

axi_lite_write_channel_decoder.v

AUTHORS

JAY CONVERTINO

DATES

2025/12/16

INFORMATION

Brief

AXI lite write channel decoder. Block address and data paths till a valid address is presented.

License MIT

Copyright 2025 Jay Convertino

Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the "Software"), to deal in the Software without restriction, including without limitation the rights to use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies of the Software, and to permit persons to whom the Software is furnished to do so, subject to the following conditions:

The above copyright notice and this permission notice shall be included in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE AUTHORS OR COPYRIGHT HOLDERS BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.

axi_lite_write_channel_decoder

```
module axi_lite_write_channel_decoder #(
    parameter
        integer
        ADDRESS_WIDTH
        =
        32,
    parameter
        integer
        BUS_WIDTH
        =
        4,
    parameter
        integer
        DATA_BUFFER
```

```
=  
1,  
parameter  
integer  
TIMEOUT_BEATS  
=  
32,  
parameter  
[ADDRESS_WIDTH-1:0]  
SLAVE_ADDRESS  
=  
32'h44A20000,  
parameter  
[ADDRESS_WIDTH-1:0]  
SLAVE_REGION  
=  
32'h0000FFFF  
)  
  
output  
wire  
connected,  
input  
wire  
aclk,  
input  
wire  
arstn,  
input  
wire  
[ADDRESS_WIDTH-1:0]  
s_axi_awaddr,  
input  
wire  
[2:0]  
s_axi_awprot,  
input  
wire  
s_axi_awvalid,  
output  
wire  
s_axi_awready,  
input  
wire  
[BUS_WIDTH*8-1:0]  
s_axi_wdata,  
input  
wire  
[BUS_WIDTH-1:0]  
s_axi_wstrb,  
input  
wire  
s_axi_wvalid,  
output  
wire  
s_axi_wready,  
output  
wire  
[1:0]  
s_axi_bresp,  
output  
wire  
s_axi_bvalid,  
input  
wire  
s_axi_bready,
```

```

    output
    wire
      [ADDRESS_WIDTH-1:0]
    m_axi_awaddr,
    output
    wire
      [2:0]
    m_axi_awprot,
    output
    wire
    m_axi_awvalid,
    input
    wire
    m_axi_awready,
    output
    wire
      [BUS_WIDTH*8-1:0]
    m_axi_wdata,
    output
    wire
      [BUS_WIDTH-1:0]
    m_axi_wstrb,
    output
    wire
    m_axi_wvalid,
    input
    wire
    m_axi_wready,
    input
    wire
      [1:0]
    m_axi_bresp,
    input
    wire
    m_axi_bvalid,
    output
    wire
    m_axi_bready
)

```

AXI lite write channel decoder. Block address and data paths till a valid address is presented.

Parameters

ADDRESS_WIDTH	Width of the AXI LITE address port in bits.
parameter integer	
BUS_WIDTH	Width of the AXI LITE bus data port in bytes.
parameter integer	
DATA_BUFFER	Buffer data channel, 0 to disable.
parameter integer	
TIMEOUT_BEATS	Number of clock cycles (beats) to count till timeout. 0 disables timeout.
parameter integer	
SLAVE_ADDRESS	Array of Addresses for each slave (0 = slave 0 and so on).
parameter [ADDRESS_WIDTH- 1:0]	
SLAVE_REGION	Region for the address that is valid for the SLAVE ADDRESS.
parameter [ADDRESS_WIDTH- 1:0]	

Ports

connected	Core has established channel connection
output wire	
aclk	Input clock
input wire	

arstn	Input negative reset
s_axi_awaddr	Slave write input channel address
s_axi_awprot	Slave write input channel protection mode
s_axi_awvalid	Slave write input channel address is valid.
s_axi_awready	Slave write input channel is ready.
s_axi_wdata	Slave write input channel data
s_axi_wstrb	Slave write input channel valid bytes
s_axi_wvalid	Slave write input channel data valid
s_axi_wready	Slave write input channel is ready.
s_axi_bresp	Slave write input channel response to write(s).
s_axi_bvalid	Slave write input channel response valid.
s_axi_bready	Slave write input channel response ready.
m_axi_awaddr	Master write output channel address.
m_axi_awprot	Master write output channel protection mode.
m_axi_awvalid	Master write output channel address is valid.
m_axi_awready	Master write output channel is ready.
m_axi_wdata	Master write output channel data.
m_axi_wstrb	Master write output channel data bytes valid.
m_axi_wvalid	Master write output channel data is valid.
m_axi_wready	Master write output channel data ready.
m_axi_bresp	Master write output channel response.
m_axi_bvalid	Master write output channel response valid.
m_axi_bready	Master write output channel response ready.

INSTANTIATED MODULES

inst_addr_buffer

Buffer for the address

bus_addr_decoder

Decoder for address bus.

inst_data_resp_buffer

If data buffer enabled, this holdbuffer will be generated.

inst_data_buffer

If data buffer enabled, this holdbuffer will be generated.