Mimostar 2
Oddities during testing

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June 1, 2006

Contents

1 Introduction

This document describes our observations using the Mimostar 2 chip.

2 Test Setup

The Test Setup used consists of a Computer and a FPGA. The Computer controls the JTAG programming and the RSTB pin. The FPGA controls the Mimostar 2 readout.

Please update the documentation. It is necessary to change the chip.

The Readout uses the following features:

- 25MHz readout clock; Differential readout clock
- Serial readout; Differential Analog output
- FPGA generates one SYNC at startup
- MxFirst is set to first pixel
- FPGA uses Px1st to synchronize to a frame
- We also tried a 40MHz readout clock with the same results

The following table lists the Signals shown in the Oscilloscope pictures in the document.

Channel 1	Analog output, shown one leg of the differential signal
Channel 2	MxFirst (First Pixel)
Channel 3	Readout Clock

3 First Pixel Marker

The first pixel marker is wider than expected based on the documentation (page 8, RO_Mode[4]=0: MxFirst ...). I expected a 1 pixel wide pulse.

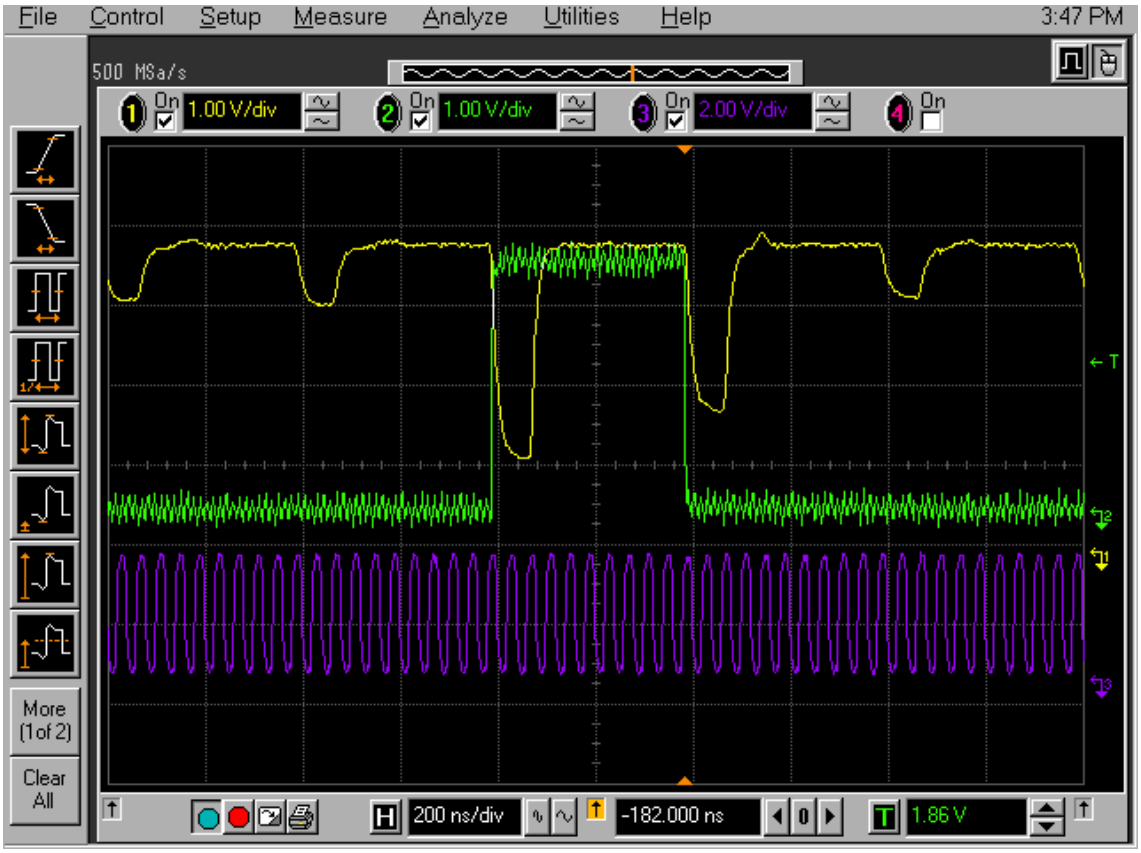

Figure 1: MxFirst: First Pixel Marker

3.1 First Pixel Marker Glitch

The MxFirst signal shows a glitch when switching from the first to the second line readout. No Glitch is observed for the following lines.

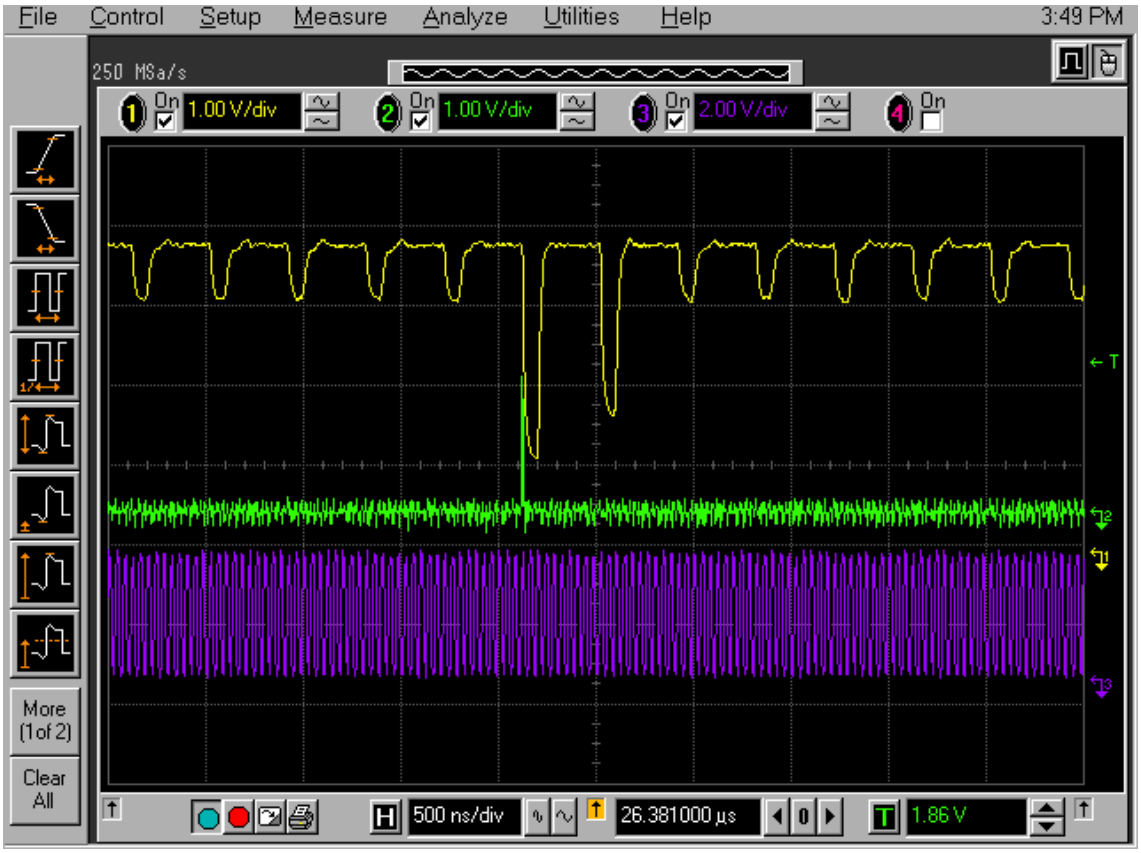

Figure 2: MxFirst Glitch

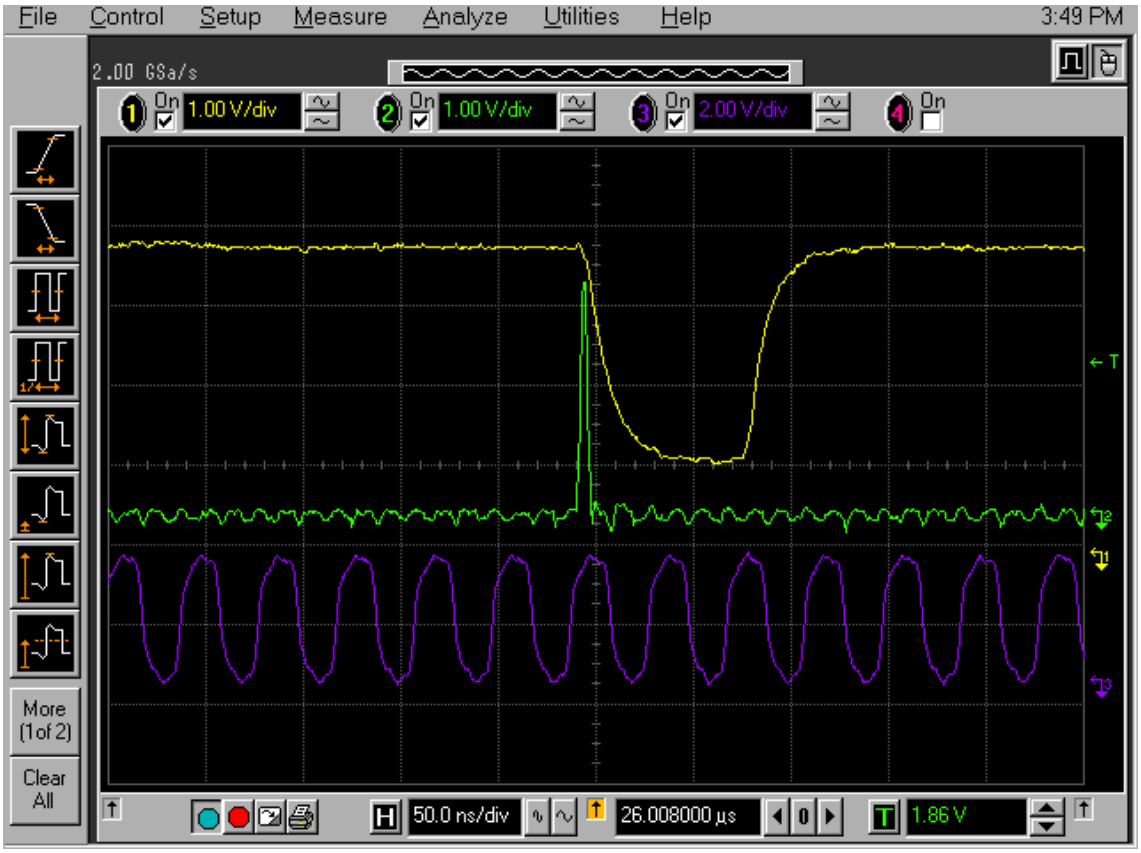

Figure 3: MxFirst glitch zoomed in

4 JTAG Reconfigure

The described JTAG Reconfiguration sequence is not the recommended sequence. But the it is not understood why the Mimostar 2 chip behaved this way.

As stated before, JTAG configuration and chip readout are not synchronized. Our startup procedure ensures JTAG configuration before chip readout. But we discovered the following if we reload JTAG after the chip is running already.

Sequence of actions:

1. Readout is running as expected
2. Assert a Reset through JTAG interface software
3. Apply all Settings
4. Continue readout without new SYNC signal (wait for MxFirst)

After this, the first pixel marker is not aligned to to the first pixel anymore, as show in the following two pictures.

Is this Behavior expected? What else can/might throw off the first pixel marker?

Is there a proposed way to start the Mimostar 2 chip in a system where the JTAG configuration and the readout of the chip is independent?

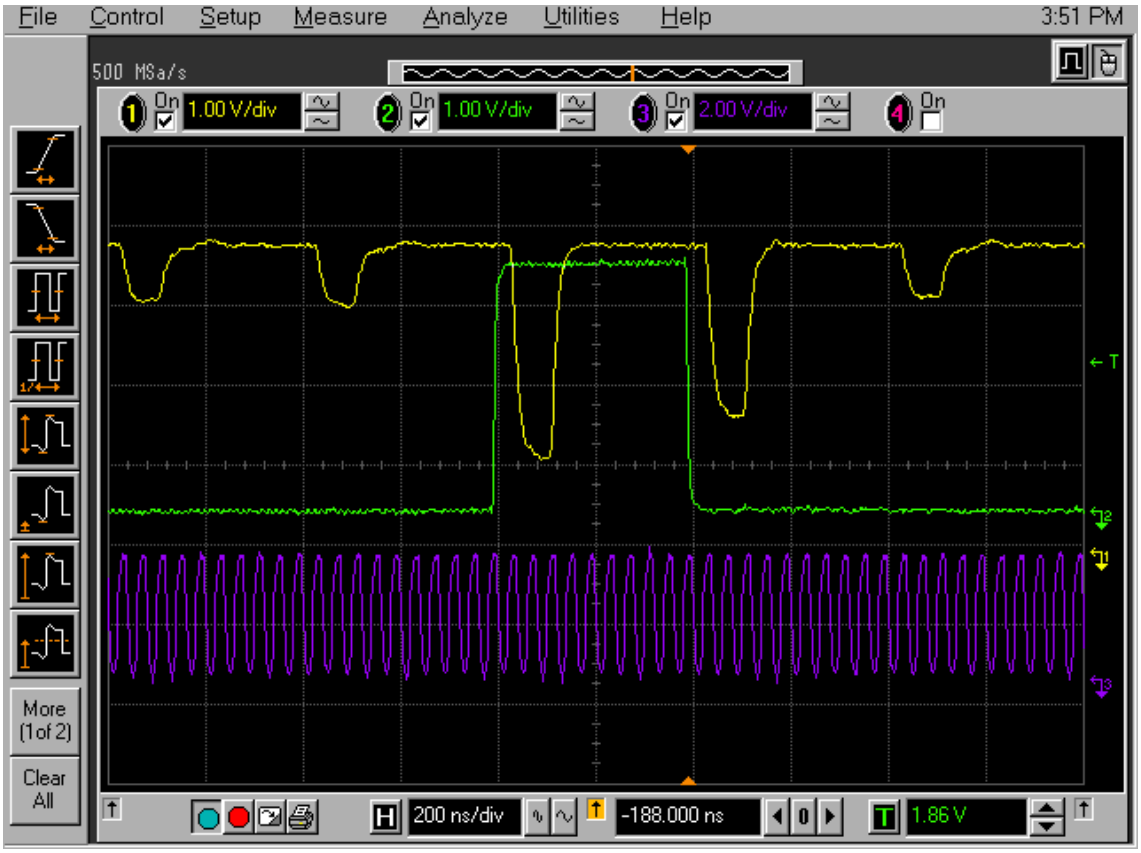

Figure 4: First Pixel Marker is off

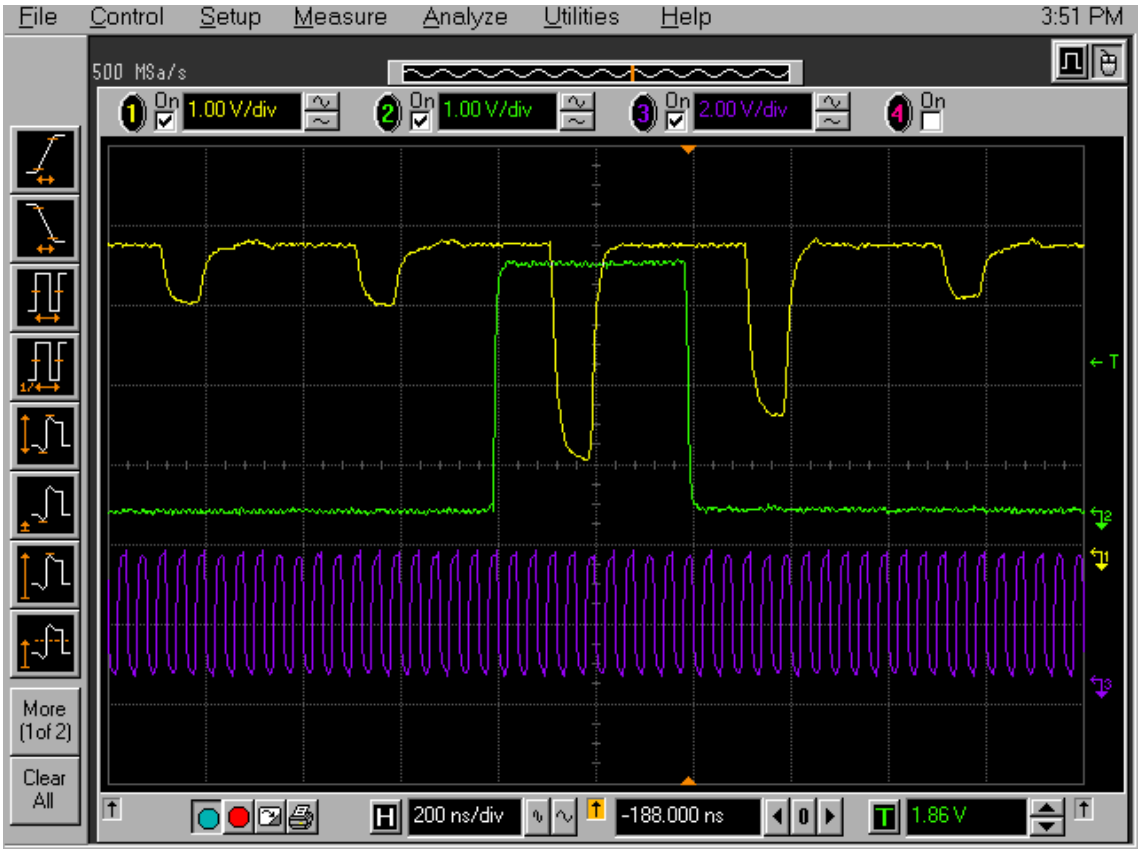

Figure 5: First Pixel Marker is off

5 Power Supply

Problem with an external power supply for the digital part of the MimoStar2 chip

For the latch up tests we wanted to separate analog and digital power supplies for the chip from the power supplies of the PCB. We did everything according to the instructions sent by Kimmo - all resistances removed, and power supplies connected to the indicated jumpers. We were very surprised to see that the chip works well when the external digital power supply is disconnected. With the this line (vd33vc) left floating we still could mea-

sure some voltage at this node (2.7 V). We didn't find any mistake on the schematics of the PCB and neither in bonding. Up to now we haven't found any explanation for this. Please, help us to understand what is going on. Was the possibility of using external power supplies tested in the past? Did it work fine?