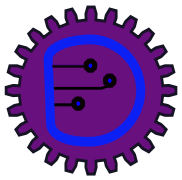

Dyumnin Semiconductors

Automating ASIC Designs

Document Status: Initial Draft

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Dyumnin Semiconductors

## For

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# Contents

# Chapter 1

# IP Specification

For a configured integer N. This IP takes N 8 bit inputs and returns the sum of those 8 inputs.

i.e. it implements

$y = \sum_{i=0}^{N} x_i$

## Introduction.

The IP has 3 sets of interface.

1. Configuration Interface, This is used to
    1. Set the value of N
    2. Start the process for each set of N inputs.
2. Input Data Interface: This interface is used to provide the input data, one byte/clock cycle.
3. Output Data Interface: This interface is used to return the result of the calculation.

Each Interface has a set of control signals and data signals. The control signals have a prefix of RDY_ or EN_ The signal with the prefix RDY_ is asserted when the interface is ready to accept data or give data. The signal with the prefix EN_ is asserted during the cycle where the data transfer takes place.

A data transfer happens on an interface when both Req and En are high in a given clock cycle. En can never be high unless Req is high.

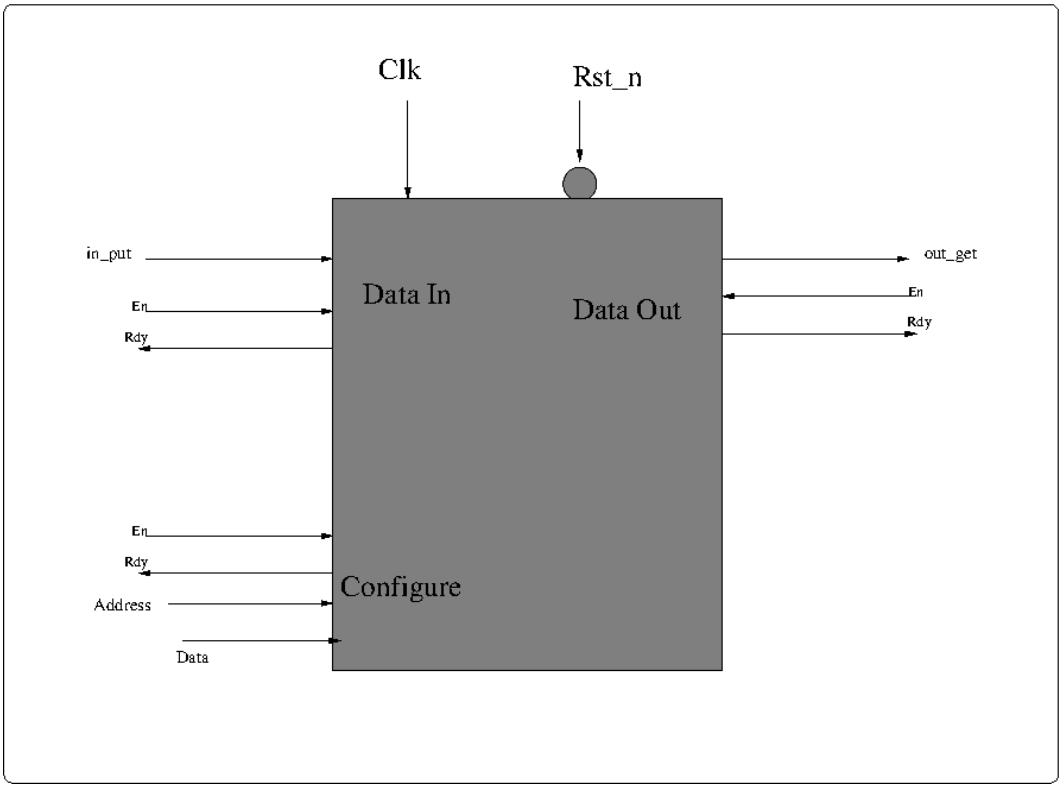


Figure 1.1: IO Diagram

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# Device under test I/O Signals

The I/O Signals are

## Output data Interface

| Name | Direction Input/output | size | props |
|---|---|---|---|
| EN_out_get | I | 1 | Enable Transaction |
| out_get | O | 8 | Result of the summation |
| RDY_out_get | O | 1 | The result is valid and transaction can take place. |

## Interrupt Interface

| Name | I/O | size | props |
|---|---|---|---|
| interrupt | O | 1 | Some exception has occured. |
| RDY_interrupt | O | 1 | const |

## Clock and reset

| Name | I/O | size | props |
|---|---|---|---|
| CLK | I | 1 | clock |
| RST_N | I | 1 | reset |

## Input interface

| Name | I/O | size | props |
|---|---|---|---|
| RDY_in_put | O | 1 | The IP is ready to accept data. |
| in_put | I | 8 | The data that should be added. |
| EN_in_put | I | 1 | Transaction Enable, the data is transferred to the IP |

## Configuration interface

| Name | I/O | size | props |
|---|---|---|---|
| RDY_configure | O | 1 | IP Is ready for configuration |
| configure_address | I | 8 | The address that should be configured (0 => Set value of N, 1=> start the process) |
| configure_data | I | 8 | The data that should be written to the address |
| EN_configure | I | 1 | Configuration transaction Enable. |

A sample transaction waveform

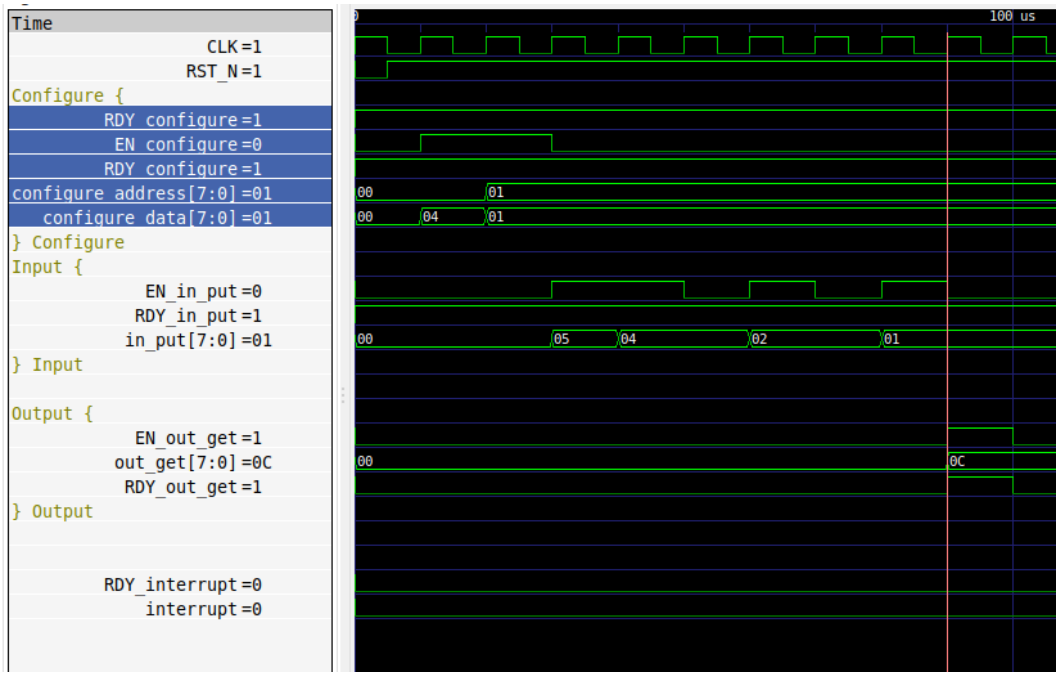


Figure 1.2: Sample Transaction Waveform