

What is ECC RAM? Distinguish between ECC RAM and regular RAM

Let's learn what the concept of ECC RAM is and distinguish between ECC RAM and regular RAM through the suggestions in the following article.

ECC RAM is a term that is of little interest to users of desktop computers or laptops today. However, in server environments at large enterprises, ECC RAM is a very important component. So, what is ECC RAM and how to distinguish this part from regular RAM? Join TipsMake to find the answer through the information in the following article.

What is ECC RAM?

ECC is an abbreviation for the phrase **Error Checking and Correction**, which means **error checking and correction** in Vietnamese. Therefore, ECC RAM is known as a RAM bar with the function of automatically checking, correcting errors and controlling data flow in and out of it.

At the same time, this is also a component that helps your computer avoid errors that may occur when transmitting core signals at high speed. Therefore, ECC RAM is often used in systems that require stability such as servers and workstations.

Picture 1 of What is ECC RAM? Distinguish between ECC RAM and regular RAM

Classification of ECC RAM?

Currently, ECC RAM is commonly used in workstations and servers. This type of RAM is divided into 2 basic types as follows:

Unbuffered ECC RAM (ECC UDIMM RAM)

Unbuffered ECC RAM is also known as memory with a buffer or register designed on the motherboard. At the same time, this type of RAM is integrated with ECC function to add features to automatically check and correct data errors.

In addition, ECC UDIMM RAM also allows the computer to execute memory access commands and move directly to the memory module without having to send it indirectly through the Registered chip part like Registered ECC RAM.

Registered ECC RAM (ECC RDIMM RAM)

Similar to ECC UDIMM RAM, Registered ECC RAM also has the ability to self-check and correct data errors thanks to the addition of ECC feature. In addition, this is also a device that contains registers mounted directly on the memory module.

Therefore, **Registered ECC RAM** helps the computer execute access commands on the Registered chip first and then transmit it to the memory module. Therefore, this part allows the module to contain more memory chips.

Compare Unbuffered ECC and ECC Registered RAM

Most desktop or laptop computers today do not have the ability to self-check and fix errors. **ECC UDIMM** or **ECC RDIMM** memory support is determined by the CPU type of Intel or AMD. Therefore, you should understand which type of ECC RAM your computer is suitable for before deciding to buy the product.

Criteria	Unbuffered ECC RAM	RAM ECC Registered
Appearance	Normal shape, no LED lights, some products are equipped with additional heat dissipation systems and are covered with aluminum.	Normal appearance, some products are also equipped with a cooling system, are covered with aluminum and do not have LED lights.
Structure	Memory access commands are sent directly to the module, so the processing speed of ECC UDIMM RAM is very fast.	The product is equipped with registers mounted directly on the memory module.
Number of memory chips	Usually 9 chips are installed on each side with similar sizes.	There are 10 chips on the front and an ECC chip in the middle with a larger size than the other chips.
Code table	The parameter behind the bandwidth is usually denoted by the letter E or ECC. As for the DDR4 ECC Unbuffered line, it will be denoted by the ECC-UDIMM cluster right on the RAM stamp.	The letter R is the symbol of the ECC RDIMM RAM line behind the bandwidth parameter. As for the DDR4 ECC Registered line, it is symbolized by the RDIMM cluster right on the RAM label.

Advantages and disadvantages of ECC RAM

ECC RAM possesses many outstanding advantages compared to regular RAM. However, this line of RAM also has many disadvantages. Specifically:

1. **About advantages** : ECC RAM is integrated with a Register chip for the ability to access data directly in memory. Therefore, this RAM line will help the CPU reduce the memory control load.
2. **Regarding disadvantages**: Retrieving data takes a long time. The reason is because the commands will be output to the Register chip first and then forwarded to the memory module. Therefore, instructions will often take nearly 1 CPU cycle to be successfully accessed.

What is the difference between ECC RAM and regular RAM?

In terms of shape and pins, regular RAM and ECC RAM of the same generation will have quite similar designs. For example, a DDR4 Non-ECC RAM stick and a DDR4 ECC RAM stick are designed with the same basic shape and structure. At the same time, they can replace each other in some cases.

However, if you take a closer look, ECC RAM is equipped with up to 9 chips on one side of the RAM. As for conventional RAM, only 8 memory chips are installed. The only difference lies in the 9th memory chip on ECC RAM. This will be the place to store important data to fix errors in case your computer loses data or the remaining 8 memory chip cells fail.

Is ECC RAM better than Non-ECC RAM?

Whether ECC RAM or Non-ECC RAM has better performance depends on certain circumstances. Although equipped with more modern parts, ECC RAM does not always reach its full potential. Because the ability and performance of ECC RAM depends greatly on the CPU and mainboard that your computer owns.

Picture 4 of What is ECC RAM? Distinguish between ECC RAM and regular RAM

Mostly on the market today, only high-end CPUs from AMD or some Intel Xeon CPU lines support the ECC feature. As for regular computers, this feature cannot be equipped.

Therefore, if you need to upgrade ECC RAM for your computer, you need to carefully consider whether the CPU and mainboard are really suitable or not. In case your computer does not support upgrading ECC RAM, you should use regular RAM to save costs.

Applications of ECC RAM in life

With the integration of advanced and modern technology, ECC RAM brings almost absolute stability to the device. Therefore, this RAM line is applied to many scientific and technological programs such as computer science, financial market research, military defense systems, elections, etc.

Do laptops and PCs use ECC RAM?

Laptops or PCs can use ECC RAM, but not all models. In particular, even though PCs and laptops are integrated with Xeon CPUs, they still do not necessarily support ECC RAM.

Therefore, to make sure your computer can use ECC RAM, you need to carefully review the parameters from the manufacturer. Or if you are not tech-savvy, you can contact a consultant to get detailed information before upgrading.

Frequently asked questions about what is ECC RAM?

Surely in the process of buying ECC RAM, you will encounter certain problems. Let's learn more about some frequently asked questions from customers who intend to use this RAM line, compiled by TipsMake as follows:

Does ECC RAM help improve gaming performance?

The answer for you is that ECC RAM does not support improved gaming performance. Because, according to some user reports, game performance benchmarks on ECC RAM are slower than on regular RAM.

Besides, Crucial - a famous RAM and SSD manufacturer has announced that ECC RAM runs about 2% slower than regular RAM. Therefore, in terms of gaming, ECC RAM can prevent errors but will affect device performance and reduce the gaming experience.

Who needs to use ECC RAM?

With the integration of many special features, ECC RAM is like the heart of the server. At the same time, it is an extremely important device that anyone in the process of building a server system for a business needs to pay special attention to.

If you are a regular user and use your computer to play games or perform basic tasks, there is no need to use ECC RAM. If you work with important data such as financial calculations, scientific research, network security, etc., ECC RAM will help protect data from possible damage and errors.

Epilogue

Above is all the information about ECC RAM that TipsMake has compiled to share with you. Hopefully through this article, you have clearly understood what ECC RAM is as well as how to distinguish and apply this RAM line effectively during computer use.

You finished reading the article "**What is ECC RAM? Distinguish between ECC RAM and regular RAM**" edited by the [TipsMake](#) team. We hope this article has provided you with many useful tech tips and tricks. You can search for similar articles on tips and guides. Thank you for reading and for following us regularly.