Overclocking

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	TITLE : Overclocking		
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WRITTEN BY		August 24, 2024	

REVISION HISTORY			
NUMBER	DATE	DESCRIPTION	NAME

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Chapter 1

Overclocking

1.1 Overclocking Accelerators

Overclock Accelerators

Warning:
It’s a term you’ll probably have heard. If you have an accelerator it may allow you to modify it for greater speed. Some people think it leads to hefty repair bills, other people think it is a great way to increase the speed of their Amiga for a minimal cost. I don’t recommend the procedure, it’s up to you to decide the props and cons, but if you want to do it, I’ll tell you how it’s done and advise you on the best ways to avoid any potential pitfalls. If you aren’t reasonably confident, don’t do it. It is reasonably safe if you are sensible, but you can blow up your CPU if you make a mistake, and your guarantee will be voided by the procedure. If it happens, don’t blame me!

Introduction:
The principle behind over-clocking is very straightforward. When you buy an accelerator which runs at say 50MHz, it does not run at this speed because of something inherent in the design of the CPU, it runs at this speed because of the clock which sends it a timing pulse 50 million times every second. The printed speed is merely the one the manufacturer guarantee it works at. Getting the CPU to run at a different speed is a matter of sending it a clock pulse at a different speed. There are fairly tight limits, but it is quite feasible to up the speed of your accelerator by around 20%.

So How Do I Do It?
On your accelerator you will see a small square or rectangular silver chip like box. It will have a whole bunch of numbers printed on it, the last of which is usually the clock speed in MHz. Expect there to be a lot of digits after the decimal point - if you have A 50MHz accelerator it will say something like: 50.000000M. This is the clock, and amazingly reclocking simply means replacing it with a faster one. These can be bought for a few pounds from most electronics retailers.

If you’re lucky, you’ll find the clock is mounted in a socket and can simply be pulled out. If you are unlucky, you’ll find that it has been soldered into place, in which case steer clear if you aren’t a good soldering iron jockey, de-soldering from an intricate PCB is very hard. If

you do take on the task, use a solder sucker or desoldering braid and remove the solder slowly over several passes, not holding the iron to the board too long at any one go to avoid damaging the tracks.

Notice one of the corners of the clock is either marked with a dot or squared off or both, this shows the clock alignment. Stick to this when you insert your next clock. When the old chip is removed, drop the new one in its place and away you go.

How fast is safe?
There are very real limits to how much a processor can be clocked, although it varies from chip to chip. Some people may find that even the smallest amount of overclocking will lead to immediate system crashes, others get away with murder. If you are using a cheaper accelerator board in which the processor is already clocked, it's not really advisable to try it. As a very rough guide:

Original Processor	New clock:
030/33	42
030/50	50
040/25	33
040/33	40
060/50	64

Some people have systems running faster than this, others have problems going this fast.

An interesting exception is the new mask revision of the '060, which has the serial number: XC68060RC50A. This is the chip used in the Apollo 1260/66MHz board, and it is possible to get it running up to 80MHz by overclocking (just about!).

What can go wrong?
Assuming you've installed properly, and you haven't been silly with the clock speed, not much. If the computer crashes a lot, you may have to give up and re-install the old clock, but otherswise is should be okay. You'll be running the chip at its limits so keep it cool. Ensure good ventilation to the CPU and make sure it has a good fan on it. Another factor is RAM speed. Slower SIMMs are problematic, and with faster clock speeds you'll need fast SIMMs. Even 60ns SIMMs may not be up to it in some cases, although there are also significant brand to brand variations to make life more interesting.

Final Note:
If you do decide to overclock your CPU on your accelerator card, since the CPU will be running at a higher clock frequency, the CPU may get hot quickly, so I suggest you consider fitting a CPU cooler to the chip. A 486 CPU cooler will do the job nicely, just use some heat transfer compound, and some superglue to glue the 486 CPU cooler onto the processor.

- Craig Daines

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