Immediate Unit

The immediate Unit (IU) is a Instruction Decoder that does not perform any other action than to put a value, encoded in the instruction, on the data network.

If the width of the immediate part of the instruction is equal or larger than that of the data network, the immediate will be directly available on the network. If the width of the immediate part of the instruction is smaller than the data network width, the immediate is built from several immediate instructions. Each time an immediate instruction is executed the data is shifted by the number of bits available in each immediate instruction.

For example:

- Our instruction width is 9 bit, therefore the size of the immediate is 8-bit (9 minus one write enable bit).
- We assume the data network to be 32 bit, meaning we need 4 loads to fill the output of the immediate unit with the 32-bit value.
- If we would want to load the immediate value 0xAABBCCDD, we would execute the following instructions:
    - imm 0xAA (IU output value: 0x??????AA)
    - imm 0xBB (IU output value: 0x????AABB)
    - imm 0xCC (IU output value: 0x??AABBCC)
    - imm 0xDD (IU output value: 0xAABBCCDD)

The IU can be configured (with a parameter in Verilog) to insert a bubble or not. This allows the total number of pipeline stages from the IF to the data arriving on the data network to be equal for both the notmal ID and FUs and the IU. The number of pipeline stages without bubble insertion is 2 and with bubble insertion 3.