This file lists all the eQASM instructions that we used in Quingo code generation. Classic instructions are compatible with RISC-V standard.

If you use a new instruction in the xtend files, remember to also add it here.

| **Format** | **Name** | **Pseudocode** |
| --- | --- | --- |
| ADD rd,rs1,rs2 | Add | rd ← sx(rs1) + sx(rs2) |
| ADDI rd,rs1,imm | Add Immediate | rd ← rs1 + sx(imm) |
| AND rd,rs1,rs2 | And | rd ← ux(rs1) ∧ ux(rs2) |
| BEQ rs1,rs2,offset | Branch Equal | if rs1 = rs2 then pc ← pc + offset |
| BNE rs1,rs2,offset | Branch Not Equal | if rs1 ≠ rs2 then pc ← pc + offset |
| LB rd,offset(rs1) | Load Byte | rd ← s8[rs1 + offset] |
| LW rd,offset(rs1) | Load Word | rd ← s32[rs1 + offset] |
| OR rd,rs1,rs2 | Or | rd ← ux(rs1) ∨ ux(rs2) |
| SB rs2,offset(rs1) | Store Byte | u8[rs1 + offset] ← rs2 |
| SLT rd,rs1,rs2 | Set Less Than | rd ← sx(rs1) < sx(rs2) |
| SLTIU rd,rs1,imm | Set Less Than Immediate Unsigned | rd ← ux(rs1) < ux(imm) |
| SW rs2,offset(rs1) | Store Word | u32[rs1 + offset] ← rs2 |
| SUB rd,rs1,rs2 | Subtract | rd ← sx(rs1) - sx(rs2) |
| XOR rd,rs1,rs2 | Xor | rd ← ux(rs1) ⊕ ux(rs2) |
| DIV rd,rs1,rs2 | Divide Signed | rd ← sx(rs1) ÷ sx(rs2) |
| MUL rd,rs1,rs2 | Multiply | rd ← ux(rs1) × ux(rs2) |
| REM rd,rs1,rs2 | Remainder Signed | rd ← sx(rs1) mod sx(rs2) |
| Floating point instructions | | |
| FMV.X.W rd,rs1 | Move to integer | rd ←rs1 |
| FMV.W.X rd,rs1 | Move from integer | rd ←rs1 |
| FCVT.S.W rd,rs1 | Convert from integer | rd ←rs1 |
| FCVT.W.S rd,rs1 | Convert to integer | rd ←rs1 |
| FNEG.S rx,ry | Negation | rx ←-ry |
| FLW rd,offset(rs1) | Load | rd ← f32[rs1 + offset] |
| FSW rs2,offset(rs1) | Store | f32[rs1 + offset] ← rs2 |
| FADD.S rd,rs1,rs2 | Add | rd ← rs1 + rs2 |
| FSUB.S rd,rs1,rs2 | Subtract | rd ← rs1 - rs2 |
| FMUL.S rd,rs1,rs2 | Multiply | rd ← rs1 × rs2 |
| FDIV.S rd,rs1,rs2 | Divide | rd ← rs1 ÷ rs2 |
| FEQ.S rd,rs1,rs2 | Compare = | rd ← rs1 == rs2 |
| FLT.S rd,rs1,rs2 | Compare < | rd ← rs1 < rs2 |
| FLE.S rd,rs1,rs2 | Compare ≤ | rd ← rs1 ≤ rs2 |

Old eQASM instructions:

SMIS, SMIT, QWAIT, QWAITR, FMR