

Good Things To Know About Lisa

June 12, 1984

By Ginger Jernigan
Lisa Phone Support

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Capacity

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Good Stuff to Know About Lisa

Monitors:

Conrac: Conrac Corp.
600 N. Rimsdale Ave.
Covina, CA 91722
(213) 966-3511

What to order: 23" Black and White
Cabinet Model SNA-23/C
27.7 KHz horizontal line rate
60 Hz vertical field rate
Under scan adjusted so that 4 corners are visible
Modified for fast vertical retrace
20 MHz video amplifier

Electrohome: Electrohome (U.S.A.) Limited
250 Wales Ave.
Tonawanda, New York 14150
(716) 694-3332

What to order: EDP-57 Monochrome Projection monitor
Projects up to 15' diagonal screen
standard is green P1 phosphor, Other phosphors available on
order.

DWP: Switch 1: 11100111
Switch 2: 10010000
Numbered 8 to 1; 1 = On, 0 = Off

Settings: Space Parity
Local
EXT/ACK Handshaking
9600 Baud
Paper out on
Duplex & Auto CR/LF off
BI directional print on
Ascii Standard

You must also use a "Modem Eliminator", 590-0029-00, in series with the interface cable.

<u>Error Numbers:</u>	<u>Error</u>	<u>Meaning</u>
	1199	DMP set in Format for the Printer
	648	No modem eliminator cable or not set properly in Preferences
	3056	Generic printer problem - check cables, paper, ribbon, etc.

Changing the Ribbon: Take a look at page 7 in the Daisy Wheel Printer manual.

Changing the Print Wheel: Take a look at page 4 in the Daisy Wheel Printer manual.

Imagewriter:

Switch 1: 00100000
Switch 2: 0011
Numbered 8 to 1; 1 - closed, 0 - open

You must also use a "Modem Eliminator", 590-0029-00, in series with the interface cable.

Error 1222:

This error means that Preferences thinks that there is another DMP connected to the expansion ports. This error frequently occurs when the system is reconfigured after previously having a parallel DMP on the system. The expansion card was taken out without resetting Preferences. See the DMP section for a more complete description.

Error Numbers:

The most common error numbers are described in the Owner's Guide starting in Appendix 3 on page 17. There are also more error messages on starting on page 125 in Appendix 6. In the Lisa 2 Owner's Guide the error messages are in Appendix 3, beginning on page G59, and on pages C49-C58. These error messages are quite general and are mainly used to point to the general direction in which the problem lies.

Other more detailed errors are located in the System Software Manual and are described below.

Meanings:

There are three types of error numbers that can be displayed:

1) A single number: xxx

This can be found in the System Software Manual. This number usually means that the error occurred in code located in the Filer. The only exception to this rule is if the number starts with a 6 (i.e. 648), then the error is related to printing.

2) Two numbers: xxx/xxx

The first number usually refers to a location in the lower levels of the Operating System. The second is usually the error code. However these are sometimes reversed so it is best to look up both in the System Software Manual.

3) Three numbers: xxx/yyy/zzz

xxx: Indicates the System program that died.

yyy: The error number indicating why it died.

zzz: The actual code address where the error occurred.

If you get one of these three number codes and the first one happens to be a 1033, the second number can give you an indication of the problem:

<u>Error</u>	<u>Meaning</u>	<u>Solution</u>
7	I/O problem	reinstall software
10	Parity Error	replace memory
21, 22	program error	none
26, 27	bad source, bad memory	

Here's some other errors that occur during startup. These error numbers are in the 10700 range and are usually accompanied by a crossed out Lisa. Following is a list of these errors:

<u>Error</u>	<u>Meaning</u>
10725	Damaged file system or file contents
10726	Profile error, problem with boot tracks
10727	Memory Error
10728	Boot file is missing or damaged
10729	"
10730	"
10731	"
10732	"
10735	"
10736	"
10737	"

If one of the above errors is encountered do the following:

1. Reinstall the startup software - in 1.0 Owner's Guide pg. D-50
2. If step 1 doesn't work then repair and try again - in 1.0 Owner's Guide pg. D-53 (Lisa 2 Owner's Guide pg. C24)
3. If step 2 doesn't work then you may have bad Office System disks. Get another set and try steps 1 and 2 again.
4. If nothing has worked, then you need to reload the software. Take the Profile over to another Lisa and save any files if you can. Then reload all of the software onto your Profile - pg. D-32 in the Owner's Guide.

DMP:

Error Numbers:

<u>Error</u>	<u>Meaning</u>
0	Not configured in Preferences
1199	2 DMP's configured in Preferences
1222	More than 1 DMP in Preferences*
1885	Profile timeout error
648	Parallel DMP on Serial A or B
3056	Generic printer problem - check cables, paper, ribbon, etc.

Error 1222:

If you originally had a dot matrix printer configured in Preferences for a parallel expansion card, then disconnected the printer to move the card to a different slot, or remove it to connect an Imagewriter, but didn't set the device connections in Preferences to "No Device" before moving (or removing), this results in a "phantom" device connection. This means that when you try to print, the Lisa thinks there is still a card and printer there and will try to print there first, giving an error 1222. When you open Preferences to check the settings, only slots which have cards in them at that time are listed; the moved or removed card is not in the list, and so you can't change the setting or verify that there is such a setting. We call this a phantom device connection.

Finding Phantom Connections:

There is an easy way to determine if there is a phantom device connection. Open any document; pull down File/Print and choose Format for Printer; for Print Method and Paper Size, select settings which don't match any printer the user has ever had (choosing daisy wheel with 14" x 11" is a good one); at the bottom of the dialog box, choose Tell Me (in Office System 2.0, it's Ask Me); click the OK button. A new dialog box will appear, labeled Intended Printer Unavailable (in 2.0: Intended Printer not in Preferences). In the middle of the box will be a list of printers next to check boxes. This list of printers will include any phantom device connections.

To fix it you must install a parallel card in the slot (or slots) that has the phantom connection, then open Preferences and set the connection to No Device.

Landscape:

Printing landscape, normal resolution (low resolution) will print tiny. In 2.0 the default is Low resolution.

Printer Buffer:

Bill Krause of CMG reports that they have used a 32K model in-line parallel printer buffer right out of the box with no problems. One of their dealers reported successfully using a 64K model. The buffers are from:

Practical Peripherals, Inc.
31245 La Baya Drive
Westlake Village, CA 91362
(213) 991-8200

Memory Errors:

<u>Error</u>	<u>Meaning</u>
10590	Memory error encountered on startup
1033/10	Error encountered in Office System
System Hang	Memory error encountered - mouse hang

Most memory errors are caused by parity errors. They are usually characterized by system hangs where the mouse doesn't move. The problem is that there isn't an indication as to which board is failing. It has been asked whether the thorough test on startup or LisaTest will determine which is bad. If you run the extended test

In LisaTest it may catch the error, but most people in the field don't have LisaTest. So, here are some things to keep in mind:

Memory is set up so that the starting address is on Memory board 2. This means that the startup software, stacks, etc. are on memory board 2. Then data and overflow are on memory board 1. What this means is that if you experience memory problems on startup it is probably memory board 2. If it is during the operation of the system, it is probably memory board 1.

If the system has only hung once, don't be concerned until it happens again or until you get another memory error. If you get an error during startup (memory board crossed out) it's probably right. Have the indicated board changed.

LisaTerminal:

Notes:

1. When doing a paste into LisaTerminal to cause a file to be transmitted there is no way to abort the paste operation.
2. There is no way to have LisaTerminal automatically respond to a prompt from a host computer (such as an editor prompt for next line).
3. If you have any LisaTerminal problems please send them in with enough supporting documentation to reproduce the occurrence.

VT100 mode:

When attempting to emulate VT100 operation with LisaTerminal, set LISA to "forget" lines that scroll off the screen. This mode appears to much more accurately emulate VT100 functions. The LISA can be toggled to "remember" to download data or text, then toggled back for VT100 terminal operation. When toggling back and forth, LISA does not clear that text which has been "remembered".

Memory Management:

LisaTerminal/LisaWrite have a problem when attempting to copy and paste a large document (20 or more pages) from LisaTerminal to LisaWrite. You can read the text into the LisaTerminal window, copy it onto the clipboard, and paste it into LisaWrite, but you run the risk of damaging the LisaWrite tool in memory. This will give you problems like: messages saying that you have too many windows open and the display is too complicated; or a technical difficulties message with a 1033/21 error; or other bizarre behavior when using LisaWrite.

To avoid problems: copy smaller portions of your Terminal document to paste; save the Terminal and Write documents before you start any editing in LisaWrite; at any sign of strange behavior in LisaWrite, turn off the Lisa and turn back on. When it comes back it will be OK.

- Dialing up another Lisa:** To dial up another Lisa, or any other computer, you need to have a modem that has an auto answer capability - Hayes Smartmodem or an Apple Modem. Make sure that the compatibility settings are the same for both machines and for convenience sake make sure it is set for half duplex to see what you're typing. Then just dial their phone number, their modem will answer and send back the carrier. When your modem receives the carrier it will tell you that you're connected. Anything that you type or paste will be sent. To terminate the connection just hang up from the phone menu.
- Copy/paste from Write:** When you paste from LisaWrite to LisaTerminal, Terminal expects a carriage return after every line. If the line is too long it will truncate it. There is a way of getting around this. Copy the Write document and paste into an off line Terminal document (one that isn't dialed into anything). The Lisa will put in carriage returns for you. Copy it again, dial up, then paste.
- There are two problems with this method: The first is that it will break in the middle of words if you don't have word wrap set. To avoid this you can set it to 132 characters. There will be less of a chance of breaking in the middle of a word. Or turn on word wrap.
- The second problem is that if you are communicating with the Source, they require that the carriage return be within 80 characters. The problem is that LisaTerminal puts that return in the 81st position. Having Terminal set for word wrap will alleviate the problem somewhat.
- Copy/paste from Calc:** To transmit information from LisaCalc in the appropriate format (in columns) you need to set tabs in LisaTerminal first, reflecting the width of each column to be transmitted, before pasting from Calc. Otherwise all of the information will be in one column, with spaces between each entry. A description of how to set tabs in Terminal is on pgs. 46-48 in the LisaTerminal manual.
- Hang when line is busy:** If you are using the auto dial feature in LisaTerminal and the line is busy or there is no answer, the system appears to hang. Actually what is happening is that LisaTerminal has a timeout loop and there is nothing, short of pulling the plug, that will get it out of the loop. When the Lisa does finally timeout (in one minute) it will behave normally.
- Apple Modem cables:** The Apple modem uses a cable similar to the Mac printer cable. Since they do look alike, this can cause problems when communicating with the modem if you have the wrong cable.
- Setting the baud rate for an Apple Modem:** For the Apple 1200 modem the baud rate is settable, however its not very obvious how this is accomplished. The modem will determine its baud rate by the speed at which information is passed to it from the program you're using. This means that if you set the Baud rate in LisaTerminal to 300 and then tell the modem to auto-dial, it will assume, from the speed of the message it receives, that you are going to be communicating at 300 baud. There is one catch: if you change the baud rate in the program without turning off the modem first, the modem will ignore you.

- Turn off the modem if you are going to change the baud rate.
- Protocol Converter:** Some have used the AVATAR PA-1000 In Line Protocol Converter with "remarkable success". The Lisa has evaluated this device along with the Irmaline Protocol Converter. They are leaning toward the Irmaline option since the installed base is about 10,000 compared to about 2500 for the AVATAR. Refer any questions about the two devices to Tech Comm.
- Cluster Controller:** The Apple Cluster Controller is an interface between an IBM host and the Apple Computer by emulating IBM 3278-2 terminal functions and 3287-1 printer functions.
- It comes in two flavors: SNA/SDLC, which emulates an IBM 3274 or IBM 3276 Control Unit/Display Station; and BSC (bisynch), which emulates an IBM 3271 Control Unit.
- The only limitation in the emulations is that the cluster controller will not support low and high intensity displays.
- VT52 Errata:** In the LisaTerminal manual, page 81 gives the chart for cursor control characters in the VT52 mode. The command for direct cursor address is incorrect. It should read:
- | | |
|-----------------------|----------|
| Direct cursor address | ESC Y1c* |
|-----------------------|----------|
- Keyboard:** The keyboard layouts are shown in Appendix 4 in the LisaTerminal Manual. Descriptions of VT-100, VT-52 and TTY CONTROL and ESC codes are also in Appendix 4.
- CR-LF:** If you aren't receiving a line feed character from the computer that you're trying to communicate with then you need to instruct the other computer to send them. It is not a problem with the LisaTerminal program. In the book it suggests that setting Auto New-line to On will resolve this problem. It doesn't.
- Clear Screen:** If you are having problems with clearing the screen then try this: set the Columns Per Line from 80 to 132 then back to 80.
- Capacity:** The capacity of a LisaTerminal document is 1500 lines. When you reach that limit, it will give you a message telling you to save the document and start on another. Otherwise, if you continue to record information you will begin to have memory problems, and run the risk of losing your document.

LisaWrite:

- Page marks:** Getting rid of page marks: If it's on a line by itself click 3 times on it with the mouse to select it then backspace or cut. If it's not by itself then click on the line below and backspace. Page marks are treated just like carriage returns.
- Letterhead:** If you want a larger margin on the top of the first page to accommodate a letterhead: set your margins for the second page, then click at the beginning of the document and use the RETURN key to space down the required amount.
- If you don't want to do this every time you create a document

then tear off a new document. Put in the required number of RETURN's at the top. Save and Put Away the document. Then make a stationary pad out of it. From then on when you tear one off, click down near the bottom of the document to put the cursor below the carriage returns.

- Double underline:** To double underline do the following: Set the format to single spaced paragraph. Go down to the next line and type in equal signs ("="). Go back and select them. Set them to superscript and bold. Then change the type style to 15 pitch, 12 pitch Elite or PS Executive. The equals will blend together in these type styles to give you the appearance of double underlines.
- Tabs:** Setting tabs is described in the LisaWrite manual on pages B104-B118 in the Tutorial. The method described in the book is the most trouble free as long as you remember two things: to press the TAB key as you're entering data; and when you're moving a tab on the tab ruler that all of the tabs to the right will move with it.
- Formatting:** If you are having problems with formats disappearing keep this in mind: all formatting is held in a carriage return. When you lose formats it means that the carriage return wasn't carried on to the next paragraph (i.e. you clicked in the wrong place before starting to type). The easiest way to fix it is to select a paragraph that is right, Copy it, select the paragraph to be fixed, then select Same as on Clipboard from the format menu.
- Printing on Right:** Don't set the right margin past 8" on an 8.5"x11" paper, or past 10" on landscape because LisaWrite has problems printing so close to the edge of the paper on the right. Otherwise, when you try to print you will get a message saying that there is information outside the printable area.
- In 2.0 this problem has cropped up even when the margins were set properly. In this case if you select all of document you will see that there is information past the margin on the right. When you get rid of it the document works fine.
- Printing underlines:** In 2.0 LisaWrite, if you print underlined words in Landscape, it prints the word but not the underlines.
- Blank pages:** Sometimes people complain about having blank pages at the end of their document. The first thing to do is click 3 times at the beginning of the blank page to see if anything is selected. Sometimes there are carriage returns that are carried at the end of the document. If nothing is selected then all you need to do is save and put away the document. This will get rid of any truly unused pages.
- Preview Pages:** There are a variety of display problems associated with Preview Pages (this includes showing the Page ruler and printing). Pieces of text are displayed in the wrong place, the elevator disappears, and text disappears. You may also have problems with it not being able to print a page in a specified range, or not displaying the document past page three.
- If you are having general display problems, just avoid using

Preview pages or the page ruler. If you are having problems printing a specific page, have that page displayed in the window before you print, or select a larger range. If a large portion of your document is gone, Don't Panic. It's still there, but not displayed. Select Don't Preview Pages, then Save and Put Away the document. When you open the document, it will come back whole. It was thought that these problems were fixed in 2.0 but we have received reports indicating that the bug is alive and well.

LisaCalc:

Capacity:

The ongoing question of the maximum size of a spreadsheet has no simple answer as you probably have deduced on your own by now. There are two limitations to the size of a LisaCalc document; the first is raw memory, which is no surprise. The second limitation is far more subtle. Calc maintains a table of pointers to the locations of the cells and formulas. This table does not get additional entries when "cut and paste adjusting" is used, thus a larger document can be generated by using "cut and paste adjusting" than by using direct entry or "cut and paste". Note that is a very simplified explanation of the way this pointer table is used so don't take this as THE explanation. Note however, that the size of the pointer table is being expanded enough to eliminate it as a constraint, leaving memory as the only limitation. The maximum size is somewhere around 300 to 400 blocks currently.

Management Techniques:

There are some techniques for managing the size of a spreadsheet:

Plan Ahead. Not only will the process of entering the information be easier, but as you'll see, making changes will have the tendency to increase the size of the sheet.

Keep the information in a somewhat rectangular construction (i.e. not an L shape). LisaCalc keeps track of All of the cells in the rectangle that contains the information in your sheet. This, by the way, will also account for the Lisa printing blank pages on occasion.

Paste Adjusted formulas take up less space than regular pasted or entered formulas. The reason for this is that the adjusted cells contain a pointer to the original formula with an increment. There's a couple of things to keep in mind, though, when using this method. First, if you paste adjust a small formula to a few cells, this won't save you any space. It works best on long formulas pasted into large ranges. Second, once you start copying, cutting, pasting, and inserting rows or columns, in the process of readjusting formulas LisaCalc will replace the pointers with real formulas, thus increasing the size of your sheet. **Plan Ahead.**

- Cell Selection:** If you want to select a range of cells that is larger than the window (such as A1:A100), click in the Cells area at the top of your document (or press APPLE-G) and type the range. Pressing ENTER will select the range.
- Time to save and put away:** In response to complaints that it takes a long time to save large Calc spreadsheets, the only answer is that the process simply takes that much time. Save times of 15 or more minutes are not uncommon or abnormal. There are no suggestions for optimizing this save time. However, if the sheet has Lookups, Ifs and Searches, the sheet seems to take longer to save.
- Cut & Paste:** Even though you have the option of cutting or copying the entire LisaCalc document, pasting it into any document is not possible. This can have tragic consequences if you cut all of document, because you are unable to paste it back into the document it came from.
- Cut & paste with formulas:** When you cut cells, formulas that directly refer to those cells are set to ERROR. When you paste, the formulas will be adjusted to reflect the location of the new cells. If you cut a group of cells and the formulas that refer to them, and paste them to another location, the formulas are automatically adjusted.
- Find Missing Value:** Find Next Missing Value does not always work. The problem occurs when the selected cell is in a column that never had any values in it. An alert box appears that there are no missing values below the selection. Be sure the selected cell is in a column that has another value.
- Formulas:** A significant number of questions are about how to set up a particular formula, or which formula will do the operation wanted. There's no way of describing every formula here, however, here's a bit of advice. Be creative, and know what your options are. In the appendix of the LisaCalc manual is an alphabetical listing, with descriptions, of all of the formulas available in LisaCalc. Use them to their best advantage, and don't be afraid of combining them to get the desired result.
- Cell coordinate entry:** There is a method for entering a cell's coordinates without typing it. Just point at the cell, press the OPTION key and the mouse button at the same time.
- Calculation:** It has been commented that the calculate time on Lisa is too long. The reason it takes longer than other calc programs is that it makes multiple passes. LisaCalc will first calculate by rows, then by columns. It then checks the two answers. If they are not the same it calculates by rows again and checks to answers. This is continued until two successive calculations yield the same answers.

Error results: Sometimes when you have seemingly innocent formulas, like $A1+B1$, you may get an Error result if A1 or B1 is blank. Ordinarily, blank cells are to be treated as zero in a formula. But sometimes the program forgets that. To get around it, just put a zero (0) in the blank cell.

Precision Problems: When real numbers are used in a IF test, you encounter problems with round off, which can cause incorrect evaluations. For example if you have a formula, $IF(A1+A2=A3, "ok", "not ok")$, and if cell A1 contains 2.1, A2 contains 1.2, and A3 contains $A1+A2$, the formula will return "not ok", even though the values look identical. The reason for this is that values in a IF statement ($A1+A2$) have a different precision than values in a cell (A3). Thus, when the two are compared, they are not the same, even though logically they are. To get around this, use Integer numbers for equality tests to avoid this situation, or use an INT function in your IF statement.

Lookup: In the LisaCalc Manual on pg. D32 it implies that you can enter more than one range for Range1 in your Lookup statement. Not true. When you enter the second range it assumes that this is Range2. There is a way of getting around this if your Lookup table spans more than one row or column. Let's say that you want a Lookup table to look up a number in the range of 1 to 300. Obviously, this will be more than one column or row. In Cells B1:B254 you have numbers from 1 to 254. In the column to the right (C1:C254) you have the result to return. In Cell B255, instead of entering the value 255, enter 301. This is a number larger than the range you are looking in. To the right of that you have a lookup that looks like this: $LOOKUP(A1, D1:D46, E1:E46)$. D1:D46 has the remaining numbers in your Lookup table, the results are to the right in column E. So in your main Lookup Statement you would have this:

$Lookup(A1, B1:B255, C1:C255)$

If the number you are looking for in A1 is 260, then the value returned will be the result of the Lookup in Cell C255.

How to check for a blank cell:

There are some instances where you will want to check to see if a cell is actually empty, or blank. To test for a cell that is blank you need to compare it with another cell that you know will always be blank. Like this:

$IF(D5=X255, 'blank', G4-D5)$

assuming that X255 is always empty.

New vs. Used: On a new Calc sheet enter the following: In cell A1=20, A3=30, A4=50, A5=100. In A6 enter MIN(A1:A5). The value will be 20. Now enter anything into any cell (other than A2) in row 2. The value in A6 is now 0. The problem is that it appears that LisaCalc makes some kind of distinction between new and used rows or columns. To get around this you would cut row 2 and insert another in it's place.

Using dates in formulas: To use a date in a formula, as for calculating cost per day, you need to transform the date part into a number. To accomplish this, use the INT function:

$$\text{INT}('12/4/84'-'1/3/84')*500$$

More About Dates: There are couple of problems encountered with dates: The first is in 1.0. Sometimes when you subtract two dates, LisaCalc may come up with a bizarre number of years (i.e. -2345345 years). Once this happens you can't get rid of it. Version 2.0 seems to work fine.

The second problem is in regards to calculating dates in a leap year after the leap day - 3/1 through 12/30. For example, in two cells enter the following formulas:

$$\text{DATE}-1/1/84 \text{ and } \text{DATE}-12/30/83$$

The results should differ by 1, but they don't. Instead they differ by 2. The first will be 102, the second will be 104. There may be other problems with leap years. The problems are fixed in 3.0.

Net Present Value: There have been questions regarding the formula used for the Net Present Value function. Here is an example derived from an accounting book which seems to work:

$$\text{NPV} = I/(1+D)^1 + I/(1+D)^2 + I/(1+D)^3 + \dots + I/(1+D)^n$$

where I is the investment, D is the discount rate, 1+D is raised to the number of the period that particular investment value falls into. Basically what you're doing is finding the present value of each investment for each period and adding them all together to get the net present value.

Sorting: Yes, there is a way of sorting in LisaCalc. Let's say, for example, that you wanted to sort a column of numbers (B1:B35) in Ascending order. To do this you need to set up an additional column of formulas like so:

In the first cell (C1) you would put

$$\text{search}(B1:B35, \text{cell}<\text{result}, 500, \text{cell})$$

In the next cell (C2) you would put

$$\text{search}(B1:B35, \text{cell}<\text{result and cell}>C1, 500, \text{cell})$$

and then paste adjust it to C3:C35, adjusting the C1. This will search the range B1:B35 and sort them in ascending order. The 500

value is any number larger than the largest number in the range.

To sort in Descending order, the formulas will look like this:

In the first cell (C1) you would put

`search(B1:B35, cell>result, 1, cell)`

In the next cell (C2) you would put

`search(B1:B35, cell>result and cell<C1, 1, cell)`

and then paste adjust it to C3:C35, adjusting the C1.

Note: There's a couple of things you need to keep in mind when sorting. The first is that this will only resort a single row or column, NOT entire rows or columns as is done in LisaList. The second is that if there are repeats of numbers in the range you are sorting, they will show up as NAs at the end of the list.

LisaDraw:

Pasting:

When pasting into Draw, objects are pasted centered around the last mouse click. If you haven't clicked in the document, it is centered on the first page.

Centered text:

If you select an object and start typing, the text will be aligned in that object. This means that if you have align centers selected (this is the default) your text will be centered on the object.

Cut & Paste from Write:

Text can be cut or copied from LisaWrite and pasted to Draw, BUT LisaDraw doesn't know how to wrap words. So, the information pasted is pasted in one long line. For example a paragraph that may take up 5 or 6 lines in Write will be pasted into Draw as one long line, which may or may not fit.

Even Spacing:

There are two methods for spacing objects evenly. The easiest and quickest is to align to Auto Grid. If you want to make copies of an object and have them all evenly spaced then make a duplicate, move it the distance you want and then make a duplicate of the duplicate. See page B70 in the LisaDraw manual.

Shading:

Text comes with white shading, as do closed objects (circles, squares, etc.). Arcs and freehand curves come with no shading. No shading can make it hard to select these objects. Shading them gives you more selectable area. Be aware that groups of objects (lines, for example) cannot be shaded.

Error 3001 or 3007:

These errors, encountered when attempting to print, occur occasionally when using BACKSPACE to delete characters in text strings. Sometimes this changes the type style of the string to the system font, used for the display of Lisa menus and messages. Unfortunately LisaDraw doesn't know how to print this.

The easiest way to resolve the problem is to Select all of document, change the type style to something else and change it back to whatever you had. The other option is to print while You Wait. LisaDraw will stop printing before it has to print the offending text string. When you've found it, clear it and retype it

or change the typestyle. (To identify a bad string: If you type a 'v' and it looks like the 'v' in 'Save' in the File/Print menu then it has been changed.)

This problem was fixed in 2.0, but if a document created in 1.0 was converted to 2.0 and it had in it the bad text it will exhibit the same symptoms. Fix it as before.

Shrinking & Stretching: Shrinking and stretching are described on pgs. B19-B21 and C75-C76. Here's some things to keep in mind when stretching and shrinking an object or group of objects:

To avoid distortion of your objects, don't use the corner handles. Use the handles on the middle of each side and move each of them the same distance from the center. For example, if you had a square (2x2) that you wanted to increase to a 4x4, you would take the handle at the middle of each side and move it an inch out from the center.

To stretch or shrink a bunch of objects, group them first. It's easier and sometime quicker.

Pasting from Graph: Keep in mind that Graphs pasted in from LisaGraph are grouped, sometimes in many layers. This means that in order to access a part of it you need to ungroup the objects until the one you want is free.

Printing landscape: When printing landscape, horizontal lines and text will come out longer than it appears on the screen. The reason for this is the difference in resolution from the screen to the printer is a problem. There is no workaround other than to compensate for it on the screen as you're drawing (make horizontal lines a little shorter, position text in boxes a little to the left, etc.).

Printing: The lower most and right most pixels will not print. Avoid putting information into this region

2.0 Stationary: Paper torn off the 2.0 LisaDraw stationary pads are 8 pages wide. To make a pad with fewer pages, select the preferred Drawing Size. Then draw a box, circle, line, etc, (lines white, shades none) before Saving and Putting Away the document and selecting Make Stationary Pad from the File/Print menu. You can throw away the old stationary pad if you wish.

Complex drawings: There have been several instances where documents that are 1-2 pages, but extremely intricate, have a tendency to disappear (unable to display document). The only suggestion is to KEEP BACKUPS.

Capacity: The maximum that we've heard is about 300 pages. We haven't talked to anyone with more than that.

LisaList:

Sorting:

Sort orders and comparisons are discussed in Appendix 4 of the LisaList manual. One problem that people frequently have is using a Text format rather than a Number format for a column that has numbers in it. LisaList, when sorting number formatted fields, will

sort them in ascending or descending numerical order. If these numbers are instead formatted as text then they will be sorted via a comparison of letters. This means that all of the numbers starting with 1 (10, 15, 100, 1000, etc.) will be together, the 2's will be together, etc. The only way to reformat the information is to add another column with the right format and transfer the information.

Data formats: The different varieties of data formats are discussed in Appendix 5 of the LisaList manual.

Zip codes: LisaList DOES accept 9-digit zip codes.

2.0 Conversion: There has been one problem encountered in the conversion of 1.0 LisaList files to 2.0. In mainly large files, number columns may come up blank. If you click in the cell the information it contains is displayed at the top of the document, but it won't display in the field. The only recourse is to add another column and reenter the information.

Capacity: The published capacity of LisaList is:

maximum for a list size depends on amount of disk space
990 bytes per record
100 fields per record

*Keep in mind that files that used to fit on the 5-1/4" disks may be too large to fit on a 3-1/2" Sony and the Lisa Operating System will NOT split it.

LisaGraph:

Copy from Calc: To copy rows from Calc and paste into columns in Graph you need to make sure that you select the entire row, by clicking in the row header, or the entire column, by clicking in the column header. Selecting a range of cells doesn't work. If you have information that you don't want to have in Graph just cut it after it's pasted.

2 decimal places: Be aware that if you want to have two decimal places on the X or Y axis numbers, LisaGraph will Always round the numbers up to 1 decimal place for any increment you choose except .05.

Customize X axis: To customize the X axis you need to make sure that you have a line graph or a scattergram selected. Customizing is described on pgs. C89-C93 in the LisaGraph manual.

Changing Shades: To change the shading on the bars and legends in a bar chart you need to paste the graph to LisaDraw, ungroup it, then shade the bars.

More graphs on a page: If you want more than one graph on a page then paste the graphs onto a LisaDraw document and arrange them the way you want.

Capacity: More than 2000 data points. How much more isn't really known.

LisaProject:

- Connecting tasks:** Be careful not to draw lines sloppily. For example, if you have a 3 tasks that are supposed to happen one after the other and the date on the middle task starts at the beginning of the project it may be that instead of connecting them one at a time a line was drawn from the first to the third. It may look like the second task is connected but it really isn't. To see how far the line extends just click on the line.
- Drawing Size:** The maximum physical size of any LisaProject document is usually 96" X 48". If a document is created in landscape, it will only be 6 pages across by 4 pages down (69" X 48"). When you attempt to add any other pages in either direction, an alert comes up saying the document cannot be made any larger than 96" X 48". If you wish to have a large landscape project, create the document in portrait, then change it to landscape.
- Resource Chart:** Resources listed on the Resource chart are listed in the order in which they were entered. However, if you save and put away the project they are listed from left to right as they appear on the chart. To get them to list in the order you want, make a task box at the very left side of your project and enter the resources listed in the order you want. Save it. When you open it again it will display the resources in that order. Any additions that you make will appear at the bottom of the chart.
- Dates:** If a date shown on your task box has question marks in it this means that the date exceeds your calendar range. This sometimes happens when you've set a scheduled date that caused the program to push the dates outside of the calendar range.
- Resources:** LisaProject does not allow for resources working on different tasks at the same time. If tasks are not being scheduled the way you wish then rename your resources so that each is unique. For example if you have Joe working on two parallel tasks then use Joe 1 and Joe 2 instead, so that the program thinks they are different resources. Resources can also impact the scheduling of tasks later on in the project, so keep an eye on them.
- Scheduled dates:** When you enter a scheduled date for a task then the schedule will recalculate the dates to reflect it. However, if the date you enter is thought by the program to be impossible it will override it and put in a date of its own. It will show the date underlined as if you had set it.
- TABS:** Make sure that when entering resources and durations that you use TAB to move to the next field, NOT Spaces. Otherwise it thinks you have a duration of zero.
- Extra pages:** If you have extra pages you want to get rid of just save and put away the document and open it. The pages will be deleted for you. If this doesn't work, then change the print orientation (i.e. portrait to landscape), change it back, then save and put away. It will delete the extra pages.

Start at beginning of calendar:

If the resource and task charts begin at the beginning of the calendar instead of the actual beginning of the project then you either have a task or resource without a predecessor or you have encountered a phantom task box. It has been reported that large phantom task boxes appear when a schedule is copied and pasted to LisaDraw. Also, sometimes a box will show just off the edge of the schedule. They seem to be spontaneous, and there's no way to get rid of them.

Capacity:

The capacities we know about are:

Over 1000 tasks (more have been reported)
Over 100 resources per task
20 vacation days
60 pages

Workshop:

There is some confusion as to what the Workshop is. The Workshop is a shell that runs under the same operating system that runs the Lisa Office System. It is a development environment that includes a system manager, file manager, the mouse editor and other utilities. The Workshop is sold as part of each language package, thus buying any of the three currently available languages (Pascal, Basic, Cobol) will include the workshop. All three languages include a language reference manual (2 volumes for Cobol) and a Workshop Users Guide. Only the Pascal product comes with the Operating System Manual since only Pascal has access to most of the features described. Each language is packaged as a stand alone product for the Lisa, therefore each one must come with the complete Workshop environment. Note: The Pascal package also includes the 68000 assembler.

Eliminating LisaBug:

For better or for worse, LisaBug comes as part of the Workshop in the form of two files: SYSTEM.DEBUG and SYSTEM.DEBUG2. In version 1.0 of the software, the mere presence of these two files enables the NMI key (non-maskable interrupt) in the Office System. This can be very distressing to end users when they press the NMI key, the minus sign on the keypad. There are two options to deal with this problem; 1) change the NMI key code or 2) disable the debugger completely.

The latter option is very simple, but will only last for the duration of a session. The next time the system is rebooted the NMI key code is set back to the minus sign on the key pad. To change the key code for the session use the following procedure:

1. Enter the debugger by pressing the NMI key (minus sign on key pad).
2. Enter the command 'NM 0' and a carriage return in response to the debugger prompt of >. This sets the key code from hex 21 to hex 0 (i.e. no key)*.
3. Type a 'g' and a carriage return to return to your starting point.

To disable the debugger there are three options: 1) delete SYSTEM.DEBUG and SYSTEM.DEBUG2, 2) change the names of the two files to something besides names starting with SYSTEM.xxxx (this enable easy restoration at a later time) or 3) transfer the two files to floppy, thus freeing up the disk space until the user wants to restore the debugger. Note; you must reboot the system before these changes will be recognized by the operating system.

* When respecifying the NMI key, to need to specify the key location not the ascii code for the character you want. The table of key codes is on page F-6, table F-1, in the Pascal Language Reference Manual.

Program termination:

There are a couple of ways to terminate a user program which is in an infinite loop from Lisabug. When you find your program in an infinite loop press the NMI key to get into the debugger. If the domain is greater than zero (1, 2 or 3), then type a 'G 0' and press RETURN. This will bring you back to your program then immediately return to Lisabug. Then type a 'G' and a RETURN. The program screen will redisplay with the message 'Process had a bus error'. Control is returned to the shell. We have also used the sequence of 'PC 0' from Lisabug to set up an exception then 'g 0' to return with a Bus error. Again this works fine from a domain greater than zero.

It is sometimes hard to get a non-zero domain if the program is caught up in I/O. You can sometimes type 'UBR' in the debugger which will cause a break in user code (domain greater than zero).

Here is another situation you may get into: Here we have a program with a procedure as follows:

```
Procedure QUIT;  
  
begin  
  
    exit(PROGRAM_NAME)  
  
end;
```

You must include a reference to QUIT in the main program or the Dead Code Analysis will remove QUIT from the object code. When you wish to terminate the program invoke Lisabug with the numeric keypad '-' (NMI) and enter the following immediate commands:

```
br  
ix movem.l d0-a6,-(a7)  
quit
```

The program will terminate and return you to the Workshop shell.

Pascal

Using Serial Ports:

How to use Serial ports in Pascal: There have been problems using the serial ports for output, the following suggestion may relieve some of them.

Although the serial ports are not file storage type devices they must be specified with a dummy file name since Lisa handles all I/O devices in the same way (see Operating System Manual). Thus when using a serial port give it a dummy file name for the pathname. Example:

```
reset(f, '-rs232a-xyz') where xyz is the dummy name
```

If you are going to be writing a program to talk to some other type of device, like a card reader, or test equipment, then you should take a look at Chapter 2 in the System Software Manual, particularly the Device_Control procedure on pgs. 2-24 thru 2-32. This allows you to configure the drivers for each of the ports to allow communication with other devices.

Creating shells:

To create your own environment shell, essentially all that is needed is to rename your standalone pascal code to SHELL."something". Once its named "shell", the environments window will allow you to start it up or if you set the defaults, it will automatically start up. You may also need some special code to shutdown the shell properly. The code and explanation is too long to write here, but if you are serious about writing code and making it a shell let Tech Comm know and they will send the information to you.

Mounting and reading twiggy diskettes:

Once you have detected the insertion of a disk into the drive by using KeybdEvent, (event.key in [1,3]) you must do the following to mount and read the directory.

```
mount(error, volname, passwd, device)
reset_catalog(error, pathname)
```

then read the file names until done, error 848

```
get_next_entry(error, prefix, filename)
```

All of these file system calls are documented in Chapter 2 of the System Software Manual in addition to other calls that will allow you to get additional information about the files other than the file name.

Units:

There has been some question as to whether units are available in Pascal. As it turns out, you can go ahead and compile a regular unit (although the manual gives you a minimum of information), but you don't have to put it in a library to use it, as for the Apple II and III. You cannot, however, create your own intrinsic units.

To compile a regular unit you need to include a compiler command at the beginning of your unit.

```
{SU-}
Unit Sample;
  Interface
  ...
  Implementation
  ...
end.
```

Just include the object code file in your program's uses statement. The only problem that we have encountered is nesting units. This seems to have problems.

Lisa Application File Structures:

Lisa division has stated that they do not have the resources or the time to publish the specifications of the file formats for the existing Desktop applications. Unfortunately each application has its own format since they were all developed somewhat independently. This very problem is one of the main issues that Toolkit should take care of since it will standardize data representation.

Numerics:

Pascal numerics are discussed in Appendix D of the Pascal Language Manual. It discussed 16, 32, 64 and 80 bit representations of numbers and how to access the routines to use them.

Basic numerics are discussed in Section 4.1.2 of the Basic Language Manual where you will note that all real numbers in Basic are double precision (which helps account for Basic's less than blinding speed). Also see Appendix B in the same manual.

Pictures:

There has been a problem using Pictures in Quickdraw. One thing that they neglected to include in the book is that before you do any picture drawing you need to set the ClipRect. Just include this line in your program:

```
ClipRect(thePort^.portBits.bounds);
```

before you do any picture drawing.

TextSize:

TextSize doesn't seem to work. Use pictures instead.

Printing Graphics:

In the current implementation of Quickdraw there is no facility for printing graphics. If you just want to print the screen you can go to the debugger and specify which screen and printer. The only limitation is that the debugger only prints to a parallel DMP. See pgs. 8-18 through 8-19 in the Workshop Manual.

If you want to write your own routine to print graphics, it is possible using the printer ESC sequences. The only thing to remember is that when you are opening the printer, make sure you specify the actual port it is connected to in the pathname, instead of '-printer'. See the sample programs at the back of this document.

Type Styles:

There are a variety of typestyles available to you in QuickDraw. Unfortunately, these are not listed in the book, so here it is:

Font #0	system font
Font #1	Small icons and symbols
Font #2	LisaDraw shading patterns
Font #3	More icons and symbols
Font #4	ps pitch, 12 point, sans serif
Font #5	ps pitch, 18 point, sans serif
Font #6	ps pitch, 24 point, sans serif
Font #7	15 pitch, 9 point, sans serif
Font #8	12 pitch, 12 point, sans serif
Font #9	10 pitch, 12 point, sans serif
Font #10	ps pitch, 12 point, serif
Font #11	ps pitch, 18 point, serif
Font #12	ps pitch, 24 point, serif
Font #13	12 pitch, 12 point, serif
Font #14	10 pitch, 12 point, serif
Font #18	Calculator symbols
Font #19	20 pitch, unknown point, sans serif
Font #20	LisaGraph tic marks
Font #21	18 pitch, sans serif
Font #22	Large icons and symbols
Font #49	LisaGuide icons and symbols

To access these type styles, use the number of the font as the parameter of the TextFont procedure. To explain some of the terms used, pitch is the number of characters per inch, ps pitch is proportional spacing. Point is the size of the characters. Serif is the style of the character: Serif means the "executive" or "classic" type styles. Sans serif represents the "modern" typestyles.

This is an example of serif
This is an example of sans serif

Font numbers not listed are comprised of undefined characters.

Quickdraw Samples:

Quickdraw samples are included at the end of this document. They include how to get characters from the keyboard, display them on the screen and simple editing. Also included is an example of how to define the mouse cursor, conversion of text strings to numbers, and other fun things.

Cobol:

Development Tools: Apple does not have any development tools for Cobol other than what is offered in the Cobol language product. Other Cobol tools may be available from Micro-Focus, the people that wrote the Lisa Cobol for us. Direct your requests to them.

Printing: There have been problems printing to a printer on a parallel card in slot 3. Slot 2 seems to work fine.

Basic:

Available Memory: For those who want to know how large the program area for Basic in the Workshop is, please take a look at the discussion of the Length command Section 3.3.2.2 in the Basic Language Manual. Length gives you the amount used by your program and the total amount of program area available.

Printing: Printing is discussed in Chapter 5 of the Basic Language Reference Manual on pgs. 5-5 thru 5-9. An example of how to open an output channel for the Printer is on page 11-2.

QuickPort:

Lisa QuickPort, also known as "the Vanilla Window" is being designed as a way of running a straight Workshop type program from the Office System desktop. The idea behind quickport is to let a user port a program that is currently running elsewhere to the workshop environment. The user must then get the program up and running in the workshop. QuickPort would then enable the user to open a window on the desktop and run their application program. Decisions are currently being made on ways of supporting graphics and the mouse through the window. Quickport is expected to be available in the spring release of 1984.

Toolkit:

The ToolKit is currently available to registered developers only. ToolKit is based on Clascal which is a superset of Pascal and is a powerful object oriented language. Using ToolKit a developer will be able to fully integrate an application onto the desktop in the Office System.

The Toolkit, however, will also require a significant commitment in time and effort to learn and should be used when there is a genuine interest in integrating with the rest of the Office System. Users that want to extend the functionality of some of the current applications (such as accessing Calc or Project documents) should definitely consider using the ToolKit. However, be aware that the ToolKit will NOT be supported. You're on your own.

Disks:

Diskette is Deteriorating Message:

This means that some bad blocks have been encountered on the diskette and spare good blocks are starting to be used. There is a directory which contains addresses of good blocks that can be used as spares. But if you get too many bad blocks on your diskette you will run out of good spare blocks and the spare block directory will be exceeded. This is when the diskette becomes unreadable. So, if you get the message that the diskette is deteriorating, its time to start thinking about putting the documents onto another diskette. The other possibility is that if the disk works fine in other drives then there may be something wrong with the drive.

ProFile - Memory Loss: If you suspect that you don't have as many blocks as you should then turn off the system and do a repair. In the Lisa 1 Owner's Guide it's on pg. D53. In the Lisa 2 Owner's Guide it's on pg C24. Do steps 1-6, on step 7 click Don't Install, then skip to step 12.

Boot PROM Versions: When a Lisa is booting the ROM versions appear in the upper left hand corner of the screen (not true for older machines). The letter indicates the boot ROM version. A slash then separates the letter from a two digit number that indicates the floppy drive ROM version.

Miscellaneous :

Page Numbering:

These examples will show how the Lisa Office System numbers pages in documents that extend both horizontally and vertically over more than one page. These examples are for four pages, extending the numbering scheme for additional pages should be obvious.

Calc, Graph, List: 1 3
 2 4 (by columns)

Project 1 2
 3 4 (by rows)

Draw (In portrait format) 1 3
 2 4 (by columns)

Draw (In landscape format) 1 2
 3 4 (by rows)

This ordering is useful for those occasions when a user wants to print only a portion of a document.

- Screen Dumps:** To do a screen dump, press the left-hand OPTION and SHIFT keys and the 4 on the key pad, all at the same time. If you are using version 1.0, this will only print to a DMP on the upper port on the parallel card in slot 2. In version 2.0 it will print to any dot matrix printer in any slot.
- Spontaneous reset:** A Lisa that resets itself spontaneously may have a bad power supply. A Lisa that starts itself up has a bad I/O board.
- Dialog boxes:** When you get a dialog box with buttons, you may have noticed that one of the buttons has a heavy outline. This indicates that that option is the default. Most of the time, if you click outside the box the default selection is automatically selected.
- Empty folders:** If you have lost the Empty Folders pad, there is an easy way to get another. Every initialized or repaired disk has a pad of Empty Folders. Just make a duplicate from one of these diskettes onto the Profile.

Accessing the Environments Window:

This is a summary of methods of accessing the environments window:

1. Office System;

From the Office System press the on-off switch while holding down the apple key to access the environments window. (Owner's Guide pg. G26 and Lisa 2 Owner's Guide, pg. G55.)

2. Workshop;

(Q)uit the main command line and respond Y to leave editor etc. Respond with an A to get Another_Shell, this brings up the environments window.

3. While booting;

Press any key on the keyboard except Caps Lock after the double click. The double click occurs at the end of the self tests, right before you see the large hour glass on the screen. If you specified the start up device from the "Start Up From..." menu then press any key after starting the boot.

- Magic Lisa Keystrokes:** A request was received for a summary of special Lisa keystrokes such as NMI, and screen dumps. Such a list does not currently exist. Nearly all of the so called magic keystrokes in the various manuals. Screen dump - see Owner's Guide, NMI and screen dumps from Workshop - Workshop Manual, Debugger section.

- Copy Protection:** There has always been a bit of confusion about how the copy protection on the Lisa works. Again, here is a description of how it works:

When a tool is copied for the first time it is imprinted with the serial number of the Lisa it is first copied on. This binding happens almost immediately so aborting the copy will still leave the master diskette tied. From then on all copies from that

master will only run on this first system.

You can make as many copies as you like and on ANY Lisa, But the copies will only run on the first Lisa the master was copied on.

The master diskette can run on any Lisa BUT the tool cannot be copied onto the profile and run.

The serial number is contained in a prom located at position C6 on the CPU board. If the CPU board is replaced for any reason it is important that this prom be placed on the new board, otherwise the software will be unusable on their system. If the Prom itself is bad then a new prom can be burned for the system or new software issued.

Which tools are protected:

The TOOL (spiral binder type icon) for each of the Lisa applications is protected. If you look at the file listing they look like "[T1].obj". The stationary pads, Office System 1-4, and LisaGuide are NOT protected.

In Pascal: Pascal.obj, Code.obj, and Editor.obj are tied.

In Cobol: All of the Cobol overlay files are tied, and, of course, Editor.obj.

In Basic: Basic.obj and Editor.obj are tied.

Spares Kit - Software:

Software was not added to the spares kit because of the cost it would add to an already expensive kit. Spare diskettes can be ordered by dealers through the regional support centers like any other spare part, it is up to the individual dealer to determine whether those spares are necessary and in what quantities. There is also a program available whereby the dealer gives the user a care which is sent directly to Apple. The required diskette is then sent directly to them.

External Sony:

There are currently no plans to have Lisa 2's support an external Sony drive under the Lisa operating system. There is an excellent possibility that MacWorks will support an external Sony drive however, there is no timetable for when the hardware to implement this will be available.

Transfer of warranty information:

The procedure for transferring warranty information when an end user sells their Lisa to another end user is: Drop a note to

Apple Computer, Inc.
20525 Mariani Ave.
Cupertino, CA 95014
Attn: Linda Maybrook, M/S 23H

In the note include the name of the seller, name of the buyer and the serial number of the Lisa.

Lisa 2:

1/2 Megabyte:

There seems to be a number of questions about what software will work without a hard disk drive and what software will run in a 1/2 meg of memory.

1. The Office System will not run in 1/2 meg and will not run without a hard disk. In fact, if you try to startup the Office System 1 disk with only 1/2 meg you'll get an 885/315 error (not enough room to start up).

2. The Workshop was originally intended to run in 1/2 meg of memory (that's why the 1/2 meg option is in Preferences), however, there are some major problems. Setting the 1/2 meg option in Preferences and then rebooting into the Workshop causes major difficulties. The first problem is that the system is so unbelievably slow it's painful. The second problem is that almost nothing will run, such as: Preferences, Editor, Pascal, Basic, need I say more? Not being able to run Preferences is a real problem because you can't reset the memory to 1 meg. You end up taking your ProFile to another machine to rewrite the preferences file on the ProFile, meanwhile unplugging the Lisa and turning off the battery switch long enough to erase parameter memory.

3. Running Workshop without a hard disk: In version 1.2, if you boot Pascal 1 and answer no to the first question "Do you want to go on with this" you end up with the Workshop command line. Everything works fine except that it is slow because each program must come in from the twiggles instead of the hard disk and if you want to run some code not on the boot disk you must run it rather than invoke it from the command line. For example the editor is on Pascal 3, therefore you must put Pascal 3 in the other drive and type R, followed by -lower-editor (assuming disk is in lower twiggy drive).

On a Lisa 2 this method doesn't work because the install now looks like the Office System install. There is no way of running the Workshop shell from diskette.

4. Mac Works will run in 1/2 meg.

Please let's be real sure that everyone knows these limitations (especially the sales folks, both Apple and the dealers) because we don't want to have to put up with irate people who find out that they are going to have to shell out big bucks for a 1/2 meg memory board to run the software they bought because "my dealer told me it would work". Be on the look out for Lisa 2/10's going out with only 1/2 meg. This has happened quite frequently and the people who get them are not very happy.

Copying OS1-4 disks: The easiest way to copy the Office System diskettes on sony media without an external drive is the following:

1. Start up and get into the Workshop.
2. Type S to get into the System manager.
3. Set FilesPrivate to Yes in system manager, then Quit the System Manager.
3. Go into the File Manager and Copy all of the files on the diskette to ProFile with a unique prefix, e.g. Copy -lower--zx-
4. Swap disks so that destination is in the drive and copy all the files back to floppy, this time stripping the unique prefix, e.g. Copy zx-,-lower--

This method allows you to create as many duplicates as needed from the prefixed files on the hard disk.

Backup:

When to backup:

It is important to backup any documents you feel are important. If something were to happen to the document or the hard disk, you will definitely be glad you have backups. There are 3 kind of backups. The first is a full backup, the second is an incremental backup, and the third is a duplication of the document onto disk. To do a full or incremental backup you insert a diskette, duplicate the hard disk, and move it to the diskette. It will then give you messages on how to proceed. In the Lisa 1 Owner's Guide it is described on page D14-D16. In the Lisa 2 Owner's Guide, backup is on pgs. B32-B37.

Full Backup:

A full backup in version 2.0 will copy all of your files on the Profile or internal disk onto diskettes. This includes any Workshop files you may have. For a Profile this could mean as many as 20-25 Sony diskettes, an internal 10 Meg disk could be conceivably more.

A full backup on 1.0 does Not copy all of the files on the Profile. Therefore, it will not backup the Workshop.

Incremental Backup:

An incremental backup will only backup those files that have changed since the last backup. In 1.0 this doesn't work very well. It copies everything. It is done the same as a full backup.

Duplicating:

The most trouble free method is to duplicate your documents onto diskettes. The only problem is user error or neglect.

Backup problems:

There are a few problems with backup that you should be aware of. In 1.0, when you do a restore from backups it wipes out Preferences. The only way to recover it is to do a full Install (i.e. erase the disk and reload everything). To get around this, you can duplicate the documents on the Backup disks to the Profile from the Office System. We assume that 2.0 restore works.

As was mentioned above, an incremental backup in 1.0 copies all of your documents, Not just the changed ones. We don't know if 2.0 was fixed.

In the 2.0 Owner's Guide on page B36, Item number 7, It says that "Everything on Internal Hard Disk, the Internal Hard Disk, is about to be erased." This error message is not correct. It will not erase the hard disk. It should, and will, look like the message in Item 10 on the next page.

Sometimes the backup will choke on about the 3rd or 4th disk. This seems to happen after the system has been used for a while or maybe there was a hang in the system's past. It typically give you a message saying that there is no room on the diskette after that diskette has been erased. Usually the only recourse is to reinstall the system, defeating the purpose of the backup.

On a Lisa 2, if you are trying to backup a Profile containing a large file to a microdrive (>728 blocks), when it gets to the point of copying the file, the system will continue to ask for the next diskette for backup, attempting to find a microdrive diskette that has enough space to backup the large file. This is not possible, as the microdrive diskette has a total storage capacity of 764 blocks and the system will Not copy the file on multiple diskettes. You might consider making duplicates of these large files and storing the duplicates on the Profile or getting another Profile for storage.

Lisa 2 Upgrade:

Upgrade kit problems:

Just for those of you out there that haven't already confronted and overcome the upgrade kit problems here is a summary of what has transpired.

a. Motherboard revision

During the boot procedure a Lisa would often display error 82 or error 10726. Usually this was fixed by swapping the I/O board. However, Macro reported a high number of I/O boards sent to them with no trouble found when tested. It turns out there is noise over the parallel port to the ProFile which occasionally resulted in the errors mentioned above. This problem has been rectified by terminating all the signal lines with resistors, the one side effect of the fix is that the built in parallel port will no longer support a printer. The boards can be distinguished by seeing the resistors clustered around the parallel port. In the future whenever an I/O board is swapped it is recommended that the motherboard be upgraded to the version with the signal terminating resistors.

b. Boot ROMs

Some kits went out with the low ROM labeled high and vice versa while some kits went out with the high ROM labeled low and I think they even managed to get some kits out the door with the ROMs labeled correctly. This is not a big problem as the old ROMs, version D, will work just fine with the 2.0

hardware, the only anomalies that might be encountered are, twiggy icon instead of a Sony and the system tells you it is having trouble with the upper drive (no kidding, since there isn't one).

Troubleshooting:

- 1) Symptom: Operating system error 10726, or error 82.
Problem: Motherboard-ProFile interaction.
Solutions:
 - a) Replace Motherboard with upgraded Motherboard (included with dealer inventory upgrades, available as service spares in March.) Ensure that I/O board is also upgraded.
 - b) Use a different ProFile.
- 2) Difficulty: CPU boot error 43.
Problem: CPU boot ROM interaction.
Solutions:
 - a) Replace CPU board with upgraded CPU board. (available as service spares in March.)
 - b) Use original Lisa boot ROMs (rev. D); only difference in operation between rev. D and later rev ROMs is slightly different icons in boot menus. (The difference is that there is an option to boot from two floppy drives when no second floppy drive exists; if one selects the top drive, the system will hang, and must simply be reset).
- 3) Difficulty: Blank screen when attempting to boot system after retrofitting.
Problem: Incorrectly labelled or placed CPU ROMs.
Solution: Check that CPU ROMs are inserted according to directions. If not incorrectly installed, one or both may be mis-labelled. Use original Lisa boot ROMs (rev. D); only difference in operation between rev. D and later rev ROMs is slightly different icons in boot menus. (The difference is that there is an option to boot from two floppy drives when no second floppy drive exists; if one selects the top drive, the system will hang, and must simply be reset).
- 4) Difficulty: System goes through self test then hangs.
Problem: System is trying to start from nonexistent drive.
Solution: Reset and from tell it specifically what drive to boot from. This problem only occurs when the CPU roms are not inserted. When the system is unplugged for the upgrade, the time on the clock is usually lost. When this happens, the system always assumes that you are starting up from drive 1 for a repair, no matter what the Preferences are. So, it tries to start from drive 1 and hangs, because drive 1 is no longer there.

LisaGuide:

Starting LisaGuide:

The most common problem with LisaGuide is starting it up. The LisaGuide disk does not have any system information on it for startup. So, in order to start LisaGuide, you need to start up the system from the Profile. If you try to start it from the diskette it will give you a Lisa icon crossed out and an error 10735. Just select Startup From..., then Profile.

Boot problems:

Sometimes the system will refuse to start up LisaGuide. The system will appear to start normally, then the LisaGuide disk is kicked out and you are shown the Environments window. When this happens, there are two things possibly at fault. Either the Office System is somehow damaged, or the LisaGuide disk is itself damaged. First repair and reinstall the Office System (see pg 3, this document), then repair the diskette. If it still doesn't work, have the diskette replaced.

Installing as a Shell:

The following describes the procedure to install LisaGuide as a shell that can be accessed through the environments window instead of from a diskette at boot time.

Copy all the files on the Guide diskette to the Profile with the following exception: IMPORTANT, do not copy these files or your Profile ends up looking like a diskette:

```
{!CATALOG}
{!CATALOG}$R
{!SAVEDESKTOP}
BOOT{!TFCATALOG}
```

Remember to set FilesPrivate to Yes in the System Manager to copy all the files that start with {.

Change the name of LISAGUIDE.SHELL to SHELL.LISAGUIDE. The next time the system is booted the environments will contain a shell listed as LISAGUIDE.

MacWorks:

At release, MacWorks will recognize the two serial ports for printers and modems, an external Sony and the full 1 megabyte of memory, if available.

The MacWorks package will include MacWrite and MacPaint at a price of \$195. MacWorks will be bundled with the Lisa 2 but will be additional for the Lisa 2/5 and the 2/10.

There are plans to make MacWorks recognize the Lisa hard disks but this will not be available at first release.

Third Party Software:

When a company announces the availability of a non Apple software product for Lisa THEY should be contacted for further information. The division provides technical support for developers, but is not privy to their marketing strategies or schedules. For example, when Ryan-McFarland announces RM/Cobol applications on Lisa/Xenix, call Ryan-McFarland to find out who and when, once they have gone public with an announcement they are fair game for you to call.

To be a developer:

If you, or someone you know, wants to be a developer for Lisa or Mac, call Software Industry Relations at (408) 973-4986.

Unix software:

If you have questions about Unix and what software is available for that operating system, here's a couple of numbers to call:

Santa Cruz Operations
500 Chestnut St.
Santa Cruz, CA 95060
(408) 425-7222

Unipress Software
1164 Raritan Ave.
Highland Park, NJ 08904
(201) 985-8000

Service Mode

Reading serial #:

One very nice feature of the service mode is the ability to read the serial number and AppleNet number of a Lisa. For all of you who don't have serial number stickers on your machines and want to find out what it is read on below.

Obtaining the Serial Number from Service Mode

1. Restart the Lisa from an unattached device, i.e. boot from upper drive when there is no disk in the drive.
2. When the Lisa gives an error hold down the Apple key while holding down the 'S' key.
3. When the Service Mode menu is displayed select display memory
4. When prompted for ADDRESS, type 240 <CR>.
5. When prompted for COUNT, type 20 <CR>.

The Service Mode window will look something like this:

```
0000240 0F0F 0002 0802 0002 0000 0400 0300 0F0F
0000250 0000 0100 0004 0102 0002 0900 0000 0000
```

The Serial Number is stored in the lower nibble, the second half of the hex number. The serial number is 11 bytes long.

6. First remove every other nibble like this:

```
00000240 0F0F 0002 0802 0002 0000 0400 0300 0F0F
      240  F F  0 2  8 2  0 2  0 0  4 0  3 0  F F
```

7. Then group the numbers like this:

```
Nibble Number (Hex)      01 23 45 678 9ABC D EF
Address      240          FF 02 82 020 0403 0 FF
                                   XX PP YY DDD SSSS X XX
```

This grouping of nibbles now tells us the Serial Number as follows:

Nibbles 0,1,D,E and F are ignored (marked as X above).
Nibbles 2 and 3 are the two digit plant code (P).
Nibbles 4 and 5 are the two digit year code (Y).
Nibbles 6, 7 and 8 are the day of the year code (D).
Nibbles 9 thru C are the 4 digit serial number (S).

The Applenet Number is found on the next line of the memory dump. The Applenet number is in the first 8 bytes.

8. Using the same method we get.

```
00000250      0000 0100 0004 0102 0002 0900 0000 0000
      250      0 0  1 0  0 4  1 2  0 2  9 0  0 0  0 0
```

```
Nibble Number      012 34567 89ABCDEF
Address      250    001 00412 02900000
                                   PPP NNNNN XXXXXXXX
```

This grouping of nibbles now tells us the Applenet Number as follows:

Nibbles 8 through F can be ignored (marked as X above).
Nibbles 0, 1 and 2 are the AppleNet prefix (P).
Nibbles 3 thru 7 are the Applenet number (N).

Newsletters:

There are currently three newsletters/magazines available:

Professional Solutions
The Editor
20525 Mariani Ave. 18-AK
Cupertino, CA 95014

ICON
Apple Lisa Association
P.O. Box 634
Santa Clara, CA 95050
(\$40.00/year membership fee)

Signal
Semaphore Corp.
207 Granada Drive
Aptos, CA 95003
(Free to Lisa owners)

St. Mac
Softalk Publishing Co.
P.O. Box 60
North Hollywood, CA 91603
(Free to Lisa owners)

Anti-Theft Device:

There is one anti-theft device available for the Lisa:

Anchor Pad of Northern California
1255 Post St., Suite 723
San Francisco, CA 94109
(415) 441-2593

Repair:

When to repair:

Anytime you have a system failure, reset, power outage, or any other kind of abnormal power down, you need to do a repair. A repair is basically a disk clean up, which closes any files that are left open, get rid of any unused scratch files, and reconstruct the catalog files if necessary. Other occasions when you may want to do a repair are: for any kind of strange behavior in the system, or if you're having any problems seeing the files on a diskette.

Problems:

There are some problems associated with repair that are kind of annoying. The first is that there are some instances where the catalog files are so badly damaged that they have to be totally reconstructed. This isn't a problem because it will come back with all of your documents, but you may not have any file folders. For some this is a major problem that may take a couple of hours to straighten. The reason that file folders are lost is that file folders are imaginary. They are a construct that is kept in the Savedesktop file to help you organize your documents. There is no way of avoiding this. It seems to be a frequent occurrence, unfortunately, in 2.0.

The other problem with repair is that if Preferences is somehow damaged during the hang or power outage, etc., repair will not fix it. When you try to open preferences it will give you a message saying that the Lisa can't find a usable copy of the "tool tool", and to insert the diskette. The only way to restore Preferences is to reinstall the entire Office System.

Minor repairs:

When you get a message saying that the disk needs "minor repairs" this is not like doing a repair from Office System 1. What this does is it reconstructs the catalog files. That's all. So if you've done a repair, you startup the Office System, and you get this message, tell it to repair. The two are not the same.

Pascal Examples

Program PrintTest;

USES

{SU-}

{SU QD/QuickDraw } QuickDraw,

{SU QD/QDSupport } QDSupport;

{SU+}

VAR

heapBuf: ARRAY[0..10000] OF INTEGER; {must keep array under 32K byte limit}

myPort: GrafPort;

printer : text;

convert : array [0..7] of integer;

PictPointer : Pichandle;

picframe : rect;

doconvert : boolean;

FUNCTION HeapFull(hz: QDPtr; bytesNeeded: INTEGER): INTEGER;

{ This function will be called if the heapZone runs out of space }

BEGIN

WRITELN('The heap is full. The program must now terminate! ');

Halt;

END;

Procedure Drawstuff;

VAR i: INTEGER;

myRect: Rect;

dstrect: Rect;

Begin

ClipRect(thePort^.portbits.bounds);

setrect(myrect,0,0,200,100);

PicFrame:= myRect;

Pictpointer := openpicture(PicFrame);

showpen;

FillRect(myRect,gray);

FrameRect(myRect);

EraseOval(myRect);

Moveto(60,60); Drawstring('Hello. My name is Ginger');

hidepen;

```

ClosePicture;
setrect(dstrect,150,150,500,300);
DrawPicture(Pictpointer,dstrect);
end;

```

```

Function BinToDec: integer;

```

```

var I : integer;
    Len : integer;
    Base : integer;
    DecNum : integer;

```

```

Begin

```

```

    If doconvert = true then begin
        Len := 7;
        Base := 1;
        DecNum := 0;
        For I := 0 to len do Begin
            if convert [i] <> 0 then DecNum := DecNum + (Convert[i]*Base);
            Base := Base * 2;
        End;
        BinToDec := DecNum;
    end
    else BintoDec := 0;
End;

```

```

Procedure PrintScreen;

```

```

Var x,y,i,j,k,L : integer;
    Lines : integer;
    Temp : boolean;

```

```

Begin

```

```

    x := 0;
    y := 0;
    j := 0;
    L := 0;
    Writeln(printer,chr(27),'q',chr(27),'T',16:2,chr(27),'ZHR');
    Repeat
        For k := 363 downto 0 do begin
            doconvert := false;
            For i := 0 to 7 do begin
                j := x+i;
                temp := GetPixel(j,k);
                If temp = true then begin
                    convert[L] := 1;
                    L := L+1;
                end
            end
        end
    until doconvert = true;

```

```

        doconvert:=true;
    end
    else begin
        convert[L] := 0;
        L := L+1;
    end;
end;
L := 0;
Write(printer,Chr(27),'G',2:4);
Write(printer,chr(BinToDec));
y := y+1;
Write(printer,chr(BinToDec));
y := y+1;
end;
Writeln(printer);
x:=x+8;
y := 0;
Until (x > 719);
end;

```

```

BEGIN { main program }
    Reset (printer,'-slot2chan2-dddd');

    QDInit(@heapBuf, @heapBuf[10000], @HeapFull); { Must do this once at beginning }
    OpenPort(@myPort);
    cliprect(thePort^.portbits.bounds);
    FillRect(thePort^.portRect,white); { Paint white background }

    DrawStuff;
    PrintScreen;
    Close(printer);
END.

```

Program CHRSamples;

{Included are samples of how to print (to the default & to a specific port),
How to convert strings to numbers}

Type

```
STR30 = string[30];
```

```
var integr: integer;  
    realno: real;
```

Procedure Default;

{This prints to the default printer}

```
var printer : text;
```

Begin

```
  Rewrite(printer,'-printer'); {Open the printer with the logical device name '-printer'}  
  Writeln(printer,'This will print on the default printer');  
  Writeln(printer,chr(27),chr(110),'This will be extended if the default is a DMP');  
  Close(printer);  
end;
```

Procedure Specific;

{this prints to a printer in a specific port - in this case a dwp in serial B}

```
Var printer : text;
```

Begin

```
  Rewrite(printer,'-rs232b-xyz'); {This opens the printer with the path name  
    '-rs232b-xyz', a dummy file}  
  Writeln(printer,'This will print on the printer attached to serial B');  
  Close(printer);  
end;
```

Function Str_to_Integer(str:STR30): Integer;

{This function converts strings to numbers - integer}

```
var number : integer;
```

```
Len: integer;
```

```
i: integer; {Length of the string}
```

```

begin
  len := length (str);
  number := 0;
  for i := 1 to len do number := number *10 + (Ord(str[i])-48);
  Str_to_Integer := number;
end;

```

```

Function Str_to_Real(str:STR30):real;

```

{This function converts strings to numbers - real - assumes there are no commas}

```

var number : real;
  Len: integer;
  i: integer;      {Length of the string}
  Decimal: integer; {position of the Decimal}

```

```

begin
  while (length(str)>0) and (str[length(str)] = ' ') do delete (str, length(str), 1); {deletes
  trailing blanks}
  len := length (str);
  decimal := pos('.',str);
  number := 0;
  for i := 1 to len do begin
    while i < decimal do number := number *10 + (Ord(str[i])-48);
  end;
  number := number*pwroften(decimal);
  Str_to_Real := number;
end;

```

```

Begin
  Default;
  Specific;
  integr := Str_to_Integer('234436');
  Writeln(integr);
  Realno := Str_to_Real('2345.456');
  Writeln(realno);
End.

```

Program Samples2;

{Included are examples of how to convert numbers to strings}

Type

```
Str30 = string[30];  
maxstring = string[255];
```

```
Var intgr : Longint;  
    realno : real;  
    intstring : maxstring;
```

```
Procedure Int_To_Str(Innumber : longint);
```

```
Var str,tempstr : maxstring;  
    temp : integer;
```

Begin

```
str := '';      {Assigning a null chr doesn't make the length of the string 0}  
delete(str,1,1);  
Tempstr := '';  
while innumber > 0 do begin  
    temp := innumber mod 10;  
    tempstr[1] := chr(temp+48);  
    insert(tempstr,str,1);  
    innumber := innumber div 10;  
end;  
intstr := str;  
end;
```

Begin

```
intgr := 345673;  
writeln('Integer is: ',intgr);  
Int_To_Str(intgr);  
writeln('String is: ',intstring);  
end.
```

Program GetChars; {gets characters from the keyboard and displays them}

USES

{SU-}

 {SU QD/QuickDraw } QuickDraw,

 {SU QD/QDSupport } QDSupport,

 {SU QD/Hardware } Hardware;

{SU+}

Type Setofchar = set of char;

 Maxstring = string[255];

 STR30 = string[30];

 STR50 = string[50];

Var cmd : char;

 Number : integer;

 Thing : MaxString;

 event : keyevent;

 heapBuf : ARRAY[0..10000] OF INTEGER;

 myPort : GrafPort;

 tempRect : Rect;

FUNCTION HeapFull(hz: QDPtr; bytesNeeded: INTEGER): INTEGER;

{ This function will be called if the heapZone runs out of space }

BEGIN

 WRITELN('The heap is full. The program is going to die!');

 Halt;

END;

Procedure Cursr(var key: boolean); {Cursor}

var i,j : integer;

 curs : rect;

 shift : point;

 base : point;

begin

 getpen(base);

 Curs.topleft := base;

 shift.v := 1;

 shift.h := 8;

 AddPt(base,shift);

 curs.botright := shift;

 PaintRect(curs);

 i := 0;

```

repeat
  i := i + 1;
  key := Keybdevent(true,false,event);
until (i = 2000) or (key);
i := 0;
EraseRect(curs);
if not key then repeat
  i := i + 1;
  key := Keybdevent(true,false,event);
until (i = 2000) or (key);
end;

```

```

Function GetChar(okset: SetofChar) : char;

```

```

Var ch: char;
    good: Boolean;
    state: penstate;
    Key : boolean;

```

```

Begin
  ch := ' ';
  Good := False;
  Repeat
    Key := false;
    Repeat cursr(key) until key;
    ch := Event.ascii;
    good := ch in okset;
    if not good then
      write (chr(7));
    until good;
  GetChar := ch;
End;

```

```

Procedure Eraser(width: integer); {Backspaces characters on the screen}

```

```

Begin
  Pensize(9,15);
  PenPat(white);
  move(0,-13);
  ShowPen;
  Line(-width,0);
  HidePen;
  Move(0,13);
  penpat(black);
  pensize(1,1);
end;

```

```

Procedure GetString(maxlen: integer);

var s1:      string[1];
    stemp:   maxstring;
    OKset:   Setofchar;
    Width,x: integer;
    Space:   integer;
    I:       integer;

begin
  thing := ' ';
  OKset := [' '..'z'];
  Space := -(CharWidth(' '));
  Width := 0;
  s1 := ' ';
  stemp := ' ';
  delete(stemp,1,1);
  i := 1;
  repeat
    if ((length(stemp) = 0) or (i = 1)) then
      s1[1] := getchar(okset + [chr(13)])
    else
      if i = maxlen+1 then
        s1[1] := getchar([chr(13), chr(8)])
      else
        s1[1] := getchar(okset+[chr(13),chr(8)]);

    If s1[1] in okset then
      Begin
        Drawstring(s1);
        stemp := concat(stemp,s1);
        i := i+1;
      end
    else
      if ((s1[1] = chr(8)) and (i < > 1))then
        begin
          i := i-1;
          width := CharWidth(stemp[i]);
          Delete(stemp,i,1);
          Eraser(width);
        end;
      Until s1[1] = chr(13);
      If length(stemp) < > 0 then thing := stemp
      else DrawString(stemp);
  end; {GetString}

```

Procedure Text;

Var name : str30;
Street,state : str50;

Begin

```
tempRect := thePort^.portRect;  
ClipRect(tempRect);  
EraseRoundRect(tempRect,30,20);  
TextFont(4);  
TextFace([bold]);  
MoveTo(150,100); DrawString('Enter Name: ');  
TextFace([]);  
Getstring(30);  
name := thing;  
TextFace([bold]);  
MoveTo(150,120); Drawstring('Enter Street Address: ');  
TextFace([]);  
getstring(50);  
Street := thing;  
TextFace([bold]);  
MoveTo(150,140); DrawString('Enter City & State: ');  
TextFace([]);  
GetString(50);  
State := thing;  
TextFace([bold]);  
MoveTo(150,300); DrawString('End of demonstration.');
```

end;

Begin {***** Main Program *****}

{*** QuickDraw ***}

```
QDInit(@heapBuf, @heapBuf[10000], @HeapFull); {Initializes the heap}  
OpenPort(@myPort); {opens the GrafPort}  
EraseRect(thePort^.portRect);  
FillRect(thePort^.portRect,black); {Paint black background}
```

{*** My Stuff ***}

```
Number := 0;  
text;  
end.
```

Macintosh Errors

General System Errors

0	No Errors
-1	Queue element not found during deletion
-2	Invalid queue element
-3	Core routine number out of range
-4	Unimplemented core routine

I/O System Errors

-17	Control error
-18	Status error
-19	Read error
-20	Write error
-21	Bad unit error
-22	Unit empty error
-23	Open error
-24	Close error
-25	Tried to remove an open driver
-26	Driver install couldn't find driver in resources
-27	I/O call aborted by KILLIO
-28	Couldn't read/write/control/status because driver not open

File System Errors

-33	Directory full
-34	Disk full
-35	No such volume
-36	I/O error
-37	There may be no bad names in the final system
-38	File not open
-39	End of file
-40	Tried to position to before start of file
-41	Memory full (open) or file won't fit (load)
-42	Too many files open
-43	File not found
-45	File is locked
-46	Volume is locked
-47	File is busy (delete)
-48	Duplicate file name (rename)
-49	File already open with write permission
-50	Error in user parameter list
-51	Refnum error
-52	Get file position error
-53	Volume not on line error (was ejected)
-54	Permissions error (on file open)
-55	Drive volume already on-line at MountVol
-56	No such drive (tried to mount a bad drive number)
-57	Not a Mac diskette (signature bytes are wrong)
-58	Volume in question belongs to an external fs
-59	File system deep s--t error; during rename the old entry was deleted

- but could not be restored
- 60 Bad master directory block
- 61 Write permissions error

Disk, Serial Ports, Clock Specific Errors

- 64 Drive not installed
- 65 Read/write requested for an off-line drive
- 66 Couldn't find 5 nibbles in 200 tries
- 67 Couldn't find valid address mark
- 68 Read verify compare failed
- 69 Address mark checksum didn't check
- 70 Bad address mark bit slip nibbles
- 71 Couldn't find a data mark header
- 72 Bad data mark checksum
- 73 Bad data mark bit slip nibbles
- 74 Write underrun occurred
- 75 Step handshake failed
- 76 Track 0 detect doesn't change
- 77 Unable to initialize IWM
- 78 Tried to read second side on a one sided drive
- 79 Unable to correctly adjust disk speed
- 80 Track number wrong on address mark
- 81 Sector number never found on a track
- 85 Unable to read same clock value twice
- 86 Time written did not verify
- 87 Parameter ram written didn't read verify
- 88 InitUtil found the parameter ram uninitialized
- 89 SCC receiver error (framing, parity, OR)
- 90 Break received (SCC)

Storage Allocator Errors (Memory Management)

- 108 Not enough room in heap zone
- 109 Handle was NIL in handle zone or other
- 111 WhichZone failed (applied to free block)
- 112 Trying to purge a locked or non-purgable block
- 110 Address was odd or out of range
- 113 Address in zone check failed
- 114 Pointer check failed
- 115 Block check failed
- 116 Size check failed
- 193 Resource file not found
- 194 AddResource failed
- 195 AddReference failed
- 196 RmveResource failed
- 197 RmveReference failed

Scrap Manager Errors

- 100 No scrap exists error
- 102 No object of that type in scrap

Application Errors

Errors -1024 to -4095 are reserved for use by the current application

Alert ID Definitions

32767	General system error
1	Bus error
2	Address error
3	Illegal instruction error
4	Zero divide error
5	Check trap error
6	Overflow trap error
7	Privilege violation error
8	Trace mode error
9	Line 1010 trap error
10	Line 1111 trap error
11	Miscellaneous hardware exception error
12	Unimplemented core routine error
13	Uninstalled interrupt error
14	I/O core error
15	Segment loader error
16	Floating point error
17	Package 0 not present
18	Package 1 not present
19	Package 2 not present
20	Package 3 not present
21	Package 4 not present
22	Package 5 not present
23	Package 6 not present
24	Package 7 not present
25	Out of memory!
26	Can't launch file
28	Stack has moved into application heap
27	File system map has been trashed
30	Request user to reinsert off-line volume
31	Not the disk I wanted

Trouble Allocator Trouble Codes

32	Memory Manager trouble code base
MemTrbBase	Set logical size error
MemTrbBase+1	Adjust free error
MemTrbBase+2	Adjust counters error
MemTrbBase+3	Make block free error
MemTrbBase+7	
MemTrbBase+8	
MemTrbBase+9	
MemTrbBase+10	
MemTrbBase+11	
MemTrbBase+12	
MemTrbBase+13	
MemTrbBase+14	
MemTrbBase+15	

MemTrbBase+16
MemTrbBase+17
MemTrbBase+18
MemTrbBase+19
MemTrbBase+20
MemTrbBase+21

Some Miscellaneous Result Codes

1	Event not enabled at PostEvent
-1	No event available (GetOSEvent, OSEventAvail)