Basic Purpose Printer
LB20

digital

User's Guide

Part number: EK-LB20A-UG.001

ACKNOWLEDGMENT
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Part number: EK-LB20A-UG.001

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1 INTRODUCTION

The LB20 Printer is delivered as one of the following:

- 9 pin dot matrix **Serial** printer (Model: LB20A-AA)

  OR

- 9 pin dot matrix **Parallel** printer (Model: LB20B-AA)

When installed the printer forms an integrated part of a User's Information System and provides a printing function in IBM ProprinterIII emulation for the following types of document:

- Passbooks - vertical or horizontal seam
- Envelopes
- Forms

The printer is simple to install, operate and maintain and provides a guaranteed Print Quality for documents of thickness 0.0787 in (2 mm) or less.

1.1 Scope

This User Guide contains the following chapters:

- Introduction
- Installation
- Setup
- Operation
- Maintenance
- Specifications
- Glossary

1.2 Related Documentation

- Programmers Reference Guide (EK-LB20A-RG)
- Field Support Manual (EK-LB20A-SM)
- Spare Part Guide (EK-LB20A-PG)

1.3 Order Process

Documentation, Accessories and Spare Parts shall be ordered from:

Digital Equipment BCFI AB, Attn. Orderdesk
P.O.Box 904
175 29 Järfälla, Sweden
Telephone: +46 8 759 4600
Facsimile: +46 8 621 1718

1.4 Warnings, Cautions and Notes

WARNING!
This type of safety instruction is used where there is a danger of injury to persons and/or damage to the equipment or the environment. The symbol inside the triangle indicates type of danger.

CAUTION!
This type of safety instruction is used where danger of injury to persons and/or damage to the equipment or the environment can occur, if the instruction is not followed.

NOTE!
Notes are used to provide important or explanatory information.

1.5 Manufacturers Declaration

Document Number: **S960242-1**

This is to certify that the Digital Equipment BCFI AB, product indicated below complies with the requirements on the EEC-Directives and/or other Standards as indicated below and has been officially released for normal delivery to customers and equipped with the CE-mark.

PRODUCT DESCRIPTION: **Terminal Printer**

DIGITAL MODEL NUMBER: **LB20A-AA, LB20B-AA**

This certificate is a confirmation of full compliance with the following regulations:

EEC-directive 89/336/EEC: "Electromagnetic Compatibility"
**EN 50081-1 (Emission EN 55022/1985)*
**EN 50082-1 (Emission IEC 801-2, -3, -4)*

EEC-Low Voltage Directive (LVD) 73/23/EEC of February 19, 1973
"Safety of Information technology equipment including electrical business equipment"
**EN60950, 1992 + A1 + A2 + A3*

Järfälla, 1996-12-19

Lars-Erik Högquist
Product Safety Manager

2 INSTALLATION

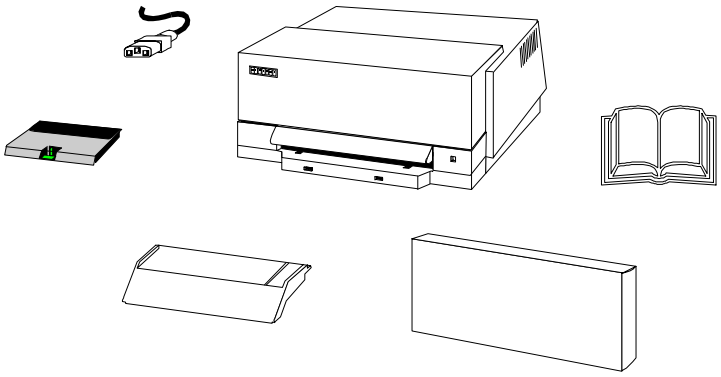
Perform the actions described and illustrated under the headings:

2.1 Preparation

Open the packing carton at one end, pull out the two foam sections and unpack the following:

1. Mains Power Cable
2. Printer
3. User's Guide
4. Ribbon Cartridge Box
5. Document Guide
6. Trapdoor

Note: If possible store the packing carton for future use



WARNING !

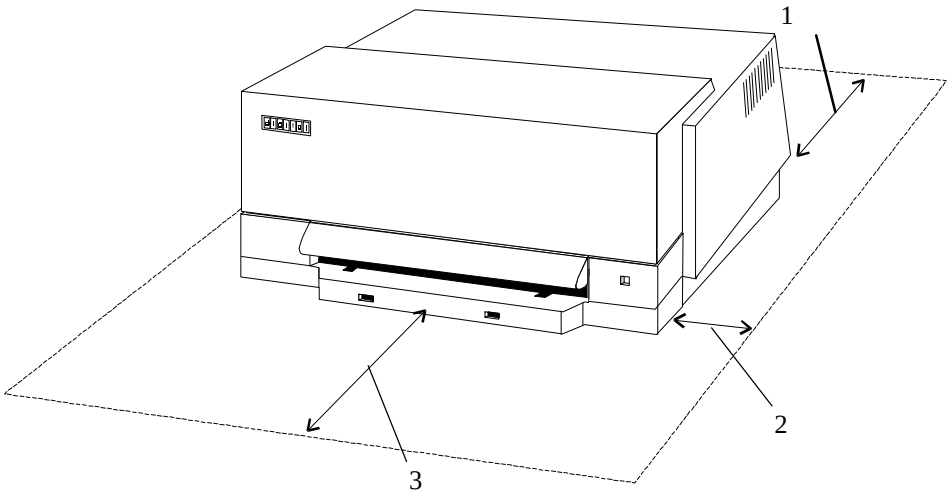
Make sure that the mains outlet connector in the building is a Class-1 outlet with protective earth, easily accessible and the fuse in the building protects against earth fault.

2.2 Operating Space

Place the printer on a flat, horizontal surface in a clear area as follows:

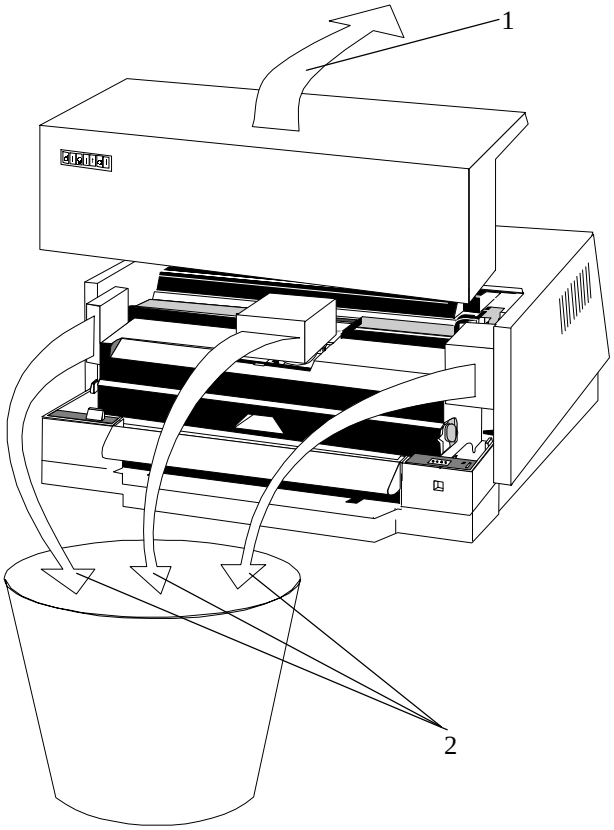
1. Back - 8in (203 mm) for document removal.
2. Sides - 4in (101mm) for air cooling.
3. Front - 10in (254 mm)for document loading.

Note: If necessary, allow further space for power and communication cable routing.



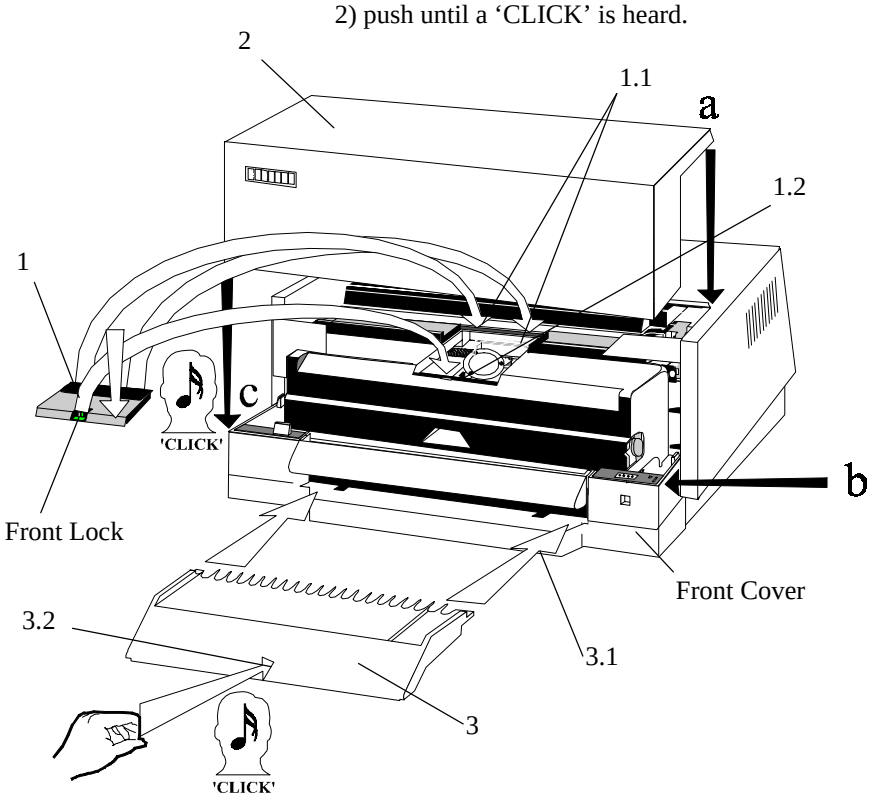
2.3 Removal of transport locks

1. Lid - lift and remove.
2. Packing - remove and discard.



2.4 Trapdoor, Lid and Document Guide

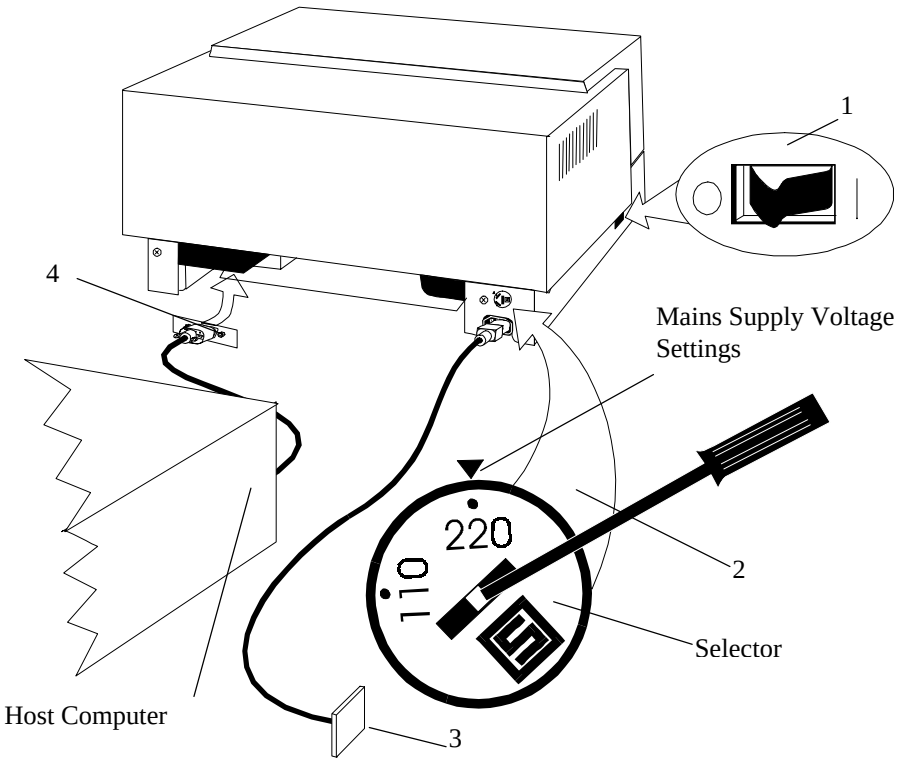
1. Trapdoor - 1) position the two Rear Lugs,
   2) lower, the trapdoor to engage the Front Lock and press until a ‘CLICK’ is heard.
2. Lid - accurately align at **a**, **b** and **c**.
3. Document Guide - 1) position in the Front Cover,
   2) push until a ‘CLICK’ is heard.



2.5 Connections and Settings

1. Power Switch - set to the OFF position.
2. Power Setting - check the setting: use a screw-driver to turn the Selector to the Mains Supply Voltage you are using.
3. Mains Power Cable - connect to the Printer and the Mains Supply.
4. Communication Cable - Connect to the Printer and the Host Computer

Note: The Communication cable is supplied as a separate item.

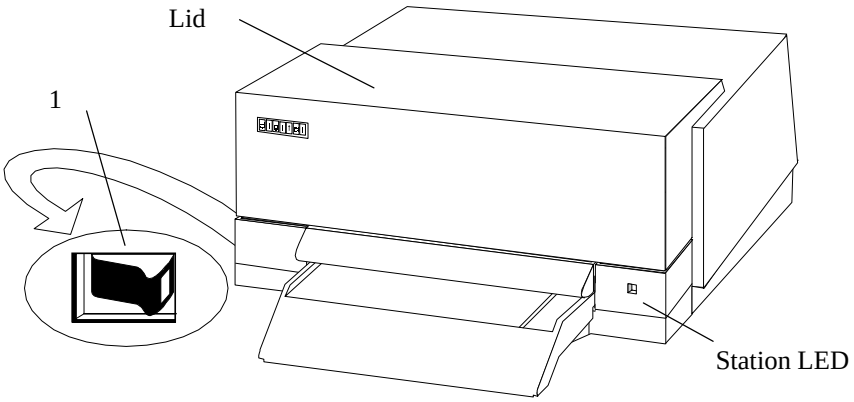


2.6 Ink Ribbon Cassette

Caution!
The printer must be switched ON during this task.

2.6.1 Power On

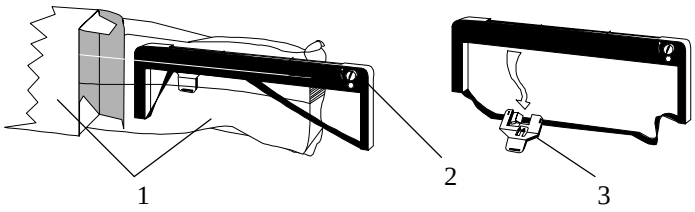
1. Power Switch - set to the ON position,
   - Station LED - shows RED for six seconds and then changes to GREEN.



Note !
If the Station LED 'BLINKS' RED check that the Lid is correctly installed.

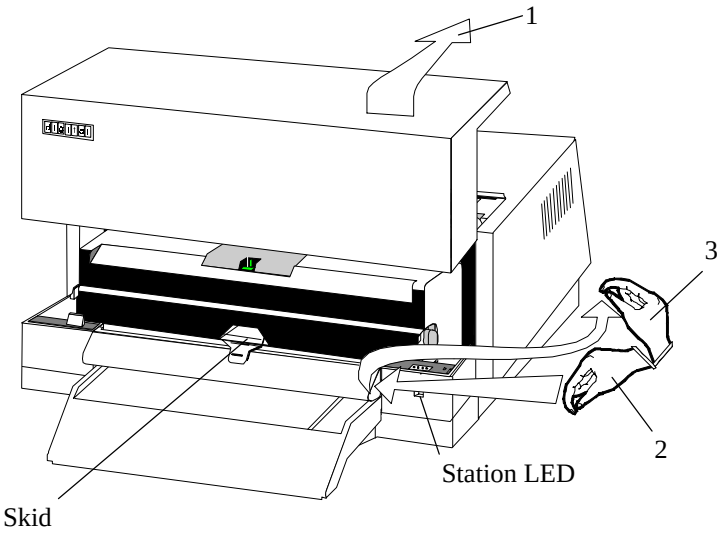
2.6.2 Unpacking the Ink Ribbon Cassette

1. Box and plastic bag - open the packing.
2. Ink Ribbon Cassette - remove from the plastic bag.
3. Skid - unclip from the Cassette.



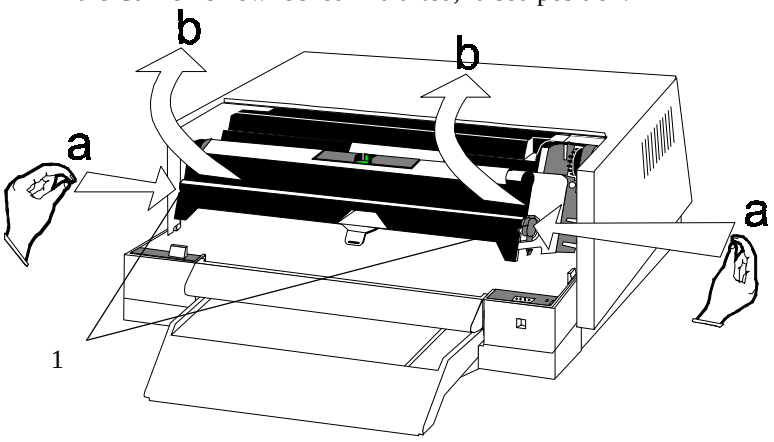
2.6.3 Centering the Skid

1. Lid - lift and remove,
   - Station LED - changes from GREEN to Blinking RED.
2. Button Bar - press and hold down,
   - Skid - moves to the center of the Carrier.
3. Button Bar - release.



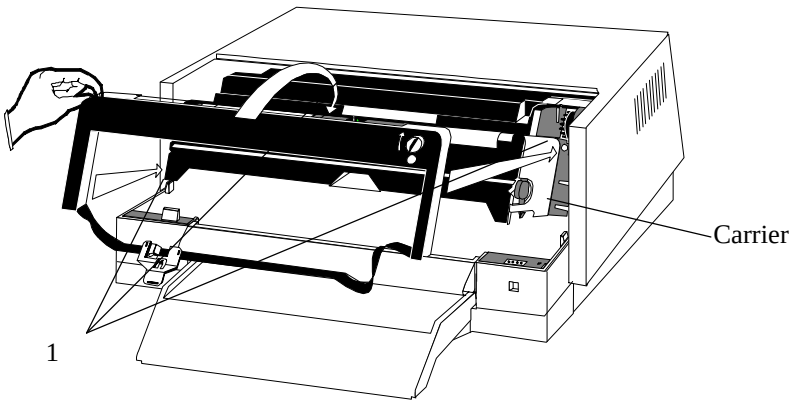
2.6.4 Raising the Carrier

1. Carrier Buttons - press in at **a** and Lift to **b**
   - the Carrier is now locked in a tilted, raised position.



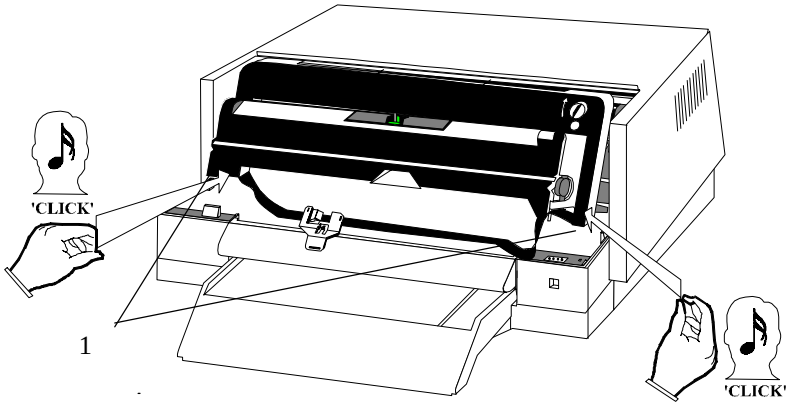
2.6.5 Positioning the Ink Ribbon Cassette

1. Ink Ribbon Cassette - position on the top and sides of the Carrier.



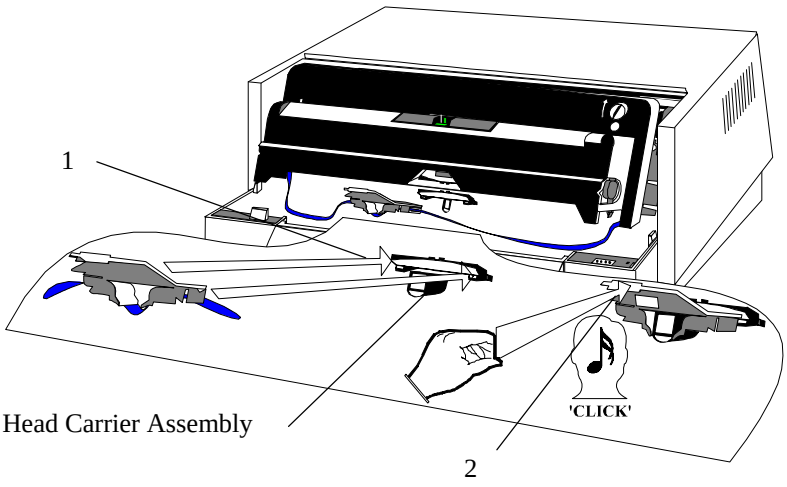
2.6.6 Installing the Ink Ribbon Cassette

1. Ink Ribbon Cassette - push until a ‘CLICK’ is heard at each side of the Carrier.



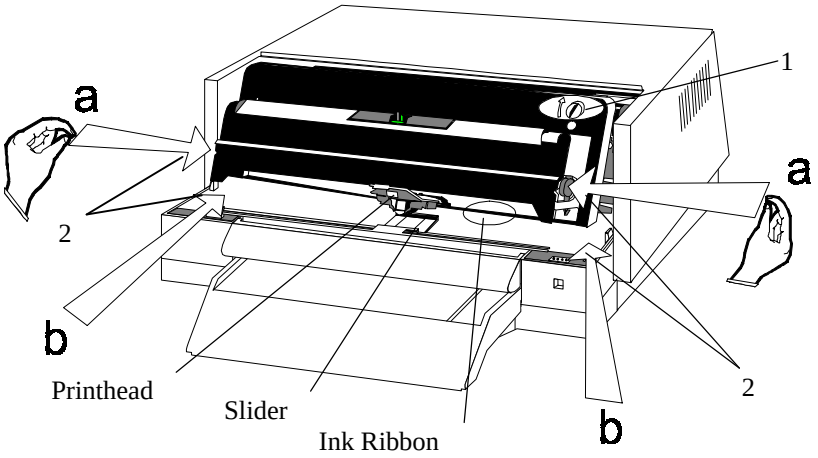
2.6.7 Installing the Skid

1. Skid - locate in the bottom of the Head Carrier Assembly.
2. Skid - push until a ‘CLICK’ is heard.



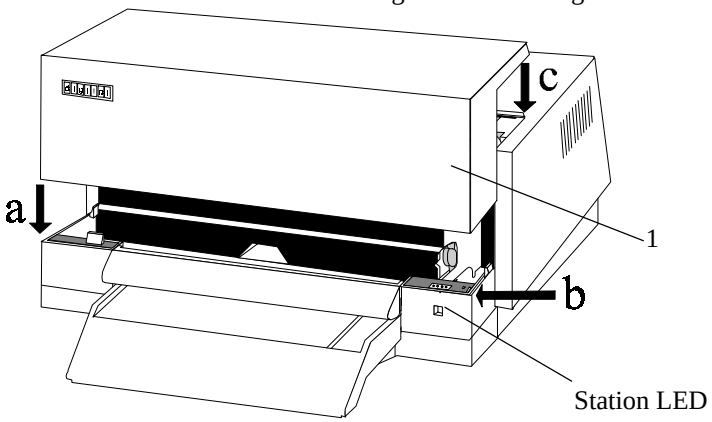
2.6.8 Removing Slack Ribbon

1. Green Wheel - turn until the Ink Ribbon is tight.
2. Carrier - hold at **a**, lower to **b** and ensure the Printhead locates in the Slider.



2.6.9 Ready to Print

1. Lid - install and align at positions **a**, **b** and **c**,
   - Station LED - changes from Blinking RED to GREEN.



3 SETUP

Setup consists of a number of Menu's that contain software settings.

It is important that the correct software settings are made in the DOC Menu so that everyday Customer documents are handled correctly. Document dimensions determine the DOC Menu software settings. Therefore, when a Customer receives a new printer, or when a new document is introduced, this Menu's settings should be checked and modified as necessary.

The printer does not need to be connected to the Host Computer during Setup.

3.1 Introduction

A Software Setting consists of assigning a value to a parameter where:

- Parameters - are shown vertically under each Menu
- Values - are shown horizontally next to the Parameter.

Software Settings are held in a matrix where:

- Parameters (matrix vertical plane) are reached using a Setup Function which advances the document under the printhead
- Values (matrix horizontal plane) are reached by using a Setup Function which moves the Printhead along a line.

3.1.1 Setup Functions

These are:

Vertical Tab the document is advanced under the printhead to a new line when the Button Bar is pressed down and released after two seconds.

Horizontal Tab the printhead is moved a fixed horizontal distance along a line when the Button Bar is held down for less than one second (Hit).

3.1.2 Setup Controls

These are:

Button Bar providing three functional periods of operation:

- Press down and release in less than one second (Hit)
- Press down and release after two seconds
- Press down and hold down until the engine runs and the document moves, then release

3.1.3 Menu's and Parameters

On entering Setup, you are prompted to Select a Menu or Quit the Setup. Menu's are Selected or Quit from the start and end point, QUIT OR SELECT. Printer Settings are printed from the VIEW point. Thus, the structure is :

QUIT OR SELECT
COM Menu IBM Menu DOC Menu <>DFT Menu <>HQD Menu
VIEW

Note: The COM menu is not used or shown in a Parallel Printer.

The Parameter's in each Menu for a Serial Printer are:

COM	IBM	DOC	<>DFT	<>HQD
Baud rate Length Stop bits Parity Flow ctrl	Country Set Font CPI LPI Condensed CR=>LF LF/VT=>CR Form Length Zero Top Margin	Cover offset Horz psbk seam Psbk range Psbk width min. Psbk seam type Top offset Psbk smudging Form smudging Print contrast	Draft coarse Draft fine	HQD coarse HQD fine

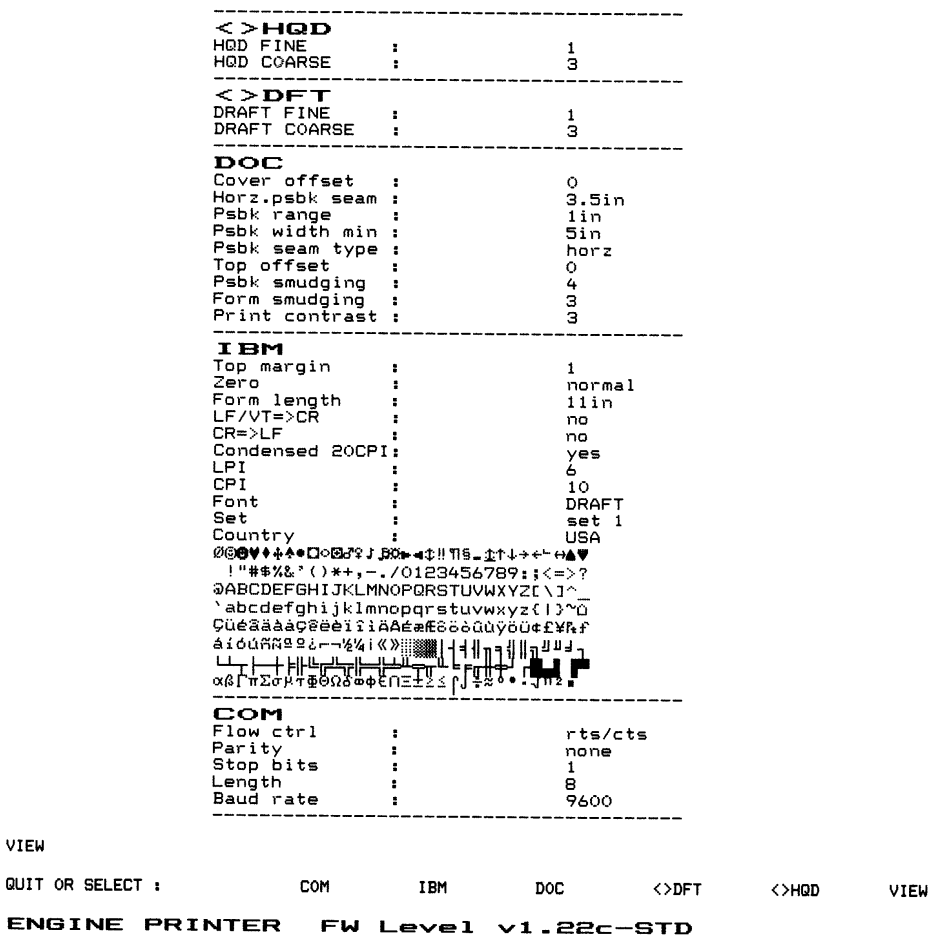
3.1.4 Changing or Viewing the Setup

This involves the following:

- Entering Setup - using a Setup Control
- Loading a Document - a blank document or an existing document is used
- Moving to VIEW or a Menu - Serial Printer have 5 Menu's Parallel Printer have 4 Menu's
- Printing Current Settings - from the VIEW point
- Changing a Setting - moving to a Menu, a Parameter and then assigning a new Value
- Validating - printing to check the change or changes
- Quitting - from the QUIT point

3.2 Setup Example

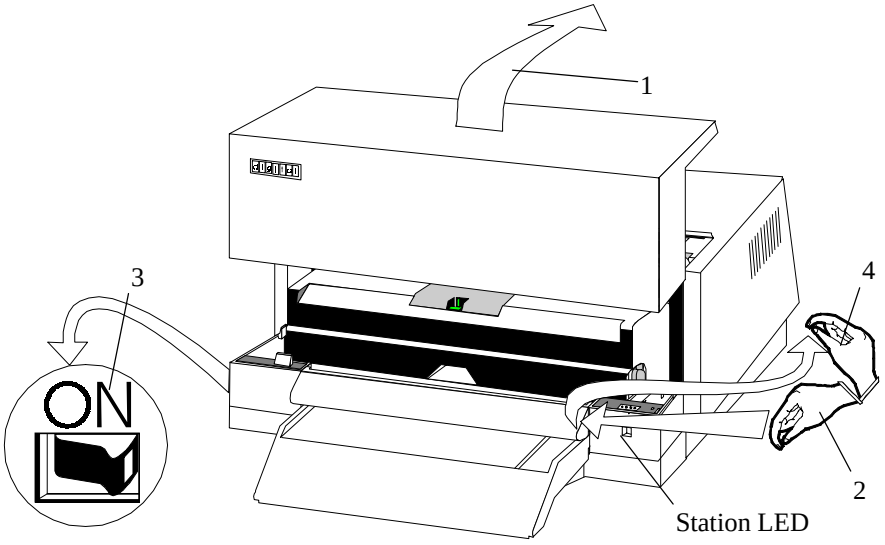
The Factory Default Setup is shown below:



The above example was produced by performing the procedure Printing the Printer Settings.

3.2.1 Entering Setup

1. Lid - lift and remove.
2. Button Bar - hold down.
3. Power Switch - set to ON,
   - Station LED - shows RED.
4. Button Bar - release,
   - Station LED - blinks GREEN within 6 seconds.



Note !

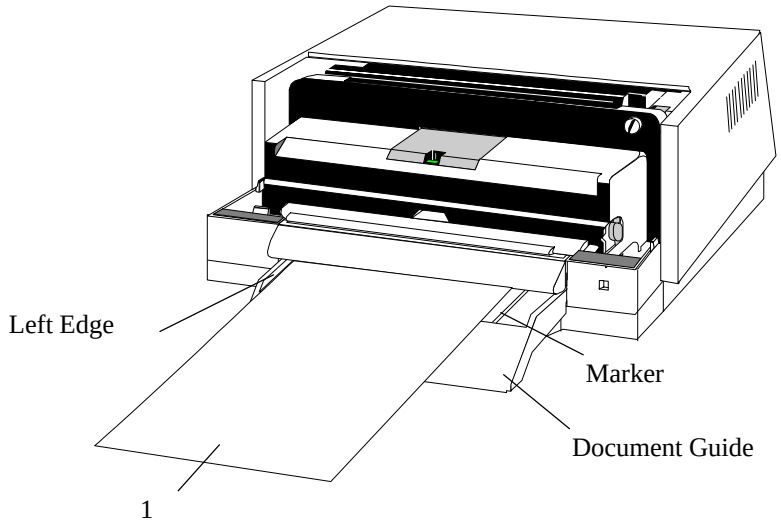
If a document is not loaded OR a document is loaded and no further actions are taken, the print engine will run for 2 minutes, stop and the Station LED will show RED and BLINK. Setup may be entered again by pressing the Button Bar down for less than one second (Hit).

3.2.2 Loading a Document

Prerequisite 1 Entering Setup has been performed.
Prerequisite 2 A blank document at least 8in (203mm) but less than 8.5in (217mm) wide and at least 10in (254mm) long must be used.

1. Document - feed along the Left Edge of the Document Guide until the document is gripped

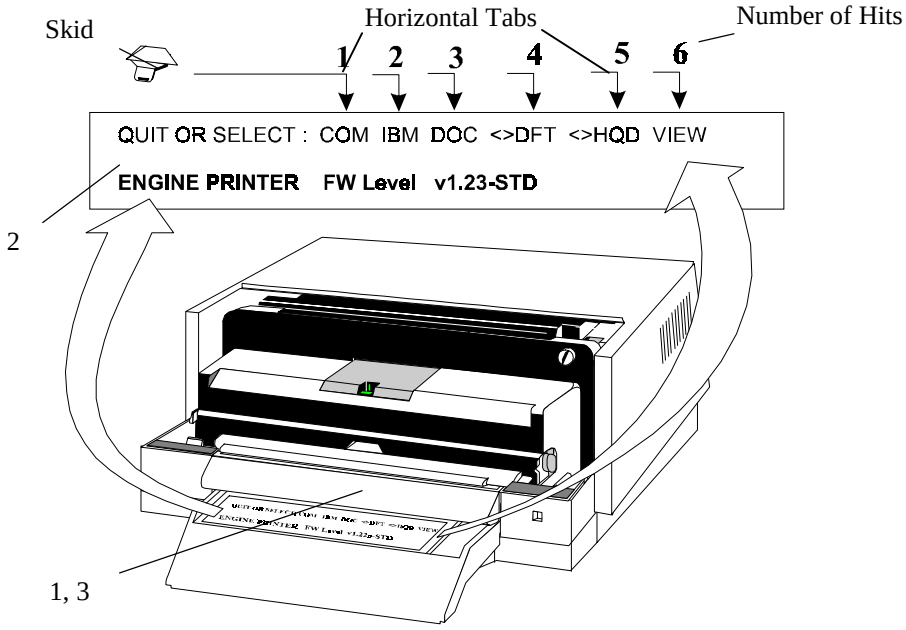
Note: If the document covers the Marker, the printer will return the document forward over the Document Guide.



3.2.3 Moving to VIEW or a Menu

Prerequisite Loading a Document has been performed

1. Button Bar - press for less than one second (Hit),
   - Document - a) advances to the Trailing edge,
     b) print of menu's are performed,
     c) returns with the Skid pointing at the QUIT OR SELECT point.
2. Menu's and VIEW are visible above the FW Level that's installed.
3. Button Bar - Tab Horizontally (Hit) until the Skid is above the selection you require.



3.2.4 Printing the Current Settings

This is done from the VIEW point.

Prerequisite 1: Loading a Document has been performed.
Prerequisite 2: Moving to VIEW has been performed.

1. Button Bar - press and hold down until the document is advanced and printing begins.

Note: When printing has finished the document will be ejected forward over the Document Guide.

3.2.5 Changing a Setting

In the following example the Print Quality parameter is changed from the factory default Value of DRAFT to HQD (High Quality Draft).

1. Enter Setup - perform Entering Setup.
2. Load a Blank Document - perform Loading a Blank Document.
3. Tab Horizontally, TWICE - the Skid points to the IBM Menu.
4. Select IBM - press and hold down the Button Bar until the engine runs and the document moves,
   - Print functions follow and the list, CURRENT SETTINGS, will be visible.
5. Tab Vertically, 2 TIMES - the FONT values DRAFT and HQD are visible.
6. Tab Horizontally, 2 TIMES - the Skid points to <>HQD.
   LOAD the selection - press and hold down the Button Bar until the engine runs and the document moves,
   - HQD is printed between FONT and DRAFT and the Skid performs a vertical tab.
7. Tab Vertically, 8 TIMES - the CONFIRM values, **yes** and **no** are visible.
8. Tab Horizontally, 1 TIME - the Skid points to the '**yes**' option.
9. Button Bar - press for longer than 2 seconds,
   - The new configuration is stored, print functions follow and the document is returned forward over the document guide.

3.2.6 Validating

10. Load a Blank Document - perform Loading a Blank Document with the other side of the document you have just used in step 8 above.
11. Print the Settings - perform Printing the Current Settings,

- the changed parameter will be underlined; Font : HQD

3.2.7 Quitting

12. Load a Blank Document - perform Loading a Blank Document using the same side of the document you have just used in step 11, above.
13. Button Bar - press and hold down until the document is returned forward and ejected.

3.3 Setup Check

Prerequisite 1: The Configuration Settings that your department will use.
Prerequisite 2: The printer's Current Settings. **Note:** Perform Printing the Current Settings on page 2-3-8.

1. Compare prerequisite 1 with prerequisite 2

- The Current Settings are the same as the Configuration Settings?

Yes	**No**
The Setup Check is complete, Go to the Operations Chapter.	Go to Changing a Setting on page 2-3-8 and make the required changes to the Setup.

3.4 Performing a Setup

An Engineer would normally perform this task for you.

Prerequisite 1 All types of Customer Document are available.
Prerequisite 2 A measuring ruler. This may be graduated in Metric or Imperial units. **Note:** 1 inch = 25.4 mm.

Move to each of the Menu's shown below and for each Parameter check or set a new Value.

3.4.1 COM Menu

This menu is available on Serial Printers only. It is used when changing the Communication Settings.

The **Baud Rate** values are:
- 19200, *9600*, 4800, 2400 and 1200 Baud

Further Parameters and Values are:

	Parameter			
	Length (bits)	Stop Bits (number)	Parity	Flow Control
Value	7	1	Even	RTS-CTS
Value	8	2	Odd	XON-XOFF
Value			None	

3.4.2 IBM Menu

The standard IBM Proprinter III parameters are used where:

The **Country** values are:
- *USA* - Code Page 437 (Factory Default Setting)
- Multi (Latin) - Code Page 850

Note: A Code Page is downloaded from the Host Computer. At Power ON the option set will be used unless overridden by a download.

The **Set** values are:

- *Set 1* - [0–31] and [128–159] specify control codes (Factory Default Setting).
- Set 2 - [03–06], 21 and [128–159] specify printable characters.

Note: The PC Table may be set such that a range of ASCII characters in the code page are interpreted.

The **Font** (quality) values are:

- *DRAFT* (Factory Default Setting)
- HQD (High Quality Draft)

The **CPI** (Characters Per Inch) values are:

- *10***,** 12, 17 or 20.

The **LPI** (Lines Per Inch) values are:

- 5, *6* or 8.

Condensed

- *17 CPI,*

The **CR =>LF(Auto Line Feed)** values are:

- Yes or *No*

Automatic Line Feed (LF) after each Carriage Return (CR).

The **LF/VT =>CR (Auto Carriage Return)** values are:

- Yes or *No*

Automatic Carriage Return (CR) after each Line Feed (LF) or Vertical Tabulation (VT).

The **Form Length** values are:

- *11in (279mm)* or 12in (305mm)
-

The **Zero** style values are:

- *Normal* or Slashed

The **Top Margin** values are:

- ***1*** = *0.1in (2.54mm) (Factory Default Setting)*
- 2 = 0.2in (5mm)
- 3 = 0.3in (7.6mm)
- 4 = 0.4in (10mm)
- 5 = 0.5in (13mm)
- 6 = 0.6in (15.mm)

3.4.3 DOC Menu

This Menu is concerned with Documents and the parameter values that must be set so that documents are handled correctly.

All documents, Form and/or Passbook (Psbk), must be measured. A value for each of the following parameters must be set:

- Top Offset
- Psbk Seam Type
- Psbk Width min.
- Psbk Range
- Horz Psbk Seam,
- Cover Offset

The values are shown along the Parameter line in the DOC Menu printout, which follows:

```
THESE SETTINGS ARE NOW RESIDENT

Cover offset   :              0
Horz.psbk seam :              3.5in
Psbk range     :              1in
Psbk width min :              5in
Psbk seam type :              horz
Top offset     :              0
Psbk smudging  :              4
Form smudging  :              3
Print contrast :              3

CONFIRM        :              yes         no

Cover offset   : 0            0           1           2           3           4

Horz.psbk seam :              2.5in       3in         3.5in       4in         4.5in

Psbk range     :              0.5in       1in         1.5in       2in         2.5in       3in

Psbk width min :              3in         4in         5in         6in         7in

Psbk seam type :              horz        vert

Top offset     :              0           1           2           3           4

Psbk smudging  :              1           2           3           4           5           6

Form smudging  : 2            1           2           3           4           5           6

Print contrast : 2            1           2           3           4           5


CURRENT SETTINGS

Cover offset   :              0
Horz.psbk seam :              3.5in
Psbk range     :              1in
Psbk width min :              5in
Psbk seam type :              horz
Top offset     :              0
Psbk smudging  :              4
Form smudging  :              3
Print contrast :              3

DOC

QUIT OR SELECT :              COM         IBM         DOC         <>DFT       <>HQD       VIEW

ENGINE PRINTER  FW Level v1.22a-STD
```

The **Print Contrast** values are:

- 1, 2, ***3*** *(Factory Default Setting)*, 4 and 5.

The **Form Smudging** values are:

- 1, 2, ***3*** *(Factory Default Setting)*, 4, 5 and 6
  1 = least smudging (anvil in the lowest position).and
  6 = most smudging (anvil in the highest position).

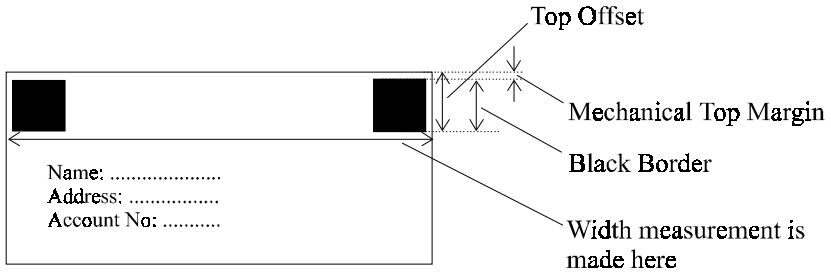
The **Psbk Smudging** values are:

- 1, 2, ***3*** *(Factory Default Setting)* 4, 5 and 6
  1 = least smudging (anvil in the lowest position).and
  6 = most smudging (anvil in the highest position).

The **Top Offset** values are:

- ***0*** **=** *0.1in (2.54mm) Factory Default Setting*
  Note: Mechanical Top Margin = Top Offset
- 1 = Up to 0.6in (13.3mm)
- 2 = Up to 1.1in (27.94mm)
- 3 = Up to 1.6in (40.64mm)
- 4 = Up to 2.1in (53.34mm)

The printer uses an Optical Sensor to measure width. During the measuring process, the sensor must not cross a black area. Therefore, if a Form or Envelope is preprinted with a black area on the near the top of the document, such as a Logo or Letter Head, a Top Offset must be set so that the width is measured in an area free of black.



Measure the Black Border and use one of the values.

The **Psbk seam type** values are:

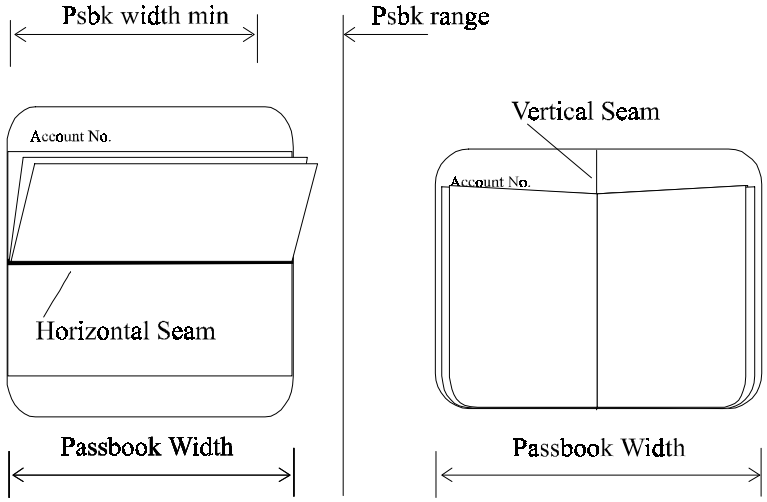
- *Horz (Factory Default Setting)* for horizontal seam passbooks
- Vert for vertical seam passbooks.

The **Psbk width min.** values are:

- 3in (76.2mm), 4in (101.6mm), *5in (127mm) Factory default value*, 6in (152.4mm), 7in (177.8mm).

The printer will handle a document as a Passbook only when the width lies within the [Pbsk width min.] + [Pbsk range].
If your Passbook Types have different widths calculate Psbk range, (see the next parameter) and then return here.

1. Measure the Passbook Width and use the value which is nearest and less than Psbk width min.



The **Psbk range** values are:

- 0.5in (12.7mm), 1in (25.4mm), 1.5in (38.1mm), *2in (50.8mm),* 2.5in (63.5mm) and 3in (76.2mm).

Psbk width + Psbk range must be greater then the highest Psbk width min. value of any Passbook that is used.

1. Measure all Passbook Widths. Make a note of the maximum width measured.
2. Add an appropriate Psbk range value to the set Psbk width min. value so that all Passbook Widths measured are in range.

The **Horz Psbk Seam** values are:

- 2.5in (63.5mm), 3in (76.2mm), *3.5 in (88.9mm),* 4 in (101.6mm) and 4.5 in (114.3mm).

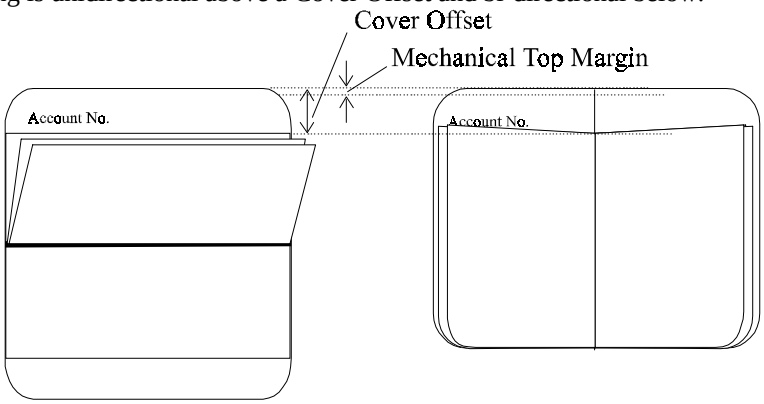
This setting indicates the seam location with respect to the top of the passbook cover. If the measured result is between two of the following, then select the smaller.
This parameter is ignored if Psbk seam type is set to vert (vertical).

The **Cover Offset** values are:

0 = 0.1in (2.54mm) Factory Default Setting
Mechanical Top Margin = Cover Offset

1 = Up to 0.6in (13.3mm)
2 = Up to 1.1in (27.94mm)
3 = Up to 1.6in (40.64mm)
4 = Up to 2.1in (53.34mm)

This setting defines the location of the top edge of an inside sheets with respect to the top edge of a Passbook (Psbk).
Printing is unidirectional above a Cover Offset and bi-directional below.



Measure the Cover Offset and use one of the following values:
If the Passbook Seam is horizontal and the Cover Offset is greater than 0, the printer will smooth the document.

3.4.4 <>DFT Menu

The Horizontal Alignment of a printed line in bi-directional DRAFT (DFT) can be adjusted. This is done in two steps, DRAFT COARSE and DRAFT FINE.

1. Print the <>DFT menu settings.
2. Look at the printout and chose the DRAFT COARSE and DRAFT FINE settings, indicated on the same line in the left most column, where you judge the character overlap to be the best.

The **Draft Coarse** values are:

- 1, 2, ***3*** *(Factory Default Setting)*, 4, 5 and 6.

This define the printing speed in steps.

Draft Fine

- ***1*** *(Factory Default Setting)*, 2, 3 and 4.

This define the printing speed in firing units.

3.4.5 <>HQD Menu

The Horizontal Alignment of a printed line in bi-directional HIGH QUALITY DRAFT (HQD) can be adjusted. This is done in two steps, HQD COARSE and HQD FINE.

Perform the following:

1. Print the <>HQD menu settings.
2. Look at the printout and chose the HQD COARSE and HQD FINE settings, indicated on the same line in the left most column, where you judge the character overlap to be the best.

The **HQD Coarse** values are:

- 1, 2, 3 (Factory Default Setting), 4, 5 and 6.

This define the printing speed in steps:

HQD Fine

- ***1*** *(Factory Default Setting)*, 2, 3 and 4.

This define the printing speed in firing units:

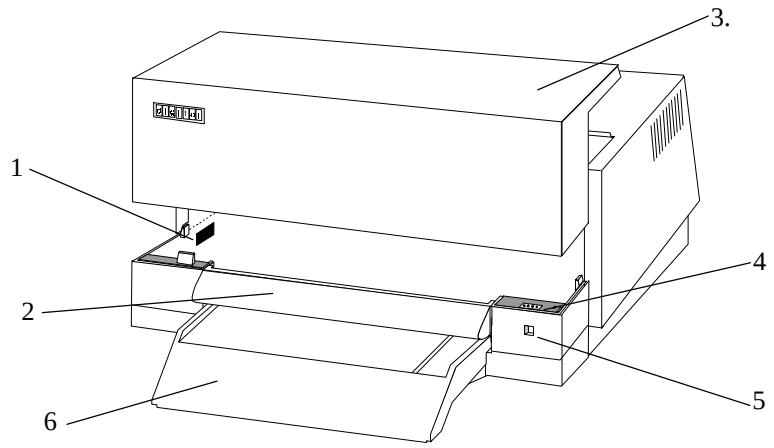
4 OPERATION

Normal everyday operation is a simple matter of Loading a Document. Printing is controlled from the Customer Host System.

4.1 Controls and Indications

1 Power Switch - ON or OFF.
2 Button Bar - having two functional periods:
- Press down and release in less than one second (Hit)
- Press down, hold and release when printer reacts (2 sec.)

3 Lid - Installed or Removed.
4 Four Status LED's - RED, static indication only.
5 Station LED - RED or GREEN, static and blinking indications.
6 Document Guide - helps to ensure correct document loading.



4.1.1 Confidence Test Routine

When printer power is switched ON a Confidence Test Routine (CTR) verifies that all functions are error free. CTR Success or Failure is indicated by the Station LED as follows:

- Solid or Blinking GREEN - Success
- Solid RED - Fatal Failure, preventing normal use
- Blinking RED - Non-Fatal Failure, recoverable errors

CTR Errors are indicated by the Status LED's as follows:

Status LED's (x=On)				Station LED	Error	Corrective Action
#4	#3	#2	#1			
			x	Blink. RED	NVM failure	Perform setup
		x		Blink. RED	Lid open	Install correctly
x				RED	Initialization	Call service
x			x	RED	Motors	Call service
x		x		RED	Edge detectors	Call service
x		x	x	RED	Motors & Edge	Call service
				RED	CPU error	Call service

4.2 Documents

When the printer is switched on and the print engine is running, documents fed over the Document Guide will be gripped and loaded by a process called Automatic Document Alignment (ADA).

4.2.1 New Pages

Smooth and flatten new pages of passbooks by slightly folding back the spine before loading.

4.2.2 Loading a Document

Caution!

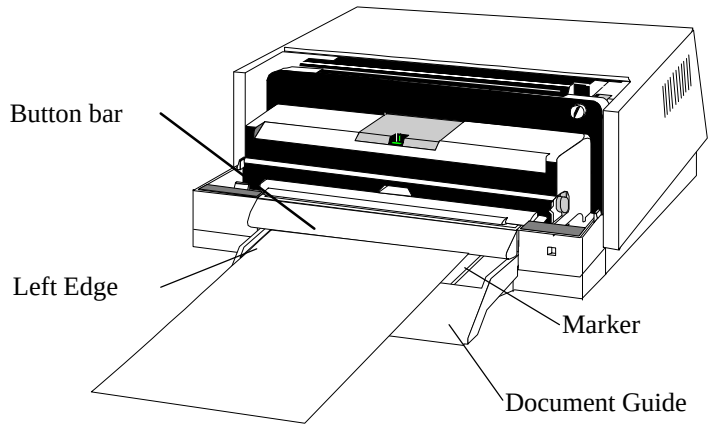
Do not load documents that are hole punched, contain staples or are held together by a paper clip. This will cause paper jams or damages to the printer.

It is only possible to load a document when the printer have received data from the host computer, or entering into Setup Mode or the internal Maintenance Tests Routine.

1 Document - Check the width
- If the document width is less than or equal to 8.7in (221mm), Load anywhere between Left Edge and the Marker
- If the document width is greater than 8.7in (221mm), ensure it touches the Left Edge of the Document Guide

2 Insert - when the Station LED blinks GREEN

3 Button bar - hit (for less than 1 sec.) and release
- Document is fed in and the width is measured
- If the document is inserted incorrect, it is ejected out and a new insertion has do be done aligning to the Left Edge
- If it's inserted correctly, printing will start



4.2.3 Stop while printing

To stop the printing, press and hold the Button Bar for more than 10 seconds.

4.2.4 Clearing Document Jams

1	Power	-	set to OFF
2	Lid	-	lift and remove
3	Carrier	-	raise and secure in open position
4	Document	-	remove by pulling from the front or rear of the printer

5 MAINTENANCE

Caution !

Unless otherwise stated, the printer should be switched ON during all Maintenance Tasks.

This chapter describes how to do if the performance of the printer is not satisfied.

Some actions should be performed to prevent unnecessary wear of the printer, or to keep up the lifetime.

The following Parts can be replaced. New parts can be ordered from your Supplier.

Part	Order Number
Ink Ribbon Cassette	2S-AA374-AA
Mylar Cassette	2S-AA373-AA
Printhead	29-33361-01

Note: All Replacement Parts should be stored at room temperature.

5.1 Ink Ribbon Cassette

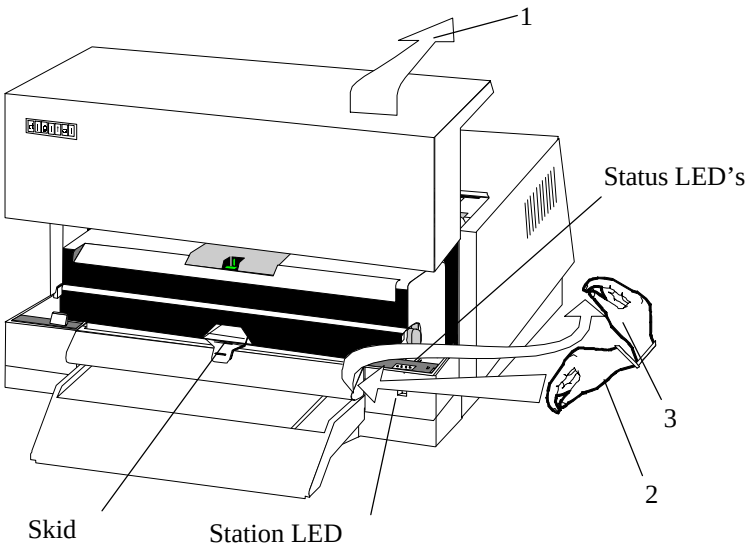
These have a maximum storage life of 2 years and should be replaced after printing approximately 2.5 million characters.

5.1.1 Centering the Skid

1 Lid - lift and remove,
- Status LED's - LED-1 is ON, others are OFF
- Station LED - changes from GREEN to Blinking RED.

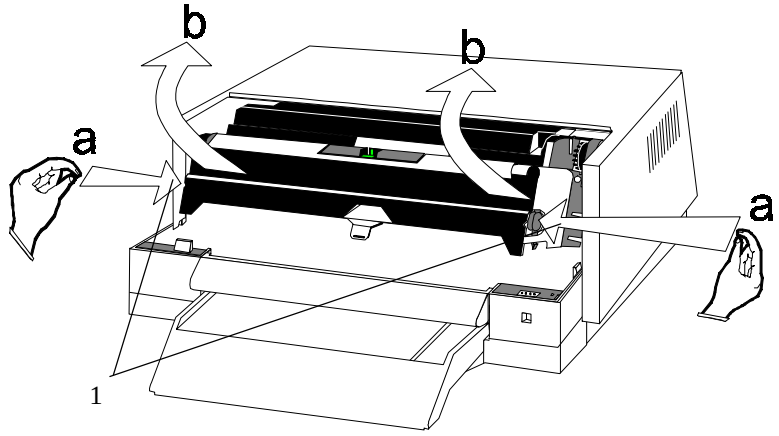
2 Button Bar - press and hold down,
- Skid - moves to the center of the Carrier.

3 Button Bar - release.



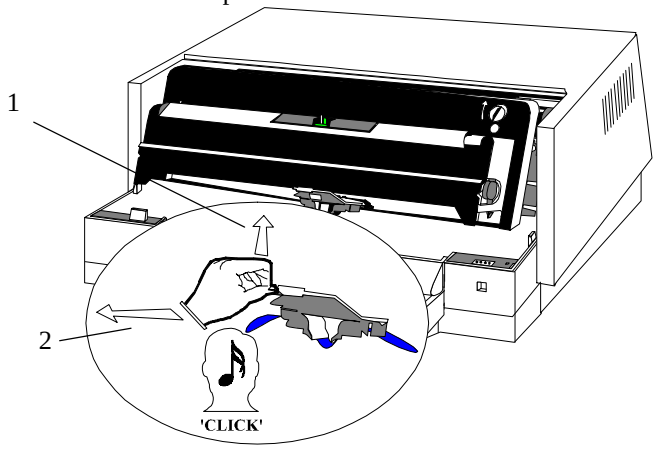
5.1.2 Raising the Carrier

1 Carrier Buttons - press in at (**a**) and Lift to (**b**),
- Carrier - is now locked in a tilted, raised position.



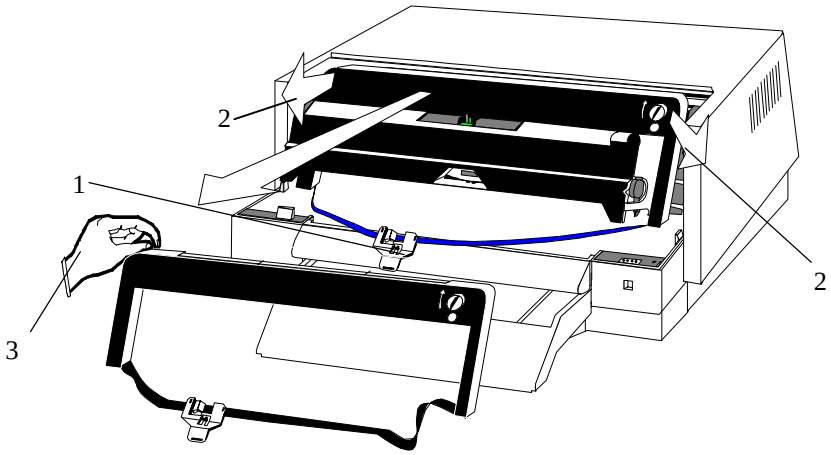
5.1.3 Removing the Skid

1 Skid - lift until a ‘CLICK’ is heard.
2 Skid - pull forward and remove.



5.1.4 Removing the Old Ink Ribbon Cassette

1 Skid - position
2 Sides - move forward
3 Ink Ribbon Cassette - remove and discard



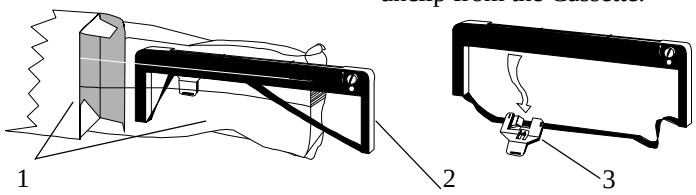
5.1.5 Cleaning

Perform the following:

- Mylar Cassette slider refer to the procedure on page 4-5-7
- Edge Detection Sensor and Mylar Slide Hole refer to the procedure on page 4-5-16

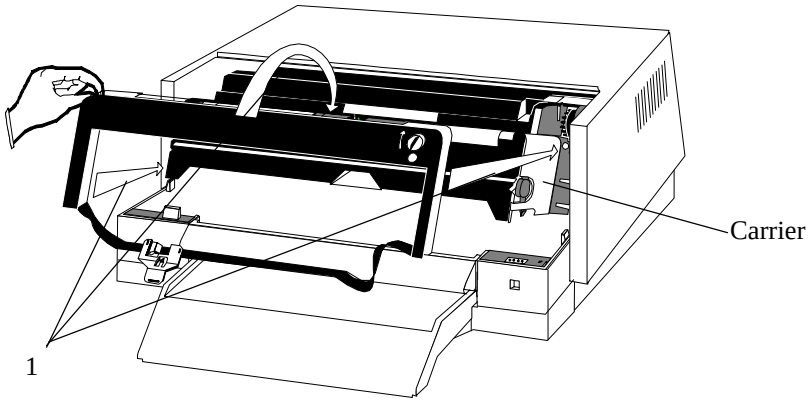
5.1.6 Unpacking the New Ink Ribbon Cassette

1. Box and plastic bag - open the packing.
2. Ink Ribbon Cassette - remove from the plastic bag.
3. Skid - unclip from the Cassette.



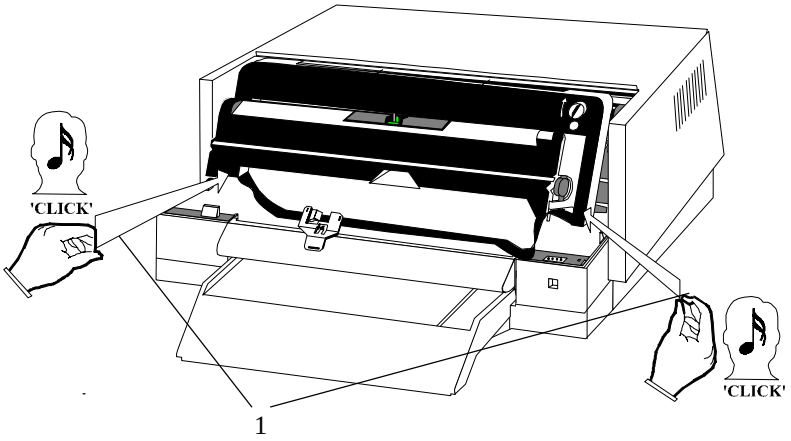
5.1.7 **Positioning the New Ink Ribbon Cassette**

1 Ink Ribbon Cassette - position on the top and sides of the Carrier.



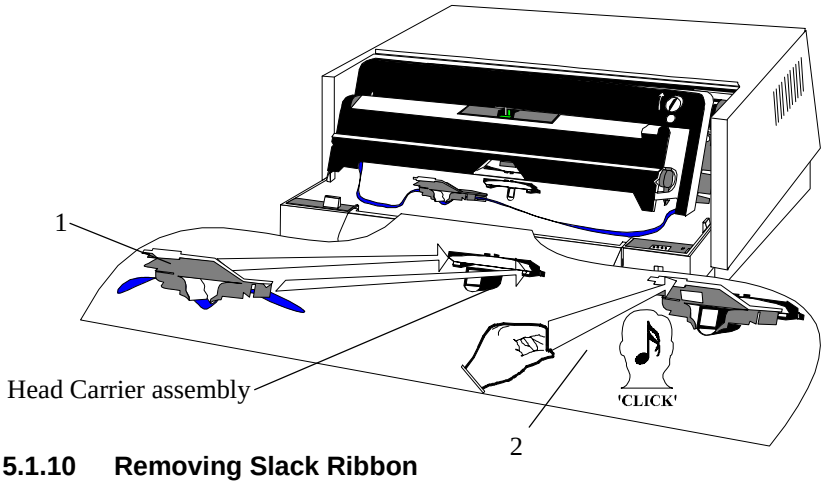
5.1.8 **Installing the New Ink Ribbon Cassette**

1. Ink Ribbon Cassette - Push until a ‘CLICK’ is heard at each side of the Carrier.



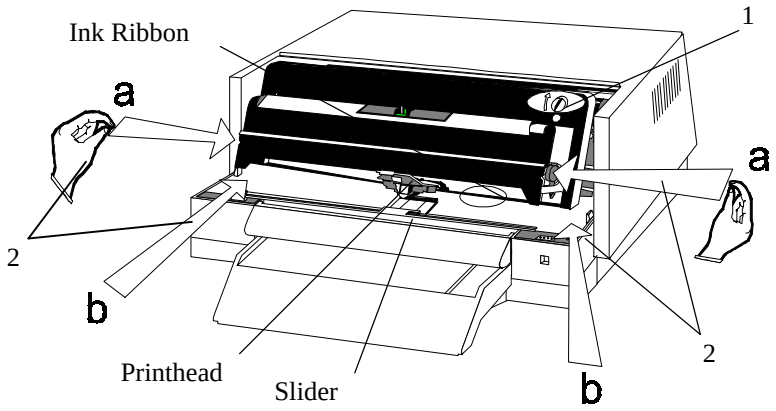
5.1.9 Reinstalling the Skid

1 Skid - locate in the bottom of the Head Carrier assembly.
2 Skid - push until a ‘CLICK’ is heard.



5.1.10 Removing Slack Ribbon

1 Green Wheel - turn until the Ink Ribbon is tight .
2 Carrier - hold at **a,** lower to **b** and ensure the Printhead locates in the Slider.



5.2 Mylar Cassette

Smooth transport of the document during printing is ensured by separating the ribbon from the document by a strip of mylar.

The mylar slider should be inspected and cleaned when the Ink Ribbon Cassette is replaced or when excessive document jams are experienced.

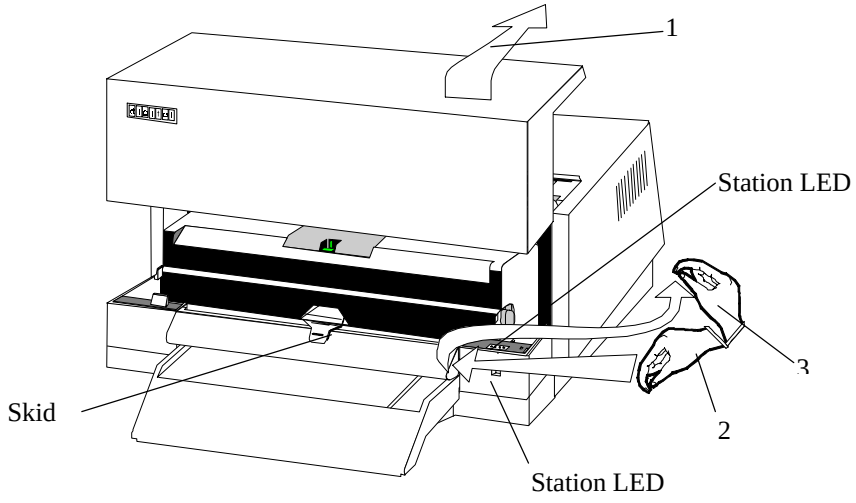
Mylar edges and surfaces may be damaged when in contact with a sharp or hard object such as a paper clip or staple.

5.2.1 Centering the Skid

1 Lid - lift and remove,
- Station LED - changes from GREEN to Blinking RED.
- Status LED's - LED-1 is ON, others are OFF

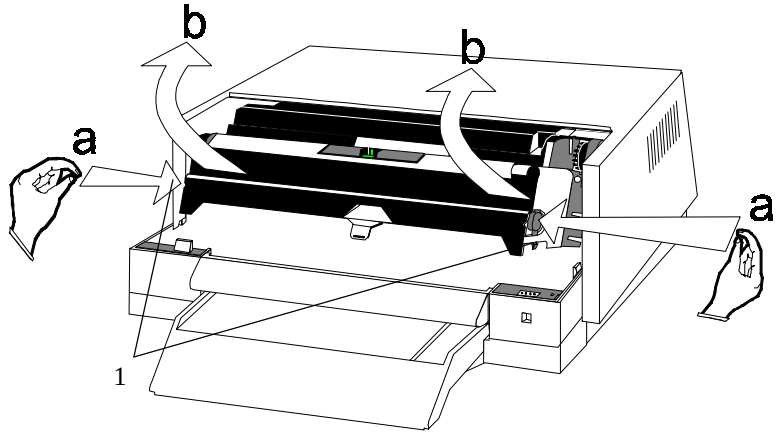
2 Button Bar - press and hold down,
- Skid - moves to the center of the Carrier.

3 Button Bar - release.



5.2.2 Raising the Carrier

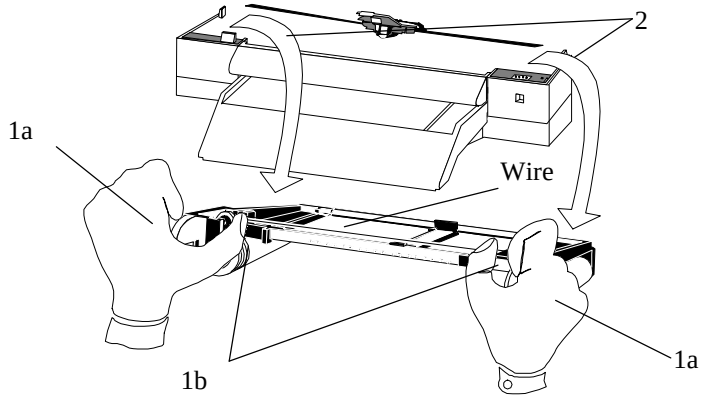
1 Carrier Buttons - press in at (**a**) and Lift to (**b**),
- the Carrier is now locked in a tilted, raised position.



5.2.3 Removing the Mylar Cassette

1 Left and right hand - a) push on each handle using a finger
b) press on the wire with each thumb.

2 Mylar Cassette - remove from the printer



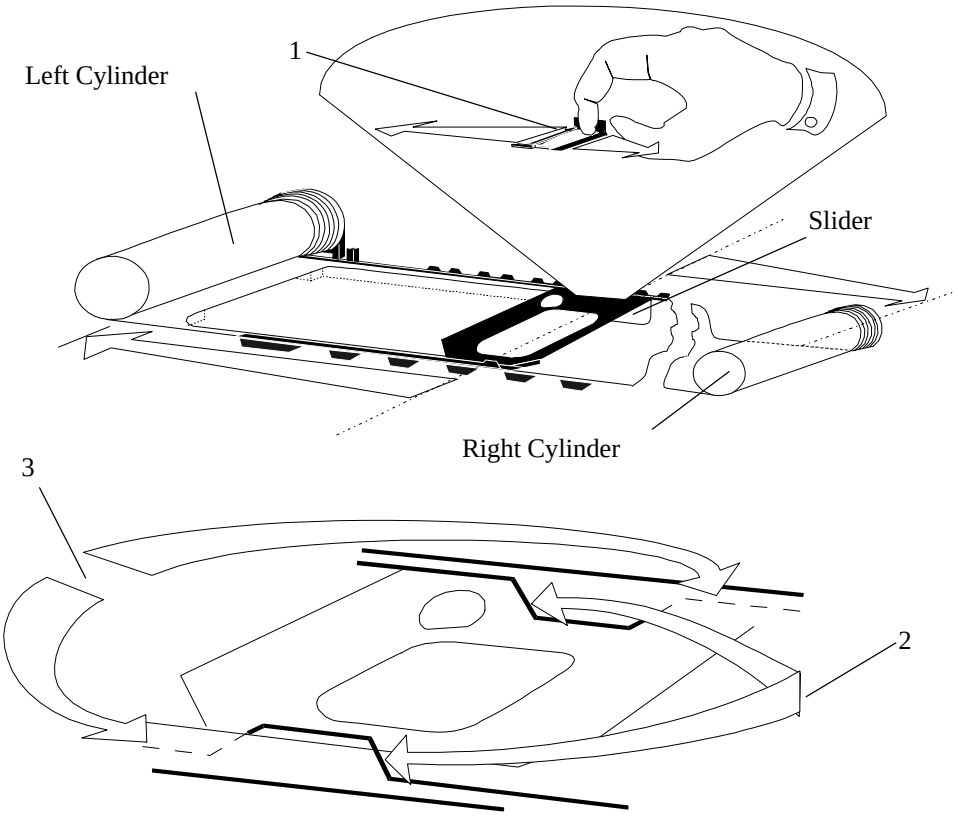
5.2.4 Inspecting the Mylar Edges (Bottom View)

Turn the Mylar Cassette over and inspect the edges for damage as follows:

1 From Cylinder to Cylinder - move the Slider and check for damage.

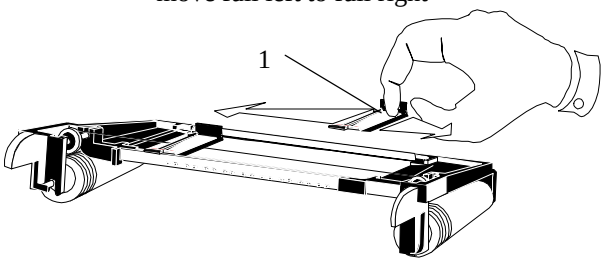
2 From Slider to Left Cylinder - move the Slider and check that the complete edge stays OUT.

3 From Slider to Right Cylinder - move the Slider and check that the complete edge stays IN.



5.2.5 Checking for Free Movement (Top View)

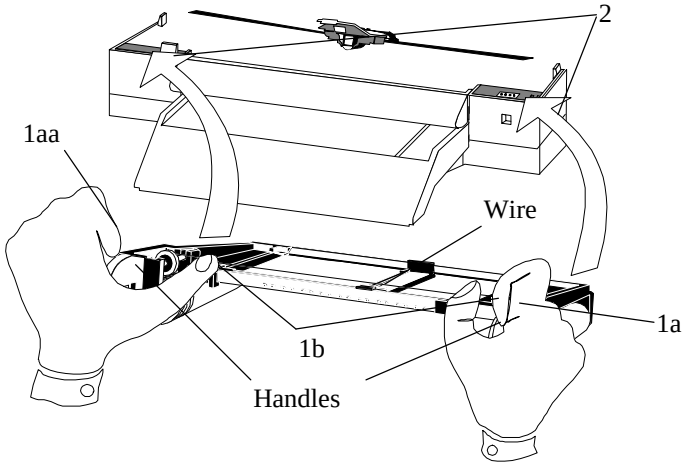
1 Slider - move full left to full right



5.2.6 Reinstalling the Mylar Cassette

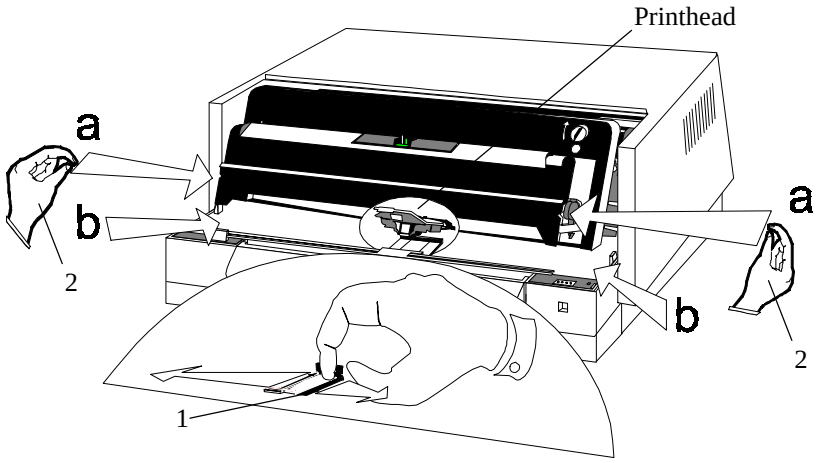
1 Left hand and right hand - a) use a Finger to push on the Handles,
b) use a Thumb to press on the Wire.

2 Mylar Cassette - install.



5.2.7 Positioning the Slider

1 Slider - position under the Printhead.
2 Carrier - hold with each finger and lower the Carrier from **a** to **b** and ensure the Printhead locates in the center of the Slider.



5.3 Printhead

The result of printing with a damaged Printhead is shown below.

The white space in the characters A,B,C,D and E above indicate a pin in the Printhead is not operating or is broken. A Pin will be damaged when is strikes a sharp or hard object such as a paper clips or staple.

Caution !

The Printhead may be hot. Be carefull when touching the printhead.

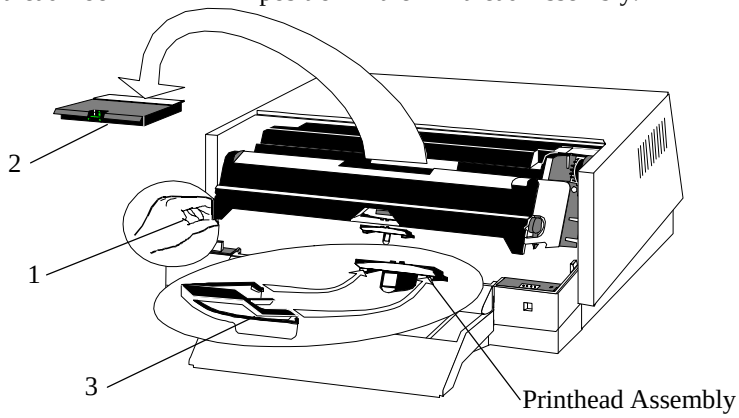
5.3.1 Preparation

Perform the following:

- Power Up
- Centering the Skid
- Raising the Carrier
- Removing the Ink Ribbon Cassette

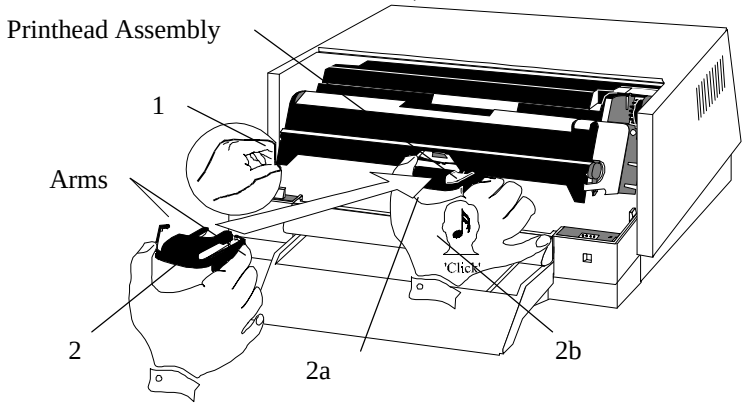
5.3.2 Removing the Trapdoor

1 Carrier - support to keep the Carrier raised.
2 Trapdoor Lock - push in to release the Lock and lift to remove the Trapdoor.
3 Printhead Tool - position in the Printhead Assembly.



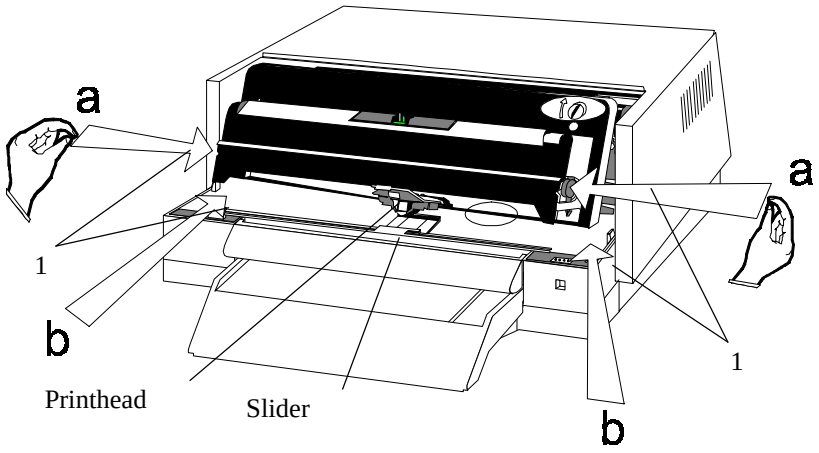
5.3.3 Releasing the Printhead

1 Carrier - support to keep the Carrier raised.
2 Printhead Tool - a) push into the Printhead assembly,
b) squeeze the arms until a 'CLICK' is heard, and then release the arms.



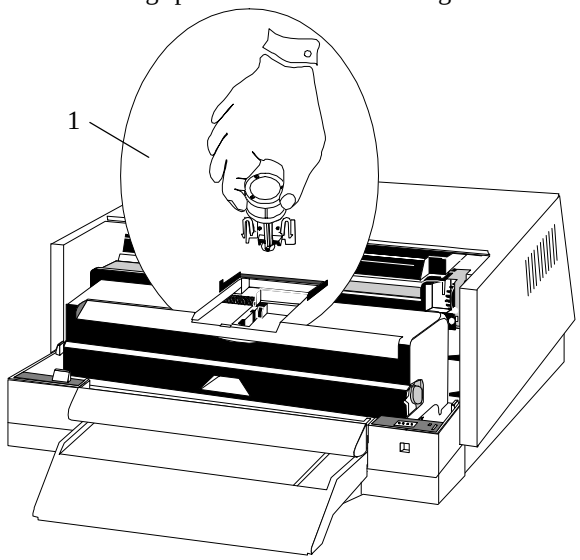
5.3.4 Lowering the Carrier

1 Carrier - hold at **a,** lower to **b** and ensure the Printhead locates in the Slider.



5.3.5 Removing the Printhead

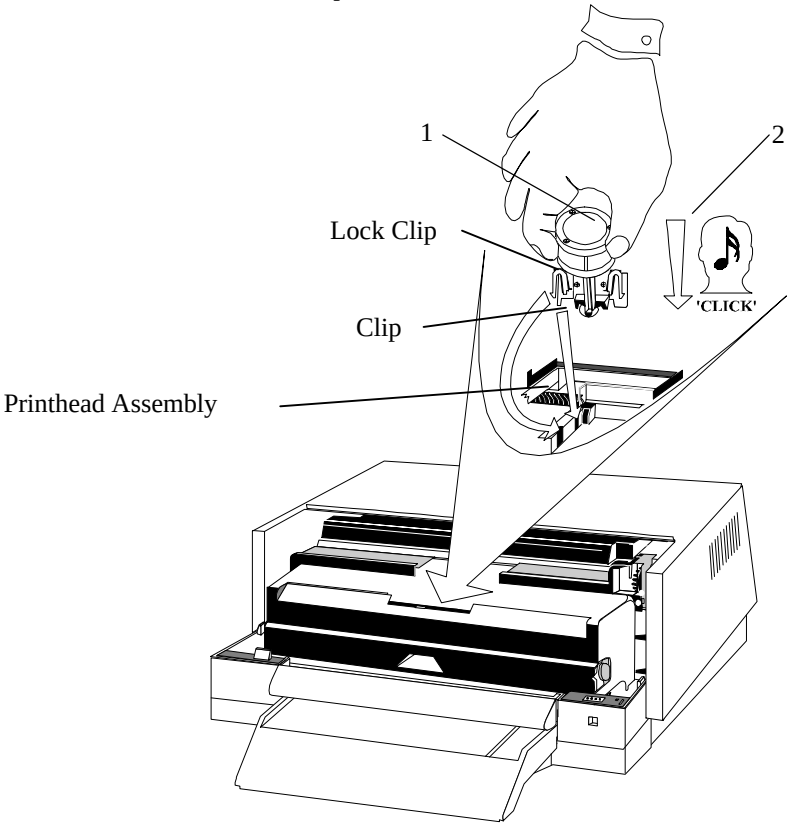
1 Printhead - grip between thumb and finger and remove



5.3.6 Reinstalling the Printhead

1 Printhead - locate the Clip and Lock Clip in the Printhead Assembly

2 Printhead - push down until a ‘CLICK’ is heard



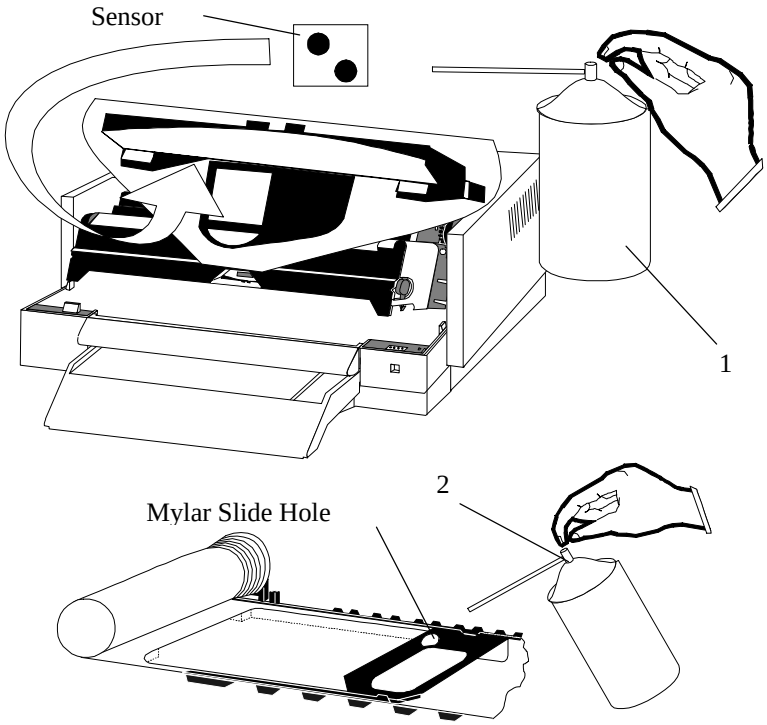
5.4 Cleaning of Edge Detection Sensor and Mylar Slide Hole

These should be cleaned when the Ink Ribbon Cassette is changed.
Note: if pressurized air is not available a Lint Free cloth may be used.

If necessary, refer to the Ink Ribbon Cassette and Mylar Cassette procedure

1 Pressurized Air Can - position the can near the sensor and release air

2 Pressurized Air Can - position the nozzle near the Slide Hole and release air



5.5 Cleaning the Feed Rollers

These should be cleaned when feeding problems are experienced or when black vertical lines appear on the document.

1 Lid - Lift and remove
- Station LED - changes from GREEN to Blinking RED,
- Status LED's - ooox, where x = ON.

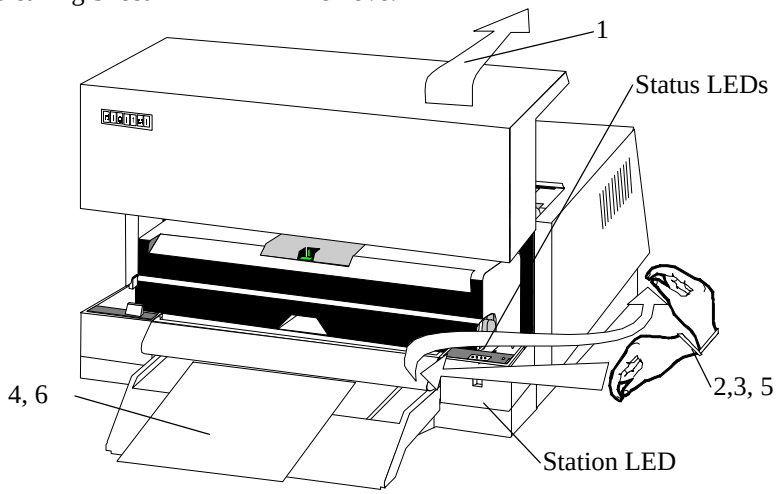
2 Button Bar - press for less than one second (Hit),
- Status LED's - ooxo, where x = ON.

3 Button Bar - press down for longer than 2 sec. and then release
- Station LED - blinks GREEN

4 Cleaning Sheet - load (see Loading a Document)

5 Button Bar - press until the Station LED shows GREEN and then release
- Cleaning Sheet - printer runs the Feed rollers some seconds and then the Cleaning Sheet is feeded a number of times
- Station LED - blinks RED

6 Cleaning Sheet - remove.

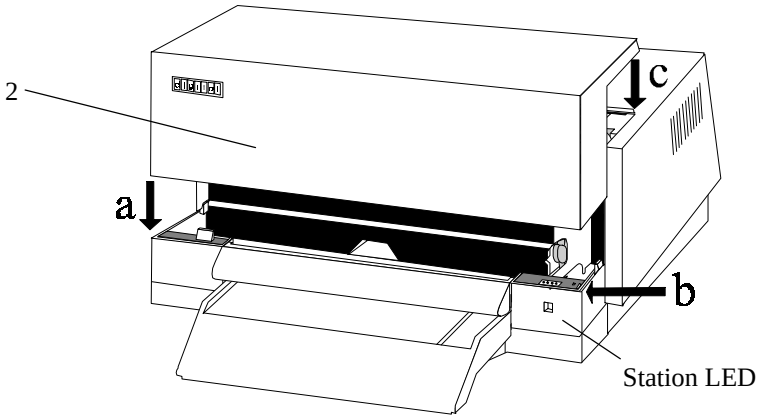


5.6 Ready to Print

After completion of Maintenance, the printer must be set back to operational mode - Printer is set to On-Line Status - ready for receiving data and printing.

1 If necessary, reinstall the Parts by performing the tasks as described on previous pages (reverse order).

2 Lid - install and align at positions **a**, **b** and **c,**
- Station LED - changes from Blinking RED to GREEN.



6 SPECIFICATIONS

These are as follows:

6.1 Printer Characteristics

Width	16.14" (410mm)
Depth w/o Doc. Guide	10.43" (265mm)
Depth with Doc. Guide	13.78" (350mm)
Height	07.48" (190mm)
Weight	19.16 lb. (8.7 kg)
Interface, Serial	One RS232C port, 9-pin male connector
Interface, Parallel	One parallel port, 36-pin female connector
Printing Speed	10 CPI draft 200 CPS
Ink Ribbon	Color: black. Replacement frequency: Draft Mode - at 30% print contrast signal after printing 2.5 million characters. Stock shelf life: 2 years max.
Power Supply	100 – 120 V or 200 – 240V
Frequency	50/60 Hz
Power Consumption	120VA(max.) 30VA(idle)
Power Cord Requirements	• For 115V operation:- UL listed and CSA certified type SVT 18/3 AWG, rated minimum 10A, 125V. • For 230V operation:- Use HAR type HO5.VVF 3G1.0
Temperature, Operating and	13°C – 35°C (55°F – 95°F)
Non-operating	- 4°C – 65°C (- 40°F – 149°F)
Rel. Humidity, Operating and	10% to 80%
Non-operating	95% max.
Acoustical Noise Level	Noise power emission: < 6.6 Bells
ISO779	Sound pressure level: < 65 dB at operator position

6.2 Serial Interface - RS232C

This signal port option is one serial line that conforms to RS232C-EIA standard.

The Printer input buffer size is 4K bytes.

6.2.1 Configurable Parameters

These are as follows, where factory defaults are in *Italic*:

- Baud Rate - 1200, 2400, 4800, *9600*, 19200
- Character length - 7, *8* data bits
- Stop Bits - *1*, 2
- Parity - odd, even, *none*
- Flow Ctrl - *RTS/CTS*, XON/XOFF

6.2.2 Serial Connector

Located at the rear of the printer is a 9 Pin male DSUB. The pin assignments and signals between printer - host are as follows:

Printer Connector 9-pin	Signal	Description	Source	Host Connector 9pin	25pin
1	DCD	Not Used	-	-	-
2	RXD	Receive Data	Host	3	2
3	TXD	Transmit Data	Printer	2	3
4	DTR	Data Terminal Ready	Printer	6	6
5	GND	Signal Ground	-	5	7
6	DSR	Data Set Ready	Host	4	20
7	RTS	Request to Send	Printer	8	5
8	CTS	Clear to Send	Host	7	4
9	-	Not Used	-	-	-

RXD - receives data from the Host. The interface ignores RX Data when DSR is low.

TXD - when using XON/XOFF, Printer to Host, Clear to Send (CTS) must be high to enable transmission. The Printer does not transmit any data when RTS or CTS are high.

DTR - is set and remains 'HIGH' while the Printer power is ON and the interface is operational.

GND - This pin is connected to the logic ground to provide a common reference for the data and control signals.

DSR - The interface ignores received data unless DSR is 'HIGH'.

RTS - This signal is set, 'HIGH' at power ON. RTS. 'HIGH' tells the HOST that the Printer is busy and cannot receive data.

CTS - The interface monitors this signal which must be. 'HIGH' for the interface to transmit XON and XOFF where:

- XON = DC1, Hexadecimal 11
- XOFF = DC3, Hexadecimal 13.

6.2.3 Handshaking

This is either XON/XOFF or RTS/CTS with the Flow Control according to Setup. A Buffer full treatment is performed according to Flow Control when the available space is 10 bytes.

XON/XOFF When this protocol is selected, the Printer sends XON to the Host when it is able to receive data and XOFF to stop the data flow or to indicate it is unable to receive any data.

RTS/CTS When the Host wants to send data to the Printer, it must wait for the Printer RTS line to go 'HIGH'. If RTS goes 'LOW', the Host must stop transmission and wait for RTS 'HIGH' before sending any data.

6.3 Parallel Interface - Centronics

This is an unidirectional interface that transfers 1 byte at a time.

Signal Name	Description	Pin in	Pin out	Source
D STROBE	Data Strobe	1	19	Host
CE DATA 1	Data 1	2	20	Host
CE DATA 2	Data 2	3	21	Host
CE DATA 3	Data 3	4	22	Host
CE DATA 4	Data 4	5	23	Host
CE DATA 5	Data 5	6	24	Host
CE DATA 6	Data 6	7	25	Host
CE DATA 7	Data 7	8	26	Host
CE DATA 8	Data 8	9	27	Host
ACK	Acknowledge	10	28	Printer
BUSY	Printer Busy	11	29	Printer
PE	Paper End	12		Printer
SELECT OUT	Printer On Line	13		Printer
AUTO FEED	Not Used	14		Host
NOT USED	Not Connected	15		Host
SIGNAL GROUND	Ground Layer	16	31	Host
CHASSIS GND	Not Connected	17		Host
+5V	Pull Up to +5V	18		Printer
GND (1)	Gnd (1)	19		Host
GND (2)	Gnd (2)	20		Host
GND (3)	Gnd (3)	21	33	Host
GND (4)	Gnd (4)	22		Host
GND (5)	Gnd (5)	23		Host
GND (6)	Gnd (6)	24		Host
GND (7)	Gnd (7)	25		Host
GND (8)	Gnd (8)	26		Host
GND (9)	Gnd (9)	27		Host
GND (10)	Gnd (10)	28		Host
GND (11)	Gnd (11)	29		Host
GND (31)	Gnd (31)	30		Host
INIT	Soft Reset	31		Host
FAULT	Printer Error	32		Printer
GND (36)	Gnd (36)	33		Host
NOT USED	Not Connected	34		Host
NOT USED	Not Connected	35		Host
SELECT IN	Not Used	36		Host

6.4 Documents

The printer handles two basic document types, forms and passbooks. Forms can be single-ply or multi-ply or envelopes. Passbooks can have a vertical or a horizontal seam.

	Vertical Seam Passbooks	**Horizontal Seam Passbooks**
Minimum Width	4.0" (101 mm)	4.0" (101 mm)
Maximum Width	7.6" (193 mm)	7.6" (193 mm)
Minimum Length	4.0" (101 mm)	4.0" (101 mm)
Maximum Length	7.6" (193 mm)	7.0" (177 mm)
Minimum Thickness	0.02" (0.5 mm)	0.02" (0.5 mm)
Maximum Thickness	0.08" (2 mm)	0.08" (2 mm)
Top & Bottom, Left & Right Minimum Margin	0.25" (6.35 mm)	0.25" (6.35 mm)
Minimum Seam Margins	2 x 0.31" (8 mm)*	2 x 0.39" (10 mm)*

Form Sizes and minimum margins are:

	Documents ≤ 8.7" (221 mm)	**Documents ≤ 9.5" (241 mm)**
Width	2.5" (63mm) to 8.7" (221mm)	2.5" (63mm) to 9.5" (241mm)
Length	2.5" (63mm) to 14.5" (368mm)	2.5" (63mm) to 14.5" (368mm)
Ratio,Length /Width	Up to 2.5	Up to 2.5
Left Margin	Single-ply 0.10" (2.5mm) Multi-ply 0.22" (5.5mm)	Single-ply 0.10" (2.5mm) Multi-ply0.22" (5.5mm)
Right Margin	Single-ply 0.10" (2.5mm) Multi-ply 0.22" (5.5mm)	Single-ply 0.10" (2.5mm) to 0.7" (18mm)* Multi-ply* 0.10" (2.5mm) to 0.7" (18mm)*

* Depending on document position

The Paper used for a Form should be:

	Single-Ply	**Two-Ply**	**Multi-Ply**
Total Thickness	0.004" to 0.02" (0.1 to 0.45 mm)	0.004" to 0.02" (0.1 to 0.45 mm)	0.004" to 0.02" (0.1 to 0.45 mm)
Max. No. of Copies	1	1 + 1	1 + 3 *
Top Sheet Weight Bottom Sheet Weight Inner sheet weight	16 to 32 lb. (60 to 120 /m^2)**	14 to 26 lb. (50 to 100 g/m^2) 14 to 26 lb. (50 to 100 g/m^2)	11 to 24 lb. (40 to 90 g/m^2) 22 to 32 lb. (80 to 120 g/m^2) 11 to 22 lb. (40 to 80 g/m^2)
Total weight	16 to 32 lb. (60 to 120 g/m^2)	26 to 52 lb. (100 to 200 g/m^2)	16 to 77 lb. (60 to 280 g/m^2)

* To handle this number of copies you must use the minimum allowed weight for each sheet

** To allow for varying paper quality, the recommended minimum weight is 65g/m2

The paper for a Passbook should be:

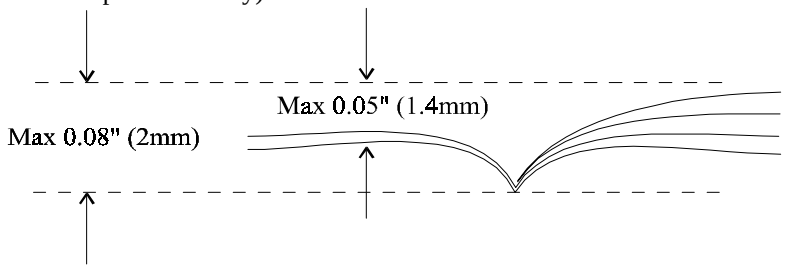
Maximum Total Thickness	0.08" (2 mm)
Cover Weight	26 to 32 lb. (100 to 120 g/m2)
Cover Thickness	0.008" to 0.02" (0.2 to 0.5 mm)
Inner sheet weight	24 to 32 lb. (90-120g/m2)

6.4.1 Recommendations and Restrictions

- Transparent documents or documents containing transparent areas cannot be used. Reflective ink surfaces (i.e. silver, gold) do not cause problems with the edge detection system.
- Dark areas at the top of a form, close to the Left and Right Margins, i.e. Logo's and Letterheads will cause problems unless the TOP OFFSET in SETUP is correctly set.
- Documents with staples, paper clips, holes or perforations are not permitted.
- Multi-ply forms of different lengths can be handled only if they are aligned at the top. The shortest form must have a minimum length of 7.3" (185 mm) and the software must eject the form at the rear of the printer.
- Multi-ply forms can consist of up to 3 copies plus the original.
  Multi-ply forms with carbon sheets are not supported.
- The single part sheet and the top sheet of a multi-ply form should be either white or a light color for maximum print contrast.
- When preprinted lines are required, the preprint must be as thin and fine as possible to produce legible results.

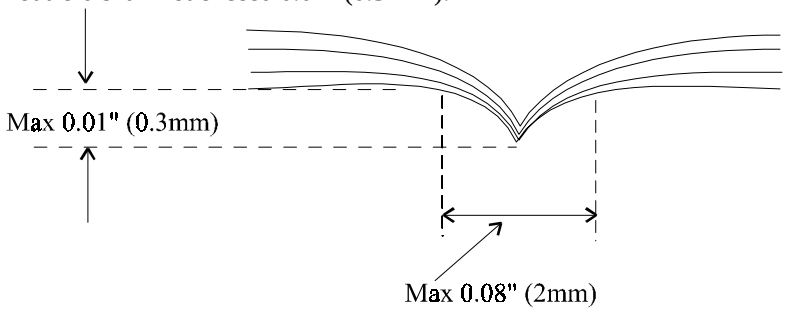
6.4.2 Passbook Thickness

The maximum thickness of a passbook shall not exceed 0.08" (2.0 mm) when the print page is opened. The difference between the maximum and the minimum thickness at the centerfold shall not exceed 0.05" (1.4 mm) except for an end sheet (vertical seam passbook only).



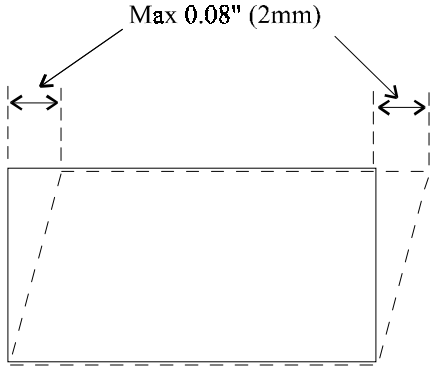
6.4.3 Center Outfold Bulge

When the passbook is opened at the middle page, the height of the bulge at the center outfold shall not exceed 0.01" (0.3 mm).



6.4.4 Passbook Squareness

When the passbook is closed, the edge of the shorter side must be at a 90° angle to the longer side.



7 GLOSSARY

ASCII	American Standard Code for Information Interchange. A standardized set of machine-readable 7 or 8-bit codes consisting of control codes and codes representing alphanumeric characters and symbols.
AWG	American Wire Gauge
Bi-directional printing	where printing occurs from left to right and from right to left.
Baud rate	The speed of data transmission measured in bits per second.
Bit	a single character of a language having just two characters, binary digits 0 or 1.
Byte	a group of bits of information.
CPI	Character Per Inch - the spacing of characters in a line. Sometimes referred to as 'pitch' or 'density'.
CPS	Characters Per Second.
CSA	Canadian Standards Association
CTR	Confidence Test Routine. Performed by the printer at power-on
CTS	See RTS/CTS.
Character Set	a table of characters, each associated with an ASCII code, in a given font that can be printed.
Ctrl	Control
DCD	Data Carrier Detect
DPI	Dots Per Inch.
Draft	printing in single strike mode where one dot impact is delivered.
DSR	Data Set Ready.
DTR	Data Terminal Ready.
Double Height	where characters are printed in two passes twice their normal height.
Double strike	where text is printed in two passes with no horizontal or vertical offset.
Double width	See expanded.
EU	European Union
EIA	Electronic Industries Association. Sets standards for the

	electrical and functional characteristics of equipment.
Emulation	where software allows the printer to imitate another printer.
Emphasized	where text is printed in two passes with a horizontal offset.
Expanded	where characters are printed in one pass at twice their normal width.
ESC	A single byte ASCII code that initiates an escape sequence. Corresponding hexadecimal code is <1B>.
Escape Sequence	A series of characters beginning with the code ESC which activates a printer function.
FCC	Federal Communications Commission
Flow Control	RTS/CTS or XON/XOFF protocol.
Font Quality	where characters are printed in Draft or High Quality Draft.
Form	a document type defined as single-ply, multi-ply or an envelope.
HQD	High Quality Draft. Two consecutive dot impacts are delivered (double strike).
Hz	Hertz. The measuring unit for frequency (cycles per second)
ISO	International Standards Organization
IEC	International Electrotechnical Commission
Intercharacter Spacing	the space left blank between two consecutive characters.
Loadable Character Set	where resident and/or downloaded characters are used.
LPI	Lines Per Inch.
Mechanical Margin	defined by the hardware, this is 0.1" (2.5 mm) from the left, right and top edges of the document.
NVM	Non Volatile Memory.
Off-line	the state when the communications line between the printer and the host is not ready for data exchange.
On-line	the state when the communications line between the printer and the host is ready for data exchange.
Overscore	To draw a line above printed characters and space.
RAM	Random Access Memory.
RS232C	serial interface standard used to connect the printer to the

	host.
RTS/CTS	Request To Send / Clear To Send. One of the standards used by the RS232C protocol for controlling the flow of data between two communicating devices using handshake signals. When the host wants to send data to the printer, it must wait for the printer RTS line to go on. If the printer RTS line goes off, the host must stop transmission and wait for it to go on again before sending any data. If the host input buffer is full, when receiving an incoming message from the printer, it must turn the printer CTS line off so that the printer stops transmitting data. To restart communication, the host turns the printer's CTS line on.
RX	Receive
RXD	Receive Data
Resident Character Set	permanently available in the printer.
Reversed	where characters are printed in white against black.
Stop bit	The bit which signals the end of data.
SVT	Standard Voltage Temperature
TX	Transmit
TXD	Transmit Data
Underscore	To draw a line under printed characters and spaces.
UL	Underwriters Laboratory
Unidirectional print mode	where the printer prints from left to right only.
V	Volt
VA	Volt Ampere
XON/XOFF	A software protocol for controlling the flow of data between two communicating devices. By sending the XON (Transmit on) code, the receiving device informs the transmitter that it is ready to receive data. By sending the XOFF (transmit off) code, the receiver instructs the transmitter to stop sending data.

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