In the 32 bit register file, a the input D is a 32 bit value which is written into one of the 32 registers or one of the 15 temp registers. This is determined by the DestReg decoder and the TempDestReg decoder. The value of DR, which is the input for the DestReg decoder, changes which register is selected, and if the value of TD, the input for the TempDestReg decoder, is 0 then D is written into on of the 32 registers when the load signal is ‘1’ and the RW signal is ‘1’. If TD is any other value, D is written into the corresponding temp Register.

The value of a register can be read using the SA, SB, TA and TB signals. These all correspond to a multiplexer, with Mux32A and Mux32B using the values of SA and SB to choose which register has its output as the first input for Mux16A and Mux16B. If TA is 0 then the output A is whichever register was read from in the output of Mux32A, and the same for if TB is 0, the output B is the output of Mux32B. If TA and TB are any other value, then one of the 15 temp registers is read from instead.