ D₁₈ D₁₉
	Drawing Data	St D₁ D₂ D₃ D₄ D₅ D₆ D₇ D₈ D₉ D₁₀ D₁₁ D₁₂ D₁₃ D₁₄ D₁₅ D₁₆ D₁₇ D₁₈ D₁₉ CC7 C/D Sp └ Start code CC7 ┘ Dedicated check digit ┘ Stop code ┘
20 digits or more		Data of up to 19 digits is drawn. Data of 20 digits or more is discarded.

Type of Bar Code: GS1 DataBar Omnidirectional/GS1 DataBar Truncated, GS1 DataBar Stacked, GS1 DataBar Stacked Omnidirectional, GS1 DataBar Limited

(1) Auto affix of dedicated C/D

No. of Input Digits		
13 digits	Input Data	D₁ D₂ D₃ D₄ D₅ D₆ D₇ D₈ D₉ D₁₀ D₁₁ D₁₂ D₁₃
	Drawing Data	D₁ D₂ D₃ D₄ D₅ D₆ D₇ D₈ D₉ D₁₀ D₁₁ D₁₂ D₁₃ C/D └ Dedicated check digit
14 digits or more		Not to be drawn

Type of Bar Code: GS1 DataBar Expanded

(1) Auto affix of dedicated C/D

No. of Input Digits		
70 digits	Input Data	D₁ D₂ D₃ D₄ D₅ D₆ D₇ D₈ D₉ D₁₀ D₁₁ D₁₂ D₁₃
	Drawing Data	D₁ D₂ D₃ D₄ D₅ D₆ D₇ D₈ D₉ D₁₀ D₁₁ D₁₂ D₁₃ C/D └ Dedicated check digit
71 digits or more		Not to be drawn **NOTE:** *Some data cannot be drawn even if the number of input digits is less than 70.*

14. AUTOMATIC ADDITION OF START/STOP CODES

Type of Bar Code	Designation of Start/Stop Codes	Input Data	Drawing Data	
CODE 39	Omit (No designation)	12345ABC	Standard	*12345ABC*
			Full ASCII	*12345ABC*
		*12345ABC	Standard	*12345ABC*
			Full ASCII	*12345ABC*
		12345ABC*	Standard	*12345ABC*
			Full ASCII	*12345ABC*
		12345ABC	Standard	*12345ABC*
			Full ASCII	*12345ABC*
		12345*ABC	Standard	*12345*ABC*
			Full ASCII	*12345/JABC*
		**12345ABC	Standard	**12345ABC*
			Full ASCII	*/J12345ABC*
		*12345ABC**	Standard	*12345ABC**
			Full ASCII	*12345ABC/J*
		*12345*ABC*	Standard	*12345*ABC*
			Full ASCII	*12345/JABC*
	Add start code	12345ABC	Standard	*12345ABC
			Full ASCII	*12345ABC
		*12345ABC	Standard	**12345ABC
			Full ASCII	*/J12345ABC
		12345ABC*	Standard	*12345ABC*
			Full ASCII	*12345ABC*
		12345ABC	Standard	**12345ABC*
			Full ASCII	*/J12345ABC*
		12345*ABC	Standard	*12345*ABC
			Full ASCII	*12345/JABC
		**12345ABC	Standard	***12345ABC
			Full ASCII	*/J/J12345ABC
		*12345ABC**	Standard	**12345ABC**
			Full ASCII	*/J12345ABC/J*
		*12345*ABC*	Standard	**12345*ABC*
			Full ASCII	*/J12345/JABC*
	Add stop code	12345ABC	Standard	12345ABC*
			Full ASCII	12345ABC*
		*12345ABC	Standard	*12345ABC*
			Full ASCII	*12345ABC*
		12345ABC*	Standard	12345ABC**
			Full ASCII	12345ABC/J*
		12345ABC	Standard	*12345ABC**
			Full ASCII	*12345ABC/J*
		12345*ABC	Standard	12345*ABC*
			Full ASCII	12345/JABC*
		**12345ABC	Standard	**12345ABC*
			Full ASCII	*/J12345ABC*
		*12345ABC**	Standard	*12345ABC***
			Full ASCII	*12345ABC/J/J*
		*12345*ABC*	Standard	*12345*ABC**
			Full ASCII	*12345/JABC/J*

Type of Bar Code	Designation of Start/Stop Codes	Input Data	Drawing Data	
CODE 39	Start/stop code not added	12345ABC	Standard	12345ABC
			Full ASCII	12345ABC
		*12345ABC	Standard	*12345ABC
			Full ASCII	*12345ABC
		12345ABC*	Standard	12345ABC*
			Full ASCII	12345ABC*
		12345ABC	Standard	*12345ABC*
			Full ASCII	*12345ABC*
		12345*ABC	Standard	12345*ABC
			Full ASCII	12345/JABC
		**12345ABC	Standard	**12345ABC
			Full ASCII	*/J12345ABC
		*12345ABC**	Standard	*12345ABC**
			Full ASCII	*12345ABC/J*
		*12345*ABC*	Standard	*12345*ABC*
			Full ASCII	*12345/JABC*

Type of Bar Code	Designation of Start/Stop Codes	Input Data	Drawing Data
NW7	Omit (No designation)	12345678	a12345678a
		a12345678	a12345678
		12345678c	12345678c
		b12345678d	b12345678d
		12345a678	a12345a678a
		ab12345678	ab12345678
		a12345678bc	a12345678bc
		d12345b678c	d12345b678c
	Add start code	12345678	a12345678
		a12345678	aa12345678
		12345678c	a12345678c
		b12345678d	ab12345678d
		12345a678	a12345a678
		ab12345678	aab12345678
		a12345678bc	aa12345678bc
		d12345b678c	ad12345b678c
	Add stop code	12345678	12345678a
		a12345678	a12345678a
		12345678c	12345678ca
		b12345678d	b12345678da
		12345a678	12345a678a
		ab12345678	ab12345678a
		a12345678bc	a12345678bca
		d12345b678c	d12345b678ca
	Start/stop code not added	12345678	12345678
		a12345678	a12345678
		12345678c	12345678c
		b12345678d	b12345678d
		12345a678	12345a678
		ab12345678	ab12345678
		a12345678bc	a12345678bc
		d12345b678c	d12345b678c