

Hardware Validation

After programming the FPGA, it's time to validate CAN communication and UART output in the physical environment.

a) CAN Bus Connection

- Connect FPGA pins IO71 (TX) and IO70 (RX) to the CAN transceiver (e.g., MCP2551 or TJA1050).
→ The transceiver interfaces with the physical CANH and CANL bus lines.
- Ensure 120 Ω termination resistors are placed at both ends of the CAN bus to avoid signal reflections and maintain signal integrity.

b) Status LEDs Check

- LED0 (transmit_irq_o): Blinks when a CAN frame is sent.
- LED1 (transmit_ack_irq_o): Lights up when the sent frame receives an ACK on the bus.
- LED5 (txDone): Indicates that the received message has been successfully transmitted via UART.

c) UART Output Monitoring

- Open the Serial Console in ChipInventor or use a serial terminal program (e.g., Putty, TeraTerm).
- Set the baud rate according to the configuration in `uart_can_std_printer` (example: 115200 bps).
- Observe the received messages printed on the UART terminal. Example of expected output:
makefile
CopiarEditor
RTR:0 ID:0x257 LENGTH:5 DATA: 0x48 0x45 0x4C 0x4C 0x4F
- (This corresponds to the "HELLO" message in ASCII.)

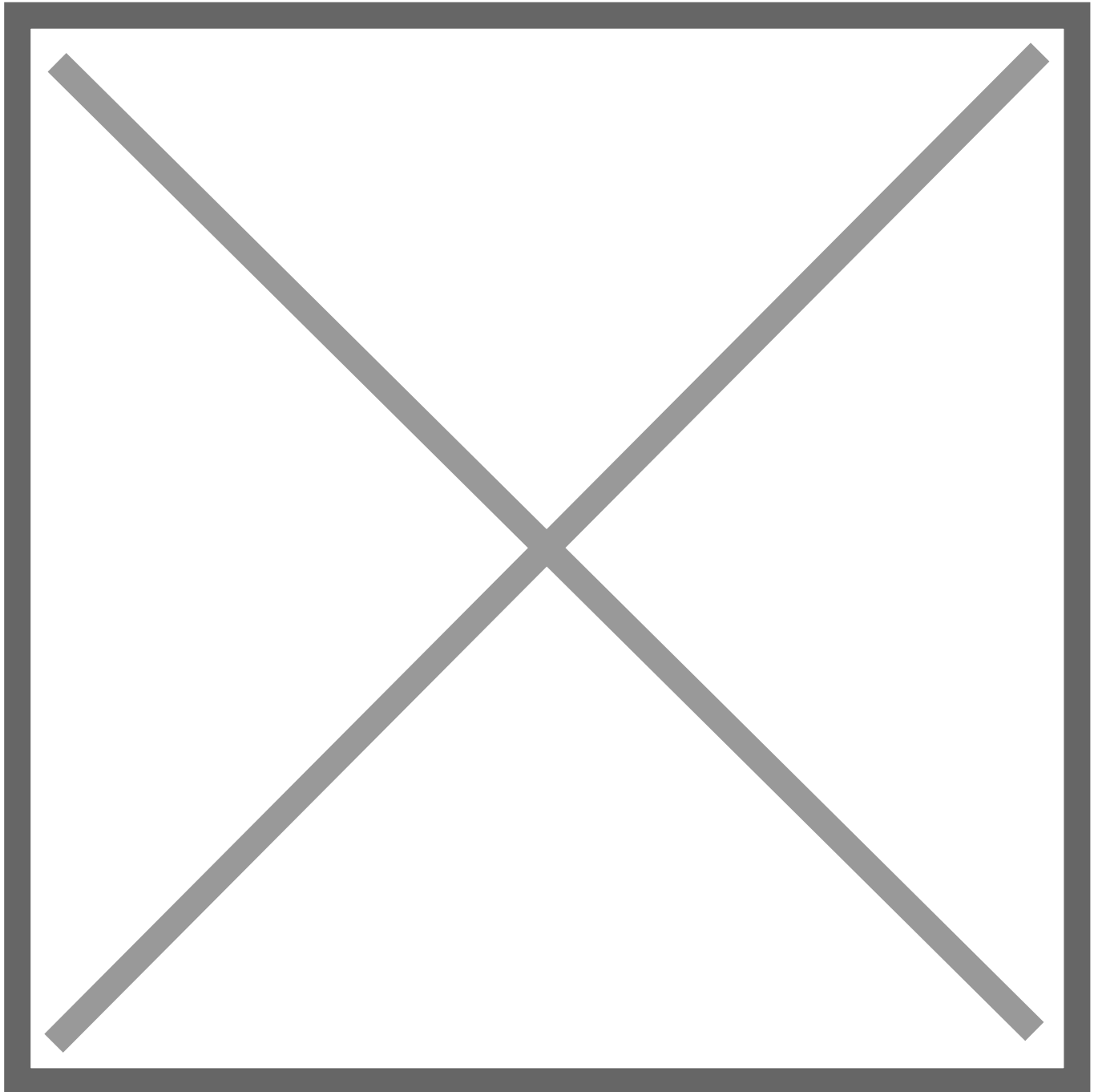
d) Reception Test

- If there is another CAN device sending data with the same `packet_id` (e.g., 0x257), the `receive_irq_o` signal will be triggered.
- The `uart_can_std_printer` will automatically display the received message on the serial terminal.

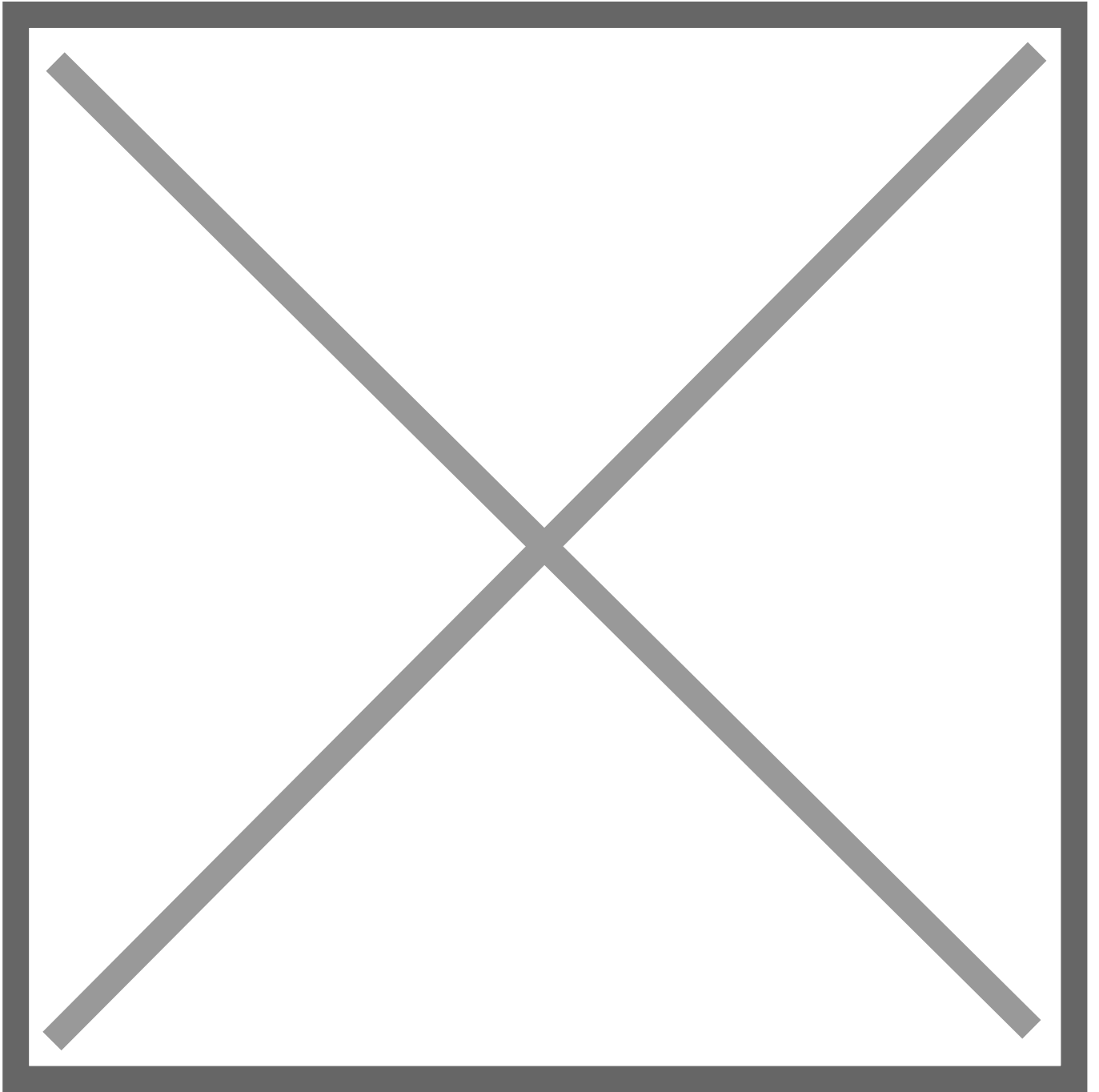
e) If Something Doesn't Work

Check the following:

- The baud rate of `can_controller_std` and confirm it matches the other devices on the network.
- Connections between IO70/IO71 and the CAN transceiver.
- Correct 120 Ω termination on the CAN bus.
- Power supply and GND signals to the CAN transceiver (MCP2551/TJA1050).
- If there is no communication:
 - Confirm `tx_request_i` is generating pulses (e.g., 1 Hz).
 - Try testing with another CAN node for cross-validation.



Implemented Circuit



Can Testing

Revision #1

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