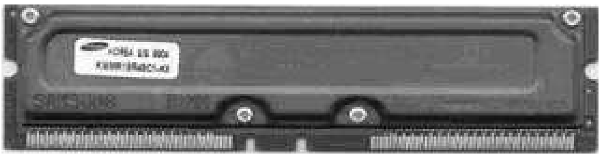
Make your own RDRAM

(Original Author: Fist, Translator: Sheng Wu)

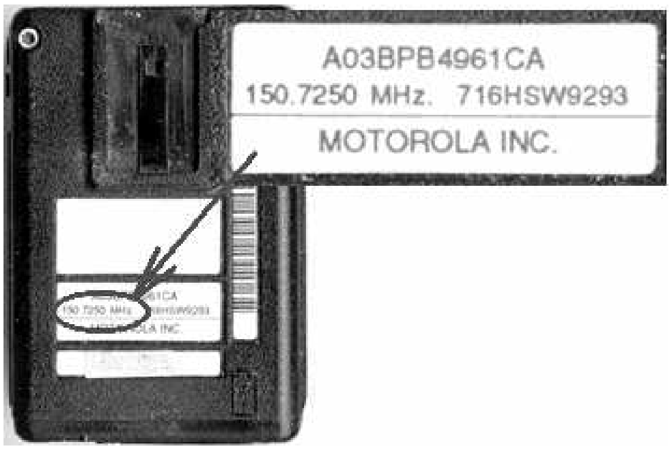
RAMBUS DRAM uses 400MHz 16bit data bus, and transfer signals at both the rising and falling edge, so it could reach 1.6GB/sec bandwidth -- twice the PC100SDRAM. Further improvement by Intel to use parallel structure will enable even wider bandwidth, maybe that is why Intel has been supporting the course of RDRAM by introducing i820 and i840.

Although RDRAM uses short copper circuit to reduce EMI, but under 400MHz, in order to work properly is not easy even with fine structure and process. Also, RDRAM has to consider heat dissipation, so the easiest solution is to put a "shield " on RDRAM --- to reduce the EMI from outside, and at the same time help heat dissipation. Below is a picture of a RDRAM module with metal shield.



The PC133-SDRAM we use is working under 100-133MHz, and do not need shielding and thermal management to work properly. But, from a standard EMI point of view, any signal with a bandwidth over 20~30MHz will give EMI interferences, especially when the conducting wire has metal tips --- this will deteriorate the performance, not only giving out signal, but also receiving stronger EMI. The situation get worse with increasing frequency and will be unavoidable at 100MHz.

The EMI with mess up with the original signal pulses by mixing and modulation, and make new EMI. If EMI induced pulses are stronger than signal pulses, the signal will be suppressed -- one example is the poorly shielded computer will crash if you use a cell phone near by. When our OCers use FSB upto 150MHz FSB (the frequency range that call be called as OC), we are stepping into the "trouble zone" : 150MHz has huge amount of EMI, like from transmitters for pagers. Below is a picture of a pager working at 150.725MHz (the pager does not give EMI, it is the transmitter station).



Of course, if the computer case has good shielding, then nothing will happen even without shielding on the components. But EMI always exists, even a computer case could eliminate EMI from outside, inside the computer, all the other components, like video card and network card could work at around 150MHz, and still give EMI, and the mobo and other components might fail. This could be a possible cause for failure of OC at high FSB.

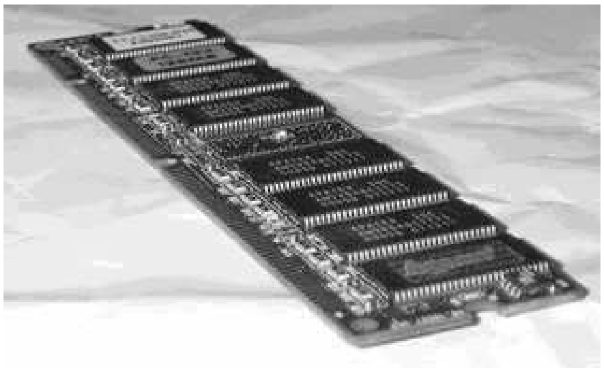
Now we want to make a shield for our PC133-SDRAM, to reduce the possible side effects from EMI. So for OCers wishing to break the 150MHz you might want to pay attention.

The best material to shielding EMI is to use copper coated iron sheet, so we use industrial copper shim stock for shielding. The Al cover on the RDRAM is for consideration of cost and weight. Copper shim stock, if too thin will reduce the cooling effect and if too thick is hard to bend --- 0,1mm to 0,3mm should be fine, and choose copper over brass --- brass is too fragile, hard to bend.

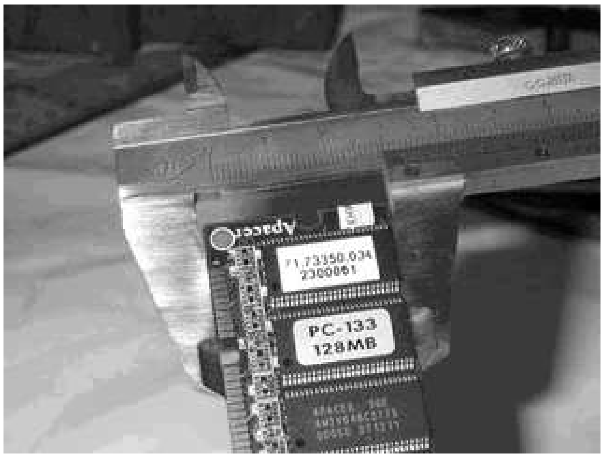
Copper shim stock might be hard to find, I am lucky to find a shop just selling copper materials. Other customers are buying by kilos, I have to beg the sales lady -- I want 10 Yuan (USD$1.2). The result is such a huge piece --- I can make over 100 shields, no problem.

Other tools depend on your preference, the tools in the picture should be easy to find: caliber for measure the RAM module’s size; scissors for cut the copper sheet; plier for shaping the copper sheet shape, ruler is for marking the size on the copper sheet; transparent tape is to prevent short circuit between the copper and the components in the RAM module; use a solder gun to make a conducting wire and gator clip to form a GND for the shield --- very simple, everyone can do.

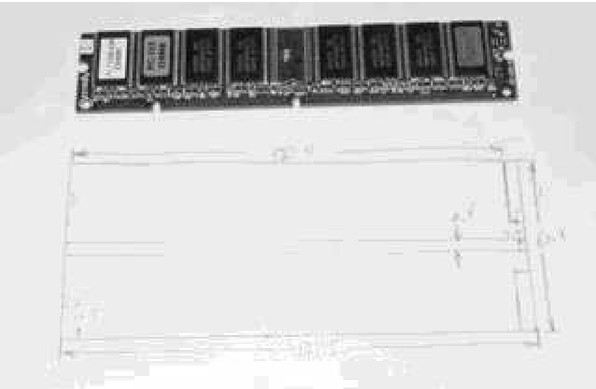
This is our heroine today, a regular ACER PC133-128, looks very common,



First measure the size of the RAM module, so to make a fitted shield clothe!

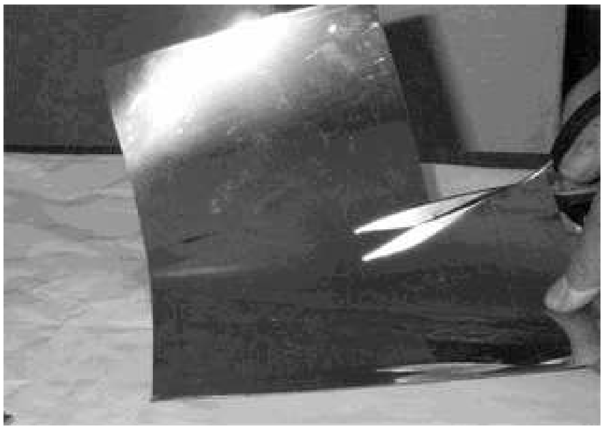


Use simple calculation, length, width, thickness needs the addition of the front and back copper sheet in order to clip the module in the center. The result is to cut 127.3x56.2mm copper sheet. Mark clearly of the 2 central divider on the copper sheet, after bending 90 degrees they will clip the module nicely.



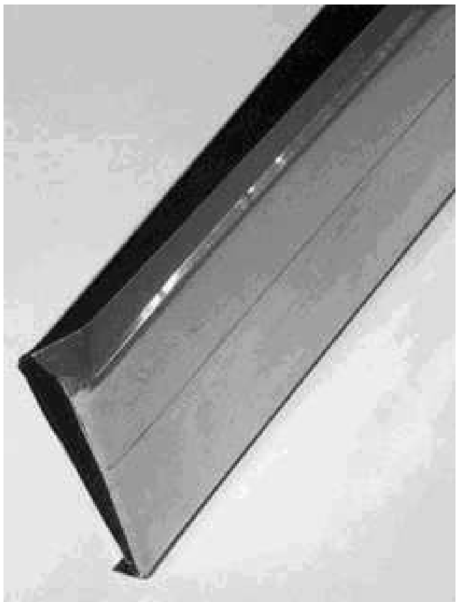
Use right angle ruler to mark the straight lines on the copper sheet -- do not make a parallel shape, you can mark the copper with the tip of your scissors.

Cut it with scissors

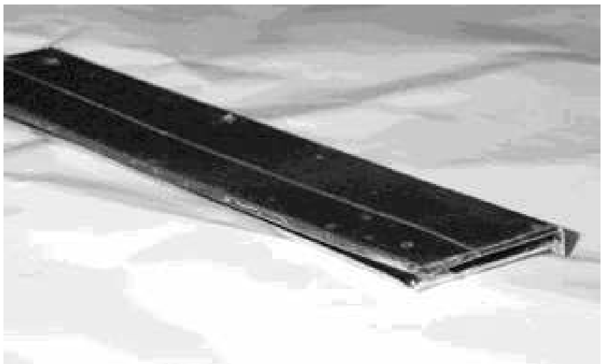


After this step, you will be challenged by the toughest job --- bending. I don’t know how you do it, but with the tools I have, this step is hard. Even you can make it, it does not look good, so try your best.

Tape the inside edges of the copper sheet to prevent circuit shortage.

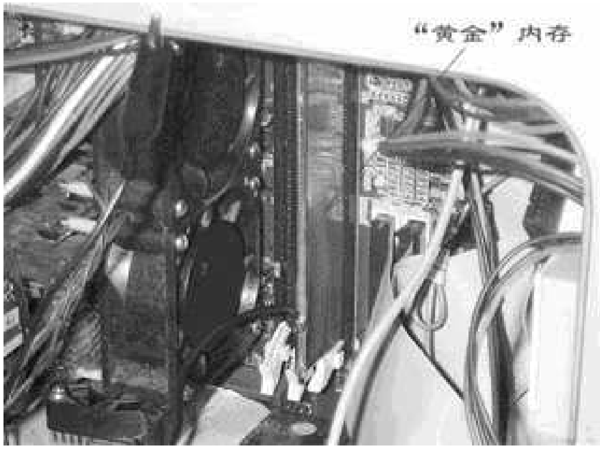


Use a needle nose pliers to bend the edges inside for 30-90 degrees, forming a complete cover, also make the outlook flat and nice.



Now, slide in the module, and if you want to increase heat dissipation you can use some heat conducting paste. Then one side the conducting wire is soldered to the gator clip and the other side to the copper sheet.

Now, putting the module back into the mobo, and clip the gator clip to the case ground, now you have a real gold module! (We already have Gold Mobo, Gold Power Supply and Gold memory module and now with a real gold looking shield, ha ha...)



Let’s start the test!

But, I do not have a CuMine 550, and the Cel 300A can only do 133 FSB (600M), can not do higher FSB. A 200MHz DSO is not cheap, so I decided to take this computer to a professional shop for a test.

To add a shield on the RAM module is similar to the 80pins in the ATA66 cable --- to make the system more stable. As far as I know, Appollon (another OCer) in ShangHai is doing the same test and study. I want to remind you that this change will not modify the memory from ground up and can not even be called as reasonable design., so please think over before you do it. Especially, you run the risk of shorting your computer if you did not do a good job.

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If anyone has tried similar scheme and have any result, please contact us.

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