

LaserDirect



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LaserDirT+LaserDirM

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Important warning:

Before transporting the printer (except for short distances), remove the Drum Set and Toner Unit*. It must also be properly packed. Full instructions on this can be found in the *Transporting the LaserDirect* section of this manual.

If the printer is returned to Computer Concepts without being packed correctly, then any damage sustained will be chargeable to you. Similarly, if the Toner Unit is not removed, then you will be charged for time spent in removing any spilt toner.

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1. Introduction

Computer Concepts' LaserDirect package provides the Archimedes user with a fast, high image-quality printer at an affordable price.

The Archimedes is ideally suited to desktop publishing applications because of its powerful processing capabilities and its graphics and font drawing abilities. These allow graphics and text to be quickly scaled by any amount and resolution. However, printing graphics can be a slow process because of the amount of data to be sent to the printer.

The LaserDirect package removes this bottleneck by using hardware and software specifically designed for the Archimedes. These permit transfer rates to the printer far higher than that provided by standard interfaces.

The package has two main parts:

- An expansion card to fit inside the Archimedes. This card contains the necessary hardware to control transfers to the printer over a parallel link. Also on the card is the associated software held in ROM. This avoids the need to load the printer drivers at run time.
- A printer specially developed for this application. It is based around the Qume Liquid Crystal Shutter (LCS) print 'engine'§.

§ 'engine' is the name used for the actual printing mechanism that transfers the image onto the paper. It is a term used with both LCS printers (like LaserDirect) and laser printers.

The LaserDirect printer is not technically a laser printer because it uses a conventional light source shining through a liquid crystal shutter (LCS) array. (A laser printer uses a laser light source and a spinning mirror.) This results in an LCS printer having fewer moving parts and greater reliability without compromising print quality.

1. Introduction

Also supplied are all necessary accessories and cables required to connect the printer and to prepare it ready for use. The only extra needed is a supply of A4 size copier-grade paper.

The software within the LaserDirect printer allows special links to other software and products from Computer Concepts. For example, when combined with the ScanLight Plus software and suitable scanner, you have the ability to scan and print a full A4 page in under a minute. The LaserDirect can, when coupled with the PostScript compatible interpreter, be used as a very fast PostScript-compatible printer (but using Acorn outline fonts). It is, of course, totally compatible with Computer Concepts' desk top publishing package, Impression. It is also compatible with other RISC OS applications that use the existing printer driver system.

LaserDirect works with any Archimedes that has the Expansion Backplane fitted. Where necessary, your dealer can fit this board. To print directly to the printer requires at least 2Mbytes of memory. If you have a 1Mbyte Archimedes, then you have to send the data first to a file created by LaserDirect software and then print from that file.

How it works

The LaserDirect uses a combination of specially written software and custom designed hardware to provide a high-performance laser printing system at a relatively low cost.

The basics

The basic principle of all RISC OS printer drivers is that the application doing the printing simply 'draws' the page to the printer, exactly as it does on screen, except at a much higher resolution. The printer driver then interprets all the drawing and printing

commands and either creates a bit-image of the resulting page or translates the commands into another form suitable for the required printer.

This system has several advantages:

Firstly, the program requires relatively little extra code to drive the RISC OS printer driver system. It even uses the same outline fonts for both screen and the printer. (Compare this system with a typical PC application which is usually accompanied by discs full of printer drivers and printer fonts, and where each different application uses its own printer driver system).

Secondly, the same code is used to drive the printer as is used to draw the page on screen. What you see on screen is what you get on the printer, albeit displayed at a lower resolution.

Thirdly, by making sure all RISC OS applications use this printer driver system, only one printer driver is required for each printer. All co-operating RISC OS applications will work with that one driver. Thus, the RISC OS printer driver supplied for the LaserDirect will work with a variety of application programs from different companies.

The specifics

When printing a document, the printer driver puts aside an area of memory. Just how much memory is reserved depends on the total memory available in the machine.

As the application prints the page, the printer driver starts rendering the page. That is, it starts drawing a high-resolution bit-image of that page in memory. It uses the operating system drawing facilities to do this and the operating system font manager to render the text. (When printing in 'Fast Text Mode' it doesn't use the Acorn font manager but a faster replacement. It

still uses the Acorn outline font definitions - see later in this manual for details.)

Many application programs suggest increasing the size of the Font Cache before printing. When using the 'fast Text Mode', this chore is unnecessary as the software automatically makes any necessary adjustments.

Calculations would suggest that about .1Mbyte of memory is needed for a single A4 page at 300 dotsper-inch (dpi). However, the LaserDirect printer driver has special compression facilities that actually mean that much less memory is required - typically no more than 20% of this (i.e about 200K per page). For simple text pages it can be a lot less than this.

Once a complete page has been rendered, the hardware then takes over. It starts the motor in the printer and begins feeding the paper. Then, as the paper passes through the printer, the data is read from memory and sent to the printer engine at about 2 Mbits/ second.

One important aspect of the LaserDirect system is that pages are printed in the background. That is, while the hardware is reading the data from memory and printing, the application and printer driver can be getting on with drawing the next page. The result is that several complete pages may be queued in memory, waiting for the hardware to catch up. In fact, if the application is fast enough, it can have printed (for example) a 10 page text document and have given control back to the user well before all the pages have emerged from the printer.

This background printing also benefits multi-copy printing, since control is given back to the main application as soon as a page is rendered. All subsequent copies of each page are printed completely in the background.

Safety notes

If used correctly, the LaserDirect is completely safe and will present no danger to you. Just take note of the following points:

- the printer is heavy (17 kg/37 lb). Lift carefully and place it only on surfaces capable of supporting its weight.
- inside the printer are parts that get hot. They cannot be touched from the outside and, even with the lid open, they are protected by a cover clearly marked with a warning. If you have to open that cover, then follow the instructions in this manual.

Help desk

Computer Concepts operate a technical help desk. It is available Monday to Friday, between 1.30 p.m. and 4.30 p.m on 0442 63933. You will be asked for the serial number at the top of the registration card. Please remember to keep a note of this number. You may also be asked for the version number of your LaserDirect software. To find this, refer to section of this manual describing the *Main Menu*.

This service is available only to customers who have returned the registration card.

On-site maintenance

For details, contact Computer Concepts on 0442 63933.

Abbreviations

We've tried to use as few abbreviations as possible but these are used throughout the text:

dpi	dots per inch
gsm	grammes per square metre
LCS	Liquid Crystal Shutter

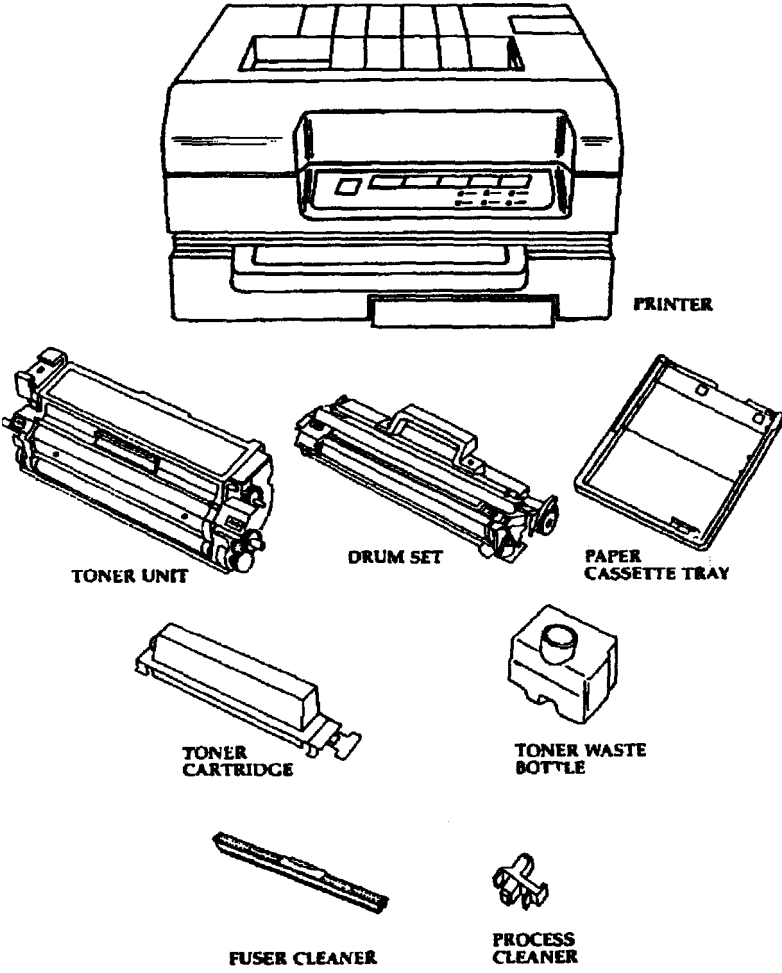


Fig 1: Component parts of printer

2. Getting started.

This section describes how to set up your printer and how to install the associated LaserDirect Expansion Card into your Archimedes. Please unpack carefully - some of the parts in the printer are delicate and may be damaged by rough handling.

What you should have received:

Check that you have received the following (those parts marked § are illustrated in fig.1 as an aid to identification):

- § LaserDirect printer
- LaserDirect Expansion Card to plug into your Archimedes
- half-width blanking plate
- § toner unit
- § drum set
- § A4 size paper tray
- single-sheet feeder
- § 2 toner cartridges
- § 2 toner waste bottles
- § fuser cleaner
- § process cleaner
- standard mains cable complete with 13A plug
- printer-to-Archimedes interface cable.

You should retain the packing material in case you need to transport or store your printer in the future.

2. Getting started

The printer contains some delicate parts and should always be moved accordingly.

Where to place your printer

Your LaserDirect printer is designed to work in a normal office environment. It needs a flat, horizontal surface on which to stand. The surface must be sufficiently robust to support the weight of the printer.

Ensure that there is ample ventilation all round the printer. The room temperature range should be 50°-90° F (100-32° C). The printer will not operate at its best in very hot or very cold rooms. Avoid placing it in direct sunlight as this may shorten the life of the printer engine. Also, avoid dusty environments.

You will need access to all sides of the printer but especially the front and left-hand side. Allow 16" (400mm) to the front. When in use, 8" (200mm) is sufficient to the left but, to refill the Toner Unit, you will need 20" (500mm). Allow 8" (200mm) to the right and rear. If you intend using the single-sheet feeder extensively, then you will require greater access to the rear.

It will obviously be convenient if you can store spare paper near to the printer. This will help to acclimatise the paper before it is used. (See the *Paper and print media* section of this manual for more information).

Installing the LaserDirect Expansion Card

IMPORTANT:

Whilst no special skills are required to fit this card into your Archimedes, the suppliers can accept no responsibility for any damage which may result from incorrect installation. If in doubt, then consult your local dealer or supplier.

The card contains circuitry that may be damaged by

static discharge. Ensure that proper anti-static precautions are taken when handling it. Before handling the board, you should touch a suitable earth-point to discharge any static build-up. (The screws securing the cover of the Archimedes are earthed whilst the mains lead is connected).

All models of Archimedes except A3000

The only tool that you require is a No.2 (medium) cross-head screwdriver.

Before proceeding, disconnect the mains lead and *all* peripherals. Remove anything that may be on top of the case such as a monitor.

The cover is secured to the main unit by five screws; three at the rear and one on either side. Completely remove all screws as the cover does not lift off vertically. Instead, slide it backwards and then lift it away.

Now check that the Expansion Card Backplane is installed in your Archimedes. The Backplane is a vertically-mounted circuit board positioned about half-way back across the main circuit board. It provides 2 or 4 sockets into which expansion cards can be fitted.

A Backplane is factory-fitted to 400 series models but must be fitted as an optional extra to 300 series models. If the backplane is not fitted, then it must be installed before you can continue.

With no expansion cards fitted, the rear panel of the main unit has three metal plates, each secured to the case by two screws, one either side. The lowest plate (containing various sockets) is secured to the main circuit board and should not be removed. The upper two plates are temporary blanking plates which are replaced when expansion cards are installed.

One 'standard width' expansion card occupies half the

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width of one blanking plate. If the LaserDirect Expansion Card is fitted adjacent to another expansion card, then their rear panels should be bolted together. If there is no adjacent expansion card, then the half-width blanking plate supplied should be bolted to the rear panel.

Which card position you use on the backplane is up to you unless an existing expansion card requires to be in a specific slot. If there are no such constraints, then the top left-hand slot (called slot 0) is the logical choice. The LaserDirect Expansion Card may now be inserted (usually from the rear). Hold the card horizontally and push into the corresponding Backplane socket. The Backplane is supported by a strong metal bar; however, we advise that you support it with one hand whilst pushing the card into place.

Replace any screws that may have been removed from the back panel ensuring that the LaserDirect Expansion Card is secured to an adjacent expansion card or a half-width blanking plate. Refit the top cover and replace the five securing screws.

Reconnect the mains and plug in the monitor. Switch on in the usual way. The Archimedes should start up as normal except that it should display the message **Computer Concepts LaserDirect**.

Continue reading from *Initial software settings*.

Archimedes A3000 only

Disconnect the mains lead and *all* peripherals. It is not necessary to remove the top cover to install the card.

The card simply plugs into the expansion socket located at the rear of the Archimedes.

Any expansion card plugged into an A3000 has little protection against accidental damage. We therefore recommend that the card is protected by a metal casing. A suitable casing can be obtained from

PRES, P.O. box 319, Lightwater, Guildford, Surrey GU18 5PW. Fit the casing as directed by the manufacturer.

Reconnect the mains and plug in the monitor. Switch on in the usual way. The Archimedes should start up as normal except that it should display the message **Computer Concepts LaserDirect.**

Initial software settings

At this stage, use default settings for the software options. For an explanation of their meaning or to change them later, refer to the *Software* section.

Press function key 12 to get the * prompt. Then type:

***Configure Desktop_PrinterLD 1**

***Configure PrinterLD_Buffer 0**

(The 1 and 0 are numerics).

Press RESET to restart the Archimedes. You should see the laser printer icon appear on the icon bar.

Setting-up the printer

Open the top lid of the printer by pulling the release lever located on the top of the cover. Fully open the top cover.

Removing the protective spacers:

The printer is sent to you fitted with four protective spacers (coloured bright-yellow). These must be removed before proceeding. Their position is shown in fig.20; their removal in fig.21. Removal details can also be found on a separate sheet packed with the printer.

Do not discard these spacers; they will be required again if you later have to repack the printer for transport or storage.

Now you can fit those parts of the printer that are

2. Getting started

shipped separately such as the Toner Unit, the Drum Set, and the Paper Tray.

Fitting the Toner Unit

The Toner Unit is illustrated in fig. 1.

Always handle the Toner Unit with care. Improper handling may cause damage and result in poor print quality.

Hold the Toner Unit by the orange handle.

Insert the Toner Unit by positioning the set shafts (marked on the printer with green arrows) into the notches in the printer (also marked with green arrows).

The Toner Unit clicks into place and should be level when properly installed.

New Toner Units, not previously used, do not contain toner. Fill the Toner Unit with toner from a Toner Cartridge before using the printer.

Adding the toner

Figs 2 & 3 are applicable.

A Toner Cartridge is used to fill or replenish the Toner Unit. It is illustrated in fig.1.

1. Before using it, prepare the Toner Cartridge by holding it upright, orange tab uppermost. Slowly rock it back and forth several times to distribute the toner evenly in the cartridge.
2. Open the Toner Unit lid (it is hinged at the rear).
3. Hold the Toner Cartridge upright. Gently lower it next to the Toner Unit (tab to the left). The hooks on the right and left of the Toner Cartridge should catch on the Toner Unit shafts.

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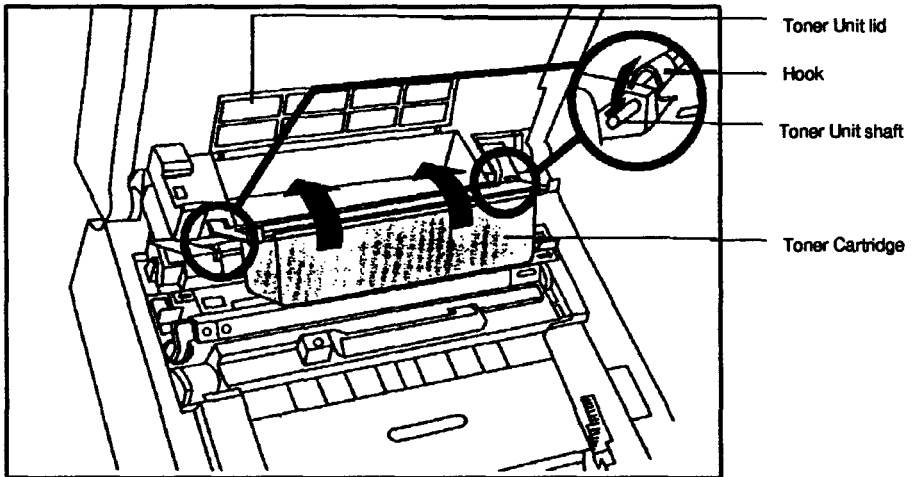


Fig 2: Installing the Toner Unit

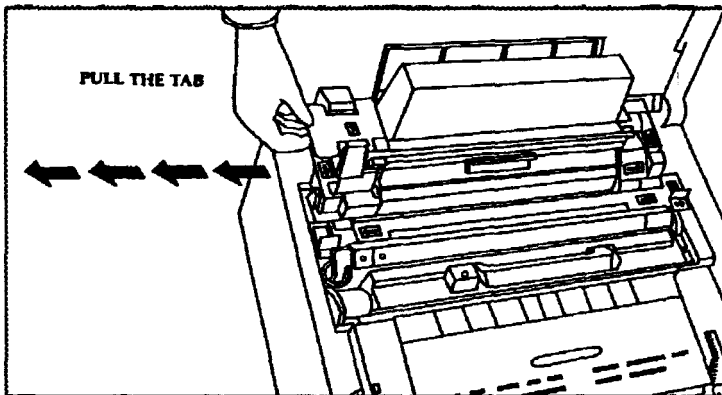


Fig 3: Emptying the Toner into the Toner Unit

4. Tip the cartridge upside down, as shown in fig.2 by the directional arrow.

5. While holding the cartridge down, grasp the orange tab and pull it until the number 2 appears in the

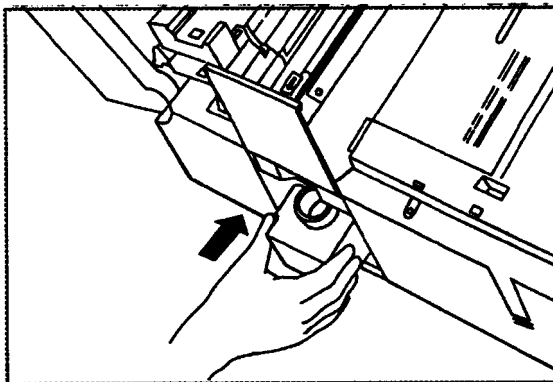


Fig 4: Installing the Waste Toner Bottle

supply mark.

6. Tap the Toner Cartridge lightly to make sure that all the toner empties into the Toner Unit.

7. Return the Toner Cartridge to the position it was in when you first inserted it into the Toner Unit.

Take care not to spill any remaining toner.

8. Close the Toner Unit cover.

9. Put the empty Toner Cartridge into the plastic bag supplied for disposal.

Installing the Waste Toner Bottle

This is shown in fig.4.

The Waste Toner Bottle is used to catch any extra toner as the printer operates. A new Bottle should be fitted each time the Toner unit is filled.

Install as follows:

- 1.The top cover of the printer must be open.
2. Slide the waste toner bottle cover (on the left side of

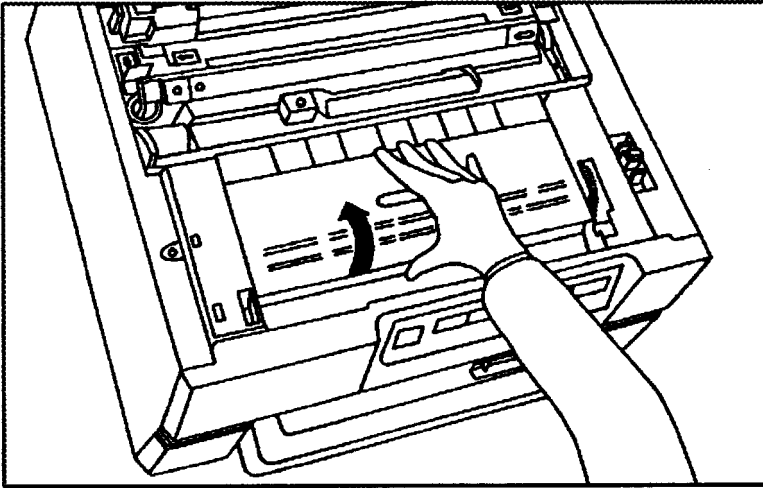


Fig 5: Opening the Fuser Cleaner cover

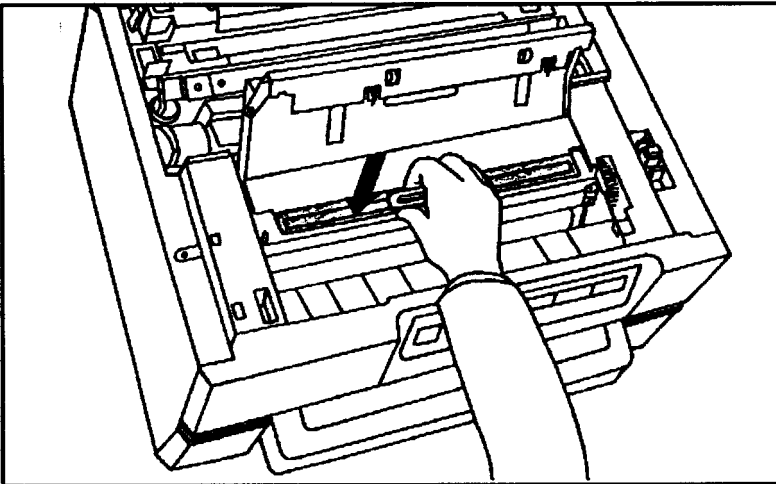


Fig 6: Installing the Fuser Cleaner

2. *Getting started*

the printer) up to open.

3. Insert the new Waste Toner Bottle.

4. slide the waste toner bottle cover down to close.

Note: Used toner in the waste bottle cannot be used again. Do not attempt to insert used toner back into the Toner Unit as this will result in inferior print quality and possible printer malfunction.

Installing the Fuser Cleaner

Figs 5 & 6 are applicable.

The Fuser Cleaner keeps the printing mechanisms clean during the printing process.

The Fuser Cleaner is provided with the Toner Unit and should be changed every time a new Toner Unit is installed.

1. Open the fuser cleaner cover located near the front of the printer. It is marked with a warning 'hot surface'. (The warning refers to the fuser surfaces under this cover).

Caution: the fuser operates at a very high temperature. Do not touch parts other than the fuser unit cover or the Fuser Cleaner knob.

2. Holding only the Fuser Cleaner knob, insert the Fuser Cleaner into the fuser unit inlet.

3. Close the fuser unit cover. The cover will not close if the Fuser Cleaner is not installed correctly.

The Drum Set

The Drum Set consists of a photosensitive drum, a charging corona wire and cleaning components. The drum applies the page's image onto the paper and operates similarly to an office photocopier.

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To maintain print-quality, the drum requires occasional replacement; a life of about 20,000 pages can be expected. A warning is displayed on the control panel when the end of the drum's useful life is approaching. (See *Control panel* section of this manual for more details).

The drum is fragile. Handle it carefully to prevent damage which could affect print quality.

- **Don't hit or knock it against anything.**

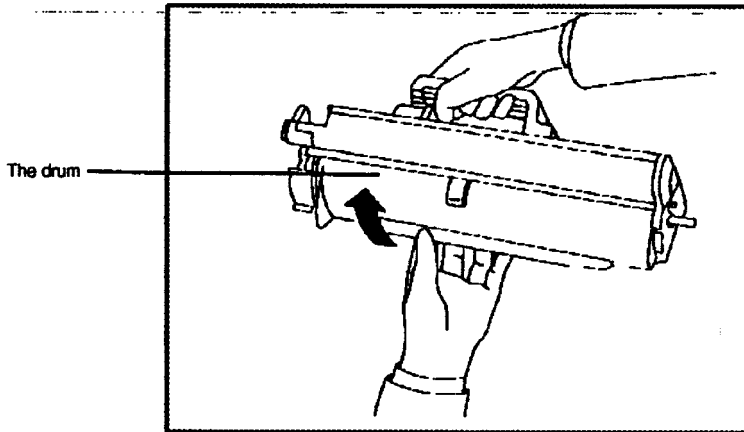


Fig 7: Opening the drum cover

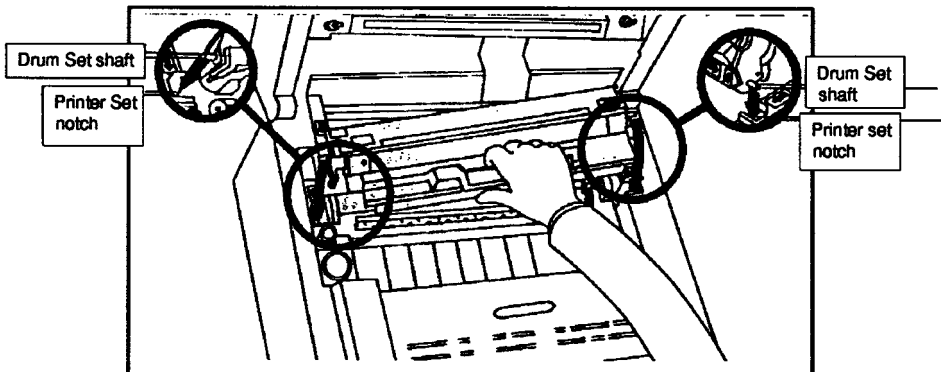


Fig 8: Installing the Drum Set

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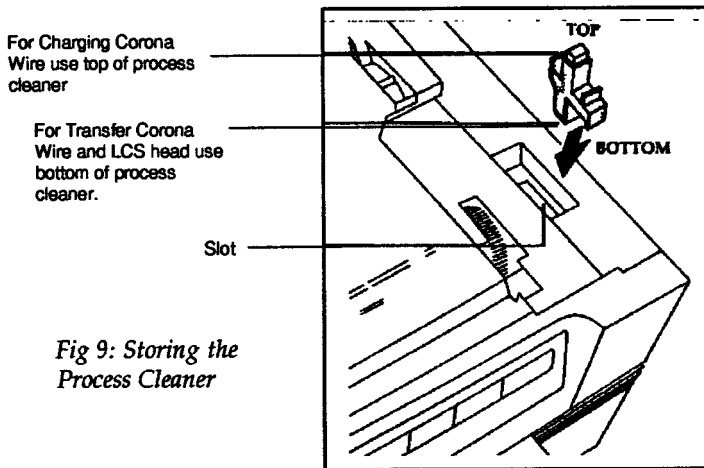


Fig 9: Storing the Process Cleaner

- Don't expose to direct sunlight (it is light sensitive).
- Fingerprints, oil or other liquid on the drum may all cause damage which affects printing quality. For example, a fingerprint on the drum will print on every page. This may require the installation of a new drum to correct the problem.
- Sudden changes of temperature may cause condensation on the drum and affect print quality. Never place the drum on or near heaters, air conditioners or similar appliances.

Installing the Drum Set

Figs 7 & 8 are applicable.

1. Hold the Drum Set by the orange handle. Open the protective drum cover before fitting it in the printer. When fully open, the cover is held open by a latch. **Be careful that you don't touch the surface of the drum.**
2. Lower the Drum Set into the printer by positioning the Drum Set shafts (marked with blue arrows) so that they rest in the printer set notches (also marked with blue arrows).

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The drum will click into place and should be level when properly installed.

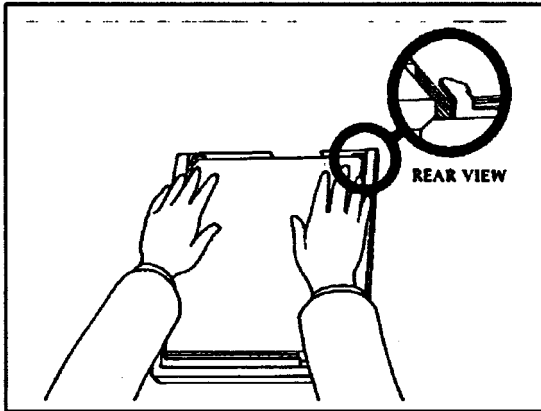
3. Store the process cleaner in its slot so that it is readily available when required (see fig.9).

With the Toner Unit and toner, Waste Toner Bottle, Fuser Cleaner, drum, and process cleaner installed you can now firmly close the printer cover.

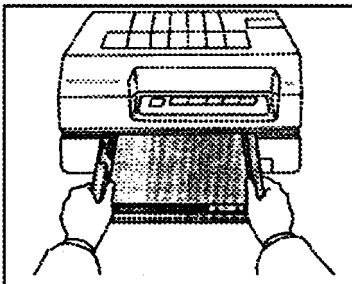
Installing the Paper Tray

Suitable paper types and print media are described later in the *Paper and print media* section.

A standard A4 size paper tray is supplied with the printer; other sizes are available to order. The paper



*Fig 10:
Putting paper in
the Paper Tray*



*Fig 11:
Installing the Paper Tray*

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tray will hold up to 100 sheets of standard weight paper.

1. Load the paper into the paper tray and ensure that the two metal clips at the rear of the tray are on top of the paper (see fig.10).
2. Fit the paper tray into its slot at the front of the printer under the front panel (see fig.11). The paper tray slides in easily and you will feel it drop into place when in the correct position.

Installing the single-sheet feeder (optional)

If required, this is clipped on to the top of the turn guide cover at the rear of the printer. (Fig.13 shows its position). Ensure both clips are fully engaged on the cover to hold the feeder securely.

Connecting the mains cable

Caution: make sure the printer is switched off before connecting the mains cable. The switch is on the left hand side of the printer and should be in the '0' position.

The LaserDirect printer must not be connected to the unswitched mains outlet of your Archimedes. It requires more AC power than can be safely drawn from that outlet. Use a conventional 13A mains socket instead.

Plug the mains cable first into the printer and then the mains socket. Switch on the printer (switch to the '1' position).

On the front panel you should see:

- the **power** light is green indicating that the printer is receiving power
- a flashing **0** will appear in the display window

When the printer is ready, the message window will stop flashing and the **ready** light will come on. This

takes about 30 seconds when the printer is warm but could be as long as 100 seconds from cold.

Making a test print

The test print produces a single page printed with parallel lines. The printing should be of equal density both across and down the page.

To perform the print test it is not necessary for the printer to be connected to the Archimedes.

1. Ensure the printer is **off-line**. If necessary, press the *ON/OFF LINE* button.
2. Press the *SCAN FUNCTIONS* button until the display shows 'I'.
3. Press the *EXECUTE FUNCTION* button. While the test page is being printed, the display window will show 'tP'.
4. When printing is complete, return the printer to **on-line**.

Connecting the printer to the Archimedes

Use the cable provided. We do not recommend the use of longer cables to increase the distance between the printer and the Archimedes.

Plug the interface cable into the expansion card in the Archimedes and into the printer. The connector on the printer is at the back. The connectors at each end of the cable are different so cannot be connected to the wrong unit. Both ends will only fit one way round. Do not try to force them in upside down.

Secure the cables in place with the clips or screws on the mating connectors.

3. The control panel

There are three areas on the control panel (front panel):

- push-buttons to select printer functions
- indicator lights to show the current operating status
- a display window for attention and status messages

Push-buttons

There are five push-buttons located along the top of the control panel.

Scan functions

Execute function

These buttons have no effect unless the printer is **off-line**.

At present, the only function available is to print a page of test pattern (function 1). Use the *SCAN FUNCTIONS* button to display 1 in the display window. Press the *EXECUTE FUNCTION* button to start printing the test page.

The test produces a single page printed with parallel lines. The printing should be of equal density both across and down the sheet.

Reset

This button resets the printer regardless of the **on** or **off-line** status. You should only press this button if a printer malfunction.

Form feed

In the off-line state, pressing this button will print a blank page. The button has no effect if a scan function has been selected and not yet executed.

On/off line

Press this button to switch between the on- and off-line states. On-line is indicated when the corresponding status light is on. The printer must be off-line to use the scan and/or execute functions or form feed.

When the printer is off-line, several pages can be stored for printing. These will be printed when the printer returns to the on-line state.

You should take the printer off-line before topping up the paper tray. This guards against a page being printed whilst you are removing or installing the tray.

Indicator lights

These lights can be **OFF** (unlit), **Flashing** or **ON** (steady).

Ready

ON — the printer is ready to be operated

OFF — the printer is either warming up or requires operator attention. (The display window will indicate which condition applies).

On line

ON — the printer can receive data from the Archimedes.

The printer must be on-line to receive data from the Archimedes and print. It must be off-line to use the scan and/or execute functions or form feed.

Power

ON — the printer is switched on and AC mains present

Data transfer

This light flashes at different rates during printing to indicate the print status.

OFF - the printer is not processing data

Flashing; equal on and off - the printer is either receiving data or printing a page.

Flashing but mainly off - the printer is rendering a page preparatory to printing.

Flashing but mainly on - there is data awaiting printing but printing is stopped because either,
the printer is off-line, or
operator assistance is required.

Operator attention

This light is not used. The display window shows operator attention messages.

Service required

This light is not used. The display window shows service required messages.

The display window

Display	Description	on/blink	Buzzer
0	Ready	on	off
0	Warming up	blink	off
11	Paper out	blink	on
12	Top cover open	blink	off
13	Paper jam	blink	on
14	No toner/drum	blink	on
16	Replace Toner Unit	on	on
17	Replace drum	on	on
18	Nearly out of toner	blink	off
19	Drum is near the end of its service life	blink	off
30.32	Hardware error	blink	off
FF	Form feed	on	off
tP	Test page	on	off

3. The control panel

If more than one problem occurs at the same time, then the most important error number is displayed.

If required, the buzzer can be permanently disabled. Refer to the *Software* section for details.

When the printer is operating normally, the window shows either '0' or the number of pages queued for printing. Normally, the queue will be quite short but will increase if the printer is switched off-line. If a problem occurs and there is a queue, the window will alternate between displaying the error number and the queue length.

The display window is also used when the engine tests are run. These are described in the *Software* section.

0 Warming up

This should change to the READY state within 100 seconds.

11 Paper out

Action: refill the paper tray with up to 100 sheets. Details of this operation can be found in the *Using the printer* section of this manual.

12 Top cover open

Action: close the top cover

13 Paper jam

Action: refer to the *If I have problems* section of this manual. Note that you have to open the lid of the printer before this alarm will cancel.

14 No toner/drum

You have forgotten to fit either one of these two items or the Waste Toner Bottle.

16 Replace toner

The supply of toner is exhausted and must be renewed. Also, remember to replace the Waste Toner Bottle. If this is not done, then this message will continue to be displayed. Details of this operation can be found in the *Using the printer* section of this manual.

17 Replace drum

The Drum Set is life-expired and must be replaced. Details of this operation can be found in the *Using the printer* section of this manual.

18 Nearly out of toner

You can print up to 50 sheets more before the toner is used up. If you are printing sheets with graphics or heavy text, then the toner may be used up earlier.

Action: refill or replace the Toner Unit. Details of this operation can be found in the *Using the printer* section of this manual.

19 Drum is near the end of its service life

The Drum Set will need replacing within the next 100 printed sheets. You can continue printing until the drum is life-expired.

Action: replace the Drum Set. Details of this operation can be found in the *Using the printer* section of this manual.

30 to 32 Hardware errors

These errors may denote a fault with the internal hardware. They may also signify a temporary disturbance caused by switching transients from other electrical equipment. Such a transient is produced when the Archimedes is powered-on. You should, therefore, always switch on the Archimedes before the printer.

3. The control panel

If such a message appears, then press the *RESET* switch on the printer.

If this does not clear the message, then briefly switch off the printer. Should the message persist after switching-on again, then your printer has a serious fault. It requires attention from a trained technician.

FF/tP Form feed & test page

These are purely informative displays; no action is needed.

4. Using the printer

This section of the manual covers the everyday use of the LaserDirect. It describes the following:

- the print margins
- loading paper
- printing single sheets or envelopes
- refilling with toner
- replacing the Drum Set
- clearing paper jams
- cleaning

The print margins

The LaserDirect printer requires margins around the edges of the paper for gripping and feeding. This means that you cannot print on the entire surface of the paper. You have to allow a top margin of 5.0 (± 2.5) mm and a left-hand margin of 8.5 (± 2) mm. The printable area on the sheet depends upon paper size and can be found in the *Specifications* section.

The A4-size master pages in Computer Concepts' Impression document processor allow adequate margins.

Loading paper (paper tray)

There are no catches to release; just lift the paper tray up and then out. Remove it fully from the printer. The tray can hold up to 100 sheets of paper. (There is a maximum-load mark on the printer tray to show when the tray is full). If you are printing labels, then the tray should be only half-full. (Again, there is a maximum-load mark to help you).

Before inserting new paper, lightly fan out the paper to separate the sheets. Discard any sheets that are creased or folded. Ensure that the sheets are lying flat and square in the paper tray. Also, ensure that the two

4. Using the printer

metal clips at the front of the tray are on top of the paper (fig.10 shows this). Replace the paper tray; you will feel it drop into place when correctly positioned.

Printing single sheets or envelopes

You can print on paper of up to 120 gsm by feeding individual sheets using the single-sheet feeder (located at the rear of the printer).

Insert the sheet of paper (or envelope) into the single-sheet feeder face-up. **Lightly** feed the sheet into the slot until resistance is met. The sheet is now ready to be printed. To avoid misfeeds, ensure that the paper is not inserted at an angle.

If you want to print only one sheet (or envelope), then you can simply insert it into the single-sheet feeder. The printer will detect it and use it in preference to the paper tray. If you want to print several, individually-fed sheets, then refer to the *Software* section of this manual. Otherwise, after printing the single sheet, the printer will restart feeding from the paper tray.

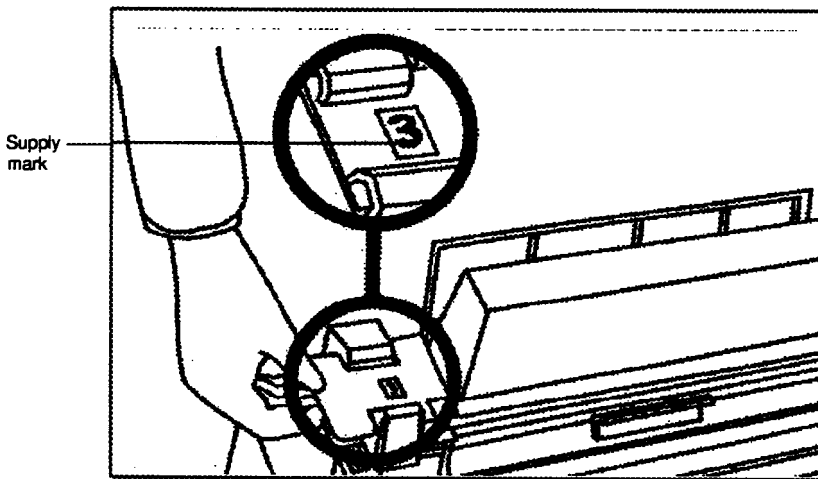


Fig 12: Toner Unit check.

Refilling with toner

Fig.1 shows the toner parts and may aid identification.

On the Toner Unit is an indicator showing usage. If 1, 2 or 3 is displayed, then the Toner Unit can be refilled with toner. If a red mark is displayed, then the Toner Unit is life-expired and must be replaced. Fig.12 shows this indicator.

Instructions on these tasks are detailed in the *Getting Started* section of this manual. Full instructions are also included with the Toner Unit kit.

When either refilling or replacing, there are other parts to be replaced at the same time. The necessary parts are supplied with Toner Unit kits and so do not need to be ordered separately.

If you **refill** with toner, also replace the Waste Toner Bottle. Do not attempt to reuse waste toner – it will give poor print results.

If you **replace** the complete Toner Unit, also replace the Fuser Cleaner and the Waste Toner Bottle. You will also have to fill the Toner Unit with toner.

Be careful when replacing the Fuser Cleaner; the fuser is very hot.

Replacing the Drum Set

The printer should be turned off when replacing the Drum Set.

Refer to the *Getting Started* section for details on how to fit the new drum. Instructions are also included with the Drum Set package.

Clearing paper jams

Fig.13 shows the various areas of the printer where paper may become jammed.

Open the printer to locate the jammed paper. You may have to remove the Drum Set and Toner Unit. It is worthwhile checking that paper is seated correctly in the paper tray. If paper repeatedly jams, then refer to the *If you have problems* section of this manual.

The alarm message in the Display Window is cancelled by opening the lid of the printer.

Paper jammed in the paper conveyer

Refer to fig.14.

Your hands will get dirty if you touch any printing on paper jammed in this area.

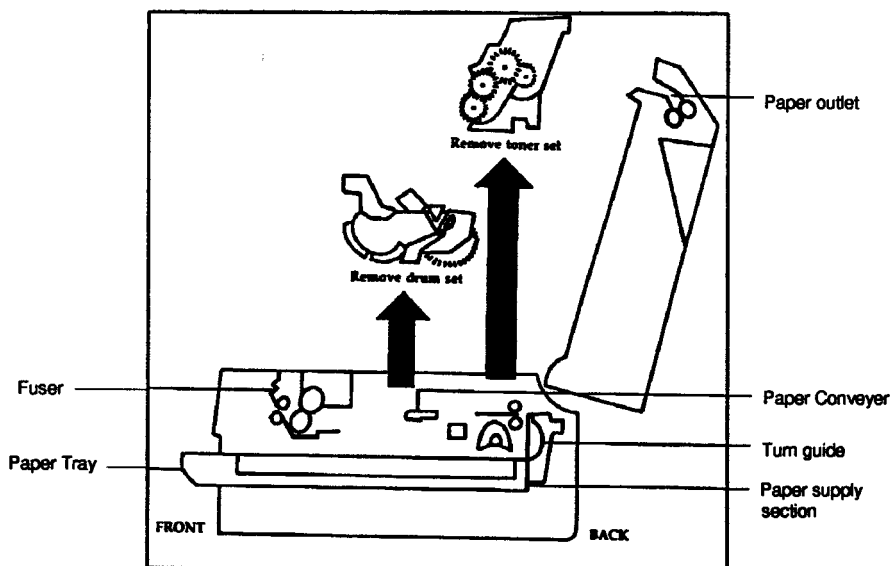


Fig 13: Checking for paper jams

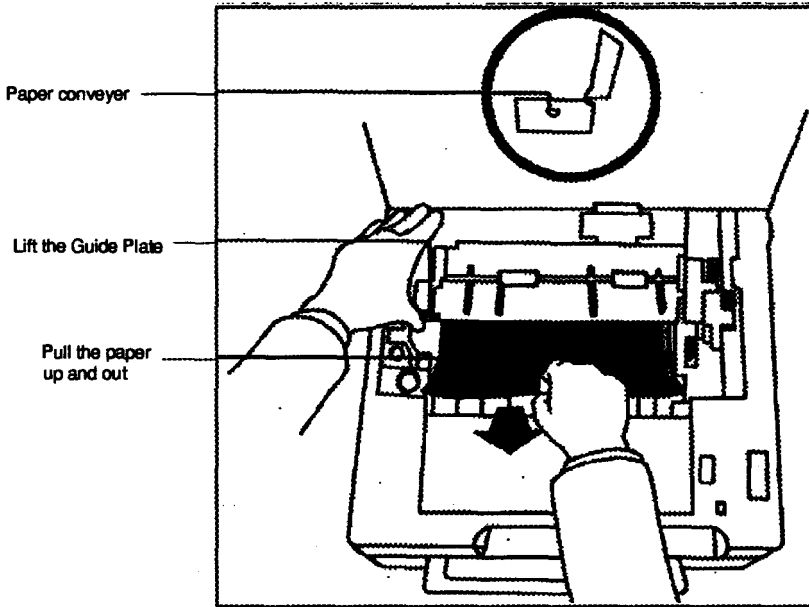


Fig 14: Paper jam in the Paper Conveyer

If the paper has entered the fuser, pull it out from that area. If the paper is beneath the guide plate, lift the guide plate to pull out the paper.

Paper jammed in the fuser

The fuser is very hot. We recommend that the printer is switched off and allowed to cool down before removing jammed paper.

Open the fuser unit cover (marked 'hot surface') and remove the jammed paper.

Paper jam in the paper outlet

Pull the paper out either forwards or backwards.

4. Using the printer

Paper jam in the Paper supply section

Open the turn guide and remove the paper. If the paper is particularly difficult to remove, take out the paper tray first.

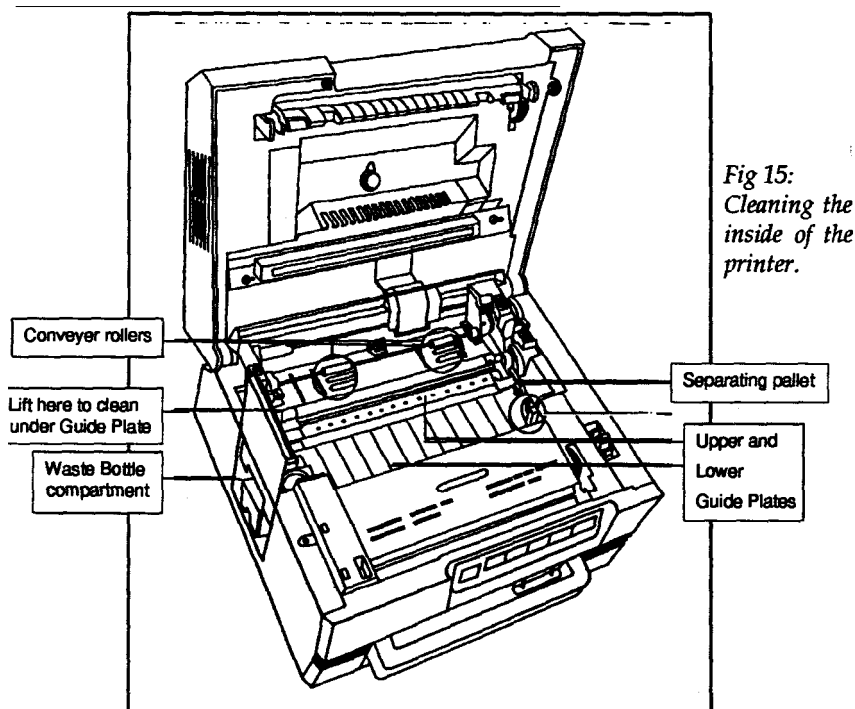
Cleaning the LaserDirect printer

Any spilt toner can be wiped away with a damp cloth and then wiped again with a dry cloth.

Never use solvents or similar chemicals.

Cleaning the outer case

Use only water or weak detergent solution. Wipe the case with a damp (not wet) cloth to maintain its appearance.



Cleaning inside the printer

Always turn off the printer power before cleaning the internal parts.

Fig.15 shows the areas to be cleaned.

Take out the Drum Set, Toner Unit and the Waste Toner Bottle. Clean the surrounding areas thoroughly.

There are three additional areas that need regular cleaning to maintain peak performance:

- the LCS head dust protection glass
- the transfer corona wire
- the charging corona wire.

Clean these areas with the process cleaner supplied with the Drum Set. It only takes a few minutes to clean these areas.

Cleaning the LCS head dust protection glass is shown in fig.16.

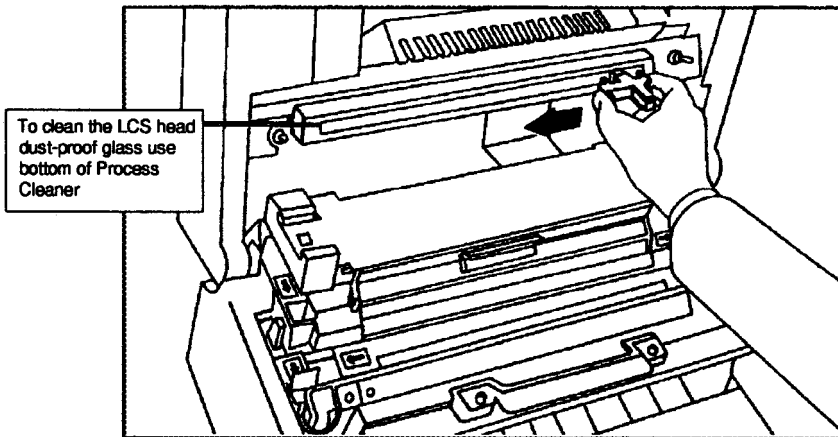


Fig 16: Cleaning the LCS Head

4. Using the printer

Set the process cleaner on the transfer corona wire and gently move it in one direction. (You will need to remove the Drum Set). See fig.17.

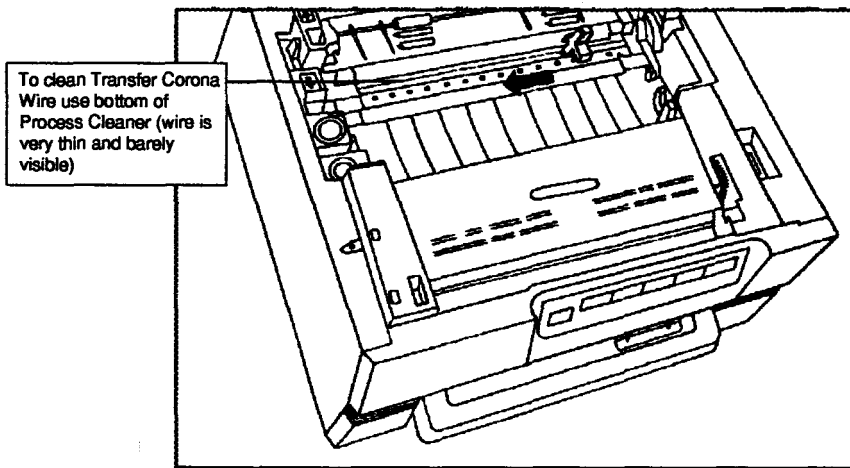


Fig 17: Cleaning the Transfer Corona Wire

Slide the top of the process cleaner into the slot located on top of the Drum Set. Clean the charging corona wire by gently moving the process cleaner. Plastic pegs either side of the process cleaner will locate it securely. See fig.18.

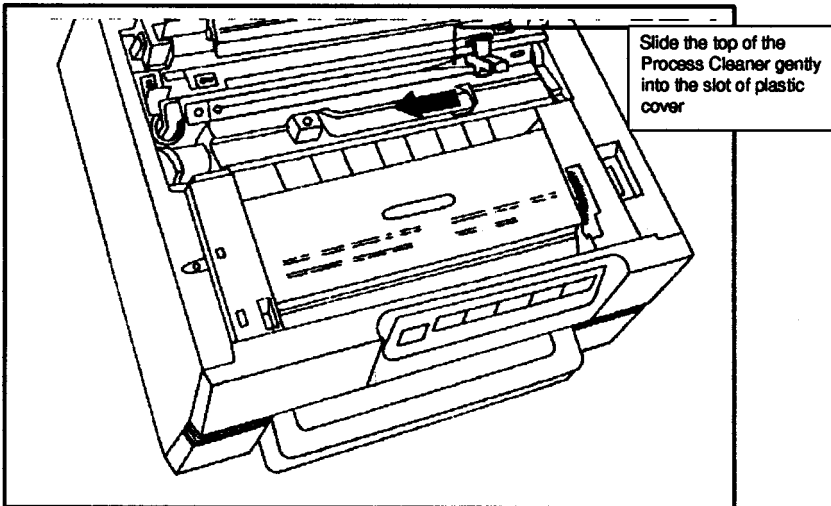


Fig 18: Cleaning the Charging Corona Wire

4. Using the printer

5. Software

This section describes how to print text files, select the various print options via menus, and use the configure commands.

Note:

Many application programs suggest increasing the size of the Font cache when printing. When using the *Quick text* option (described later), this is unnecessary and the Font Cache size can be left at its usual, screen-use size.

Printing files

You can print Text, Command, and Obey files by dropping their icons onto the printer icon. You can also do this with files created by LaserDirect printing-to-file (described later). With other file types, the software asks you to confirm that you want them printed as plain text.

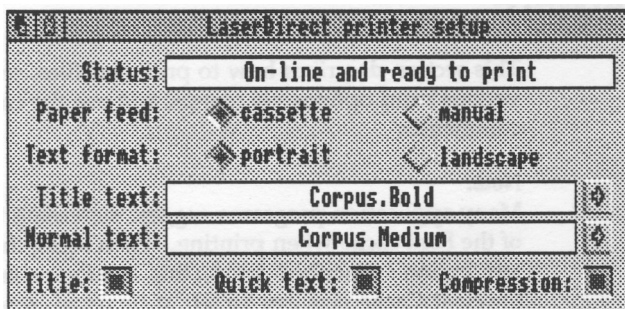
The software tells you if there is not enough spare memory for printing. You then have the option of either continuing when memory becomes free (by you quitting other tasks) or abandoning the print task.

Print options

The print options are controlled by clicking on the printer icon. Using the **SELECT** button brings up a dialogue box to set the operating options. The **MENU** button brings up a menu to send data to the printer or to a file, and to run the in-built printer engine tests.

SELECT dialogue box

Functions marked § only apply when printing text files dragged onto the LaserDirect icon. These functions are ignored when printing from within an application program.



Status

This displays the current status of the printer. Normally, the message **Laser READY** is displayed showing that the printer is ready for printing. This box also displays if the printer is off-line or if an error has occurred.

Paper Feed

You have the option of using either the paper tray at the front of the printer (**cassette**) or the single-sheet feeder at the rear (**manual**).

If you want to print one page via the single-sheet feeder, then you can leave the setting at **cassette**. The printer will detect the paper in the single-sheet feeder and use that in preference to the paper tray. If there is more than one page to print, then the subsequent sheets are taken from the paper tray. This feature is useful if you have, say, a three-page letter to print. A sheet of headed paper would be loaded in the single-sheet feeder and continuation paper in the paper tray. The printer would then print the first page on the headed paper and the other two pages on the continuation paper.

If you want to print several sheets via the single-sheet feeder, then you should select **manual**. The printer will

wait for each sheet to be loaded before printing. The paper tray is not used with this option selected and should be removed.

Text format (§ text printing only)

This is used to control printing of documents where the file is dragged onto the printer icon.

portrait (§ text printing only)

The pages are printed full-size. The paper is orientated with the long sides vertical (the same way as this manual).

landscape (§ text printing only)

The pages are reduced by approximately 33% and printed two on a sheet. The paper is orientated with the long sides horizontal.

Title text (§ text printing only)

Normal text (§ text printing only)

Clicking the **menu** button over either of these two boxes gives a menu of available fonts. This allows you to set the print style for your document.

Title (§ text printing only)

Select this if you want a title line on each page printed. The title line reports: page number, file name, date, and time.

Quick text

Select this to use the optimised text-rendering routines included in the printer driver (rather than those supplied by the Acorn font manager). These optimised routines are much faster and require a smaller font cache.

When using this option, you can ignore the advice commonly given in manuals about increasing the size of the Font Cache when printing. The Font Cache can

be left at its normal size; the software makes any necessary adjustments when rendering a page.

The switch allows these routines to be disabled should this become necessary in the future. This would be required if, for example, Acorn produced a new version of their font manager with a new font format.

Compression

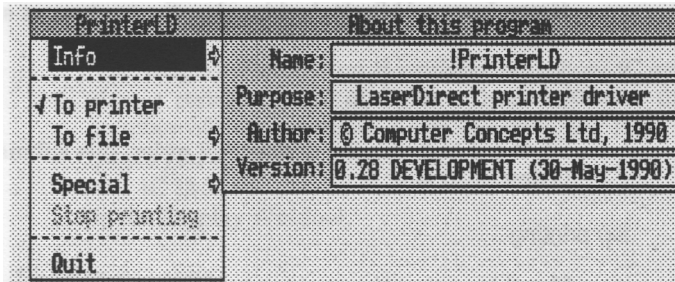
Using the data compression techniques has the following advantages:

- in a 2Mb Archimedes, at least two pages can be queued ready for transfer instead of one uncompressed,
- the processor is available for other tasks between bursts of page processing

It has the following disadvantage:

- because the compressed data has to be reformed before it can be sent to the printer, there is a constant software overhead. Thus, there is a slight additional delay between pages.

Which option is selected is mainly a matter for personal preference. We suggest using **compression** on a 2Mb Archimedes and **no compression** on a 4Mb machine.



Main menu

Info

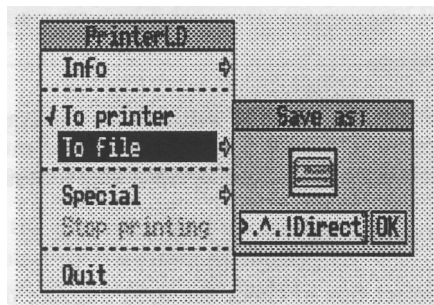
This is the standard *About this program* information. A sample display is shown above. The *Version* box contains the software version number. This number may be required if you call the Computer Concepts' help desk.

To printer

To file

Output can either be sent directly to the printer or to a file.

If output to file is selected, then you can specify a directory path and file name. You can also drag the file icon to the required destination. Saving to file is useful if you have little available memory. This may be because of either the number of tasks currently running or a single memory-intensive task.



If you have a 1Mbyte Archimedes, then you must save to file.

Special

So as not to break the descriptive order, this submenu is described later.

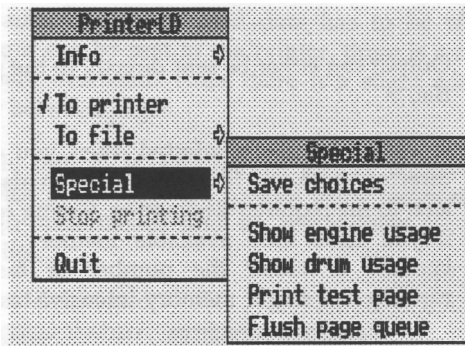
Stop printing

Use this option if you want to abort the printing of a document. Any pages queued will still be printed unless flushed using the **Flush page queue** option in the Special sub-menu.

Quit

This is the standard option to quit the printer driver.

Special submenu



Save choices

Store the current settings for: output device (file/ printer), output file name, paper orientation (portrait/ landscape), and text options (e.g. font name).

Show engine usage

Select this to check the total number of pages printed

by the engine.

The Display Window on the printer will show **tC** and then a series of pairs of digits. These digits are the number of pages printed. As an example, for 123,456 pages you would see the sequence

tC 12 34 56

in the Display Window.

Show drum usage

Select this to check the number of pages printed since the current Drum Set was installed.

The Display window on the printer will show **dC** and then three pairs of digits. These digits are the number of pages printed on the Drum Set. As an example, for 12,345 pages you would see the sequence

dC 01 23 45

in the Display Window.

Test page

Select this to print a single page of test pattern. The Display Window on the printer will show **tP** whilst the page is being printed. Test pages can also be generated from the printer's Control Panel.

Rush page queue

Any pages stored awaiting printing will be flushed from memory. This is useful if, for example, you want to restart printing a document on different paper.

Configure commands

There are four commands to configure the printer:

- set the automatic start-up option
- to start-up the driver manually
- to set the size of printer buffer

- enable/disable the buzzer.

Use the standard command **Status** to show the current settings of these options. If you are unsure about how to use **Status**, refer to the Archimedes' *User Guide*.

Automatic start-up

Syntax: ***Configure Desktop_PrinterLD <0/1>**

With **0** automatic start-up is disabled.

With **1** automatic start-up is enabled. The printer drivers automatically load at power-up or reset. The printer icon will appear on the icon bar.

Manual start-up

Syntax: ***Desktop_PrinterLD**

This command starts-up the printer drivers if they have been disabled with

***Configure Desktop_PrinterLD 0.**

Printer buffer size

Syntax: ***Configure PrinterLD_Buffer <size>[K]**

This sets the maximum size of buffer claimed by the printer for page rendering. **<size>** is the memory size claimed in Kb and is rounded up to a 256Kb boundary (400K rounds up to 512Kb). **[K]** is optional and is ignored by the software.

A value of **0** (numeric zero) has a special meaning. It sets the printer buffer to use 75% of available memory.

Alarm buzzer

Syntax: ***Configure PrinterLD_Buzzer <0/1>**

0 disables the alarm buzzer

1 causes the alarm buzzer to sound when there is a fault condition and operator attention is needed.

6. If you have problems

Nothing's happening ...

Is the Power light on?

If not, then is the printer switched on?. Is plugged into the mains? Is the fuse in the mains plug o.k.?

Is the printer on-line?

If not, then press the **on-line** switch.

Is there a status message in the display window?

If so, then refer to the *Control panel* section to determine what action is required.

Has the interface cable to the Archimedes fallen out?

Replace it. To stop it happening again, secure the cable with the clips and screws on the mating connectors.

A sheet of paper has got jammed ...

Refer to the *Using the printer* section as to how to remove jammed paper.

The paper keeps jamming ...

Take the paper tray out and ensure the paper is stacked squarely and is not creased or otherwise damaged. Check that you haven't overloaded the paper tray. (There are maximum-load marks on the side of the paper tray to help you).

The paper may be damp or to the wrong specification. If this could be the case, then try fresh paper. (It is a good idea to keep a small reserve of high-quality paper to try when you have problems like this)

6. *If you have problems*

Did a sheet of paper get damaged while being printed?
You may have left a small piece of paper inside the printer. Recheck to make certain.

It's not printing properly ...

Pages are being printed but the final result isn't perfect. There are a number of possible causes but each shows distinctive symptoms. Find which of the following list describes your particular problem and then take the recommended action(s).

Replacing parts and cleaning are described in the *Using the printer* section. (When cleaning the corona wire is suggested, remember that there are two such wires: **charging** and **transfer**. Clean the correct one.)

Dirty background

Adjust the density control (located on the left of the printer).

Printing isn't dark enough

1. Adjust the density control.
2. Clean the transfer corona wire (use the special cleaning tool).
3. The paper could be damp - try some fresh paper.
4. You could have condensation inside the printer. Switch off and wait for the condensation to clear.
5. The LCS head glass could be dirty. Clean it using the process cleaner tool.

White lines across the image

1. The LCS head glass could be dirty. Clean it using the process cleaner tool.
2. There could be dirt or dust in the Toner Unit -

replace it.

Dirty patches

Clean the inside of the printer. (Remember to switch off the power before working inside the printer).

Spots on the page in a repetitive pattern

1. The Drum Set could be scratched - replace it.
2. If this does not cure the problem, then the fuser roll is damaged. This requires attention from a trained technician.

Black lines across the page

1. Clean the charging corona wire with the process cleaner tool.
2. If this does not cure the problem, then the Drum Set is scratched - replace it.

Parts of the image are not printed

1. Clean the transfer corona wire with the process cleaner tool.
2. The paper could be damp - try some fresh paper.

White or dark bands along the length of the paper

The Drum Set has been exposed to the light - replace it.

Whole sheet is black or smudgy

The charging corona wire is damaged. Replace the Drum Set.

6. If you have problems

Nothing printed

There is condensation inside the printer. Switch off and wait for it to clear.

If this does not clear the problem, then the transfer corona wire is damaged. This requires attention from a trained technician.

Dirt on the back of the page

Clean the rollers and paper guides inside the machine with a damp cloth.

If the problem persists, then replace the Fuser Cleaner.

Image smears when touched

This means that the image has not been fixed by the heated fuser. This requires attention from a trained technician.

7. Paper and print media

The LaserDirect printer is designed to work with a wide range of papers and also with overhead transparencies. The best results will be obtained using a good grade copier paper of between 60 and 85 grammes per square metre (**gsm**). For normal printing, paper of 75-80 gsm will give good results. Paper of up to 120 gsm and envelopes can also be printed by using the single-sheet feeder.

We recommend that, before the paper is placed in the paper tray, you first fan it to separate the individual sheets. Always take the paper tray completely out of the printer and make sure that the paper is flat and stacked squarely.

If you change the type of paper you use, then you should test a full ream (500 sheets) before bulk purchase.

Always store paper properly as described below. If you follow these recommendations, then you should have no problems with paper jams or misfeeds. However, paper storage and manufacture are beyond our control and we cannot guarantee that paper meeting these specifications will not cause any problems.

Paper storage

Sometimes, even paper that is normally reliable may cause problems if it is has been stored incorrectly or is taken directly from a cold storeroom.

Allow the paper to acclimatise to the room temperature, preferably for 24 hours. This applies particularly if there is a big difference in temperature or humidity between where the paper has been stored and where it is to be used.

Always store the paper in the original wrapping, flat

7. Paper and print media

at 60° - 95° F (15 - 35° C) and a humidity of 40% - 60%.
Never store paper in damp conditions.

Letterheaded paper

You can use pre-printed letterheaded paper in your printer provided that the ink can withstand a fusing temperature of 200°C for 0.1 seconds. Low temperature inks or thermography may offset onto the fuser roller and cause damage. If you are in doubt, then check with your stationer.

Papers to avoid

- Any paper not meeting the specification above
- Extremely smooth or shiny paper
- Coated paper
- Embossed paper
- Highly textured paper
- Damaged or wrinkled paper
- Paper with staples or tabs
- Multipart stationery or carbon paper
- Pre-printed paper using low-temperature dyes or thermography

Labels

You can print on sheets of labels provided that the cut-marks separating the individual labels do not extend to the edges of the sheet. There must be an uncut margin around the edge of the sheet. Fig.19 shows this.

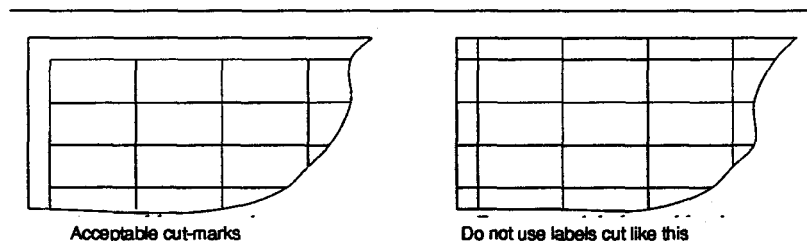


Fig 19: Label cut-marks

7. Paper and print media

If you do use labels cut right to the edge, they may tear when being printed.

Other media

You can print on overhead transparencies and similar media. Use only those designed for use in laser or xerographic printers. Non-laser media may not be able to withstand the high temperatures of the fuser roller and could cause damage.

Suggestion:

Trying to sort out problems with paper misfeeds can be difficult and time-consuming. If you find a batch of paper is especially good, then why not keep some spare? If you later have problems with a different type of paper, then you have some reliable paper to try. Alternatively, buy a ream of high-quality paper (say 90 gsm) for the same purpose. Remember to keep such paper dry and at room temperature.

8. Transporting the LaserDirect

Remember that the LaserDirect contains some delicate parts. Therefore, if you have to transport or store it, then please pack it carefully. See *Important warning at the front of this manual*.

Never move the printer (except for short distances) without first removing the Toner Unit. The Toner Unit contains a loose powder which may get spilt inside the printer. Also, the protective spacers must be refitted. Fig. 20 shows the position of these spacers; fig.21 (which shows their removal) will help when refitting.

1. Open the printer. Remove the Drum Set, the Toner Unit and the Waste Toner Bottle (fig.1 illustrates these parts).
2. Open the fuser cover and install a spacer either side of the fuser. (Allow the printer time to cool down if it has been recently used).
3. Lift the upper guide plate and install protective spacers on either side.
4. Close the fuser cover and the printer lid.
5. Repack in the original packing.

Wherever possible, transport the printer horizontally and avoid excessive vibration.

Returns to Computer Concepts Ltd

If you should need to return the printer to Computer Concepts, then please contact us first on 0442 63933 or fax 0442 231632. Where possible, we will arrange transportation via our own carriers.

Returned printers must be packed in accordance with the above instructions. Please return the mains cable and the interface cable. The Toner Unit and the Drum

8. Transporting the LaserDirect

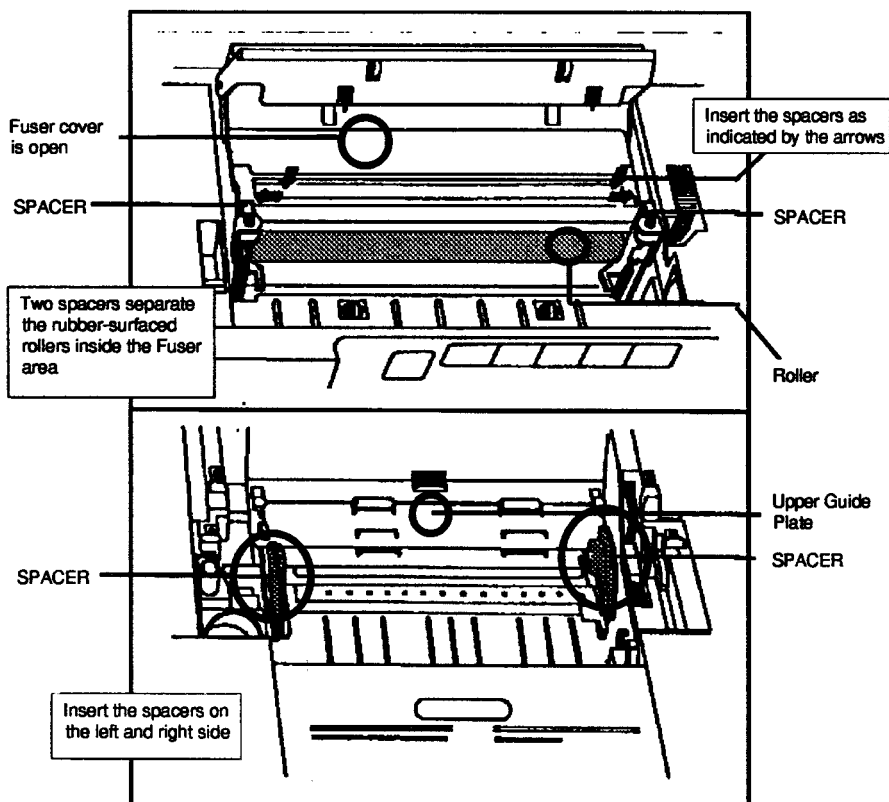
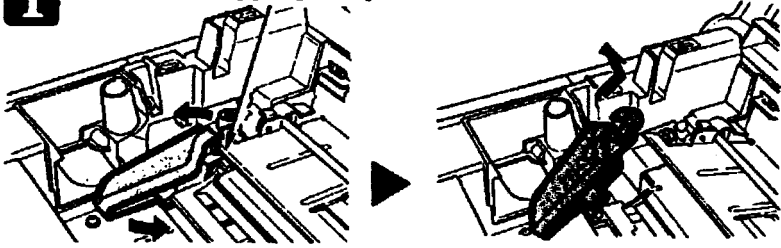


Fig 20: The protective spacers

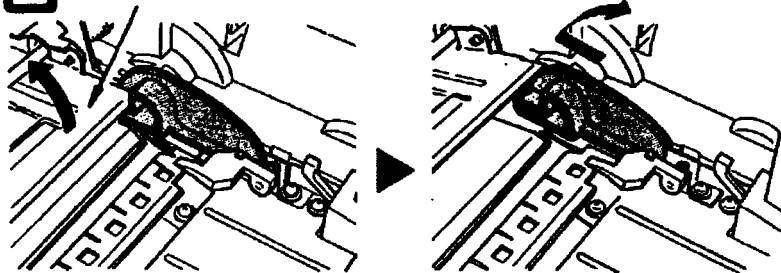
Set should also be returned, separately wrapped, unless we request otherwise.

1 Tab of the upper guide plate



- As shown in the left side illustration, twist the yellow spacer to disengage it from the tab of the upper guide plate. Slide the spacer outward, as shown in the right side illustration, to remove it from the section.

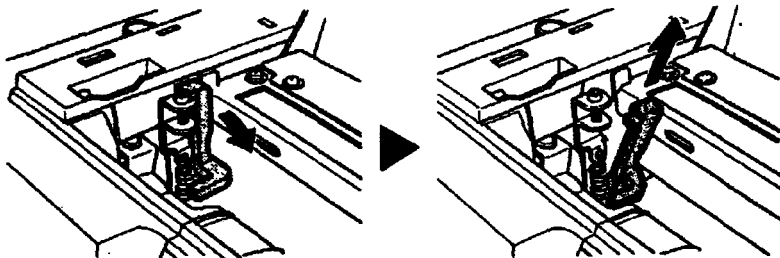
2 Upper guide plate



- With the upper guide plate being lifted up, slide the yellow spacer outward, as shown in the right side illustration, to remove it from the section.

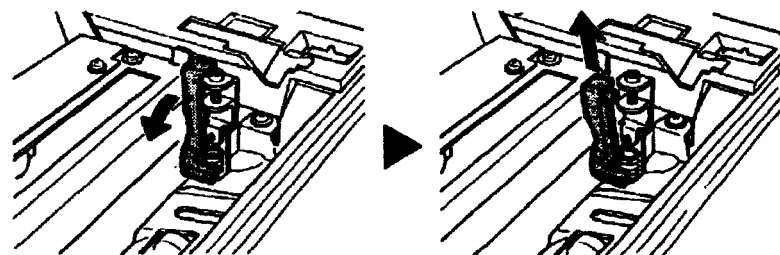
Fig 21: Location of protective spacers

3



- Remove the left hand side yellow fuser spacer by pushing it toward the right.

4



- Remove the right hand side yellow fuser spacer by pushing it toward the left.

9. Specifications

Printing

Printing method: Dry electrophotography using liquid crystal shutter imaging, based upon Casio LCS 130 engine.

Imaging light source: Halogen lamp

Photoconductor: Organic photoconductor (OPC) drum.

Resolution: 300 x 300 dots per inch (dpi).

Printing speed: The printer is ready to print the first page 24 seconds (maximum) after the page has been rendered by the printer driver.

The maximum print rate is nominally six A4 pages per minute during continuous multiple copy printing. (A time of 57 seconds to print 6 pages was measured during tests.)

The printer is considered to be printing continuously when it reaches its highest rated speed (for example, when printing multiple copies of the same page). Aggregate printing speed is affected by the time taken for the printer driver to render the page, for the application to output the data to the printer driver, and other RISC OS-related delays such as font cacheing time. Therefore, even when printing a lengthy document, the printer may not be printing continuously.

Print margins

At top of page (all paper sizes): 5.0 ± 2.5 mm (0.19"±0.098")
Left-hand side (all paper sizes): 8.5 ± 2.0 mm (0.33"±0.078")

paper size dimensions		print area
A4	210 x 297 nun	198.1 x 286.9 mm
B5	182 x 257 mm	171.0 x 246.8 mm
letter	8.5" x 11"	8.06" x 10.6"
legal	8.5" x 14"	8.06" x 13.6"

9. Specifications

Warm-up time

Typically 100 seconds or less at normal temperatures from initial cold turn on.

Physical

Power supply	220/240V 50Hz AC
Power consumption	700 Watts max.
Operating temperature	50°-90°F (10° - 32° C)
Operating humidity	20%-80% relative humidity (non-condensing)
Operating sound level - printing	52dBA, excluding peaks
- idle	47dBA
Weight	17 kg (37 lb)
Dimensions (w x d x h)	15.7" x 13.4" x 9.1" 398mm x 340mm x 230mm

Consumables life

Drum set	20,000 copies (approx)
Toner set	7,500 copies at 5% coverage

Paper and other print media

Paper sizes:
using supplied paper tray - standard A4 (210mmx297mm) using
single-sheet feeder - width 96mm to 218mm (3.8"-8.5") Paper
weight

using paper tray	60 - 85 gsm
single sheets	up to 120 gsm

All media used must be suitable for xerographic printing which involves a brief exposure to high temperature. Transparencies and pre-printed letterheads can be used if able to withstand 200°C for 0.1 second.

10. Consumables

The LaserDirect printer uses standard Qume parts. The following consumables are available either directly from Computer Concepts Ltd or from any Qume printer supplier:

- Toner unit (complete with three toner cartridges and waste bottles)
- Drum set (complete with fuser and process cleaners)
- Alternative sizes of paper trays. Currently available are B5, letter (8.5" x 11"), and legal (8.5" x 14") sizes.

Paper and other printable media can most easily be obtained from your usual stationer.

11. Technical bulletins

We feel that LaserDirect will be useful to other software houses who require the ability to produce laser-quality printed output of graphic and text images. To encourage the integration of software packages with LaserDirect, we can supply a number of technical bulletins.

For availability, please contact:

Technical Department,
Computer Concepts Ltd,
Gaddesden Place,
Hemel Hempstead
Herts.
HP2 6EX
FAX 0442 231632.

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