

Basic Purpose Printer LB20



Field Support Manual

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A publication of:

DIGITAL EQUIPMENT BCFI AB
P.O. Box 904
S-175 29 Järfälla, Sweden

Printed in Sweden, March 1997

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Part number: EK-LB20A-SM.001

PREFACE

The Field Support Manual gives information for Service Engineers.

A thorough knowledge of mechanical and electronic functions of the LB20 is desirable.

Scope

This Field Support Manual contains the following chapters:

- Introduction
- Fault Diagnosis
- Removal and Replacement
- Glossary

Related Documentation

- User's Guide (EK-LB20A-UG)
- Programmer's Reference Guide (EK-LB20A-RG)
- Spare Part Guide (EK-LB20A-PG)

Order Process

Documentation, Accessories and Spare Parts shall be ordered from:

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P.O.Box 904

175 29 Järfälla

Sweden

Telephone: +46 8 759 4600

Facsimile: +46 8 621 1718

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.

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4 GLOSSARY

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1 Introduction

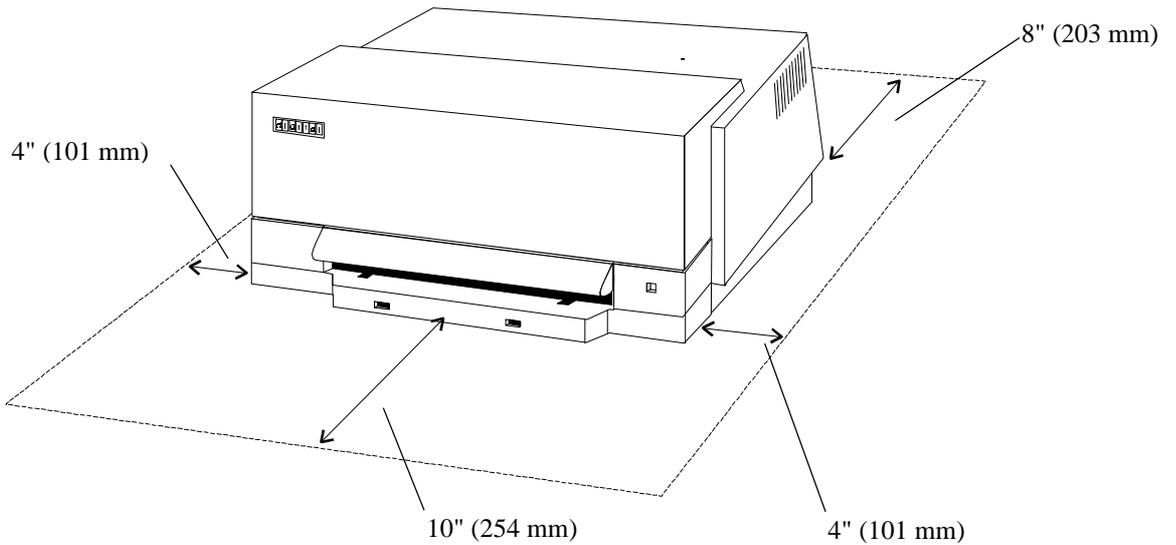
The printer is simple to install, operate and maintain.

1.1 Installation

The printer shall be installed on a flat, smooth, and horizontal surface. The User's Guide explains how the printer is installed and setup. The menu default settings are shown at the end of this chapter.

1.1.1 Operating Space

If necessary, allow further space for power and communication cable connections.



1.2 Specifications

For the printer these are:

Dimensions	Width	16.14" (410 mm)
	Depth without Document Guide	10.43" (265 mm)
	Depth with Document Guide	13.78" (350 mm)
	Height	07.48" (190 mm)
Weight		19.16 lb. (8.7 kg)
Interface,	Serial printers	One RS232C port, 9-pin male connector
Interface,	Parallel printers	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		<ul style="list-style-type: none">• For 115V operation:- UL listed and CSA certified type SVT 18/3 AWG, rated minimum 10A, 125V. Molded-On parallel blade attachment plug cap with grounding pin. Other end terminates in molded-on cord connector.• For 230V operation (EU countries):- Use HAR type HO5.VVF 3G1.0
Temperature, Operating		13°C to 35°C (55°F to 95°F)
Temperature, Non-operating		-4°C to 65°C (-40°F to 149°F)
Rel. Humidity, Operating		10% to 80%
Rel. Humidity, Non-operating		95% max.
Acoustical Noise Level		Noise power emission: < 6.9 Bells Sound pressure level: < 68 dB operator position when printing ISO 7779 pattern at 200 CPS in Draft on 80 g/m ² single-ply paper
Safety Certifications		IEC 950/EN 60950,
RF Emission Certifications		EN 50082-1 and EN 55022B

1.2.1 Serial Interface - RS232C

This signal port option satisfies the RS232C-EIA standard. The Printer input buffer size is 4K bytes.

Configurable Parameters

These are as follows:

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

Default Configuration

9600 Baud, 8 data bits, 1 stop bits, No Parity bit, RTS/CTS Flow control.

1.2.2 Serial Connector

This is a 9 Pin male sub-miniature in a D-shell. The pin assignments and signals are:

Pin Number	Signal Name	Source	Description
1	DCD	-	Not Used
2	RXD	Host	RX Data
3	TXD	Printer	TX Data
4	DTR	Printer	Data Terminal Ready
5	GND	-	Signal Ground
6	DSR	Host	Data Set Ready
7	RTS	Printer	Request to Send
8	CTS	Host	Clear to Send
9	-	-	Not Used

- RX Data - receives data from the Host. The interface ignores RX Data when DSR is low.
- TX Data - 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'.
- Data Terminal Ready - is set and remains, 'HIGH', while the Printer power is ON and the interface is operational.
- Signal Ground - This pin is connected to the logic ground to provide a common reference for the data and control signals.
- Data Set Ready - The interface ignores received data unless DSR is 'HIGH'.
- Request to Send - This signal is set, 'HIGH' at power ON. RTS. 'HIGH' tells the HOST that the Printer is busy and cannot receive data.
- Clear to Send - 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

1.2.3 Serial Cable

The pin linking from the printer's 9 pin male DSUB to a 9 or 25 pin Host is:

Printer Connector			Host Connector		
Pin Number	Signal Name	Cable Line	Signal Name	9 Pin Pin Number	25 Pin Pin Number
2	TXD	Host	TXD	3	2
3	RXD	Printer	RXD	2	3
4	DSR	Printer	DSR	6	6
-	-	-	DCD	-	-
5	GND	-	GND	5	7
6	DSR	Host.	DTR	4	20
1	DCD	-	-	-	-
7	RTS	Printer	CTS	8	5
8	CTS	Host	RTS	7	4

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 Flow Control

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 Flow Control

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.

1.2.4 Parallel Interface - Centronics

This signal port option is an unidirectional Transistor to Transistor (TTL) interface that transfers one byte of data at a time.

Signal Name	Internally used as	Pin No.	Source
D STROBE	Data Strobe	1	Host
CE DATA 1	Data 1	2	Host
CE DATA 2	Data 2	3	Host
CE DATA 3	Data 3	4	Host
CE DATA 4	Data 4	5	Host
CE DATA 5	Data 5	6	Host
CE DATA 6	Data 6	7	Host
CE DATA 7	Data 7	8	Host
CE DATA 8	Data 8	9	Host
ACK	Printer Acknowledge	10	Printer
BUSY	Printer Busy	11	Printer
PE	Printer 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	Host
CHASSIS GROUND	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	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	Printer 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

1.3 Documents

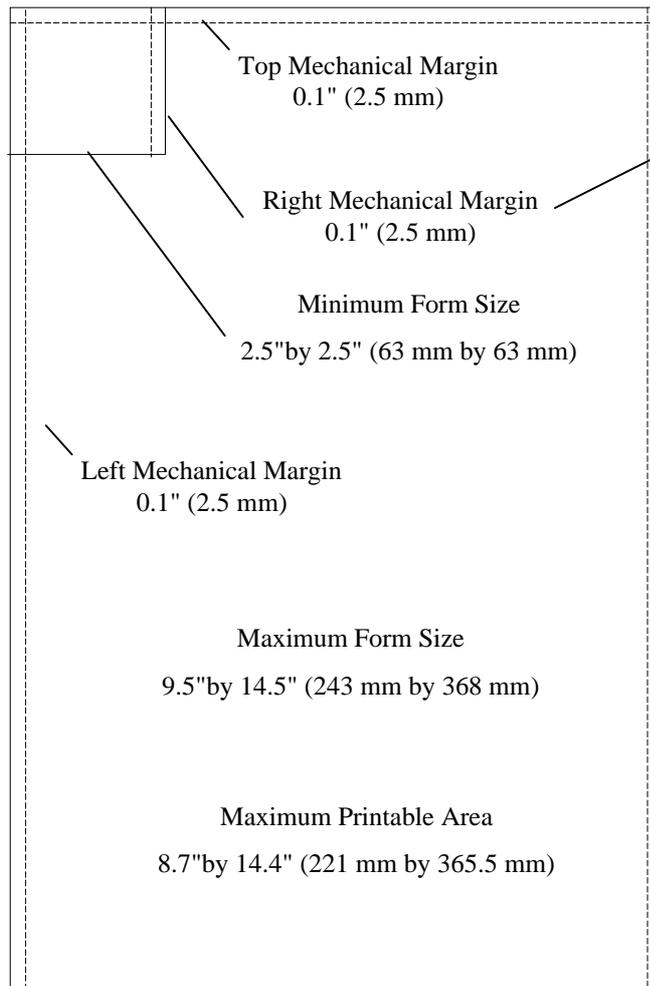
These may be of different size, shape and thickness.

The two types are:

- Forms - single-sheet or a 'set of forms' (an envelope is treated as a form)
- Passbooks - vertical or horizontal seam.

1.3.1 Forms

The printable area is defined to be between the left, right, top and bottom mechanical margins, as shown below:



Single-Sheet and 'Set of Forms'

The printer can handle a 'set of forms' consisting of one top sheet and up to three copies.

Form Size and Minimum Margins are:

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

* 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	16 to 32 lb. (60 to 120 /m ²)**	14 to 26 lb. (50 to 100 g/m ²)	11 to 24 lb. (40 to 90 g/m ²)
Bottom Sheet Weight		14 to 26 lb. (50 to 100 g/m ²)	22 to 32 lb. (80 to 120 g/m ²)
Inner sheet weight			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

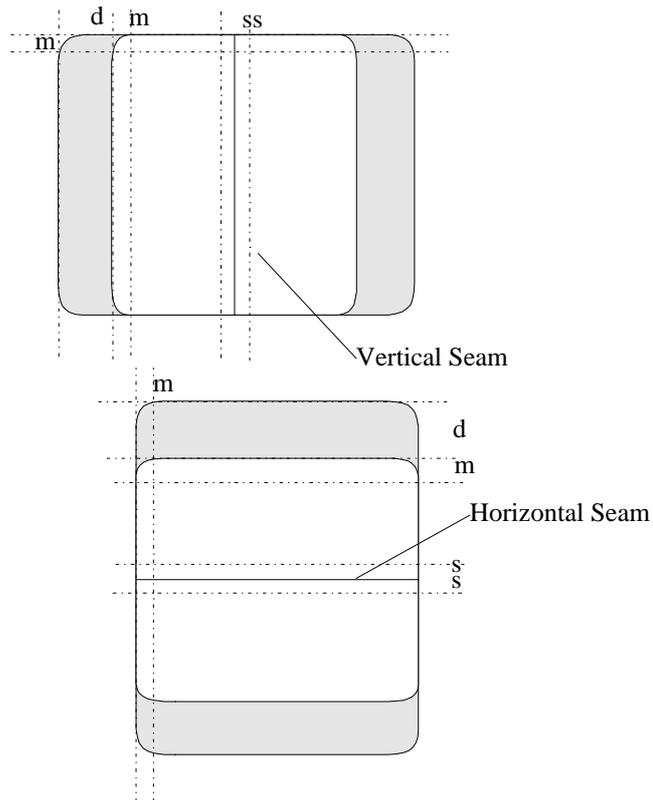
1.3.2 Passbooks

Dimensions are:

	Vertical Seam	Horizontal Seam
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)*

Parameters

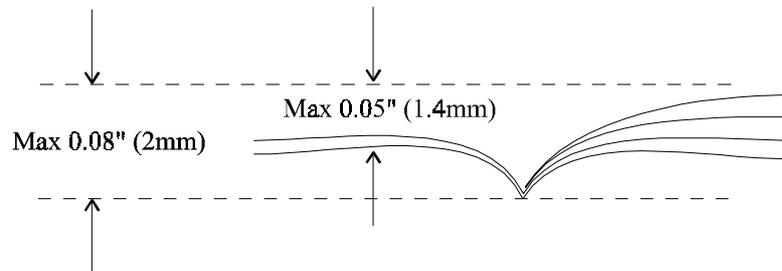
These are; d = Cover Offset, m = Mechanical Margin and s = Seam Margin as shown below:



Note: For more information on Passbook Parameters please refer to the DOC Menu in the User's Guide.

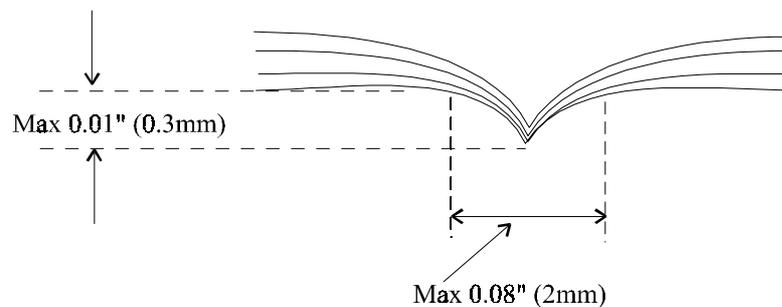
1.3.3 Passbook Thickness

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



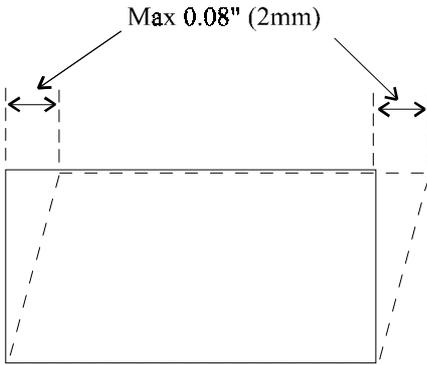
Center Outfold Bulge

The height of the bulge at the center outfold shall not exceed 0.01" (0.3 mm).



1.3.4 Passbook Squareness

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



The Paper used for a Passbook should be:

Maximum Total Thickness	0.08" (2 mm)
Cover Thickness	0.008" to 0.02" (0.2 mm to 0.5 mm)
Inner Sheet Weight	90 to 120g/m ²

1.3.5 Rules for Forms

All documents must be accurately measured before the printer is used

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 Letterhead's 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 application software must eject the form at the rear of the printer.

Multi-ply forms can consist of up to 3 copies plus the original. **Note:** carbon sheets are not supported.

Single sheets 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.

1.4 Test Routines

A fault is indicated by the Status LED's in a RED or Blinking RED condition. At Power ON, the Confidence Test Routine (CTR) verifies, that all functions are trouble free.

The Maintenance Test Routine (MTR) is used to assist fault diagnosis.

1.5 Default Configuration

COM Menu

Parameter	Default
Baud Rate	9600
Length	8 bits
Stop Bits	1 bit
Parity	None
Flow Control	rts/cts

IBM Menu

Parameter	Default value
Country	USA
Set	Set 1
Font	Draft
CPI	10 CPI
LPI	6 LPI
Condensed 20 CPI	Yes
CR =>LF	No
LF/VT=>CR	No
Form Length	11"
Zero	Normal
Top Margin	1

DOC Menu

Parameter	Default value
Print Contrast	3
Form Smudging	3
Psbk Smudging	4
Top Offset	0
Psbk Seam Type	horz
Psbk Width Min.	5"
Psbk Range	1"
Horz Psbk Seam	3.5"
Cover Offset	0

<>DFT Menu

Parameter	Default
Draft Coarse	3
Draft Fine	1

<>HQD Menu

Parameter	Default
HQD Coarse	3
HQD Fine	1

Note: Default values are used if a Logic Board is changed. NVM errors may reset a setting to the default value.

Note: In the User's Guide, a page shows a printout by the LB20 Factory Default Setup.

2 Fault Diagnosis

At Power ON the Confidence Test Routines (CTR), loaded in firmware, is performed.

2.1 Confidence Test Routine

CTR verifies that the main printer functions are trouble-free. CTR is entered automatically at Power ON and performs several tests. Success or failure is indicated by the Station LED as follows:

- Solid GREEN or Blinking Green - Success
- Solid RED - Fatal error, non-recoverable
- Blinking RED - Non-Fatal error, indicating a recoverable error

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

Status LED's 'x' = ON				Station LED	Faults	Corrective Action
			x	RED	CPU	Replace Board's
				Blinking RED	NVM	Perform Setup
		x		Blinking RED	Lid	Close lid, check magnet/sensor
x				RED	Initialization	Use MTR , then troubleshooting
x			x	RED	Motors	Use MTR , then troubleshooting
x		x		RED	Edge detector only	Use MTR , then troubleshooting
x		x	x	RED	Motors, then edge detector	Use MTR , then troubleshooting

2.1.1 Recoverable Errors

These are cleared by pressing the Button Bar for less than one second (Hit). After error clearing, the default values are loaded in the NVM.

Note: The printer must be re-configured using Setup after an NVM error to restore the user settings.

2.1.2 Tests

- CPU - logic board tests are performed
- NVM - checks the configurable part of the RAM with a Cyclic Redundancy Check (CRC) test
- Front Cover - checks that the Lid is correctly installed
- Initialization - checks the basic internal functions of the Logic Board
- Motors - checks the multifunction motor, printhead carrier motor, and the form feeder motor
- Edge Detector - indicates that the edge detector is covered

2.2 Maintenance Test Routine

MTR consists of a set of manually activated tests, loaded in firmware, that are designated to locally exercise almost all printer functions. The tests are:

Status LED's where 'x' = ON				Test
			x	Edge Detector Adjustment
		x		Print
		x	x	Printhead Burn-in
	x			Printhead Carrier
	x		x	Anvil
	x	x		Form Feed
	x	x	x	Life
x				Left Margin Adjustment
x			x	Top Margin Adjustment
x		x		Acoustic
x		x	x	Usage, Top and Left Margins
x	x			Loopback
x	x	x	x	MTR Quit

2.2.1 Entering MTR

Perform the following:

1. ensure the Lid is correctly installed
2. press and hold down the Button Bar
3. select Power ON
 - the Station LED shows RED
 - the Motor runs and the Printhead moves
 - the Station LED extinguishes
4. release the Button Bar

Note: MTR is entered and the Status LED's indicate the Edge Detector Adjustment.

2.2.2 Scrolling through MTR

The Button Bar is used to scroll through the tests as follows:

- press the Button Bar down for less than one second, then release (Hit)

2.2.3 Stopping the current MTR

- a) press the Button Bar for longer than 2 seconds, then release
 - the Station LED Blinks RED
- b) press the Button Bar down for less than one second , then release (Hit)
 - the Station LED is extinguished
- c) the Status LED's indicate the test just performed is ready for entering
- d) Repeat the test or scroll to another

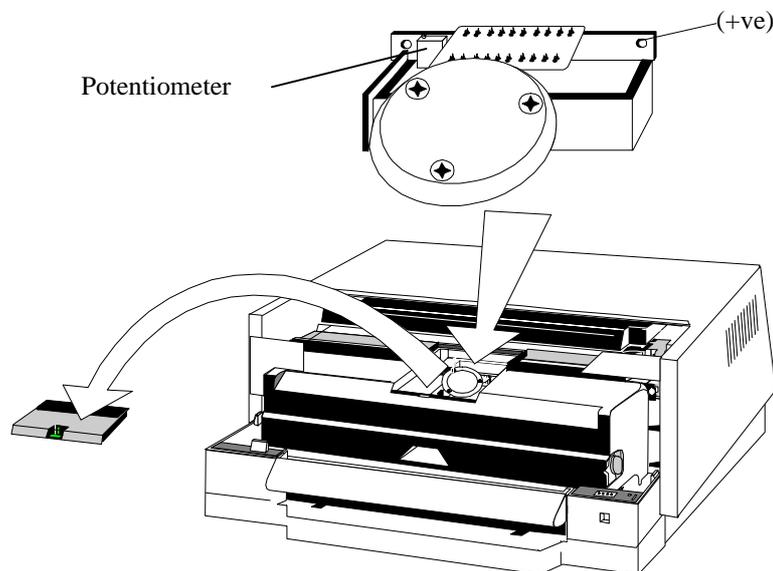
2.3 Tests and Adjustments

These are as follows:

2.3.1 Edge Detector Adjustment

When a part has been replaced in the edge detection function:

- The Mylar Cassette Slider, the Edge Detector Sensor and Ink Ribbon Cassettes must be cleaned.
 - Perform this test followed by the Left and Top Margin Adjustments
1. Perform the following: refer to the Printhead Maintenance Procedure in the User's Guide if necessary
 - Power Up **Note:** the Lid must be correctly installed
 - Centering the Skid
 - Raising the Carrier
 - Removing the Ink Ribbon Cassette
 - Removing the Trapdoor
 2. Perform Entering MTR. Remove the Lid and confirm that the Status LED's indicate that the Edge Detector Adjustment is available, LED's = Off, Off, Off, On.
 3. Select the test - press the Button Bar down until the Station LED turns SOLID GREEN, then release
 4. Insert an A4, 80 g/m² white document over the Document Guide to the Upper front roll.
 5. Press the Button Bar down for less than one second, then release (Hit)
 - the Printhead moves to the center
 - the document is drawn forward approximately halfway
 6. Connect a digital voltmeter across the Printhead Board test points, with the positive probe +ve on the right test point.



7. Adjust the potentiometer until the voltmeter indicates between 0.24V and 0.26V.
8. Press the Button Bar for less than one second (Hit)
 - the document is ejected



Caution !

Damage to the printer may result if the Button Bar is pressed down. Take care not to press the Button Bar down, or the Printhead will move.

9. Verify that the Voltmeter indicates at least 3.8V. Reduce the voltage by 0.2 V to 0.3 V ensuring that the voltage does not drop to below 3.5 and remove the voltmeter probes.
10. Press the Button Bar for less than one second (Hit) to complete this test
 - The Printhead moves to home position (left side)
 - the status LED's indicate the Edge Detector Adjustment
11. Reinstall the Trapdoor, the Ink Ribbon Cassette and the Lid.
13. Go to the Left Margin Adjustment, and then Top Margin Adjustment.

2.3.2 Print

Is used to check the printhead when a pin failure (resulting in a missing dot) is suspected.

1. Perform Entering MTR. Remove the Lid and scroll through MTR until the status LED's indicate that Print has been reached , LED's = Off, Off, On, Off.
2. Enter the test by pressing the Button Bar down for longer than 2 seconds and load an A4, 80 g/m² white document over the Document Guide
 - the station LED Blinks GREEN
3. Press the Button Bar down until the Station LED shows solid GREEN, then release
 - the test starts

The printer prints the dot number followed by a single dot line printed with the specified dot. The printer performs a line feed and the same process restarts for the next dot. All the printhead dots are exercised one at a time up to the ninth dot. When all pins have been tested further print attribute test are performed.

When the test is finished the document is ejected and,

- the Station LED is extinguished
 - the Status LED's indicate the Print test
4. Perform MTR Quit or scroll to another test

2.3.3 Printhead Burn-in

Is used to exercise the Printhead.

1. Perform Entering MTR. Remove the Lid and scroll through MTR until the status LED's indicate that Printhead Burn-in has been reached, LED's = Off, Off, On, On.
2. Enter the test by pressing the Button Bar down for longer than 2 seconds and load an A4, 80 g/m² white document over the Document Guide
 - the station LED Blinks GREEN
3. Press the Button Bar down until the Station LED shows solid GREEN, then release
 - the test starts

After selecting the print mode (Draft or HQD) the test prints the USA Extended character set in 10 CPI, 6 LPI, no attribute.

4. Perform MTR Quit or scroll to another test

2.3.4 Printhead Carrier

Continuously exercises the full movement of the Printhead Carrier.

1. Perform Entering MTR. Remove the Lid and scroll until the status LED's indicate that this test has been reached, LED's = Off, On, Off, Off.
2. Press the Button Bar down until the Station LED shows solid GREEN, then release
 - the test starts
3. Press down the Button Bar for less than one second, then release (Hit)
 - the test stops
 - the Station LED extinguishes and the Status LED's indicate that this test has been reached
4. Perform MTR Quit or scroll to another test

2.3.5 Anvil

Continuously exercises all positions of the anvil stepper.

1. Perform Entering MTR. Remove the Lid and scroll until the status LED's indicate that this test has been reached LED's = Off, On, Off, On.
2. Press the Button Bar down until the Station LED shows solid GREEN, then release
 - the test starts
3. Press down the Button Bar for less than one second (Hit), then release
 - the test stops
 - the Station LED extinguishes and the Status LED's indicate that this test has been reached
4. Perform MTR Quit or scroll to another test

2.3.6 Form Feed

Continuously exercises the Feeder forward and backward

1. Perform Entering MTR. Remove the Lid and scroll until the status LED's indicate that this test has been reached, LED's Off, On, On, Off.
2. Press the Button Bar down until the Station LED shows solid GREEN, then release
 - the test starts
3. Press down the Button Bar for less than one second (Hit), then release
 - the test stops
 - the Station LED extinguishes and the Status LED's indicate that this test has been reached
4. Perform MTR Quit or scroll to another test

2.3.7 Life

Continuously exercises the printing and motors burn-in functions.

1. Perform Entering MTR. Remove the Lid and scroll until the status LED's indicate that this test has been reached, LED's = Off, On, On, On.
2. Enter the test by pressing the Button Bar down for longer than 2 seconds and load an A4, 80 g/m² white document over the Document Guide
 - the station LED Blinks GREEN
3. Press the Button Bar down until the Station LED shows solid GREEN, then release
 - the test starts

The test consists of 8 hours printing, followed by 4 hours of motors burn-in. The print pattern is a special one used for acoustical level measurement. It is printed in HQD or Draft at 10 CPI and 8 LPI without special print attribute.

The test prints 85 lines per form. Each line is overprinted 20 times. Each overprint occurs every 17 seconds. At the end of the print the document is ejected and the motors burn-in takes place. 720 cycles of insertion/ejection without document are performed. Each cycle occurs every 20 seconds.

4. Press down the Button Bar for less than one second (Hit), then release
 - the test stops
 - the Station LED extinguishes and the Status LED's indicate that this test has been reached
5. Perform MTR Quit or scroll to another test

2.3.8 Left Margin Adjustment

This test is ideally performed using a 6" (152 mm), 80 g/m² white document where a visual check is possible such that the printed line is centered between the left and right edges.

Note: If the 6" document is not available the Left Margin must be measured and set to 2.54 mm plus or minus 0.5 mm

The adjustment procedure is as follows:

1. Perform Entering MTR. Remove the Lid and scroll, until the status LED's indicate that this test has been reached, LED's = On, Off, Off, Off.
2. Enter the test by pressing the Button Bar down for longer than 2 seconds
 - the station LED Blinks GREEN
3. Load a 6" (152 mm), 80 g/m² white document over the Document Guide

4. Press the Button Bar down for less than one second, then release (Hit)

- the document is loaded and the following line is printed:

HHH>+>--- CENTER THIS LINE ON THE 6 INCHES FORM----<-<HHH

The document is ejected and the LED's indicate the current setting in accordance with the following:

Status LED's where 'x' = ON				Setting where the 'increment' is 2/180, (0.282 mm)
				Zero Value
			x	+1
		x		+2
		x	x	+3
	x			+4
	x		x	+5
	x	x		+6
x	x	x	x	Exit without changing the value
x	x	x		-6
x	x		x	-5
x	x			-4
x		x	x	-3
x		x		-2
x			x	-1
				Zero Value

Note: The above table of increments is cyclical

If necessary adjust the Left Margin as follows:

- Decide what increment from the above table to set.
- Scroll through the table until the desired increment is reached
- Press and hold down the Button Bar for longer than two seconds
 - the increment will be applied
 - the Status LED's indicate that the Left Margin Adjustment is still running (LED's =On, Off, Off, Off)
- Repeat steps 4 to 8 until the Left Margin is correct.
- Go to the Top Margin Adjustment.

2.3.9 Top Margin Adjustment

This shall be set to 6.35 mm plus or minus 0.5 mm.

The adjustment procedure is as follows:

1. Perform Entering MTR. Remove the Lid and scroll, by pressing the Button Bar down for less than one second, then release (Hit), until the status LED's indicate that Top Margin has been reached, LED's On, Off, Off On.
2. Enter the test by pressing the Button Bar down for longer than 2 seconds, then release.
 - the station LED Blinks GREEN
3. Load an A4, 80 g/m² white document over the Document Guide
4. Press down the Button Bar for less than one second, then release (Hit)
 - the document is loaded and the following line is printed:

HHH>+>--- CENTER THIS LINE ON THE 6 INCHES FORM----<-<HHH

The document is ejected and the LED's indicate the current setting in accordance with the following:

Status LED's where 'x' = ON				Setting where the 'increment' is 2/180, (0.282 mm)
				Zero Value
			x	+1
		x		+2
		x	x	+3
	x			+4
x	x	x	x	Exit without changing the value
x	x			-4
x		x	x	-3
x		x		-2
x			x	-1
				Zero Value

Note: The above table of increments is cyclical

If necessary adjust the Top Margin as follows:

5. Decide what increment from the above table to set.
6. Scroll through the table, press down the Button Bar for less than one second, then release (Hit), as necessary until the desired setting is reached.
7. Press and hold down the Button Bar for longer than two seconds
 - the increment will be applied
 - the Status LED's show that the Top Margin Adjustment is still selected.
8. Repeat steps 4 to 8 until the Top Margin is correct.
9. Perform MTR Quit or scroll to another test.

2.3.10 Acoustic

This test allows acoustic measurements using the standardized ISO pattern.

1. Perform Entering MTR. Remove the Lid and scroll, by pressing the Button Bar down for less than one second, then release (Hit), until the status LED's indicate that Acoustic test has been reached, LED's On, Off, On, Off.
2. Enter the test by pressing the Button Bar down for longer than 2 seconds
 - the station LED Blinks GREEN
3. Load an A4, 80 g/m² white document over the Document Guide
4. Press the Button Bar down for less than one second, then release (Hit)
 - the document is loaded and the ISO Pattern is printed
 - the Status LED's show that the Acoustic test is still in selected
5. Perform MTR Quit or scroll to another test .

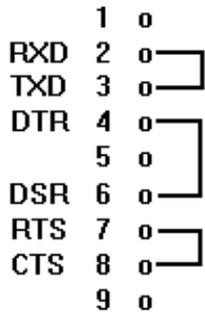
2.3.11 Usage & Top/Left Margins

This test prints the following printer information:

- FW level
 - Number of Power ON's
 - Number of Characters printed
 - Left Margin Adjustment value
 - Top Margin Adjustment value
1. Perform Entering MTR. Remove the Lid and scroll, by pressing the Button Bar down for less than one second, then release (Hit), until the status LED's indicate that the Usage & Top/Left Margin Settings test has been reached, LED's On, Off, On, On.
 2. Enter the test by pressing the Button Bar down for longer than 2 seconds
 - the station LED Blinks GREEN
 3. Load an A4, 80 g/m² white document over the Document Guide
 4. Press the Button Bar down for less than one second, then release (Hit)
 - The settings are printed
 - the Status LED's show that Usage & Top/Left Margin is still selected
 5. Perform MTR Quit or scroll to another test .

2.3.12 Loopback

This test provides a Communication Check. A female Loopback connector is required, wired as follows:



1. Perform Entering MTR. Remove the Lid and scroll, by pressing the Button Bar down for less than one second, then release (Hit), until the status LED's indicate that the Usage & Top/Left Margins test has been reached, LED's On, On, Off, Off.
2. Install the Loopback connector in the printer communication port.
3. Enter the test by pressing the Button Bar down for longer than 2 seconds, then release
 - the station LED Blinks GREEN = Test Successful
 - the station LED Blinks RED = Test Failed'
4. Stop the test by pressing the Button Bar down for less than one second, then release (Hit)
 - the Status LED's show that the Loopback test is still selected
5. Perform MTR Quit or scroll to another test.

2.3.13 MTR Quit

Perform the following:

1. Scroll, by pressing the Button Bar down for less than one second, then release (Hit), until the status LED's indicate that the Quit test has been reached (LED's On, On, On, On)
 - the status LED's indicate that the Edge Detector Adjustment is selected
 - the Station LED blinks RED
2. Re install the Lid
 - the Station LED is solid GREEN

2.4 Troubleshooting

When more than one component is suspected, perform the following:

1st Suspect: the first component to be replaced

2nd Suspect: the next component to be replaced having replaced the 1st Suspect

3rd Suspect: the next component to be replaced having replaced the 2nd Suspect

Before using the guide check the following:

- There are no missing parts in the printer
- There is no evidence of a damaged or broken part in the printer
- There are no loose objects in the printer.

Power	Go to Step
Dead Printer	1
Power Shuts Down After Power ON	10
All LED's Inactive	20
Motors Are Inactive	25
CTR Fails	Go to Step
Initialization	35
Motors	36
Lid	75
Edge Detector	80
NVM	95
CTR Passes	Go to Step
Communication	96
Button Bar Actuator	100
Feeding	110
Missing Dot	120
Random Missing Dot	130
Power shuts down in reverse character mode printing	140

2.4.1 Dead Printer

Step	Check/Action	Yes	No
1	Remove the Top Cover, reconnect power and Power ON	-	
2	The voltage between 0VP and 300V on the Power Interface Board is $280V \leq V_{dc} \leq 342V$?	Next step	Go to Step 4
3	Change the Power Interface Board	END	
4	Disconnect power. Is the fuse OK?	Next Step	Go to Step 6
5	Change the Power Interface Board	END	
6	Change the fuse -1st suspect Change the Power Interface Board - 2nd suspect	END	

2.4.2 Power Shuts Down After Power ON

Step	Check/Action	Yes	No
10	Remove the Top Cover. Disconnect J102, J103, J104 on the Power Interface Board and Power ON.	Continue	
11	Power shuts down ?	Change the Power and Interface Board	Next Step
12	Power OFF. Reconnect J104. Power ON	Continue	
13	Power shuts down ?	Change the Printhead Carrier Motor	Next Step
14	Power OFF. Reconnect J103. Power ON.	Continue	
15	Power shuts down ?	Change the Form Feeder Motor	Next Step
16	Power OFF. Reconnect J102. Power ON.	Continue	
15	Power shuts down ?	Change the Multifunction Motor	END

2.4.3 All LED's Inactive

Step	Check/Action	Yes	No
20	Change the Control Panel Board - 1st suspect Change the Logic Board - 2 nd suspect	END	

2.4.4 All Motors Inactive

Status LED's: On, Off, Off, On Station LED: RED

Step	Check/Action	Yes	No
25	Is the Lid installed ?	Next Step	Go to step 75
26	Change Logic Board - 1st suspect Change Power and Interface Board - 2nd suspect	END	

2.4.5 Initialization

Status LED's: On, Off, Off, Off Station LED: RED

Step	Check/Action	Yes	No
35	Change the Logic Board	END	

2.4.6 Motors

Status LED's: On, Off, Off, On Station LED: RED

Step	Check/Action	Yes	No
36	There is abnormal noise before the Head carrier moves	Go to Step 38	Next Step
37	The Head carrier jogs on the left or right side of the Main Frame after power on	42	Look for a loose object
38	Isolate power, remove the Top Cover, remove plug P102 from J102 on the Power Interface Board	-	
39	The resistance between pins 1 - 2 and pins 3 - 4 at plug P102 is $4 \Omega \leq R \leq 7 \Omega$?	Go to Step 41	Next Step
40	Change the Multifunction Motor	END	
41	Change the P0 XFT Sensor - 1 st suspect Change the Control Panel Board - 2 nd suspect Change the Logic Board - 3 rd suspect Change the Power Interface Board - 4 th suspect	END	
42	Isolate Power, remove the Top Cover, remove plug P104 from J104 on the Power Interface Board	Next Step	
43	The resistance between pins 1 - 2 and pins 3 - 4 at plug P104 is $2 \Omega \leq R \leq 3 \Omega$?	Go to Step 45	Next Step
44	Change the P0 Carrier Sensor - 1 st suspect Change the Control Panel Board - 2 nd suspect Change the Logic Board - 3 rd suspect	END	
45	Change the Printhead Carrier Motor - 1 st suspect Change the Power Interface Board - 2 nd suspect	END	

2.4.7 Lid

Status LED's: Off, Off, On, Off Station LED: Blinking RED

Step	Check/Action	Yes	No
75	Is the Lid Off ?	Next Step	77
76	Install the Lid and Power OFF, Power ON	END	
77	Remove the Lid. Is the magnet in the Lid. ?	79	Next Step
78	Install a magnet or order a new Lid	END	
79	Change the Control Panel Board - 1 st suspect Change the Logic Board - 2 nd suspect	END	

2.4.8 Edge Detector

Status LED's: On, Off, On, Off or On, Off, On, On

Station LED: RED

Step	Check/Action	Yes	No
80	Perform the Edge Detector Adjustment.		
81	Power OFF/ON and enter MTR. Do the Status LED's still show an error ?	Next Step	END
82	Change the Logic Board. Enter MTR. Do the Status LED's still show an error ?	Next Step	END
83	Change the Head carrier assembly 1 st suspect Change the Printhead Board - 2 nd suspect Change the Printhead Cable - 3 rd suspect Change the Logic Board 4 th suspect		END

2.4.9 NVM

Status LED's: Off, Off, Off, On

Station LED: Blinking RED

Step	Check/Action	Yes	No
95	Change Battery assembly (1st suspect). See Note: Change Logic board (2nd suspect)		-

Note: Measure the voltage across C43 Capacitor. Battery O.K. = <3.0V

2.4.10 Communication

Step	Check/Action	Yes	No
96	Was the MTR Loopback test (Serial Printers) O.K. ?	Check the Host	Go to Step 99
97	Print the COM Menu (Parallel Printers only) Is the configuration OK?	Check the Host	Next Step
98	Perform Setup		END
99	Change the Logic Board		END

2.4.11 Button Bar Actuator

Step	Check/Action	Yes	No
100	Button Bar- 1 st suspect Control Panel Board - 2 nd suspect Logic Board Change - 3 rd suspect		END

2.4.12 Feeding

Step	Check/Action	Yes	No
110	There is an abnormal noise from the Form feeder motor	Next Step	check the Belt Set
111	Isolate Power and remove the Top Cover. The resistance between pins 1 - 2, 3 - 4 of the Form Feeder Motor plug, P103 is $17 \Omega \leq R \leq 21 \Omega$?	Go to 113	Next step
112	Change the Form feeder motor		END
113	Change the Power Interface Board - 1 st suspect Change the Logic Board - 2 nd suspect		END

2.4.13 Missing Dot

Step	Check/Action	Yes	No
120	Enter MTR and perform Print. Was the test good ?	Change the Ink Ribbon Cassette	Next Step
121	See the Pin Assignments below. The resistance between the dot is $4 \Omega \leq R \leq 9 \Omega$?	Step 122	Step 123
122	Change the Power Interface Board 1 st suspect Change the Printhead cable 2 nd suspect	END	
123	Change the Printhead	END	

Pin Assignments

These are as follows:

PTC	dot1	dot2	dot3	dot4	dot5	dot6	dot7	dot8	dot9
<input type="checkbox"/>									
<input type="checkbox"/>									
PTC	ret1	ret2	ret3	ret4	ret5	ret6	ret7	ret8	ret9

where: Dot 'x' resistance is tested between dot1 and ret1 and PTC stands for Positive Thermal Coefficient

2.4.14 Random Missing Dot

Step	Check/Action	Yes	No
130	Change the Power Interface Board 1 st suspect Change the Printhead cable 2 nd suspect Change the Printhead 3 rd suspect	END	

2.4.15 Power shuts down in reverse character mode printing

Step	Check/Action	Yes	No
140	Change the Power Interface Board	END	

3 Removal and Replacement

This chapter contains preventive and corrective maintenance procedures. The following preventive maintenance tasks are normally carried out by the user.:

- Replacing the Ink Ribbon Cassette, see page 3-1 - Order Number 2S-AA374-AA
- Replacing the Mylar Cassette, see page 3-6 - Order Number 2S-AA373-AA
- Replacing the Printhead, see page 3-12 - Order Number 29-33361-01
- Cleaning the Edge Detection Sensor and Mylar Slide Hole, see page 3-16
- Cleaning the Feed Rollers, see page 3-18

The Order Number for a Field Replaceable Unit (FRU), and other replaceable parts that has a calculated Mean Time Between Failure (MTBF), are shown in the Parts Catalogue. Parts should be stored at room temperature.

3.1 FRU and Other replaceable parts

The FRU's are:

- Print Module
- Logic Board
- Power Interface Board
- Control Panel Board
- Printhead

Other replaceable parts with MTBF-values are:

- Button Bar
- Printhead Carrier Motor
- Form Feeder Motor
- Multifunction Motor
- PO XFT Sensor
- PO Carrier Sensor
- Belt Set
- Printhead Board
- Head Carrier
- Edge Detector
- Carrier Nut
- Spiral Carrier Shaft



Caution !

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

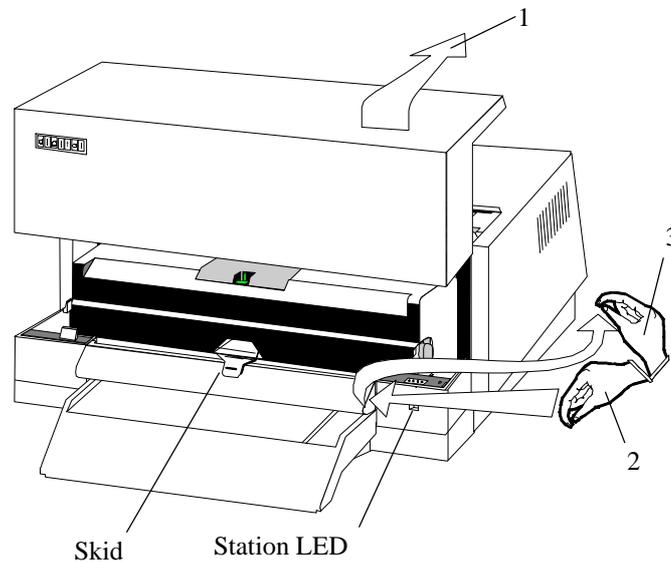
3.2 Ink Ribbon Cassette

This has a storage life of 2 years maximum, may be changed during a print task and should be replaced after printing approximately 2.5 million characters.

The print task will be suspended when the Lid is removed, restarted when the Lid is reinstalled and the Button Bar pressed for less than one second, then released (Hit).

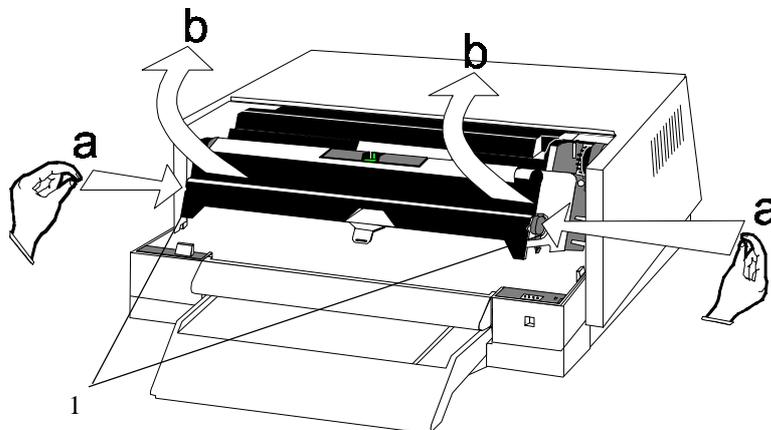
3.2.1 Centering the Skid

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



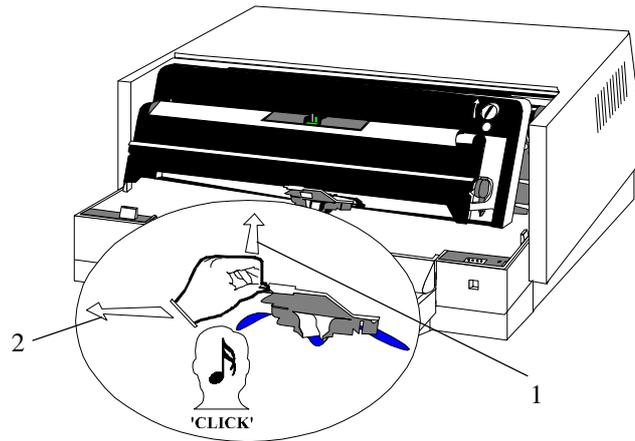
3.2.2 Raising the Carrier

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



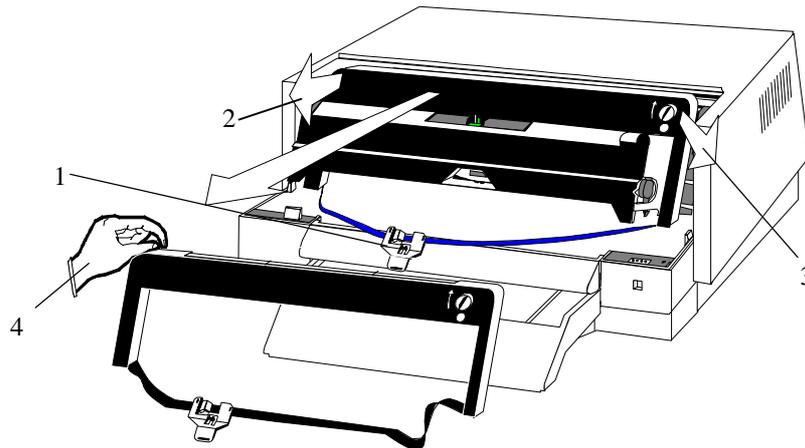
3.2.3 Removing the Skid

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



3.2.4 Removing the Old Ink Ribbon Cassette

1. Skid - position.
2. Left side - move forward.
3. Right side - move forward.
4. Ink Ribbon Cassette - remove and discard.

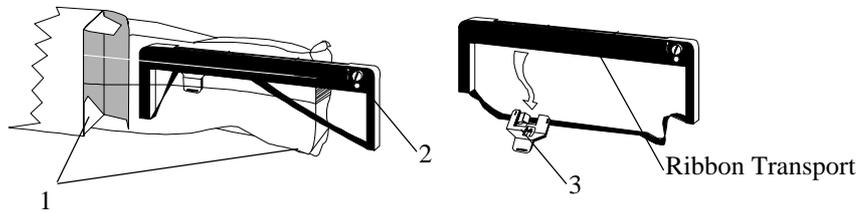


3.2.5 Mylar Cassette

This should be removed, inspected and cleaned. Perform the actions in the procedure Mylar Cassette and then complete this procedure

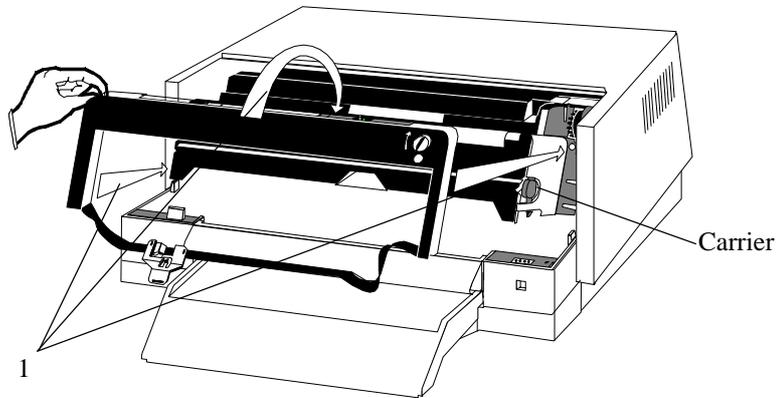
3.2.6 Unpacking the New Ink Ribbon Cassette

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



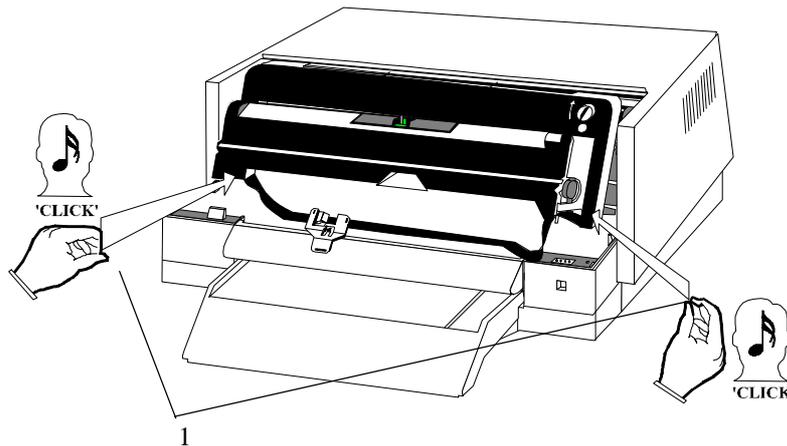
3.2.7 Positioning the New Ink Ribbon Cassette

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



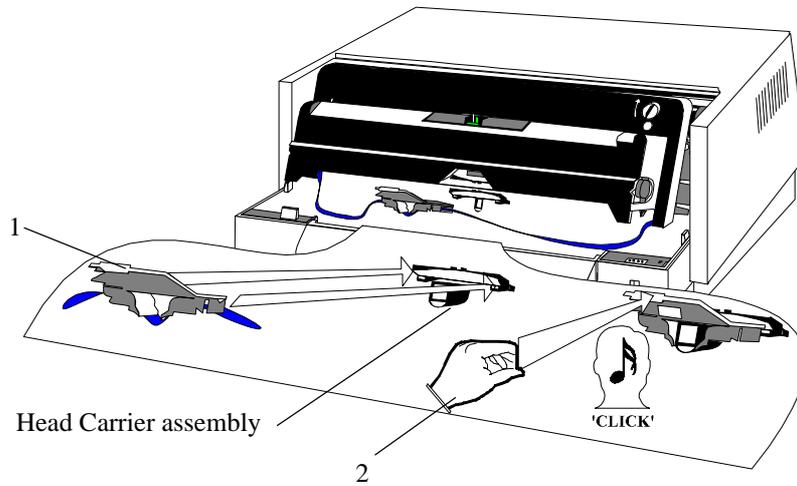
3.2.8 Installing the New Ink Ribbon Cassette

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



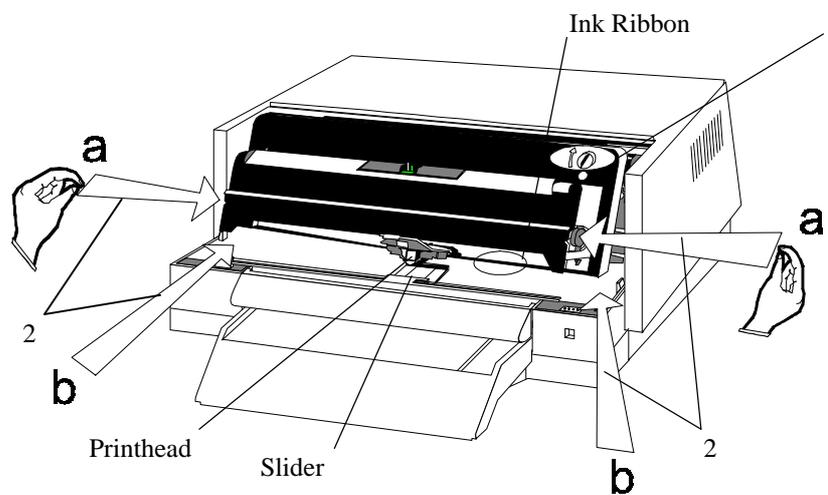
3.2.9 Reinstalling the Skid

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



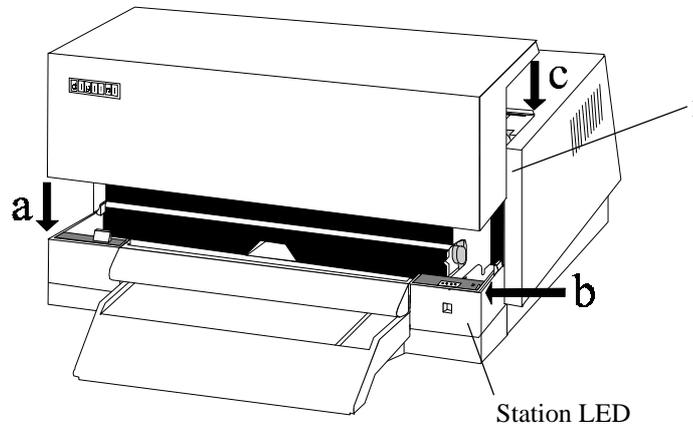
3.2.10 Removing Slack Ribbon

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.



3.2.11 Ready to Print

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



3.3 Mylar Cassette

Smooth transport of the document during printing is ensured by separating the ribbon from the document, but not at the at the Printhead, by a strip of mylar.

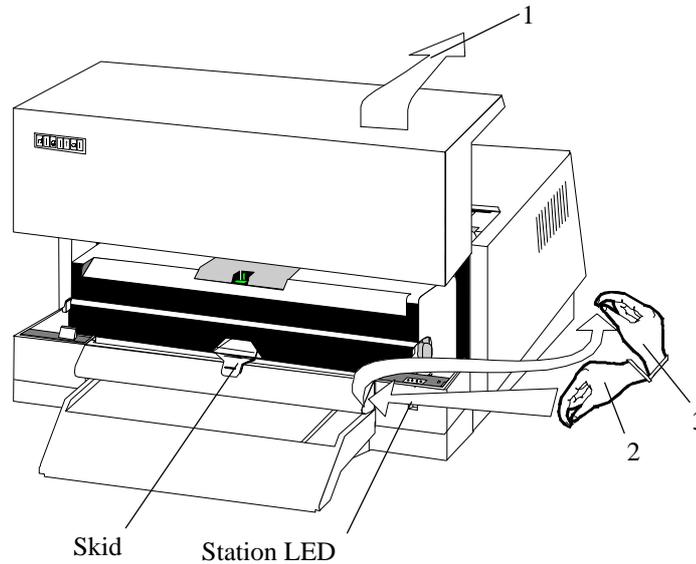
The mylar should be inspected when the Ink Ribbon Cassette is replaced or when excessive document jams are experienced.

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

To ensure correct bi-directional printing alignment with the new cassette, you should adjust the bi-directional alignment as described in Section 2.

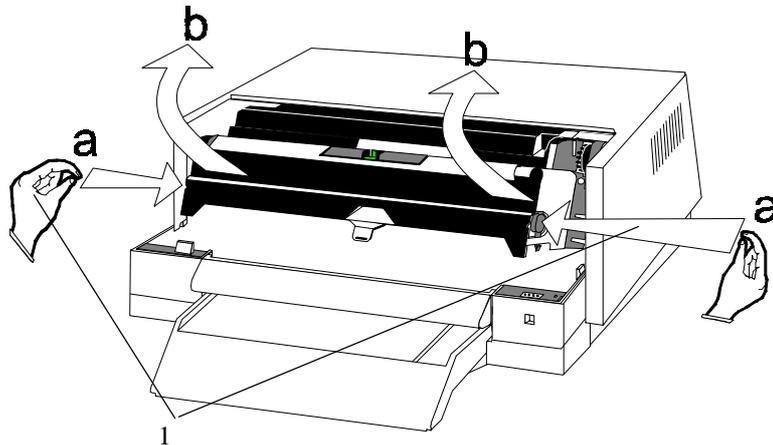
3.3.1 Centering the Skid

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.



3.3.2 Raising the Carrier

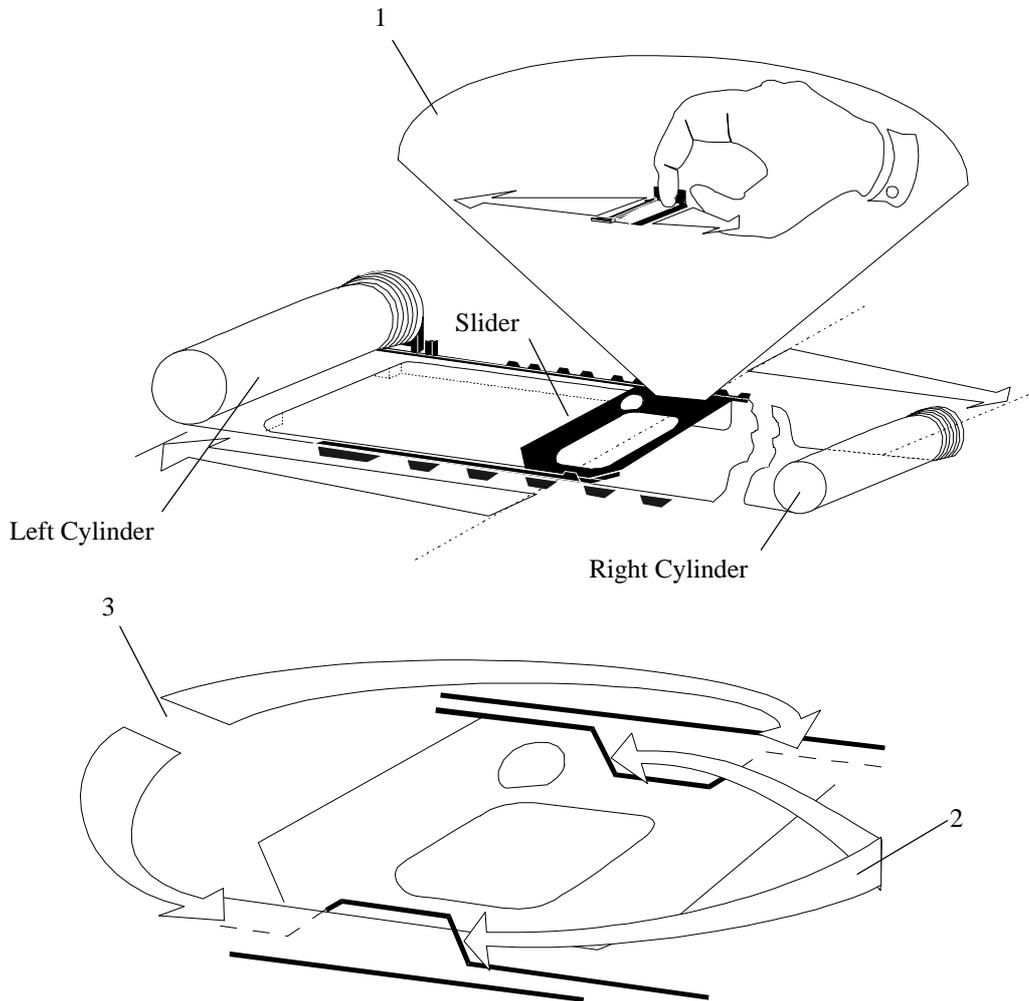
1. Carrier Buttons - press in at (a) and Lift to (b),
the Carrier is now locked in a tilted, raised position.



3.3.5 Inspecting the Mylar Edges (Bottom View)

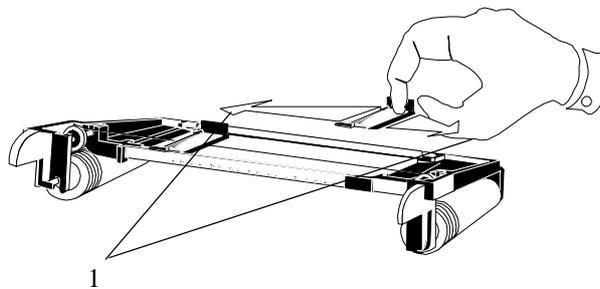
Turn the Mylar Cassette over and inspect the edges for damage as follows:

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 Cylinder - move the Slider and check that the complete edge stays IN.



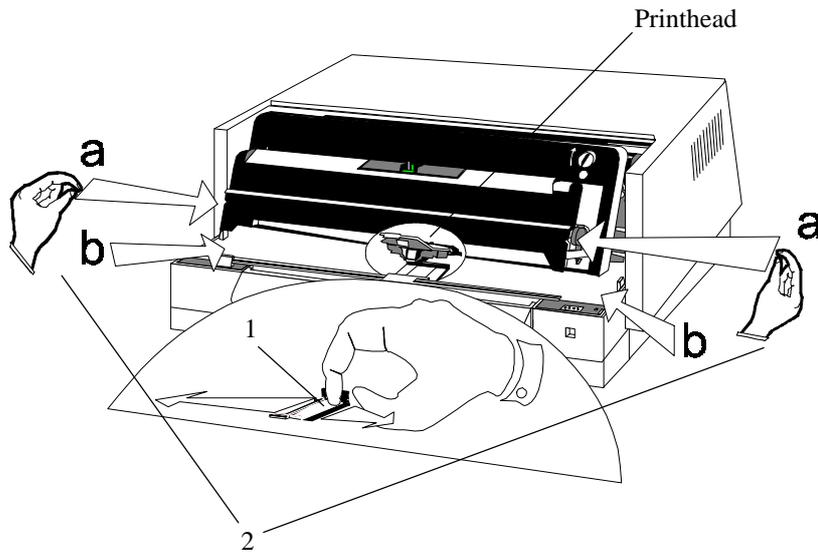
3.3.6 Checking for Free Movement (Top View)

1. Slider - move full left to full right



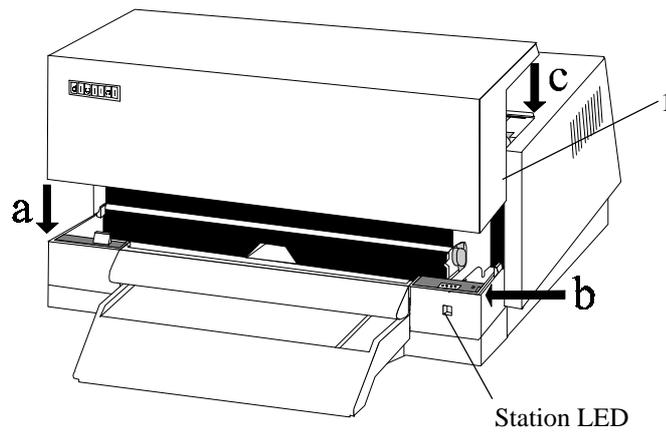
3.3.9 Positioning the Slider

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.



3.3.10 Ready to Print

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



3.4 Printhead

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

Ā B̄ C̄ D̄ Ē

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 it strikes a sharp or hard object such as a paper clips or staple.



Warning !

The Printhead may be hot.

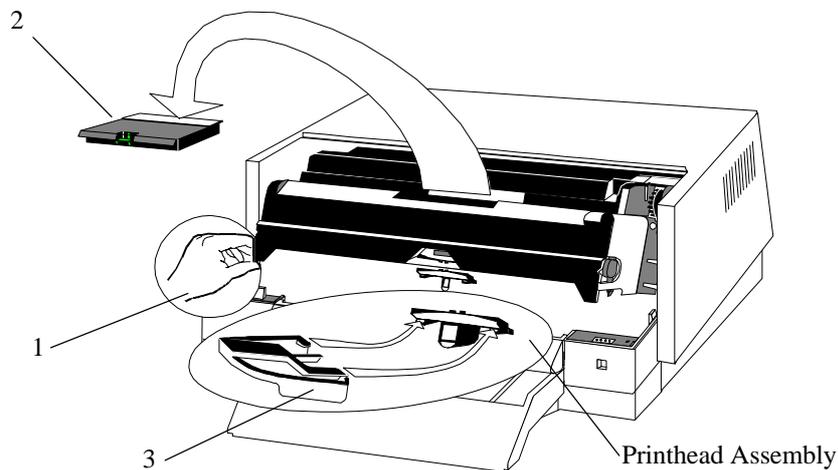
3.4.1 Preparation

Perform the following:

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

3.4.2 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.

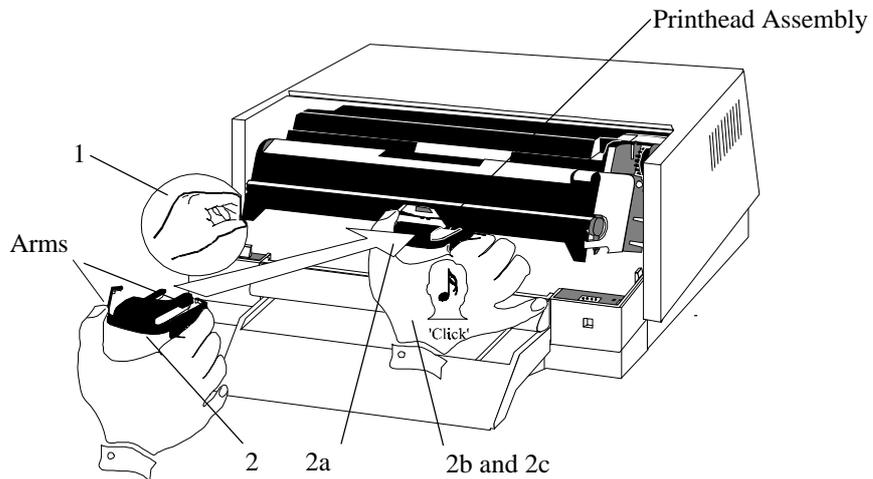


3.4.3 Releasing the Printhead

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,
 - c) release the arms.

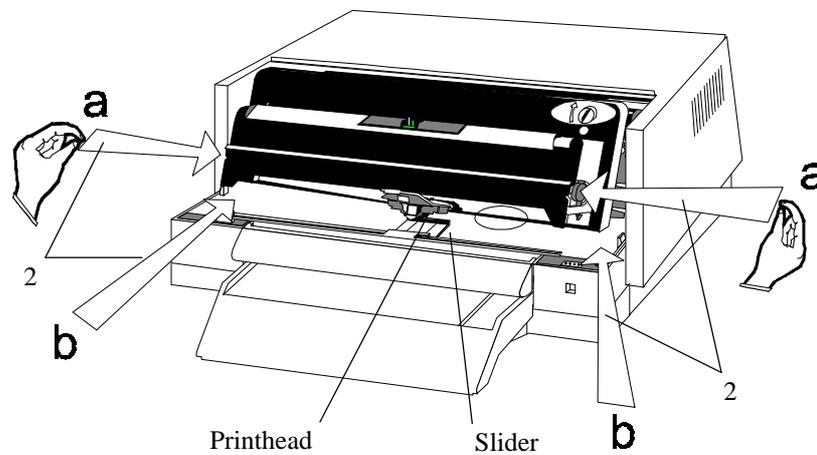


Warning !
The Printer must be Powered Off before releasing the Printhead.



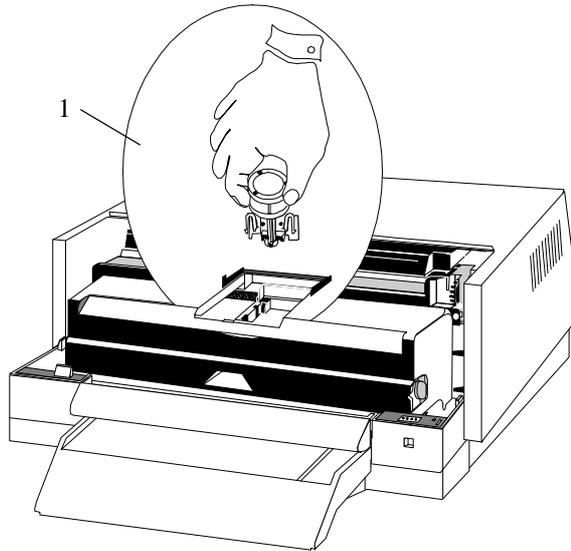
3.4.4 Lowering the Carrier

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



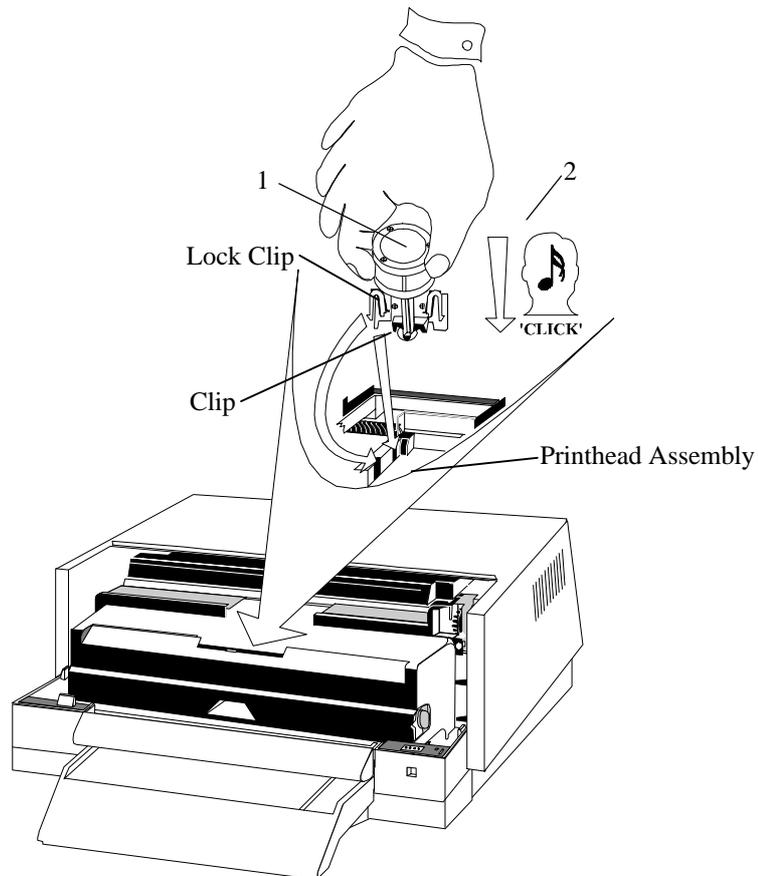
3.4.5 Removing the Printhead

1. Printhead - grip between thumb and finger and remove



3.4.6 Reinstalling the Printhead

1. Printhead - locate the Clip and Lock Clip in the Printhead Assembly
2. Printhead - push down until a 'CLICK' is heard



3.4.7 Reinstalling the Ink Ribbon Cassette

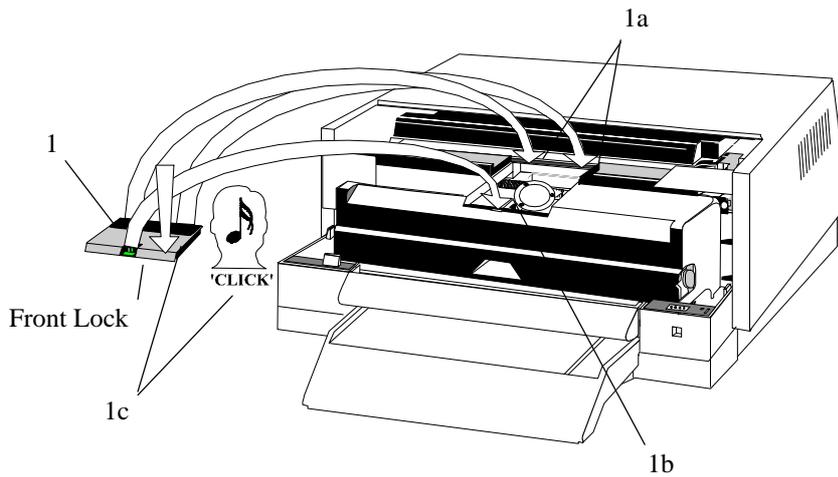
Perform the following:

- Positioning the Ink Ribbon Cassette
- Installing the Skid
- Removing the Slack Ribbon

3.4.8 Reinstalling the Trapdoor

1. Trapdoor

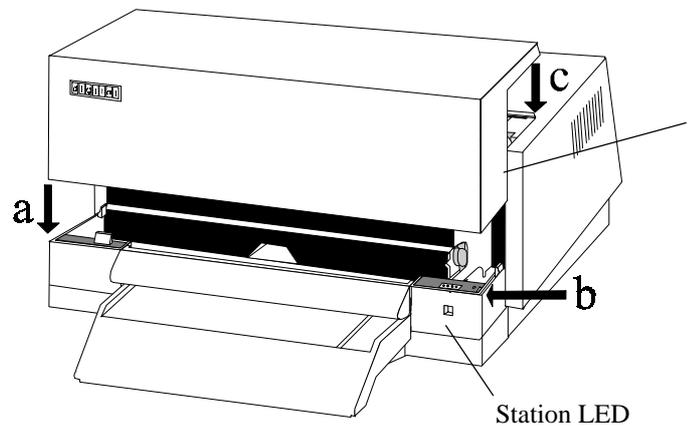
- a) position the two Rear Lugs,
- b) lower the trapdoor to engage the Front Lock,
- c) press down until a 'CLICK' is heard.



3.4.9 Ready to Print

1. Lid

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



The following preventive cleaning tasks may be performed by the user or the service engineer:

- Edge Detection Sensor and Mylar Slide
- Feed Rollers

3.5 Edge Detection Sensor and Mylar Slide Hole

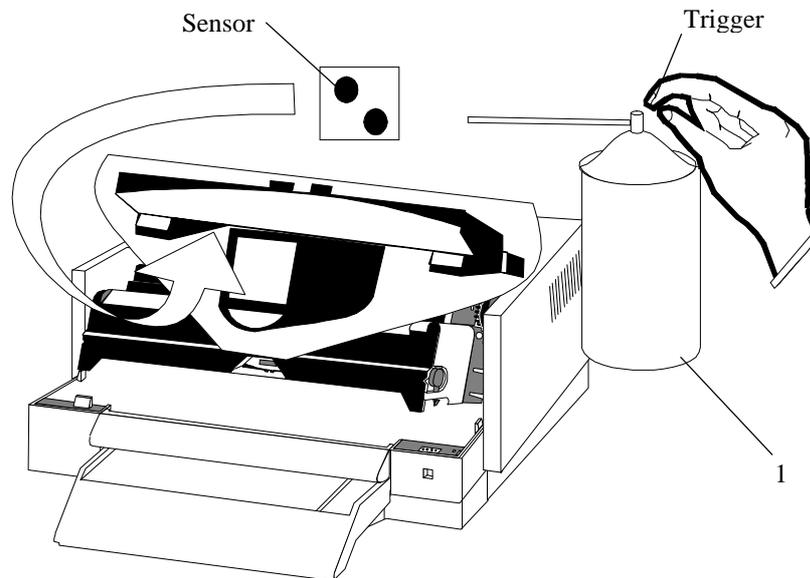
These should be cleaned when the Ink Ribbon Cassette is changed. **Note:** if pressurized air is not available a Lint Free cloth may be used.

Prerequisite - Pressurized air or a lint free cloth.

3.5.1 Cleaning the Sensor

If necessary, refer to the Ink Ribbon Cassette procedure and perform the following:

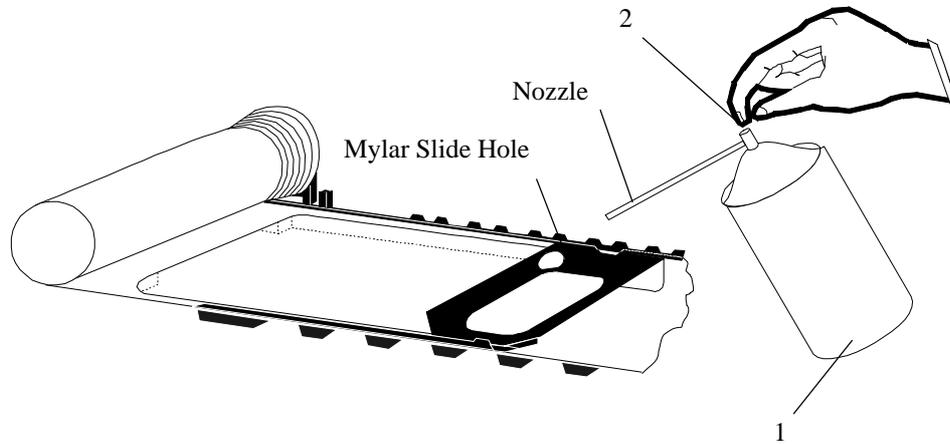
- Centering the Skid
 - Raising the Carrier
 - Removing the Old Ink Ribbon Cassette
1. Pressurized Air Container - position the Nozzle near the sensor
 2. Trigger - press to release air



3.5.2 Cleaning around the Mylar Slide Hole

If necessary refer to the Mylar Cassette procedure and perform:

- Removing the Mylar Cassette
 1. Pressurized Air Container - position the Nozzle near the Slider
 2. Trigger - press to release air



3.5.3 Reinstalling

Perform the following:

- Installing the Mylar Cassette
- Unpacking the New Ink Ribbon Cassette
- Positioning the New Ink Ribbon Cassette
- Installing the Ink Ribbon Cassette
- Installing the Skid
- Removing the Slack Ribbon
- Positioning the Mylar Cassette
- Installing the Mylar Cassette
- Positioning the Slider
- Ready to Print

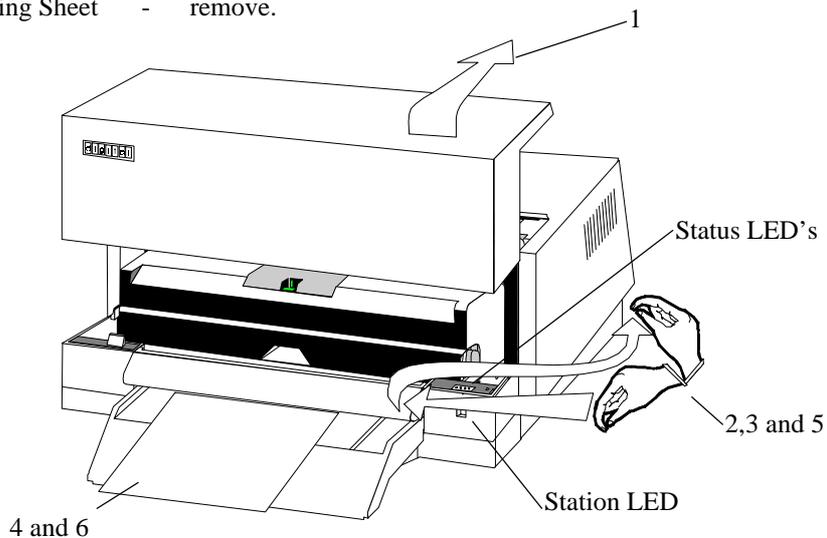
3.6 Feed Rollers

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

Prerequisite - Cleaning Sheet. **Note:** This is impregnated with a cleaning agent.

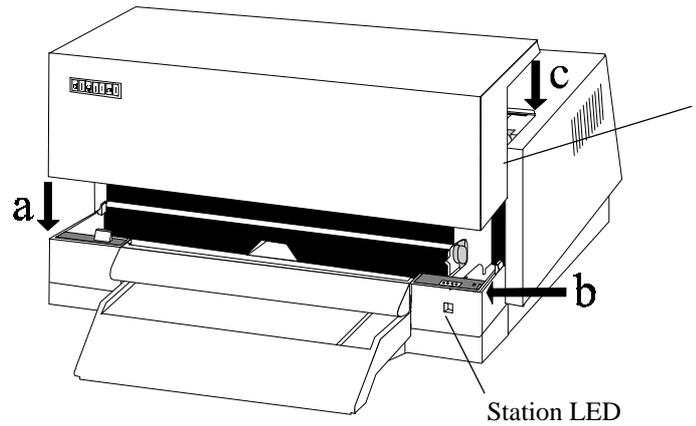
3.6.1 Cleaning the Feed Rollers

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 seconds, then release,
 - Station LED
 - blinks GREEN
4. Feed Roller Cleaning Sheet
 - refer to Loading a Document.
5. Button Bar
 - press down until the Station LED shows solid GREEN, then release.
 - Feed Roller Cleaning Sheet
 - after 18 seconds the engine runs and the Feed Roller Cleaning Sheet is advanced and returned a number of times,
 - Station LED
 - blinks RED
6. Feed Roller Cleaning Sheet
 - remove.



3.6.2 Ready to Print

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

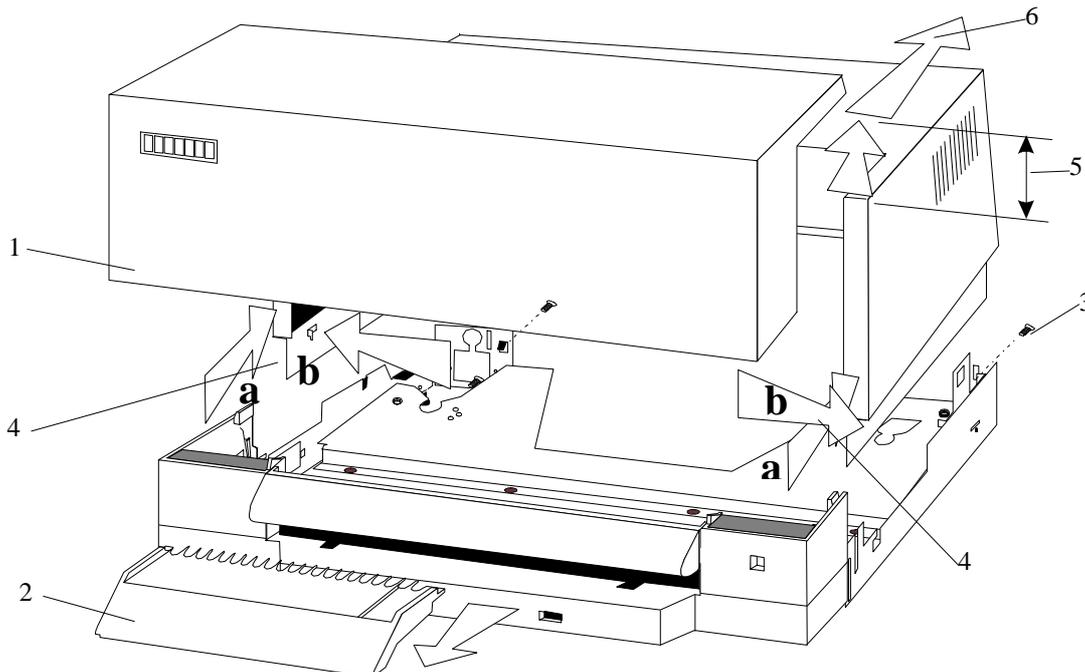


3.7 Top Cover



Warning !
Isolate the power to the printer.

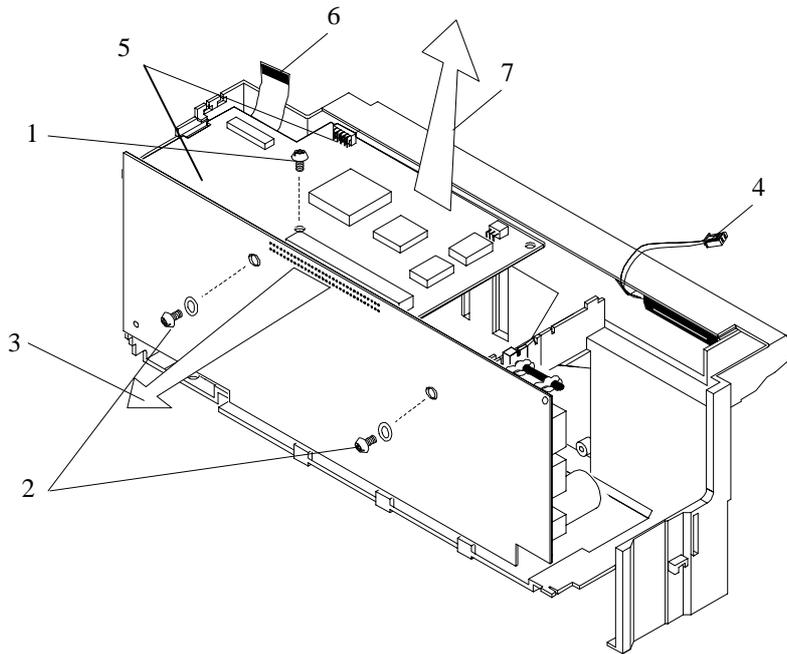
1. Lid - remove and retain
2. Document Guide - remove and retain
3. Screws (2) - remove and retain
4. Top Cover - push at **a** to release the lugs **b**
5. Top Cover - lift slightly, 0.5 (12.7 mm) to disengage the lugs
6. Top Cover - push back and remove



3.7.1 Logic Board

Remove the Top Cover. If necessary, refer to the procedure on page 3-19.

1. 1 screw - remove from the Logic Board
2. 2 screws - remove from the Power Interface Board
3. Power Interface Board - pull back and disconnect from the Logic Board
4. Battery Cable - disconnect from the Logic Board
5. Communications Cable - disconnect from the Logic Board (either serial or parallel)
6. Control Panel Cable - disconnect from the Logic Board
7. Logic Board - lift and remove



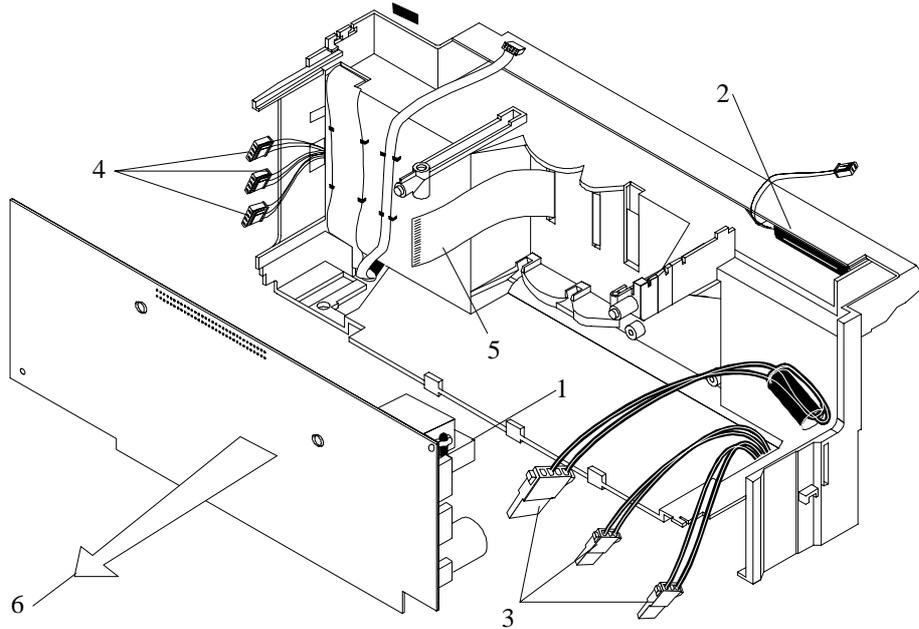
3.8 Fuse, Battery and Power Interface Board

Remove the Top Cover. If necessary, refer to the procedure on page 3-19.

Remove the Logic Board. If necessary, refer to the procedure on page 3-19.

1. Fuse - unclip and remove if broken
2. Battery - unclip and remove if necessary
3. Plugs - remove P1, P2 and P3
4. Plugs - remove P102, P103 and P104
5. Printhead Cable - release from J101
6. Power Interface Board - unclip and remove

To reassemble, reverse the above instructions and then go to Recommissioning.



3.9 PCB Box

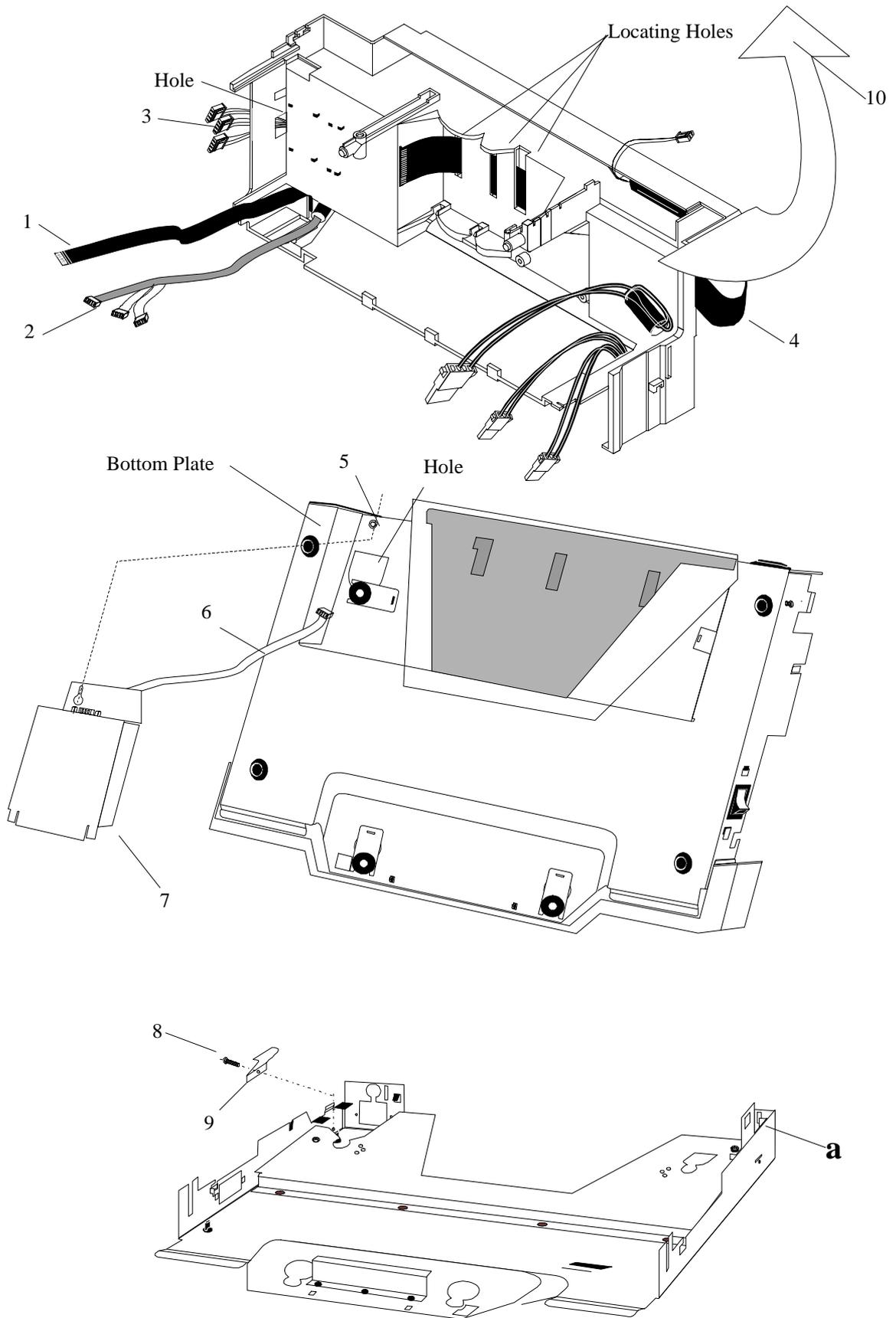
Remove the Top Cover. If necessary, refer to the procedure on page 3-19.

Remove the Logic Board. If necessary, refer to the procedure on page 3-19.

Remove the Power and Interface Board. If necessary refer to the procedure on page 3-21

1. Control Panel Cable - unclip from the PCB Box
2. Data Cable - unclip from the PCB Box
3. P102, P103 and P104 - remove, by passing through the hole, from the PCB Box
4. Printhead Cable - remove, by pulling through the locating holes, from the box
5. Screw - loosen
6. Cables - remove, by passing through the hole in the Bottom Plate
7. Connector Plate - remove and retain
8. Screw - loosen
9. Clamp, PC Box - release from the PCB Box
10. PCB Box - lift and release from the locating hole (a) in the Bottom Plate

To reassemble, reverse the above instructions and then go to Recommissioning.



3.10 Front Cover, Control Panel Board and Button Bar

Remove the Top Cover. If necessary, refer to the procedure on page 3-19.

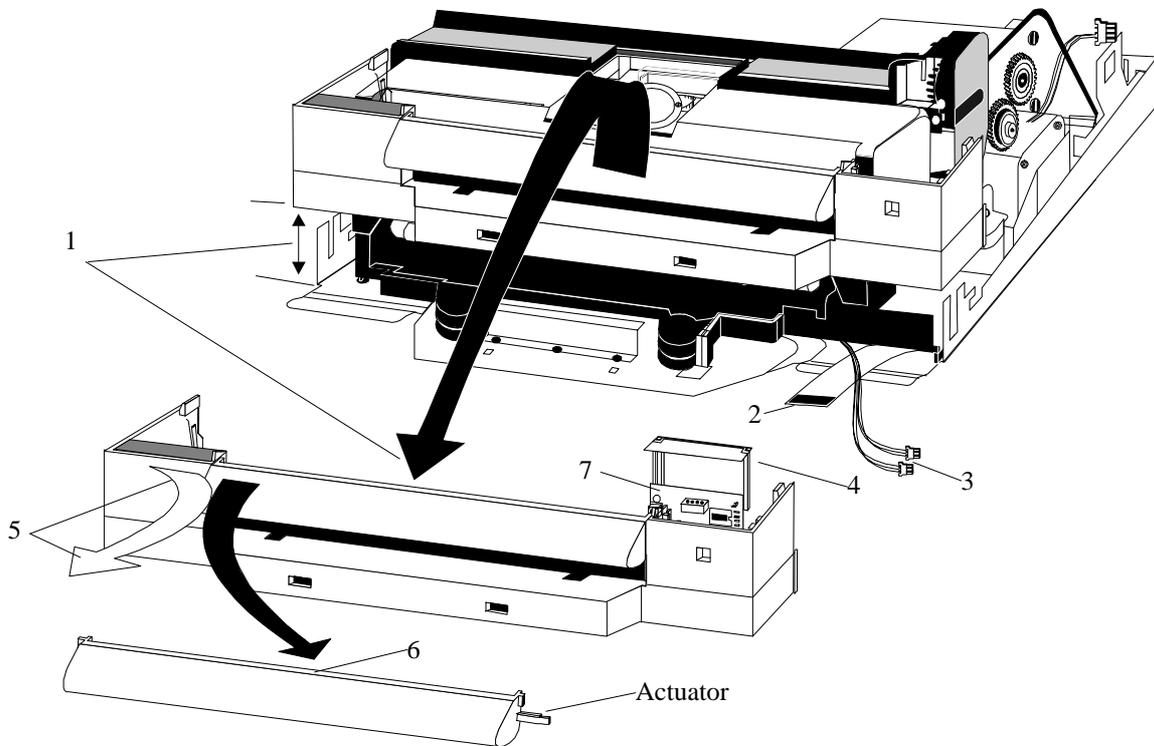
Remove the Logic Board. If necessary, refer to the procedure on page 3-19.

Remove the Power and Interface Board. If necessary refer to the procedure on page 3-21

Remove the PCB Box. If necessary refer to the procedure on page 3-21

1. Front Cover - lift approximately 0.5" (12.7 mm) and place in this position
2. Cable - disconnect from the Control Panel Board
3. Plugs, P2 and P3 - disconnect from J2 and J3 on the Control Panel Board
4. Control Panel Cover - lift and remove
5. Front Cover - lift off from Bottom Plate
6. Button Bar - remove, taking care not to damage the Actuator
7. Control Panel Board - lift and remove

To reassemble, reverse the above instructions and then go to Recommissioning.



3.11 Print Module

Remove the Top Cover. If necessary, refer to the procedure on page 3-19.

Remove the Logic Board. If necessary, refer to the procedure on page 3-19.

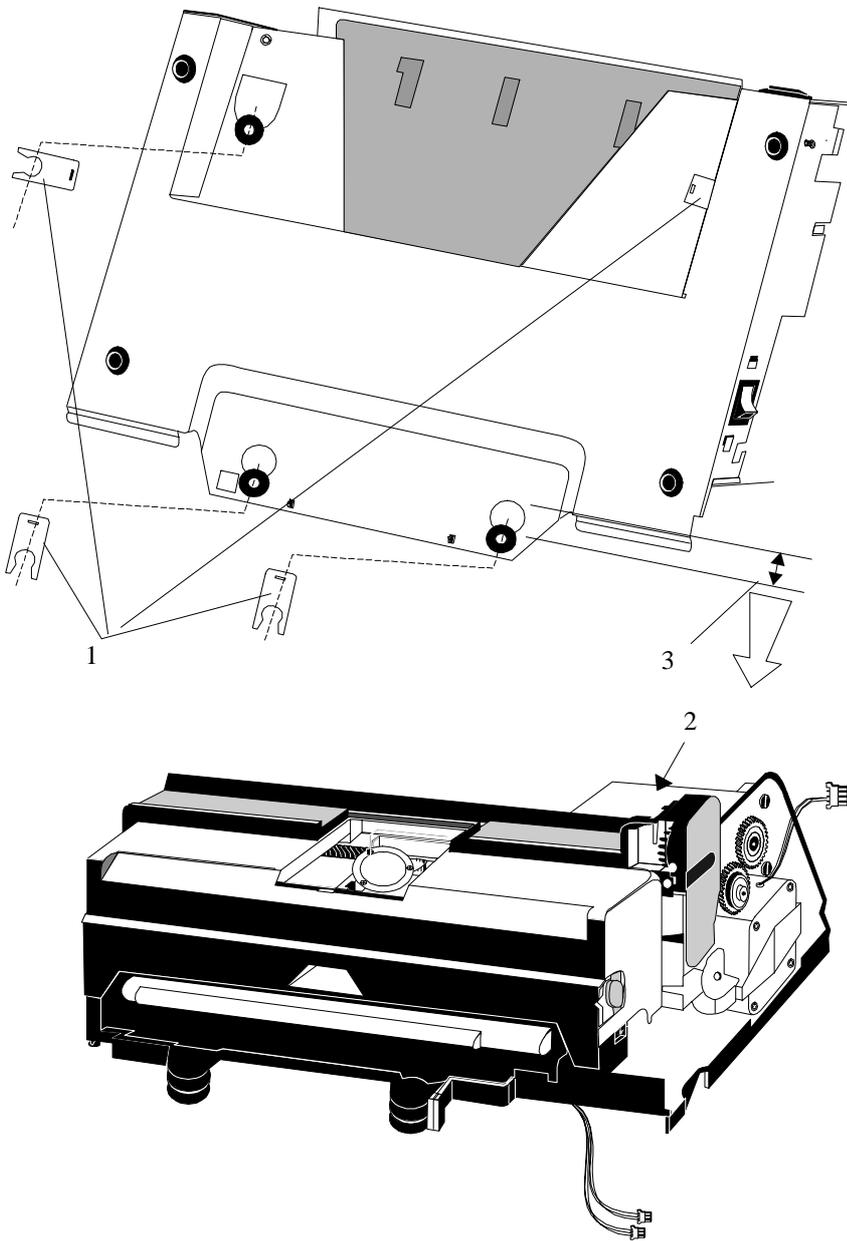
Remove the Power and Interface Board. If necessary refer to the procedure on page 3-21

Remove the PCB Box. If necessary refer to the procedure on page 3-21

Remove the Front Cover. If necessary refer to the procedure on page 3-23

1. Lock Plates (4) - remove and retain
2. Print Module - hold here
3. Bottom Plate - slide until the rubber feet are over the holes and remove

To reassemble, reverse the above instructions and then go to Recommissioning.



3.12 Other Replaceable Parts

These are:

- Head Carrier Assembly
- Edge Detector
- Printhead Board
- Spiral Carrier Shaft
- Carrier Nut
- Printhead Carrier Motor
- Multifunction Motor
- P0 Carrier Sensor
- PO XFT Sensor
- Belt set

3.12.1 Carrier Frame

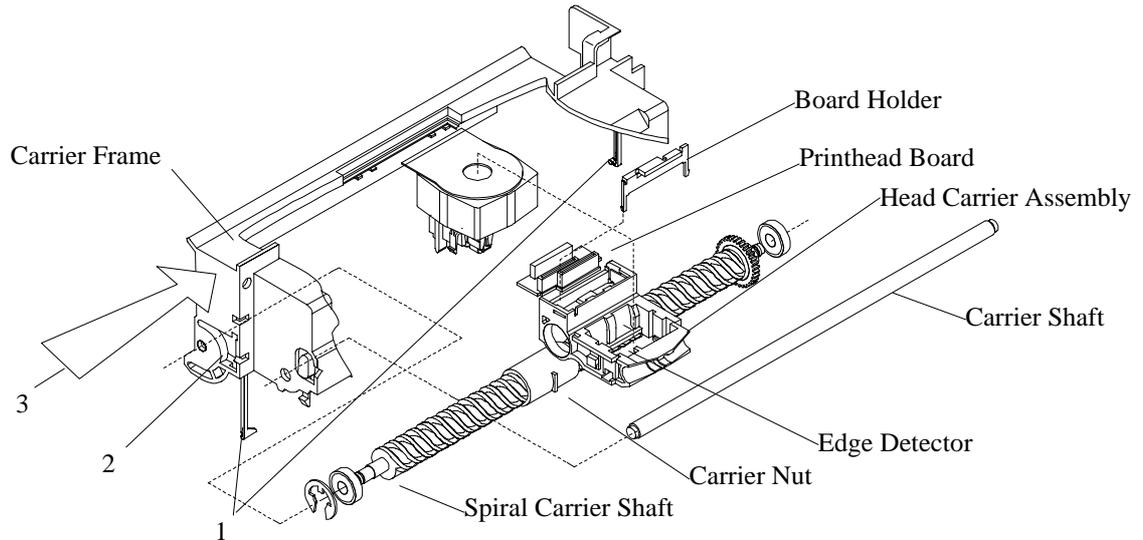
This pivots around the axis of the spiral carrier shaft. The Carrier Frame must be removed before the Edge Detector, Spiral Carrier Shaft, Head Carrier and Plastic Nut can be replaced.

Remove the Printhead. See the procedure on page 3-12.

Remove the Print Module. See the procedure on page 3-23

1. Cassette Locks (2) - remove and retain
2. Carrier Frame - pull out over the end of the Spiral Carrier Shaft
3. Carrier Frame - move to the right to release the right side from the Spiral Carrier Shaft.
4. Carrier Frame - remove

To reassemble, reverse the above instructions and then go to Recommissioning .



3.12.2 Edge Detector

This is glued in position on the Head Carrier Assembly.

Remove the Carrier Frame, see above.

1. Disconnect the connector from the Printhead Board.
2. Release the wiring.
3. Break the glue bond and remove.

Note: install and glue the new edge detector using Three Bond 1401C and perform the Edge Detector Adjustment on page 2-3.

To reassemble, reverse the above instructions and then go to Recommissioning.

3.12.3 Spiral Carrier Shaft

The spiral carrier shaft is driven through a gearbox by the printhead Carrier Motor. When the spiral carrier shaft rotates the Head Carrier Assembly moves.

If a replacement is decided it is recommended that the Carrier Nut, which is part of the Head Carrier Assembly, is also changed.

Remove the Carrier Frame.

1. Remove the Transmission Gear. **Note:** this is shown on the Figure on page 3-27.
2. Lift and remove, at the same time, the Spiral Carrier Shaft and the Head Carrier Assembly.
3. Remove the circlip and roller bearing from the left side of the Spiral Carrier Shaft.
4. Remove the old Spiral Carrier Shaft from the Head Carrier Assembly.

Installation

1. Replace the Carrier Nut.
2. Identify the two larger threads on the Spiral Carrier Shaft.
3. Install the Spiral Carrier Shaft through the Head Carrier Assembly to the Carrier Nut so that the channel between the two larger threads locates on the spiral.
4. Turn the Spiral Carrier Shaft clockwise to engage the Carrier Nut

To reassemble, reverse the above instructions and then go to Recommissioning.

3.12.4 Head Carrier Assembly

This holds the Carrier Nut, the Printhead, the Edge Detector, the Printhead Board and a small magnet.

Remove the Carrier Frame.

1. Spiral Carrier Shaft - Lift shaft from Feeder Frame.
2. Head Carrier Assembly - "Screw" it off the Spiral Carrier Shaft.

To reassemble, reverse the above instructions and then go to Recommissioning.

3.12.5 Printhead Board

Remove the Printhead. See the procedure on page 3-12.

Remove the Print Module. See the procedure on page 3-23

1. Disconnect the Edge Detector connector from the Printhead Board.
2. Remove the Board holder
3. Remove and then disconnect the Printhead cable.

To reassemble, reverse the above instructions and then go to Recommissioning.

3.12.6 Carrier Nut

Remove the Spiral Carrier Shaft.

1. Carrier Nut - remove from the Head Carrier Assembly.

To reassemble, reverse the above instructions and then go to Recommissioning.

3.12.7 Printhead Carrier Motor

This is mounted in the Main Frame at the right side secured by a spring clamp and drives the Spiral Carrier Shaft.

Remove the Top Cover. If necessary, refer to the procedure on page 3-19.

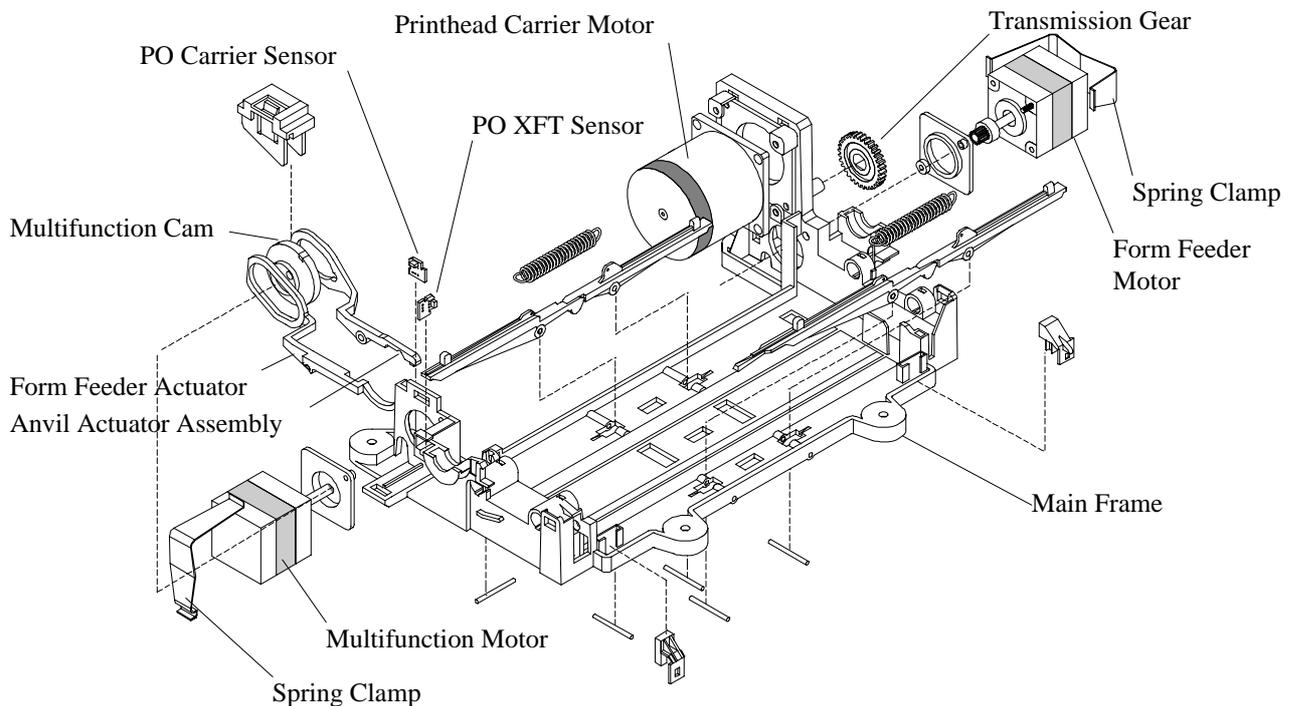
Remove the Logic Board. If necessary, refer to the procedure on page 3-19.

Remove the Power and Interface Board. If necessary refer to the procedure on page 3-21

Remove the PCB Box. If necessary refer to the procedure on page 3-21

1. Transmission Gear - remove and retain
2. Nuts (4), Washers (8) and Screws (4) - remove and retain
3. Printhead Carrier Motor - remove

To reassemble, reverse the above instructions and then go to Recommissioning.



3.12.8 Multifunction Motor

This is mounted in the Main Frame at the left side secured by a Spring Clamp and drives via a Cam which moves the Anvil Actuator Assembly, and the Form Feeder Actuator to operate the Insertion Tables and the Flap.

1. Isolate power to the printer.
2. Remove the Print Module. If necessary refer to the procedure on page 3-23. **Note:** it is not necessary to remove the Front Cover.
3. Multifunction Cam - slide to the right and unclip from the motor shaft.
4. Spring Clamp - remove
5. Multifunction Motor - firmly hold the Multifunction Cam and remove

To reassemble, reverse the above instructions and then go to Recommissioning.

3.12.9 P0 Carrier Sensor Assembly

This is mounted on the Main Frame under the Multifunction Cam and is activated by a magnet in the Multifunction Cam.

Remove the Multifunction Motor

1. Multifunction Cam - remove
2. P0 Carrier Sensor - remove

To reassemble, reverse the above instructions and then go to Recommissioning.

3.12.10 P0 XFT Sensor Assembly

This is used to determine the left most position of the Head Carrier called P0 position and is activated by a magnet on the Head Carrier Assembly.

1. Isolate power to the printer.
2. Remove the Print Module. If necessary refer to the procedure on page 3-23. **Note:** it is not necessary to remove the Front Cover.
3. PO XFT Sensor Assembly - remove

To reassemble, reverse the above instructions and then go to Recommissioning.

3.12.11 Form Feeder Motor

Via a Belt Set this drives the Upper Rear Driving Roll, the Upper Front Driving Roll and is mounted on the right side of the Main Frame.

Remove the Top Cover. If necessary, refer to the procedure on page 3-19.

Remove the Logic Board. If necessary, refer to the procedure on page 3-19.

Remove the Power and Interface Board. If necessary refer to the procedure on page 3-21

Remove the PCB Box. If necessary refer to the procedure on page 3-21

Remove the Print Module. If necessary refer to the procedure on page 3-23. **Note:** it is not necessary to remove the Print Cover.

1. Spring Clamp - remove and retain.
2. Form Feeder Motor - remove.

To reassemble, reverse the above instructions and then go to Recommissioning.

3.12.12 Belt Set

This consists of two belts.

1. Switch the machine OFF and disconnect the line cord from the machine.
2. Remove the printer mechanism from the base.
3. Remove the form feed motor and the front upper feeding box.
4. Unlock and remove the right plastic bushing of the rear pressure rollers shaft.
5. While unlocking the left plastic bushing of the rear pressure shaft, slide the shaft to the left, lift its right end up and then slide it to the right.
6. Remove the rear pressure rollers shaft.
7. Unlock and remove the right plastic bushing of the front pressure roller shaft.
8. Unhook the flap actuator from the left end of the flap and leave it in this waiting position.
9. Unscrew the flap right holder and slide the flap and the detection fingers to the left. Lift the right side of the flap from the right frame.
10. While unlocking the left plastic bushing of the front pressure shaft, slide the shaft to the left, lift its right end up and then slide it to the right.
11. Unhook the spring and remove the front pressure roller shaft together with its gear holder.
12. When the right end of both the flap and the detection fingers are lifted up, slide them to the right to disengage the left shaft.
13. Remove together the detection fingers and the flap.
14. Remove the tie-wrap from the insertion detector harnesses and remove the insertion detector housings.
15. Lift the right end of the feeding frame up, unmesh the gears and remove the two driving belts.
16. Reassemble in reverse order.

To reassemble, reverse the above instructions and then go to Recommissioning.

3.13 Recommissioning

If you have replaced/removed/adjusted ...	Then...
<ul style="list-style-type: none"> • the Logic Board OR • the Battery assembly 	<ol style="list-style-type: none"> 1. perform Edge Detection and Margin Adjustments 2. restore the Setup parameters 3. restore the smudging and contrast parameters 4. set the bi-directional alignment (coarse and fine) parameters to zero for each print mode 5. perform the bi-directional alignment (coarse and fine) for each print mode
<ul style="list-style-type: none"> • the Edge Detector OR • the Printhead Board 	<ol style="list-style-type: none"> 1. perform Edge Detection and Margin Adjustments 2. set the bi-directional alignment (coarse and fine) parameters to zero for each print mode 3. perform the bi-directional alignment (coarse and fine) for each print mode
<ul style="list-style-type: none"> • the Spiral Carrier Shaft OR • the Carrier Nut OR • the Head Carrier Assembly 	<ol style="list-style-type: none"> 1. set the bi-directional alignment (coarse and fine) parameters to zero for each print mode 2. perform the bi-directional alignment (coarse and fine) for each print mode

4 Glossary

A

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.

APA - All Points Addressable. The ability to address and display or not display each picture element on a display surface.

AWG - American Wire Gauge

B

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.

C

CPI - Character Per Inch - the width of characters in a line. Sometimes referred to as 'pitch' or 'density'.

CPS - Characters Per Second.

CSA - Canadian Standard Association. The Canadian counterpart of U.S. Underwriters Laboratory.

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

D

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.

E

EC - European Community

EIA - Electronic Industries Association. Sets standards for the electrical and functional characteristics of equipment used in data communication. See RS232.

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.

F

FCC - Federal Communication Commission.

FRU - Field Replaceable Unit. The unit may be an assembly or a component part

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.

H

HO5.VVF 3 G1.0 - EC Standard

HQD - High Quality Draft. Two consecutive dot impacts are delivered (double strike).

Hz - Hertz. The measuring unit for frequency (cycles per second)

I

ISO - International Standard Organization. An organization that sets international standards.

IEC -

Intercharacter Spacing - the space left blank between two consecutive characters.

L

Loadable Character Set - where resident and/or downloaded characters are used.

LPI - Lines Per Inch. Number of lines per inch. $LPI = (\text{number Lines}) / (\text{number inch})$. 1 inch = 25.4 mm.

Line Graphic - Graphics provided through the character sets.

M

MTBF - Mean Time Before Failure

Mechanical Margin - defined by the hardware, this is 0.1" (2.5 mm) from the left, right and top edges of the document.

N

NVM - Non Volatile Memory. Memory that holds its content without power. ROM's, PROM's, EPROM's and flash memory are examples. Sometimes the term refers to memory that is inherently volatile, but maintains its content because it is connected to a battery.

O

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.

R

RAM - Random Access Memory. Primary workspace in computers. The “random” means that the contents of each byte can be directly accessed without regards to the bytes before and after it. This is also true of other types of memory chips, including ROM’s and PROM’s. However, unlike ROM’s and PROM’s, RAM chips require power to maintain their content.

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 RS232-C 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.

RXD - RX Data Line in RS232 serial interface. This line receives data from the host. The serial interface ignores received data when DSR is low.

Resident Character Set - permanently available in the printer.

Reversed - where characters are printed in white on a black background.

S

Stop bit - The bit which signals the end of data.

SVT - Standard Voltage Temperature

T

TXD - TX Data line in RS232 serial interface. This line is for XON/XOFF transmission from the printer to the host only. CTS must be high to enable transmission. The printer does not transmit data when RTS/CTS is selected.

U

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

V - Volt

VA - Volt Ampere

X

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.

digital



Printed in Sweden on
Totally Chlorine Free paper (TCF)