

Accumulate & Branch Unit

The Accumulate and Branch Unit (ABU) can be configured to perform two tasks, as the name implies.

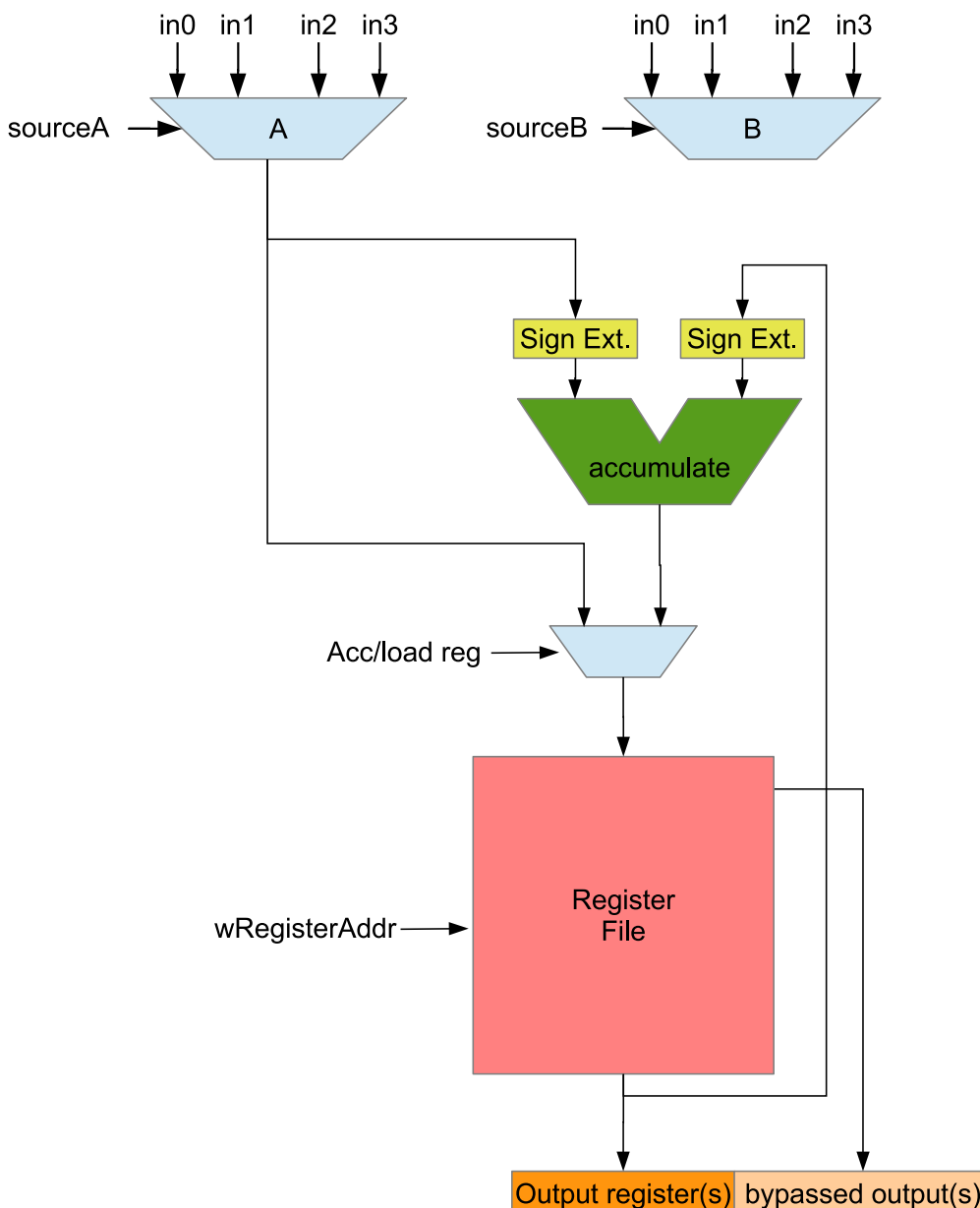
- It can be used as a multi-register accumulator.
- It can be used to calculate program counters and hence function as a branch unit.

Selection between these two functionalities is made at configuration time by setting (branch functionality) or clearing (accumulate functionality) the configuration bit.

Accumulate mode:

The width of the accumulation registers is 16-bit in 8 and 16 bit modes and 32-bit in 32-bit mode. The accumulate output of the selected register is available at the highest portnumber(s).

- In 8-bit mode two outputs are used to output one of the 16-bit accumulation registers, 16 accumulate registers are available.
- In 16-bit mode one output is used to output the selected accumulate register, 16 accumulate registers are available. Any additional outputs are connected directly to the register number corresponding to the port number.
- In 32-bit mode one output is used to output the selected accumulate register, a pair 16-bit registers are concatenated in this mode therefore 8 32-bit accumulate registers are available. Any additional outputs are connected directly to the register number corresponding to the port number.



Branch mode:

The program counter is available at the highest portnumber(s) and uses a 16-bit counter. In 16-bit and 32-bit mode the port N-1 can be used to load values from any of the 16 internal 16-bit registers. In 8-bit mode this option is not available to port number limitations.

The branch unit supports absolute/relative conditional/unconditional jumps. When the branch only has to jump a limited number of instructions it is possible to use an intermediate branch instruction, otherwise the branch target has to be present on one of the inputs. Conditions always have to be present on the inputs.

- In 8-bit mode two outputs are used to output the 16-bit program counter. No register reading is supported. Any additional outputs are connected directly to the register number corresponding to the port number.
- In 16-bit and 32-bit mode the highest output port produces the program counter, port number N-1 reads the selected register. Any additional outputs are connected directly to the register number corresponding to the port number.

Not yet implemented: The additional registers will, in the future, be used for configuration of hardware loop support.

