
Getting Started with Circaflex™ Lite and NI Single-Board RIO™

Note: If this is the first time you are using the NI Single-Board RIO, please refer to the Getting Started Guide for the NI Single-Board RIO before using this guide.

This document demonstrates how you can use the Cyth Circaflex Lite board to simplify and accelerate connectivity to your NI 964X Single-Board RIO. This prototyping accessory has been developed to allow connectivity to all of the I/O available on the NI Single-Board RIO device without needing multiple cables and breakout boards. Once you have finished the design of your control system, Cyth Systems can create for you a connectivity board with customized layout and circuitry.

Safety Information



Do *not* use the board for any purposes other than what is specified in the documentation. This may compromise the safety of the product and other hazards may arise if the device is used improperly. If the product is damaged, please send it back to Cyth Systems for proper repair.

Do *not* modify or install unspecified parts to the device because this may introduce dangerous hazards. Only use the product with the chassis, modules, accessories, and cables specified in the installation instructions.

Keep the unit free from contaminants and completely dry before using. To clean the device properly, use a soft nonmetallic brush and lightly brush off dust and other light particles. For cleaning off stubborn contaminants, use a stiff, nonmetallic brush.

Required Components

Note: This board requires an NI 964x Single-Board RIO. All of the hardware and software requirements for that product are relevant to the Cyth Circaflex Lite board. Please see the User Manual for the NI 964x for information regarding those requirements. You will need all of the appropriate drivers and development code from National Instruments installed before using the Circaflex Lite with the NI Single-Board RIO.

Hardware Requirements

- Cyth Circaflex Lite
- NI 964x Single-Board RIO
- 24V DC Power Supply
- Cyth M1 Flathead Screwdriver (included with Cyth Circaflex Lite kit)
- 16-30 AWG Wire

Software Requirements

- Optional Cyth Circaflex Lite Indicator Code (available at cyth.com/redeem)
- Software requirements for the NI Single-Board RIO can be found in the User Guide for that product.

Hardware Setup

The Cyth Circaflex Lite prototyping board is a plug-in adapter that provides access to the I/O available on the NI 964x Single-Board RIO. Use 20mm standoffs between the NI Single-Board RIO and Circaflex Lite for the seven mounting holes. When connecting Circaflex Lite to the NI Single-Board RIO, align the D-sub 37 connector (the “D”-shaped connector) to the D-sub connector on the NI Single-Board RIO. After correct alignment, press evenly on Circaflex Lite until all the I/O connectors are all the way in and the Circaflex board rests on the NI Single-Board RIO evenly.

With the card plugged in, you can immediately use the screw terminals on the Circaflex Lite to make connections to the I/O on the NI Single-Board RIO. It is recommended that you use the screwdriver included in the Circaflex Lite kit on the screw terminals found on the Circaflex Lite board to prevent damage to the screw terminals. **The maximum torque for tightening the screw terminals is 1.35 in-lb (0.15 Nm). Please use caution when tightening screw terminals. DO NOT OVERTIGHTEN.**



If you plan to use the industrial outs on the board, you will need to supply DC current to the *DO.VSUP* pin found on the Industrial Digital Out section of the board. The NI Single-Board RIO supports 6V-35V DC as your Industrial Out source, but Cyth recommends using 24V DC. This is a standard voltage supported by many industrial devices, and this voltage will ensure that all of the LED indication on the Industrial Outs work properly. Note that as long as your DC power supplied to the *DO.VSUP* input is between 6V and 35V the Industrial Outs will behave as expected. The only issue you will see with voltages other than 24V is that the LED indication for the Industrial Out channels may not function as expected.

The current and voltage ratings on the Circaflex Lite are equivalent to the ratings on the NI Single-Board RIO. Please follow the current and voltage ratings specified by NI Single-Board RIO guidelines. The silkscreen labels on the board represent the actual Digital and Analog channels on the NI Single-Board RIO. All grounds on the board are connected, including the AI GNDs and D GNDs.

Pre-built Cyth Software for Circaflex Lite

Cyth Systems has developed some basic FPGA and RT code to get you started in your application. Download the software from <http://www.cyth.com/redeem> and open it in LabVIEW.

This code enables the RTOS and FPGA status LEDs on the board. This will allow you to know if the RTOS or FPGA are running on your NI Single-Board RIO. This code also acts as a pass-through for most of the digital and analog ins and outs. The one exception is the fact that 10 of the TTL I/Os were reserved for use by LEDs on the board like the User LEDs and the RTOS and FPGA LEDs.

To quickly get your project started, simply modify the LabVIEW RT code to suit your needs. You will want to add any algorithms you need in your application into the LabVIEW RT code and redeploy the code to the NI Single-Board RIO. If you need to modify the FPGA code, that option is available too. Be sure to recompile and redeploy the bitfile before using the modified I/Os in your LabVIEW RT code.

Separating Circaflex Lite from the NI Single-Board RIO



It is not recommended to separate the Circaflex board from the NI Single-Board RIO after they have already been connected. Please contact Cyth Systems if the occasion calls for the separation of the boards. If separation is necessary, use **caution** when removing Circaflex Lite from the NI Single-Board RIO. Do *not* pull the two apart using concentrated force on one side or corner. The weight distribution to pull them apart should be as even as possible and separated carefully and slowly. Therefore, each quadrant of the Circaflex Lite board should be lifted only millimeters at a time as you go around the board. Keep the board parallel to NI Single-Board RIO at all times, especially when making the final separation. This will prevent damage to the IDC connectors on the NI Single-Board RIO.

This product is not intended to withstand repeated removal and attachment of the NI Single-Board RIO from the Circaflex Lite board. If there is a potential for repeated removal and attachment of the two boards, please contact Cyth Systems for additional help.

LED Indications

There is an LED indicator on every digital I/O. There are 6 main LED indicators at the top left corner of the Circaflex Lite board. RTOS Status LED will blink when the Real-Time Operating System is running. The FPGA Status LED will blink when the FPGA is active. The two User LEDs are generic indicator LEDs that the user can use to turn their own device on and off using Cyth software. The 5V Indicator LED shows that 5V is being supplied to the board from the NI Single-Board RIO. The Industrial Digital Supply LEDs show that voltage is hooked up to the *DO.VSUP*.

Specifications

Standoff Size between NI Single-Board RIO and Circaflex Lite	20mm
Tightening torque max for screw terminals	1.35 in-lb
Screw threads	M1, 6
Type of wire to connect to Circaflex Lite	Stranded Wire
Number of 5Vdc supply from NI Single-Board RIO	4

Support

Cyth Systems, corporate headquarters is located at 9939 Via Pasar, San Diego, California, 92126. For technical support in the United States, please call 888 508 7355 or email support@cyth.com. Cyth Systems also has offices located in UK for technical support in Europe. For telephone support in UK, please call 44 0 8455 197813.

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