CITIZEN

User's Manual

CONTROL BOARD FOR LT-286
MODEL BD2-2860

Rev.1.01 Added notes Mar.19th,1999

Japan CBM Corporation

<CAUTIONS>

1. Before using this equipment, be sure to read this User's manual thoroughly.
   Please keep this with care so as to referred to any time at need.
2. Portions of the contents of this User's manual may be changed without prior notice.
3. The reproduction of parts or all of the contents of this User's manual without permission is strictly forbidden.
4. Absolutely do not carry out maintenance, disassembly, or repair of parts that are not specified in this User's manual.
5. Note that losses which may be attributed to the user's wrong operation method or operating environment will be outside the responsibility of this company.
6. Do not carry out the operations other than those explained in this User's manual, since doing do so may become a cause of accidents or breakdowns.
7. Because data is basically transient, long-period and permanent storage of data will not be possible. Please note in advance that this company will not be responsible in any way for losses or lost profits caused through the clearing of the data due to breakdowns, repairs, investigations, etc.
8. If any questionable points, mistakes, omitted explanations, etc. are found in the contents of this manual, please contact this company.
9. Please note that notwithstanding the conditions in above 8; this company will not be responsible for the consequences of results obtained through operation of this equipment.

CONTENT

1. OUTLINE

This control boards is designed to be used to control our thermal printer, "LT-286" series through the computer etc.

As being provided with many abundant functions, it can be used widely in various applications.

Before you start using it, read this manual thoroughly and understand the content.

1.1 Features

(1) Ultra compact

(2) Both interface of Serial and Parallel can be selected by dip switch.

(3) Input buffer incorporated.

(4) Bar code printing is available.

(5) Auto paper cutter control incorporated.

(6) User-defined character registration function (94 characters)

1.2 Precaution

(1) Make sure to turn OFF the power supply in case of connecting / disconnecting the connectors.

(2) Absolutely do not make a short circuit between the terminals of connectors.

(3) Use power supply, LED, interface etc. following their specifications.

(4) Use the recommended paper shown below.

- Thermal Paper TF50KS-E2(Nippon-Seishi)

1.3 Maintenance and Service

For the information on maintenance and service, please contact our dealer or at the following address.

Northern America
CBM America Corporation
Service Center
365 Van Ness Way Suite 510
Torrance, CA 90501, U.S.A

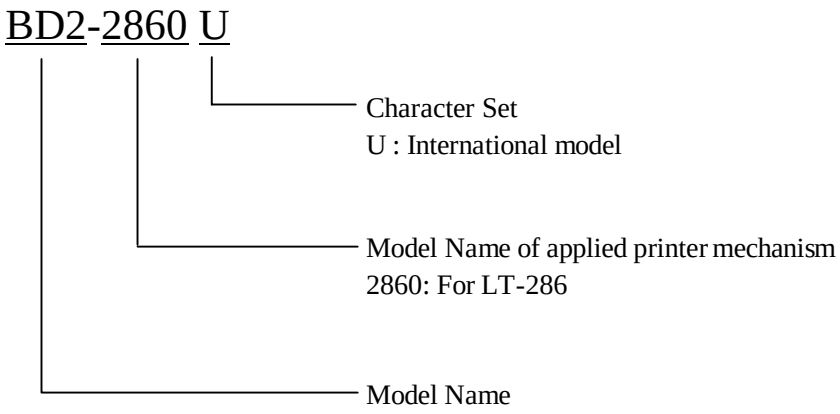
TEL 310-781-1460
FAX 310-781-9157

Other Areas
Japan CBM Corporation
Information Systems Division
5-68-10, Nakano Nakano-ku,
Tokyo 164-0001 Japan

TEL 03-5345-7540
FAX 03-5345-7541

2. BASIC SPECIFICATIONS

2.1 Model classification



2.2 Basic Specifications

Items	Contents
Print width	48 mm
Print Speed	400 dot line / sec (When 7.2V)
Number of columns	Font A : 32 columns Font B : 42 columns
Character dimensions	Font A : 1.25 mm x 3.00 mm (10 + 2 dots space x 24 dots) Font B : 0.88 mm x 2.13 mm (7 + 2 dots space x 24 dots)
Character types	Alphanumeric, international characters
Bar code type	UPC-A/E, JAN (EAN) 13 / 8 columns, ITF CODE 39, CODE 128, CODABAR
Line pitch	4.23 mm (Can be changed by command)
Interface	Parallel (Conforms to Centronics) or Serial (Conforms to RS-232C) (Selectable by dip switch)
Input buffer	2 K bytes
Supply voltage	5V ± 5 % Approx. 180mA 4.2V ~ 8.5V Approx. 1.3A(Ave) Approx. 4.0A(Peak) When 7.2V Ordinal voltage is to be 7.2V(Max) 8.5V is a voltage, which is right after charging.
Operating Environment	0 ~ 40°C (Print guaranteed at 5 ~ 40°C)
Storage Environment	-20 ~ 60°C
Outer Dimension	75mm (W) x 80mm (D) (For height of component parts, see outer drawing.)
Weight	Approx. 50 g

3. CONNECTING CONNECTORS

3.1 CN1 Connector for Printer Mechanism (For Print Head)

Pin No.	Signal Name	I/O	Function
1	VH	–	Power for print head
2	VH	–	Power for print head
3	VH	–	Power for print head
4	DO	Output	Head data output signal
5	$\overline{\text{LATCH}}$	Output	Latch signal
6	CP	Output	Clock pulse
7	Vdd	–	Power for circuit
8	STRB1	Output	Strobe 1
9	STRB2	Output	Strobe 2
10	STRB3	Output	Strobe 3
11	TH	Input	Thermistor
12	GND	–	Power GND
13	GND	–	Power GND
14	GND	–	Power GND
15	GND	–	Power GND
16	GND	–	Power GND
17	GND	–	Power GND
18	GND	–	Logic GND
19	NC	–	No connection
20	NC	–	No connection
21	STRB4	Output	Strobe 4
22	STRB5	Output	Strobe 5
23	STRB6	Output	Strobe 6
24	NC	–	No connection
25	DI	Input	Print data serial input
26	VH	–	Power for print head
27	VH	–	Power for print head
28	VH	–	Power for print head

Applicable Connector : 6216-28 000 808 (Kyocera Elco)

3.2 CN2 Connector for Print Mechanism (For Motor & Sensor)

Pin No.	Signal Name	I/O	Function
1	MOTOR A	Output	Operation signal for motor A
2	MOTOR B	Output	Operation signal for motor B
3	MOTOR $\overline{A}$	Output	Operation signal for motor $\overline{A}$
4	MOTOR $\overline{B}$	Output	Operation signal for motor $\overline{B}$
5	PE C	–	Photo-transistor collector (Paper sensor)
6	GND	–	Photo-transistor emitter (Paper sensor)
7	PE A	–	Photo-LED anode (Paper sensor)
8	GND	–	Photo-LED cathode (Paper sensor)
9	GND	–	Head-up sensor GND
10	H-UP	Input	Head-up signal

Using Connector : 53047-1010 (Molex)

3.3 CN3 Connector for Interface

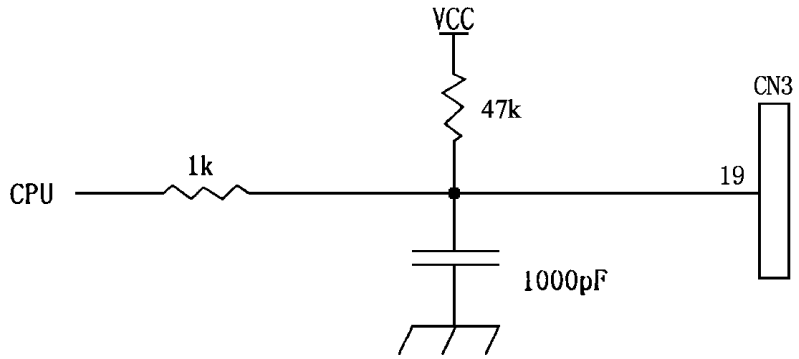
Pin No.	Signal Name	I/O	Function
1	Vdd	–	Power supply for circuit (5V)
2	Vdd	–	Power supply for circuit (5V)
3	Vdd	–	Power supply for circuit (5V)
4	GND	–	GND
5	GND	–	GND
6	GND	–	GND
7	VH	–	Power supply for operation (4.2~8.5V)
8	VH	–	Power supply for operation (4.2~8.5V)
9	VH	–	Power supply for operation (4.2~8.5V)
10	VH	–	Power supply for operation (4.2~8.5V)
11	VH	–	Power supply for operation (4.2~8.5V)
12	VH	–	Power supply for operation (4.2~8.5V)
13	P-GND	–	GND for operation
14	P-GND	–	GND for operation
15	P-GND	–	GND for operation
16	P-GND	–	GND for operation
17	P-GND	–	GND for operation
18	P-GND	–	GND for operation
19	$\overline{\text{LF-SW}}$	Input	LF Switch input
20	$\overline{\text{ERROR}}$	Output	Error LED output (Can be connected directly)
21	$\overline{\text{PE OUT}}$	Output	PE LED output (Can be connected directly)
22	DTR	Output	Serial Interface DTR
23	TXD	Output	Serial Interface TXD
24	RXD	Input	Serial Interface RXD
25	DSR	Input	Serial Interface DSR
26	$\overline{\text{STB}}$	Input	Parallel Interface $\overline{\text{STB}}$
27	BUSY	Output	Parallel Interface BUSY
28	$\overline{\text{ACK}}$	Output	Parallel Interface $\overline{\text{ACK}}$
29	DATA 0	Input	Parallel Interface DATA 0
30	DATA 1	Input	Parallel Interface DATA 1
31	DATA 2	Input	Parallel Interface DATA 2
32	DATA 3	Input	Parallel Interface DATA 3
33	DATA 4	Input	Parallel Interface DATA 4
34	DATA 5	Input	Parallel Interface DATA 5
35	DATA 6	Input	Parallel Interface DATA 6
36	DATA 7	Input	Parallel Interface DATA 7
37	PE	Output	Parallel Interface PE
38	$\overline{\text{FAULT}}$	Output	Parallel Interface $\overline{\text{FAULT}}$
39	$\overline{\text{RESET}}$	Input	Parallel Interface $\overline{\text{RESET}}$
40	NC	–	No Connection

Using Connector : LY20-40P-DT1-P5 (JAE)

Applicable Connector : LY10-DC40 (JAE)

⚠CAUTION:

1. For LED of $\overline{\text{ERROR}}$ and $\overline{\text{PE}}$, there is a resister of 330Ω on the circuit side to make current value 10mA.
   Please use LED which its voltage is approx. 2V. LED over 10mA may break a control board.
2. Control circuit requires power supply only for one pin of each VCC and GND.
   However, Operation voltage is to be supplied to all of pin for safety use.
3. Serial interface equips a driver and receiver of RS-232C, make sure to use it at RS-232C level.
4. $\overline{\text{RESET}}$ terminal is pulled up by 3.3KW. Make sure to make this terminal NC, when this terminal is not used.
5. $\overline{\text{LF-SW}}$ input circuit is as below.



3.4 CN4 Connector for Paper Cutter

Pin No.	Signal Name	I/O	Function
1	M +	Output	Cutter motor operational signal M +
2	M –	Output	Cutter motor operational signal M –
3	GND	–	GND
4	SW	Input	Cutter switch input signal

Using Connector : 5207-0410A (Molex)

Note) Use the specified Paper Cutter(Model Name : ACS-220-5V)

4. DIP SWITCH SETTING

(1) DIP SWITCH

Pin No.	Function	ON	OFF	Factory Setting
DS1-1	Auto Cutter	Enable	Disable	OFF
2	CR Selection	LF Enable	LF Disable	ON
3	Print Density	Combination with (2)-J6 (See below)		OFF
4	DTR/XON-XOFF	XON-XOFF	DTR/DSR	OFF
5	Baud Rate	See below (3)		OFF
6	"			OFF
7	"			OFF
8	"			OFF

(2) JUMPER

No.	Function	Short	Open	Factory Setting
J1	International Character set	See below (4)		Open (Short circuit)
J2	"			Open (Short circuit)
J3	"			Open (Short circuit)
J4	Paper Auto Loading	Enable	Disable	Short circuit
J5	Print Drive System	Variable division	Fixed division	Short circuit
J6	Print Density (Supplementary)	Combination with DS1-3 See below(5)		Short circuit
J7	Not Used			Short circuit
J8	Not Used			Short circuit

(3) INTERFACE & BAUD RATE

DS1-8	7	6	5	Input Method	Parity	Baud Rate
OFF	OFF	OFF	OFF	Parallel Input	--	--
OFF	OFF	OFF	ON	Serial Input	None	1200 bps
OFF	OFF	ON	OFF	"	"	2400 bps
OFF	OFF	ON	ON	"	"	4800 bps
OFF	ON	OFF	OFF	"	"	9600 bps
OFF	ON	OFF	ON	"	"	19200 bps
OFF	ON	ON	OFF	"	Odd	1200 bps
OFF	ON	ON	ON	"	"	2400 bps
ON	OFF	OFF	OFF	"	"	4800 bps
ON	OFF	OFF	ON	"	"	9600 bps
ON	OFF	ON	OFF	"	"	19200 bps
ON	OFF	ON	ON	"	Even	1200 bps
ON	ON	OFF	OFF	"	"	2400 bps
ON	ON	OFF	ON	"	"	4800 bps
ON	ON	ON	OFF	"	"	9600 bps
ON	ON	ON	ON	"	"	19200 bps

(4) INTERNATIONAL CHARACTER SET

J-3	2	1	International Character
Open	Open	Open	Japan (JIS)
Open	Open	Short	Japan (Shift-JIS)
Open	Short	Open	Sweden
Open	Short	Short	Denmark 1
Short	Open	Open	U.K.
Short	Open	Short	Germany
Short	Short	Open	France
Short	Short	Short	U.S.A

(5) PRINT DENSITY

DS1-3	J-6	Print Density	Level	Print Density Rate
OFF	Open	Light	0	80%
OFF	Short	Standard	1	100%
ON	Open	Slightly Dark	2	120%
ON	Short	Dark	3	150%

Note)

1. Input Buffer is 2k byte.(Fixed)
2. Serial data length is 8 bits.(Fixed)

5. POWER SUPPLY

5.1 Specifications

VCC : 5V ± 5% 180 mA

VP : 4.2V ~ 8.5V 1.3A (Peak : Approx.4.0A)

Ordinal Voltage is to be 7.2V(Max). 8.5V is a voltage that is right after charging.

8.5V cannot be used for ordinal voltage.

5.2 Precautions

(1) Design the product to supply power to Vdd before VH When power is supplied to this control board.

(2) Design the product to turn off the power for Vdd after VH when power is turned off.

(3) Make sure to turn off the power in case of connecting / disconnecting connectors.

(4) Make sure to use Vdd and VH following their specifications.

(5) Make sure to use this control board connecting all of terminals between VH and P-GND.

6. PARALLEL INTERFACE

6.1 Specifications

Data input method : 8 bit parallel signal (DATA0~7)

Control signals : $\overline{\text{ACK}}$, BUSY, $\overline{\text{STB}}$, $\overline{\text{FAULT}}$, PE, $\overline{\text{RESET}}$

6.2 Explanation of Input /Output Signals

DATA0~7 : 8 bit parallel signal (Positive logic)

$\overline{\text{STB}}$: Strobe signal to read 8 bit data (Negative logic)

$\overline{\text{RESET}}$: Signal to reset control board (Negative logic)

$\overline{\text{ACK}}$: 8 bit data request signal. Pulse signal output at the end of the BUSY signal (Negative logic)

BUSY : Signal to indicate BUSY state of the printer, Input new data for "LOW" (Positive logic)

$\overline{\text{FAULT}}$: Signal which is made "LOW" when printer is in alarm state.(Negative logic)

PE : Signal which is output when paper runs out.(Positive logic)

6.3 Electrical characteristics

(1) Input Signal Level

"HIGH" level : 0.7Vdd MIN

"LOW" level : 0.3Vdd MAX

(2) Output Signal Level

"HIGH" level : Vdd – 0.1V MIN

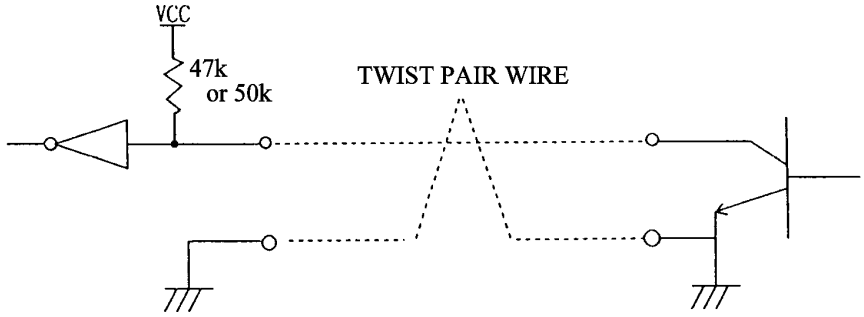
"LOW" level : 0.1V MAX

(3) I/O Conditions

$\overline{\text{STB}}$, $\overline{\text{RESET}}$ input signals are pulled up by 47KΩ.

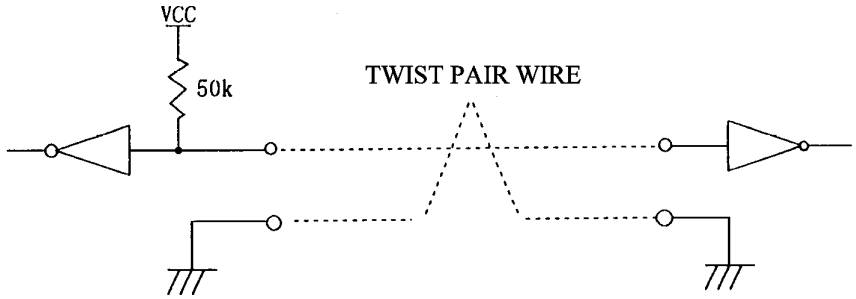
Other input signals are pulled up by 50KΩ.

<Printer side> <Host side>



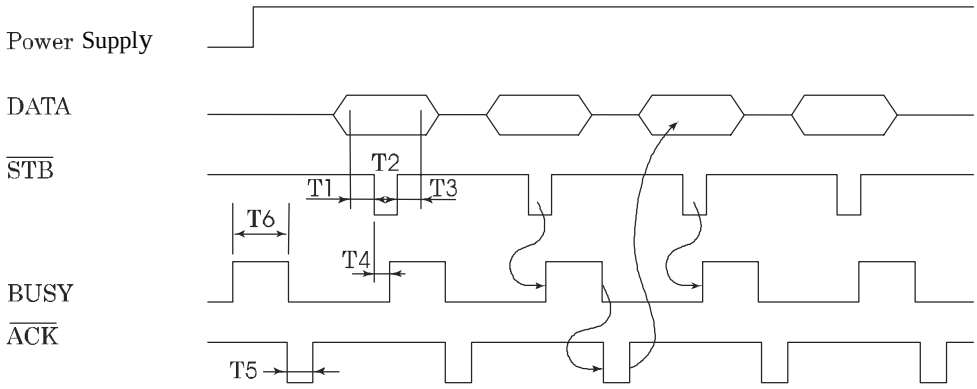
All the output signals are pulled up by 50KΩ.

<Printer side> <Host side>



6.4 Timing chart

(1) Data Input and Printing Timing



T1, T2, T3	: 0.5 µs (MIN)
T4	: 270 ns (MAX)
T5	: 2.3 µs (TYP)
T6	: 500 ms (MIN) *On supplying power

6.5 Data receiving control

When BUSY signal is "LOW", data from the host can be received. When it being "HIGH", data cannot be received.

6.6 Buffering

This control board incorporates 2K byte buffer.

Therefore, big data can be buffered in input buffer, and the host side can be released immediately.

7. SERIAL INTERFACE

7.1 Specifications

(1) Data transfer system : Asynchronous

(2) Baud rates

1200, 2400, 4800, 9600, 19200 bps (Selectable by user)

(3) Configuration of one word

Start bit	:	1 bit
Data bit	:	8 bits Fixed
Parity bit	:	Odd/Even or No parity (Selectable by user)
Stop bit	:	1 bit or more

(4) Signal polarity

RS-232C

• Mark	=	logic " 1" (–3V ~ –12V)
• Space	=	logic " 0" (+3V ~ +12V)

(5) Receiving data (RD signal)

RS-232C

• Mark	=	1
• Space	=	0

(6) Receiving control (DTR signal)

RS-232C

• Mark	:	Data transfer is not available
• Space	:	Data transfer is available

(7) Transmission control (TD signal)

DC1 code (11H) X-ON	:	Data reception is available
DC3 code (13H) X-OFF	:	Data reception is not available

7.2 Explanation of Input / Output signals

(1) RXD

Serial receiving data signal. On occurrence of framing error, overrun error, or parity error, the data is printed as "?".

(2) DTR

When this signal is READY, write data or a command. When they are written in BUSY, overrun error is occurred and data is ignored. Even during printing, data can be loaded in the input buffer. Further, BUSY can take place on supply of power, during test printing, during on-line, or on resetting.

(3) TXD

When, while in data reception, the rest of input buffer on the printer side goes less than 256 bytes , DC3 (13H) data reception impossible signals are output, when the rest of input buffer goes more than 256 bytes, DC1 (11H) data reception possible signals are output to the host.

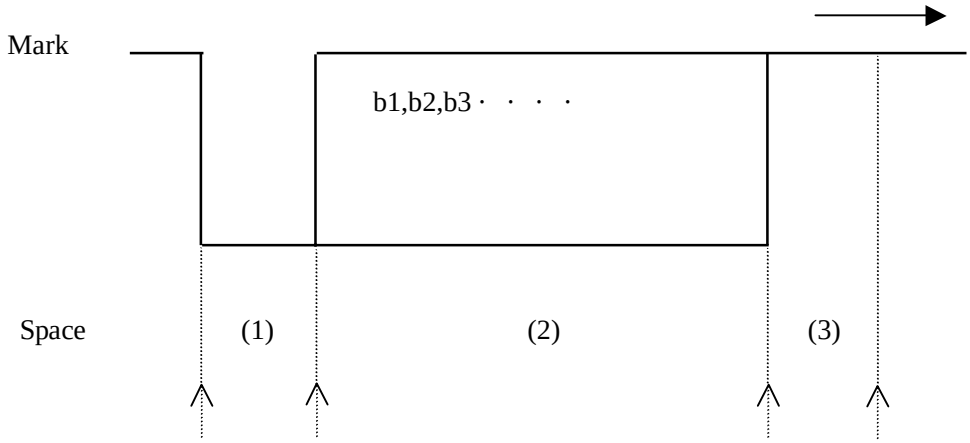
When DTR/DSR control having been selected in status information transmission, it is first confirmed that DSR is "space" and data is sent.

When DTR/DSR control has not been selected, DSR is ignored and data is transmitted.

(4) GND

Common GND on the circuit.

7.3 Date configuration



(1) Start bit
(2) Data bit (+ Parity bit)
(3) Stop bit (1 or more)

(1) Start Bit

In 1/2 bit from the mark-to-space starting edge, state is read once again. When "space" state is confirmed, it is recognized as the start bit. If it is "mark" state, it is not taken as the start bit.
Without taking it as an error, detection of a start bit is carried out once again.

(2) Data Bit + Parity Bit

Data bit and parity bit are sampled at 1/2 start bit for time length equal to 1 bit. The state thus sampled is taken as the data for the bit concerned. Bits are named as Bit 0, Bit 1.…. Parity bit counted from the one close to the start bit.

(3) Stop Bit

The stop bit is a mark level of 1 bit or more. With "space" having been detected on detection of a stop bit, framing error takes place.

7.4 Error Detection

Parity, framing, and overrun are detected. On detection of any error, the data are stored in the buffer as "?".

(1) Framing Error

With "space" state having been detected on detection of a stop bit, error takes place.

The data are stored in the buffer as "?".

(2) Parity Error

With an error having been detected under specifying parity check, the data is stored in the buffer as "?".

(3) Overrun Error

On detection of an overrun error, the data are stored in the buffer as "?".

7.5 Data receiving control

When DTR/DSR control having been selected, with BUSY signal at "LOW", data from the host side are received. With the signal at "HIGH", they can not be received.

When DTR/DSR control not having been selected, after X-ON transmission, data is received from the host side. No transmission of data can take place after X-OFF is transmitted.

7.6 Buffering

Data transfer to the input buffer include DTR signals and TD signals as the control signals concerned.

(1) DTR signals (See the page 20 – 7.2(2))

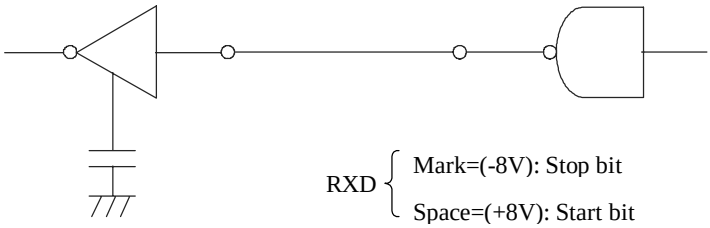
(2) TXD signals (See the page 20 – 7.2(3))

7.7 Electrical characteristics

(1) RS-232C Circuit

Input (RXD, DSR)

<Printer side> <Host side>



RXD { Mark=(-8V): Stop bit
Space=(+8V): Start bit

Equivalent MAX232

Output (DTR, TXD)

Equivalent MAX232

DTR { Mark=(-8V): At Busy
Space=(+8V): At Ready

TD { Mark=(-8V): 1
Space=(+8V): 0

8. ERROR HANDLING

8.1 Peripheral Circuit Errors

These errors are detected at power-on or initialization just after a reset.

(1) Error Types

Error	Description
Memory error	The CPU made a self-diagnosis of the circuit and detected an error with the external RAM.
Cutter error	With the auto cutter enabled at the function selection terminal (DS1-1), the auto cutter (ACS-220-5V) is not connected to the cutter connector (CN4).

(2) External signal outputs

Interface Connector (CN3)

Pin No.	Signal Name	Remarks
20	$\overline{\text{ERROR}}$	LED output. For a blinking pattern, see 8.3 Error Indication.
22	DTR	Serial interface
27	BUSY	Parallel interface
38	$\overline{\text{FAULT}}$	Parallel interface

(3) Resetting methods

Error	Resetting Method
Memory error	Unrecoverable
Cutter error	After turning off the power, connect the auto cutter (ACS-220-5V) or turn off the function selection terminal (DS1-1) and turn on the power again.

8.2 Operation Errors

(1)Error types

Error	Description
No paper	The printing paper set is not set
Head –up	The head-up lever is at its up position
VH voltage error	A VH voltage is beyond its allowable range (4.2 to 8.5V)
Head temperature error	A head temperature is less than 0°C or 65°C or higher.
Cutter lock (ACS-220-5V)	When driving the cutter, the cutter is locked due to an external factor (Paper jam, etc.).

Note 1) The 8.5V upper-limit voltage for VH voltage error is only an assumptive voltage just after charging the battery when using the battery power. It cannot be normally used. A normal maximum voltage is 7.2V.

(2) External signal outputs

Interface Connector (CN3)

Pin No.	Signal Name	Remarks
20	$\overline{\text{ERROR}}$	LED output. For a blinking (Lighting) pattern, see 8.3 Error Indication.
21	$\overline{\text{PE OUT}}$	LED output. This is always output at the time of no paper.
22	DTR	Serial interface
27	BUSY	Parallel interface
37	PE	Parallel interface
38	$\overline{\text{FAULT}}$	Parallel interface

(3) Resetting methods

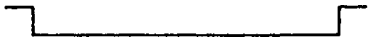
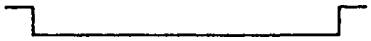
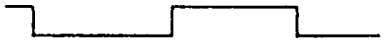
Error	Resetting Method
No paper	Set the paper. See Note 1.
Head –up	Bring down the head-up lever.
VH voltage error	Set to a voltage within the allowable range (4.2 to 8.5V) and turn on the power again. Alternatively, activate the Pin19 (LFSW) of the CN3(interface connector).
Head temperature error	At the lower limit (less than 0°C), printing becomes operational at 0°C higher. At the upper limit (65°C or higher), it become operational at 60°C or lower.
Cutter lock (ACS-220-5V)	Eliminate paper jam and activate the Pin19(LFSW) of the CN3(Interface Connector) or turn on the power again.

Note 1) When auto loading has not been selected with the function selection jumper(J4), set the paper manually. When it has been selected, the auto loading function is enabled to facilitate replacement of the paper.

Note 2) The 8.5V upper-limit voltage for VH voltage error is only an assumptive voltage just after charging the battery when using the battery power. It cannot be normally used. A normal maximum voltage is 7.2V.

8.3 Error Indication

The errors other than no paper are indicated by a LED output (Illumination or blinking) of the Pin20 $\overline{\text{ERROR}}$ of the CN3 (Interface connector).

Error	Display Pattern	Description
Memory error		Blinking cycle of 200ms
Cutter lock (Cutter error)		Blinking cycle of 150ms(6 times) and 500ms(1 time).
Head –up		Illuminated until reverted
VH voltage error		Illuminated until reverted
Head temperature error		Blinking cycle of 1 sec.
Macro execution wait		Blinking cycle of 500ms.

9. PRINTER MECHANISM CONTROL SYSTEM

9.1 Thermal Head Control System (Division Driving system)

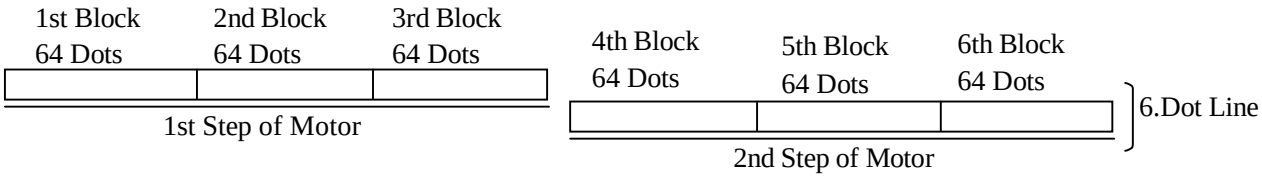
The LT-286(Line thermal printer) is driven by this control board has a384 dots/line head divided into 6 block of 64 dots each. When actually driving the head, you can select either Fixed Division Number system, which drives the head, always dividing it into 6 blocks or Variable Division Number system which collectively drives several blocks at the time according to the number of activated head dots.

For selection by function selection, see 4. DIP SWITCH SETTING.

For selection by a command, see 10.2 Command Details.

9.1.1 Fixed Division Number System

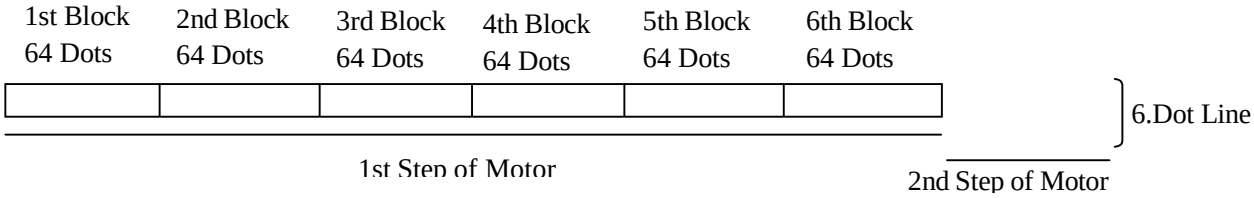
This system always drives each block in the same sequence.



Note) for a stepping motor driving method, see 9.2 Motor Drive.

9.1.2 Variable Division Number System

This system counts the number of printing dots for each block of the printing dot line and drives the blocks collective in such a manner not to exceed the maximum number of driving dots (64 dots).



Unlike the Fixed Division Number system, this system drives all the head in the head in the head in the 1st step of the motor and simply feeds the paper in the 2nd step of the motor.

9.2 Motor Drive

The LT-286 uses a 4-phase bipolar stepping motor. It feeds the 1 dot line worth of paper in two steps by 2-to-2 phase excitation.

9.2.1 Motor Drive Features

1) Drive at an optimum drive speed by the VH voltage.
2) Prevents heat generation of the motor by PWM control to restrain current consumption.
3) Provides acceleration control at the time of start.

9.2.2 Maximum Motor Drive Speeds at Major Voltage

VH Voltage	Motor Drive Speed
5V	300pps
6V	490pps
7.2V	800pps

Note) The maximum drive speed depends on the VH voltage.
A printing speed may slightly differ depending on a processing time o r voltage detection accuracy.
During the course of printing, a motor drive speed may be slower than the maximum drive speed, depending on what is printed or the head divided drive system.

10. PRINT CONTROL FUNCTIONS

10.1 Command List

	Control Code	Function	Code	Page
1	HT	Horizontal tab command	09H	31
2	LF	Printing and paper feed	0DH	32
3	CR	Print command	0DH	33
4	ESC SP	Setting the right space amount of the character	1BH 20H n	34
5	ESC !	Collective specifying printing mode	1BH 21H n	35
6	ESC %	Specifying/canceling download character set	1BH 25Hn	37
7	ESC &	Defining download characters	1BH 26H 5 n m[a p1 p2 ... psxa]m-n+1	38
8	ESC *	Specifying the bit image mode	1BH 2AH mn1n2[d]k	40
9	ESC –	Specifying/canceling underline	1BH 2DH n	42
10	ESC 2	Specifying 1/6-inch line feed rate	1BH 32H	43
11	ESC 3	Setting line feed rate of minimum pitch	1BH 33H n	44
12	ESC =	Data input control	1BH 3DH n	45
13	ESC @	Initializing the Printer	1BH 40H	46
14	ESC D	Setting horizontal tab position	1BH 44H [n]k00H	47
15	ESC E	Specifying/canceling highlighting	1BH 45H n	48
16	ESC G	Specifying/canceling double printing	1BH 47H n	49
17	ESC J	Printing and feeding paper n/203 inch	1BH 4AH n	50
18	ESC R	Selecting the international character set	1BH 52H n	51
19	ESC V	Specifying/Canceling 90°-right- turned Characters	1BH 56H n	52
20	ESC a	Aligning the characters	1BH 61H n	53
21	ESC c3	NOP		
22	ESC c4	NOP		
23	ESC c5	Enabling/disabling the panel switches	1BH 63H 35H n	54
24	ESC d	Printing and feeding the paper by n lines	1BH 64H n	55
25	ESC i	Activating auto cutter (Full cut)	1BH 69H	56
26	ESC m	Activating auto cutter (Partial cut)	1BH 6DH	57
27	ESC p	NOP		
28	ESC t	Selecting the character code table	1BH 74H n	58
29	ESC u	NOP		
30	ESC v	Transmitting the printer status (Serial type)	1BH 76H n	59
31	ESC {	Specifying/canceling the inverted characters	1BH 7BH n	60
32	ESC $	Specifying the absolute positions	1BH 24H n1 n2	61
33	ESC \	Specifying the relative positions	1BH 5C n1 n2	62
34	GS k	Printing the bar code	1DH 6BH n ["d"]k00H	63
35	GS w	Selecting the horizontal size (scale factor) of bar code	1DH 77H n	67
36	GS h	Selecting the height of the bar code	1DH 68H n	68
37	GS H	Selecting of print position of HRI code	1DH 48H n	69
38	GS f	Selecting the font of HRI code	1DH 66H n	70
39	GS *	Defining the download, bit image	1DH2An1n2[d]n1xn2x8	71
40	GS /	Printing the download, bit image	1DH 2FH m	73
41	GS :	Starting/ending macro definition	1DH 3AH	74
42	GS ^	Executing the macro	1DH 5E n1n2 n3	75
43	DC2 A	Selecting the Print drive system	12H 41H n	76

10.2 Command Details

10.2.1 Description of Items

XXXX ALL

[Function]	Command Function
[Code]	A sequence of code constituting a command is represented in hexadecimal number for < >H, binary number for < >B, and decimal number for < >, respectively; [ ]k represents a repeat count of k-times.
[Range]	Describes an argument value(setting range) for the command.
[Outline]	Describes a command outline.
[Caution]	Describes a caution as required.
[Default]	Describes an initial value for the command when accompanied by an argument.
[See Also]	Describes the associated commands for use.
[Sample Program]	Describes a coding example in the Q-BASIC sample program. * This example is only for your reference and differs depending on the language used, version, and so on. For details, see the manual for the language used.

10.2.2 Details

HT

[Function] Horizontal Tab Command

[Code] <09>H

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

- Ignored when the next horizontal tab position has not been set.

[Caution]

- The horizontal tab position is set by ESC D.
- Initial setting of the horizontal tab position is each 8 characters in 9th, 17th, 25th,columns.

[See Also] ESC D

[Sample Program]

```
LPRINT "012345678901234567890 1";
LPRINT CHR$ (&HA);
LPRINT CHR$ (&H9) + "AAA";
LPRINT CHR$ (&H9) + "BBB";
LPRINT CHR$ (&HA);
LPRINT CHR$ (&H1B) + "D";
LPRINT CHR$ (3) + CHR$ (7) + CHR$ (14) + CHR$ (0 );
LPRINT CHR$ (&H9) + "AAA";
LPRINT CHR$ (&H9) + "BBB";
LPRINT CHR$ (&H9) + "CCC" + CHR$ (&HA);
```

[Print Results]

```
012345678901234567890 1
        AAA     BBB     <------ Initially set horizontal tab
AAA BBB     CCC         <------ When set to the 4th, 8th, and 15th digits
```

LF

[Function] Printing and Paper Feed Command

[Code] <0A>H

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

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

[See Also] ESC 2, ESC 3

[Sample Program]

```
LPRINT "AAA" + CHR$ (&HA);
LPRINT "BBB" + CHR$ (&HA);
LPRINT CHR$ (&HA);
LPRINT "CCC" + CHR$ (&HA);
```

[Print Results]

```
AAA   <-- Print and line feed
BBB   <-- Print and line feed
      <-- Line feed only
CCC   <-- Print and line feed
```

CR

[Function] Print Command

[Code] <0D>H

[Outline] 1) When DS 1-2 is OFF:

This command is ignored.

2) When DS 1- 2 is ON:

With data held inside the internal print buffer, printing and line feed are performed.

Without data inside the internal print buffer, however, no printing is performed.

[See Also] LF

[Sample Program]

```
LPRINT "AAA" + CHR$ (&HD);
LPRINT "BBB" + CHR$ (&HD);
LPRINT CHR$ (&HD);
LPRINT "CCC" + CHR$ (&HD);
```

[Print Results]

```
AAA   <-- Print and line feed
BBB   <-- Print and line feed
      <-- Line feed only
CCC   <-- Print and line feed
```

ESC SP n

[Function] Setting the right space amount of the character

[Code] <1B>H<20>H<n>

[Range] {0 =< n=< 20} Data is described in Hex code.

[Outline] The rightward space amount is set in dot unit (1/203 inch unit). In the initial value, it is n=0.

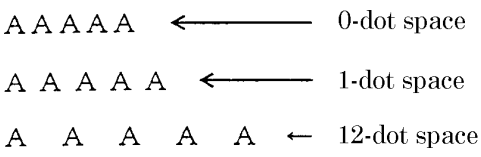
[Caution] The rightward space amount in doublewide mode is made double of the set volume.

[Default] n = 0

[Sample Program]

```
LPRINT CHR$ (&H1B) + "  " + CHR$ (0);
LPRINT "AAAAA" + CHR$ (&HA);
LPRINT CHR$ (&H1B) + "  " + CHR$ (1);
LPRINT "AAAAA" + CHR$ (&HA);
LPRINT CHR$ (&H1B) + "  " + CHR$ (12);
LPRINT "AAAAA" + CHR$ (&HA);
```

[Print Results]



ESC ! n

[Function] Collective Specifying Printing Mode

[Code] <1B>H<21>H<n>

[Range] {0 =< n=< FF} Data is described in Hex code.

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

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

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

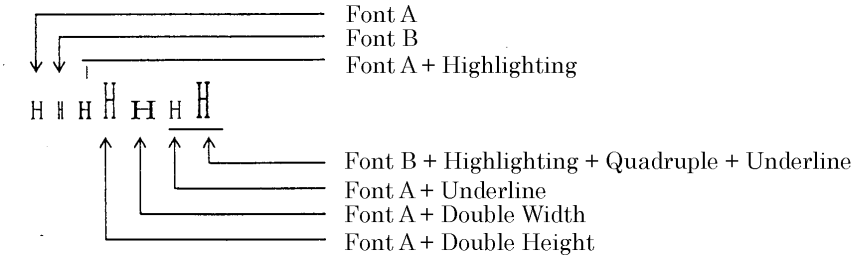
[Default] n = 0

[See Also] ESC E, ESC –

[Sample Program]

```
LPRINT CHR$ (&H1B) + " ! " + CHR$ (&H00) + "H" ;
LPRINT CHR$ (&H1B) + " ! " + CHR$ (&H01) + "H";
LPRINT CHR$ (&H1B) + " ! " + CHR$ (&H08) + "H";
LPRINT CHR$ (&H1B) + " ! " + CHR$ (&H10) + "H";
LPRINT CHR$ (&H1B) + " ! " + CHR$ (&H20) + "H";
LPRINT CHR$ (&H1B) + " ! " + CHR$ (&H80) + "H";
LPRINT CHR$ (&H1B) + " ! " + CHR$ (&HB9) + "H";
LPRINT CHR$ (&HA);
```

[Print Results]



ESC % n

[Function] Specifying/Canceling Download Character Set

[Code] <1B>H<25>H<n>

[Range] {0 =< n =< FF} data is described in Hex code.

[Outline] Specifying/canceling download characters.

Further, only the lowest bit (n0) is valid for n.

The lowest bit (n0) indicates the following.

n0	Function
0	Canceling download character set
1	Specifying download character set

[Caution] Download characters and download bit images cannot be defined simultaneously.

[Default] n = 0

[See Also] ESC &

[Sample Program]

```
GOSUB SETCHR                          DATA  6
LPRINT CHR$ (&H1B) + "%" + CHR$ (0);  DATA  &HFF,  &H80,  &H00
LPRINT "@A" + CHR$ (&HA);             DATA  &H80,  &H80,  &H00
LPRINT CHR$ (&H1B) + "%" + CHR$ (1);  DATA  &H80,  &H80,  &H00
LPRINT "@A" + CHR$ (&HA);             DATA  &H80,  &H80,  &H00
END                                   DATA  &HFF,  &HFF,  &HFF
SETCHR:                               DATA  &HFF,  &HFF,  &HFF
LPRINT CHR$ (&H1B) + "&";             DATA  12
LPRINT CHR$ (3) + "@" + "A";          DATA  &HFF,  &HFF,  &HFF
FOR J=1 TO 2                          DATA  &H80,  &H07,  &HF9
READ REP                              DATA  &H80,  &HFF,  &HF9
LPRINT CHR$ (REP);                    DATA  &H87,  &HFE,  &H01
FOR I=1 TO REP*3                      DATA  &H9F,  &H06,  &H01
READ D                                DATA  &HF8,  &H06,  &H01
LPRINTCHR$ (D);                       DATA  &HF8,  &H06,  &H01
NEXT I                                DATA  &H9F,  &H06,  &H01
NEXT J                                DATA  &H87,  &HFE,  &H01
RETURN                                DATA  &H80,  &HFF,  &HF9
                                      DATA  &H80,  &H07,  &HF9
                                      DATA  &HFF,  &HFF,  &HFF
```

[Print Results]

@A ←—— Internal Character Set

 ←—— Download Character

ESC & s n m [a [p] s × a] m – n +1

[Function] Defining Download Character

[Code] <1B>H<26>H<s><n><m> [<a><p1><p2><ps×a>]m-n+1

[Range] {s = 03}
{20 (Hex) =< n =< m =< 7E (Hex)}
{0 =< a =< 0C(Hex)} (Font A)
{0 =< a =< 0A(Hex)} (Font B)

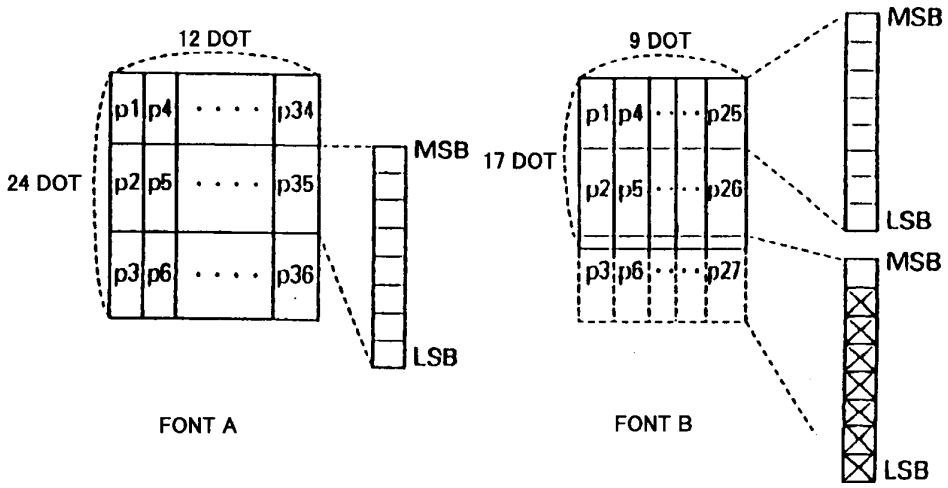
[Outline] Defines the font of download characters of alphanumeric characters.

- "s" indicates the number of bytes in vertical direction.
- "n" indicates the start character code and m the end character code. To define only one character, set n=m.
- Character codes definable includes 95 ASCII codes in total between <20>H ~<7E>H.
- "a" indicates the number of dots in horizontal direction for definition.
- "p" is the data to be defined, which indicate a pattern equal to "a" dot in horizontal direction from the left end. The rest of the pattern on the right side is filled with space.
  The rest of data to be defined is s x a.
- Download characters thus defined remain valid until redefinition, ESC @ execution, GS * execution, or power OFF is practiced.

[Caution] Download characters and download bit images c an not be defined simultaneously.
Running this command clears the definition of the download bit image.

[Default] Same as the internal character set

[Example]



Create each data bit by setting "1" for a printed dot and "0" for an unprinted dot.

[Sample Program] [Print Results]

See Sample Program and Print Results for ESC % on Page 37.

ESC * m n1 n2 [d] k

[Function] Specifying the Bit Image Mode

[Code] <1B>H<2A>H<m><n1><n2> [<d>] k

[Range] {m= 0, 1, 32, 33 bit image mode (See the table below.)}

{0 =< n1 =< FF(Hex)}

{0 =< n2 =< 03(Hex)}

{0 =< d =< FF(Hex)}

{k = n1 + FF(Hex) × n2 (m = 0, 1)

{k = (n1+ FF(Hex) × n2) × 3} (m = 32, 33)

[Outline] According to the number of dots specified in n1, n2, specify the bit image of mode n.

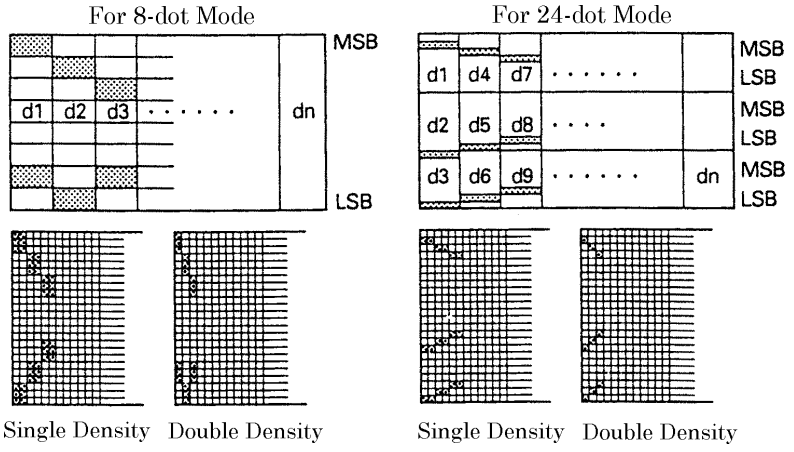
- The No. of dots printed is divided by 256, whose quotient is taken as n2 and residual as n1.
- The total no. of dots printed in the bit image is equal to n1 + (256 x n2).
- When bit image data have been input in excess of dot position of one line (448 d ots) , the excess data are discarded.
- d is bit image data, the bits subject to printing are taken as "1" and those not as "0".
- The bit image modes specified by m are shown as follows:

m(Hex)	Mode	Vertical Direction		Horizontal Direction	
		No. of Dots	Dot Density	Dot Density	Max. No. of Dots
0	8-dot single density	8	67 DPI	101 DPI	192
1	8-dot double density	8	67 DPI	203 DPI	384
32	24-dot single density	24	203 DPI	101 DPI	192
33	24-dot double density	24	203 DPI	203 DPI	384

[Caution]

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

[Example]

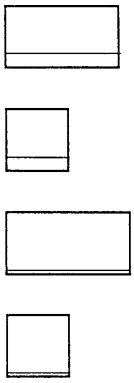


[Sample Program]

```
LPRINT CHR$ (&H1B) + "*";
LPRINT CHR$ (0) + CHR$ (20) + CHR$ (0);
GOSUB IMG1
LPRINT CHR$ (&HA);
LPRINT CHR$ (&H1B) + "*";
LPRINT CHR$ (1) + CHR$ (20) + CHR$ (0);
GOSUB IMG1
LPRINT CHR$ (&HA);
LPRINT CHR$ (&H1B) + "*";
LPRINT CHR$ (32) + CHR$ (20) + CHR$ (0);
GOSUB IMG2
LPRINT CHR$ (&HA);
LPRINT CHR$ (&H1B) + "*";
LPRINT CHR$ (33) + CHR$ (20) + CHR$ (0);
GOSUB IMG2
LPRINT CHR& (&HA);
END
```

```
IMG1 :
LPRINT CHR$ (&HFF) ;
FOR I=1 TO 18
LPRINT CHR$ (&H85) ;
NEXT I
LPRINT CHR$ (&HFF) ;
RETURN
IMG2 ;
LPRINT  CHR$ (&HFF) ;
LPRINT CHR$ (&HFF) ;
LPRINT  CHR$ (&HFF) ;
FOR I=1 TO 18
LPRINTCHR$ (&H80) ;
LPRINTCHR$ (&H00) ;
LPRINTCHR$ (&H05) ;
NEXT I
LPRINT CHR$ (&HFF) ;
LPRINT CHR$ (&HFF) ;
LPRINT CHR$ (&HFF) ;
RETURN
```

[Print Results]



ESC – n

[Function] Specifying/ Canceling Underline

[Code] <1B>H<2D>H<n>

[Range] {0 =< n =< 02} data is described in Hex code.

[Outline] Specifying/canceling an underline.

- Types of underlines by n value are shown below:

n (Hex)	Type
0	Canceling an underline.
1	Specifying an underline for 1-dot width.
2	Specifying an underline for 2-dots width.

[Caution]

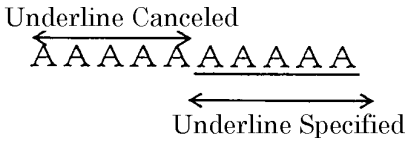
- An underline is attached to the full character width. It is, however, not attached to the part having been skipped by horizontal tab command.
- An underline is not attached to a 90 °- right-turned characters.
- Specification/cancellation with this command is invalid to Kanji.

[See Also] ESC !, FS –

[Sample Program]

```
LPRINT CHR$ (&H1B) + "–" + CHR$ (0);
LPRINT "AAAAA" ;
LPRINT CHR$ (&H1B) + "–" + CHR$ (1);
LPRINT "AAAAA" + CHR$ (&HA);
```

[Print Results]



ESC 2

[Function] Specifying 1/6-inch line feed rate

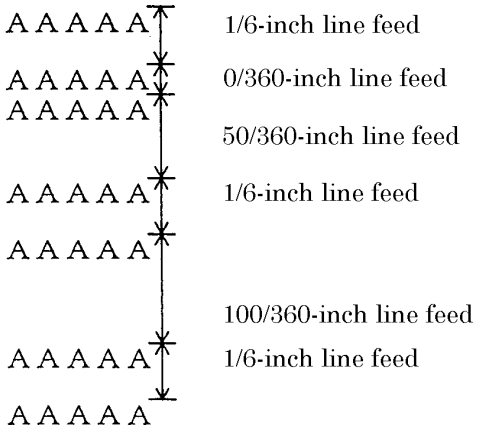
[Code] <1B>H<32>H

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

[Sample Program]

```
LPRINT "AAAAA" + CHR$ (&HA);
LPRINT CHR$ (&H1B) + "3" + CHR$ (0);
LPRINT "AAAAA" + CHR$ (&HA);
LPRINT CHR$ (&H1B) + "3" + CHR$ (50);
LPRINT "AAAAA" + CHR$ (&HA);
LPRINT CHR$ (&H1B) + "2";
LPRINT "AAAAA" + CHR$ (&HA);
LPRINT "AAAAA";
LPRINT CHR$ (&H1B) + "J" + CHR$ (100);
LPRINT "AAAAA" + CHR$ (&HA);
LPRINT "AAAAA" + CHR$ (&HA);
```

[Print Results]



ESC 3 n

[Function] Setting line feed rate of minimum pitch

[Code] <1B>H<33>H<n>

[Range] {0 =< n =< FF} Data is described in Hex code.

[Outline] The line feed rate per line is specified by n/360 inch.
Since an actual mechanical pitch is 1/203 inch, it is internally converted approximate to the value specified with this command.

[Default]
- The initial value is n = 60 (1/6 inch) (18H), being 4.23 mm line feed rate.

[Sample Program] [Print Results]

See Sample Program and Print Results for ESC 2 on Page 43.

ESC = n

[Function] Data Input Control

[Code] <1B>H<3D>H<n>

[Range] {0 =< n =< FF} Data is described in Hex code.

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

- Each bit of n indicates as follows:

Bit	Equipment	Value	
		0	1
0	Printer	Invalid	Valid
1	Not defined		
2	Not defined		
3	Not defined		
4	Not defined		
5	Not defined		
6	Not defined		
7	Not defined		

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

[Caution]
- Even when the printer has not been selected, it can become BUSY state through printer operation.
- When the printer is deselected, this printer discards all the data until it is selected with this command.

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

[Sample Program]

```
LPRINT "AAAAA";
LPRINT CHR$ (&H1B) + "=" + CHR$ (0);
LPRINT "aaaaa" + CHR$ (&HA);
LPRINT CHR$ (&H1B) + "=" + CHR$ (1);
LPRINT "AAAAA" + CHR$ (&HA);
```

[Print Results]

```
A A A A A A A A A A
      ↑
  a a a a a  is not printed
```

ESC @

[Function] Initializing the Printer

[Code] <1B>H<40>H

[Range] Clears data stored in the print buffer and brings various settings to the initial state (Default state).

[Caution]
- Data inside the internal input buffer are not cleared.
- Dip switches setting are red once again.

[Sample Program]

```
LPRINT CHR$ (&H1B) + " ! " + CHR$ (&H30) ;
LPRINT CHR$ (&H1B) + "V" + CHR$ (1);
LPRINT "AAA" + CHR$ (&HA);
LPRINT CHR$ (&H1B) + "@";
LPRINT "AAA" + CHR$ (&HA);
```

[Print Results]

ESC D [n] k NUL

[Function] Setting Horizontal Tab Position

[Code] <1B>H<44>H [<n>] k<00>H

[Range] {0 =< n =< FFH} Data is described in Hex code.
{0 =< k =< 20H} Data is described in Hex code .

[Outline] Specifying a horizontal tab position.

- "n" indicates the no. of columns from the beginning to the horizontal tab position. At this time, n= set position − 1 is to be specified. For example, to set the position at 9th column, n=8 is to be specified.
- k denotes the number of horizontal tab positions you want to set.
- The tab position is set at position where it is "character width x n" from the line beginning. The character width, at this time, includes the rightward space amount. In double wide characters, it is made double of the ordinary case.
- Tab positions can be specified are maximum 32. Specifying exceeding this is ignored.
- <n> k, which denotes a setting position, is input in the increasing order and ends at <00> H.
- ESC D NUL clears all the set tab positions. Following clearing, horizontal tab command is ignored.

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

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

[See Also] HT

[Sample Program] [Print Results]

See Sample Program and Print Results for HT on Page 31.

ESC E n

[Function] Specifying/canceling highlighting

[Code] <1B>H<45>H<n>

[Range] {0 =< n =<FF} Data is described in Hex code.

[Outline] Specifying/canceling the highlighting characters.

- "n" is valid only for the lowest bit (n0).
- Control by the lowest bit (n0) is shown as follows:

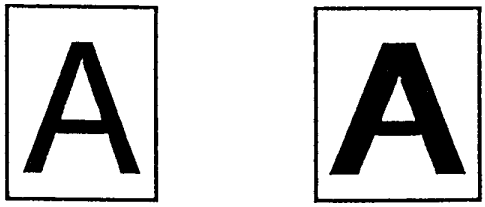
n0	Type
0	Canceling highlighting.
1	Specifying highlighting.

- This is effective to all characters.
- Dot configuration of a highlighted character includes one extra dot added at its side.

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

[See Also] ESC !

[Example]



[Sample Program]

```
LPRINT CHR$ (&H1B) + "E" + CHR$ (0);
LPRINT "AAABBB" + CHR$ (&HA);
LPRINT CHR$ (&H1B) + "E" + CHR$ (1);
LPRINT "AAABBB" + CHR$ (&HA);
```

[Print Results]

AAABBB ← Highlighting canceled

AAABBB ← Highlighting canceled

ESC G n

[Function] Specifying/canceling Double Printing (ESC G n)

[Code] <1B>H<47>H<n>

[Range] {0 =< n =< FF} Data is described in Hex code.

[Outline] Specifying/canceling the double printing.

- "n" is valid only for the lowest bit (n0).
- Control by n is shown as follows.

n0	Type
0	Canceling double printing.
1	Specifying double printing.

- This is effective to all characters.

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

[See Also] ESC E

[Sample Program]

```
LPRINT CHR$ (&H1B) + "G" + CHR$ (0);
LPRINT "AAABBB" + CHR$ (&HA);
LPRINT CHR$ (&H1B) + "G" + CHR$ (1);
LPRINT "AAABBB" + CHR$ (&HA);
```

[Print Results]

AAABBB ← Highlighting canceled

AAABBB ← Highlighting canceled

ESC J n

[Function] Printing and feeding paper n/203 inch

[Code] <1B>H<4A>H<n>

[Range] {0 =< n =< FF} Data is described in Hex code.

[Outline] Prints data inside the print buffer and feeds paper by n/360 inch. Since an actual mechanical pitch is 1/203 inch, it is internally converted approximate to the value specified with this command.

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

[Sample Program] [Print Results]

See Sample Program and Print Results for ESC 2 on Page 43.

ESC R n

[Function] Selecting the International Character set

[Code] <1B>H<52>H<n>

[Range] {0 =< n =< 0A) Data is described in Hex code.

[Outline] Depending on the value of n, following character sets are specified.

n(Hex)	Character Set
0	U.S.A.
1	France
2	Germany
3	U.K.
4	DenmarkI
5	Sweden
6	Italy
7	Spain
8	Japan
9	Norway
A	DenmarkII

[Default] • The initial value of n indicates the character set specified by Jumper (J1~J3).

[See Also] Character Code Table (International Character Set)

[Sample Program]

```
FOR I=0 TO 10
LPRINT CHR$ (&H1B) + "R" + CHR$ (I);
LPRINT " #$@[¥]^";
LPRINT CHR$ (&H60) + "{¥} ~";
LPRINT "n=" + STR$ (I);
LPRINT CHR$ (&HA);
NEXT I
```

[Print Results]

```
#$@[\]^`{|}~  n = 0
#$à°ç§^`éùè¨  n = 1
#$§ÄÖÜ^`äöüß  n = 2
£$@[\]^`{|}~  n = 3
#$@ÆØÅ^`æøå~  n = 4
#¤ÉÄÖÅÜéäöåü  n = 5
#$@°\é^ùàòèì  n = 6
₧$@¡Ñ¿^`¨ñ}~  n = 7
#$@[¥]^`{|}~  n = 8
#¤ÉÆØÅÜéæøåü  n = 9
#$ÉÆØÅÜéæøåü  n = 10
```

ESC V n

[Function] Specifying/Canceling 90°-right- turned Characters

[Code] <1B>H<56>H<n>

[Range] {0 =< n =< 1} Data is described in Hex code.

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

- "n" means the followings.

n (Hex)	Condition
0	Canceling 90°-right- turned Characters
1	Specifying 90°-right- turned Characters

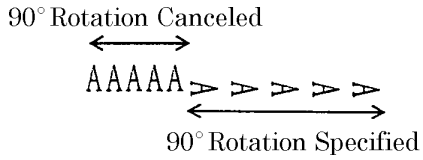
[Caution] • No underlines are attached to 90°-right- turned characters.

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

[Sample Program]

```
LPRINT CHR$ (&H1B) + "V" + CHR$ (0);
LPRINT "AAAAA";
LPRINT CHR$ (&H1B) + "V" + CHR$ (1);
LPRINT "AAAAA" + CHR$ (&HA);
```

[Print Results]



ESC a n

[Function] Aligning the characters

[Code] <1B>H<61>H<n>

[Range] {0 =< n =< 2} Data is described in Hex code.

[Outline] All the printed data within one line are aligned in the specified position.

- Depending on n value, positional alignment is carried out as in the table below:

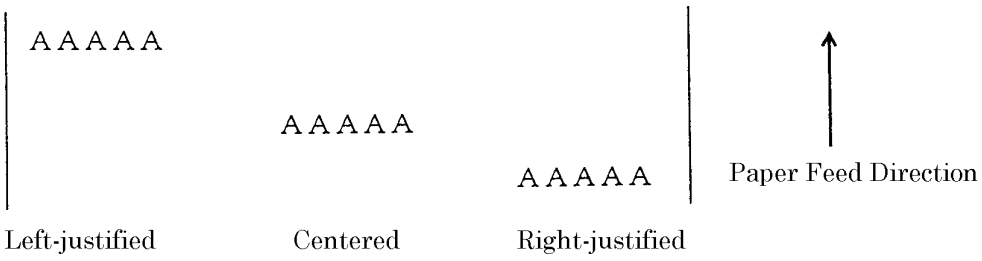
n (Hex)	Position
0	Left end alignment
1	Centering
2	Right end alignment

[Caution]
- This is valid only when n is inputted at the beginning of line.
- The initial value of n is "0".

[Sample Program]

```
LPRINT CHR$ (&H1B) + "a" + CHR$ (0);
LPRINT "AAAAA" + CHR$ (&HA);
LPRINT CHR$ (&H1B) + "a" + CHR$ (1);
LPRINT "AAAAA" + CHR$ (&HA);
LPRINT CHR$ (&H1B) + "a" + CHR$ (2);
LPRINT "AAAAA" + CHR$ (&HA);
```

[Print Results]



ESC c5 n

[Function] Enabling/Disabling Panel Switches

[Code] <1B>H<63>H<35>H<n>

[Range] {0 =< n =< FF} Data is described in Hex code.

[Outline] Selecting the LF switch valid/invalid.

- "n" is valid only in the lowest bit (n0).
- "n" bit means the followings.

n0	Condition
0	LFSW valid.
1	LFSW invalid.

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

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

[Sample Program]

```
LPRINT CHR$ (&H1B) + "c5" + CHR$ (0); ……When enabling the LF switch
LPRINT CHR$ (&H1B) + "c5" + CHR$ (1); ……When disabling the LF switch
```

ESC d n

[Function] Printing and Feeding the paper by n lines

[Code] <1B>H<64>H<n>

[Range] * {0 =< n =< FF} Data is described in Hex code.

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

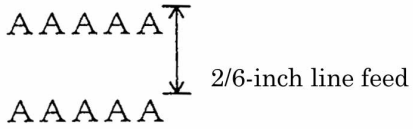
- Specified line does not remain.
- The beginning of the line is to be considered as the next printing start position.

[Default] • The initial value is not defined.

[Sample Program]

```
LPRINT "AAAAA"
LPRINT CHR$ (&H1B) + "d" + CHR$ (2);
LPRINT "AAAAA" + CHR$ (&HA);
```

[Print Results]



ESC i (When Using Auto Paper Cutter)

[Function] Full Cut

[Code] <1B>H<69>H

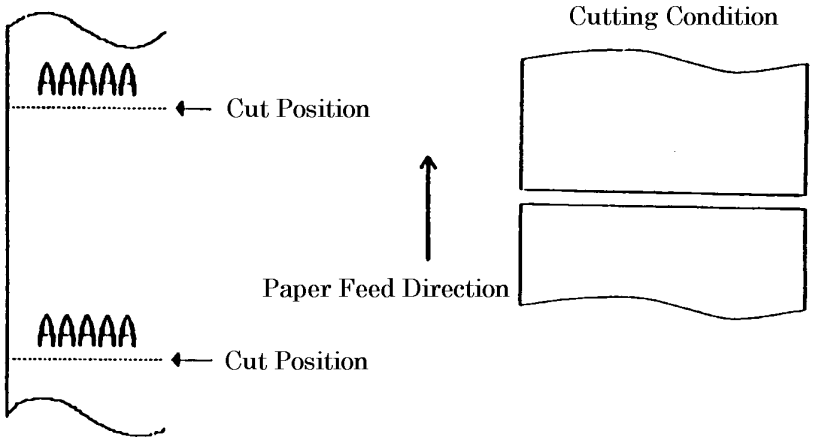
[Outline] Activating auto cutter unit (Full cut)

[Caution]
- This is valid only when n is inputted at the beginning of line.
- Prior to cutting the paper, feed the paper from the printing position to beyond the paper cutting position of the cutter. Otherwise, the character just after print will remain on this side of the cutter.

[Sample Program]

```
LPRINT "AAAAA";
LPRINT CHR$ (&H1B) + "J";
LPRINT CHR$ (150);
LPRINT CHR$ (&H1B) + "i";
LPRINT "AAAAA";
LPRINT CHR$ (&H1B) + "J";
LPRINT CHR$ (150);
LPRINT CHR$ (&H1B) + "i";
```

[Print Results]



ESC m (When Using Auto Paper Cutter)

[Function] Partial Cut

[Code] <1B>H<6D>H

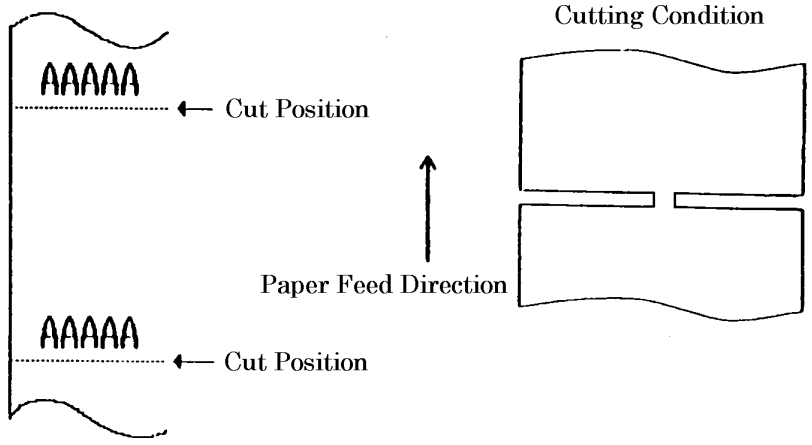
[Outline] Activating auto cutter unit (Partial cut)

[Caution]
- This is valid only when n is inputted at the beginning of line.
- Prior to cutting the paper, feed the paper from the printing position to beyond the paper cutting position of the cutter. Otherwise, the character just after print will remain on th is side of the cutter.

[Sample Program]

```
LPRINT "AAAAA";
LPRINT CHR$ (&H1B) + "J";
LPRINT CHR$ (150);
LPRINT CHR$ (&H1B) + "m";
LPRINT "AAAAA";
LPRINT CHR$ (&H1B) + "J";
LPRINT CHR$ (150);
LPRINT CHR$ (&H1B) + "m";
```

[Print Results]



ESC t n

[Function] Selecting Character Code Table

[Code] <1B>H<74>H<n>

[Range] {0 =< n =< 1} Data is described in Hex code.

[Outline] Selecting Page n on the character code table:
The character code table is selected depending on the value of n.
"n" means the followings.

n (Hex)	Condition
0	Page0(IBM Character #2)
1	Page1(Domestic Character)

[Default] The initial value of n is subject to the character set for the country specified by the Jumper(J1~J3).

- When Japan is selected: Domestic characters
- When non-Japan is selected: IBM characters #2

[See Also] Character Code Table

[Sample Program]

```
LPRINT CHR$ (&H1B) + "t" + CHR$ (0);
LPRINT " n=0       “;
FOR C=&HB1 TO &HB5
LPRINT CHR$ (C);
NEXT C
LPRINT CHR$ (&HA);
LPRINT CHR$ (&H1B) + "t" + CHR$ (1);
LPRINT " n=1       “;
FOR C=&HB1 TO &HB5
LPRINT CHR$ (C);
NEXT C
LPRINT CHR$ (&HA);
```

[Print Results]

n = 0 ｱｲｳｴｵ ← Page 0
n = 1 ｱｲｳｴｵ ← Page 1

ESC v (Serial Interface Only)

[Function] Transmitting the printer status (Serial Type)

[Code] <1B>H<76>H

[Outline] Current printer status is transmitted.

[Caution]
- Status sent out consists of 1 byte whose content is as in the table below.
- In DTR/DSR control, after revertible state of the host (DSR signal being in SPACE state) is confirmed, only 1 byte is transmitted. In XON/XOFF control, DSR signal state not being confirmed, only 1 byte is transmitted.
- In DTR/DSR control, when the host is in unrespectable state (DSR signal being in MARK state), it waits until receptacle state is created.
- In paper end (paper near end) status, this command may be unrespectable state due to BUSY state.

Remarks. This command is valid only for serial interface model.

Bit	Function	Value	
		0	1
0	Not defined		
1	Not defined		
2	Paper end	With paper	Without paper
3	Not defined		
4	Not used	Fixed to 0	–
5	Not defined		
6	Not defined		
7	Not defined		

[Sample Program]

```
OPEN "COM1: N81NN" AS #1;
PRINT #1, CHR$ (&H1B) + "v";
A$ = INPUT$ (1, #1);
CLOSE #1
```

ESC { n

[Function] Specifying/Canceling the Inverted Characters

[Code] <1B>H<7B>H<n>

[Range] {0 =< n =< FF} Data is described in Hex code.

[Outline] Specifying/canceling inverted characters.

- "n" is valid only for the lowest bit (n0).
- Bit n (n0) means the followings.

n0	Condition
0	Canceling inverted characters.
1	Specifying inverted characters.

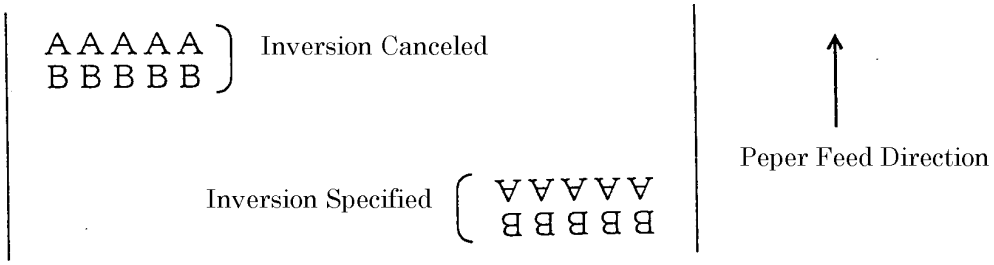
[Caution]
- Inverted-printing means printing the line at 180°turned.
- This is valid only when this is specified at the beginning of a line.

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

[Sample Program]

```
LPRINT CHR$ (&H1B) + "{" + CHR$ (0);
LPRINT "AAAAA" + CHR$ (&HA);
LPRINT "BBBBB" + CHR$ (&HA);
LPRINT CHR$ (&H1B) + "{" + CHR$ (1);
LPRINT "AAAAA" + CHR$ (&HA);
LPRINT "BBBBB" + CHR$ (&HA);
```

[Print Results]



ESC $ n1 n2

[Function] Specifying the Absolute Positions

[Code] <1B>H<24>H<n1><n2>

[Range] {0 =< n1 =< FF}
{0 =< n2 =< 1} Data is described in Hex code.

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

- The number of dots is divided by 256, whose quotient is taken as n2 and the residual as n1.
- Therefore, the printing start position is equal to n1+n2 x 256 from the beginning of line.

[Caution]
- Specifying beyond the line end is ignored.

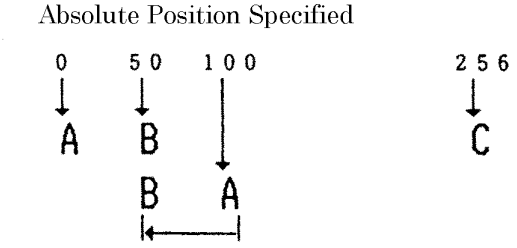
[Default]
- The initial value is not specified.

[See Also] ESC \

[Sample Program]

```
LPRINT CHR$ (&H1B) + "$";
LPRINT CHR$ (0) + CHR$ (0) + "A";
LPRINT CHR$ (&H1B) + "$";
LPRINT CHR$ (50) + CHR$ (0) + "B";
LPRINT CHR$ (&H1B) + "$";
LPRINT CHR$ (0) + CHR$ (1) + "C";
LPRINT CHR$ (&HA);
LPRINT CHR$ (&H1B) + "$";
LPRINT CHR$ (100) + CHR$ (0) + "A";
LPRINT CHR$ (&H1B) + "¥";
LPRINT CHR$ (&HC2) + CHR$ (&HFF) + "B";
LPRINT CHR$ (&HA);
```

[Print Results]



ESC ¥ n1 n2

[Function] Specifying the Relative Positions

[Code] <1B>H<5C>H<n1>< n2>

[Range] {0 =< n1 =< FF}
{0 =< n2 =< FF} Data is described in Hex code.

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

- Rightward direction is taken as plus and leftward direction as minus.
- To specify N dot in minus (left) direction, use a complement of N for assignment.
  –N dots = 65536 – N
- The number of dots is divided by 256, whose quotient is taken as n2 and the residual as n1.

[Caution]
- Specifying exceeding the top of line or the end of line is ignored.

[Default]
- The initial value is not specified.

[See Also] ESC $

[Sample Program] [Print Results]

See Sample Program and Print Results for ESC $ on Page 61.

GS k n [d] k NUL

[Function] Printing the Bar Code

[Code] <1D>H<6B>H<n> [< d>] k <00>H

[Range] {0 =< n =< 7} Data are described in Hex code.

[Outline] Specifying a type of bar code and printing bar codes.

- The beginning of line is considered as the next printing start position.
- Depending on the value of n, the following bar code can be selected.
  d indicates a character code to be printed and k indicates the number of character to be printed.

n (Hex)	Bar Code System	Maximum Columns
0	UPC-A	---
1	UPC-E	---
2	JAN13 (EAN)	---
3	JAN 8 (EAN)	---
4	CODE 39	13
5	ITF	22
6	CODABAR (NW-7)	17
7	CODE 128	15

[Caution]

- When data being held in the print buffer, this command is ignored.
- Regardless of the specified feed pitch, this command feeds the paper to be required to print a bar code.
- If the character code d cannot be printed in the respective bar code system, the bar code so far will be printed, processing the subsequent data as normal data.
- When a bar code whose number of characters to be printed is fixed has been selected, the number of characters k have to be always made equal to the number of characters to be printed. (The bar code is not printed when not matching.)
- When the horizontal direction exceeds one line length, the excess part is not printed.

[Default]

- The initial value is not specified.

[Description of Bar Codes] <For print examples, see Page 66. >

UPC-A This bar code, consisting of numerals only, has a fixed length of 12 column; a 11-columns number entered from the host or application software plus a check column(12th column) automatically calculated inside the printer. If the 12th-column numeral is sent from the host, the entire bar code will be printed as it is.

UPC-E This bar code, consisting of numerals only, has a fixed length of 8 column; the first number system character is "0" stationary. A 12-column numeral entered from the host or application software is compressed to 8 columns with a check column and printed. The 12th-column check column is automatically calculated inside the printer and sent from the host, the entire bar code will be printed, compressed to 8 columns.

JAN-13(EAN) This bar code, consisting of numerals only, has a fixed length of 13 column; a 12-column number entered from the host or application software plus a check column(13th column) automatically calculated inside the printer. If the 13th-column numeral is sent from the host, the entire bar code will be printed as it is.

JAN-8(EAN) This bar code, consisting of numerals only, has a fixed length of 8 column; a 7-column number entered from the host or application software plus a check column(8th column) automatically calculated inside the printer. If the 8th-column numeral is sent from the host, the entire bar code will be printed as it is.

CODE39 This bar code, consisting of uppercase alphabets and numerals, has a variable length of column. A start/stop code "*" is automatically added by the printer. Available characters include a space and "$, %, +, -, · , /, 0, 1, 2, 3, 4, 5, 6, 7, 8, 9," and uppercase alphabets.

ITF This bar code, consisting of numerals only, has a variable length of even column. If an odd-column code is transferred, nothing will be printed.

CODABAR (NW-7)

This bar code, consisting of alpha numerals, has a variable length of column. Available characters include "0, 1, 2, 3, 4, 5, 6, 7, 8, 9, A, B, D, D, $, +, -,., /, :." A start/stop code is required; any one of A, B, C, and D is used.

CODE128

- This bar code consists of all of 128 ASCII code characters and has a variable length of column. This printer supports the code subsets A, B, and C. By prefixing a transfer code with any one character of A, B, and C, you can select the code subset to start from. If not prefixed with A, B, or C, the code subset B will be selected.
- The code subset A is the bar code consisting of standard uppercase alphabets, numerals, symbols, and special codes.
- The code subset B is the bar code consisting of standard uppercase/lowercase alphabets, numerals, symbols, control codes, and special codes.
- The code subset C is the bar code consisting of special characters and 100 kinds of numbers ranging from 00 to 99.
- The check column automatically calculated inside the printer is added to the end of the entered column to be printed.

• Processing of the special characters
The characters above the ASCII code number 96 are considered special characters. The following lists the converted characters for entering these characters.

ASCII Code	Converted Character	Subset Code	Subset Code B	Subset Code C
96	80h	FNC 3	FNC 3	-N/A-
97	81h	FNC 2	FNC 2	-N/A-
98	82h	SHIFT	SHIFT	-N/A-
99	83h	CODE C	CODE C	-N/A-
100	84h	CODE B	FNC 4	CODE B
101	85h	FNC 4	CODE A	CODE A
102	86h	FNC 1	FNC 1	FNC 1

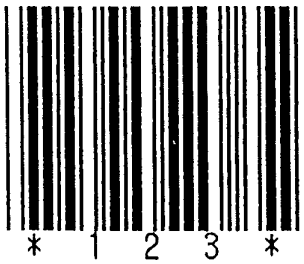
The following exemplifies a selection of the code subset as a method to utilize the special characters.

<Selection of Code Subset>
• Initial selection: Enter any one character of A, B, and C.
• Conversion on the way: Enter any one character of 82h through 85h
Example) When initially testing with the code subset B, and then, printing the bar code, "123," with the code subset A
• Input code : B TEST <85> 123
• Bar code data : <CODE B>TEST<CODE A>123

[Sample Program]

```
LPRINT CHR$ (&H1D) + "H" + CHR$ (2);
LPRINT CHR$ (&H1D) + "k";
LPRINT CHR$ (4);
LPRINT "123" + CHR$ (0);
```

[Print Results]



When the data "123" is printed with the code 39

[Description of Bar Codes]

UPC-A, UPC-E, JAN-13 (EAN), JAN-8 (EAN), CODE39, ITF, CODABAR, CODE128

Type	Print Sample	Outline of Symbol	Max. column
UPC-A		12-column fixed-length bar code consisting of numerals only	–
UPC-E		8-column fixed-length bar code consisting of numerals only. Abbreviated version of UPC-A	–
JAN-13		13-column fixed-length bar code consisting of numerals only	–
JAN-8		8-column fixed-length bar code consisting of numerals only	–
CODE39		Variable-length bar code consisting of alphabets and numerals. The start/stop code "*" is automatically added.	13
ITF		Even-column variable-length bar code consisting of numerals only	22
CODABAR (NW-7)		Variable-length bar code consisting of alpha numerals. Any one of A, B, C, and D is required as the start/stop code.	17
CODE128		Variable-length bar code consisting of all 128 ASCII code characters.	15

Printing is done depending on bar code specification type, number of print column, bar code height, width (Magnification), visible code presence, and bar code data specification.

GS w n

[Function] Selecting the horizontal size (Scale factor) of the Bar Code

[Code] <1D>H <77>H<n>

[Range] {2 =< n =< 4} Data is described in Hex code.

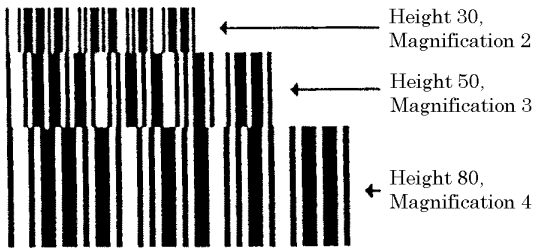
[Outline] Selecting bar code width.
n denotes the number of dots in fine element width.

[Default] • The initial value of this width is "3".

[Sample Program]

```
LPRINT CHR$ (&H1D) + "h" + CHR$ (30);
LPRINT CHR$ (&H1D) + "w" + CHR$ (2);
GOSUB BC
LPRINT CHR$ (&H1D) + "h" + CHR$ (50);
LPRINT CHR$ (&H1D) + "w" + CHR$ (3);
GOSUB BC
LPRINT CHR$ (&H1D) + "h" + CHR$ (80);
LPRINT CHR$ (&H1D) + "w" + CHR$ (4);
GOSUB BC
END
BC:
LPRINT CHR$ (&H1D) + "k";
LPRINT CHR$ (4);
LPRINT "12" + CHR$ (0);
RETURN
```

[Print Results]



GS h n

[Function] Selecting the height of the Bar Code

[Code] <1D>H<68>H<n>

[Range] {1 =< n =< FF} Data is described in Hex code.

[Outline] Selecting bar code height.
n denotes the number of dots in the vertical direction.

[Default] • The initial value of n is "162".

[Sample Program] [Print Results]

See Sample Program and Print Results for GS w on page 67.

GS H n

[Function] Selecting of Printing Position of HRI Code

[Code] <1D>H<48>H<n>

[Range] {0 =< n =< 3} Data is described in Hex code.

[Outline] Selecting printing position of HRI code in printing bar codes.

- "n" means the followings.

n (Hex)	Printing Position
0	No printing
1	Above the bar code
2	Below the bar code
3	Both above and below the bar code

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

[Caution] The HRI code is printed in the font selected with GS f. Specify before the GS k command.

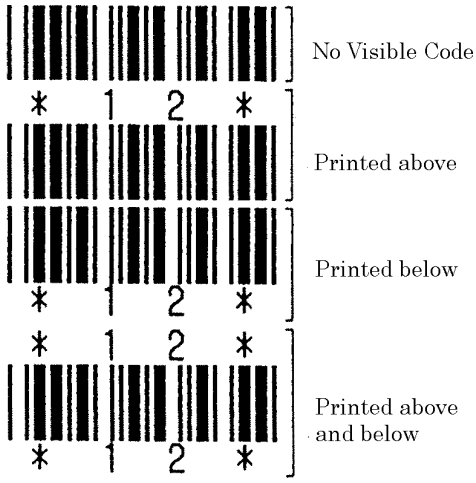
[Default] • The initial value of n is "0".

[See Also] GS f

[Sample Program]

```
LPRINT CHR$ (&H1B) + "3" + CHR$ (5);
LPRINT CHR$ (&H1D) + "h" + CHR$ (50);
LPRINT CHR$ (&H1D) + "H" + CHR$ (0);
GOSUB BC
LPRINT CHR$ (&H1D) + "H" + CHR$ (1);
GOSUB BC
LPRINT CHR$ (&H1D) + "H" + CHR$ (2);
GOSUB BC
LPRINT CHR$ (&H1D) + "H" + CHR$ (3);
GOSUB BC
END
BC:
LPRINT CHR$ (&H1D) + "k";
LPRINT CHR$ (4);
LPRINT "12" + CHR$ (0);
LPRINT CHR$ (&HA);
RETURN
```

[Print Results]



GS f n

[Function] Selecting the font of HRI code

[Code] <1D>H<66>H<n>

[Range] n = 0, 1

[Outline] Selecting the font of HRI code in printing bar code.
The type of font can be printed by selecting n is as follows.
The HRI code refers to the bar code-turned characters so that you can read them.

n	Font
0	Font A
1	Font B

[Caution] The HRI code is printed at the position specified with GS h on page 63.

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

[See Also] GS H

[Sample Program]

```
LPRINT CHR$ (&H1D) + "h" + CHR$ (50);
LPRINT CHR$ (&H1D) + "H" + CHR$ (2);
LPRINT CHR$ (&H1D) + "f" + CHR$ (0);
GOSUB BC
LPRINT CHR$ (&H1D) + "f" + CHR$ (1);
GOSUB BC
END
BC:
LPRINT CHR$ (&H1D) + "k";
LPRINT CHR$ (4);
LPRINT "123" + CHR$ (0);
LPRINT CHR$ (&HA);
RETURN
```

[Print Results]

GS * n1 n2 [d] n1 × n2 × 8

[Function] Defining the Download Bit Image

[Code] <1D>H<2A>H<n1><n2> [< d >] n1 × n2 × 8

[Range] {1 =< n1 =< FF}
{1 =< n2 =< 30}
{n1 × n2 =< 51F} Data is described in Hex code.

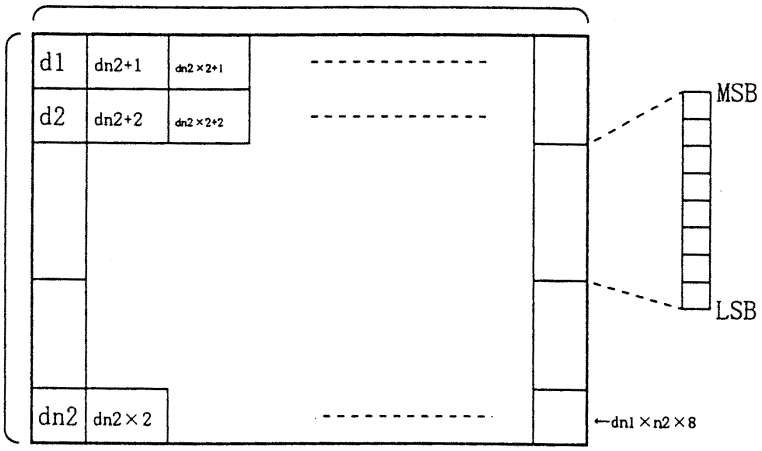
[Outline] Defines downloading bit images of the number of dots specified by n1/n2.

- The numbers of dots are n1 x 8 in horizontal direction and n2 x 8 in vertical direction.
- d indicates bit image data.
- The download bit image thus defined remains effective until redefinition, ESC @ execution, ESC &, or power OFF takes place.

[Caution]

- A download character and a download bit image can not be defined simultaneously. With this command executed, defined content of a download character is cleared.
- Relations between the bit image data and the dot defined are shown below:
- If a download bit image is defined with this command while it is being printed (GS /), printing operation may become unstable (fluctuating print pitch).

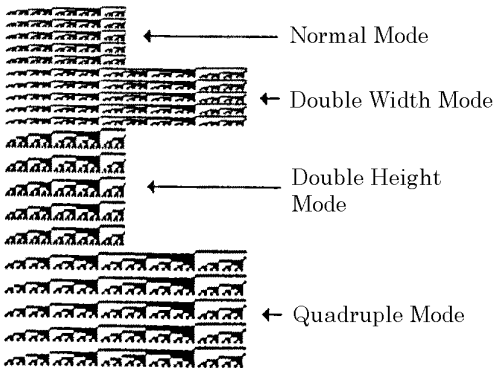
[See Also] GS /



[Sample Program]

```
GOSUB IMG
LPRINT CHR$ (&H1D) + "/" + CHR$ (0);
LPRINT CHR$ (&H1D) + "/" + CHR$ (1);
LPRINT CHR$ (&H1D) + "/" + CHR$ (2);
LPRINT CHR$ (&H1D) + "/" + CHR$ (3);
END
IMG:
n 1 = 10 : n 2= 5
LPRINT CHR$ (&H1D) + "*";
LPRINT CHR$ (n1) + CHR$ (n2);
FOR J=1 TO n1*8
FOR I=1 TO n2
LPRINT CHR$ (J);
NEXT I
NEXT J
RETURN
```

[Print Results]



GS / m

[Function] Printing the Download, Bit Image

[Code] <1D>H<2F>H<m>

[Range] {0 =< m =< 03} Data is described in Hex code.

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

- Modes can be selected by m are shown below.

m	Mode Name	Dot Density in Vertical Direction	Dot Density in Horizontal Direction
0	Normal mode	203 DPI	203 DPI
1	Double wide mode	203 DPI	101 DPI
2	Double high mode	101 DPI	203 DPI
3	Double wide/double high mode	101 DPI	101 DPI

[Caution]

- When data exist inside the print buffer, this command is ignored.
- When a download bit image has not been defined, this command is ignored.
- A portion of a download bit image exceeding one line length is not printed.
- A download character and a download bit image cannot be defined simultaneously.
- If a download bit image data is defined while it is being printed with this command, printing operation may become unstable (fluctuating print pitch).

[Default]

- The initial value is not specified.

[See Also] GS *

[Sample Program] [Print Results]

See Sample Program and Print Results for GS * on Page 71.

GS :

[Function] Starting / Ending Macro Definition

[Code] <1D>H<3A>H

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

[Caution] Maximum content available for macro definition is 2048 bytes.
A portion exceeding 2048 bytes is not defined.

- Even with ESC @ (initialization of the printer) having been executed, defined content is not cleared. Therefore, it is possible to include ESC @ into the content of macro definition.
- Normal printing operation is carried out even while in macro definition

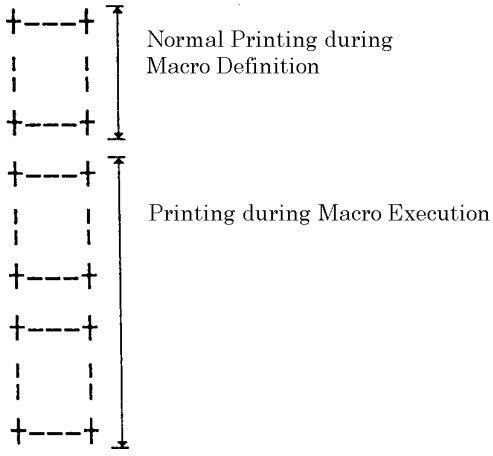
[Default] • Initially, Macro is not specified.

[See Also] GS ^

[Sample Program]

```
LPRINT CHR$ (&H1D) + ": " ;
LPRINT "+——+" + CHR$ (&HA);
LPRINT " |      | " + CHR$ (&HA);
LPRINT "+——+" + CHR$ (&HA);
LPRINT CHR$ (&H1D) + ": ";
LPRINT CHR$ (&H1D) + " ^ ";
LPRINT CHR$ (2) + CHR$ (10);
LPRINT CHR$ (0);
```

[Print Results]



GS ^ n1 n2 n3

[Function] Executing the Macro

[Code] <1D>H<5E>H<n1><n2><n3>

[Range] {0 =< n1 =< FF}

{0 =< n2 =< FF}
{0 =< 3 =< 1} Data is described in Hex code.

[Outline] Executing contents defined in macro.

- "n1~ n3" indicate as follows:

n1 : The number of times of macro execution

n2 : Waiting time on macro execution

Waiting time of n2 x 100msec is given for every execution.

n3 : Macro execution mode

n3	Mode
0	Continuous execution
1	Execution by LFSW

Continuous execution: The Macro is executed n1 times continuously at the time intervals specified by n2.

Execution by FEED S: After waiting for lapse of time specified by n2, the ALAME LED flickers and the LF switch is waited to be pressed. When it is pressed, the macro is executed once.
This action is repeated n1 times.

[Caution]
- When this command is received while in macro definition, suspension of macro definition is indicated. At this time, the defined content is cleared.
- No execution takes place when macro is held undefined or n1=0.
- While in macro execution with n3=1, paper feed with the LF SW is not available.

[Default]
- Initially, this command is not specified.

[See Also] GS :

[Sample Program] [Print Results]

See Sample Program and Print Results for GS : on Page 74.

DC2 A n

[Function] Selecting the Print drive system

[Code] <12>H<41>H<n>

[Range] {0 =< n =< FF}

[Outline] Selecting the Fixed division system or the Variable division system.

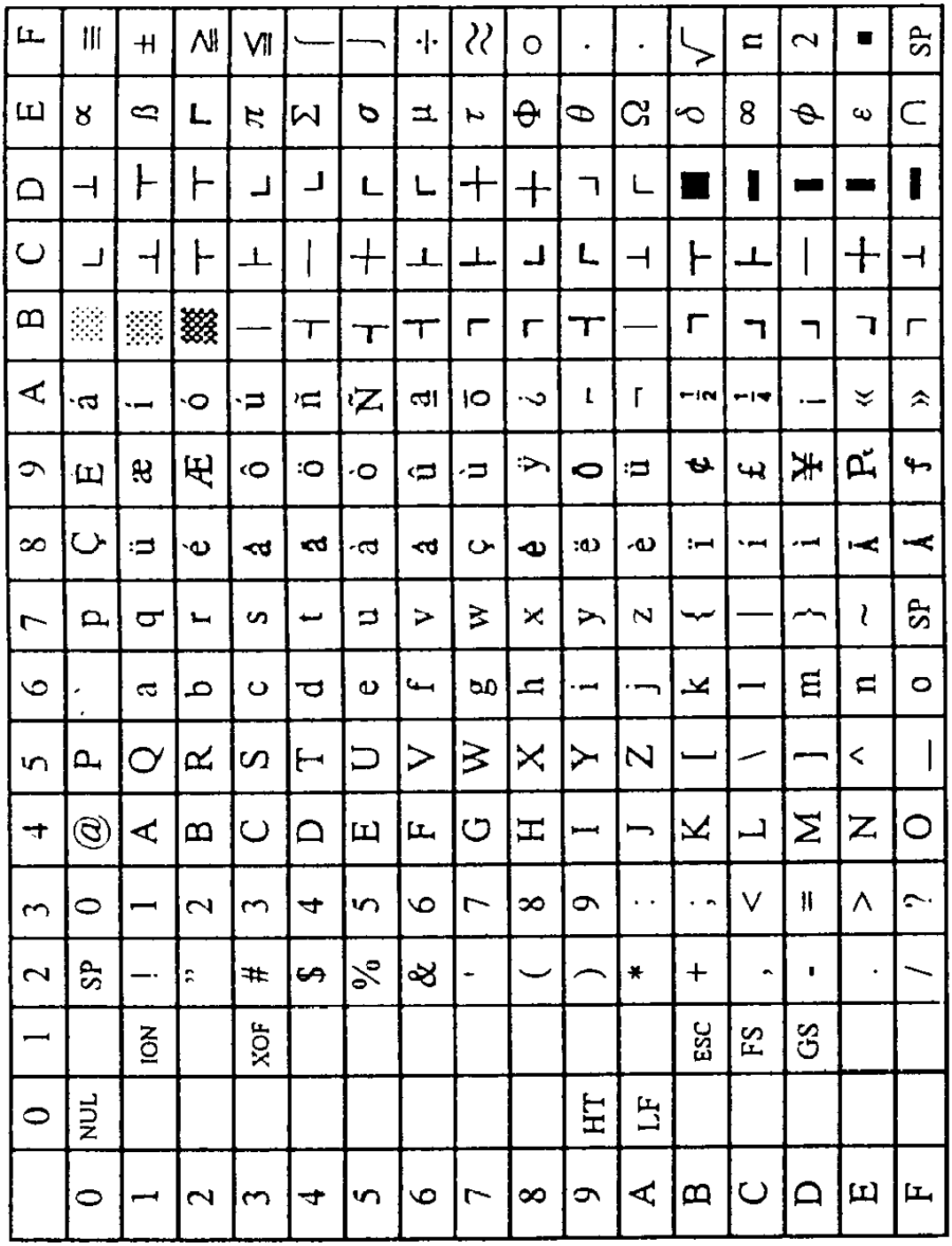
- "n" is valid only for the lowest bit (n0).

n0	Print Drive System
0	Fixed division number system
1	Variable division number system

[Default] The initial value of n is specified by Jumper (J5).

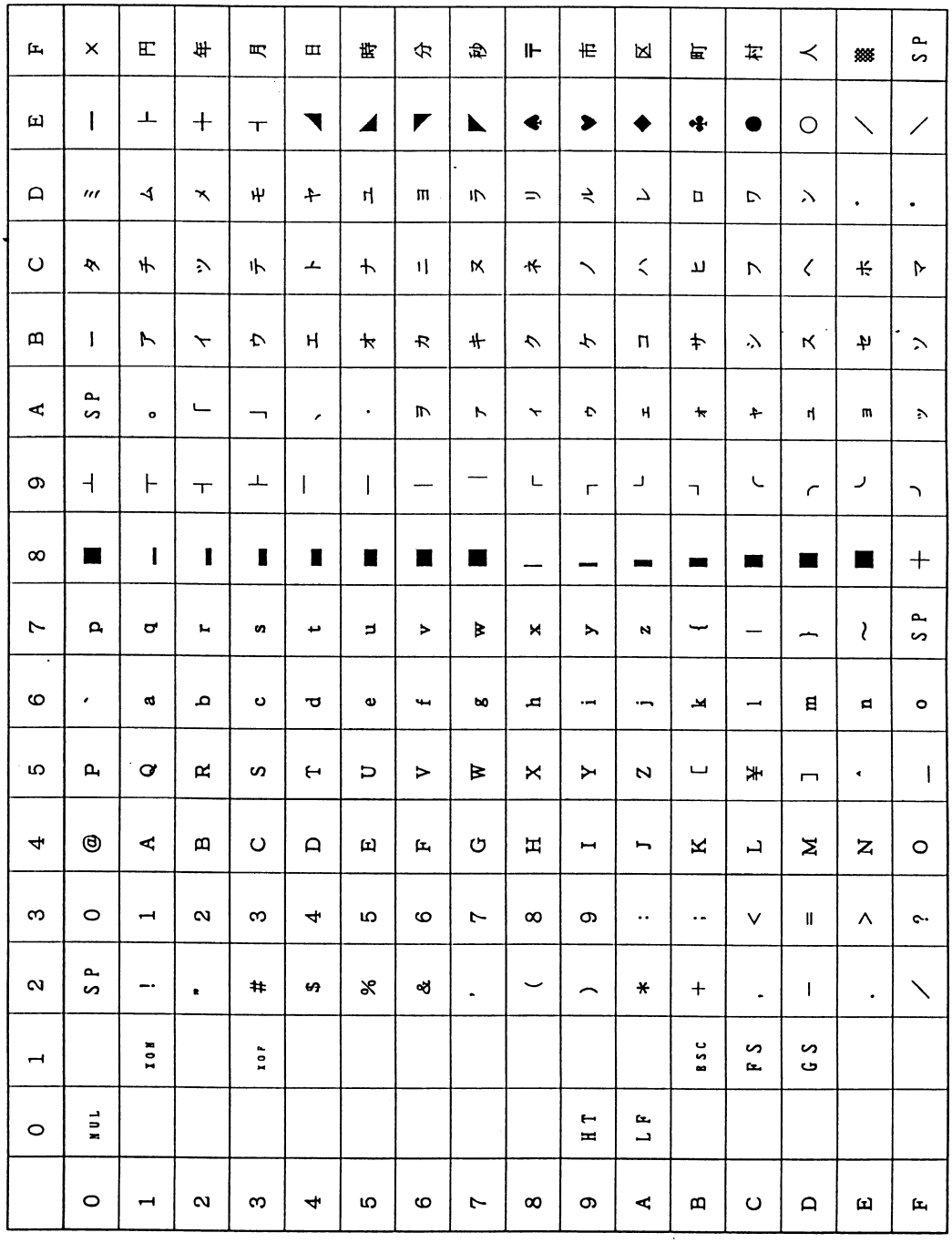
11. CHARACTER CODE TABLE

11.1 International



	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	NUL		SP	0	@	P	`	p	Ç	E	á	▒	└	┴	α	≡
1		ION	!	1	A	Q	a	q	ü	æ	í	▒	┴	┬	ß	±
2			"	2	B	R	b	r	é	Æ	ó	▓	┬	├	Γ	≥
3		XOF	#	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	HT		)	9	I	Y	i	y	ë	Ö	⌐	╣	┌	┘	θ	·
A	LF		*	:	J	Z	j	z	è	Ü	¬	║	┴	┌	Ω	·
B		ESC	+	;	K	[	k	{	ï	¢	½	╗	┬	┤	δ	√
C		FS	,	<	L	\	l	|	î	£	¼	╝	┬	├	∞	n
D		GS	-	=	M	]	m	}	ì	¥	¡	╜	┬	┤	φ	2
E			.	>	N	^	n	~	Ä	Pt	«	╛	┼	┤	ε	■
F			/	?	O	_	o	SP	Å	ƒ	»	┐	┴	┤	∩	SP

11.2 Japanese

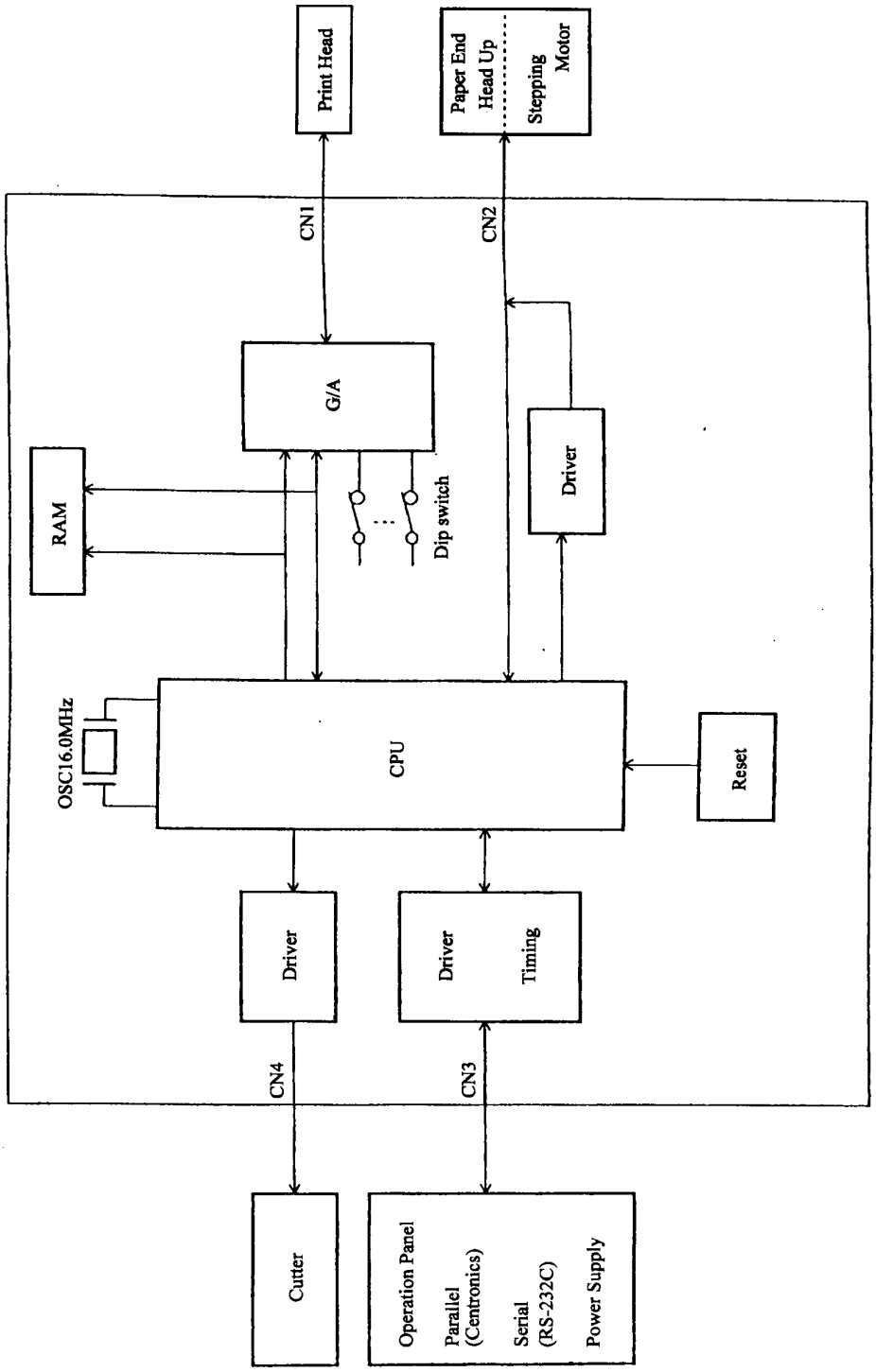


	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	NUL		SP	0	@	P	`	p	■	┴	SP	ー	タ	ミ	一	×
1		IOM	!	1	A	Q	a	q	ー	┬	。	ア	チ	ム	上	円
2			"	2	B	R	b	r	▬	┼	「	イ	ツ	メ	十	年
3		IOF	#	3	C	S	c	s	▬	┴	」	ウ	テ	モ	十	月
4			$	4	D	T	d	t	▮	─	、	エ	ト	ヤ	◢	日
5			%	5	E	U	e	u	■	─	・	オ	ナ	ユ	◢	時
6			&	6	F	V	f	v	■	─	ヲ	カ	ニ	ヨ	◤	分
7			'	7	G	W	g	w	■	─	ァ	キ	ヌ	ラ	◣	秒
8			(	8	H	X	h	x	▏	┌	ィ	ク	ネ	リ	◆	千
9	HT		)	9	I	Y	i	y	▌	┐	ゥ	ケ	ノ	ル	◆	市
A	LF		*	:	J	Z	j	z	▬	└	ェ	コ	ハ	レ	◆	区
B		BSC	+	;	K	[	k	{	▬	┘	ォ	サ	ヒ	ロ	♣	町
C		FS	,	<	L	¥	l	|	■	┌	ャ	シ	フ	ワ	●	村
D		GS	−	=	M	]	m	}	■	├	ュ	ス	ヘ	ン	○	人
E			.	>	N	^	n	~	■	┤	ョ	セ	ホ	゛	／	▒
F			／	?	O	_	o	SP	+	┘	ッ	ソ	マ	゜	＼	SP

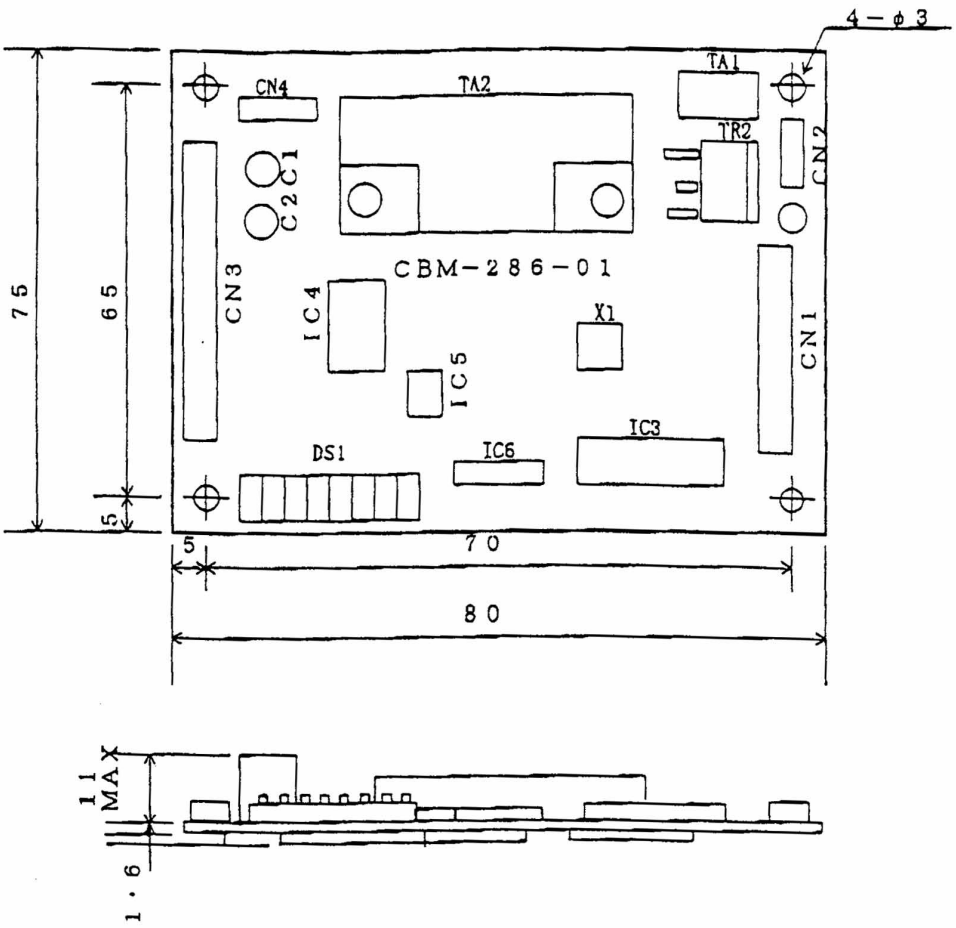
11.3 International Character Set

	国名	23	24	40	5B	5C	5D	5E	60	7B	7C	7D	7E
0	U.S.A.	#	$	@	[	\	]	^	`	{	|	}	~
1	France	#	$	à	°	Ç	§	^	`	é	ù	è	¨
2	Germany	#	$	§	Ä	Ö	Ü	^	`	ä	ö	ü	ß
3	U.K.	£	$	@	[	\	]	^	`	{	|	}	~
4	Denmark I	#	$	@	Æ	Ø	Å	^	`	æ	ø	å	~
5	Sweden	#	¤	É	Ä	Ö	Å	Ü	é	ä	ö	å	ü
6	Italy	#	$	@	°	\	é	^	ù	à	ò	è	ì
7	Spain	₧	$	@	¡	Ñ	¿	^	`	¨	ñ	}	~
8	Japan	#	$	@	[	¥	]	^	`	{	|	}	~
9	Norway	#	¤	É	Æ	Ø	Å	Ü	é	æ	ø	å	ü
10	Denmark II	#	$	É	Æ	Ø	Å	Ü	é	æ	ø	å	ü

APPENDIX 1. Block Diagram



APPENDIX 2. Outer Dimension



UNIT = mm