

Fixed-Point Calculator

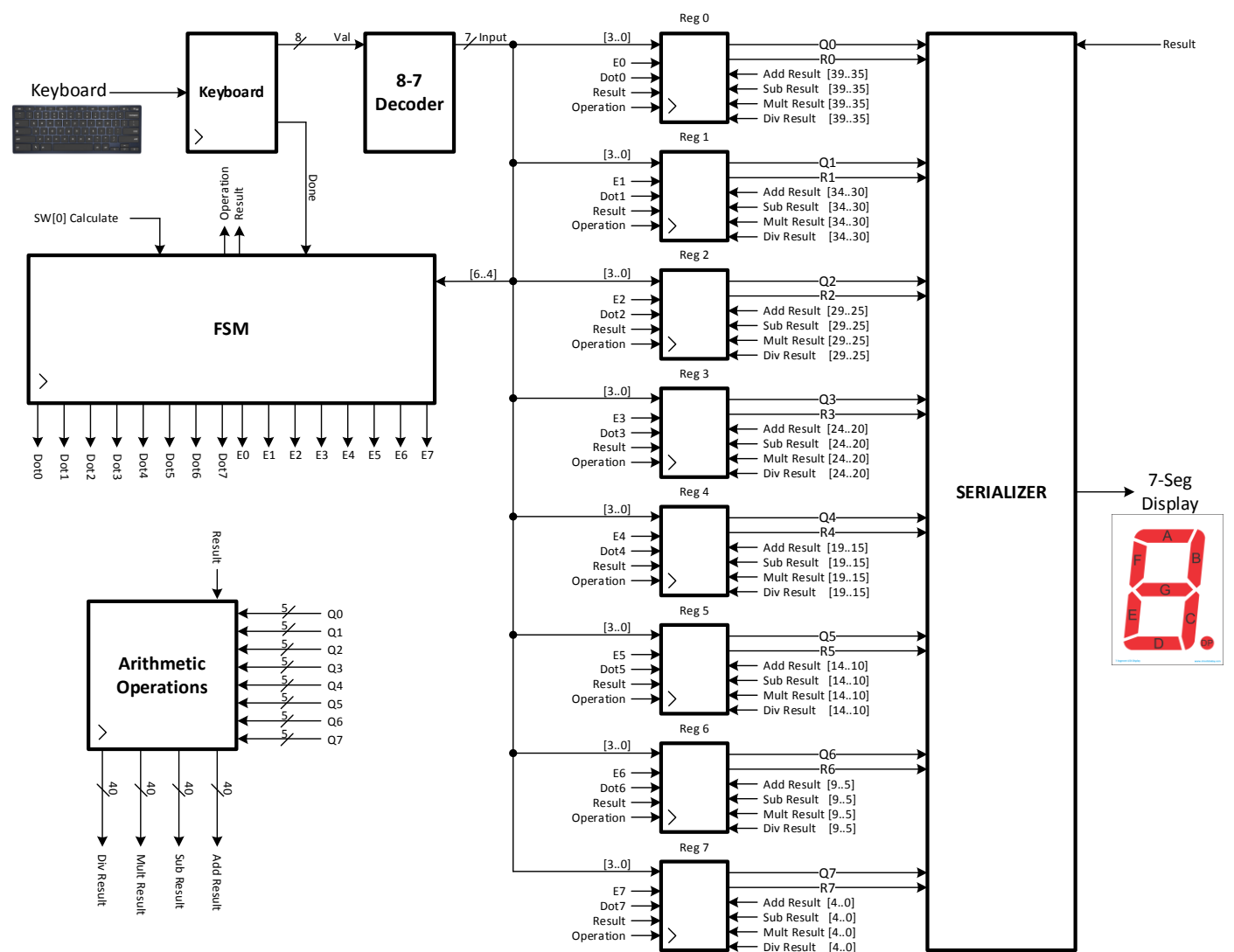
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ECE 4710 - Computer Hardware Design

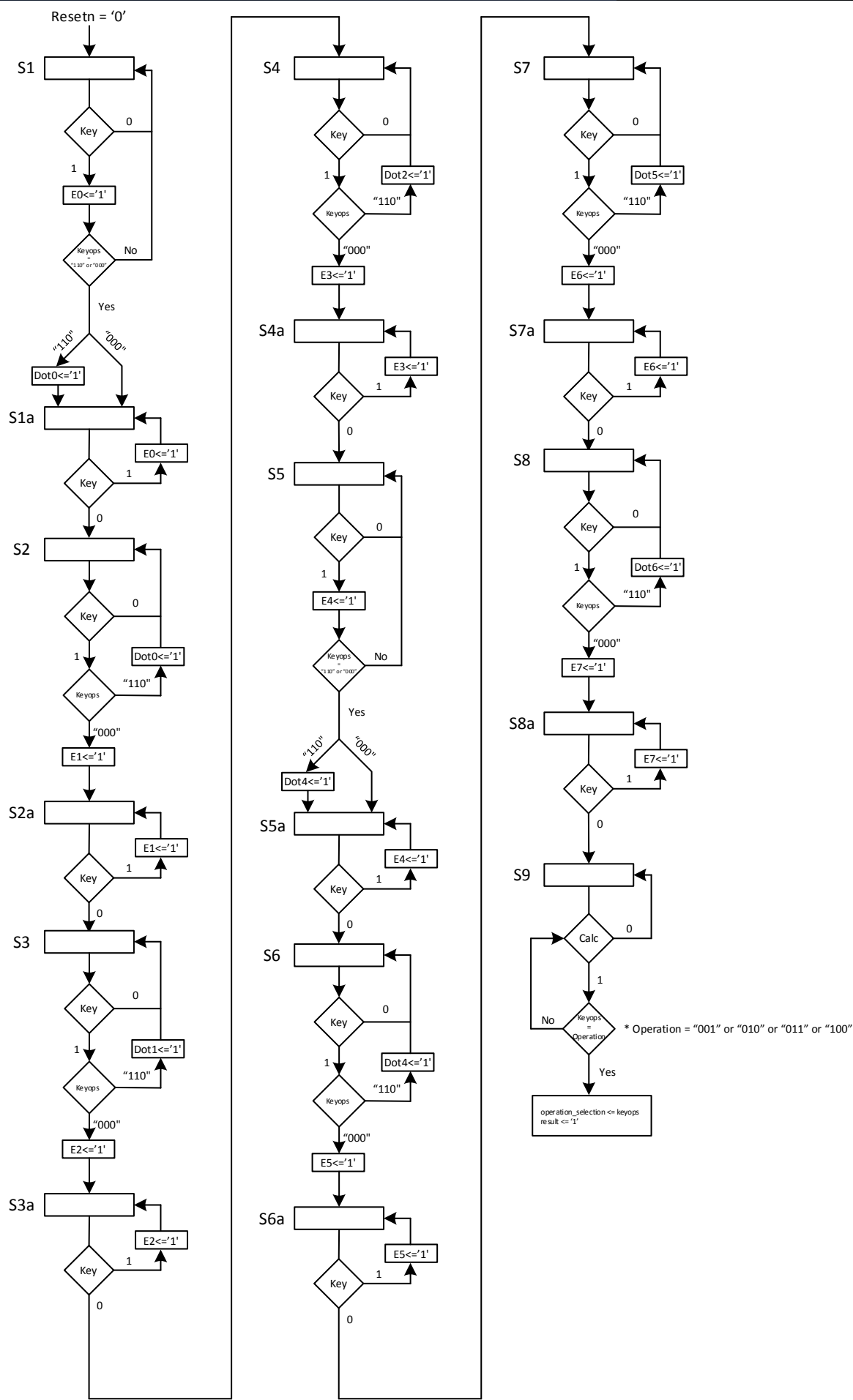
High-Level Operation

- Input peripheral:
USB connected
keyboard
- Output peripheral:
on-board 7-
segment displays
- Input hexadecimal
numbers (signed)
- Input hexadecimal
point
- Perform desired
basic operation
- Display output
(signed)

FX Calculator Datapath



Logic Finite-State Machine



Arithmetic Circuits Component

- Addition/Subtraction Logic:
 - Split operands: Integer portion & Fractional portion
 - Combine portions and perform operation
 - Display Result
- Multiplication Logic:
 - Perform operation
 - Deduce Result output based on hexadecimal point location
- Division Logic:
 - Alignment of operands
 - 4 Fractional bits
 - Perform operation and display Result

Project Testing

$$90.23 + 1.4A0 = FF91.6D00$$

$$0.2FB - 00.FB = FFFF.34B0$$

$$1A.90 \times 9.FF2 = F60.88C20$$

$$9.003 \div 3.003 = FFFFFFFD.B$$