



ECC: What Is It, and Why Would I Pay Extra For It?

This is the question #2 for the Ram Guy. So, let me try to clear things up a little...

First of all, what does ECC stand for?

"ECC" stands for "Error Checking and Correction".

And, what is "Error Checking and Correction"?

Error Checking and Correction refers to a technology which allows a computer system to operate even if a memory error occurs.

Why do ECC modules cost more than modules without ECC?

In order to check and correct the memory, additional RAMs are required. A non-ECC module which has eight RAMs would need to have a ninth RAM added; a sixteen RAM module would generally need to have TWO additional RAMs added. Obviously, the additional RAMs make the module more expensive.

So it's kind of like the old parity modules, right?

Well, kind of, but ECC is a WHOLE LOT more useful. The ECC technology used on most x86-architecture PCs and servers is capable of correcting errors, where parity can only detect errors. If you've ever had an error "detected" on your system, you know the result - the blue screen of DEATH! Really useful, huh... With ECC you would sail right through, without crashing or even interrupting normal operation. Much more useful!

I don't understand why these memory errors occur. What gives?

Unfortunately, the Ram Guy is not a physicist. But, he did speak to one, and was told that there are two main causes of these errors:

- naturally occurring radioactive isotopes (which emit alpha particles), and
- high energy cosmic rays from supernovas

Both of these phenomena can change the value of a memory bit from a zero to a one or from a one to a zero.

By the way, these errors are known as "soft" errors. They are called "soft" because they can be repaired by simply correcting the value of the memory bit.

Come on... cosmic rays? Really, how often does this occur?

The Ram Guy consulted with some experts on this one. Basically, it's a statistics problem. But, when you do the math, a soft error is likely to occur in a system with 256 Mbytes of memory about every 750 hours! And, the more memory you have, the more frequently soft errors will occur.

Is that such a big deal?

You tell me. At two hours a day, 750 hours is once a year. Probably no big deal. But, at twenty-four hours a day, it's a month. That's not sounding so good, now...

If you're emailing and word processing, a crash is an inconvenience. If you're serving web pages, a crash can be disastrous! It's really up to you...

What's the bottom line?

If you are running any kind of server, the Ram Guy thinks you are NUTS if you don't use ECC. For desktops with 256MB or less of memory that are running typical office applications, ECC is really not necessary. For high performance workstations or other systems with more than 256MB of memory, the Ram Guy would recommend that you use ECC, but will cut you some slack if you feel differently.