
PSION SERIES *3a*



Service Manual



Service Manual

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Note



The PSION Series 3a contains CMOS devices that may be damaged by electro-static discharge (ESD). The following steps to minimise ESD must be taken before the unit is dismantled. To prevent any damage that could result if the unit or its parts are not handled properly, observe the following precautions during any handling procedures:

- ?? Minimise all handling of static-sensitive components and assemblies.
- ?? Transport and store static-sensitive components and assemblies in their original containers or in anti-static bags.
- ?? Label accordingly any package that contains static-sensitive components or assemblies.
- ?? Discharge static electricity from the body by wearing a grounded anti-static wrist strap while handling these components. Servicing static-sensitive components or assemblies should be done only at a static-free work station by qualified service technicians. Increasing the humidity in the work area minimises static electricity problems.
- ?? Do not allow anything that can generate or hold a static charge on the work station surface.
- ?? Pick up components by their bodies, never by their leads.
- ?? Do not slide components over any surface.
- ?? Avoid handling components in areas with a floor or work-surface covering that can generate static charge.

FCC Information for the USA

Radio and Television Interference:

This equipment radiates radio frequency energy and if not used properly - that is, in strict accordance with the instructions in this manual - may cause interference to Radio and Television reception. It has been tested and found to comply with the limits for a Class B computing device pursuant to part 15 of the FCC Rules. These are designed to provide reasonable protection against harmful interference in a residential installation. This equipment can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- ?? Reorient or relocate the receiving antenna.
- ?? Increase the separation distance between the equipment and the receiver.
- ?? If you are using the Series 3a computer with a mains adapter, plug it into an outlet which is on a different circuit from that to which the receiver is connected.

Consult an authorised Psion dealer or an experienced radio/TV technician for help.

This equipment was tested for FCC compliance under conditions that included the use of shielded cables and connectors between it and the peripherals. It is important that you use shielded cable and connectors to reduce the possibility of causing Radio and Television interference. Shielded cables, suitable for the Series 3a, can be obtained from an authorised Psion dealer. If the user modifies the Series 3a or its Expansion Peripherals in any way, and these modifications are not approved by Psion, the FCC may withdraw the user's right to operate the equipment. For customers in the USA, the following booklet prepared by the Federal Communications Commission may be of help: "How to Identify and Resolve Radio-TV Interference Problems". This booklet is available from the US Government Printing Office, Washington, DC 20402 - Stock No: 004-000-00345-4.



Table of Contents

1	<i>Introduction.....</i>	1
2	<i>Circuit Description.....</i>	2
	- Overview	
3	<i>Troubleshooting Guide.....</i>	4
4	<i>Exploded Views.....</i>	5
	- General Assembly	
	- TAB LCD Module	
	- EMC Compliance Modifications	
5	<i>Spares Kits.....</i>	7
	- Individual Assemblies and Components Available Separately	
6	<i>Disassembling The Series 3a.....</i>	9
	- Overview	
	- Tools Required	
	- Disassembly Procedure	
	- Disassembling the Keyboard	
7	<i>Reassembly Instructions.....</i>	13
	- Notes for Reassembly	
8	<i>Final Test Procedure.....</i>	16
	- Overview	
	- Explanation of Tests	
	- Series 3/3a Current Levels	
	- LED Summary	
	- Test Procedure Set Up	
	- Test Sequence	
	- Soak Test Procedure	
	- Software Upgrade Procedure	
	- New Test Hardware	
9	<i>Final Test Unit Modification History.....</i>	24
	- Test Unit - Modification Level	
10	<i>Warranty.....</i>	25

Introduction

The purpose of this service manual is to give an overview of the service procedures that may need to be performed on the Psion Series 3a by either a third party user or a registered Psion service centre. It has been designed to be used by the service and repair technicians who have the responsibility of maintaining the products.

~~✍~~ ~~A~~ *Note: References will be made in these instructions to the Series 3a user manual, Psion p/no: 6103-0085.*

Since the UK launch of the Series 3a in July 1993 many features of the product have undergone modification. This manual will attempt to reflect these modifications and reference where necessary what changes have taken place. One of the major changes to the Series 3a occurred during the last quarter of 1995 when the product was modified to improve compliance to the following EMC directives:

EN55022 1987: *Limits and Methods of Measurement of Radio Interference of Information Technology Equipment.*

EN50082-1 1992: *Generic Standard Part 1 Residential, Commercial and Light Industry.*

These modifications enabled the Series 3a to legally display the CE mark - . CE approved Series 3a's can be verified by this mark which is clearly displayed on the product label. It is very important to ensure that non-CE approved Series 3a's do not receive CE mark labels during the servicing process.

The Series 3a uses both conventional component and high-density surface mount component technology which requires specialist servicing techniques. We therefore recommend that repairs are carried out at a *circuit board* level, rather than at *component* level. We also encourage service centres to carry a small buffer stock of replaceable components, to allow immediate exchange, should they need to be replaced.

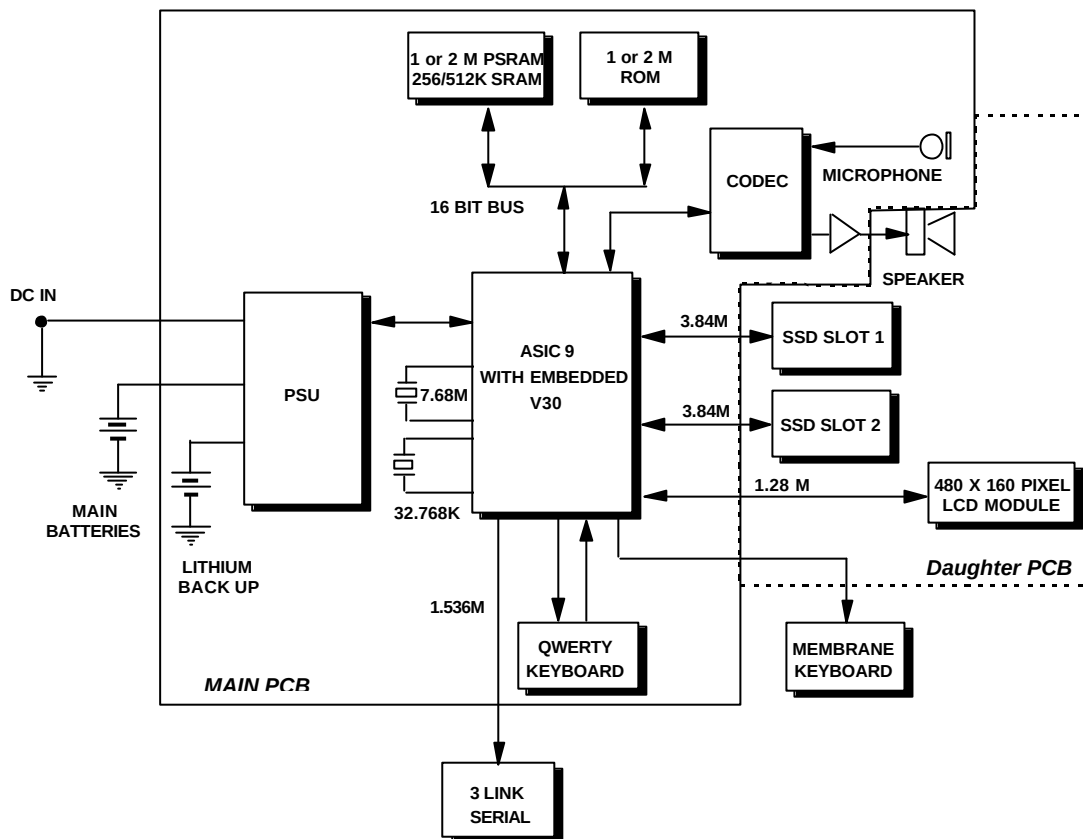
Although a final test unit is not essential to service a Series 3a, it is recommended. The final test unit is used within Psion during the manufacturing process to run a final check on the assembly. When a Series 3a is connected to the final test unit test code is downloaded into the machine via the comms interface. The test program can then be run to exercise the LCD, keyboard, membrane, SSDs, switches, comms door, speaker and microphone. Operating, idle and standby current consumption can also be measured. This can be extremely valuable to investigate or diagnose a reported problem. In addition, once a repair has been completed, a full test can be run to ensure that the repair has been carried out correctly and that no other fault has been introduced during the servicing procedure.

The Psion button on the Series 3a can be used to operate combination key presses. Refer to the user manual - page 5 for a detailed explanation of these functions. For example, Psion - X refers to pressing the Psion and X keys simultaneously, which will exit the running application.

~~✍~~ ~~✍~~ ~~A~~ *Note: The information enclosed in this document is confidential and should therefore only be released under a non-disclosure agreement.*

Circuit Description

Apart from the row and column drivers on the LCD display module, all of the Series 3a active circuitry is contained on a single PCB. This includes the power supply, processor, memory and I/O logic (refer to the block diagram below). This PCB has provision for 256k or 512k bytes of static RAM; or 1Mb or 2Mb of pseudo static RAM; with the operating system contained in 1MB or 2 Mb of ROM. All frequencies used by the system are derived from a single 7.68MHz crystal oscillator, with the exception of the real-time clock which is generated from a 32.768kHz watch crystal oscillator.



ASIC9 is a 176 pin QFP standard cell ASIC which contains all the core electronics, these include :

- ?? V30HL micro-processor core
- ?? Bus controller
- ?? LCD controller
- ?? CODEC serial interface
- ?? 16 bit timers
- ?? Watch-dog timer
- ?? Address and I/O protection
- ?? CPU clock generation and halting
- ?? High speed synchronous protocol controller
- ?? Real time clock
- ?? PSU control
- ?? Keyboard interface
- ?? 32.768 KHz and 7.68 MHz oscillators

The PSU circuitry provides the following functions :

- ?? Programmable supply rails
- ?? DC to DC converters
- ?? Battery monitoring

The Series 3a operates from its own battery supply or from an ac/dc adapter. When the latter is plugged-in it takes over from the internal battery source.

A daughter PCB provides interconnections between the main PCB and LCD Module, membrane switch assembly/ SSDs and speaker.

All PCBs previous to version 4.0 support only -ve bias voltage LCD modules. Rev. 4.0 and above PCBs support both -ve and +ve bias voltage LCD modules, depending on a build option. Positive bias voltage boards can be identified by a '+' in their serial number. Negative LCD modules must not be connected to +ve bias voltage PCBs, or the LCD module will be damaged. Positive bias LCD modules may be identified by a '+' on the flexible interconnect close to the end which plugs into the daughter board.

The Series 3a uses a 1.536MHz serial link, similar to that used for the internal SSD slots, as a general purpose expansion connection to enable communication with a variety of different expansion devices such as the 3-Link serial interface and the 3-Link parallel printer interface. These devices contain an ASIC which converts the synchronous protocol to the protocol appropriate for the interface they are connected to, as well as any required voltage conversion and buffering circuitry.

Fault	Cause	Cure
?? Unit appears dead	1. Main PCB failure 2. LCD failure 3. Daughter PCB failure	1. Replace the main PCB. 2. Listen for key clicks as the LCD may be dead but the main PCB could still be functional. Check battery or DC supply. 3. Test the main PCB by using another LCD and daughter PCB.
?? Membrane keys not responding.	1. Membrane failure 2. Daughter PCB failure 3. Main PCB failure	1. Replace the membrane. 2. Replace the daughter PCB. 3. Replace the main PCB.
?? Dead on main batteries	1. Dead batteries 2. Battery cable failure 3. Main PCB fault	1. Replace the main batteries. 2. Replace the battery cable. 3. Replace the main PCB.
?? No sound and/or incorrect sound	1. Daughter PCB failure 2. Main PCB fault	1. Replace the daughter PCB. 2. Replace the main PCB.
?? LCD lines missing	LCD fault	Replace the LCD module.
?? Unit incapable of writing to flash SSD	1. Daughter PCB fault 2. Main PCB fault	1. Replace the daughter PCB. 2. Replace the main PCB.
?? Unit not recognising expansion port	3. Expansion Door Switch 4. Main PCB fault	1. Check that switch contact is in place and is functioning correctly. 2. Replace main PCB
?? Unit constantly resets	Main PCB fault	Replace Main PCB
?? Unit not reading SSD's	5. SSD fault 6. Door switch fault 7. Daughter PCB fault 8. Main PCB fault	1. Check unit updates lists on door close (door switch may be out of place) 2. Replace the daughter PCB 3. Replace the main PCB
?? Keys not working	9. Keymat split 10. Membrane fault 11. Main PCB failure	1. Replace the keymat 2. Replace the membrane 3. Replace the main PCB

Before commencing service procedures on a Series 3a check for the following:

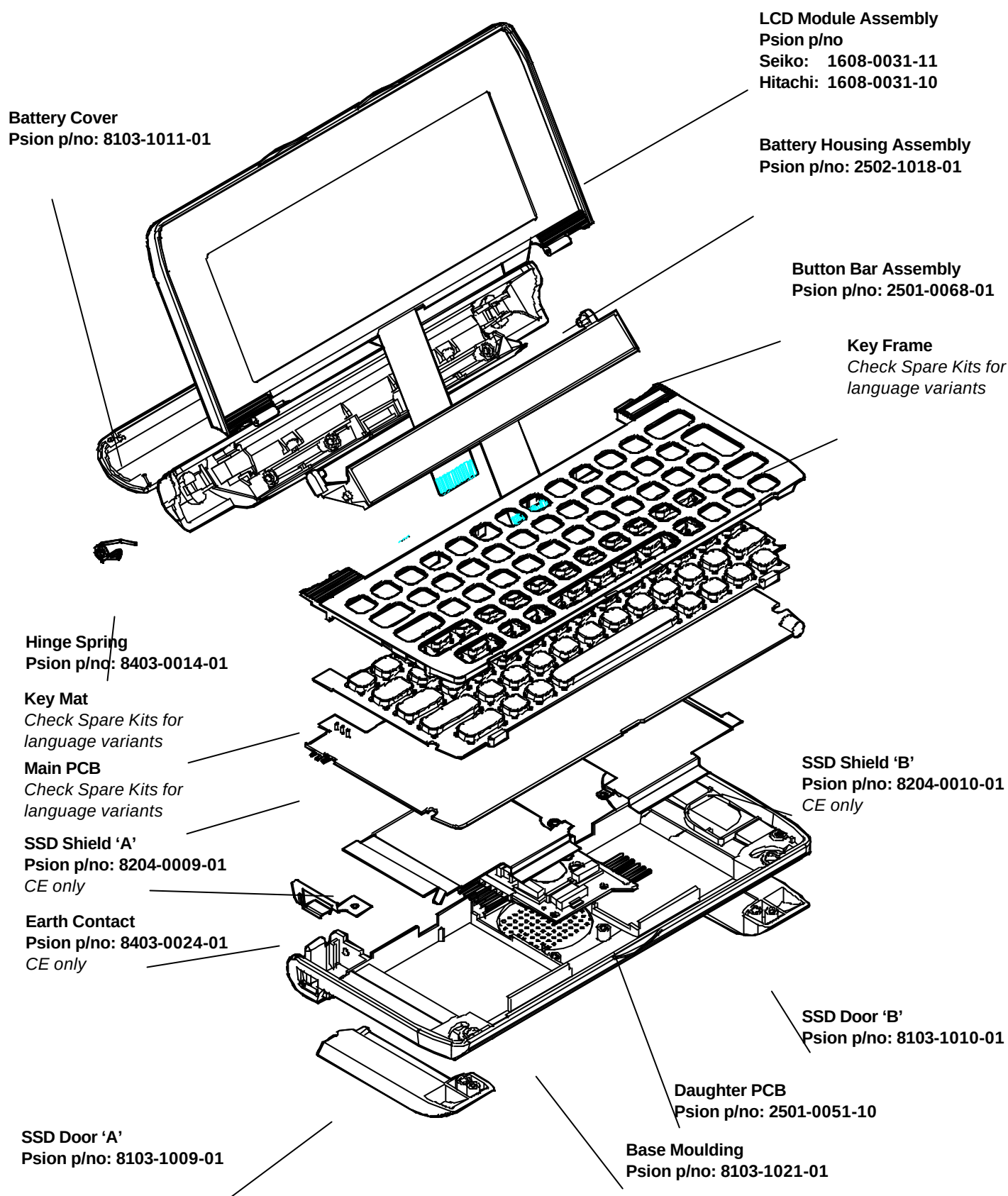
?? Broken warranty label.

?? Corrosion.

It is important to note that units can occasionally experience a software crash, which can be rectified by enacting a soft reset; see User Guide page 244. However it is possible that a crash can be caused by an intermittent hardware fault, and therefore it is advisable to fully test any unit that has experienced a crash. Faults such as failure to read SSD's, links, power supplies or batteries can be caused by the peripherals themselves and these faults should be determined only using Series 3a's that are known to work. Some brands of batteries are shorter in length than the European average and as such can give poor contact, which can result in the unit giving incorrect low battery warnings. Also, re-chargeable batteries have a very low usage time and as such can give the false impression that the Series 3a is draining them too quickly.

Exploded Views

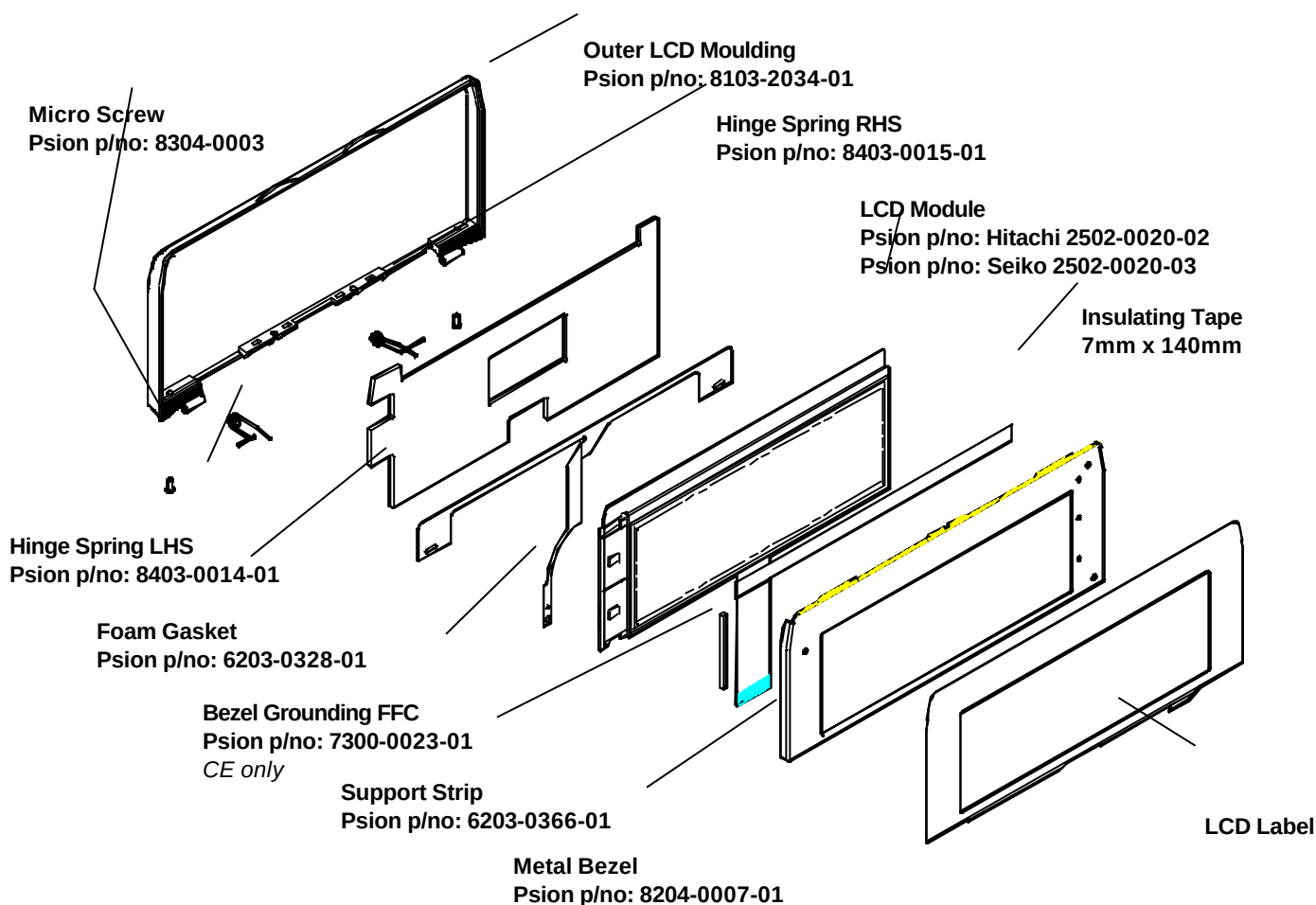
The following illustration shows the general assembly of a CE approved Series 3a dismantled into replaceable sub-assemblies.



TAB LCD Module Assembly.

The following diagram shows the TAB LCD Module full assembly including the bezel grounding FFC (Flexible Flat Cable) which was added to improve compliance to EMC Directives.

Note: Two LCD versions are offered - Seiko positive polarity, and Hitachi negative polarity. Very few non-English Series 3a's will be fitted with Seiko LCD modules.



EMC Compliance Modifications

There were a number of changes to the Series 3a which took place in November 1995 to improve the product's compliance to the EMC directives that are listed in the Introduction of this manual. These changes specifically were as follows:

A bezel grounding FFC was inserted between the TAB LCD module and foam gasket which makes contact with the metal bezel at each front corner to conduct any potentially disruptive currents to ground. (The assembly procedure for the TAB LCD assembly is unchanged). Once the LCD assembly has been snapped into place in the lid moulding, and the micro screws fitted, the FFC must be attached to the metallised inner surface of the base moulding under the daughter PCB assembly. The FFC locates on the left hand side daughter PCB support, and sits between the daughter PCB assembly and the base moulding. Note that the bezel grounding FFC is not required on non TAB LCD assemblies.

The earth contact, shown on page 5 provides connection of frame ground to a 3-Link device connected to the fast serial port on the side of the Series 3a. This prevents the build up of any large voltage differences between the main PCB and ground.

The SSD shield has been split into two halves - 'A' and 'B', which correspond with the adjacent SSD drive door. They are each attached to the metallised base moulding by the daughter PCB securing screws and two conductive labels. As the inner surface of the base moulding has been metallised any potentially disruptive current loops are prevented.

Note: From the 1st January 1996, only 2 piece SSD shields will be available as spare parts, and existing Series 3a's requiring SSD shield replacement should therefore be retro-fitted with the 2 part shields.

A conductive strip made from aluminium tape has been adhered to the top edge of the key frame moulding. The strip is concealed by the keyboard label.

Generally, these modifications improve resistance to transient currents induced within the product. The changes cumulatively effect EMC compliance, and must all be implemented if the product is to legally display the CE mark. Note that V1.9, V4 and above main PCB's can be used. These components are available as individual spare parts, and can be obtained through Psion PLC.

Spares Kits

The following tables show the listed spares kits that are offered to service centres enabling thorough and complete service and repair work. They have been subdivided into relevant groups to differentiate between the generic kits that supply parts for the servicing of all Series 3a's, and the language and option specific kits which deal with the localised servicing requirements. The spares kits can be ordered by referencing the 1608 part numbers given.

Generic Spares Kits:

The generic kit contains all components that are common to all variants of the Psion Series 3a. It does not contain PCB and LCD assemblies. The battery wire spares kit contains 100 battery wires, and the wooden case set kit contains components that are specific to the special run of wooden case Series 3a's.

Part Number	Description
1608-0021-10	S3a Spares Kit - Generic TAB (CE)
1608-0034-01	S3a Spares Kit - Battery Wires x 100
1608-0033-01	S3a Spares Kit - Wooden

LCD Spares Kits:

The TAB LCD kits contain the relevant components to repair either a TAB LCD machine, or retrofit a TAB LCD assembly to a non-TAB LCD Series 3a.

Part Number	Description
1608-0031-10	S3a Spares Kit Hitachi - TAB LCD CE
1608-0031-11	S3a Spares Kit Seiko - TAB LCD CE
1608-0032-10	S3a Spares Kit TAB LCD - Retrofit

Language Specific Spares Kits.

These contain language specific screen and keyboard labels, plus the relevant outer case Series 3a/Serie 3a logo labels.

Part Number	Description
1608-0022-01	S3a Spares Kit English
1608-0023-01	S3a Spares Kit German
1608-0024-01	S3a Spares Kit French
1608-0025-01	S3a Spares Kit Swedish
1608-0026-01	S3a Spares Kit Italian
1608-0027-01	S3a Spares Kit Danish
1608-0028-01	S3a Spares Kit Spanish
1608-0029-01	S3a Spares Kit Hungarian
1608-0030-01	S3a Spares Kit French-Int.

PCB Spares Kits:

The PCB is an expensive component and as such these spares kits contain a quantity of PCB assemblies only.

Part Number	Description
1608-0053-01	S3a Spares Kit PCB 1MB English
1608-0054-01	S3a Spares Kit PCB 2MB English
1608-0055-01	S3a Spares Kit PCB 1MB USA
1608-0056-01	S3a Spares Kit PCB 2MB USA
1608-0057-01	S3a Spares Kit PCB 1MB French
1608-0058-01	S3a Spares Kit PCB 2MB French
1608-0059-01	S3a Spares Kit PCB 1MB German
1608-0060-01	S3a Spares Kit PCB 2MB German
1608-0061-01	S3a Spares Kit PCB 1MB Dutch, Belgium
1608-0062-01	S3a Spares Kit PCB 2MB Dutch, Belgium
1608-0063-01	S3a Spares Kit PCB 1MB Italian
1608-0064-01	S3a Spares Kit PCB 2MB Italian
1608-0051-01	S3a Spares Kit PCB 256K Acorn PBII
1608-0052-01	S3a Spares Kit PCB 512K Acorn PBII
1608-0065-01	S3a Spares Kit PCB 1M Acorn PBII
1608-0041-01	S3a Spares Kit PCB 512K English
1608-0040-01	S3a Spares Kit PCB English 256K
1608-0043-01	S3a Spares Kit PCB 512K German
1608-0046-01	S3a Spares Kit PCB 256K German
1608-0042-01	S3a Spares Kit PCB 512K French
1608-0045-01	S3a Spares Kit PCB 256K French
1608-0044-01	S3a Spares Kit PCB 512K Dutch, Belgium
1608-0047-01	S3a Spares Kit PCB 256K Dutch, Belgium
1608-0048-01	S3a Spares Kit PCB 512K SW/IT/D/SP/H
1608-0049-01	S3a Spares Kit PCB 256K SW/IT/D/SP/H
1608-0066-01	S3a Spares Kit PCB 256K UK+VE LCD
1608-0067-01	S3a Spares Kit PCB 512K UK+VE LCD
1608-0068-01	S3a Spares Kit PCB 1M UK+VE LCD
1608-0069-01	S3a Spares Kit PCB 2M UK+VE LCD

Disassembling The Series 3a

This section will deal with the disassembly of the Series 3a's two main sub-assemblies - the LCD assembly and the main body assembly. The assembled product is similar to the Series 3, although there are differences; the most significant of which being that if necessary the Series 3a can be dismantled without separating the LCD and keyboard mouldings, and that the unit can be dismantled in the upright position. It is important that the following instructions are followed precisely so that certain points during the procedure are not overlooked. This procedure also explains the differences between early Series 3a's and later models that incorporate changes such as the TAB LCD module and CE Mark modifications.

 *Note: Never apply a CE Marked product label to a non-CE approved Series 3a*

Before commencing the disassembly procedure, be sure to remove any batteries (including the lithium dry cell), and/or SSD's that may be contained within the Series 3a. To remove the lithium dry cell open the SSD door marked 'B' to access the cell and push it inwards, towards the centre of the Series 3a so as to clear the retaining detail in the case moulding. This action pushes the cell against a spring which will in turn push the cell out of its location. Do not use a metallic tool to do this as it may short the cell.



Do not remove both the lithium dry cell and main batteries without first ensuring that the data contained in the Series 3a's internal memory has first been backed up. Removal of both the battery sources, without previously attaching an external power supply, will erase all information stored on the internal memory.

When removing the internal workings from the case, care should be taken not to damage the LCD module. Do not bend the module, as the circuit board is prone to fracturing. If the LCD breaks, be careful not to get any liquid crystal in your mouth or eyes. In the event of any liquid crystal getting on skin or clothes, wash off immediately with soap and plenty of water.

The LCD module is non-user serviceable and has recently undergone substantial re-engineering, and as such it is not recommended that it is disassembled in any way. The changes to the LCD module have been introduced as a result of new construction technology, specifically the use of Tape Automatic Bonding (TAB) technology in the construction of LCD modules. Psion is now building the Series 3a with both Hitachi and Seiko/Tecdis sourced TAB-LCD modules, and these are supplied to service centres as ready-to-fit spare parts kits. Other new parts introduced for this kit include a new LCD case moulding, new profile window label, new design hinge springs (which are dyed blue to help differentiate between old parts), and two extra securing micro screws.

 *Note: The LCD modules fitted to Series 3a's manufactured before September 1995 are no longer available as spare parts kits. The TAB LCD module is supplied ready to be retro-fitted to all Series 3a's in existence.*

The only external visually distinguishing feature of the new LCD is the screen location, which is now closer to the hinge than before, providing sufficient space above the screen to print the Psion logo and 'Series 3a' insignia below the horizontal detail lines. The new LCDs are bonded to a metal bezel which adds rigidity and allows easier application of the

LCD window label than before. The space between the rear of the LCD and the case moulding is taken by an impact absorbing foam gasket. The bonding of the LCD to the metal bezel cannot be performed in the field so a service kit has been provided (for both the Hitachi and Seiko/Tecdis versions) which consists of the LCD module pre-bonded to the metal bezel, along with the foam support gaskets. See later in this manual for details on fitting the TAB LCD module kit.

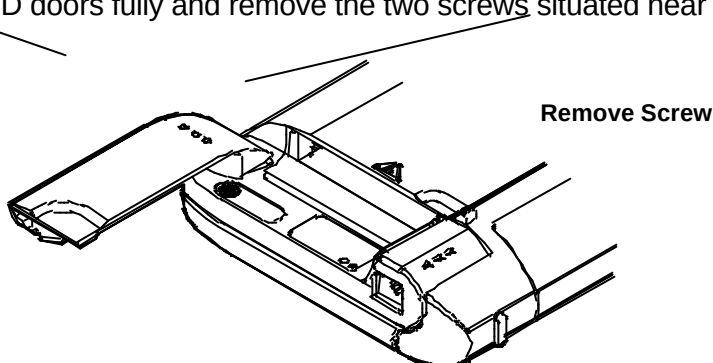
Tools Required

Tool	Description	Type
Screwdriver	Pozi	Size - 00
Screwdriver	Pozi	Size - 1
Knife / Scalpel	-	-
Tweezers	-	Straight Point
Pliers	-	Snipe Nose

Disassembly Procedure

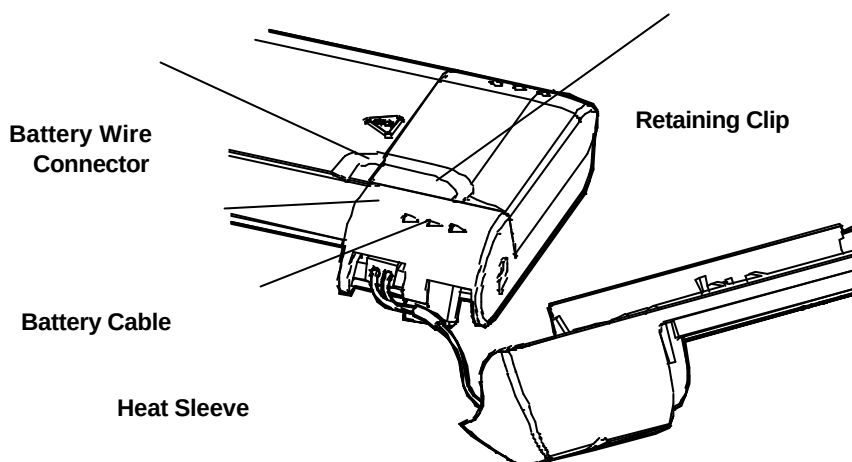
1. Open both SSD doors fully and remove the two screws situated near the door pivots.

SSD Door



Note: The screw inside the SSD door marked 'A' is located beneath a tamperproof label

2. Remove the battery cover and the four screws securing the battery housing to the rear of the unit.
3. Remove the battery housing, and carefully pull the heat-sleeved part of the battery cable from the retaining clip. Pull this aside and disconnect the battery lead connector.





 **Note:** Use pliers to gently remove the connector.

Disassembling the Keyboard

Early UK and most foreign versions of the Series 3a have keymats that do not incorporate the individual keys attached to the rubber mat design, and therefore care must be taken whilst removing these keymats to prevent the keys becoming dislodged. Keymats with unattached keys can be depicted by the two rubber stops at the bottom of the keyframe being coloured black.

1. Unclip the keyframe at the front, by deforming the outer keyboard moulding in the centre of the front edge.

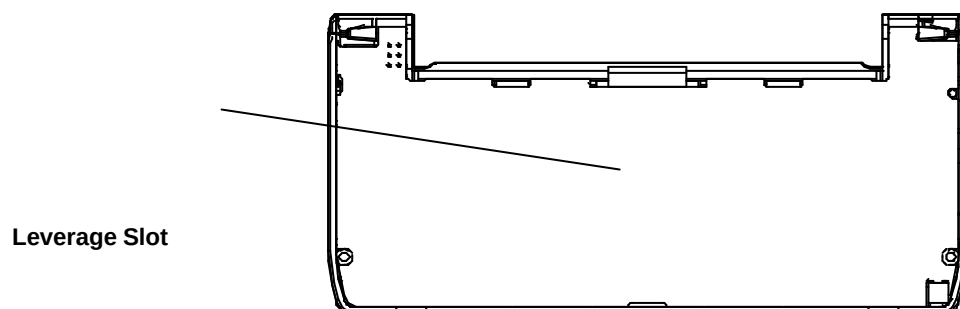
Hinge up the keyframe from the front to disengage the clips at the back.



2. Slide the keyframe out from under the hinge areas.
3. Lift off the keymat that has now become exposed, taking care not to dislodge the keys if the keymat is of this design.
4. Remove the main PCB by gently levering the board upwards at its front edge using the leverage slot, and easing the PCB out of its socket on the daughter PCB. Take care not to damage the front edge of the keyboard moulding whilst removing the main PCB. When the PCB has been hinged up about 30° carefully remove it from the case.



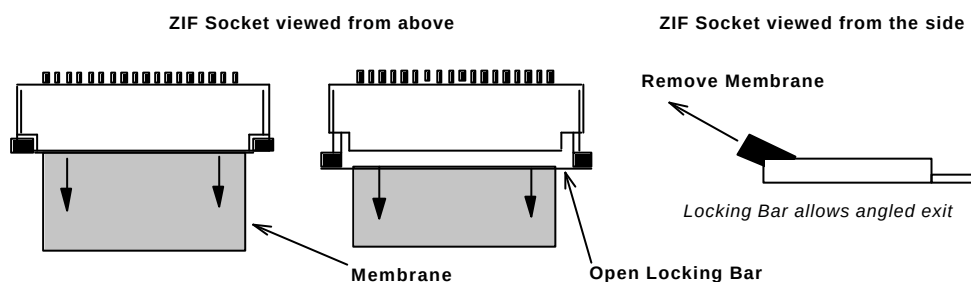
 **Note:** Pushing the expansion door slightly inwards will allow easier removal of the main PCB



6. The expansion door moulding with spring (Fast Serial Port) is removed by lifting the front edge of the moulding clear of the stop on the main PCB and sliding it off the connector pins.

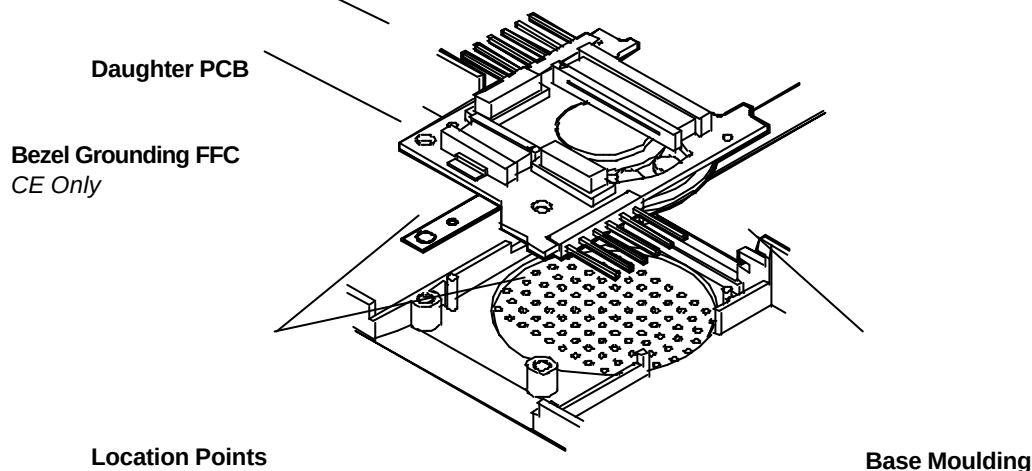
 **Note:** To remove the main PCB neither the hinge link or the LCD module need to be removed.

7. Remove the 2 hinge springs. Hold the unit vertical with the hinge side upper most and pull the coiled part of the spring towards the centre of the unit and off the hinge link arm. The spring will move towards its pivot and free of the hinge link. Squeeze the spring arms together and slide towards the centre of the unit. Take care not to damage plastic parts or LCD/membrane cables.
8. Remove the hinge link assembly by pushing either hinge link arm towards the opposite end of the unit until the pivot detail on the hinge link disengages from the keyboard outer moulding. Lift this end so the pivot detail rests on the keyboard outer moulding. Repeat for the other end. (The hinge link assembly will bend a reasonable amount to help removal).
9. The LCD and hinge link assemblies can now be disconnected from the Zero Insertion Force (ZIF) connectors on the daughter circuit board. These incorporate a locking bar to retain the cables. Pull the locking bar out at both sides of the connector to release the cable. The cable should give no resistance when being removed.



 **Note:** Do not force the cable out of a locked ZIF socket as this may cause damage to the cable and/or the socket.

10. Remove the daughter PCB by removing the two screws securing it and the SSD shield(s) to the base moulding.



11. The LCD module and cover moulding assembly can now be disconnected from the case moulding by removing the two hinge pins from their locations. The TAB LCD module can be removed from the cover moulding by removing the two micro-screws at either end of the LCD outer moulding, and releasing the 4 clip details at the middle of the bottom edge of the screen. This feature enables a TAB LCD module to be replaced without removing the hinge pins or the cover moulding. The Engineering Update Sheet, Psion p/no: 6103-0100-01 gives detailed instructions on the nature of the Series 3a TAB LCD module, and should be referred to in the event of replacement enquiries.

The disassembly of the Series 3a is now complete.

Reassembly Instructions

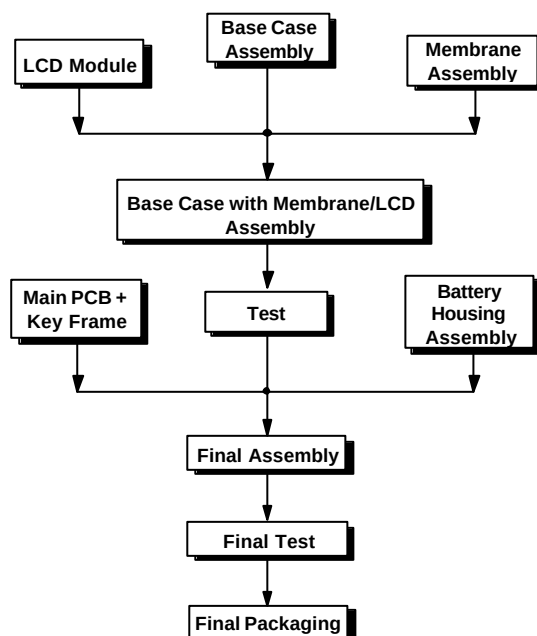
The Series 3a can be reassembled by enacting the reverse of the Disassembly Procedure. However, observe the following points:



Exercise caution whilst reinserting the FFC's into the ZIF sockets. Inserting FFC's into the sockets at an angle can cause short or open circuits.

Ensure that an CE approved Series 3a retains its CE marked speaker label, and that a non CE approved Series 3a does not receive a CE marked speaker label. Replacement labels are available in the Spares Kits, detailed on page 7 of this document.

The machine can be fully assembled following this flow diagram, which shows the correct sequence in which the various sub-assemblies of the Series 3a should be combined:



Notes for Reassembly

Fitting Hinge Pins.

When fitting the two hinge pins it is important that they are pushed fully home. The heads of the hinge pins must be flush with the battery moulding as they can catch on the hinge link when the case is opened and closed. The hinge pins should be a tight fit within the hinge sleeve in the outer LCD moulding as if they are inserted too easily they will loosen and could jam the hinge link mechanism.

SSD Doors

The outer keyboard moulding is supplied with the two SSD doors fitted, and as the three mouldings have been produced as a set they should be stored together to ensure accurate alignment. Secure the two SSD doors with the self tapping screws and washers. Take care not to over tighten screws and strip screw bosses. SSD doors should open and close smoothly and should not feel loose or rattle when fully open.

Daughter PCB

With the speaker facing downwards hold the PCB assembly at 30° with the PCB tabs pointing down. Insert the tabs into the lower slots at the back of the outer keyboard. Hinge down the PCB ensuring the board locates on the two mounting pegs on the base moulding. If the Series 3a has been fitted with a CE approved TAB LCD, it will be necessary to locate the bezel grounding FFC as shown on page 12 of this document when placing the daughter PCB onto the mounting pegs.

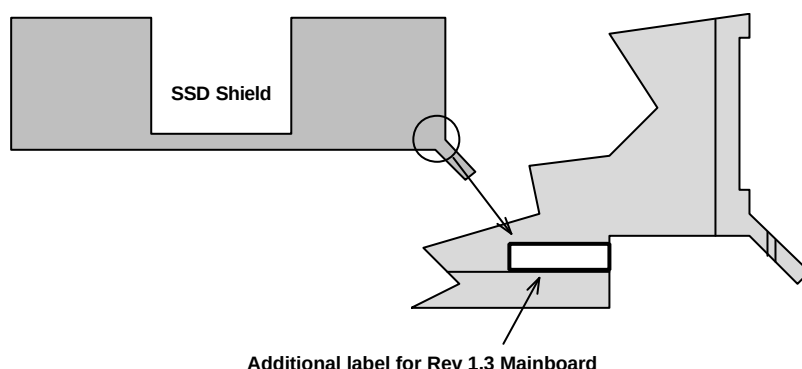
SSD Shield.

Non-CE approved Series 3a's are fitted with a stainless steel shield which provides additional RFI shielding and ESD protection. CE approved machines have 2 shields fitted which perform the same function as the single shield. These are each held in place with the fixing screw and 2 tabs of adhesive copper tape. It is possible to retro-fit the 2 shields to a non-CE approved machine if the single shield has become damaged in any way.

Note: During reassembly ensure that the 4 copper tabs securing the split SSD shield are sufficiently adhered to the shields and the case moulding. If they are loose they may come into contact with electronic components and cause malfunctions.

Align the tab hole with the right hand daughter PCB screw hole, and secure with the screw.

Note: On revision 1.3 main PCB's a diode was fitted to the board, and as protection against shorting a label was also added and is glued to the shield:



Hinge Springs

When fitting the hinge springs note that they must be fitted in the respective left or right handed sockets. Squeeze the ends of the spring together, slide the protruding end along the edge of the outer LCD moulding and into the hole. Push the hinge link arm towards the Spring and bend the free end of the spring so it locates in the two cut-outs on hinge link. Hook the centre of the spring onto the stub on the hinge link arm and push fully home.

~~Note:~~ *TAB LCD hinge springs are coloured blue. Non-TAB LCD hinge springs are coloured black.*

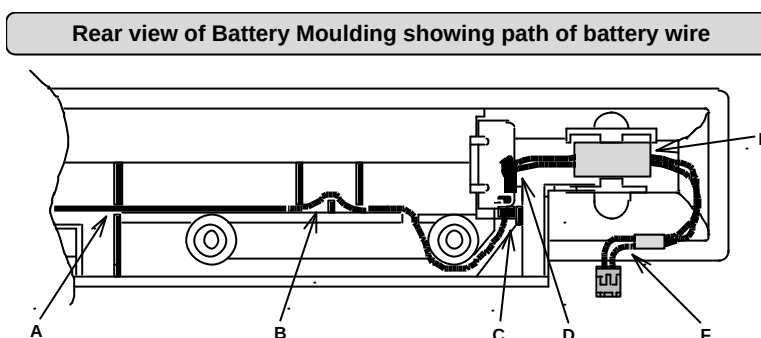
Battery Wire Assembly

It is important that the Battery Housing and Door mouldings are kept together as these have been manufactured and finished as a pair.

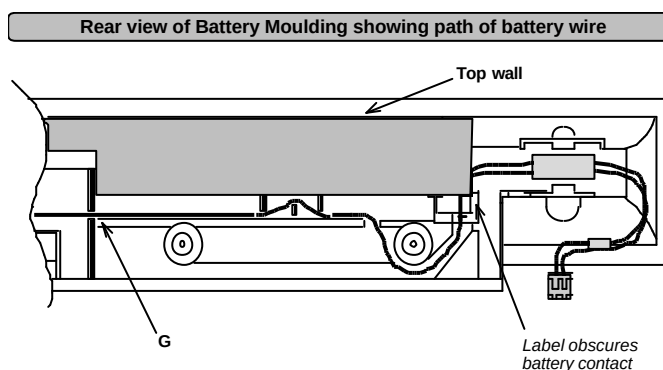


The battery wires are flexed every time the machine is opened and closed. As a consequence it is recommended to always replace the battery wires whenever a machine is disassembled

1. Start assembly at the left hand end (longer wire) by preforming the wire close to the contact. Push the contact fully home to trap the wire in place.



2. Feed this wire towards the right hand side and fit into the two moulding details 'A'.
3. Fit the wire through the two cable grips 'B'. Ensure there is no slack at the left hand end, as this could create an uneven loop at the connector end.
4. Feed the wire around the screw boss and down under the right hand battery contact 'C'.
5. Push wires into the bottom of the moulding, towards the contact, 'D'. Use a blank hinge-link moulding (8103-1008), pressed in place, to form the wires to the correct length.
6. Clip ferrite bead in place 'E'.
7. Preform the wires so they exit close to the connector at 90°, 'F'.
8. On some machines a label is added to obscure the battery contacts when the machine is assembled. Align the cut out in the centre of the label with the two 'G' ribs. Ensure that the label is flush with the top wall before pressing the label firmly into place.



 ~~Note:~~ Ensure that none of the label encroaches on areas that would stop the assembly fitting correctly onto the main assembly.

Final Test Procedure - Version 1.6

This document outlines the final test procedure for the Series 3 range of pocket computers. The test equipment requirements are outlined below.

Series 3 Final Test Equipment:

Qty.	Description	Psion p/no:
1	Final test unit **	1610-0001
1	Mains lead	-
2	Test SSDs	2301-0115
1	DC Jack lead (50cm)	2503-0001
1	Expansion lead	2503-0002
1	Battery cartridge/cable assembly	2503-0003
1	Good Lithium battery	4900-0018
1	Case Key (for Software Upgrades)	OKW

Optional Additions for S3a:

Qty.	Description	Psion p/no:
1	Buzzer Cradle	Custom
1	50cm 3.5mm to 3.5mm Jack Lead	Custom

** Only final test units with a buzzer output are suitable for testing Series 3a units

 ~~Note:~~ The final test unit is suitable for working with supplies in the range 90-130/180-260VAC 47-63Hz without adjustment.

Explanation of Tests

The final test unit is capable of testing the following features of the Series 3/3a:

Start:

The Series 3/Series 3a toggle switch on the final test unit adjusts the standby supply voltage output applied via the 'AA' battery connections. When it is switched to the Series 3 position 4.2 volts is applied to the Unit Under Test (UUT). This value is applied in order to generate stable standby current measurements. When it is switched to the Series 3a position 2.75 volts is applied. In the event of the wrong setting being selected the final test program will automatically detect the incorrect position of the toggle switch and prevent further operation. The current in either case is limited to approximately 50mA. The presence (and correct orientation) of the middle battery clip is also checked and the battery fault LED and the Series 3 standby current may also be checked at this point.

Sequence Options:

This feature is adjustable for distinguishing a non-CE approved machine and a CE approved machine. 'All' includes a continuity test between the 7th SIBO pin and the PCB 0V, (Connection via the case metallisation). and this must be selected for all CE approved machines. 'All-EARTH' excludes the 7th pin test, suitable for use on non-CE approved machines.

Language (As displayed in the Menu) - Series 3a only:

This test will report the language variant of the UUT to the operator. An O/S call is used to read the keyboard label ID. Check that the language calculated by the test corresponds to the keyboard fitted.

On & Operation:

The battery supply voltage is reduced to an output within the range 2.5-2.60V. The supply current limit is increased to 500mA. The action of moving the battery switch to the 'On' position places a clock pulse on the expansion serial channel. The clock pulse should turn the UUT on. The final test program should also be downloaded from an erasable PROM sited within the final test unit into RAM within the UUT. The 'Expansion Supply OK' LED indicates the presence of 5V on the expansion connector.

Expansion:

Checks the operation of the expansion socket micro switch within the Series 3a.

Supply:

A 10V supply (current limited to 200mA) is applied to the DC jack socket of the UUT. No ground connection is present on this jack, instead a separate circuit tests that the GND connection is present on the jack socket fitted to the UUT. This is done in order that it may detect any fault in the ground return path such as a break in the input filter toroidal or GND choke, as this would prevent normal operation via this connector.

SSD:

This tests the operation of both SSD door switches and the SSD connectors. On the Series 3a the DC Jack must be present and ON in order for this test to operate correctly. This is because the Vback o/p from the Series 3a is below the test SSDs limit when supplied via batteries. The Vback o/p is increased when the DC jack is present.

Sound:

The DC Jack must be present and ON in order for this test to work to prevent current limiting via the battery.

Microphone:

The buzzer (either internal to the test unit or external) will sound for a maximum of three seconds. A recording of the buzzer will be made and analysed for zero crossings. Failure will result if zero crossings are found to differ from the expected values. The buzzer used has a typical frequency of 2.9Khz with a range of 2.3 - 3.4 Khz. Minimum sampling time is one quarter of a second.

On and Idle current measurement:

This test should be made only when the processor is not active. i.e. at the end of the test sequence.

Series 3a only - From final test version 1.08 onwards the idle current reading will be in line with the electrical specification. A 3% addition has been made to the maximum values in order to take into account possible meter error.

Earth:

This verifies the 7th connection on the SIBO connector. The 7th connection is pulled up to +5V within the final test unit via a 1K5 resistor. The status of the line can be read via ASIC5 within the test unit. CE approved machines should pull this line low as they should be linked to 0V, and therefore produce a PASS.

Reset (& Standby Current Test for the Series 3a):

This verifies that the Reset switch operates correctly.

Series 3a only - The meter should settle at the standby current for the particular UUT. Units with Pseudo static memory have their refresh enabled after cold booting. Thus the standby current can only be measured at the end of the test sequence. The applied voltage of 2.75V

allows the standby current measurements to be extracted directly from the electrical specification. A small addition (3%) has been added in order to take into account possible meter error).

Series 3/3a Current Levels

Maximum currents levels for both 'standby' and 'On & Idle' states are listed for all models in the following table:

Model	Standby Current (Meter 1.999 mA F.S.D.)	On & Idle Current (Meter 199.9 mA F.S.D.)
Series 3	0.250mA	20.0mA
Series 3a - 256K/512K	0.205mA (Typical 0.155mA)	27.0mA (Typical 22mA)
Series 3a - 1Mb	0.245mA (Typical 0.190mA)	32mA (Typical 27mA H'chi PSRAM)
Series 3a - 2Mb	0.310mA (Typical 0.250mA)	40mA (Typical 35mA H'chi PSRAM)

LED Summary

The table below assumes that all cables are connected to the Unit Under Test - UUT, the unit is switched 'On' and that the expansion interface has been selected.

LED	OFF	ON
Battery Clip (Red)	OK	Fault
DC Jack Lead (Red)	OK	Fault
Expansion (Green)	Fault	OK
Battery (Green)	Fault	OK
DC (Green)	Fault	OK

Test Procedure Set-Up

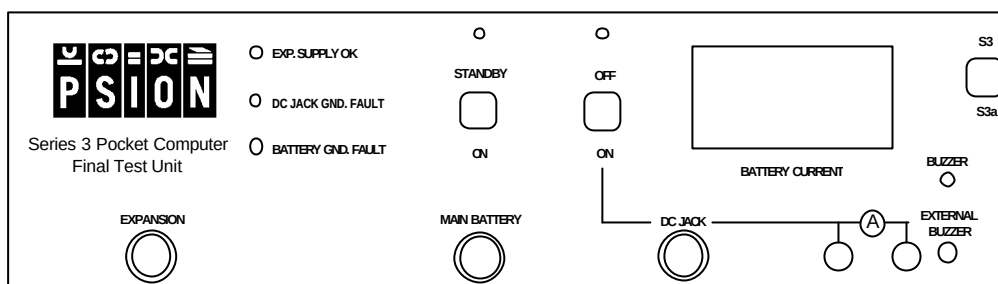


To avoid the possibility of this test equipment malfunctioning it must be used in a benign electromagnetic environment. Strong radiating devices, such as mobile phones, must not be used in the vicinity of the product as they may cause a temporary disturbance.

This test equipment must be used in a static-free environment. Such an environment can be provided by using static dissipative surfaces on the test bench below the equipment and ensuring that operators are discharged by means of static wristbands, prior to using the equipment. Static dissipative surfaces and wristbands can be obtained from your local component stockists.

Connect the battery, DC jack and expansion cables to the final test unit. Ensure that the battery switch is in the 'Standby' position and that the DC switch is 'Off'.

The following diagram shows the front panel of the final test box:



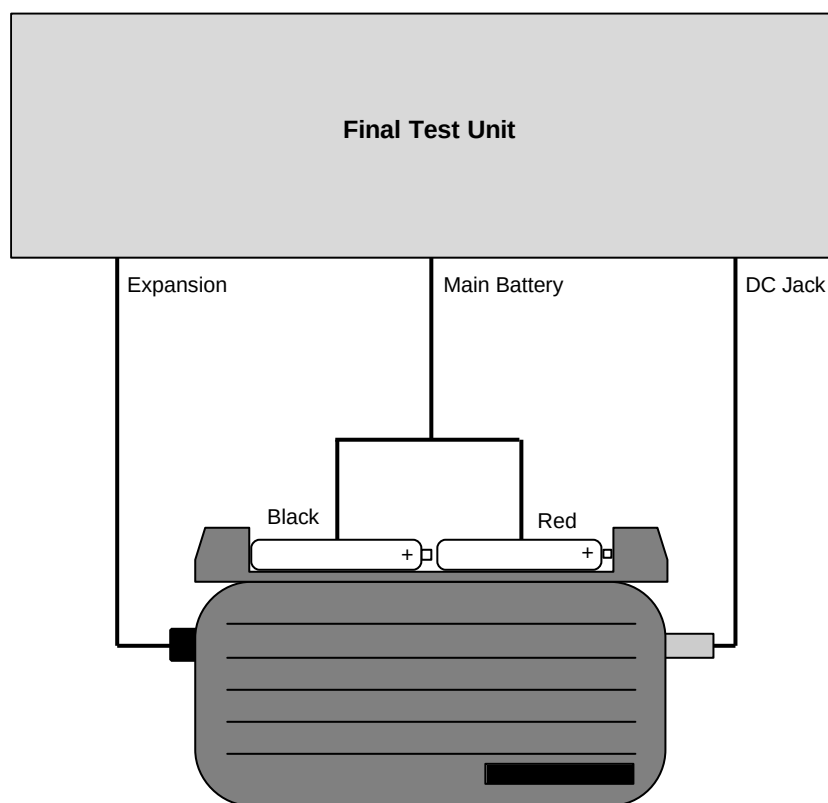
Connect the following cables between the final test unit and the UUT:

- ?? 1 x 'AA' Battery Cable
- ?? 1 x Expansion Cable
- ?? 1 x DC Jack lead

Insert the following items into the UUT:

- ?? 1 x Lithium Battery
- ?? 2 x Test SSDs

Ensure the UUT is connected to the final test unit thus:



*Series 3/3a unit contains:
Lithium Battery + 2 x Test SSD's*

Series 3a Microphone Test only - Connect a buzzer cradle to the final test unit by using the 3.5mm jack lead. The UUT can sit within the cradle for the duration of the test sequence.

Test Sequence

Operate the S3/S3a toggle switch on the final test unit and Select S3 or S3a as appropriate for the UUT. Check the ammeter on the final test unit. Proceed with the test only if the ammeter is not in the over-range state. This is indicated by a single '1' digit to the left hand of the display. In addition observe that the 'Battery Clip Fault' LED is now extinguished.

Series 3 only - Check the battery standby current of the UUT by examining the ammeter on the final test unit. For specific values given refer to page 18.

Test procedure version

1. Move the battery switch from 'Standby' to the 'On' position. The final test program should now be loaded via the expansion serial cable. Check that the 'Expansion Supply OK' LED illuminates.
2. The following menu will be displayed on a Series 3a under test, where VER is the operating system version, RAM is the memory size and LANG is the language:

```

      MENU - FINAL-S3A 1.11F
    VER 3.40F  RAM 1M  LANG ENG

  All-EARTH   Soak
  Lcd          Keys   Cpu
  Expansion   Supply  SSDs
  Sound       Microphone EARTH

  Arrow keys move, ENTER selects
  
```

3. Check that the final test program version number displayed in the top line next to the Series 3/3a type corresponds to the latest release, if not then abandon the test and refer to the test software upgrade procedure described on page 23.

Note: The items VER, RAM and LANG, and the test procedure version will depend on the build of the UUT and must be checked for accuracy by the operator.

4. The main test sequence may now be invoked by selecting either 'All' on the menu for CE approved Series 3a's, or All-EARTH for Non CE approved Series 3a's.

Display:

This test comprises three sections:

1. A bold centred cross with corner markers - The cross should be bold and even throughout and all corner markers should be complete. This is used to determine if any of the row or column drives are faulty. Press SPACE to select the next pattern
Series 3a only - The cross should contain a grey scale section and all corner markers should be complete.

2. Maximum contrast. Press SPACE to select the next pattern

3. Minimum contrast, display should be blank.

Press SPACE if all tests are OK.

Keys:

A full keyboard map is displayed including the eight key membrane. Successful pressing of each key in turn will cause the selected key image to change from dark grey to light grey.

**CPU:**

This verifies the CPU chip and will only be seen if a failure occurs.

Expansion Port:

Remove and replace the expansion port connector (on the UUT) at the appropriate prompts.

Supply:

At the 'Switch On the DC Jack' prompt move the DC switch to the 'ON' position.

At this point note the following:

?? The DC supply indicator i.e. the green LED, on the UUT should illuminate.

?? The current reading on the battery ammeter should reduce to zero.

Solid State Disks:

Open and close the doors as instructed by the prompts. Press SPACE if OK.

~~Note:~~ *Note: The DC Jack must be present and ON in order for this test to work.*

Sound:

Checks the quality of the speaker. Press SPACE if OK.

~~Note:~~ *Note: The DC Jack must be present and ON in order for this test to operate correctly.*

Microphone - (Only applies to the Series 3a):

Checks the microphone for operation. This test is automatic and therefore requires no operator response. (If the cradle is not used or unavailable just hold the UUT close to the internal buzzer on the test box). The operator will now be prompted to remove the SSDs and lithium battery. Do this and press any key to continue.

If all tests have passed by this stage 'OK' will be displayed.

On & Idle Current Measurement:

At the end of the final test sequence i.e. when 'OK' is displayed, switch off the DC supply and check the ON Idle current of the UUT by examining the ammeter on the final test unit, for specific values refer to page 18.

Earth:

Verifies the 7th connection on the SIBO connector, and will only be seen if a failure occurs.

Reset (& Standby Current Test for the S3a):

Series 3 - Remove the expansion port connector from the UUT and operate the 'Reset' switch and observe the UUT. Check that the system menu appears on the screen.

Series 3a - Remove the expansion port connector from the UUT, move the battery switch to the 'Standby' position and operate the reset switch whilst observing that the UUT returns to its standby state. Check the battery standby current by examining the ammeter on the final test unit. For specific values refer to page 18.

Remove the DC jack and battery cables. The final test procedure is now complete.

Soak Test Procedure

The soak test is intended to keep the machine active for prolonged periods whilst it undergoes environmental and physical testing. The 'Soak' option may be selected from the main final test menu. During this test the elapsed time is normally recorded to an SSD. When the test is selected, it first checks that there is a valid SSD in drive A on which to record the results (flash is recommended). If not it will prompt for an SSD to be inserted. The test may be run without recording the results by pressing ESC at this point, otherwise a SSD should be inserted and any other key pressed.

During the test cycle the machine shows the elapsed time on the screen in minutes and seconds. If an SSD is fitted then approximately every five minutes this time is added to the file "soak.res". If the SSD should become full during the test it is formatted automatically and the test continues.

 *Note: A soak test mode can be invoked from within the Series 3a ROM. i.e. no final test unit is required.*

~~To start the soak test first reset the UUT and then press the 'ON' key whilst holding down the Psion and left hand shift keys. No SSD logging is supported in this mode. The UUT will display 'Soak Test' and display elapsed time until the test is exited.~~

The test runs with the machine on for approx. 5 minutes and then the machine switches off for 5 minutes. When the machine is off there is no harm in switching it on as normal. When the test is terminated by pressing the ESC key the file "Soak.res" is left on the SSD.

Software Upgrade Procedure

This procedure must be enacted following the receipt of a new version of the final test software kit. The upgrade will be issued in the form of a 32 pin dual in line erasable PROM.

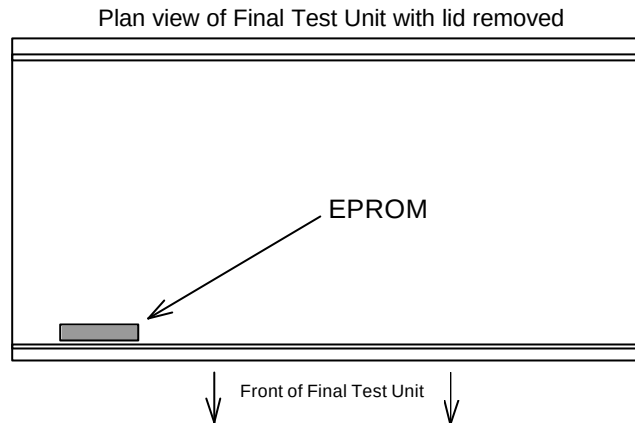


WARNING - Hazardous voltages are contained within the final test unit. Please follow this procedure explicitly.

1. Switch off the mains at the rear of the final test unit.
2. Remove the IEC mains socket.
3. Using the special key provided with the kit, locate the four release notches on the case.

 *Note: There are two release notches on each side of the case.*

4. With the unit apart, locate the erasable PROM socket on the main PCB assembly. Operate the two levers in order to remove the existing device. Replace the device taking care to note the pin 1 position.



5. Clip the case together and proceed with testing.

New Test Hardware

This procedure is to be followed on receipt of a new version of the final test hardware. The upgrade will be issued in the form of replacement front and rear panel assemblies.

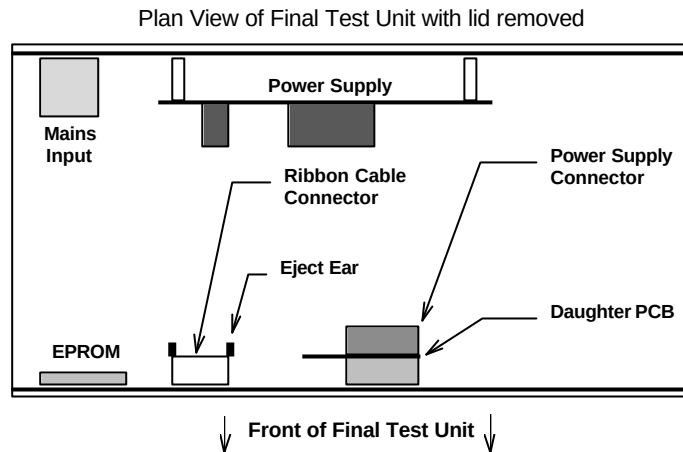
1. Switch off the mains at the rear of the final test unit.
2. Remove the IEC mains socket.
3. Using the special key provided with the kit, locate the four release notches on the case.

~~✎~~ *Note: There are two release notches on each side of the case.*

4. With the unit apart, disconnect the 8 way power supply cable. (Just pull the connector body to remove), and the 10 way ribbon cable, taking care to use the eject ears from the front panel assembly.
5. The two original assemblies can now be safely removed and returned to Psion at the address shown below. Please use the packing that the final test unit was delivered in.

~~✎~~ *Note: Do not attempt to mix old and new panels as they have been tested and serial numbered as a pair.*

6. Take the two new assemblies and insert by carrying out the reverse process as in step 4. Ensure that the small daughter PCB remains firmly connected to the front panel PCB.



7. Clip the case together and proceed with testing.

Please return the old EPROM and/or hardware to:

Test Department,
Psion PLC.,
19 Harcourt Street,
London, W1H 1DT,
England.
Tel: (+44) 0171 208 1811

~~Please~~ Please feel free to enclose any comments or suggestions you may have regarding this service procedure.

Final Test Unit Modification History

V1.0 - 29/11/95 Initial Release

1. Relay problem rectified.
2. Switch for S3/S3a selection added. Provides correct standby voltage for the S3a i.e. 2.75V. Standby and idle current measurements as per the electrical specification.
3. LINK 7th GND pin detect added. Required for S3a CE build units.
4. RAM test for upper memory bank on 2Mb units.

Description	Test Equipment	Software Version	Mod
1. Series 3 - 128/256K	Series 3 final test unit	0.01A-1.10F	0
2. Series 3a - 256/512K 3. Series 3 - 128/256K	Series 3a final test unit Series 3a final test unit	Series 3a - 1.00F Series 3 - 1.21F Note: Series 3 program incorporated into Series 3a ROM	0
4. Series 3a - 1/2Mb + Series 3a - 256/512K +	Series 3a final test unit	1.0	0

Series 3 - 128/256K			
As (4) above	Series 3a final test unit	1.0 - 1.07F	1
As (4) above	Series 3a final test unit	Series 3 program 1.22F - (Incorporates switch detect) Series 3a program 1.08F	2
As (4) above	Series 3a final test unit	Series 3a 1.09/1.10F	3
As (4) above	Series 3a final test unit	Series 3a 1.11F	4

Test Unit - Modification Level

A modification label should be found on the rear panel of the test unit i.e. where the mains cable enters. This label is used to inform the user of the status of the test unit in terms of its hardware and internal firmware. The adjacent diagram is an example of an unused label:

0	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20

The current modification level of the test unit is determined by reading from left to right and selecting the last crossed number. For example the adjacent diagram depicts the label on a final test box at modification level 4:

0	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20



Warranty

Manufacturer's Warranty and Limitation of Liability.

To avoid any possible damage to your Psion products, they should not be exposed to extremes of temperature or humidity. Do not subject them to hard knocks or excessive force and do not immerse them in liquids or use volatile fluids when cleaning.

If, within 12 months of purchase, this product can be shown to the reasonable satisfaction of Psion to be faulty and not to function substantially as described in the user manual, Psion will, at their discretion, refund the purchase, repair, or replace the affected product. Apart from this warranty, Psion will not in any event be liable for any loss, including consequential loss, caused by any error, defect or failure of the computer system hardware or software, or howsoever otherwise arising, including but not limited to loss of use, loss of stored data, loss of profit or loss of contracts. This limitation of liability shall not apply to consumer transactions nor to any liability for death or personal injury arising from the negligence of Psion or its employees.

If you encounter difficulty using this Psion product, consult the manuals supplied with it to verify you are using it correctly. If after thoroughly checking the documentation the difficulty still persists, return the affected item with proof of purchase to the dealer where the machine was purchased who will send it for examination and repair or replacement as appropriate.

Please note that **all** items must be sent by registered post and proof of purchase with dates must be enclosed. Packaging should be robust and secure against damage in transit.

Be aware that any information stored in the product will be lost during our test procedures. Psion accepts no responsibility for loss or damage of equipment in transit to us, nor will Psion be held responsible for any loss of data held in any of the devices returned to us. It is the user's responsibility to ensure that their data has been adequately backed-up prior to shipment to Psion.