
LA70

LA70 Personal Printer Service Guide

Order Number: EK-LA70J-SG.0001

digital equipment corporation
maynard, massachusetts

March 1990

The information in this document is subject to change without notice and should not be construed as a commitment by Digital Equipment Corporation. Digital Equipment Corporation assumes no responsibility for any errors that may appear in this document.

The information in this document is subject to change without notice and should not be construed as a commitment by Digital Equipment Corporation. Digital Equipment Corporation assumes no responsibility for any errors that may appear in this document.

The software described in this document is furnished under a license and may be used or copied only in accordance with the terms of such license.

No responsibility is assumed for the use or reliability of software on equipment that is not supplied by Digital Equipment Corporation or its affiliated companies.

Restricted Rights: Use, duplication, or disclosure by the U. S. Government is subject to restrictions as set forth in subparagraph (c) (1) (ii) of the Rights in Technical Data and Computer Software clause at DFARS 252.227-7013.

Copyright © Digital Equipment Corporation 1990 Digital Equipment Corporation

All Rights Reserved.
Printed in U.S.A.

The following are trademarks of Digital Equipment Corporation:

DEC	Digital	RSX
DEC/CMS	EduSystem	UNIBUS
DEC/MMS	IAS	VAX
DECnet	LA70	VAXcluster
DECsystem-10	MASSBUS	VAX DOCUMENT
DECSYSTEM-20	PDP	VMS
DECUS	PDT	VT
DECwriter	PrintServer	
DIBOL	RSTS	digital™

IBM is a registered trademark of International Business Machines Corporation.

This document was prepared and published by Educational Services Development and Publishing, Digital Equipment Corporation.

Contents

Figures

Tables

About This Manual

This guide describes how to troubleshoot, install, repair and maintain the LA70 Personal Printer at first line level. The information is presented in the following chapters:

Chapter 1	**Overview of the LA70** Gives a brief overview of the LA70 and its capabilities.
Chapter 2	**Troubleshooting** Describes fault symptoms, their probable cause, and solutions.
Chapter 3	**Customer Services Engineering Tests and Diagnostics** Describes the use of the LA 70 self-tests.
Chapter 4	**Installation** Describes preparation and installation in a step-by-step process.
Chapter 5	**Set-up Mode** Describes the Set-up mode.
Chapter 6	**Field Replaceable Units (FRUs)** Lists the FRUs. Explains, using a step-by-step process, how to remove, replace, and retest.
Chapter 7	**Maintenance and Cleaning** Describes the maintenance tasks and cleaning techniques.
Chapter 8	**Repair Center Activity** This chapter is included for information only. The parts described in this chapter must not be replaced at the customer site. Changing and adjusting these parts is a repair center activity only.
Chapter 9	**Automatic Sheet Feeder** Includes installation and removal of the sheet feeder; plus setting it up, testing, and trouble shooting.
Chapter 10	**Firmware** Gives a brief description of the firmware and its location.

Appendixes provide the following information:

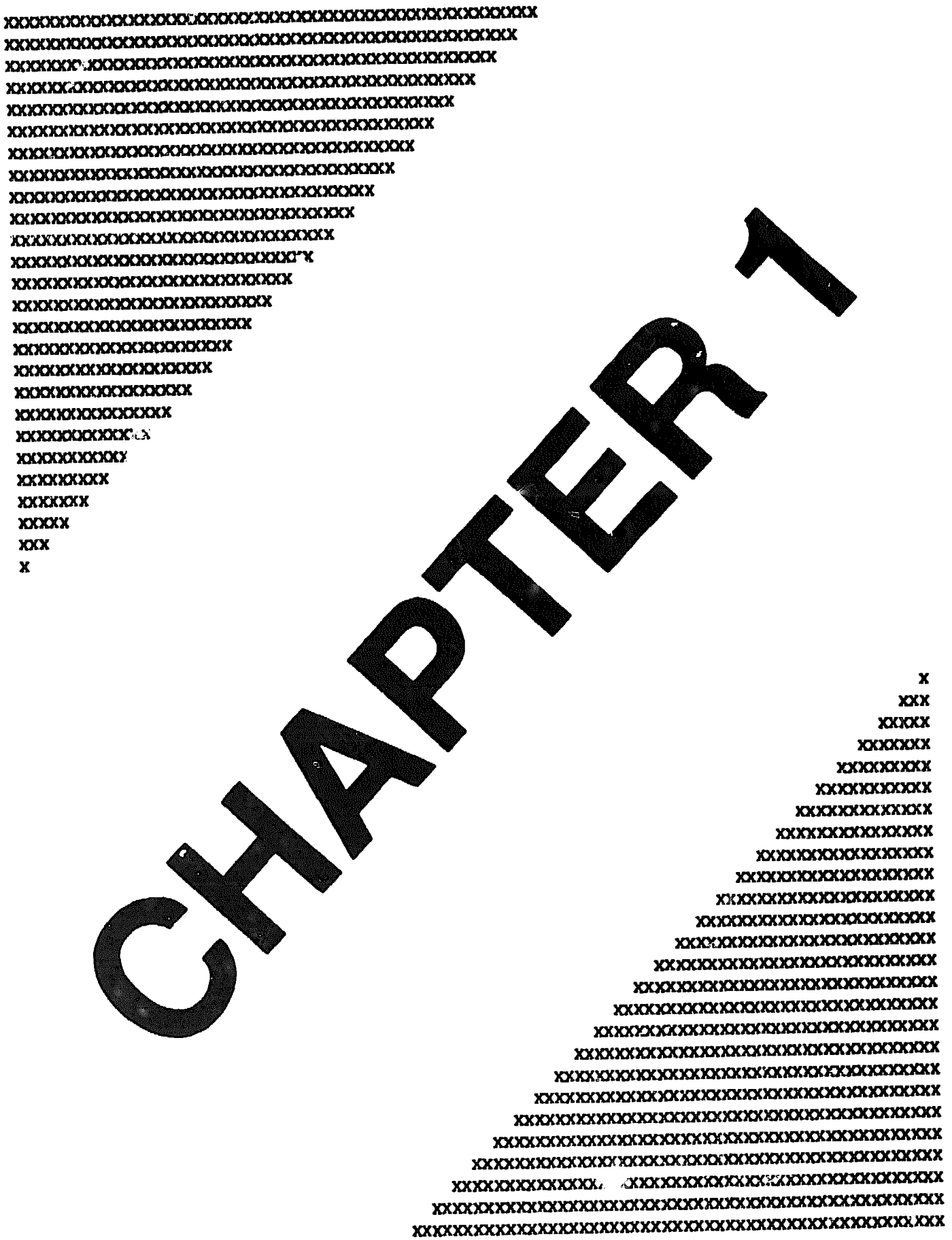
Appendix A	Specifications
Appendix B	Spares and Service Kit Part Numbers
Appendix C	Meaning of the Indicators
Appendix D	Function of the Switches
Appendix E	Functional Diagram
Appendix F	Control Character Acronyms
Appendix G	List of Features
Appendix H	LA70/LA75 Differences

Conventions Used In This Guide

WARNINGS contain information to prevent personal injury.
CAUTIONS contain information to prevent damage to equipment.
NOTES contain helpful or general interest information.
PN refers to a Digital part number.
text refers to a switch on the operator's control panel.

Reference Documentation

Title	Order Number
LA70 Personal Printer Installation and User's Guide	EK-LA70J-UG
LA70 Personal Printer Programmer's Reference Manual	EK-LA70J-RM
LA70 Personal Printer Technical Manual	ER-LA70J-TM


CHAPTER 1

1
Overview

The LA70 is a reliable, low cost, narrow carriage, dot matrix printer. It is designed to be a personal desk top printer suitable for general business applications. It has flexible paper handling and is capable of printing on single sheets, multiple part forms, and envelopes. The print quality is suitable for limited word processing in a small-to-medium computer environment.

The LA70 supports serial and parallel interfaces. Both are located on the Main PCB kit. The serial interface connects with Digital compatible systems through Digital's DECconnect, modular 6-pin type connector (MMJ).

The parallel interface connects through a standard 36-pin "D" type connector.

The active port is selected by the Set-up function.

The LA70 Personal Printer emulates Digital's Conformance Level-2 printer protocol and IBM Proprinter protocol. These protocols reside in the printer

The LA70 is produced in four voltage models to meet all worldwide voltage requirements.

The LA70 enables the user to select a Quiet print mode, in which acoustic noise is reduced to a minimum by performing printing with double passes.

The LA70 also has self-test diagnostics. These are initiated at power-up by pressing front panel keys when the power is switched on.

1.1 Recommended Tools

You are recommended to use the following tools:

Table 1–1 Recommended Tools

Part Number	Description
29-26106-00	50 Hz Terminal Tool Kit
29-26109-00	60 Hz Terminal Tool Kit
12-25083-01	MMJ Loopback Connector
29-27887-01	Parallel Loopback Connector
29-11762-00	Antistatic Kit

1.2 Identification of the Parts

The following figures and tables show the main parts of the LA70 Personal Printer.

Table 1–2 LA70 Part Names

B	Ribbon Cartridge	Q1	Serial Data Socket
G	Access Cover	Q2	Parallel Data Socket
G1	Flip-Up Paper Support	R	Printhead
H	Main Cover	T	Tractor Assembly
J	Tractor/Friction Feed Lever	T1	Tractor Locking Lever
K	Parking Lever	V	Bail Bar
L	Operator Panel	U	Serial Number
M	On/Off Switch		
M1	Power Socket		
N	Paper Thickness Lever		
P	Platen		
P1	Platen Knob		

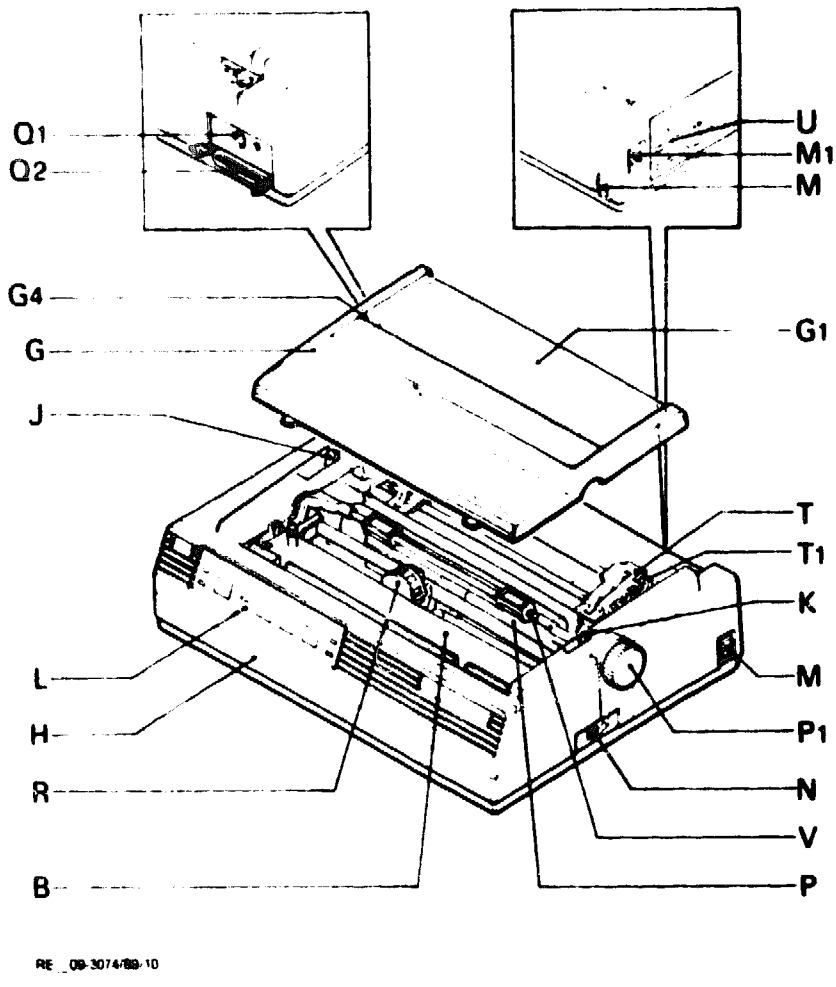
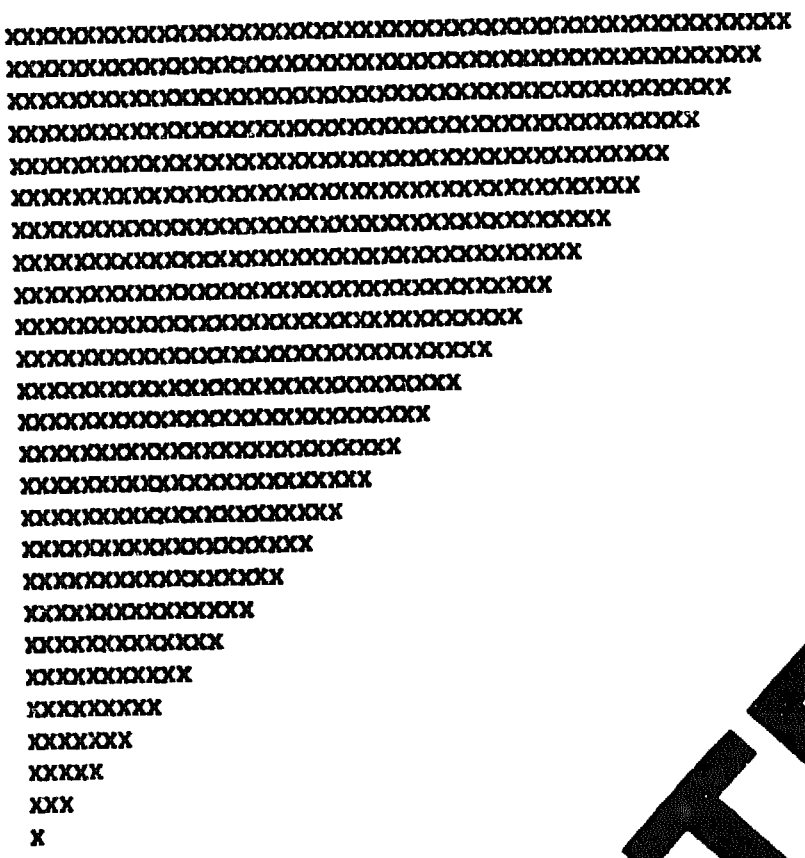
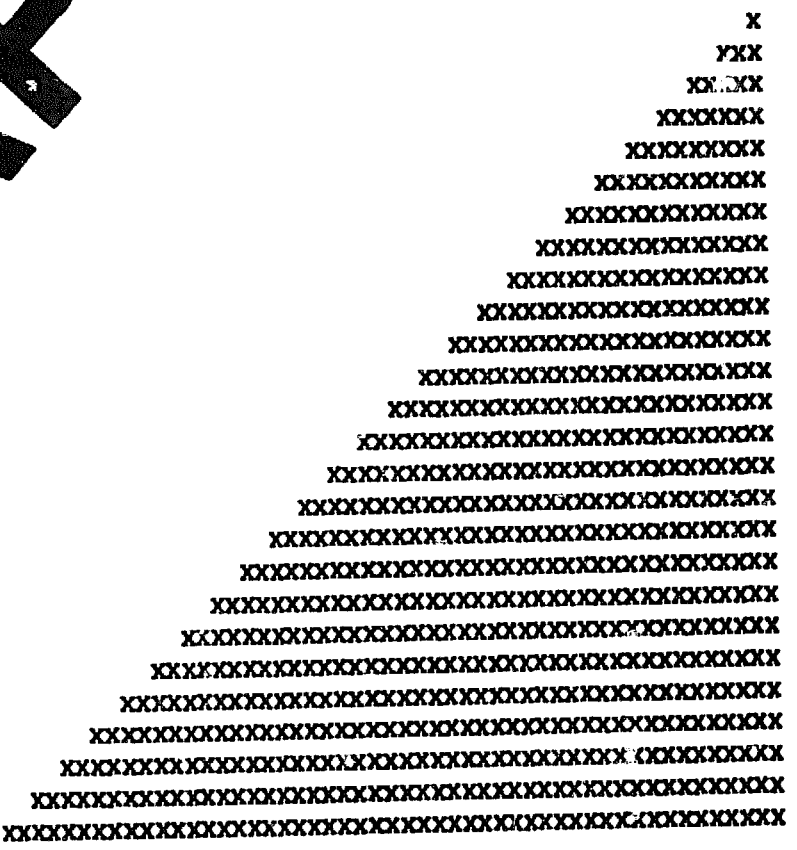


Figure 1–1 Identification of the Parts



CHAPTER 2



2
Troubleshooting

2.1 Introduction

The general office environment, in which the LA70 will be used, has its own hazards for equipment like this. Make sure that airborne particles and paper dust and the drying out of the light lubricating oil are not the main factors of a poor performance. These problems can be rectified by cleaning and lubrication, but only in exceptional circumstances should they be done on-site. Internal cleaning and lubrication are repair center activities.

WARNING
The procedures described in this chapter involve the removal of the system covers adn should be performed by trained personnel only.

ADVARSEL!
Ifølge de procedurer, som er beskrevet i dette kapital, skal systemets beskyttelsesplader fjernes; dette bør kun udføres af personer der ved hvordan dette skal gøres.

WAARSCHUWING
Bij de procedures die in dit hoofdstuk worden beschreven dienen bepaalde delen van de systeemomhulling te worden verwijderd; dit mag uitsluitend worden gedaan door opgeleid personeel.

NOTE
VAROITUS!)Tässä luvussa kuvatut toimenpiteet liittyvät järjestelmän suojakansien irrottamiseen. Ainoastaan koulutettu henkilökunta saa suoritta nämä toimenpiteet.

AVIS!
Ce chapitre decrit les interventions qui demandent que les couvercles exterieurs des appareils soient enleves. Ces travaux

devraient etre mis en main uniquement par des techniciens experimentes.

VORSICHT!
Bei der Ausfuhrung der in diesem Kapitel beschriebenen Anweisungen mussen die Systemabdeckungen entfernt werden. Dies sollte nur von geschultem Personal ausgefuhrt werden.

אזהרה

הפעולות המוזארות בפרק זה, כרוכות בהסרת המכסים
של המערכת ויבוצעו אך ורק על ידי אדם מוסמך.

ATTENZIONE
La procedura descritta in questo capitolo comporta la rimozione delle coperture e deve essere eseguita solo da personale specializzato.

注 意

本章では，本体カバーの取り外し等について
述べてあります，作業は，必ず専門の担当者
によっておこなって下さい。

ADVARSEL
I dette kapitlet beskrives bl. a. hvordan man fjerner dekslene rundt systemet. Dette arbeidet må bare utføres av fagfolk.

AVISO
Os procedimentos descritos neste capítulo respeitam à formo como se retiram as protecções do systema. Dada a sua especificidade, recomendamos que seja executado por pessoal especializado.

¡ATENCION!
Los procedimientos descritos en este capitulo incluyen el desmontaje de las cubiertas del sistema y debe ser realizado solamente por personal entrenado.

VARNING
I detta kapitel beskrivs hur systemkaapan tas bort. Detta faar endast utfoeras av utbildad personal.

2.2 General Troubleshooting Rules

- **Learn about the problem.**
  Talk to the operator who is using the equipment and probably knows more about the problem than anyone else.
- **Examine the environment.**
  Could it cause problems for the equipment?
  For example, is it very dirty or very hot?
- **Identify the problem.**
  Before removing any FRUs, demonstrate the fault for yourself.
  The printout of the LA70 will show many of the problems.
- **Isolate the problem.**
  Use the faul[illegible] notes and tables and any other assistance to help you. Al[illegible] check the initial power-up sequence as shown in To be supplied.

- **Correct the problem.**
  Use replacement and adjustment procedures to bring the equipment back to full service.
- **Test the equipment.**
  Wherever possible test the equipment in the presence of the operator to show that the problem has been fixed and that no other problems have been introduced.

2.3 Print Quality Checklist

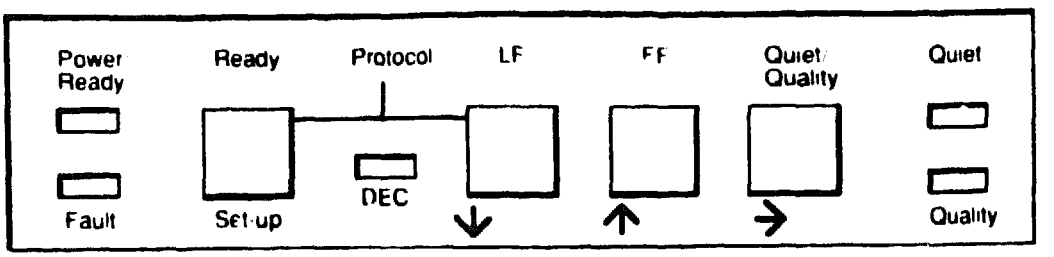
When examining the printer output look for:

- Equal density of characters
- Equal intensity of print over the whole print area
- Character sharpness
- No missing parts of characters
- Underline character and descenders (g,y,q,p) fully formed
- No smudges or streaks
- Even spacing between lines and characters.

2.4 Before You Start

Start with the most obvious symptom but consider that it may be indicating multiple failures.

The five visual indicators on the front panel, shown in Figure 2–1, can be interpreted as shown in Table C–1.



RE_09-3074/89/07

Figure 2–1 Locations of the LED Indicators

NOTE
When checking the indications of the LEDs, refer to Appendix C for their precise meaning. Remember that it is possible for LEDs to burn out. The first two seconds of the start-up procedure are intended to show any LED that is permanently on or off.

The precise function of each of the control panel switches is shown in Appendix D.

2.5 Fault Isolation

The following sections list possible fault symptoms and give tests you can make and actions you can take to help to clear those symptoms.

CAUTION
When replacing the main board, make sure that the contacts from the Paper Out Detect switch are touching the edge contacts on the main board (see Z7 on Figure 8–2).

WARNING
There is mains potential on the mains inlet board. A small cover is provided to prevent accidental contact. However, the following safety precautions must be observed:

1. **Do not work on live equipment unless this is absolutely essential.**
2. **Do not touch the mains inlet board or its cover with the equipment live.**
3. **Do not hold the filter board to unplug the mains connector from the machine, even if the machine power switch is turned off. Always unplug the power cord from the wall socket first.**
4. **Always allow 10 seconds after disconnecting the power for stored voltages on the mains inlet board to dissipate.**

AVISO
El panel de toma de la red eléctrica tiene voltaje, por lo que se suministra una pequeña cubierta para evitar contactos accidentales; no obstante, para una mayor seguridad, se recomienda tomar las siguientes precauciones:

1. **No trabajar con equipos conectados a menos que sea totalmente imprescindible.**
2. **No tocar el panel de tomas de la red eléctrica ni la cubierta con el equipo conectado.**
3. **No sujetar el panel de filtros para desenchufar la conexión de la máquina a la red, aún cuando el interruptor esté apagado. Siempre hay que sacar primero el enchufe de la pared.**
4. **Dejar transcurrir siempre 10 segundos después de deconectar para que se disipe el voltaje acumulado en el panel de toma de la red eléctrica.**

VORSICHT
An der Platine am Netzeingang liegt Spannung an. Die Plastikabdeckung schützt zwar vor irrtümlicher Berührung, Sie sollten jedoch die folgenden Sicherheitsvorkehrungen beachten:

1. **Arbeiten Sie niemals an Geräten, die unter Spannung stehen.**
2. **Berühren Sie niemals die Platine am Netzeingang oder die Plastikab- deckung, wenn das Gerät ans Netz angeschlossen ist.**
3. **Achten Sie darauf, daß Sie die Filterplatine nicht berühren, wenn Sie das Netzkabel entfernen. Dies gilt auch dann, wenn das Gerät ausgeschaltet ist (Netzschalter in Stellung 0).**
4. **Trennen Sie das Gerät vom Netz, indem Sie das Netzkabel aus der Steck- dose ziehen.**
5. **Warten Sie nach dem Ausschalten mindestens 10 Sekunden, damit sich eventuell vorhandene Restspannung abbauen kann.**

ATTENTION
UNE TENSION ELECTRIQUE DANGEREUSE EST PRESENTE SUR LA CARTE D'ENTREE. Un couvercle est fourni afin de prévenir tous contacts accidentels, IL FAUT NEANMOINS OBSERVER LES PRECAUTIONS SUIVANTES :

1. **Ne pas intervenir sur la machine tant qu'elle est sous tension, sauf si indispensable pour le depannage.**
2. **Ne pas toucher la carte principale ni le couvercle de protection si la machine est sous tension.**
3. **Ne pas tenir à la main le filtre secteur pour déconnecter le cable d'alimentation de la machine, même si la machine n'est pas sous tension. Toujours débrancher en premier le cable d'alimentation de la prise de courant murale.**
4. **Attendre au moins pendant 10 secondes après la mise hors tension pour la décharge des tensions capacitives résiduelles de la carte principale**

Table 2–1 indicates what problems are covered in this chapter and where you can find the relevant information.

Table 2–1 Problems Covered in this Chapter

Problem Areas	Section	Specific Faults
Power related problems	Section 2.5.1	No LEDs on when power is switched on
		Power/Ready LED is flashing. Faulty LED is flashing and does not respond when Ready/Set Up is pressed.
		At power on, the carriage does not move
		Printing does not start
		No response to computer commands. Ready LED is on
		Carriage moves but there is no printout during printing self-test
		Pinfeed paper does not advance
		Single sheet paper does not advance
Operation-related problems	Section 2.5.2	LA70 stops printing. Fault LED is on.
		No reverse paper feed
		Paper is not positioned at perforation for tear-off feature.
		Printhead carrier does not move smoothly
		Carriage does not move. Fault LED flashes.
Print-related problems	Section 2.5.3	Print faint or of poor quality.
		Character or characters do not print evenly or are not uniform in pitch
		Print lines overlap
		Characters printed at a slant. Paper tears or jams.
		Error reports or error characters printed. Ready LED is on.
		Printer does not stop when out of paper

Table 2–1 (Cont.) Problems Covered in this Chapter

Problem Areas	Section	Specific Faults
Ribbon or carriage-related problems	Section 2.5.4	Ribbon problems
		Carrier does not move smoothly
Automatic sheet feeder-related problems	Section 2.6	ASF not working after installation
		Printer/sheet feeder does not operate
		Paper does not feed
		Paper skews, feeds incompletely, double feeds, or feeds inconsistently
		Output paper is stacking badly

2.5.1 Power-Related Problems

No LEDs On When Power is Switched On

1. If printer is functioning correctly but no LEDs are on, replace the Panel PCB Assembly.
2. Test the power supply at a wall socket by substitution or metering. If faulty, contact the responsible site engineer.
3. Make sure the connectors are firmly inserted into both the printer and the wall socket. (In the U.K. and Ireland, make sure the fuse in the three pin plug is zero ohms.)
4. Switch the power off and disconnect the power cable. Check whether a fuse has blown.
   a. Check the fuse on the Noise Filter PCB assembly, see Section 6.6 Replace the fuse if necessary:

1.6 A (Medium Time-lag) for U.S.	DEC P.N. 29-26003-00
1.0 A (Time-lag) for Europe	DEC P.N. 29-26004-00

b. Check the fuse on the main board kit (see Section 6.5 Replace the fuse if necessary:
3.0 A (Medium Time-lag) DEC P.N. 12-33600-01

5. Check whether the secondary output of the transformer is normal.

a. Switch the power off and disconnect the power cable. Disconnect the 2-pin connector CN4 on the Main PCB kit from the transformer. (Section 6.5).

b. Connect the power cable, switch the power on and measure the AC voltage from the secondary of the transformer.

If the measured voltage is not a nominal 23VAC (see the CAUTION in Section 6.6 for correct connection details for CN1 on the Noise Filter PCB assembly), switch the power off, disconnect the power cable and then replace the Noise Filter PCB assembly (Section 6.6) or/and the Mechanical Assembly (see Section 6.9).
If the measured voltage is a nominal 23VAC, switch the power off, disconnect the power cable and then replace the Main Board Kit (see Section 6.5) or/and the Mechanical Assembly (see Section 6.9). Be sure to reconnect the 2-pin connector CN4 to the Main PCB kit.

Power/Ready LED is flashing,
Faulty LED is flashing (one second period) and does not respond when [Ready/Set Up] is pressed

1. Is the access cover fitted and seated correctly?
Closing it and pressing [Ready/Set Up] should light the Ready LED.

2. If you have an Automatic Sheet Feeder, ensure that its front cover is correctly seated.
Closing it and pressing [Ready/Set Up] should light the Ready LED.

3. Load paper.

4. Logic may not be receiving the access cover switch signal.

a. Make sure the connection between Panel PCB Assembly and Main PCB kit is good.

b. Replace the Panel PCB Assembly

5. Logic may not be able to respond to the access cover signal. Replace the Main PCB kit

At power on, the carriage does not move

1. Make sure the access cover is seated correctly.
2. Logic may not be receiving the access cover switch signal.
   a. Make sure the connection between the Panel PCB Assembly and the Main PCB kit is good.
   b. Replace the Panel PCB Assembly
3. Make sure the printhead carrier can move. Push and pull from size to side. It should move freely. If not:
   a. Remove any visible obstruction
   b. Replace the Mechanical Assembly

Printing does not start

1. Make sure the Ready LED is on. If not, press [Ready/Set Up]. Printing should start when you send data from the host computer.
2. Make sure the printer is connected to the host computer.
3. Make sure the host computer can send data.
4. Make sure you have set the correct protocol. See Chapter 5 and Appendix G.
5. Make sure you have selected the correct port. See Chapter 5 and Appendix G.
6. Logic may not be receiving the [Ready/Set Up] switch signal.
   a. Make sure the connection between the Panel PCB Assembly and the Main PCB kit is good.
   b. Replace the Panel PCB Assembly
7. Logic may not be able to respond to the READY signal. Replace the Main PCB kit.
8. Replace the Mechanical Assembly.

No response to computer commands.
Ready LED is On

1. Examine the data cable connections. Rectify as necessary.
2. Check the condition of the data cable. Replace if damaged.

3. Run the printing self-test. If this is not satisfactory replace the Main PCB kit. If the printing self-test is satisfactory, run either the serial or parallel loopback test appropriate for your situation. If this test fails, replace the Main PCB kit. If both tests give satisfactory results look for the problem outside the printer with the following checks.
4. Examine the features setup for a communications mismatch. Do features such as 8, 9, 12, or 13 match those of the host computer?

Carriage moves but there is no printout during Printing Self-Test

1. Make sure the ribbon is installed.
2. Examine the ribbon path. Does the ribbon pass in front of the whole printhead? Adjust if necessary.
3. Printhead pins may not be able to respond to control signals. Replace the printhead.
4. Printhead may not be receiving control signals. Replace printhead ribbon cable.
5. The Main PCB kit may not be able to send printhead control signals. Replace the Main PCB kit.

Pinfeed paper does not advance.

1. Make sure the tractor/friction feed lever is set to tractor feed.
2. The paper feed mechanism may be jammed or broken. Replace the Mechanical Assembly.
3. Replace the Main PCB kit.

Single sheet paper does not advance.

1. Make sure the tractor/friction feed lever is set to friction feed.
2. Replace the Main PCB kit.
3. The paper feed mechanism may be jammed or broken. Replace the Mechanical Assembly.

2.5.2 Operation-Related Problems

**LA70 stops printing,
Fault LED is On**

1. This is an "out of paper" response.
   Load paper. If the Ready LED is flashing, press Ready/Set Up . LA70 should continue printing.
2. Make sure the paper is not torn or otherwise damaged. If it is, replace with undamaged paper.
3. Make sure that the connection of the paper edge detector to the Main PCB kit is good.
4. Replace the Main PCB kit.
5. Replace the Mechanical Assembly.

No reverse paper feed

1. Are you trying to park? Printer will not reverse paper feed when:
   a. In Ready state (Ready LED On)
   b. Tractor/friction feed lever is in friction feed position
2. Make sure you are not at the end of paper.
3. Make sure that the paper is not damaged.
4. Make sure that the connection of the paper edge detector to the Main PCB kit is good.
5. Replace the Main PCB kit.
6. Replace the Mechanical Assembly.

Paper is not positioned at perforation for tear-off feature

1. Make sure the printer is in the Pause state. If Ready LED is on, press Ready/Set Up .
2. If the platen has been moved by hand, reload the paper. Make sure you use a complete form for the first sheet.
3. Select the correct form length using the Setup feature.
4. Replace the Main PCB kit.

Printhead carrier does not move smoothly

1. Examine the paper pathway. Remove any obstructions.
2. Examine the printhead carrier bar (the round bar on which the printhead moves). Is it dirty? If so, clean it with a soft cloth.
3. Examine the carrier area for obstructions. Remove as necessary.
4. Replace the Main PCB kit.
5. Replace the Mechanical Assembly. Return the faulty mechanism to the service center for replacement of the carrier motor.

Carriage does not move,
Fault LED flashes

1. Examine the paper pathway. Remove any obstructions. Press [Ready/Set Up] when paper pathway is cleared.
2. Replace the Main PCB kit.
3. Replace the printer mechanism. Return the faulty mechanism to the service center for replacement of the carrier motor.

2.5.3 Print-Related Problems

Print faint or of poor quality

1. Is the paper thickness control set correctly for the paper you are using? Adjust as necessary.
2. Have you used the correct paper? Appendix A contains a full specification of the paper you can use. Replace paper if it does not match the specification.
3. Make sure the ribbon is tensioned correctly.
4. Make sure the ribbon is of the correct type (see Appendix A).
5. Does the ribbon need changing? Replace with a new ribbon if necessary.
6. Is the ribbon cartridge properly seated? Reseat as necessary.
7. Replace the printhead.
8. Replace the Main PCB kit.

Character or characters do not print evenly or are not uniform in pitch

1. Examine the paper pathway for dirt or other obstruction that may cause the gap between printhead and platen to vary. Remove the obstruction.
2. Replace the Main PCB kit.
3. Replace the printer mechanism. Return the faulty mechanism to the service center for replacement of the carrier motor.

Print lines overlap

1. Examine the paper pathway for dirt or other obstruction that may prevent the platen from rotating freely. Remove the obstruction.
2. Make sure the traction/friction feed lever is set fully to the front or to the rear and not in an intermediate position.
3. Make sure the platen can rotate freely by moving the platen knob.
4. Replace the Mechanical Assembly.
5. Replace the Main PCB kit.

Characters printed at a slant,
Paper tears,
Paper jams

1. Make sure the traction/friction feed lever is set fully to the front or to the rear and not in an intermediate position.
2. Examine the paper pathway, remove any obstructions.
3. Is the paper too loose or too taut between the tractors?
   If the holes in the paper are deformed at their outer edges the paper is too taut.
   If the paper rises between the tractors it is too loose.
   Readjust the tractor spacing so that the paper lies smoothly but without any tension.
4. Replace the Mechanical Assembly.

Error reports or error characters printed.
Ready LED is On

1. Run the printing self-test. If this is not satisfactory, replace the Main PCB kit. If the printing self-test is satisfactory, run either the serial or parallel loopback test appropriate for your situation. If this test fails, replace the Main PCB kit. If both tests give satisfactory results, look for the problem outside the printer with the following checks.

2. Examine and if necessary reseat the data cable connections.
3. Make sure the data cable is in good condition. If it is damaged, replace it.
4. Examine the features setup; there may be a communications mismatch. Do features such as 8, 9, 12, 13, and 14 or 15 match those of the host computer?
5. Make sure the host computer is operating correctly.
6. Replace the data cable.

Printer does not stop when out of paper

1. Printer circuits do not detect that there is no paper. Examine the paper pathway. Remove any obstructions. Press [Ready/Set Up] when paper pathway is cleared.
2. Make sure that the connection of the paper edge detector to the Main PCB kit is good.
3. Replace the Main PCB kit.
4. Replace the Mechanical Assembly.

2.5.4 Ribbon- or Carriage-Related Problems

Ribbon Problems

1. Make sure the ribbon is:
    1. Tensioned correctly
    2. Not worn thin or dry
    3. Not torn damaged in any other way
    4. Not jammed
    5. The correct type as recommended by Digital
2. Replace the Main PCB kit.
3. Replace the Mechanical Assembly.

Carrier does not move smoothly

1. Examine the paper pathway. Remove any obstructions.
2. Examine the printhead carrier bar (the round bar on which the printhead moves). Is it dirty? If so, clean it with a soft cloth.
3. Examine the carriage area for obstructions. Remove as necessary.
4. Replace the Main PCB kit.
5. Replace the Mechanical Assembly. Return the faulty mechanism to the service center for replacement of the carrier motor.

2.6 Automatic Sheet Feeder-Related Problems

In all the following problems the quickest fault elimination test by far is to replace the suspect ASF with another either from stock or from another LA70. Therefore, your first action in all cases should be to substitute another ASF for the suspect one wherever possible.

ASF Not Working After Installation

1. The ASF can only operate correctly when the firmware recognizes that it has been installed. The firmware check for the presence of the ASF is done when power is switched on.

   Switch the power off, pause for a few seconds, and switch the power on.

Printer/Sheet Feeder Does Not Operate

1. Check power to printer. Refer to printer's user manual.
2. Check cable connections at printer and computer.
3. Press READY switch to put printer on-line.

Paper does not Feed

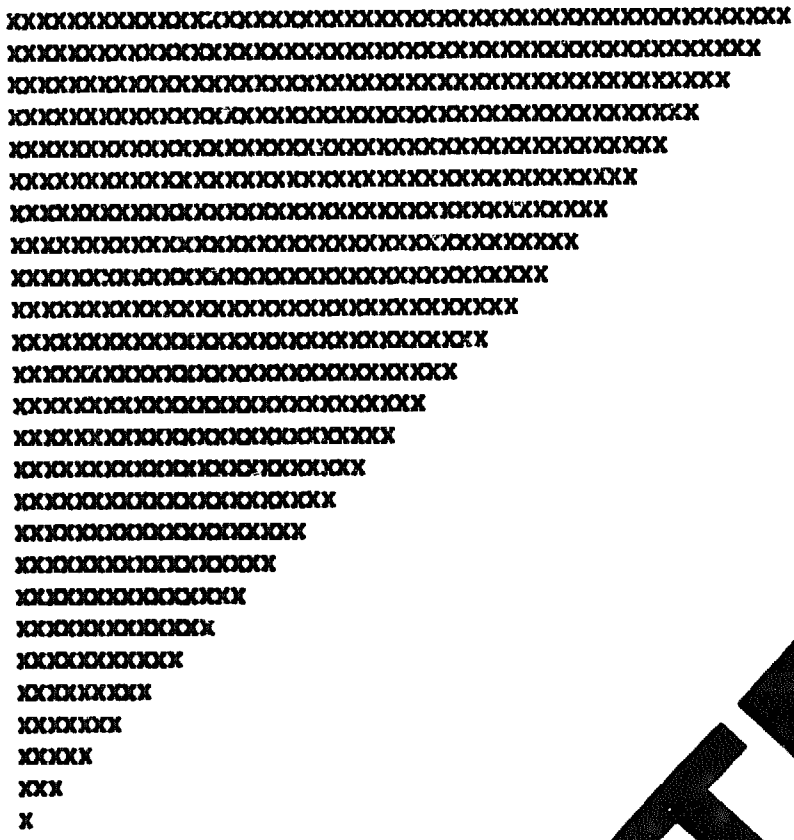
1. Check sheet feeder installation
2. Clear paper jam
3. Clean feed rollers with DEC platen cleaner

Paper skews, feeds incompletely, double feeds, or feeds inconsistently

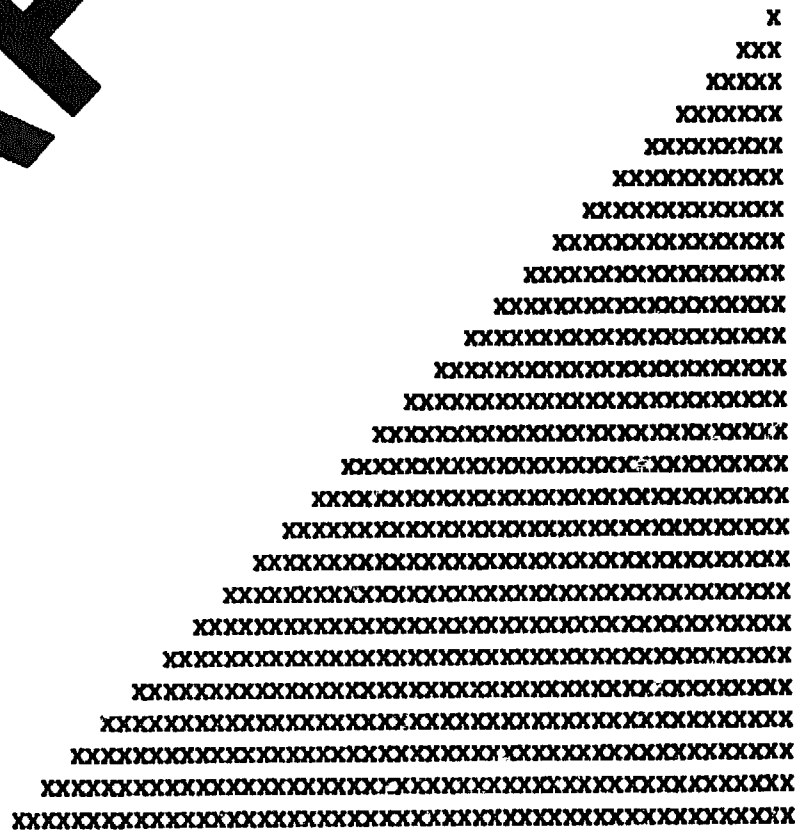
1. Clean printer platen with DEC platen cleaner
2. Clean feed rollers with DEC platen cleaner
3. Set right hand hoppers for correct paper width
4. Remove some paper
5. Fan and reload paper
6. Use paper conforming to specifications. See printer's user manual.
7. Check sheet feeder installation.

Output paper is stacking badly

1. Check output holder installation.
2. Use paper conforming to specifications. See printer's user manual
3. Empty output paper holder



CHAPTER 3



3
Customer Services Engineering Tests and Diagnostics

3.1 Introduction

The front panel enables the operator to select three types of printer function, namely: Setup (see Chapter 5), user features and test, and Customer Services engineers diagnostics. Five diagnostics always run when the power to the LA70 is switched on. These are:

- **ROM checksum test**
  This test verifies all bits in the ROM.
- **RAM pattern test**
  This test exercises and verifies all bits in the RAM.
- **NVR checksum test**
  This test verifies all bits in the NVR (No Volatile ROM).
- **LED test**
  The LEDs flash on and off for 2 seconds to enable the user to verify that all LEDs switch on and off.
- **Head movement test**
  This test moves the head from the center position to the left margin and back to the center.

3.2 Diagnostics Startup Summary

Table 3–1 Users' Facilities

Test	Comment	To Start	To Stop
ROM checksum			
	Startup sequence	Power on.	Stops at end of pass.
RAM pattern			
	Startup sequence	Power on.	Stops at end of pass.
NVR checksum			
	Startup sequence	Power on.	Stops at end of pass.
LED test			
	Startup sequence	Power on.	Stops at end of pass.
Carriage motion			
	Startup sequence	Power on.	Stops at end of pass.
Serial Loopback			
	C.S. Engineering test Needs loopback connector	Press [Ready/Set Up] AND [LF] AND switch the power on. Release front panel keys.	Power off

Table 3–1 (Cont.) Users' Facilities

Parallel Loopback			
	C.S. Engineering test Needs loopback connector	Press [Ready/Set Up] AND [FF] AND switch the power on. Release the front panel keys.	Power off.
Carriage Motion			
	Repair Center test	Press [Quiet/Quality] AND [FF] AND switch on.	Press [FF] to go to next test. Power off to stop.
H pattern			
	C.S. Engineering test	While in the carriage motion test, press [FF] .	Press [FF] to go to next test. Power off to stop.
Printhead pattern			
	C.S. Engineering test	While in the H pattern test, press [FF] .	Press [FF] to go to next test. Power off to stop.
PLU/PLD			
	C.S. Engineering test Paper movement	While in the PH pattern test, press [FF] .	Press [FF] returns to the Carriage Motion test. Power off to stop.

Table 3–1 (Cont.) Users' Facilities

Printing Self-test			
	User's test Swirl pattern	With paper loaded, press [Quiet/Quality], AND switch on.	Power off.
Vertical Paper Alignment			
	User adjustment	With no paper loaded, press [FF] AND power ON.	Press [Quiet/Quality] to save the setting.
Hex Dump			
	Programmer's tool	With paper loaded, press [FF] AND power ON.	Power Off.

3.2.1 Printing Self-Test

Function

This is a confidence check on the general serviceability of the printer for use by the customers and C.S. Engineers during installation. It prints all printable characters in all positions of the printhead. The pattern is known as the swirl pattern.

Selection and Deselection

With paper loaded, press the print mode key, [Quiet/Quality], AND switch on.

The test runs continuously until switched Off.

Operation

The printer outputs a swirl pattern (see Figure 3–1). There are no operational activities with this test. Verify the quality of the output visually. Refer to Section 2.3 for print quality guidelines.

Detected failures causes the Fault indicator to blink.

Discussion

The size and spacing of the print output is determined by the setting of the appropriate features; for example, horizontal print density, vertical print density, and print quality features affect the style of this printout. Refer to Chapter 5 for the method of changing the settings of the printer.

Figure 3–1 shows part of the test printout.

Figure 3–1 Print Test Pattern

3.3 C.S. Engineering Tests

These are defined as those tests that are selected by switching the power on at the same time as pressing TWO other keys.

3.3.1 Serial Port Loopback Self-Test

Function

The printer is capable of executing a loopback test when connected in any configuration which externally loops the SEND DATA signal back to the RECEIVE DATA signal, and the DSR signal back to the DTR signal of the serial port. This is typically achieved with a loopback connector. Detected failures cause the fault light to blink.

Selection and Deselection

Insert loopback connector (PN 12-25083-01).

Press [Ready/Set Up] AND [LF] AND switch the power on. Release front panel keys to initiate this test.

Switch the power off to stop the test and remove the loopback connector.

Operation

This test transmits the character sequence of the printing self-test (ASCII Swirl) on the SEND DATA signal at the selected baud rate and in the selected character format.

The Fault LED flashes if the printer does not detect data on the RECEIVE DATA line within one second after the loopback test is started or if a signal output to the DTR is not detected on the DSR circuit.

Successful execution of the test is determined by operator examination of the printed test pattern.

Discussion

Examine the quality of the printout (refer to print quality checklist in Section 2.3 and make sure the sequence of characters is complete. If this is not satisfactory, change the Main PCB kit.

3.3.2 Parallel Port Loopback Self-Test

Function

The test operates with a loopback connector. It exercises each output signal and the corresponding input circuits of the parallel port.

The test runs continuously.

Detected failures cause the Fault LED to flash and the test to stop.

Selection and Deselection

Insert the parallel loopback connector (PN 29-27387-01) into the parallel port connector. Press [Ready/Set Up] AND [FF] AND switch the power on. Release the front panel switches to initiate this test.

Switch the power off to stop the test and remove the loopback connector.

Operation

Run this test in the following way:

1. Insert the loopback connector and run the test. There should be no failures.
2. Remove the loopback connector and run the test. It should fail.

Discussion

This test produces no printout.

Replace the Main PCB kit if step 1 above fails or if step 2 does not fail.

3.3.3 Carriage Motion Self-Test

Function

This is a repair center test only. The printer executes carriage motions and ribbon motions continuously.

Detected failures cause the Fault light to flash.

During this test, paper supply is not checked by the printer. If the cover is opened, the test will stop and the fault LED blink. The test can be resumed by closing the cover and pressing the Ready Switch.

Selection and Deselection

Press [Quiet/Quality] AND [FF] AND switch on.

Press [FF] to move on to the next test.

Switch off to stop the test.

Operation

There are no operational procedures for this test.

3.3.4 "H" Pattern Self-Test

Function

This self test is used to adjust bidirectional print accuracy (Vertical Dot Alignment).

Selection and Deselection

While in the Carriage Motion Test, press [FF] .
The test runs automatically and stops after four possible selections have been printed.
Note that this test should not be interrupted before completion.

Operation

The printer outputs four groups of four lines of Hs, each preceded by its setting number.

The currently selected adjustment setting is printed after the four "H" patterns.

To change setting press [LF] until the required setting number is printed.

The last selected number is stored.

Discussion

Each group of Hs is printed at 10 CPI and 12 LPI in draft mode so that the Hs connect vertically. This enables easy selection of the best adjustment setting.

Choose the setting that gives the best alignment over the most commonly used part of the line (usually the lefthand side).

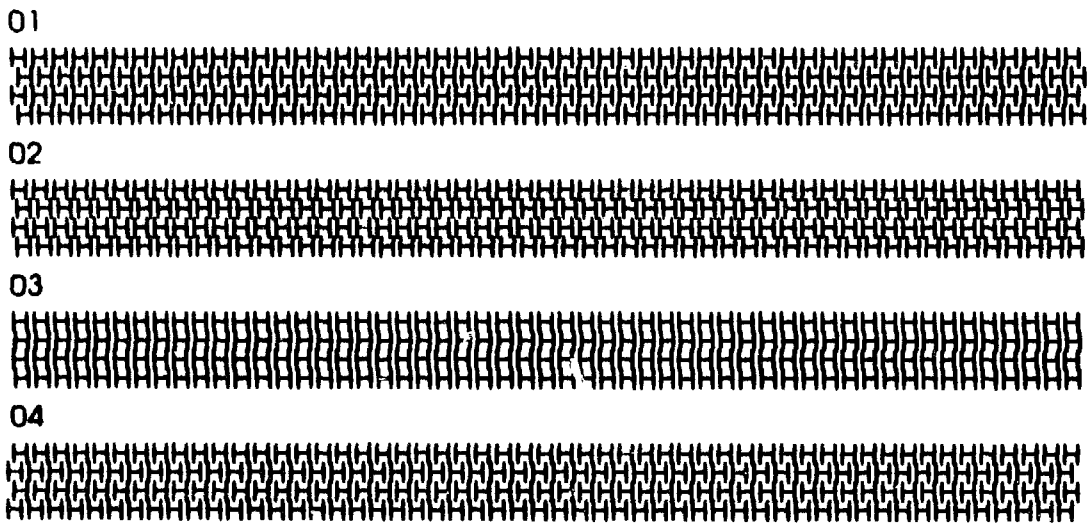


Figure 3–2 Dot Alignment Printout

3.3.5 Printhead Pattern

Function

The printer outputs a pattern that enables the C.S. Engineer to verify that each printing needle is functioning correctly and to examine the printout for signs of wear on each pin.

Selection and Deselection

While in the H Test Self-Test press [FF] .

Press [FF] to move on to the next test.

Switch off to stop the test.

Operation

There are no operational procedures for this test.

Discussion

This pattern activates individual print pins.

Wear on an individual pin can be seen by:

- Lighter print than other pins (caused by the pin being shorter)
- Erratic print (caused by either a worn pin or worn bearing).

Replace the printhead if necessary.

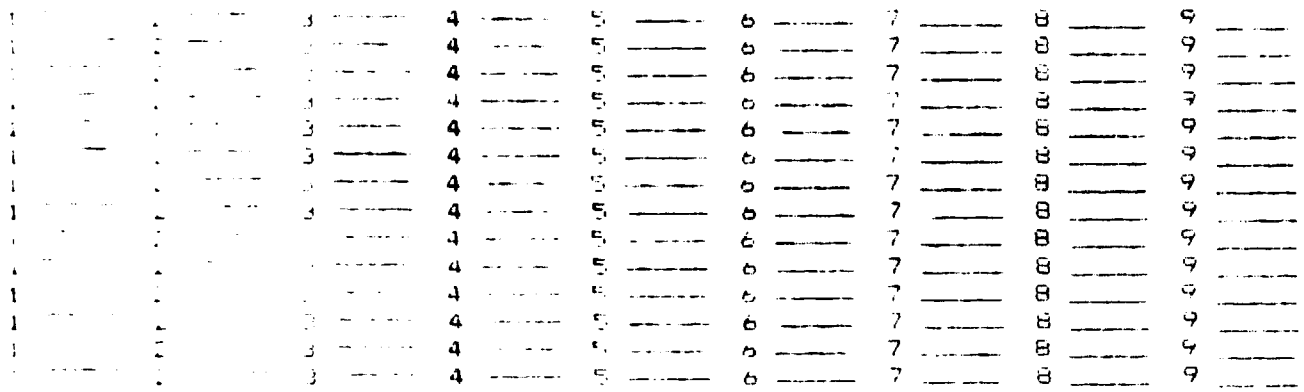


Figure 3–3 Printhead Pattern

3.3.6 PLU/PLD Test

Function

"PLU/PLD" stands for Partial Line Up and Partial Line Down. This is a print pattern to test the up and down motion of the platen and paper.

Selection and Deselection

While in the printhead pattern test press [FF] .

This pattern is executed continuously until the LF button is pressed.

If [FF] is pressed, the Carriage Motion test is selected.

Operation

The characters "MID" are printed starting at column one at current line.

Then the following sequence is executed across the page:

partial line up (1/12 inch)
print "PLU"
partial line down (1/12 inch)
print "MID"
partial line down (1/12 inch)
print "PLD"

At the end of the line a <CR> is actioned and the pattern repeats.

Discussion

Printing is performed at 10 CPI and 8 LPI in draft mode.

Examine the output for quality and position of the characters.

A typical printout is shown in Figure 3–4.

$MID^{PLU}MID_{PLD}MID^{PLU}MID_{PLD}MID^{PLU}$

Figure 3–4 Paper Motion Test

3.3.7 First Line on Page Adjustment

Function

This adjustment allows the user to define the position of the first active line on the page. The active range is within 0 to +0.5 inches from the top of form.

Selection and Deselection

With no paper loaded, press [FF] AND switch on.

Operation

After the printer is turned on, if the FF button is pressed, paper is loaded automatically and eight Hs are printed at the first line first column according to the latest setting. Paper is then advanced to enable the user to read the printed line on top of the tear bar. The user is able to change the setting by pressing the LF and FF buttons as follows:

[LF]	Printed line moves 1/24 inch down the page.
[FF]	Printed line moves 1/24 inch up the page.
[Quiet/Quality]	Store last setting

Each time a key is pressed the following actions occur:

1. The paper is moved up or down 1/24 inch.
2. Eight Hs are printed in the next group of eight columns to show the current location.
3. Paper is advanced to enable the user to see the new setting above the tear bar.

Discussion

This adjustment has no impact on the tear off operation. The paper movement that enables users to tear off forms is dependent on the selected form length, not of this adjustment.

The Hs pattern is printed in draft mode, normal print mode at 10 cpi, so that 10 changes can be performed on a page width. At the eleventh change, printing resumes at the first column. The user can also switch the power off and start again with a new form.

A typical printout is shown in Figure 3–5

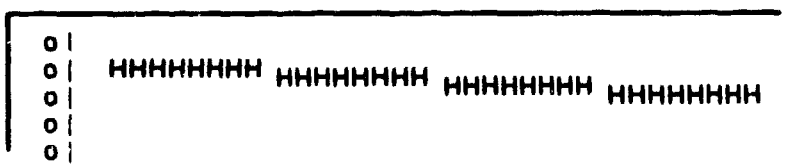


Figure 3–5 Printout When Setting the Vertical Alignment

3.3.8 Hex Dump Printing (Control Representation Mode)

Function

This mode is for use by programmers and support engineers. It prints control characters instead of executing them, with the following exceptions:

1. Line Feed character produces a carriage return and line feed action, as well as printing <LF>.
2. Form Feed character prints <FF>, followed by form feed action.
3. Space character produces a space.

Use this facility to assist when debugging software.

Selection/Deselection

With paper loaded, press the linefeed key, [LF] , AND switch on.

Switch off to stop this test.

Operation

Enable this mode. Send a file from the host CPU. Examine the output.

Discussion

Normal text characters are printed in Normal mode, draft, 10 CPI, 6 LPI. Control character acronyms are printed in angle brackets and bolded. The control code acronyms are shown in Appendix F.

Those characters which have no acronym listed in Appendix F, cannot be imaged with a printable character are imaged in hexadecimal code (for example, <X80>).


CHAPTER 4

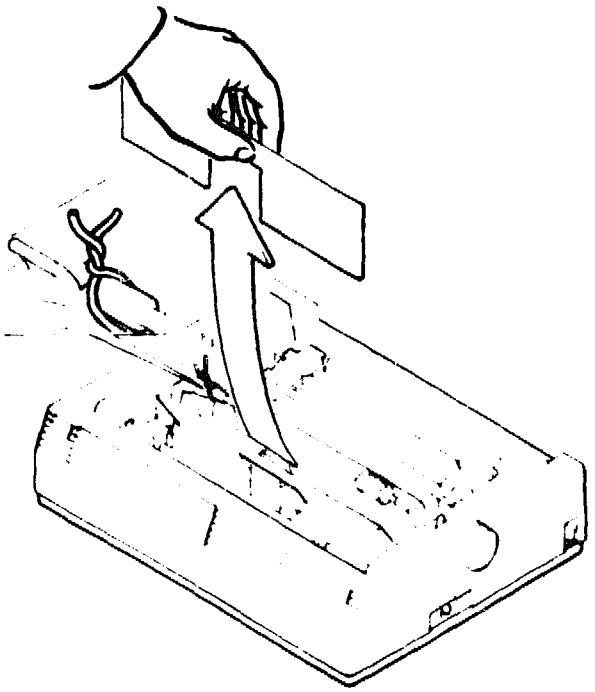
4
Installation

4.1 Preparation

The LA70 is designed to work in a normal office environment. No special conditions are needed. The only preparation needed is to ensure that the space allocated is adequate for its operation and is within normal reach of the cables from the host computer and electrical supply socket; that is, the cables should not be pulled tight nor should they cross passageways.

4.2 Installation

1. Unpack the LA70
2. Inspect the contents for damage and for quantity against the user documentation.
   Any damage or shortages should be reported.
3. Locate the LA70 where it is to be used.



RE_09-3074/89/13

Figure 4–1 Removing the Transit Packing

4. Remove the printhead restraining transit packing. See Figure 4–1.
5. Remove the twisted-wire bail bar restrainer.
6. Make sure that the label on the back of the printer quotes the same voltage as that available from the wall socket.
7. Connect the power cable first to the printer and then to the wall socket.

   DO NOT SWITCH ON.

8. Install the ribbon cartridge.

The aim here is to insert the ribbon cartridge so that the ribbon is prepared for the loading action. The printer automatically completes the ribbon loading process when you switch the power on.

a. Tension the ribbon by rotating the knob (B1) as indicated on the ribbon cartridge.

b. Lower the ribbon cartridge into position so that the ribbon rests on the printhead with the TOP edge of the ribbon at the TOP.

c. Push the cartridge down at both ends so that it locks into position.

9. Do not connect data cable to host system.

10. Load the paper.

    The printer loads paper automatically. Do NOT use the platen control knob.

    Insert the paper into the tractors and release the tractor locking levers to position the paper. The paper should not be too taut or too slack.

    Lock the tractors into position.

11. Replace the access cover.

12. Set the tractor/friction feed lever (J) to tractor feed.

13. Power on.

The Start Up Sequence

During the start up process the following should happen:

a. All LEDs flash for approximately two seconds. (This is for LED verification. If any do not come on or do not go off, there is a fault.)

NOTE
If you are switching on AND pressing switches, the LED test does not occur.

b. Printhead moves to the left, to the right, and back to center.

c. The ribbon loads.

d. Paper loads to top of form.

e. Power/Ready LED flashes slowly. (If the Digital protocol is selected, the DEC LED is on.)

f. When you press [Ready/Set Up], the Power/Ready LED should be permanently on.

The printer is ready for testing.

Test the basic operation of the printer by printing the list of features and values as follows:

1. Switch the power off.
2. Press [Ready/Set Up] AND switch on.
3. Release [Ready/Set Up].

The printer outputs the current feature list. For a new printer this will be the factory set list. The factory settings are shown in Appendix G by an asterisk (*).

The basic installation is now complete. The printer is ready for verification testing.

4.3 Verification

This section describes the testing needed to verify that the LA70 operates correctly and can be accepted by the customer and C.S..

NOTE
The self-tests referred to in this process are described in Chapter 3.

If any of the self-tests fail, refer to the appropriate table in Chapter 2. Continue with the installation verification tests when the problem has been fixed.

The test sequence should be:

1. Do the startup tests
2. Run the C.S. self-test diagnostics
3. Use the setup capability
4. Connect the printer to the host CPU.

4.4 Running the C.S. Diagnostics

Run the C.S. diagnostics in the following order:

1. Printing Self-test
2. Serial Loopback
   Needs loopback connector (PN 12-25083-01)
3. Parallel Loopback
   Needs loopback connector (PN 29-27887-01)
4. H pattern
5. Printhead pattern
6. PLU/PLD
7. Vertical Paper Alignment

Refer to Chapter 3 for the selection and deselection procedures and for the expected results.

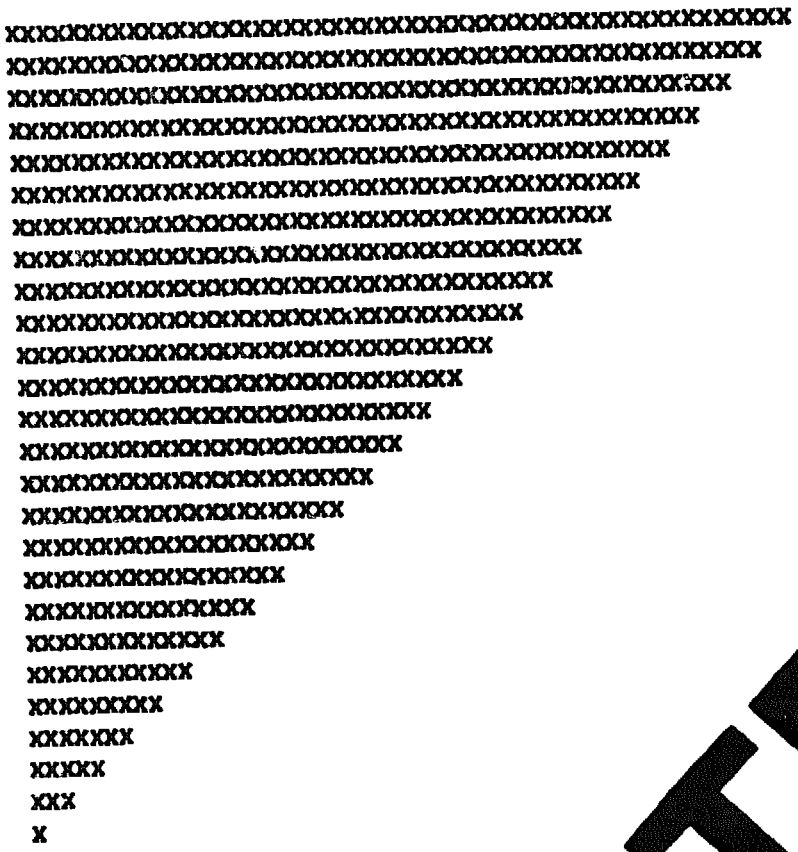
4.5 Proving the Setup Capability

The suggested check for this verification is to set up a short page length, switch the power off and on, and verify the changed length with the form feed key. When satisfied, reset the value to the local page length and exit setup.

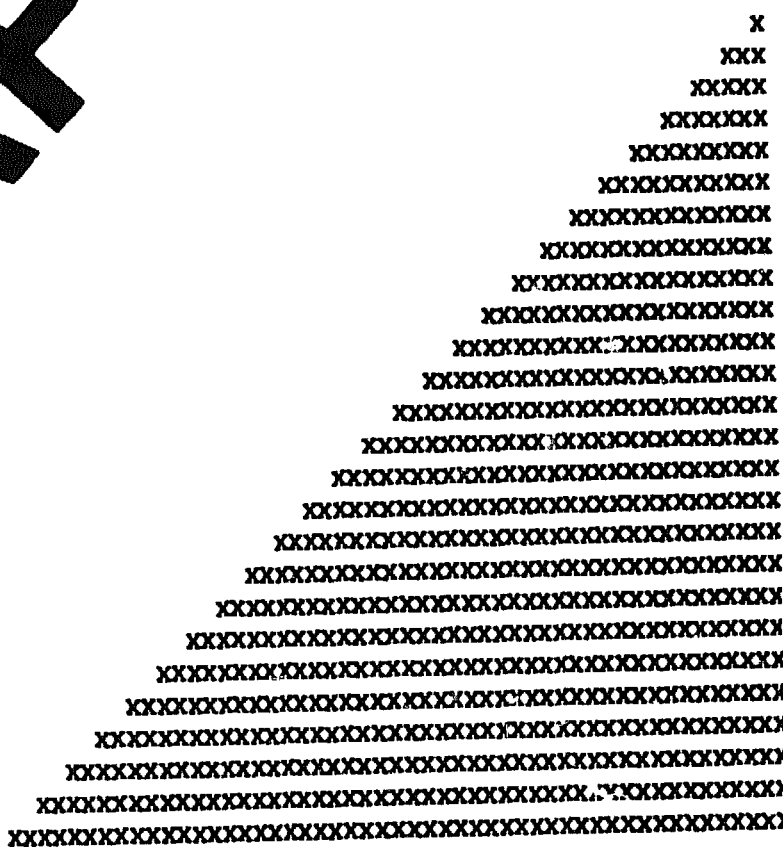
The procedure to do this is as follows:

1. Enter Set Up.
   Switch the power off, press [Ready/Set Up] AND switch the power on. Release [Ready/Set Up]. The factory settings will be printed.
2. Press [↓] once. "2 Horizontal Print Density" is printed and displayed. (If you go beyond this feature press [↑] to move back.)
3. Press [→] until "10 16.5 CPI (132 col)" is displayed. (If you go beyond this value you must continue pressing [→] until value 10 is printed again.)
4. Exit Setup Mode.
   Press [Ready/Set Up].
5. Power Off.
6. Run the printing self-test (see Section 3.2.1). Make sure that the printer now prints 132 characters per line.

7. Return the printer to the normal CPI.
   1. Power Off.
   2. Press [Setup] AND switch the power on.
   3. Press [↓] once. "2 Horizontal Print Density" is printed and displayed. (If you go beyond this feature press [↑] to move back.)
   4. Press [→] until "7 10 CPI (80 col)" is displayed. (If you go beyond this value continue pressing [→] until value 7 is printed again.)
   5. Exit Setup Mode.
      Press [Ready/Set Up] .



CHAPTER 5



5
Setup

5.1 Introduction

The Setup mode enables the definition of the operating features of the printer. Once set, these features are permanently available.

There are no alphanumeric indicators on the LA70. All setup information is displayed on the printout.

When first selected, Setup mode prints the factory set values of the printer, shown by asterisks (*) in Appendix G. Subsequent selections of this mode print the current features list. When the list is complete, the first feature is reprinted and is ready to be changed if needed.

The [Ready/Set Up] key on the front panel (Figure 2–1) controls the selection of Setup mode and enables you to choose the operational features of the LA70 from a series of menus.

When Setup mode is selected the symbols beneath the keys of the front panel apply, and have the meaning shown in Table 5–1:

Table 5–1 Meaning of Setup Symbols

[↑]	=	Select the previous feature
[↓]	=	Select the next feature
[→]	=	Move to the next value of the current feature

The functionality of the LA70 is divided into a series of features, such as form length, line spacing, baud rate and so on. These are selected by entering the Setup mode and moving up and down the list of features with the [↑] and [↓] switches.

Each of the features has two or more values to choose from, such as IBM mode or Digital mode. Use the [→] key to select the next value. Value selection is one way only.

As each feature is selected its position in the list, full name and current value number and name is printed.

5.2 Selecting Setup Mode

Use the following procedure to select Setup mode:

With paper loaded:

1. Switch off the printer.
2. Press and hold the [Setup] key.
3. Switch the LA70 on.
4. Release the [Setup] key.

Press [→], to see the next value for the displayed feature.

The printer stores the last displayed value of any feature, unless power fails, or is removed before the next feature is selected.

Move through the features list with the [↑] and [↓] keys.

When all the necessary values have been set, press [Set Up] to return to the Ready state.

NOTE
If power is switched off before exiting from the Setup mode, the newly selected values are not stored.

5.3 Paper Out in Setup Mode

Paper out in Setup mode causes the front panel keys to be disabled and the Fault indicator to flash. Load more paper manually, using the platen knob. When paper is loaded, press the ready switch to resume set-up mode.

5.4 Set-up with Automatic Sheet Feeder

In this mode, if paper cannot be loaded because of a paper jam or because there is no paper in the input bin, the fault indicator flashes. To clear this fault condition and resume set-up, follow this procedure:

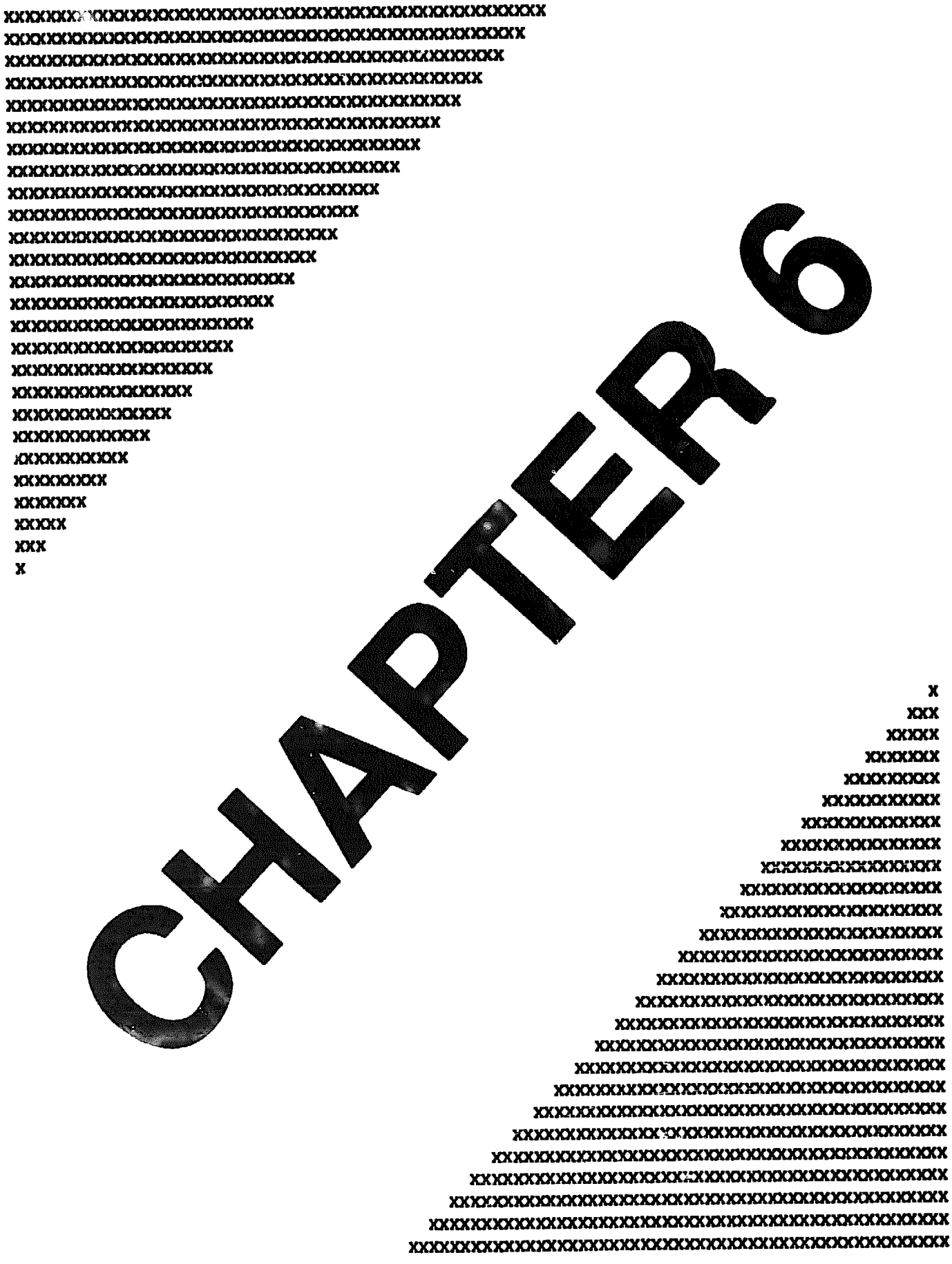
- Load paper into input bin
- Press FF switch
- Press Ready switch

5.5 Selectable Features

Refer to Appendix G for the full list of available features. The factory set values of each feature are shown by an asterisk (*).

5.6 Factory Setting

The feature number 99 is used to store the factory setting for each feature. If value "YES" has been selected prior to exiting the set-up mode, all factory setting values are stored.


CHAPTER 6

6
Removing and Replacing FRUs

6.1 Introduction

The FRUs of the LA70 are:

FRU	PART NUMBER
Main PCB kit	29-28163-01
Noise Filter PCB Assembly 100/120V	29-28165-01
	OR
Noise Filter PCB Assembly 220/240V	29-28165-02
Panel PCB Assembly	29-28164-01
Printer Mechanism 100/120V	29-28160-01
	OR
Printer Mechanism 220V/240V	29-28160-02
The printer mechanism includes the mechanical assembly, the transformer, the motherboard, the printer base, and other minor items.	
Printhead	29-28161-01
Printhead cable	29-28162-01
Fuses UL-TSC 3A	12-33600-01
Mini Fuse MT4 1.6A 100/120V	29-26003-00
	OR
Mini Fuse 1A 220/240V	29-26004-00

FRU	PART NUMBER
Automatic Sheet Feeder	LA70X-SF

Figure 6–1 shows the sequence in which the LA70 is disassembled to gain access to its FRUs.

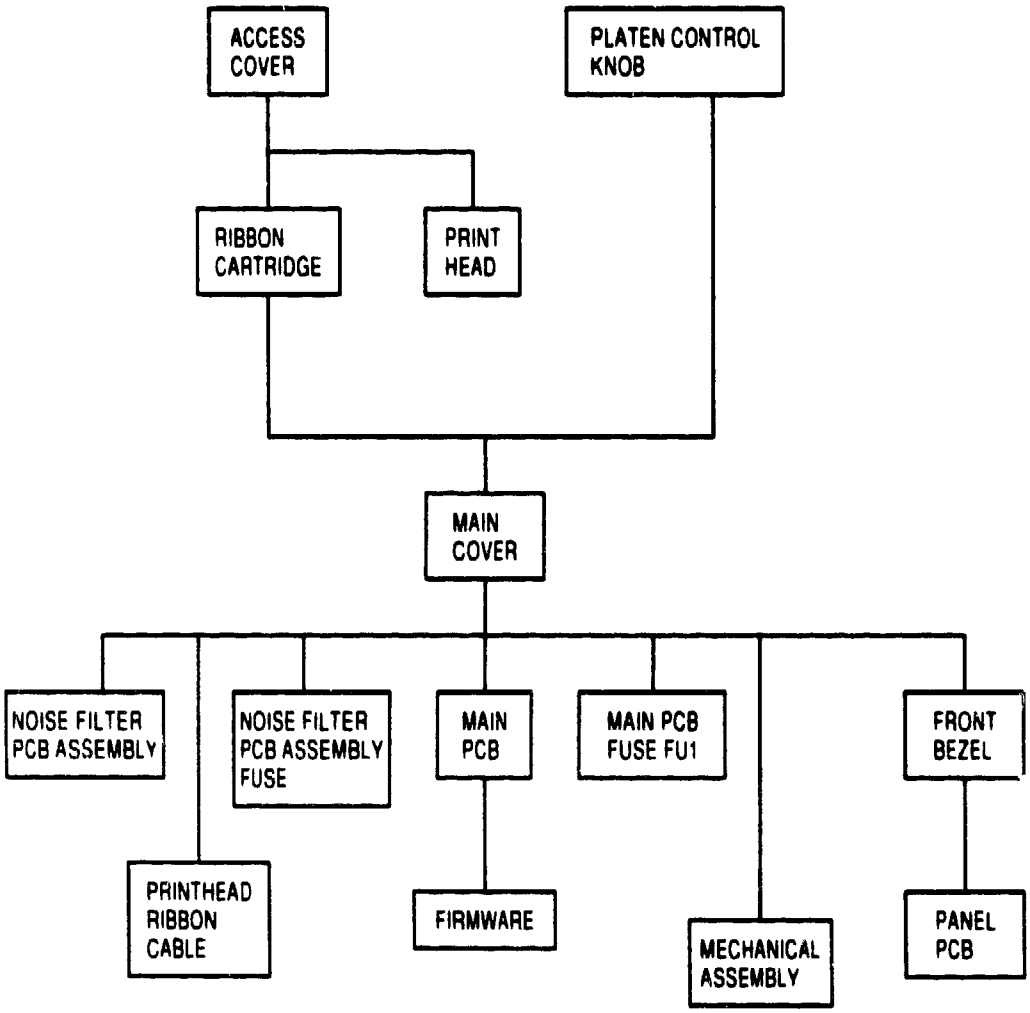


Figure 6–1 FRU Removal Sequence

CAUTION
Removing and replacing FRUs has been made especially easy by the use of plastic locking tabs. Please note that these tabs can be damaged by excessive force. Use extra care when releasing all components retained by plastic tabs.

The printhead can be replaced by removing the access cover. Access to all other FRUs is gained by removing the main cover (see Figure 6–4).

WARNING
The procedures described in this chapter involve the removal of the system covers and should be performed by trained personnel only.

ADVARSEL!
Ifølge de procedurer, som er beskrevet i dette kapital, skal systemets beskyttelsesplader fjernes; dette bør kun udføres af personer der ved hvordan dette skal gøres.

WAARSCHUWING
Bij de procedures die in dit hoofdstuk worden beschreven dienen bepaalde delen van de systeemomhulling te worden verwijderd; dit mag uitsluitend worden gedaan door opgeleid personeel.

NOTE
VAROITUS!)Tässä luvussa kuvatut toimenpiteet liittyvät järjestelmän suojakansien irrottamiseen. Ainoastaan koulutettu henkilökunta saa suoritta nämä toimenpiteet.

AVIS!
Ce chapitre decrit les interventions qui demandent que les couvercles exterieurs des appareils soient enleves. Ces travaux devraient etre mis en main uniquement par des techniciens experimentes.

VORSICHT!
Bei der Ausfuhrung der in diesem Kapitel beschriebenen Anweisungen mussen die Systemabdeckungen entfernt werden. Dies sollte nur von geschultem Personal ausgefuhrt werden.

אזהרה

הפעולות המתוארות בפרק זה, כרוכות בהסרת המכסים
של המערכת וביצוען אך ורק על ידי אדם מיומן.

ATTENZIONE
La procedura descritta in questo capitolo comporta la rimozione delle coperture e deve essere eseguita solo da personale specializzato.

ADVARSEL
I dette kapitlet beskrives bl. a. hvordan man fjerner dekslene rundt systemet. Dette arbeidet må bare utføres av fagfolk.

AVISO
Os procedimentos descritos neste capítulo respeitam à formo como se retiram as protecções do systema. Dada a sua especificidade, recomendamos que seja executado por pessoal especializado.

¡ATENCION!
Los procedimientos descritos en este capitulo incluyen el desmontaje de las cubiertas del sistema y debe ser realizado solamente por personal entrenado.

VARNING
I detta kapitel beskrivs hur systemkaapan tas bort. Detta faar endast utfoeras av utbildad personal.

注 意

本章では，本体カバーの取り外し方について
述べてあります，作業は，必ず専門の担当者
によっておこなって下さい。

WARNING
There is mains potential on the mains inlet board. A small cover is provided to prevent accidental contact. However, the following safety precautions must be observed:

1. **Do not work on live equipment unless this is absolutely essential.**
2. **Do not touch the mains inlet board or its cover with the equipment live.**
3. **Do not hold the filter board to unplug the mains connector from the machine, even if the machine power switch is turned off. Always unplug the power cord from the wall socket first.**
4. **Always allow 10 seconds after disconnecting the power for stored voltages on the mains inlet board to dissipate.**

AVISO
El panel de toma de la red eléctrica tiene voltaje, por lo que se suministra una pequeña cubierta para evitar contactos accidentales; no obstante, para una mayor seguridad, se recomienda tomar las siguientes precauciones:

1. **No trabajar con equipos conectados a menos que sea totalmente imprescindible.**
2. **No tocar el panel de tomas de la red eléctrica ni la cubierta con el equipo conectado.**
3. **No sujetar el panel de filtros para desenchufar la conexión de la máquina a la red, aún cuando el interruptor esté apagado. Siempre hay que sacar primero el enchufe de la pared.**
4. **Dejar transcurrir siempre 10 segundos después de deconectar para que se disipe el voltaje acumulado en el panel de toma de la red eléctrica.**

VORSICHT
An der Platine am Netzeingang liegt Spannung an. Die Plastikabdeckung schützt zwar vor irrtümlicher Berührung, Sie sollten jedoch die folgenden Sicherheitsvorkehrungen beachten:

1. **Arbeiten Sie niemals an Geräten, die unter Spannung stehen.**
2. **Berühren Sie niemals die Platine am Netzeingang oder die Plastikab- deckung, wenn das Gerät ans Netz angeschlossen ist.**
3. **Achten Sie darauf, daß Sie die Filterplatine nicht berühren, wenn Sie das Netzkabel entfernen. Dies gilt auch dann, wenn das Gerät ausgeschaltet ist (Netzschalter in Stellung 0). Trennen Sie das Gerät vom Netz, indem Sie das Netzkabel aus der Steck- dose ziehen.**
4. **Warten Sie nach dem Ausschalten mindestens 10 Sekunden, damit sich eventuell vorhandene Restspannung abbauen kann.**

ATTENTION
UNE TENSION ELECTRIQUE DANGEREUSE EST PRESENTE SUR LA CARTE D'ENTREE. Un couvercle est fourni afin de prévenir tous contacts accidentels, IL FAUT NEANMOINS OBSERVER LES PRECAUTIONS SUIVANTES :

1. **Ne pas intervenir sur la machine tant qu'elle est sous tension, sauf si indispensable pour le depannage.**
2. **Ne pas toucher la carte principale ni le couvercle de protection si la machine est sous tension.**
3. **Ne pas tenir à la main le filtre secteur pour déconnecter le cable d'alimentation de la machine, même si la machine n'est pas sous tension. Toujours débrancher en premier le cable d'alimentation de la prise de courant murale.**
4. **Attendre au moins pendant 10 secondes après la mise hors tension pour la décharge des tensions capacitives résiduelles de la carte principale**

6.2 Printhead

The printhead is retained by two plastic clips, one each side of the print pin housing (see Figure 6–2).

6.2.1 Removal

1. Switch off the printer.
2. Remove the access cover.
3. Remove the ribbon cartridge .
4. Slide the printhead to one end of its travel so that when it is removed, it does not hit the bail bar.
5. Pull both printhead retaining clips towards the front of the printer at the same time and lift the printhead from the hooks.
6. Release the ribbon cable connector clip by sliding it away from the printhead approximately 5 mm (0.2 inches) (see Figure 6–2). This releases the ribbon cable.
7. The printhead can now be removed.

6.2.2 Replacement

To replace the printhead reverse the procedure detailed above.

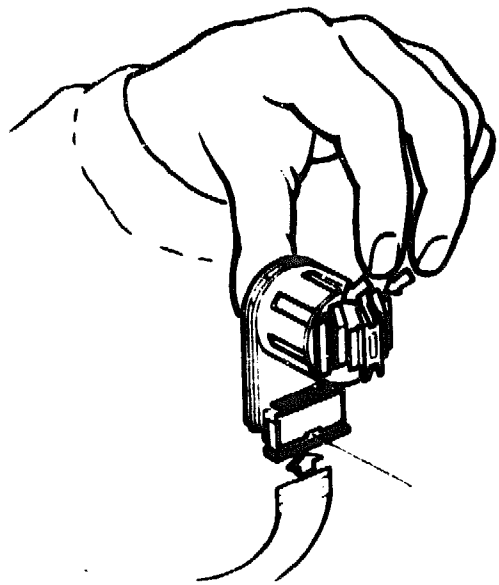


Figure 6–2 Removing the Printhead

6.3 Main Cover Assembly

The main cover is a two-part plastic moulding. It is retained by five locking tabs and one self-tapping screw.

The platen control knob passes through the main cover and needs to be removed before the main cover can be lifted off.

CAUTION
Take care NOT to damage the cosmetic surface of the plastic in the following operations.

6.3.1 Removal

Refer to Figure 6–3 and Figure 6–4.

1. Switch the power off.
2. Remove power and signal cables.
3. Remove the access cover.
4. Remove the ribbon cartridge.
5. Remove the push fit platen control knob by pulling it off the platen shaft.
6. Remove the main cover.

   This process has three stages:

   a. Remove the main cover retaining screw. This is a cross head, self-tapping screw located on the rear underside of the LA70.

   b. Release the five plastic locking tabs at the bottom edge of the main cover - three at the front and two at the back. Do this by pulling the edge of the main cover outwards with your fingertips to release the locking tabs. When the tabs are released, lift the right hand edge of the main cover (when viewed from the front) and stand it on its left hand side.

   c. Finally, carefully disconnect the operator panel connector from the motherboard. The main cover can now be moved away and stored in a safe place.

6.3.2 Replacement

Replacement of the main cover is a reversal of the above process.

CAUTION
Take care not to break the plastic Gap Set Cover.

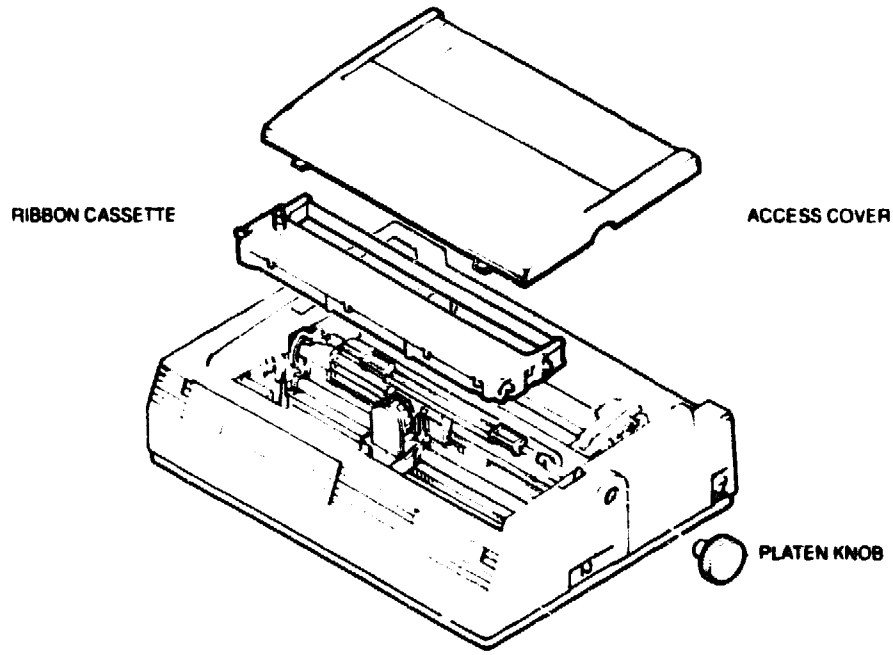


Figure 6–3 Removing the Access Cover and Ribbon Cartridge

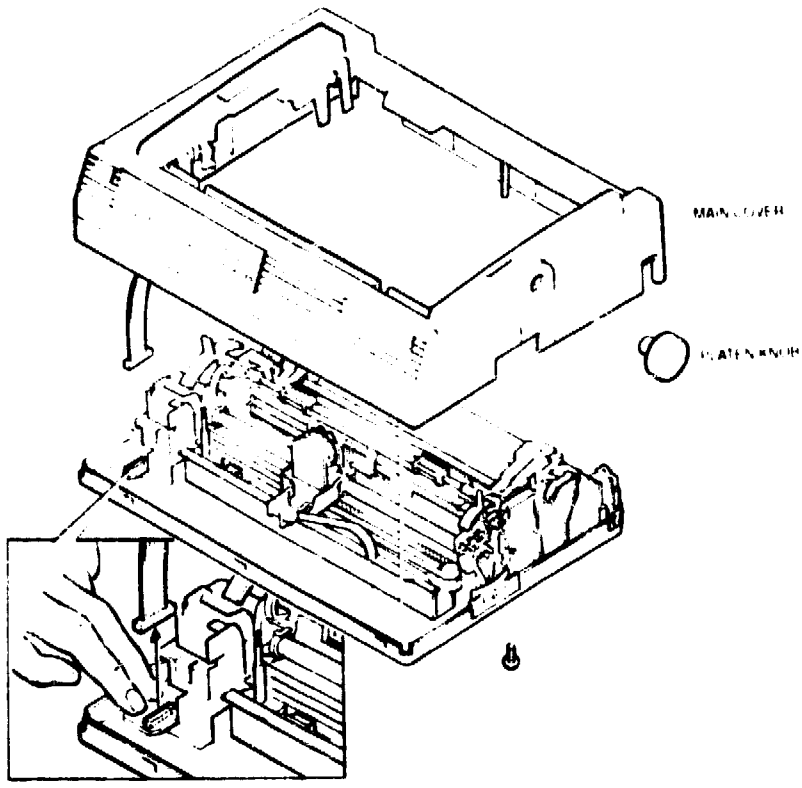


Figure 6–4 Removing the Main Cover

CAUTION
When disconnecting the Panel PCB connector from the mother board, hold the mother board with one hand while pulling the connector with the other hand.

6.4 Fuses

The fuses of the LA70 are located at the back of the printer and are accessible when the main cover has been removed. Refer to Figure 6–5.

Flip open the mains inlet cover to allow access to the PCB. Check the fuse with an ohmmeter.

Only replace with fuses of the correct value:

— Fuse on Noise Filter PCB Assembly =

100V/120V	1, 6 A, PN 29-26003-00
220V/240V	1 A, PN 29-26004-00

— Fuse FU1 on Main PCB kit = 3 A, PN 12-33600-01

6.4.1 Removal

1. Switch the power off.
2. Remove power and signal cables.
3. Remove the access cover.
4. Remove the ribbon cartridge.
5. Remove the platen control knob.
6. Remove the main cover (see Figure 6–4).
7. You can now remove the appropriate fuse on the Noise Filter PCB by holding the insulating cover (see Figure 6–5).

6.4.2 Replacement

Return the LA70 to normal use by reversing the above procedure.

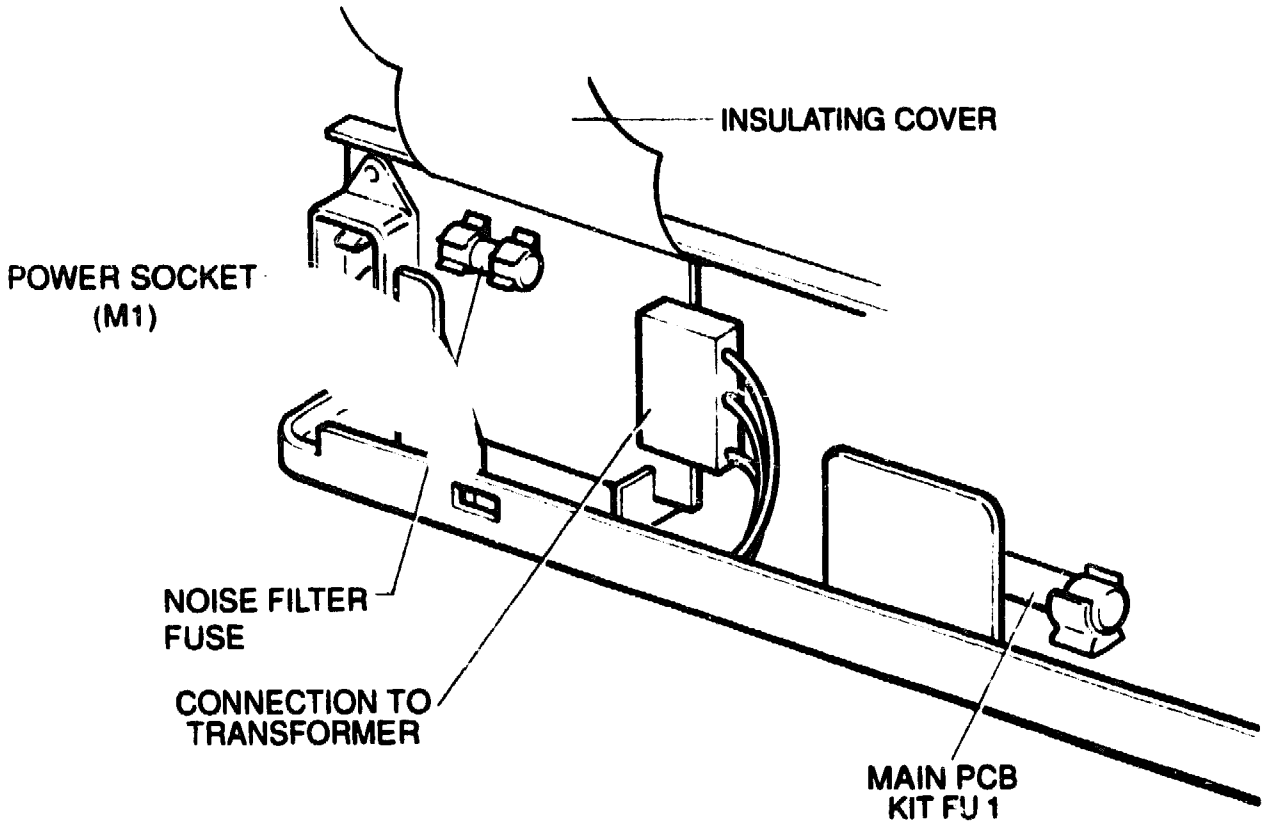


Figure 6–5 Location of Fuses

6.5 Removing the Main PCB kit

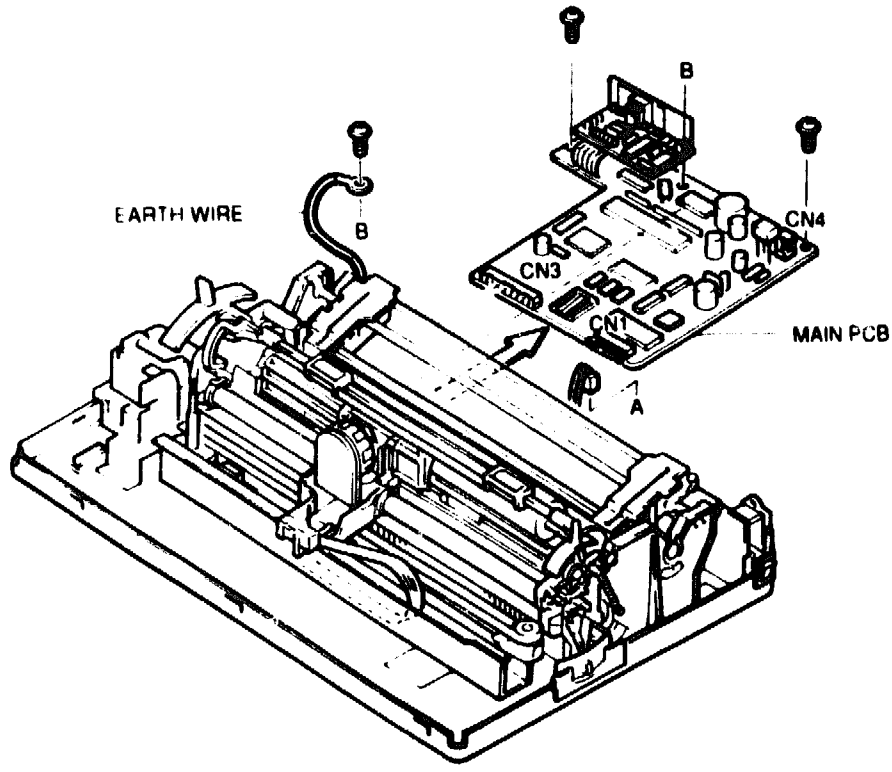


Figure 6–6 Main PCB kit

6.5.1 Removal

CAUTION
Wear an antistatic strap when doing this procedure.

1. Switch the power off.
2. Remove power and signal cables.
3. Remove the access cover.
4. Remove the ribbon cartridge.
5. Remove the platen control knob.
6. Remove the main cover (see Figure 6–4).

7. Remove the three Main PCB kit retaining screws shown in Figure 6–6.
8. Disconnect the printhead ribbon cable from connector CN1.
9. Disconnect the power supply connector from CN4.
10. Lift the back edge of the Main PCB kit so that it clears the raised back edge of the metal base, and pull the logic PCB backwards to disconnect it from the 30 way connector CN3.
11. Place the Main PCB kit on an antistatic mat.

6.5.2 Replacement

Replacement of the Main PCB kit is a reversal of the above procedure.

NOTE
Insert the Main PCB kit into the Mechanical Assembly, so that CN3 fits correctly into the corresponding connector on the mother board.

Care must be taken to ensure that the contact springs from the Paper Out detectors seat properly on the Main Board contacts.

Fully test the LA70 when the Main PCB kit has been replaced.

6.6 Noise Filter PCB Assembly

6.6.1 PCB Removal

1. Switch the power off.
2. Remove power and signal cables.
3. Remove the access cover.
4. Remove the ribbon cartridge.
5. Remove the platen control knob.
6. Remove the main cover (see Figure 6–4).
7. Release the clip retaining the plastic insulating safety shield and remove the shield by sliding it to the left.
8. Remove the screw making the ground connection.
9. Disconnect CN1 on the Noise Filter PCB Assembly (this is the connection to the transformer).
10. Slide the Noise Filter PCB Assembly locking strip to the left until it is clear of the mechanism (lift the catch on the inner end to free it). See Figure 6–7.
11. The Noise Filter PCB Assembly is now free and can be lifted out of the printer.

CAUTION
Voltage selection is achieved by rotating the plug CN1 (see Figure 6–7). The wire colour location for the voltage selection is as follows:

- **100 V operation, brown wire on Pin 1 (TOP)**
- **120 V operation, red wire on Pin 1 (TOP)**
- **220 V operation, yellow wire on Pin 1 (TOP)**
- **240 V operation, blue wire on Pin 1 (TOP)**

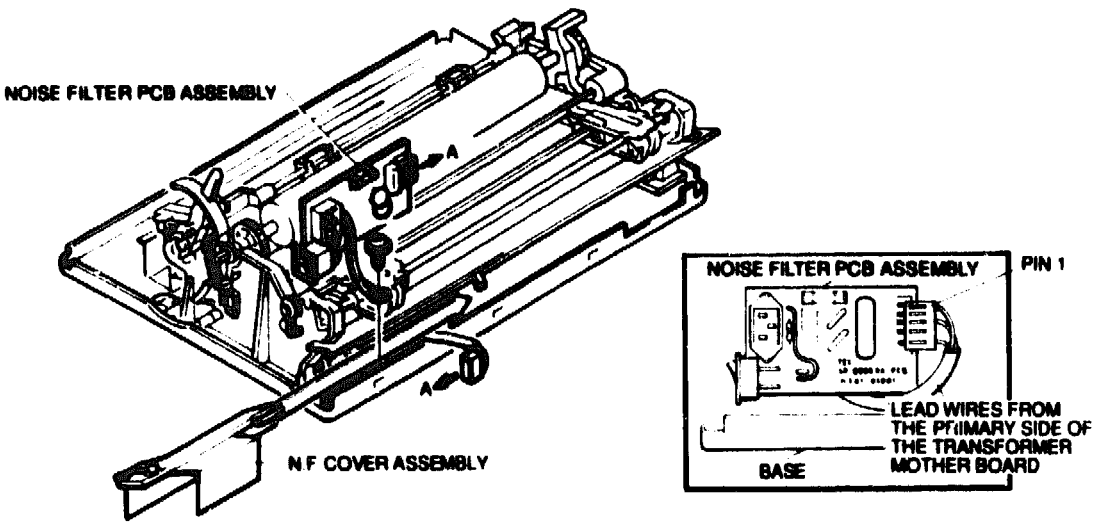


Figure 6–7 Removing and Replacing the Noise Filter PCB Assembly

6.6.2 Replacing the Noise Filter PCB Assembly

Replace the Noise Filter PCB Assembly by reversing the above procedure.

Ensure that the cable to CN1 passes under the edge of the PCB.

Ensure the insulating cover is correctly retained.

6.7 Panel PCB Assembly

6.7.1 Removal

1. Switch the power off.
2. Remove the power and signal cables.
3. Remove the access cover.
4. Remove the ribbon cassette.
5. Remove the platen control knob.
6. Remove the main cover (see Figure 6–4).

7. Remove the front moulding by depressing the two retaining clips located on the upper inner surface of the main cover (see Figure 6–8.

NOTE
The Operator Panel PCB is accessed after removing the main cover front moulding.

8. Carefully release the cover open switch from the main cover, and then free the PCB retaining clips. The PCB can now be lifted out of the main cover.

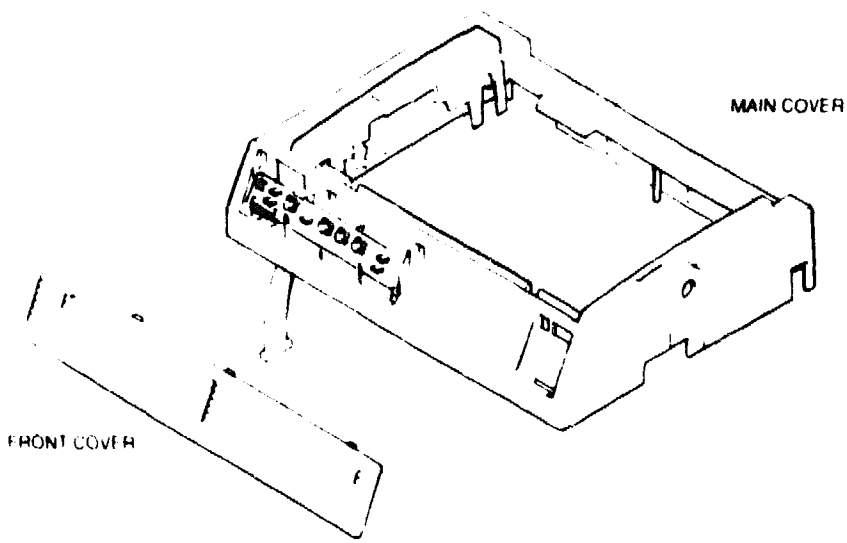


Figure 6–8 Removing the Front Moulding

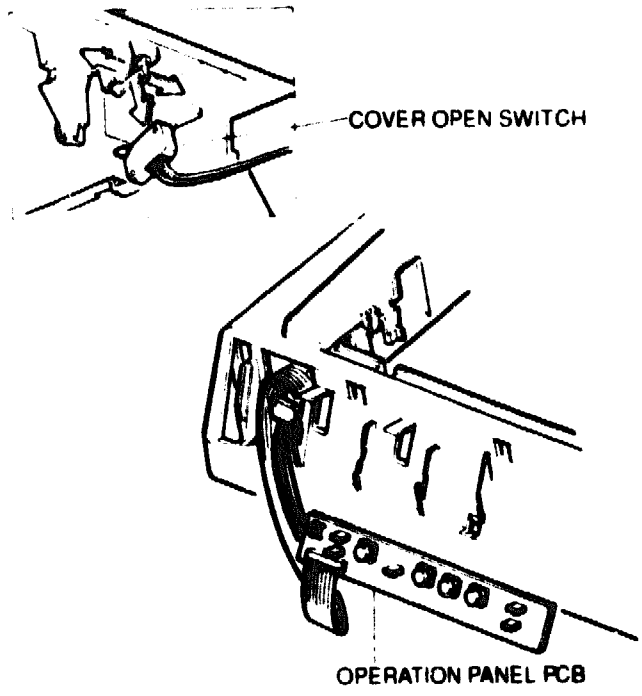


Figure 6–9 Removing the Operator Panel PCB

6.7.2 Replacement

Reverse the dismantling procedure to refit the Operator Panel and front cover.

6.8 Printhead Cable

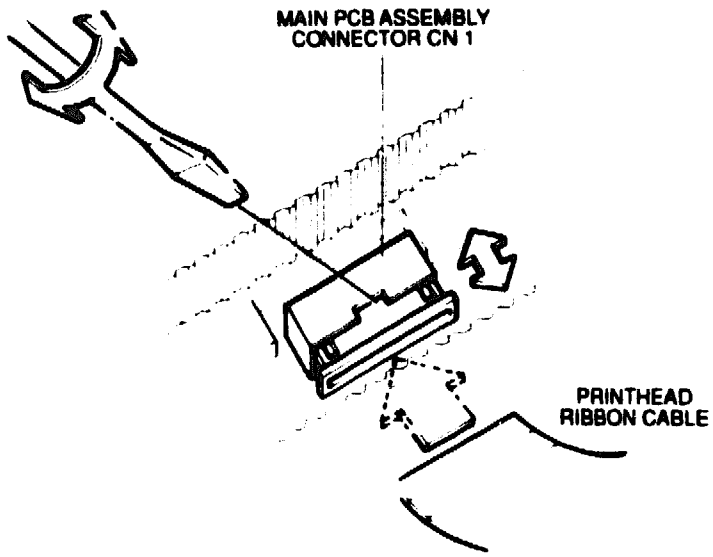


Figure 6–10 Removing the Printhead Ribbon Cable

6.8.1 Removal

1. Switch the power off.
2. Remove the power and signal cables.
3. Remove the access cover.
4. Remove the ribbon cassette.
5. Remove the platen control knob.
6. Remove the printhead and disconnect the ribbon cable (see Figure 6–2).
7. Remove the main cover (see Section 6.3).
8. Ensure the printhead is at the righthand side of the printer.
9. Release the printhead ribbon cable clamp at CN1 on Main PCB kit as shown in Figure 6–10.

6.8.2 Replacement

CAUTION
Take care not to damage the printhead cable in the following procedure.

1. Insert the ribbon cable into connector CN1 (connections downwards).
2. Lock the cable into the connector by pushing the locking clamp into the connector as far as it can go.

The remainder of the replacement is a reversal of the removal procedure, steps 1 to 7. Reverse the dismantling procedure to refit the ribbon cable.

6.9 Printer Mechanism

This includes the mechanical assembly, the transformer, the mother board, the printer base and other minor items, but not the printhead and its ribbon cable.

NOTE
The replacement printer mechanism is delivered with transit packing. Remove and retain this packing material for use in the printer mechanism being returned.

6.9.1 Removing the Mechanical Assembly

1. Switch the power off.
2. Remove power and signal cables.
3. Remove the access cover.
4. Remove the ribbon cartridge.
5. Remove the platen control knob.
6. Remove the main cover (see Figure 6–4)
7. Remove the printhead.
8. Remove the printhead ribbon cable.
9. Remove the main PCB and the Noise Filter PCB Assembly.

6.9.2 Replacing the Mechanical Assembly

Remove the transit packing.

Replacement is a reversal of the above procedure.

6.10 Automatic Sheet Feeder (ASF)

6.10.1 Removal

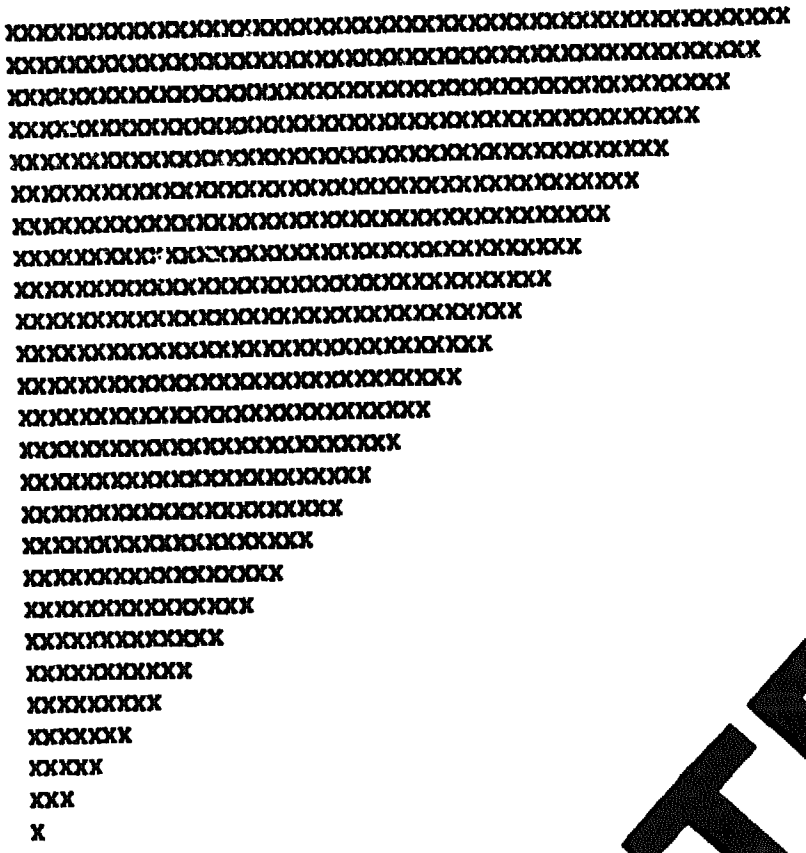
1. Unload all paper.
2. Press the Automatic Sheet Feeder release button Z and lift the assembly up and off the printer.

   Store in a safe place.
3. Replace the access cover.
4. Set Friction/Tractor feed lever to suit your need.

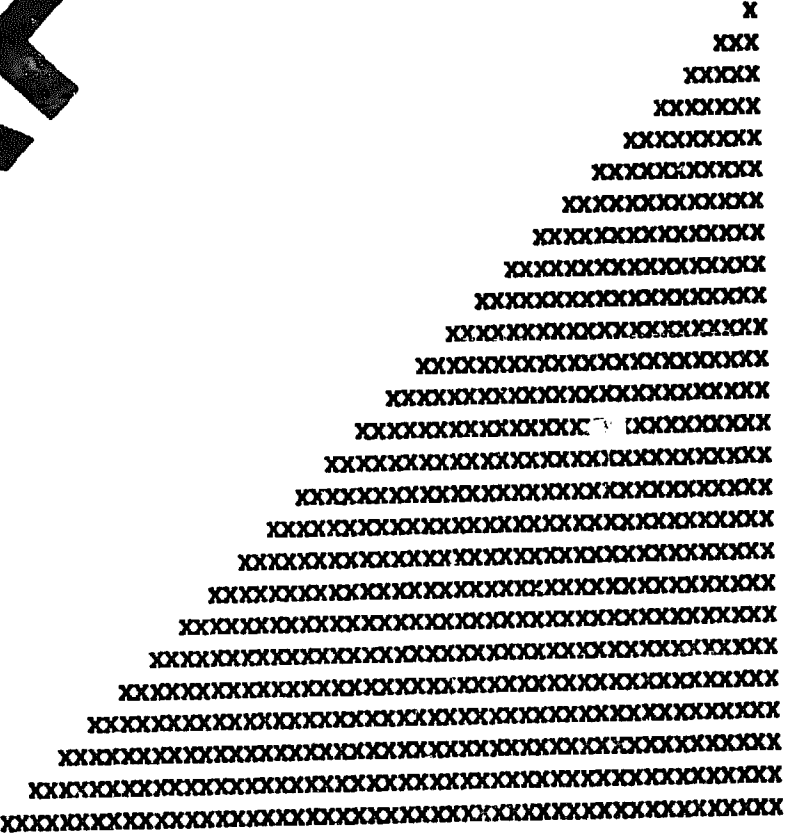
The removal of the ASF is now complete.

6.10.2 Replacement

Refer to Section 9.2 for replacement details.



CHAPTER 7



7
Maintenance and Cleaning

7.1 Introduction

The LA70 has been designed as a low maintenance printer. Most of the maintenance needed is determined by the environment in which it operates.

High ambient temperatures cause the oil on the paper moving mechanism and carriage to dry out. Dust, dirt in the atmosphere, and the residue from the ribbons and paper coat the internal surfaces (especially the oily ones), and clog the mechanism.

Use a few minutes of a site visit to examine the printer rather than wait for the fault call.

7.2 Maintenance

This is a repair center activity.

Measure the carriage belt tension. See Chapter 8 for details of this measurement. Adjust as required.

7.3 Cleaning

Customer cleaning responsibilities are defined in *LA70 Personal Printer Installation and User's Guide*.

Wipe off dirt with a soft cloth. Remove obstacles such as small pieces of paper using tweezers.

CAUTION
Be very careful not to damage the mechanism nor bend a part when cleaning.

7.3.1 Cleaning the Carrier Shaft

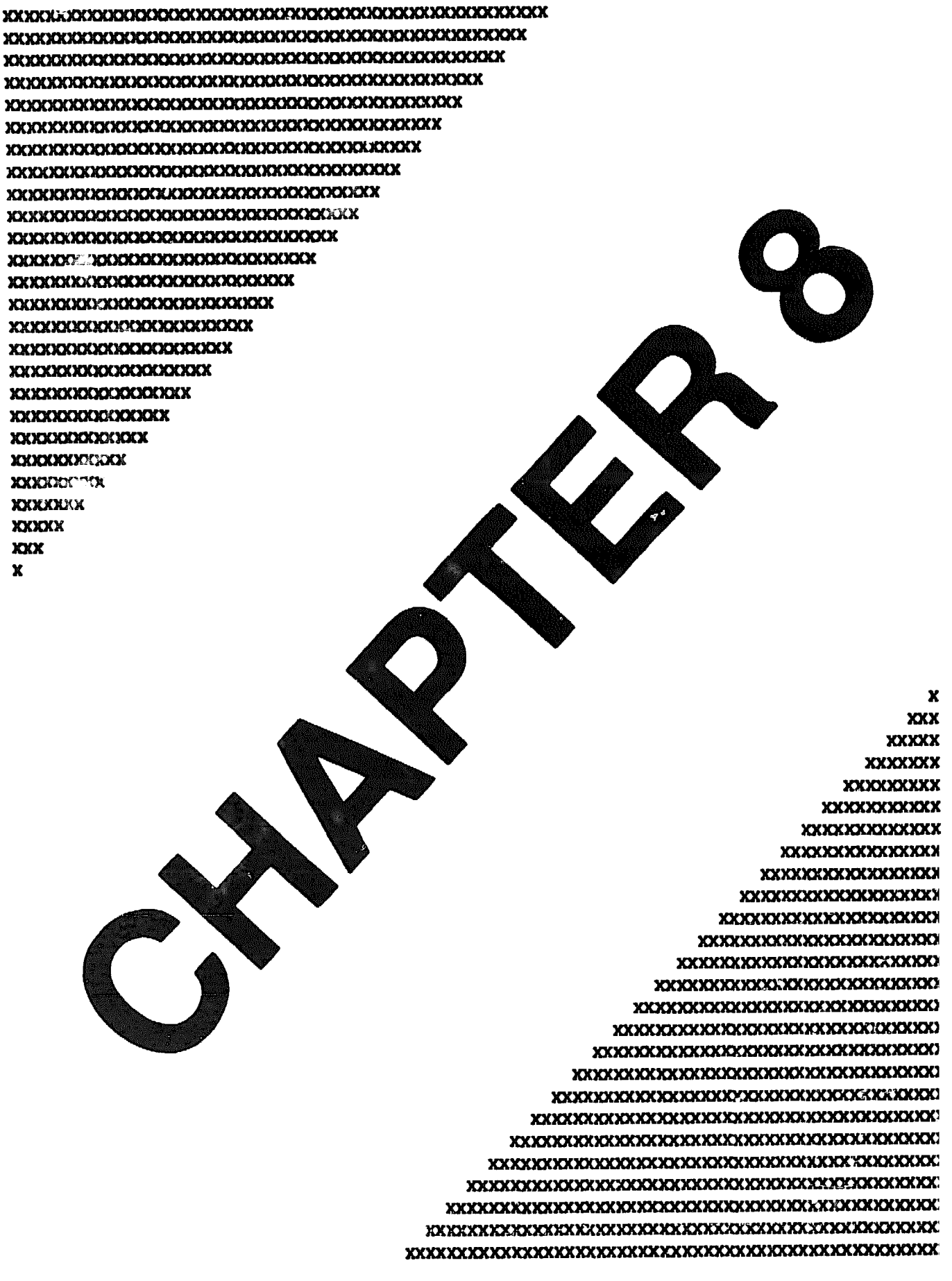
This is a repair center activity only.

The carrier shaft accumulates dust easily as it is lubricated with lauma oil. Wipe off dirt with a soft cloth. Lightly lubricate the cleaned parts.

NOTE
Do not overlubricate. Excessive dust could build up and may cause damage.

7.3.2 Platen

Open the printer cover and clean the platen surface with an approved platen cleaner.
See the DECdirect catalog for details of a suitable cleaner.


CHAPTER 8

8
Repair Center Activity

This chapter is included for information only. The parts described in this chapter must not be replaced at the customer site. Changing and adjusting these parts is a repair center activity only.

Table 8–1 LA70 Part Names

B3	Ribbon Drive Shaft
J	Tractor/Friction Feed Lever
K	Parking Lever
L1	Panel PCB Assembly
M	On/Off Switch
M1	Power Socket
M2	Noise Filter PCB Assembly
R	Printhead
R1	Printhead Carrier
R2	Printhead Carrier Shaft
R3	Printhead Carrier Drive Belt Adjuster
R4	Printhead Carrier Drive Belt
R5	Printhead Ribbon Cable
T	Tractor Assembly
V	Bail Bar
Z6	Pinch Rollers
Z61	Pinch Roller Bar
Z7	Paper Edge/Paper Out Detector
Z9	Main PCB kit
Z91	Firmware PROM

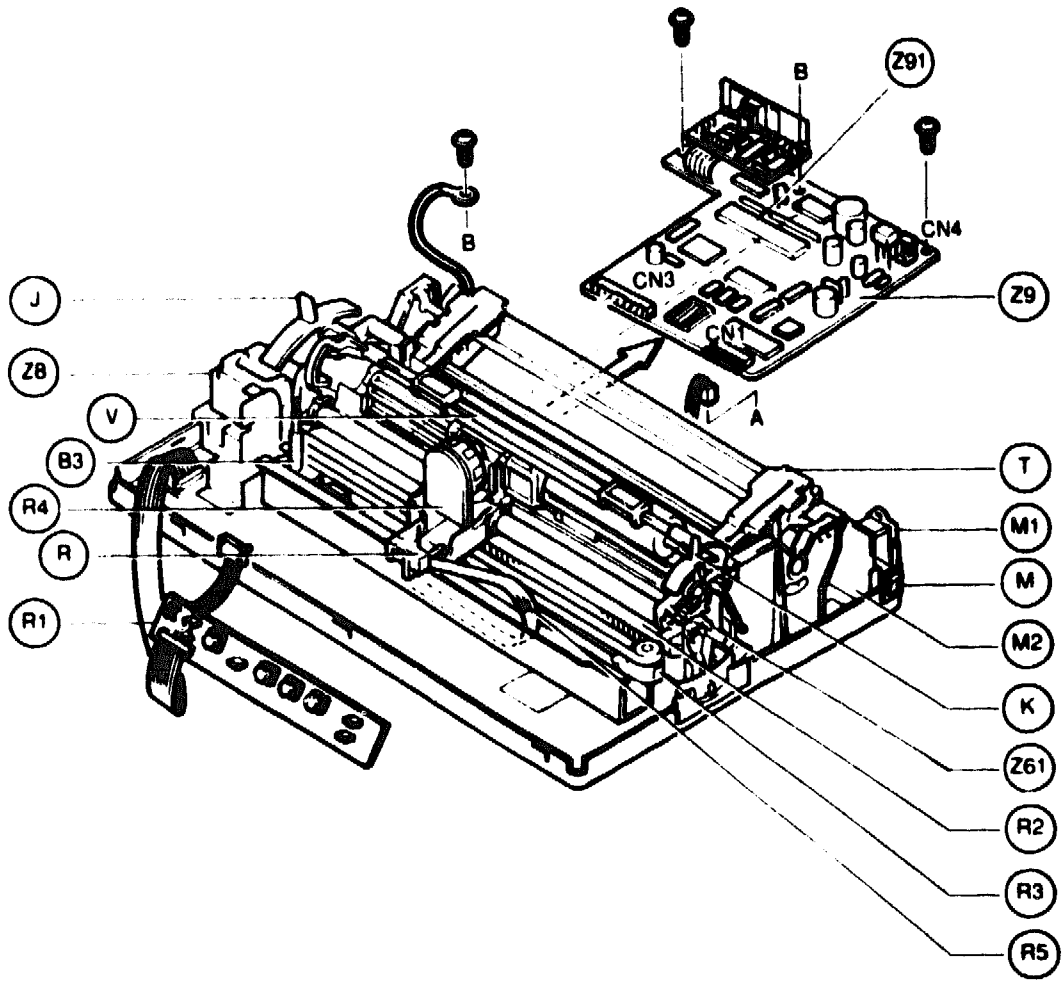


Figure 8–1 Identification of the Parts

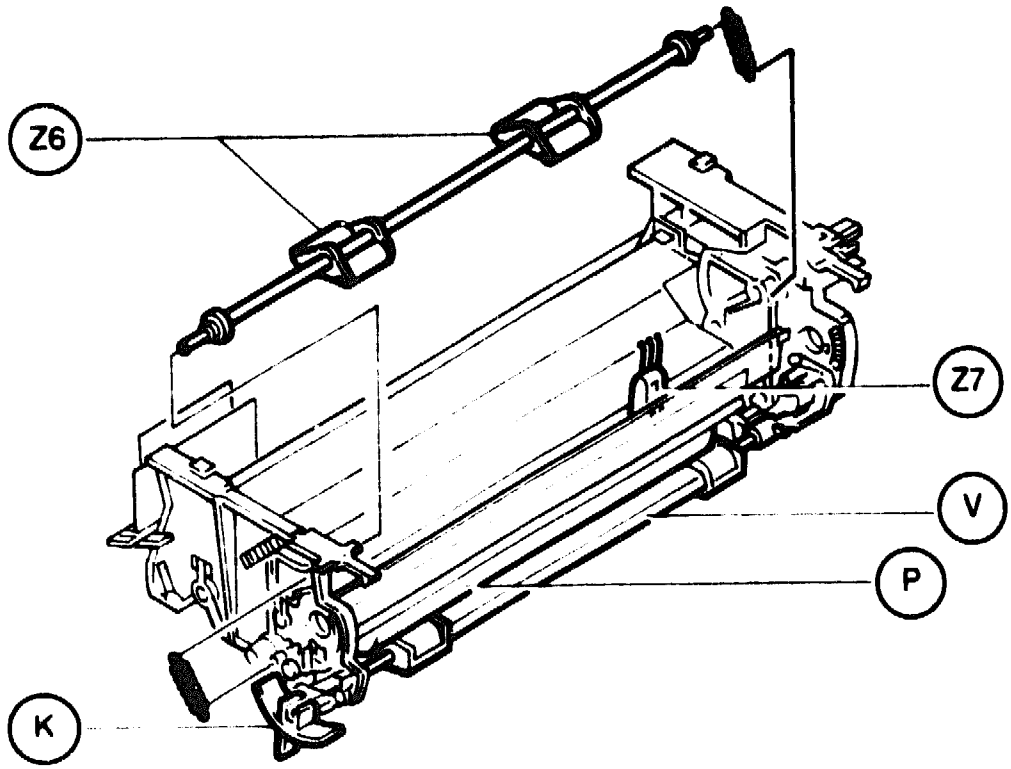


Figure 8–2 Identification of the Parts (cont.)

8.1 Paper Feed Motor

This section refers to repair center activity. It is included for information only.

1. Switch the power off.
2. Remove power and signal cables.
3. Remove the access cover.
4. Remove the ribbon cartridge.
5. Remove the platen control knob.
6. Remove the main cover (see Figure 6–4).

7. To disengage the paper feed motor, rotate it clockwise.
8. Release the retaining clips of the paper feed motor connector and remove the connector.
9. The paper feed motor is now free of the LA70.

Replace the paper feed motor by reversing the above process.

There are no adjustments to make when replacing the paper feed motor.

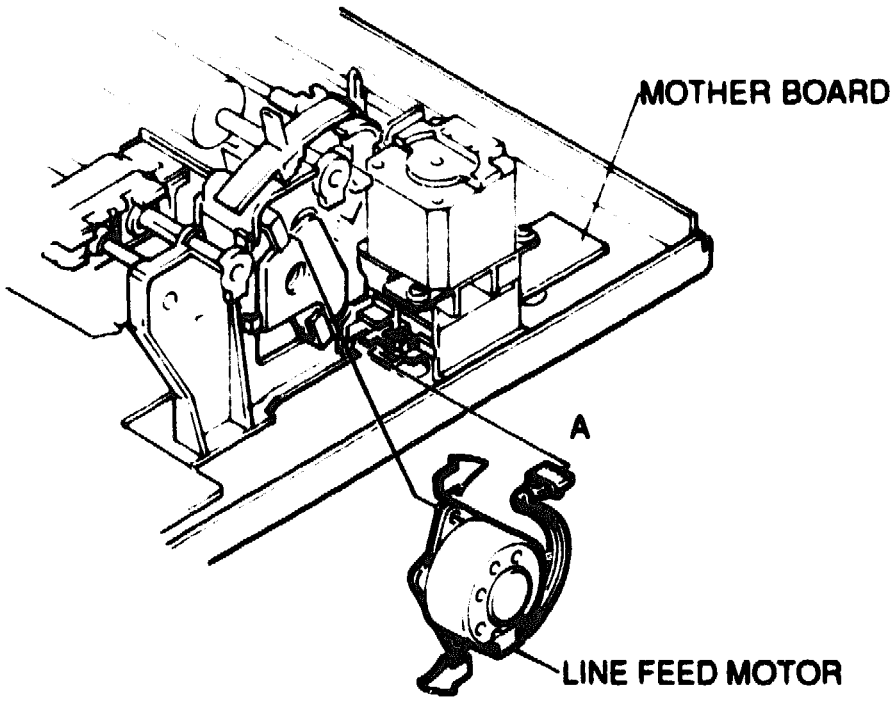


Figure 8–3 Removing the Paper Feed Motor

8.2 Carrier Motor

8.2.1 Removing the Carrier Motor Block

This section refers to repair center activity. It is included for information only.

1. Switch the power off.
2. Remove power and signal cables.
3. Remove the access cover.
4. Remove the ribbon cartridge.
5. Remove the platen control knob.
6. Remove the main cover (see Figure 6–4).

7. Slacken the belt tension adjuster clamp screw (see Figure 8–4), remove the belt from the idler pulley.
8. Disconnect the Park switch assembly inline connector.
9. Remove the three screws retaining the carrier motor.
10. Remove the carriage motor block from the printer.

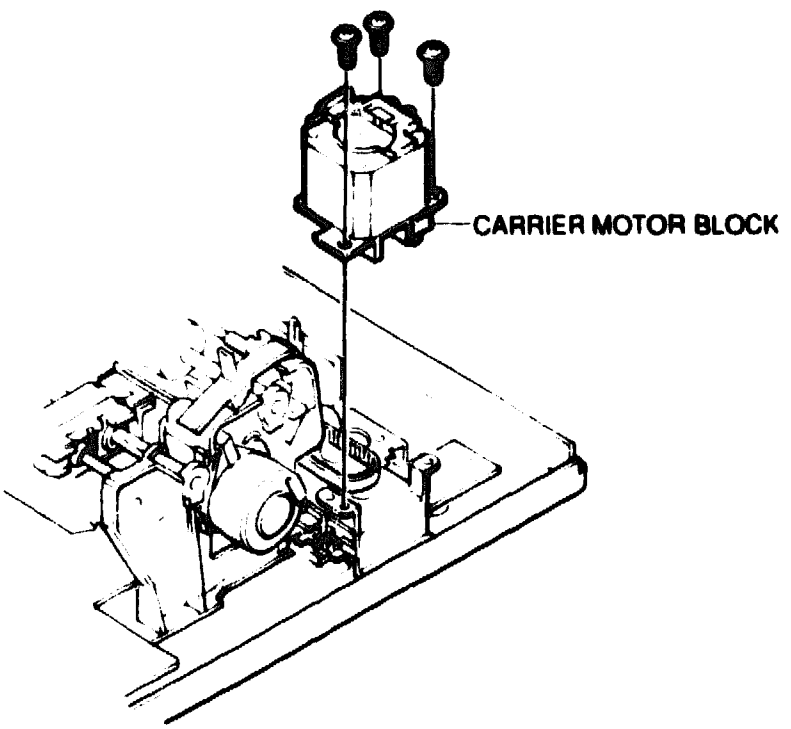


Figure 8–4 Location of the Belt Tension Adjuster Locking Screw

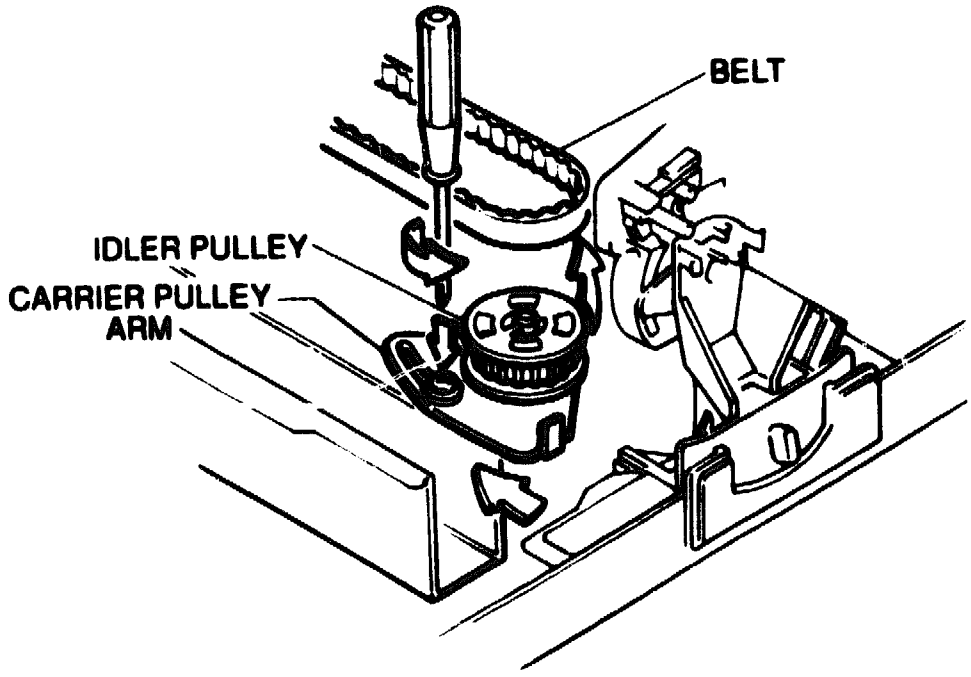


Figure 8–5 Removing the Carrier Motor

8.2.2 Replacing the Carrier Motor

Adjustments need to be made when replacing this FRU.

1. Engage the belt on the pulley of the carrier motor block and secure the three retaining screws.

   Make sure that the connector of the carrier motor is firmly engaged in its connector on the motherboard.

2. Engage the carriage drive belt on the idler pulley. Push the idler pulley firmly to the right while tightening the locking screw.
3. Adjust the belt tension as described in Chapter 8.
4. Continue with the replacement of the parts removed when removing the carrier motor.

8.3 Platen Unit

This section refers to repair center activity. It is included for information only.

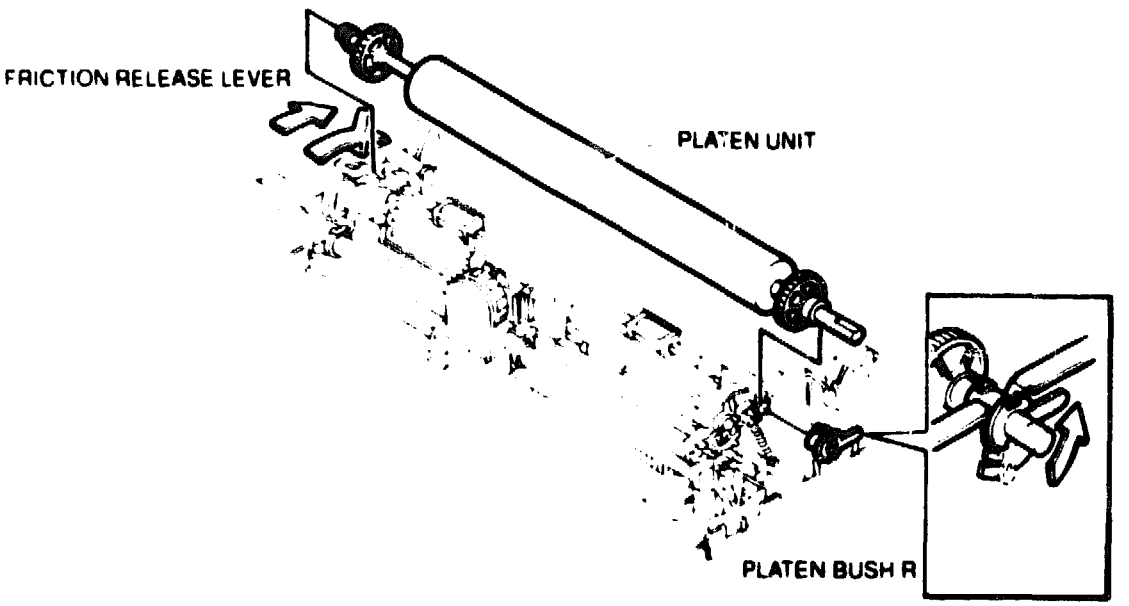


Figure 8–6 Removing the Platen Unit

8.3.1 Removal and Replacement

1. Switch the power off.
2. Remove the power and signal cables.
3. Remove the access cover.
4. Remove the ribbon cassette.
5. Remove the platen control knob.
6. Remove the Main Cover (see Section 6.3).
7. Push the friction lever towards the rear of the printer.
8. Remove the Platen Bush (R) from the right hand side of the printer frame, by pushing it in an anticlockwise direction (viewed from the end of the shaft).

9. Remove the platen by first lifting out the right hand end and then lifting the other end to free the platten.

Reverse the removal procedure to refit the platen. Remember to refit the platen bush (R) by rotating it in a clockwise direction.

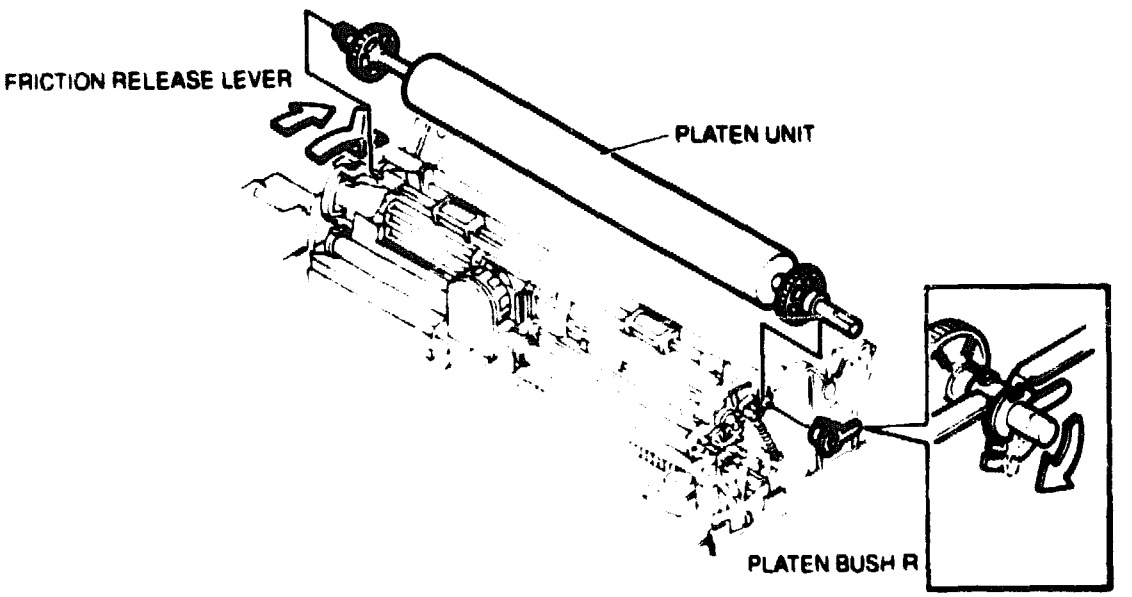


Figure 8–7 Replacing the Platen Unit

8.4 Tractor Unit

This section refers to repair center activity. It is included for information only.

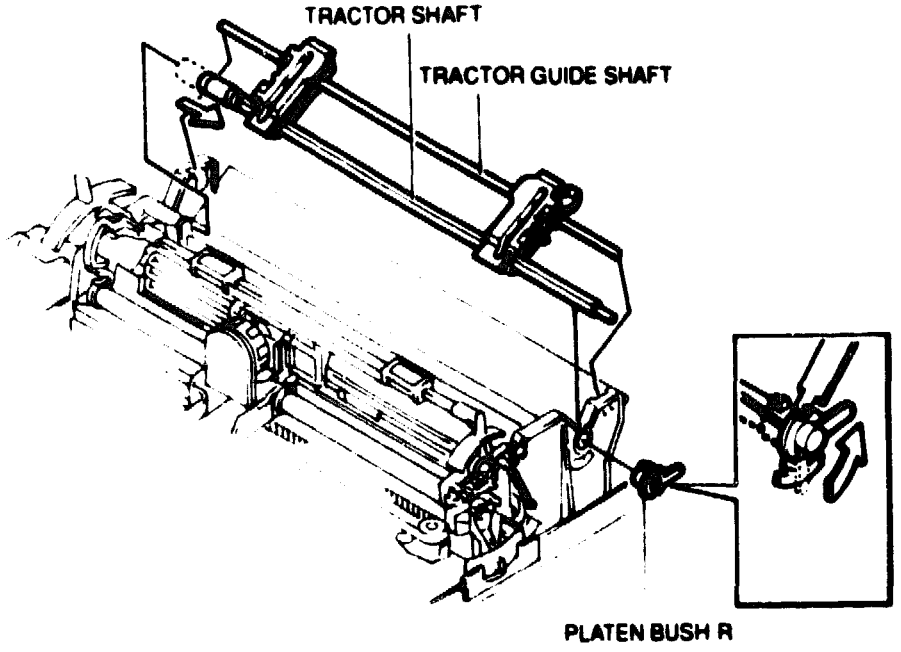


Figure 8–8 Removing the Tractor Unit

8.4.1 Removal and Replacement

1. Switch the power off.
2. Remove the power and signal cables.
3. Remove the access cover.
4. Remove the ribbon cassette.
5. Remove the platen control knob.
6. Remove the Main Cover (see Section 6.3).
7. Remove the tractor bush (R) from the right hand side of the printer frame, by pushing it in an anticlockwise direction (viewed from the end of the shaft) with a small flat bladed screwdriver.
8. Remove the tractor shaft by sliding it to the right and removing the tractor guide shaft from the printer frame holders.

Reverse the removal procedure to refit the tractor unit. Remember to refit the tractor bush (R) by rotating it in a clockwise direction.

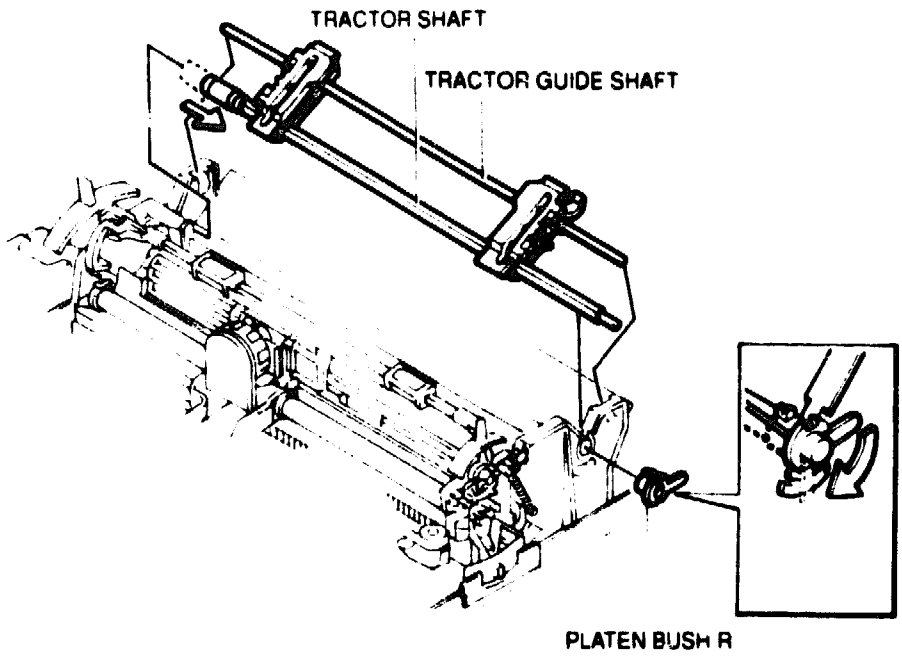


Figure 8–9 Replacing the Tractor Unit

8.5 Carrier Unit

This section refers to repair center activity only. It is included for information only.

8.5.1 Removal

1. Switch the power off.
2. Remove the power and signal cables.
3. Remove the access cover.
4. Remove the ribbon cassette.
5. Remove the platen control knob.
6. Remove the main cover (see Section 6.3).
7. Remove the printhead.
8. Remove the Carrier Motor block.
9. Remove the Paper Thickness cover and Paper Thickness lever from the right hand side of the printer.

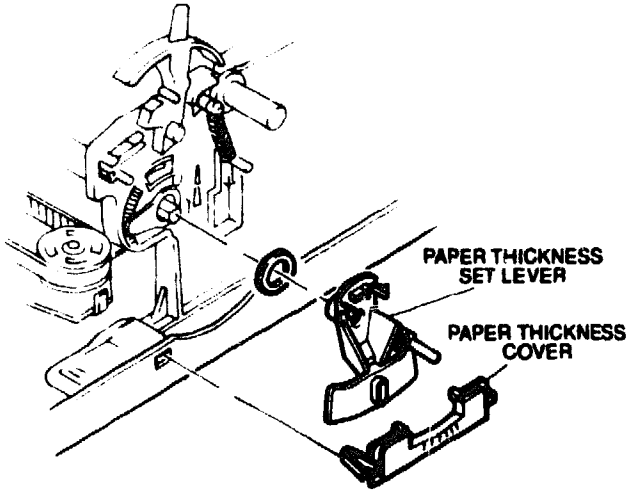


Figure 8–10 Removing the Paper Thickness Lever and Cover

10. Remove the Paper Thickness bush (R) from the right hand side of the printer.

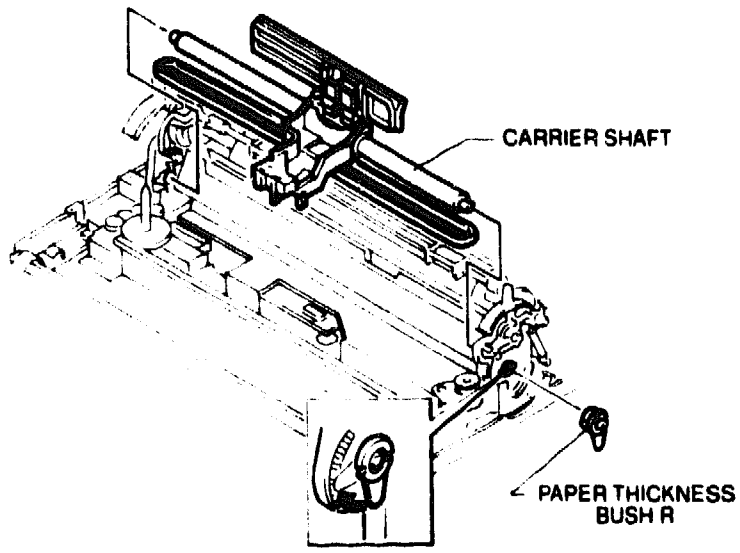


Figure 8–11 Removing the Paper Thickness Bush

11. Disengage the Carrier Shaft from the printer.
12. Pull out the Carrier Shaft from the carrier and remove the belt by opening the belt joint on the bottom of the carrier.

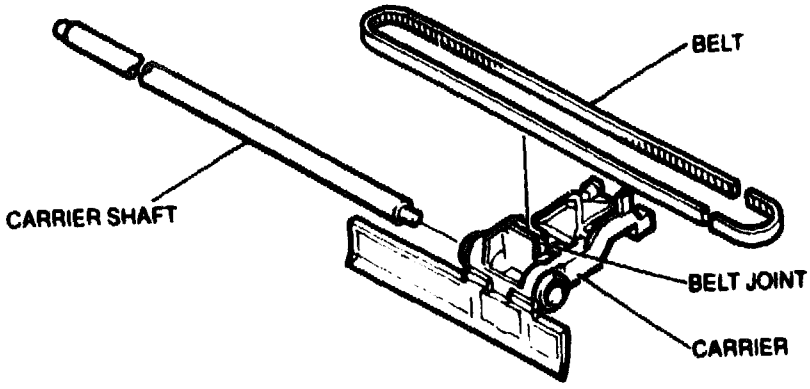


Figure 8–12 Removing the Carrier Shaft and Belt

8.5.2 Replacement

1. Press the belt into the belt joint on the bottom of the carrier and insert the carrier shaft into the carrier.
2. Attach the carrier shaft to the printer. Remember to refit the Paper Thickness bush (R).
3. Attach the Paper Thickness lever and cover to the right hand side of the printer.
4. Refit the remainder of the removed items in reverse order to their removal.

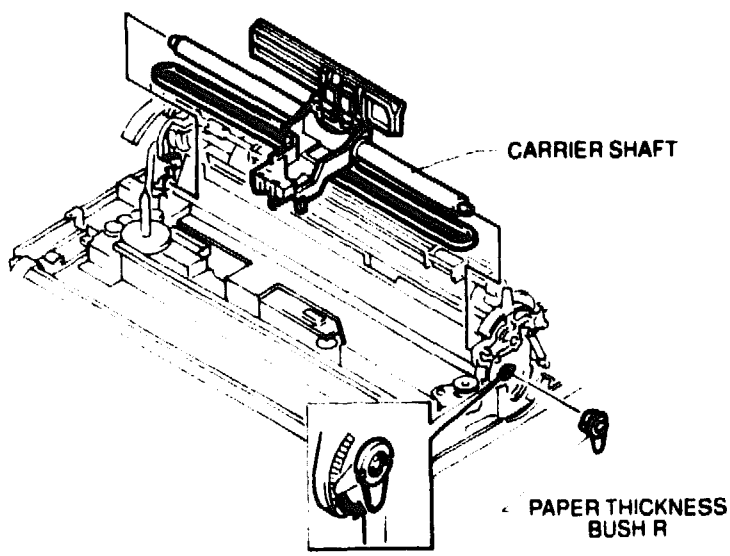


Figure 8–13 Replacing the Carrier Shaft

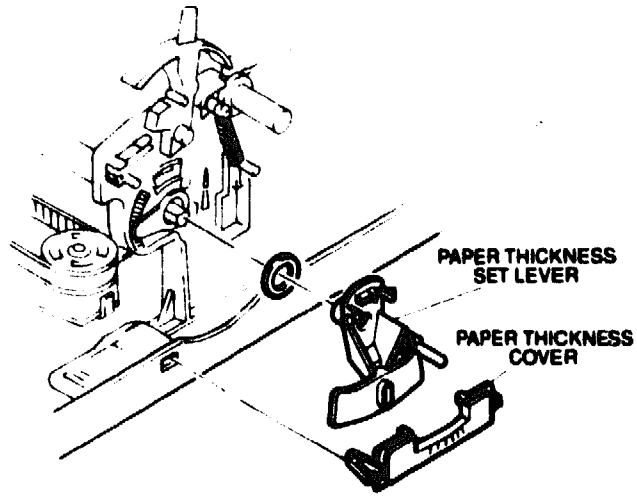


Figure 8–14 Replacing the Paper Thickness Lever and Cover

8.6 Main Unit

This section refers to repair center activity. It is included for information only.

8.6.1 Removal

1. Switch the power off.
2. Remove the power and signal cables.
3. Remove the access cover.
4. Remove the ribbon cassette.
5. Remove the platen control knob.
6. Remove the Main Cover (see Section 6.3).
7. Remove the printhead.
8. Remove the Carrier Motor block.
9. Remove the Carrier.
10. Remove the Main Logic PCB.
11. Remove the Power Supply PCB.
12. Disengage the two retaining catches on the right and left hand sides of the Main Unit.

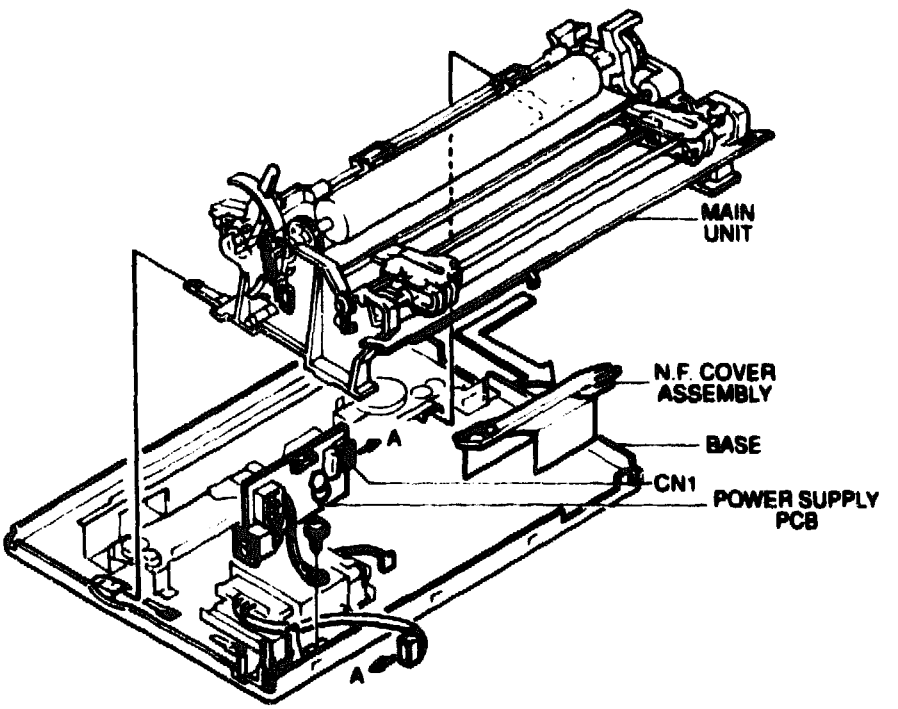


Figure 8–15 Removing the Main Unit

13. Slide the Main Unit to the rear and lift it clear of the base plate.

8.6.2 Replacement

1. Engage the two Main Unit retaining catches into the slots in the base plate and slide it backwards until it locks into position.
2. Refit the Power Supply PCB making sure that the Ground lead and Power Supply connector are refitted.

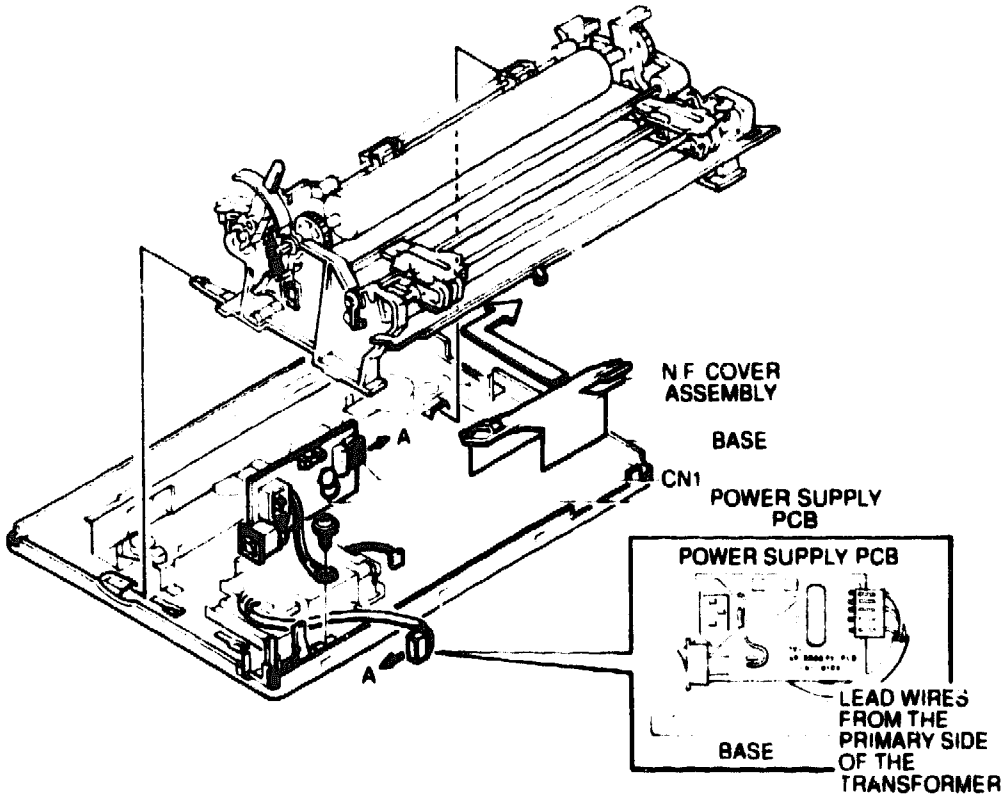


Figure 8–16 Replacing the Main Unit

NOTE
When refitting the Power Supply PCB, ensure that the cable from the transformer primary is laid between the base plate and the PCB.

3. Refit the remainder of the removed items in the reverse order to the removal.

8.7 Pinch Roller

This section refers to repair center activity. It is for information only.

8.7.1 Removal

1. Switch the power off.
2. Remove the power and signal cables.
3. Remove the access cover.
4. Remove the ribbon cassette.
5. Remove the platen control knob.
6. Remove the main cover (see Section 6.3).
7. Remove the printhead.
8. Remove the Carrier Motor block.
9. Remove the carrier.
10. Remove the Main Logic PCB.
11. Remove the Noise Filter PCB Assembly.
12. Remove the Main Unit.
13. Remove the Pinch Roller fastening springs on the rear of the main unit and slide out the Pinch roller (see Figure 8–17).

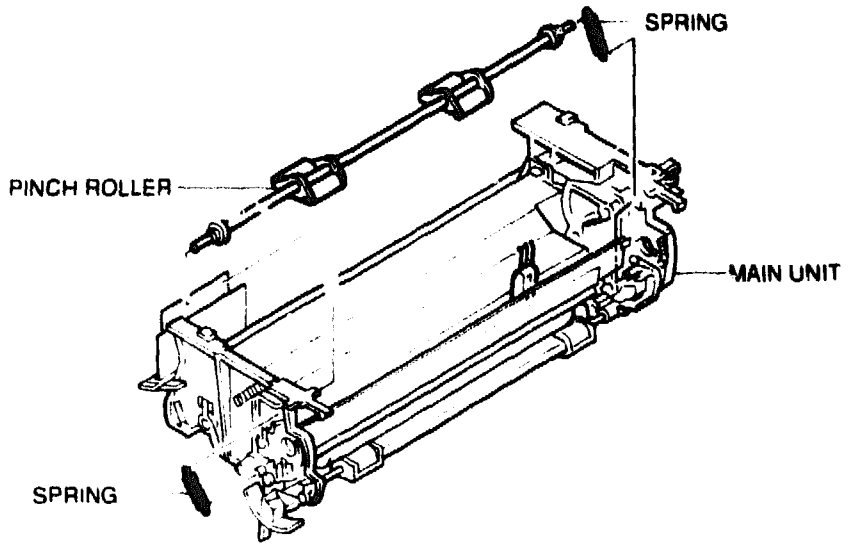


Figure 8–17 Removing the Pinch Roller

8.7.2 Replacement

1. Engage the two fastening springs with each end of the Pinch Roller and the sides of the Main Unit.
2. Locate the Pinch Roller in the main Unit, making sure that it is free to pivot freely.
3. Refit the remainder of the removed items in the reverse order to the removal.

8.8 Head Gap Adjustment

This section refers to repair center activity. It is for information only.

Use this adjustment when replacing the Printhead Carrier. No adjustment is needed when replacing the printhead.

1. Remove the card holder.

2. Use a thickness gauge to check that the clearance between the print head and the platen is 0.35 to 0.4 mm when the Paper Thickness lever is pulled all the way forward. This check should be performed at three points: on both sides and in the center of the platen.
3. If the clearance is not as specified, adjust the head gap to 0.35 to 0.4 mm by turning the Paper Thickness bush located on each end of the carrier shaft.

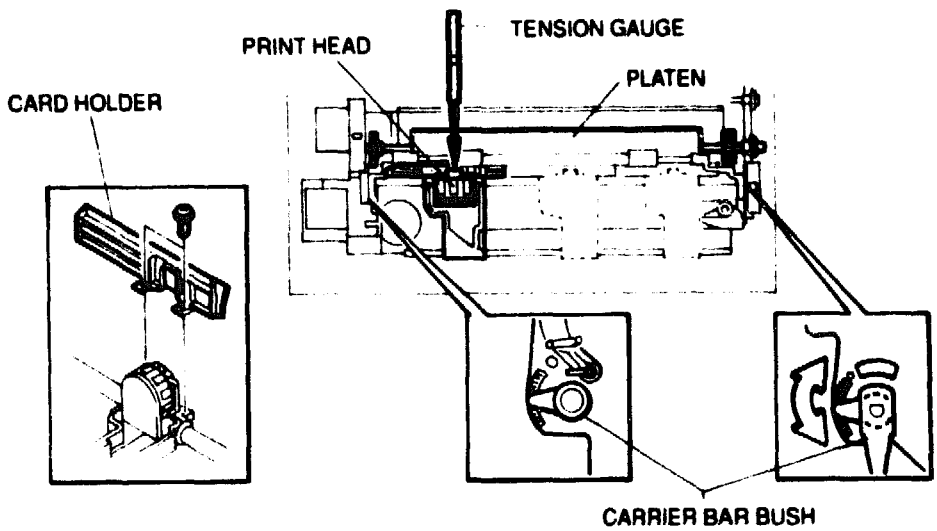


Figure 8–18 Setting the Printhead Gap

NOTE
When reattaching the card holder, make sure that the 0.125mm-thick mylar sheet can be inserted between the platen and the card holder smoothly. (The carrier must be positioned at the center of the platen.)

8.9 Carriage Belt Tension Adjustment

This section refers to repair center activity. It is for information only.

Use this adjustment when replacing the carriage motor or carriage drive belt.

1. Loosen the fastening screw of the carrier pulley arm.
2. Apply a tension gauge to the raised rib of the carrier pulley arm and fasten the arm in a position which yields a reading of 1.6 kg.

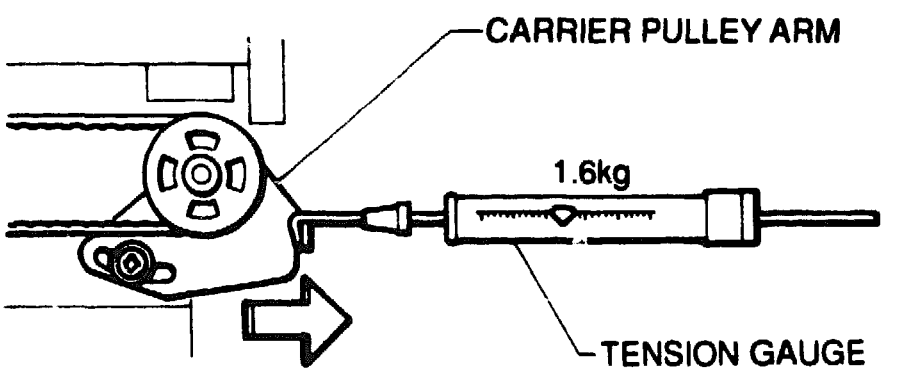
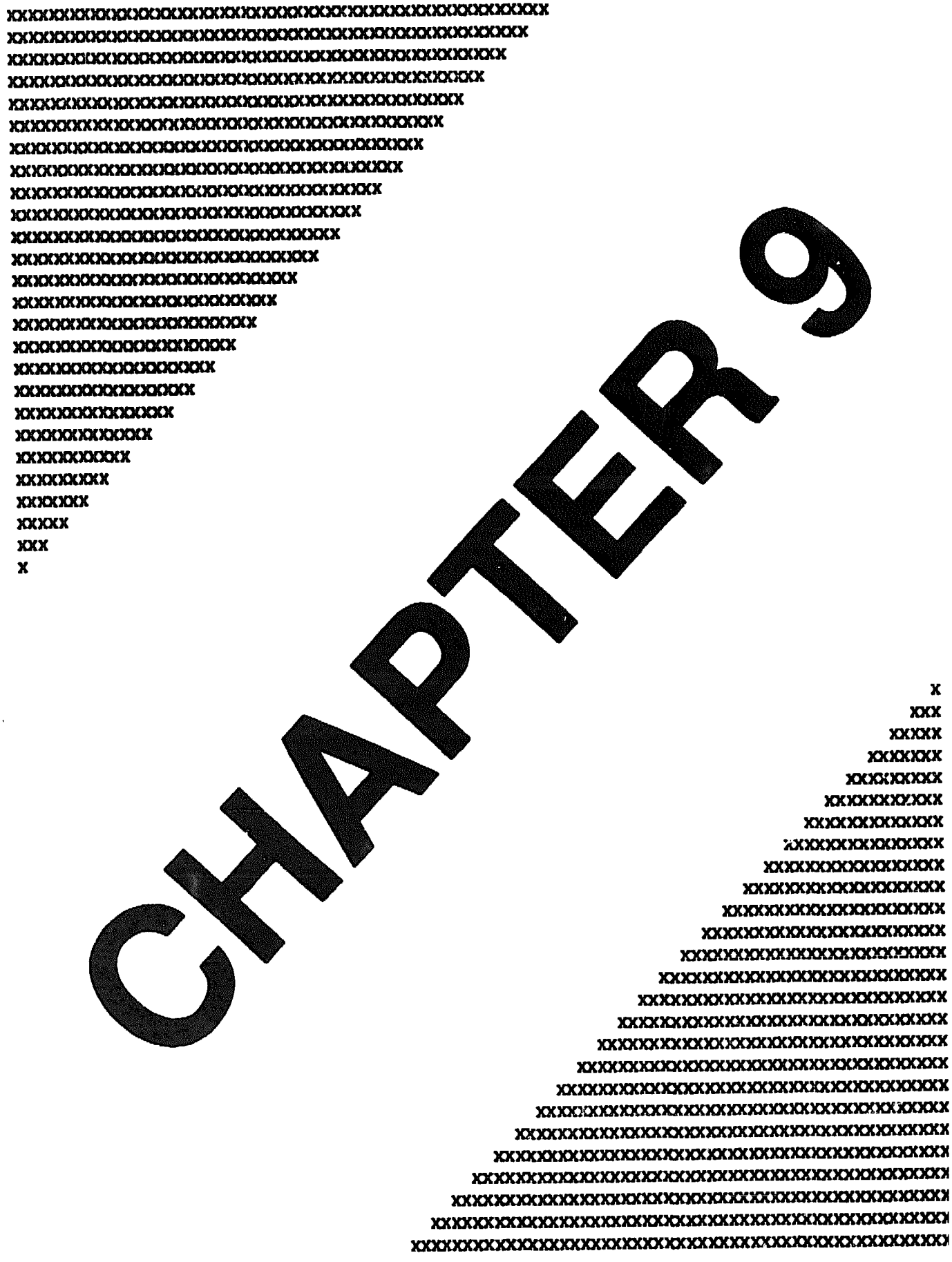


Figure 8–19 Setting the Carriage Belt Tension


CHAPTER 9

9
Automatic Sheet Feeder (ASF)

9.1 Introduction

The ASF is a single bin cut sheet feeder.

It attaches to the LA70 by simply lowering into position. A locking catch keeps it in position.

The printer firmware interrogates the position of the parking lever at power on. If this is detected to be in the forward position the firmware assumes that the ASF is fitted.

9.2 Installing the Automatic Sheet Feeder (ASF)

Detailed user level installation information is supplied with each ASF. This guide summarizes the installation for the C.S. Engineer.

The ASF is delivered with transit packing in place. Remove this before using the ASF.

9.2.1 Preparation

1. Install and test the LA70 printer.
2. Remove all paper.
3. Switch the power off.

9.2.2 Installation

Refer to Figure 9–1.

1. Remove the access cover (G). Store in a safe place.
2. Set Tractor/Friction feed lever (J) to friction (forwards).
3. Remove transit packing from the ASF.

4. Lower the ASF locating tabs (Z5) into the slots in the printer main cover (W). At the same time, move the parking lever forwards.
5. Press the ASF down until it sits squarely on top of the main cover and locks into position.
6. Insert the input bin paper support (X).
7. Insert the output bin paper support (Y).

The ASF is now installed.

NOTE
The presence of the ASF is detected when the power is switched on. If you have installed the ASF with the power on, you will need to switch the power off and on again for it to be recognized.

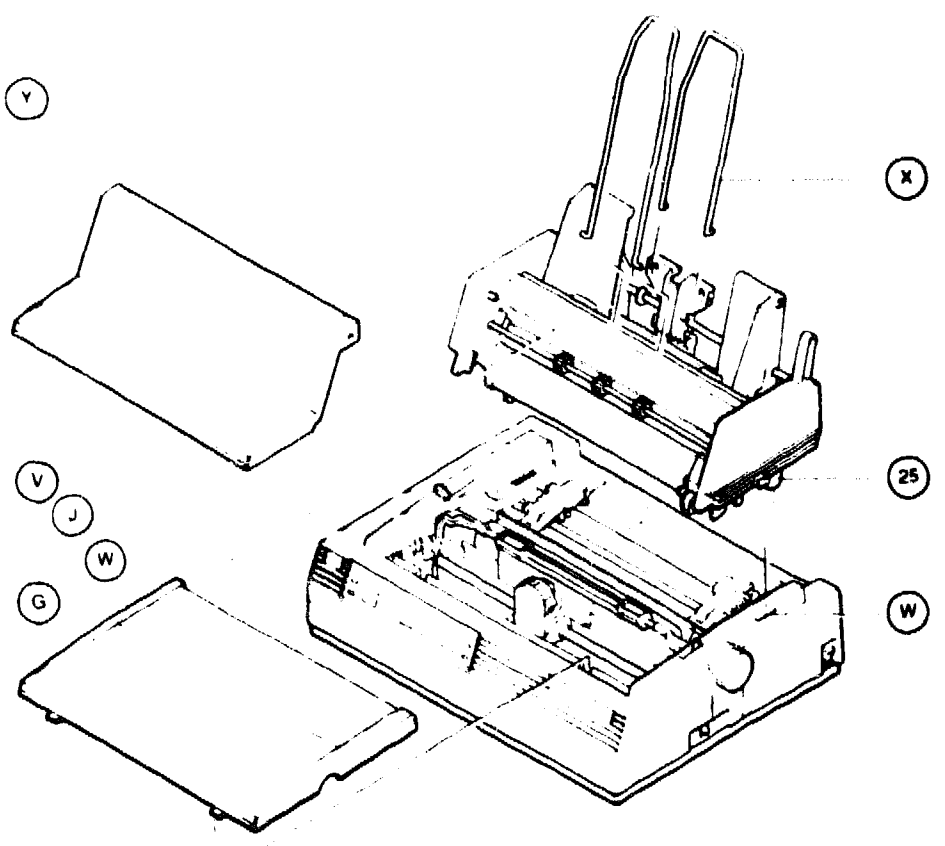


Figure 9–1 Installing the ASF

9.3 Removal

1. Unload all paper.
2. Press the Automatic Sheet Feeder release button (Z) (see Figure 9–1 and lift the assembly up and off the printer.

The removal of the ASF is now complete.

NOTE
The presence of the ASF was detected when the power was switched on. If you removed the ASF with the power on, you will need to switch the power off and on again for the printer to return to pinfeed or single sheet operation.

9.4 Setting the Automatic Sheet Feeder

Refer to Figure 9–1.

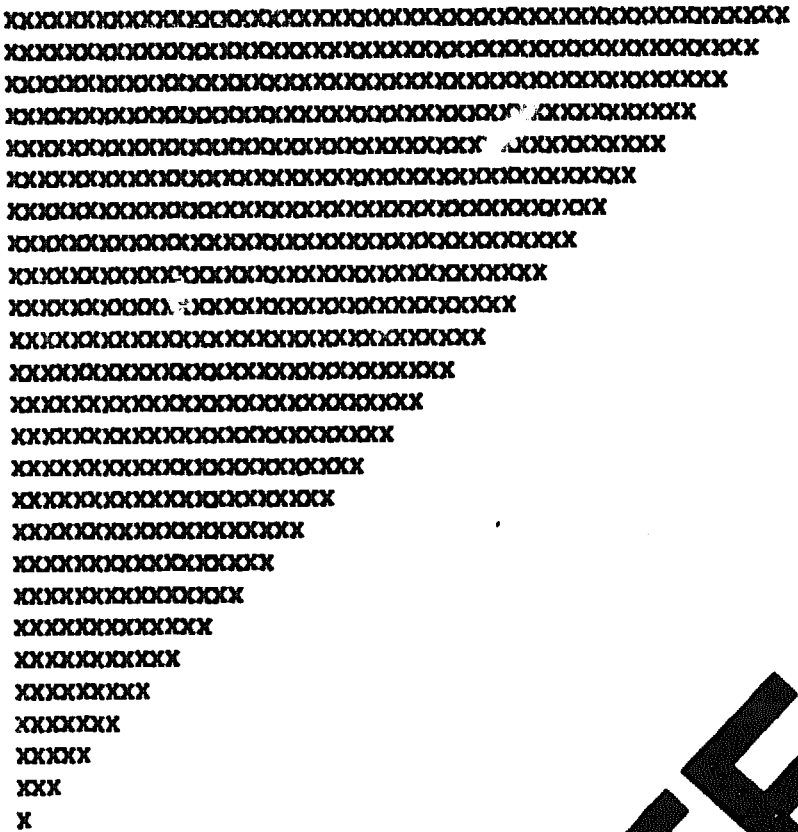
1. Set the left hand paper guide (Z1) in line with the mark (Z2).
2. Set the right hand paper guide to suit the paper width.
3. Set the paper bin pressure lever (Z3) open (forwards) until it locks.
4. Shuffle and insert the paper.

   Release the paper pressure lever (Z3).
5. Switch the power on.

The LA70 Automatic Sheet Feeder is now ready for use.

9.5 Testing the ASF

Use the printing self-test to test the ASF. Refer to Section 3.2.1 for details of this test.



CHAPTER 10

10
Firmware

The functions of the printer are controlled by code located in the EPROM in chip 20 on the Main PCB kit. This chip also contains the two protocols: ANSI (Digital Conformance Level-2) and IBM Proprinter Emulation.

When working with an open LA70 always note the revision level of the EPROM to assess whether an update is required. The release level is written on the EPROM. It is also printed on the first line of the features setup printout. (See Chapter 5.)

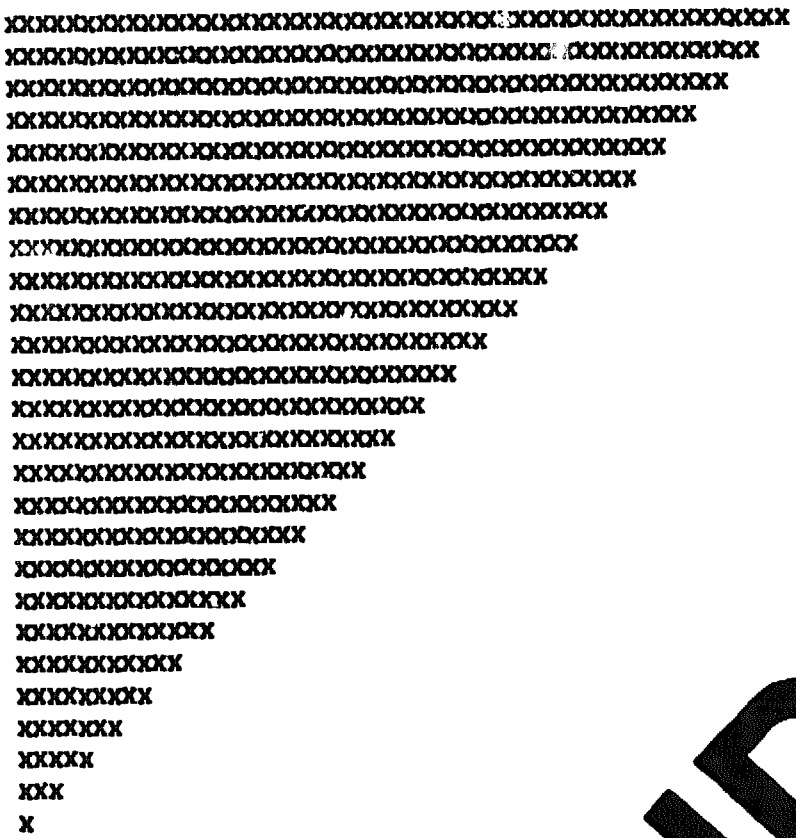
10.1 Replacing the Firmware

This component is replaced with the Main PCB kit removed. Refer to Section 6.5 for details of removing the Main PCB kit and location of the PROM, chip 20.

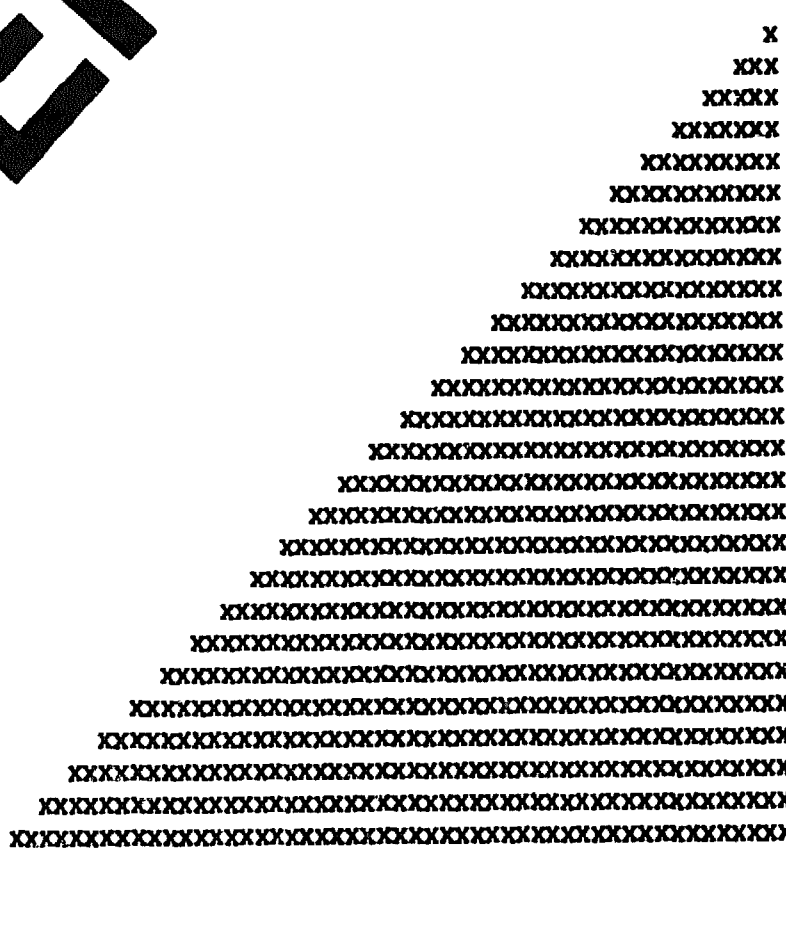
Replace the Main PCB kit and test the printer fully.

Table 10–1 Current Firmware Revision Status

Digital Part Number	Vendor Part Number	Release
N/A	N/A	LA70 V1.0



APPENDIX A



A
Specifications

A.1 Printer Specifications

Feature	Capability
Printing Method:	Impact dot matrix, 9 pin
Printhead:	9 wire @ 72 dots per inch vertical density
Sensors:	Printhead position Cover open Paper out Paper edge Parking lever pulled/ASF installed
Protocols:	Digital's Conformance Level-2 IBM Proprinter
Interfaces:	Serial, via 6-pin DECconnect type connector Parallel, via 36-pin "D" type. type connector
Selectable Baud Rates:	200, 300, 600, 1200 2400, 4800, 9600
Selectable Data Bits and Parity:	7-Even, 7-Odd, 7-Space, 7-Mark 8-Even, 8-Odd, 8-None
Print Modes:	Normal Quiet (double passes)
Average Print Speeds:	

Print	Quiet Mode	Normal Mode
Draft	66 cps	200 CPS
Memo	40 cps	100 CPS
NLQ	18 cps	40 CPS

Feature	Capability

Paper handling:

Pinfeed, Single Sheet
Single bin Automatic Sheet Feeder (optional)
Also see "Paper Specifications" in this appendix.

Selectable Form Length:

Inches	mm	Inches	mm
3	76.2	8.5	215.9
3.5	88.9	11	279.4
4	101.6	11 2/3	296.16
5.5	139.7	12	355.6
6	152.4	14	355.6
7	177.8	15	381
8	203.2	(1/144 in):XXX	(0.176):XXX

Other values are available by software selection

Horizontal Print Density:

5 CPI	10 CPI (80 col)
6 CPI	12 CPI
6.6 CPI	13.2 CPI
8.25 CPI	16.5 CPI (132 col)
8.55 CPI	17.1 CPI
9 CPI	18 CPI

Vertical Print Density:

2 LPI	6 LPI
3 LPI	8 LPI
4 LPI	12 LPI

Average Usage

500 pages per month maximum.

Printing Quality Modes:

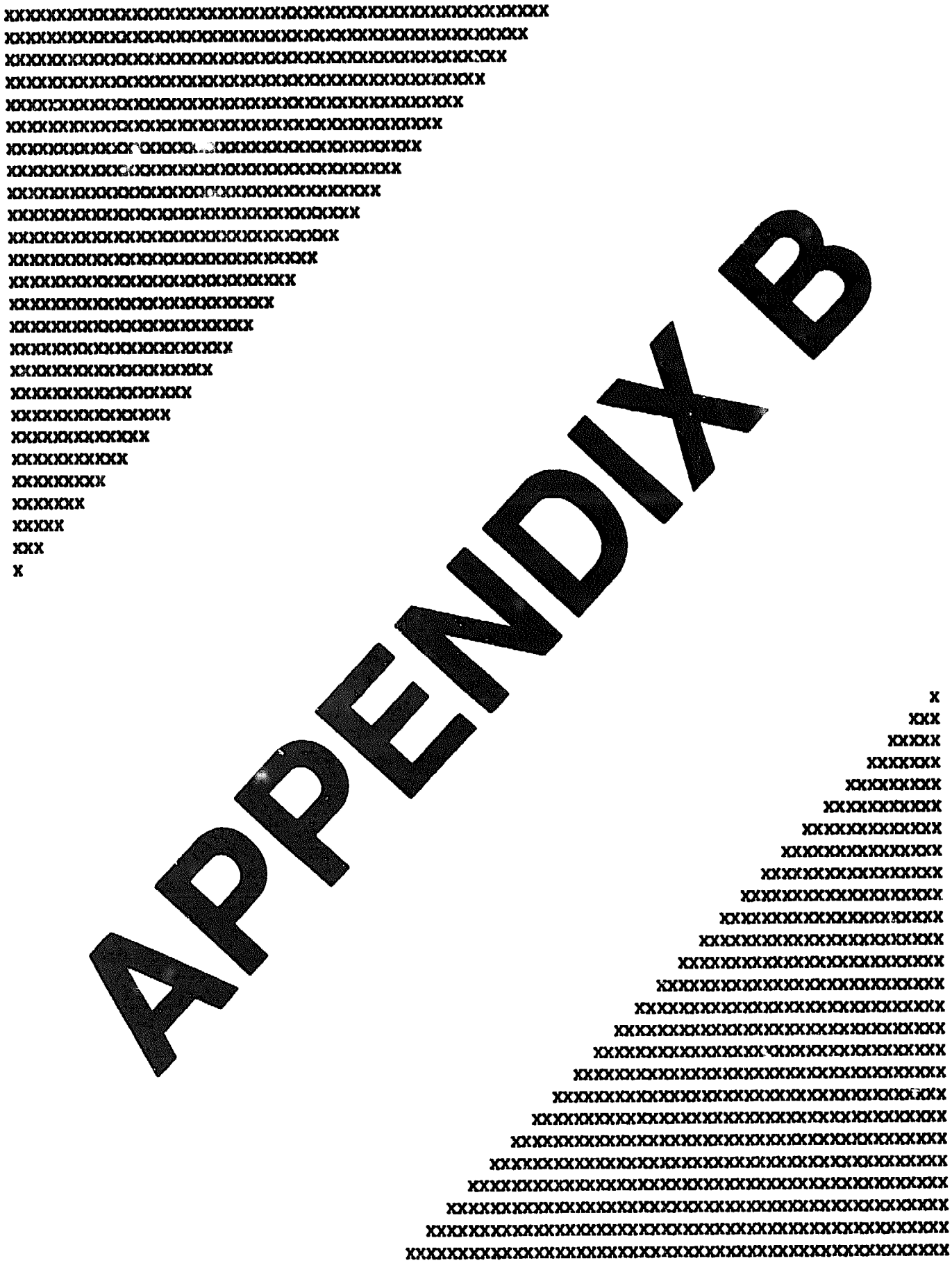
Draft
Memo
NLQ

Feature	Capability
Print Attributes:	Underline Double underline Overline Italic Strike-through Shadow bold Double width
Character Sets:	**Digital** U.S. ASCII Great Britain Digital Finland France Digital French Canada Germany Italy JIS Roman (Japanese) Digital Norway/Denmark Spain Digital Sweden Norway/Denmark Digital Dutch Digital Swiss Digital Portugal Digital Special Graphics (VT100) Digital Technical Digital Supplemental ISO Supplemental Digital Hebrew Digital Hebrew Supplemental ISO Hebrew Supplemental **IBM** Character Set 1 Character Set 2 Character Set 3 (All Characters) Graphics Set A
Noise Level:	52 dB in Quiet Mode

Feature	Capability
Dimensions:	Width = 400mm (15.7 in), Depth = 290mm (11.4 in), Height = 120mm (4.8 in), Height with Auto Sheet Feeder = 400mm (15.7 in)
Weight:	16 pounds (7.5Kg)
Power Requirements:	100 V @ 0.75 Amps, 50/60 Hz, 50W. 120 V @ 0.75 Amps, 50/60 Hz, 50W. 220 V @ 0.5 Amps, 50/60 Hz, 50W. 240 V @ 0.5 Amps, 50/60 Hz, 50W.

A.2 Paper Specifications

Feature	Capability
Paper types summary:	Pinfeed (tractor media) Single sheets Up to 3 part forms Envelopes
Continuous Paper (Tractor Media):	1. Single part continuous paper between 4 in and 10 in wide including perforations is supported. The allowable weight for these forms is 15 to 24 pounds per ream. 2. Multiple part forms: 4 in to 10 in wide including perforation. • 3 parts (1 original and 2 copies) with carbon: First Sheet - 16 to 20 lb/ream Copies - 12 to 15 lb/ream Total thickness: 0.012 in maximum (0.3 mm) • 3 parts (1 original and 2 copies) without carbon: first sheet and copies - 14.5 to 15 lb/ream last sheet - 13 to 15 lb/ream Total thickness: 0.012 in maximum (0.3 mm) **NOTE** **Hole spacing should be 12.5 mm +/- 0.025 mm (0.50 in +/- 0.01 in) non-accumulative over 50.00 mm (2.00 in) with a hole diameter of 3.8 mm to 4.1 mm (0.15 in to 0.16 in).**
Single Sheet Paper (Hand Fed Media):	Single sheet plain bond, typewriter quality paper between 16 and 24 pounds per ream. Hand fed multiple part forms (0.012 in maximum thickness) and up to 8.5 in in width.
Single Sheet Paper (Sheet Feeder Media):	Single sheets plain bond (ream weights: 16 to 24 lb/ream) Bin Capacity: up to 100 Sheets at ream weight: 20 lb/ream


APPENDIX B

B

Spares and Service Kit Part Numbers

B.1 Recommended Van-Kit Spares List

Description	Part Number
Mechanical Assembly 100/120V	29-28160-01
Mechanical Assembly 220/240V	29-28160-02
Printhead (PH-9101)	29-28161-01
Printhead Cable	29-28162-01
Main PCB Kit	29-28163-01
Panel PCB Assembly	29-28164-01
Noise Filter PCB 100/120V	29-28165-01
OR	
Noise Filter PCB 220/240V	29-28165-02
Mini Fuse MT4 1.6A 100/120V	29-26003-00
OR	
Mini Fuse 1A 220/240V	29-26004-00
Fuse UL-TSC 3A	12-33600-01
LA70 Misc Kit "Screws"	29-28198-01
LA70 Misc Kit "Springs"	29-28199-01
Automatic 1-bin Sheet Feeder	LA70X-SF

B.2 Special Tools

Description	Part Number
MMJ Loopback Connector	12-25083-01
Parallel Loopback Connector	29-27887-01.A01

B.3 Country Kits/Power Cables

Description	Part Number
USA, Canada, Mexico	17-00083-00
Australia, New Zealand	LA70-KZ
Central Europe	17-00199-12
United Kingdom/Ireland	17-00209-08
Switzerland	LA70-KK
Denmark	LA70-KD
Italy	LA70-KI
Germany, Austria	LA70-KG
Israel	LA70-KT

B.4 Data Cables

Description	Part Number
MMJ serial cable (BC16E-10)	17-00811-02
Shielded MMJ serial cable (DD16E-10) for Germany	17-01364-01
Parallel cable (BC19M-10)	17-01516-00

B.5 Miscellaneous Spares

Description	Part Number
Front Cover Assembly	29-28166-01
Main Cover	29-28167-01
Platen Knob Assembly	29-28168-01
Access Cover Assembly	29-28169-01
Cut Sheet Guide	29-28170-01
Gap Set Knob	29-28171-01
Gap Set Cover	29-28172-01
Ribbon cartridge (1 in a box)	LA70R-01
Ribbon cartridge (6 in a box)	LA70R-06

B.6 LA70 Miscellaneous Kit

Description	Part Number
LA70 Misc Kit "Screws"	29-28198-01
Tapping Screw	
Double Sems Screw	
Double Sems Screw	
Double Sems Screw	
Flanged Tapping Screw	
Toothed Washer	
LA70 Misc kit "Springs"	29-28199-01
Deflector Spring	
Pinch Roller Spring	
Bail Lever Spring	
Idler Gear Spring	
Bail Roller Spring	


APPENDIX C

C
Meaning of the Indicators

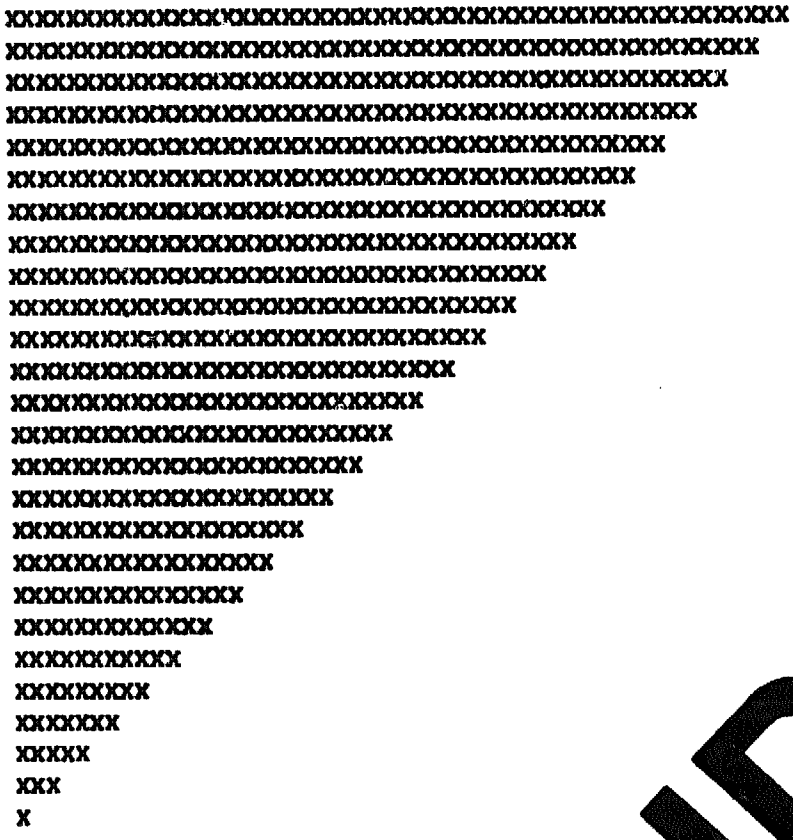
Table C–1 Meaning of the LEDs

LED Title	State	Meaning
Power	Off	Power off or power problem
	On	Power on, printer in Ready or Busy state.
	Flashing	Printer in Pause state.
Fault	Off	No faults
	On	Out of paper
	Flashing	One-second period if: • paper cover is open • paper jam • carriage error • ASF activated but cannot eject paper or cannot load paper 0.5 second period if internal diagnostic error.
DEC	Off	IBM mode selected
	On	Digital mode selected
Quiet	Off	Normal mode selected
	On	Quiet mode selected
Quality	Off	Print quality controlled by software

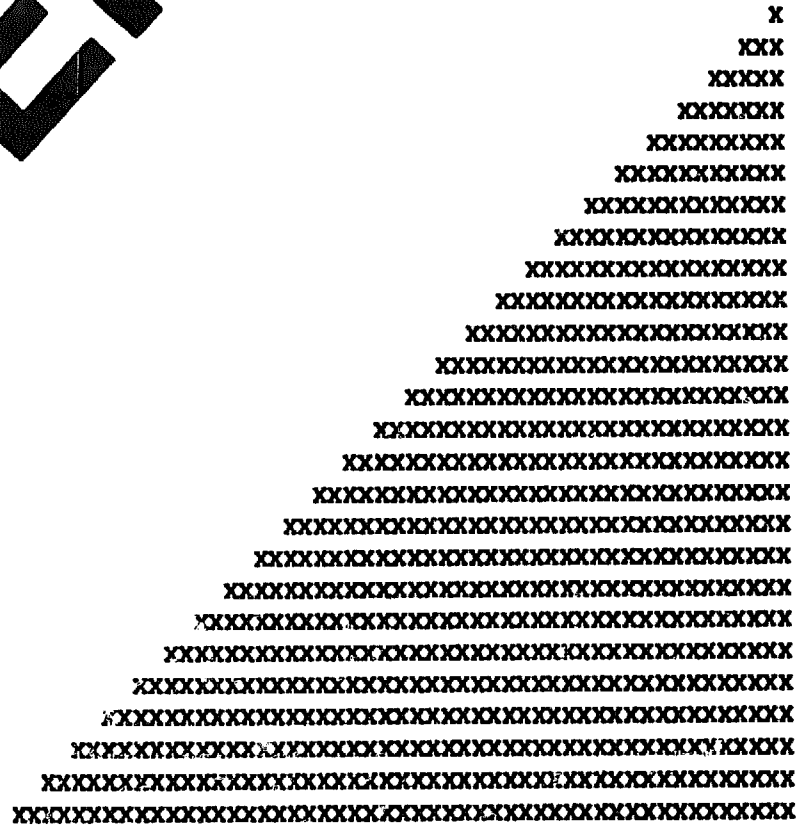
Table C–1 (Cont.) Meaning of the LEDs

LED Title	State	Meaning
	On	High quality forced by the user, that is, either Memo or NLQ depending on the Setup selection

NOTE
In the setup mode, both the Ready and the DEC indicators flash simultaneously.



APPENDIX D



D

Function of the Switches

Table D–1 Meaning of Operator Controls

Key Label	Meaning
The switches on this printer have two different functions: normal and setup. The Setup function results if the printer is switched on with Ready/Set Up pressed.	
Ready/Set Up	Switches the printer between Pause and Ready states. When the printer is Ready, the Power/Ready indicator is on. When the printer is in Pause, the Power/Ready indicator is blinking, and printing stops or cannot start. Data is still accepted from the host until buffer full forces an XOFF. When the printer switches from the Ready to the Pause state, paper is advanced for Viewing or Tear-off, when the printer comes back to the Ready state, paper is backed to the previous position. The printer assumes the Setup state when this key is pressed while switching the power on. In the Setup state the features of the printer can be selected and changed. Pressing this key in Setup mode saves the settings of the feature list, and switches back to normal mode.

Table D–1 (Cont.) Meaning of Operator Controls

Key Label	Meaning
LF/ ↓	Advances the paper one line at the current pitch. This button has the same function whether the printer is in the Pause or the Ready state. In normal mode, keys [Ready] and [LF] toggle the printer between Digital protocol and IBM protocol when the printer is in the Pause state, provided that the input buffer is empty. If not empty, the current protocol is unaffected. When the Digital protocol is selected, the DEC indicator is on. When the IBM protocol is selected, the DEC indicator is off. In the Setup mode this key moves to the previous feature.
FF/ ↑	Advances the paper to the top of form, ready for printing. Also used for fanfold/pinfeed demand printing operations, which allow the user to print and tear-off a single form without wasting the next form. In the Setup mode this key moves to the next feature.
Quiet/Quality/ →	Switches the print mode between normal and quiet print modes when the printer is in the Ready state. The switch occurs after completion of the line next to the active line. When the printer is in the Pause state, this key forces one of the two print quality settings, the selected upper print quality or software control. The manual selection made with this key is not affected by a software selection. The manual selection remains in effect until the next manual selection is made or the printer power is switched off. The upper print quality is either Memo or NLQ and is determined by the Setup function. When the upper print quality is forced, the Quality indicator is on, when the print quality is under software control, the Quality indicator is off. In Setup mode the key moves to the next value of the current feature. This is a one-way scan. When the last value of a feature is selected, the next press selects the first value.


APPENDIX E

E
Functional Diagram

Figure E–1 shows the functional blocks of the printer.

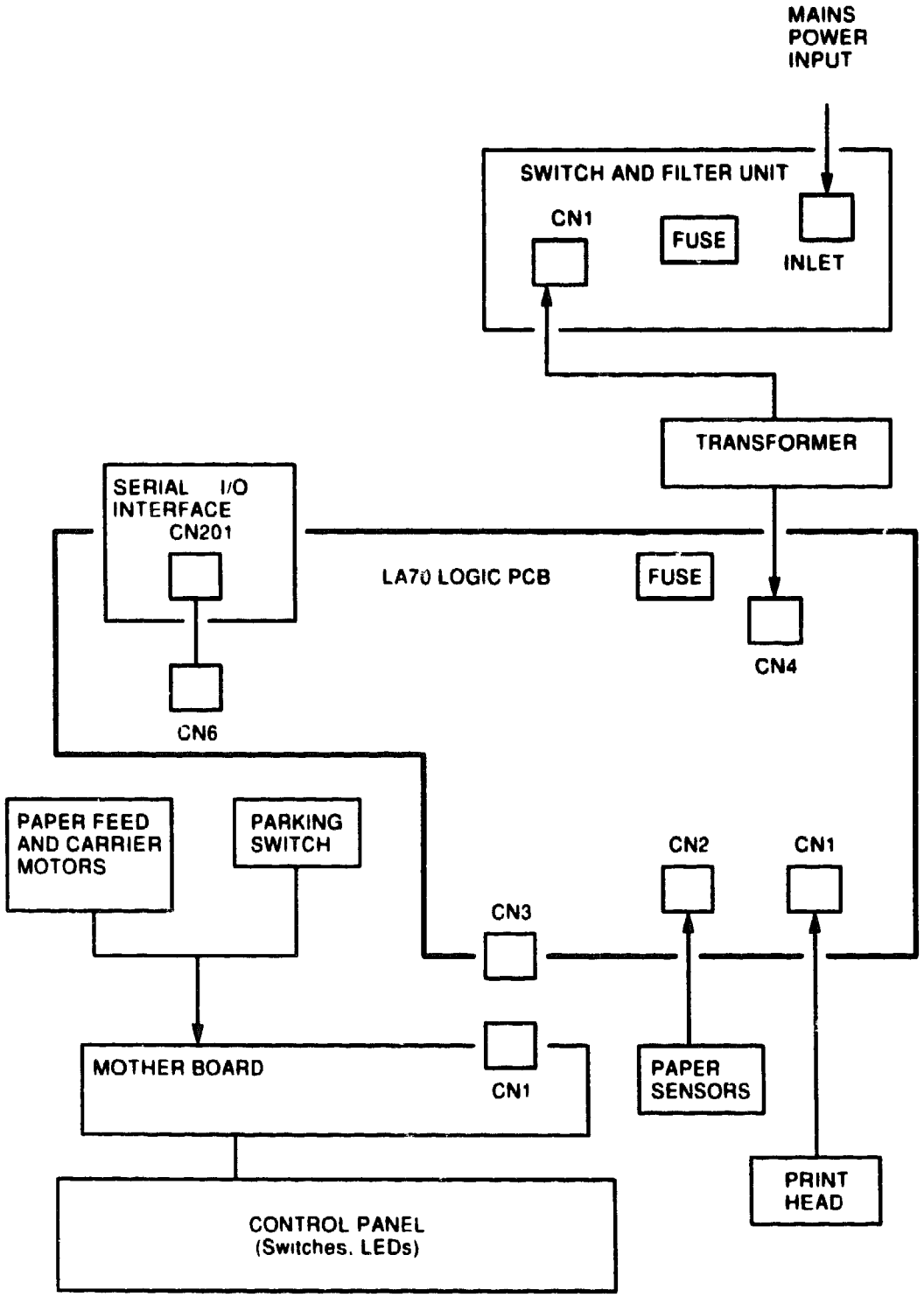


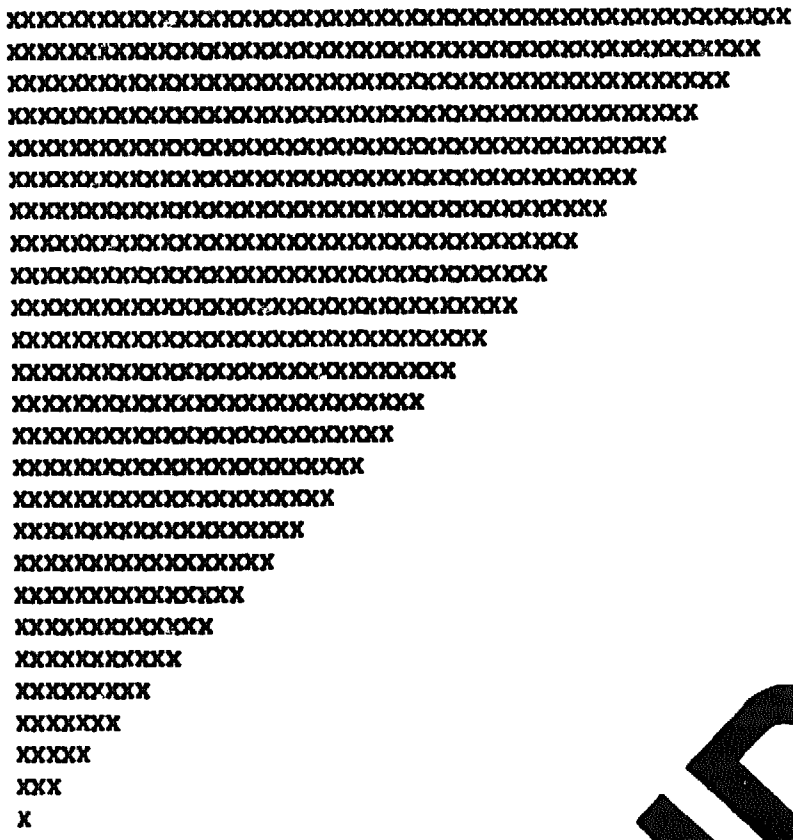
Figure E–1 Block Schematic Diagram of the LA70


APPENDIX F

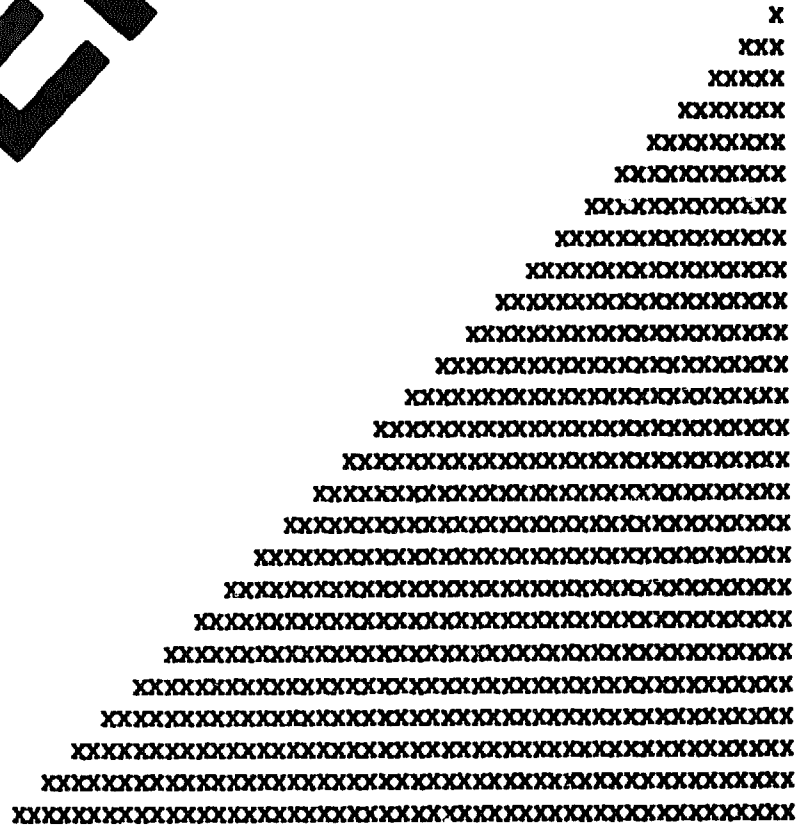
F

Control Character Acronyms

Control	Acronym	Control	Acronym
X00	NUL	X1E	RS
X01	SOH	X1F	US
X02	STX	X20	SP
X03	ETX	X7F	DEL
X04	EOT	X84	IND
X05	ENQ	X85	NEL
X06	ACK	X86	SSA
X07	BEL	X87	ESA
X08	BS	X88	HTS
X09	HT	X89	HTJ
X0A	LF	X8A	VTS
X0B	VT	X8B	PLD
X0C	FF	X8C	PLU
X0D	CR	X8D	RI
X0E	SO	X8E	SS2
X0F	SI	X8F	SS3
X10	DLE	X90	DCS
X11	DC1	X91	PU1
X12	DC2	X92	PU2
X13	DC3	X93	STS
X14	DC4	X94	CCH
X15	NAK	X95	MW
X16	SYN	X96	SPA
X17	ETB	X97	EPA
X18	EM3	X9B	CSI
X19	CAN	X9C	ST
X1A	SUB	X9D	OSC
X1B	ESC	X9E	PM
X1C	FS	X9F	APC
X1D	GS		



APPENDIX G



G
Feature List

Complete Feature List

The following features apply to both DEC and IBM protocols.

FEATURE	VALUE		VALUE	
1	Form Length			
	1	3 in	8	8.5 in
	2	3.5 in	9	11 in*
	3	4 in	10	11.66 in (A4)
	4	5.5 in	11	12in
	5	6 in	12	14 in
	6	7.0 in	13	15 in
	7	8 in	14	XXX in
2	Horizontal Print Density			
	1	5 CPI	7	10 CPI (80 col)*
	2	6 CPI	8	12 CPI
	3	6.6 CPI	9	13.2 CPI
	4	8.25 CPI	10	16.5 CPI (132 col)
	5	8.55 CPI	11	17.1 CPI
	6	9 CPI	12	18 CPI
3	Vertical Print Density			
	1	2 LPI	4	6 LPI*
	2	3 LPI	5	8 LPI
	3	4 LPI	6	12 LPI
4	Automatic Advance			
	1	Selected	2	Not Selected*
5	Print Quality At Power Up			
	1	Draft*	2	Upper Quality

*Factory setting

FEATURE		VALUE	VALUE	
6	Upper Print Quality			
		1 Memo	2	NLQ*
7	Printing Mode at Power-On			
		1 Normal*	2	Quiet
8	Protocol			
		1 DEC*	2	IBM
9	Serial/Parallel Port Selection			
		1 Serial*	2	Parallel
10	Power-On State			
		1 Ready*	2	Pause
11	Paper Position at Power-On			
		1 No paper feed 2 Park Position	3	Active Line 1*
12	Baud Rate			
		1 200 2 300 3 600 4 1200	5 6 7	2400 4800* 9600
13	Data Bits and Parity			
		1 7-Even 2 7-Odd 3 7-Space 4 7-Mark	5 6 7	8-Even 8-Odd 8-None*
20	Buffer Control			
		1 XON/XOFF*	2	DTR

*Factory setting

The following features apply to DEC protocol only.

FEATURE		VALUE	VALUE
14	G0 Character Set		

FEATURE	VALUE		VALUE	
	1	US ASCII*	13	DEC Dutch
	2	Great Britain	14	DEC Swiss
	3	DEC Finland	15	DEC Portugal
	4	France	16	DEC Hebrew
	5	DEC French Canada	17	DEC Supplemental
	6	Germany	18	ISO Supplemental
	7	Italy	19	DEC Technical
	8	JIS Roman	20	Katakana
	9	DEC Norway/Denmark	21	DEC Hebrew Sup.
	10	Spain	22	ISO Hebrew
	11	DEC Sweden	23	VT100
	12	Norway/Denmark	24	SPECIAL
			25	User Preference
15 G2 Character Set		List as for feature 14 above. Factory setting = 25,User Preference		
16 Printer ID				
	1	LA50 ID	3	LA210 ID
	2	LA120 ID	4	Conf. Level 2*
17 Text Mode Right Margin				
	1	Truncate	2	Wrap*
18 Auto LF on CR				
	1	Auto LF on CR	2	No Auto LF*
19 Auto CR on LF				
	1	Auto CR on LF	2	No Auto CR*

*Factory setting

The following features apply to IBM protocol only.

FEATURE	VALUE		VALUE	
21 Slashed Zero (Emulation)				
	1	Zero with Slash	2	Without Slash*

*Factory setting

FEATURE	VALUE		VALUE	
22	Auto LF on CR (Emulation)			
	1	Auto LF on CR	2	No Auto LF*
23	Active Character Set (Emulation)			
	1	Graphics set A*	2	Graphics set B
24	Auto CR on LF (Emulation)			
	1	Auto CR on LF	2	No Auto CR*
25	User Preference Character Set			
	1	DEC Supp*		
	2	ISO Supp		
	3	Katakana		
	4	ISO Hebrew		
	5	DEC Hebrew Supp		
	6	DEC 7 bit Hebrew		
	7	DEC Technical		
99	Factory Setting			
	1	No	2	Yes

*Factory setting


APPENDIX H

H

LA70/LA75 Differences

H.1 Hardware/Firmware Differences

Feature	LA70	LA75
Number of Models	4 (2 for Europe)	6 (4 for Europe)
Input Ports	DEC 423 and Parallel	DEC 423 or Parallel
Protocols	DEC (1 & 2) and IBM	Digital (1 & 2) and IBM
Firmware compatibility	LA75 Compatible	
Down loadable character set	Y	Y
Font cartridge	N/A	Y
Front panel	4 Buttons 5 Indicators	5 Buttons 7 Indicators
Setup configuration	Similar to LA75 with additional features	
Footprint	393 mm X 290 mm	452 mm X 338 mm

H.1.1 Printing Capabilities

Feature	LA70	LA75
Printhead	9 Wires	9 Wires
Carriage	Narrow	Narrow
Character sets	Same as LA75 + Hebrew	
Fonts	Same as LA75	

Feature	LA70		LA75
Print accuracy and quality	Same as LA75 except letter quality		
Line and dot spacings	Same as LA75		
Paper and printable width	Same as LA75		
Print qualities	Draft-Memo-NLQ		Draft-Memo-NLQ-LQ
Print modes	Normal and Quiet		Normal
Print speeds (CPS)	Normal	Quiet	Normal
Draft	200	66	250
Memo	100	40	125
NLQ	40	18	40
LQ			32
Noise Level (DbA)	Normal	Quiet	Normal
	<55	52	55

H.1.2 Paper Handling

Feature	LA70	LA75
Medium	Fanfold and Cut Sheet	Fanfold and Cut Sheet
Multipart forms	1 + 2	1 + 3
Tractor	Push	Push and Pull
Bottom feed	N/A	Y
Auto loading	Y	Y
Auto park	Y	Y
Zero tear off	Y	N
Viewing	Y	N
Automatic viewing	Y	N
Top of form printing	Y	Y

Feature	LA70	LA75
Automatic Sheet Feeder (ASF)	One bin	One bin
A.S.F. detected by printer	Y	Y

H.1.3 Usage and Life

Feature	LA70	LA75
Average pages/month	500	1500
Head life	100 million chars.	200 million chars.
Ribbon cartridge	2 million chars.	2 million chars.