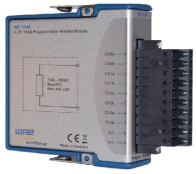
wireflow WF 3144 Programmable Resistor Module



wireflow WF 3144 Programmable Resistor Module User Manual

Contents

workflow WF 3144 Programmable Resistor Module

Specifications

- **Number of Channels**: 4
- **Max Voltage**: 60V
- **Max Power**: 100mW/channel
- **Range:**
  - **R < 100**: 0.03% Max Error
  - **R < 1k**: 0.1% Max Error
  - **R < 10k**: 1% Max Error
  - **R < 160k**: 10% Max Error
  - **32 < R < 160k:** 0.25% Max Error (Enhanced mode)
- **Update Rate**: 200S/s

Product Usage Instructions

Calibration

Each module is delivered calibrated. If the module no longer stays within the Max Error range specified in the specifications section, it can be re-calibrated by WireFlow. For questions regarding calibration, please contact WireFlow's support.

Pinout

The pinout for the WF 3144 module in normal mode and enhanced mode is as follows:

Normal Mode	Enhanced Mode
Ch0 a – 0	Ch0 a – 0
Ch0 b – 1	Ch0 b – 1
Ch1 a – 2	Ch1 a – 2
Ch1 b – 3	Ch1 b – 3
Ch2 a – 4	Ch2 a – 4
Ch2 b – 5	Ch2 b – 5
Ch3 a – 6	Ch3 a – 6
Ch3 b – 7	Ch3 b – 7
n.c. – 8	n.c. – 8
n.c. – 9	n.c. – 9
a – External jumper cables	a – 32-160k Max 60V Max 100mW
b – External jumper cables	b – 32-160k Max 60V Max 100mW

Software

- The WF 3144 module comes with a LabVIEW driver for managing the module using FPGA property nodes and IO nodes. The driver 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.

Requirements

- The WF 3144 driver supports LabVIEW 2011 or later versions. The previous version of the driver (v2.0.4) is available on www.wireflow.se.

FAQ

1. **Where can I get technical support and product information?**
    - You can visit WireFlow's website at **www.wireflow.se** for technical support and product information. You can also refer to the appendix in the user manual for more information.
2. **Where can I find the Declaration of Conformity for the WF 3144 module?**
    - Please contact WireFlow to get a copy of the Declaration of Conformity for the WF 3144 module.

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

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 leaddirectly 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
- 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

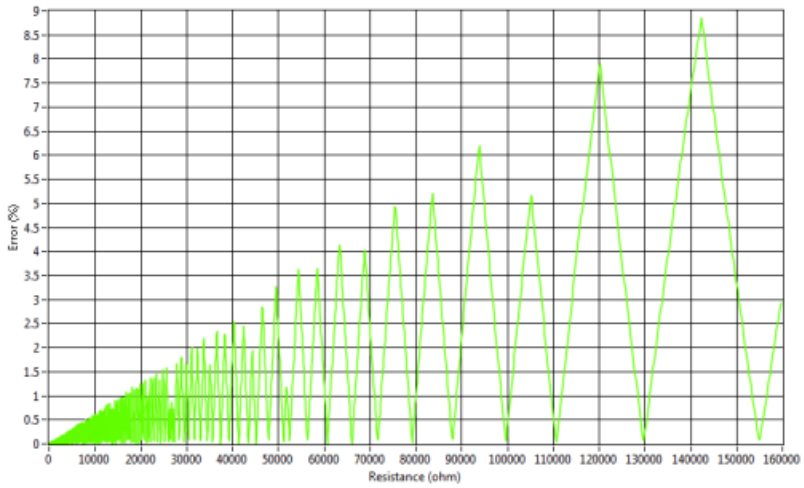


Figure 1 – Error (%) versus Resistance in normal mode

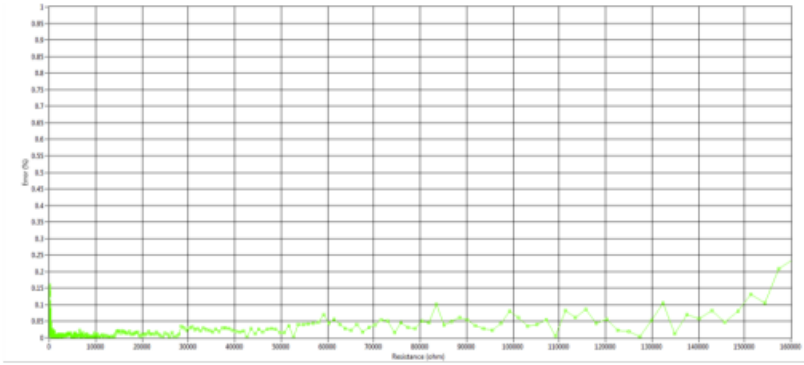


Figure 2 – Error (%) versus Resistance in enhanced mode

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 the desired value

Specifications

- Number of Channels / 4
- Max Voltage / 60V
- Max Power / 100mW/channel
- Range /16Ω – 160kΩ

Max Error

- **R < 100 Ω** / 0.03%
- **R < 1 k** / 0.1%
- **R < 10 kΩ** /1%
- **R < 160 kΩ** /10%
- **32 Ω < R < 160 kΩ** / 0,25% (Enhanced mode)
- **Update Rate** /200S/s

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, "Technical Support and Professional Services".

Pinout

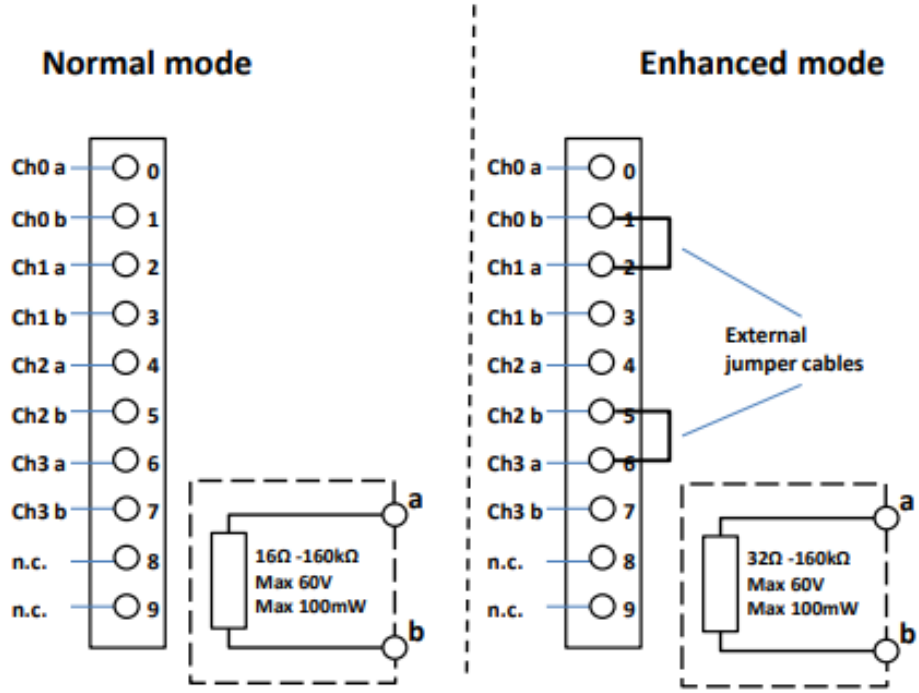


Figure 3 – Pinout and connection diagram

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);

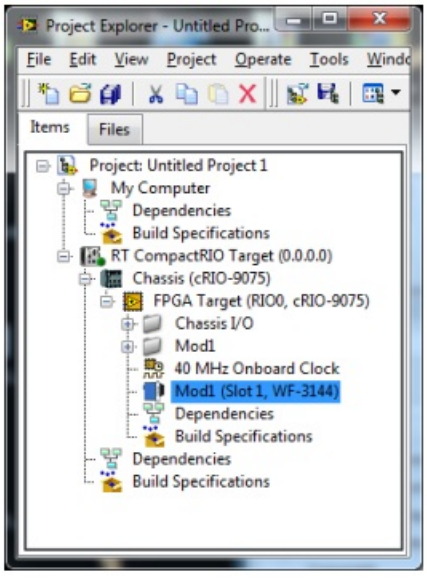
1. Double-click the *.vip package
2. Follow the instructions in VIPM to select the LabVIEW version where to install the driver
3. Restart LabVIEW

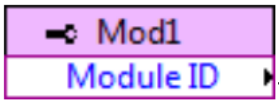
Once installed the necessary files should be installed in the LabVIEW application folders, see the API section for details.

Supported Platforms

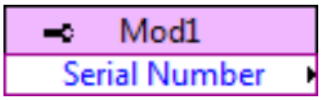
- The WF 3144 module can be used in any C Series chassis, with LabVIEW FPGA programming enabled. This currently excludes the CompactDAQ series of chassis, but includes cRIO, EtherCAT and FPGA expansion chassis.

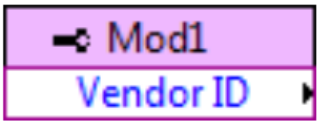
API



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

- 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.

Enhanced accuracy mode

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

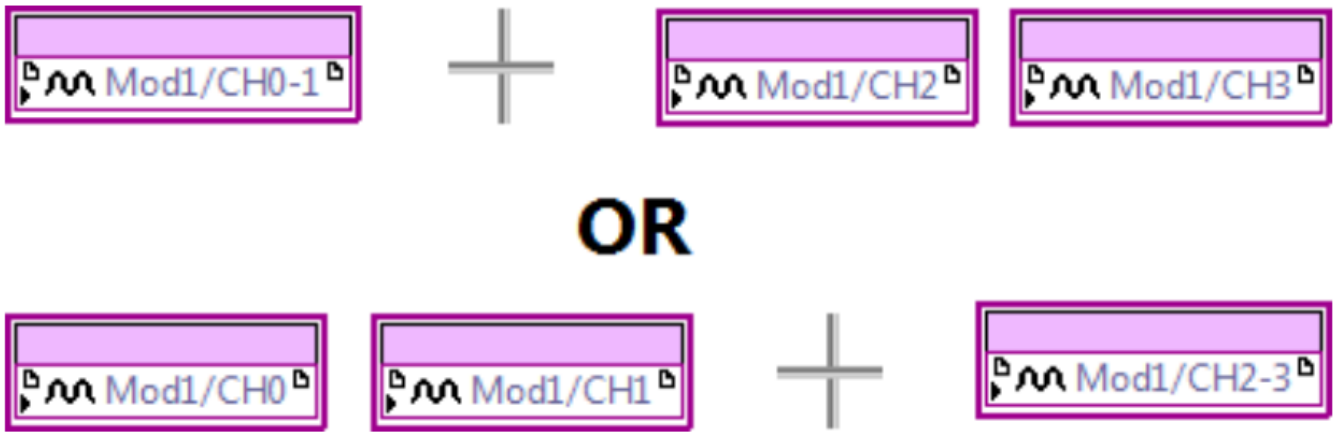
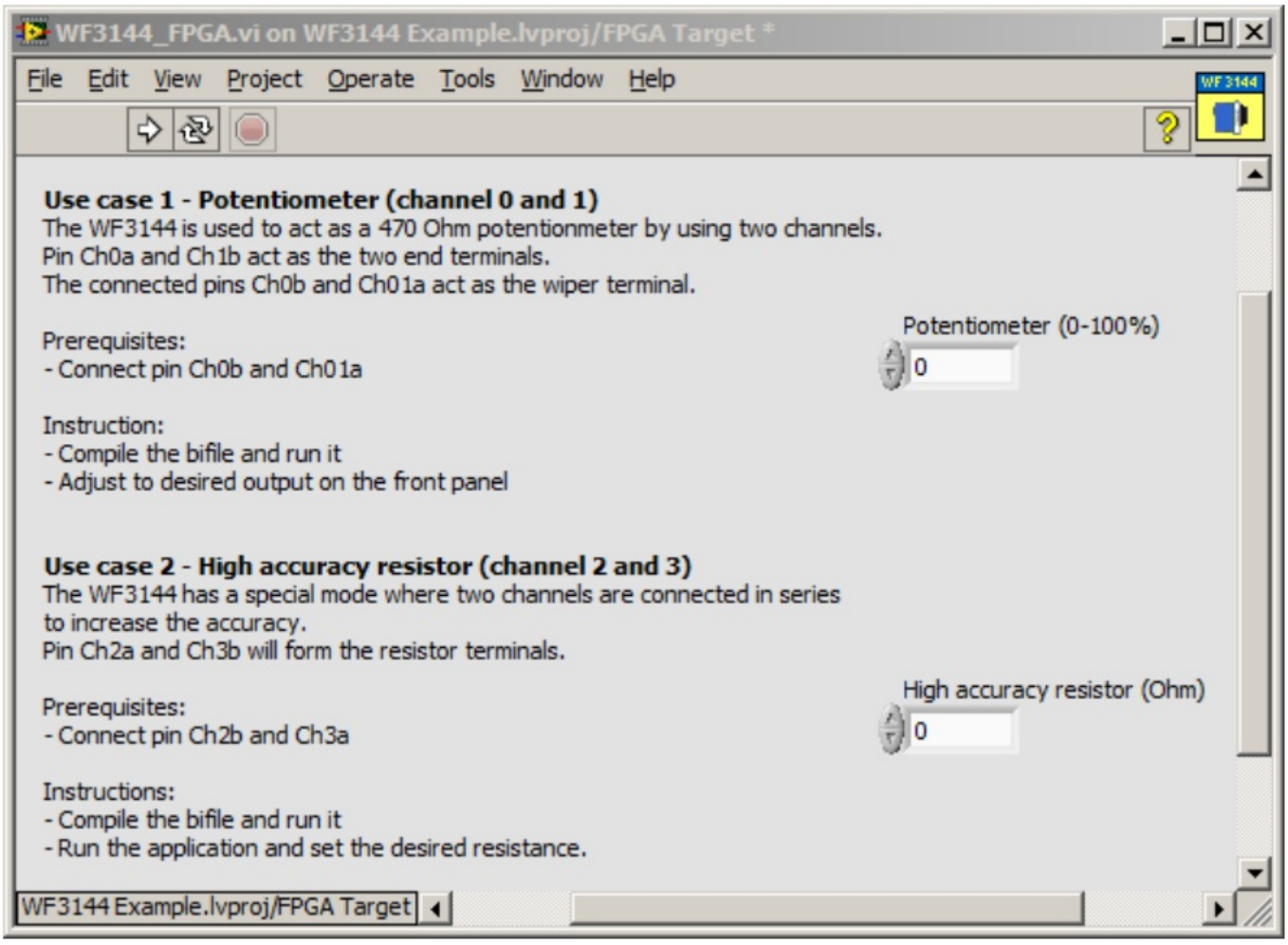


Figure 7 – Mixed mode operation

- 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.

Examples



Proarammable resisitor control loop

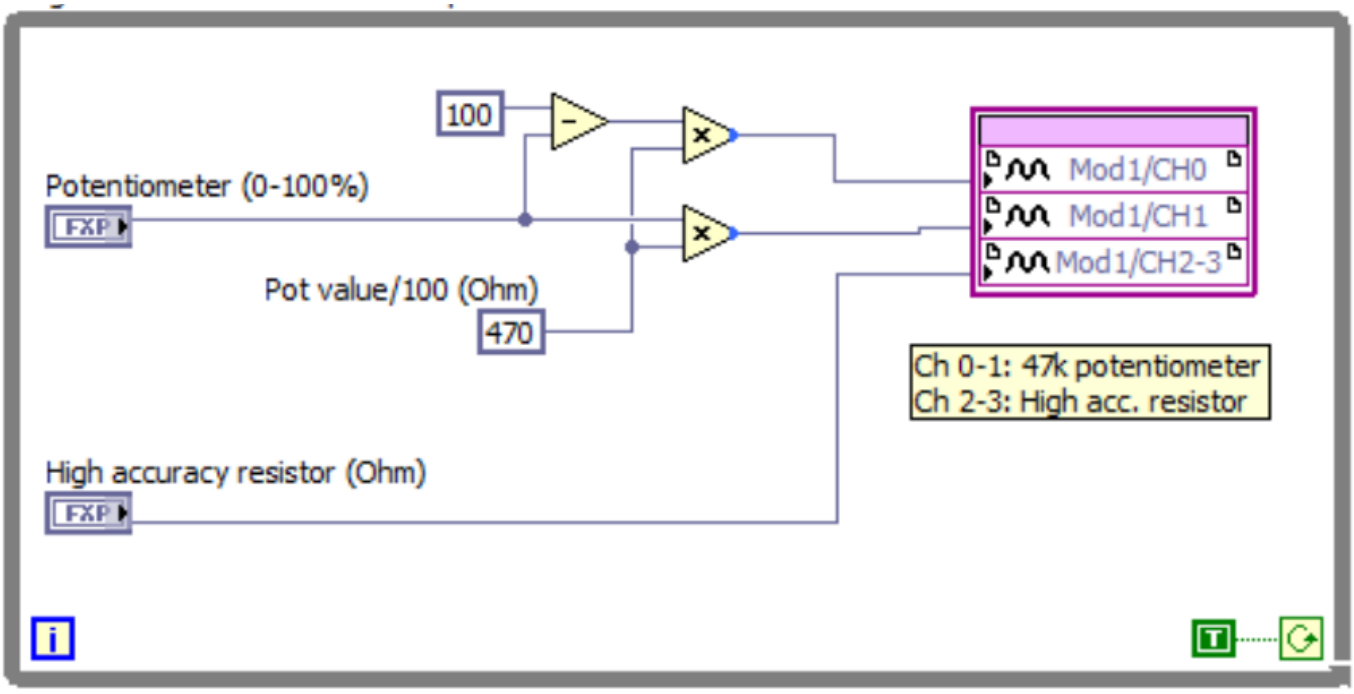


Figure 9 – Block diagram of WF 3144 example

- 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.

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 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”

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**.

Documents / Resources

	**wireflow WF 3144 Programmable Resistor Module** [pdf] User Manual WF 3144 Programmable Resistor Module, WF 3144, Programmable Resistor Module, Resistor Module, Module

References

- **User Manual**