

# **WaveVision3 Connector on WaveVision4 Data Capture Boards**

**Using A/D Converter Evaluation Boards Designed for the  
WaveVision3 Data Capture Board with the WaveVision4 Data Capture Board**

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## 1.0 Introduction

The WaveVision4 Data Capture Board has a connector that accepts Analog-to-Digital Converter Evaluation Boards that were designed for the older WaveVision3 Data Capture Board. However, there are certain cautions to be observed when using a WaveVision4 Data Capture Board with an Evaluation Board designed for use with the WaveVision3 Data Capture Board.

Not all of the older A/D Converter Evaluation Boards will work as well with the WaveVision4 Data Capture Board as with a WaveVision3 Data Capture Board. There are two things that will affect compatibility of these older Evaluation Boards with the WaveVision4 Data Capture Board: (1) PLD/FPGA Capture Clock Circuit and (2) Capture Clock to Data timing.

**NOTE:** Although many of the Evaluation Boards designed to be used with the WaveVision3 Data Capture Board will exhibit adequate performance when used with a WaveVision4 Data Capture Board, no assurance is offered that this will always be the case.

## 2.0 PLD/FPGA Capture Clock Circuit

The WaveVision3 clock circuit arrangement is as shown in *Figure 1*. The ADC clock source is chosen with a Clock Select Jumper to be either a clock source on the DUT board or the divided master clock on the WaveVision3 Data Capture Board. For many boards another choice is an external clock source, such as a signal generator. The master clock on the WaveVision3 Data Capture Board is always used to capture data from the ADC. Better performance is obtained with the ADC clock source on the DUT board, but there is a problem in that the two clock sources do not always have the same phase relationship, sometimes resulting in the capture of bad data and the need to recapture that data.

*Figure 2* shows the ADC clock circuit arrangement for the WaveVision4 data capture system. From a block diagram these circuits at first appear to be quite similar, however, there are important differences.

While the ADC clock for the WaveVision3 system can come from the clock on the ADC Evaluation Board or from a divided version of the clock on the WaveVision3 Data Capture Board, in the WaveVision4 system the ADC clock always comes from the clock on the ADC Evaluation Board. That clock signal is also sent to the WaveVision4 Data Capture Board to capture the ADC data, resulting in a more reliable data capture than with the WaveVision3 system.

Doing this creates signal integrity issues, but in most cases accurate data capture is achieved. Sometimes, however, the results might appear to be accurate, but the measured performance might be far below specification.

Although many of the Evaluation Boards designed for use with the WaveVision3 Data Capture Board will exhibit adequate performance when used with a WaveVision4 Data Capture Board, no assurance is offered that this will be the case for every Evaluation Board.

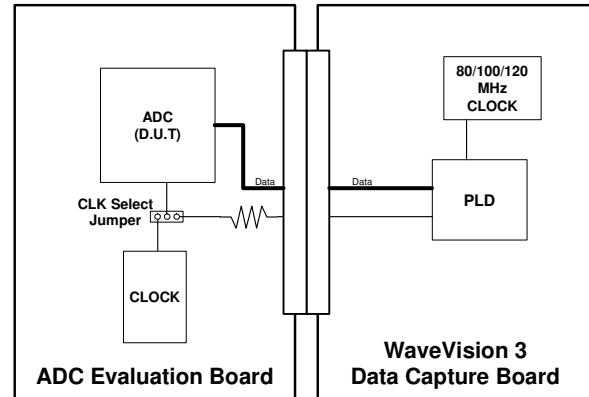


Figure 1. WaveVision3 ADC Clock Arrangement

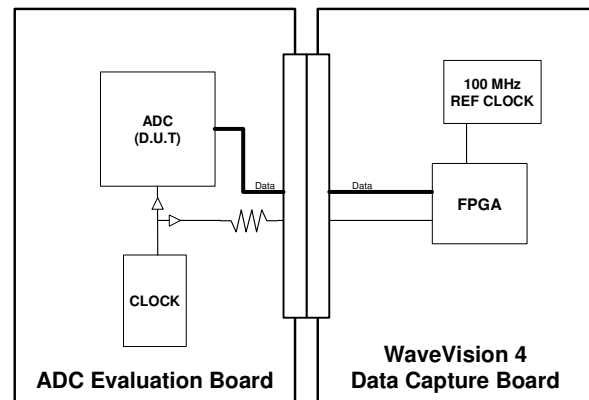


Figure 2. WaveVision4 ADC Clock Arrangement

In order to use a WaveVision3 Evaluation Board with a WaveVision4 Data Capture Board, then, it is necessary to short together all three pins of the CLK Select jumper on the Evaluation Board.

## 3.0 Capture Clock to Data Timing

The WaveVision4 Data Capture Board, when in the WaveVision3 Compatibility Mode, always captures data from the Evaluation Board on the rising edge of the clock coming from the Evaluation Board. If the rising edge of that clock coincides with or is close to the data transition, then bad or marginal data capture might result. It is this potential timing issue that may lead to indicated performance that is worse with the WaveVision4 Data Capture Board than with the WaveVision3 Data Capture Board.

We have observed 10-bit ADCs with a 9.4 ENOB show an ENOB of 8.6 when the time domain plot appeared to be perfectly normal.

Sometimes it is possible to move the timing enough by modifying the value of the resistor that is in series

with the clock line to the WaveVision4 Data Capture Board. This resistor is shown in *Figure 1* and in *Figure 2*.

#### 4.0 Configuring WaveVision4 Capture Board for WaveVision3 Compatibility

The WaveVision4 Board may be easily configured for WaveVision3 compatibility from the WaveVision4 software by clicking on the Settings/Capture Settings pull-down menu and clicking on "[Configure as WaveVision3 compatible](#)" as shown in *Figure 3*. After the download of the appropriate firmware, the open panel will appear similar to that of *Figure 4*.

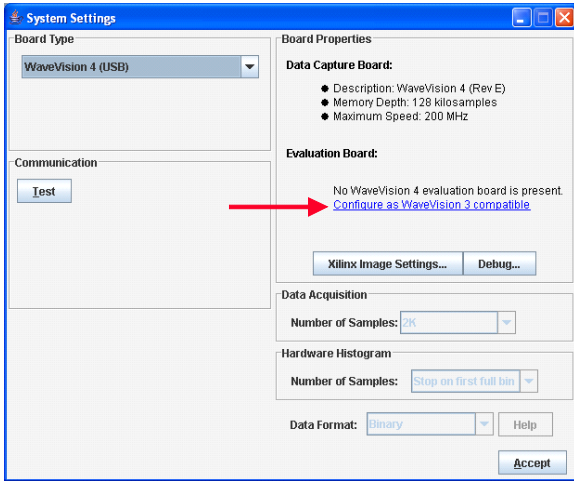


Figure 3. Configuring the WaveVision4 Data Capture Board for WaveVision3 Compatibility

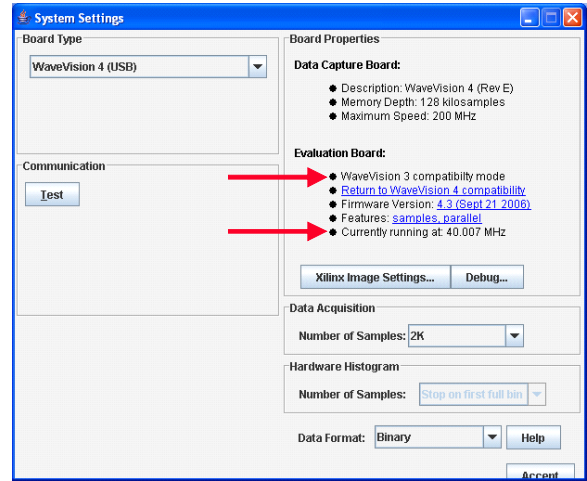


Figure 4. WaveVision4 Data Capture Board in WaveVision3 Compatibility Mode

Note in *Figure 4* that the compatibility mode is shown, as is the current ADC clock frequency. If the ADC clock frequency is not shown, this is most likely because the three pins of the clock select jumper are not all shorted together.