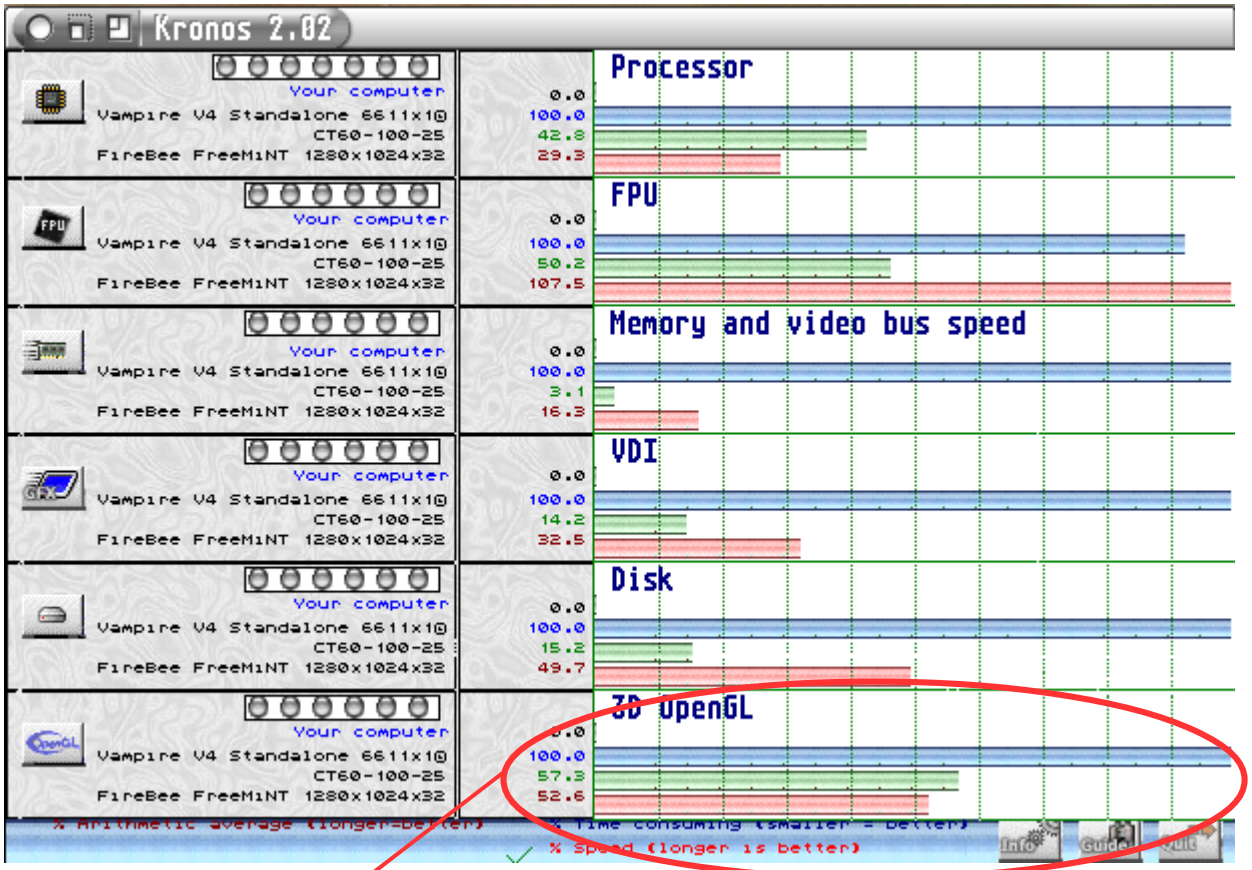
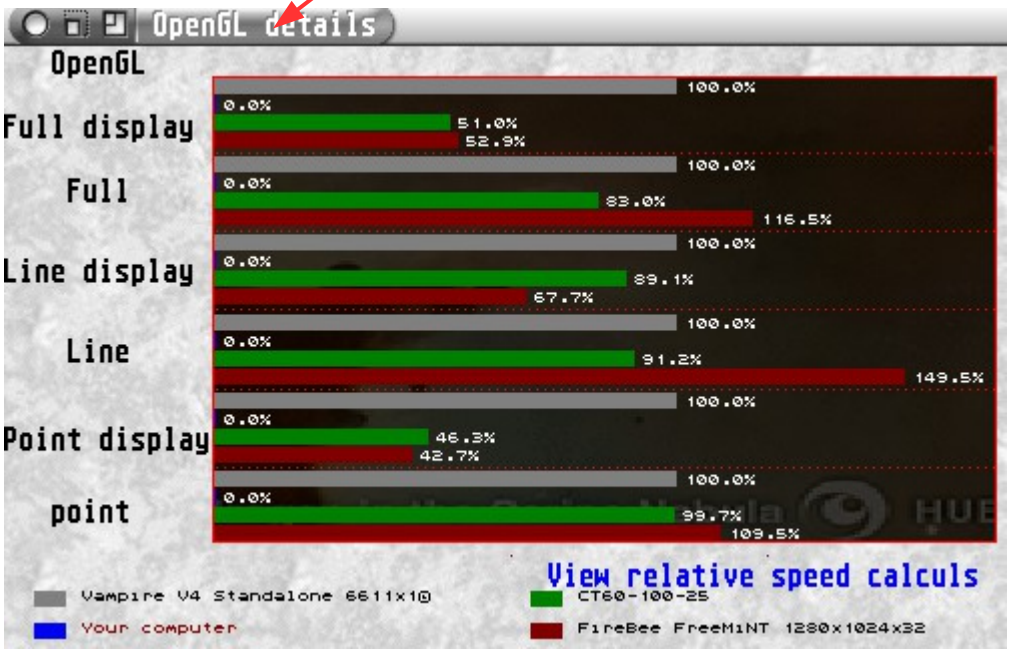
V4 x14 standalone Atari Kronos bench

- Comparison V4 (video 16 bits) vs CT60 100Mhz without video card (8 bit interleaved Atari format (very slow)) and firebee without video card (32 bits video format)
- V4 bench use 68881 FPU and Opengl version
- Absolutely no use any 68080 feature (except perhaps VDI system optimisation of Emutos driver I don't know)
- Firebee tests are old perhaps results are now better





Display version of tests depend highly of computer screen format and video memory tranfer, other are independant it's time to build image 24bit format in memory, tiny_gl is used, it is pure C code, this test use 68881 test result giving better results than 68040 see page 8.
With this result we build a value named in Kronos « **mothercard perf** » :

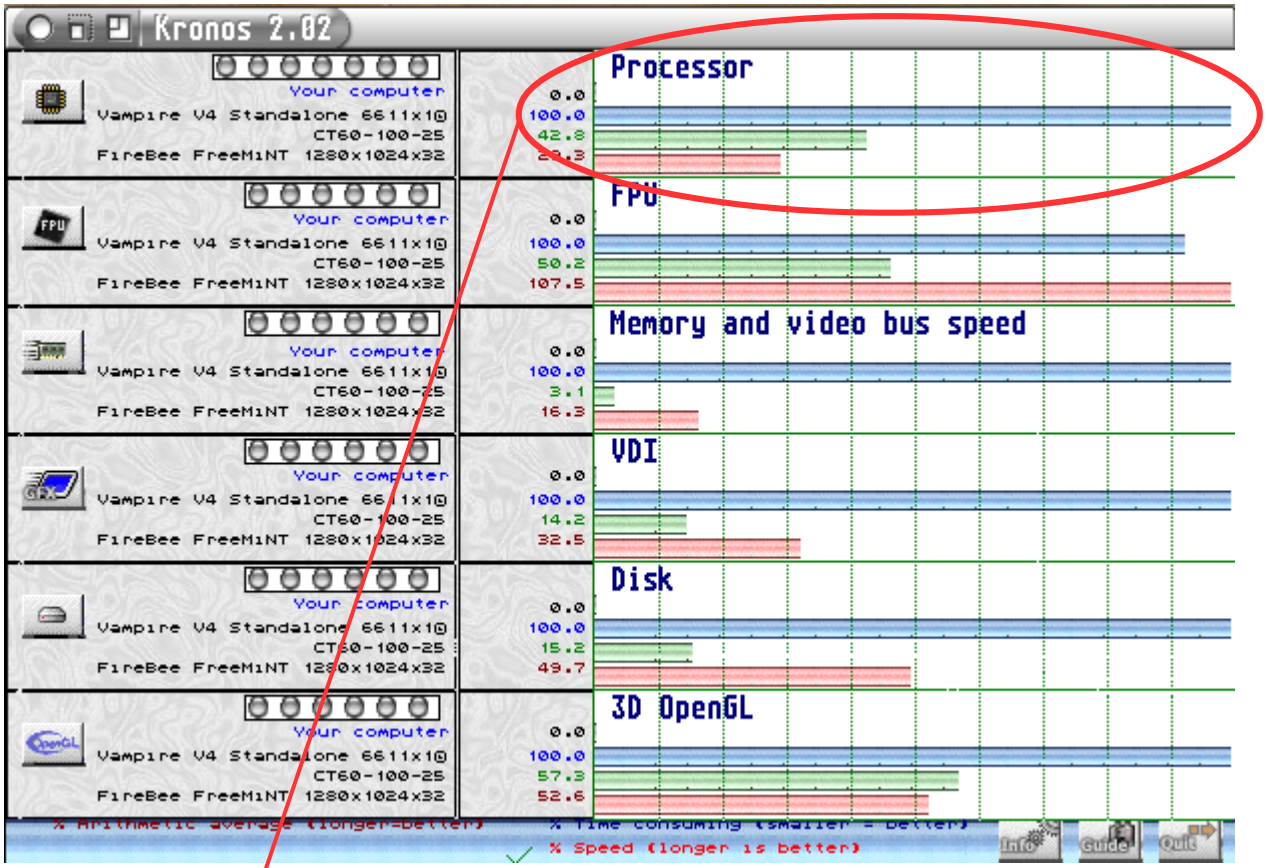
CT60 100 Mhz : 1139
Coldfire firebee 266 Mhz : 1820
V4 x14 june 2019 (99Mhz): 1337

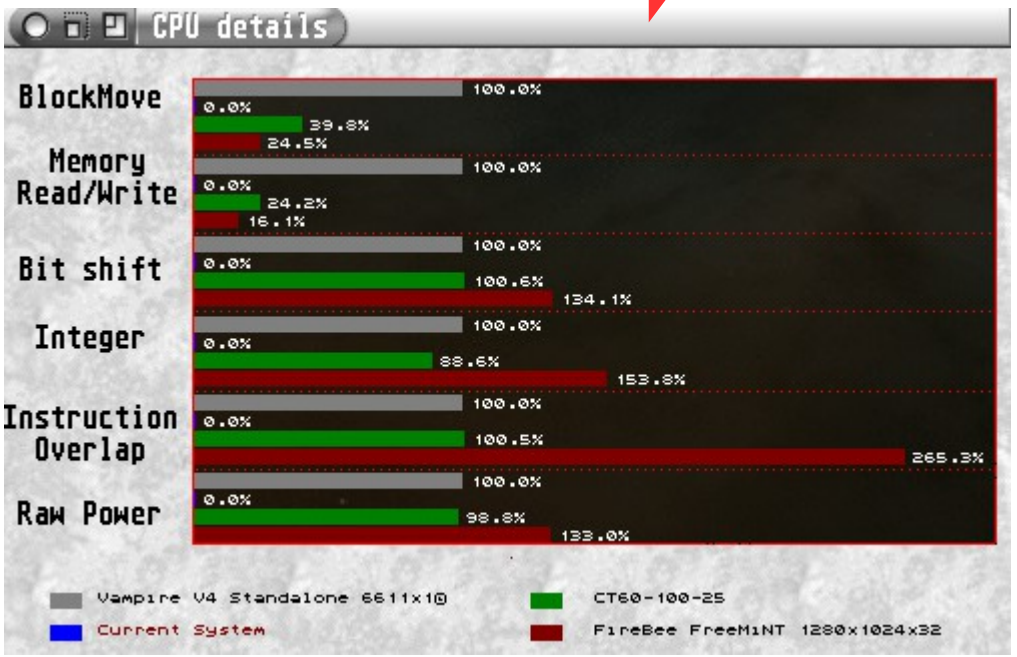
So on this point V4 is around 17% faster than 68060 100 Mhz on CT60 and equal to a virtual coldfire at 200 Mhz so around 28% slower.

Opengl display version give far higher result, of course this result depend of screen resolution and memory transfer to screen. Here we can see V4 board give very high results, CT60 has very poor memory transfer to Falcon video this is the same as V2 on Amiga computer. There is a value for this test named « **Pseudo Opengl perf**»

CT60 100 Mhz : 6.3
Coldfire firebee 266 Mhz : 5.7
V4 x14 june 2019 (99Mhz): 9.8

So to display opengl test V4 in this configuration 55% faster than CT60 and 72% than firebee !
Notice this result depend of video format and a bit to video driver



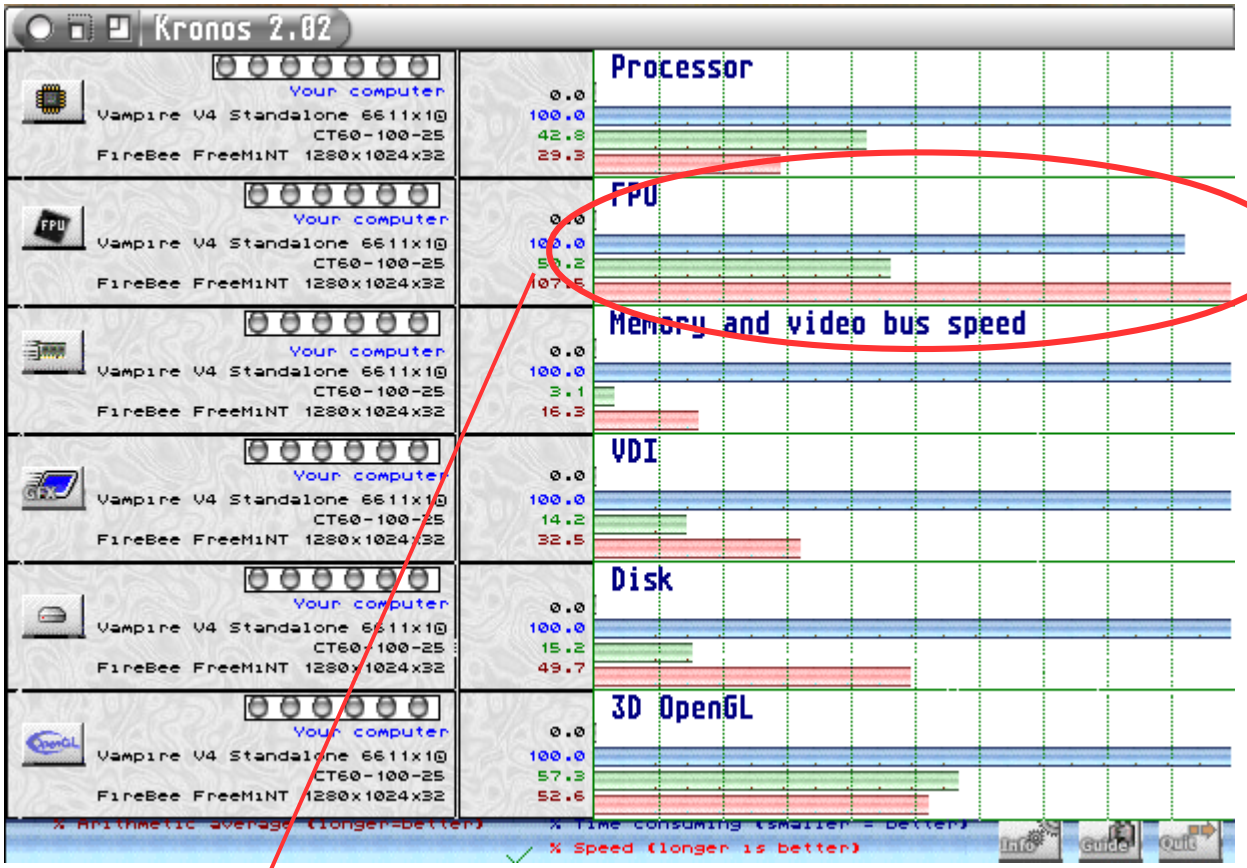


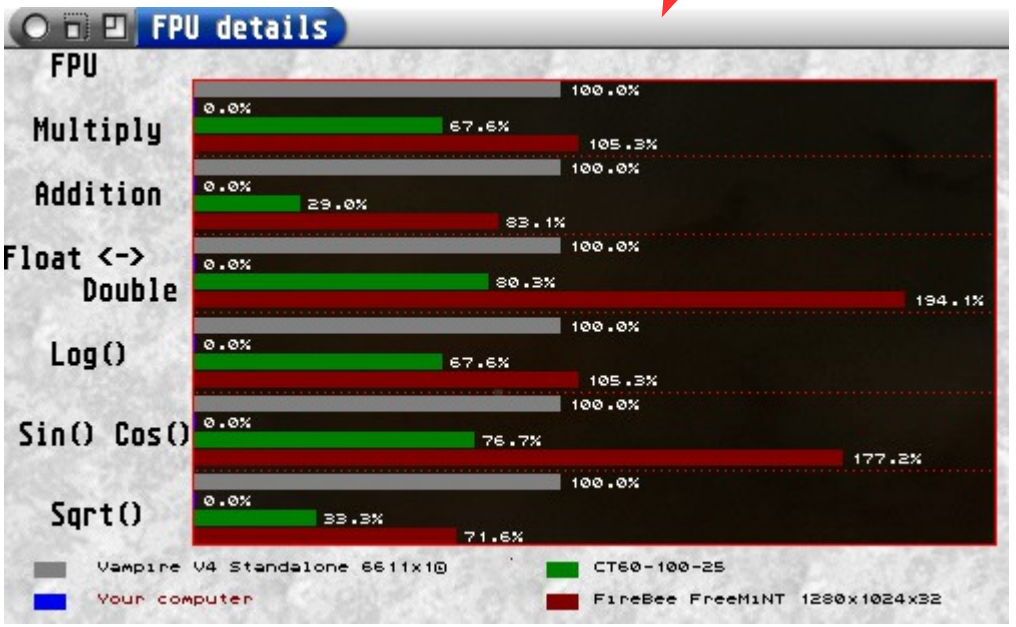
CPU test is very basic and far to be able to be reflect power of the processor.

But the 2 first tests are interesting because they give information to memory access in TTRam. In this case we can see V4 as incredible memory access up to 2.5 to 4 time higher than CT60 known to have high memory flow access. Memory block move is absolutely not optimized for 68080 but all cpu should do same test.

CT60 100 Mhz : 46.5 Mo/sec
Coldfire firebee 266 Mhz : 28.6 Mo/sec
V4 x14 june 2019 (99Mhz): 116.8 Mo/sec

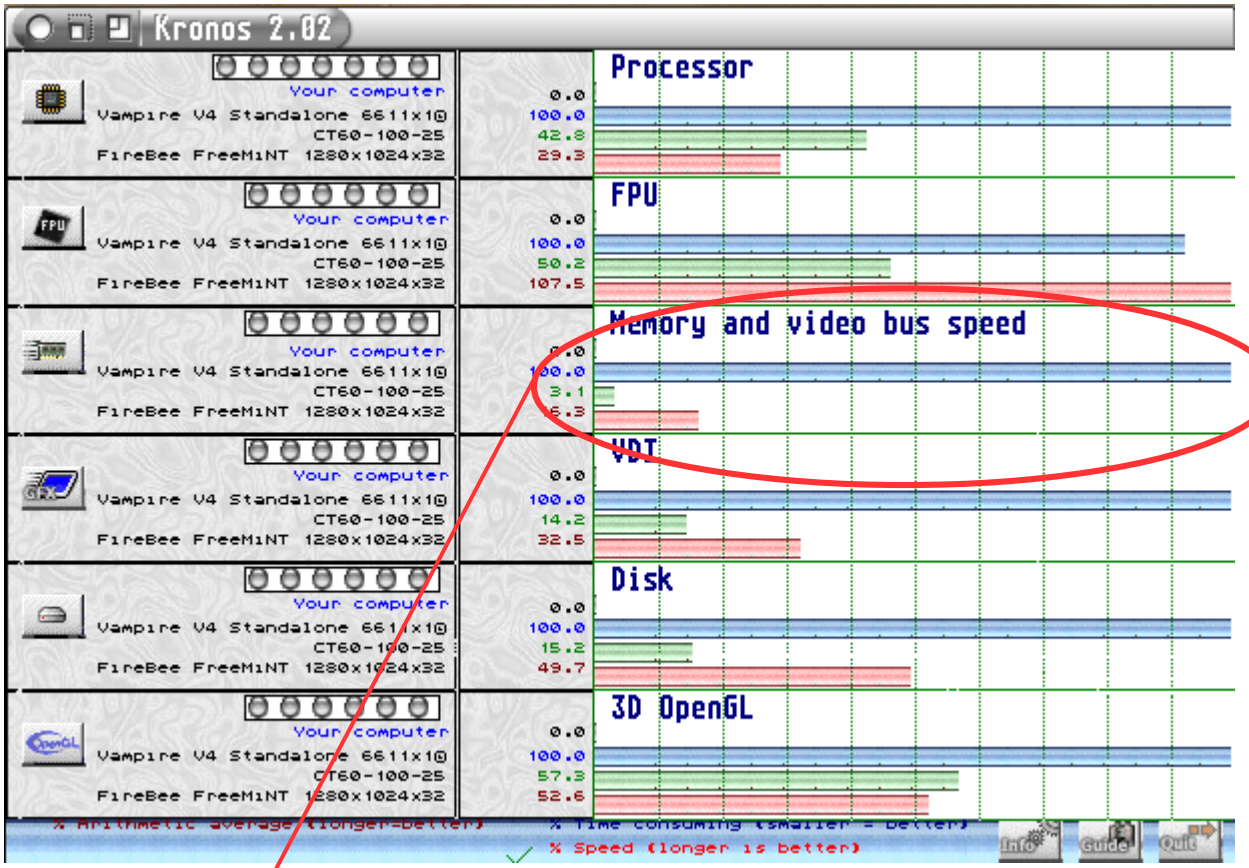
Notice « Instruction Overlap » is nice to know processor frequency.

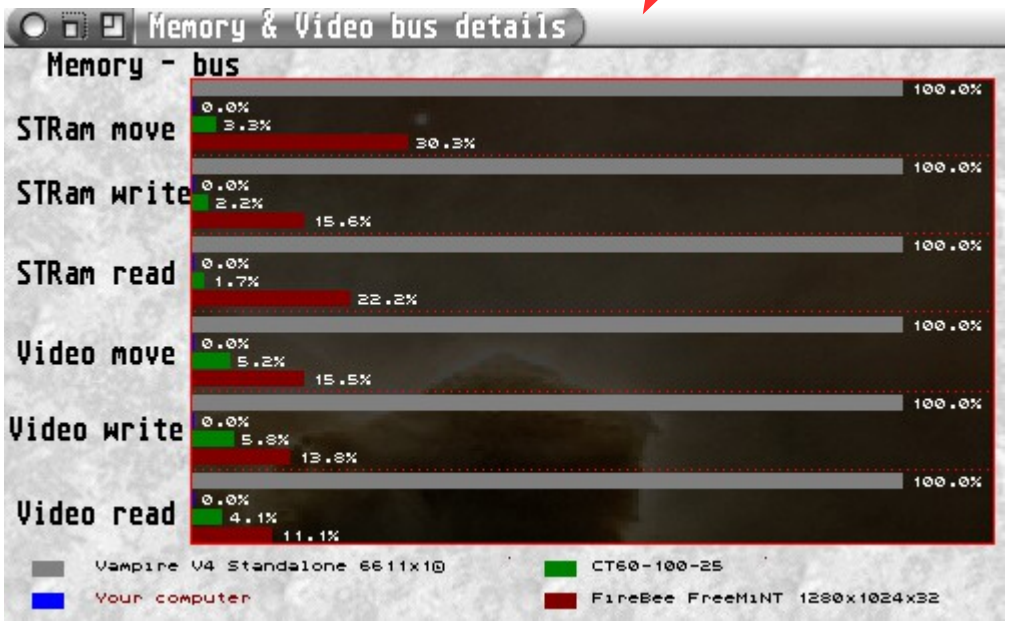




FPU test is quite simple, the four last tests are dependant from math library and there is possible issue in Kronos with possible use of a different math library for coldfire version, same remark can be done for opengl test.

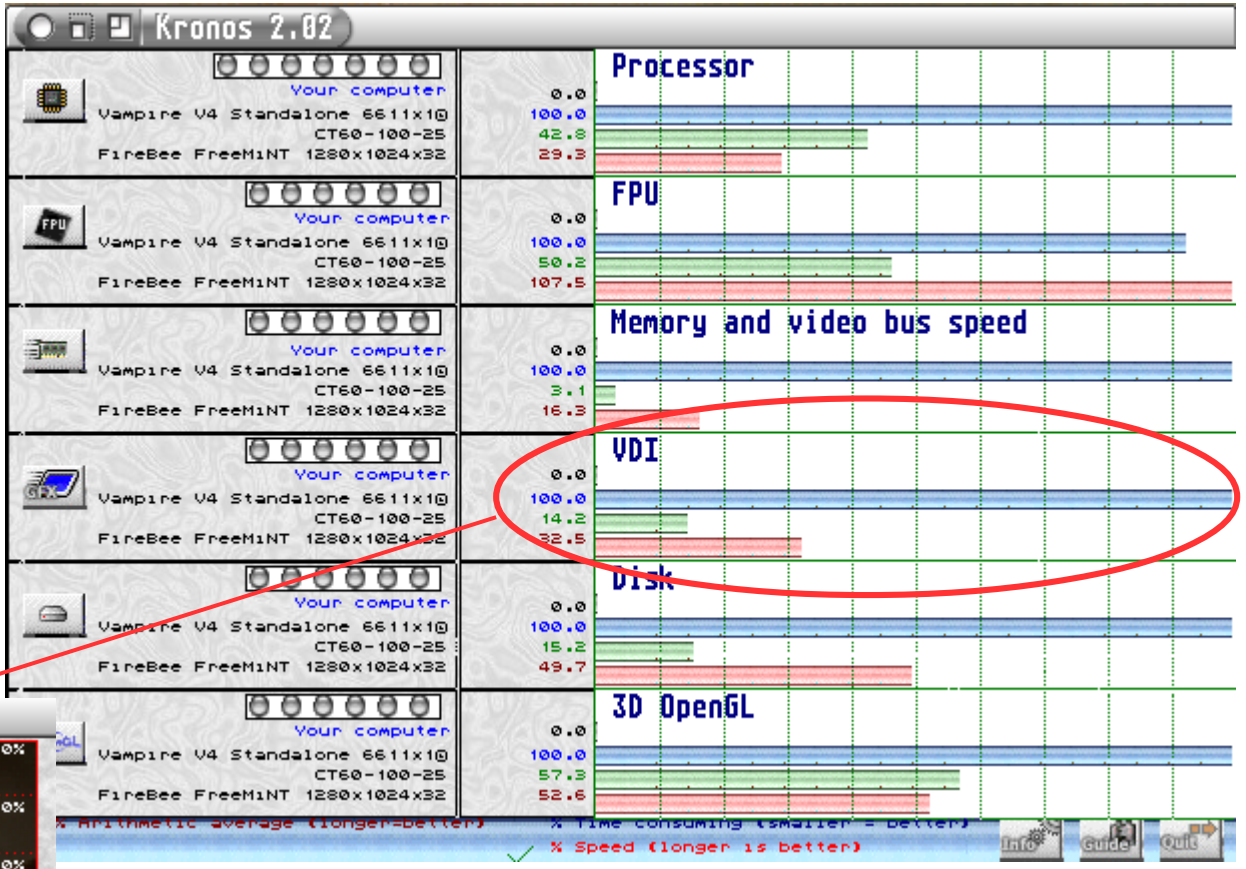
68080 is widely faster than the 68060 !

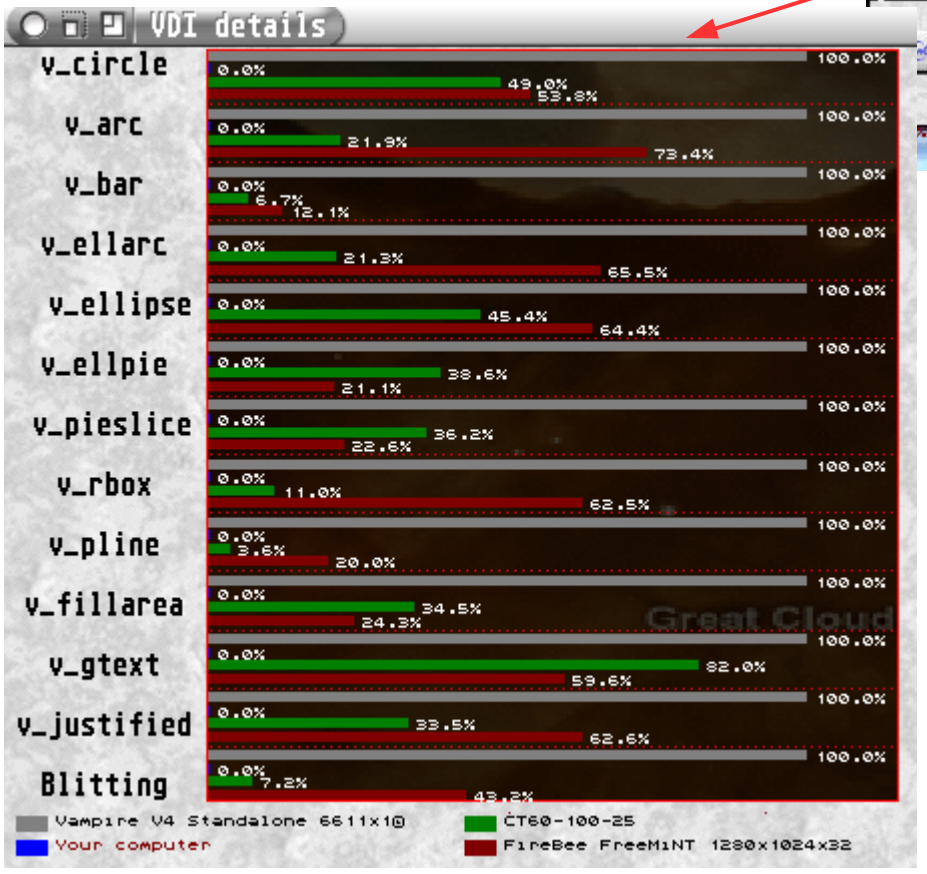




STRam give exactly same result as TTRam as speed access, there is no difference on V4, so it is very fast compare to card acceleration as CT60 or V2 for Amiga using memory of the computer. The difference is more than 30 time faster !

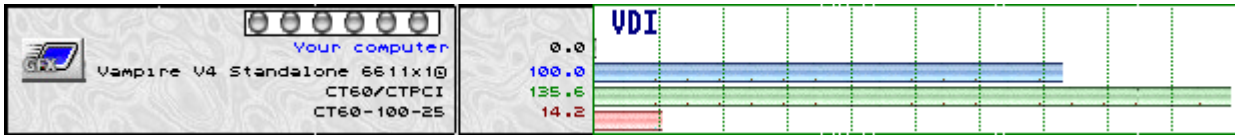
Of course video memory access give same type of result as video memory on Falcon is on STRam, the only difference on this 2 type of access, one is directly done by Kronos routine while video memory access is done through VDI vro_cpyfm VDI api, so result depend of video driver.

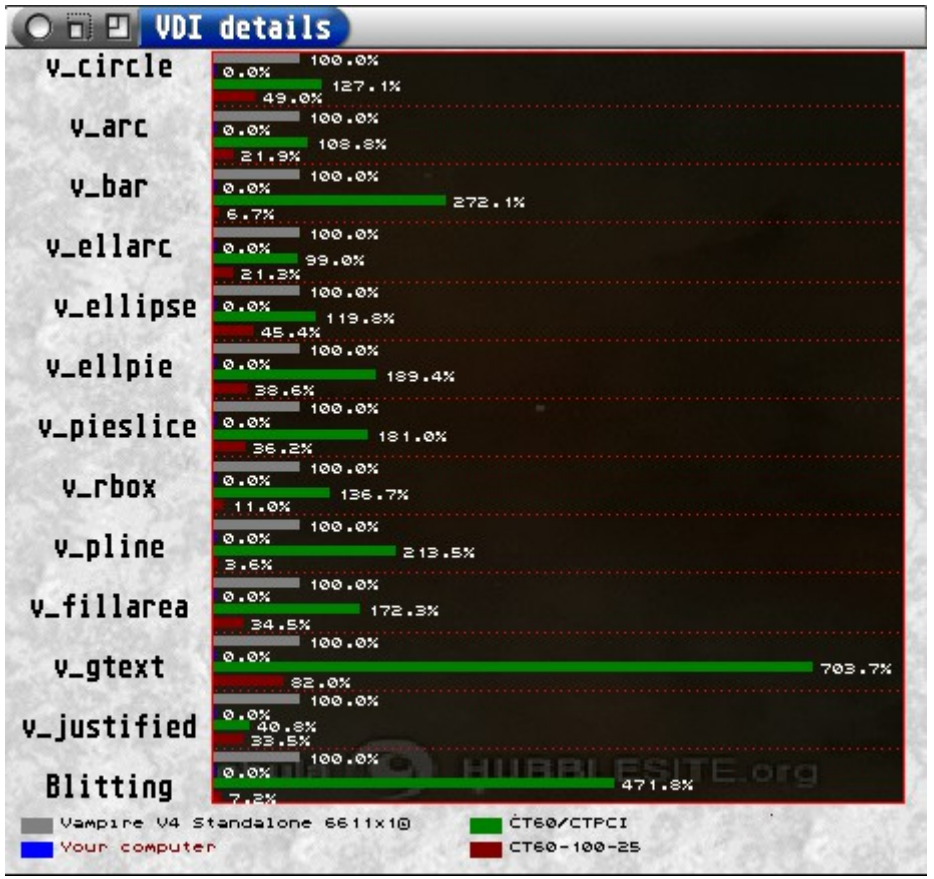




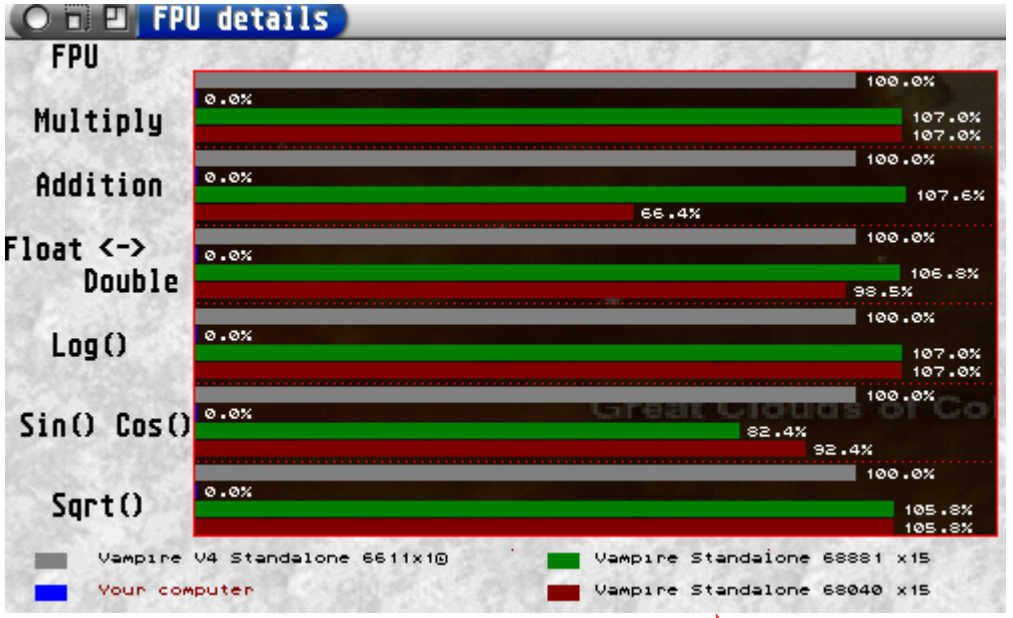
VDI is quite fast but CT60 with Radeon video card (see next page) is able to present far faster results but with a lower compatibility.

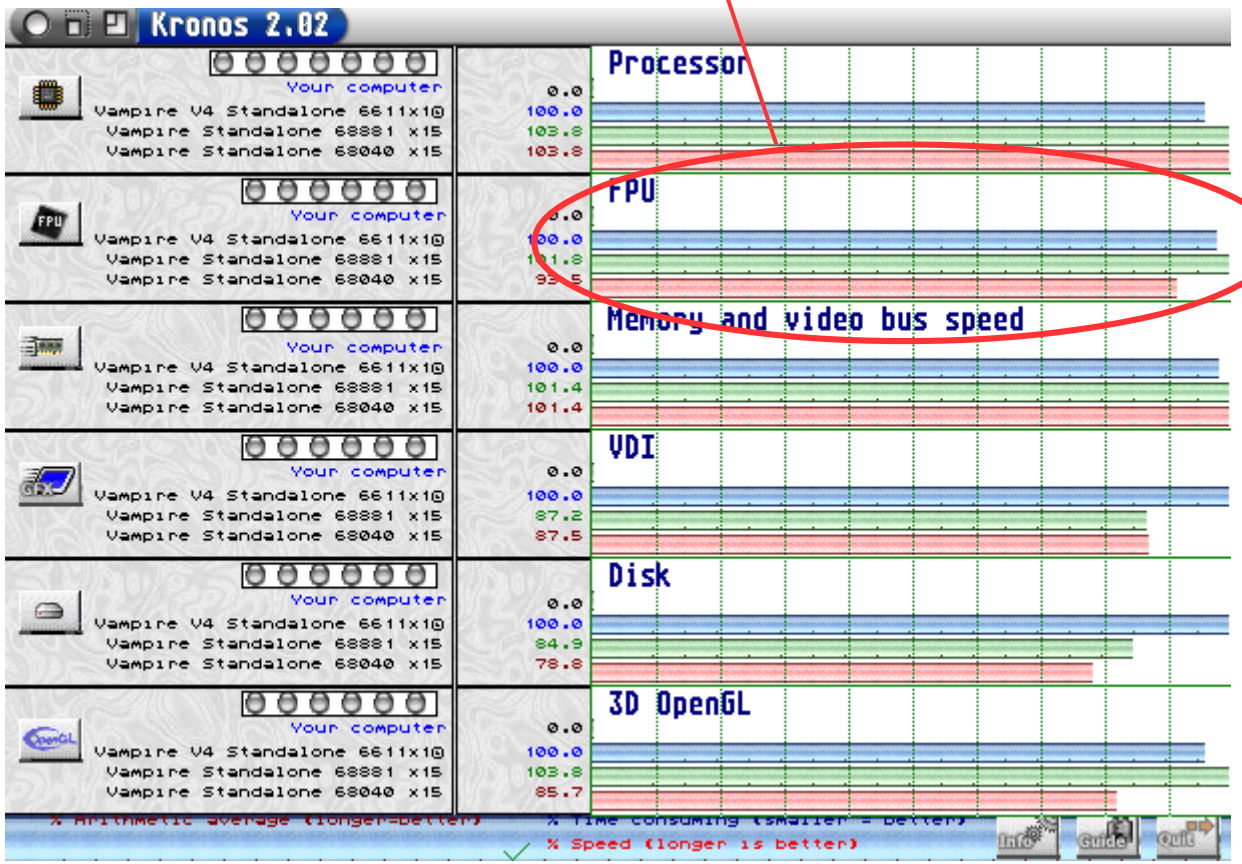
V4 VDI comparison with CT60 with radeon PCI video card





Comparison with CT60 100Mhz and CTPCI with PCI Radeon video card, in this case globally video card is far faster than V4 VDI, notice for AES redraw most important function used are, v_bar, v_pline, v_gtext and vro_cpyfm from/to screen-memory, the 3 first function are far faster with radeon video card but far slower in the case of the vro_cpyfm screen-memory copy





X14 vs X15 and 68040 vs 68881

Notice x14 test have not been tested on same system configuration as x15 68040 and 68881 (screen resolution was same but VDI driver was not the same).

- Disk test is not very stable don't take into account

- x15 is a bit faster than x14 (Not surprizing isn't it !)

- VDI difference probably link to video driver used (fVDI+NVDI for x14, Emutos only for x15)

68881 FPU version of test give better results than 68040 version of around 15% on openGL version all tests, « **mother board perfs** » is 22.7% slower for 68040 version.

Details FPU give some strange results 68881 test addition look faster than 68040 after check looks like there is display bar issue for addition and float – double conversion in Kronos ! Don't take into account.

Sin() Cos() is slower with 68881 test than 68040 while I was expecting faster result for 68881 version as it is inline asm code in this case, while 68040 this functions are provided by math library.

Conclusion

New V4 standalone is a full computer with homogeneous results, compare to accelerated card there is no need to access to a slow address bus and slow memory from the host computer.

Memory access is very fast and globaly very fast on simple test, more complex tests give less advantage but still give good results.

Thanks to Tuxie and ShK for bench tests

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