ft245_sync_to_axis.v

AUTHORS

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DATES

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INFORMATION

Brief

Converter FT245 sync FIFO interface to AXIS.

License MIT

ft245_sync_to_axis

```
module ft245_sync_to_axis #(
parameter
BUS_WIDTH
 =
1
) ( input rstn, input ft245_dclk, inout [BUS_WIDTH-1:0] ft245_ben, inout [(
```

Converter FT245 sync FIFO interface to AXIS.

Parameters

BUS_WIDTH　　Width of the FT245 and AXIS bus.
parameter

Ports

rstn	Negative reset
ft245_dclk	Input clock from FIFO.
ft245_ben	Byte enable used in FT60x, similar to AXIS tkeep in 1 is a valid byte for each bit.
ft245_data	FIFO data bus
ft245_rdn	Enable read on active low
ft245_wrn	Enable write on active low
ft245_siwun	Send Immediate / Wakeup for USB suspend. Active low.
ft245_txen	When low, write data to the fifo.
ft245_rxfn	When low, read data from the fifo.
ft245_oen	Output enable active low
ft245_rstn	Negative Reset
ft245_wakeupn	Sleep ft245 active low
s_axis_tdata	Input axis data
s_axis_tkeep	Input axis data bytes that are valid. Each bit equals one byte.
s_axis_tvalid	Input axis data is valid when active high.
s_axis_tready	Input data bus is ready when signal is active high.
m_axis_tdata	Output axis data
m_axis_tkeep	Output what axis data bytes are valid. Each bit equals one byte.
m_axis_tvalid	Output is active high when axis data is valid.
m_axis_tready	Output data bus is told that the receive device is ready. The device is ready if it asserts this signal active high.

DATA STORE REGISTERS

Register data based upon ft245 clocks.

r_oen

```
reg r_oen
```

output enable registers

rr_oen

```
reg rr_oen
```

output enable registers registers

rrr_oen

```
reg rrr_oen
```

output enable registers registers registers

r_m_axis_tdata

```
reg [(
BUS_WIDTH*8
)-1:0] r_m_axis_tdata
```

master axis register to hold tdata for tready not ready at end condition

r_m_axis_tkeep

```
reg [BUS_WIDTH-1:0] r_m_axis_tkeep
```

master axis register to hold tkeep for tready not ready at end condition

r_m_axis_tvalid

```
reg r_m_axis_tvalid
```

master axis register to hold tvalid for tready not ready at end condition

ASSIGNMENTS

How various comibinations of logic are created and data dealt with.

ft245_data

```
assign ft245_data = (
                                         rr_oen & r_oen ?
s_axis_tdata
: '
bz
)
```

combinartoral signals to convert registers and axis to and from ft245. tristate ft245 based on output enable state

ft245_ben

```
assign ft245_ben = (
                                         rr_oen & r_oen ?
s_axis_tkeep
: '
bz
)
```

tristate ft245 based on output enable state

ft245_wrn

```
assign ft245_wrn = ft245_txen | ~ft245_rxfn | ~s_axis_tvalid | ~rr_oen
```

only allow write if there is space, nothing availbe to read, valid data available, and output enable is timed correctly.

ft245_oen

```
assign ft245_oen = rr_oen
```

output enable

ft245_rdn

```
assign ft245_rdn = ~m_axis_tready | rrr_oen | rr_oen & r_oen
```

only ready when output enable is correctly timed and we are ready for data ft245 will output data as soon as oen is applied (FWFT).

ft245_wakeupn

```
assign ft245_wakeupn = 1'b0
```

always keep it awake

ft245_siwun

```
assign ft245_siwun = 1'b0
```

always keep it awake

ft245_rstn

```
assign ft245_rstn = rstn
```

apply system reset to ft245

s_axis_tready

```
assign s_axis_tready = (

ft245_txen &
```

```
  ft245_rxfn
  ) & rr_oen
```

convert ft245 to ready. only ready when write buffer is available, nothing is incoming, and output enable is set correctly.

m_axis_tdata

```
assign m_axis_tdata = (
                                              rr_oen | r_oen ?

r_m_axis_tdata
:
ft245_data
)
```

output ft245 to master axis. at end, output registers incase next core was not ready.

m_axis_tkeep

```
assign m_axis_tkeep = (
                                              rr_oen | r_oen ?

r_m_axis_tkeep
:
ft245_ben
)
```

output ft245 to master axis. at end, output registers incase next core was not ready.

m_axis_tvalid

```
assign m_axis_tvalid = (
                                              rr_oen | r_oen ?

r_m_axis_tvalid
: ~
                                                               (

rrr_oen | ft245_rxfn)
)
```

data is only valid in the correct output enable register state and is no longer valid if rxfn indicates the receive exhausted.