Multiplication Hardware

1. Test Multiplier0
   - Multiplier0 = 1
   - Multiplier0 = 0

1a. Add multiplicand to product and place the result in Product register

2. Shift the Multiplicand register left 1 bit

3. Shift the Multiplier register right 1 bit

32nd repetition?
   - No: < 32 repetitions
   - Yes: 32 repetitions

Done
### Division Hardware

1. Subtract the Divisor register from the Remainder register and place the result in the Remainder register.

2. **2a.** Shift the Quotient register to the left, setting the new rightmost bit to 1.
   
   **2b.** Restore the original value by adding the Divisor register to the Remainder register and placing the sum in the Remainder register. Also shift the Quotient register to the left, setting the new least significant bit to 0.

3. Shift the Divisor register right 1 bit.

4. **3rd repetition?**
   
   **No:** < 33 repetitions
   
   **Yes:** 33 repetitions
   
   **Done**

Initially divisor in left half

Initially dividend

**Divisor**

- Shift right 64 bits

**64-bit ALU**

- Remainder
  - Write 64 bits

**Control test**

- 32 bits
  - Quotient
    - Shift left

**Remainder**

- Write 64 bits