The Great Superboard Speed-Up and Other RAMblings

I do not know if Bufferin is twice as fast as Aspirin, but here is all you need to make your OSI Model 600 board run twice as fast as it normally does.

Jack Robert Swindell
P.O. Box 8193
Canton, OH 44711

The OSI Superboard 11, Challenger 1P is a great machine — fast so you can really get the job done. Not bad considering that it is running at under 1MHZ. Wouldn't it be even nicer running at 2? Don't start jumping up and down and barking yet, we have a few hurdles to jump first. They are not really tall ones, but you had better know where they are at instead of stumbling into them.

The model 600 board was designed to run the 6502 at about 983KHZ or almost 1MHZ. This meant that they could keep the cost down by having highly efficient software resident in ROM's (firmware) do the magic of making process time short instead of sloppy software with a faster clock rate to help make up for it. The cost saving is in the RAM...it only seems to be good for 1MHZ or thereabouts. Apparently the same Basic in ROM is used in several OSI computers with the I/O handling controlled by a monitor/support ROM unique to each model (or series). If this really is the case (does anyone know for sure?) then the Basic in ROM must be able to operate at 2MHZ to prevent having to stock multiple grades of ROM (which is a rather expensive proposition) for the different speeds of CPU's.

The other thing that makes me think that there is only one grade of Basic in ROM is that there are no suffix marks on the ROM's to indicate that they might have been sorted for speed. It is possible that the monitor/support ROM was only specified to guarantee operation at 1MHZ as that is the intended processor operating speed for the 600 series board. As this ROM is probably unique to the model 600 and would not appear on the 2MHZ board, the 2MHZ capability may not have been specified for this chip.

There is one other thing to consider before delving into the hardware aspect of this project. Do you have any optional boards tied into your 600 board? Especially memory...the original factory-installed RAM on my card was not able to make 2MHZ; therefore, I most certainly wouldn't count on their expansion RAM handling double the normal recommended speed. Translated: The memory that you already have probably won't work at 2MHZ and will have to be replaced (OUCH). Perhaps you could trade with someone. Well, let's not jump the gun and start ordering parts yet, there is always that chance that *your* memory might be different than mine and will work OK...I hope so. My originals were 2114L's by SEMMI. I don't know what happens if you have a mini-floppy tied in and then double the speed. Also assume that your warranty is shot once you modify it. You might want to wait until it expires.

The first thing to do is to decide whether or not you want to go any further than just reading this article. *Remember:* Neither the author nor MICRO guarantee the safety or operation of this modification, nor should you expect the manufacturer or service department to honor any warranties after you have modified your equipment. Mostly what I am saying is that if you don't understand what you are doing: *DON'T DO IT!* And...if you goof up and ruin your machine *you did it yourself.* I don't know how to say it in proper legalese, but you get the picture.

TURN OFF THE POWER FIRST!!!!

The illustration applies to my model 600 CPU, revision B. What this modification is doing is moving the tap on the clock circuit divider chain one divide by two closer to the oscillator. You're sure that you want to do this? OK...cut the line as shown in the illustration. You have just severed the clock line going to pin 37 on the 6502. Take a small piece of insulated wire and make a jumper like in the illustration. You won't have to strip off very much insulation at each end to do the job. Solder it in, again see the illustration, taking care not to short any of those eentsy conductors nearby. Now the CPU will have twice the clock speed as before. Now to see how it turned out.

I hope your memory makes it as is...we'll soon see. Connect the video monitor cable and turn on the monitor. Do not connect any off-card peripherals of any sort yet. Now apply power to the CPU and press BREAK. Does the screen show any characters other than D/C/W/M? If so, jump to the next paragraph. Press C and finish off the usual initialization routine. If there are any incorrect characters, jump to the next paragraph. Try to run a few simple two or three line programs and solve some easy problems in the command mode. If anything didn't work satisfactorily, jump to the next paragraph. Congratulations, you are now the owner of a super-Superboard. Keep an eye open just in case any problems might develop until you feel sure that all is OK. Branch to the next sub-heading.

If you are reading this paragraph then you have a minor problem to solve. Most probably your RAM is a bit too slow. Try to borrow four 2114 RAM's known to be good at 2 or more MHZ. Pull out all ten (or eighteen) RAM's on your CPU card (note polarity), both program and video memory. Look in the back of your User's manual for the locations of U31, U39, U40 and U45. Plug in the faster 2114's here making sure that you get them in the same way that the others came out. Try to run through the initialization tests of the previous prargraphs. It should say that it has 255 bytes free. If this doesn't work, you can either try one more set of different RAM's in the hope that one of them still wasn't fast enough. No go? I'm sorry...probably one of the ROM's is a bit slow. Well, just reverse the order of steps in the modification, restore the original memory chips (making sure to put a jumper in where you cut the line and removing your modification jumper) and you're none the worse for wear.

COMMAND MODE STRING PRINTING

I have one small item of curiosity to throw in before I vector off into oblivion. Type (in command mode), ?"67 or 68 characters", press RETURN. It may or may not print the string and will almost always print a syntax error at some non-existent line number. Branch to next article.

HAPPY COMPUTING!

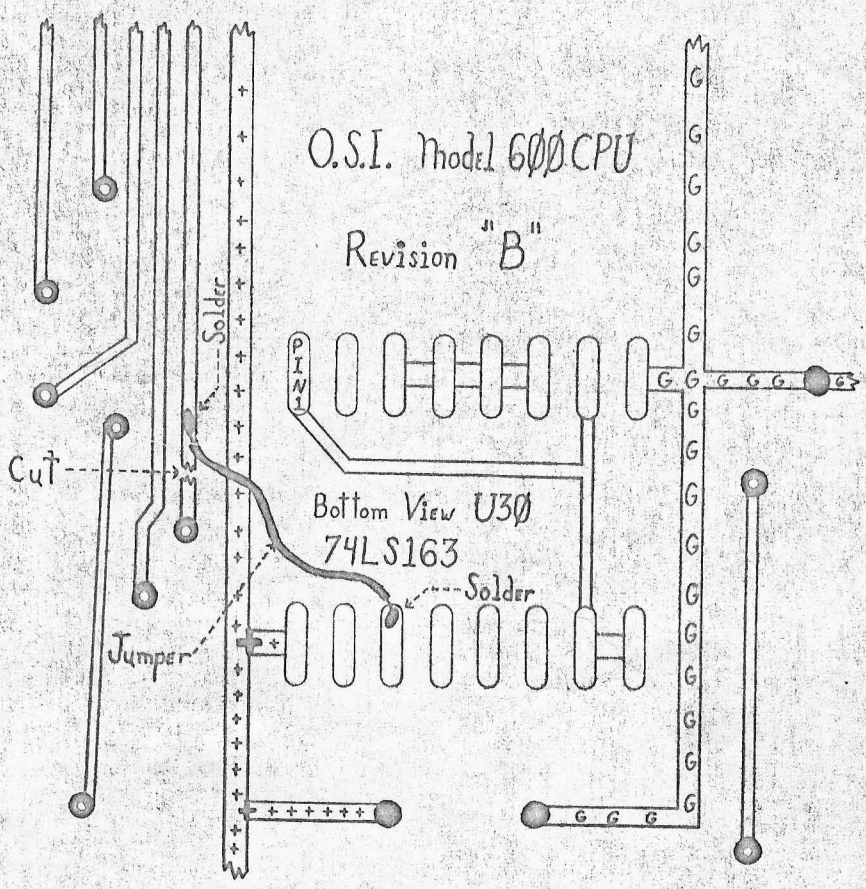

Figure 1