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# **BCI-1553 Compact RIO MIL-STD-1553B Module**

Installation Instructions and Hardware Reference

Revision 1.2  
March 11, 2017

## Revision History

Rev.	Date	Description
1.0	08/17/2015	Initial version.
1.1	11/2/2016	Added regulatory and cable information; reformatted; removed programming-specific documentation
1.2	3/11/2017	Minor fixes to troubleshooting table, updated company NJ address

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## 1.0 Overview

These operating instructions describe how to install the Bloomy BCI-1553 MIL-STD-1553 module into a National Instruments Compact RIO (cRIO) system. For information about installing, configuring, and programming the system, refer to the system's documentation.

**Note:** The safety guidelines and specifications in this document are specific to the BCI-1553. The other components in your system may not meet the same ratings and specifications. Refer to the documentation for each component in your system to determine the ratings and specifications for the entire system.

### 1.1 Maintenance

To clean the module, wipe it with a dry towel.

### 1.2 Ratings

Power consumption	12-24VDC, 2.5W (max.)
Weight	5.5oz
Storage temperature range	-40°C to 85°C
Operating temperature range	-40°C to 70°C
Ingress protection	IP 30
Operating altitude	2,000m
Pollution degree	2

### 1.3 Regulatory

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Refer to the product Declaration of Conformity for additional regulatory compliance information. To obtain product certifications and declarations of conformity for this product, see [www.bloomy.com/support](http://www.bloomy.com/support).

## 2.0 Module Description

The Bloomy Controls BCI-1553 module is a redundant multi-function MIL-STD-1553 terminal designed for use in a cRIO system. The BCI-1553 module supports operation as a remote terminal, dual remote terminals, bus controller, or bus monitor. Redundancy on the module is handled by having up to two transmission buses for any of the operation modes, each being independently configurable.

### 2.1 Features

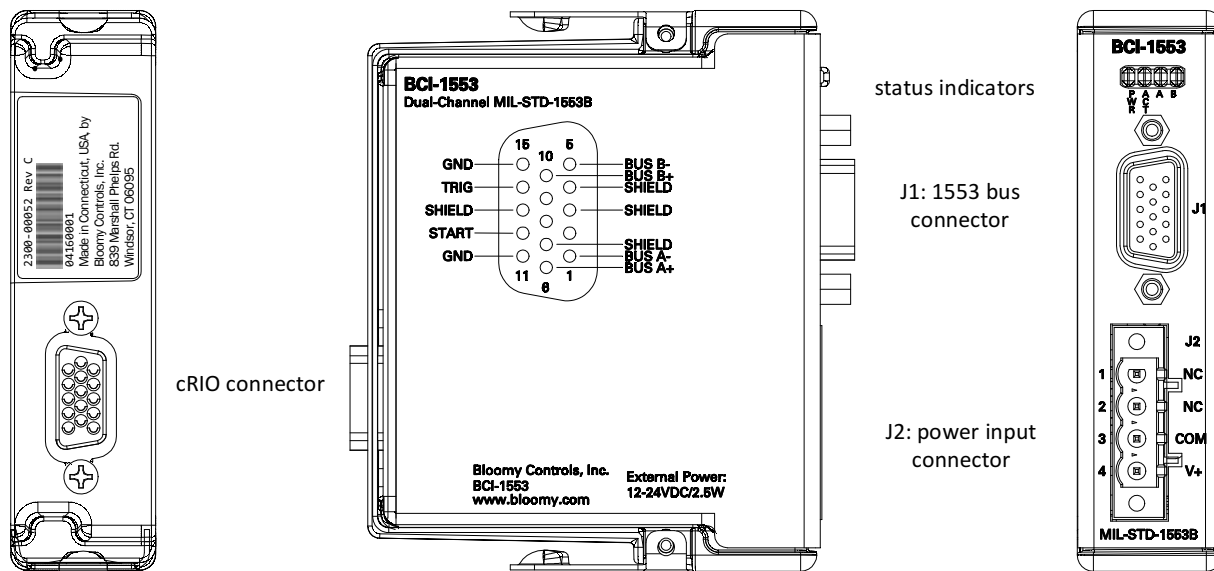
The BCI-1553 uses the Holt HI-6131 integrated terminal to provide a dual-redundant bus MIL-STD-1553B terminal. Bloomy's high-level APIs provide the ability for the module to act as a bus control-

ler, a bus monitor, or as one or two remote terminals. An additional low-level API provides the user with the ability to enable any two or three of these modes simultaneously by programming the Holt HI-6131 directly. Integrated isolation transformers allow the module to be connected to stubs off a MIL-STD-1553B bus. Direct coupling is easily accommodated using a cable with integral terminating resistors.

## 2.2 Hardware Overview

**Note:** Do not open the module. The module contains no user-serviceable components, and the module’s components are sensitive to static electricity which can destroy the module.

The figure below shows the BCI-1553 module’s rear, side, and front views.



Hardware Components	
PWR indicator	illuminates when the module is adequately powered and an application is running on the cRIO FPGA
ACT indicator	illuminates when the module is ready for operation in the selected mode
A/B indicators	illuminate when the module is transmitting or receiving on the 1553 bus
cRIO connector	use only for connection to the cRIO chassis
J1	1553 bus connector (see pinout below)
J2	DC power input connector (see description below)

## 3.0 Installation

### 3.1 System Requirements

The BCI-1553 module requires:

- a compatible National Instruments cRIO chassis with a Kintex 7 70T FPGA or greater
- an external power source capable of providing 12-24VDC/2.5W (max.)
- a cable, such as Bloomy P/N 1200-00027, to connect the module to the 1553 network
- LabVIEW 2014 (or later) with FPGA and Real Time modules.

**Note:** Install the latest software drivers for this module before plugging the module into the target cRIO chassis. The latest version of the software may be obtained from [www.bloomy.com/support](http://www.bloomy.com/support).

### 3.2 Driver Installation

The BCI-1553 module drivers are available from [www.bloomy.com/support](http://www.bloomy.com/support). The latest drivers may be requested at the time of purchase and may be delivered on CD or flash drive. The installer will place the required drivers onto the host computer thereby allowing an installed version of LabVIEW to recognize the BCI-1553 module when it is present in a cRIO chassis.

#### 3.2.1 Before Installing Drivers

Before installing the BCI-1553 drivers, make sure that LabVIEW is not running on the host computer and that no other installers are actively running.

#### 3.2.2 Installing BCI-1553 Drivers

- 1) Navigate to the *Setup.exe* file provided and double-click it.
- 2) Follow the prompts presented by the installer.

### 3.3 Hardware Installation

After the drivers have been installed, install the BCI-1553 module into the cRIO chassis and connect power and the MIL-STD-1553B bus per the following sections.

#### 3.3.1 J1: MIL-STD-1553B

J1 is a standard female DE-15 (D-shell, E size, high-density, 15-pin) connector which will mate with TE Connectivity P/N 1757823-7 and other similar connectors.

Pin	Function	
6	Bus A+	Connect 78Ω twinax for each bus connection.  When using a stub-coupled bus (also called transformer-coupled), limit the stub length to 20'.  If direct-coupling is required, insert a 55Ω/2W resistor in series with each bus + and – line as close to J1 as possible, and limit the length between the module and the bus to 1' or less.  (Contact Bloomy to order cables compatible with this module.)
1	Bus A-	
7	Bus A shield	
10	Bus B+	
5	Bus B-	
4	Bus B shield	
14	Trigger	When a trigger is configured in software, applying a 3.3VDC signal to this pin will cause execution of the triggered action.
13	Trigger return	
12	Reserved	Do not make connections to these pins.
11	Reserved	

### 3.3.2 J2: Power

External power is required for the module to function. J2 is a standard four-position pluggable terminal block connector. The BCI-1553 module is supplied in a kit with its mating connector, FCI P/N 20020002-G041B01LF or equivalent. Connect a 12-24VDC/2.5W (min.) power supply to pins 4 and 3 of the connector as shown on the module.

## 3.4 Include the Module into a LabVIEW FPGA Project

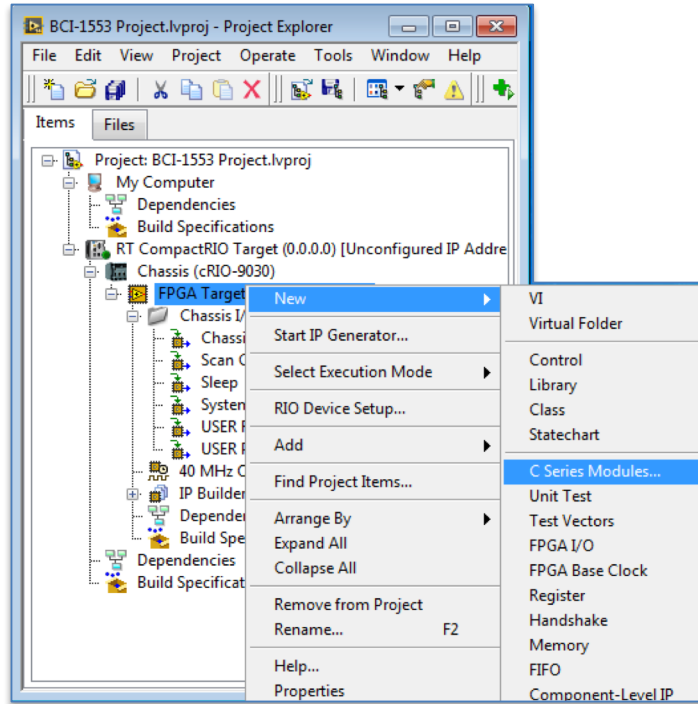
Once the driver software is installed on a target computer, the BCI-1553 module is discoverable and can be added to an FPGA project. The module will operate in any available slot, and the number of modules allowable in a single chassis depends entirely on the FPGA space available.

**Note:** The BCI-1553 module is incompatible with National Instruments Scan Engine.

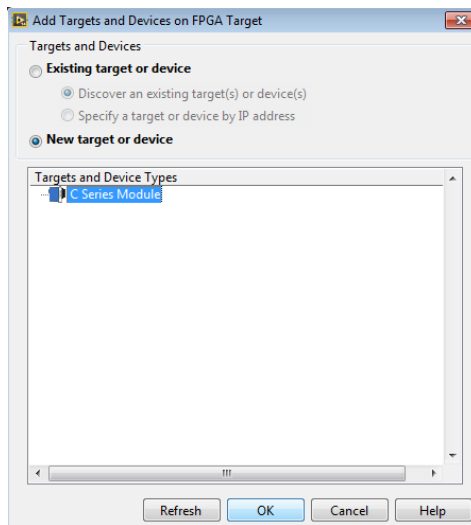
### 3.4.1 Adding the BCI-1553 Module to a LabVIEW FPGA Project

The BCI-1553 module supports auto-discovery and manual addition to a project. The following steps outline the basic procedure for manually adding the BCI-1553 module to a LabVIEW FPGA project.

**Step 1:** Add a new C Series module to the FPGA target as shown below.

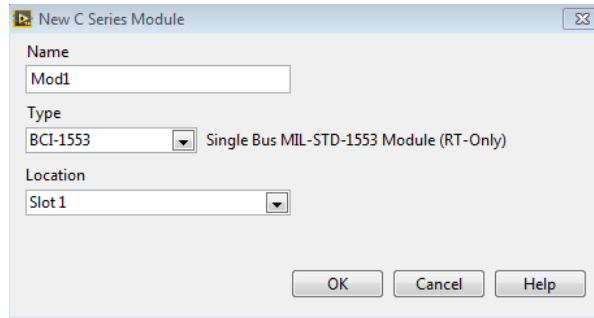


**Step 2:** Select to add a new target or device. (Auto-discovery may be used by selecting the “Existing target or device” option.)

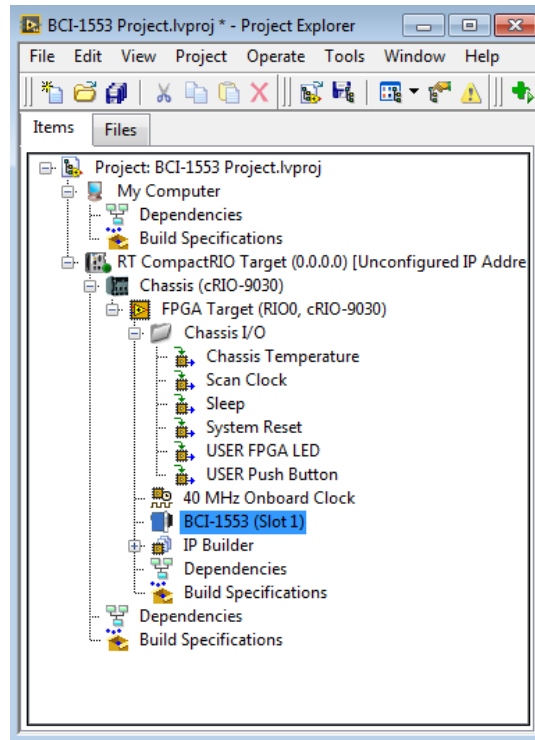




**Step 3:** Set the module name, set the type to BCI-1553, and set the slot.



**Step 4:** Verify the BCI-1553 module is present in the project.



### 3.5 Programming the Module

Program the module using the programming reference manual appropriate for the mode of operation.

## 4.0 Troubleshooting

General		
Symptoms	Possible Causes	Probable Fix
Power LED does not turn on	FPGA code is not running on the host C-Series chassis.	When an application is not running on a C Series FPGA, the chassis holds all modules in a sleep state. Running a simple application (whether it uses the BCI-1553 or not) can verify if proper power is being supplied to the BCI-1553.
	Incorrect power being supplied to the BCI-1553 module.	Make sure that the power supplied to the BCI-1553 module conforms to the details in Section 3.
BCI-1553 module does not transmit	Incorrect bus termination.	Check that the MIL-STD-1553B bus is configured properly.
	Operation has not been started.	Call the start function relevant for the mode of operation the BCI-1553 module is in.
	Module not initialized	Call the initialize function relevant for the mode of operation the BCI-1553 module is in.
BCI-1553 module is not discoverable in a cRIO chassis	Incorrect or no power being supplied to module.	Make sure that the power supplied to the BCI-1553 module conforms to the details in Section 3.
Remote Terminal data transmissions are inconsistent	Subaddress not configured before starting the Remote Terminal.	Ensure that all subaddresses relevant to the application have been configured before starting the remote terminal.