Joystick Controller

Ports

- From bus:
    - AddressFromBus[25:0]
    - WEFromBus
    - (ignore DataFromBus)
- From joystick:
    - X[3:0]
    - Y[3:0]
- To bus:
    - DataToBus[31:0]
    - WriteToBus

Addresses

- 0x3FFFF50 → X ADDRESS (read X input)
- 0x3FFFF54 → Y ADDRESS (read Y input)

Address compare

- 26-bit unsigned compare to the constants above.

Behavior

- Read X: if (Address==0x3FFFF50) & (~WEFromBus)
    - DataToBus = zero_extend(X[3:0])
    - WriteToBus = 1
- Read Y: if (Address==0x3FFFF54) & (~WEFromBus)
    - DataToBus = zero_extend(Y[3:0])
    - WriteToBus = 1
- Writes (WEFromBus=1) to either address are ignored (WriteToBus=0).
- Otherwise idle: WriteToBus=0.

LED Controller

Ports
- From bus: AddressFromBus[25:0], DataFromBus[31:0], WEFromBus
  - To device: DataToLED (1 bit) ← drives the Logisim LED/wire
  - To bus (optional readback): DataToBus[31:0], WriteToBus

Address
- 0x3FFFF40 → LED_CTRL

Address compare
- 26-bit unsigned compare to the constants above.

Behavior
- Write (set LED): if (Address==0x3FFFF40) & WEFromBus
  - led_reg = DataFromBus[0]
  - DataToLED = led_reg
  - WriteToBus = 0
- Read (optional status): if (Address==0x3FFFF40) & ~WEFromBus
  - DataToBus = zero_extend(led_reg)
  - WriteToBus = 1
- Otherwise idle: WriteToBus=0.