Macintosh: "Sad Macintosh" Error Code Meaning

Languages English

This article lists and explains the error codes that accompany the "sad Macintosh" icon that appears on the screen when a Macintosh computer does not start up.

This article has been archived and is no longer updated by Apple.

Products Affected

The "sad Macintosh" icon and its associated error codes exist only in older Macintosh computers. Newer models, such as those with Universal Serial Bus (USB) or Open Firmware, use a different mechanism for reporting such failures. For more information on newer systems, please see the following articles:

Article 58183: "**Power-On Self-Test Beep Definition - Part 1**"
Article 58442: "**Power-On Self-Test Beep Definition - Part 2**"
Article 95036: "**Power Mac G4: Power-On Self Test**"

Overview

The particular error code that appears with the "sad Macintosh" is not as important as **when** it occurs. If the Macintosh can start up from a different system disk then the fault is probably with the system software on the other disk. System faults are usually identified when you get a "happy Macintosh" face and the "Welcome to Macintosh" screen before the "sad Macintosh."

If the "sad Macintosh" appears immediately when you turn on the computer, that usually suggests an issue with the logic board or memory. Try starting up from a floppy disk before assuming it is a hardware fault.

Sad Mac Error Codes Description

On the Original ROMs (Macintosh 128K 512kK 512kK, Plus):

When you press the interrupt button on the side of your Macintosh when starting up, a sad Mac icon on the screen with '0F000D' and some bits cycling under the icon indicating it is performing a memory test.

This numeric code is in two parts:

- The first two characters are the class code. The class code tells what part of the diagnostic program found the error.
- The second four are the sub code. The sub class code tells what the error was. In the case of a bad RAM chip, the sub class identifies the bad chip (this was very helpful to homegrown upgraders).

Class Code	Sub Code
1=ROM test failed	Meaningless
2=Memory test--bus subtest	identifies bad chips
3=Memory test--byte write	identifies bad chips
4=Memory test--Mod3 test	identifies bad chips

5=Memory test--address uniqueness	identifies bad chips

Single Chip Identification		
Data Bit	**Location**	**Sub Code Bits**
0	F5	0001
1	F6	0002
2	F7	0004
3	F8	0008
4	F9	0010
5	F10	0020
6	F11	0040
7	F12	0080
8	G5	0100
9	G6	0200
10	G7	0400
11	G8	0800
12	G9	1000
13	G10	2000
14	G11	4000
15	G12	8000

Class Code	**Sub Code**	**Sub Code Meaning**
F=Exception	0001	Bus error
	0002	Address error
	0003	Illegal Instruction
	0004	Zero divide
	0005	Check instruction
	0006	Traps instruction
	0007	Privilege violation

	0008	Trace
	0009	Line 1010
	000A	Line 1111
	000B	Other exception
	000C	Nothing
	000D	NMI (normal indication)
	0064	Couldn't read System File into memory

Macintosh SE and Macintosh II ROMs

The "sad Macintosh" error codes for Macintosh SE and Macintosh II computers were changed to incorporate additional power for testing and to support the 32-bit world. Generally, the same codes are used for 68000 exceptions as the Macintosh but they are displayed differently.

Traditional

The traditional Macintosh error codes are displayed in hexadecimal notation like this: 0F0003

Where F indicates an exception occurred, and 3 indicates an illegal instruction occurred. On the Macintosh SE and Macintosh II, the display would appear:

0000000F
00000003

Power On

The power-on error codes have the following format:

XXXXYYYY
ZZZZZZZZ

Where XXXX is internal test manager state information (ignore this), YYYY contains codes that indicate either an exception code, or the test number for a power on test failure. The ZZZZZZZZ code contains additional failure information to help track down the fault.

YYYY Error Codes	
Error Code	**Meaning**
$0001	The ROM checksum test failed. Ignore the Z field.
$0002	The first small chunk of RAM to be tested failed. The Z field indicates which RAM Bit(s) failed. This small chunk of RAM is always in Bank B. Using $AABBCCDD as a guide: AA=8 bit mask for bits 31-24 BB=8 bit mask for bits 23-16 CC=8 bit mask for bits 15-8 DD=8 bit mask for bits 7-0

$0003	The RAM test failed while testing bank B, after passing the chunk tested for code $0002. The Z field indicates which bits failed as in code $0002.
$0004	The RAM test failed while testing bank A. The Z field indicates which bits failed as in code $0002.
$0005	The RAM External addressing test failed. The Z field indicates a failed address line.
$0006	Unable to properly address the VIA1 chip. The Z field is not applicable.
$0007	Unable to properly address the VIA2 chip (Macintosh II only). The Z field is not applicable.
$0008	Unable to properly access the Front Desk Bus. The Z field is not applicable.
$0009	Unable to properly access the MMU. The Z field is not applicable.
$000A	Unable to properly access NuBus. The Z field is not applicable.
$000B	Unable to properly access the SCSI Chip. The Z field is not applicable.
$000C	Unable to properly access the IWM chip. The Z field is not applicable.
$000D	Unable to properly access the SCC Chip. The Z field is not applicable.
$000E	Failed Data Bus test. The Z field indicated the bad bit(s) as a 32-bit mask for bits 0-31. This may indicate either a bad SIMM or data bus failure.
$000F	Reserved for Macintosh compatibility.
$FFxx	A 680xx exception occurred during power on testing. The xx indicates the exception: $01 Bus Error $02 Address Error $03 Illegal Instruction Error $04 Zero Divide $05 Check Instruction $06 cpTrapCC, Trap CC, Trap V $07 Privilege violation $08 Trace $09 Line A $0A Line F $0B unassigned $0C CP protocol violation $0D Format exception $0E Spurious interrupt $0F Trap 015 exception $10 Interrupt Level 1 $11 Interrupt Level 2 $12 Interrupt Level 3 $13 Interrupt Level 4 $14 Interrupt Level 5 $15 Interrupt Level 6 $16 Interrupt Level 7 $17 FPCP bra or set on unordered condition $18 FPCP inexact result

$19 FPCP divide by zero
$1A FPCP underflow
$1B FPCP operand error
$1C FPCP overflow
$1D FPCP signalling NAN
$1E PMMU configuration
$1F PMMU illegal operation
$20 PMMU access level violation

Macintosh Portable ROMs

The startup code in the Macintosh Portable contains a series of startup tests that are run to ensure that the fundamental operations of the computer are working properly. If any of those tests fail, a "sad Macintosh" icon appears on the screen with a code below that describes what failure occurred. Here is a typical example of a Sad Mac display with an error code below it:

SAD MAC CODE

05460203 = (D7.L)
000OB6DB = (D6.L)

The two codes are actually the contents of the two CPU data registers D6 and D7. The upper word (upper 4 hexadecimal digits, in this case 0546) of D7 contains miscellaneous flags that are used by the start–up test routines and are unimportant to just about everybody except a few test engineers within Apple. The lower word of D7 is the major error code. The major error code identifies the general area the test routines were in when a failure occurred. D6 is the minor error and usually contains additional information about the failure, something like a failed bit mask.

SAD MAC CODE BROKEN DOWN

Test Flags Major Error

0546 0203

Minor Error Minor Error

0000 B6DB

The major error is further broken into the upper byte that contains the number of any 68000 exception that occurred ($00 meaning that no exception occurred), and the lower byte that usually contains the test that was being run at the time of failure. If an unexpected exception occurred during a particular test, then the exception number is logically ORed into the major error code. This way both the exception that occurred as well as the test that was running can be decoded from the major error code:

SAD MAC CODE FURTHER BROKEN DOWN

68000 Exception Test Code

02 03

In this example, the code says that an address error exception ($0200) occurred during the RAM test for Bank A ($03); $0200 ORed with $03 = $0203.

Major Error Codes

Below is a brief description of the various test codes that might appear in the major error code:

Important: Some of these codes may mean slightly different things in Macintosh models other than the Macintosh Portable. These descriptions describe specifically how they are used in the Macintosh Portable.

Major Error Codes	
Error Code	**Meaning**
$01	ROM test failed. Minor error code is $FFFF, which means nothing.
$02	RAM test failed. Minor error code indicates which RAM bits failed.
$05	RAM external addressing test failed. Minor error code indicates a failed address line.
$06	Unable to properly access the VIA 1 chip during VIA initialization. Minor error code not applicable.
$08	Data bus test at location eight bytes off of top of memory failed. Minor error code indicates the bad bits as a 16bit mask for bits1500. This may indicate either a bad RAM chip or data bus failure.
$0B	Unable to properly access the SCSI chip. Minor error code not applicable.
$0C	Unable to properly access the IWM (or SWIM) chip. Minor error code not applicable.
$0D	Not applicable to Macintosh Portable. Unable to properly access the SCC chip. Minor error code not applicable.
$0E	Data bus test at location $0 failed. Minor error code indicates the bad bits as a 16bit mask for bits 1500. This may indicate either a bad RAM chip or data bus failure.
$10	Video RAM test failed. Minor error code indicates which RAM bits failed.
$11	Video RAM addressing test failed. Minor error code contains the following: upper word = failed address (16–bit) msb of lower word = data written lsb of lower word = data read Data value written also indicates which address line is being actively tested.
$12	Deleted
$13	Deleted
$14	Power Manager processor was unable to turn on all the power to the board. This may have been due to a communication error with the Power Manager. If so, the minor error code contains a Power Manager error code, explained in the next section.
$15	Power Manager failed its self–test. Minor error code contains the following: msw = error status of transmission to power manager. lsw = Power Manager self–test results (0 means it passed, non–zero means it failed)

$16	A failure occurred while trying to size and configure the RAM. Minor error code not applicable.

Minor Error Codes; Power Manager Processor Failures

If a communication breakdown occurs during communication with the Power Manager, the following error codes appear somewhere in the minor error code (usually in the lower half of the code, but not always):

Minor Error Codes	
Error Code	**Meaning**
$CD38	Power Manager was never ready to start handshake.
$CD37	Timed out waiting for reply to initial handshake.
$CD36	During a send, Power Manager did not start a handshake.
$CD35	During a send, Power Manager did not finish a handshake.
$CD34	During a receive, Power Manager did not start a handshake.
$CD33	During a receive, Power Manager did not finish a handshake.

Diagnostic Code Summary

Below is a summarized version of the Sad Mac error codes:

Diagnostic Code Summary	
Test Codes	**Meaning**
$01	ROM checksum test.
$02	RAM test.
$05	RAM addressing test.
$06	VIA 1 chip access.
$08	Data bus test at top of memory.
$0B	SCSI chip access.
$0C	IWM (or SWIM) chip access.
$0D	No applicable to Macintosh Portable; SCC chip access.
$0E	Data bus test at location $0.
$10	Video RAM test.
$11	Video RAM addressing test.
$14	Power Manager board power on.
$15	Power Manager self-test.

$16	RAM sizing.

Power Manager Communication Error Codes	
Error Code	**Meaning**
$CD38	Initial handshake.
$CD37	No reply to initial handshake.
$CD36	During send, no start of a handshake.
$CD35	During a send, no finish of a handshake.
$CD34	During a receive, no start of a handshake.
$CD33	During a receive, no finish of a handshake.

CPU Exception Codes (as used by the startup tests)	
Error Code	**Meaning**
$0100	Bus error exception code.
$0200	Address error exception code.
$0300	Illegal error exception code.
$0400	Zero divide error exception code.
$0500	Check inst error exception code.
$0600	cpTrapcc,Trapcc,TrapV exception code.
$0700	Privilege violation exception code.
$0800	Trace exception code.
$0900	Line A exception code.
$0A00	Line F exception code.
$0B00	Unassigned exception code.
$0C00	CP protocol violation.
$0D00	Format exception.
$0E00	Spurious interrupt exception code.
$0F00	Trap inst exception code.

$1000	Interrupt level 1.
$1100	Interrupt level 2.
$1200	Interrupt level 3.
$1300	Interrupt level 4.
$1400	Interrupt level 5.
$1500	Interrupt level 6.
$1600	Interrupt level 7.

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