

# axis\_spi\_master.v

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## AUTHORS

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## INFORMATION

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### Brief

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Stream SPI input/output data over AXIS bus.

### License MIT

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## axis\_spi\_master

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```
module axis_spi_master #(
    parameter
    CLOCK_SPEED
    =
    20000000,
    parameter
    BUS_WIDTH
    =
    4,
    parameter
    SELECT_WIDTH
    =
    8
) ( input aclk, input arstn, input [BUS_WIDTH*8-1:0] s_axis_tdata, input s_e
```

SPI core with axis input/output data. Read/Write is size of BUS\_WIDTH bytes. Write activates core for read.

### Parameters

<b>CLOCK_SPEED</b> parameter	This is the aclk frequency in Hz, this is the the frequency used for the bus and is divided by the rate.
<b>BUS_WIDTH</b> parameter	AXIS data width in bytes.
<b>SELECT_WIDTH</b> parameter	Bit width of the slave select.

## Ports

<b>aclk</b>	Clock for AXIS
<b>arstn</b>	Negative reset for AXIS
<b>s_axis_tdata</b>	Input data for SPI MOSI.
<b>s_axis_tvalid</b>	When set active high the input data is valid
<b>s_axis_tready</b>	When active high the device is ready for input data.
<b>m_axis_tdata</b>	Output data from SPI MISO
<b>m_axis_tvalid</b>	When active high the output data is valid
<b>m_axis_tready</b>	When set active high the output device is ready for data.
<b>sclk</b>	spi clock, should only drive output pins to devices.
<b>mosi</b>	transmit for master output
<b>miso</b>	receive for master input
<b>ssn_i</b>	slave select input
<b>ssn_o</b>	slave select output
<b>rate</b>	output rate of spi core.
<b>cpol</b>	clock polarity of sclk
<b>cpha</b>	clock phase of sclk
<b>miso_dcount</b>	Current number of input bits available from parallel register.
<b>mosi_dcount</b>	current number of output bits available to serial shift output.

## STATE MACHINE

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Constants that makeup the data\_state machine.

### ready

---

```
localparam ready = 3'd1
```

ready and waiting for data

### processing

---

```
localparam processing = 3'd3
```

data is being processed

### error

---

```
localparam error = 3'd0
```

someone made a whoops

## INSTANTIATED MODULES

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### inst\_spi\_output\_clk

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```
mod_clock_ena_gen #(
    .CLOCK_SPEED(CLOCK_SPEED)
) inst_spi_output_clk ( .clk(aclk), .rstn(arstn), .start0(1'b0), .clr(spi_en)
```

Generates enable at rate for spi output data.

### inst\_spi\_input\_clk

---

```
mod_clock_ena_gen #(
    .CLOCK_SPEED(CLOCK_SPEED)
) inst_spi_input_clk ( .clk(aclk), .rstn(arstn), .start0(1'b1), .clr(spi_en)
```

Generates enable at rate for spi input data.

### inst\_piso

---

```
piso #(
    .BUS_WIDTH(BUS_WIDTH)
) inst_piso ( .clk(aclk), .rstn(arstn), .ena(spi_ena_mosi), .load(spi_mosi)
```

take axis input parallel data at bus size, and output the word to the spi bus.

### inst\_sipo

---

```
sipo #(
    .BUS_WIDTH(BUS_WIDTH)
) inst_sipo ( .clk(aclk), .rstn(arstn), .ena(spi_ena_miso), .load(spi_miso)
```

take serial input data, and output the world to the parallel data bus.