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wireflow

AC0021-002, rev D

WF 3144
User Manual



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Support information

Technical support and Product information

www.wireflow.se

WireFlow headquarters

WireFlow AB
Theres Svenssons gata 10
SE-417 55 Göteborg

Please see appendix “Technical support and Services” for more information.

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Important information

Copyright

The WF 3144 module and accompanying software driver is Copyright © 2011-2018, WireFlow AB.

High risk activities

The software and hardware is not designed, manufactured or intended for use or resale as on-line control equipment in hazardous environments requiring fail-safe performance, such as in (but not limited to) the operation of nuclear facilities, aircraft navigation or communication systems, air traffic control, direct life support machines, or weapons systems, in which the failure of the Software could lead directly to death, personal injury, or severe physical or environmental damage ("High Risk Activities"). WireFlow and its suppliers specifically disclaim any express or implied warranty of fitness for High Risk Activities.

Compliance

CE - European Union EMC and Safety Compliance CE

This product meets the essential requirements of applicable European Directives, as follows:

- Electromagnetic Compatibility (EMC) Directive 2004/108/EC
- RoHS Directive 2011/65/EU

Please contact WireFlow to get a copy of the Declaration of Conformity for the WF 3144 module

Device information

Features

- Four independent, galvanically isolated channels
- Entirely solid-state simulation
- High resolution with non-linear scaling
- Wide resistance range
- Enhanced accuracy mode
- On-board calibration memory
- LabVIEW driver included
- Compatible with NI VeriStand
- Combines permutations of real resistors to achieve desired value

Specifications

Resistor Characteristics		
Number of channels	4	
Max Voltage	60 V	
Max Power	100 mW/channel	
Range	16 Ω – 160 kΩ	
Max error in Normal mode (Figure 1)	R < 100 Ω R < 1 kΩ R < 10 kΩ R < 160 kΩ	0.03% 0.1% 1% 10%
Max error in Enhanced mode (Figure 2)	32 Ω < R < 160 kΩ	0,25%
Max update rate	200 Hz	

Isolation Voltages (rated working voltage)	
Channel-to-channel, continuous	250 Vrms
Channel-to-earth ground, continuous	250 Vrms

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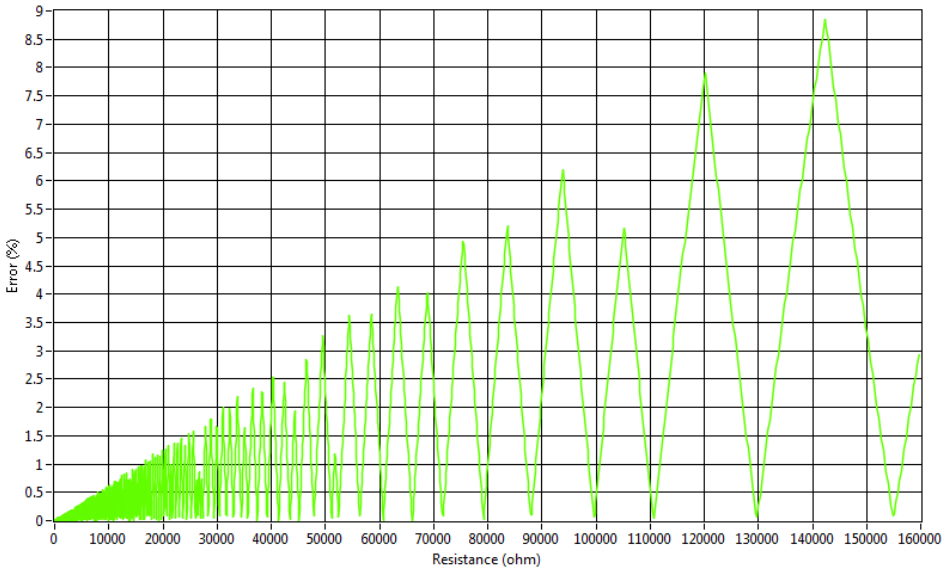


Figure 1 – Error (%) versus Resistance in normal mode

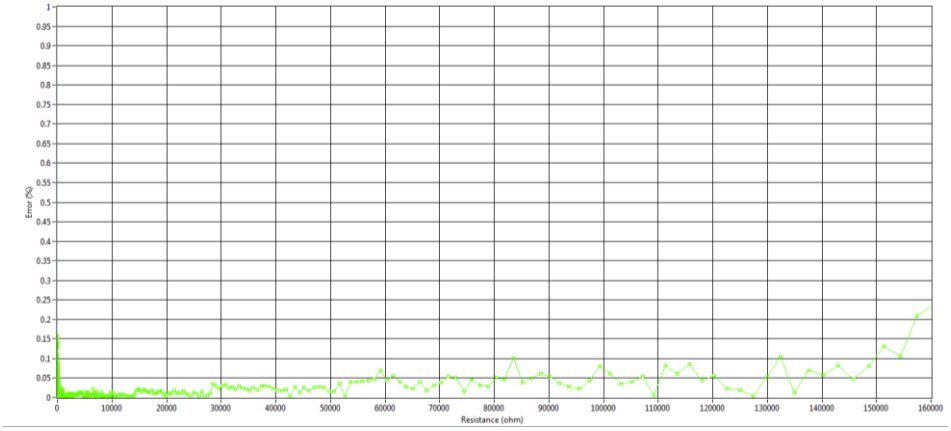


Figure 2 – Error (%) versus Resistance in enhanced mode

Calibration

Each module is delivered calibrated. Modules that no longer stay within the Max Error range given in the specifications section can be re-calibrated by WireFlow.

For questions regarding calibration, please contact WireFlow's support, see chapter "Technical Support and Professional Services".

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Pinout

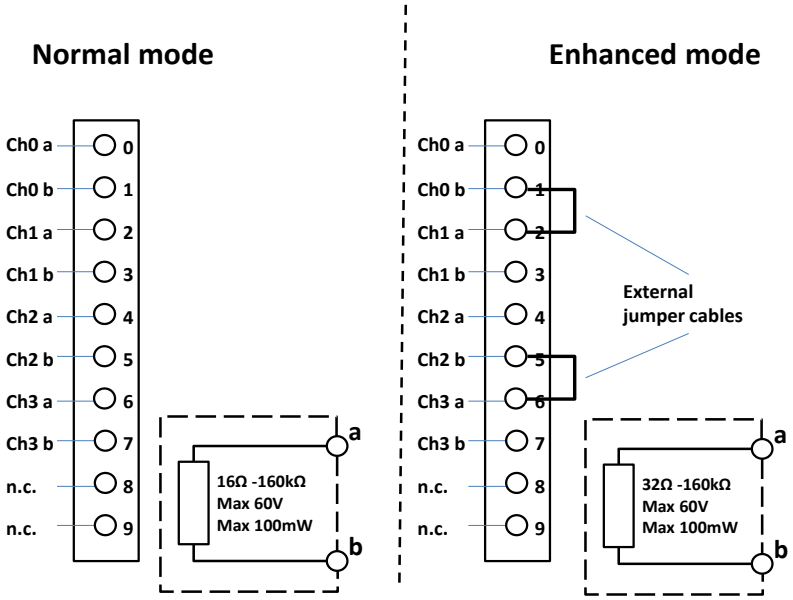


Figure 3 – Pinout and connection diagram

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Software

The WF 3144 is delivered with a LabVIEW driver to manage the module using FPGA property nodes and IO nodes. This chapter describes the installation, requirements and basic usage.

Requirements

- LabVIEW Full (version >= 2017 SP1*)
- LabVIEW FPGA module
- NI RIO (version >= 17.6)
- VI Package Manager (for installation)

Previous version of this driver (v2.0.4) is available on www.wireflow.se and supports LabVIEW2011

The WF 3144 driver currently requires the LabVIEW FPGA toolkit. The software for the WF 3144 is delivered as a VIPM packet (.vip) and requires the free version of VI Package Manager (VIPM) to be installed (available at jki.net or from ni.com).*

Installation

The easiest way to install/update the WF 3144 software is (when VIPM is already installed);

1. Double click the *.vip package
2. Follow the instructions in VIPM to select LabVIEW version where to install the driver
3. Restart LabVIEW

Once installed the necessary files should be installed in the LabVIEW application folders, see the **API** section for details.

Supported Platforms

The WF 3144 module can be used in any C Series chassis, with LabVIEW FPGA programming enabled. This currently excludes the CompactDAQ series of chassis, but includes cRIO, EtherCAT and FPGA expansion chassis.

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API

Once the WF 3144 module has been added to the project the module can be controlled using property nodes and IO nodes.

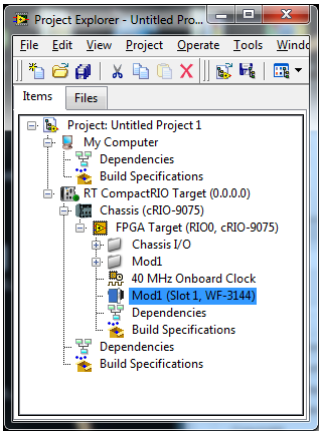
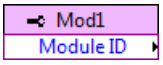
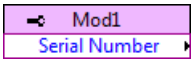
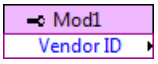


Figure 4 – The WF 3144 module added to the project

The property nodes return information about the current firmware, the information returned is;

- 

This is the identification number of the WF-3144 module
- 

Serial number of the module
- 

Vendor identification number (in this case WireFlow)

The output resistance is set by the FPGA IO nodes.



Figure 5 – IO nodes for normal operation mode

To set infinite resistance (Open Circuit), use -1 (or any negative number) as the resistance input.

Normal operation mode

In the normal operation mode each channel is managed separately (see IO nodes in Figure 3), and the output resistance is available between the a- and b- terminals of each channel. This mode has a non-linear accuracy scaling, with better accuracy at lower resistance values.

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Enhanced accuracy mode

The enhanced accuracy mode uses two resistance channels in series (CH0-CH1 or CH2-CH3).



Figure 6 – IO nodes for enhanced accuracy mode

In this mode the enhanced mode IO nodes should be used (see Figure 4). The IO nodes for the separate channels should not be used.

Please note that the enhanced mode requires external cabling to get the corresponding channels in series, i.e. a jumper cable between terminal **b** on the first channel and terminal **a** on the second channel. The requested resistance is then available between terminal **a** on the first channel and terminal **b** on the second channel.

Mixed mode

The WF-3144 driver allows mixing of operation modes, e.g. CH0 and CH1 can be used in normal mode while CH2 and CH3 are used in enhanced mode.

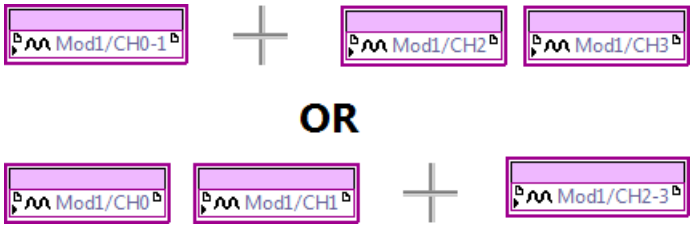


Figure 7 – Mixed mode operation

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Examples

The shipping examples demonstrate the usage of the API driver methods. To find the examples, open LabVIEW example finder and search for the WF 3144.

The example below shows how to simulate a potentiometer using two channels in normal mode. It also shows how to the WF 3144 can act as a high accuracy resistor by using two channels in enhanced accuracy mode.

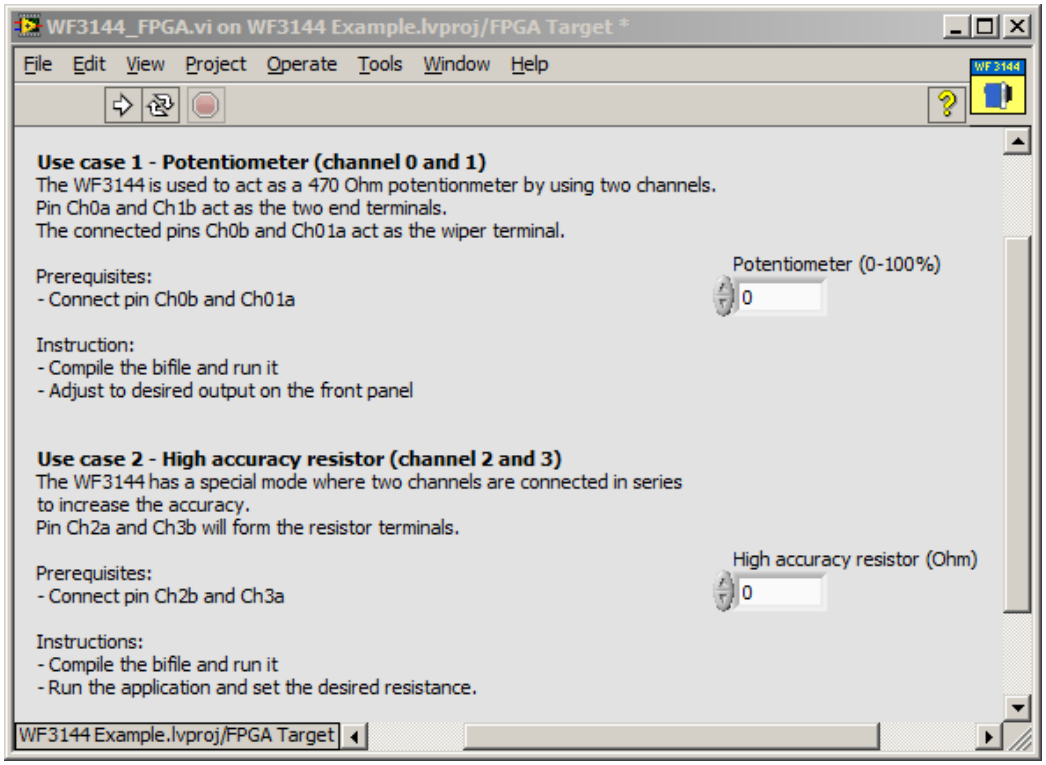


Figure 8 – Front panel of WF 3144 example

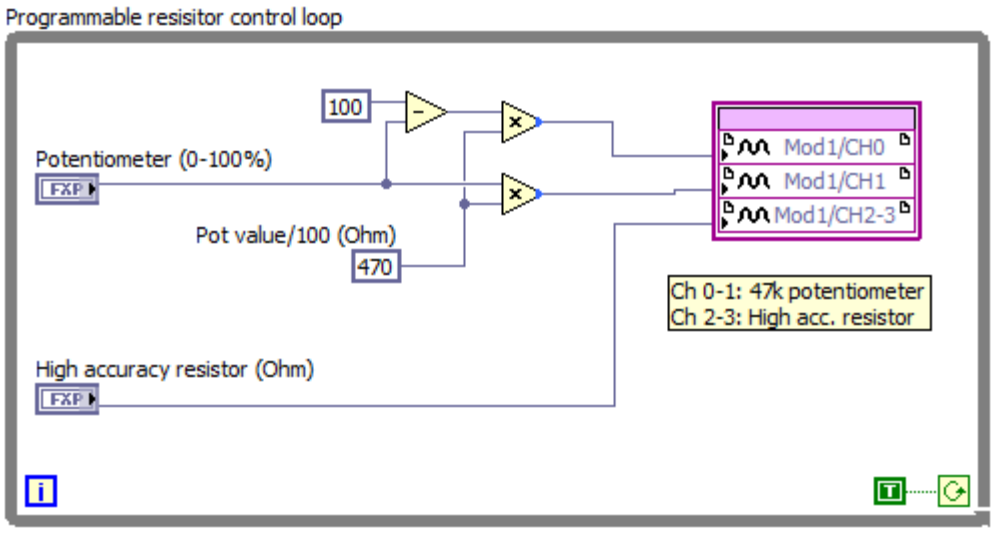


Figure 9 – Block diagram of WF 3144 example

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Troubleshooting

Enhanced mode output

Enhanced mode resistance requires an external jumper cable between the first channel b-terminal and the second channel a-terminal. Failing to do this result in an infinite resistance between CH0a and CH1b (or CH2a and CH3b).

Installation

During the installation progress the program folder is modified (new files are added to the <LabVIEW> directory). On some operating systems or Windows installations it might therefore be necessary to install the driver package with administrator rights.

Technical support and Professional services

If you need to contact support please include the following information for faster handling

- Product number
  printed on the side of the module, ACxxxx
- Serial number
  printed on the side of the module, s/n XXXXXX
- HW version
  printed on the side of the module, vX.X.X
- Driver version (as indicated in VIPM)
- LabVIEW version
- NI-RIO version
- NI-FPGA version
- Target platform
- General description of the problem.

If possible, please include sample code that exemplifies the problem.

Please send support questions to support@wireflow.se, and set the subject to “Support WF 3144”

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Waste Electrical and Electronic Equipment (WEEE)



EU Customers At the end of the product life cycle, all products must be sent to a WEEE recycling center. For more information about how to, visit www.wireflow.se/weee.

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