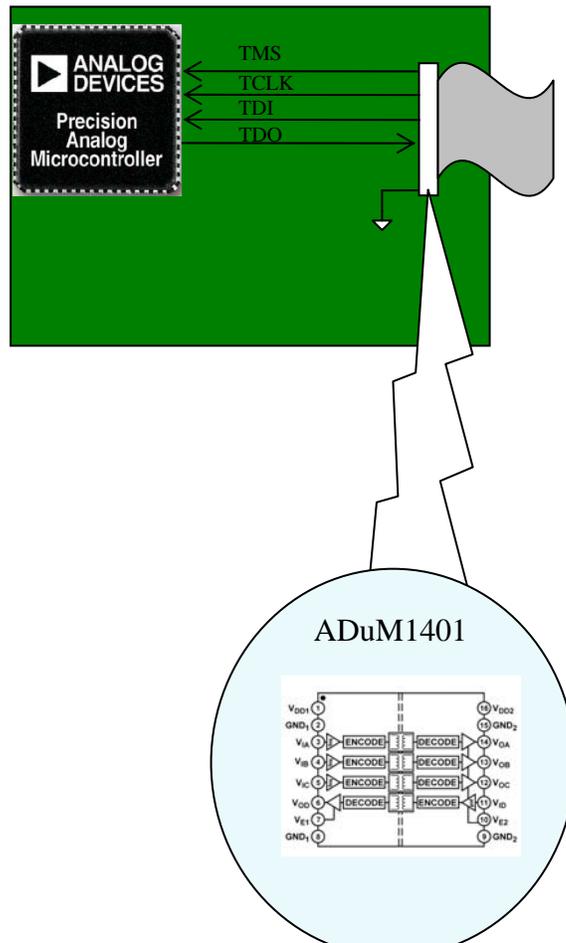


Using *iCoupler*® Digital Isolators for System Diagnostic Interfaces

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Debugging a complex system often requires direct access to the FPGA or embedded controller at the heart of that application. While direct access may help get to the root of a problem, it exposes the FPGA or controller to potentially damaging voltage surges. After you have invested considerable time and energy building your system, the last thing you want to do is to destroy it and then have to explain that to your supervisor! Designers often use optocouplers to isolate the diagnostic interface, but these can be difficult to work with or even expensive to use or impossible to find when you need to run your diagnostics at high data rates. *iCoupler* digital isolators are ideally suited for this application, especially since you can use even a single component to directly isolate standard diagnostic signals.

Consider the industry-standard JTAG interface. If you wish to gain direct access to a processor with an ARM7 or similar core, such as used in ADI's precision analog microcontrollers (e.g., ADuC702x or ADuC703x families), you need only isolate four (4) signals with a single ADuM1401 as shown in the figure below. These signals typically run between 100 kHz to 10 MHz, a range that fits comfortably within the capabilities of *iCoupler* digital isolators. Another nice feature of using the ADuM1401 in this manner is that the ADuM1401 can also level shift so the microcontroller can remain at 3.3V operation while the debug hardware can operate at a higher voltage such as 5V. The ADuM1401 offers an isolation rating of 2.5 kV rms for 1 minute; however, other products such as the ADuM240x offer even higher isolation capability: 5 kV rms for 1 minute.



Lastly, you may wish to have your system provide power to your debug hardware. In that case, consider replacing the ADuM1401 with the ADuM5401. Fitting into the same form factor as the ADuM1401 and providing the same capability for data isolation, the ADuM5401 also has an integrated ½ W isolated DC/DC converter that can power the rest of your debug board.

So, if you want to protect your investment and avoid difficult conversations with your supervisor, but you don't want to spend too much additional time associated with the complexities of optocouplers, consider using a single ADuM1401 or ADuM5401 to isolate the diagnostic interface of your next design.