USER'S MANUAL

Hybrid Printer
BTP-RM180

Shandong New Beiyang Information Technology Co., Ltd.

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Warning and Caution

⚠ **Warning:** Items shall be strictly followed to avoid injury or damage to body and devices.

⚠ **Caution:** Items with important information and prompts for operating the printer.

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ISO9001 Quality Control System Certification

ISO14001 Environmental Management System Certification

OHSAS18001 Occupational Health and Safety Management System Certification

IECQ QC 080000 Hazardous Substance Process Management System Certification

Contact us:

Address: No.169 huoju road, high-tech zone, Weihai, China

Hot line: 400-618-1368 800-860-1368

Fax: +86-631-5656098

PC: 264209

Website: www.snbc.cn

General Safety Information

Before installing and using the printer, please read the following items carefully.

1. Safety instructions

Warning: Do not touch the cutter of the printer.

Warning: The print head is a thermal element and it is at a high temperature during printing or just after operation, therefore do not touch it or its peripherals for reasons of safety.

Warning: The print head is an ESD-sensitive device. To avoid damage, do not touch either its printing parts or connecting parts.

2. Caution

1) Install the printer on a flat and stable place.
2) Reserve adequate space around the printer so that convenient operation and maintenance can be performed.
3) Keep the printer away from water source, and avoid direct exposure to sun light, strong light and heat of fire.
4) Do not use or store the printer in a place exposed to high temperature, moisture and serious pollution.
5) Do not place the printer on a place exposed to vibration or impact.
6) No dew condensation is allowed to the printer. In case of such condensation, do not turn on the power until it has completely evaporated.
7) Connect the DC adapter to an appropriate grounding outlet. Avoid sharing a single electrical with large power motors and other devices that may cause the fluctuation in voltage.
8) Disconnect the DC adapter when the printer is not used for a long time.
9) Do not let the water or electric materials (like metal) go into the printer. If this happens, turn off the power immediately.
10) Do not allow the printer to start printing when there is no recording paper installed; otherwise the print head and platen roller will be seriously damaged.
11) To ensure the print quality and normal lifetime, use recommended or good quality paper.
12) Shut down the printer when connecting or disconnecting interfaces connectors to avoid damage to the control board.
13) Set the print darkness to a lower grade as long as the print quality is acceptable. This will help to keep the print head durable.
14) The printer should only be disassembled or repaired by a technician, who is certified by the manufacturer.
15) Keep this manual safe and at hand for ready reference.

Caution: The following content about cutter only applies to printers with cutter.

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1 Summary

This document specifies the requirements for Hybrid Printer – BTP-RM180.

2 General specifications

2.1 Basic Requirements

Hybrid Printer consists of thermal printing mechanism with cutter, tear bar and an endorsement mechanism
Paper Roll width of 76 or 80mm and maximum diameter of 3.27”(83mm) Core outer diameter = 15.7mm and core inner diameter = 12.7mm
Required sensors: paper end, front cover open, back cover open, endorsement paper present (see item 2.4) Optional sensors: paper near end (it should actuate with minimum of 2m of paper roll)
Drop-in system to change paper roll
Impact dot matrix mechanism for endorsement
Cutter: Scissors cut type, full and partial
Power On and Status/Error Led indicators
Paper feed and auto-cutter buttons
Interface: USB
Power Supply connector: Hosiden TCS7960-43 (Power Plug) or equivalent
Buzzer indicator for endorsement (user configurable)
Power On/Off switch
Outer plastic parts: - All cover material: ABS / Flame retardant rating: HB / Color: BLACK COLOR PANTONE 7C 2X. - Cover open lever material: POM (Methylene Polyoxide (POM), also known as polyacetal or acetal) / Flame retardant rating: HB / Color: BLUE COLOR PANTONE 285 C - Texture area requirement: SPI Finish B-3 — 320 Grit Paper (reference: http://www.professional-plastic-mold-manufacturer.com/knowledge-advice-plastic-injection-molding/spi-mold-finish-practical-approach/)

2.2 Electrical Requirements

Item	Specification
Interface	USB (full speed)
Power Supply	Input: 100-240 VAC 1,5A 50/60 Hz Output: 24V@2,5A +/- 5% (Power Plug type connector)
Dynamic current consumption	Printer‘s peak current over time must not exceed limits defined below (In a interval of 1s): - 6A x 10mS - 4A x 400mS

Item	Specification
Buttons	Line Feed Button Auto cutter Button
Led Indicator Panel	- Beep (Notes for Commands 5.1.3) - Power ON - green Led - Endorsement paper present - yellow Led - Status/Error - red Led flashing (see item 4) PS: There are only two Leds. Endorsement paper present and Status/Error are bicolor Led.

2.3 Printer Mechanism

Item	Specification
Dot density	203 dpi (8 dots/mm)
Paper width	80 / 76 mm (+0,5 / -1,0 mm)
Printing width	Min. 72.0 mm (576 dots)
Printing speed	Text Mode: 200 mm/s Graphic Mode: 120 mm/s
Receipt	40mm minimum
Distance from printing position to cutting position:	17mm maximum
Thermal head life span	100 Km minimum (12,5% printing duty at 25°C with OJI KPH55 or OJI TERMOBANK papers)
Cutter life span	1 million cuts minimum.
Thermal printhead energy control	Must have printhead temperature sensor and voltage sensor for energy self-adjustment in order to keep printing uniformity and avoid printhead over heating

2.4 Endorsement Mechanism

Item	Specification
Printing speed	4 lps minimum
Copies	Up to Original + 2 copies (0.20mm maximum)
Impact printhead	Must control printhead temperature to avoid damage
Paper present Sensor	Sensor should be located to ensure correct insertion of the document above useful printing area and must not actuate by impact printhead movement
Printing width	65,3 mm – 432 columns
Printing position	Typically, 16mm from the center of the printed text to the bottom edge of the inserted paper. Printing happens in front face of paper (obverse)
Paper characteristics	Width:85 mm minimum Height: 35 mm minimum Weight: 56 to 90 gr/m2

2.5 Printer Specifications

Item	Specification
Emulated	Specific commands for each configuration
Characters Fonts (H x V)	Font Elite : 14 x 24 dots (12 + 2 espaces) Font Normal : 12 x 24 dots Font Condensed : 9 x 24 dots Font Reduced : 9 x 16 dots (characters index and exponent)
Characters per line	- 40 CPL / 48 CPL / 64 CPL
Characters table	- ABICOMP - CP437 - CP850 - UNICODE (CP819) – (item 6.2) - Custom CodePage Procomp – (item 6.1)
Attributes	- Condensed - Double width - Emphasized - Underlined - Double height - Italic
Barcodes	- Interleaved 2 of 5 - Code 39 - Code 93 - Code 128 - Codabar - EAN-13 - EAN-8 - UPC-A - UPC-E - QRCode (2D)
Graph Mode	- Lines (Raster) - Columns (8 bits)

2.6 Endorsement Specifications

Item	Specification
Emulated	Specific commands for each configuration (see item 4.3)
Characters Fonts (H x V)	Font Normal : 9 (dots) x 9 / 9 x 10 (9 + 1 espace) Font Condensed : 9 (dots) x 7 / 9 x 8 (7 + espace) Font Reduced : 9 (dots) x 8 colunas (subscript and superscript)
Characters per Line (Width 65,3 or 420 columns)	- Font: 9 x 10 – 42 CPL (Normal) - Font 9 x 9 – 46 CPL (Normal) - Font 9 x 8 – 52 CPL (Normal) - Font 8 x 7 – 60 CPL (Condensed)
Characters Table	- ABICOMP

Item	Specification
	- CP437 - CP850 - UNICODE (CP819) – (item 6.2) - Custom CodePage Procomp – (item 6.1)
Attributes	- Condensed - Double width - Underlined - Italic

2.7 Cutter

Item	Specification
Cutter	Full cut and Partial cut
Type	Scissors cut
Paper Width	80 mm maximum
Paper Weight	56 +/- 2 g/m2
Paper Thickness	59 +/- 5 µm
Reliability	1 million cuts

2.8 Thermal Paper Specifications

Item	Specification
Thermal Face Paper	External side of the roll
TermoBank	See OJI specifications
TermoScript KPH55	See OJI specifications
Width	80 mm maximum
Weight	56 +/- 2 g/m2
Thickness	59 +/- 5 µm

2.9 Printing Quality

Item	Specification
Durability	Ensure optical density specified from the thermal paper manufacturer. Use 1 cm2 black pattern and measure in 3 different points with spectrodensitometer X-RITE 500 or similar. Must get 1.25 minimum value.
Uniformity	Ensure print uniformity, even for high density graphics It is not acceptable to have marks on thermal paper due to heat after motor stops.
Availability	Be capable of printing ASCII pattern (at full speed) for at least 270s without stopping by printhead hot

2.10 Special Characteristics

Item	Specification
Optical sensor self adjustment	Yes
paperself-alignment after cover closed and paper cut	Yes
Life indicators storage	- Thermal Printhead: number of printed dotlines and printed meters - Cutter: number of cuts - Dot Matrix Mechanism: number of printed lines and printed characters
Configuration Parameters	• Code page Tab (Customer settings) • Table of commands (CMD_TABLE) • Automatic Line Feed (AUTO_LF) • Plug & Play (USB) – (item 2.13) • Automatic Line Overflow (AUTO_OVERFLOW) • Cut command after paper load (LOADING) • Cutter button behavior –(KEY_CUT) • Auto cut (AUTO_CUT) • Thermal Printhead Energy • Serial Number • Etc...
Auto recover	• If cutter fails, its blade must retract to prevent blocking printer cover • If impact printhead fails positioning, it must retry finding home position
Buffer size	• 8K bytes minimum (For both, thermal and endorsment)

2.11 Work Profile

Item	Specification
Load profile	72,000 transactions / year
work load	6,000 printed receipts per month - Receipt with average of 20 lines with 48 Characters per line 6,000 endorsements per month - 48-character line authentication with minimum 30-second interval between transactions
Receipt length	100 mm
MTBF	60 months, considering the work load

2.12 Quality goals

Item	Specification
Lifetime Mechanics	9 million lines min
Lifetime cutter	1,000,000 cuts min.
Lifetime Thermal printhead	100 Km min.
Lifetime Dot matrix printhead	100 million characters min.
Lifetime Dot matrix ribbon	3 million characters using Epson ERC-38B ribbon.

2.13 Software Requirements

Item	Specification
Status	Capability to report current status may depend on product configuration
Configuration	Capable of reading and writing configuration by command (compatible)
Firmware update	Capable to download firmware online.
Driver	Full compatibility with actual driver
Indicators	Capable of reading and updating the indicators
USB Descriptors	Manufacturer – SNBC Product – BTP-RM180 Class – Printer (USB Printing Support) CID(Compatible ID) - SNBC Thermal Printer Self Powered wMaxPacketSize: 0x0040 (64)

2.14 Self-test

Item	Specification
Power On	Capable to check cutter's home position and dot matrix print head's home position
User	Capable to execute features by user's command (buttons or commands). Printing test, endorsement and paper cut. See item 5.5

2.15 Firmware version

Item	Specification
Standard version	As indicated on item 5
Customer Settings	Customization of the command table, configuration parameters according item Customer settings (item 5.1.4), by customer settings command and configuration buffer

2.16 Performance Requirements

Item	Specification
Time of printing	Must print a 30cm receipt (graphic mode) in 3,6s maximum
QRCode	Must receive and print QRCode command em less than 1s

2.17 Technical Environmental Requirements

Temperature/Humidity

	Temperature [°C]		Check	Rel. Humidity [%]		Check
	min	max		min	max	
Operating conditions	5	45	X	10	85	X
Storage conditions	-10	60	X	5	95	X

2.17.1 Mechanical & Vibration

2.17.1.1 Drop Test

Drop Test		Check
For Equipment	ISTA (International Safe Transit Association) - Procedure 2A	X

2.17.1.2 Vibration Test

Vibration Test
Technical reference standards: IEC 60068-2-6, IEC 60721-3-3, IEC 60721-4-3, IEC 60068-2-27, NBR 5295/1975

2.17.2 EMC

2.17.2.1 Electromagnetic Compatibility

Electromagnetic Compatibility	Target Country
EN 55022:1998 - Class A (Information technology equipment -Radio disturbance characteristics- Limits and methods of measurement); EN61000-4-2:1995 Severity level 3 - Class C (Electrostatic Discharge Requirement); EN61000-4-3:1995, 10V/m – Class A (Radiated, radio-frequency, electromagnetic fields, immunity test); EN61000-4-6:1996, 10Vrms – Class A (Immunity to conducted disturbances, induced by radio-frequency fields).	Brazil

2.17.3 Acoustic Requirements

It is desired that the noise level will be as low as possible and in line with other vendor's competitive models. The product shall not emit acoustic noise that detracts from the perception of a quality product. Harsh sounds and loud irregular sound generally detract from the perception of a quality product.

System Type	Idle	Operating (typical transaction mix)
Indoor	28 dB(A)	55 dB(A)

3 Service requirements

3.1 General

a. Shall be able to run diagnostics without connecting to the host.
b. The complete paper path of the printer must be accessible by an operator for clearing of paper jams, without the need of tools or removal of components.
c. The exchange of consumable such as paper roll shall be possible for any operator, without the need of tools or removal of components.
d. Preventive maintenance for the printer shall not be necessary.
e. The printer shall store statistical data like printed paper length, number of cuts/tickets. This data must still be available after repair and after a new firmware has been loaded.
f. The used system for screws, washers etc. must be metric.
g. A status code should be displayed on the printer (e.g. LED's), and stored.
h. Module to have Self-diagnosis and failure recovery capabilities.

3.2 No adjustments in the field

a. The product shall not include any adjustments in the field.

3.2.1 Weight < 5kg

a. The weight of a Field Replaceable Unit must not exceed 05 kg.

3.2.2 Mounting and dismounting - no negative impact

a. The mounting and dismounting of each Field Replaceable Unit shall not have a negative influence on the mechanical integration in the system with regards to its lifetime.

3.3 Maximum Repair Time

a. The maximum repair (plus) time should not be higher than 30 minutes per repair action including testing time and mounting/dismounting the printer.

3.4 MTTR

a. An average repair time (MTTR*) of 20 minutes has to be ensured. * removal of the faulty component, installation of the replacement component, test time

3.5 Maintenance

3.5.1 Preventive Maintenance

a. Preventive maintenance for the printer must not be necessary.

3.6 Changes during lifetime

a. Technical changes during life time of entry level receipt printer shall be documented. Also impacts of the spare part documentation.
b. Technical changes during life time of entry level receipt printer which need to release a new spare part of repair process shall be documented as a new module state / revision level of the Field Replaceable Unit including upgrade instruction in Team center.
c. Technical changes new spare parts follows shall be informed following proper process.
d. Old spare parts shall be available further on over complete life cycle if new parts are not backwards compatible.

4 Behavior Characteristic

4.1 Thermal + Dot Matrix Synchronization

In this hybrid printer, the thermic printer is the master printer, who decide and send lines to dot matrix printer.

Both printers never print simultaneously.

The auto line feed function is always disable in dot matrix printer, and only prints the data with a document inserted.

The thermic printer decision may be different, according to custom and commands received.

This can be summarized above:

4.1.1 Paper Roll Mode

In this mode, all data are printed on the paper roll, using thermic printer.

If the sensor detects a validation paper, thermic printer must stop printing and wait for the paper to be removed to continue printing.

4.1.2 Validation Paper Mode

In this mode, all data is printed on validation paper, using dot matrix printer.

If there is no paper on the document sensor, the validation printer waits the document for print.

4.1.3 Hybrid Mode

In this mode is possible to print in both printers.

When a command to print data in the print buffer is processed, (like LF, CR..) or auto line feed is reached, we have:

- With validation paper inserted, must print on validation paper and discard the print buffer of receipt printer (thermic)
- Without validation paper inserted, must print on paper roll and discard the print buffer of validation printer (dot matrix)

4.1.4 Multiple Validation Mode

This Mode is valid only for Validation printer (dot matrix):

- Multiple Mode: it´s not necessary to remove the document between successive validations–
- Normal Mode – it´s necessary to remove the document between successive validations

4.2 Failures, invalid commands, etc

Item	Specification
Invalided ESC sequence command (ESC + <data>)	Discard the sequence (ESC + <data>)
Partial Cut	The beginning of the receipt after a partial cut can not be distorted

4.3 Customer settings

4.3.1 Customer settings change

For change customer setting, it´s necessary to use the Write Configuration Command (<GS> ’0’ ’c’ ’@’ ‘#’ ’g’ <addr> <data>).
it is advisable to check if the value to be written is different from the current one, to avoid unnecessary access of writing.

4.3.2 Default Setting

To avoid unexpected behavior, the first time FW is loaded, it must write the default table in the Customer settings.

4.3.3 Fail Safe

As the proper functioning of the product depends on the correct Customer settings, care must be taken to avoid loss of configuration.

5 FIRMWARE

5.1 Commands Tables

5.1.1 General Command Table – Common

These commands are executed independent from command table selected.

These commands must be processed even printer is on fail, and there were buffered data.

ASCII	Hex	Function
<GS> ‘0’ ‘r’	1Dh 30h (ou 00h) 72h	Recover error command, used to cancel the failure state for the non-recoverable failures. Recover error command retrieve one active fault at a time. Self-recovered faults are skipped. Others are clean to make the printer available. If necessary, a reset can occur.

ASCII	Hex	Function
<DLE> <STX> <n>	10h 02h <n>	Real Time Status (It´s processed immediately, on reception): This command sends 1 status byte, according to <n> parameter: For <n> = 00h ou 30h – Reserved. For <n> = 01 or 31h – Paper and Thermic Head Status: **BIT 7** – Always 0, Status requested. **BIT 6,5** – Status Type: Bit6 = 0 e Bit5 = 1. **BIT 4** – If 1 indicates VH voltage out of range. **BIT 3** – If 1 indicates head temperature past the limit. **BIT 2** – If 1 indicates rear cover open or thermic head raised. **BIT 1** – If 1 indicates paper out **BIT 0** – If 1 indicates paper low. For <n> = 02h or 32h – Generic Status: **BIT 7** – Always 0, Status requested. **BIT 6,5** – Status Type: Bit6 = 1 e Bit5 = 0. **BIT 4** – If 1 indicates unrecoverable error occurred. **BIT 3** – If 1 indicates that the reception buffer is empty. **BIT 2** – If 1 indicates that the reception buffer is full. **BIT 1** – Always 0, reserved. **BIT 0** – If 1 indicates front cover open. For <n> = 03h or 33h – Validation Printer Status: **BIT 7** – Always 0, Status requested. **BIT 6,5** – Status Type: Bit6 = 1 e Bit5 = 1. **BIT 4** – If 1 indicates matrix mechanism disconnected. **BIT 3** – If 1 indicates that the reception buffer (validation printer)is full. **BIT 2** – If 1 indicates document detected. **BIT 1** – If 1 indicates validation time-out. **BIT 0** – If 1 indicates carriage detection error .
<GS> ’0’ ’c’ ’@’ ‘#’ ’l’ <addr>	1Dh 30h <63h> <40h> <23h> <6ch> <addr>	Read Configuration/Read Metrics: Reads the printer configurations and metrics. (Reads only 1 byte. Since the metrics have 4 bytes, this command should be called 4 times to form the metrics value). <addr> - Address This command should receive a 4 character string, representing the hex value, for e.g.: - ‘0’ ‘0’ ‘1’ ‘0’, means 10h or 16 value
<GS> ’0’ ’c’ ’@’ ‘#’ ’g’ <addr> <dado>	1Dh 30h <63h> <40h> <23h> <67h><addr><d dado>	Write Configuration/Write Metrics: Command to permanent set the printer configurations and metrics (non-volatile memory). (Writes only 1 byte. Since the metrics have 4 bytes, this command should be called 4 times to form the metrics value). <addr> - Address
<GS> ’0’ ’c’ ’@’ ‘#’ ’v’	1Dh 30h <63h> <40h> <23h> <76h>	GetAppVersion: Reads the Version String and CheckSum of the firmware APP area. This command should receive 20 data bytes, according to the description below: <d0>..<d3> - string with check sum (4 bytes) <d4>..<d19> - firmware version string (16 bytes) (The firmware string can be defined by the supplier)

ASCII	Hex	Function
<GS> '0' 'c' '@' '#' 'C' NULL	1Dh 30h <63h> <40h> <23h> <43h> <00h>	Set Customer Settings 0: Selects CMD_TABLE = 0 (Client Settings) and AUTO_OVERFLOW = 0 only until the printer is shut down or restarted Note: This command is for fabrication testing purposes, to use the same commands for testing independent of customization
<GS> '0' 'c' '@' '#' 'D'	1Dh 30h <63h> <40h> <23h> <44h>	GetDwlVersion: Reads the Version String and CheckSum of the firmware BootLoader area. This command should receive 20 data bytes, according to the description below: <d0>..<d3> - string with check sum (4 bytes) <d4>..<d19> - firmware version string (16 bytes) (The firmware string can be defined by the supplier)
<GS> '0' 'c' '@' '#' 'B'	1Dh 30h <63h> <40h> <23h> <42h>	GetMatrixVersion: Reads the Version String and CheckSum of the Matrix area. This command should receive 20 data bytes, according to the description below: <d0>..<d3> - string with check sum (4 bytes) <d4>..<d19> - firmware version string (16 bytes) (The firmware string can be defined by the supplier, suggested string I50.70.00.MTX.xx)
<GS> '0' 't'	1Dh 30h (or 00h) 74h	Prints a Self-Test report. NOTE: Used for Diagnosis purposes only.
ESC 's' <type>	1Bh 2Eh 73h <type>	Detailed command on each CMD_TABLE

5.1.2 Receipt Printer Command Table – Common

These commands are processed independent from command table selected.

These commands must not be processed when printer is on fail.

ASCII	Hex	Function
<ESC> '>' <type> <n1> <n2>	1Bh 3Eh <type> <n1> <n2>	Reserved, only discard command data.
<ESC> ']' <n>	1Bh 5Dh <n>	Enable / Disable double-height mode If <n> = 01h or 31h enable double-height mode. If <n> = 00h or 30h disable double-height mode.
<ESC> 'j' <n>	1Bh 6Ah <n>	Performs a fine line feed. Print the data in the print buffer and feeds the paper a <n> * 0,125mm.
<ESC> 'k' <n1> <n2> <dotline>	1Bh 6Bh <n1> <n2> <dotline>	Print raster bitmap. Print <n2>*256 + <n1> dotlines, each dot line 72 bytes (for 576 dot header).
<ESC> 'n' <marg> <width> <n1> <n2> <dotline>	1Bh 6Eh <marg> <width> <n1> <n2> <dotline>	Print raster bitmap normal, with margin and width user defined. Print <n2>*256 + <n1> dotlines, each dot line <width> bytes and left margin with 8 * <marg> dots. If(<margin> + width)* 8 exceeds dotline width, the excess data is discarded (not printed). Horizontal dot density – 203 dpi Vertical dot density – 203 dpi
<ESC> 'o' <n>	1Bh 6Fh <n>	Performs a fine line feed. Print the data in the print buffer and feeds the paper a <n> * 0,250mm.

ASCII	Hex	Function
<ESC> 'q' <marg> <larg> <n1> <n2> <dotline>	1Bh 71h <marg> <larg> <n1> <n2> <dotline>	Print raster bitmap double-height, with margin and width user defined. Print <n2>*256 + <n1> dotlines, each dot line <width> bytes and left margin with 8 * <marg> dots. If(<margin> + width)* 8 exceeds dotline width, the excess data is discarded (not printed). Horizontal dot density – 203 dpi Vertical dot density – 101 dpi

<table>
<tr>
<td><ESC> '|' <type>
<n1> <n2> <n3>
<n4> <b_1> <b_n></td>
<td>1Bh 7Ch <type>
<n1> <n2> <n3>
<n4> <b_1> <b_n></td>
<td>
Print barcode system specified by <type>:
• <type> = '0' (30h / 48) –EAN-13
• <type> = '1' (31h / 49) – 2interlevead 5
• <type> = '2' (32h / 50) – Code39
• <type> = '3' (33h / 51) – Code128
• <type> = '4' (34h / 52) – Code EAN-8
• <type> = '5' (35h / 53) – Code93
• <type> = '6' (36h / 54) – Codabar
• <type> = '7' (37h / 55) – Code UPC-A
• <type> = '8' (38h / 56) – Code UPC-E

This command require following parameters:
<n1> - bar height <n1>
• For horizontal printing (n1*0,125mm) 23 <n1<256.
• For vertical printing (n1*0,250) 11 < n1 < 256.

<n2> - barcode module unit (dots), printing orientation and printing speed.
• BIT 0 to 3 – barcode module unit in 0,125mm :

<table>
<tr><th colspan="4">BIT</th><th rowspan="2">Module (width)</th></tr>
<tr><th>3</th><th>2</th><th>1</th><th>0</th></tr>
<tr><td>0</td><td>0</td><td>0</td><td>0</td><td>Inválida</td></tr>
<tr><td>0</td><td>0</td><td>0</td><td>1</td><td>1 = 0,125 mm</td></tr>
<tr><td>0</td><td>0</td><td>1</td><td>0</td><td>2 = 0,250 mm</td></tr>
<tr><td>0</td><td>0</td><td>1</td><td>1</td><td>3 = 0,375 mm</td></tr>
<tr><td>0</td><td>1</td><td>0</td><td>0</td><td>4 = 0,500 mm</td></tr>
<tr><td>0</td><td>1</td><td>0</td><td>1</td><td>5 = 0,625 mm</td></tr>
<tr><td>0</td><td>1</td><td>1</td><td>0</td><td>6 = 0,750 mm</td></tr>
<tr><td>0</td><td>1</td><td>1</td><td>1</td><td>7 = 0,875 mm</td></tr>
<tr><td>1</td><td>0</td><td>0</td><td>0</td><td>8 = 1,00 mm</td></tr>
<tr><td>1</td><td>0</td><td>0</td><td>1</td><td>9 = 1,125 mm</td></tr>
<tr><td>1</td><td>0</td><td>1</td><td>0</td><td>10= 1,250 mm</td></tr>
<tr><td>1</td><td>0</td><td>1</td><td>1</td><td>11= 1,375 mm</td></tr>
<tr><td>1</td><td>1</td><td>0</td><td>0</td><td>12= 1,500 mm</td></tr>
<tr><td>1</td><td>1</td><td>0</td><td>1</td><td>13= 1,625 mm</td></tr>
<tr><td>1</td><td>1</td><td>1</td><td>0</td><td>14= 1,750 mm</td></tr>
<tr><td>1</td><td>1</td><td>1</td><td>1</td><td>15= 1,875 mm</td></tr>
</table>
• BIT4 and BIT5: Printing position for vertical printing, for horizontal printing is always centered:

<table>
<tr><th colspan="2">BIT</th><th rowspan="2">Position</th></tr>
<tr><th>5</th><th>4</th></tr>
<tr><td>0</td><td>0</td><td>Left aligned</td></tr>
<tr><td>0</td><td>1</td><td>centered</td></tr>
<tr><td>1</td><td>0</td><td>Right aligned</td></tr>
</table>
• BIT6 and BIT7: Printing speed:

<table>
<tr><th colspan="2">BIT</th><th rowspan="2">Printing Speed</th></tr>
<tr><th>7</th><th>6</th></tr>
<tr><td>0</td><td>0</td><td>Normal</td></tr>
<tr><td>0</td><td>1</td><td>80mm/s</td></tr>
<tr><td>1</td><td>0</td><td>50mm/s</td></tr>
</table>
</td>
</tr>
</table>

ASCII	Hex	Function
		<n3> - Codebar exhibition Bit 0 to 2, if 0 ≤ n3 ≤ 3 checksum will be added For <n3> = 0 – HRI not printed. For <n3> = 1 – HRI printed above barcode. For <n3> = 2 – HRI printed below barcode. For <n3> = 3 – HRI printed above and below barcode. Bit 0 to 2, if 4 ≤ n3 ≤ 7 no checksum will be added For <n3> = 4 – HRI not printed. For <n3> = 5– HRI printed above barcode. For <n3> = 6 – HRI printed below barcode. For <n3> = 7 – HRI printed above and below barcode. Bit 3 – Vertical printing: For Bit3 = 0 – Horizontal Printing For Bit3 = 1 – Vertical Printing <n4> - Depends on each code <b_1> <b_n> - Depends on each code Valid for all code: - If there is any inconsistency, the will not be printed, and the string "Codigo Invalido" must be printed
<ESC>'|''0' <n1><n2><n3> <b1>...<b12>	1Bh 7Ch 30h <n1><n2><n3> <b1>...<b12>	Print barcode EAN-13, Fixed amount of data: Checksum is Always added <b1>...<b12> 12 numeric characters ASCII (30h ≤ bn ≤ 39h). 13th checksum digit is automatically added.
<ESC>'|''1' <n1><n2><n3> <n4> <b1>.<bn>	1Bh 7Ch 31h <n1><n2><n3> <n4> <b1>.<bn>	Print code 2 interleaved5 Checksum will be added only if programmed <n4> - amount of data. 1 < n4 < 66 <b1>...<bn> numeric characters ASCII (30h ≤ bn ≤ 39h), according <n4>.
<ESC>'|''2' <n1><n2><n3> <n4> <b1>.<bn>	1Bh 7Ch 32h <n1><n2><n3> <n4> <b1>.<bn>	Print Code39: Checksum will be added only if programmed <n4> - - amount of data. 1 ≤ n4 ≤ 35 <b1>...<bn> -Alpha numeric characters ('0' a '9', 'A' e 'Z', '-', '.', ' ','$','/','+' e '%')), according <n4>.
<ESC>'|''3' <n1><n2><n3> <n4> <b1>.<bn>	1Bh 7Ch 33h <n1><n2><n3> <n4> <b1>.<bn>	Print Code128.: Checksum is Always added, Checksum digit Mod 103 <n4> - - amount of data. 1 < n4 < 81 <b1>...<bn> - Alpha numeric characters or controller, char < 128, according <n4>.
<ESC>'|''4' <n1><n2><n3> <b1>...<b7>	1Bh 7Ch 34h <n1><n2><n3> <b1>...<b7>	Print code EAN-8. Fixed amount of data. Checksum is Always added <b1>...<b7> 7 numeric characters ASCII (30h ≤ bn ≤ 39h). 8th checksum digit is automatically added.
<ESC>'|''5' <n1><n2><n3> <n4> <b1>.<bn>	1Bh 7Ch 35h <n1><n2><n3> <n4> <b1>.<bn>	Print Code93. Checksum is Always added, Checksum digit as Code93 specification. <n4> - - amount of data. 1 < n4 < 49 <b1>...<bn> - Alpha numeric characters ('0' a '9', 'A' e 'Z', '-', '.', ' ','$','/','+' e '%') according <n4>.

<table>
<tr><th>ASCII</th><th>Hex</th><th>Function</th></tr>
<tr><td><ESC>‘|’‘6’
<n1><n2><n3>
<n4> <b1>.<bn></td><td>1Bh 7Ch 36h
<n1><n2><n3>
<n4> <b1>.<bn></td><td>Print Codabar.
<n4> - - amount of data. 1 < n4 < 51
<b1>...<bn> - - Alpha numeric characters (‘0’ a ‘9’, ‘-‘, ‘$’, ‘:’, ‘/’, ‘.’ e ‘+’) and for first and last character (Start/Stop) (‘A’,’B’, ‘C’, ‘D’, ‘E’, ‘N’, ‘T’ e ‘*’), according <n4>.
If no Start/and/or Stop character is send, character ‘A’ for Start and ‘B’ for Stop will be used.</td></tr>
<tr><td><ESC>‘|’‘7’
<n1><n2><n3>
<b1>...<b11></td><td>1Bh 7Ch 37h
<n1><n2><n3>
<b1>...<b11></td><td>Print Code UPC-A. . Fixed amount of data.
<b1>...<b11> -11 numeric characters ASCII (30h ≤ bn ≤ 39h). 12th checksum digit is automatically added.</td></tr>
<tr><td><ESC>‘|’‘8’
<n1><n2><n3>
<b1>...<b6></td><td>1Bh 7Ch 38h
<n1><n2><n3>
<b1>...<b6></td><td>Print Code UPC-E. . Fixed amount of data.
<b1>...<b11> -6 numeric characters ASCII (30h ≤ bn ≤ 39h). 7th checksum digit is automatically added.</td></tr>
<tr><td><ESC>‘(‘‘k’
<n_1><n_2> ‘1’
<cmd> <param></td><td>1Bh 28h 6Bh
<n_1><n_2> 31h
<cmd> <param></td><td>QRCode printing commands</td></tr>
<tr><td><ESC>‘(‘‘k’ 03
00 ‘1’ ‘B’ <Posit></td><td>1Bh 28h 6Bh
03h 00h 31h
42h <Posit ></td><td>Printing position:
<Posit> = ‘0’ Left aligned
<Posit> = ‘1’ - Centered
Default ‘0’, left aligned.</td></tr>
<tr><td><ESC>‘(‘‘k’ 03
00 ‘1’ ‘C’
<width></td><td>1Bh 28h 6Bh
03h 00h 31h
43h <width ></td><td>Set the size of module, in unit of 0,125mm.
0 ≤ width < 17
Default 0, define the largest module for the code to be printed, at maximum 16.</td></tr>
<tr><td><ESC>‘(‘‘k’ 03
00 ‘1’ ‘E’ <error></td><td>1Bh 28h 6Bh
03h 00h 31h
45h <error></td><td>Selects the error correction level (ECC):
<table>
<tr><th><error></th><th>Level</th><th>Recovery capacity</th></tr>
<tr><td>0 or ‘0’(30h/48)</td><td>L</td><td>7%</td></tr>
<tr><td>1 or ‘1’(31h/49)</td><td>M</td><td>15%</td></tr>
<tr><td>2 or ‘2’(32h/50)</td><td>Q</td><td>25%</td></tr>
<tr><td>3 or ‘3’(33h/51)</td><td>H</td><td>30%</td></tr>
</table>
Default L, 7% Recovery capacity.</td></tr>
</table>

<table>
<tr><th>ASCII</th><th>Hex</th><th>Function</th></tr>
<tr><td><ESC> ‘(‘ ‘k’ <n1><n2> ‘1’ ‘P’ ‘0’ <d0><d1>...<dk></td><td>1Bh 28h 6Bh <n1> <n2> 31h 50h 30h <d0><d1>...<dk></td><td>Store QRCode symbol data.
Amount of data k = (<n1> + <n2> * 256) – 3.
The maximum amount of data to be coded is defined by the QR code specification.
<table>
<tr><td>Data type</td><td>Characters</td></tr>
<tr><td>Numeric</td><td>‘0’ a ‘9’</td></tr>
<tr><td>Alpha numeric</td><td>‘0’ a ‘9’, ‘A’ a ‘Z’, , SP, $, %, *, +, –, . , /, :</td></tr>
<tr><td>Kanji</td><td>Value Shift JIS (JISX0208)</td></tr>
<tr><td>Byte</td><td>00h a FFh</td></tr>
</table></td></tr>
<tr><td><ESC> ‘(‘ ‘k’ 03 00 ‘1’ ‘Q’ ‘0’</td><td>1Bh 28h 6Bh 03h 00h 31h 51h 30h</td><td>Print QR Code, according the programmed parameters..
The code will not be printed if:
• Amount of data exceeds the maximum allowed:
<table>
<tr><td>Data type</td><td>ECC L</td><td>ECC M</td><td>ECC Q</td><td>ECC H</td></tr>
<tr><td>Numeric</td><td>7089</td><td>5596</td><td>3993</td><td>3057</td></tr>
<tr><td>Alpha numeric</td><td>4296</td><td>3391</td><td>2420</td><td>1852</td></tr>
<tr><td>Kanji</td><td>2953</td><td>2331</td><td>1663</td><td>1273</td></tr>
<tr><td>Byte</td><td>1817</td><td>1435</td><td>1024</td><td>784</td></tr>
</table>
• No data loaded.
In this case the string “QR Code Invalido” will be printed.
If the code is too large, the printer adjust to fit.</td></tr>
</table>

5.1.3 Notes for commands

The permanents and on-line mode commands (underlined, condensed, emphasized, italic and expanded) are combined each other.

The same commands have different characteristics in the receipt printer and in the validation printer:

♦***(Note 1)*** Line feed commands in the validation printer, never feed paper.

♦(Note 2) For double density graphics we have:

- For validation printer, no adjacent can be printed:
  - Maxim width 436 dots (65mm)
  - Horizontal resolution 0,150mm
  - Vertical resolution 0,353mm

- For receipt printer, repeat each bit three times and to improve graphic quality, combine current graphic column with previous (or logical operation) :
  - Maxim width 576 dots (72mm)
  - Horizontal resolution 0,125mm
  - Vertical resolution 0,375mm

♦(Note 3) For single density graphics we have:

- For validation printer, blank column is inserted.:
  - Maxim width 218 dots (65mm)
  - Horizontal resolution 0,300mm
  - Vertical resolution 0,353mm

- For receipt printer, repeat each bit three times and the column is repeated:
  - Maxim width 288 dot (72mm)
  - Horizontal resolution 0,250mm
  - Vertical resolution 0,375mm

♦(Note 4) For double density graphics we have:

- For validation printer, adjacent dots can be printed , for this printer speed is reduced:
  - Maxim width 436 dots (65mm)
  - Horizontal resolution 0,150mm
  - Vertical resolution 0,353mm
  -

- For receipt printer, repeat each bit three times:
  - Maxim width 576 dots (72mm)
  - Horizontal resolution 0,125mm
  - Vertical resolution 0,375mm

♦(Note 5) For 7 bits graphic, mask bit7 and proceed like 8 bits graphic.

♦(Note 6) Graphics commands don´t feed automatic. In case of excess data, must be discarded. If a new graphic command is processed and the previous line reached right margin, in this case, a line feed must be processed and the graphic will be printed in a new line.

♦(Note 7) Beep – Need to give an audible signal. To simulate a beeper, the neddle are used, with narrow pulse, repeated 150 times, as follow:

◆ (Note 8) Cutter:

- Minimum receipt - If the receipt size is less than the minimum, the cut command will add automatically line feeds, to reach the minimum receipt size.
- Full Cut and Partial Cut behavior:
  - Cutter Disable – On commands, only feed paper to cut position
  - Cutter Only Partial – On all cutting commands execute Partial Cut
  - Cutter Only Total - On all cutting commands execute Total Cut
  - Cutter Partial and Total – Executes the specified cut. For auto cutter button, executes partial cut.

5.1.4 Customer settings

Name	Index	Description	Range	Default
KEY_CUT	8	Configure cut key behavior	0 – optimize, feed only necessary paper to reach cutter position before cutting 1 – feeds paper CUT_FEED lines, before cutting	0
AUTO_CUT	9	Enable auto-cut behavior.	0 – Disable 1 - Enable, after <n, programmable AUTO_CUT_LF > blank lines feeds, wait 150ms after stopped printing, if no data is received, execute optimized cutting (feeds only necessary paper to reach cut position)	0
AUTO_CUT_LF	10	Configure blank line to execute auto cutting	0 – 7 blank lines 1 to 20	0
RP_CPL	13	Receipt printer CPL	0 - 48 CPL (char 12 dots) 1 – 52 CPL (char 11 dots) 2 – 57 CPL (char 10 dots) 3 – 64 CPL (char 9 dots)	0
AUTO_OVERFLOW	15	Configure automatic line overflow (end of line). Not for graphics.	0 – Enable (when print buffer is full, prints buffer and LF is executed) 1 – Disable (when print buffer is full, discard excess data)	0
MIN_REC	16	Configure minimum receipt	5 – 255 lines (6LPP) 8 lines	8
LINE_SPACE	17	Configure initial line spacing	0 – 4,25mm(6LPP) 1 – 3,75mm(7LPP) 2 – 3,25mm(8LPP)	2
CODEPAGE	18	Configure initial code page	0 – Reserved (select 1 – ABICOMP) 1 – ABICOMP 2 – CP850 3 – CP437 4– UNICODE (CP819) 5– PROCOMP	1

Name	Index	Description	Range	Default
			6 – reserved (select 1 – ABICOMP) 7 – CP858	
CMD_TABLE	19	Configurecommandtable	0- Customer Settings 0 1– Customer Settings 1 2- Customer Settings 2 3– Customer Settings 3	0
AUTO_EJECT	20	Enable ejection on paper end	0 – Disable 1 – Enable	0
FAIL_DISCARD	21	Enable discard date on fail	0 – Disable 1 – Enable	0
MODO_BUSY	22	OnLine on Fail	(0) OnLine on failure Only for compatibility, no effect	0
LOWPAPER	23	Enable Low paper sensor	0 – Disable 1 – Enable	0
COVER	24	Enable open cover sensor	0 – Disable 1 – Enable	1
CUT_FEED	26	Configure line feeds before cutting (6LPP lines)	2 – 255	Mechanical defined
ADVANCED_SHOW	27	Sets feedrate for text display in menu mode	N 1/6 pol lines	6
LOADING	28	Enable cutting after loading paper	0 – Disable 1 – Enable	1
LOGO_AUTO_TESTE	29	Logo Printing on Self Test	(0) Enable (1) Disable	0
CUTTER	33	Disable/ Set cutter	(0) Disable (1) Only Partial Cutting (2) Only Total Cutting (3) Partial and Total Cutting	1
ZERO_TYPE	36	Zero Character Cut or not	(1)Cut, Zero character is printed Ø (2)No cut, Zero character is printed 0 There two matrix character for Zero, is selected using this configuration	0
PRINTED_MODE	37	Print quality mode	(0) Normal	0

Name	Index	Description	Range	Default
			Only for compatibility, no effect	
INTENSITY	38	Configure printing intensity	0 – Normal (Note: For a while, this setting will not be used. If necessary, it will be evaluated)	0
VALIDATION_BEEP	40	Enable beep on validation end. Beeps after validation printing.	0 – Disable 1 – Enable	0
DEB_NEAR_END	42	Configure debounce for near end detection, in 10cm multiples	0 – 10 cm Till 50 = 50*10cm = 500cm	0
NULL_LINE	45	Enable pattern for advanced line by key (Pattern "■■■")	0 – Disable 1 – Enable	0
KEYBOARD	46	Disable keyboard	0 – Enable 1 – Disable	0
SIZE_PAGE	50	Sets page size in 6LPP lines	(0) Page 12 lines Only for compatibility, no effect	0
AUTO_LF	51	Configure automatic line feed	0 – Disable (Print don´t will perform LF if a CR is received) Only for compatibility, no effect	0
TYPE_CHARACTER	53	Define whether to use Elite character. Valid for Dot Matrix printer only, 40 columns per line.	(0) - Normal (1) - Elite	0
CUSTOM1	54	Configure multiple validation. For multiple validation, between validation prints, there is no need to remove the document.	0 – No 1 – Enable multiple validation	0
DISABLE_PV	55	Disable Validation Printer (Only for test purpose)	0 – Enable 1 – Disable	0
WIDTH_CHARACTER_IA	56	Set default density Authenticator	(0) - Condensate 52col (1) Normal 46 col (2) Normal 42 col	1

Name	Index	Description	Range	Default
WIDTH_PAPER_IA	57	Set up authenticator dots	(0) - 420 (63mm) (1) - 432 (65mm)	1
PLUG&PLAY	58	Disables USB ID, does not install drive automatically. During enumeration, don't return GET DEVICE IDcommand.	0 – Enable 1 – Disable	0
CUSTOM2	60	Configure cutting by keyboard	0 – Only Cutter Button (pressing cutter button executes cutting) 1 – Cutter Button + Paper Feed Button(pressing both buttons executes cutting)	0
CUSTOM3	61	Configures Beep Paper End	0 – Disable Beep on Paper End 1 - Enable Beep on Paper End	0
CUSTOM4	62	Configures Blinks to remove document after validation. After validation, start blinking yellow led, until the document isremoved.	0 – Disable Blinks 1 – Enable Blinks	0
CUSTOM5	63	Configures paper roll width.	0 – Set 80mm paper width 1 – Set 76mm paper width	0
CUSTOM6	64	Prints patrimony number on Self Test Receipt (Factory Setting TERMINAL_POSITION_PATRIMONY – 13 positions)	0 – Do not print 1 -Print	0

5.1.5 Configure command table

5.1.5.1 Customer Settings 0 (default)

Command set for CMD_TABLE = 0

5.1.5.1.1 Commands

This command set is valid for receipt and validation printer, except when indicated with (**, not valid for validation printer):

ASCII	Hex	Function (CMD_TABLE = 0)
<ETX>	03h	If print buffer has data, print and feed one line.
<HT>	09h	Moves the print position to the next horizontal tab position. Default 8 columns
<LF>	0Ah	Prints current data and feed one line, according current line spacing
<VT>	0Bh	Prints current data and moves print position to the next vertical tab position. Default as command <LF> (Note 1)
<FF>	0Ch	Prints current data and moves print position to next page beginning. Default page: 12 lines. (Note 1)
<CR>	0Dh	For receipt printer: • If automatic line feed is set (command ESC 5 <n>), same as LF command. • If automatic line feed is not set, prints current data and the sequence CR+LF or LF+CR only feed one line, according current line spacing. For validation printer: • Prints current data and returns the carriage. (Note 1)
<SO>	0Eh	Enable double width mode one line
<SI>	0Fh	Enable condensed mode.
<GUIL>	11h	Feeds paper to cutter position and execute full cut (Note8).(**)
<DC2>	12h	Disable condensed mode.
<DC4>	14h	Disable double width mode one line.
<CAN>	18h	Clear the last line send to the printer.
<ESC><SO>	1Bh 0Eh	Enable double width mode one line.
<ESC><SI>	1Bh 0Fh	Enable condensed mode.
<ESC> <DC2>	1Bh 12h	Disable condensed mode
<ESC> <DC4>	1Bh 14h	Disable double width mode one line.
<ESC><US>	1Bh 1Fh	Optimized partial cut. (**) Feed only necessary paper to reach cutter position and execute partial cut (Note 8).. Verify amount empty line feed, and feed only remaining lines to cutter position.
<ESC> '-' <n>	1Bh 2Dh <n>	Underlined Mode. If <n> = odd – enable underlined mode. If <n> = even – disable underlined mode.

ASCII	Hex	Function (CMD_TABLE = 0)
<ESC> '5' <n>	1Bh 35h <n>	Determine Carriage Return Command Behavior Automatic Line Feed : If <n> = odd – enable Automatic Line Feed, CR command executes LF command. If <n> = even – disable Automatic Line Feed, if there is data to be printed, prints current data and feed paper, otherwise, discard command. If a command LF is received in sequence, is discarded (don't feed new line)
<ESC> 'A' <n>	1Bh 41h <n>	Sets lines spaces to <n>/72". (**)
<ESC> 'B' <n1>..<nk> 00h	1Bh 42h <n1> ..<nk> 00h	Sets vertical TAB position. (**) Set k TAB positions (k < 64), ended by a NUL code. This command cancel any previous vertical TAB setting.
<ESC> 'C' <n>	1Bh 43h <n>	Set page size in 1/6" lines and starts a new page. (**) 1 < n < 255.
<ESC> 'D' <n1>..<nk> 00h	1Bh 44h <n1> ..<nk> 00h	Sets horizontal TAB position. Set k TAB positions (k < 28), ended by a NUL code. This command cancel any previous horizontal TAB setting.
<ESC> 'E'	1Bh 45h	Enable emphasized mode. (**) Note: Validation Printer never emphasize
<ESC> 'F'	1Bh 46h	Disable emphasized mode.
<ESC> 'J' <n>	1Bh 4Ah <n>	Italic mode. If <n> =odd – Enable italic mode. If <n> =even – Disable italic mode.
<ESC> 'K' <n1> <n2> <g1>..<gk>	1Bh 4Bh <n1> <n2> <g1>..<gk>	Selects 8 bit image (compatible with dot matrix), single density, where is used n1 + n2*256 columns, with 1 byte (8dots) per column. Graphic column – 1 byte: Graphic Byte: Bit7 – Dot or Needle 1 (superior) Bit6 – Dot or Needle 2 Bit5 - Dot or Needle 3 Bit4 - Dot or Needle 4 Bit3 - Dot or Needle 5 Bit2 - Dot or Needle 6 Bit1 - Dot or Needle 7 Bit0 - Dot or Needle 8 Graphics and text can be mixed. (Note 3)

ASCII	Hex	Function (CMD_TABLE = 0)
<ESC> 'L' <n1> <n2> <g1>..<gk>	1Bh 4Ch <n1> <n2> <g1>..<gk>	Selects 8 bit image (compatible with dot matrix),, double density, where is used n1 + n2*256 columns, with 1 byte (8dots) per column. Graphic column – 1 byte: Graphic Byte: Bit7 – Dot or Needle 1 (superior) Bit6 – Dot or Needle 2 Bit5 - Dot or Needle 3 Bit4 - Dot or Needle 4 Bit3 - Dot or Needle 5 Bit2 - Dot or Needle 6 Bit1 - Dot or Needle 7 Bit0 - Dot or Needle 8 Graphics and text can be mixed. (Note 4)
<ESC> 'M'	1Bh 4Dh	Set normal mode, clear all others modes. Disable document Mode, if enabled
<ESC> 'N'	1B 4Eh	Enable Document Mode (set hybrid mode) (**)
<ESC> 'O'	1Bh 4Fh	Disable Document Mode (set paper roll mode) (**)
<ESC> 'R'	1Bh 52h	Clear all vertical and horizontal TAB programmed, set default.
<ESC> 'S' <n>	1Bh 53h <n>	Enable Subscript or superscript mode: If <n> =odd – Enable superscript mode. If <n> =even – Enable subscript mode..
<ESC> 'T'	1Bh 54h	Disable Subscript or superscript mode.
<ESC> 'U' <string><ETX>	1Bh 55h <string> 03h	Enable double Validation Mode (Validation Paper Mode). (**) Receiving this command, the printer wait a document to be detected, print the <string>. Wait the document to be removed, print same string on paper roll (Paper Roll Mode)..
<ESC> 'V' <string><ETX>	1Bh 56h <string> 03h	Enable Validation Mode (Validation Paper Mode).(**) Receiving this command, the printer wait a document to be detected, print the <string>. Wait the document to be removed (Paper Roll Mode)
<ESC> 'W'<n>	1Bh 57h <n>	Double width mode. If <n> =odd – Enable double width mode. If <n> =even – Disable double width mode.
<ESC> 'X'	1Bh 58h	End current line printing, restart printer

ASCII	Hex	Function (CMD_TABLE = 0)
<ESC> 'Y' <n1> <n2> <g1>..<gk>	1Bh 59h <n1> <n2> <g1>..<gk>	Selects 8 bit image (compatible with dot matrix),, double density, where is used n1 + n2*256 columns, with 1 byte (8dots) per column. Graphic column – 1 byte: Graphic Byte: Bit7 – Dot or Needle 1 (superior) Bit6 – Dot or Needle 2 Bit5 - Dot or Needle 3 Bit4 - Dot or Needle 4 Bit3 - Dot or Needle 5 Bit2 - Dot or Needle 6 Bit1 - Dot or Needle 7 Bit0 - Dot or Needle 8 Graphics and text can be mixed. (Note 2)
<ESC>'Z'<n1> <n2><n3>	1Bh 5Ah <n1> <n2><n3>	Set validation time-out. Suggested parameters <n1>, <n2> e <n3> equal 00h. <n1> - Set insertion time-out, in 55 ms units <n2> - Set confirmation time-out, in 55 ms units <n3> Set removal time-out, in 55 ms units. If n3=1, enable multiple validation mode
<ESC> 'r'	1Bh 72h	End current line printing, restart printer (on reception)
ESC 's' <type>	1Bh 73h <type>	Request status . The parameter <type> defines the status type. (It´s processed immediately, on reception):. For <type> = 0 or 30h – Request Single Printer Status, turn-off automatic cyclic status **BIT 7** – Always 0,Printer Status. **BIT 6** – If 1 indicates Self-test mode. **BIT 5** – If 1 indicates validation time-out. **BIT 4** – If 1 indicates unrecoverable error occurred. **BIT 3** – If 1 indicates front/and/or rear cover open. **BIT 2** – If 1 indicates reception buffer (validation printer)is full. **BIT 1** – If 1 indicates document detected. **BIT 0** – If 1 indicates paper end. For <type> = 1 ou 31h - Enable automatic cyclic Status, Status Printer is send every 100ms. For <type> = 2 ou 32h – Request Single Fiscal Status turn-off automatic cyclic status **BIT 7** –Always1,Fiscal Status. **BIT 6 a 2** – Always 0. **BIT 1** – Always 1. **BIT 0** – Always 1.
<ESC> 't' <n>	1Bh 74h <n>	Select character Code Page. If <n> = 01h or 31h – Select Code Page Abicomp (default). If <n> = 02h or 32h – Select Code Page 850 If <n> = 03h or 33h – Select Code Page 437 If <n> = 04h or 34h – Select Code Page 819. If <n> = 05h or 35h – Select Code Page Procomp..
<ESC> 'w'	1Bh 77h	Feeds paper to cutter position and execute partial cut (Note 8)
<ESC> 'y' <n>	1Bh 79h <n>	Set Keyboard .(**) If <n> = odd – enable keyboard (Default). If <n> = even – disable keyboard

ASCII	Hex	Function (CMD_TABLE = 0)
<ESC> 'p' '0' <t1> <t2>	1Bh 70h 30h <t1> <t2>	Reserved, only discard command data. For compatibility.

5.1.5.1.2 Synchronization

Action	Flow	Notes
Default	Paper Roll Mode	
<ESC> 'V' command - Validation	Validation Paper Mode	After validation, back to Default
<ESC> 'U' command – double validation	Validation Paper Mode	After validation, back to Default
<ESC> 'N' command – Enable Document Mode	Hybrid Mode	Allow multiple validation
<ESC> 'O' command – Disable Document Mode	Default	

5.1.5.2 Customer Settings 1

Command set for CMD_TABLE = 1.

5.1.5.2.1 Commands

This command set is valid for receipt and validation printer, except when indicated with (**, not valid for validation printer):

ASCII	Hex	Function (CMD_TABLE = 1)
<ETX>	03h	If print buffer has data, print and feed one line.
ENQ	05h	(It´s processed immediately, on reception):. This command sends 1 status byte: **BIT 7** – Always 0. **BIT 6** – Always 0. **BIT 5** – If 1 indicates paper out. **BIT 4** – If 1 indicates printer online. **BIT 3** – If 1 indicates printer on fail. **BIT 2** – Always 0. **BIT 1** – If 1 indicates document detected. **BIT 0** – Always 0.
<BS>	08h	Discard this command
<HT>	09h	Moves the print position to the next horizontal tab position. Default 8 columns
<LF>	0Ah	Prints current data and feed one line, according current line spacing
<VT>	0Bh	Prints current data and moves print position to the next vertical tab position. Default as command <LF> (Note 1)
<FF>	0Ch	Prints current data and moves print position to next page beginning. Default page: 12 lines. (Note 1)

ASCII	Hex	Function (CMD_TABLE = 1)
<CR>	0Dh	For receipt printer: • If automatic line feed is set (command ESC z <n>), same as LF command. • If automatic line feed is not set, prints current data and the sequence CR+LF or LF+CR only feed one line, according current line spacing. For validation printer: • Prints current data and returns the carriage. (Note 1)
<SO>	0Eh	Selects the double width mode one line.
<SI>	0Fh	Enable condensed mode.
<GUIL>	11h	Feeds paper to cutter position and execute full cut (Note 8).(**)
<DC2>	12h	Disable condensed mode.
<DC4>	14h	Disable double width mode one line.
<CAN>	18h	Clear the last line send to the printer.
<ESC><SO>	1Bh 0Eh	Selects the double width mode one line.
<ESC><SI>	1Bh 0Fh	Enable condensed mode.
<ESC> <DC2>	1Bh 12h	Disable condensed mode.
<ESC> <DC4>	1Bh 14h	Disable double width mode one line.
<ESC><US>	1Bh 1Fh	Optimized partial cut. (**) Feed only necessary paper to reach cutter position and execute partial cut (Note 8).. Verify amount empty line feed, and feed only remaining lines to cutter position.
<ESC> '-' <n>	1Bh 2Dh <n>	Underlined Mode. If <n> = odd – enable underlined mode. If <n> = even – disable underlined mode.
<ESC>'2'	1Bh 32h	Set the line spacing of 1/6".
<ESC> '3' <n>	1Bh 33h <n>	Set the line spacing <n> * 1"/144.(**) To 8LPP, <n> = 18. To 6LPP, <n> = 24
<ESC>'4'	1Bh 34h	Enable italic print mode.
<ESC>'5'	1Bh 35h	Disable italic print mode.
<ESC>'8'	1Bh 38h	Disable paper end sensor.
<ESC>'9'	1Bh 39h	Enable paper end sensor (Default)
<ESC>'@'	1Bh 40h	Set normal mode, clear all others modes
<ESC> 'B' <n1>..<nk> 00h	1Bh 42h <n1> ..<nk> 00h	Sets vertical TAB position. (**) Set k TAB positions (k < 64), ended by a NUL code. This command cancel any previous vertical TAB setting.
<ESC>'C' <n>	1Bh 43h <n>	Set page size in 1/6" lines and starts a new page. (**) 1 < n < 255.
<ESC> 'D' <n1>..<nk> 00h	1Bh 44h <n1> ..<nk> 00h	Sets horizontal TAB position. Set k TAB positions (k < 28), ended by a NUL code. This command cancel any previous horizontal TAB setting.
<ESC> 'E'	1Bh 45h	Enable emphasized mode.
<ESC> 'F'	1Bh 46h	Disable emphasized mode.
<ESC> 'G'	1Bh 47h	Enable emphasized mode.
<ESC> 'H'	1Bh 48h	Disable emphasized mode.
<ESC>'J' <n>	1Bh 4Ah <n>	Italic mode.

ASCII	Hex	Function (CMD_TABLE = 1)
		If <n> =odd – Enable italic mode. If <n> =even – Disable italic mode.
<ESC> 'K' <n1> <n2><g1>..<gk>	1Bh 4Bh <n1> <n2><g1>..<gk>	Selects 8 bit image (compatible with dot matrix),, double density, where is used n1 + n2*256 columns, with 1 byte (8dots) per column. Graphic column – 1 byte: Graphic Byte: Bit7 – Dot or Needle 1 (superior) Bit6 – Dot or Needle 2 Bit5 - Dot or Needle 3 Bit4 - Dot or Needle 4 Bit3 - Dot or Needle 5 Bit2 - Dot or Needle 6 Bit1 - Dot or Needle 7 Bit0 - Dot or Needle 8 Graphics and text can be mixed. (Note 2)
<ESC> 'M'	1Bh 4Dh	Set normal mode, clear all others modes
<ESC> 'N' <n>	1B 4Eh <n>	Set bottom margin in 1/6" lines. 0< n < page length – 1.
<ESC> 'O'	1Bh 4Fh	Clear bottom margin
<ESC> 'P'	1Bh 50h	Set normal mode, clear all others modes
<ESC> 'Q' <n>	1Bh 51h <n>	Set right margin in characters from default left margin. If the right margin is set to the left of the current horizontal position, the margin becomes valid in next line. The right margin position must be at least 2 columns more then left margin.
<ESC> 'W'<n>	1Bh 57h <n>	Double width mode. If <n> =odd – Enable double width mode. If <n> =even – Disable double width mode.
<ESC>'Z'<n1> <n2><n3>	1Bh 5Ah <n1> <n2><n3>	Reserved, only discard command data
<ESC> 'a' <n>	1Bh 61h <n>	If <n> = 01h enable Validation Mode 3 (Validation paper mode). If <n> = 00h disable Validation Mode 3 (Paper roll mode).
<ESC> 'f' '0' <n>	1Bh 66h 30h <n>	Horizontal skipping Performs a horizontal skipping of <n> characters.
<ESC> 'f' '1' <n>	1Bh 66h 31h <n>	Vertical skipping Performs a vertical skipping of <n> lines
<ESC> 'l' <n>	1Bh 6Ch <n>	Set left margin n <n> column. If the left margin is set to the right of the current horizontal position, the margin becomes valid in next line. The left margin position must be at least 2 columns less then left margin.
<ESC> 'p' '0' <t1> <t2>	1Bh 70h 30h <t1> <t2>	Reserved, only discard command data
ESC 's' <type>	1Bh 73h <type>	Request status . The parameter <type> defines the status type. (It´s processed immediately, on reception):. For <type> = 0 or 30h – Request Single Printer Status, turn-off automatic cyclic status **BIT 7** – Always 0,Printer Status. **BIT 6** – If 1 indicates Self-test mode. **BIT 5** – If 1 indicates validation time-out. **BIT 4** – If 1 indicates unrecoverable error occurred.

ASCII	Hex	Function (CMD_TABLE = 1)
		BIT 3 – If 1 indicates front/and/or rear cover open. **BIT 2** – If 1 indicates reception buffer (validation printer)is full. **BIT 1** – If 1 indicates document detected. **BIT 0** – If 1 indicates paper end. For <type> = 1 ou 31h - Enable automatic cyclic Status, Status Printer is send every 100ms. For <type> = 2 ou 32h – Request Single Fiscal Status turn-off automatic cyclic status **BIT 7** –Always1,Fiscal Status. **BIT 6 a 2** – Always 0. **BIT 1** – Always 1. **BIT 0** – Always 0.
<ESC> 't' <n>	1Bh 74h <n>	Select character Code Page. If <n> = 00h or 30h – Select Italic character. If <n> = 01h or 31h – Select Code Page Abicomp (default). If <n> = 02h or 32h – Select Code Page 850 If <n> = 03h or 33h – Select Code Page 437 If <n> = 04h or 34h – Select Code Page 819. If <n> = 05h or 35h – Select Code Page Procomp..
<ESC> 'v' <n>	1Bh 76h <n>	Reserved, only discard command data. For compatibility.
<ESC> 'w'	1Bh 77h	Feeds paper to cutter position and execute partial cut (Note 8)
<ESC> 'x'	1Bh 78h	Enable dump mode (**)
<ESC> 'y' <n>	1Bh 79h <n>	Set Keyboard .(**) If <n> = odd – enable keyboard (Default). If <n> = even – disable keyboard
<ESC> 'z' <n>	1Bh 7Ah <n>	Determine Carriage Return Command Behavior Automatic Line Feed : If <n> = odd – enable Automatic Line Feed, CR command executes LF command. If <n> = even – disable Automatic Line Feed, if there is data to be printed, prints current data and feed paper, otherwise, discard command. If a command LF is received in sequence, is discarded (don't feed new line)
<ESC> '^' <n1> <n2> <g1>..<gk>	1Bh 5Eh <n1> <n2> <g1>..<gk>	Selects 9 bit image (compatible with dot matrix),, double density, where is used n1 + n2*256 columns, with 2 byte (8 + 1 dots) per column. Graphic column – 2 byte: Graphic Byte(First): Bit7 – Needle 1 (superior) Bit6 – Needle 2 Bit5 - Needle 3 Bit4 - Needle 4 Bit3 - Needle 5 Bit2 - Needle 6 Bit1 - Needle 7 Bit0 - Needle 8 If second graphic byte equal 80h, Needle 9 is turn on. For receipt printer, must print 9 dots in 24 dots. Graphics and text can be mixed.

ASCII	Hex	Function (CMD_TABLE = 1)
		(Note 2)
<ESC> '}' <n>	1Bh 7Dh <n>	Set Validation Mode 1 (It´s processed immediately, on reception):. If <n> = 01h enable Validation Mode 1 (Hybrid Mode).. If <n> = 00h disable Validation Mode 1 (Return to last mode). Paper out, disable Validation Mode 1.
<ESC> '~' <n>	1Bh 7Eh <n>	Set Validation Mode 2:. If <n> = 01h enable Validation Mode 2 (Hybrid Mode).. If <n> = 00h disable Validation Mode 2 (Return to last mode). Paper out, disable Validation Mode 2.
<ESC> '[' 'F' 01h 00h 03h	1Bh 5Bh 46h 01h 00h 03h	Set only validation mode (Validation Paper Mode) Print only if there is an inserted document, validation printer.
<ESC> '[' 'F' 01h 00h 02h	1Bh 5Bh 46h 01h 00h 02h	Set only paper roll mode (Paper Roll Mode) Print only if there is no inserted document, on paper roll.

5.1.5.2.2 Synchronization

Action	Flow	Notes
Default	Hybrid Mode	
<ESC> '}' <01> Command – Validation Mode 1 on	Hybrid Mode	Turn off validation Mode 2 if active
<ESC> '}' <00> Command - Validation Mode 1 off	Paper roll mode	
Command <ESC> '~' <01> Command - Validation Mode 2 on	Hybrid Mode	Turn off validation Mode 1 if active
<ESC> '~' <00> Command - Validation Mode 2 off	Paper roll mode	
<ESC> '[' 'F' 01h 00h 03h Command – Document Mode	Validation paper mode	Keeps this mode till receives command to turn off. Enable multiple validations.
<ESC> '[' 'F' 01h 00h 02h Command – paper roll mode	Paper roll mode	
<ESC> 'a' <01> Command – Document Mode	Validation paper mode	Keeps this mode till receives command to turn off. Enable multiple validations.
<ESC> 'a' <01> Command – paper roll mode	Paper roll mode	

5.1.5.3 Customer Settings 2

Command set for CMD_TABLE = 2.

5.1.5.3.1 Commands

This command set is valid for receipt and validation printer, except when indicated with (**, not valid for validation printer):

ASCII	Hex	Function (CMD_TABLE = 2)
<Null>	00h	If graphic mode is on, turn-off graphic mode, otherwise, discard.
<ENQ>	05h	If Paper Roll Mode (printer controls validation- command ESC . 1Ah), Enable Validation Mode (Validation Paper Mode).(**) Receiving this command, the printer wait a document to be detected to print current data in validation printer. Disable keyboard. Wait the document to be removed (Paper Roll Mode) and keyboard is enabled. If Hybrid Mode (API controls validation), discard this command.
<LF>	0Ah	Prints current data and feed one line, according current line spacing (Note 1)
<FF> <*n*>	0Ch <*n*>	Prints current line and feed <n> + 1 lines. 0 > n > 9 ***(Note 1)***
<CR>	0Dh	For receipt printer: • If automatic line feed is set (command ESC . z <n>), same as LF command. • If automatic line feed is not set, prints current data and the sequence CR+LF or LF+CR only feed one line, according current line spacing (default). For validation printer: • Prints current data and returns the carriage. (Note 1)
<SO>	0Eh	Selects the double width mode one line, (the other attributes one line are deactivated in this line, permanents attributes remain)
<SI>	0Fh	Selects the condensed mode one line, (the other attributes one line are deactivated in this line, permanents attributes remain)
<GUIL>	11h	Feeds paper to cutter position and execute full cut (Note 8).(**)
<DC2>	12h	Selects the normal mode, deactivating all the other attributes (permanent and one line attributes).
<DC4>	14h	Selects the normal mode, deactivating all the other attributes (permanent and one line attributes).
<ESC> <US>	1Bh 1Fh	Optimized partial cut. (**) Feed only necessary paper to reach cutter position and execute partial cut (Note 8).. Verify amount empty line feed, and feed only remaining lines to cutter position.
<ESC> '.' 00h	1Bh 2Eh 00h	Selects the italic mode one line, (the other one line are deactivated in this line, permanents attributes remain)
<ESC> '.' 01h	1Bh 2Eh 01h	Select CodePage 850.

ASCII	Hex	Function (CMD_TABLE = 2)
<ESC> '.' 02h	1Bh 2Eh 02h	Select CodePage Procomp.
<ESC> '.' 03h	1Bh 2Eh 03h	Select CodePageABICOMP.
<ESC> '.' 04h <ng>.. <Null>	1Bh 2Eh 04h <ng>..00h	Enable 7 bit image (compatible with dot matrix), double density Following byte are processed like graphic byte, till NULL(00H) or LF (0Ah) that cancel graphic mode. Graphic Byte: Bit0 – Dot or Needle 1 (Upper) Bit1 – Dot or Needle 2 Bit2 – Dot or Needle 3 Bit3 – Dot or Needle 4 Bit4 – Dot or Needle 5 Bit5 – Dot or Needle 6 Bit6 – Dot or Needle 7 Bit7 – don't care Note: The relation between bits x needle is different from graphic command <ESC> '.' 'K' <n1> <n2> <ng>..<nn> If the graphic exceeds the print width, data will be discarded. (Note 2)
<ESC> '.' 05h	1Bh 2Eh 05h	Selects the normal mode one line, (all attributes one line and permanents attributes italic,condensed and double width are deactivated in this line)
<ESC> '.' 06h	1Bh 2Eh 06h	Selects the permanent italic mode, deactivating permanent attribute condensed and double width.
<ESC> '.' 07h	1Bh 2Eh 07h	Selects the normal mode, deactivating all the other attributes (permanent and one line attributes).
<ESC> '.' 08h	1Bh 2Eh 08h	Selects the permanent condensed mode, deactivating permanent attribute italic and double width.
<ESC> '.' 09h	1Bh 2Eh 09h	Selects the permanent double width mode, deactivating permanent attribute italic and condensed.
<ESC> '.' 0Ah	1Bh 2Eh 0Ah	Enable Procomp II graphic mode, a kind of Code Page. All byte > 127 are processed like graphic data, like command <ESC> '.' 04h. ***(Note 2)***
<ESC> '.' 0Ch	1Bh 2Eh 0Ch	Restarts the printer (RESET).
<ESC> '.' 10h	1Bh 2Eh 10h	EnableKeyboard.(**)
<ESC> '.' 11h	1Bh 2Eh 11h	DisableKeyboard.(**)
<ESC> '.' 19h	1Bh 2Eh 19h	Reserved.
<ESC> '.' 1Ah <n>	1Bh 2Eh 1Ah <n>	Select validation mode: <n> - even – select Hybrid Mode (API controls validation) <n> - odd – select Paper Roll Mode(printer controls validation). Enable multiple validation.

ASCII	Hex	Function (CMD_TABLE = 2)
<ESC> '.' '-' <n>	1Bh 2Eh 2Dh <n>	Underlined Mode. If <n> = odd – enable permanent underlined mode, deactivating permanent attribute italic, double width and condensed. If <n> = even – disable permanent underlined mode.
<ESC> '.' 'A' <n>	1Bh 2Eh 45h <n>	Set the line spacing <n> * 1/72"(**) To 6LPP, <n> = 12.
<ESC> '.' 'E'	1Bh 2Eh 45h	Enable permanent emphasized mode.
<ESC> '.' 'F'	1Bh 2Eh 46h	Disable permanent emphasized mode.
<ESC> '.' 'K' <n1><n2><ng> ..<nn>	1Bh 2Eh 4Bh <n1><n2><ng> ..<n>	Selects 8 bit image (compatible with dot matrix),, double density, where is used n1 + n2*256 columns, with 1 byte (8dots) per column. Graphic column – 1 byte: Graphic Byte: Bit7 – Dot or Needle 1 (superior) Bit6 – Dot or Needle 2 Bit5 - Dot or Needle 3 Bit4 - Dot or Needle 4 Bit3 - Dot or Needle 5 Bit2 - Dot or Needle 6 Bit1 - Dot or Needle 7 Bit0 - Dot or Needle 8 Graphics and text can be mixed. (Note 2)
ESC '.' 's' <type>	1Bh 2Eh 73h <type>	Request status . The parameter <type> defines the status type. (It´s processed immediately, on reception):. For <type> = 0 or 30h – Request Single Printer Status, turn-off automatic cyclic status **BIT 7** – Always 0,Printer Status. **BIT 6** – If 1 indicates Self-test mode. **BIT 5** – If 1 indicates validation time-out. **BIT 4** – If 1 indicates unrecoverable error occurred. **BIT 3** – If 1 indicates front/and/or rear cover open. **BIT 2** – If 1 indicates reception buffer (validation printer)is full. **BIT 1** – If 1 indicates document detected. **BIT 0** – If 1 indicates paper end. For <type> = 1 ou 31h - Enable automatic cyclic Status, Status Printer is send every 100ms. For <type> = 2 ou 32h – Request Single Fiscal Status turn-off automatic cyclic status **BIT 7** –Always1,Fiscal Status. **BIT 6 a 2** – Always 0. **BIT 1** – Always 1. **BIT 0** – Always 1.
<ESC> '.' 'z' <n>	1Bh 2Eh 7Ah <n>	Determine Carriage Return Command Behavior Automatic Line Feed : If <n> = odd – enable Automatic Line Feed, CR command executes LF command. If <n> = even – disable Automatic Line Feed, if there is data to be printed, prints current data and feed paper, otherwise, discard command. If a command LF is received in sequence, is discarded (don't feed new line)

ASCII	Hex	Function (CMD_TABLE = 2)
<ESC> 'K' <n1><n2><ng> ..<nn>	1Bh 4Bh <n1><n2><ng> ..<n>	Selects 8 bit image (compatible with dot matrix),, double density, where is used n1 + n2*256 columns, with 1 byte (8dots) per column. Graphic column – 1 byte: Graphic Byte: Bit7 – Dot or Needle 1 (superior) Bit6 – Dot or Needle 2 Bit5 - Dot or Needle 3 Bit4 - Dot or Needle 4 Bit3 - Dot or Needle 5 Bit2 - Dot or Needle 6 Bit1 - Dot or Needle 7 Bit0 - Dot or Needle 8 Graphics and text can be mixed. (Note 2)
<ESC> 't' <n>	1Bh 74h <n>	Select character Code Page. If <n> = 00h or 30h – Select Italic character. If <n> = 01h or 31h – Select Code Page Abicomp (default). If <n> = 02h or 32h – Select Code Page 850 If <n> = 03h or 33h – Select Code Page 437 If <n> = 04h or 34h – Select Code Page 819. If <n> = 05h or 35h – Select Code Page Procomp
<ESC> 'w'	1Bh 77h	Feeds paper to cutter position and execute partial cut (Note 8)

5.1.5.3.2 Synchronization

Action	Flow	Notes
Default	Hybrid Mode	
<ESC> '.' 1Ah <odd> Command Selects paper roll mod (Printer controls validation)	Paper roll mode	
<ESC> '.' 1Ah <even> Command – Selects Hybrid Mode (API controls validation)	Hybrid Mode	
<ENQ> Command- Validation (when printer is in Paper roll mode, printer controls validation)	Validation Paper Mode	After validation, returns to paper roll mode. Allow multiple validation.

5.1.5.4 Customer Settings 3

Command set for CMD_TABLE = 3.

5.1.5.4.1 Commands

This command set is valid for receipt and validation printer, except when indicated with (**, not valid for validation printer):

ASCII	Hex	Function (CMD_TABLE = 3)
<ETX>	03h	If print buffer has data, print and feed one line.
<BEL>	07h	Beep
<BS>	08h	Discard this command
<HT>	09h	Moves the print position to the next horizontal tab position. Default 8 columns
<LF>	0Ah	Prints current data and feed one line, according current line spacing
<VT>	0Bh	Prints current data and moves print position to the next vertical tab position. Default as command <LF> (Note 1)
<FF>	0Ch	Prints current data and moves print position to next page beginning. Default page: 12 lines. (Note 1)
<CR>	0Dh	For receipt printer: • If automatic line feed is set (command ESC z <n>), same as LF command. • If automatic line feed is not set, prints current data and the sequence CR+LF or LF+CR only feed one line, according current line spacing. For validation printer: • Prints current data and returns the carriage. (Note 1)
<SO>	0Eh	Selects the double width mode one line.
<SI>	0Fh	Enable condensed mode one line.
<GUIL>	11h	Feeds paper to cutter position and execute full cut (Note 8).(**)
<DC2>	12h	Disable condensed mode one line

ASCII	Hex	Function (CMD_TABLE = 3)
<DC4>	14h	Disable double width mode one line.
<CAN>	18h	Clear the last line send to the printer.
<ESC> <SO>	1Bh 0Eh	Enable the double width mode one line.
<ESC> <SI>	1Bh 0Fh	Enable condensed mode.
<ESC> <DC2>	1Bh 12h	Disable condensed mode.
<ESC> <DC4>	1Bh 14h	Disable the double width mode one line.
<ESC> <US>	1Bh 1Fh	Optimized partial cut. (**) Feed only necessary paper to reach cutter position and execute partial cut (Note 8).. Verify amount empty line feed, and feed only remaining lines to cutter position.
<ESC> '#' 'C' 'F' 'Q' <n>	1Bh 23h 43h 46h 54h <n>	Change pattern for advanced line by key configuration (NULL_LINE): If <n> = 00h or 30h('0') – no pattern. (Change Customer Setting NULL_LINE(45) to 0(disabled)) If <n> = 01h or 31h('1') – "■■■". (Change Customer Setting NULL_LINE(45) to 1(enabled)) If <n> = 02h or 32h('2') – "■■■" (Change Customer Setting NULL_LINE(45) to 1(enabled)) Note: This command change Customer Setting NULL_LINE(45).
<ESC> '#' 'C' 'F' 'T' <n>	1Bh 23h 43h 46h 54h <n>	Change Disable keyboard configuration : (KEYBOARD) If <n> = 00h or 30h('0') Disable keyboard. (Change Customer Setting KEYBOARD (46) to 1(disabled)) If <n> = 01h or 31h('1') – Enable keyboard. (Change Customer Setting KEYBOARD (46) to 0(enabled)) Note: This command change Customer Setting KEYBOARD(46).
<ESC> '-' <n>	1Bh 2Dh <n>	Underlined Mode. If <n> = odd – enable underlined mode. If <n> = even – disable underlined mode.
<ESC> '2'	1Bh 32h	Set the line spacing of 1/6".
<ESC> '3' <n>	1Bh 33h <n>	Set the line spacing <n> * 1"/144.(**) To 8LPP, <n> = 18. To 6LPP, <n> = 24
<ESC> '4'	1Bh 34h	Enable italic print mode.
<ESC> '5'	1Bh 35h	Disable italic print mode.
<ESC> '8'	1Bh 34h	Disable paper end sensor.
<ESC> '9'	1Bh 35h	Enable paper end sensor (Default)
<ESC> '@'	1Bh 40h	Restart printer after printing data buffer
<ESC> 'B' <n1>..<nk> 00h	1Bh 42h <n1> ..<nk> 00h	Sets vertical TAB position. (**) Set k TAB positions (k < 64), ended by a NUL code. This command cancel any previous vertical TAB setting.
<ESC> 'C' <n>	1Bh 43h <n>	Set page size in 1/6" lines and starts a new page. (**) 1 < n < 255.
<ESC> 'D' <n1>..<nk> 00h	1Bh 44h <n1> ..<nk> 00h	Sets horizontal TAB position. Set k TAB positions (k < 28), ended by a NUL code. This command cancel any previous horizontal TAB setting.
<ESC> 'E'	1Bh 45h	Enable emphasized mode.
<ESC> 'F'	1Bh 46h	Disable emphasized mode.
<ESC> 'G'	1Bh 45h	Enable emphasized mode.

ASCII	Hex	Function (CMD_TABLE = 3)
<ESC> 'H'	1Bh 46h	Disable emphasized mode.
<ESC> 'K' <n1> <n2><g1>..<gk>	1Bh 4Bh <n1> <n2><g1>..<gk>	Selects 8 bit image (compatible with dot matrix),, double density, where is used n1 + n2*256 columns, with 1 byte (8dots) per column. Graphic column – 1 byte: Graphic Byte: Bit7 – Dot or Needle 1 (superior) Bit6 – Dot or Needle 2 Bit5 - Dot or Needle 3 Bit4 - Dot or Needle 4 Bit3 - Dot or Needle 5 Bit2 - Dot or Needle 6 Bit1 - Dot or Needle 7 Bit0 - Dot or Needle 8 Graphics and text can be mixed. (Note 2)
<ESC> 'L' <n1> <n2> <g1>..<gk>	1Bh 4Ch <n1> <n2> <g1>..<gk>	Selects 8 bit image (compatible with dot matrix), single density, where is used n1 + n2*256 columns, with 1 byte (8dots) per column. Graphic column – 1 byte: Graphic Byte: Bit7 – Dot or Needle 1 (superior) Bit6 – Dot or Needle 2 Bit5 - Dot or Needle 3 Bit4 - Dot or Needle 4 Bit3 - Dot or Needle 5 Bit2 - Dot or Needle 6 Bit1 - Dot or Needle 7 Bit0 - Dot or Needle 8 Graphics and text can be mixed. (Note 3)
<ESC> 'M'	1Bh 4Dh	Set normal mode, clear all others modes
<ESC> 'N' <n>	1B 4Eh <n>	Set bottom margin in 1/6" lines. 0< n < page length – 1.
<ESC> 'O'	1Bh 4Fh	Clear bottom margin
<ESC> 'P'	1Bh 50h	Set Elite Mode
<ESC> 'Q' <n>	1Bh 51h <n>	Set right margin in characters from default left margin. If the right margin is set to the left of the current horizontal position, the margin becomes valid in next line. The right margin position must be at least 2 columns more then left margin.
<ESC> 'W'<n>	1Bh 57h <n>	Double width mode. If <n> =odd – Enable double width mode. If <n> =even – Disable double width mode.

ASCII	Hex	Function (CMD_TABLE = 3)
<ESC> 'Y' <n1> <n2> <g1>..<gk>	1Bh 59h <n1> <n2> <g1>..<gk>	Selects 8 bit image (compatible with dot matrix),, double density, where is used n1 + n2*256 columns, with 1 byte (8dots) per column. Graphic column – 1 byte: Graphic Byte: Bit7 – Dot or Needle 1 (superior) Bit6 – Dot or Needle 2 Bit5 - Dot or Needle 3 Bit4 - Dot or Needle 4 Bit3 - Dot or Needle 5 Bit2 - Dot or Needle 6 Bit1 - Dot or Needle 7 Bit0 - Dot or Needle 8 Graphics and text can be mixed. (Note 2)
<ESC> 'a' <n>	1Bh 61h <n>	If <n> = 01h enable Validation Mode 3 (Validation paper mode). If <n> = 00h disable Validation Mode 3 (Paper roll mode).
<ESC> 'f' '0' <n>	1Bh 66h 30h <n>	Horizontal skipping Performs a horizontal skiiping of <n> characters.
<ESC> 'f' '1' <n>	1Bh 66h 31h <n>	Vertical skipping Performs a vertical skiiping of <n> lines
<ESC> 'l' <n>	1Bh 6Ch <n>	Set left margin n <n> column. If the left margin is set to the rigth of the current horizontal position, the margin becomes valids in next line. The left margin position must be at least 2 columns less then left margin.
ESC 's' <type>	1Bh 73h <type>	Request status . The parameter <type> defines the status type. (It´s processed immediately, on reception):. For <type> = 0 or 30h – Request Single Printer Status, turn-off automatic cyclic status **BIT 7** – Always 0,Printer Status. **BIT 6** – If 1 indicates Self-test mode. **BIT 5** – If 1 indicates validation time-out. **BIT 4** – If 1 indicates unrecoverable error occurred. **BIT 3** – If 1 indicates front/and/or rear cover open. **BIT 2** – If 1 indicates reception buffer (validation printer)is full. **BIT 1** – If 1 indicates document detected. **BIT 0** – If 1 indicates paper end. For <type> = 1 ou 31h - Enable automatic cyclic Status, Status Printer is send every 100ms. For <type> = 2 ou 32h – Request Single Fiscal Status turn-off automatic cyclic status **BIT 7** –Always0,Fiscal Status. **BIT 6 a 2** – Always 0. **BIT 1** – Always 1. **BIT 0** – Always 0.

ASCII	Hex	Function (CMD_TABLE = 3)
<ESC> 't' <n>	1Bh 74h <n>	Select character Code Page. If <n> = 00h or 30h – Select Italic Mode If <n> = 01h or 31h – Select Code Page Abicomp (default). If <n> = 02h or 32h – Select Code Page 850 If <n> = 03h or 33h – Select Code Page 437 If <n> = 04h or 34h – Select Code Page 819. If <n> = 05h or 35h – Select Code Page Procomp..
<ESC> 'v' <n>	1Bh 76h <n>	Reserved, only discard command data. For compability.
<ESC> 'w'	1Bh 77h	Feeds paper to cutter position and execute partial cut (Note 8)
<ESC> 'x'	1Bh 78h	Enable dump mode (**)
<ESC> 'y' <n>	1Bh 79h <n>	Set Keyboard .(**) If <n> = odd – enable keyboard (Default). If <n> = even – disable keyboard
<ESC> 'z' <n>	1Bh 7Ah <n>	Determine Carriage Return Command Behavior Automatic Line Feed : If <n> = odd – enable Automatic Line Feed, CR command executes LF command. If <n> = even – disable Automatic Line Feed, if there is data to be printed, prints current data and feed paper, otherwise, discard command. If a command LF is received in sequence, is discarded (don't feed new line)
<ESC> '~' <n>	1Bh 7Eh <n>	Set Validation Mode 2:. If <n> = 01h enable Validation Mode 2 (Hybrid Mode).. If <n> = 00h disable Validation Mode 2 (Return to last mode). Paper out, disable Validation Mode 2.
<ESC> '^' <n1> <n2> <g1>..<gk>	1Bh 5Eh <n1> <n2> <g1>..<gk>	Selects 9 bit image (compatible with dot matrix),, double density, where is used n1 + n2*256 columns, with 2 byte (8 + 1 dots) per column. Graphic column – 2 byte: Graphic Byte(First): Bit7 – Needle 1 (superior) Bit6 – Needle 2 Bit5 - Needle 3 Bit4 - Needle 4 Bit3 - Needle 5 Bit2 - Needle 6 Bit1 - Needle 7 Bit0 - Needle 8 If second graphic byte equal 80h, Needle 9 is turn on. For receipt printer, must print 9 dots in 24 dots. Graphics and text can be mixed. (Note 2)
<ESC> '{' <n>	1Bh 7Bh <n>	Set Validation Mode 1 (It´s processed immediately, on reception):. If <n> = 01h enable Validation Mode 1 (Hybrid Mode).. If <n> = 00h disable Validation Mode 1 (Return to last mode). Paper out, disable Validation Mode 1.
<ESC> '[' 'F' 01h 00h 03h	1Bh 5Bh 46h 01h 00h 03h	Set only validation mode (Validation Paper Mode) Print only if there is an inserted document, validation printer.

ASCII	Hex	Function (CMD_TABLE = 3)
<ESC> '[' 'F' 01h 00h 02h	1Bh 5Bh 46h 01h 00h 02h	Set only paper roll mode (Paper Roll Mode) Print only if there is no inserted document, on paper roll.

5.1.5.4.2 Synchronization

Action	Flow	Notes
Default	Paper roll mode	
Command <ESC> '~' <01> Command - Validation Mode 2 on	Hybrid Mode	Turn off validation Mode 1 if active
<ESC> '~' <00> Command - Validation Mode 2 off	Paper roll mode	
<ESC> '{' <01> Command – Validation Mode 1 On	Hybrid Mode	Turn off validation Mode 2
<ESC> '{' <00> Command – Validation Mode 1 Off	Paper roll mode	
<ESC> '[' 'F' 01h 00h 03h Command – Document Mode	Validation paper mode	Keeps this mode till receives command to turn off. Enable multiple validations.
<ESC> '[' 'F' 01h 00h 02h Command – paper roll mode	Paper roll mode	
<ESC> 'a' <01> Command – Document Mode	Validation paper mode	Keeps this mode till receives command to turn off. Enable multiple validations.
<ESC> 'a' <01> Command – paper roll mode	Paper roll mode	

5.1.5.5 Customer Settings 4

Customer Settings 4 were removed.

5.2 Failures

List of minimum failures to be checked and flagged:

Name	Note
End paper	Interrupts printing
Front Cover Open	Interrupts printing
Back Cover Open	Interrupts printing
Near paper	Warning only
Carriage failure of the authenticating printer	Interrupts printing
High thermal head temperature	Stops printing, but does not discard the received data (if scheduled data discard)
Guillotine movement failed	Interrupts printing

5.3 Reported Status

5.3.1 Visual Signaling

5.3.1.1 Failures

When the printer is faulty, it should signal through the status LED (flashing red), blinking at a frequency of 2 Hz, with an interval between 1s signals, as shown in the table below. The signaling must remain until the cause of the fault has been eliminated.

List of minimum failures to be checked and flagged:

LED of Status	**Error Type**	**Note**
0 (Keep led on)	Near paper	Warning only, does not prevent printing
1	End paper	Interrupts printing
2	Carriage failure of the authenticating printer	Interrupts printing
5	Front Cover Open	Interrupts printing
6	Back Cover Open	Interrupts printing
7	High thermal head temperature	Stops printing, but does not discard the received data (if scheduled data discard)
8	Guillotine movement failed	Interrupts printing

5.3.1.2 Authenticator Status

The status LED (signaling in yellow), blinking at a frequency of 4 Hz, as shown in the table below.

LED of Status	Status
Light	Indicates that there is a document inserted in the authenticating printer. The document is detected by the authentication sensor
Blinking	Indicates that the printer has received the authentication command and is waiting for the document to be authenticated.

5.3.2 Status Reported via Communication Interface

See command tables for Status Commands.

5.4 Customer settings

Have the capability to configure (custom) itself through communication interface (commands). Jumpers and switches shall not be present for the purpose of configuration option selection.

During power-on, the printer must verify configurations integrity e correct if necessary. This process must be fault tolerant.

5.4.1 Customer Setting

For Customer settings is necessary to set each parameters, that is different from default value, using the Set Configuration Command .

<GS>	‘0’	‘c’	‘@’	‘#’	‘g’	Index (1 byte)	Value

1Dh	30h	63h	40h	23h	67h	Index (1 byte)	Value

A binary file must be send to the printer with the commands, for example:

```
0000: 1D 30 63 40  23 67 08 01  1D 30 63 40  23 67 09 00  1D 30 63 40  23 67 0A 00
0018: 1D 30 63 40  23 67 0C 00  1D 30 63 40  23 67 0E 00  1D 30 63 40  23 67 10 08
0030: 1D 30 63 40  23 67 11 02  1D 30 63 40  23 67 12 01  1D 30 63 40  23 67 13 00
0048: 1D 30 63 40  23 67 14 00  1D 30 63 40  23 67 15 00  1D 30 63 40  23 67 16 00
0060: 1D 30 63 40  23 67 17 00  1D 30 63 40  23 67 18 01  1D 30 63 40  23 67 1A 00
0078: 1D 30 63 40  23 67 1B 06  1D 30 63 40  23 67 1C 01  1D 30 63 40  23 67 1D 00
0090: 1D 30 63 40  23 67 21 01  1D 30 63 40  23 67 24 00  1D 30 63 40  23 67 25 00
00A8: 1D 30 63 40  23 67 26 00  1D 30 63 40  23 67 28 00  1D 30 63 40  23 67 2A 00
00C0: 1D 30 63 40  23 67 2D 00  1D 30 63 40  23 67 2E 00  1D 30 63 40  23 67 32 0C
00D8: 1D 30 63 40  23 67 33 00  1D 30 63 40  23 67 35 00  1D 30 63 40  23 67 36 00
00F0: 1D 30 63 40  23 67 37 00  1D 30 63 40  23 67 38 01  1D 30 63 40  23 67 39 01
0108: 1D 30 63 40  23 67 3A 01
```

5.4.2 Factory Setting

The Names below are information regarding of the controls performed during the assembly of the printer in the factory, which are different for each unit:

Name	Index	Description	Range	Default
PART_NUMBER	70	12 bytes to keep part number	0 - 255	0
SERIAL_NUMBER	82	8 bytes to keep serial number	0 - 255	0
MANUFACTURE_DATE	90	8 bytes to keep part number	0 - 255	0
MANUFACTURE_LOCATION	98	15 bytes to keep part number	0 - 255	0
TERMINAL_POSITION_PATRIMONY	113	15 bytes to keep terminal position or 13 bytes to keep patrimony serial number	0 - 255	0
HARDWARE_REVISION	128	4 bytes to keep part number	0 - 255	0

Using the Set Configuration Command:

<GS>	‘0’	‘c’	‘@’	‘#’	‘g’	Index (1 byte)	Value

1Dh	30h	63h	40h	23h	67h	Index (1 byte)	Value

5.4.3 Metrics Setting

Metrics are fields dedicated (non-volatile memory) registration of records relating to the use of the printer. The various metrics allow the registration of the use of cutter, thermal head, authenticators head, amount of paper used, and amount of FW download.

The Names below are metrics fields in the printer:

Name	Index	Description	Range	Default
NUMSTROBES_AT	192	Long - Number of strobes enabled	1 equals 1 strobe on	0
NUMMETROSHEAD	196	Long - Number of advanced lines	1 equals 1 dotline or 0.125 mm	0
NUMMETROSMECAN	200	Long - Number of advanced meters in the mechanism	1 equals 1 dotline or 0.125 mm	0
NUMDOWNLOADS	204	Long - Number of downloads made (each unit is equivalent to 1 download)	1 is equivalent to an update FW	0
NUMCUTS	208	Long - Number of cuts made	1 equals 1 cut	0
NUMLINES_PRINT_IA	212	Long - Number of Printed Lines	1 equals one line	0
NUMCHAR_PRINT_IA	216	Long - Number of Printed Characters	1 equals one character of 10 dots wide	0

Using the Set Configuration Command:

<GS>	‘0’	‘c’	‘@’	‘#’	‘g’	Index (1 byte)	Value

1Dh	30h	63h	40h	23h	67h	Index (1 byte)	Value

The metric value should be update, at least, each 5 minutes of operation (if there changes). Considering the printer life, the metrics should be update, at least, 500.000 during the life.

5.4.4 Debounce Near End

This parameter setting is to confirm the real condition of the near end sensor before the correct report of paper low status.

5.5 Self-Test

The self-test lets you know if your printer is operating properly. It checks the control circuits, printer
Mechanisms, print quality, Firmware version, configuration setting and metrics

- To start running the self-test on power-on, with a paper roll

1. Make sure the printer is turned off and the printer covers are closed properly.
2. While holding down the PAPER FEED button, turn on the printer using the power switch to begin the self-test. The self-test prints the printer settings, ask for validate a document, validate a document, cuts the paper, and pauses.
3. If a fault occurs during SelfTest execution, the printer stops printing. After the fault is solved, the printer will remain stopped. Press Line Feed button, for the printer be restarted.

- To start running the self-test when print is on, press both key , wait the cutting, then hold for 3 seconds

The printer is ready to receive data as soon as it completes the self-test.
The self-test pattern must be as follow, the printed message may change for each custom.
Highlighted text in BLUE change according Customer Settings.

IMPRESSORA HÍBRIDA BTP-RM180

VERSÕES FIRMWARE:
Periférico: I43.5X.00.AAY.XX / XXXX
Download: I43.5X.00.DLY.XX / XXXX
Matriz: I43.5X.00.MTY.XX / XXXX

INDICADORES:
Cabeça : XXXX K Dotlines
XXXX Metros

Mecanismo : XXXX Metros
XXXX Cortes

Autenticadora:
XXXX Linhas Impressas
XXXXk Caracteres Impressos

HARDWARE:
Guilhotina TP Desabilitado
Interface Disponíveis:
USB
Sensores:
Pouco Papel Desabilitado
Tampa Habilitado
Bobina: 80 mm
Temp. Cabeça 30-35°C
Tensão 24,2 V

CONFIGURAÇÕES:
Tabela Caracteres CP850
Avanço Linhas 3,25 mm
Comandos Padrão

PARÂMETROS INTERNOS:
Parâmetro 7 = 1
Parâmetro 15 = 0
Parâmetro 16 = 8
Parâmetro 20 = 0

```
! " # $ % & ' ( ) * + , - . /
0 1 2 3 4 5 6 7 8 9 : ; < = > ?
@ A B C D E F G H I J K L M N O
P Q R S T U V W X Y Z [ \ ] ^ _
` a b c d e f g h i j k l m n o
p q r s t u v w x y z { | }  ~

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Insira DOCUMENTO p/ teste do Sensor de DOCUMENTO

5.6 Hex Dump Mode

This feature allows users to see exactly what data has been received. When you turn on the Hexdecimal dump function, the printer prints all commands and other data in Hexdecimal format on paper roll to help you find specific commands.
To enable the Hexdecimal dump feature, follow these steps:
1. After you make sure that the printer is off, put a document to block the sensor.
2. Hold down the FEED button while you turn on the printer.
3. Remove the document.
4. The printer prints “Hexdecimal Dump”.
5. Run any software program that sends data to the printer. The printer prints all the codes it receives in a two-column format. The first column contains the Hexdecimal codes and the second column gives the ASCII characters that correspond to the codes.

Hexdecimal Dump	ASCII
41H 72H 71H 75H 69H 76H 6FH 20H 64H	Arquivo d
65H 20H 74H 65H 73H 74H 65H 20H 64H	e teste d
65H 20H 4DH 6FH 64H 6FH 20H 48H 65H	e Modo He
78H 20H 44H 75H 6DH 70H 0DH 0AH 30H	x Dump 0
31H 32H 33H 34H 35H 36H 37H 38H 39H	123456789

6. A period (.) is printed for each code that has no ASCII equivalent.
7. During the Hexdecimal dump all commands except STATUS do not function.
8. Press the FEED button so that the printer will print the last line.
9. Turn off the printer to turn off the Hexdecimal dump mode.