



PT100 Resistance Thermometer Simulator

with WF 3144 – Programmable Resistor Module

Abstract

This application note demonstrates how the WF 3144 Programmable Resistor Module can be used to simulate PT100 resistance thermometers.

Problem

To simulate PT100 resistance thermometers.

Solution

The WF 3144 Programmable Resistor Module can be used to simulate resistive sensors such as pressure sensors, thermistors (NTC and PTC) and resistance temperature detectors (RTDs), including PT100. Thermocouples however, produce a temperature-dependent voltage and can therefore not be simulated using this module. This application note shows how to access the WireFlow C Series module using the FPGA Read/Write control to simulate a PT100.

The first step is to add the WireFlow module under the FPGA target. To access the channels of the module, add a simple FPGA VI with front panel controls wired to FPGA I/O Nodes.

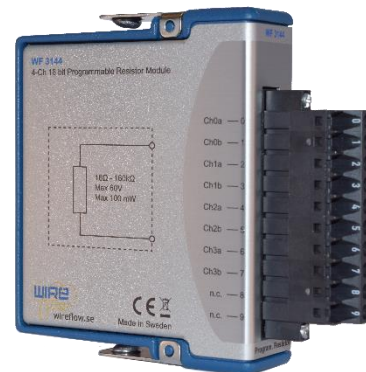


Figure 1. The WF 3144 Programmable Resistor Module

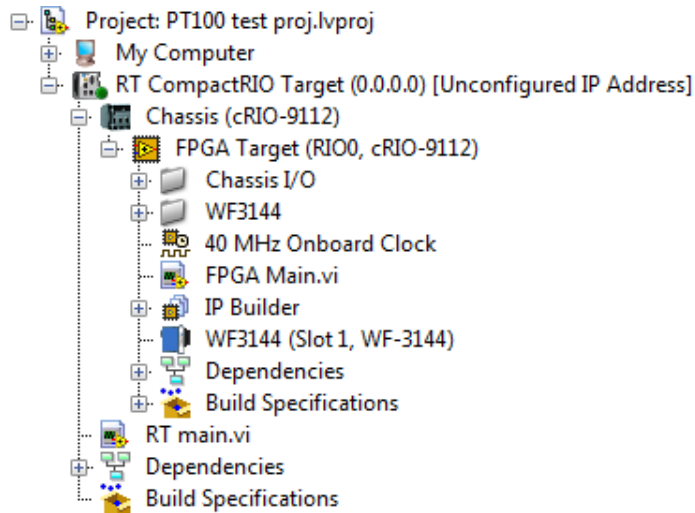


Figure 2. Add the WF 3144 module under the FPGA target

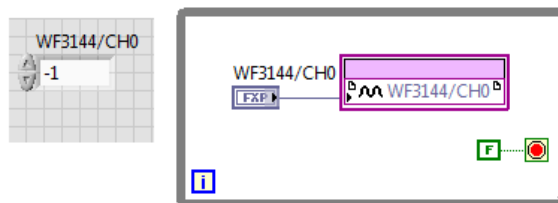


Figure 3. The FPGA VI with an FPGA I/O node



Once the FPGA VI has been compiled, the WireFlow module can be accessed using the FPGA Interface methods:

- Open FPGA VI Reference
- Read/Write Control
- Close FPGA VI Reference

The Read/Write Control node automatically shows the items that can be accessed for the WireFlow module (that exist on the FPGA VI front panel). Using this technique, an application can be created that takes temperature values from front panel controls, converts to ohms and programs the WF 3144 module to output the resistance between two channels (in this example between Ch0a and Ch0b).

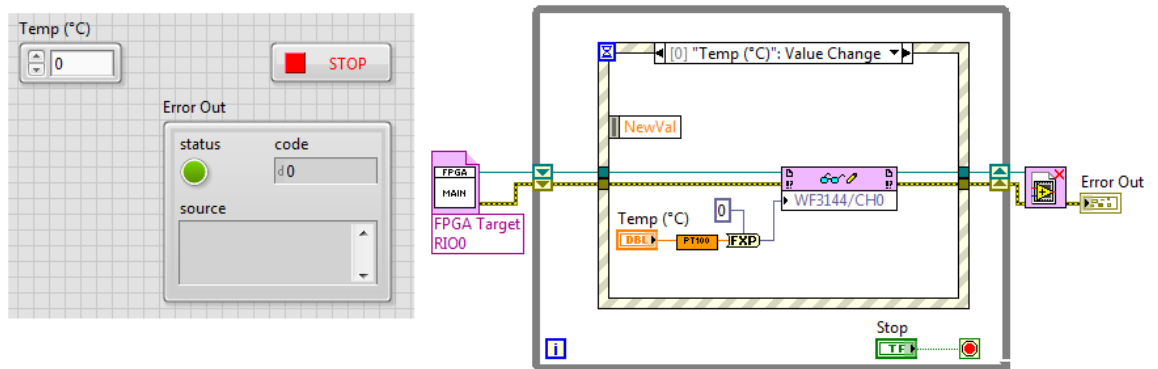


Figure 4. The RT main VI

The subVI that converts from temperature to resistance is available as a zip-file from wireflow.se/downloads (AB0005-086 AN9 PT100 Simulator examples.zip).

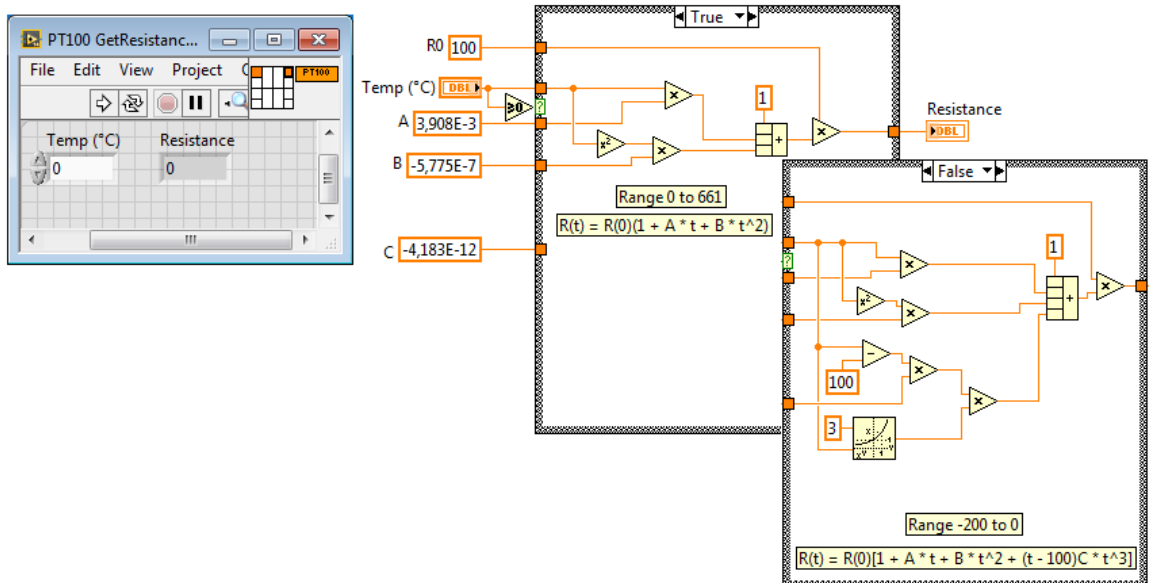


Figure 5. PT100 GetResistanceFromTemp.vi

WireFlow C Series modules can also be accessed using User-Defined Variables, which is the preferred way to access third party modules when used in an EtherCAT slave chassis. This method is demonstrated in application note 4 (AB0005-056 AN4 Mixing WF and NI modules).