axi_lite_spi_master.v

AUTHORS

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DATES

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INFORMATION

Brief

AXI Lite SPI Master is a core for interfacing with SPI Slave devices.

License MIT

axi_lite_spi_master

```
module axi_lite_spi_master #(
parameter
ADDRESS_WIDTH
 =
32,
parameter
BUS_WIDTH
 =
4,
parameter
WORD_WIDTH
 =
4,
parameter
```

```
CLOCK_SPEED
 =
100000000,
parameter
SELECT_WIDTH
 =
16,
parameter
DEFAULT_RATE_DIV
 =
0,
parameter
DEFAULT_CPOL
 =
0,
parameter
DEFAULT_CPHA
 =
0
) ( input wire aclk, input wire arstn, input wire s_axi_awvalid, input wire
```

AXI Lite based SPI Master device. BUS_WIDTH is 4 bytes.

Parameters

ADDRESS_WIDTH parameter	Width of the uP address port, max 32 bit.
BUS_WIDTH parameter	Width of the uP bus data port, only valid values are 2 or 4.
WORD_WIDTH parameter	Width of each SPI Master word. This will also set the bits used in the TX/RX data registers. Must be less than or equal to BUS_WIDTH. VALID: 1 to 4.
CLOCK_SPEED parameter	This is the aclk frequency in Hz, this is the the frequency used for the bus and is divided by the rate.
SELECT_WIDTH parameter	Bit width of the slave select, defaults to 16 to match altera spi ip.
DEFAULT_RATE_DIV parameter	Default divider value of the main clock to use for the spi data output clock rate. 0 is 2 (2^(X+1) X is the DEFAULT_RATE_DIV)
DEFAULT_CPOL parameter	Default clock polarity for the core (0 or 1).
DEFAULT_CPHA parameter	Default clock phase for the core (0 or 1).

Ports

aclk	Clock for all devices in the core
arstn	Negative reset
s_axi_awvalid	Axi Lite aw valid
s_axi_awaddr	Axi Lite aw addr
s_axi_awprot	Axi Lite aw prot
s_axi_awready	Axi Lite aw ready
s_axi_wvalid	Axi Lite w valid
s_axi_wdata	Axi Lite w data
s_axi_wstrb	Axi Lite w strb
s_axi_wready	Axi Lite w ready
s_axi_bvalid	Axi Lite b valid
s_axi_bresp	Axi Lite b resp

s_axi_bready	Axi Lite b ready
s_axi_arvalid	Axi Lite ar valid
s_axi_araddr	Axi Lite ar addr
s_axi_arprot	Axi Lite ar prot
s_axi_arready	Axi Lite ar ready
s_axi_rvalid	Axi Lite r valid
s_axi_rdata	Axi Lite r data
s_axi_rresp	Axi Lite r resp
s_axi_rready	Axi Lite r ready
irq	Interrupt when data is received
sclk	spi clock, should only drive output pins to devices.
mosi	transmit for master output
miso	receive for master input
ss_n	slave select output

up_rreq

```
wire up_rreq
```

uP read bus request

up_rack

```
wire up_rack
```

uP read bus acknowledge

up_raddr

```
wire [ADDRESS_WIDTH-(
BUS_WIDTH
                                                                    /
2
)-1:0] up_raddr
```

uP read bus address

up_rdata

```
wire [31:0] up_rdata
```

uP read bus request

up_wreq

```
wire up_wreq
```

uP write bus request

up_wack

```
wire up_wack
```

uP write bus acknowledge

up_waddr

```
wire [ADDRESS_WIDTH-(
BUS_WIDTH
                                                                    /
2
)-1:0] up_waddr
```

uP write bus address

up_wdata

```
wire [31:0] up_wdata
```

uP write bus data

INSTANTIANTED MODULES

inst_up_axi

```
up_axi #(
                                                                    .
AXI_ADDRESS_WIDTH(ADDRESS_WIDTH)
) inst_up_axi ( .up_rstn (arstn), .up_clk (aclk), .up_axi_awvalid(s_axi_aw
```

Module instance of up_axi for the AXI Lite bus to the uP bus.

inst_up_spi_master

```
up_spi_master #(
                                                                    .
ADDRESS_WIDTH(ADDRESS_WIDTH),
                                                                    .
BUS_WIDTH(BUS_WIDTH),
                                                                    .
WORD_WIDTH(WORD_WIDTH),
                                                                    .
CLOCK_SPEED(CLOCK_SPEED),
                                                                    .
SELECT_WIDTH(SELECT_WIDTH),
                                                                    .
DEFAULT_RATE_DIV(DEFAULT_RATE_DIV),
                                                                    .
```

```
 DEFAULT_CPOL(DEFAULT_CPOL),
                                                                                .
 DEFAULT_CPHA(DEFAULT_CPHA)
) inst_up_spi_master ( .clk(aclk), .rstn(arstn), .up_rreq(up_rreq), .up_rack
```

Module instance of up_spi_master creating a Logic wrapper for spi master axis bus cores to interface with uP bus.