A1. COORDINATES SYSTEM

The PPLA coordinates system is depicted in Figure A1-1.

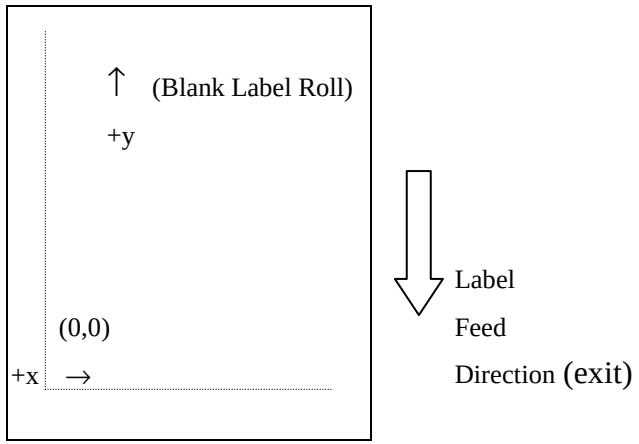


Fig. A1-1 PPLA coordinates system

The point of origin (0,0) of this coordinates system is at the left bottom corner. The origin point remains unchanged, while the texts, bar codes or other objects are being rotated. Negative coordinate value is not allowed. The ranges of X and Y coordinates are shown in the table below:

	Minimum	Maximum
X coordinate	0	It depends on printer models
Y coordinate	0	It depends on printer models

The measurements of the X- and Y-axis of the coordinates system can be in inches or in millimeters.

A2. COMMAND CATEGORIES

According to functions, the PPLA programming commands in this manual are divided into the following five categories:

- Interaction commands
- System setting commands
- System level commands
- Label formatting commands
- Font downloading commands

Only the label formatting commands must be grouped to send, other commands can be sent separately. For example:

Command/data from host	Data from printer (RS232C)
Interaction command 0	Printer status
System level command 0	
Interaction command 1	Printer status
System level command 1	
Font downloading 0	
…	
Font downloading N	
System level command 2	
<STX>L (system command)	
Label formatting command 0	
…	
Label formatting command N	
E (Label formatting command)	

A3. INTERACTION COMMANDS

The interaction commands demand the printer's immediate interaction. But the printer only communicates a detailed status to the host via the printer's serial (RS232C) port, since only serial port supports bi-direction communication.

Upon receiving this kind of command, the printer will either perform the command or send back the corresponding data to the host so that the user and programmer can determine what to do with the next step.

Command	Description	Response from printer
<SOH>#	Resets the printer	<XOFF> <XON> T

1. This command resets the printer like "power on" step. Resetting the Printer returns all settings to default value, except the downloaded graphics and fonts.
2. The printer sends <XOFF>, suspending the data input.
3. The printer sends <XON> and 'T', ready to resume work.
4. Since this command will delay communication for one second, if not necessary, the user is advised to send other alternative system level command instead of this one.

Command	Description	Response from printer
<SOH>*	Restarts the printer	<XON> R

1. This command restarts the printer. Printer has "power off" and "power on" steps.
2. This command will clear DRAM memory.

Note: This command is for X-1000V/VL/ X-2000V/ OS-2140/ A-2240(E)/ A-3140/ X-2300(E)/X-3200(E)/ CP-2140(E)/ CP-3140.

Command	Description	Response from printer
<SOH>A	Sends a readable status string	XXXXXXXX<CR>

This command drives the printer to retrieve an 8-byte data string followed by a <CR> to the host. Each 'X' will be 'Y' or 'N' reporting the printer status.

Byte 1	Y - Firmware parser is busy. N – Firmware parser is idling.
Byte 2	Y - Paper out. N - Paper installed.
Byte 3	Y - Ribbon out. N - Ribbon installed.
Byte 4	Y - Printing batch file. N - Others.
Byte 5	Y – At printing state. N - Not at printing state.
Byte 6	Y - Printer is paused and waiting for the second press. N - Printer is not paused.
Byte 7	Y - Label is present. N – Label is not present.
Byte 8	N – Always 'N'.

Command	Description	Response from printer
<SOH>B	Toggles pause condition	None

This command toggles the pause state on or off. Byte 6 generated from <SOH>A will reflect the change of the status.

Command	Description	Response from printer
<SOH>D	Disables the interaction command.	None

Interaction commands will be ignored after this command is sent.

The <SOH>D command must be sent prior to loading graphic images or fonts, since some graphic images or fonts may contain data sequences that can be misinterpreted as commands by the printer.

Command	Description	Response from printer
<SOH>E	Sends preset label to be printed	XXXX<CR>

This command drives the printer to report the numbers of labels queued to print.

This 'XXXX' is a 4-digit decimal number, e.g.

```
0020<CR>
```

(There are still 20 labels left in printer buffer waiting to be printed.)

Command	Description	Response from printer
<SOH>F	Sends one byte printer status	X<CR>

This command instructs the printer to send a single byte where each bit (1 or0) represents one of the printer's status flags, followed by a <CR>.

Bit 1	1 - firmware parser busy. 0 - firmware parser idling.
Bit 2	1 - paper out, 0 - paper installed.
Bit 3	1 - ribbon out, 0 - ribbon installed.
Bit 4	1 - printing batch file 0 - others.
Bit 5	1 - at printing state. 0 - not at printing state.
Bit 6	1 - printer is paused and waiting for the second press. 0 - printer is not paused.
Bit 7	1 - label present. 0 - label not present.
Bit 8	0 – always '0'.

A4. SYSTEM SETTING COMMANDS

System setting commands are used to control the printer configuration and will be written into the printer E^2PROM. This kind of commands will remain in effect, whenever the printer is turned on, unless the command with different parameters to replace it.

The factory default settings are

Parameter Description	**Default Value**	**Remark**
RS232 baud rate	9600 baud	**
Print darkness	Normal darkness (H10)	
Transfer type	Thermal transfer	**
Gap length	3 ~ 5 mm (normal)	++
Cut position	Center of gap	**
Command mode	Standard control codes	**
Label length for continuous label (under Windows)	0 From top to last black pixel	**
Symbol set for ASD smooth fonts	USASCII	

**: For X2000+/X3000+/G6000, these settings are controlled by the DIP switches or the panel. No command is required.

++: For X3000+/G6000, this setting is controlled by the DIP switches.

Command	Description	Parameter Range
<STX>KI5__	Sets the gap height	__ is a two digit value and in terms of millimeters.

If the gap height is more than 6 mm the command must be sent otherwise the label detection may be incorrect.

This command is for OS202/204/214//314/R400 PPLA only.

Example: `<STX>KI508<CR>`

Sets the gap height to 8 mm.

Command	Description	Parameter Range
<STX>KI7*n*	Sets transfer type	*n* : ‘0’ for direct thermal or ‘1’ for thermal transfer

This command should comply with other settings for printer configuration. In case that the setting is not correct, the printer may hang to work or miss-detect the gap. For instance, if the setting is thermal transfer and the ribbon is not installed, the printer will stop working and blink both LEDs.

Note: This command is invalid for X2000+/X3000+/G6000.

Command	Description	Parameter Range
<STX>KI8*n*	Sets baud rate**	*n* : '0' - 9600, '1' - 600, '2' - 2400, '3' - 19200, '4' - 4800, '5' - 38400, '6' - 1200, '7' - 9600 baud, '8' - 57600++, '9' - 115200++

Above command is used for RS232C communication. It becomes effective after the printer is being restarted. This command can be sent either through the serial port or the parallel port, provided that the host and the printer are under the same protocol (baud rate and data format).

Example: `<STX>KI83<CR>`

The above example will set baud rate to 19200 for RS232C.

** *This command is not valid for X2000+/X3000+/G6000.*

++ *Only OS-214 plus supports baud rate 57600 and 115200.*

Command	Description	Parameter Range
<STX>KI9*bdpt*	Sets baud rate, data length, parity and stop bit no.	*b* : '0' - 9600, '1'- 600, '2' - 2400, '3' - 19200, '4' - 4800, '5' - 38400, '6' - 1200, '7' - 9600, '8' - 57600++, '9' - 115200++ *d* : '7' - 7-bit data, '8' - 8-bit data. *p* : 'N' - none parity, 'E' - even parity, 'O' - odd parity. *t* : '1' - 1 stop bit, '2' - 2 stop bits.

Example: `<STX>KI937E1<CR>`

The above example will set baud rate to 19200, bit data to 7, parity to even and stop bit to 1. *This command is invalid for X2000+/X3000+/G6000.*

Command	Description	Parameter Range
<STX>KI<*m*	Sets symbol set for ASD smooth fonts	*m* : '0' - USASCII, '1' - United Kingdom, '2' - Spanish, '3' - Swedish, '4' - French, '5' - German, '6' - Italian, '7' - Danish/Norwegian.

Above command is used to select the European symbol set. It is for the use of ASD smooth font set, which is prevailing in Europe.

Example:
```
<STX>KI<7<CR>
<STX>L<CR>
D11<CR>
191100300100020Special characters: æÆÅ<CR>
E<CR>
```

Suppose you are using the Danish system and keyboard, the above command will select Danish/Norwegian symbol set and enable the printer to print some special characters.

Special characters: æÆÅ

Fig. A4-1

Command	Description	Parameter Range
<STX>KXxxxx	Sets label length for continuous label.	xxxx is a 4 digit decimal value in millimeters (mm).

This command is valid for using Label Dr. driver under Windows. Without this command (setting) the label length ranges from the start printing position to the last black image (pixel).

Example: <STX>KX0100<CR>
Sets the continuous label length to 100 mm.

Note: This command is not for X2000+/X3000+/G6000.

Command	Description	Parameter Range
<STX>KI;*n*	Sets control code set.	*n* value : '0' : Standard control codes. '1' : Alternative control codes.

Refer to the list below for standard and alternative control codes. To exit from the alternative mode, just reset the menu on the printer panel or send the command of "!KI;0" in alternative mode 1 or send the command of "~KI;0" in alternative mode 2.

Standard (default)		Alternative 1		Alternative 2		Alternative 3
Control codes	Hexadecimal value	Control codes	Hexadecimal value	Control codes	Hexadecimal value	Control codes
ESC	0x1B	[	0x5B	ESC	0x1B	[1B
CR	0x0D	\	0x5C	CR	0x0D	0x0D
STX	0x02	!	0x21	~	0x7E	[02
SOH	0x01	SOH	0x01	^	0x5E	[01

Note1: Both DIP and alternative commands must be set in X2000+/X3000+/G6000 so that the alternative mode can be enabled.

Note2: Alternative 3 is only effective in R-400Plus.

Command	Description	Parameter Range
<ESC>KI:_	Sets horizontal shift.	_ is a binary signed byte and in terms of pixels. 00H ~ 7FH are positive and 80H ~ FFH are negative.

This command shifts the image print position in the X coordinate.

Note: This command is only for X2000+/X3000+/G6000.

Command	Description	Parameter Range
<ESC>KI;_	Sets offset value for cutting or peeling position.	_ is a binary signed byte in terms of pixels. 00H ~ 7FH are positive values and 80H ~ FFH are negative values.

This command set the cut position for specific labels.

Note: This command is not for X2000+/X3000+/G6000.

Command	Description
<ESC>@0	Clears the flash memory that is used for soft fonts, forms or graphics.

This command clears the flash memory. All objects in the flash memory will be deleted after this command is sent. This command will affect flash memory life.

Command	Description	Parameter Range
<ESC>KIJ*n*	Select JIS code or SHIFT JIS code when using Japanese fonts.	*n* value: '0' : for JIS code with Japanese font. '1' : for SHIF JIS code with Japanese font.

Example: `<STX>KIJ1<CR>`

The above example will set SHIFT JIS code for Japanese fonts.

A5. SYSTEM LEVEL COMMANDS

This group of commands is used to set the printing related parameters or environment for the current or subsequent labels. They will be reset after restarting the printer or by other related system level commands. Unlike system setting commands, these commands will not be saved into E^2PROM.

Command	Description	Default
<STX>A	Sets date and time	

This command sets the date and time. It takes effect only when the RTC (real time clock) board is installed. In general the RTC board must be set at the first time when you use it.

<STX>A*wmmddyyyyhhMMjjj*

Location	Digit no.	Description
w	1	Day of week. 1 for Monday
mm	2	Month. 01 for January
dd	2	Day.
yyyy	4	Year.
hh	2	Hour in 24-hour format.
MM	2	Minutes.
jjj	3	Julian data.

Example: `<STX>A5100720001230287`

This command sets Friday Oct. 7th, 2000, 12:30, the 287 of the year.

Command	Description	Default
<STX>a	Enables label echo character	Disabled

This command enables the printer to send the control code of RS (1EH) the host through the serial port after each label is being printed.

Example: `<STX>a`

`1EH` ; 1st label printed

`1EH` ; 2nd label printed

Command	Description	Response from printer
<STX>B	Gets date and time	*wmmddyyyyhhMMjjj*

This command gets the date and time from printer through serial (RS232) port. It takes effect only when the RTC (real time clock) board is installed.

Location	Digit no.	Description
w	1	Day of week. 1 for Monday
mm	2	Month. 01 for January
dd	2	Day.
yyyy	4	Year.
hh	2	Hour in 24-hour format.
MM	2	Minutes.
jjj	3	Julian data.

Example: `<STX>B`

Command	Description	Default
<STX>cxxxx	Sets continuous label length	0000

This command disables the edge sensor sensing the gap or mark between the labels and sets a page length for the printer to feed. (Otherwise the printer will feed the label for 12 inches long.)

This command will overwrite <STX>e and <STX>r commands, which are in conflict with it. The label length means the distance between the start printing position to the stop printing position.

Parameter: xxxx

4-digit decimal used to set label length. (e.g.X2000+ maximum value: 43 inches)

Example: `<STX>c0200`

Set two-inch continuous label.

Provided the print object is longer than the set paper length, the paper length will automatically increase to cover the object. In consequence, it becomes 0200*N.

Make sure the object ready to be printed no longer than 30 inches, otherwise unexpected outcome will occur.

Command	Description
<STX>Dxxxxxxx	Dumps the memory contents

This command is used for debugging program or maintenance purpose only. It dumps the memory contents for 4 K memory and sends them to the host through the RS232

port.

Parameter: xxxxxxx

A 6 or7-digit HEX value used for specify internal memory address of the printer (7 digits for models OS314/R400/R600/X2000+/X3000+/G6000 and 6 digits for models OS203/OS204/214/202/X1000+).

Example: `<STX>D9090000`

Dump the memory from 9090000H for 4 K bytes.

Response:

```
9090000  00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00
9090010  00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00
...              ...                        ...
9090FF0  00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00
```

Command	Description	Default
<STX>Exxxx	Sets copy count for stored label	0001

This command should be sent in conjunction with <STX>G, as both commands are related to label storage. The stored label format is the last printed format, kept in the print buffer.

Example: `<STX>E0003<CR>`

`<STX>G<CR>`

Result: Print out 3 pieces of the last printed label format.

Command	Description
<STX>e	Selects edge sensor for gap

1. This command is used for see-through media. It sets the printer to sense the gap between labels. **
2. Refer to <STX>r for reflective media.
3. Once received this command, the printer will ignore the previous command for continuous label (<STX>c*xxxx*).

**: Only for X2000+/X3000+/G6000.

Command	Description
<STX>F	Feeds a label

1. This command will feed a label till where the gap is being detected, in case that the paper type is set to non-continuous.
2. The media paper will be fed for certain length, when the paper type is set to continuous.
3. Basically this function is the same as pressing the “Feed” button.

Command	Description	Default
<STX>fxxx	Sets stop position and automatic back-feed for the label stock	f220

1. This command causes the label stock to stop at a position convenient for the user to tear off. When the next label format is sent to the printer, it will automatically back-feed to the start of print position.
2. Back-feed will not be activated if xxx is less than 220.
3. Under multi-copy or continuous printing, this command is valid only for the first label and last labels.

Example: `<STX>f320<CR>`

Result: Label stock feeds backward for one inch before the next label format is printed.

Command	Description
<STX>G	Prints stored label format

This command should be used in conjunction with <STX>E.

The stored label format is the last printed label format kept in the buffer.

Example:
```
<STX>L<CR>
1211000002001OOThis is a label<CR>
E<CR>
<STX>E0002<CR>
<STX>G<CR>
```
Result: Print the label 3 times (1+2 copies).

Command	Description
<STX>Imbfnn…n	Downloads the graphics file

Parameters:

m : Memory module. ‘A’ for RAM module, ‘B’ for flash memory module and ‘C’ for default module (Normally, the default module is RAM module).

Note: The flash memory module is an optional item. Suppose you select ‘B’ flash memory and the flash module is not installed, the printer will automatically save the graphics into RAM. Delete or store flash data will affect flash memory life.

b : ’A’ - 7-bit data image file.

f : Image file format. The printer supports 4 image file formats, PCX, BMP, IMG and HEX formats. This parameter specifies graphic format type and direction.

f parameter	Image File Format	Direction
'B'	8-bit BMP file format	Flipped
'b'	8-bit BMP file format	
'I'	8-bit IMG file format	Flipped
'I'	8-bit IMG file format	
'P'	8-bit PCX file format	Flipped
'p'	8-bit PCX file format	
'F'	7-bit HEX file format	

1. nn…n : file name, maximum 16 characters. The file name can be accessed with label formatting commands (Y).
2. The file name must be same as defined.
3. Refer to the appendix AA for details of the HEX format.

Example: The example of downloading and retrieving HEX graphics is as below:

```
Part 1
    <STX>IAFhexfile<CR>
Part 2
    … (HEX file)
Part 3
    <STX>L<CR>
    …
    1Y1100001000100hexfile<CR>
    1Y1100002000100hexfile<CR>
    E<CR>
```

Result: The HEX graphics image file "`hexfile`" will print on the same label.

Command	Description	Default
<STX>J	Sets pause for each printed label	Normal

This command will pause the printer each time after a label is printed. When the printer is at pause state, the "**READY"** LED will keep blinking to alert the user to press the "**FEED**" button (OS series) or "**PAUSE**" button (X, G and R series) to resume the printing work.

Command	Description
<STX>j	Cancels pause

This command cancels the pause function generated by <STX>J.

Command	Description
<STX>KQ	Inquires system configuration

This command drives the printer to send the memory configuration including standard, expansion and available memory sizes to the host through the RS232.

Example: `<STX>KQ`

Response:

```
INTERNAL MEMORY<CR>
VER: 1.0 100198<CR>
```

```
STANDARD RAM : 524288 BYTES<CR>
EXPANSION RAM: 0 BYTES<CR>
AVAILABLE RAM : 429632 BYTES<CR>
NO. OF DL SOFT FONTS : 0<CR>
```

Command	Description
<STX>k	Test RS232 port

This command drives the printer to send the character Y via its RS232 serial port. Failure to receive the character Y at the host may indicate an interfacing problem.

Example: `<STX>k`

Response: `Y`

Command	Description
<STX>L	Enters label formatting state

The above command switches the printer into the label-formatting mode. The printer will process the label formatting commands until it receives the command to exit from this mode.

In the process of the label formatting, the system level commands will be ignored.

Example:
```
<STX>L<CR>
121100001000050THIS LABEL IS MADE BY JIMMY<CR>
E<CR>
```

Output:

THIS LABEL IS MADE BY JIMMY

Fig. A5-1

Command	Description	Default
<STX>Mxxxx	Sets maximum label length	1200

Above command sets the maximum label length and the printer will search for gap or mark within the specified length accordingly. The default length is 12 inches.

Parameter: xxxx

A 4-digit decimal. (1 to 12 inches)

Example: `<STX>M0300<CR>`

Result: Set maximum label length to 3 inches.

Command	Description	Default
<STX>m	Sets measurement to metric	N

There are two measurements for the printer, in metric and in inch.

Example:
```
<STX>m
<STX>M0600
```

Result: 60 mm for maximum label length

Command	Description	Default
<STX>n	Sets measurement to inches	In inches

There are two measurements for the printer, in metric and in inch.

Example:
```
<STX>n
<STX>M0600
```

Result: 6 inches for maximum label length.

Command	Description	Default
<STX>Oxxxx	Sets print start position	0220

This command sets the offset value for start print position. The default 0220 sets the start print position exactly below the TPH (print head) line. You may change it to meet the specific label format requirements.

This parameter will be ignored if continuous label command is sent. (<STX>cxxxx).

Command	Description
<STX>P	Enters data dump mode

This command drives the printer to dump the HEX value of the data that is transmitted to the printer afterwards. The printer will not return to normal function, unless restarted.

Example: <STX>P

Output:

```
0140 20 20 39 3A 33 30 0D 0A 1A                        9:30
0130 20 20 20 20 30 20 20 30 37 2D 32 34 2D 39 38 20     0  07-24-98
0120 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20
0110 39 38 20 20 20 39 3A 32 38 0D 0A 54 20 20 20 20 98   9:28  T
0100 20 20 20 20 20 20 20 35 20 20 30 37 2D 32 34 2D       5  07-24-
00F0 4D 50 20 20 20 20 20 20 20 20 20 20 20 20 20 20 MP
00E0 32 34 2D 39 38 20 20 20 39 3A 30 31 0D 0A 44 55 24-98   9:01  DU
00D0 20 20 20 20 20 20 20 20 20 36 30 20 20 30 37 2D          60  07-
00C0 0A 4A 49 4D 4D 59 20 20 20 20 20 20 20 20 20 20  JIMMY
00B0 30 37 2D 32 33 2D 39 38 20 20 31 39 3A 30 36 0D 07-23-98  19:06
00A0 20 20 20 20 20 20 20 20 20 20 20 20 20 20 39 20              9
0090 30 37 0D 0A 43 4F 4E 54 20 20 20 20 20 20 20 20 07  CONT
0080 30 20 20 30 37 2D 32 33 2D 39 38 20 20 31 39 3A 0  07-23-98  19:
0070 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 36                 6
0060 46 49 47 5C 41 0D 0A 53 50 45 43 49 41 4C 20 20 FIG\A  SPECIAL
0050 79 20 6F 66 20 43 3A 5C 44 4F 43 5C 4D 41 4E 5C y of C:\DOC\MAN\
0040 2D 31 38 46 44 0D 0A 20 44 69 72 65 63 74 6F 72 -18FD   Director
0030 6C 20 4E 75 6D 62 65 72 20 69 73 20 33 44 35 41 l Number is 3D5A
0020 53 0D 0A 20 56 6F 6C 75 6D 65 20 53 65 72 69 61 S   Volume Seria
0010 64 72 69 76 65 20 43 20 69 73 20 4D 53 2D 44 4F drive C is MS-DO
0000 0D 0A 1A 0D 0A 20 56 6F 6C 75 6D 65 20 69 6E 20       Volume in
```

Fig. A5-2

Command	Description
<STX>p	Enters pause mode

This command drives the printer to enter pause mode, often applied between batches of paper.

Example: <STX>p

Command	Description
<STX>Q	Clears memory

This command instructs the printer to clear both of the RAM and flash memory. Normally, this command is sent at the end of each job to avoid that the graphics and fonts become accumulated up and overflow the memory.

In case of the memory full, the printer will erase the first-in graphics or fonts. To avoid this situation and to save the data re-processing time, you are advised to send this command at the end of a job.

Example:
```
<STX>IAFhexfile<CR>
… (HEX file)
<STX>L<CR>
…
1Y1100001000100hexfile<CR>
E<CR>
<STX>Q<CR>
```

Command	Description
<STX>q*n*	Clears memory module

This command clears the selected memory module.

Parameter: *n*

'A' - RAM module, 'B' - flash memory and 'C' - default module.

Command	Description
<STX>r	Selects reflective sensor for gap

This command selects the reflective sensor for label detection. It is used for "Black stripe" media sensing. If the label stock is non-continuous type, refer to <STX>e for see-through media. Once this command is received, the previous continuous paper command (<STX>cxxxx) will be ignored.

Command	Description
<STX>T	Prints test pattern

This command is used for testing the printout quality or checking the print head for debugging or maintenance purpose. Normally users do not use this command.

Example: `<STX>T`

Output:

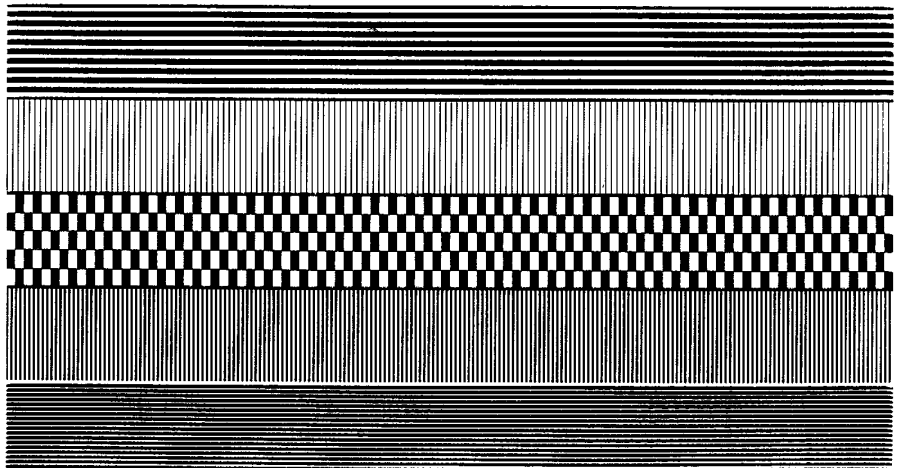


Fig. A5-3

Command	Description
<STX>U*nncccc*	Replaces the data of the specified data

Where: *nn* field number

cccc data to be replaced

This command is used to replace the field data in a form. Other data are kept the same as the previous ones.

Example:
```
<stx>L
D11
121100000100020filed 1 data
121100000400020filed 2 data
Q0001
E
```

Output:

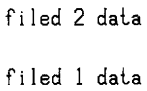


Fig. A5-4

Example: `<stx>U01NEW DATA 1`
`<stx>E0001`
`<stx>G`

Output:

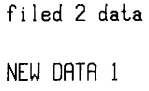


Fig. A5-5

Command	Description
<STX>V*n*	Sets cutter and dispenser configuration

Parameter: *n*

'0': no cutter and peeler function

'1': Enables cutter function

'4': Enables peeler function

Example: `<STX>V0` ; no cutter and peeler function
`<STX>V1` ; Enables cut operation

Command	Description
<STX>v	Inquires the printer version

This command is used for maintenance purpose. It inquires the printer of the firmware

version. The printer will response with version and date code through RS232C.

Example: `<STX>v`

Response: `Label Printer with Firmware Ver. 1.0 100198`

Command	Description
<STX>W*n*	Inquires the graphics/fonts and memory status

The command inquires the printer of the contents of graphics/fonts/labels as well as the available RAM size. The printer will check its memory and response through RS232C.

Parameter*: n*

F : Show fonts and memory status

G : Show graphics and memory status

L : Show stored labels and memory status

Example: `<STX>WG`

Response: `IMGFILE1<CR>`
`BMPFILE1<CR>`
`AVAILABLE RAM : 421632 BYTES<CR>`

The "`IMGFILE1`" and "`BMPFILE1`" are graphics that were downloaded before.

Command	Description
<STX>X*n*	Sets default module

This command sets the default memory module when loading PCL bitmap fonts (Refer to the section A8 Font Downloading Commands.).

Parameter: *n*

'A' for RAM module and 'B' for flash memory module.

Note: The flash memory module is an optional item. Suppose you select 'B' flash memory and the flash module is not installed, the printer will automatically save the soft font into RAM.

Command	Description
<STX>xmtn…n	Releases file from memory

This command deletes the specific file from the specified memory module, evacuating memory space to load other data, further to avoid memory overflow.

Parameters:

m: The memory module identification character.

Please refer to <STX>I cmmand.

t : The file type identification code.

'G' for graphics.

'F' for fonts.

n…n : file name (maximum 16 characters).

Example: `<STX>IAFstar<CR>`


```
… (HEX file)
<STX>L<CR>
…
1Y1100001000100star<CR>
E<CR>
<STX>xAGstar<CR>
```

Results:

- Download the graphics with file name "star".
- Print the graphic image.
- Delete the "star" image file.

A6. LABEL FORMATTING COMMANDS

The label formatting commands will:

- Set the print environment, margins, print modes, multi-copies, etc.
- Set cursor position and print graphics, texts, bar codes, lines and boxes
- Control the heat of the printing, label print position and user interface
- All commands after < STX>L are interpreted as Label Formatting Commands.

Different from other group commands, the label formatting commands have no leading control code, e.g. SOH, STX or ESC.

Command	Description	Default
:xxxx	Sets cut by amount	0001

This command is valid only when the cutter is installed. It allows a predetermined number of labels to be printed before a cut is made. Please refer to [cxx].

Example:
```
<STX>V1<CR>
<STX>L<CR>
131100002000050CHCK THE CUT FUNCTION<CR>
Q0010<CR>
:0003<CR>
E<CR>
```

Result: Enable the cutter to cut after 3 labels have been printed.

Command	Description	Default
A*n*	Sets logic image printing mode	A1

This command puts the printer on logical OR operation or XOR operation, which makes the printout more attractive.

Parameter: *n*

'1' for logical XOR (exclusive OR).

'2' for logical OR.

The default mode is '1'.

Example 1:
```
<STX>L<CR>
A1<CR>
151100002000050ABC<CR>
151100002000050---<CR>
E<CR>
```

Output 1:

Fig. A6-1

Example 2:
```
<STX>L<CR>
A2<CR>
151100002000050ABC<CR>
151100002000050---<CR>
E<CR>
```

Output 2:

Fig. A6-2

Command	Description	Default
Cxxxx	Sets left margin	0000

This command allows horizontal adjustment of the point where printing begins. Different margin value makes image shift to the left or right.

Parameter: xxxx

Example: C0100

Result: Set left margin to one inch

Command	Description	Default
Cxx	Sets cut by amount	c01

This command is valid only when the cutter is installed. It instructs the printer to cut the label media after the specified numbers of labels have been printed.

Its function is same as the command ":xxxx", except only a 2 digit value can be entered.

Example:
```
<STX>V1<CR>
<STX>L<CR>
131100002000050CHCK THE CUT FUNCTION<CR>
Q0010<CR>
c03<CR>
E<CR>
```

Result: Enable the cutter to cut the label media after 3 labels have been printed.

Command	Description	Default
D*wh*	Sets width and height pixel size	D22

Though the maximum resolution is up to the printer model, besides the smallest one, the other pixel sizes can be set by this command. However, reducing the resolution may cause the image pixel to be amplified and the printout get zigzagged. The minimum pixel size set by "D11" is varied from models.

Models OS203/204/214/214plus/R400/
X1000+/X2000+/G6000: 0.0049 inch (0.125 mm)
Models OS314/R600/X3000+: 0.0033 inch (0.084 mm)

Parameters:

w – is pixel width ('1' or '2', default is '2').

h – is pixel height ('1', '2' or '3', default is '2').

Example:
```
<STX>L<CR>
D23<CR>
120000002000050PIXEL SIZE FOR D23<CR>
E<CR>
```

Output:

PIXEL SIZE FOR D23

Fig. A6-3

Command	Description

E	Ends the job and exit from label formatting mode

When the printer is in label formatting mode and receives an “E” command, it will immediately exit from the mode and will print a label based on the data that has already been received. Even if no printable data has been received, the printer will generate and feed a label.

Command	Description
G	Stores previous data to global register
<STX>S*n*	Retrieves the global register contents

The command saves the previous data to global register and retrieves it to print only when the restore command <STX>S*n* is sent. This command may be used more than one time and the global registers are named in the order created, beginning with register ‘A’ and ending at register ‘Z’.

Parameter: *n*

The Name of the register ranges from ‘A’ to ‘Z’.

Example:

```
<STX>L<CR>
D11<CR>
140000000700150DATA A<CR>
G<CR>
140000000700050DATA B<CR>
G<CR>
140000001000050<STX>SA<CR>
140000001300050<STX>SB<CR>
140000001600050<STX>SA<CR>
E<CR>
```


Output:

DATA A
DATA B
DATA A
DATA B DATA A

Fig. A6-4

Command	Description	Default
Hxx	Sets heat value (H00~H20)	H10

The heat value affects the darkness of the image. To get a better quality printout, some of the factors like paper media, ribbon types (wax, semi-resin and resin) and image pattern itself etc. should also be taken into consideration.

Command	Description
M	Toggles the mirror mode.

This command toggles the mirror mode. At mirror state the printer mirrors the following field data.

Example:

```
<STX>L<CR>
150000001800000NORMAL<CR>
M<CR>
150000001400100MIRROR<CR>
M<CR>
```

```
1500000010000000NORMAL AGAIN<CR>
E<CR>
```

Output:

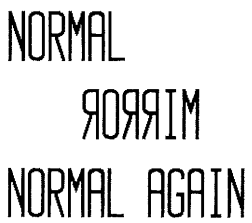


Fig. A6-4

Command	Description	Default
m	Sets measurement in metric.	In inch.

There are two measurements in the printer - metric and inch.

Command	Description	Default
n	Sets measurement in inch	In inch.

Command	Description	Default
P*n*	Sets print speed	PC

This command controls the print speed.

Parameter: *n*

A	1.0 ips	**E**	3.0 ips	**I**	5.0 ips
B	1.5 ips	**F**	3.5 ips	**J**	5.5 ips
C	2.0 ips	**G**	4.0 ips	**K**	6.0 ips

D	2.5 ips	**H**	4.5 ips	**L**	7.0 ips

Printer	Speed Range
OS314	**A ~ C**
OS204/214/214plus	**A ~ E**
OS203	**A ~ F**
R600/X1000+/G6000	**A ~ G**
R400/X2000+	**A ~ K**
X3000+	**A ~ L**

Command	Description	Default
Qxxxx	Sets the quantity of labels to print	Q0001

This command is used to set the number of the labels to be printed. If the printout contents are same or just different in certain auto increment/decrement fields, sending this command can save the communication and processing time.

Parameter: xxxx

A 4-digit decimal. The default is 0001.

Example:

```
<STX>c0060<CR>
<STX>L<CR>
D11<CR>
1300000002000002 COPIES<CR>
Q0002<CR>
E<CR>
```

Output:

Fig. A6-5

Command	Description	Default
Rxxxx	Sets vertical offset	R0000

The command sets the vertical start point to be printed. By this command the print image can be shifted vertically.

Example: `R0100`

Result: Set 1 inch vertical offset.

Command	Description
rn…	Retrieves label data to printer buffer
smn…	Stores label data to printer buffer

The data of the label format can be stored in the printer memory and recalled. With 'store' commands, the printer will exit from label formatting mode.

Parameters:

m: Name of the memory module. 'A' for RAM module, 'B' for flash memory module and 'C' for default module (Normally, the default module is RAM module.).

n … n : File name with maximum 16 characters.

Example:

```
<STX>L<CR>
D11<CR>
1300000000200100STORED LABEL<CR>
sASLAB<CR>
```



```
<STX>L<CR>
rSLAB<CR>
1300000000500100TEXT 1<CR>
E<CR>
```

Output:

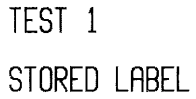


Fig. A6-6

Command	Description	Default
Tnn	Sets end-of-line code. The nn is represented by HEX value	T<0x0D>

Example:

```
<STX>L<CR>
D11<CR>
T40<CR>
1300000002200100ABC@
E<CR>
```

Output:

Fig. A6-7

The above example changes the end-of-line code from <CR> to <0x40> (ASCII character: '@').

Command	Description
X	Exits from Label Formatting mode.

The command will exit from Label Formatting mode and switch to the System Level command mode. If you have data in Label Formatting mode, it will not be printed out. Unless sending <STX>G command.

Example: <STX>L<CR>
130000000200100TEST<CR>
X<CR>

Command	Description	Default
Z	Changes slash zero Ø to normal 0	Slash zero

The alphanumeric fonts (font 0 to font 6) provide both normal and slash zeros (Ø & 0). If this kind of fonts has been selected, the default slash zero (Ø) is being used. This command puts the normal zero 0 in use.

Example: <STX>L<CR>
D11<CR>
130000000200100NO. 0228<CR>
E<CR>

<STX>L<CR>
D11<CR>
z<CR>
130000000200100NO. 0228<CR>
E<CR>

Output:

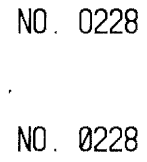


Fig. A6-8

Command	Description
+xx	Makes auto increment for numeric
>xx	Makes auto increment for alphanumeric

This command can increment field on each label printed to save the time used in communication and data processing between the host and the printer.

Parameter: xx
A 2-digit value is to specify the amount to increment the field by.

Example: <STX>c0050<CR>
<STX>L<CR>
D11<CR>
130000000200100100<CR>
+10<CR>
Q0003<CR>
E<CR>

Output:

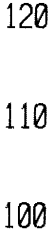


Fig. A6-9

Command	Description
-xx	Makes auto decrement for numeric
<xx	Makes auto decrement for alphanumeric

This command can decrement the field on each label printed to save the time use in communication and data processing between the host and the printer.

Parameter: xx

A 2-digit value is to specify the amount to decrement the field by.

Example:
```
<STX>c0050<CR>
<STX>L<CR>
D11<CR>
130000000200100111<CR>
-15<CR>
Q0003<CR>
E<CR>
```

Output:

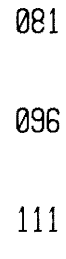


Fig. A6-10

Command	Description
^xx	Sets count by amount

An application using incrementing or decrementing fields will occasionally require that more than one label be printed with the same values before the field data is updated. This command can be applied in this situation, but it can only be sent once per label format.

Parameter: xx

A 2-digit value is to specify the number of labels to be generated before incrementing or decrementing fields on the label.

Example:
```
<STX>c0050<CR>
<STX>L<CR>
D11<CR>
130000000200020COUNT :<CR>
130000000200100123<CR>
-01<CR>
^02<CR>
Q0003<CR>
E<CR>
```

Output:

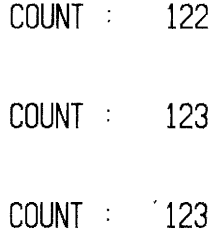


Fig. A6-11

Command	Description
<STX>T<string>	Prints date and time

This command takes effect only when the RTC board is installed. It prints current date and time. The <string> is any set of characters A ~ Z or a~f.

Characters	Description	Characters	Description
A	Day of week	VW	Hour, 24 format.
BCD	Day of week name	XY	Hour, 12 format.
EF	Month number	Za	Minutes.
GHI	Month name	gh	Seconds
PQ	Day	bc	AM or PM
RSTU	Year	def	Julian data

Example:
```
<STX>L<CR>
121100000800010<STX>TBCD GHI PQ, TU<CR>
121100000100010<STX>TA EF PQ, RSTU VW:Za:gh<CR>
E<CR>
```

Output:
```
TUE APR 06, 10
2 04 06, 2010 17:19
```


A7. IMAGE EDITING COMMANDS

The following group of commands is the subset of label formatting commands. They control the position and the scale of the image and put the image directly into the frame buffer of the printer memory. All of them are led by ‘1’, ‘2’, ‘3’ ‘4’ respectively. These numbers represent the orientation or rotation direction. The image types include:

- Texts - internal hard fonts and downloadable soft fonts.
- Bar Codes - both one and two dimension (2D) bar codes.
- Graphics - PCX, BMP, IMG and HEX format files.
- Lines - solid lines.
- Boxes - variable sizes, length and thickness.

Rotation

Fig. A7-1

There are 4 print directions shown as figure A7-1. The leading character controls the direction or rotation.

1- Portrait.

2- Reverse landscape.

3- Reverse portrait.

4- Landscape.

Example:

```
<STX>L<CR>
D11<CR>
141100000800060R1 - PORTRAIT<CR>
241100002150200R2 - REV LAND<CR>
341100002400217R3 - REV PORT<CR>
441100001030079R4 - LANDSCAP<CR>
E<CR>
```

Output:

Please see Fig. A7-1.

Text

The format is:

Rthvoooyyyyxxxx[data string]

Parameters:

R : Print direction. ‘1’, ‘2’, ‘3’ or ‘4’.

t : Font type. Please refer to the font tables in User’s Manual

t character	*ooo* sub font type	Font type
‘0’, ‘1’, ‘2’, ‘3’, ‘4’, ‘5’, ‘6’, ‘7’, ‘8’	‘000’	font 0 ~ font 8 respectively.
‘9’	’000’ ~ ‘006’	ASD smooth fonts. ** ‘000’ : 4 points, ‘001’ : 6 points, ‘002’ : 8 points, ‘003’ : 10 points, ‘004’ : 12 points,‘005’ : 14 points, ‘006’ : 18 points.
‘9’	’xxx’	For PCL soft font selection. xxx : A 3-digit decimal represents the soft font ID. Refer to section A8.
‘:’	‘000’ ~ ‘007’	Courier fonts, (*ooo* represents symbol set)++ 000 - Roman-8, 001 - ECMA-94, 002 - PC set, 003 - PC set A, 004 - PC set B, 005 - Legal, 006 – Greek and 007 - Russian.

*Notes: ** : Models OS203*/OS214/R400/X1000+/X2000+/G6000 *do not support 4-point smooth font.*

++: Models OS203/OS314/R600/X3000+ *do not support Courier fonts.*

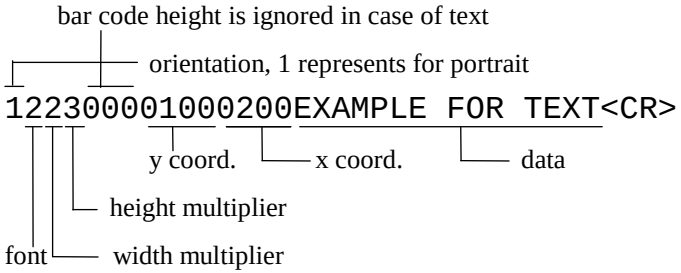
h : Horizontal scale. ‘0’ through ‘9’ and ‘A’ through ‘O’ represent scale factors. (‘A’=10, ‘B’=11, .. and ‘O’=24).

v : Vertical scale. ‘0’ through ‘9’ and ‘A’ through ‘O’ represent scale factors. (‘A’=10, ‘B’=11, .. and ‘O’=24).

yyyy : A 4-digit value for Y coordinate. The lower left corner is the origin point of the XY coordinate system and the Y value is the vertical offset from the origin point.

xxxx : A 4-digital value for X coordinate. The lower left corner is the origin point of the XY coordinate system. The X value is the horizontal offset from the origin point.

data string: A string of printable data with maximum 255 characters in length. The data string ends with a <CR> control code or pre-defined code by Txx command.



Example:

```
<STX>L<CR>
D11<CR>
121100001000000FONT2, H=1, V=1<CR>
122100001200000FONT2, H=2, V=1<CR>
121200001400000FONT2, H=1, V=2<CR>
191100201700000SMOOTH, 8 POINTS<CR>
191100302000000SMOOTH, 10 POINTS<CR>
E<CR>
```

Output:

SMOOTH, 10 POINTS

SMOOTH, 8 POINTS

FONT2, H=1, V=2

FONT2, H=2, V=1

FONT2, H=1, V=1

Fig. A7-2

Bar Codes

The format is:

Rthvoooyyyyxxxx[data string]

Parameters:

R : Print direction. ‘1’, ‘2’, ‘3’ or ‘4’.

t : Bar code type. The range can be ‘A’ through ‘T’ and ‘a’ through ‘z’, each character represents a bar code type and rule. Refer to section A10 for more details on bar codes.

h : ‘0’ through ‘9’ and ‘A’ through ‘O’ represent the width of wide bar. (‘A’=10, ‘B’=11, .. and ‘O’=24).

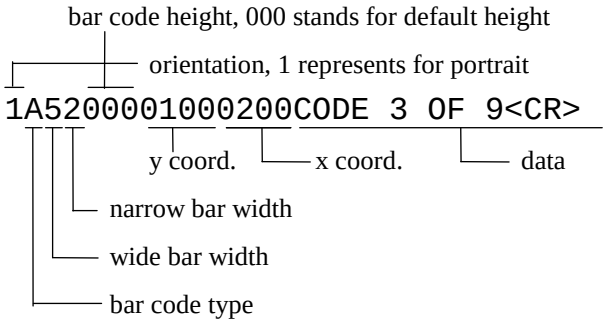
v : ‘0’ through ‘9’ and ‘A’ through ‘O’ represent the width of narrow bar. (‘A’=10, ‘B’=11, .. and ‘O’=24).

ooo : A 3-digit value that represents the bar code height.

yyyy : A 4 digit value for Y coordinate. The lower left corner is the origin of the XY coordinate system. The Y value is the vertical offset from origin point.

xxxx : A 4-digit value for X coordinate. The lower left corner is the origin point of the XY coordinate system. The X value is the horizontal offset from origin point.

Data string: A string of data with maximum 255 characters in length, ended by <CR> or pre-defined EOL (end of line) code. The length of the string may be varied from the type of the bar code.



Example:

```
<STX>L<CR>
D11<CR>
1A0000000200000BC 1<CR>
1A0005000200120BC 2<CR>
1A6300000200240BC 3<CR>
E<CR>
```

Output:

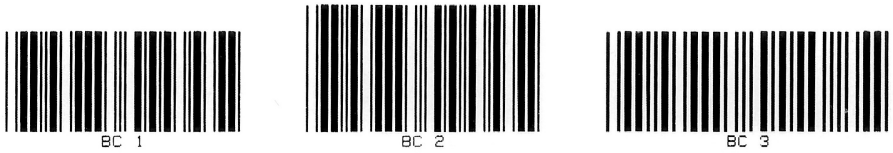


Fig. A7-3

Line

The format is:

*R*X11000*yyyyxxxx*L*aaabbb* or *R*X11000*yyyyxxxx*l*aaaabbbb*

Parameters:

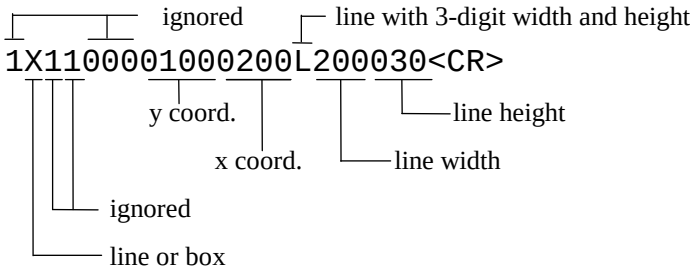
R : Print direction. ‘1’, ‘2’, ‘3’ or ‘4’.

yyyy : A 4-digit value for Y coordinate. The lower left corner is the origin point of the XY coordinate system. The Y value is the vertical offset from origin point.

xxxx : A 4-digit value for X coordinate. The lower left corner is the origin of the XY coordinate system. The X value is the horizontal offset from origin point.

aaa or *aaaa* : A 3 or 4-digit value that specifies the width of line.

bbb or *bbbb* : A 3 or 4-digit value that specifies the height of line.



Example:
```
<STX>L<CR>
D11<CR>
1X1100000200000L100020<CR>
1X1100000800000l00100100<CR>
E<CR>
```

Output:

Fig. A7-4

Box

The format is:

*R*X11000*yyyyxxxx*B*aaabbbtttsss* or *R*X11000*yyyyxxxx*b*aaaabbbbttttssss*

Parameters:

R : Print direction. ‘1’, ‘2’, ‘3’ or ‘4’.

yyyy : Y coordinate. A 4-digital decimal. The lower left corner is the origin of the XY coordinate system. The Y value is the vertical offset from origin.

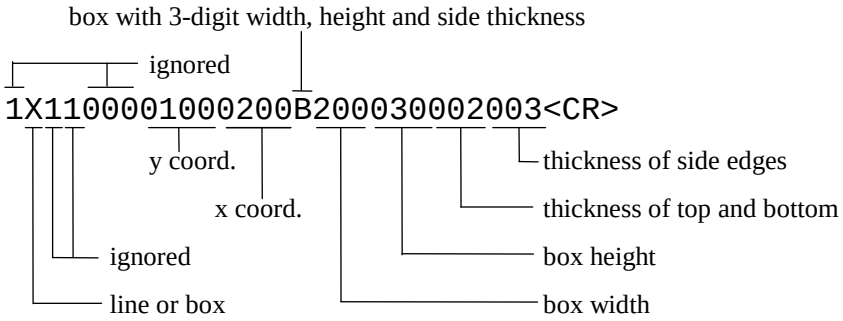
xxxx : X coordinate. A 4-digital decimal. The lower left corner is the origin of the XY coordinate system. The X value is the horizontal offset from origin.

aaa or *aaaa* : A 3 or 4-digit value that specifies the width of box.

bbb or *bbbb* : A 3 or 4-digit value that specifies the height of box.

ttt or *tttt* : A 3 or 4-digit value that specifies the thickness of top and bottom box edges.

sss or *ssss* : A 3 or 4-digit value that specifies the thickness of side edges.



Example:
```
<STX>L<CR>
D11<CR>
1X1100000200100B100040002005<CR>
1X1100000800100b0250010000030004<CR>
E<CR>
```

Output:

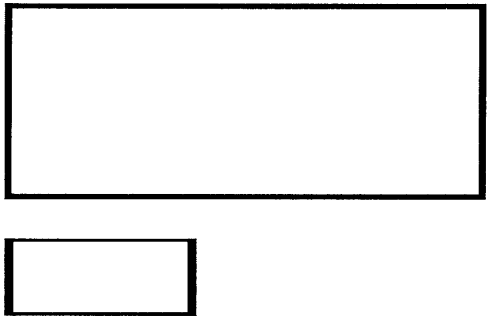


Fig. A7-5

Graphic

Before sending the graphic selection command, make sure that the graphic was already loaded into the flash memory, otherwise send the command led by <STX>I to download the graphic first.

The format is:

1Y11000*yyyyxxxxn..n*

Parameters:

yyyy : A 4-digit value for Y coordinate. The lower left corner is the origin point of the XY coordinate system. The Y value is the vertical offset from origin point.

xxxx : A 4-digit value for X coordinate. The lower left corner is the origin point of the XY coordinate system. The X value is the horizontal offset from origin point.

n..n : Graphic file name that was downloaded (maximum 16 characters).

Example:

```
<STX>IAFHEXFILE<CR>
802000FF00FF00FF00FF00FF00FF00FF00FF00FF00FF00FF00FF00FF00FF00FF00FF00FF<CR>
802000FF00FF00FF00FF00FF00FF00FF00FF00FF00FF00FF00FF00FF00FF00FF00FF00FF<CR>
802000FF00FF00FF00FF00FF00FF00FF00FF00FF00FF00FF00FF00FF00FF00FF00FF00FF<CR>
802000FF00FF00FF00FF00FF00FF00FF00FF00FF00FF00FF00FF00FF00FF00FF00FF00FF<CR>
8020FF00FF00FF00FF00FF00FF00FF00FF00FF00FF00FF00FF00FF00FF00FF00FF00FF00<CR>
8020FF00FF00FF00FF00FF00FF00FF00FF00FF00FF00FF00FF00FF00FF00FF00FF00FF00<CR>
8020FF00FF00FF00FF00FF00FF00FF00FF00FF00FF00FF00FF00FF00FF00FF00FF00FF00<CR>
8020FF00FF00FF00FF00FF00FF00FF00FF00FF00FF00FF00FF00FF00FF00FF00FF00FF00<CR>
0000FF10<CR>
8020FFFFFF000000000000000000000000000000000000000000000000000000FFFFFF<CR>
```

```
FFFF<CR>


<STX>L<CR>
D11<CR>
1Y1100001000050HEXFILE<CR>
E<CR>
```

Output:

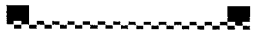


Fig. A7-6

A8. FONT DOWNLOADING COMMANDS

The following commands are used for downloading the soft fonts with the PCL bitmap format. Refer to the PCL technical manual for their descriptions. (PCL4 or PCL5).

Command	**Description**
<ESC>*c###D	Assigns the soft fonts ID number (### : 0 ~ 999)
<ESC>)s###W	Downloads font descriptor (### : length of font descriptor)
<ESC>*c###E	Sets character code (### : 1 ~ 255)
<ESC>(s###W	Downloads character descriptor and image (### : length of character descriptor and image)

For more information on the soft font format, please refer to the related PCL technical manual.

Example:
```
<ESC>*c100D
<ESC>)s26W ...
<ESC>*c33E
<ESC>(s32W ...
. . .
. . .
<STX>XB

<STX>L
190010002000200THIS IS A TEST FOR PCL SOFT FONT.
E
```

Result:

This example downloads a PCL soft font with ID 100 into flash memory, and then selects and prints it.

A9. PROGRAMMING EXAMPLES FOR TEXTS

This section explains how to select the internal fonts to format the desired printout and generate the font styles as well as font characteristics. Please refer to the User's Manual for the symbol table of each font.

Font 0: This is a USASCII set from code <0x21> to <0x7F>.

Example:

```
100000000200000Font 0 : ASCII Character Set<CR>
```

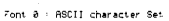


Fig. A9-1

Font 1: This is a USASCII and extension set.

Example:

```
110000000400000Font 1 : ASCII+Extension Character Set<CR>
```

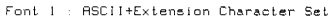


Fig. A9-2

Font 2: This is a USASCII and extension set.

Example:

```
120000000600000Font 2 : ASCII+Extension Character Set<CR>
```

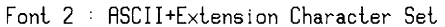


Fig. A9-3

Font 3: This font includes numeric and uppercase letters.

Example:

```
130000000900000Font 3 : Alphanumeric Uppercase font<CR>
```

FONT 3 : ALPHANUMERIC UPPERCASE FONT

Fig. A9-4

Font 4: This font includes numeric and uppercase letters.

Example:

```
140000001200000Font 4 : Alphanumeric Uppercase font<CR>
```

FONT 4 : ALPHANUMERIC UPPERCASE FONT

Fig. A9-5

Font 5: This font includes numeric and uppercase letters.

Example:

```
150000001600000Font 5 : Alphanumeric Uppercase font<CR>
```

FONT 5 : ALPHANUMERIC UPPERCASE FONT

Fig. A9-6

Font 6: This font includes numeric and uppercase letters.

Example:

```
160000001000000Font 6 : Alphanumeric<CR>
160000000500000       Uppercase font<CR>
```

FONT 6 : ALPHANUMERIC UPPERCASE FONT

Fig. A9-7

Font 7: This font includes OCR-A ASCII characters.

Example:

```
170000001500000Font 7 : OCR-A font<CR>
```

Font 7 : OCR-A font

Fig. A9-8

Font 8: This font includes numeric and some special characters only. It is an OCR-B set.

Example:

```
170000002000000Font 8 : OCR-B font<CR>
180000002000200123456789<><CR>
```

Fig. A9-9

ASD smooth font Set

The smooth font set includes USASCII and the extension characters with multiple point sizes. The font type is '9' for a smooth font and the height field represents the point size.

Example:
```
1900001004000000ASD : 6 Points. ABCabc<CR>
1900002006000000ASD : 8 Points. ABCabc<CR>
1900003008000000ASD : 10 Points. ABCabc<CR>
1900004011000000ASD : 12 Points. ABCabc<CR>
1900005015000000ASD : 14 Points. ABCabc<CR>
1900006019000000ASD : 18 Points. ABCabc<CR>
```

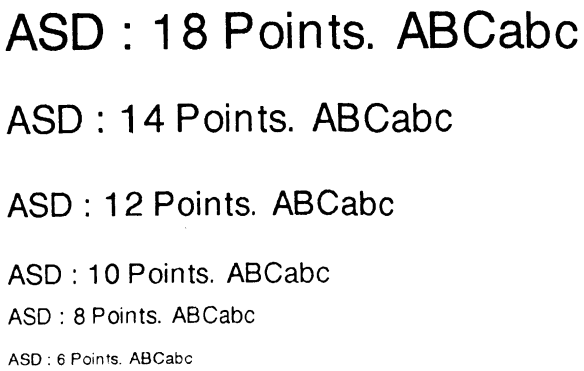


Fig. A9-10

Courier Fonts

The Courier font includes 8 symbol sets with 15 points. It is only for models OS204/

OS214/OS214plus/R400/X1000+/X2000+/G6000. The font type is ':' and the height field represents the symbol set.

Height	Symbol set
000	Roman 8
001	ECMA 94
002	PC
003	PC-A
004	PC-B
005	Legal
006	PC437 (Greek)
007	Russian

Example:
```
1:0000000200000Courier : Roman 8 : [\]^{|}~<CR>
1:0000100500000Courier : ECMA-94 : [\]^{|}~<CR>
1:0000200800000Courier : PC : <03H><04H><05H>[\]^<CR>
1:0000501100000Courier : Legal  : [\]^{|}~<CR>
1:0000601400000Courier : PC 437 (GREEK)<CR>
```

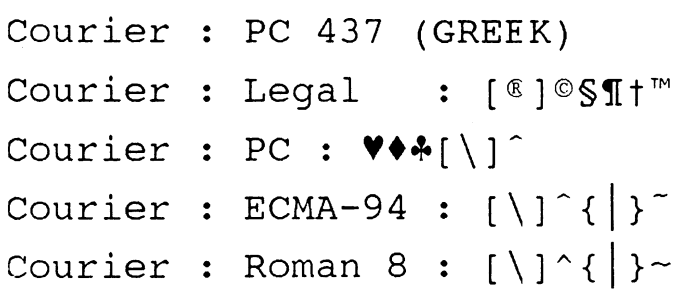


Fig. A9-11

A10. PROGRAMMING EXAMPLES FOR BAR CODES

This printer supports 24 bar code types, including 21 of one dimension and 3 of two dimension bar codes. The functions of parameters are varied from the specific bar codes. The bar code cannot be printed out, if the input code is invalid or its length is not up to the specification.

Bar code A: Code 3 of 9

Length	Check sum	Type for readable string	Type for non-readable string	Valid codes	Bar ratio
variable	No	'A'	'a'	0 ~ 9, A ~ Z, $%*+-./ and space	2 : 1 ~3 : 1

Example: `130000001320010BAR CODE A : 3 OF 9<CR>`
`1A3000000800110194502228<CR>`

Fig. A10-1

Bar code B: UPC-A

Length	Check sum	Type for readable string	Type for non-readable string	Valid codes	Bar ratio
12 digits (11+1)	Yes	'B'	'b'	0 ~ 9	2 : 3 : 4

Example: `130000002000000BAR CODE B : UPC-A<CR>`
`1B000000180015502281234567<CR>`

Fig. A10-2

Bar code C: UPC-E

Length	Check sum	Type for readable string	Type for Non-readable string	Valid codes	Bar ratio
7 digits (6+1)	Yes	'C'	'c'	0 ~ 9	2 : 3 : 4

Example: `130000001000000BAR CODE C : UPC-E<CR>`
`1C000500080016065432 1<CR>`

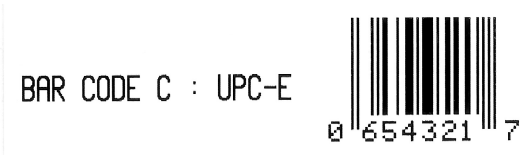


Fig. A10-3

Bar code D: Interleaved 2 of 5 (I25)

Length	Check sum	Type for readable string	Type for non-readable string	Valid Codes	Bar ratio
Variable	No	'D'	'd'	0 ~ 9	2 : 1 ~ 3 : 1

The digit count should be an even number otherwise a '0' will be automatically entered at the first position.

Example: `130000002200000BAR CODE D :<CR>`
`130000002000000INTERLEAVED 2 of 5<CR>`
`1D530800180017013579246 8<CR>`

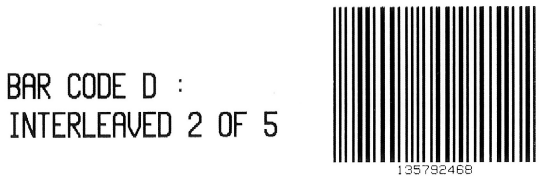


Fig. A10-4

Bar code E: Code 128 including subset A, B and C

The default code subset is B.

Subset A: Place an ASCII 'A' (DEC 65 or HEX 41) before the data to be encoded.

Subset B: place an ASCII 'B' (DEC 66 or HEX 42) before the data to be encoded.

Subset C: place an ASCII 'C' (DEC67, HEX43) before the data to be encoded. Subset C can only encode numeric data with even byte count (DEC 30~DEC 39).

If user not place an ASCII 'A',' B' or 'C' before the data to be encoded, the barcode will be judged into Subset B.

Example 1: Encoded data: "BBar code", Output data: "Bar code"

Example 2: Encoded data: "12345", Output data: "12345"

Length	Check sum	Type for readable string	Type for non-readable string	Valid codes	Bar ratio
variable	Yes	'E'	'e'	from code 0 to 127 (128 codes)	2 : 3 : 4

Example: `130000001100000BAR CODE E :<CR>`
`130004000900000CODE 128<CR>`
`1E00040008001 40TO JIMMY<CR>`

Fig. A10-5

The following example will print "24681357" by Code 128 subset C.

Example: 1E0004000800160C24681357<CR>

Bar code F: EAN-13

Length	Check sum	Type for readable string	Type for non-readable string	Valid codes	Bar ratio
13 digits (12+1)	Yes	'F'	'f'	0 ~ 9	2 : 3 : 4

Example: 130000002060000BAR CODE F : EAN-13<CR>
1F000500180016013592468228<CR>

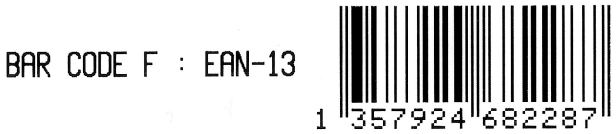


Fig. A10-6

Bar code G: EAN-8

Length	Check sum	Type for readable string	Type for non-readable string	Valid codes	Bar ratio
8 digits (7+1)	Yes	'G'	'g'	0 ~ 9	2 : 3 : 4

Example: 130000001100000BAR CODE G : EAN-8<CR>
1G300000080016002280 01<CR>

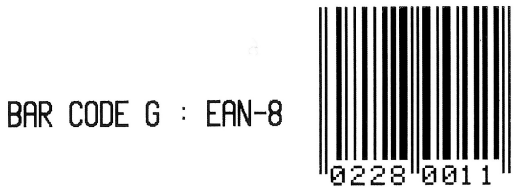


Fig. A10-7

Bar code H: HBIC

Health Industry Bar Code (HBIC) is same as bar code A (code 3 of 9), except that it includes an additional modulo 43 checksum.

Length	Check sum	Type for readable string	Type for non-readable string	Valid codes	Bar ratio
variable	Yes	'H'	'h'	0 ~ 9, A ~ Z, $%*+-./ and space	2 : 1 ~3 : 1

Example: 130000002400000BAR CODE H : HBIC<CR>
1H0000001800120HEALTH<CR>

Fig. A10-8

Bar code I: Coda bar

Length	Check sum	Type for readable string	Type for non-readable string	Valid codes	Bar ratio
at least 3 characters	No	'I'	'i'	0 ~ 9, A ~ D, $+-. : And /	2 : 1 ~3 : 1

Example: 130000000900000BAR CODE I : <CR>
130000001100000CODA BAR<CR>
1I00000000800100ABCD0123456789<CR>

Fig. A10-9

Bar code J: Interleaved 2 of 5 with a modulo 10 checksum

Same as bar code D (Interleaved 2 of 5), except that it includes an additional modulo 10 checksum.

Length	Check sum	Type for readable string	Type for non-readable string	Valid codes	Bar ratio
Variable	Yes	'J'	'j'	0 ~ 9	2 : 1 ~3 : 1

Example: 130000002100000BAR CODE J : I25<CR>
130000001900000WITH CHECKSUM<CR>
1J000000180016019970701<CR>

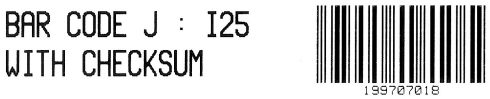


Fig. A10-10

Bar code K: Plessey

An additional checksum will be added to the bar code string where '+' character is inserted.

Length	Check sum	Type for readable string	Type for non-readable string	Valid codes	Bar ratio
1 ~ 14 digits	Yes	'K'	'k'	0 ~ 9	2 : 1 ~3 : 1

Example: 130000001100000BAR CODE K :<CR>
130000000900000PLESSEY<CR>
1K00000008001205038197 8<CR>

Fig. A10-11

Bar code L: Interleaved 2 of 5 with a modulo 10 checksum and shipping bearer bars

Same as bar code D (Interleaved 2 of 5) except that it includes a modulo 10 checksum and the horizontal shipping bearer bars.

Length	Check sum	Type for readable string	Type for non-readable string	Valid codes	Bar ratio
Variable	Yes	'L'	'l'	0 ~ 9	2 : 1 ~ 3 : 1

The horizontal bearer bars exist only when the input digit count is 13.

Example:
```
130000002300000BAR CODE L : I25<CR>
130000002100000WITH CHECKSUM &<CR>
130000001900000BEARER<CR>
1L000600180014019970701873 91<CR>
```

Fig. A10-12

Bar code M: UPC2

Length	Check sum	Type for readable string	Type for non-readable string	Valid codes	Bar ratio
2 digits	No	’M’	’m’	0 ~ 9	2 : 3 : 4

Example:
```
130000000900000BAR CODE M : UPC2<CR>
1M000500060016038<CR>
```

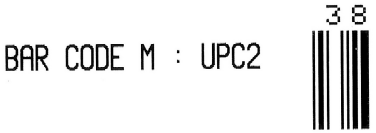


Fig. A10-13

Bar code N: UPC5

Length	Check sum	Type for readable string	Type for non-readable string	Valid codes	Bar ratio
5 digits	No	’N’	’n’	0 ~ 9	2 : 3 : 4

Example:
```
130000002000000BAR CODE N : UPC5<CR>
1N00050018001 6002280<CR>
```

Fig. A10-14

Bar code O: Code 93

Length	Check sum	Type for readable string	Type for non-readable string	Valid codes	Bar ratio
Variable	Yes	’O’	’o’	0 ~ 9, A ~ Z, $%+-./ and space	2 : 3 : 4

Example:
```
130000001100000BAR CODE O :<CR>
130000000900000CODE 93<CR>
1O00000000800120CODE 93 OK<CR>
```

Fig. A10-15

Bar code P: Postnet

Length	Check sum	Type for readable string	Type for Non-readable string	Valid Codes
Variable	Yes	Not defined	’p’	0 ~ 9

Example: 130000002100000BAR CODE P :<CR>
130000001900000POSTNET<CR>
1p00060018001201997O7<CR>

Fig. A10-16

Bar code Q: UCC/EAN Code 128

Length	Check sum	Type for readable string	Type for non-readable string	Valid codes	Bar ratio
20 digits (19+1)	Yes	’Q’	’q’	0 ~ 9	2 : 3 : 4

Example: 130000001300000BAR CODE Q<CR>
130000001100000: UCC/EAN<CR>

130000000900000128<CR>
1Q000700100008578129808999089998<CR>

Fig. A10-17

Bar code R: UCC/EAN Code 128 K-MART

Length	Check sum	Type for readable string	Type for non-readable string	Valid codes	Bar ratio
18 digits	Yes	’R’	’r’	0 ~ 9	2 : 3 : 4

Example: 130000002300000BAR CODE R<CR>
130000002100000: UCC/EAN<CR>
130000001900000128 K<CR>
1R000600200008319970701194502280O<CR>

Fig. A10-18

Bar code S: UCC/EAN Code 128 Random weight

Length	Check sum	Type for readable string	Type for non-readable string	Valid codes	Bar ratio
34 digits	Yes	’S’	’s’	0 ~ 9	2 : 3 : 4

Example:

```
130000001300000BAR CODE S : UCC/EAN<CR>
130000001100000CODE 128 RANDOM WEIGHT<CR>
1S000500040000012345678901234567890123456789012345678901234<CR>
```

Fig. A10-19

Bar code T: Telepen

Length	Check sum	Type for readable string	Type for non-readable string	Valid codes	Bar ratio
Variable	Yes	’T’	’t’	From 0 to 127	2 : 3 : 4

Example:
```
130000000900000BAR CODE T :<CR>
130000000700000TELEPEN<CR>
1T0005000600120ABC!-=.<CR>
```


Fig. A10-20

Bar code V: FIM (Facing Identification Mark)

Length	Check sum	Type for readable string	Type for non-readable string	Valid codes
1 character	No	Not defined	’v’	A, B, C and D

Example:
```
130000000900000BAR CODE V :<CR>
130000000700000FIM<CR>
1v0000000600160B<CR>
```

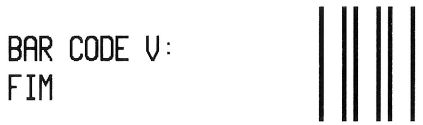


Fig. A10-21

Bar code U: UPS MaxiCode

This is a two dimensional bar code defined by UPS and AIM International. It applies the Reed-Solomon encoding rule. The bar code’s data stream consists of 5 different sections:

- a 5-digit primary zip code

- a 4-digit secondary zip code
- a 3-digit country code
- a 3-digit class of service code
- a data string that can not exceed 84 characters

Example:
```
130000002100000BAR CODE U :<CR>
130000001900000MAXICODE<CR>
1u000000150016032987444484O555TO JIMMY<CR>
```

BAR CODE U :
MAXICODE

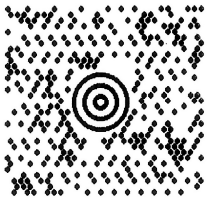


Fig. A10-22

Bar code W: DataMatrix

The Datamatrix is a two dimensional bar code (Only for ECC200 of Datamatrix symbol)

Command for DataMatrix:

*a*W1c*bdeeeffffgggg*2000*jjjkkk*ddddddddd...dd

Parameters:

a : Print direction: ‘1’, ’2’, ’3’ or ’4’.

W 1c: Fixed value, for extended bar code set.

c: DataMatrix bar code.

b : Horizontal multiplier for module size.

d : Vertical multiplier for module size.

eee : Always 000.

ffff : Y coordinate.

gggg : X coordinate.

200 : Fixed value for ECC200 of Datamatrix symbol.

0 : Fixed value.

jjj : A 3 digit even number (or 000) of rows requested.
000 causes rows to be automatically determined.

kkk : A 3 digit even number (or 000) of columns requested.
000 causes columns to be automatically determined.

ddddd...dd : data to be encoded and printed.

Example:
```
130000000700050BAR CODE W :<CR>
130000000500050DATAMATRIX<CR>
1W1c55000005001702000000000DATA MATRIX<CR>
```

Encode the data "DATA MATRIX"

Horizontal multiplier : 4 Vertical multiplier : 4

Y coordinate : 50 X coordinate : 31

BAR CODE W :
DATAMATRIX

Fig. A10-23

Bar code W1d: QR Code (Auto format)

QR Code is only supported on OS-214Plus, OS-2140, A-2240, A-3140 X-1000VL, X-2000v, X-2300E, X-3200 and CP-2140.

QR Code has four type valid characters (Numeric data, alphanumeric data, 8-bit byte data, and Kanji). QR Code also has variable length.

Command for QR Code:

*a*W1d*cdeeeffffgggghh…h*

Parameters:

a : Print direction: ‘1’, ’2’, ’3’ or ’4’.

W 1d: Fixed value, for extended bar code set.

Automatic format. The data string (hh...h) to be data only.

c : Horizontal multiplier for module size. The “c” and “d” must be equal, because each cell in the bar code is square. The cell unit depends on the the conversion mode *(<STX>n or <STX>m*). Value: 1~9, A~Z and a~z.

d : Vertical multiplier for module size. Value: 1~9, A~Z and a~z.

eee : Value:000~999.(Ineffective; must be numeric)

ffff : Y coordinate.

gggg : X coordinate.

hh…h: Data string.

Example:

```
<STX>L<CR>
1W1d4400001000100123321 4567<CR>
1W1d4400001000200 立象科技<CR>
1W1d4400001000300CHINESE 中文<CR>
1W1d550000200010012ABCD456as 印表機<CR>
```



```
1211000004000 50QR Code-auto format(W1d)<CR>
E<CR>
```

QR Code-auto format(W1d)

Fig. A10-24

Bar code W1D: QR Code (Manual formatting)

QR Code has four type valid characters (Numeric data, alphanumeric data, 8-bit byte data, and Kanji). QR Code also has variable length.

Command for QR Code:

*a*W1D*cdeeeffffgggg[q,][e[m]i,]cdata cdata cdata…cdata*

Parameters:

a : Print direction: ‘1’, ’2’, ’3’ or ’4’.

W 1D: Fixed value, for extended bar code set.

Manual format. The data string (hh…h) to be entered with a comma (,) as a separated field, the separated fields are optional in each QR code specifications, and the first field indicates Model1 or Model 2 QR Code. Default model: model 2.

c : Horizontal multiplier for module size. The “c” and “d” must be equal,

because each cell in the bar code is square. The cell unit depends on the the conversion mode *(<STX>n or <STX>m*). Value: 1~9, A~Z and a~z.

d : Vertical multiplier for module size. Value: 1~9, A~Z and a~z.

eee : Value:000~999.(Ineffective; must be numeric)

ffff : Y coordinate.

gggg : X coordinate.

q : QR Code model number; optional.

Values: 1, 2

Default value: Model 2.

e : Error correction level.

Values: H= Ultra reliability level (30%)

Q= High reliability level (25%)

M= Standard reliability level (15%)

L= High density level (7%)

m: Mask number; optional.

Values: None= Automatic selection

0~7= Mask 0~Mask 7

8= No mask

i: Data input mode.

Values: A= Automatic setting, ASCII

a=Automatic, hex-ASCII

M=Manual setting, ASCII

m=Manual, hex-ASCII

cdata: Character mode.

Values: N=Numeric, N data

A=Alphanumeric, A data

Bxxxx= For 8-bit byte mode; xxxx is indicate number of characters. (A Simple or Traditional Chinese word is 2 characters)

K=Kanji, K data

(The four values are immediately followed by data.)

Example:

```
<STX>L<CR>
1W1D55000008001002,HA,Athis QR is OK<CR>
1W1D55000008002002,Ha,B0016立象科技 is GOOD<CR>
1W1D55000008003002,HM,N7533967<CR>
1W1D55000018001002,Hm,Athis QR is OK<CR>
121100000400020QR Code-Manual format(W1D)<CR>
E<CR>
```

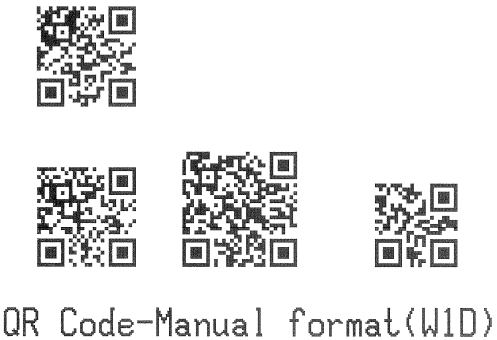


Fig. A10-25

Bar code W1f: Aztec Bar Code (Variable Length)

Aztec Bar Code is only supported on OS-2140 series/A-2240 series/A-3140 series/ CP series/X-2300E/X-3200.

Command for Aztec Bar Code:

*a*W1f*cdeeeffffggggijjjkk…k*

Parameters:

a : Print direction: ‘1’, ’2’, ’3’ or ’4’.

W 1f: Fixed value, for extended bar code set.

This parameter sets Aztec bar code length as variable.

c : Horizontal multiplier for module size.

Default: 0; Value: 1~9, A~Z and a~z.

d : Vertical multiplier for module size.

Default: 0; Value: 1~9, A~Z and a~z.

eee : Ineffective; must be 000.

ffff : Y coordinate.

gggg : X coordinate.

i: ECI (Extended Channel Interpretation) mode.

Disable ECI mode: 0, Enable ECI mode: 1

jjj: Error correction.

000: Default value, approximately 23%.

001~099: Error correction percentage.

101~104: 1 to 4 layers in compacted symbol

201~232: 1 to 32 layers in full symbol.

300: Rune symbol

kk…k: Data string.

Example:

```
<STX>L<CR>
1W1f880000170010001000AZTEC barcode(W1f)<CR>
122200002700100Aztec Barcode(W1f) <CR>
E<CR>
```

Aztec Barcode(W1f)

Fig. A10-26

Bar code W1F: Aztec Bar Code (Specified Length/Byte count)

Aztec Bar Code is only supported on OS-2140 series/A-2240 series/A-3140 series/ CP series/X-2300E/X-3200.

Command for Aztec Bar Code:

*a*W1f*cdeeeffffggggghhhhijjjkk…k*

Parameters:

a : Print direction: ‘1’, ’2’, ’3’ or ’4’.

W 1f: Fixed value, for extended bar code set.

This parameter sets Aztec bar code length as specified with a Byte Count Specifier.

c : Horizontal multiplier for module size.

Default: 0; Value: 1~9, A~Z and a~z.

d : Vertical multiplier for module size.

Default: 0; Value: 1~9, A~Z and a~z.

eee : Ineffective; must be 000.

ffff : Y coordinate.

gggg : X coordinate.

hhhh: Length Specifier. The field termination is set by Byte Count.

This value includes all of the data following this byte count field, but not include itself.

i: ECI (Extended Channel Interpretation) mode.

Disable ECI mode: 0, Enable ECI mode: 1

jjj: Error correction.

000: Default value, approximately 23%.

001~099: Error correction percentage.

101~104: 1 to 4 layers in compacted symbol

201~232: 1 to 32 layers in full symbol.

300: Rune symbol

kk…k: Data string.

Example:

```
<STX>L<CR>
1W1F880000025010000220000AZTEC barcode(W1F)<CR>
122200001250100Aztec Barcode(W1F)<CR>
E<CR>
```

Aztec Barcode(W1F)

Fig. A10-27

Bar code W1k: RSS (GS1 DataBar)

This command can print all RSS-14 bar code. (RSS-14, RSS Limited, RSS-14 Stacked, RSS-14 Truncated, RSS Expanded and RSS Stacked Omnidirectional)

Command for RSS:

*a*W1k*cdeeeffffgggghijmn…n*| *p…p* *(parameter1)*
*a*W1k*cdeeeffffgggghijmnn p…p*|*q…q* *(parameter2)*

Parameter1:

a: Print direction: ‘1’, ’2’, ’3’ or ’4’.

W1: Fixed value, for extended bar code set.

k: RSS bar code.

c: Bar width ratio. No reference. *(Value= bar narrow ratio.)*

d: Bar narrow ratio. *Default value=2. (Valid value=1~9)*

eee: Barcode height. Default value: refer to the following table.

(If barcode height value=0,

the actual barcode height=’default’’d’*’i’,*

the actual barcode height=’eee’.

The ‘eee’ unit is set by the “<STX>n” or “STX>m” command.)

Barcode	Description
R	RSS-14 (GS1 DataBar Omnidirectional) *Width multiplier: 96 pixels;* *Min. Height Multiplier: 33 pixels (default)*
L	RSS Limited (GS1 DataBar Limited) *Width multiplier: 74pixels;* *Min. Height Multiplier: 10 pixels (default)*
S	RSS Stacked (GS1 DataBar Stacked) *Width multiplier: 50 pixels;* *Min. Height Multiplier: 13 pixels (default)*
T	RSS Truncated (GS1 DataBar Truncated) *Width multiplier: 96pixels;* *Min. Height Multiplier: 13 pixels (default)*

D	RSS Stacked Omnidirectional (GS1 DataBar Stacked Omnidirectional) *Width multiplier: 50 pixels;* *Min. Height Multiplier: 69 pixels (default)*

ffff : Y coordinate. *Value: 0000~9999*

gggg : X coordinate. *Value: 0000~9999*

h: RSS type

R = RSS-14 (GS1 DataBar Omnidirectional)

T= RSS-14 Truncated (GS1 DataBar Truncated)

S = RSS-14 Stacked (GS1 DataBar Stacked)

D = RSS Stacked Omnidirectional
(GS1 DataBar Stacked Omnidirectional)

L = RSS Limited (GS1 DataBar Limited)

i : Pixel multiplier. *Default: 1; Value: 1~9*

j: No reference. Value= always 0.

m: No reference. Value= always 0.

n…n: *Value:0~9, numeric ; numeric linear data, length 13.*

|: Optional. Vertical bar separates primary data from secondary 2D data.

p…p: 2D data.

Parameter2:

a: Print direction: ‘1’, ’2’, ’3’ or ’4’.

W1: Fixed value, for extended bar code set.

k: RSS bar code.

c: Bar width ratio. No reference. *(Value= bar narrow ratio.)*

d: Bar narrow ratio. *Default value=2. (Valid value=1~9)*

eee: Barcode height. Default value: refer to the following table.

(If barcode height value=0,

the actual barcode height=’default’’d’*’i’,*

the actual barcode height=’eee’.

The ‘eee’ unit is set by the “<STX>n” or “STX>m” command.)

Barcode	Description
E	RSS Expanded (GS1 DataBar Expanded) *Width multiplier: 102~534 pixels;* *Min. Height Multiplier: 34pixels (default)* *Row:1~11*

ffff : Y coordinate. *Value: 0000~9999*

gggg : X coordinate. *Value: 0000~9999*

h: RSS type

E = RSS Expanded (GS1 DataBar Expanded)

i : Pixel multiplier. *Default: 1; Value: 1~9*

j: No reference. Value= always 0.

m: No reference. Value= always 0.

nn: Segments per row. Only work in RSS Expanded

Default value: 22; Accepted Values: 2-22(even only)

p…p: Alphanumeric. *Value: 0~9*

|: Optional. Vertical bar separates primary data from secondary 2D data.

q…q: 2D data.

Example:

<STX>L<CR>

```
D11<CR>
1W1k0000000200050R10089121121|RSS-14<CR>
1W1k0000000800050L10089121121|RSS Limited<CR>
1W1k0000001300050S10089121121|RSS Stacked<CR>
1W1k0000002000050T10089121121|RSS Truncated<CR>
1W1k0000002500050D10089121121|RSS Stacked
Omnidirectional<CR>
1W1k0000003700050E100220188689121121|RSS Expanded<CR>
1W1k0000004500050E100040188689121121|RSS Expanded
Stacked<CR>
121100000200200RSS-14<CR>
121100000800200RSS Limited<CR>
121100001300200RSS Stacked<CR>
121100002000200RSS Truncated<CR>
121100002500200RSS Stacked Omnidirectional<CR>
121100003700240RSS Expanded<CR>
121100004500200RSS Expanded Stacked<CR>
Q0001<CR>
E<CR>
```

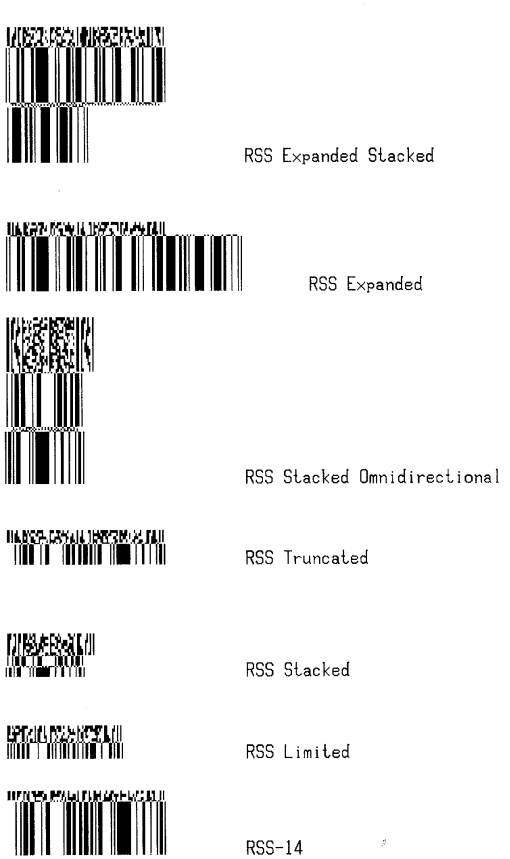



Fig. A10-28

Bar code Z: PDF-417

This is a two dimensional bar code defined by AIM International. It applies the Reed-Solomon encoding rule and includes all ASCII characters. It provides the function of multiple-level error detection and correction. The bar code's data stream consists of 6 different sections:

Length	Description
1	F : normal, T : truncated
1	0 ~ 8 : security level
2	00 ~ 99 : aspect ratio, 00 stands for 1:2
2	03 ~ 90 : row number, 00 for best fit
2	01 ~ 30 : column number, 00 for best fit
Variable	Data string

Example: `130000002100000BAR CODE Z :<CR>`
`130000001900000PDF-417<CR>`
`1z4900001800140F0001002ARGOXINFO<CR>`

BAR CODE Z :
PDF-417

Fig. A10-29

Bar code W1z: MiocroPDF417

MicroPDF417 is only supported on OS-2140 series/A-2240 series/A-3140 series/ CP series/X-2300E/X-3200.

Command for MicroPDF417:

*a*W1z*cdeeeffffgggghijkom…m*

Parameters:

a : Print direction: ‘1’, ’2’, ’3’ or ’4’.

W 1z: Fixed value, for extended bar code set.
This parameter sets MicroPDF417.

c : Horizontal multiplier for module size.

Default: 0; Value: 1~9, A~Z and a~z.

d : Vertical multiplier for module size.

Default: 0; Value: 1~9, A~Z and a~z.

eee : Ineffective; must be 000.

ffff : Y coordinate.

gggg : X coordinate.

h: Column number; Value: 1~4.

i: Row number; Value: 0~9 and A.

j: Byte compaction mode for binary data.

Auto mode: 0; Byte compaction mode: 1.

k: Substitute Macro character function.

Disable substitution mode: 0; Enable substitution mode: 1

o: Fixed value.

m…m: Data string.

h	*i*	Columns	Rows	Max Binary Data (Bytes)	Max Alphabetic Characters	Max Numeric Characters
1	0	1	11	3	6	8
1	1	1	14	7	12	17
1	2	1	17	10	18	26
1	3	1	20	13	22	32
1	4	1	24	18	30	44
1	5	1	28	22	38	55
2	0	2	8	8	14	20

2	1	2	11	14	24	35
2	2	2	14	21	36	52
2	3	2	17	27	46	67
2	4	2	20	33	56	82
2	5	2	23	38	67	93
2	6	2	26	43	72	105
3	0	3	6	6	10	14
3	1	3	8	10	18	26
3	2	3	10	15	26	38
3	3	3	12	20	34	49
3	4	3	15	27	46	67
3	5	3	20	39	66	96
3	6	3	26	54	90	132
3	7	3	32	68	114	167
3	8	3	38	82	138	202
3	9	3	44	97	162	237
4	0	4	4	8	14	20
4	1	4	6	13	22	32
4	2	4	8	20	34	49
4	3	4	10	27	46	67
4	4	4	12	34	58	85
4	5	4	15	45	76	111
4	6	4	20	63	106	155
4	7	4	26	85	142	208
4	8	4	32	106	178	261
4	9	4	38	128	214	313
4	A	4	44	150	250	366

Example:

```
<STX>L<CR>
1W1z4600001300020440000MICROPDF417<CR>
121100001800030Micro PDF417(W1z)<CR>
E<CR>
```

Micro PDF417(W1z)

Fig. A10-30

Bar code W1Z: MiocroPDF417 (with Specified Byte Count)

This barcode is only supported on OS-2140 series/A-2240 series/A-3140 series/ CP series/X-2300E/X-3200.

Command for MicroPDF417 (with Specified Byte Count):

*a*W1Z*cdeeeffffggggghhhhm…m*

Parameters:

a : Print direction: ‘1’, ’2’, ’3’ or ’4’.

W 1Z: Fixed value, for extended bar code set.

This parameter sets MicroPDF417 (with Specified Byte Count).

c : Horizontal multiplier for module size.

Default: 0; Value: 1~9, A~Z and a~z.

d : Vertical multiplier for module size.

Default: 0; Value: 1~9, A~Z and a~z.

eee : Ineffective; must be 000.

ffff : Y coordinate.

gggg : X coordinate.

hhhh: Specify Byte count.

m…m: Data string; data string must refer to *hhhh*.

Example:

```
<STX>L<CR>
1W1Z4600001300020001220000MICRO<0X0D)Z<CR>
121100001800030Micro PDF417(W1Z)<CR>
E<CR>
```

Micro PDF417(W1Z)

Fig. A10-31

APPENDIX AA: HEX GRAPHIC FORMAT

Unlike the PCX, BMP and IMG formats, the HEX format is a proprietary one.

It consists of 3 types of records.

Record type	Format	Description
Data	80xx[…]	xx : hex value, stands for byte count. […] : image data, 2 hex digits represent one byte raster image.
Repeat	0000FFxx	xx: repeat count. The repeated data will appear at the subsequent data record. The maximum value is 255 (FFH). If the actual repeat count is more than 255, split it to fit the range.
End	FFFF	End the HEX file.

APPENDIX AB: HOW TO SEND THE COMMANDS TO PRINTER

The way to send a command file edited under MS-DOS in PC system is subject to your environment:

1. Suppose you connect the serial cable to COM1:
   - Set the baud rate and data format (the default baud rate under DOS is 2400)
   - Copy the command file to COM1 port

```
>MODE COM1:9600,N,8,1,P
>COPY/B CMDFILE COM1:
```

2. Suppose you connect the Centronics cable to LPT1:
   - Just copy the command file to LPT1: port

```
>COPY/B CMDFILE LPT1:
```

3. Suppose you connect the serial cable to COM1: and use Quick Basic
   - Open a device file and set related parameters
   - Run the Basic program

Basic example program:

```
1   ' Continuous label(2 inches), direct thermal
2   ' Print a bar code and text string
3   ' 2 copies
5   PRINT "A TEST FOR COM PORT"
10  OPEN "COM1:9600,N,8,1" FOR RANDOM AS #1
20  PRINT #1, CHR$(2) + "KI7" + CHR$(0) ' for direct thermal
30  ' CHR$(2) + "KI7" + CHR$(1)  : for thermal transfer
40  PRINT #1, CHR$(2) + "c0200"    ' continuous, 2-inch height
55  PRINT #1, CHR$(2) + "L"
60  PRINT #1, "D11"              ' Resolution
70  PRINT #1, "1A5200000400095ARGOX"    ' Bar code A: C39
80  PRINT #1, "131100000050030THIS IS A TEST FOR SERIAL PORT."
85  PRINT #1, "Q0002"      ' Copy count
90  PRINT #1, "E"         ' FEED
100 END
```

APPENDIX AC: FONT SELECTION FROM FONT BOARD

The special font board is used for special font styles or different languages like Chinese, Japanese and Korean. And the commands for extension fonts are similar to those of standard fonts (font 0 ~ font 9).

Font type	Command	200 dpi font size	300 dpi font size
Chinese-Traditional font	‘;’	24x24	24x24
Chinese-Simplified font	‘;’	24x24	24x24
Japanese font	‘;’	24x24	32x32
	‘<’	16x16	24x24
Korean font	‘;’	24x24	32x32
	‘<’	16x16	24x24

The command of extension fotn is ‘;’ or ‘<’ and that can offer different font size.

Example:

```
1;1100001000200THIS IS EXTENSION FONT IN BOARD
```

The above command specifies:

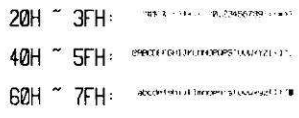
- ‘1’ - Portrait orientation.
- ‘;’ - Selects font from font board.
- ‘11’ - Both width multiplier and height multiplier are 1.
- ‘000’ – Fixed value.
- ‘0100’ - Y coordinate.
- ‘0200’ - X coordinate.

APPENDIX AD: FONTS AND BAR CODES FOR PPLA

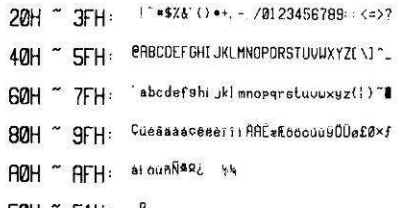
Internal Fonts

Fonts 0~8 have single symbol set.

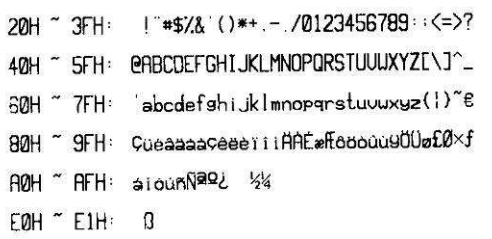
Font 0



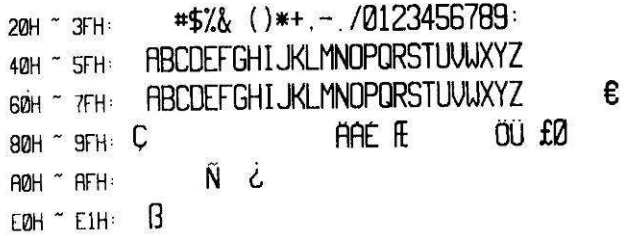
Font 1



Font 2



Font 3



Font 4

```
20H ~ 2FH:     #$%& ()*+,-./
30H ~ 3FH: 0123456789:
40H ~ 4FH:  ABCDEFGHIJKLMNO
50H ~ 5FH: PQRSTUVWXYZ
60H ~ 6FH:  ABCDEFGHIJKLMNO
70H ~ 7FH: PQRSTUVWXYZ    €
80H ~ 8FH: Ç                ÄÅ
90H ~ 9FH: É Æ       ÖÜ £Ø
A0H ~ AFH:       Ñ  ¿
E0H ~ E1H:  ß
```

Font 5

```
20H ~ 2FH:     #$%& ()*+,-./
30H ~ 3FH: 0123456789:
40H ~ 4FH:  ABCDEFGHIJKLMNO
50H ~ 5FH: PQRSTUVWXYZ
60H ~ 6FH:  ABCDEFGHIJKLMNO
70H ~ 7FH: PQRSTUVWXYZ    €
80H ~ 8FH: Ç                ÄÅ
90H ~ 9FH: É Æ       ÖÜ £Ø
A0H ~ AFH:       Ñ  ¿
E0H ~ E1H:  ß
```


Font 6

```
20H ~ 2FH:     #$%& ()*+,-./
30H ~ 3FH: 0123456789:
40H ~ 4FH:  ABCDEFGHIJKLMNO
50H ~ 5FH: PQRSTUVWXYZ
60H ~ 6FH:  ABCDEFGHIJKLMNO
70H ~ 7FH: PQRSTUVWXYZ    €
80H ~ 8FH: Ç                ÄÅ
90H ~ 9FH: É Æ       ÖÜ £Ø
A0H ~ AFH:       Ñ  ¿
E0H ~ E1H:  ß
```

Font 7

```
20H ~ 3FH:  !"#$%&'()*+,-./0123456789:;<=>?
40H ~ 5FH:@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_
60H ~ 7FH:`abcdefghijklmnopqrstuvwxyz{|}~
```

Font 8

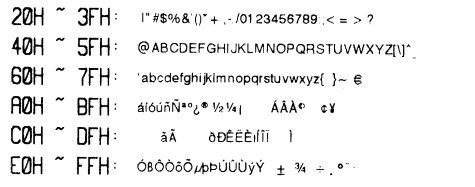
```
20H ~ 3FH:             +    0123456789  < >
40H ~ 5FH:   C E         N    ST   X Z
60H ~ 7FH:   C E         N    ST   X Z |
```

Font 9

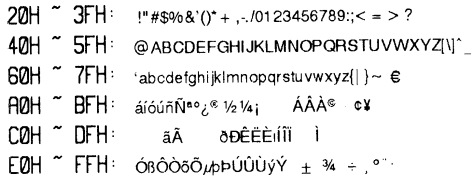
Font 9 (ASD smooth font set) includes 8 symbol sets, USASCII, UK, German, French, Italian, Spanish, Swedish, and Danish/Norwegian.

The sizes are 4, 6, 8, 10 12, 14 and 18 points. The 4-point font is for the model OS-314 /R600/X3000+only.

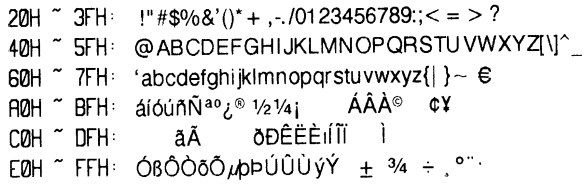
4 points



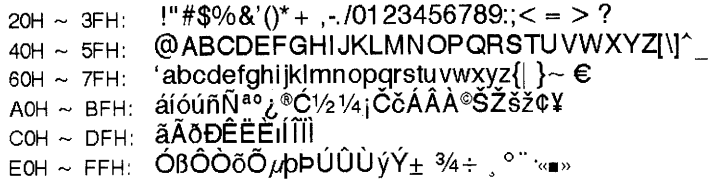
6 points



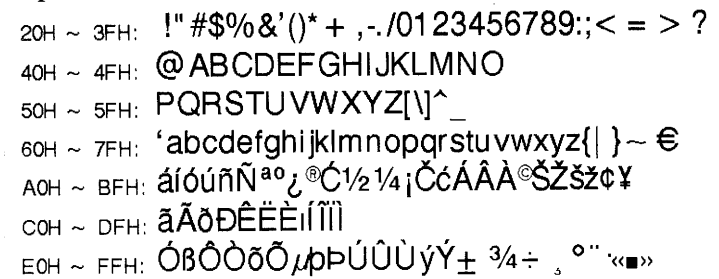
8 points



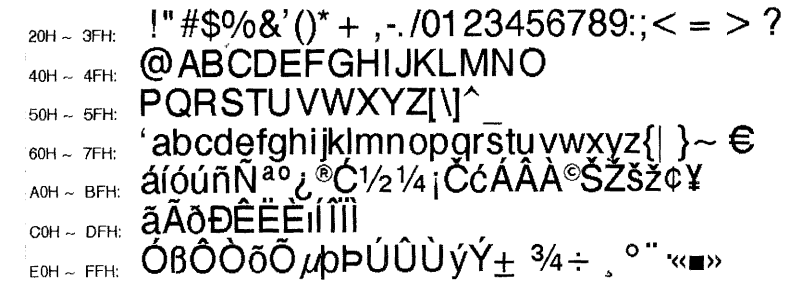
10 points



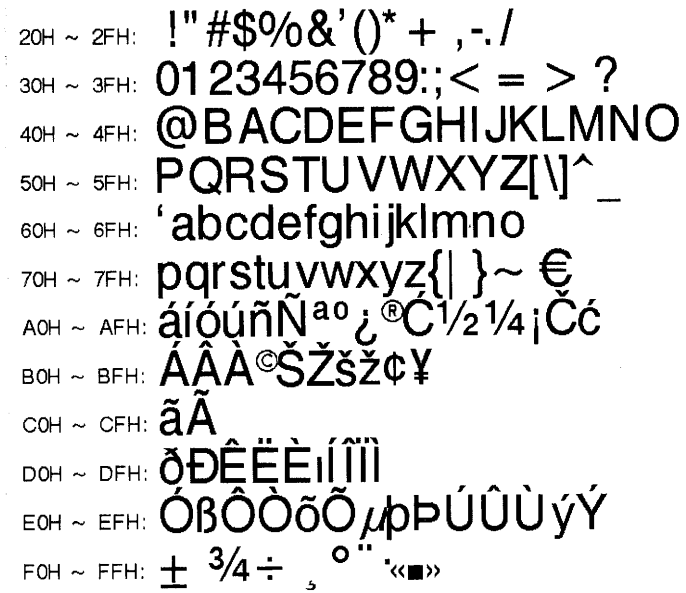
12 points



14 points



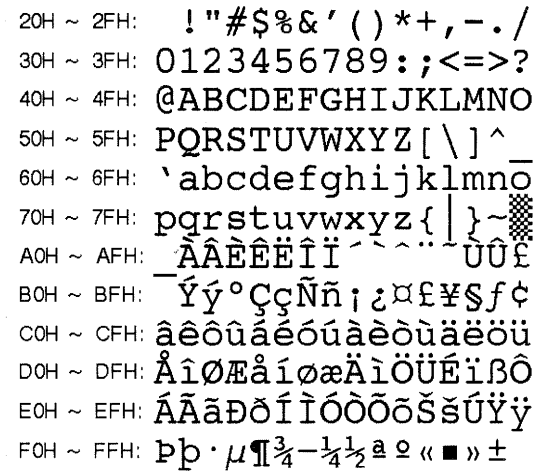
18 points



Courier Font set

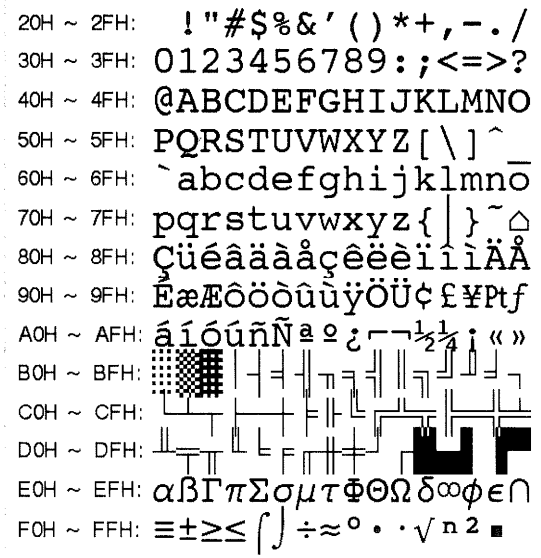
The Courier font set is only for 200dpi printers. It includes Roman-8, PC, PC-A, PC-B, EAMA-94, Legal, Greek and Russian symbol sets.

Roman-8

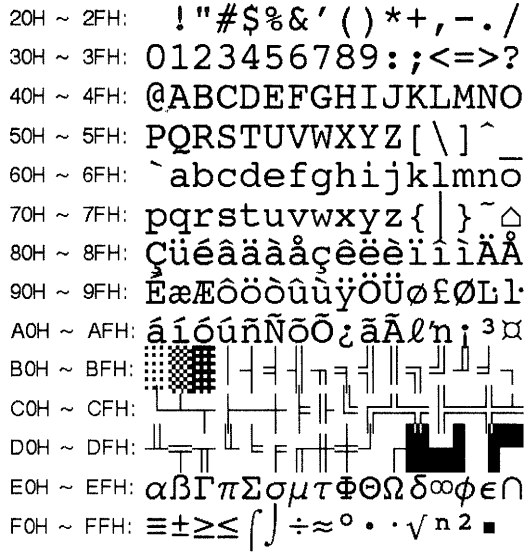


ECMA-94

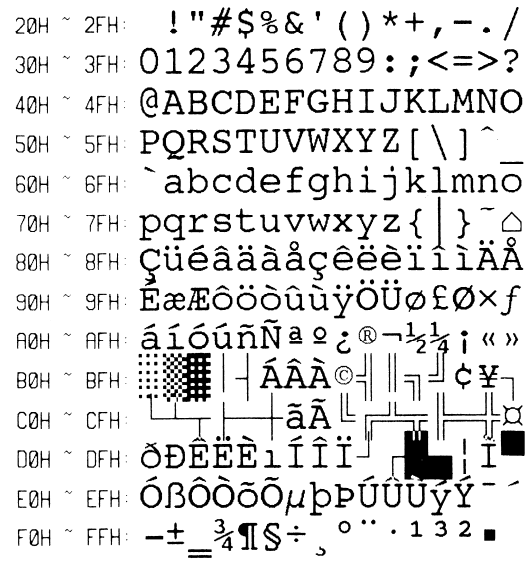
PC



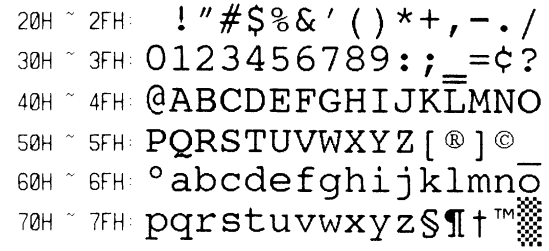
PC-A



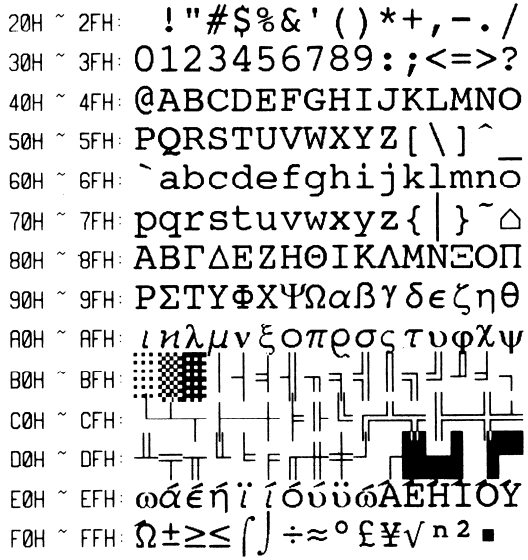
PC-B



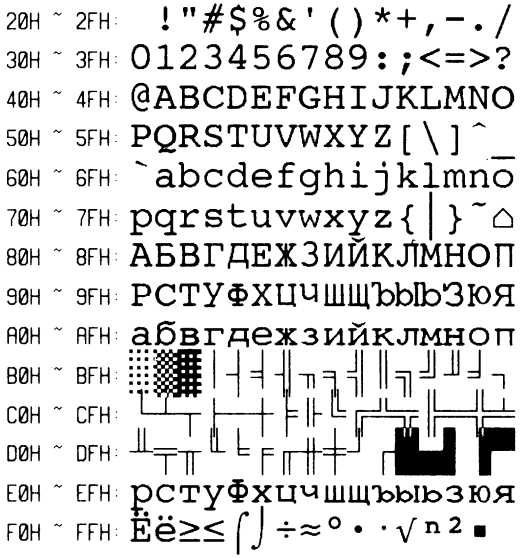
Legal



Greek



Russian



Internal Bar Codes

This PPLA supports 21 one dimensional bar codes and 8 two dimensional bar codes.

BAR CODE G : EAN-8

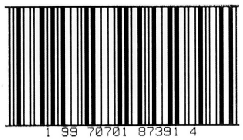
BAR CODE H : HBIC

CODA BAR
BAR CODE I :

BAR CODE J : I25
WITH CHECKSUM

BAR CODE K :
PLESSEY

BAR CODE L : I25
WITH CHECKSUM &
BEARER



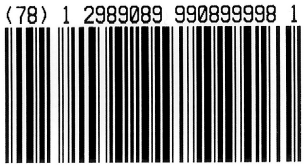
BAR CODE M : UPC2

BAR CODE N : UPC5

BAR CODE O :
CODE 93

BAR CODE P :
POSTNET

BAR CODE Q
: UCC/EAN
128



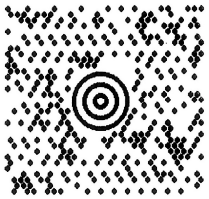
BAR CODE R
: UCC/EAN
128 K

BAR CODE S : UCC/EAN
CODE 128 RANDOM WEIGHT

BAR CODE T:
TELEPEN

BAR CODE V:
FIM

BAR CODE U :
MAXICODE



BAR CODE W :
DATAMATRIX

BAR CODE W1d:
QR(Auto format)

BAR CODE W1D:
QR(MANUAL FORMAT)

BAR CODE W1f:
Aztec Barcode

BAR CODE W1F:
Aztec Barcode

BAR CODE W1K:
RSS

BAR CODE W1z:
Mirco PDF417

BAR CODE Z :
PDF-417

APPENDIX AE: PPLA COMMANDS QUICK REFERENCE CHART

This reference chart is a summary of PPLA commands. A symbol " * " represents the printer supports such function. A character " S " indicates that the function can be set via DIP switches. A character "P" indicates that the function can be set via Panel.

Command	Description	A2240 A3140	OS203	OS2130	OS204	OS214	OS204 plus	OS214 plus	OS2140	OS314	R400 R600	X1000+	X1000VL	X2000+	X2000v	X3000+	X2300 X3200	G6000	CP2140 CP3140 CP-3140L
<SOH>*#*	Resets the printer.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
<SOH>A	Sends a readable status string.	*			*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
<SOH>B	Toggles pause condition.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
<SOH>D	Disables the interaction command.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
<SOH>E	Sends preset label to be	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
<SOH>F	Sends one byte printer status.	*			*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
System Setting Commands																			
<STX>K15_	Sets the gap height.				*	*													
<STX>K17*n*	Sets transfer type.	*				*		*	*	*	*	*	*	S	P	S	P	S	*
<STX>K18*n*	Sets baud rate.	*	*	*	*	*	*	*	*	*	*	*	*	S	P	S	P	S	*
<STX>K19*bd pt*	Sets baud rate, data length, parity and stop bit no.	*	*	*	*	*	*	*	*	*	*	*	*						*
<STX>KI<*m*	Sets symbol set for ASD smooth fonts.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
<STX>KX*xxx*L	Sets label length for continuous label.	*	*	*	*	*	*	*	*			*	*						*
<STX>KI*;n*	Sets control code set.	*	*	*	*	*	*	*	*	*	*	*	*	*S	P	*S	P	*S	*
<ESC>KI:_	Sets horizontal shift.	*			*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
<ESC>KI:_	Sets offset value for cutting or peeling position.	*	*	*	*	*	*	*	*	*	*	*	*	P	P	P	P	P	*
<ESC>@0	Clears the flash memory that is used for soft fonts, forms or graphics.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
<ESC>KJ*n*	Select JIS code or SHIFT JIS code when using Japanese	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
System Level Commands																			
<STX>A	Sets date and time.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
<STX>a	Enables label echo character.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
<STX>B	Gets date and time.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
<STX>cxxxx	Sets continuous label length.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
<STX>Dxxxx	Dumps the memory contents.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
<STX>Fxxxx	Sets copy count for stored	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
<STX>e	Selects edge sensor for gap.													*	*	*	*	*	

Command	Description	A2240 A3140	OS203	OS2130	OS204	OS214	OS204 plus	OS214 plus	OS2140	OS314	R400 R600	X1000+	X1000VL	X2000+	X2000v	X3000+	X2300 X3200	G6000	CP2140 CP3140 CP-3140L
<STX>F	Feeds a label.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
<STX>fxxx	Sets stop position and automatic back-feed for the	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
<STX>G	Prints stored label format.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
<STX>Imbfnn ...n	Downloads the graphics file.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
<STX>J	Sets pause for each printed label.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
<STX>j	This command cancels the pause function generated by	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
<STX>KQ	Inquires system configuration.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
<STX>k	Test RS232 Port.					*								*	*				
<STX>L	Enters label formatting state.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
<STX>Mxxxx	Sets maximum label length.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
<STX>m	Sets measurement to metric.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
<STX>n	Sets measurement to inches.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
<STX>Oxxxx	Sets prints start position.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
<STX>P	Enters data dump mode.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
<STX>Q	Clears memory.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
<STX>q*n*	Clears memory module.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
<STX>r	Selects reflective sensor for	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
<STX>T	Prints test pattern.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
<STX>U*nncc c*	Replaces the data of the specified data.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
<STX>V*n*	Sets cutter and dispenser confiuration.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
<STX>v	Inquires the printer verison.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
<STX>W*n*	Inquires the graphics/fonts and memory status.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
<STX>X*n*	Sets default module.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
<STX>xmtn...	Releases file from memory.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Label Formatting Commands																			
:xxxx	Sets cut by amount.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*

Command	Description	A2240 A3140	OS203	OS2130	OS204	OS214	OS204 plus	OS214 plus	OS2140	OS314	R400 R600	X1000+	X1000VL	X2000+	X2000v	X3000+	X2300 X3200	G6000	CP2140 CP3140 CP-3140L
A*n*	Sets logic image printing	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Cxxxx	Sets left margin.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Cxx	Sets cut by amount.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Dwh	Sets width and height pixel	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
E	Ends the job and exit from label formatting mode.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
G	Stores previous data to global register.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
<STX>S*n*	Retrieves the global register contents.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Hxx	Sets heat value.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
M	Toggles the mirror mode.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
m	Sets measurement in metric.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
n	Sets measurement in inches.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
P*n*	Sets print speed.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Qxxxx	Sets the quantity of labels to print.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Rxxxx	Sets vertical offset.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
rn...	Retrieves label data to printer buffer.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
smn...	Stores label data to printer buffer.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Tnn	Sets end of line code. The nn is represented by HEX value.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
X	Exits from Label Formatting mode.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
z	Changes slash zero to normal zero.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
+xx	Makes auto increment for numeric.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
>xx	Makes auto increment for alphanumeric.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
-xx	Makes auto decrement for numeric.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*

Command	Description	A2240 A3140	OS203	OS2130	OS204	OS214	OS204 plus	OS214 plus	OS2140	OS314	R400 R600	X1000+	X1000VL	X2000+	X2000v	X3000+	X2300 X3200	G6000	CP2140 CP3140 CP-3140L
<xx	Makes auto decrement for alphanumeric.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
^xx	Sets count by amount.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
<STX>T<string>	Print date and time.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Image Editing Commands																			
Text	Rthvoooyyyxxx[data string]	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Barcodes	Rthvoooyyyxxx[data string]	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Line	RX11000yyyyxxxxLaaabbb	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	RX11000yyyxxxlaaaabbbb	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Box	RX11000yyyyxxxxBaaabbbttttsss	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	RX11000yyyyxxxxbaaaabbbbttttss	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Graphic	1Y11000yyyyxxxxn....n	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*