**Commodore VIC-20: Hyper Expander Rev. 1**

**Functional Description**

The EPROM part with IC1 and IC2 is pretty much a straight forward VIC-20 EPROM cartridge. The data bus (D0…D7) and the address bus (A0…A12) are connected to the EPROM. This allows to address 8k of memory. The address bit A13…A15 can be jumpered (JP3), which results in selectable 8k memory banks.

The chip selects can be set for each EPROM differently (JP1 and JP2). It is not every chip select possible to use with IC1 and IC2.

IC3 and IC5 are static RAMs (32kByte each). Again, the data bus (D0…D7) and the address bus (A0…A12) is connected to both ICs, which results in an 8k RAM bank size. These four RAM banks are selected with the signals RA13 and RA14 (IC3 = Low RAM)) and RAB13 and RAB14 (IC5 = High RAM)). Those additional address signals are generated by the 8 to 3 decoder IC4 and IC6 for the High RAM). If one of the chip selects gets LOW, the signal or gets LOW, too. This is forming the chip select signal of IC3/IC5.

The three chip select signals for the 3k RAM expansion are originally made for addressing 2114 1kx4 RAMs. Since the 4th RAM block is addressed with the 3k chip selects , those need to be combined to a single chip select, which is accomplished with D1, D2 and D3 and the pull-up resistor R4. In case one of those signals is LOW, the combined is LOW as well.

The 2nd EPROM IC2 is optional and can only be installed, in case the High RAM IC5 is not installed. In this case, IC6 and JP4 are not required.