



APPLICATION NOTE 503

Replacing the DS1287/DS12887 Real-Time Clock in a Personal Computer

Abstract: This application note describes the replacement of the DS1287/DS12887 real-time clock (RTC) or "CMOS clock" in a personal computer (PC). The CMOS clock is also sometimes referred to as the "battery" or "CMOS battery."

The following information is provided to assist anyone who needs to replace a real-time clock (RTC) in a personal computer(PC).

How do I know if my RTC battery is bad?

Usually, the clock will lose time, or the PC will lose the CMOS setup if you turn the power off. If the clock loses time while it is turned on, it is not the RTC.

How do I know if I have a Dallas Semiconductor RTC?

Many PCs use Dallas Semiconductor or another manufacturer's RTC module to keep the time, date, and CMOS settings while the PC power is off. The RTC module contains a clock IC, crystal, and battery to maintain this information. Other PCs use a clock incorporated in the chip set. An external battery is used to power the clock within the chip set. The following information is intended to help you determine what clock module is being used.

- If your computer contains a Nickel Cadmium or a coin cell battery attached to the motherboard, or uses a battery connected to the motherboard via a wire harness, then your computer does not use a clock module. If your PC does use a Dallas clock module, it will look something like the following:



Figure 1.

- The following table lists the Dallas Semiconductor RTCs most commonly used in PCs and their availability status:

Device	Status
DS1287	Not Available
DS12887	Available
DS12887A	Available
DS12B887	Not Available
DS12C887	Available
DS1387	Not Available
DS1397	Not Available
DS1587	Not Available

What is the difference between the DS12887 and DS12887A? What is RAM clear?

The "A" at the end of the part number indicates a "RAM clear" pin. This is true for many clock modules, including those from other manufacturers. The DS12B887 also has a RAM clear function; however, it works differently than the "A" RAM clear.

RAM clear is a way to reset the user RAM in the clock module. The user RAM is normally used to hold the CMOS setup information. If a BIOS has a BIOS (boot) password option (not to be confused with the Windows password), the password can usually be reset by clearing the CMOS setup (user RAM). Usually, a part without the RAM clear option will replace a part that does have one. However, if a BIOS password is used and then forgotten, there is no way to reset it. The clock module would need to be replaced.

I forgot my BIOS password. How can I reset it?

If you have a Dallas Semiconductor RTC with an "A" or a "B" in the part number, such as DS12887A, you should be able to reset the password. Consult the documentation for the PC/motherboard for information on how to do so. If the part number does not contain an "A" or "B," it cannot be reset. See the information on "RAM clear" for a more detailed explanation.

Will replacing the clock module fix my PC?

Unfortunately, replacing your clock module, even with the exact part number, does not guarantee that the PC will work afterwards. Here are some of the issues:

- The DS1287 is obsolete. In many cases, a DS12887 will replace it. However, on some systems, the BIOS or chip set will access the wrong address partition in the DS12887. In those cases, the system will not work.
- Some PCs, after replacing the clock, will not properly initialize the new one. Apparently, some BIOS versions expect the RTC to be partially initialized before it is placed on the motherboard. Only the manufacturer of the motherboard will know how the clock needs to be initialized. PCs with marginal power supplies, especially if they have a large number of drives, cards and/or memory, may cause the new clock to fail. The clock can fail immediately, or within a few days or weeks.
- In addition, you must be careful when replacing the module. If you insert the module backwards, or bend a pin while inserting it, you can damage the motherboard and/or the module. Improper handling also can cause ESD damage. The power should always be off when replacing the module. If you are in any way unsure of what you are doing, you should have a trained technician do the work.

Can I replace a Houston Tech HT12888 or HT12888A with a Dallas Semiconductor clock?

The Houston Tech HT12888, HT12888A, and VIA82887 are not compatible with Dallas clocks.

My manual says that it uses a DS12887, but the motherboard has a HT or VIA clock. Can I use a Dallas clock?

Many manuals indicate that a Dallas RTC is used on the motherboard. However, the motherboards are often designed so that other clocks can be used. So the RTC used in your PC often will depend upon what was available during a particular production run. In the case of incompatible clocks such as the Houston Tech or VIA Technologies (VT), the HT/VIA clock uses a special chipset in combination with the clock. The special chipset will not work with Dallas clocks.

Can I replace a Benchmarq or Odin clock with a Dallas clock?

Dallas does not manufacture motherboards, and we do not maintain a list of motherboards that are compatible with our products. In some cases, a Dallas clock will replace other manufacturer's clock. You should check with the manufacturer of your PC or motherboard concerning compatibility. Dallas Semiconductor/Maxim cannot guarantee that any of our clocks will replace a clock from another company.

I have a DS12B887. Can it be replaced?

The DS12B887 is obsolete. In some cases, it can be replaced with a DS12887.

I understand that the DS12C887 is Y2K-compliant. Can I replace my RTC with the DS12C887 and make my PC Y2K-compliant?

Replacing another type of RTC with a DS12C887 will not make your PC Y2K-compliant. For a PC to be Y2K-compliant, the BIOS, RTC, operating system, and application software must all be compliant. In addition, the Y2K-compliant BIOS must be matched with the type of RTC it was designed for. In some cases, the BIOS

updates the RTC with the correct century information; in other cases, the RTC does the job. In the latter case, the BIOS must look for the century information in the correct location. If your system is working without any Y2K issues now, it is probably best to use the same RTC as is currently being used.

How do I purchase a replacement clock from Dallas Semiconductor?

Visit our [website](#) to order any available Dallas product.

Where can I get more information about replacing clocks?

The following link provides information about replacing clock modules: <http://www.resource800.com>

My question wasn't here. Who do I contact?

Contact Dallas Semiconductor's Timekeeping Technical Support at:

- Tel: (972) 371-4448
- E-mail: Time_Keep.Support@dalsemi.com

Application Note 503: <http://www.maxim-ic.com/an503>

More Information

For technical questions and support: <http://www.maxim-ic.com/support>

For samples: <http://www.maxim-ic.com/samples>

Other questions and comments: <http://www.maxim-ic.com/contact>

Related Parts

DS12887: [QuickView](#) -- [Full \(PDF\) Data Sheet](#) -- [Free Samples](#)

DS12887A: [QuickView](#) -- [Full \(PDF\) Data Sheet](#) -- [Free Samples](#)

DS12C887: [QuickView](#) -- [Full \(PDF\) Data Sheet](#) -- [Free Samples](#)

DS12C887A: [QuickView](#) -- [Full \(PDF\) Data Sheet](#) -- [Free Samples](#)

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