

Automatic Startup Tests

Every time you turn the Lisa on, the system runs a series of tests to verify that startup can proceed. This appendix describes the tests in the order in which they are run and provides a table explaining the detailed error messages generated by the tests. A less detailed table of the most common messages and a discussion of the procedures for responding to startup test error messages appear in Section C, Troubleshooting.

STARTUP TEST SEQUENCE

If everything is working correctly during startup, the tests proceed in the following sequence.

ROM Checksum

This test computes a 16-bit checksum of the entire ROM to check its validity. If the checksum is successful, the system passes on to the next test.

If the system fails the ROM checksum, the system hangs. The screen may be blank, or it may display a random pattern at a very bright contrast level.

MMU Register Test

This is a read/write and address test of the static RAMs in the memory management unit. Successful completion is followed by the next test.

An early failure causes the test to repeat indefinitely, with a blank display on the screen.

If this test reaches its final stages and then encounters a failure, the screen displays the CPU board icon, with error code 40.



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Memory Sizing

This test determines the amount of memory in your system to facilitate further testing. If an error is found, the error is saved but testing continues. If memory cannot be accessed at all, the speaker beeps once with a low tone and the system hangs with a series of vertical lines on the screen.

Preliminary Memory Test

Next the system tests the first 2048 bytes of memory to ensure that some memory is available for use by the startup ROM. If an error occurs, the Lisa sounds the speaker twice and then hangs in a test loop, with a random display on the screen.

VIA Test

This test verifies that the I/O board can be accessed. Failure results in the appearance of either the I/O board icon, with error code 58, or the CPU board icon, with error code 41.



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If this test proceeds without problems, the Lisa turns the screen contrast all the way down.

Screen Memory Test

This test facilitates the reporting of errors that are found during other tests. Errors do not interrupt the tests but are reported at the end of startup as a memory failure.

I/O Board Tests

The contrast is set to midrange, and the keyboard and mouse connections are checked. If either the keyboard or the mouse is not connected, the Lisa alerts you to the situation at the end of the startup sequence. If those tests proceed normally, a click is emitted from the speaker. This click tells you that all tests up to this point have been executed and that the keyboard is ready to accept alternative startup device commands. The procedure for giving an alternative startup command is described in Setting Startup Specifications, in Appendix 1, Setup Procedures.

From this point, the screen displays a series of icons showing which test is in progress, as shown in Figure 1. While a board is being tested, its icon is highlighted on the screen. As each board passes the tests, the Lisa displays a check mark over the icon. Usually, the video screen has not had time to warm up at this point, so you may not see this display.

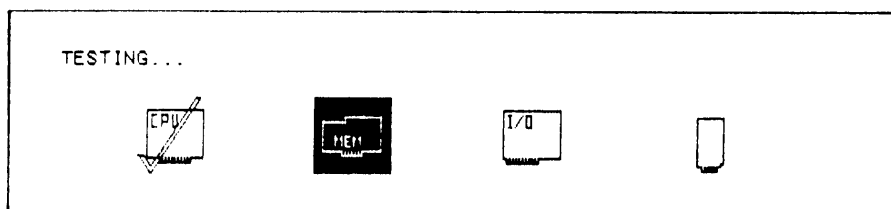


Figure 1. Startup Module Test Display.

Errors detected during the following tests are reported both by a screen message and by a two- or three-note error tone. A table of error tones appears in Startup Symptoms and Error Messages, in Section C, Troubleshooting.

CPU Board Test Completion

The remaining two CPU board tests partially check the video circuitry and record wrong parity circuitry. If either test fails, testing is terminated, and the CPU board icon is displayed with one of two error codes:

42 -- Video logic error

43 -- Parity logic error



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Memory Test

The final memory check is a full read/write and address check of all RAM not yet tested. The brief test takes about 18 seconds for a full megabyte of memory. If you have specified a thorough test in your startup specifications, the test takes twice as long.

Errors detected in this test are displayed at the end of the startup sequence. The memory board icon with error code 70 indicates read/write errors, and the memory board icon with error code 71 indicates parity errors.



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I/O Board Test Completion

This test verifies that the disk controller is ready, checks shared memory, and then disables the disk interrupts until startup is complete. Errors are displayed as an I/O board icon with error code 57.



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The Lisa then tests the serial port controller. Errors are displayed as an I/O board icon, with error code 55 for port A errors and error code 56 for port B errors.



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After these tests, the speaker emits a double click and the Lisa scans the keyboard for any keystrokes entered since the first click. The Lisa then reads the clock/calendar and saves the time and date information for later use.

Errors in reading the keyboard or the clock are displayed as an I/O board icon, with error code 52 for the I/O board COPS, which controls the keyboard and mouse interfaces, or with error code 54 for the clock/calendar.



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Expansion Slot Configuration Check

Finally, the system scans each expansion slot to see if a card is present. The results are stored for future use but are not compared with the information in parameter memory.

If this check uncovers a bootable device in any slot, the Lisa scans the required ROM on the card to ensure that it can be read properly. An error here is displayed as an expansion card icon, with error code 92.



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STARTUP ERROR MESSAGES AND TONES

Each startup error message can consist of three parts:

- An icon representing the module that caused the problem.
- A numeric code indicating the kind of problem.
- A one-, two-, or three-note error tone indicating either which module caused the problem or what kind of problem it is.

Some of the error messages indicate a physical problem with the Lisa; others indicate a problem with the system setup. In general, the presence of an icon with or without a numeric code means that the module represented by the icon should be checked or replaced. For recommended troubleshooting procedures, see Section C, Troubleshooting.

The meanings of the numeric codes are summarized in Table 1. The meanings of the error tones are summarized in Startup Symptoms and Error Messages, in Section C, Troubleshooting.

Table 1. Startup Error Messages


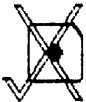

Icon	Code	Meaning
Disk drive		No diskette in startup drive.
		
Diskette	23	Unable to read diskette.
	38	No startup file on diskette.
	39	Disk controller timeout.
CPU board	40	MMU error.
	41	CPU selection logic error.
	42	Video circuitry error.
	43	Parity circuitry error.
	44	Unexpected NMI interrupt.
	45	Bus error.
	46	Address error.
	47	Other unexpected exception.
	48	Illegal instruction error.
	49	Line 1010 or 1111 trap.



Table 1. Startup Error Messages, continued

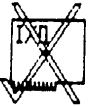


Icon	Code	Meaning
I/O board	50	COPS VIA error.
	52	I/O board COPS error.
	53	Keyboard COPS error.
	54	Clock error.
	55	Serial port A (RS232) error.
	56	Serial port B (RS232) error.
	57	Diskette controller error.
	58	I/O board access error.
	59	I/O board COPS code error.
	60	I/O or keyboard error.
Memory board	70	Memory read/write error.
	71	Memory parity error.
		



Table 1. Startup Error Messages, continued

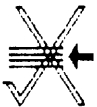




Icon	Code	Meaning
Startup device 	75	Startup failure; startup file on disk probably bad.
		
		
Hard disk	80	Hard disk not attached.
	81	Disk not ready.
	82	Bad response from disk.
	83	Non-zero status bytes returned from disk.
	84	Invalid boot file on disk.
	85	Disk timeout.



Table 1. Startup Error Messages, continued

Icon	Code	Meaning
Expansion card	90	No expansion card installed.
	91	Expansion card not bootable.
	92	Bad ROM checksum on expansion card.
	93	Bad status returned from expansion card.
