last revised: 1/29/96

This manual provides troubleshooting and service information for service providers repairing AlphaSmart word processing keyboards. This includes the **AlphaSmart** model and **AlphaSmart Pro** .

AlphaSmart¹s have a date coded serial number on an adhesive label on the back of each unit. The first 4 numeric digits of the serial number is the manufacture month and year. The last four digits is the number of the unit produced that month. For example, if the serial number is AA 0395-2400, then this AlphaSmart was manufactured (and shipped) in March of 1995, and was the 2400th unit manufactured.

AlphaSmarts carry a one year limited warranty. Without the legal jargon (see manual for legal description), we will repair any problem that is not a result of abuse or rough handling. Evidence of mishandling is usually quite obvious.

By the way, AlphaSmarts shipped after 8/95 survive single drops over 5 feet on any angle without any permanent damage. (AlphaSmarts shipped before then survived 3 feet falls.) Note: A fall of 5 feet may cause key caps to fly off, lithium battery to shake loose from its socket and the ROM to come out of its socket, but these are replaceable by the user. Damages caused by dropping are NOT covered in the warranty.

Product History:
The original AlphaSmart, shipped from 8/93-3/95 was only Macintosh compatible.
AlphaSmart Pro is both Macintosh and PC compatible.

There are 3 types of LCDs used in AlphaSmart Pros. The different displays may be identified by opening the case, looking at the back of LCD module, and oberving the IC chips on the back (black squares). Here are the 3 different types -- be sure to specify which type when ordering replacements.
1) 3 chip display, Optrex LCD display
2) 10 chip, all chips the same size, Hyundai display
3) 10 chip, 8 small, 2 large, Hantronix display
3 chip displays were shipped from in from 1/95 thru 9/95. 10 chip displays were shipped from 9/95 to present.

ROM versions 2.0x (2.03, 2.05, 2.07, 2.08 and 2.09) support the 3 chip display while ROM versions 2.1x (v2.1, v2.1.2 and v2.1.3) support the 10 chip displays. The latest 3 chip LCD ROM version, 2.09 at the time of this printing, has all the features and bug fixes of the 10 chip display ROM v2.1.3 except for international characters.

AlphaSmart Service Parts Costs and Ordering

The Service Repair Kit whose contents are listed in Appendix A at the end of this document costs

$30, shipping included. Please allow 4-6 weeks for delivery.

The following parts are sold as replacement AlphaSmart parts:
Top Plastic: $5
Bottom Plastic: $5
LCD: $40 [specify old (3 chips on back) or new (10 chips on back)]
Keypad: $30
Logic Board: $50 (AlphaSmart Pro logic board)
Each Service Part order is subject to a $10 shipping and handling fee. For example: An order of a Bottom Plastic and Keypad would cost $5 + $30 + $10 = $45; ordering 4 Bottom Plastics would cost 4 x $5 + $10 = $30. Please try to consolidate your service orders.

We do not sell individual logic board components.

Factory Repair Charges:
AlphaSmarts sent to the factory for repair, not under warranty, will be charged $20 labor + parts replaced as listed above. For example, an AlphaSmart repaired by the factory replacing a keypad would cost $30 + $20 = $50.
Note: ALL AlphaSmarts sent in for repair MUST have a RMA (Return Material Authorization) number. To receive an RMA number, follow the instructions in the AlphaSmart Return Instructions.

Besides this document, see also:
Service Notices #1 through #7, Service Notice 4, LCD tape
AlphaSmart System Test Procedure
AlphaSmart keypad matrix and diode schematic

When servicing an AlphaSmart, you **risk losing all user data** (depending upon what repairs/upgrades are made). **All user data should be downloaded to a Mac or PC and saved before servicing.**

Whenever a AlphaSmart is received for service it should be upgraded to the latest level. All Service Notices should be preformed on every unit. So every AlphaSmart you receive you should check for:

The ROM version should be latest version, v1.06 if AlphaSmart, v2.05 if AlphaSmart Pro. If it is a smaller number (like v1.05 or v1.03, or 2.00), replace it with a new ROM per Service Notice #6.

Whenever servicing any AlphaSmart, check to see if the 2 spare keypad screw bosses have screws in them. If not, put screws in them -- for a total of 6. This will help prevent screw boss breakage when dropped. (Drop tests show that putting in the extra 2 screws allow the AlphaSmart to be dropped an additional 18" without breakage.)

Check D18 as per Service notice #2 (If it is a red and clear diode instead of a black one, there

is no need to change it.)

Check the space bar to see if it's spring is missing. Press on the space bar and if it doesn't feel normal, pop it off and see if the spring is missing. It is quite common for this spring to be missing.

Check R9 as per Service notice #1.

Make sure the LCD has a piece of tape on one of its hold down tabs, as per [Service Notice #4](#).

Before returning the AlphaSmart to the customer, a full system test should be done. See AlphaSmart Testing Procedure. Be sure to check ALL the keys, and make sure it works on **both** batteries and AC power.

Equipment needed:
Soldering iron
very small Phillips screw driver, size 0. This is for the PCB, keypad, and LCD screws.
small Phillips screw driver, size 1. This is for the case screws.

Note 1: Some older AlphaSmarts will have small Torx screws for the PCB, keypad, and LCD. Use a #6 Torx screw driver to remove them. The ones that you remove, don't put them back in the product, throw the Torx screws away and replace with the small Phillips screws. We will supply all the small Phillips screws needed.

Note 2:

Use only the small Phillips screws provided by IPD.

They are a custom made screw designed for the plastic boss in the product. DO NOT use another standard screw you have laying around, it will stress the plastic and the plastic will possibly crack and fail after a year or more. In an crunch you can use a #2x.25" type B screw, but you risk it cracking the plastic in time. (If the plastics are ever redesigned they will be designed to use a standard screw.)

AlphaSmart Trouble Shooting Guide

List of Common AlphaSmart Problems and their Solutions:

(first ones are generally most common)

Note: Always test for described problem before you open the case and always do a full test before you close it backup again (saves you taking the screws out again when you find something else wrong).

Problem: **I get a "Here" or "Here 2" or "Queue Full" message.**
Solution: **LCD tab is shorting keyboard cable.** Install the tape on the LCD as per [Service Notice #4](#) and retest.

Problem: **It loses my data when I turn if off.**
Solution: **Lithium Battery is discharged or dislodged.** Take the unit apart and if the battery is not dislodged, replace the lithium battery and be sure to check D18 to see if it is the correct diode (red and clear) -- Service Notice #4. Also make sure ROM is well seated while you have the case off. If the lithium is dislodged, often the ROM is also a bit loose.

Problem: **RAM is being tested ("Sig. not found" message) every time I turn it on.**
Solution: **Lithium Battery is discharged or dislodged.** Take the unit apart and if the battery is not dislodged, replace the lithium battery and be sure to check D18 to see if it is the correct diode (red and clear) -- Service Notice #4. Also make sure ROM is well seated while you have the case off. If the lithium is dislodged, often the ROM is also a bit loose.

Problem: **LCD has 2 black lines on top.**
Solution: **Reseat ROM.** This usually happens after a unit is dropped and the ROM is shook loose from its socket. Remove the back case and reseat the ROM.
When a unit has been dropped hard enough to knock the ROM out, it often breaks one or more screw bosses. Be sure to lift up on the keypad assembly when you have the cover off to make sure no keyboard screw bosses have been broken. If one or more is broken, see Service Notice #5 for repair.

Problem: **Various Keys don't work.**
Solution: This can have 3 different causes:
a) LCD tab may be shorting keyboard cable.
b) Keyboard actually went bad. The keypad we use is a membrane keyboard, which is quite reliable, but there is a small failure rate on the keyboards.
c) Keyboard connectors may be loose or flex cables may be slightly misaligned in connectors J4 and J5.
d) One or more of the diodes D1-D16 might have gone bad.

The easiest way to determine what is bad is to:
1) Install the tape on the LCD as per [Service Notice #4](#) and then see if problem is still there. Test, if still a problem,
2) Take the keyboard flex cables out of J4 and J5 and reconnect them. Test, if still a problem,
3) Swap the keypad with a known good one. If the AlphaSmart works, then the keypad was bad.
4) If it still doesn't work, look at the 16 diodes D1-D16 on the logic board. Use the AlphaSmart keypad matrix and diode schematic to help you determine which diode went bad. If a particular

diode has failed, then all the keys on that row or column of the diode will be bad -- by looking at which keys are bad and referring the AlphaSmart keypad matrix and diode schematic, you can easily determine which diode to check.
If the diodes all test fine, then one of the connectors, J4 or J5 might have gone bad.

Problem: **My P key doesn't work.**
Solution: **LCD tab is shorting keyboard cable.** Install the tape on the LCD as per [Service Notice #4](#) and retest.

Problem: **The space bar feels funny and or gets stuck sometimes.**
Solution: **Spacebar spring missing.** This is very common and is most common in elementary schools. In one elementary school, 25% or 8 out of 32 AlphaSmarts had the space bar spring missing after 1 year of use. When a AlphaSmart is dropped, the most common keycap to pop off is the space bar. The spring flys off and is lost or the student doesn't know how to put it back on. Keep a good supply of springs on hand and take some with you whenever you visit a school and replace them and/or show the computer teacher how to replace it. Remember, only one spring per spacebar and it doesn't matter what side you put it on.

[We are currently experimenting with different glues to use to attach the spring to the keyboard so it doesn't take flight as easily.]

Problem: **Only Function keys 6,7, and 8 do not work.**
Solution: **Keyboard cable is folded in the way.** Occasionally the left flex cable (the one that goes into J4) on the keypad, gets wedged between the keyboard and the top case when the AlphaSmart is assembled. Take the AlphaSmart apart and push down on the flex cable, when reassembling, make sure it doesn't get wedged.

Problem: **There is something rattling inside.**
Solution: **Lithium Battery is dislodged.** Open the unit and replace the lithium battery. The battery should be OK to put back it(Check D18 per Service Notice #2). The ROM may also be loose, make sure it is in its socket securely. Also push down on the LCD connector on the logic board -- it sometimes comes loose when jarred hard enough. Be sure to lift up on the keypad assembly when you have the cover off to make sure no keyboard screw bosses have been broken. When a unit has been dropped hard enough to knock the lithium battery out, it often breaks one or more screw bosses.
While you have the lithium battery out, measure its voltage with a volt meter. It should be 2.9-3.1V. If it is less than 2.5V, it is discharged and needs to be replaced.

Problem: **The keyboard is loose or wiggles a bit.**
Solution: **Keyboard screw bosses have been broken.** See Service Notice #5 to repair this.
Note: Whenever servicing any AlphaSmart, check to see if the 2 spare keypad screw bosses have