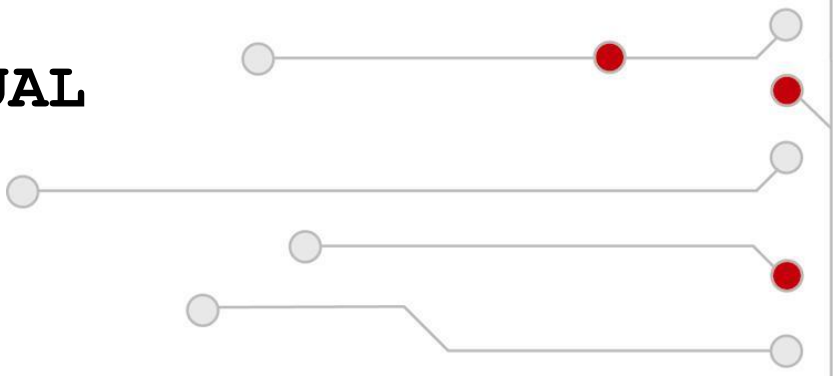
TECHNICAL MANUAL



PRINTER

CHD6800

Computer Hardware Design

Notice

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1 SETTINGS

1.1 **Serial Port**

On 6800 from Android the printer is accessible on "/dev/ttymxc4", which is RS-232 serial port with HW flow control.

On 6800W from Windows the printer is accessible on "COM4", which is RS-232 serial port with HW flow control. Printer is also accessible on “COM6”, which essentially is a USB CDC device and is faster than “COM4”. Do not use both ports simultaneously.

1.2 **Serial port settings**

Printer operates with following settings on “COM4”:

- Baud rate: 38400 bit/s
- Data bits: 8
- Parity: none
- Stop bits: 1
- Flow control: RTS/CTS

For “COM6” settings are not relevant – it works with same high speed disregarding baud rate etc.

2 COMMANDS

2.1 DLE EOT Real time status transmission

[FORMAT] <10>H<04>H<n>

[RANGE] n = 1, 2, 4

[FUNCTION] Transmits the printer status specified by *n* in real-time.

- n=1 Transmit printer status (v5.0.0)
- n=2 Transmit offline status
- n=3 Transmit error status (v5.3.0)
- n=4 Transmit paper roll sensor status

[CAUTION]

* The printer transmits the status without confirming if the HOST is ready to receive data.
* This command is executed when the data is received.
* This command is executed even when the receive buffer is full, or an error occurs.
* This command should not be used within the data sequence of another command that consists of two or more bytes. Please note this when sending graphical logo.
* This command CAN be used within the data sequence of another command that consists of two or more bytes IF delay at least 150ms after DLE or DLE EOT bytes before sending next byte. **This feature is unsupported** in v1.1.1 and lower versions (6800A, 6800W) and in v5.5.0 (6800W) and higher versions. Please note this when sending graphical logo.
* Starting with v5.5.0 (6800W) and higher DLE EOT can be used within other commands, but will be handled also as this command. For example, if graphical logo contains this command, this information will be printed on paper AND answer to HOST will also be sent.

***n* = 1: Printer status (v5.0.0)**

BIT	Function	VALUE	
		0	1
0	Not used	Always 0	-
1	Not used	-	Always 1
2	Drawer kick out connector pin 3 is HIGH	Low	High
3	Offline (e.g. printer error; for cause query **"Offline status"**)	Online 0	Offline 1
4	Not used	-	Always 1
5	Not used	Always 0	-
6	Not used	Always 0	-
7	Not used	Always 0	-

***n* = 2: Offline status**

BIT	Function	VALUE	
		0	1
0	Not used	Always 0	-

1	Not used	-	Always 1
2	Printer head	Down	Up
3	Not used	Always 0	-
4	Not used	-	Always 1
5	Paper-end stop	No stop	Stop
6	Error	No error	Error
7	Not used	Always 0	-

***n* = 3: Error cause (v5.3.0)**

BIT	Function	VALUE	
		0	1
0	Not used	Always 0	-
1	Not used	-	Always 1
2	Not used	Always 0	Up
3	Autocutter error	No error	Error
4	Not used	-	Always 1
5	Unrecoverable error	No error	Error
6	Automatically recoverable error	No error	Error
7	Not used	Always 0	-

Bit 5: Print head temperature out of range (head disconnected) = 1, print head temperature in range = 0
Bit 6: Print head temperature is overheat = 1, print head temperature is normal = 0

***n* = 4: Paper roll sensor status**

BIT	Function	VALUE	
		0	1
0	Not used	Always 0	-
1	Not used	-	Always 1
2	Not used	Always 0	-
3	Not used	Always 0	-
4	Not used	-	Fixed to off
5	Paper roll sensor	Present	End
6		Always 0	-
7	Not used	Always 0	-

2.2 **ESC !** Select print mode

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

[RANGE] 0≦n≦FFH

[FUNCTION] * Select print mode using *n* as follows.

BIT	Function	VALUE	
		0	1
0	Character font	Font A	Font B
1	Undefined		
2	Undefined		
3	Emphasizing **(v3.0.0)**	Cancelled	Selected
4	Double-height	Cancelled	Selected

5	Double-width	Cancelled	Selected
6	Undefined		
7	Underline	Unsupported	Unsupported

[CAUTION] * Double height concerns whole line to be printed
* This command is executed when the data is received.
~~* Emphasising is not applied to GB2312 and BIG5 encoding characters.~~ (v3.2.0)

[CAUTION] Specification of font by bit 0 and 1 are as follows:

BIT 0	Bit 1	Character font	Standard characters	Kanji character
0	0	Font A	12 x 30	24 x 24
0	1	Font B	12 x 20	24 x 24

* When both double-height and double-width modes (bit 4 and 5) are selected, quadruple size characters are printed.
* Double – height concerns whole line and last set value is used when printing line
* When the size of character font is enlarged to the horizontal direction, it is enlarged to the right based on the left side of the character.

[DEFAULT] n=0

2.3 ESC % Select/cancel user-defined character set (v4.0.0)

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

[RANGE] 0≦n≦255

[FUNCTION] Selects or cancels the user-defined character set.
- When the LSB of n is 0, the user-defined character set is not used
- When the LSB of n is 1, the user-defined character set is used.

[DEFAULT] n=0

[CAUTION] * User defined characters, bit image (GS *), print bitmap block (GS q) and print raster bit image (GS v 0) shares the same memory. Sending this command will discard bit image or bitmap block.
* This command is ignored if user defined characters are not defined using ESC & or are deleted, for example, using FS q, GS *, GS q or GS v 0 command.

2.4 ESC & Define user-defined characters (v4.0.0)

[FORMAT] <1B>H<26>H<y><c1><c2>[x1 d1...d(y×x1)]...[xk d1...d(y×xk)]

[DESCRIPTION] y - the number of bytes in the vertical direction
c1 – the beginning character code for the definition
c2 - the final code
x - the number of dots in the horizontal direction from the left edge.
d - the defined data (in column format, see FS q command for refference).

[RANGE] y – 4 for font A
y – 3 for font B
32 ≤ c1 ≤ c2 ≤ 126
0 ≤ x ≤ 12
0 ≤ d ≤ 255
k = c2 – c1 +1

[FUNCTION] Defines the user-defined character pattern for the specified character codes.

[CAUTION] * User defined characters, bit image (GS *), print bitmap block (GS q) and print raster bit image (GS v 0) shares the same memory. Sending this command will discard bit image or bitmap block.
* If x = 0, command data is considered finished and following data will be treated as other commands or printable characters.

2.5 ESC ? Delete user-defined characters (v4.0.0)

[FORMAT] <1B>H<3F>H<n>

[DESCRIPTION] Deletes the user-defined character pattern specified by character code n.

[RANGE] 32 ≤ n ≤ 126

[CAUTION] * This command is ignored if user defined characters are not defined using ESC & or are deleted, for example, using FS q, GS * or GS v 0 command.

2.6 ESC @ Initialize printer

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

[FUNCTION] Clears the data in the print buffer, resets formatting. Defaults to code page CP 1257, justification.

[CAUTION] Does not clear following data:
* receive buffer
* NV bit image (set by **FS q** command)
* RAM bit image (set by **GS *** command)
* settings set or changed by **GS (…** commands

2.7 ESC E Turn emphasize mode on/off (v3.0.0)

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

[RANGE] 0≦n≦255

[FUNCTION] Turns emphasize mode on or off.
- When the LSB of n is 0, emphasized mode is turned off.
- When the LSB of n is 1, emphasized mode is turned on.

[CAUTION] ~~* Emphasising is not applied to following encoding characters:~~ (v3.2.0)
~~- JISX0201 (Katakana)~~
~~- JISX0208~~
~~- Shift JIS~~
~~- GB2312~~
~~- BIG5~~

2.8 ESC J Print and feed paper

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

[RANGE] 0≦n≦255

[FUNCTION] Prints the data in the print buffer and feeds the paper [n x pixel line].

[CAUTION] * After printing is completed, the next print start position is set to the beginning of the line.

2.9 ESC M Select font

[FORMAT] <1B>H<4D>H<n>

[RANGE] n = 0, 1

[FUNCTION] Selects font. 0 – Font A, 1 – font B

[CAUTION] * After printing is completed, the next print start position is set to the beginning of the line.

2.10 ESC a Select justification

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

[RANGE] 0≦n≦2H, 30≦n≦32H

[FUNCTION] Aligns all the printed data within one line to the specified position.

n = 0, 30 Left justification
n = 1, 31 Centering
n = 2, 32 Right justification

[CAUTION] * This command affects whole line to be printed.

[DEFAULT] n=0

2.11 ESC c Select print paper (v5.3.0)

[FORMAT] <1B>H<63>H<30>H <n>

[RANGE] n – ignored

[FUNCTION] Selects paper station for printing.

n = 1 Selects journal paper
n = 2 Selects receipt paper
n = 3 Selects both receipt and journal

[CAUTION] * This command is made for compatibility with TH-582.

2.12 ESC d Print and feed paper

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

[RANGE] 0≦n≦255

[FUNCTION] Prints the data in the print buffer and feeds the paper [n x pixel line].

[CAUTION] * After printing is completed, the next print start position is set to the beginning of the line.

2.13 ESC i Full cut

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

[RANGE] -

[FUNCTION] Sets full cut.

[CAUTION] * Paper must be fed 3 mm after printing to prevent paper jam.

2.14 ESC m Partial cut (one point left uncut)

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

[RANGE] -

[FUNCTION] Sets partial cut.

[CAUTION] * Paper must be fed 3 mm after printing to prevent paper jam.

2.15 ESC p Generate pulse

[FORMAT] <1B>H<70>H<m><n1><n2>

[RANGE] m - ignored
0≦n1≦FFH
n2 - ignored

[FUNCTION] Outputs the pulse specified by n1 to drawer kick-out connector pin 2.

[CAUTION] * The pulse ON time is n1 x 2 msec.

2.16 **ESC t** Select character code table

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

[RANGE] n – see table below

[FUNCTION] Selects a page *n* of the character code table.

n	PAGE
0	CP 437 (USA, Standard Europe)
1	JISX0201 (Katakana)
6	JISX0208
7	Shift JIS
16	CP 1252 (Latin I)
24	CP 1253 (Greek)
26	CP 1257 (Baltic)
28	CP 1251 (Cyrillic)
33	CP 1255 (Hebrew)
40	CP 1256 (Arabic) **(v5.4.0)**
42	CP 1250 (Central European (Windows))
43	GB2312 (Simplified Chinese) **(v2.2.0)**
44	BIG 5
255	User defined page **(v4.0.0)**

[CAUTION] If unsupported code page is sent, already set one is not changed.
User define page CP (n = 255) will be set only if user defined characters are set (ESC &).
This command does not interfere with ESC % command.
For JISX0201, JISX0208, Shift JIS, GB2312 and BIG 5 text rendering differs from other code page rendering. Appropriate renderer is selected for the whole printable text line by looking-up code page for the first printable character in the line **(v5.3.0)**. Use either 1 of listed 5 code page chars in single line. Other code page chars except 5 listed may be freely mixed in 1 text line.

[DEFAULT] n=26.

2.17 **FS !** Set print mode for Kanji (JISX0208)

[FORMAT] <1C>H<21>H<n>

[RANGE] n – ignored

[FUNCTION] Ignored.

[CAUTION] Use ESC t to set code page.

2.18 FS & Set Kanji ON (JISX0208)

[FORMAT] <1C>H<26>H

[FUNCTION] When JISX0201, JISX0208 or Shift JIS set, sets Kanji mode ON.

[CAUTION] Use ESC t to set code page.
Effective only if before set JIS type (using FS C command)

2.19 FS . Set Kanji OFF (JISX0208)

[FORMAT] <1C>H<2E>H

[FUNCTION] When JISX0201, JISX0208 or Shift JIS set, sets Kanji mode OFF.

[CAUTION] Use ESC t to set code page.
Effective only if before set JIS type (using FS C command)

2.20 FS C Set JIS type for Kanji (JISX0208)

[FORMAT] <1C>H<43>H<n>

[FUNCTION] Sets JIS type.
n = 0, 30 JIS
n = 1, 31 Shift JIS

[CAUTION] Use ESC t to set code page.
This command is cannceled only by power cycle or ESC @ command

2.21 FS - Set underline for Kanji (JISX0208)

[FORMAT] <1C>H<2D>H<n>

[RANGE] n – ignored

[FUNCTION] Ignored.

2.22 FS S Set spacing for Kanji (JISX0208)

[FORMAT] <1C>H<53>H<n><m>

[RANGE] n – ignored
m - ignored

[FUNCTION] ignored.

2.23 **FS W** Set quadruple for Kanji (JISX0208)

[FORMAT] <1C>H<57>H<n><m>

[RANGE] n – ignored
m - ignored

[FUNCTION] ignored.

2.24 **FS p** Print NV bit image

[FORMAT] <1C>H<70>H<n><m>

[RANGE] n - ignored
m - ignored

[FUNCTION] Prints a NV (Non-volatile) bit image.

[DETAILS] * NV bit image is a bit image which is defined in a non-volatile memory by **FS q** and can be printed by **FS p**.
* This command is invalid when the specified NV bit image is not defined.
* This command is not affect by print modes (emphasized, character size, double height).

2.25 **FS q** Define NV bit image

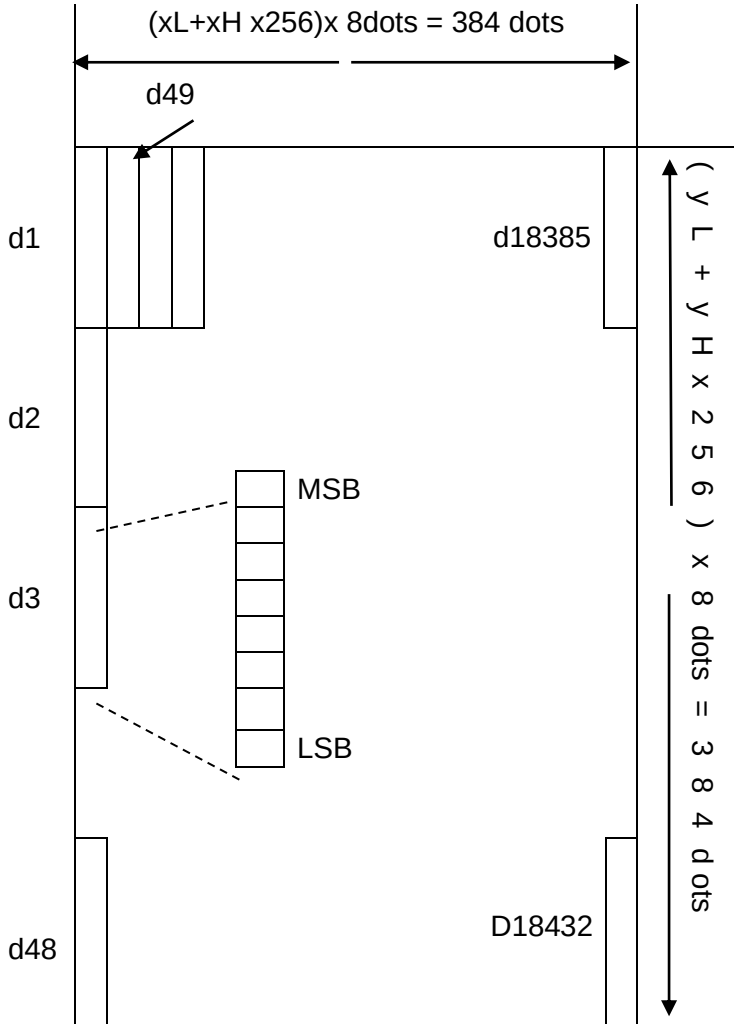
[FORMAT] <1C>H<71>H<n>[xL xH yL yH d1...dk]

[RANGE] 0≦xL≦30H
xH = 0
0≦yL≦30H
yH = 0
0≦d≦FFH
k = (xL+xH x256) x (yL+yH x256) * 8

[FUNCTION] Define the NV(Non-volatile) bit image specified.
* xL, xH specifies the horizontal direction for the NV bit image to (xL+xH x256)x 8 dots.
* yL, yH specifies the vertical direction for the NV bit image to (yL+yH x256)x 8dots.

[CAUTION] * This command cancels NV bit image which have been already defined. Thus, the printer cannot re-define only one of several defined data which have been previously defined. In this case, all data needs to be sent again.
* While this command is processed, the printer status is BUSY until the data is written to the NV user memory. When the printer is BUSY, it stops receiving data. Do not try to transmit data including real-time commands while processing this command.
* NV bit image is a bit image which is defined in a non-volatile memory by **FS q** and can be printed by **FS p**.

* This command may interfere with ordinary text printing command if sent while text line has not been printed.
* This command is effective when 7 bytes <FS～yH> is processed as normal value.
* If image dimensions exceed 384x384 pixels, the command and data is ignored.
* *d* is the defined data. A 1 bit specifies a dot to be printed and a 0 bit specifies a dot not to be printed.
* This command can define several NV bit images.
*Once a NV bit image is defined, it is not cleared by executing **ESC** @, reset, power off.
*This command executes only definition of a NV bit image and does not perform printing. Printing of NV bit image is executed by **FS p**.
*Frequent command execution may cause damage the NV memory. Thus, it is strongly recommended to write the NV memory 10 times a day.
* This command should not contain DLE EOT (Real time status) byte sequences.
* This command can contain DLE EOT (Real time status) byte sequence starting with v5.5.0 (6800W) and higher versions.
* Sending this command will discard user defined characters (ESC &), print bitmap block (GS q) and print raster bit image (GS v 0).



（EXAMPLE）When xL=48, xH=0, yL=48, yH=0

2.26 GS ! Select character size

[FORMAT] <1D>H<21>H<n>

[RANGE] 0≦n≦FFH

[FUNCTION] Selects the character size, height and width.

Bit	Function	Value
0	Character height selection	See table 2
1		
2		
3		
4	Character width selection	See table 1
5		
6		

7		

Table 1
Character width selection

Hex.	Width
00H	1(normal)
10H	2(double-width)
20H	1(normal)
30H	2(double-width)
40H	1(normal)
50H	2(double-width)
60H	1(normal)
70H	2(double-width)

Table 2
Character height selection

Hex.	Height
00H	1 (normal)
01H	2(double-height)
02H	1 (normal)
03H	2(double-height)
04H	1 (normal)
05H	2(double-height)
06H	1 (normal)
07H	2(double-height)

[DETAILS]
* This command is effective for all characters (alphanumeric and Kanji).
* In standard mode, the vertical direction is the paper feed direction and the horizontal direction is the perpendicular direction to the paper feed.
* Double – height concerns whole line and last set value is used when printing line.
* The **ESC !** command can turn double-width and double-height modes on or off but the last received command is effective.

2.27 **GS *** Define download bit image

[FORMAT] <1D>H<2A>H<x><y><d1>…<d (*x* * *y* * 8)>

[RANGE] 0≦ x ≦30H
0≦ y ≦30H
d = x * y * 8

[FUNCTION] Defines a download bit image of the number of dots specified by *x*8* and *y*8*.
* *x* specifies the bytes in the horizontal direction and *y* specifies the number bytes in the vertical direction.

[CAUTION]
* The number of dots in the horizontal direction is *x* x 8 and in the vertical direction is *y* x 8.
* If *x* * *y* is out of the specified range (48 x 48), this command is ignored.
* Parameter *d* is bit-image data. A bit corresponding to printing dot is 1 and not to printing is 0.
* The download bit image is effective until the printer is re-defined, reset or the power is turned off.
* See FS q command for bit layout in data bytes.
* Bit image, user defined characters (ESC &), print bitmap block (GS q) and print raster bit image (GS v 0) shares the same memory. Sending this command will discard user defined characters or bitmap block.

2.28 **GS /** Print download bit image

[FORMAT] <1D>H<2F>H<n>

[RANGE] n – ignored

[FUNCTION] Prints download bit image set by GS * command.

[CAUTION]
* This command may interfere with ordinary text printing command if sent while text line has not been printed.
* This command is ignored if a download bit image has not been defined or is deleted, for example, using ESC & command.

2.29 **GS H** Select printing position of bar code HRI characters (v1.1.0)

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

[RANGE] 0 ≦ n ≦ 2H
30H ≦ n ≦ 32H

[FUNCTION] Selects the printing position of HRI characters when printing a bar code.
n = 0, 30H: Not printed.
n = 1, 31H: Above the bar code.
n = 2, 32H: Below the bar code.

[DEFAULT] n = 0

[CAUTION] HRI is Human Readable Interpretation.
HRI characters are printed using the font selected by **GS f**

2.30 **GS I** Transfer printer ID (v3.2.0)

[FORMAT] <1D>H<49>H<n>

[RANGE] n = 1, 31H: Printer model ID - 0x10H
n = 2, 32H: Type ID

bit	Type ID
0	Multi-byte characters supported
1	Auto cutter installed
2	Customer display
3 - 7	Not used

Following responses are sent as NULL terminated string, e.g. last char is 00H.
n = 41H: Firmware version
n = 42H: Manufacturer (“CHD”)
n = 43H: Printer name (“Ltp0124501” or “CAPD245D”)
n = 44H: Product ID (serial number)
n = 45H: List of supported multi-character fonts, for example “JIS,BIG5” or “JIS,GB2312”

2.31 **GS L** Set left margin

[FORMAT] <1D>H<4C>H<nL><nH>

[RANGE] nL, nH – ignored

[FUNCTION] Ignored.

2.32 **GS f** Select font for bar code HRI characters (v1.1.0)

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

[RANGE] 0 ≦ n ≦ 1H
30 ≦ n ≦ 31H

[FUNCTION] Selects a font for the HRI characters when printing a bar code.
n = 0, 30H: font A
n = 1, 31H: font B

[DEFAULT] n = 0

[CAUTION] HRI is Human Readable Interpretation.
HRI characters are printed at the position specified by **GS H**

2.33 **GS h** Select bar code height (v1.1.0)

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

[RANGE] 1 ≦ n ≦ FFH

[FUNCTION] Selects the bar code height.
n = the number of dots in the vertical direction

[DEFAULT] *n* = 200 (25mm)

2.34 GS k Print bar code (v1.1.0)

[FORMAT] (1) <1D>H<6B>H<m><d1>…<dk><00>H
(2) <1D>H<6B>H<m><n><d1>…<dk>

[RANGE] (1) m = 2, 12 ≦ k ≦ 13
m = 4, 1 ≦ k ≦ 27

(2) m = 43H
m = 45H

[FUNCTION] Selects a bar code system and prints the bar code.
(1)

m	Bar code system	Number of characters (k)	Defined range of d	Firmware version
2	JAN13 (EAN13)	12≦k≦13	48≦d≦57	**v1.1.0**
4	Code 39	1≦k≦27	48≦d≦57, 65≦d≦90, 32, 36, 37, 43, 45, 46, 47	**v2.3.0**

(2)

m	Bar code system	Number of characters (k)	Defined range of d	Firmware version
43H	JAN13 (EAN13)	12≦n≦13	48≦d≦57	**v1.1.0**
45H	Code 39	1≦n≦27	48≦d≦57, 65≦d≦90, 32, 36, 37, 43, 45, 46, 47	**v2.3.0**

[CAUTION] [In case of (1)]
* This command ends with a NUL code.
* When the bar code system is JAN13 (EAN13), the printer prints the bar code at the time it receives 12 bytes (without check digit) and <00>H or 13 bytes bar code data and <00>H.
* When the bar code system is Code 39, the printer prints the bar code at the time it receives 1 – 27 bytes of barcode data and <00>H.
* When the bar code system is JAN13 (EAN13) and less than 12 bytes are received, barcode is not printed.
* If barcode data exceeds max k value, k+1 byte, which had to be <00>H is dropped and following data is processed as normal data.

[In case of (2)]
* n is the number of bar code data and the printer processes n bytes from the next data as bar code data.
* If n is out of the defined range, the printer stops processing command and processes the following data as normal data.
* After printing a bar code, this command specifies the print position to the beginning of the line.

* This command is not affected by print modes (emphasized, double-strike, underline, character size).

2.35 **GS q** Print bitmap block (v4.0.0)

[FORMAT] <1D>H<71>H <l> <n> xL xH d1 … dk

[RANGE] l – 30 (fixed) - number of pixel lines
n – data format: 0 – raw data (not supported), 1 – RLE compressed data
(xL+xH x256) = 65535 – length of following data
0≦d≦FFH
0≦k≦FFFFH

[DESCRIPTION] Prints 30 pixel line full printer width (384 pixels) bitmap block. Data d1…dk is in convenient line format and should be RLE (Run Length Encoding) compressed, if <n> = 1. RLE is lossless compression. In this case RLE works on byte basis. For compressed data if 2 equal bytes follow, then 3rd is number of sequential equal bytes. For example, if beginning of horizontal pixel line consists of following data “00 00 00 00 00 00 A5 A5 01 A5 02 02 02…”, then after applying RLE it will look “00 00 06 A5 A5 02 01 A5 02 02 03…”.

[CAUTION]
* User defined characters, bit image (GS *), print bitmap block (GS q) and print raster bit image (GS v 0) shares the same memory. Sending this command will discard bit image or user defined characters.
* Data to be compressed should contain 30 pixel lines * (384 printer width / 8 bits per byte) = 1440 bytes. Compressed data length is then specified by xL and xH.
* If bitmap to print consists of less than <l> (30) lines, missing lines should be filled with 0x00 and also sent.
* For better performance it is recommended to configure 115200 baud rate (GS (E; fn = 11).
* This command is dedicated for printing receipts when using RS232 interface. For graphical logotypes it is recommended to use FS q and FS p or GS * and GS / commands.

2.36 **GS v 0** **Print raster bit image (v5.1.0)**

[FORMAT] <1D>H<76>H <30>H <m> xL xH yL yH d1 … dk

[RANGE] m – mode
1 ≦ (xL+xH x256) ≦ 48 – number of bytes in the horizontal direction
1 ≦ (yL+yH x256) ≦ 65535 – number of dots in the vertical direction
0≦d≦FFH - data
0≦k≦FFFFH

[DESCRIPTION] Prints a raster bit image using the mode specified by m (mode):

m	Mode	Vertical direction	Horizontal direction	
0, 48	Normal	170 dpi	170 dpi	
1, 49	Double-width	170 dpi	85 dpi	Unsupported
2, 50	Double-height	85 dpi	170 dpi	Unsupported
3, 51	Quadruple	85 dpi	85 dpi	Unsupported

[CAUTION] * User defined characters, bit image (GS *) print bitmap block (GS q) and print raster bit image (GS v 0) shares the same memory. Sending this command will discard bit image or user defined characters.
* For better performance it is recommended to use it over USB.

2.37 GS (A Execute test print (v5.2.0)

[FORMAT] <1D>H<28>H <41>H xL xH n m

[DESCRIPTION] xL = 2, xH = 0 number of bytes (xL+xH x256) after xH.
n – Paper (ignored)
m – test pattern

[FUNCTION] Executes specified test print.

m	Test pattern
1, 49	Hexadecimal dump (not supported)
2, 50	Printer status report
3, 51	Rolling pattern (unsupported)

[CAUTION] * After processing this command printer reset is performed, which puts printer in same state as it is after power-on.

2.38 GS (E Set user setup commands (v3.3.0)

[FORMAT] <1D>H<28>H <45>H xL xH fn d1 … dk

[DESCRIPTION] xL, xH number of bytes (xL+xH x256) after xH.
fn – function name (or number)
k = (xL+xH x256) – 1; (-1 for fn)
d1 … dk – function specific data

[FUNCTION] Allows reading and changing various settings.

fn	Function name
1	Begin user setting mode session
2	End user setting mode session
11	Set configuration item for serial interface
12	Get configuration item for serial interface

2.39 GS (E; fn = 1 Begin user setting mode session (v3.3.0)

[FORMAT] <1D>H<28>H <45>H xL xH fn d1 d2

[RANGE] (xL+xH x256) = 3; (xL = 3, xH = 0)
fn – 01H
d1 – 49H (‘I’)
d2 – 4EH (‘N’)

[DESCRIPTION] Reads existing settings for modification.

2.40 GS (E; fn = 2 End user setting mode session (v3.3.0)

[FORMAT] <1D>H<28>H <45>H xL xH fn d1 d2 d3

[RANGE] (xL+xH x256) = 4; (xL = 4, xH = 0)
fn – 02H
d1 – 4FH ('O')
d2 – 55H ('U')
d3 – 54H ('T')

[DESCRIPTION] Applies settings modified using **GS (E** commands.

[CAUTION] * Command is executed only if previously **GS (E; fn = 1** was received
* Clears send and receive buffers.

2.41 GS (E; fn = 11 Set configuration item for serial interface (v3.3.0)

[FORMAT] <1D>H<28>H <45>H xL xH fn a d1 … dk

[RANGE] (xL+xH x256) = 1, 4, 5, 6 (xL = 1, 4, 5, 6, xH = 0)
fn – 0BH
a – item number (1 … 4)
k = (xL+xH x256) – 2; (-2 for fn and a)
d – 30H … 39H
d3 – 54H ('T')

[DESCRIPTION] Changes specified serial interface parameter.

a	Item description	k	d1 … dk
1	RS232 baud rate	4	"2400"
		4	"4800"
		4	"9600"
		5	"19200"
		5	"38400"
		5	"57600"
		6	"115200"
2	RS232 parity	1	"0" (None)
			"1" (Odd)
			"2" (Even)
3	RS232 flow control (ignored)	1	(ignored)
4	RS232 data length	1	"7"
			"8"

[CAUTION] * Settings changed by this command are cleared by **GS (E; fn = 1** command.
* Settings changed by this command are applied by **GS (E; fn = 2** command.
* Settings changed by this command are cleared after reset or power cycle (off, on).
* Settings can be read using **GS (E; fn =12** command.
* These settings are not affected by **ESC** @ command.

2.42 GS (E; fn = 12 Get configuration item for serial interface (v3.3.0)

[FORMAT] <1D>H<28>H <45>H xL xH fn a

[RANGE] (xL+xH x256) = 2; (xL = 2, xH = 0)
fn – 0CH
a – item number (1 … 4)

[DESCRIPTION] Following responses are sent as NULL terminated string, e.g. last char is 00H.

a	Item description	Response
1	RS232 baud rate	"2400"
		"4800"
		"9600"
		"19200"
		"38400"
		"57600"
		"115200"
2	RS232 parity	"0" (None)
		"1" (Odd)
		"2" (Even)
3	RS232 flow control	"0" (None) "1" (RTS/CTS - Hardware) "2" (XON/XOFF – Software)
4	RS232 data length	"7"
		"8"

[CAUTION] * This command returns current effective settings (the ones used by printer after **GS (E; fn = 2** command).
* Settings can be changed using **GS (E; fn =1**, then **GS (E; fn =11**, then **GS (E; fn =2** command.

2.43 GS (k Set up and print symbol (v2.0.0)

[FORMAT] <1D>H<28>H <6B>H xL xH cn fn d1 … dk

[DESCRIPTION] xL, xH number of bytes (xL+xH x256) after xH.
cn – code number (49 – QR code)
fn – function name (or number)
k = (xL+xH x256) – 2; (-2 for cn and fn)
d1 … dk – function specific data

[FUNCTION] Handles 2-dimmensional code data and printing.

cn	fn	Function name
49	41H	QR code: Select the model (ignored)
	43H	QR code: Set the size of module
	45H	QR code: Set error correction level
	50H	QR code: Store data
	51H	QR code: Print
	52H	QR code: Get stored data size (ignored)

2.44 GS (k; fn = 41H QR code; Select model *(ignored)* (v2.0.0)

[FORMAT] <1D>H<28>H <6B>H xL xH cn fn n1 n2

[RANGE] (xL+xH x256) = 4; (xL = 4, xH = 0)
cn – 31H
fn – 41H
n1 – ignored
n2 – ignored

[CAUTION] * Receiving of this command is supported, but not executed.

2.45 GS (k; fn = 43H QR code; Set the size of module (v2.0.0)

[FORMAT] <1D>H<28>H <6B>H xL xH cn fn n

[RANGE] (xL+xH x256) = 3; (xL = 3, xH = 0)
cn – 31H
fn – 43H
4 ≦ n ≦ 16;

[DEFAULT] n = 4

[DESCRIPTION] Sets size of QR pixel (module) to n printer dots.

[CAUTION] * Values n = 1, 2, 3 are also valid to send, but internally n is set to 4.

2.46 GS (k; fn = 45H QR code; Set error correction level (v2.0.0)

[FORMAT] <1D>H<28>H <6B>H xL xH cn fn n

[RANGE] (xL+xH x256) = 3; (xL = 3, xH = 0)
cn – 31H
fn – 45H
30H ≦ n ≦ 33H;

[DEFAULT] n = 30H

[DESCRIPTION] Sets error correction level for QR code.

n	Description	Approximate recoverable error amount
30H	Error correction level L	7%
31H	Error correction level M	15%
32H	Error correction level Q	25%
33H	Error correction level H	30%

2.47 GS (k; fn = 50H QR code; Store data (v2.0.0)

[FORMAT] <1D>H<28>H <6B>H xL xH cn fn m d1 … dk

[RANGE] 4 ≦ (xL+xH x256) ≦ 7092 (0 ≦ xL ≦ 255, 0 ≦ xH ≦ 27)
cn – 31H
fn – 50H
m – index of stored QR code data
30H – index = 0
31H – index = 1 (**v2.1.0**)
d – 0H – FFH (binary data)
k - (xL+xH x256) – 3 (-3 for cn, fn and m)

[DESCRIPTION] Stores QR code data (d1 … dk) in QR code m area.

[CAUTION] * Highest supported QR level is 19. Max result QR size is 93x93 modules (QR pixels). Max input data is 1903 digits (‘0’ – ‘9’), or 1153 alphanumeric chars, or 792 binary bytes, or 488 Kanji chars.
* If k > 1903, all data is dropped and no QR is printed.
* All QR data starting with m + 1 are cleared.

2.48 GS (k; fn = 51H QR code; Print (v2.0.0)

[FORMAT] <1D>H<28>H <6B>H xL xH cn fn m

[RANGE] (xL+xH x256) = 3; (xL = 3, xH = 0)
cn – 31H
fn – 51H
m = 30H; ignored (**v2.1.0**);

[DESCRIPTION] Encodes data stored in m QR code area (see previous command) and prints QR bitmap.

[CAUTION] * number of printed QR-s depends on m in last "QR code; Store data" command (**v2.1.0**)
* multiple QR codes are printed centered (**v2.3.0**)
* Consider that a quiet zone (left, right, upward and downward space areas, depending on the QR Code specifications) must be ensured for printed QR bitmap.

2.49 GS (k; fn = 52H QR code; Get stored data size *(ignored)* (v2.0.0)

[FORMAT] <1D>H<28>H <6B>H xL xH cn fn m

[RANGE] (xL+xH x256) = 3; (xL = 3, xH = 0)
cn – 31H
fn – 52H
m – 30H

[CAUTION] * Receiving of this command is supported, but not executed.