Issue

1

RA LAMB LIMITED

Slide MicroWriter

Operating Manual

RAYMOND A LAMB LTD.

Slide MicroWriter Operating Manual

Units 4-5 Alder Close • Eastbourne
Phone 1323 737000 • Fax 1323 733000
Email @ralamb.com

Table of Contents

For the Operator

It is recommended that all laboratory staff using the MicroWriter should read the Operator Section of the manual thoroughly.

Hazards such as mains electricity are present within the MicroWriter, the MicroWriter must be switched off and allowed to cool down before opening or removing any of the covers.

The MicroWriter needs no regular servicing but we do recommend an annual inspection that will help to ensure its safety and reliability.

A Service Manual is available* which contains information allowing a service engineer to conduct safety checks and to rectify faults. Unqualified personnel should not undertake such work.

* Please see our website www.ralamb.com

For Your Safety

The equipment you have purchased complies with the 89/336/EEC directive (as amended by 92/31/EEC and 93/68/EEC) and 73/23/EEC (as amended by 93/68/EEC). It has also been produced to meet the standards required by IEC1010 directive and the requirements of the Electrical Safety Code for Hospital Laboratory Equipment (ESCHLE).

The requirements of IEC1010 and ESCHLE ensure that equipment is designed and constructed in a manner, which minimises the risk of electric shock to the operator, offers maximum protection from overheating and provides clear and adequate labelling of both controls and internal assembly.

The equipment needs no regular servicing but we do recommend an annual inspection, as detailed in the manual, which will prolong the life of the instrument and ensure continued safety.

It is recommended that all laboratory staff using the instrument should read Section A of the manual thoroughly.

There are no user serviceable parts inside the MicroWriter, only a qualified service engineer using the instructions given in the Service Manual should make any inspection or maintenance repairs.

The instrument must be protectively earthed. Make sure that it is plugged into a properly earthed mains supply.

The instrument must be on a level and secure surface when in use. It must be possible to interrupt the mains supply at source by removing the plug from the mains supply socket.

If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

This symbol appears in documents to warn that instructions must be followed to ensure correct or safe operation.

General Description

The Slide MicroWriter System has been designed and developed as a means of automating the referencing of Microscope Slides with relevant specimen information.

The Slide MicroWriter provides a secure method of slide identification. It is controlled via an RS232 serial interface making it possible to link the unit to a wide range of computer equipment and Bar Code systems.

The Slide MicroWriter is used with the Dust Extractor Unit which removes dust created during the engraving process.

A feature of MicroWriter is its versatility, particularly with regard to referencing. The operator is permitted to vary the size of character, the number of characters per line and the number of lines. It will be appreciated that the latter two are dependent upon the first. Any alphanumeric reference is reproducible in addition to some special symbols.

MicroWriter is semi-automatic, inasmuch as it is possible to pre-load the 'hopper' with slides and program the instrument to proceed with the referencing process while the operator continues with other duties. Should the unit run out of slides during the sequence, an audible alarm will sound.

After each slide is marked they are ejected into the Collection System. The Collection System features a removable collection hopper and a sprung loaded platform to reduce the distance the slides have to drop.

MicroWriter has a serial interface and can be controlled from any device with an RS232 communications port.

MicroWriter responds to a restricted set of 127 ASCII characters. Special characters are available upon request including foreign languages and customised symbols.

Slide MicroWriter incorporates an engraving tool, which physically writes, on a plotting principle, to produce a reference on a slide.

PLEASE NOTE:
The best slide marking results are achieved when SuperFrost colour end coded slides are used as the Engraving Tool merely removes the coloured coating leaving clear glass beneath.

The Slide MicroWriter will mark plain glass or frosted slides but this requires the Engraving Tool to be sharp and the unit printing at the slowest speed. Frequent Engraving Tool changes will be necessary.

Cautionary Notes

DO NOT	Use solvent solutions to clean the surfaces of the MicroWriter
	Balance any objects on top of the instrument
	Remove any covers from the instrument before switching off at the mains electricity supply
	Force any moving parts if resistance is felt

DO	Switch off the MicroWriter when not in use
	Treat the instrument with respect, it is a sensitive piece of equipment
	Read the contents of this manual to fully acquaint yourself with the equipment
	Contact us if you have any query regarding the equipment, its operation or the contents of this manual

IT IS RECOMMENDED THAT

Equipment is disconnected from the mains when not required for use in the event of mechanical damage to the power cable or instrument, the apparatus should be checked by a service engineer before use.

A trained service engineer should only undertake repair work

GOOD HOUSEKEEPING

Slide MicroWriter has few parts that move and of those that do, the movement is minimal. The life span, therefore, should be quite extensive. By way of routine cleaning, etc, there is little that the operator can do except: Clear away dust or debris which could either prevent the MicroWriter's parts moving or, air circulating through the case.

The Dust Extractor requires regular checking to ensure that the filter bowl is emptied when necessary.

Note: If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

Cleaning

a) As required the casing may be wiped using minimal quantities of mild domestic detergents or polishes on a soft cloth.
b) Ensure the instrument is disconnected from the power supply before cleaning.

Note:
In the event of liquids being spilt on or inside the instrument, the equipment should be checked by a qualified service engineer.

Before using any cleaning method except those recommended by the manufacturer, users should check with the manufacturer that the proposed method will not damage the equipment.

Chapter 1

Operator Section

1.1 Unpacking the MicroWriter

Before unpacking the MicroWriter first check the container for damage and report any if necessary to the shipping agent.

The MicroWriter is supplied in a carton designed to protect it during shipping. Additional packing is added between the Engraving Assembly and the Chassis to lock the Stylus in position; this prevents damage from shock movement.

To unpack the MicroWriter:

Open the outer carton and take out the foam packing spacer, lift out the inner box containing the MicroWriter; remove the MicroWriter from the box and plastic bag.

Figure 1

Remove the stylus packing. (See Figure 1)

1.15 Unpacking the Dust Extractor

IMPORTANT NOTE:

During transit it is essential that the vacuum pump inside the casework is secured using the Transit Plate. The Transit Plate must be removed and replaced with the Cover Plate provided before operating the unit.

To Unpack The Dust Extractor:

The Dust Extractor is packed in a similar carton to the MicroWriter. Open the outer carton and take out the foam packing spacer, lift out the inner box containing the Dust Extractor; remove the Dust Extractor from the box and plastic bag.

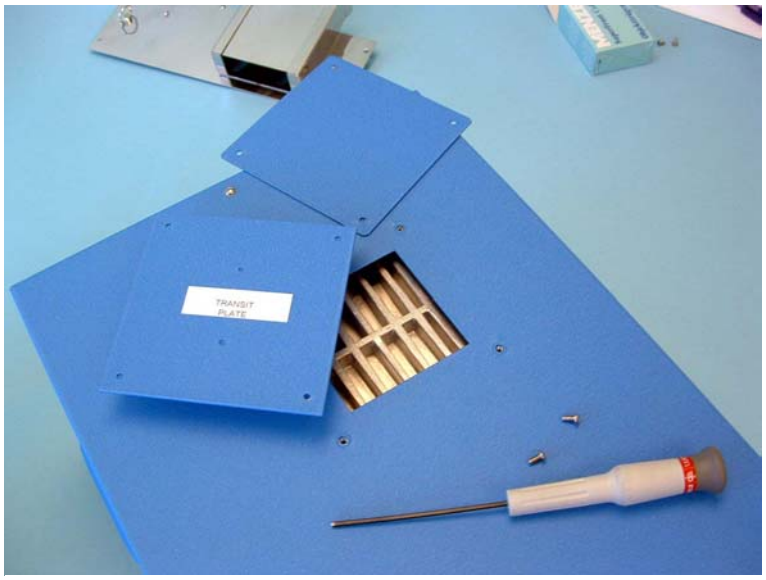

Figure 2

Remove Transit Plate (see Figure 2) using a 2mm hex key and replace with Cover Plate.

1.2 Connecting the MicroWriter and Dust Extractor

Before connecting the MicroWriter to the mains supply it is essential to check for any damage to the unit and the Mains Cable, if any damage is found DO NOT CONNECT the mains supply. Ensure that all packing material has been removed (see1.1) particularly from around the Stylus.

Check the Mains Cable is the correct type for your region and is not damaged. Please note if you are using your own cable or a custom made cable it is essential the cable has connections for LIVE, NEUTRAL and EARTH.

1. Ensure the Mains Switch (See Figure 5) is in the "0" OFF position.

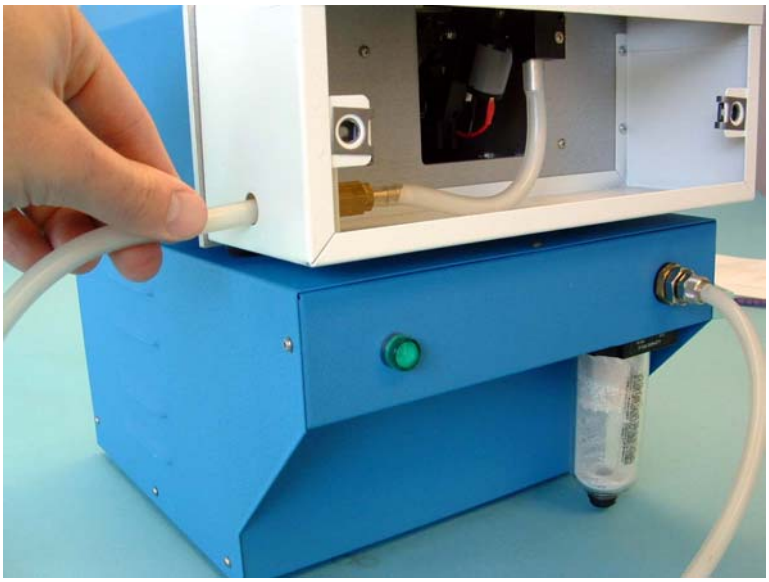

Figure 3

2. Connect the Vacuum Tube from the Dust Extractor to the hose tail connector on the L side of the Slide MicroWriter (See Figure 3).

Figure 4

3. Connect the Dust Extractor / Slide MicroWriter Link cable (See Figure 4). NOTE: Ensure that the Dust Extractor is only connected to the mains supply via the Slide MicroWriter.

4. Connect the Mains Supply Cable to the MicroWriter Inlet Socket first then plug into the Mains Supply Socket.

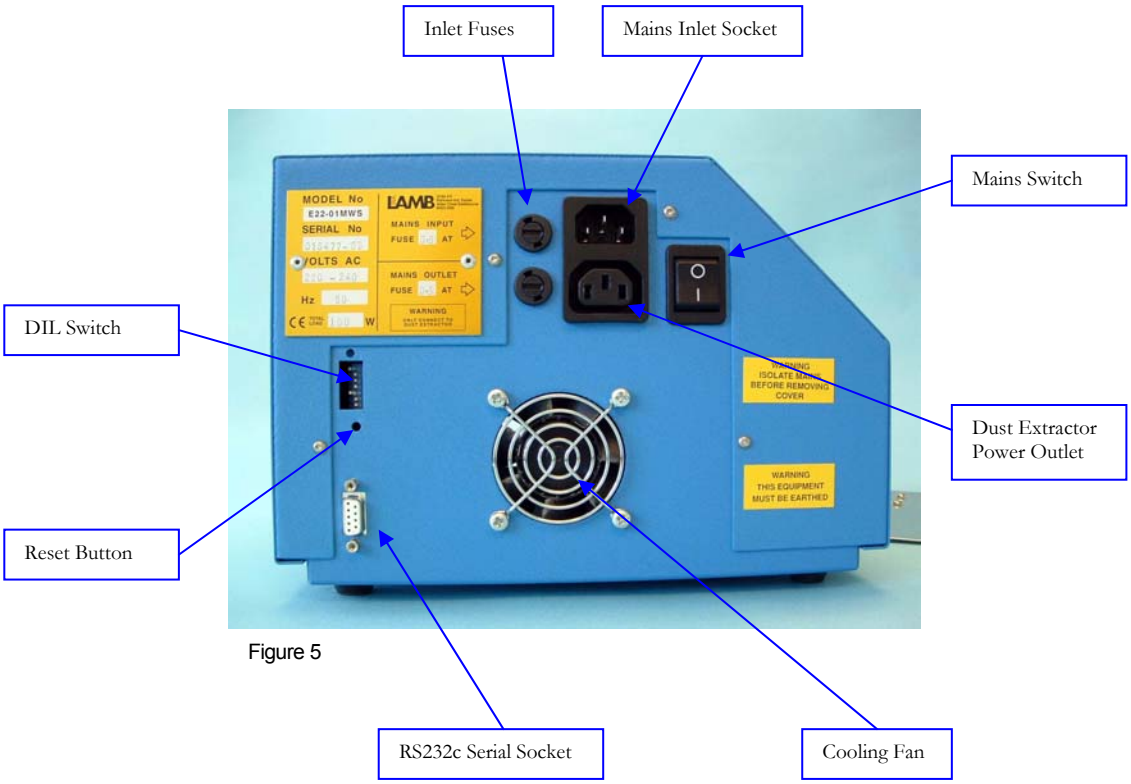

Figure 5

1.3 Operating the MicroWriter for the first time.

The MicroWriter can now be switched on for the first time.

Position the MicroWriter to allow air circulation via the Cooling Fan located at the rear of the main cover.

Before connecting the MicroWriter to your PC / Barcode Scanner it is advisable to check the operation of the MicroWriter using the Self Test Function.

To perform a Self Test proceed as follows:

1. Switch on the MicroWriter.
2. Load the MicroWriter with slides (see section 1.5)
3. If the ERROR light is not shown – Press and hold the ON LINE key and press SELECT key. The MicroWriter will print a test slide if it is OK.

1.4 Connecting to a PC or Barcode Reader.

Commands sent to the MicroWriter are received via the 9 Pin Serial Socket located at the rear of the main cover (see Figure 4) For technical information regarding the Serial Socket please see Chapter 2.

The cable used to connect the MicroWriter to a PC should either be supplied by RA Lamb Ltd. Or custom made to ensure that connections between the two devices are correct. Please note "off-the-shelf" Serial Cables from PC Suppliers are usually not suitable.

If a software package is used please refer to the software manual for installation and operating instructions.

NOTE: The Keypad (located on the front of the Slide MicroWriter) indicates if the MicroWriter is ready to receive and perform commands to print. The ON LINE lamp must be lit for the MicroWriter to receive commands; The SELECT lamp must be lit for the MicroWriter begin to print. Please see Section 2.7 for a full description of the Keypad.

1.5 Loading with Slides

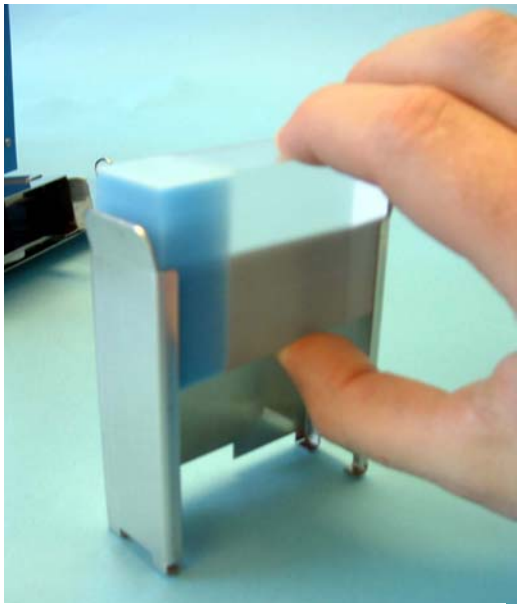

Figure 6

The MicroWriter Hopper is designed to be filled with a full box of Microscope Slides (see Figure 6)

The "painted" surface of the slide should be on the left side of the hopper and facing downwards.

Figure 7

Insert the Slide Hopper into the MicroWriter (see Figure 7) with the open face towards you.

1.6 Engraving Stylus Replacement

The Slide MicroWriter marks the Microscope Slide surface by means of an Engraving Tool tipped with diamond fragments. The diamond fragments will eventually wear down to a level where engraving quality is no longer acceptable. The MicroWriter is designed to allow a tool free replacement of the Engraving Tool. The Engraving Tool is a simple push fit into the Engraving Tool Holder/ Motor Assembly and is kept in place internally using an o-ring. To help prevent tool holder wear an o-ring is also placed over the Engraving Tool to cover the tool holder bearing area.

The Engraving Tool is normally covered by the Vacuum Nozzle, for ease of tool replacement the Vacuum Nozzle is 'hinged' and sprung loaded. The tip of the Nozzle can simply be pulled forwards to access the tool.

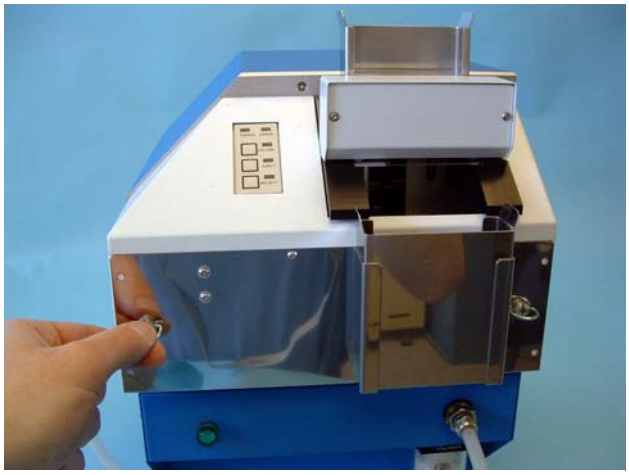

Figure 8

To replace the Engraving tool it is necessary to move the stylus assembly towards the front of the MW. To make things easier it is a good idea to remove the metal front cover plate (see Figure 8), simply turn the two front ¼ turn fasteners.

To move the Engraving Mechanism out into maintenance position:

To replace the engraving tool it is necessary to move the Engraving Mechanism into a position where the tool is accessible. With the MW switched on - press and hold down the ON LINE key and press the EJECT key, the stylus will move forwards allowing access for replacement.

Figure 9

To remove the Engraving Tool pull the Vacuum Nozzle towards you and grip the Engraving Tool (see Figure 9), pull firmly in the direction of the Engraving Tool. If the tool is too firmly in place to move it may be necessary to use a pair of forceps to improve grip, ensure that you only pull in the direction of the Engraving Tool.

Note: Figure 8 view has the cover removed for clarity. It is not necessary to remove the cover.

Figure 10

To replace the Engraving Tool insert the new tool into the tool holder and press into place, you should feel some resistance as the tool makes contact, and passes through the o-ring before it firmly makes contact with the bottom of the hole. To make the tool slide more easily through the o-ring you can very slightly moisten the end of the tool. It is also recommended to support the underside of the Engraving Motor when pressing the tool into place.

Ensure that the Vacuum Nozzle is 'sprung' back into place and the protective o-ring is fitted to cover the tool holder.

To move the Engraving Mechanism back into its normal position:

With the MW still switched on from earlier – press SELECT key; the stylus should move back into the normal 'park' position.

Please Note: The correct 'park' position may not be found immediately because the assembly's position may have been moved when changing the tool. To allow the MW to find the correct position it may be necessary to switch off and on the MW several times until the ERROR light goes out.

Checking Tool Height

Correct tool height should be checked before printing as follows:
With the MW ready to print (slides loaded and the Engraving Mechanism in normal position) the tip of the Engraving Tool should be level with the top surface of the slide in the print position. (see Figure 11)
To adjust loosen the Engraving Assembly screw (see Figure 12) and move motor assembly higher or lower as required. Retighten screw when level is correct.

Checking Vacuum Nozzle Position

In normal use it should not be necessary to adjust the Vacuum Nozzle, however if the Nozzle has moved from its factory set position please follow the guidelines below.
To prevent unnecessary wear to the engraving assembly and ensure effective removal of engraving waste the Vacuum Nozzle position should be checked.
The Vacuum Nozzle position is offset to allow the Engraving Tool to move further to the Left. It is important that any adjustments do not bring the Tool into contact with the Nozzle slot. Nozzle slot clearance should be checked in the printing area because the Nozzle can be pulled out of position by the silicon connection tube in other areas.
The end of the Nozzle should be adjusted to clear the underside of the slide by 0.25-0.5mm.

Printing with a new Engraving Tool

A new Engraving Tool will be very abrasive and engrave very heavily for a few slides until the rough edges are worn off. It is a good idea to print 20 or so slides with a high number of characters so that the tool can wear in. After this period the tool will only remove the painted surface of the slide leaving the shiny glass surface beneath. The result is increased contrast between the engraved and non engraved areas.

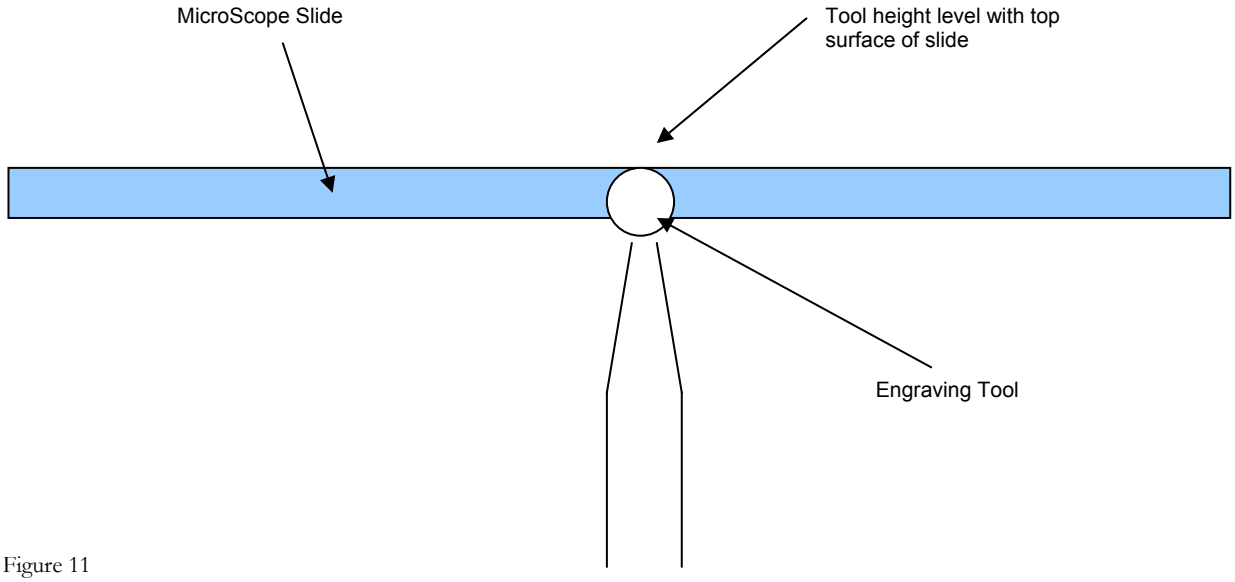

Figure 11

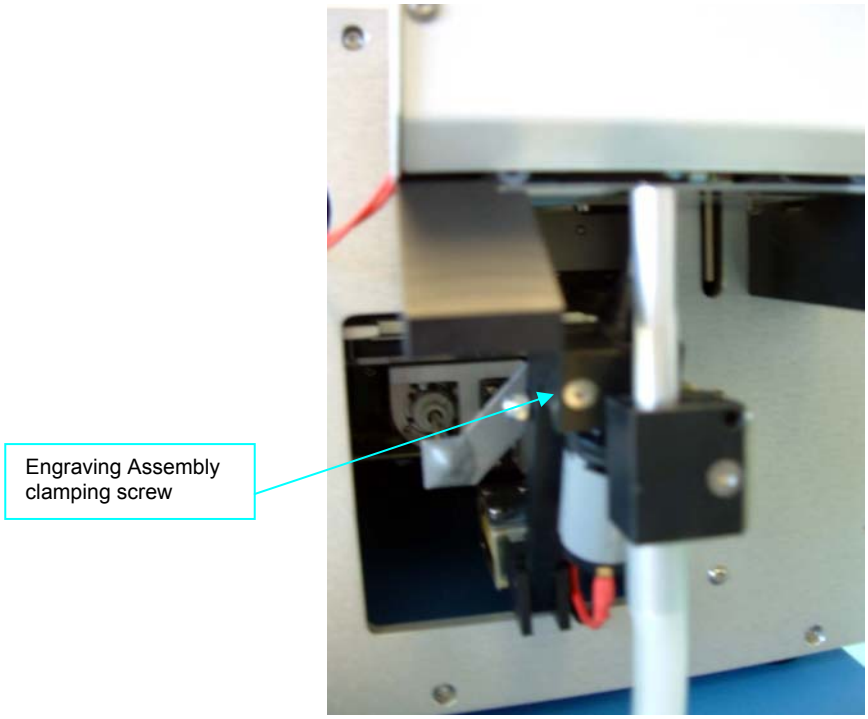

Figure 12

1.8 Dust Extractor Maintenance

Figure 13

The Dust Extractor collects particles created during the engraving process in the Vacuum Filter (See Figure13). The Vacuum Filter Bowl must be emptied periodically to ensure the Dust Extractor operates efficiently; the frequency will depend on the amount of engraving the Slide MicroWriter performs. We recommend that the level of dust in the filter bowl should not be allowed to reach above 10mm.

The Filter Bowl has a "bayonet" style fitting; to remove twist the bowl anti-clockwise until a firm stop is reached, then pull downwards.

To keep the Vacuum Pump working efficiently the Filter Element must be regularly replaced (it can not be cleaned). As with emptying the filter bowl the frequency is dependent upon usage. When the Element appears to be saturated with dust it should be replaced.

To remove the Filter Element simply unscrew the plastic fixing collar.

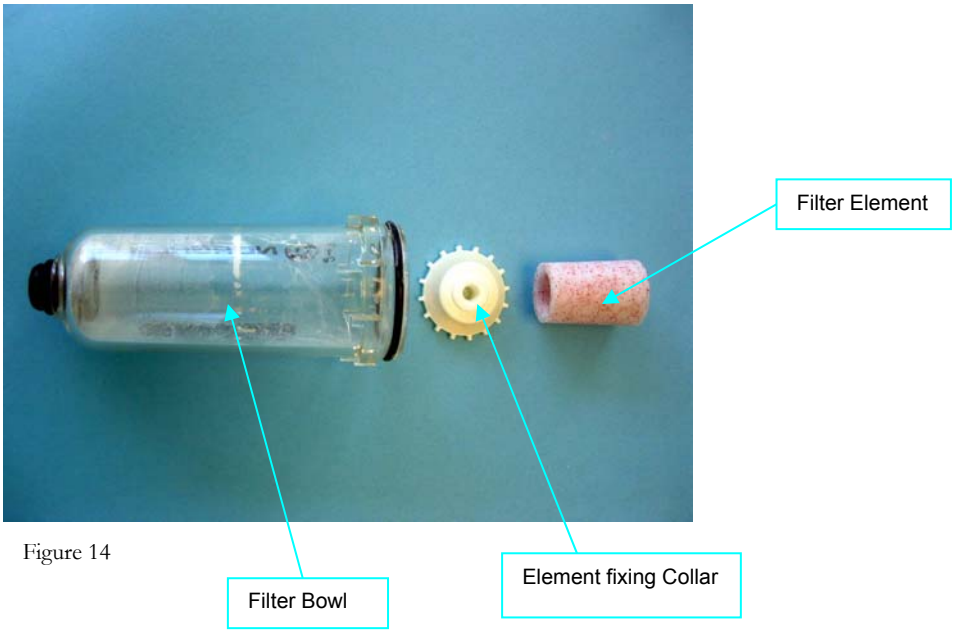

Figure 14

Chapter 2

Technical Information

2.0.1 Serial Interface

MicroWriter connection via Serial Communications Port – RS232c 9 pin D Type Socket

Socket Pin Detail – Pin 2 Receive; Pin 3 Transmit; Pin 5 Signal Ground

Transmission – 9600 Baud; 8 Data Bits; 1 Stop Bit; Odd Parity (No Parity selectable – see 2.2)

2.0.2 DIL Switch Settings

It is possible to customise certain aspects of the MicroWriter's operation using the DIL Switch accessible through the cut out in the rear of the main cover (see Figure 5.) The switches are not intended for daily use and should only be used by personnel familiar with the equipment.

PRINT ORIENTATION – Print can be Normal or Inverted

COMMUNICATIONS – Depending on the method chosen to command the MicroWriter it may be necessary to configure the MicroWriter's serial port. For more detailed information see later in this section.

ENGRAVING SPEED – The normal (slowest) speed is recommended as faster speed reduces the clarity of the engraving.

EJECT SPEED – Normal slide eject or more powerful slower speed (helps if slides are sticking in hopper).

The following chart shows a brief description of the settings available.

DIL Switch Selection Chart

Switch Number	Position	Description
1	On*	Odd Parity
	Off	No Parity
2	On*	Default setting – do not change
	Off	Not used
3	On*	Normal echoing communication
	Off	X-On X-OFF handshaking
4	On	Not Used (test facility)
	Off*	Default Setting – do not change
5	On*	See table below
	Off	
6	On*	See table below
	Off	
7	On*	Normal Slide Eject Speed
	Off	Slow Slide Eject Speed (more powerful)
8	On	Inverted Print
	Off*	Normal Print

* Default factory setting

Engraving Speed Selection

Switch 5	Switch 6	Engraving Speed
On	On	Normal (slowest)
Off	On	
On	Off	
Off	Off	Fastest speed

2.0.3 Summary of Basic Command Codes

$	Code to define the beginning of a command string
#N	New Line
#I	Increment preceding number/ letter
#G*xx*	Quantity (***xx***) of Slides to print
#1 (2; 3 or 4)	Selects Font Size from (1 to 4) for the Characters that follow
CR (carriage Return)*	Code to define the end of the command string and begin printing

*CR, LF, <ret> or <enter>

For a full description of all command codes available please see later in this section.

2.1 Control Functions

The machines are controlled by software that communicates with an RS232 interface, normally to an IBM PC or terminal. Data transmission between the printer and the controlling device via the serial interface is at: 9600 baud, 8 data bits, 1 stop bit and odd parity. Parity can be set to 'none' using the DIL switch (see 2.0.2)
A protocol has been developed for describing the labels, or sequence of labels, which are to be written. Machine operation is controlled by 3 console keys, while usage of each machine is personalised by 8 DIL switches. All these facilities are described in the following paragraphs.

Labels comprise up to 156 characters for Slide MicroWriters. In practice 60 characters should be more than adequate for real applications. Characters are written in four fonts, controlling their size. Font 1 is large to font 4 is small. Font 2 is the default when the machine is powered up, but when a new font is selected this remains in force until the next change command is issued, possibly many Slides later. It is possible to mix fonts on the same label. See the protocol function '#f ' (2.2) for details.

A label may comprise more than one line of text, with rules as described for the protocol command **'#N'**.

2.1.1 Communications Protocol

a.) Labels (and commands) are defined by the text input between a **'$'** which resets the input and output streams and <enter> which indicates the end of label, and initiates writing if the machine is ready. Comment lines of text without the **'$'** character are ignored.

b.) Labels (and commands) are terminated by either a 'carriage return' CR or 'line feed' LF character. Either character is echoed as CR LF. The common CR LF combination is treated as a termination character followed by a blank comment line, which is ignored.

c.) The text may comprise digits, 0 -9; letters A -Z; ' . / * + - ( ) -#' characters ; and a number of 'special ' characters, with effects listed below.

d.) All characters 00H to FFH (0 to 127) are recognised and converted through the Font EPROM. At present any characters not described here are converted into spaces.

e.) Any characters which would be written outside the normal area are suppressed.

f.) 5 special characters are recognised, these are:

Shape	Key to press
Dot in a circle	; (semi-colon)
Upward arrow	, (comma)
Downward arrow	[(open square bracket)
Left arrow	] (close square bracket)
Right arrow	' (apostrophe)

g.) Five 'foreign' characters are allowed, although their ASCII codes are above the normal limit of 127.
Lower case versions are written as upper case.

Character	Upper Case	Lower Case
Ä ä	142. 8EH	132. 84H
Å å	143. 8FH	143. 86H
Æ æ	146. 92H	145. 91H
Ö ö	153. 99H	148. 94H
Ü ü	154. 9AH	129. 81H

Incrementing these characters by '**#I**' or '**#J***n*' commands is not meaningful. Sometimes another of these characters is generated (add 1 to the decimal or hex values in the table above) but mostly the resulting characters are not recognised by the MicroWriter, and are therefore ignored.

h.) Various control sequences, introduced by a '**#**' character may be included within the label text, with the following effects.

The control letter may be typed in upper or lower case. '***f*** ', '***n***' and '***nn***' represent numeric digits as an identity number or count.

i.) If the character following '**#**' is not recognised then the '**#**' is ignored and the character is written. This allows '**##**' to be typed for a single '**#**' in the label.

2.2 Positioning and size of label text

#*f* Font selection. The numeric digit '***f*** ' identifies the selected Font.
Fonts 1 to 4 are defined, ranging from large characters to small.

Font	Slide
1	2 line of 8 characters
2	4 lines of 13 characters
3	6 lines of 16 characters
4	7 lines of 19 characters

The font selection can be changed anywhere within the text of the label and as often as desired. The effective Font at the end of a label remains effective at the start of the next label.

#N New line. Calculates the position of the top left hand corner of characters on the next line down on the label. The next character is positioned as far to the left as possible, while avoiding the space occupied by any larger Font characters already included. This calculation takes no account of any '**#U***nn*' or '**#D***nn*' commands.

2.2.1 Positioning of Stylus

#U*nn*	Up. Adjusts the current writing position upwards by ***nn*** x 0.1mm.
#D*nn*	Down. Adjusts the current writing position downwards by ***nn*** x 0.1mm.
#L*nn*	Left. Adjusts the current writing position to the left by ***nn*** x 0.1mm.
#R*nn*	Right. Adjusts the current writing position to the right by ***nn*** x 0.1mm.

The orientation of Up, Down, Left and Right, in the above commands, corresponds to reading the label as printed, regardless of the 'Inverse Writing' option.

2.3 Sequence Numbers or Codes and Label Repetition

#I Increment. Positioned after a number or code causes the preceding character to be incremented after writing. If the character was '9' it is made '0', if it was 'Z' or 'z' it becomes 'A' .In any of these cases the next preceding character is also incremented in the same way, until the start of the line is reached. A space character + 1 becomes 1.

#J*n* Left increment. Start from the character '***n***' positions left of the #, and increment it in the same way as for '#**I**' above. If the character was '9', 'Z' or 'z' adjust it and increment the next character to the right.

#G*nn* Go. When typed anywhere in the label text this command will write '***nn***' labels, with increments as defined by '**#I**' commands.

2.4 Flow Control

#W Wait before writing. When this command is included anywhere in the label, the label text is echoed as usual but writing is not initiated. The user may initiate writing, after checking the echoed text, by typing '**$**<enter>', '**$#G**<enter>, or '**$#G***nn*<enter>'.

Note that when XON/XOFF handshake flow control is selected from the DIL switch 3 there is no echo of the labels or commands, so this facility is not relevant in this case.

2.5 Status Requests

The following commands are complete lines of text and do not contain any label information.

$#T**<enter> Responds with the machine Type as **$#T*ab cd ef*<ret> where letters ***a*** to ***f*** are each a hexadecimal digit 0-9, A-F Value 0-15.

ab	DIL Switch S2 (PCB edge) setting byte. B0 = SW1 to B7 =SW8
c	Carousel position sensors reading. Note: Not fitted to Slide MicroWriter, will read F.
d	Stylus Heater Rotary Switch S3 position (temp. setting Note Stylus Heater not used)
ef	DIL Switch S4 (PCB middle) setting byte. B0 = SW1 to B7 =SW8

$#S<enter> Status request. This command returns a report on the current MicroWriter status. This action does not affect memory of the current or last written label, but does destroy any pending label received. The returned status comprises:

8 character Serial No. unique to this MicroWriter
The first character is 'S' for Slide MicroWriters
1 Character Hopper No. normally 'space' for the Slide MicroWriter.
5 Character status R (space) L J E. Each character position contains a letter (as below) to show that the relevant status is effective, or a space character if not.

'**R**'eady to receive the next label, possibly while writing the previous one.
(space)
'**L**'ive if On-Line lamp lit.
e' **J** 'ect lamp lit.
'**E**'rror lamp lit.

1 space character as separator.

A copy of the current or last label, which may be repeated by '**$**<enter>' or '**$#G***nn*<enter>'.

$#Q<enter> Responds with the current total Quantity of cassettes printed (counter begins at 10000.)

2.5.1 Stop or Continue Label Sequences.

$<enter> Sets or reduces the repeat count to 1. This has the effect of stopping a '**#G***nn*' sequence of cassettes or slides after the current one is completed, or producing one more copy, with appropriate '**#I**' or '**#J***n*' action as specified, if the previous label sequence is already complete.

$#G**<enter> Has the same effect as '**$<enter>' above, except that any '**#G***nn*' command in the previous label is allowed to initiate a further sequence of '*nn*' labels, while continuing numbering by '**#I**' and/or '**#J***n*' commands.

$#G*nn*<enter> Initiates a sequence of '*nn*' (from this command) copies of the previous label.

$#C<enter> Cancel any '**#G***nn*' sequence of labels, after completion of the current label. Do not initiate a new copy of the previous label.

2.6 Control Panel Key Simulation.

$#K*a*<enter> Simulates key actions as from the front panel of the MicroWriter. Acceptable values for the letter '***a***' (upper or lower case) are as follows:

'E'	Eject current slide. Not effective if the unit is already in the 'ejected' position.
'L'	Load slide. Not effective unless the unit is in the 'ejected' position.
'C'	Select (ready) Mode (simulates SELECT Key.)
'R'	Reset. Reset MicroWriter as if powered off and then re-started.

2.7 The Front Panel Keys and Lamps

a.) The front panel comprises 5 lamps and 3 keys. The **'POWER'** lamp is lit whenever there is power connected to the unit. The remainder are under software control.

b.) The **'ERROR'** lamp. This lamp is normally used to indicate when no slide is found in the Loading Hopper, although it will also be lit if the writing mechanism fails to return to its 'park position' within a set time.

c.) The **'ON-LINE'** key and lamp.
When the MicroWriter is 'ON-LINE' with this lamp lit, it is allowed to receive command and label data from a PC or terminal etc. and will respond to them. When it is 'Off-line' it will ignore input with the exception of the following commands: **$#S**<enter>; **$#Q**<enter>; **$#T**<enter>; **$#K*a***<enter>; **$#C**<enter>; **$#R**<enter>.
The ON-LINE key toggles the status and therefore the lamp state.

d.) The **'EJECT'** key and lamp.
When the EJECT key is pressed during normal running of the MicroWriter, the current slide is completed and ejected.

e.) The **'SELECT'** key and lamp.
The SELECT Lamp indicates that the MicroWriter is ready to receive commands* and print slides. The SELECT key returns the MicroWriter to this mode after the EJECT key has been used or an error encountered (such as run out of slides).
*(It is necessary for the SELECT and ON LINE lamps to be lit)

2.8 Self Test Label

Holding the ON-LINE key pressed while pressing the SELECT key causes the MicroWriter to enter a self test mode which loads a specific label from the Fonts EPROM, as if it had been received from the Communications Port. This exercises all the stepper motors and solenoids to write a slide.

A slide must be in the printing position for the Self Test to perform correctly.

Note that the ON-LINE lamp is toggled when it is pressed, and may need to be reset by pressing the ON-LINE button to receive data.

2.9 Engraving Mechanism Out For Maintenance

Holding the ON-LINE key pressed while pressing the EJECT key drives the Engraving Mechanism forward, for easy inspection. When the EJECT key is pressed following this action, the Engraving Mechanism is returned to its normal position.

Chapter 3

WARRANTY/GUARANTEE

Please complete the warranty card enclosed in your package and return to Shandon Lipshaw to register your unit for coverage under our one-year limited warranty.

Those customers outside the U.S. do not have to return the warranty card, as the distributor in their region will handle the warranty.

This warranty covers manufacturing defects due to materials or workmanship
for a period of one year from the date of the invoice. It does not cover problems resulting from:

Unauthorised repairs
Misuse or failure to follow user instructions
Accidents or lack of proper maintenance

Disclaimer

Except for the express warranty set forth above, no other warranty, either expressed or implied and including a warranty of merchantability and fitness for a particular purpose, has been or will be made by or on behalf of the manufacturer or the seller or by operation of law with respect to the equipment and accessories or their installation, use, operation, replacement or repair or any services provided by or on behalf of the manufacturer or the seller.

Seller's liability to buyer in the even of loss or damage due to breach of contract, breach of any warranty or for negligence, strict liability or other tort, or other causes or otherwise shall be limited to the return of the purchase price and shall not include special, indirect or consequential damages arising out of, resulting from, or in any way connected with the equipment and accessories or their installation, use, operation, replacement or repair or any services provided even if seller is advised of the possibility of such damages.

No agent, employee, or representative of the seller, unless authorised in writing by an officer of the seller, has authority to bind the seller to any affirmation, representation, promise or warranty concerning the equipment and accessories or their installation, use, operation, replacement or repair or any services provided.

For instructions on how to obtain warranty service, call our Service Department. Please have the serial number, the part number and the operating voltage of your unit ready. The sole obligation of Shandon Lipshaw under this warranty shall be to repair or replace any product it delivers which is found to be defective.

SHANDON LIPSHAW
171 Industry Drive
Pittsburgh, PA 15275

Specification

Physical	Height (without Hopper) Width Depth Weight	26.0cm 26.5cm 29.5cm 9.3 Kg
Hopper Capacity	72 slides	
Serial Interface	'D' Type 9 pin connector (socket) RS232c 9600 Baud 8 Data Bits 1 Stop Bit Odd Parity (No Parity is selectable)	
Electrical	Voltages Frequency Power	115V a.c (~) 230V a.c (~) 50 / 60 Hz 100w
Fuses - Slide MW	Mains Cable plug Mains Input Socket Transformer PCB F1 (Internal Fuse) Mains Distribution PCB (Internal Fuse)	F5A 240V (where applicable) 230VAC Supply T1.25A H250V 115VAC Supply T1.6A H250V T5A L250V 230VAC Supply T1.25A H250V 115VAC Supply T2.5A H250V
Fuses – Dust Extractor	Mains Input Socket	230VAC Supply T1.25A H250V 115VAC Supply T2.5A H250V
	Note: Fuses should only be replaced after checking for possible fault.	
Switch convention	**I** **O**	Power On Power Off
Environment	General Temperature Humidity Altitude Pollution Installation Category	Indoor use only +5°C to +40°C 80% max. for temperatures <31°C 50% max. for temperatures <31°C to 40°C (Non condensing environment) up to 2000m 2 as defined in IEC1010 II as defined in IEC1010