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Contents

1 Introduction

In this section we will describe briefly the scope of the project and give a brief overview of the AXI protocol.

1.1 Project Scope

The scope of the project is to understand how works the AXI communication protocol, and test our knowledge by designing an "AXI interconnect" component and putting it inside the processor and see if everything works.

1.2 AXI Protocol

The AXI protocol is a fast point to point protocol multimasters multi slave with two bus dedicated to data and addresses, and for each bus there is an handshake protocol to drive the communiation. The AXI interconnect has the due to bind the master to the Server it needs to communicate with.

It's worth to spend here few words on how the fact that AXI offers the possibility to have different clock regions, but for our application it's not needed.

2 Our Design

Here we will explain how we developed our AXI interconnect, first explaining how it works as a stand-alone component, and then how we inserted it into the Processor.

2.1 Block Design

In the figure **??** is reported the Block Diagram of the AXI interconnect we developed.

2.2 Coupling

The coupling is achieved by the Muxers and Demuxers, driven by the Decoders which reads the Address and couple the address to the correspective slave.

2.3 Handshake

The handshake's signals are checked by the FSM that will drive the Decoders to signal when the address is valid and when it's not.

2.4 Errors

There are 2 types of error: The ones raised by the slave (and are generated by slave and so pass through the AXI interconnect) The ones raised if the address isn't mapped; in such a case we have an ad-hoc fake slave that sends the error to the master.

2.5 Integration inside the processor

We managed to put our AXI right inside the processor without any fake component.

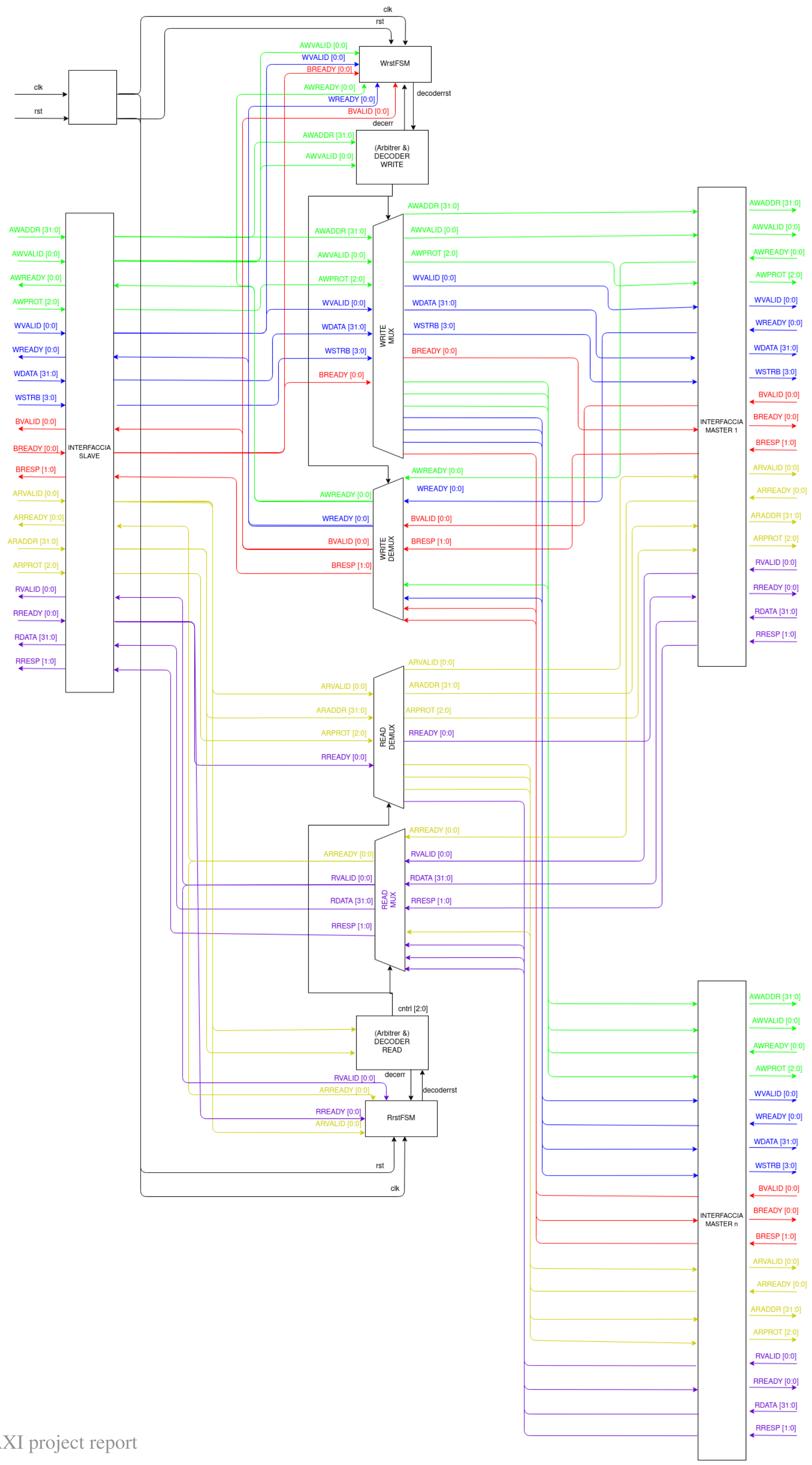

Figure 1: highLevel block diagram

3 Reading The OUTPUT

We read the output of the system by the uart -with hand method and software one-

4 Differences

The main differences that we found are:

4.1 Time Differences

Due to not having couplers

4.2 Signal Propagation

Our implementation is safer but more costly