THERMAL PRINTER MECHANISM

# ASTERON
# WITH CONTROLLER BOARD

## USER MANUAL

**Reference 31 09 433**
Issue I
**October 2008**

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# EVOLUTIONS

| Date | Issue | Modifications |
|---|---|---|
| 01/2008 | Z | Initial Release |
| 02/2008 | A | - Modification of J1 & J4 connectors references<br>- RS232 and TTL Communication cables chapter |
| 02/2008 | B | - Cables Communication table update<br>- Control codes modification & addition |
| 04/2008 | C | - Modification of RS232 cable example<br>- Addition of control code: “Select or Cancel Upside-Down Print Mode” |
| 04/2008 | D | - Suppression of Fonts paragraph<br>- Modification of Font Size: 16 x 24 Dots<br>- Addition of control code: “Select Pitch (Column width)”<br>- Modification of RS232 and TTL cables examples |
| 07/2008 | E | - Modification of Communication Interfaces<br>- Modification of control code: “Select Print Mode»<br>- Addition of RAL for grey and white mechanisms<br>- J4 connector name modification<br>- Addition of “How to print a self test ticket” |
| 08/2008 | F | - Addition of MaxStick paper<br>- Modification of “Select Print Mode Code” |
| 09/2008 | G | - Additional Note for Maxstick paper |
| 10/2008 | H | - Modification of male and female SUDB9 pinout |
| Mars2010 | I | - Remove rs232 cable extension to avoid confusing |

# IMPORTANT

**This manual contains the basic instructions for printer operation.**
**Read it carefully before printer use.**

# CONTENTS

# 1 UNPACKING

The packing box contains the Asteron mechanism, a user manual, 2 snaps for mechanism integration (refer to Chapter "*Assembly principle by snap")*, a power supply cable, a RS232 and TTL communication cable (refer to Chapter "*Connector J1"* )
Printer mechanisms are packaged in an antistatic molded plate.
Observe precautions by handling mechanisms in electrostatic protected areas.

# 2 GENERAL SPECIFICATIONS

**SUMMARY OF PRINTER SPECIFICATIONS**

| ITEM | VALUE | UNITS |
|---|---|---|
| Print method | Direct thermal dot line printing | - |
| Print width | 48 | mm |
| Maximum print speed | Up to 60 mm/second throughput (See Note 1) | mm/sec |
| Paper loading | Clamshell | - |
| Paper width | 58 | mm |
| Maximum paper thickness | 60 | $g/m^2$ |
| Recommended papers | JUJO AF50KSE3 | - |
| | MaxStick MS 21460/B (See Note 2) | (repositionable adhesive label) |
| Number of resistor dots | 384 | - |
| Resolution | 8 | dots/mm |
| Paper feed pitch | 2 | motor steps |
| | 0.125 | mm |
| Head temperature detection | By Thermistor | - |
| Out of paper detection | By opto-sensor | - |
| Door detection | By switch-sensor | - |
| Maximum diameter size for the roll paper | 50 | mm |
| Specified standards | UL60950-1; CSA C22.2 N°60950-1; IEC 60950 | |
| Human Interface | Paper Feed Button and LED Indicator<br>Software commands are used for easy setup configuration | |

**Note 1** : 60 mm/sec at 8V
40 mm/sec at 5V
**Note 2** : MaxStick Paper recommendations:
Temperature range = 0 to 40°C
Paper path needs cleaning every 5 rolls (bucket and Printhead). Printhead and platen roller must be cleaned with a cotton stick containing an alcohol solvent (ethanol, methanol or IPA).
**Do not touch the print head with you fingers to avoid burning and ESD damage.**

## *2.1 Compliance to legal approval*

FCC symbol class A
CE symbol class B
UL standard

## SUMMARY OF PRINTER SPECIFICATIONS (continued)

| ITEM | | VALUE | UNITS |
|---|---|---|---|
| Maximum Duty cycle (ton/(ton+toff)<br>In conditions : 25℃, 8.0V | | 39 | % |
| Storage temperature range | | - 20 to + 60 | ℃ |
| Operating temperature range | | 0 to + 50 | ℃ |
| Relative humidity (*operating*) | | 10 to 90 | % |
| Operating voltage range VDD (*logic*) | | 2.7 to 5.5 | V DC |
| Operating voltage range Vch (*dot*) | | 4.5 to 8 | V DC |
| Energy Supply | | 0.3 | MJ/dot |
| Current consumption:<br>Icc max at value : 5V | | 54 | mA |
| Current consumption:<br>Stepping motor (at nominal value) | | 500 | mA<br>per activated phase |
| Electrical life time | | 100 x $10^6$ | pulses |
| Mechanical life time | | 50 | km |
| Over all dimensions **: | Height | 56,8 | mm |
| | Width | 78 | mm |
| | Depth | 85,7 | mm |
| Weight | | 104 | g |

* The printing density variation may become significant when the number of dots energized simultaneously becomes greater than 64. Print head is allowed to have 4.0A maximum.
***: Note: general tolerances ± 0.2 (when no other is specified)*

| | |
|---|---|
| Communication Interfaces | RS232 128ko reception buffer / TTL |
| Resident character set | PC Code Pages : 858 |
| Bar code support | Code 39, UPC-A, UPC-E, JAN8 (EAN), JAN13 (EAN), Interleaved 2 of 5 (ITF), |
| Drivers available | Windows 98, 2000, XP, CE |

**Colour of housing**
Two colours are available:

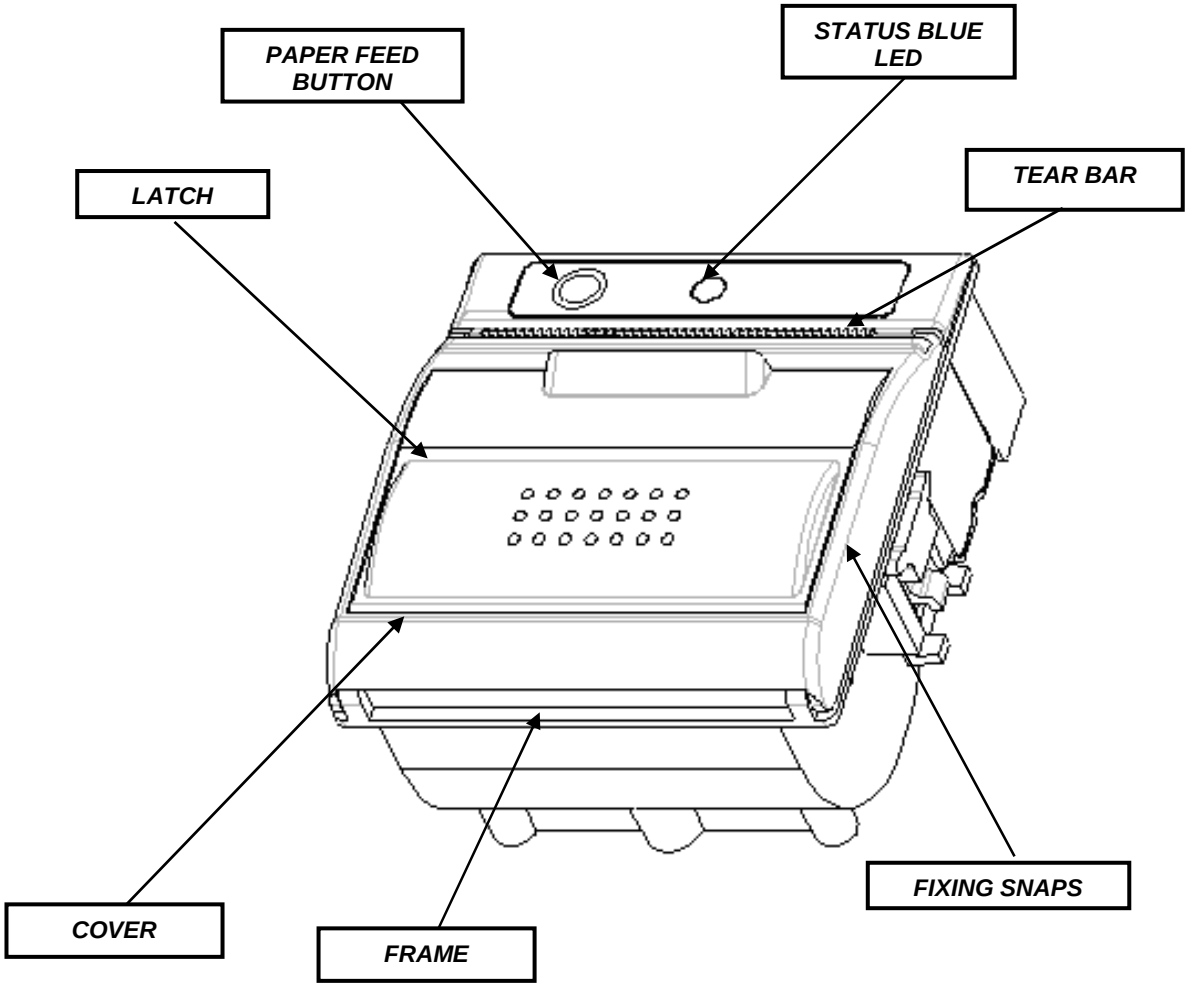
- Grey mechanism: RAL 7026

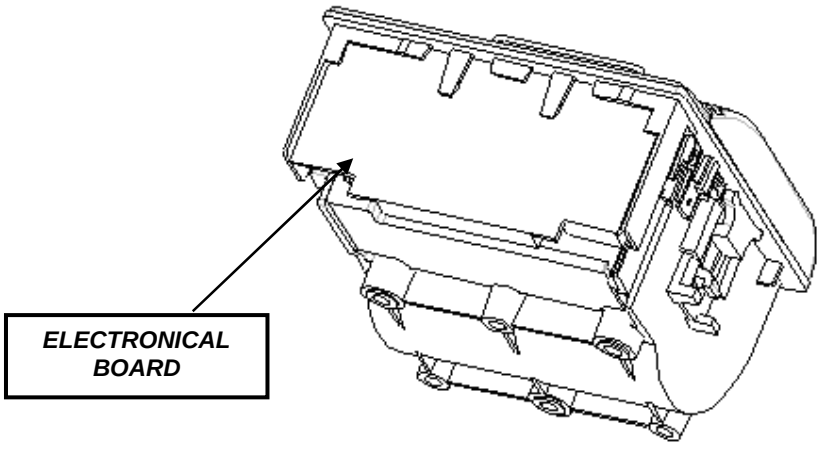
or

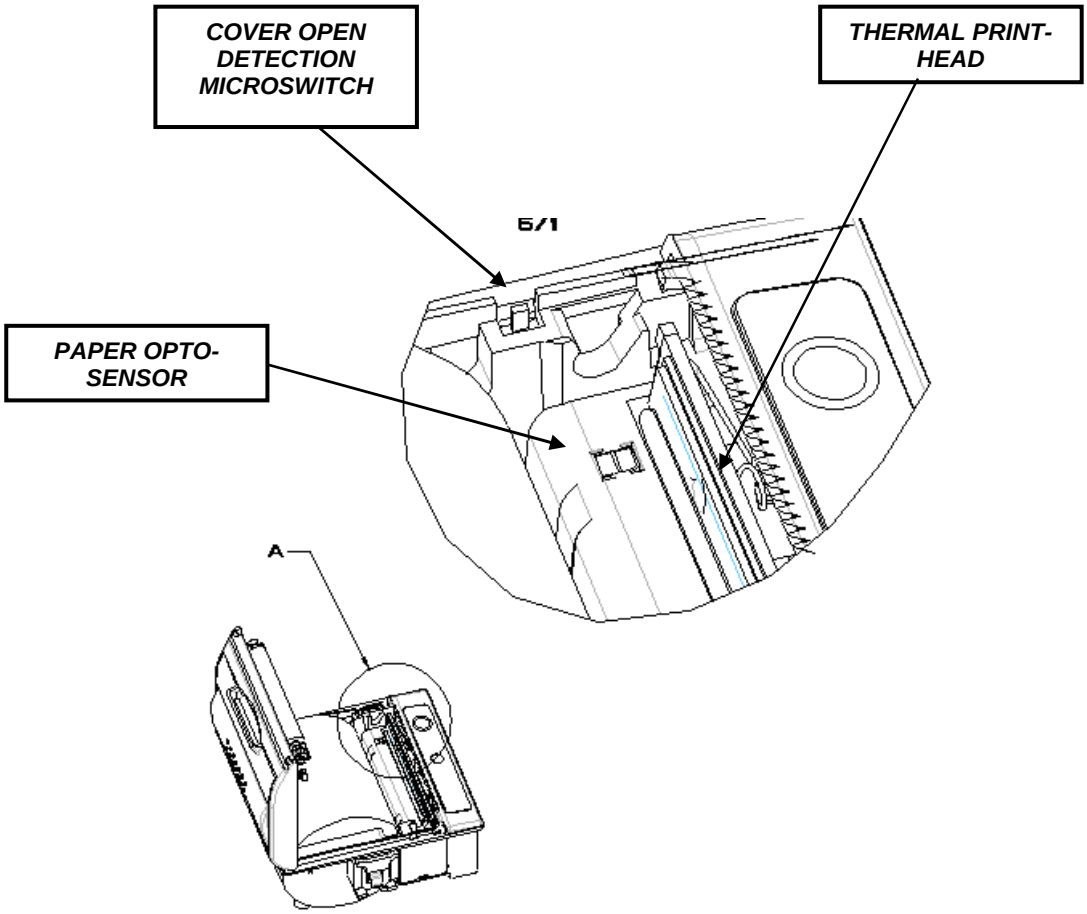
- White mechanism: RAL 9003

# 3 MECHANICAL SPECIFICATIONS

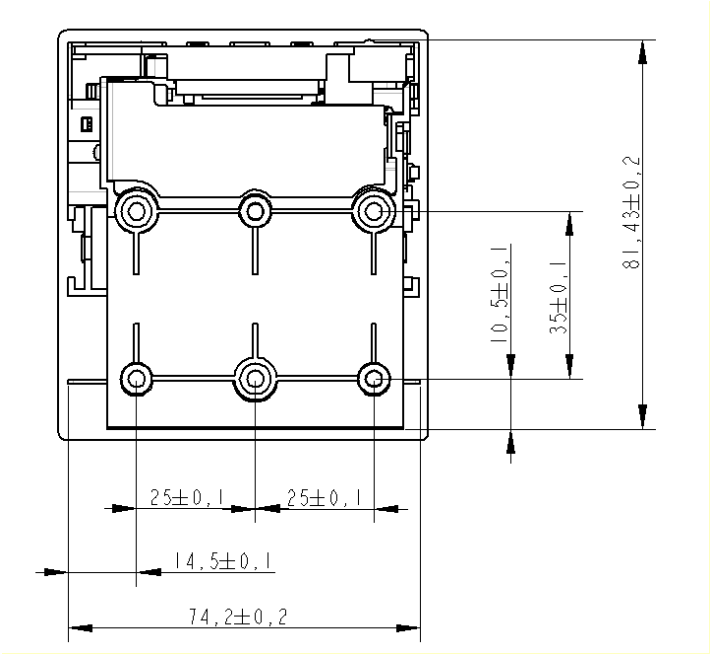
## *3.1 General Views*

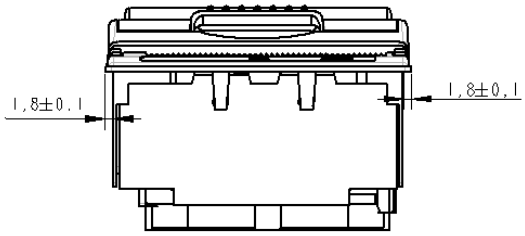


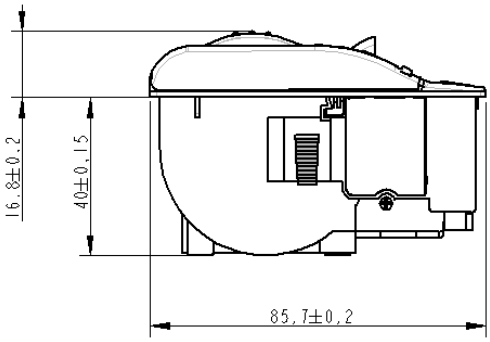



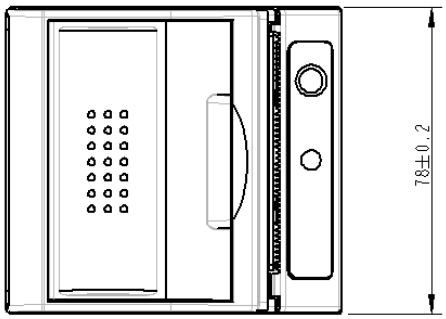

COVER OPEN DETECTION MICROSWITCH
THERMAL PRINT-HEAD
PAPER OPTO-SENSOR
A

## *3.2 Mechanism dimensions*



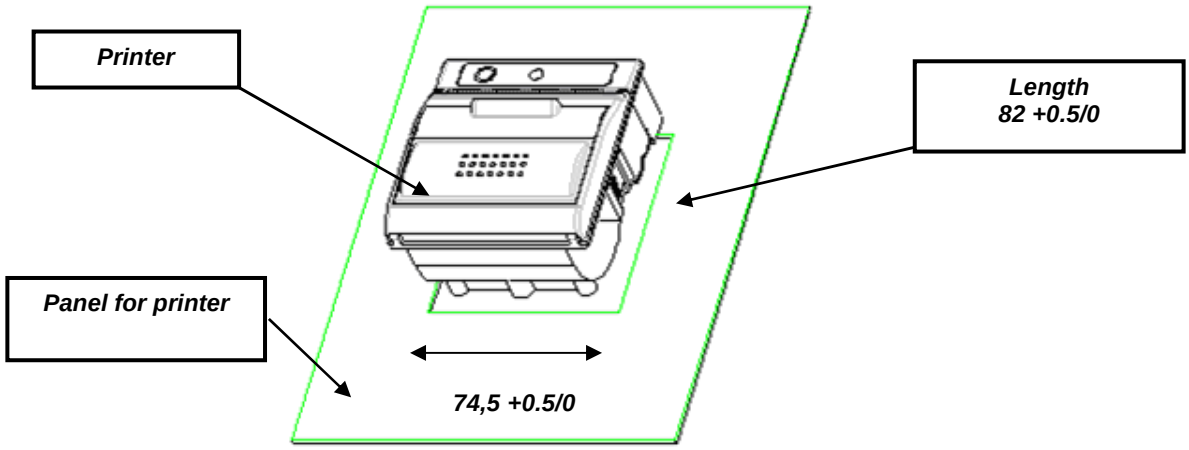



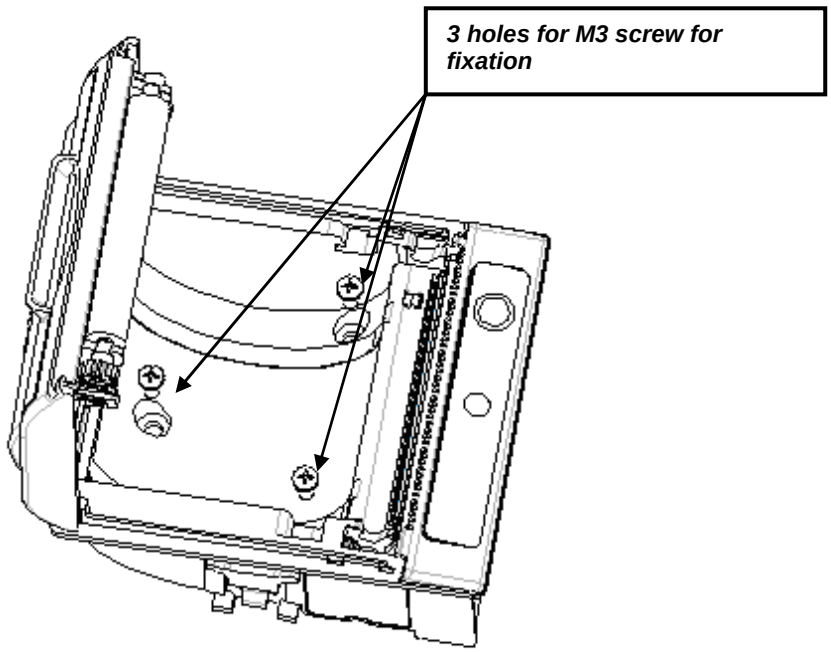



## 3.3 Fixing

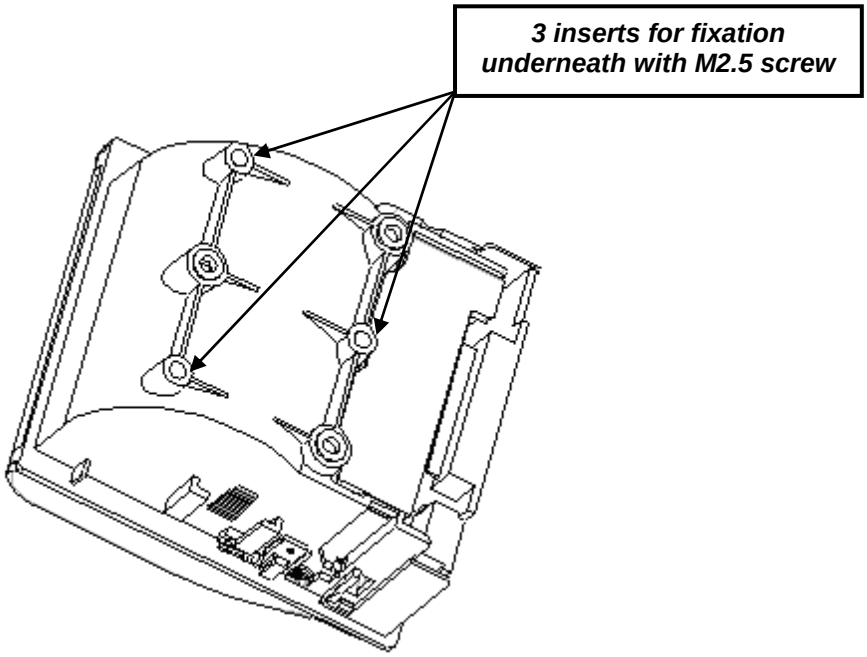
### 3.3.1 Panel for mechanism




### 3.3.2 Fixing by 3 screws inside the bucket

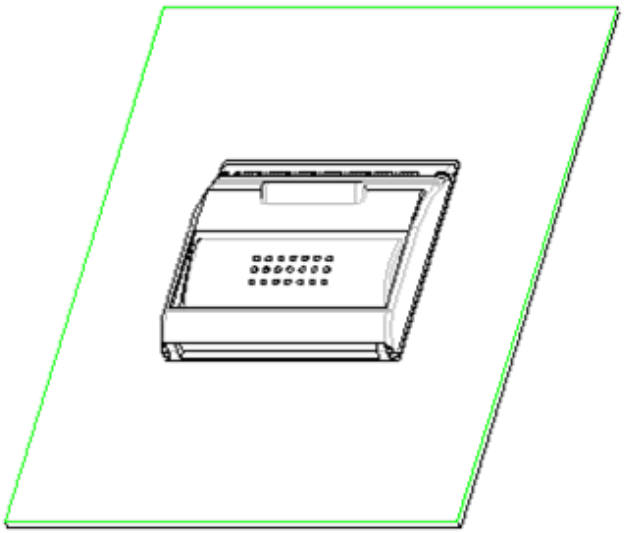


### 3.3.3 *Fixing by 3 screws inside the mechanism*

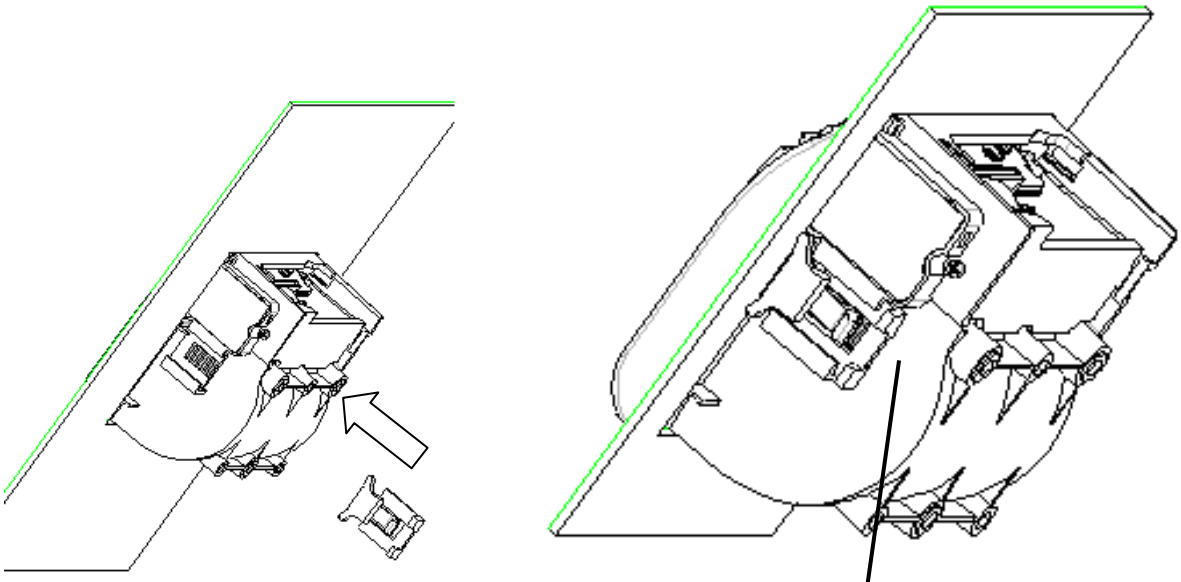



### 3.3.4 *Assembly principle by snap*

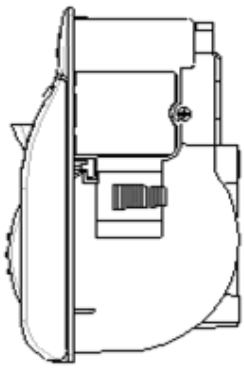
Mechanism integration in panel cut



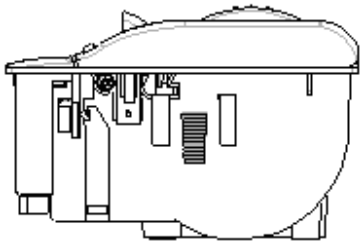
Snaps setting



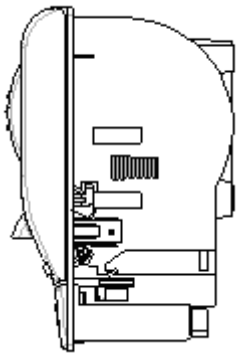

### *3.4 Mechanism orientation positions*



***POSSIBLE***

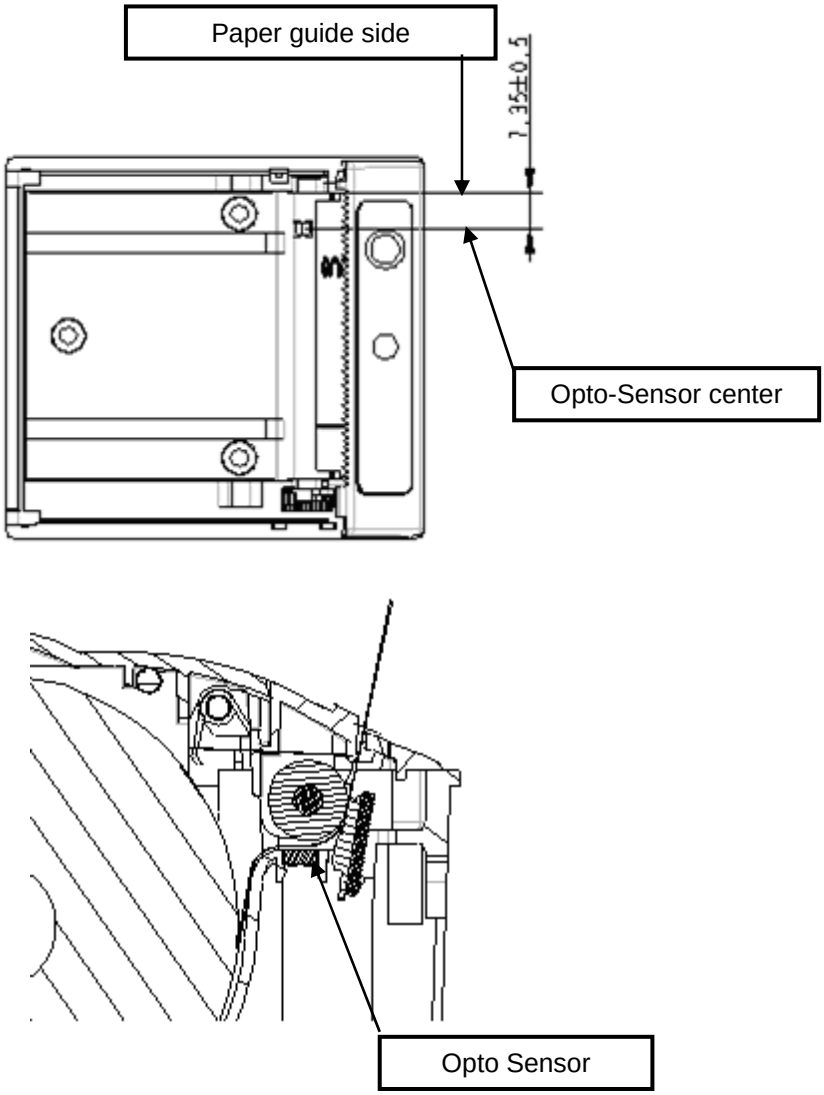


***POSSIBLE***

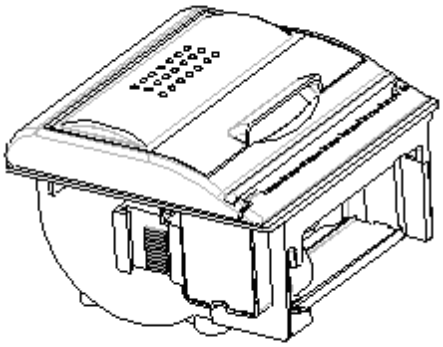


***Risk of the paper roll falling out when cover opened***

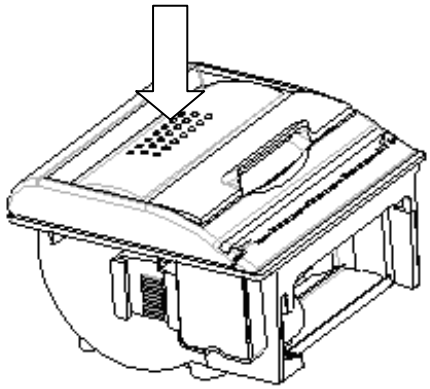
### *3.5 Paper presence opto-sensor position*



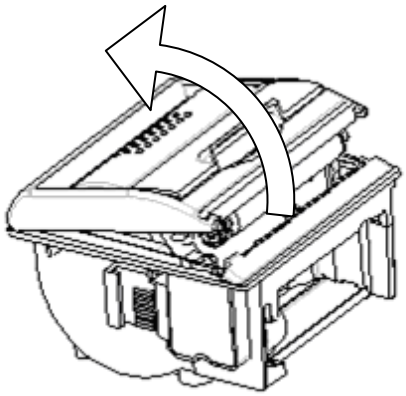
### *3.6 Opening system*

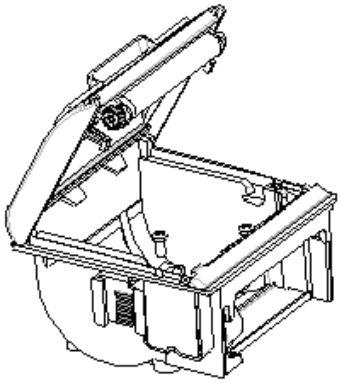


Cover closed

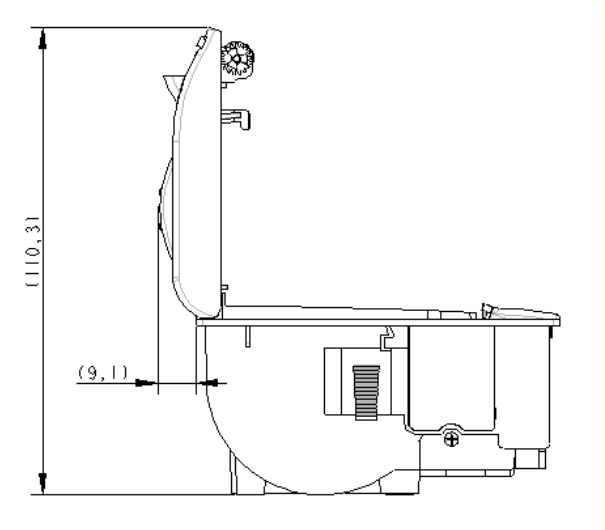


Push on cover



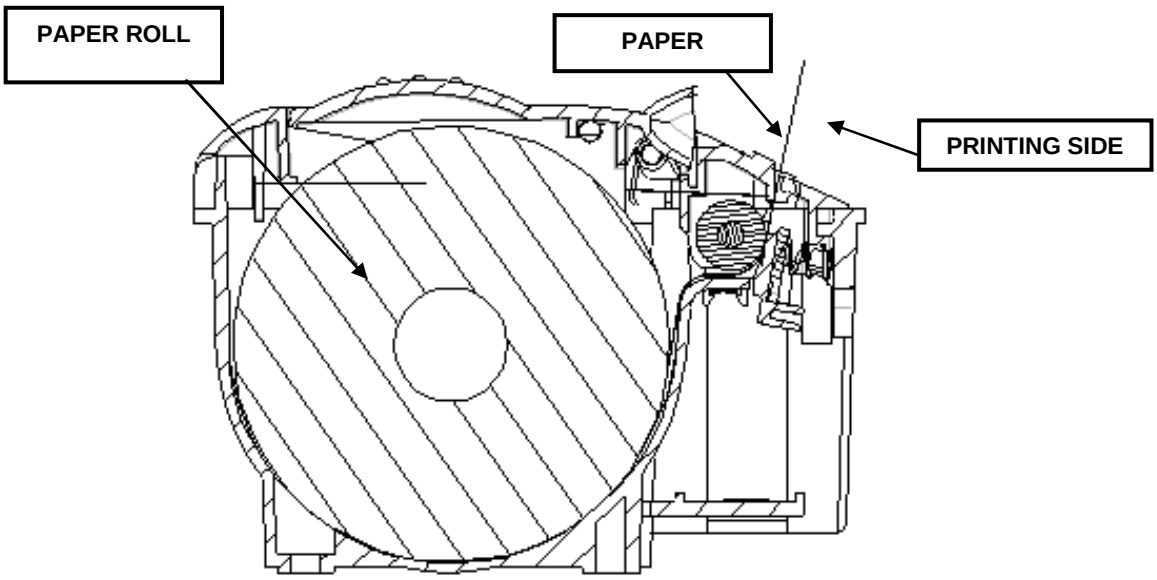


Lever unlocking & cover opening



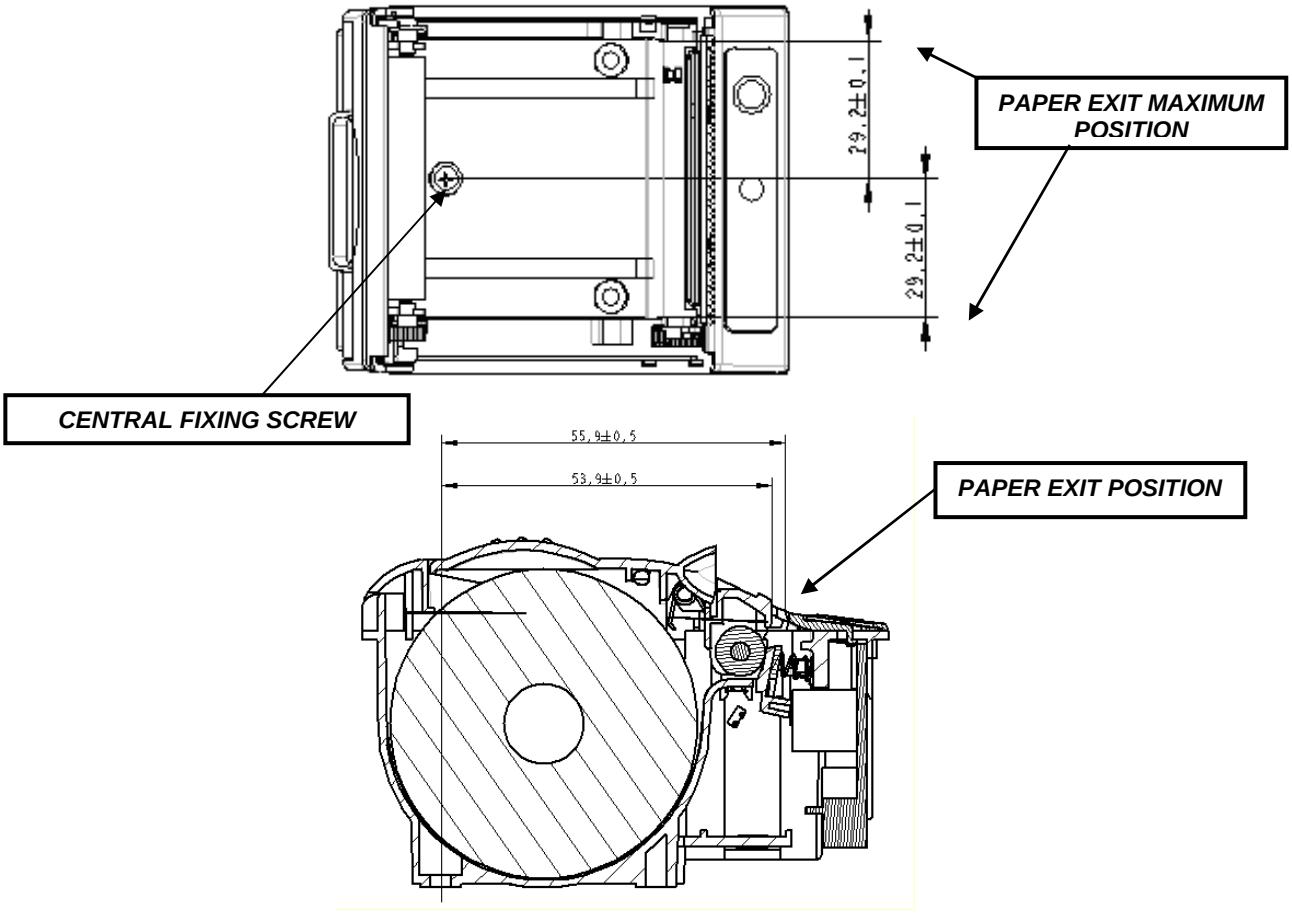

Open cover maximum clearance

### *3.7 Printing*



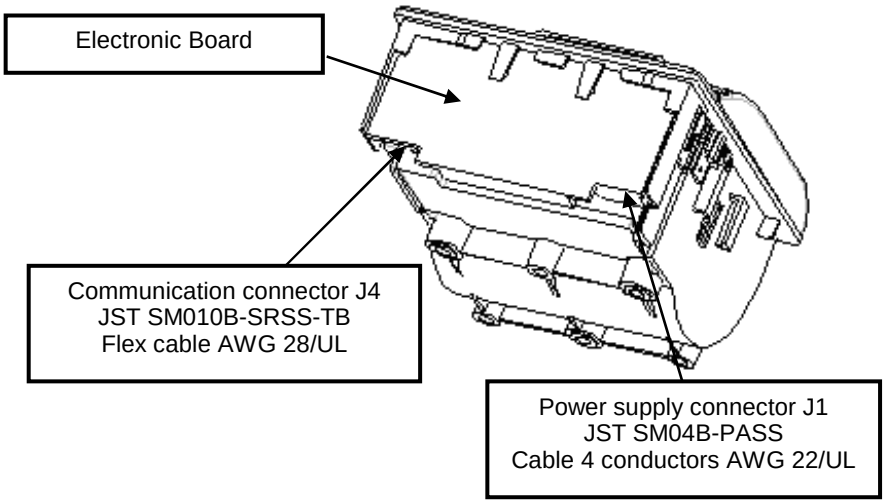

Distance between line of dots and manual tear bar: around 8mm.
Printing width: 48mm

### *3.8 Mechanism Paper exit positions*

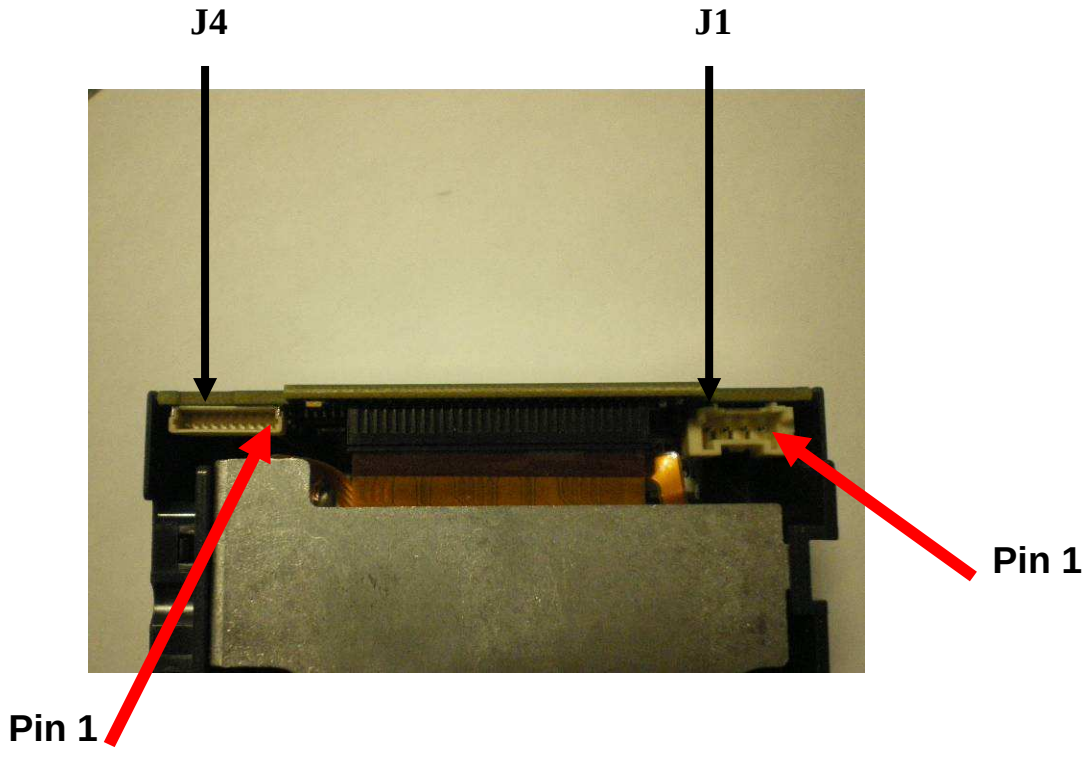



Roll: Maxi diameter 50mm
Width 58 0/-1mm

### *3.9 Connection*




**Power supply and communication cables (delivered with printers) are with length: 300 ± 10 mm and no connector on one side.**



# 4 POWER SUPPLY

The following illustration shows the power cable connector **J1** and pin assignments. The power cable connector is a 4-pin JST ref: PAP-04V-S, or WST ref: P4-I10001.
Contact reference: JST SPHD-001T-P05

**J1** : Power supply connector:

1 GND
2 GND
3 VCH
4 VCH

**Remote Power Supply**

| | |
|---|---|
| Voltage | 4.5 to 8 V |
| Amps | 1 to 10 A depend on multi heating mode * |

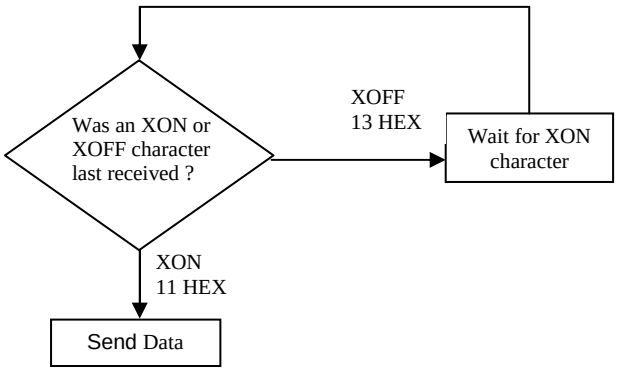
* See code 1F 03 A5 *n* "Set Multi-Heat Mode (temporary, not stored in EEPROM)"

# 5 RS232 PARAMETERS

The RS-232C interface uses either XON/XOFF (software) or DTR/DSR (hardware) protocol to control the flow of information between the computer and the printer.
In XON/XOFF mode, a particular character is sent back and forth between the host and the printer to regulate the communication.
In DTR/DSR mode, changes in the DTR/DSR signal on the RS-232C interface controls the information flow.

## *5.1 XON/XOFF Protocol*

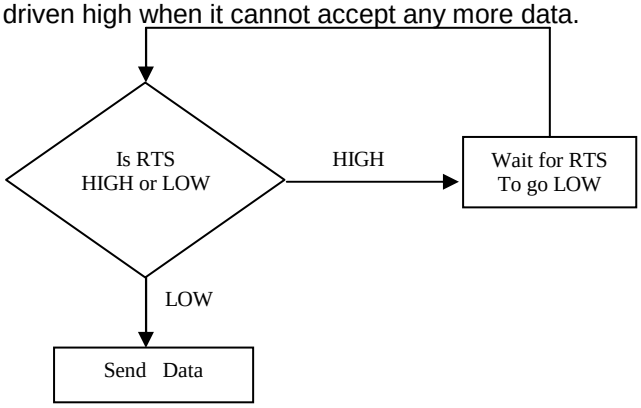
The XON/XOFF characters controls the information transfer between the printer and the host computer. The printer sends an XON character when it is ready to receive data and it sends an XOFF character when it cannot accept any more data. The software on the host computer must monitor the communication link as shown in the following flowchart in order to send data at the appropriate times.
If XON/XOFF has been selected, the printer also toggles the DTR signal, as described in the next section, but it does not look at the DSR signal to transmit data.




XON character = hexadecimal 11.
XOFF character = hexadecimal 13.

## *5.2 RTS/CTS Protocol*

The RTS signal is used to control data transmission to the printer. It is driven low when the printer is ready to receive data and driven high when it cannot accept any more data.



## 5.3 Connector J4 :

The following illustration shows the RS-232C communication connector and pin assignment. The connector is located at the rear of the printer, and is specified, ref JST SM010B-SRSS_TB

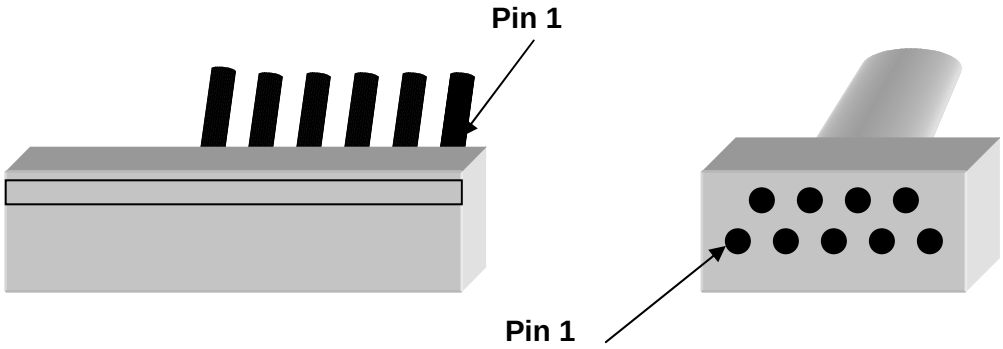
Cable communication connector: 10 pin JST ref SHR-10V-S

Contact reference: JST SSH-003TP0.2-H

### *RS232 cable example:*

**Board side** **Application side**

**Pinout :**




**RS232 cable extension for PC in DB9 ( level RS232 +12V – 12V):**

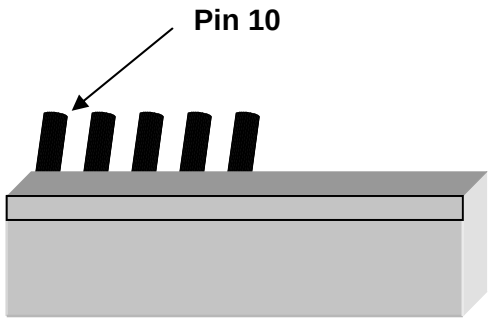
| *JST Connector* | *SUBD9_Out (Female) connected to PC* |
|---|---|
| 1 TXD (OUT) | 2 |
| 2 RTS (OUT) | 6 |
| 3 RXD (IN) | 3 |
| 4 CTS (IN) | 4 |
| 5, 6 GND (*) | 5 |
| 7, 8, 9, 10 | NC |

**(*) It's necessary to connect pin 5 and 6 to GND to enable the mode RS232 compatible**

***TTL cable example( if you wish connect directly the UART with your processor ( level 0V- 3.3V):***

**Board side**

**Pinout :**



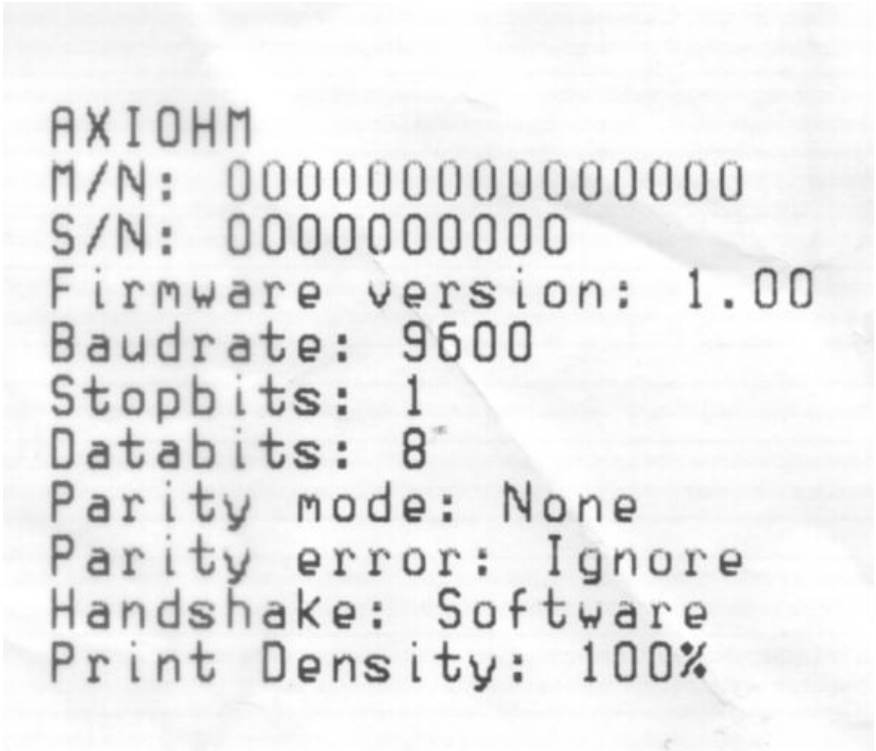

| JST Connector |
|---|
| 10 TXD (OUT) |
| 9 RTS (OUT) |
| 8 RXD (IN) |
| 7 CTS (IN) |
| 6 GND |
| 1,2,3,4,5 NC |

**(*) the pin 5 must be No Connected to enable the mode TTL compatible !**

## 5.4 Self test ticket description

To print a self test ticket, press on the paper feed button when you power ON the printer
Here is the description of the self test print out.

| | | |
|---|---|---|
| - Model Number | : | - This is a 15 digit number fixed by Axiohm. |
| - Serial Number | : | - This is a 10 digits number fixed by Axiohm<br>First letter: letter<br>Next two digits: year of production<br>Next two digits: week of production<br>Next 5 digits: incremental number that is reset every Monday morning. |
| FIRMWARE VERSION | | -Vx.xx<br>This a 4 digits check sum |
| Baud rate | : | Baud rate Value. |
| Data Bits | : | Number of data bits. |
| Stop Bit(s) | : | Number of stop bit(s). |
| Parity mode | : | Type of parity to control frame validity. |
| Parity error | : | Type of parity to control frame validity. |
| Handshake | : | Hardware or software handshaking. |
| Print Density | : | - Percentage of the nominal heating time value for specified paper. |




*(For further information, please contact your distributor or Axiohm Technical Support Team at **www.axiohm.com**)*

# 6 PRINT SPECIFICATION

## 6.1 *Characters*

Print Modes

- Normal
- Underline
- Reverse Video
- Double Height
- Double Width

**Standard**

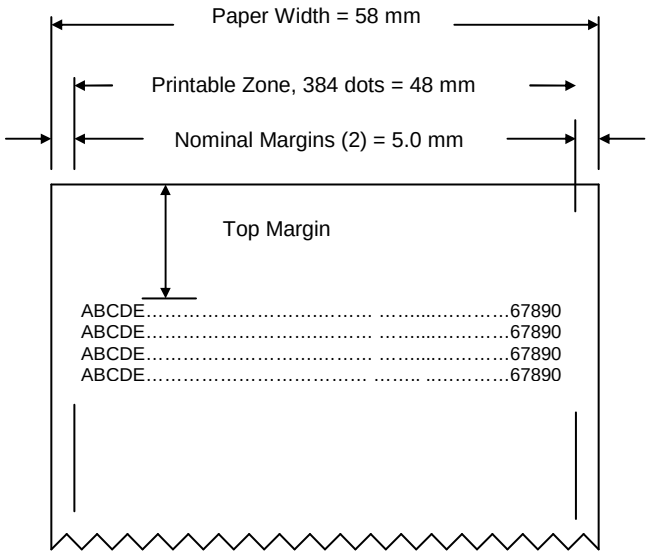
- Characters per Inch: 16.9
- Characters per Line: 24
- Cell Size: 16 x 24 Dots

Font set: 32-255 characters, standard code page 858.
Font size: 16 x 24 with 4 dot space

## 6.2 ***Print zone***

Print Zones for 58 mm (2.36 inches) paper:

- 384 dots (addressable) @ 8 dots/mm, centered on 58 mm
- Standard Mode: minimum margins: 4.0 mm (.157 inches)
- Top margin to knife cut:



## 6.3 Print density and density of receipt print lines

This function makes it possible to adjust the energy level of the Printhead to darken the printout. An adjustment should only be made when necessary. The factory setting is 100%.

## 6.4 Characters sets

Code Page 858

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 00 0 | 10 16 | 20 32 | 30 0 48 | 40 @ 64 | 50 P 80 | 60 ` 96 | 70 p 112 | 80 Ç 128 | 90 É 144 | A0 á 160 | B0 ⁞ 176 | C0 └ 192 | D0 ð 208 | E0 Ó 224 | F0 ‒ 240 |
| 01 1 | 11 17 | 21 ! 33 | 31 1 49 | 41 A 65 | 51 Q 81 | 61 a 97 | 71 q 113 | 81 ü 129 | 91 æ 145 | A1 í 161 | B1 ▒ 177 | C1 ┴ 193 | D1 Ð 209 | E1 ß 225 | F1 ± 241 |
| 02 2 | 12 18 | 22 " 34 | 32 2 50 | 42 B 66 | 52 R 82 | 62 b 98 | 72 r 114 | 82 é 130 | 92 Æ 146 | A2 ó 162 | B2 ▓ 178 | C2 ┬ 194 | D2 Ê 210 | E2 Ô 226 | F2 — 242 |
| 03 3 | 13 19 | 23 # 35 | 33 3 51 | 43 C 67 | 53 S 83 | 63 c 99 | 73 s 115 | 83 â 131 | 93 ô 147 | A3 ú 163 | B3 │ 179 | C3 ├ 195 | D3 Ë 211 | E3 Ò 227 | F3 ¾ 243 |
| 04 4 | 14 20 | 24 $ 36 | 34 4 52 | 44 D 68 | 54 T 84 | 64 d 100 | 74 t 116 | 84 ä 132 | 94 ö 148 | A4 ñ 164 | B4 ┤ 180 | C4 ─ 196 | D4 È 212 | E4 õ 228 | F4 ¶ 244 |
| 05 5 | 15 21 | 25 % 37 | 35 5 53 | 45 E 69 | 55 U 85 | 65 e 101 | 75 u 117 | 85 à 133 | 95 ò 149 | A5 Ñ 165 | B5 Á 181 | C5 ┼ 197 | D5 € 213 | E5 Õ 229 | F5 § 245 |
| 06 6 | 16 22 | 26 & 38 | 36 6 54 | 46 F 70 | 56 V 86 | 66 f 103 | 76 v 118 | 86 å 134 | 96 û 150 | A6 ª 166 | B6 Â 182 | C6 ã 198 | D6 Í 214 | E6 µ 230 | F6 ÷ 246 |
| 07 7 | 17 23 | 27 ' 39 | 37 7 55 | 47 G 71 | 57 W 87 | 67 g 103 | 77 w 119 | 87 ç 135 | 97 ù 151 | A7 º 167 | B7 À 183 | C7 Ã 199 | D7 Î 215 | E7 þ 231 | F7 ¸ 247 |
| 08 8 | 18 24 | 28 ( 40 | 38 8 56 | 48 H 72 | 58 X 88 | 68 h 104 | 78 x 120 | 88 ê 136 | 98 ÿ 152 | A8 ¿ 168 | B8 © 184 | C8 ╚ 200 | D8 Ï 216 | E8 Þ 232 | F8 º 248 |
| 09 9 | 19 25 | 29 ) 41 | 39 9 57 | 49 I 73 | 59 Y 89 | 69 i 105 | 79 y 121 | 89 ë 137 | 99 Ö 153 | A9 ® 169 | B9 ╣ 185 | C9 ╔ 201 | D9 ┘ 217 | E9 Ú 233 | F9 ¨ 249 |
| 0A 10 | 1A 26 | 2A * 42 | 3A : 58 | 4A J 74 | 5A Z 90 | 6A j 106 | 7A z 122 | 8A è 138 | 9A Ü 154 | AA ¬ 170 | BA ║ 186 | CA ╩ 202 | DA ┌ 218 | EA Û 234 | FA · 250 |
| 0B 11 | 1B 27 | 2B + 43 | 3B ; 59 | 4B K 75 | 5B [ 91 | 6B k 107 | 7B { 123 | 8B ï 139 | 9B ø 155 | AB ½ 171 | BB ╗ 187 | CB ╦ 203 | DB ▉ 219 | EB Ù 235 | FB ¹ 251 |
| 0C 12 | 1C 28 | 2C , 44 | 3C < 60 | 4C L 76 | 5C \ 92 | 6C l 108 | 7C \| 124 | 8C î 140 | 9C £ 156 | AC ¼ 172 | BC ╝ 188 | CC ╠ 204 | DC ▄ 220 | EC ý 236 | FC ³ 252 |
| 0D 13 | 1D 29 | 2D - 45 | 3D = 61 | 4D M 77 | 5D ] 93 | 6D m 109 | 7D } 125 | 8D ì 141 | 9D Ø 157 | AD ¡ 173 | BD ¢ 189 | CD ═ 205 | DD ¦ 221 | ED Ý 237 | FD ² 253 |
| 0E 14 | 1E 30 | 2E . 46 | 3E > 62 | 4E N 78 | 5E ^ 94 | 6E n 110 | 7E ~ 126 | 8E Ä 142 | 9E × 158 | AE « 174 | BE ¥ 190 | CE ╬ 206 | DE Ì 222 | EE ¯ 238 | FE ■ 254 |
| 0F 15 | 1F 31 | 2F / 47 | 3F ? 63 | 4F O 79 | 5F _ 95 | 6F o 111 | 7F △ 127 | 8F Å 143 | 9F ƒ 159 | AF » 175 | BF ┐ 191 | CF ¤ 207 | DF ▀ 223 | EF ´ 239 | FF 255 |

# 7 LIST OF CONTROL CODES

| Code (Hexadecimal) | Command | Page |
|---|---|---|
| 0A | Print and Feed One Line | 28 |
| 0D | Activate Carriage Return | 28 |
| 11 *n1...nx* | Print Raster Graphics | 30 |
| 1B 16 01 | Select Pitch (Column Width) | 29 |
| 1B 21 *n* | Select Print Mode | 29 |
| 1B 40 | Initialize Printer | 27 |
| 1B 4A *n* | Print and Feed Paper | 28 |
| 1B 7B *n* | Select or Cancel Upside-Down Print Mode | 28 |
| 1B 76 | Transmit Paper Sensor Status | 31 |
| 1D 04 *n* | Real Time Status Transmission | 34 |
| 1D 42 *n* | Select or Cancel White/Black Reverse Print Mode | 29 |
| 1D 49 *n* | Transmit Printer ID | 32 |
| 1D 49 40 *n* | Transmit Printer ID, Remote Diagnostics Extension | 33 |
| 1D 68 *n* | Select Bar Code Height | 37 |
| 1D 6B *d1…dk NUL*<br>1D 6B *m n d1…dn* | Print Bar Code | 38 |
| 1D 77 *n* | Select Bar Code Width | 39 |
| 1D FF | Reset Firmware | 27 |
| 1F 02 n*1…n6* | Set Communication Interface Parameters | 40 |
| 1F 03 00 *n* | Set Diagnostic Mode | 41 |
| 1F 03 C0 *n* | Select main Board | 41 |
| 1F 03 A5 *n* | Set Multi-Heat Mode (temporary, not stored in EEPROM) | 41 |
| 1F 0B 4E 52 4A *n* | Set Print Density | 41 |
| 1F 56 | Send Printer Software Version | 42 |
| 1F 74 | Print Test Form | 42 |

# 8 COMMAND DESCRIPTION

## *8.1 Command conventions*

The following information describes how each command is organized:

Command Name
A designation (not the ASCII code) used to identify the command.

Description
A brief summary of the command, followed by detailed information, if necessary.

| | |
|---|---|
| ASCII | the ASCII control code |
| Hexadecimal | the Hexadecimal control code |
| Decimal | the Decimal control code |
| Value or Values | a description of the command operand values |
| Range | the upper and lower limits of the command operand |
| Default | the command operand default after printer reset |
| Formulas | any formula used for this command. |

Exceptions
Describes any exceptions to this command, for example, other commands that the command cannot be used with.

Related Information
This section describes any related information for this command and provides references to other sections for additional information.

# 9 RESETS COMMANDS

## INITIALIZE PRINTER

Clears the print line buffer and resets the printer to the default settings for the startup configuration (refer to Default settings below).
Single-Wide, Single-High, Non-Rotated, and Left-Aligned characters are set and User-defined characters or logo graphics are cleared.

**ASCII** ESC @
**Hexadecimal** **1B 40**
**Decimal** 27 64

**Default**

| | | |
|---|---|---|
| Character Pitch | 16.9 CPI | |
| Column Width | 24 characters | |
| Extra Dot Rows | 3 | |
| Character Set | Default | |
| Printing Position | Column | One |

## RESET FIRMWARE

Reboots the printer.

**ASCII** GS (SPACE)
**Hexadecimal** **1D FF**
**Decimal** 29 255

# 10 VERTICAL POSITIONING and PRINT COMMANDS

## PRINT AND FEED ONE LINE

Prints one line from the buffer and feeds paper one line.

**ASCII** LF
**Hexadecimal** **0A**
**Decimal** 10

## ACTIVATE CARRIAGE RETURN

Prints one line from the buffer and feeds paper one line.

**ASCII** CR
**Hexadecimal** **0D**
**Decimal** 13

## PRINT AND FEED PAPER

Prints one line from the buffer and feeds the paper *n*/203 inch (*n*/8 mm). The line height equals the character height when *n* is too small.
If the Set Horizontal and Vertical Minimum Motion Units command (1D 50) is used to change the horizontal and vertical minimum motion units, the parameters of this command (Print and Feed Paper) will be interpreted accordingly.

**ASCII** ESC J *n*
**Hexadecimal** **1B 4A *n***
**Decimal** 27 74 *n*

**Value of *n*** *n*/203 inch
**Range of *n*** 0-255

## SELECT OR CANCEL UPSIDE-DOWN PRINT MODE

Prints upside-down characters. The command may be combined with Clock Wise Rotated print (1B 56) or Counter Clock Wise Rotated print (1B 12). The character order is inverted in the buffer so text is readable. Only bit 0 is used. Bits 1-7 are not used. See Summary of Rotated Printing in this document for more information.

**ASCII** ESC { *n*
**Hexadecimal** **1B 7B *n***
**Decimal** 27 123 *n*

**Value of *n*** 0 = Cancel
1 = Set

**Default** 0 (Cancel)

**Exceptions**
The command is valid only at the beginning of a line.
It cannot be used with right side up characters on the same line.

# 11 PRINT CHARACTERISTICS COMMANDS

## SELECT PRINT MODE

Selects the print mode :bold, underlined, double high or double wide.

**ASCII** ESC ! *n*
**Hexadecimal** **1B 21 *n***
**Decimal** 27 33 *n*

**Value of *n*** See table

| **Value of *n*** | | **0** | **1** |
|---|---|---|---|
| **Bit**[1] | **Function** | | |
| Bit 0, 1,2,6 | NA | | |
| Bit 3 | Bold | Canceled | Set |
| Bit 4 | Double High | Canceled | Set |
| Bit 5 | Double Wide | Canceled | Set |
| Bit 7 | Underlined Mode | Canceled | Set |

## SELECT OR CANCEL WHITE/BLACK REVERSE PRINT MODE

Turns on White/Black reverse printing mode. In White/Black reverse printing mode, print dots and non-print dots are reversed, which means that white characters are printed on a black background.
This command can be used with built-in characters and user-defined characters, but does not affect the space between lines.
White/Black Reverse Print Mode does not affect bit image, downloaded bit image, bar code**.**
**ASCII** GS B *n*
**Hexadecimal** **1D 42 *n***
**Decimal** 29 66 *n*

**Value of *n*** 0 = Off
1 = On
(When 0 and 1 are the Least Significant Bit, LSB)

**Default** 0 (Off)

**Exceptions**

Only the lowest bit of *n* is valid.

## SELECT PITCH (COLUMN WIDTH)

Selects the character pitch for a print line

**ASCII** ESC SYN *n*
**Hexadecimal** **1B 16 *n***
**Decimal** 27 22 *n*

**Value of *n*** 0 = Standard pitch
1 = Compressed pitch

**Default** 0 (Standard pitch)

**Formulas**
The following table provides the print characteristics for both pitches.

| Pitch | Number of columns (number of characters) | Character width (in dots) |
|---|---|---|
| Standard | 24 | 16 |
| Compressed | 42 | 8 |

# 12 GRAPHICS COMMANDS

## PRINT RASTER GRAPHICS

Prints one row of data. *n*1 . .. *n*l: bytes describing the line to print.

**ASCII** DC1 *n1 ...nl*
**Hexadecimal** **11 *n1 ...nl***
**Decimal** 17 *n1 ...nl*

**Value of *n*** *n1…n48*

**Range** 0-255

# 13 PRINTER STATUS COMMANDS

## TRANSMIT PAPER SENSOR STATUS

Sends status data to the host computer. The printer sends one byte to the host computer when it is not busy or in a fault condition. See the following table.

**ASCII** ESC v
**Hexadecimal** **1B 76**
**Decimal** 27 118

**Values**

**Status Byte**

| Bit | Function | 0 Signifies | 1 Signifies |
|---|---|---|---|
| 0 | Not Used | Fixed to Zero | Fixed to Zero |
| 1 | Receipt Cover (*) | Closed | Open |
| 2 | Receipt Paper | Present | Out |
| 3 | Not Used | Fixed to Zero | Fixed to Zero |
| 4 | Not Used | Fixed to Zero | Fixed to Zero |
| 5 | Temperature | In valid range | Too hot or too cold |
| 6 | Voltage | In valid range | Too high or too low |
| 7 | Not Used | Fixed to Zero | Fixed to Zero |

(*) If the main board configuration is Asteron (not valid in Picoboard mode) (see Select main board command)

## TRANSMIT PRINTER ID

Transmits the printer model, type of version as defined below. This command is processed as normal printer data.

**ASCII** GS I *n*
**Hexadecimal** **1D 49 *n***
**Decimal** 29 73 *n*

Operand: *n* = printer ID select
Limit: Decimal: $1 \le n \le 2$; $49 \le n \le 50$
Hex: $01 \le n \le 02$; $31 \le n \le 32$

| "GS I" OPERAND AND RETURNED STATUS DEFINITION | | | | |
|---|---|---|---|---|
| ***n*** | | **Printer ID** | **Function** | **Value (hex)** |
| **Decimal** | **Hex** | | | |
| 1, 49 | 01, 31 | Printer Model ID | Asteron | 0x3B |
| 2, 50 | 02, 32 | Type ID | See table below | |
| 66 | 42 | Manufacturer | AXIOHM | "_AXIOHM" |
| 67 | 43 | Printer Name | TBD | "_ASTERON" |
| 68 | 44 | Serial Number | Depends on serial number | |

| **Bit** | **Function** | **Value** | |
|---|---|---|---|
| | | **0** | **1** |
| 0 | 2-byte character code | Not installed | Installed |
| 1 | Reserved | - | - |
| 2 | Reserved | - | - |
| 3 | Undefined | | |
| 4 | Fixed | Always 0 | - |
| 5 | Undefined | | |
| 6 | Undefined | | |
| 7 | Fixed | Always 0 | - |

***Note***: for n = 66 , 67, 68, the printer response is sent back in the following format :
Header = 5F (hex)
Data = ASCII string
NULL = 00 (hex)

## TRANSMIT PRINTER ID, REMOTE DIAGNOSTICS EXTENSION

Performs the remote diagnostic functions specified by *n.*
Each returned message is defined as: *n* + data + <CR>
**ASCII** GS I @ *n*
**Hexadecimal** **1D 49 40 *n***
**Decimal** 29 73 64 *n*

**Values of *n*** Refer to table

| Value of *n* | | Remote diagnostic item | Function |
|---|---|---|---|
| **Hex** | **Dec** | | |
| 20 | 32 | Serial #,<br>10 digit ASCII | Write to NVRAM<br>Example, send 14 bytes to printer:<br>GS I @ 0x20 1234567890 |
| 23 | 35 | Serial # | Return Serial #, preceded by *n* to identify<br>Printer returns 12 bytes in above example:<br>#1234567890<CR> |
| | | | |
| 24 | 36 | Class/model #,<br>15 digit ASCII | Write to NVRAM |
| 27 | 39 | Class/model # | Return Class/model #, returns 17 bytes |

# 14 REAL TIME COMMANDS

## REAL TIME STATUS TRANSMISSION

Transmits the selected one byte printer status specified by *n* in Real Time according to the following parameters. This command includes two sequences: GS and DLE.

| | GS Sequence | DLE Sequence |
|---|---|---|
| **ASCII** | GS EOT *n* | DLE EOT *n* |
| **Hexadecimal** | **1D 04 *n*** | **10 04 *n*** |
| **Decimal** | 29 4 *n* | 16 4 *n* |

**Value of *n***

1 = Transmit printer status
2 = Transmit offline status
3 = Transmit error status
4 = Transmit receipt paper status

### Exceptions

The command is ignored if *n* is out of range.

### Related Information

**1 = Transmit Printer Status**

| Bit | Status | Hex | Decimal | Function |
|---|---|---|---|---|
| 0 | Off | 00 | 0 | Fixed to Off. |
| 1 | On | 02 | 2 | Fixed to On. |
| 2 | On | 04 | 4 | Fixed to On. |
| 3 | Off<br>On | 00<br>08 | 0<br>8 | Not busy at the communication interface.<br>DTR Line is high. |
| 4 | On | 10 | 16 | Fixed to On. |
| 5 | | | | Undefined. |
| 6 | | | | Undefined. |
| 7 | Off | 00 | 0 | Fixed to Off. |

## 2 = Transmit Off-Line Status

| Bit | Status | Hex | Decimal | Function |
|---|---|---|---|---|
| 0 | Off | 00 | 0 | Fixed to Off. |
| 1 | On | 02 | 2 | Fixed to On. |
| 2 | Off<br>On | 00<br>04 | 0<br>4 | Cover closed (*)<br>Cover opened (*) |
| 3 | Off | 00 | 0 | Fixed to Off |
| 4 | On | 10 | 16 | Fixed to On. |
| 5 | Off<br>On | 00<br>20 | 0<br>32 | Printing not stopped due to paper condition.<br>Printing stopped due to paper condition. |
| 6 | Off<br>On | 00<br>40 | 0<br>64 | No error condition.<br>Error condition exists in the printer. |
| 7 | Off | 00 | 0 | Fixed to Off. |

(*) If the main board configuration is Asteron (not valid in Picoboard mode) (see Select main board command)

## 3 = Transmit Error Status

| Bit | Status | Hex | Decimal | Function |
|---|---|---|---|---|
| 0 | Off | 00 | 0 | Fixed to Off. |
| 1 | On | 02 | 2 | Fixed to On. |
| 2 | Off | 00 | 0 | Fixed to Off. |
| 3 | Off | 00 | 0 | Fixed to Off |
| 4 | On | 10 | 16 | Fixed to On. |
| 5 | Off<br>On | 00<br>20 | 0<br>32 | No unrecoverable error.<br>Unrecoverable error occurred. |
| 6 | Off<br>On | 00<br>40 | 0<br>64 | Thermal Printhead temp. and power supply voltage are in range.<br>Thermal print head temp. or power supply voltage are out of range. |
| 7 | Off | 00 | 0 | Fixed to Off |

## 4 = Transmit Receipt Paper Status

| Bit | Status | Hex | Decimal | Function |
|---|---|---|---|---|
| 0 | Off | 00 | 0 | Fixed to Off |
| 1 | On | 02 | 2 | Fixed to On |
| 2 | Off | 00 | 0 | Fixed to Off |
| 3 | Off | 00 | 0 | Fixed to Off |
| 4 | On | 10 | 16 | Fixed to On |
| 5 | Off<br>On | 00<br>20 | 0<br>32 | Paper present<br>Paper exhausted |
| 6 | Off<br>On | 00<br>40 | 0<br>64 | Paper present<br>Paper exhausted |
| 7 | Off | 00 | 0 | Fixed to Off |

# 15 BAR CODE COMMANDS

## SELECT BAR CODE HEIGHT

Sets the bar code height to *n* dots or *n*/203 inch (*n*/8 mm).

**ASCII** GS h *n*
**Hexadecimal** **1D 68 *n***
**Decimal** 29 104 *n*

**Value of *n*** Number of dots
**Range of *n*** 1-255
**Default** 216

## PRINT BAR CODE

Selects the bar code type and prints a bar code for the ASCII characters entered. If the width of the bar code exceeds one line, the bar code is not printed.
There are two variations to this command. The first variation uses a NULL character to terminate the string; the second uses a length byte at the beginning of the string to compensate for the Code 128 (*) bar code that can accept a NULL character as part of the data. With the second variation the length of byte is specified at the beginning of the string.
The check digit is calculated for UPC and JAN (EAN) codes if it is not sent from the host computer. Six-character zero-suppressed UPC-E tags are generated from full 11 or 12 characters sent from the host computer according to standard UPC-E rules. Start/Stop characters are added for Code 39 if they are not included.
Bar code HRI characters will be automatically printed under bar code.

| | First Variation | Second Variation |
|---|---|---|
| **ASCII** | GS k *m d1…dk* NUL | GS k *m n d1…dn* |
| **Hexadecimal** | **1D 6B *m d1…dk* NUL** | **1D 6B *m n d1…dn*** |
| **Decimal** | 29 107 *m d1 dk* NUL | 29 107 *m n d1…dn* |

(0 = End of command)

### Exceptions

The command is only valid at the beginning of a line.
Illegal data cancels the command.

**First Variation: Data string terminated with NULL Character**

| *m* | **Bar Code** | **D** | ***n*, Length** |
|---|---|---|---|
| 0 | UPC-A | 48- 57 (ASCII numerals) | Fixed Length: 11, 12 |
| 1 | UPC-E | 48- 57 | Fixed Length: 11, 12 |
| 2 | JAN13 (EAN) | 48- 57 | Fixed Length: 12, 13 |
| 4 | Code 39 | 48- 57,<br>65- 90 (ASCII alphabet),<br>32, 36, 37, 43, 45, 46, 47 (ASCII special characters)<br>d1 = dk = 42 (start/stop code is supplied by printer if necessary) | Variable Length |
| 5 | Interleaved 2 of 5 | 48- 57 | Variable Length (Even Number) |

**Second Variation Length of Byte Specified at Beginning of String**
The value of *m* selects the bar code system as described in the table.
The variable *d* indicates the character code to be encoded into the specified bar code system. See the table. If character code *d* cannot be encoded, the printer prints the bar code data processed so far, and the following data is treated as normal data.

| *m* | **Bar Code** | **D** | ***n*, Length** |
|---|---|---|---|
| 65 | UPC-A | 48- 57 (ASCII numerals) | Fixed Length: 11, 12 |
| 66 | UPC-E | 48- 57 | Fixed Length: 11, 12 |
| 67 | JAN13 (EAN) | 48- 57 | Fixed Length: 12, 13 |
| 69 | CODE39 | 48- 57,<br>65- 90 (ASCII alphabet),<br>32, 36, 37, 43, 45, 46, 47 (ASCII special characters)<br>*d1* = *dk* = 42 (start/stop code is supplied by printer if necessary) | Variable |
| 70 | Interleaved 2 of 5 (ITF) | 48- 57 | Variable (Even Number) |
| 73 | Code 128 (*) | 0-104<br>d1 = 103-104 (must be a Start code)<br>d2 = 0-102 (data bytes)<br>(Stop code is provided by the printer) | Variable |

(*) Only modes A and B are managed for the Code 128 bar code, not mode C.

## SELECT BAR CODE WIDTH

Sets the bar code module to *n*/203 inch (*n*/8 mm).

**ASCII** GS w *n*
**Hexadecimal** **1D 77 *n***
**Decimal** 29 119 *n*

**Value of *n*** 2, 3, 4, 5,6

**Default** n=3

***Formulas***

*n*/203 inch (*n*/8 mm).

# 16 CONFIGURATION COMMANDS

## SET COMMUNICATION INTERFACE PARAMETERS

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Synopsis: | Setting communication parameters | | | | | | | | |
| Syntax: | ASCII: | US | STX | *n1* | *n2* | *n3* | *n4* | *n5* | *n6* |
| | Decimal: | 31 | 2 | *n1* | *n2* | *n3* | *n4* | *n5* | *n6* |
| | Hex: | **1F** | **02** | ***n1*** | ***n2*** | ***n3*** | ***n4*** | ***n5*** | ***n6*** |

***Description***:

| n1 | Interface |
|---|---|
| 00h | RS232 |

| n2, bit [0..2] | RS232 Baudrate |
|---|---|
| 00h | 1200 |
| 01h | 2400 |
| 02h | 4800 |
| 03h | 9600 |
| 04h | 19200 |
| 05h | 38400 |
| 06h | 57600 |
| 07h | 115200 |

| n2, bit 4 | RS232 Number of stop bits |
|---|---|
| 0 | 1 |
| 1 | 2 |

| n2, bit 5 | RS232 Number of data bits |
|---|---|
| 0 | 8 |
| 1 | 7 |

| n3 | RS232 Parity |
|---|---|
| 0x00 | Odd parity |
| 0x01 | Even parity |

| n4 | RS232 Parity mode |
|---|---|
| 0x00 | No parity |
| 0x01 | Enabled and set using parameter described above |

| n5 | RS232 Handshaking |
|---|---|
| 0x00 | Xon/Xoff |
| 0x01 | DTR/DSR |

| n6 | RS232 Parity Error Processing |
|---|---|
| 0x00 | Ignore |
| 0x01 | Print '?' |

***Notes***: This command must be followed by “Printer Reset” command (1D FF).

## SET DIAGNOSTIC MODE

This command will store the printer diagnostics mode in non-volatile memory. This mode is used to select a test mode.

**ASCII** US ETX NUL *n*
**Hexadecimal** **1D 03 00 *n***
**Decimal** 31 03 0 *n*

**Value of *n*** See table

| OPERAND DEFINITION | | |
|---|---|---|
| ***N*** | | |
| **Decimal** | **Hex** | **MODE** |
| 0 | 00 | Normal Operation |
| 3 | 03 | Demo Mode |

## SELECT MAIN BOARD

This command will select the main circuit board for the printer. The parameter is stored in non-volatile memory.

**ASCII** US ETX A *n*
**Hexadecimal** **1F 03 C0 *n***
**Decimal** 31 03 192 *n*

**Value of *n*** See table

| OPERAND DEFINITION | | |
|---|---|---|
| ***N*** | | |
| **Decimal** | **Hex** | **BOARD TYPE** |
| 1 | 00 | PICOBOARD |
| 1 | 01 | ASTERON |

Note : In Picoboard mode, the door open switch is not managed.
In Asteron mode, the door open switch is managed

## SET MULTI-HEAT MODE (TEMPORARY, NOT STORED IN EEPROM)

**1F 03 A5 n**
Refers to Peak Current Limitation feature (command 1C for IF-Com).
Maximum number of dots will be set prior use of printer according customer application. IF-Com command set will be used.

## PRINT DENSITY

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Synopsis: | Setting Print density | | | | | | |
| Syntax: | ASCII: | US | VT | N | R | J | *n* |
| | Decimal: | 31 | 11 | 83 | 80 | 69 | *n* |
| | Hex: | **1F** | **0B** | **4E** | **52** | **4A** | ***n*** |

| | | |
|---|---|---|
| Range | | n |
| | Decimal: | 80 <= n <= 120 |
| | Hex: | 0x50 <= n <= 0x78 |
| default | Decimal : | 100 |
| | Hex: | 0x64 |

***Description***: Set the print density ( energy applied to paper ) in percent relative to nominal energy.
***Notes***: This command must be followed by “Printer Reset” command (1D FF).

## SEND PRINTER SOFTWARE VERSION

The printer returns 8 bytes containing the boot and flash software version.
The first 4 bytes returned are an ASCII string for the boot version.
The second 4 bytes are an ASCII string for the flash version.

***Example***: the printer returns 1.072.15
This means the boot version is 1.07 and the flash version is 2.15

**ASCII** US V
**Hexadecimal** **1F 56**
**Decimal** 31 86

## PRINT TEST FORM

This command will print the configuration settings ticket.

**ASCII** US t
**Hexadecimal** **1F 74**
**Decimal** 31 116

# 17 LED TROUBLESHOOTING

| Problem | Possible Causes | What to Do |
|---|---|---|
| LED, slow continuous flashing (1 flash / sec or more). | Out of paper. | Put in a new paper roll. |
| | Cover is off. | Put the cover on. |
| | Print head is too hot. | Turn the printer off (*unplug*). Contact your authorized service representative. |
| | Voltages are out of range. **(>8V or <4,5V)** | |
| Flashing LED in various combinations. | | These indicate serious problems. Contact your authorized service representative. |
| Fast continuous flashing of LED: | Main Program CRC Test Failure. | |