Router DUT Specification:

Router DUT

Inputs: dut_inp, inp_valid, reset, clk

Outputs: dut_outp, outp_valid, busy, error
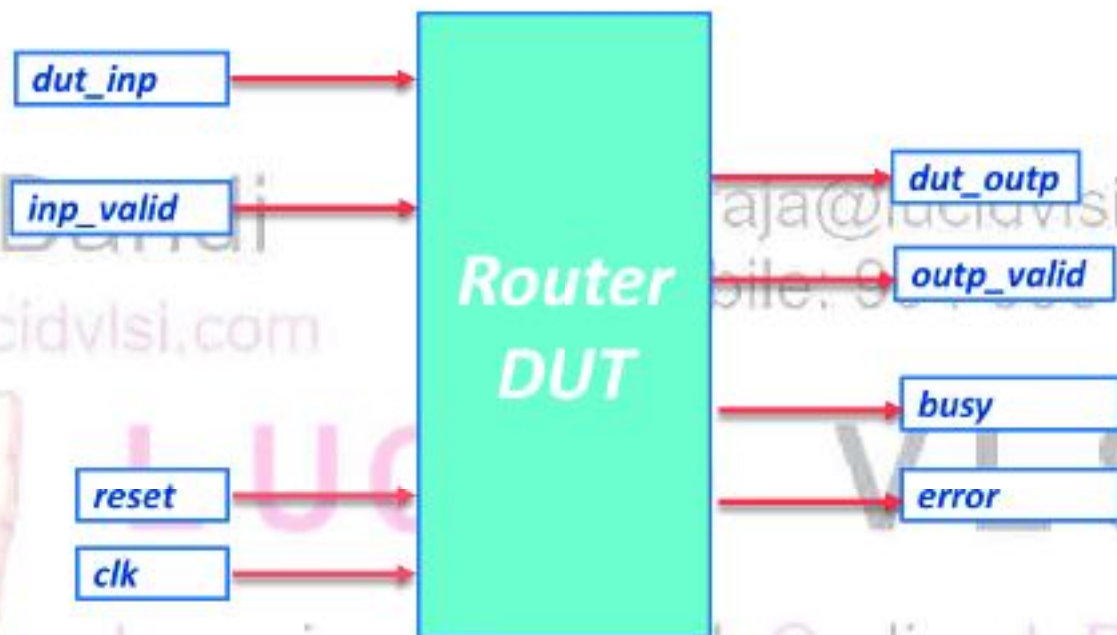
DUT supplied in the lab is strictly for testbench purpose and not synthesizable

I/O PINS:

Pin Name	Direction	Size (bits)	Functionality
clk	input	1	All operations happen at posedge of clk
reset	input	1	Active high, asynchronous reset pin
dut_inp	input	8	Input Data pin.
inp_valid	input	1	Indicates valid packet on dut_inp Value 1 indicates *start of packet*. Value 0 indicates *end of packet*
dut_outp	output	8	Output Data pin.
outp_valid	output	1	Indicates valid data on dut_outp Value 1 indicates *start of packet*. Value 0 indicates *end of packet*.
busy	output	1	Indicates router availability. Value 1 indicates router is busy and don't drive any packet on data_inp. Value 0 indicates router is ready to accept the packet.
error	output	4	Refer page 4 for full description of this pin

Input data port (**dut_inp**) is 8-bit wide.
One can drive 8-bits into router per clock.
Input port inp_valid indicates *start/end of packet*.
Value high on inp_valid indicates *start of packet* and low indicates *end of packet*.

Output data port (*dut_outp*) is 8-bits wide and DUT can output 8-bits per clock.
Output port outp_valid will be driven by DUT and **indicates** *start/end of packet*.
Value *high* on outp_valid indicates *start of packet* and *low* indicates *end of packet*.

Output pin *busy* indicates router availability.
Value 1 indicates router is busy and don't drive any packet on dut_inp.
Value 0 indicates router is ready to accept the packet.

Minimum packet length is 12 bytes and max is 2000 bytes.
Below is the *packet format* which comes as input to dut.
RTL accepts 8-bits per clock.

SA	DA	Length (length of complete packet)	CRC (of payload)	Payload
1 byte	1 byte	4 bytes	4 bytes	2-to-1990 bytes

DUT internally calculates CRC (of payload only) and if that is not matching with CRC in the received packet then *packet will be dropped.*

Output port *"error" is a 4-bit port and indicates the error status of the router.*
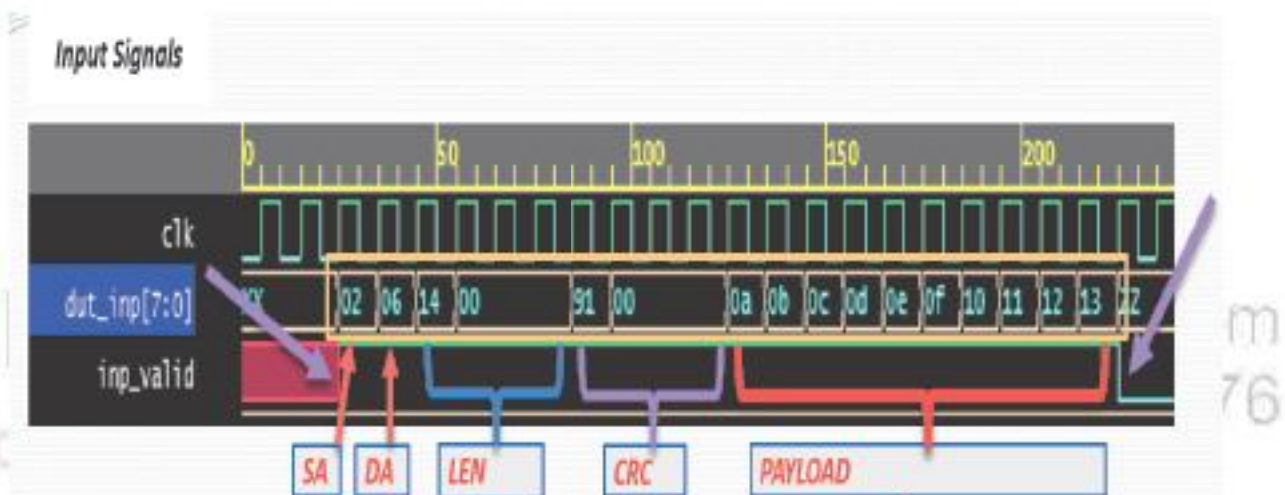
Below table lists the error codes and their meaning

Error code: Value	Meaning
0	Router Successfully processed packet.
1	Protocol Violation. *Packet driven while Router is busy.*
2	*Packet Dropped due to CRC mismatch.*
3	*Packet Dropped due to Minimum packet size mismatch.*
4	*Packet Dropped due to Maximum packet size mismatch.*
5	Packet Corrupted. Packet dropped due to packet length mismatch. Step 1: Check value of len filed of packet driven from TB Step 2: Check total number of bytes received in DUT in the waveform (Check dut_inp). Check value of Step 1 matching with Step 2 or not.

Reference input waveform:

Reference output waveform: