

5V CONTROLLER BOARD

**SERIAL INTERFACE
&
PARALLEL INTERFACE**

USER'S MANUAL

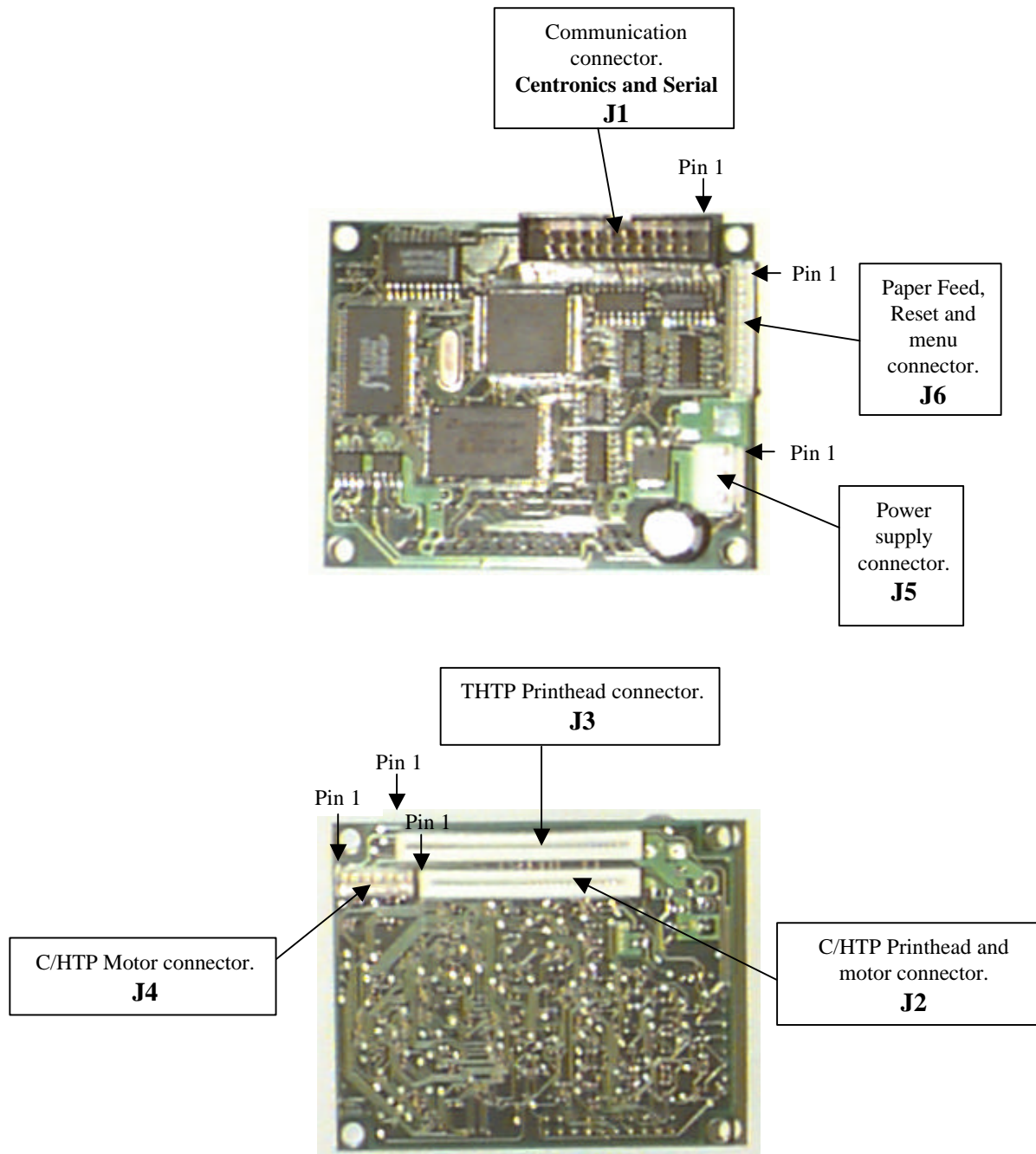
Reference FDE Preliminary issue

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1. BOARD DESCRIPTION



Length : 72 mm
 Width : 59 mm

Fixing holes diameter : 4mm (four symmetrical holes)
 Fixing holes position : the centre of the holes is at 3mm from each edge of the board.

2. CONNECTORS DESCRIPTION

<p><u>J1</u> : COMMUNICATION</p> <p>Pin 1 : TXD Pin 11 : /ACK Pin 2 : DTR Pin 12 : D7 Pin 3 : RXD Pin 13 : D6 Pin 4 : DSR Pin 14 : D5 Pin 5 : GND Pin 15 : D4 Pin 6 : /RESET Pin 16 : D3 Pin 7 : /ERR Pin 17 : D2 Pin 8 : VCC Pin 18 : D1 Pin 9 : PE Pin 19 : D0 Pin 10 : BUSY Pin 20 : /STROBE</p>	<p><u>J2</u> : HTP PRINthead and MOTOR</p> <p>Pin 1 : Vch Pin 14 : Th1 Pin 2 : Vch Pin 15 : GND Pin 3 : + 5V Pin 16 : H_Str5V Pin 4 : H_Dout Pin 17 : GND Pin 5 : H_Str5V Pin 18 : GND Pin 6 : GND Pin 19 : H_Str5V Pin 7 : A_Opto Pin 20 : H_Str5V Pin 8 : GND Pin 21 : GND Pin 9 : Col_Opto Pin 22 : H_Din5V Pin 10 : H_Str5V Pin 23 : H_Lat5V Pin 11 : GND Pin 24 : H_Clk5V Pin 12 : H_Str5V Pin 25 : Vch Pin 13 : GND Pin 26 : Vch</p>
<p><u>J3</u> : THTP PRINthead</p> <p>Pin 1 : GND Pin 16 : H_Str5V Pin 2 : Sw_Door Pin 17 : H_Str5V Pin 3 : Vch Pin 18 : + 5V Pin 4 : Vch Pin 19 : H_Clk5V Pin 5 : H_Din5V Pin 20 : H_Lat5V Pin 6 : H_Str5V Pin 21 : H_Dout Pin 7 : H_Str5V Pin 22 : Vch Pin 8 : H_Str5V Pin 23 : Vch Pin 9 : GND Pin 24 : Ph_b0 Pin 10 : GND Pin 25 : Ph_a0 Pin 11 : GND Pin 26 : Ph_a1 Pin 12 : GND Pin 27 : Ph_b2 Pin 13 : GND Pin 28 : A_Opto Pin 14 : Th2 Pin 29 : GND Pin 15 : H_Str5V Pin 30 : Col_Opto</p>	<p><u>J4</u> : C/HTP MOTOR and SWITCH DOOR</p> <p>Pin 1 : Ph_b0 Pin 2 : Ph_a0 Pin 3 : Ph_a1 Pin 4 : Ph_b1 Pin 5 : Sw_Door Pin 6 : GND</p>
<p><u>J6</u> : PAPER FEED, RESET, MENU and LED</p> <p>Pin 1 : Sw_Paper Feed Pin 2 : GND Pin 3 : Sw_Menu Pin 4 : GND Pin 5 : A_Led Pin 6 : K_Led Pin 7 : M_Reset Pin 8 : GND</p>	<p><u>J5</u> : POWER SUPPLY</p> <p>Pin 1 : GND Pin 2 : VCC(Logical 5V) Pin 3 : VCH (Printhead power 5V)</p> <p>VCC : 4.75 – 5.25 V</p> <p>VCH : 4.1 – 6.5 V For HTPN 4.1 – 8.5 V for THTP</p>

3. PC ® BOARD CONNECTION

3.1. Centronics

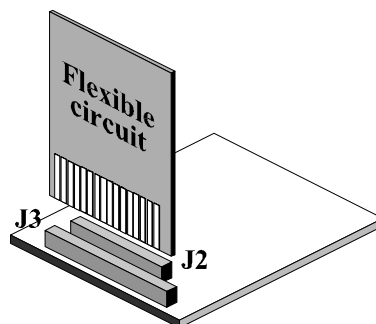
BOARD	PC
Pin 5 : GND	Pin 23 : GND
Pin 6 : /RESET	Pin 16 : RESET
Pin 7 : /ERR	Pin 15 : Pulled to Vcc
Pin 8 : VCC	Pin 13 : Pulled to Vcc
Pin 9 : PE	Pin 12 : Paper Out
Pin 10 : BUSY	Pin 11 : BUSY
Pin 11 : /ACK	Pin 10 : ACK
Pin 12 : D7	Pin 9 : Data Bit 7
Pin 13 : D6	Pin 8 : Data Bit 6
Pin 14 : D5	Pin 7 : Data Bit 5
Pin 15 : D4	Pin 6 : Data Bit 4
Pin 16 : D3	Pin 5 : Data Bit 3
Pin 17 : D2	Pin 4 : Data Bit 2
Pin 18 : D1	Pin 3 : Data Bit 1
Pin 19 : D0	Pin 2 : Data Bit 0
Pin 20 : /STROBE	Pin 1 : STROBE

3.2. Serial

BOARD	PC
Pin 1 : TXD	Pin 2 : RXD
Pin 2 : DTR	Pin 6 : DSR
Pin 3 : RXD	Pin 3 : TXD
Pin 4 : DSR	Pin 4 : DTR
Pin 5 : GND	Pin 5 : GND

4. THTP Connection

For THTP mechanism, connect the flexible circuit to J3 connector.



5. CONFIGURATION MENU

5.1. How to enter the configuration menu

In the Minicont 5V board, there is a connector (J6) where you can find Paper feed, Switch menu and reset buttons.

- The paper feed button will be Pins 1 and 2 of the J6 connector.
- The switch menu will be pins 3 and 4.
- the reset button will be pins 7 and 8.

In order to enter the configuration menu, press all the buttons and then release the reset button only ; the configuration menu receipt starts printing.

5.2. How to move the pointer

When you are in the configuration menu, a list is printed.

- Interface type
- Baud rate
- Parity
- Parity type
- Data
- Stop
- Protocol
- Tests

This list only appear if the printer is set in RS232 communication. In Centronics configuration, the list will be :

- Interface type
- Tests

To move the pointer, press the Paper feed button.

5.3. How to enter Sub-menus

When you have selected one menu, you can access to parameters by pressing the Switch menu button.

5.4. How to save and quit configuration menu

In order to save the configuration, go through the **End** scroll, push the menu button twice then press reset button in order to quit configuration menu.

6. CONTROL CODE LIST

Print commands :

ASCII Command	Hexa Command	Description
15 H n	15 n	Feed N dot lines
LF	0A	Print & Line feed
CR	0D	Print and Carriage return
ESC d n	1B 64 n	Print and Feed n lines
DC4 n	14 n	Feed n print lines
ESC J n	1B 4A n	Print and feed N dots

Line spacing :

ASCII Command	Hexa Command	Description
ESC 2	1B 32	Set line spacing to 1/6-inch (<i>default</i>)
16 H n	16 H n	Set line spacing
ESC 3 n	1B 33 n	Set line spacing

Print position :

ASCII Command	Hexa Command	Description
BEL	07	Receipt setting
HT	09	Horizontal tab
ESC \ nL nH	1B 5C nL nH	Set relative print position
ESC D [n] k NUL	1B 44 [n] k 00	Set horizontal tabs
ESC \$ nL nH	1B 24 nL nH	Set absolute print position
GS L nl nH	1D 4C nL nH	Set left margin
ESC a n	1B 61 n	Select justification
GS P x y	1D 50 x y	Set horizontal and vertical motion units

Character control :

ASCII Command	Hexa Command	Description
DC2	12	Select double-wide characters
DC3	13	Select single-wide characters
ESC SP n	1B 20 n	Set right-side char spacing
ESC ! n	1B 21 n	Select printing modes
ESC % n	1B 25 n	Select/cancel user-defined char set
ESC & y c1 c2 x1 d1...dn	1B 26 y c1 c2 x1 d1...dn	Define user-defined character
ESC - n	1B 2D n	Turn underline mode on/off
ESC ? n	1B 3F n	Cancel user-defined char
ESC { n	1B 7B n	Turn on/off upside down printing mode
ESC DC2	1B 12	Rotate Characters counter-clockwise
ESC E n	1B 45 n	Bold Print mode on/off
ESC G n	1B 47 n	Turn on/off double strike
ESC I n	1B 49 n	Italic Print mode on/off
ESC V n	1B 56 n	Turn 90 degrees clockwise mode on/off
GS B n	1D 42 n	Turn white/black reverse print mode

Bit image :

ASCII Command	Hexa Command	Description
GS * <i>x y [d] xxyx8</i>	1D 2A <i>x y [d] xxyx8</i>	Define download bit image
GS / <i>m</i>	1D 2F <i>m</i>	Print download bit image
DC1	11 H	Graphic printing mode

Bar code :

ASCII Command	Hexa Command	Description
GS H <i>n</i>	1D 48 <i>n</i>	Select printing position for HRI char
GS f <i>n</i>	1D 66 <i>n</i>	Select font for HRI char
GS h <i>n</i>	1D 68 <i>n</i>	Select bar code height
GS k <i>m dl...dk</i> NUL	1D 6B <i>m dl...dk</i> NUL	Print bar code
GS w <i>n</i>	1D 77 <i>n</i>	Set bar code width

Kanji : (option)

ASCII Command	Hexa Command	Description
FS &	1C 26	Select Kanji character mode
FS .	1C 2 ^E	Cancel Kanji character mode
FS !	1C 21	Select print modes for Kanji characters

Other commands :

ASCII Command	Hexa Command	Description
ESC @	1B 40	Initialise printer
ESC []	1B 5B 7D	Switch to boot mode
DLE	10	Clear Printer buffer
AX STX	1F 02	Interface configuration
AX t	1F 74	AUTOTEST
AX f	1F 66	Power mode and Top of form
GS `` <i>n</i>	1D 22 <i>n</i>	Select memory type (SRAM / FLASH) where to save logos or user's defined fonts
EM <i>n</i>	19 <i>n</i>	Adjust brightness
GS % <i>n</i>	1D 25 <i>n</i>	Multi heat configuration

7. CONTROL CODE DESCRIPTION

11h

Description High speed raster print mode

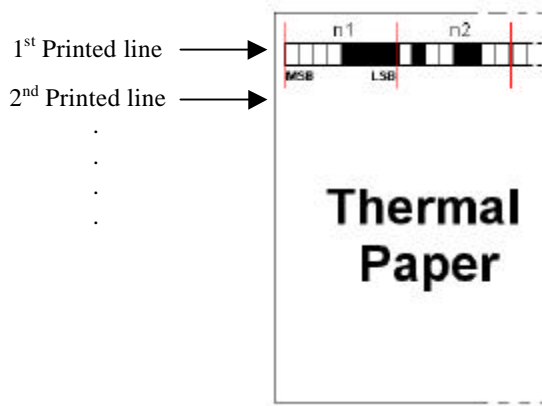
Format <11h> <n1>, <n2> ... <n48> (where n_i represents 8 dots)

1	0	1	1	0	0	1	1
Black	White	Black	Black	White	White	Black	Black

MSB LSB

Comments This command specifies a single line of graphic data for 384 dots, the print zone for the printer. The data is sent as 48 bytes, or 384 bits, representing the dots to be “on” or “off”.

Example : 11 0F 4C



15 h n

Description Feed n dot lines

Format <15> <n>

Comments This command allows the user to feed n dot lines ($n / 8\text{mm}$; $n / 203\text{ inches}$) before printing another line.

$00 \leq n \leq 7F$

16 h n

Description Set line spacing

Format <16> <n>

Comments This command allows the user to define line spacing as character height plus $n/203$..
 $00 \leq n \leq 0C$

19 h n

- Description** Adjust brightness
- Format** <19> <n>
- Comments** This command allows the user to adjust the brightness of the receipt from 50% to 150% of the nominal value.
32H <n < 96 where n represent the % of the nominal value.

AX t

- Description** Autotest
- Format** <1F> <74>
- Comments** This command allows the user to perform an AUTOTEST.

AX f n1, n2, n3, n4, n5, n6, n7, n8, n9

- Description** Power mode and Top of form configuration
- Format** <1F> <66> <n1>
- Comments** This command allows the user to configure the Power mode and the Top of form.
Only the first 3 bits of the third octect (n1) will be set.

Bit 2	Bit 1	Bit 0	Power Mode	Top of form
0	0	0	OFF	OFF
0	0	1	Power Down	OFF
0	1	0	OFF	OFF
0	1	1	IDLE	OFF
1	0	0	OFF	ON
1	0	1	Power Down	ON
1	1	0	OFF	ON
1	1	1	IDLE	ON

The power down mode will turn your printer off if there is no action while 10 seconds.

BEL

Description Receipt setting

Format <07> <n1> <n2> <n3>

Comments This command allows the user to set its receipt only in the case of top of form tickets.

Value	Description
n	Length of the receipt (mm) 00 < n < FF
n1	Distance (mm): last printed line / Cutting 00 < n1 < FF
n2	Distance (mm): Top of the receipt / first printed line 00 < n2 < FF

AX STX

Description Interface Configuration

Format <1F> <02> <n1> <n2> <n3> <n4> <n5> <n6>

Comments This command allows the user to configure the RS232 port.

Number	Description
n1	Interface 00 : RS232 01 : CENTRONICS
n2	Baudrate Bit [0...3] 00 : 1200 01 : 2400 02 : 4800 03 : 9600 04 : 19200 05 : 38400 06 : 57600 07 : 115200 Stop bit Bit [4] 0 : 1 stop bit 1 : 2 stop bits Data bit Bit [5] 0 : 8 data bits 1 : 7 data bits
n3	Parity 00 : Odd 01 : Even
n4	Parity mode 00 : Disable 01 : Enable
n5	Flow control 00 : Xon / Xoff 01 : DTR / DSR
n6	Parity error management 00 : Ignore 01 : Print ?

Important : This control code is only available in download mode.
To enter this mode, use the control code **1B 5B 7D** before sending reconfiguration code.
At the end, use the Hard reset Control code **1D FF** to store your configuration.

Example : 1B 5B 7D 1F 02 00 03 00 00 01 00 1D FF
this syntax configure the controller board to
Interface RS232, Baudrate 9600, 1 stop bit, 8 data bits, odd parity, no parity, DTR/DSR, Ignore.

CR

Description Print and carriage return

Format < 0D h>

Comments This command print the buffer and carriage return.

DC2

Description Double Wide Print

Format < 12 h>

Comments This command doubles the size of characters. The printer is reset to single-wide mode after a line has been printed or the Clear Printer (10) command is received. Double-wide characters may be used in the same line with single-wide characters.

Ex : 41 41 41 41 12 41 41 41 41

 ⇒ AAAA ⇒ AAAA

DC3

Description Single Wide Print

Format <13 h>

Comments This command allows to return to single wide mode when the double wide mode has been selected.

Ex : 12 41 41 41 41 13 41 41 41 41

 ⇒ AAAA ⇒ AAAA

DC 4

Description Feed N Print Lines

Format <14 h> <n>

Comments This command feeds n lines forward only before text.
00 < n < 7F

Ex : 14 02 41 41 41 41 41 41 14 02 41 41

 ⇒ . . ⇒ AAAA

 . . 2 lines

 AAAA

DLE

Description Clear printer buffer

Format <10 h>

Comments This command clears the buffer of the printer.

- Double-Wide command (12) is cancelled
- Line Spacing, Pitch, and User-Defined Character Sets are maintained at current selections (RAM is not affected)
- Single-Wide, Single-High, Non-Rotated, and Left-Aligned characters are set
- Printer is restarted and error status is cleared in a fault condition
- Printing position is set to column one

ESC ?

Description Cancel user-defined character

Format <1B h><3F h><n>

Comments This command cancels the user-defined characters defined for the character code n. After the user-defined characters are canceled; the internal character set is printed.

ESC !

Description Set print mode

Format <1B h><21 h><n>

Comments n is a 8 bits word converted in hexadecimal. It can be set to vary the printing mode according to the table below. Default value is n=0 (i.e. Font A in standard mode)

Bit	Function	Bit =0	Bit =1
0	Character Font	A	B
1	(not used)	-	-
2	(not used)	-	-
3	Emphasised	Cancelled	Set
4	Double height	Cancelled	Set
5	Double width	Cancelled	Set
6	(not used)	-	-
7	Underlined	Cancelled	Set

ESC \$

- Description** Set absolute position.
- Format** <1Bh> <24h> <n1> <n2>
- Comments** This command sets the printing starting position to the specified number of dots (1/8 mm units) from the beginning of the line so that the position is (n1 + n2 x 256) dots from the left hand side. If the position exceeds the printing area, the command is ignored.

n2	n1
00	00 - FF
01	00 - 80 for a printing area of 48mm (384 dots)

ESC %

- Description** Set/cancel user-defined characters
- Format** <1B h> <25 h> <n>
- Comments** This command allows to choose between two fonts, the resident font and the user defined font. The user defined character set and a down-loaded bit image can not be defined at the same time.

n (00-FF)	Function
Even	Select resident fonts
Odd	Select user-defined font

ESC -

- Description** Underline mode on / off
- Format** <1B h> <2D h> <n>
- Comments** This command allows or not the underline mode and defines the thick of the line under the text.

N	Function
00	Cancel underline print (default)
01	Begin underline 1 dot thick
02	Begin underline 2 dots thick

Ex : **1B 2D 00** 41 41 41 **1B 2D 01** 41 41 41 **1B 2D 02** 41 41 41
 ⇒ AAA ⇒ AAA ⇒ AAA

ESC @

- Description** Initialisation of the printer
- Format** <1B h> <40 h>
- Comments** This command clears data in the buffer and initializes the printer settings. Single-Wide, Single-High, Non-Rotated, and Left-Aligned characters are set and User-defined characters or logo graphics are cleared.

ESC \

Description Set relative position

Format <1B h> <5C h> <n1> <n2>

Comments This command sets the print starting position to the specified number of dots (1/8 mm units) from the current printing position, where position = current position + (n1 + n2 x 256). If the position exceeds the print area, the command is ignored.

n2	n1
00	00 - FF
01	00 - 80 for a printing area of 48mm (384 dots)

ESC {

Description Upside-down character printing on / off

Format <1B h> <7B h> <n>

Comments This command rotates the printed characters by 180°. The command is valid only when it is used at the beginning of the line.

n	Function
00	Cancel rotated characters (default)
01	Begin rotated characters

Ex : **1B 7B 00** 41 41 41 **1B 7B 01** 41 41 41
 ⇒ AAA ⇒ ∇∇∇

ESC &

Description Define user-defined characters.

Format <1B h> <26 h> <s> <n> <m> [<a> <p1> <p2> ... <p(s x a)>] (m-n+1)

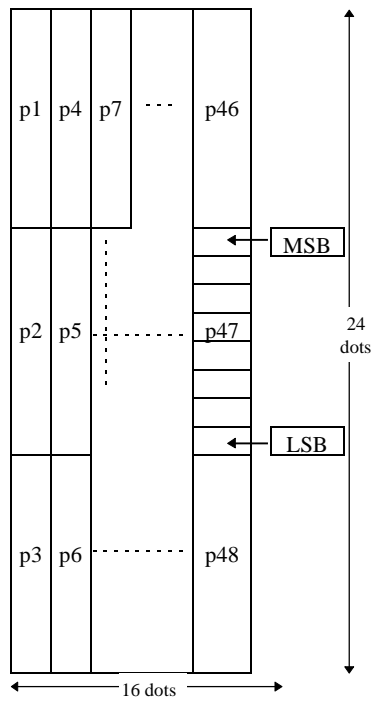
Comments " s " specifies the number of bytes in the vertical direction.
 " n " specifies the beginning ASCII code for the definition and " m " the final code. If only one character is defined, use n = m.
 The allowable character code range is from ASCII code <20 h> to <7E h> and the maximum number of characters is 95.
 " a " specifies the number of dots in the horizontal direction.
 " p " is the dot data for the characters. The dot pattern for a dot is in the horizontal direction from the left side (the remaining dot pattern on the right side is space, the amount of data to be defined is s x a).
 After user defined characters are defined once, they are available until an other definition is made, ESC @ is executed, GS * is executed or the printer is turned off.

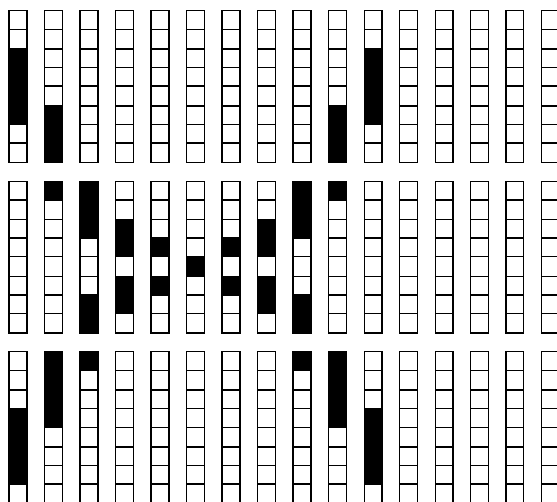
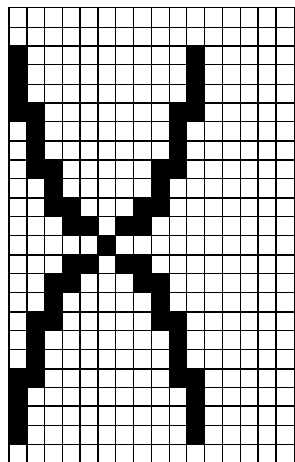
If $a \leq A$ character horizontal size is A (A : horizontal size of selected font).

If $a > A$ character horizontal size is a.

Byte	Description
s	Height in octets (s=03 h for 24 bits)
n	$20 \text{ h} \leq n \leq m \leq 7\text{E}$
m	Starting and final code
a	$0 \leq a \leq 10 \text{ h}$
p1 ... p(s x a)	$00 \text{ h} \leq p1 \dots p_{s \times a} \leq \text{FF h}$

Font A is selected :



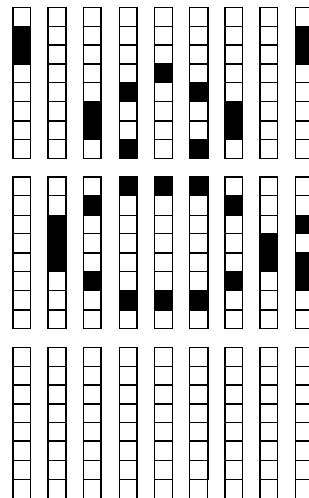
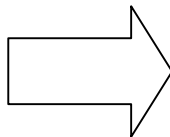
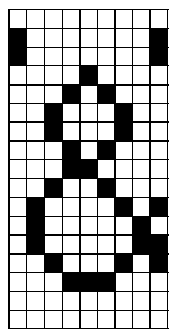
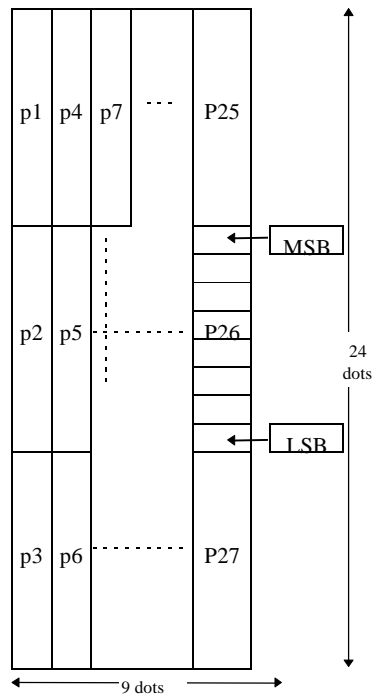


p1 = <3C>H
 p2 = <00>H
 p3 = <1E>H

p4 = <07>H
 p5 = <80>H
 p6 = <F0>H

p7 = <00>H....
 p8 = <E3>H....
 p9 = <80>H....

Font B is selected :



p1 = <60>H p4 = <00>H p7 = <06>H...
 p2 = <00>H p5 = <38>H p8 = <44>H...
 p3 = <00>H p6 = <00>H p9 = <00>H...

ESC [}

Description Switch to Boot mode

Format <1B h> <5B h> <7D

Comments This command Puts the printer in flash download mode in preparation to receive commands controlling the downloading of objects into flash memory. When this command is received, the printer leaves normal operation and can no longer print transactions until the Reboot the Printer command (1D FF) is received or the printer is rebooted.
This command does not affect the current communication parameters. Once the printer is in flash download mode, this command is no longer available.

ESC 2

Description Set to default line spacing

Format <1B h> <32 h>

Comments This command sets the line spacing to 1/6 inch.

ESC 3

Description Set line spacing n dots

Format <1B h> <33 h> <n>

Comments This command sets the line spacing to n/360 of an inch. Minimum line spacing is 7.5 lines per inch. The line equals the character height when n is too small.

ESC a

Description Set left, centred or right justification

Format <1B h> <61 h> <n>

Comments This command should be at the start of a new line, and is otherwise ignored.

n	Function
00	Align left (default)
01	Align centred
02	Align right

Ex :

ABC	ABC	ABC
ABCD	ABCD	ABCD
ABCDE	ABCDE	ABCDE
<i>n = 00</i>	<i>n = 01</i>	<i>n = 02</i>

ESC d

Description Print and line feed n character lines

Format <1B h> <64 h> <n>

Comments This command prints the data contained in the buffer and performs n linefeeds so that printing will start at the beginning of the line below.

n	Function
$00 \leq n \leq FF$	n linefeeds

ESC D

Description Set Horizontal Tab

Format <1B h> <44 h> <n>

Comments <n> is the number of characters that the horizontal tab will jump.

ESC DC2

Description Rotated Mode

Format <1B h> <12 h>

Comments This command rotates characters counter-clockwise. To cancel this mode, just send the clear printer buffer command : DLE (10H)

Ex : **1B 12** 41 41 41 41 41

⇒ ◀ ◀ ◀ ◀ ◀

ESC E

Description Bold print mode on / off

Format <1B h> <45 h> <n>

Comments This command has the same effect as printing twice the character at the same printing position.

n	Function
00	Cancel bold print (default)
01	Begin bold print

Ex : **1B 45 00** 41 41 41 **1B 45 01** 41 41 41
 ⇒ AAA ⇒ AAA

ESC G

Description Double Strike mode on / off

Format <1B h> <47 h> <n>

Comments This command has the same effect as bold printing the character.

n	Function
00	Cancel bold print (default)
01	Begin bold print

Ex : **1B 47 00** 41 41 41 **1B 47 01** 41 41 41
 ⇒ AAA ⇒ AAA

ESC I

Description Italic print mode on / off

Format <1B h> <49 h> <n>

Comments When this command is set "on", the top third of each character is printed two dots to the right, the middle third is printed one dot to the right, and the bottom third is printed at the same position as standard characters.

n	Function
0	Cancel italic print (default)
1	Begin italic print

Ex : **1B 49 00** 41 41 41 **1B 49 01** 41 41 41
 ⇒ AAA ⇒ AAA

ESC J

Description Print and feed n dot lines

Format <1B h> <4A h> <n>

Comments 1/8 mm Step.

ESC SP

Description Set spacing to right of characters.

Format <1B h> <20 h> <n>

Comments This command sets spacing to right of characters in dots. In double width mode, the amount of space is doubled also.
 $0 \leq n \leq 32$

ESC V

Description Set / cancel rotated print

Format <1B h> <56 h> <n>

Comments This command causes each character or bar code to be rotated 90° clockwise.

n	Function
0	Cancel rotated print
1	Set rotated print

Ex : **1B 56 00** 41 41 41

⇒ AAA

1B 56 01 41 41 41

⇒ ∨∨∨

FF

Description Form Feed

Format <0C h>

Comments This command is used to test feed a few steps.

FS &

- Description** Select Kanji character mode
- Format** <1C h> <26 h>
- Comments** This command allows the user to select the kanji mode.

FS !

- Description** Select print modes for Kanji characters
- Format** <1C h> <21 h> <n>
- Comments** This command allows the user to select two kanji fonts.

n	Function
00	Font Kanji A is selected (24 x2 4)
01	Font Kanji B is selected (16 x 16)

FS .

- Description** Cancel Kanji character mode
- Format** <1C h> <2E h>
- Comments** This command allows the user to return in standard character mode.

GS % n nh nl

- Description** Multi Heat Configuration
- Format** <1D> <25> <n> <nh> <nl>
- Comments** This command allows the user to set or not the multi heat process and to configure the peak current. This peak current is the maximum current the board will need to print correctly.

Value	Description
n	00 Multi heat mode OFF
	01 Multi heat mode ON
nh	00 < nh < FF
nl	00 < nl < FF

The peak current value (mA) will be calculated as follows :

$$P \text{ Current} = (nh \times 256) + nl$$

Example : 1D 25 01 0D AC => Peak current = 3.5 A.

GS "

- Description** Select memory type (SRAM/Flash) where to save logos or users-defined fonts.
- Format** <1D h> <22 h> <n>
- Comments** This command allows the user to select the memory type where to save logos and user-defined fonts.
 Default : Logos are saved in Flash
 User-defined fonts are saved in RAM

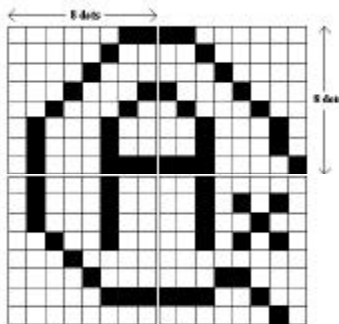
GS *

- Description** Define download bit image
- Format** <1D h> <2A h> <n1> <n2> <d> ... <d(n1 x n2)>
- Comments** User-defined graphics are stored in volatile memory. Each graphic is stored in a “cell” which is individually addressable and may be up to 384 dots wide x 255 dots high in size (maximum 128 KB total). Each graphic cell may vary in size. The graphic cell remains available until another GS * definition to the same cell is made, ESC @ is executed, or the printer is reset/turned off. If the command would result in exceeding available memory, it is ignored.

Byte	Description
n1	Width ÷ 8 dots (1 to 48)
n2	Height ÷ 8 dots (1 to 255)
d1 ... d(n1 x n2)	n1 x n2 bytes of character data. 1 bit per dot, top to bottom then left to right.

Example :

Here is an example of a bit image ; n1 = 02, n2 = 02 and Data are given below :



Data : 00 00 07 E0 08 10 10 08 20 04 47 F2 89 02 91 02 91 02 89 02 47 F2 20 04 10 54 08 22 06 51 01 00

To print the download bit image use the GS / Command.

GS /

- Description** Print download bit image
- Format** <1D h> <2F h><m>
- Comments** Prints the current graphics cell defined by the GS * command.

m	Function
0	Print normal
1	Print double width
2	Print double height
3	Print double width and height

GS B

- Description** Set / cancel inverse printing
- Format** <1D h> <42 h>
- Comments** This command causes each character to be printed with reversed background and foreground (white characters on black background).

n	Function
00	Cancel inverse characters
01	Set inverse characters

Ex : **1D 42 00** 41 41 41 **1D 42 01** 41 41 41
 ⇒ AAA ⇒ **AAA**

GS f

- Description** Select HRI font
- Format** <1D h> <66 h> <n>
- Comments** This command allows the user to select font of the HRI characters.
If n=00 Standard font
If n=01 Compressed font.

GS h

Description Select barcode height

Format <1D h> <68 h> <n>

Comments This command allows the user to define the barcode height.
00 < n < FF

GS H

Description Select HRI position

Format <1D h> <48 h> <n>

Comments This command allows the user to select the position for the barcode numbers.

n	Description
00	Numbers are not printed
01	Numbers are printed at the top of the barcode
02	Numbers are printed at the bottom of the barcode
03	Numbers are both printed at the top and the bottom

GS k

Description Print barcode

Format <1D h> <6B h> <k> <data> <0>

Comments This command allows the user to print barcode.

k	
00	Code UPC-A mode 1
01	Code UPC-E mode 1
02	Code EAN-13 mode 1
03	Code EAN-8 mode 1
05	Interleaved 2 of 5
41	Code UPC-A mode 2
42	Code UPC-E mode 2
43	Code EAN-13 mode 2
44	Code EAN-8 mode 2
0A	PDF 417

Description of the Interleaved 2/5 bar code :

Here is the table describing the bit representation of numbers 0 to 9.

Number	Bit representation				
0	0	0	1	1	0
1	1	0	0	0	1
2	0	1	0	0	1
3	1	1	0	0	0
4	0	0	1	0	1
5	1	0	1	0	0
6	0	1	1	0	0
7	0	0	0	1	1
8	1	0	0	1	0
9	0	1	0	1	0

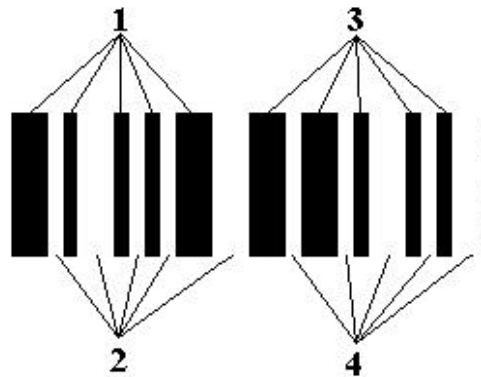
bit representation : "1" represent a large bar.
"0" represent a small bar.

Here is the algorithm which is used to make a bar code from numbers :

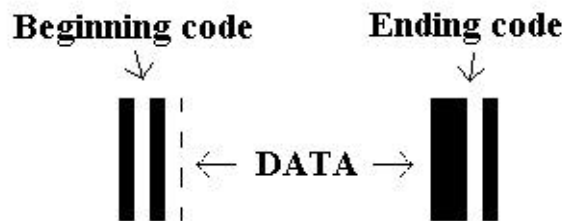
Example : 1234

- 1 - There must have an even number of digits else a zero is placed at the beginning.
123 is traduced by 0123.
- 2 - The number is divided in two digit pairs described as follows :
1234 -> 12 34
- 3 - Then, digits are encoded by pairs.
1 3 (digits encoded by bars)
2 4 (digits encoded by spaces)

figure :



The user number is between two codes : the beginning code and the ending code.



The result is :



GS L

- Description** Set left margin
- Format** <1D h> <4C h> <nL> <nH>
- Comments** This command allows the user to the left margin in standard mode.
The new margin is $nL + 256 * nH$.

GS P

- Description** Set horizontal / Vertical motion units
- Format** <1D h> <50 h> <X> <Y>
- Comments** This command allows the user to define the vertical and horizontal motion units to 1/X and 1/Y inch.

GS w

- Description** Select barcode width
- Format** <1D h> <77 h> <n1> <n2>
- Comments** This command allows the user to define the barcode width.
N1 and n2 is for the ration between small bars and large bars.

HT

- Description** Horizontal tab.
- Format** <09 h>
- Comments** This command moves the printing position to the next horizontal tab position.
Default tabs are every 8 characters.

Ex : **09** 41 41 41 41 41 41 41 41 41
 ⇒ _ _ _ _ _ _ _ _ AAAAAAAAAA

LF

Description Feed one line.

Format <0A h>

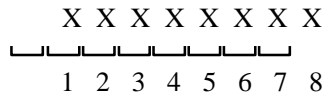
Comments This command prints and moves the printing position to the beginning of the next line.

Ex : 41 41 41 41 41 41 **0A** 41 41 41

⇒ AAAAA
 AAA

8. CODIFICATION

Miniboard 5V (Preliminary)



Digit 1 (Xxxx xxxx)

H for board in standard temperature range

Digit 2 (xXxx xxxx)

Interface and connector type (with standard software) :

Interface	RS232C	Connector
		Standard
	Centronics	R
		C

Digit 3 (xxXx xxxx)

Option digit only :

Printer only : A

Digit 4 (xxxX xxxx)

Type of mechanism and printhead controlled

printhead dots/mm voltage	60 mm mechanism HTP/CHTP	60 mm mechanism THTP	80 mm mechanism MHTP	112mm mechanism WHTP
3.8/ 5 V	C	NA	*	*
7.6/ 5 V	D	NA	*	*
8 / 5 V	E	F	*	*
12 / 5 V	*	*	*	*

* : To be defined (if necessary)

Digit 5 (XXXX X~~XXX~~)

Option digit

Memory (Flash)	Standard software	KANJI software (only with 7.6 or 8 dots/mm)
256 KB (standard)	0	*
512 KB	1	*
756 KB	2	*
1024 KB	3	K

* : **Not available**

Digit 6 (XXXX xX~~XX~~)

Reserved for evolutions : **0**

Digit 7 (XXXX xxX~~X~~)

Reserved for evolutions : **0**

Digit 8 (XXXX xxxX~~X~~)

Type of paper end detector :

Switch : **0**
 Reflective opto : **1**

9. CONNECTORS REFERENCE

Name	Description	Supplier	Type	Reference
J1	HE10 20 dots	3M Electronique	Male	2520-6002
			Female	3421-6000
J5	8 dots connector	JST	Male	B8B-EH-A
			Female	EHR-8
J6	3 dots connector	JST	Male	B3P-VH
			Female	VHR-3N

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