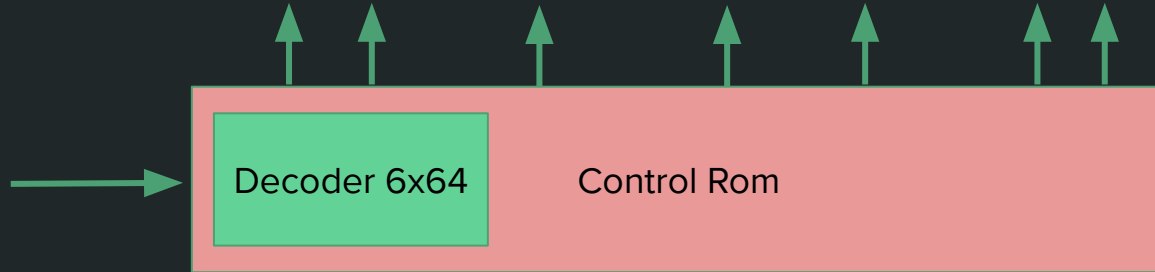


Control Rom

Raul Cabanellas

What is the Control Rom

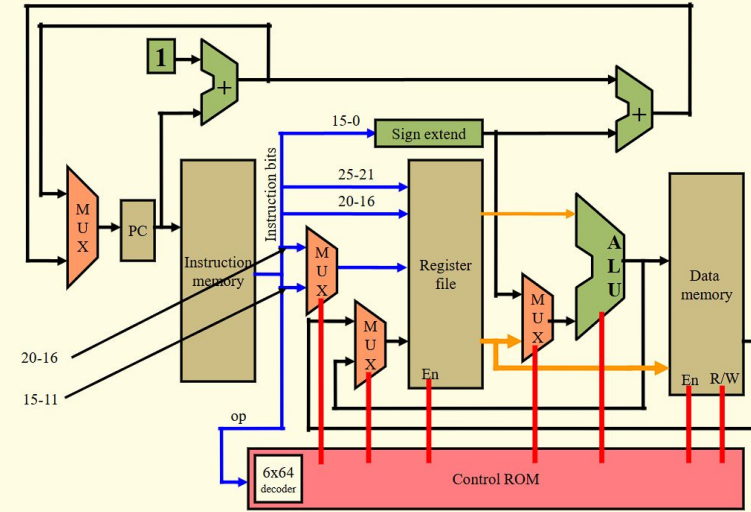
- A component that decodes instructions inside of the Single Cycle Processor
- The component takes in the opcode which is 6 bits to determine the type of instruction such as ADD, MOV, etc
- Depending on the instruction will output various control signals to other components

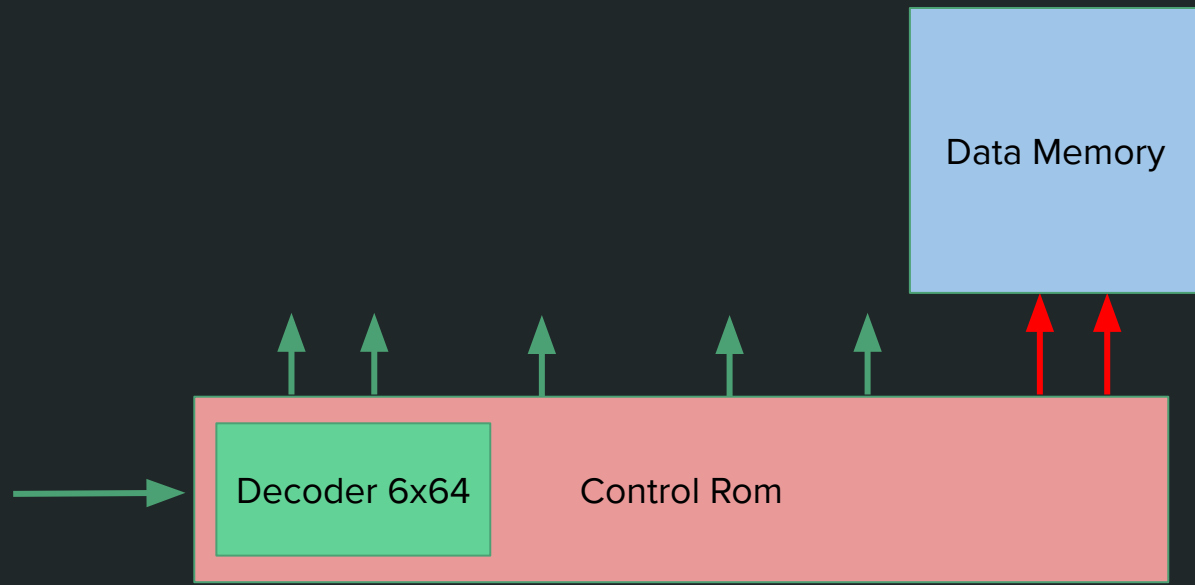


Why the Control Rom is important

- The Control Rom controls the data traffic
- The signals it sends affect the flow of data in the datapath
- The processor needs the data to flow correctly to perform operations the right way

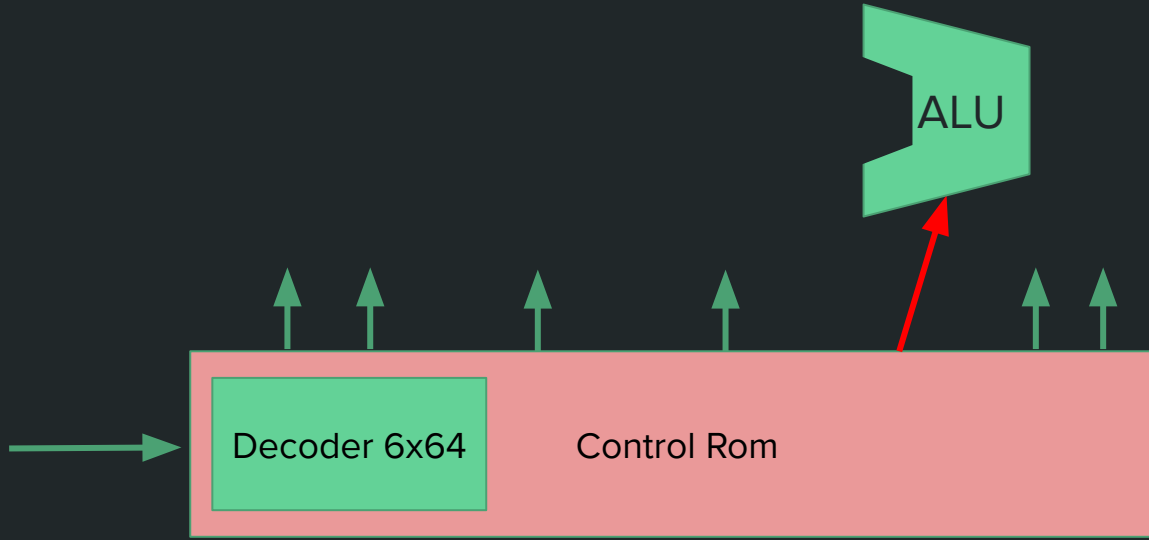
A MIPS-32 Datapath Implementation





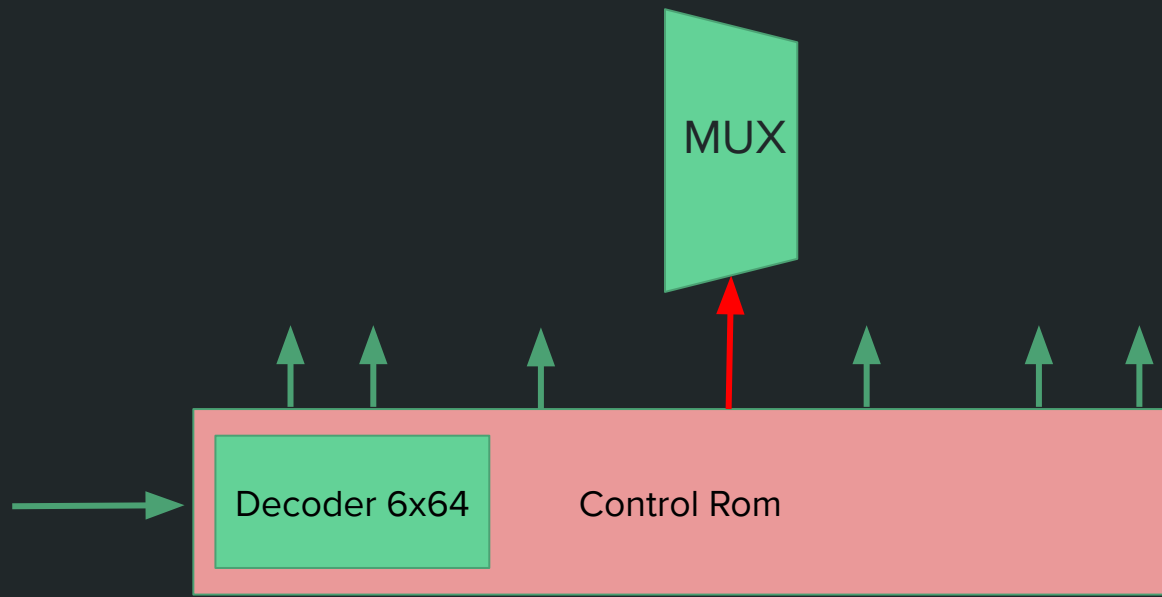
Affects the data memory module

- The control signals from the Control ROM determines whether or not the component Data Memory writes data into memory
- The control signals also determine if the Data memory reads from Memory



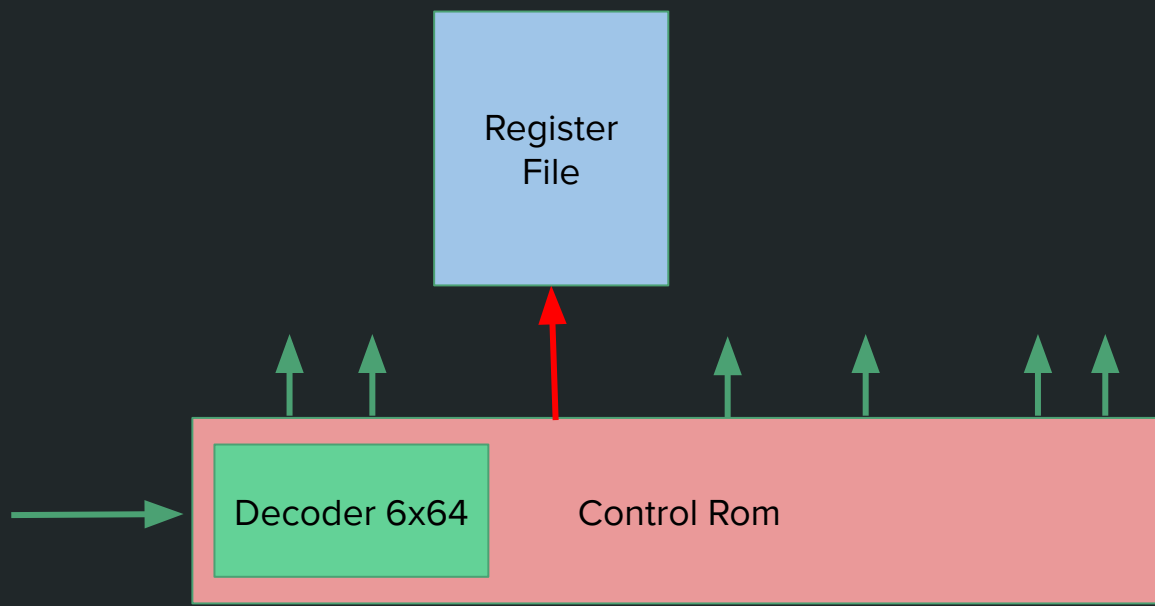
Affects the Alu module

- The control signal from the Control Rom determines whether or not the ALU performs a calculation or just directly uses the value



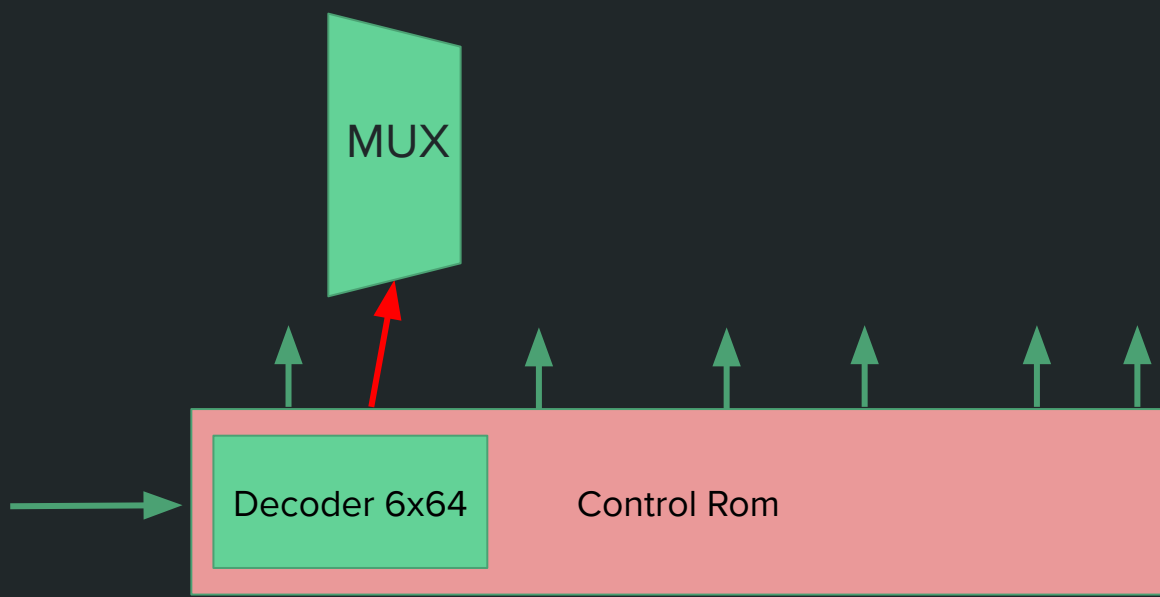
The Multiplexer that connects the Register File and ALU

- The control signal from the Control Rom determines the MUX's output which will be either the Sign Extender's value or the Register File's value to be used as the ALU's input for calculations



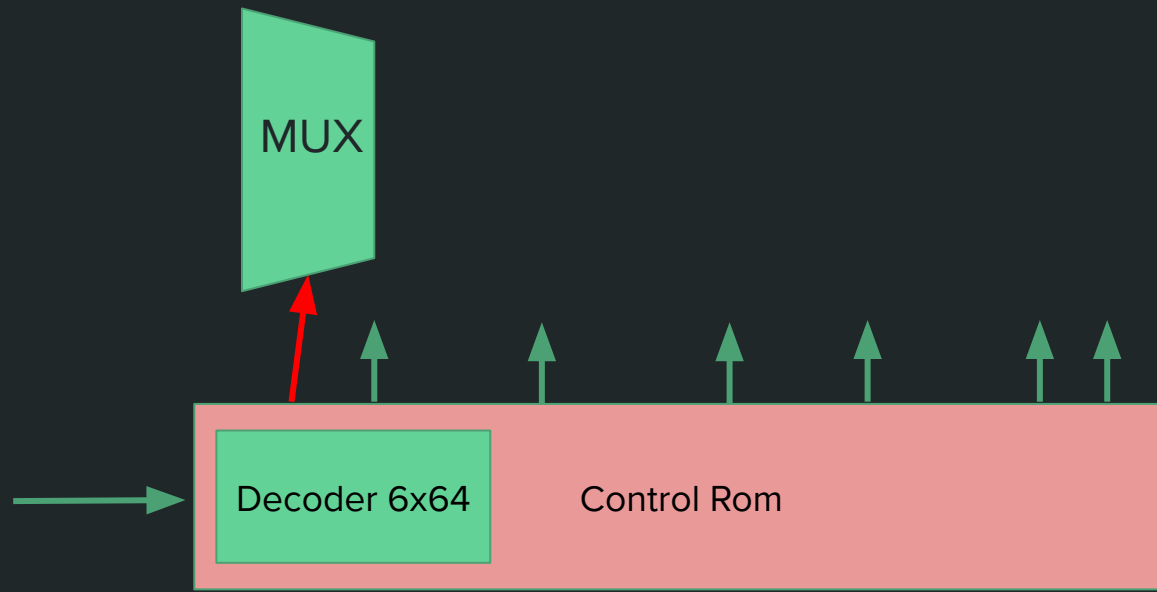
Affects the Register File module

- The control signal from the Control Rom determines whether or not the Register file stores data in the registers



The Multiplexer that connects the Data memory and Register File

- The control signal from the Control Rom determines the MUX's output which will be either the ALU result or the Data Memory read which will be used as the Register File write data if enabled



The Multiplexer that connects the Instruction memory and Register File

- The control signal from the Control Rom determines the MUX's output which will be either RT or RS that will be used as the destination of which register to store the write data

Difficulties implementing the Control Rom in SCP

- Setting the signals correctly for each type of instruction was difficult
 - To solve this issue had to thoroughly go over the data path of the SCP
 - This solution was beneficial as having a better understanding of the data flow in the data path helped solve more issues when implementing the entire SCP
-