How to Scan and Diagnose Hardware Issues on Your Mac with Apple’s Built-In Tools

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Can’t get your Mac to start up? The problem could be software, in which case your best bet may be to reinstall macOS. If that fails, though, the problem could be hardware-related.

Happily, Apple offers tools outside the operating system that can scan your computer and diagnose hardware problems. If your Mac is acting up, and you can’t find a software solution, these tools make troubleshooting a lot easier.

Intel Macs built before June 2013 offer a program called the Apple Hardware Test; Macs built since then offer Apple Diagnostics. The two tools serve basically the same function, testing hardware and reporting back any problems. They’re also triggered by the same keyboard shortcut, so you don’t need to look up when your Mac was made to use one tool or the other.

To get started, shut your Mac down. Ideally you should unplug any external hardware, like USB hard drives or ethernet connections. Next, turn your Mac on, holding down the “D” key. Depending on when your Mac was made, one of two things will happen.

Using Apple Hardware Test to Troubleshoot Macs Made Before June 2013

If your Mac was made before June 2013, you’ll soon see this logo:

This means that Apple Hardware Test is starting. You may be asked to choose a language for the user interface. After that, you’ll see a user interface that resembles old versions of macOS, complete with a “Test” button:

You can click the “Hardware” tab to find out more about your Mac, including the Serial number. To run your tests, however, you’re going to want to click the “Test” button.

Running the tests may take a while, particularly if you’ve got a lot of memory. When the scan is done you’ll see a list of any hardware errors detected, along with some

error codes. You can write these codes down and look them up on your phone, or you can boot your Mac into recovery mode and look up the codes there.

Using Apple Diagnostics to Troubleshoot Macs Made After June 2013

If your Mac was made after December 2013, your Mac will load Apple Diagnostics. This tool is functionally similar to Apple Hardware Test, but instead of the retro macOS look, it feels like you never quite left the boot screen. You might be asked to pick a language, or the test might start immediately:

The test might take a while, especially if you've got a lot of memory installed. When it's done, you'll get a list of potential hardware problems. Unlike the Apple Hardware Test, Apple Diagnostics gives you a plain language explanation of your problems.

The error codes are still included, so you can look those up on your phone or boot your Mac into recovery mode to find more information.

What If Neither Tool Launches?

If neither tool launches, don't worry: you've still got options.

- If you're Mac is running macOS (then OS X) 10.7 (Lion) or earlier, Apple Hardware Test is not installed on your hard drive. You'll need Applications Install Disk 2 inserted, or the MacBook Air Software Reinstall Drive if you're using an older MacBook Air.
- If you're using a more recent version of macOS, and neither tool is booting when you start up your Mac, you can boot both tools from the network. Simple hold Option+R when your computer starts up. You'll be asked to connect to a wireless network, then the appropriate tool will be downloaded and executed as outlined above.

It's good to have a few backup options, right?

What to Do If You Find Errors

As we said earlier, this tool will let you know about any hardware problems your Mac has, but won't actually fix them. Exact repair tips are way outside the scope of this article, because there are thousands of things that might be broken.

If your Mac is still under warranty or AppleCare, you can write the codes down and share them with a technician at the Apple Store. If your Mac is out of warranty, however, you need to look into repair options on your own. I suggest Googling the error codes to see if others have had success fixing things, if you're the do-it-yourself sort. Otherwise, you can call a local repair shop, or even the Apple Store, and get a quote.

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