



PB2

Operation Manual



PhetChanpha Co., Ltd
Shenzhen CATIC Information Technology Industry Co., Ltd

Thank you for choosing CITIC PB series passbook printer.

CITIC PB series of specialized passbook printer is developed by :

Shenzhen CATIC Information Technology Industry Co., Ltd.

This series of passbook printer is manufactured in Shenzhen China where is the production base of printer equipment in the World as well.

Key features and technical reference of PB series are as follows:

- ❖ Printing speed can be up to 460 cps, and printing speed of native character can be up to 155 (Chinese character) per second.
- ❖ Diameter of pin is 0.20mm which is typically suitable for printing bit image.
- ❖ It equips with advanced document handling features, such as automatic document thickness adjustment, automatic skew alignment, automatic document edge detection. It performs precise printing quality and supports media materials of various size, thickness (refer to following sections for detail specification of document).
- ❖ In addition to Big 5 (Traditional Chinese) and IBM5550, it comes with built-in GB18030 (Simplified Chinese) and possesses special symbols to suit needs in bank and other commercial environment.
- ❖ It supports different pitches, adjustable pitch, justify and proportional pitch; double width, triple width and quadruple width; double height, triple height and quadruple height as well as characters created by combinations of these features; multiple attributes, etc.
- ❖ To adapt with different kinds of connection to host terminal, it provides port of :
 - Dual RS232 serial + Centronics IEEE 1284 parallel, or
 - RS232 serial + Centronics IEEE 1284 parallel + USB
- ❖ It equips with multi-emulations and is compatible with Olivetti PR40, PR40+, PR50, PR54, PR2, PR2E and IBM Proprinter II, IBM X24, IBM 4748, IBM 9068, and OKI, EPSON, etc. It is also integrated a feature of automatic compression mode for wide-width printing which was firstly developed by CITIC in 1997. This is specially suitable for passbook printing in China, HK, Taiwan as well as other countries in Asia.
- ❖ Configuration setup and diagnostic test can be carried out via front panel. It supports online upgrade for firmware and character sets.

Current available models of CITIC PB series are PB2/S01, PB2/S02, PB2/S03 and PB2/S04. All of them equip with emulations of Olivetti PR series, IBM Proprinter II, IBM PPDs and OKI, EPSON, etc.

Among these available models, PB2/S01 is of standard type which provides 1 serial port + 1 IEEE 1284 parallel port.

PB2/S02 provides 2 serial port + 1 IEEE 1284 parallel port.

PB2/S03 provides 1 serial port + 1 IEEE 1284 parallel port + 1 USB port.

PB2/S04 provides 2 serial port + 2 USB port.

CITIC PB2/M01 is of standard type + automatic horizontal magnetic device.

User can opt a model which suits their requirements and needs.

PB3 series is the product group which performs higher printing speed as it is the enhanced product based on PB2 in the PB family. It refers to same characteristics as PB2.

Please read this manual thoroughly before using the product. Upon comprehensive understanding of the correct operation, the product will fully perform its features well.

In order to properly explicate the meaning in this manual, there are three different denotes as follows:

- Notes :** Usually it lists additional characteristics or describes some restrictions. In some cases, it might give special operation hints for execution.
- Attention :** It is expected to draw attention to some operations which might cause some consequences or problems which should be avoided.
- Caution :** It describes special operating procedures that user must follow. Any improper operation might incur serious damage on printer.

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NOTICE :

Shenzhen CATIC Information Technology Industry Co., Ltd. reserves the right to modify the equipment described in this manual at any time and without notice.

Safety Announcement



Danger

1. Check the voltage label adhered with the equipment and ensure its required working voltage matches with the power source.
2. To avoid potential electrical shock, please use the power source which is properly earthed.
3. Electrical leakage due to damage on cables is dangerous, please disconnect the power cord before connecting data cable.
4. Do not open cover of power supply device. This device is only serviced by qualified personnel.



Warning

1. In any emergency case, please disconnect the power source.
2. Do not use other fuse for substitution. Only use the qualified type which is specified.

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Section 1 - Installation

This section describes how to install and set up the PB series printer.

1.1 Packing And Options

1.1.1 Packing List

Upon opening the carton box, please check the items inside. (See Fig. 1.1-1)

They are :

- 1) PB series printer – one unit.
- 2) Power cord cable – one piece.
- 3) Ribbon – one cartridge.
- 4) Operation manual for CITIC PB series passbook printer – one set.

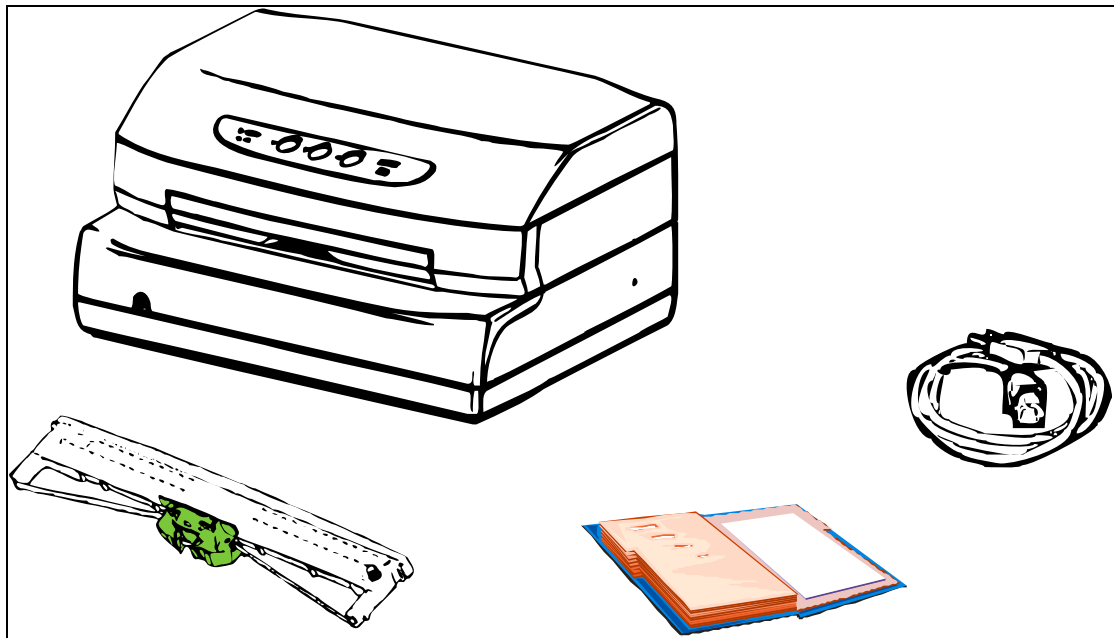


Fig. 1.1-1 Packing list

If there is any discrepancy found inside the carton box, please contact your sales agent. In such a case, do not power on the printer in order to avoid potential damage on the printer. In the mean time, kindly keep the packing material in a proper place for future use.

1.1.2 Options

PB2/MM Manual magnetic stripe reader.

PB2/AM Automatic horizontal magnetic stripe reader.

1.2 General Diagram

Front view (See fig. 1.2-1)

- 1) Top cover
- 2) Control panel
- 3) Document insertion platform
- 4) Power switch

Back view (See fig. 1.2-2)

- 5) Power plug
- 6) Rear side of document ejection platform
- 7) Serial port
- 8) Second serial port
- 9) Parallel port or others expansion port

Top view after opening top cover

- 10) Magnet at top cover
- 11) Ribbon gear
- 12) Lever for mechanism
- 13) Printer head frame



Fig. 1.2-1 Front view

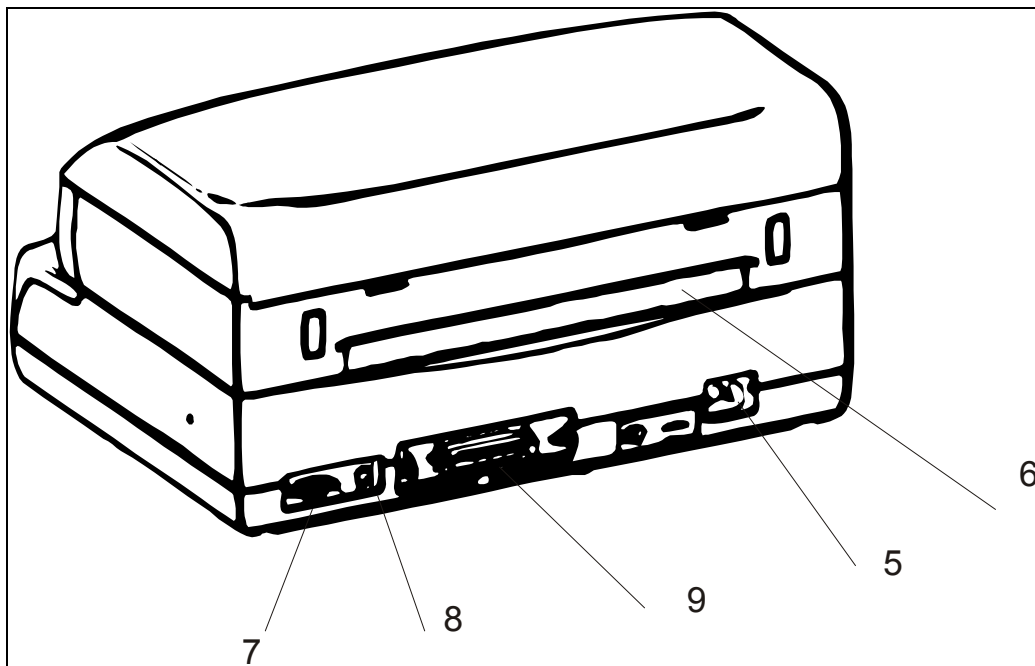


Fig. 1.2-2 Back view

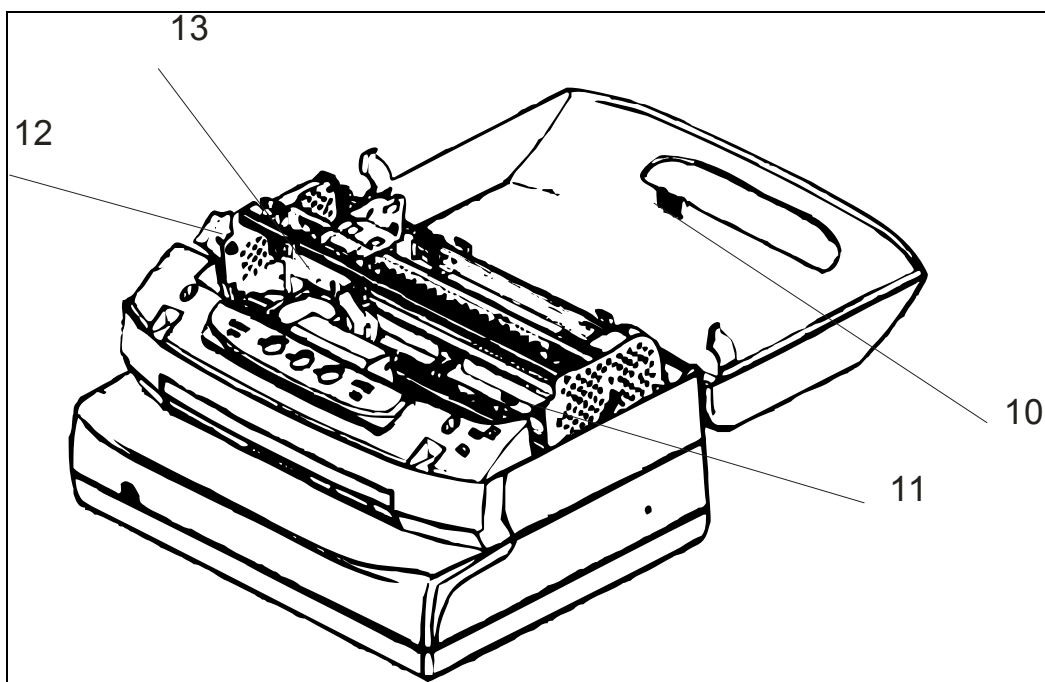


Fig. 1.2-3 Top view – opening top cover

1.3 Taking Out The Transportation Protection Clip

1.3.1 Opening Top Cover

Hold the top cover and uplift it to reach an angle about 45° until the position is locked. Top cover can be fully opened to an angle of 180° with care in order to avoid damage on the hinges.

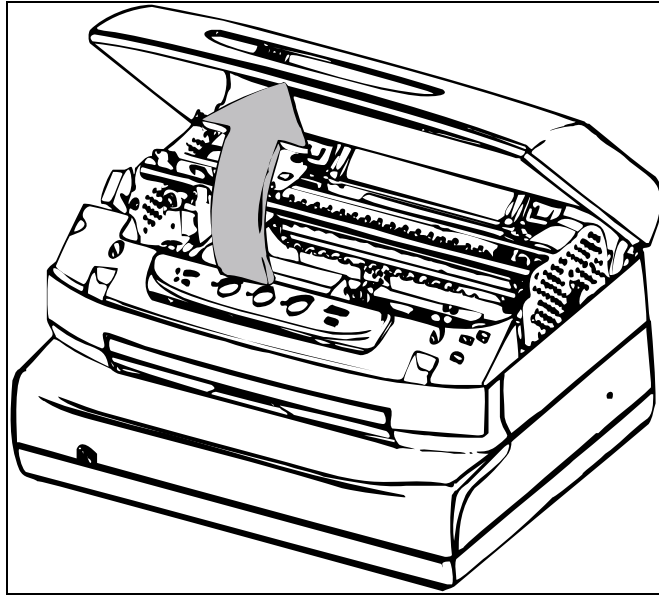


Fig. 1.3-1 Opening the cover to an angle about 45° until the position is locked

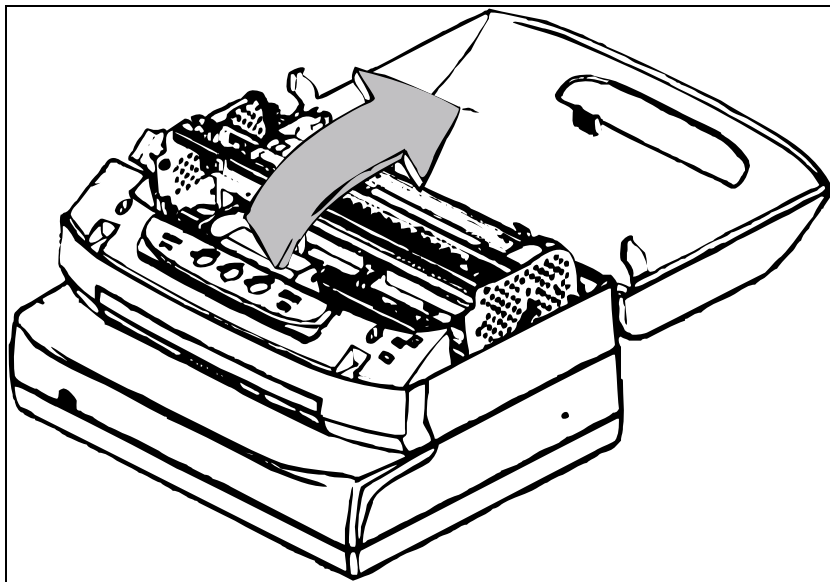


Fig. 1.3-2 Fully opening top cover at the angle of 180°

1.3.2 Taking Out The Two Plastic Clips

Referring to Fig 1.3-3, at both two sides take away the two clips which lock the mechanism and the another two red clips which protect the printer head during transportation.

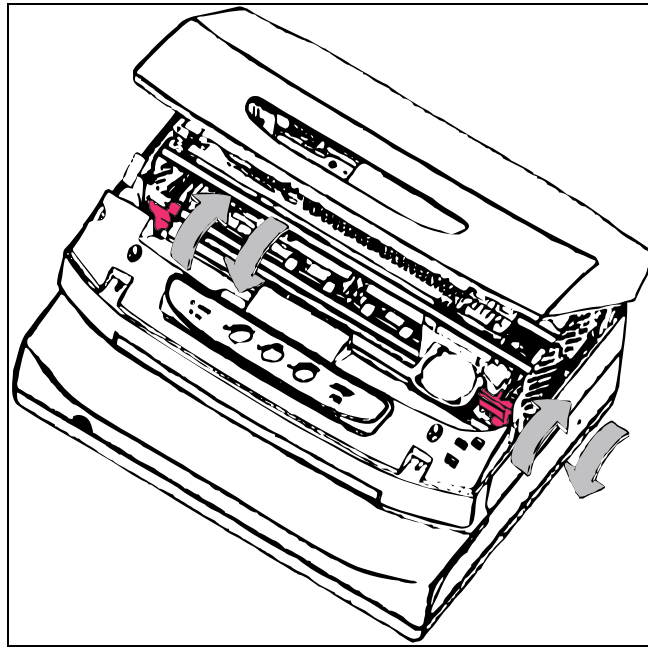


Fig. 1.3-3 Procedure for taking out the clips

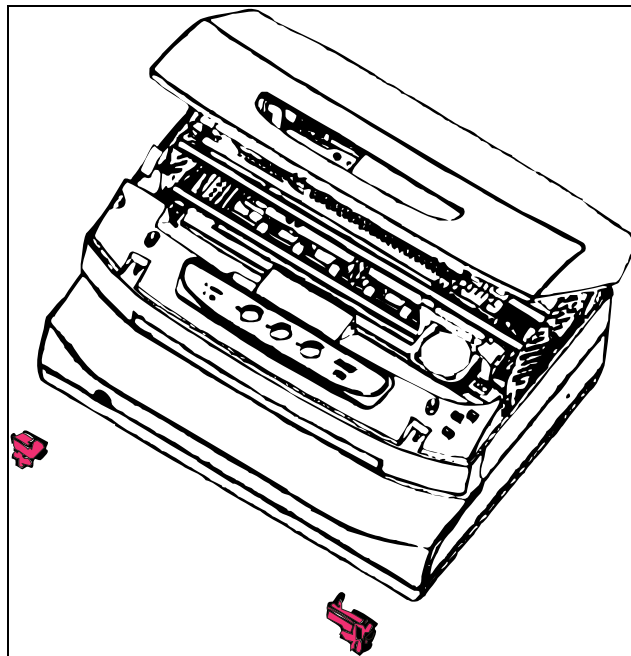


Fig. 1.3-4 Taking out the red plastic clips

Notes : Keep the clips in proper place for future need of transportation.

1.4 Installation Environment

1.4.1 Requirements For Environment

Operating temperature :	15°C ~ 35°C
Storage temperature :	-10°C ~ +60°C
Operating humidity :	35% ~ 85%
Storage humidity :	10% ~ 90%
Power source :	220V \pm 15%(AC), 50Hz \pm 1Hz (Note 1) 110V \pm 15%(AC), 60Hz \pm 1Hz (Note 1)

Note 1: Power supply for operating voltage will depend on customer's requirement specified on purchase order.

This printer is designed for typical office environment. Please follow the instructions stated below in order to ensure user's sake of safety and keep the printer in good condition.

- Power supply should be electrical ground protected.
Without connecting ground, it may be hazard to operator and equipment may be interfered by electrical fields.
- Printer should be apart from electrical interference and equipment with higher voltage fluctuation.
Do not let printer share power socket with those equipment which may generate electrical spike, such as copying machine, air-conditioner, etc.
- Do not put printer at dusty place, such as near air-conditioner or air convention outlets. Dust, small particle and ash are hazard to movement items inside printer and may incur malfunction of electronic circuits.
- Do not put printer in environment of heat, vibration and high humidity, and avoid direct sunshine on it, such as boiler, humidifier and refrigerator.
- Printer should be placed on a firm platform with good air convention, and ample space for operator.

1.5 Installing Ribbon

- (1) Take the ribbon from its packing and take away the lock plate, which locates between ribbon cartridge and the guide, for prevention from damage during transportation. See the diagram below :

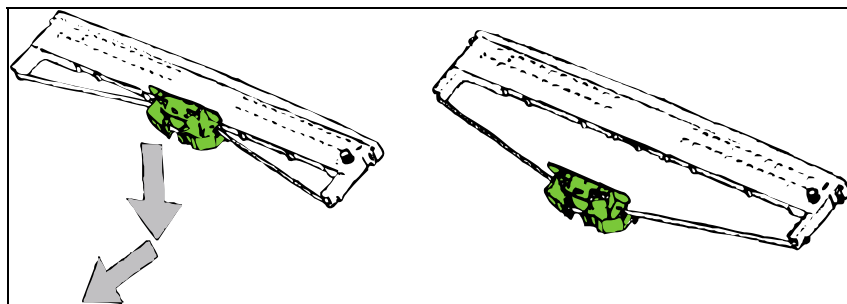


Fig. 1.5-1 Taking away the guide from ribbon

- (2) Jack up printer head assembly by using the lever.

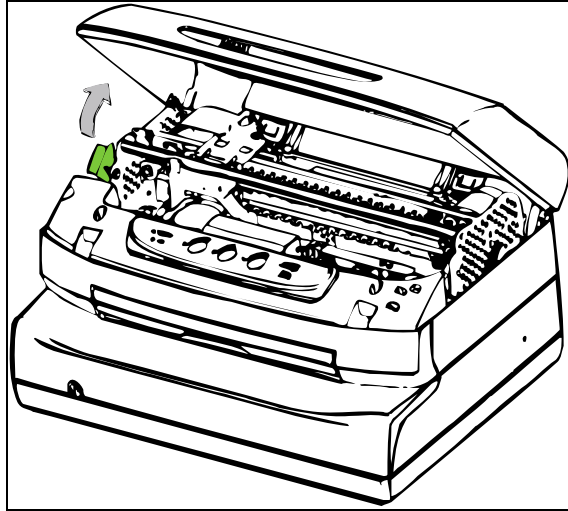


Fig. 1.5-2 Jack up the printer head assembly

- (3) Align the printer head to centre position. Insert ribbon cartridge onto the scrolling gear, and lock its two ends with related slots.

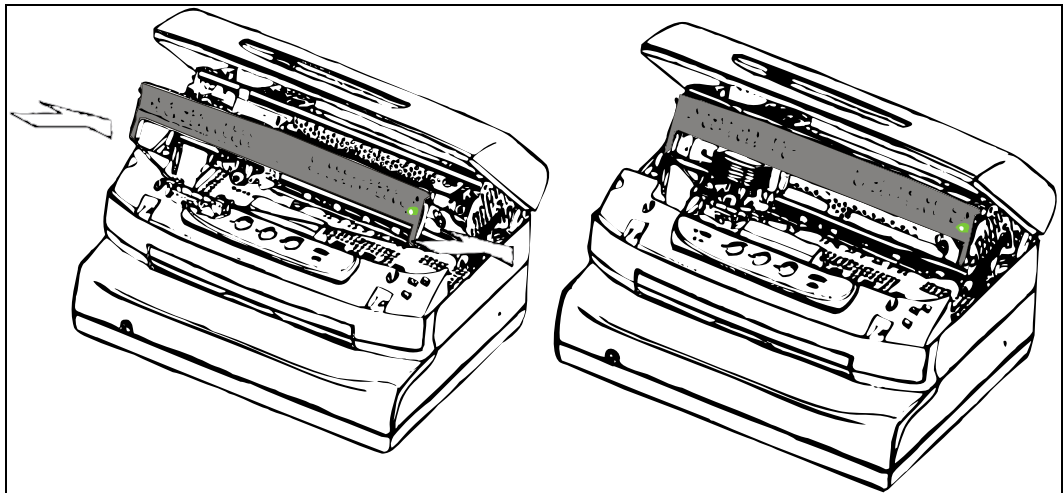


Fig. 1.5-3 Insert ribbon cartridge onto the scrolling gear and lock its two ends with related slots.

- (4) Insert ribbon guide upward to the printer head and press it slightly to ensure the position holes lock with the slots at rear side of the printer head.

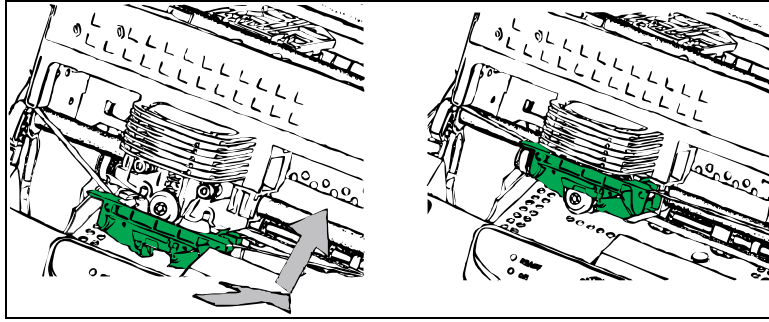


Fig. 1.5-4 Press the ribbon guide upward to printer head and lock with the slots.

- (5) Turn the ribbon gear anti-clockwise until it is tense.
- (6) Pull out the plastic guide.
- (7) Lower down the ribbon-loaded printer head by the lever.
- (8) Close the top cover.

1.6 Connecting Power

Caution : Check the voltage of power source in use, and make sure it matches with the printer's specification as stated at the label. Check the power and make sure it is grounded.

Never try to power on the printer whenever there is a doubt about the power sources does not match with the voltage as stated at the label. Please contact your distributor immediately.

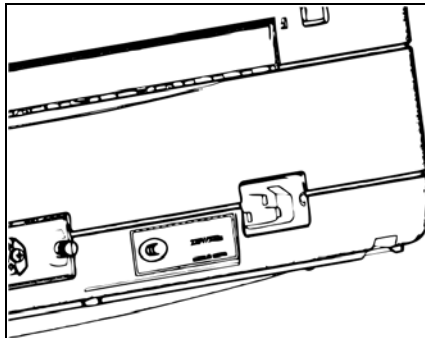


Fig. 1.6-1 Electricity label

1. Set the power switch at OFF position (outmost).
2. Plug the power cord to printer.
3. Plug the power cord to power source.

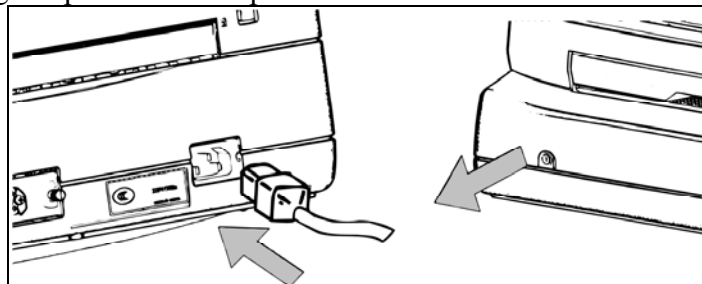


Fig. 1.6-2 Power plug and Power switch

CITIC takes no liability to any accident and / or damage due to the use of non-qualified or defective power plug.

Printer will turn on by pressing the power switch at front side.

Following will appear after switching on power :

- All indicators will light on, and POWER indicator keeps on while the rest indicators will turn off after several seconds.
- Printer will eject document, if any.

If printer does not behave as stated above, please refer to Section Four “ Maintenance and Problem Solving”.

1.7 Print Test

A configuration menu and print test can be simply processed by now.

1.7.1 Print Test Procedure

1. Switch off power.
2. Press Station2 without release and switch on power.
3. Keep pressing Station2 until mechanical movement stops.
4. Insert a paper not shorter than A4 (210mm X 297mm) into printing platform. Printer will automatically align its printing position.

Printer will print two pages of configuration menu. Now Switch off power will end the print test.

1.7.2 Test Content

In addition to printing CITIC’s logo, printer’s model and firmware’s version, the printout also shows the details of current configuration. Parameters inside configuration are changeable by user. By following the SET-UP procedure as stated in Section 3, configuration details can be reset to match with requirements of the actual environment when needed.

Following is a sample of configuration list. Actual details may vary with different firmware version.

CITIC PB2(BIG5) PASSBOOK PRINTER 3.00A
HW VER. 03 FW VER. 256 CG VER. 115

Needles test:

										1	1	1	1	1	1	1	1	1	2	2	2	2	2	0	E
1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	D	V

BASIC CONFIG.
EMULATION: CITIC-OLIVETTI
CX EMULATION: OKI
EMUL. TYPE: TEMP.
DRAFT SPEED: NORMAL
LQ TYPE: NLQ1
BUZZER: YES
INTERFACE: AUTO
BAUD RATE: 9600
BIT/CHAR: 8
PARITY: NONE
STOP BIT: 1
DSR: NO
DCD: NO
PAP.EDGE DETECT.: NO
SPECIAL FORMS: NO
CMPL PIN: NO

IBM CONFIG.
EMULATION: IBM PPII
PASSBOOK: YES
BINDING: VERTICAL
ASCII/KANJI: KANJI
KANJI CODE: BIG5
ASCII S.B.C. CASE: IBM/PC
CHAR. SET: PC
PC CHAR SET: 437 (INT)
PC TABLE: TABLE 2
CHAR DEFINITION: LQ
CPI: 12
LF+CR: NO
CR+LF: NO
SLASH ZERO: NO
LINE WIDTH: 8 IN.
FORM LENGTH: 11 IN.
LIKE IBM-PP BOM: YES
LIKE IBM-PP TOM: YES
SELECT PNS: NO

OLIVETTI CONFIG.
EMULATION: PR40+
PASSBOOK: YES
BINDING: VERT.
MARGIN: LEFT
LINE BUFF. PR40: NO
ASCII/KANJI: KANJI
KANJI CODE: BIG5
ASCII S.B.C. CASE: ASCII
GRAPHIC MODE DPI: 96
CHAR. SET: PC CHAR SET
CHAR DEFINITION: LQ
CPI: 12
VERT. SPACE: 1/240
LF+CR: YES
INIT EJECT PAP.: YES
TOP PR40 LIKE: YES

SELECT PNS: NO

0 : : 0
SHEET TOP MADJ(1/60"): 0
SHEET TOP ADJ: 1/4"
EJECT DIR: FRONT
SHEET FORMAT: CON. FORM
BIM PRINT DIR: UNI-DIR
CR+LF: CR
CHAR SET: EPSON ITALIC
QUALITY: LQ
KANJI CODE: BIG5
ASCII/KANJI: KANJI
COL. LIKE W.WIDTH: 108
LIKE W.WIDTH: NO
EPSON CONFIG.
0 : : 0
LEFT MARGIN(1/100"): 0
LEFT MARGIN(1/10"): 0
SHEET TOP MADJ(1/60"): 0
SHEET TOP ADJ: 1/4"
EJECT DIR: FRONT
SHEET FORMAT: SHEET
AUTO PAP. INTRO: YES
CR+LF: CR
LF+CR: LF+CR
QUALITY: H.DENSITY
KANJI CODE: BIG5
OKI, ZIJIN EMUL.: OKI
COL. LIKE W.WIDTH: 106
LIKE W.WIDTH: AUTO
OKI, ZIJIN CONFIG.

The printer can be now connected with a PC or host system when it is believed to be working correctly.

1.8 Connecting With Host

This printer usually connects with a host machine through either a RS232 serial cable or a parallel cable. Connect the cable's male connector with the printer's plug by using the cable's given screws or clips.

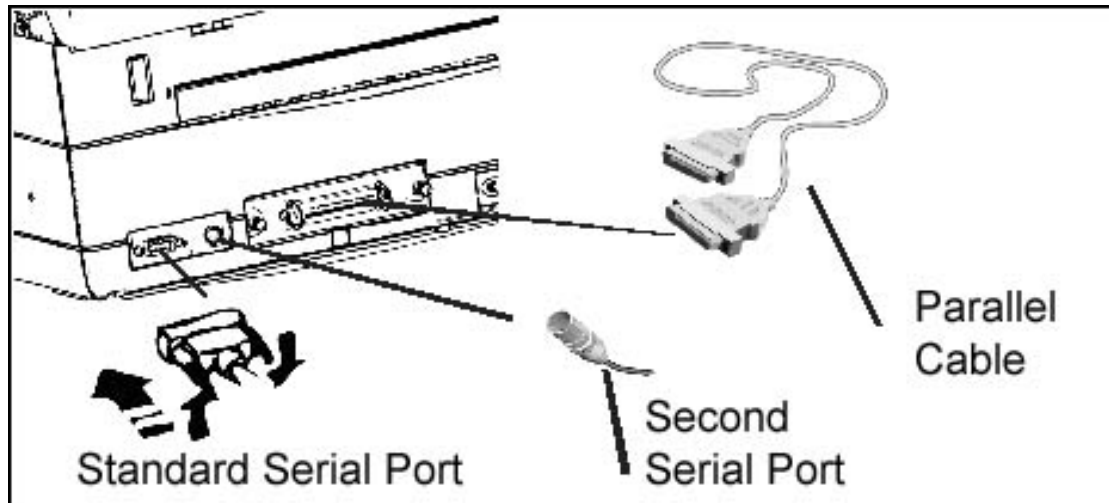


Fig. 1.8-1 Connection between PC and the printer

It is recommended to use the cable supplied by CITIC for the second serial port. The third serial port at the expansion board can use a standard 9-pin serial cable. Parallel cable is of a standard type.

The length of parallel cable is recommended not to exceed than 1.5M in order to avoid potential problem.

Attention : Please following the instructions below when installing or operating the printer.

- 1) Switch off the printer before connecting cable. It may entail damage if disconnect the data cable or power cord while the printer is working.
- 2) Please ensure the stability of voltage to avoid potential damage on printer due to electrical surge.
- 3) Power cord and data cable should be properly laid so as to prevent damage from stumble or trample.
- 4) Choose qualified, reliable and correct power rating power socket of 3 wires and single phase. Its ground lead should be properly earthed, and the resistance to earth should be less than 4Ω .
- 5) The printer should be working at clean environment and avoid dust. Do not use liquid detergent or solvent to clean parts inside printer.
- 6) Do not try to disassemble the electrical or mechanical parts of printer. Especially for mechanical items, these require special tools and equipment to calibrate by

following a series of procedure. Any attempt to disassemble the mechanical will cause maladjustment on mechanical transfers and electrical control which eventually incur damage on printer.

- 7) Please contact your distributor whenever encounter problem with the printer.

Section 2 - Front Panel And Its Operation

This section mainly describes the front panel and its operation for CITIC PB2.

2.1 Front Panel

There are 5 LEDs and 3 buttons on the front panel.

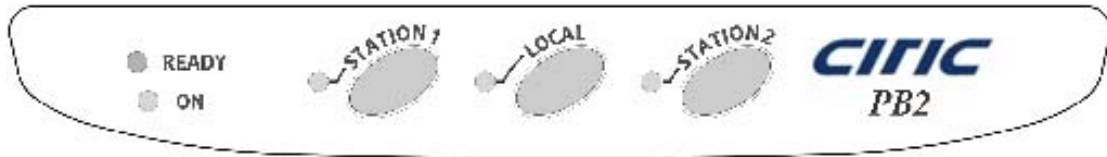


Fig. 2.1-1 Front panel of printer

2.2 Indicator

LEDs show printer's status as follows:

ON	Power is on.
READY	Printer is printing, or waiting for printing data inside memory.
LOCAL	Offline.
STATION1 (EJECT)	Olivetti emulation mode, and printer is assigned for operator 1.
STATION2 (NLQ)	When Olivetti mode, this means the printer is assigned for operator 2. When IMP PP emulation mode, this means NLQ is selected. When OKI emulation mode, this means HD is selected.

2.3 Buttons

The buttons perform functions as follows:

Toggle the printer from LOCAL (offline) to READY (online) or vice versa.

STATION1	When Olivetti mode, the printer is assigned to operator 1.
EJECT (*)	When IBM PP or OKI mode, ejects document.
STATION2	When Olivetti mode, the printer is assigned to operator 2.
NLQ (*)	When IBM PP or OKI mode, the printing mode is selected to NLQ or HD respectively.

(*) Only when the printer is offline, pressing EJECT to release document is valid for IBM or OKI mode.

(*) Pressing EJECT to release document under OKI mode, following procedures are required :

- When printing single sheet, printer ejects the document (direction is determined by “single sheet eject direction” via the SETUP).
- When printing continuous form, printer aligns the form to top edge of next page. If the form is not long enough, it will be ejected at rear side of printer.

To release document under Olivetti mode, simply press LOCAL (its LED will light up), and press STATION1. At this moment, data inside print buffer will remain unchanged.

Configuration features via front panel will be discussed on Section 3

2.4 Document Handling

This printer can handle single sheet, multiply of paper, voucher and passbook. Simply put a document inside the platform, PB2 will handle the alignment for the document automatically.

Caution : Having inserted the document, it should be released when the automatic alignment feature is started.

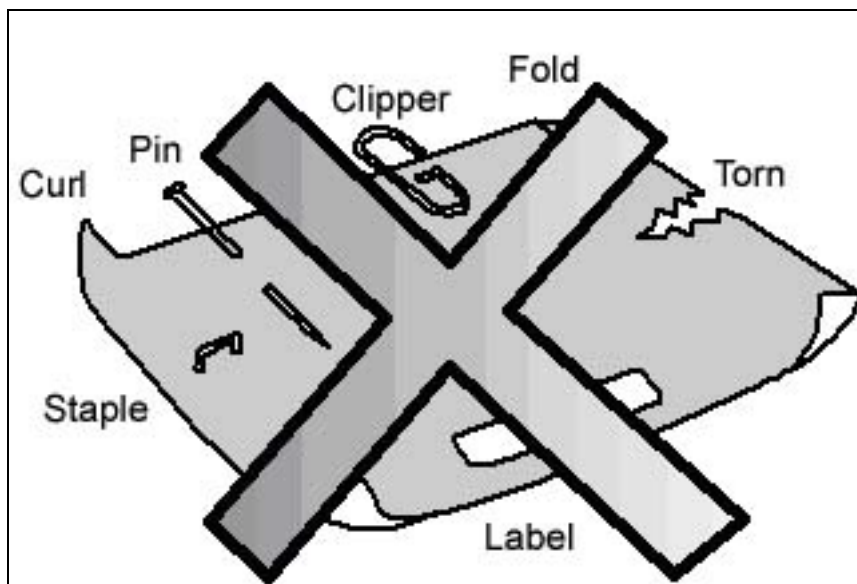


Fig. 2.4-1 Prohibited items on document

Caution : When using passbook, please check to see if any part is folded or torn to avoid poor quality in printing or obstruction to movement.

When using a brand-new passbook, bend the binding at reverse direction in order to make the passbook flatten.

Section 3 - Setting Configuration (SETUP) And Parameters

3.1 Configuration (SETUP)

3.1.1 Introduction

Setting configuration means to alter certain parameters preset by factory in order to let the printer fit with user's environment. Certain parameters are not necessary to change while certain parameters are only valid for a typical model with optional feature installed. Before making the changes, please make sure the item being changed are understood. Prior to making changes, please read this section in order to avoid incorrect printing.

3.1.2 Printer Status

Printer status (or mode) can be changed by using LOCAL key. Before switching on the printer, press one or several keys and switch on printer can change parameters.

Major printer status are as follows:

- Online (host connected, ready) status.
- Offline (local) status.
- Operational test status (as described in Section 2).
- Setting configuration status.
- Adjusting configuration status.

Pressing LOCAL key will toggle the status from online (connecting host, ready) to offline (local), or vice versa.

3.1.3 Emulations

Printer interprets data captured from data line by according to the emulation pre-defined. Printer will perform accordingly upon receipt of codes. CITIC PB2 printer provides emulations for choice. These are Olivetti PR series, IBM PP, and OKI series. Having chosen relevant setup menu will lead to the another menu for selecting emulations.

3.1.4 Setting Parameters (SETUP)

Following procedure is required to setup parameters (SETUP):

- Power off printer.
- Press STATION1 and STATION2 simultaneously then power on printer. Keep pressing the keys until initialization is complete.
- Insert a A4 document.

Printer will print two lines of message as follows:

Press STATION1 to confirm Press STATION2 for options Press LOCAL start to setup.

SZ CITIC PB2Sxx Ver. X.XX

- Press LOCAL key to let printer go into setup mode. Printer will print a line as follows:

Basic Configuration

- Pressing STATION1 now will choose current “Basic configuration” and will enter into its sub-menu “Setting Parameters” to select parameters.
- Pressing STATION2 now will discard current menu, and printer will print a line as follows:

IBM configuration

If now press STATION1, then means to confirm current “IBM configuration” menu, and enter into its associated sub-menu for other options.

If now press STATION2, then means to discard the current menu. Printer will print the next menu for choice, until all available choices inside “Configuration Menu” are shown.

- Enter into “Setting Parameters” menu which is the sub-menu following the either choice of “Basic configuration”, “IBM configuration”, “Olivetti configuration”, “OKI, Zijin configuration”, or “EPSON configuration”. Having entered into “Setting Parameters” menu, STATION1 key and STATION2 key will be used to set parameters. Work-flow of SETUP will be different from a key selected by user.
 - a) Press STATION1 to select the option shown or certain operating mode available at current menu, and will enter into next option.
 - b) Press STATION2 to discard the option shown or certain operating mode. Next option or certain operating mode will be shown for choice.

Repeat actions in a) or b) until “Setting Parameters” is done.

- Under the menu of “Basic configuration”, “IBM configuration”, “Olivetti configuration”, “OKI, Zijin configuration”, or “EPSON configuration”, printer will print message as follows when either press LOCAL key or the setup is done.

“Save parameters ?”

- Follow point a) or b) as aforementioned to confirm whether to save the newly changed parameters or not. If the newly changed parameters are saved, this means the printer will base on these parameters to initialize itself whenever it is powered on. If “No” is chosen, this means the newly changed parameters are discarded.
- Once the configuration mode is selected, printer will repeatedly list options for choice until either the setup process is done, or the printer is powered off.

Having confirmed “Save Parameters ?”, it is needed to wait a reminding signal (beep sound) before going further to configure parameters or switching off the printer.

Following is the flowchart for setting parameters.

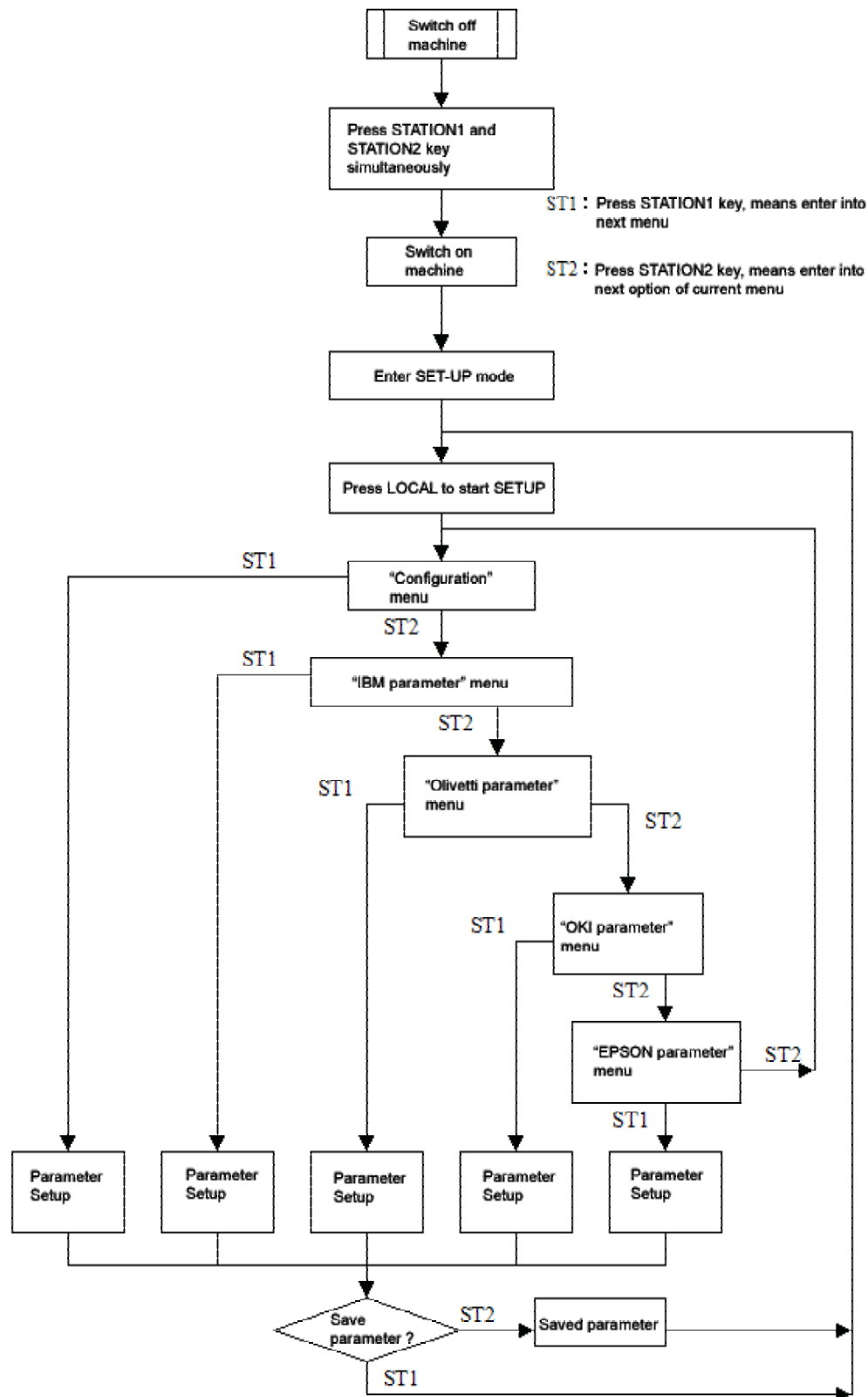
3.1.5 SETUP Description

Parameters available from SETUP are determined by the modules as follows:

1. Basic configuration
2. IBM configuration
3. Olivetti configuration
4. OKI configuration
5. Epson configuration

(In configuration description, “option” of typical configuration is expressed in **bold**).

Flow chart of setting configuration :



3.1.5.1 Basic Configuration

Parameter	Option	Remarks
EMULATION	CA-IBM CA-OLIVETTI CA-OKI Zijin, CA-EPSON	Serial port 1 or emulation of defined port.
CX EMULATION	CA-OKI CA-EPSON IBM PPII	Emulation of parallel port when “auto” port is selected.
EMUL. TYPE	Temporary – permanent	Whether to save when emulation is changed via control command
DRAFT SPEED	Normal – high speed – very high speed	Select printing speed for draft mode
LQ TYPE	NLQ1 -NLQ2-LQ2	Select printing quality
BUZZER	Yes – No	Whether to sound when receiving beep command
INTERFACE	RS232-Parallel- auto -non buffered parallel-USB	
BAUD RATE	9600 -1200-2400-4800	Baud rate for serial port
BIT/CHAR	8 -7	bit length for data
PARITY	none -odd-even	Parity for serial port
STOP BIT	1 -2	Stop bit length for serial port
DSR	No -yes	Need DSR hand-shaking?
DCD	No -yes	Need DCD hand-shaking?
PAP. EDGE DETECT	No -yes	Whether to stop printing when out of paper edge
SPECIAL FORMS	No -yes	Whether support printing for thin paper, or variance in thickness at vertical direction
CMPL PIN	No -yes	Complementary pins
H.S. CMPL PIN	No -yes	
CMPL PIN NO	1 ~ 24	
SAVE PARAMETER	Yes - no	

3.1.5.2 IBM Parameter

Parameter	Options	Remarks
EMULATION	IBM PII -IBM4722- IBM4748 –IBM9055- IBM9068	Emulation
PASSBOOK	Yes -no	Define if passbook handling is needed.

BINDING	Horizontal-vertical	Define passbook binding type
ASCII / KANJI	ASCII –IBM 5550 – GB (Simplified Chinese char)	ASCII / Chinese char.
KANJI CODE	Big5 – IBM5550	
ASCII S.B.C. CASE	GB-5007 - IBM/PC	Single byte char. case for ASCII under Chinese char. mode
CHAR. SET	PC-ISO	Options for English character set
PC CHAR SET	DK/N-210(GR)- 220 (E)- 437 (INT) - 850 (LATIN 1)- 860 (P)- 862 (IL)- OLI- UNIX-ISO 8859/1	Define PC character set
ISO CHAR SET	OLI-UNIX - 8859/1	
PC TABLE	Table 1 – table 2	Select command table
CHAR DEFINITION	Draft – LQ	Define printing quality
CPI	10-12	Size of character
LF+CR	No -yes	Carriage return follows line feed
CR+LF	No -yes	Line feed follows carriage return
SLASH ZERO	No -yes	Character 'zero' with slash?
ASF	No - yes	
LINE WIDHT	8 in. – 9 in.	Length of line
FORM LENGTH	11 in. – 12 in.	Document length
LIKE IBM-PP BOM	Yes -no	Choose to respond (BOF) bottom of Form "yes"= 13.7mm "no"=4.23 mm
LIKE IBM-PP TOM	Yes -no	Choose to respond (TOF) Top of Form. "yes" : document = 4.23 mm passbook = 4.23 mm – 30 mm (can be defined via SETUP) "no" document = 4.23 mm – 30 mm (can be defined via SETUP) passbook = 7.4 mm
SELECT PNS	No -yes	Select PNS ? (Non-standard Product)
SAVE PARAMETER	Yes -no	

3.1.5.3 Olivetti Parameters

Parameters	Options	Remarks
EMULATION	PR40+ -PR40-PR2-PR2E	Which emulation in use?
PASSBOOK	Yes -no	Define if passbook handling is needed.
BINDING	Horizontal - vertical	Define passbook binding type
MARGIN	Left -right	Reference for edge alignment
LINE BUFF. PR40	No -yes	Select the length of print buffer: “yes” = 1K bytes “no” = 8K bytes
ASCII / KANJI	ASCII – KANJI	ASCII / Chinese char.
KANJI CODE	Big5 – IBM5550	
ASCII S.B.C. CASE	GB5007 - ASCII	Single byte char. case for ASCII under Chinese char. mode
GRAPHIC MODE DPI	96 -72	Select DPI
CHAR. SET	PC character set – Olivetti Character set	Select character set
CHAR DEFINITION	Draft- LQ -OCRA-OCRB	Print quality
CPI	10- 12 -15-16.6-17.1	Character size
VERT. SPACE	1/240 in. – 1/216 in.	Spacing between lines
LF+CR	No- yes	Carriage return follows line feed ?
INIT.+EJECT PAP.	No- yes	Whether need to eject paper when printer is initialized ?
TOP PR40 LIKE	No- yes	Top margin likes PR40 ?
SAVE PARAMETER	Yes -no	

3.1.5.4 OKI, Zijin Parameters

Parameter	Options	Remarks
LIKE W.WIDTH	No – yes- auto	Compression mode
COL. LIKE W.WIDTH	80- 106 -108-132-136	Line length in compression mode
OKI,ZIJIN EMUL.	Zijin 371B emulation – OKI emulation	Emulation
QUALITY	High speed – high density	
LF+CR	LF- LF+CR	Line feed + return

CR+LF	CR – CR+LF	Return + line feed
AUTO PAP. FEED	Yes-no	Select auto paper feed feature ?
SHEET FORMAT	Single sheet – continuous form	Select type of paper in use
SHEET FEED DIR	Front – rear	Define the direction of paper ejection
SHEET TOP ADJ	SET-UP value - 1/12"- 1/4" -1/3"-1/2"-11/12"- 1"13/12"-0"- -1/12"	Adjust top margin
SHEET TOP ADJ(1/60")	-5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5	fine tune top margin per each 1/60"
LEFT MARGIN(1/10")	SET-UP value -2 -1 0 1 2 3 4 5 6	Left margin
LEFT MARGIN(1/100")	-5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5	Fine tune left margin
SAVE PARAMETER	Yes – no	

3.1.5.5 EPSON Parameter

Parameter	Options	Remarks
LIKE W.WIDTH	No-yes- auto	Compression mode
COL. LIKE W.WIDTH	80- 106 -108-132-136	No. of column in compression mode
ASCII / KANJI	English – KANJI	
QUALITY	High speed – high density	Select printing quality
CHAR SET	EPSON italic – IBM graphics	
CR+LF	LF- LF+CR	Carriage return follows line feed ?
Auto line feed (CR+LF)	CR -CR+LF	Line feed follows carriage return ?
BIM PRINT DIR	UNI-DIR - BI-DIR	Mono directional will have better print quality, but slower speed
SHEET FORMAT	Single sheet – continuous form	Paper ejection is invalid when using continuous form.
SHEET FEED DIR	Forward - Backward	
SHEET TOP ADJ	Settings in SETUP menu: 1/12"- 1/4" -1/3"-1/2"- 11/12"-1"13/12"-0"- -1/12"	Adjusting top margin
SHEET TOP ADJ(1/60")	-5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5	Fine tuning top margin, and measuring unit is 1/60 inch.
LEFT MARGIN (1/10")	Settings in SETUP menu: -2 -1 0 1 2 3 4 5 6	Adjusting margin at left hand side

LEFT MARGIN (1/100")	-5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5	Fine tuning left margin, and measuring unit is 1/100 inch.
SAVE PARAMETER	Yes – no	

3.2 Adjustment

Making appropriate adjustment to certain parameters can help printer improve its performance. In some practical situations, sometimes can also help to better format the layout of print-out. The printer is properly configured in production by according to standards. It is not necessary to re-adjust some parameters in most of cases. If there is really a need, please contact your sole agent.

Following describes those adjustable parameters :

The parameters can be adjusted via front panel :

- Photo-sensors adjustment
- Bidirectional alignment adjustment
- Paper top edge adjustment
- Left margin adjustment
- Detecting page length

3.2.1 Adjusting Parameters Of Photo-Sensors

Though parameters of photo-sensors are already well configured in production, their electrical characteristics can be changed when needed. Especially when special type of paper is in use.

All the photo sensors present in the machine require calibration; the following are installed:

1. Paper detection photo sensor assembly
This assembly consists of two LEDs and two photo receivers that are the first to detect when a document is inserted in the front insertion slot. The ray of light is transmitted by fibre optics.
2. Paper font alignment photo sensor assembly
These photo sensors are included in the same mechanical assembly as the paper detection photo sensors, indicated in this manual as Front photo sensor assembly.
The paper front alignment photo sensors check the alignment of the document before it reaches the print head. The assembly consists of four LEDs and four photo receivers, all connected via fibre optics.
3. Auto border photo sensor
Fitted on the print head, it detects the paper so as to measure the position of the first print column. If selected from Set-up, with this sensor it is also possible to control printing interruption in cases when the paper is narrower than the line being printed and sent from the system.

The location of the individual photo sensors in the machine is shown in the figure on the following page.

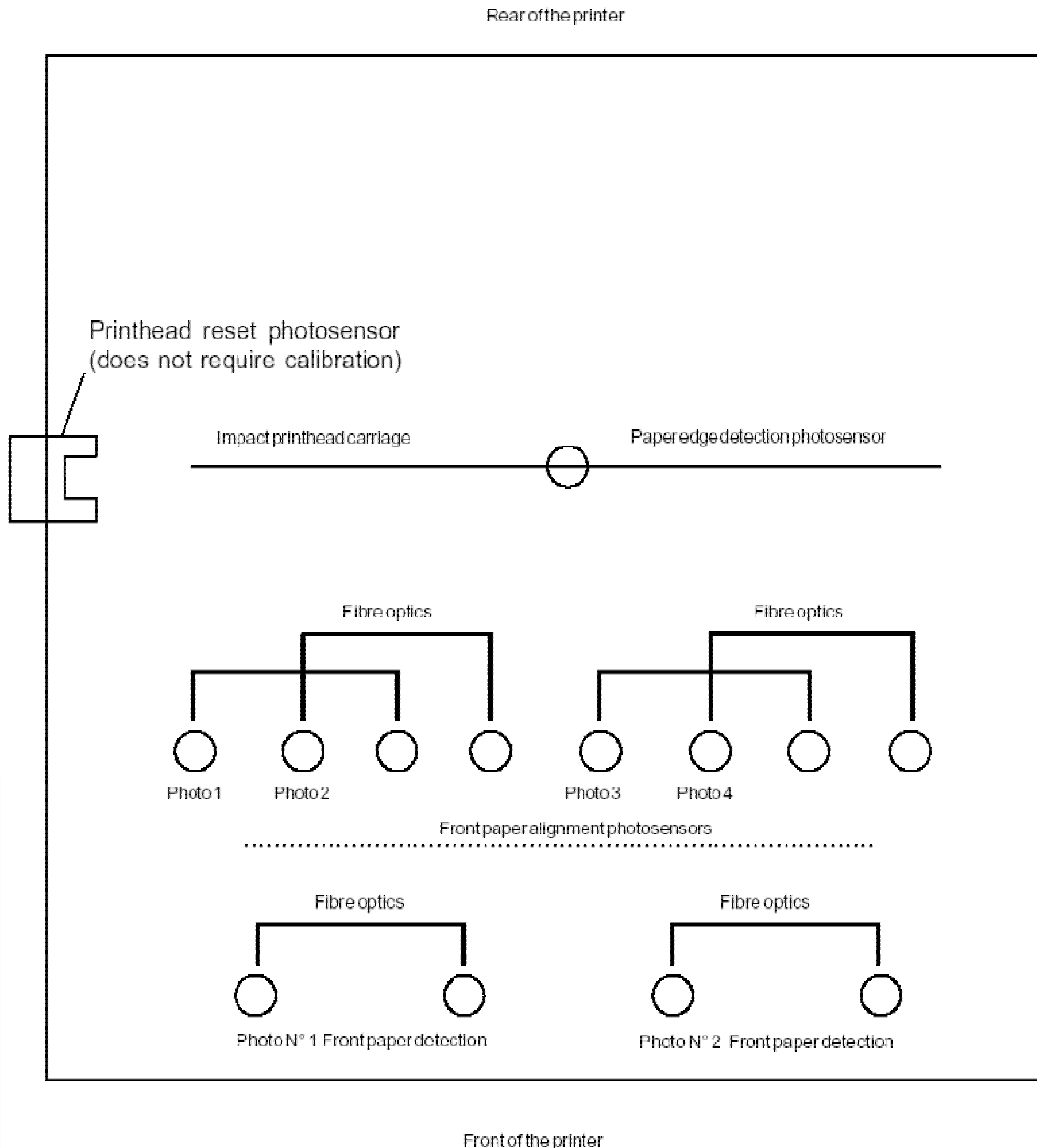



Fig 3.2-1 Locating Printer Photo sensors

Proceed as follows to calibrate the photo sensors:

1. Power on the printer with its cover open and while holding down the three buttons on the console.
2. Wait for the audible signal indicating that the printer has switched to the calibration and adjustment procedures.
3. Manually position the print head towards the left-hand side and then close the cover.
4. Press the "Station 1" button twice to enter the menu.
5. Upon the completion of this phase, the sensors have stored the electrical current ratings with the printer in an out of paper condition.
6. Insert a sheet of 60 gr/m2 paper, in the landscape position, into the front insertion slot. During this phase the motor continues to turn forcing the paper against the brush.

7. Press the “Station 2” button. Wait for the sheet feed and expulsion movement to be completed. If no failure is detected, after the expulsion of the sheet of paper the console LEDs will remain off; the reloading of an A4 sheet of paper will allow you to print the values read and selected for each single photo sensor.

If calibration does not end successfully, the faulty photo sensor is identified through specific LED configurations. Pressing one of the console buttons allows you to identify any other faulty photo sensor. In this case, the other calibrations or measurements may not be performed. If, instead, calibration was successful, load an A4 sheet of paper in order to print the calibration values. The following table indicates the parameters that need to be checked.



Photosensor	1 No paper (mV.)	2 Paper (mV.)	Aver. value (mV.)	Current (mV.)
Photos. 1, front paper alignment	XXXX	XXXX	XXXX	XX
Photos. 2, front paper alignment	XXXX	XXXX	XXXX	XX
Photos. 3, front paper alignment	XXXX	XXXX	XXXX	XX
Photos. 4, front paper alignment	XXXX	XXXX	XXXX	XX
Photos. 1, front paper presence	XXXX	XXXX	XXXX	XX
Photos. 2, front paper presence	XXXX	XXXX	XXXX	XX
Rear paper detection photos.	0	0	0	0
Paper edge printhead photos.	A XXXX B	XXXX	XXXX	XX

3

Parameters to be checked

MINIMUM ACCEPTABLE VALUE 2800

VALUE \leq 1500

B - A 2000 MINIMUM ACCEPTABLE VALUE

Perform a further check by inserting a form at the two sides and center of the insertion slot and with its shortest side parallel to the axis of the photo sensors. Check for correct operation.

Note: The parameters indicated above are useful indications to determine in which operating segment the PB2 is positioned as far as document acceptance is concerned.

3.2.2 Adjusting Alignment For Bidirectional Printing

Two-way printing is faster than when printing in one direction only, but may result in the lines printed in one direction not being aligned with those printed in the opposite direction.

This failing may be eliminated by way of appropriate setting (from the operator console).

It is recommended that this be done by qualified personnel.

Printing alignment setting is described in detail in the printer's Technical Service Manual.

Alignment calibration corrects any bi-directional printing misalignment possibly caused by the printer's mechanical tolerances. Bi-directional printing alignment can be optimized by means of a calibration procedure which must be performed for each of the following print modes:

-Very High Speed Draft	10 cpi
-High Speed Draft	10 cpi
-Draft	10 cpi
-Draft	12 cpi
-Draft	15 cpi
-Near Letter Quality	10 cpi
-Near Letter Quality	12 cpi
-Letter Quality	10 cpi
-Near Letter Quality Condensed	

Each print mode has two types of calibration. One type of calibration is for the printing of lines without tabulation stops and the other is for the printing of lines with tabulation stops. For this reason two specific texts will be printed, one for each print mode to be calibrated.

Proceed as follows to calibrate the alignments:

1. Power on the printer with its cover open and while holding down the three console buttons.
2. Wait for the audible signal indicating that the printer has switched to the calibration mode and then close the printer cover.
3. Press the Station 1 button.
4. Press the Station 2 button.
5. The three console buttons are now active. The "Station 1" button activates printing ahead of time while "Station 2" delays printing.
6. Pressing the Station 1 and Station 2 buttons before step 5 stores approximate default values, very close to the correct ones, for all the print modes.
7. Insert an A4 sheet of paper into the front feed slot to check the print alignment status.
8. Press "Station 1" and/or "Station 2" to calibrate the alignments.
9. Repeat steps 7 and 8 cyclically until the calibrations are completed.
10. Press the "Local" button twice to permanently store the alignment setting for the current print mode and to automatically switch to the next adjustment.

Calibration ends when all the print modes are completed or by simultaneously pressing all three console buttons. In both cases the printer will switch to the main menu.

3.2.3 Adjusting Top Edge

This feature is used to adjust the space between the top physical edge of paper and the bottom edge of character at the most first printable line.

If PR40+ emulation is selected, modified top edge will be valid only when “emulate PR40 top edge = [no]” which is set in SETUP menu. (For OKI and EPSON emulation, this method is not active. This should be changed via SETUP menu).

Proceed as follows to perform this calibration:

1. Power on the printer with its cover open and while holding down the three buttons on the console.
2. Wait for the audible signal indicating that the printer has switched into the calibration and adjustment procedures.
3. Press the Local button and then wait for the printer to complete its reset.
4. Press the Station 1 button; the three console buttons are now active. By pressing Station 1 you can reduce the TOF while by pressing Station 2 you can increase it.
5. Insert an A4 sheet of paper into the front feed slot to check the status of the current TOF. This check is made by printing a specific test. If the current TOF value is too high, printing may occur off the sheet of paper.
6. Press "Station 1" and/or "Station 2" to decrease or increase the TOF.
7. Repeat points 6 and 7 cyclically until the calibrations are complete.
8. Press "Local" twice to permanently store the TOF and to automatically move on to the next calibration.

3.2.4 Adjusting Left Margin

This feature is used to adjust the space between the left physical edge of paper and the most left printable character.

Proceed as follows to perform this calibration:

1. Power on the printer with its cover open and while holding down the three buttons on the console.
2. Wait for an audible signal to indicate that the printer has switched to the calibration and adjustment mode.
3. Press Local and wait for the machine to complete its reset.
4. Press Station 2.
5. Press the Station 1 button until hearing a prolonged dual-tone signal (different from the previous).
6. Insert an A4 sheet of paper and wait for the printed page. Check that the left margin has the required measurement.

7. The minimum distance between the left edge of the document and the beginning of the character must be a maximum of 0.5 mm with console calibration completely to the left. If this condition is not met, recalibrate the photo sensor.
8. Check according to the requirements of step 6.
9. By pressing Station 2, move the left margin rightward until reaching 6.95 ± 0.55 mm.
10. Press Local twice.

3.2.5 Detecting Page Length

This feature is used to define the length of page, and makes quick process against those passbook with magnetic strip.

Positioning magnetic strip is executed by according to the parameters preset via SETUP. This is to avoid repeatedly measuring the length every time when insert passbook. (This assumes the process for identical type of passbook is same).

Proceed as follows to make this calibration:

1. Power on the printer with its cover open and while holding down the three buttons on the console.
2. Wait for the audible signal indicating that the printer has switched into the calibration and adjustment mode.
3. Press the Local button and wait for the completion of machine reset.
4. Insert an A4 sheet of paper into the front insertion slot and then press Station 1. The sheet will be inserted and expelled automatically.
5. If necessary, repeat step 5.
6. Press Local twice to permanently store the form length value measured and to automatically switch to the next calibration.

Section 4 - Maintenance And Problem Solving

4.1 Maintenance

What PB2 needs user to maintain is simply to keep replacing ribbon and cleaning regularly. Printer possesses its life time similar to host system. However operating the printer should follow the instructions as described in operating guide, especially on how to properly manage paper and assign job loading.

4.1.1 Keeping Clean

In order to keep the printer in good working condition, it needs cleaning frequently. Cleaning the printer needs a small dust cleaner and a piece of soft cloth. Special attention should pay on dust which might adhere around printer head, printer head sensor and print bar. Especially the small platform at most left hand side of print bar which is used for repositioning.

Caution :

Power off the printer before doing cleaning job.

Do not use any alcohol, solvent or hard-hair brush. Do not let water or other kind of liquid pour inside printer.

4.1.2 Replacing Ribbon Cartridge

When there is any intermittent missing characters or the print quality goes dim (or higher failure rate on reading print out by photo-optical reader), it is the time to replace a new ribbon.

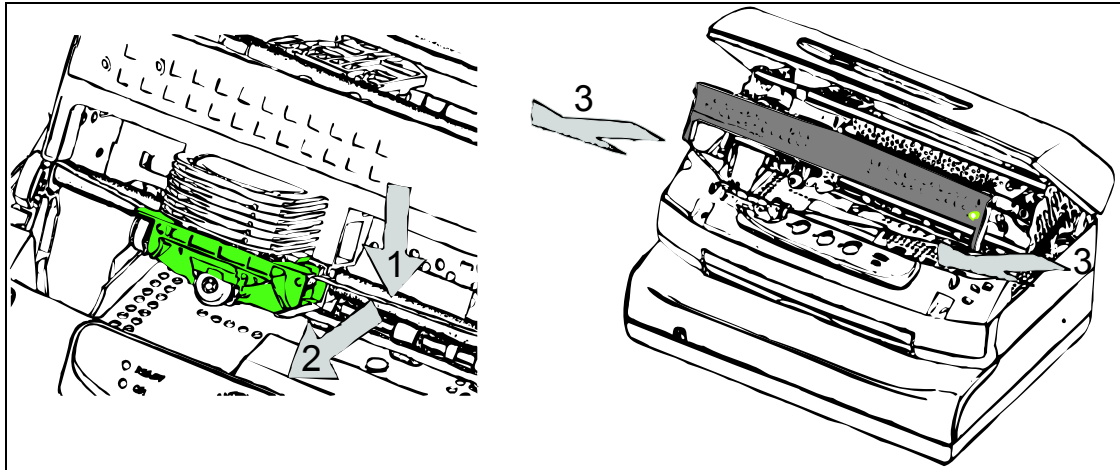
Replacing ribbon is a simple work and the detailed procedure are described in Clauses 1.5 “Installation of ribbon cartridge” of Section 1 “Installation”.

There is no need to switch off the printer while replacing ribbon. Upon opening the top cover, printer head will automatically move itself at centre part to make the replacing work easier.

Printer head also can be moved to the centre part manually when the printer is off.

Procedure of replacing work is as follows:

1. Open the top cover and printer will stop operating.
2. Jack up the printer head mechanical part by using the lever.
3. Press the ribbon clip downward to release it from the printer head.
4. Take out the ribbon cartridge.
5. Take out a new ribbon cartridge from its packing and release its protection clip.
6. Insert the cartridge onto the driving gear and ensure its two sides to be locked with the frame.
7. Push the hooks of cartridge upward to ensure it locks with its associated slot firmly. (Until a “click” sound is heard).
8. Turn the button at the cartridge anti-clockwise to tighten the ribbon.



(Fig. 4.1-1 Replacing ribbon cartridge)

9. Pull out the plastic guide.
10. Lower the printer head and ribbon cartridge by using the lever.
11. Close the top cover.

Caution :

1. **Ribbon is made of nylon and is in a form of loop shape. It must be replaced when the printing quality degrades.**
2. **Please carefully check the tension between the printer head and ribbon cartridge.**

4.2 Problem Finding And Solution

By referring to some examples, this section will give some hints which could help user resolve some possible problems when using the printer.

Do not attempt to resolve any problems relating to mechanical or electrical faults.

Please call your sales distributor or seek help from relevant customer service centre to avoid the situation going further worse.

Please contact the relevant customer service centre if the problem you have encountered can be found neither in the following table nor in the service manual.

Whenever there is any problem with operating the printer, try to locate the problem as described in the following paragraph. The related root cause and its solution are as follows:

4.2.1 No Mechanical Action

- Get no power connected (all LEDs do not light up)
- Check to see if the power cord is properly connected with power source.

4.2.2 Initialization Incomplete

When switching in the printer, the printer head does not go to the most right hand side, and the initialization is found incomplete :

- Check to see whether the protection materials for transportation are moved or not.
- Check to see if any obstacles to mechanical movements.
- Refer to “front panel diagnostic test” (4.2.7)
- Check if the top cover is proper closed.
- Power on the printer again to see if the problem is corrected.

4.2.3 Operation Test Not Working

- Check if the top cover is proper closed.
- Try to power on the printer while keep pressing STATION2 key until mechanical actions are complete.
- Check if the mechanical parts of printer head are functioning properly.
- Check if ribbon cartridge is installed properly.

4.2.4 Problem With Ribbon Cartridge

Please use SNUG CART supplied by CITIC.

4.2.4.1 Difficulty In Ribbon Installation

- Check if any obstacles with the ribbon cartridge.
- Do not forcibly install the cartridge. Take the cartridge out and careful try again the steps.

4.2.4.2 Only Portion Of Characters Printed

- Ribbon cartridge is improperly installed. Unload the cartridge and try to install again.
- The cartridge is defective which needs to be replaced.

4.2.5 Problem With Paper

4.2.5.1 Not Accepting Paper

- Check to see if the paper, in use, its size and weight are consistent with requirement.
- Check if the paper is properly aligned and inserted.

4.2.5.2 Paper Jam Or Torn

- There might be obstacles to the paper path.
- Paper might be skew or too thick.
- Inferior paper quality, curl up or irregular.
- Multiply-copy paper is not properly adhered.
- Paper might be too thick, too thin or too many plies.

- Paper in use might be incorporated with fibre or other paper. Please use paper with quality and specification as described in Section 5 “Document specification”.

4.2.6 Problem With Printing

This printer equips with circuitry for printer head over heat protection. In the case the circuitry is activated, printing speed will slow down or even interrupt for a while until the temperature of printer head resumes to normal.

4.2.6.1 Not Printing

- Check if the top cover is properly closed.
- Check if the printer is both physically and logically connected with host system. There is, at least, one LED lighted up. Ribbon Cartridge should be properly installed.
- Check if the printer is online status (READY LED lights up), and connects with host system.

4.2.6.2 Printing Interrupted

- Ribbon is snapped.
- Ribbon cartridge is loosened due to improper installation.

4.2.6.3 Vague Characters

- Ribbon belt twisted up or improperly installed.

4.2.6.4 Flaw In Printing

- When printing Arabic characters, if there is a horizontal blank line then it might be caused by at least one broken or bended pin. Broken or bended pin might result from printing on paper edge. In such a case, please contact customer service centre for replacing damaged printer head.
- Avoid printing on paper edge.

4.2.7 Front Panel Diagnostic Test

The printer will beep if it encounters problem during power on self-test. Combination of LEDs will light up corresponding to the assembly which has fault.

Following table lists relationship between combination of LEDs and associated faults : When the problem relates to the electronics board or it cannot be resolved by user, please contact customer service centre for assistance.

LEDs	Defective assembly
READY, LOCAL, STATION1, STATION2	Main board

READY, LOCAL	Other assembly (*)
--------------	--------------------

(*) In this circumstance, certain LED(s) might flash when pressing LOCAL key. The combination of flashing LEDs will indicate where is the fault.

Following table shows the combination :

Flashing LEDs	Cause
STATION2	Top cover is open
LOCAL	Paper jam
READY, STATION1	Paper jam at insertion platform
READY, STATION1, STATION2	Paper jam inside printer

When there is an error, data inside printer buffer will lose if the printer is powered off. When there is paper jam, simply take out the paper without switching off the printer and the printer will continue to working after pressing STATION2.

4.2.8 Paper Jam

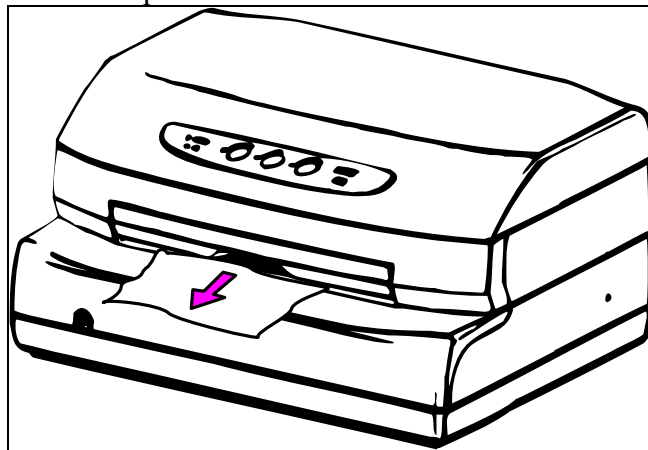
When printer ejects paper, there might be obstacles, such as another piece of paper, at its path.

4.2.8.1 Cause Of Paper Jam

- Obstacles at the paper's moving path, such as other small piece of paper.
- Improperly inserting paper.
- Paper is too thin and fails to meet specification.
- Inferior quality, curl, or irregular of paper in use.
- Paper in use might be incorporated with fibre or other paper. This might seriously
- Multiply copy of paper adhered irregularly.

4.2.8.2 Possible Locations Of Paper Jam And Related Solutions

- A. Front side of insertion platform
 - B. Central part of printer
 - C. Rear side of printer
- A. Front side of insertion platform



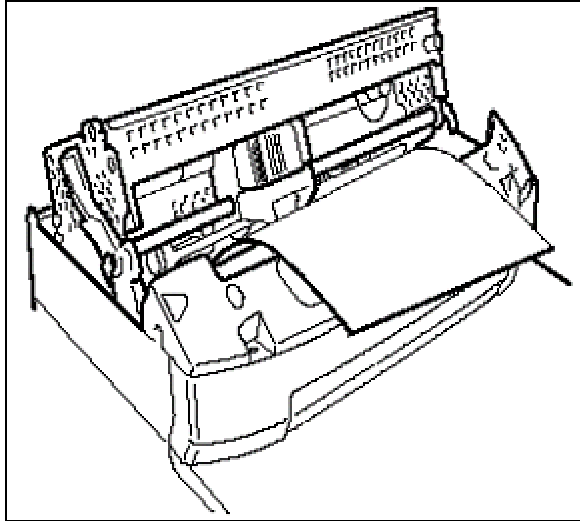
(Fig 4.3-1 Gently pulling out the jammed paper)

At the front side, gently pull the jammed paper outward without tearing off it.

B. Central part of printer

Procedure for taking out the jammed paper from central part of printer is as follows:

1. Completely open the printer covers without switching off the printer.

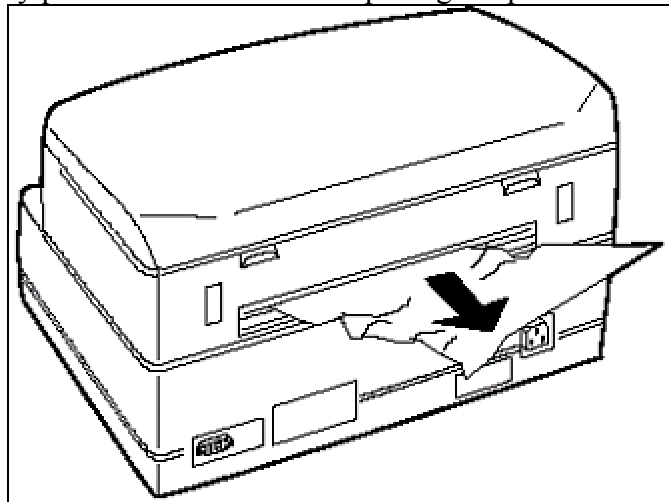


(Fig 4.2.-2 Taking out the jammed paper inside printer)

2. Lift up the printer head mechanism by using the lever.
3. Gently pull out the paper.

C. Rear side of printer

If the paper is jammed at rear side of the printer, to avoid damage on the paper it can be gently pulled outward without opening the printer's cover.



(Fig 4.2-3 Taking out jammed paper at rear side of printer)

4.2.8.3 Solution For Fatal Paper Jam

When attempt to pull out a paper which has jammed at the front side of printer, the attempt is failed because paper is easily being torn. Sometimes there is a small piece

of paper left inside the path when a paper is moving in or out, and this small piece of paper is difficult to be taken out. In such a circumstance, do not try to use any sharp metallic tool to hollow in order not to damage the printer.

Such a kind of problem can be resolved by following method :

1. Switch off the printer.
2. Open its top cover and lift up the printer head mechanism by using lever.
3. Switch on the printer while pressing STATION1 key. Buzzer will beep twice. Meanwhile STATION1 and STATION2 will flash continuously.
4. Press STATION1 once to move the jammed paper a step ahead. Keep pressing STATION1 then will continuously move the jammed paper out (towards rear side of printer). Vice versa, press STATION2 once to move the jammed paper a step backward (towards the front side of printer). Keep pressing STATION2 then will continuously move the jammed paper out.
5. If the above steps fail to eject the jammed paper, a thick paper (such as a card) in a similar or small size of A4 can be used. Same aforementioned procedure of using STATION1 key should be carried out again. This is expected to push the jammed paper out by this thick paper.
6. Switch off the printer when the jammed paper is out. Lower down the printer head mechanism by the lever and close its cover.

In a such a case, if the attempt of using all above steps fails to fix the problem then please contact the customer service centre.

Section 5 - Technical Reference

5.1 Technical Characteristics

Printer head

Technology	Dot matrix
Pin	24
Diameter of pin	0.20mm
Heat protection method	PTC
Printer head life time	> 400 Million dot (pin)

Ribbon

Ink type	1056
Ribbon belt	Black weave
Belt length	15 Meter
Ribbon life time	3.5 Million characters
Rolling type	Auto or manual (power off)

Physical parameter

Dimension	384mm(W) x 280mm(D) x 199mm(H)
Weight	9.5 Kg (standard model) 10.5 Kg (standard model + Horizontal magnetic reader)

Electrical parameter

Voltage & Frequency	220V ($\pm 15\%$), 50Hz ($\pm 1\text{Hz}$) 110V ($\pm 15\%$), 60Hz ($\pm 1\text{Hz}$)
Power consumption	Standby : 12W Printing: 170W (max)

Environment

Temperature	5°C ~ 35°C
Humidity	15% ~ 85%
Noise level	< 54dB

Quality indicator

Reliability	MTBF $\geq 10,000$ hours
EMC	Comply with FCC class B

Safety

CCC
In Compliance with CB scheme

5.2 Port And Pin Assignment

5.2.1 Serial Port

Basic model of PB2 provides synchronies EIA RS232C (CCITT V24) serial port with 9-pin CANNON connector for communicating with host system.

- Technical characteristics

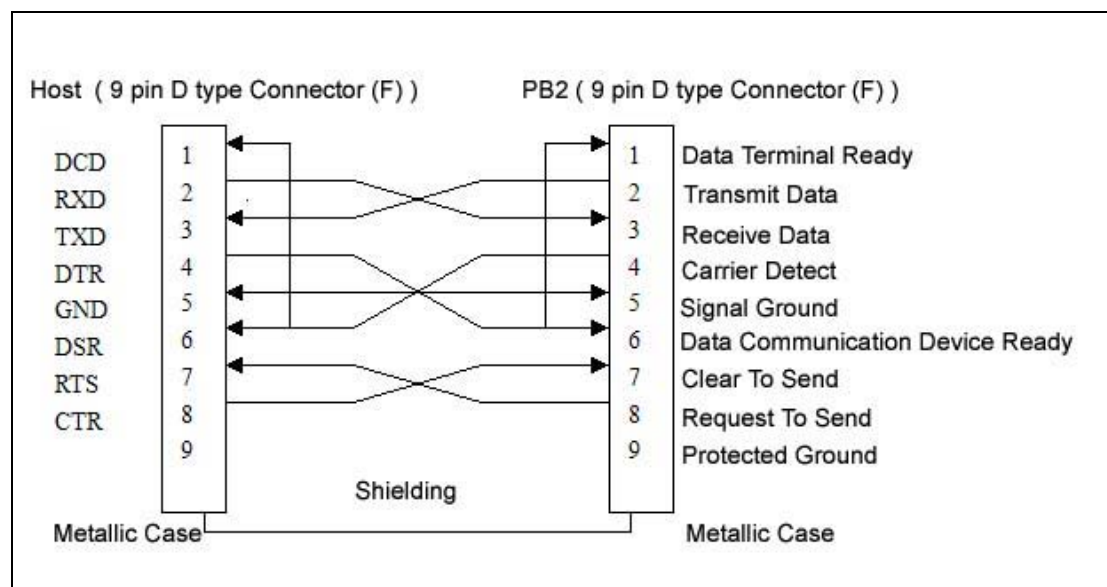
Following parameters can be revised via SETUP menu.

Baud Rate :	1200, 2400, 4800, 9600 baud (bit / second)
Bits / Char :	7 or 8 bit
Stop bit :	1 or 2 stop bit
Parity :	1 bit (none, odd, even)
DSR hand-shaking :	Yes / no
DCD hand-shaking :	Yes / no

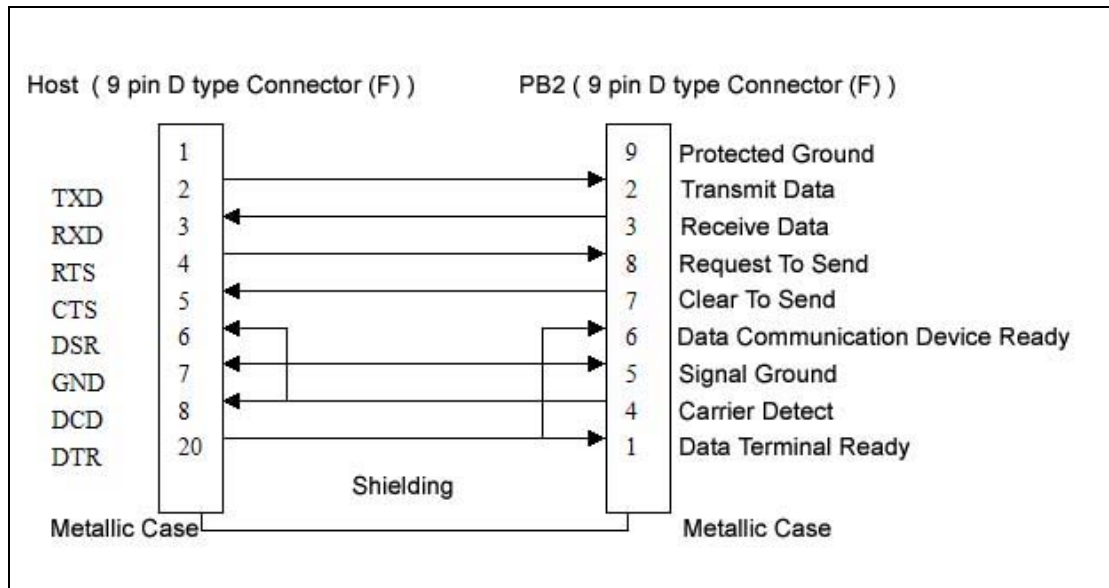
- Signal lines
(host)

CCITT V24	EIA RS232C	Symbol	Direction	Signal Name	Pin #
Signal Description	Signal Description				
101 protected ground	AA protected ground			Ground	1
103 Send data	BA send data	TxD	From PRN	T103A	2
104 Receive Data	BB Receive Data	RxD	To PRN	T104A	3
105 Request to send	CA Request to send	RTS	From PRN	T105A	4
106 Clear to send	CH Clear to send	CTS	To PRN	T106A	5
102 Signal Ground	AH Signal Ground	GND		Ground	7
107 Data Set Ready	CC Data Set Ready	DSR	To PRN	R107A	6
108/2 Data Terminal Ready	CD Data Terminal Ready	DTR	From PRN	T108A	20
109 Data Carrier Detect	CF Data Carrier Detect	DCD	To PRN		8

- Example of pin assignment



(Fig. 5.2-1 Wiring of 9-pin RS232 ports between PB2 and host)



(Fig. 5.2-2 Wiring of 25-pin RS232 ports between PB2 and host)

If the host terminal uses a port whose pin assignment is different from standard RS232 port, then please refer to the manual of the host terminal for wiring details.

5.2.2 Parallel Port

PB2 provides one Centronics IEEE1284 bi-directional parallel port. Brief description for Centronics port is as follows :

Technical Characteristics :

Compatibility :	Centronics
Logical circuitry :	TTL
Bits / Char. :	7 or 8 bit
Logical voltage level :	0-5 V
Connector :	Amphenol 36 pin (female)

All input / output signal are connected to 5 V via a pull up resistor of 2.2K Ω

Signal lines :

Pin	Direction	Description
1	To PRN	Strobe
2-9	To PRN	Data 1 – 8
10	From PRN	ACK (acknowledgement)
11	From PRN	Busy
12	From PRN	Out of paper

13	From PRN	Select
16		Signal Ground
17		Frame Ground
18	From PRN	+5V (max. current 100mA)
19-30		Signal Ground
31	To PRN	IMPRA
32	From PRN	Error
33		Logic ground
35	From PRN	+5V (max. current 100mA)

5.3 Document Specification And Technical Description

This section describes the specification and format of those documents which can be handled by the printer. Types of document can be managed are as follows :

- Single sheet or multiply copy of document
- Paper Card
- Horizontal / Vertical binding passbook

Any document, which does not belong to any type of above mentioned, should be carefully evaluated the relevant requirement of its material before using.

Document insertion	Manual
Paper edge alignment	Automatic detection and alignment
Max. thickness of document	2 mm
Max. width of document	245 mm
Max length of printing line (at 10 cpi)	238.76 mm
Standard value between printable line and physical edge of document (measure from character base)	PR2E emulation = 4.23mm PR40 emulation = 7.4mm IBM PP II emulation = 4.23mm
Minimum distance between the last printable base line on cover page of passbook and the physical bottom edge	5mm (0.2 inch)
Minimum value of bottom edge for document (from character base)	PR2E / PR40 emulation = 3.1mm IBM PP II emulation = 10mm
Minimum value of bottom edge for passbook (from character base)	5mm
Margin value LH / RH for document (space between character edge and paper	3.0mm \pm 0.3mm

edge)

Margin value LH / RH for passbook
(space between character edge and paper edge) 3.0mm \pm 0.3mm

Minimum distance between the
horizontal binding and the base of last
printable character above the binding 5mm

Minimum distance between the
horizontal binding and the base of last
printable character below the binding 8mm

Minimum distance between the central
axis of printable character and the vertical
binding 5.08mm

Document

Specification of single sheet and multiply copy

Max. width 245mm

Min. width 65mm

Suggested max. length 297mm

Min. length 70mm

Weight g/M² (single sheet) 60-160g/ M² (when “special
document type” is set “yes”, it
supports 35g/ M² thin paper)

Thickness of single sheet 0.07-0.28mm

Original + copies (chemical) heavy
paper 40-60g/ M²

Replicable paper 20-34g/ M²

Max. copies 1+4 (even weight)

Suggested weight of paper Original 50g/ M²
Copy 60g/ M²

Adherence type for multiply
document Top or single side edge adherence

Max. weight for multiply document 240g/ M²

Printing mode Suggested to choose LQ or NLQ
mode

Horizontal binding passbook

Max. expansion width	241.3mm
Min. expansion width	110mm (4.3 inches)
Max. expansion length	220mm
Min. expansion length	165mm
Suggested value :	
Max. expansion thickness	1.8mm
Max. positioning error rate on sheet	1.2mm
Thickness of cover	0.2mm – 0.5mm
Binding type	Thread, no staple, no clip
Brand new or crease passbook	Must be flattened before inserting

Automatic document alignment feature

Application	Applicable to all type of passbook and document (exclusive to non-standard passbook)
Alignment speed	Approx. 4 second
1/6" line feed speed	Approx. 45ms
Positioning error rate of automatic alignment feature	Continuous insertion : <ul style="list-style-type: none"> ▪ Horizontal $\pm 0.25\text{mm}$ ▪ Vertical $\pm 0.25\text{mm}$ Between different machine: <ul style="list-style-type: none"> ▪ Horizontal $\pm 0.5\text{mm}$ ▪ Vertical $\pm 0.5\text{mm}$

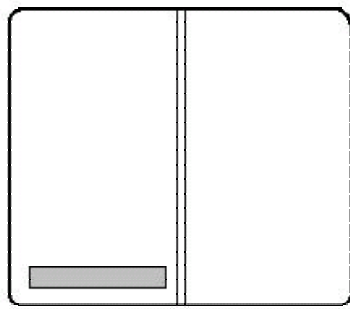
Magnetic stripe

Single sheet / multiply copy :

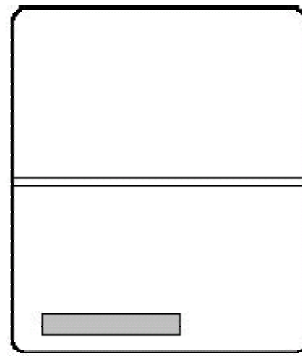
* Min. length = 70mm

* Other parameters (refer to description of single sheet / multiply copy respectively)

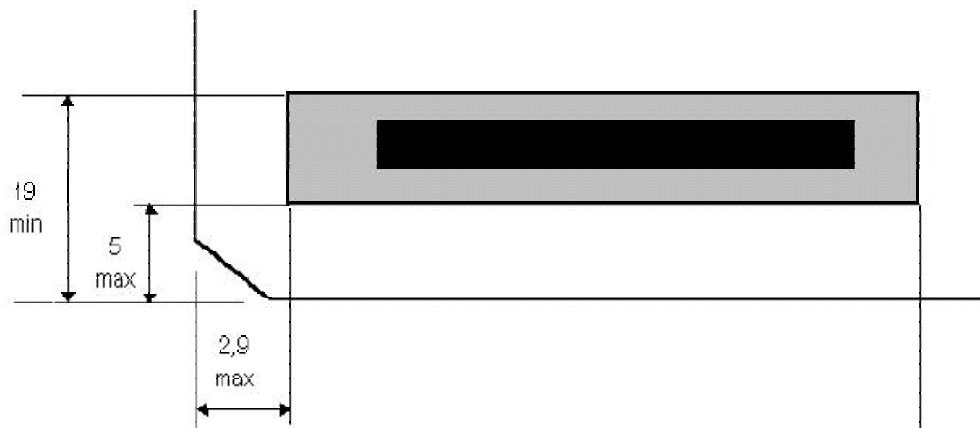
(Diagrams of passbook and magnetic stripe)



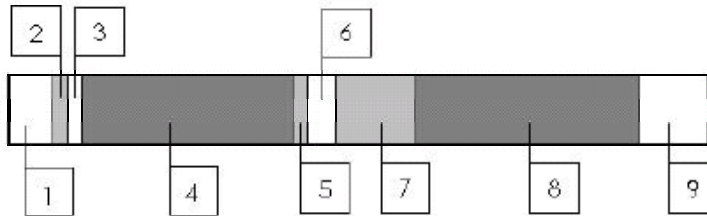
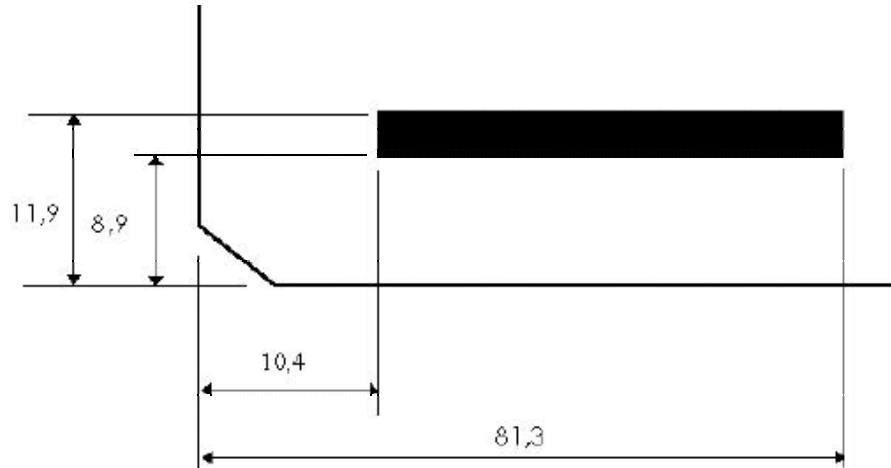
Vertical binding passbook



Horizontal binding passbook



(Format of magnetic data record)



- | | | | |
|---|------------------------------|---|----------------------------|
| 1 | 20 zero bit start characters | 6 | LRC |
| 2 | Start sentinel | 7 | 60 zero bits |
| 3 | «A» character | 8 | 2nd field: 36 characters |
| 4 | 1st field: 36 characters | 9 | 20 zero bit end characters |
| 5 | End sentinel | | |

5.4 Horizontal Magnetic Read / Write Device (Optional)

The magnetic stripe device (optional) is applicable for data reading from and writing to the magnetic stripe on passbook. Its detail specification is as follows :

Coding :

- BCD code
- 4 data bits
- 1 VRC parity control bit

Recordable character :

The column 3 of ASCII table

Record type :

Symmetrical cell frequency duplication
(STD ISO 3554)

Writing current :

20mA P.P.

Write track width :

6mm

Read track width :

2mm

Starting position for reading :

5mm (from most left physical edge)

Read / write speed :

0.34 Meter / second

Displacement :	<ul style="list-style-type: none"> ▪ Standard ▪ Standard + 10mm ▪ Standard + 20mm
Number of Retry :	1 ~ 3
Field duplication :	Yes / no
Error rate :	< 1/10000 reads

Work flow for horizontal magnetic read / write device (optional)

A brief description for operating this optional device is as follows :

1. Insert passbook
2. The printer will measure the position of magnetic stripe. (Passbook will be automatically aligned after insertion).
3. Printer will be ready to read magnetic data after positioning.
4. Read the magnetic stripe (the process is taken place during passbook is ejected).
5. Position for printing (passbook needs to position for printing first).
6. Position for recording magnetic track.
7. Record magnetic track and verify.
8. Eject passbook from printer.

DIN / ISO32744 Standard

Density :	210 bits / inch $\pm 5\%$
Preamble :	20 “0” bits
Postamble :	At least 20 bit “0”. If there is no data, “0”s will be added between 9.5 – 85mm starting from the left edge.
Starting point :	9.5mm (from most left edge)
Write track width :	3mm (STD); 6mm (PB2)
Recordable characters :	0-9, “A”, “B”, “C” and “E”
Starting sentinel (SOM) :	“D”
Ending sentinel (EOM) :	“F”
Max. number of recordable data :	Max. 45 chars. for field duplication. The two fields are identical and separated by 60 bits at zero.
Distance between track central axis :	13.9mm (from bottom edge of passbook)
Max. capacity :	Max. 108 char. (inclusive control codes and separators).

IBM3604 Standard

Density :	210 bits / inch $\pm 5\%$
Preamble :	20 bit “0”
Postamble :	At least 20 bit “0”. If there is no data, “0”s will be added between 10.4 – 81.3mm starting from the left edge.
Starting point :	10.4mm (from most left edge)
Recordable characters :	0-9, “A”, “D” and “E”
Starting sentinel (SOM) :	“B”
Ending sentinel (EOM) :	“F” or “C”
Vertical verification (LCR) :	At the end sentinel
Max. number of recordable data :	Max. 45 chars. for field duplication. The two fields are identical and separated by 120 bits at zero.
Distance between track central axis :	10.4mm (from bottom edge of passbook)
Max. capacity :	Max. 108 char. (inclusive control codes and separators).

ANSI Standard

Density :	210 bits / inch $\pm 5\%$
Preamble :	20 bit “0”
Postamble :	At least 20 bit “0”. If there is no data, “0”s will be added between 9.5 – 85mm starting from the left edge.
Starting point :	9.5mm (from most left edge)
Write track width :	3mm (STD); 6mm (PB2)
Recordable characters :	0-9, “A”, “C”, “D” and “E”
Starting sentinel (SOM) :	“B”
Ending sentinel (EOM) :	“F”
Max. number of recordable data :	Max. 45 chars. for field duplication. The two fields are identical and separated by 60 bits at zero.
Distance between track central axis :	13.9mm (from bottom edge of passbook)
Max. capacity :	Max. 108 char. (inclusive control codes and separators).

Cross reference table

Following table shows the relationship between ASCII codes and the three standards of DIN/ISO, IBM, ANSI.

	DIN/ISO	IBM	ANSI	DIN/ISO	IBM	ANSI	VRC	BIT 4	BIT 3	BIT 2	BIT 1
0	30	-	-	crt	crt	crt	1	0	0	0	0
1	31	-	-	crt	crt	crt	0	0	0	0	1
2	32	-	-	crt	crt	crt	0	0	0	1	0
3	33	-	-	crt	crt	crt	1	0	0	1	1
4	34	-	-	crt	crt	crt	0	0	1	0	0
5	35	-	-	crt	crt	crt	1	0	1	0	1
6	36	-	-	crt	crt	crt	1	0	1	1	0
7	37	-	-	crt	crt	crt	0	0	1	1	1
8	38	-	-	crt	crt	crt	0	1	0	0	0
9	39	-	-	crt	crt	crt	1	1	0	0	1
A	3A	-	-	crt	crt	crt	1	1	0	1	0
B	3B	"B"	3B	crt	SOM	crt	0	1	0	1	1
C	3C	"C"	3C		EOM	crt	1	1	1	0	0
D	"D"	3D	"B"	SOM	crt	SOM	0	1	1	0	1
E	3E	3E	3E	crt		crt	0	1	1	1	0
F	"F"	"F"	"F"	EOM	EOM	EOM	1	1	1	1	1

crt=character ; SOM=start of message ; EOM=end of message

5.5 Command Set

5.5.1 CITIC Olivetti Emulation Command Set

CITIC Olivetti emulation command set collects commands for emulations of PR2E and PR40. Some of these command are in common. In the column of "Applicable Range" where describes each command and its application to emulations. Certain commands might apply to same applicable range but with different meaning.

5.5.1.1 Commands Dedicated To Chinese Mode

Command	Description	Applicable Range
FS &	Combined characters mode	PR2 、PR54+ 、PR40+
FS .	Cancel Chinese mode	PR2 、PR54+ 、PR40+
FS K	Set double byte char. case ASCII code	PR2 、PR54+ 、PR40+
FS g	Cancel double byte char. case ASCII code	PR2 、PR54+ 、PR40+

5.5.1.2 Control Command

Command	Description	Applicable Range
---------	-------------	------------------

ESC Q nnn ESC Z	Define document length	PR2 、PR54+ 、PR40+
ESC J nnn	Define left margin	PR2 、PR54+ 、PR40+
ESC T nnn	Define top of form (TOF)	PR2 、PR54+ 、PR40+
ESC M nnn	Define bottom of form (BOF)	PR2 、PR54+ 、PR40+
ESC & nnn	Elementary vertical spacing	PR2 、PR54+ 、PR40+

5.5.1.3 Pitch Command

Command	Description	Applicable Range
ESC <	Print pitch 10 cpi	PR2E 、PR40+
ESC =	Print pitch 12 cpi	PR2E 、PR40+
ESC >	Print pitch 16.6 cpi	PR2E 、PR40+
ESC a n	Print pitch	PR2E
ESC ?	Set to proportional spacing	PR2E 、PR40+

5.5.1.4 Attribute Command

Command	Description	Applicable Range
ESC R nnn	Select graphic font	PR2E 、PR40+
ESC 3	Double width	PR2E 、PR40+
ESC 4	Cancel double width	PR2E 、PR40+
FS h	Triple width	PR2 、PR54+ 、PR40+
FS j	Clear triple width	PR2E 、PR40+
ESC d	Double height and double width	PR2E 、PR40+
ESC e	Cancel double height double width	PR2E 、PR40+
ESC w n	Set / cancel double height	PR2E 、PR40+
ESC ! SP nnn	Add columns to the right of the character	PR2E
FS S nn	Adjustable character spacing	PR2E 、PR40+
ESC (Bold face	PR2 、PR54+ 、PR40+
ESC)	Cancel bold face	PR2E 、PR40+
FS (n	Set / Cancel background printing	PR2E 、PR40+
ESC * x	Underline	PR2E 、PR40+

ESC +	Cancel underline	PR2E 、 PR40+
ESC ` n	Superscript - Subscript	PR2E 、 PR40+
ESC {	Cancel Superscript - Subscript	PR2E 、 PR40+
Esc } g n1 n2	Expanded character (n1- vertical, n2 - horizontal)	PR2E
FS J n	Set rotation	PR2E 、 PR40+
FS K	Cancel rotation	PR2E 、 PR40+
FS ! n	Set / Cancel outline printing	PR2E 、 PR40+
FS [T n	Set / Cancel special paper printing	PR2 、 PR54+ 、 PR40+

5.5.1.5 Operation Command

Command	Description	Applicable Range
ESC S 5	Select printer device	PR2E 、 PR40+
ESC S 1	Select journal printer	PR2E 、 PR40+
LF	Line feed forward	PR2E 、 PR40+
FF	Form feed (ejection from rear side)	PR2E 、 PR40+
CR	Carriage return	PR2E 、 PR40+
ESC 7	Line feed back	PR2E 、 PR40+
ESC H nnn	Absolute horizontal position	PR2E 、 PR40+
ESC I nnn	Relative horizontal position	PR2E 、 PR40+
ESC L nnn	Absolute vertical position	PR2E 、 PR40+
ESC O	Eject document	PR2E 、 PR40+
ESC ^ 0	Switch to IBM emulation	PR2E 、 PR40+
ESC ^ 1	Switch to OKI emulation	PR2E 、 PR40+
ESC ^ 2	Switch to EPSON emulation	PR2E
ESC [nnn	Select character set	PR2 、 PR54+ 、 PR40+
BEL	Bell	PR2E 、 PR40+
DEL	Clear print memory	PR2E 、 PR40+

5.5.1.6 Graphic Mode Command

Command	Description	Applicable Range
ESC l p mmmm nnn	Set to B.I.M. printing mode (PR54+ at 24 pin, PR40+ at 8 pin)	PR2E 、 PR40+

ESC 2	Reset B.I.M. printing mode	PR2E 、PR40+
ESC X nnn	Set relative horizontal position	PR2E 、PR40+
ESC ! G n	Control command for pins	PR2E

5.5.1.7 User Define Down Line Loading Fonts Command

Command	Description	Applicable Range
ESC h 0 n m d0 d1 d2 D1 D2 ... Dm	User define down line loading fonts	PR2E 、PR40+
ESC h 0 n m d1 d2 d3 ... d72	User define down line loading fonts for Chinese characters or symbols	PR2E 、PR40+
ESC : 000	Copy character sets to RAM	PR2E 、PR40+
ESC m n 0	Select ROM/RAM content	PR2E 、PR40+

5.5.1.8 Control Command

Command	Description	Applicable Range
ESC Z	Request for primary ID	PR2E 、PR40+
ESC //	Printer ID	PR2E
ESC / 7	Printer ID	PR2E
ESC i	Request for basic machine configuration	PR2E 、PR40+
ESC p x y z k	Printer configuration	PR2E 、PR40+
ESC j	Request printer status	PR2E 、PR40+
ESC r x	Synchronous basic machine status	PR2E 、PR40+
ESC SP B	Request for document status	PR2E
ESC B id m ESC Z	Synchronous document status	PR2E
ESC SP b	Request for FW release ID	PR2E
ESC.b idrel.1;idver.1;... drel.n;idver.n ESC Z	Firmware release identity	PR2E
ESC SP a	Request for set-up configuration	PR2E
ESC a byte 1 byte 2 byte 3...byte n ESC Z	SET – UP configuration	PR2E
ESC l	Reset error	PR2E 、PR40+
ESC n	Olivetti controlled selection	PR2E 、PR40+

ESC 0	General reset	PR2E 、PR40+
ESC U n	Book operator	PR2E 、PR40+
ESC r x	Answer to book operator command	PR2E 、PR40+
ESC _	Select manual operator booking	PR2E 、PR40+
ESC .	Select automatic operator booking	PR2E 、PR40+

5.5.1.9 Magnetic Device Control Command

Command	Description	Applicable Range
ESC]	Read passbook magnetic stripe	PR2E 、PR40+
ESC t...data...GS	Data to be recorded on the magnetic stripe	PR2E 、PR40+
ESC \	Record and verify magnetic device	PR2E 、PR40+

5.5.1.9.1 BP8900IV Magnetic Device Control Command (Model M01 only)

Command	Description	Applicable Range
ESC % B	Select BP8900 IV emulation	PR2E 、PR40+
ESC % A	Cancel BP8900 IV emulation	PR2E 、PR40+
ESC]	Read magnetic stripe	PR2E 、PR40+
ESC t	Write magnetic stripe	PR2E 、PR40+
ESC j	Request printer status	PR2E 、PR40+
ESC 1	Set magnetic stripe read / write data standard	PR2E 、PR40+
ESC 2	Set magnetic stripe read / write data standard	PR2E 、PR40+
ESC 3	Set magnetic stripe read / write data standard	PR2E 、PR40+
ESC 4	Set magnetic stripe read / write data standard	PR2E 、PR40+
ESC 5	Set magnetic stripe read / write data standard	PR2E 、PR40+
ESC X	Set magnetic strip to double field	PR2E 、PR40+
ESC Y	Set magnetic strip to single field	PR2E 、PR40+
ESC 0	General reset	PR2E 、PR40+

5.5.1.10 Device Setup Command

Command	Description	Applicable Range
ESC Y E k1 k2	Set horizontal magnetic device	PR2E 、PR40+
ESC # n	Assign reference for ESC L nnn	PR2E 、PR40+

ESC A nnn	Define offset in elementary steps	PR2E 、PR40+
ESC B nnn	Define document width in elementary steps	PR2E 、PR40+
ESC ` n	Set document type	PR2E 、PR40+
ESC / m nnn	Set absolute vertical position in elementary steps	PR2E 、PR40+
ESC -	Measure document length	PR2E 、PR40+
ESC } -	Measure document width	PR2E
ESC S nnn	Measure document length or width : answer	PR2E 、PR40+

5.5.1.11 Bar Code Command

Command	Description	Applicable Range
ESC x mm; hh; zz; n ESC Z	Set bar code print	PR2E
ESC y .. dati .. ESC Z	Start bar code print	PR2E

5.5.1.12 External Device Command

Command	Description	Applicable Range
ESC } +	Form position control	PR2E
ESC } L t nnn	Passbook positioning	PR2E
ESC } M nnn	Negative bottom of form	PR2E
ESC } W	Awaiting end of print	PR2E
ESC } 0 P	Reset form parking	PR2E
ESC } p...	Image acquisition	PR2E
STX mn ..	Data transmission from image reader	PR2E

5.5.1.13 Logotype Management Command

Command	Description	Applicable Range
ESC } e ..	Store logotype	PR2E
ESC } f ..	Print logotype	PR2E
ESC } E ..	Reply to store logotype request	PR2E
ESC } h	Request for identifiers of the stored logotypes	PR2E
ESC } H ..	Reply to the request for the stored logotypes	PR2E
ESC } l ..	Cancel stored logotype	PR2E

ESC } L ..	Reply to the request for the cancellation of the stored logotype	PR2E
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5.5.1.14 Gestione Marker

Command	Description	Applicable Range
ESC } m n ..	Read marker command	PR2E
ESC } m ..	Reply to read marker command	PR2E

5.5.2 CITIC IBM Emulation Command Set

Basic Operation Command

Command	Description
BS	Back space
HT	Horizontal tabulation
LF	Line feed
VT	Vertical tabulation
FF	Form feed
CR	Carriage return

5.5.2.1 Margin Control Command

Command	Description
ESC X n1 n2	Left and right margin
ESC C n	Form length as no. of lines
ESC C NUL n	Form length in inches
ESC 4	Top of Form (TOF)
ESC N n	Bottom of form (BOF)
ESC O	Cancel bottom of form

5.5.2.2 Pitch Command

Command	Description
ESC 0	Line feed = 1/8"
ESC 1	Line feed = 7/72"
ESC 2	Line feed = 1/6" or activate ESC A n command

ESC 3 n	Line feed = $n/216''$ or $n/180''$ (for graphic)
ESC A n	Line feed = $n/72''$ or $n/60''$ (for graphic)
ESC J n	One line feed of $n/216''$ or $n/180''$ (for graphic)

5.5.2.3 Pitch Control Command

Command	Description
DC2	Define pitch 10 cpi (Pica)
ESC:	Define pitch 12 cpi (Elite)
SI	Define pitch 17.1 cpi (condensed)
ESC P n	Define proportional spacing

5.5.2.4 Print Modes

Command	Description
ESC G	Double-passing
ESC H	Cancel double-passing
ESC I n	Select print mode
SO	Double width (one line)
DC4	Cancel double width (one line)
ESC W n	Double width (continuous)
ESC [@ n1 n2 m1 m2 m4	Double height / width
ESC E	Bold face
ESC F	Cancel face
ESC _n	Overline
ESC -n	Underline
ESC S n	Superscript / subscript
ESC T	Cancel superscript / subscript
ESC U n	Uni/bidirectional printing

5.5.2.5 Tabulation

Command	Description
ESC D n1..nk NUI	Horizontal tabulation program
ESC B n1..nk NUI	Vertical tabulation program

ESC R	Cancel tabulation stops
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5.5.2.6 Bit Image Mode Command

Command	Description
ESC K n1 n2..data..	Normal resolution BIM
ESC L n1 n2..data..	Double and half resolution BIM
ESC Y n1 n2..data..	Double resolution BIM
ESC Z n1 n2..data..	Quadruple resolution BIM

5.5.2.7 Down Line Loading Customized Characters (DLL)

Command	Description
ESC = n1 n2 (id) m (char.)	Customized characters (DLL)

5.5.2.8 Data Control Command

Command	Description
CAN	Clear print buffer
DC1	Activate printer – host connection
DC3	Deactivate printer – host connection
ESC Q n	Deactivate printer – host connection
ESC 5 n	Automatic line feed after CR
ESC 6	Table 2 of character set
ESC 7	Table 1 of character set
ESC \n1 n2	Print characters from table 3
ESC ^	Print a character from table 3

5.5.2.9 Others Control Command

Command	Description
NUL	NULL
BEL	Buzzer
SP	Space
ESC BEL E BS	Select OLIVETTI emulation
ESC BEL E HT	Select OKI emulation
ESC BEL>O n	Select bottom of form (BOF)

Command	Description
ESC n	Document type
FS &	Set GB (Simplified Chinese) mode
FS I	Set IBM 5550 mode
FS .	Set ASCII mode
FS 2 n1 n2 d1...d72	User define down line loading fonts for Chinese characters or symbols
FS t n	Select Chinese character fonts
FS J n	Set rotation
FS K	Cancel rotation
FS h	Set triple width
FS j	Cancel triple width
ESC [A n1 n2 m1 m2 m3 m4	Triple width / height printing
FS ! n	Cancel / Set outline printing
FS (n	Cancel / Set reverse printing
FS B n	Background printing
FS S n1 n2	Set spacing for Chinese characters
ESC K n	Select Chinese Character fonts and BIM
ESC d Ln Hn	Relative forward horizontal movement
ESC]	Reverse line feed
ESC [d SOH NUL n	Set printing quality
ESC [g Ln Hn mode data	Set graphic mode
ESC [I STX NUL Hf Lf	Set spacing for English characters
ESC [-STX NUL loc type	Set underline
ESC * m n1 n2...data...	Set AGM graphic mode

5.5.3 CITIC OKI Emulation Command Set

5.5.3.1 Hardware Control Command

Command	Description
DC1	Device control 1
DC3	Device control 3
CAN	Clear print buffer
ESC b	Confirm operation completed

ESC k	Set SHIFT JIS mode
ESC l	Cancel SHIFT JIS mode

5.5.3.2 Vertical Spacing Control

Command	Description
LF	Line feed
ESC 6	Set line space to 1/6"
ESC 8	Set line space to 1/8"
ESC % 9 n1 n2	Set line space to n/120"
ESC VT n1 n2	Feed forward no. of lines
ESC % 5 n	Feed forward length of n/120"
ESC F n1 n2	Set page length
ESC 5	Define top of form (TOF)
FF	Form feed
ESC G n1 n2	Set form feed length
DC4	Set vertical Tab
VT	Move to vertical Tab

5.5.3.3 Horizontal Spacing Control

Command	Description
CR	Carriage return
ESC % 4 n1 n2	Position head to left
BS	Back space
ESC % 6 n1 n2	Set carriage return position
ESC % 3 n1 n2	Position head to right
ESC (n1 n2	Define left margin
ESC) n1 n2	Define right margin
ESC L	Set horizontal Tab
HT	Move to horizontal Tab

5.5.3.4 Character Attribute Control Command

Command	Description
ESC N	Set Pica HS ANK char. mode

ESC H	Set Pica HD ANK char. mode
ESC B	Set Elite HS ANK char. mode
ESC E	Set Elite HD ANK char. mode
ESC % 1 n1 n2	Graphical data transfer
ESC % 2 n1 n2	Horizontal double width graphical data transfer

5.5.3.5 Printing Mode Attribute Command

Command	Description
ESC D	Set high speed mode
ESC I	Set high density mode
ESC 0	Set low noise mode
ESC X	Set underline mode
ESC Y	Cancel underline mode
ESC U	Set double width
ESC R	Cancel horizontal double width for ANK char.
CEX P	Set horizontal double width for double byte char. case
CEX q	Cancel horizontal double width for double byte char. case
ESC <	Set horizontal condensed mode
ESC >	Cancel horizontal condensed mode
ESC [Set double height
ESC]	Cancel double height
ESC e	Set triple height
ESC f	Cancel triple height
ESC g	Set triple width
ESC h	Cancel triple width
ESC I	Set double strike
ESC j	Cancel double strike
ESC % U	Set uni-directional
ESC % B	Set bi-directional
ESC m	Set double passing
ESC n	Cancel double passing

5.5.3.6 Native Character Attribute

Command	Description
ESC \$ @	Set Chinese char. mode
ESC (H	Cancel Chinese
CEX N	Set superscript
CEX O	Cancel superscript
CEX P	Set subscript
CEX Q	Cancel subscript
CEX R	Set superscript / subscript
CEX S	Cancel superscript / subscript
CEX r	Set single byte char. case
CEX s	Cancel single byte char. case
CEX 0 n1 n2	Set down line loading user defined fonts
CEX 2 n1 n2	Import user defined fonts
CEX \$ n	Set spacing between char.
CEX J	Set vertical printing for Chinese char.
CEX K	Set horizontal printing for Chinese char.
CEX -	Set synthesis for single byte char. case
CEX t	Inhibit vertical printing for single byte char.
CEX u	Cancel inhibit vertical printing for single byte char.

5.5.3.7 C. S. F. Control Code

Command	Description
ESC A	Set C.S.F. auto paper feed
ESC M	Set manual paper feed
ESC S	C.S.F. single page feed
ESC V	Output C.S.F single page feed

5.5.3.8 OKI 5530SC Additional Control Code

Command	Description
ESC T n	Set single page feed direction
DLE B	Initialization

5.5.3.9 Emulation Control

Command	Description
ESC ^ 1	Switch to OLIVETTI emulation
ESC ^ 0	Switch to IBM emulation

5.5.4 CITIC EPSON Emulation Command Set**5.5.4.1 Hardware Control Command**

Command	Description
DC1	Activate printer – host connection
DC3	Deactivate printer – host connection
CAN	Clear buffer

5.5.4.2 Vertical Spacing Command

Command	Description
VT	Vertical tabulation
LF	Line feed
FF	Form feed
ESC J n	Carrying out n/180” forward line feed
ESC j n	Carrying out n/180” backward line feed

5.5.4.3 Vertical Spacing Command

Command	Description
BS	Back space
HT	Horizontal tabulation
CR	Carriage return
ESC c nl n2	Set spacing between char.
ESC \$ nl n2	Horizontal positioning (absolute)

5.5.4.4 Character Attribute Control Command

Command	Description
SO	Double width (one line)
SI	Set horizontal compressed / single byte char. case

DC2	Cancel horizontal compressed / single byte char. case
DC4	Cancel double width (one line)
ESC SO	Double width (one line)
ESC SI	Set horizontal compressed / single byte char. case
ESC EM	Automatic single sheet feeding on / off
ESC SP	Character spacing
ESC !	Combined print mode
ESC % n	Customized characters (DLL) on / off
ESC & n m...	User defined ASCII char. set
ESC (Trellis background
ESC * m nl nh d1...dk	General graphic mode
ESC + n	Line feed = $n/360''$
ESC - n	Underline on / off
ESC 0	Line feed = $1/8''$
ESC 2	Line feed = $1/6''$
ESC 3 n	Line feed = $n/180''$
ESC 4	Italic printing on
ESC 5	Italic printing off
ESC:0 n m	Copy ROM char. set
ESC <	Set head to home position
ESC @	Initialization
ESC A n	Line feed = $n/60''$
ESC B n1 n2...nk 00	Vertical tabulation program
ESC C n	Form length as no. lines
ESC C 0 n	Form length in inches
ESC D n1 n2...nk 00	Horizontal tabulation program
ESC E	Bold face
ESC F	Cancel bold face
ESC G	Double-passing printing
ESC H	Cancel double-passing printing
ESC K nl nh d1...dk	Normal resolution BIM (8 pin)
ESC L nl nh d1...dk	Double resolution BIM (8 pin)
ESC M	12 cpi (Elite)

ESC N n	Bottom of form
ESC O	Cancel bottom of form
ESC P	10 cpi (Pica)
ESC Q n	Determine right margin
ESC S n	Superscript / subscript
ESC T	Cancel superscript / subscript
ESC U n	Uni / bidirectional printing
ESC W n	Set / Cancel double width
ESC Y nl nh d1..dk	Double resolution BIM (8 pin)
ESC Z nl nh d1..dk	Quadruple resolution BIM (8 pin)
ESC \ nl nh	Horizontal positioning (relative)
ESC b	Vertical tabs for any channel
ESC g	15 cpi
ESC k n	Select LQ type font
ESC l n	Define left margin
ESC p n	Proportional spacing
ESC q n	Select style
ESC t n	Select the character set
ESC w n	Double height printing on / off
ESC x n	Select draft / LQ print quality
ESC n	Select emulation
FS SO	Set double width (one line)
FS SI	Set horizontal compressed mode / single byte char. case
FS DC2	Set horizontal compressed mode / single byte char. case
FS DC4	Cancel double width (one line)
FS ! n	Set combined char. mode
FS &	Set Chinese char. mode
FS - n	Set / cancel over/underline
FS .	Set ASCII model
FS D	Vertically printing two Chinese char. in single byte char. case
FS J	Vertical printing
FS K	Horizontal printing

FS S n1 n2	Set clear to Chinese char. in double byte char. case
FS T n1 n2	Set clear to Chinese char. in single byte char. case
FS U	Set single byte char case complement to double byte char. case
FS V	Cancel single byte char case complement to double byte char. case
FS W n	Set / cancel double width double height
FS r	Set superscript / subscript
FS v n	Set / cancel tabulation
FS x n	Set / cancel high speed printing

5.5.4.5 Other Control Command

Command	Description
BEL	Buzzer

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[End of this manual]