

tb_cocotb.v

AUTHORS

JAY CONVERTINO

DATES

2025/03/04

INFORMATION

Brief

Test bench wrapper for cocotb

License MIT

Copyright 2024 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.

tb_cocotb

```
module tb_cocotb #(
  parameter
    CLOCK_SPEED
    =
    200000000,
  parameter
    SAMPLE_RATE
    =
    200000000
) ( input aclk, input arstn, input [15:0] s_axis_tdata, input s_axis_tvalid,
```

This core is a MIL-STD-1553 to AXI streaming decoder. It uses the postive edge of a clock to sample data. This restricts the core to 2 Mhz and above for a sample clock.

Parameters

CLOCK_SPEED parameter	This is the aclk frequency in Hz, must be 2 MHz or above.
SAMPLE_RATE parameter	2 MHz or above rate that is an even divisor of CLOCK_SPEED

Ports

aclk	Clock for all logic
arstn	Negative reset
s_axis_tdata	Input data for 1553 encoder.
s_axis_tvalid	When active high the input data is valid.
s_axis_tuser	Information about the AXIS data {TYY,NA,I,P} Bits explained below:

```
- TYY = TYPE OF DATA
  - 000 NA
  - 001 REG (NOT IMPLIMENTED)
  - 010 DATA
  - 100 CMD/STATUS
- NA = RESERVED FOR FUTURE USE.
- D = DELAY BEFORE DATA
  - 1 = Delay of 4us or more before data
  - 0 = No delay between data
- I = INVERT
  - 1 = Invert input data before output
  - 0 = No inversion of data before output.
- P = PARITY
  - 1 = ODD
  - 0 = EVEN
```

s_axis_tready	When active high the device is ready for data.
diff	Output data in TTL differential format.

INSTANTIATED MODULES

dut

```
axis_1553_encoder #(
    CLOCK_SPEED(CLOCK_SPEED),
    SAMPLE_RATE(SAMPLE_RATE)
) dut ( .aclk(aclk), .arstn(arstn), .s_axis_tdata(s_axis_tdata), .s_axis_tvalid(s_axis_tvalid), .s_axis_tready(s_axis_tready), .diff(diff))
```

Device under test, axis_1553_encoder