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Find the *National Instruments SMB-2163* at our website: *Click HERE*

USER GUIDE

NI SMB-2163

Single-Ended Digital I/O Accessory

このドキュメントには、日本語ページも含まれています。

The NI SMB-2163 is a breakout box for National Instruments single-ended digital waveform generator/analyzer modules. The NI SMB-2163 provides an easy way to connect to other devices for testing and debugging.

This guide explains how to set up and use the NI SMB-2163 single-ended digital I/O (DIO) accessory with NI single-ended digital waveform generator/analyzer modules.

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Conventions

The following conventions are used in this manual:

>

Angle brackets that contain numbers separated by an ellipsis represent a range of values associated with a bit or signal name—for example, DIO <0..3>.

The » symbol leads you through nested menu items and dialog box options to a final action. The sequence **File»Page Setup»Options** directs you to pull down the **File** menu, select the **Page Setup** item, and select **Options** from the last dialog box.



This icon denotes a note, which alerts you to important information.



This icon denotes a caution, which advises you of precautions to take to avoid injury, data loss, or a system crash. When this symbol is marked on a product, refer to the *Specifications* section for information about precautions to take.

old

Bold text denotes items that you must select or click in the software, such as menu items and dialog box options. Bold text also denotes parameter names.

alic

Italic text denotes variables, emphasis, a cross reference, or an introduction to a key concept. This font also denotes text that is a placeholder for a word or value that you must supply.

monospace

Text in this font denotes text or characters that you should enter from the keyboard, sections of code, programming examples, and syntax examples. This font is also used for the proper names of disk drives, paths, directories, programs, subprograms, subroutines, device names, functions, operations, variables, filenames, and extensions.

What You Need to Get Started

To set up and use the NI SMB-2163, you need the following items:

- ❑ SHC68-C68-D2 cable assembly
- ❑ NI digital waveform generator/analyzer, installed in a PXI or CompactPCI chassis
- ❑ 50 Ω cables with SMB connectors

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- ❑ The documentation included with the digital waveform generator/analyzer and driver software
- ❑ (Optional) Rack Mount Kit for CA-1000 (part number 777665-01), available from National Instruments

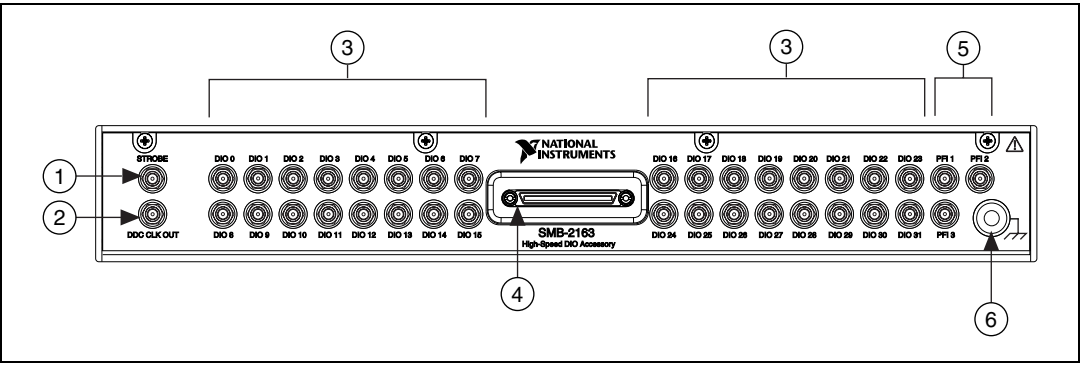
Related Documentation

The NI digital waveform generator/analyzer ships with several documents designed to familiarize you with different aspects of the module. The documentation set includes the following pieces:

- *NI Digital Waveform Generator/Analyzer Getting Started Guide*—Read this printed document to set up the digital waveform generator/analyzer and configure it to complete your first acquisition or generation.
- *NI Digital Waveform Generator/Analyzer Help*—This online document provides more in-depth information about the hardware capabilities of the module, theory of operation, programming flow, and software reference.
- NI digital waveform generator/analyzer specifications—This printed document provides specifications for your module.

Parts Locator

Refer to Figure 1 to locate connectors on the NI SMB-2163.



1	STROBE	4	68-Pin Digital Data & Control (DDC) Connector
2	DDC CLK OUT	5	Programmable Function Interface (PFI) <1..3>
3	DIO <0..31>	6	Shield Ground Lug

Figure 1. NI SMB-2163 Parts Locator Diagram

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nstalling Cables

Complete the following steps to install the NI SHC68-C68-D2 cable and any 50 Ω SMB cables.

Caution Disconnect power from the device, accessory, and any other connected hardware before connecting the cable to prevent damage to the hardware and personal injury. NI is *not* liable for damage resulting from improper connections.

1. Install the driver software and digital waveform generator/analyzer by following the installation procedure in the *NI Digital Waveform Generator/Analyzer Getting Started Guide*.

Note Always install the module in a computer or PXI/CompactPCI chassis *before* attaching any cables or accessories.

2. Attach either end of an NI SHC68-C68-D2 cable assembly to the DDC connector of the digital waveform generator/analyzer and secure the cable with the captive screws on the cable connector.

Notes Do *not* use cables other than the NI SHC68-C68-D2 cable with this accessory.

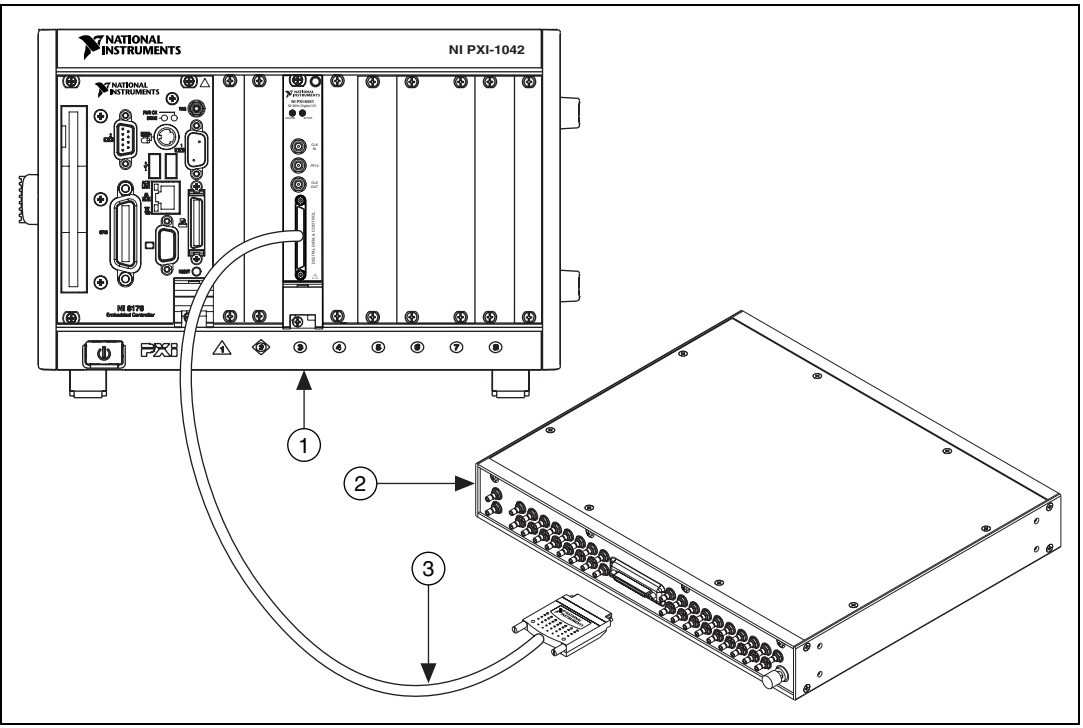
Do *not* use the NI SMB-2163 accessory with differential digital signals, such as the digital pattern output of the NI PXI-5421 signal generator.

The NI SMB-2163 is *not* compatible with the NI 6533/6534 products.

3. Attach and secure the other end of the NI SHC68-C68-D2 cable assembly to the DDC connector of the NI SMB-2163 and secure them together with the captive screws on the cable connector.

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Figure 2 shows how the NI SHC68-C68-D2 cable connects the NI SMB-2163 and the NI digital waveform generator/analyzer.



1 PXI Chassis with NI Digital Waveform Generator/Analyzer
2 NI SMB-2163
3 NI SHC68-C68-D2 Cable Assembly

Figure 2. Connecting a Single-Ended Digital Waveform Generator/Analyzer to the NI SMB-2163

4. Make signal connections by connecting SMB cables to NI SMB-2163 signal terminals.

Note To ensure a solid ground connection, tighten the SMB connectors by gently snapping them into place.

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Connecting Signals

The NI SMB-2163 provides connectivity to up to 32 single-ended DIO channels, three programmable function interface (PFI) channels, and two clock channels of an NI digital waveform generator/analyzer. You can connect to these signals from the labeled SMB connectors on the NI SMB-2163.

Caution Connections that exceed any of the maximum ratings for the NI SMB-2163 or the NI digital waveform generator/analyzer can damage the device and the computer. Maximum input ratings are provided in the specifications document that shipped with the NI digital waveform generator/analyzer. NI is *not* liable for any damages resulting from such signal connections.

Figure 3 shows the pinout of the DDC connector of the accessory. Each DIO, PFI, and clock channel is connected to a corresponding pin on the NI SMB-2163.

Table 1 describes the DDC signals in the pinout.

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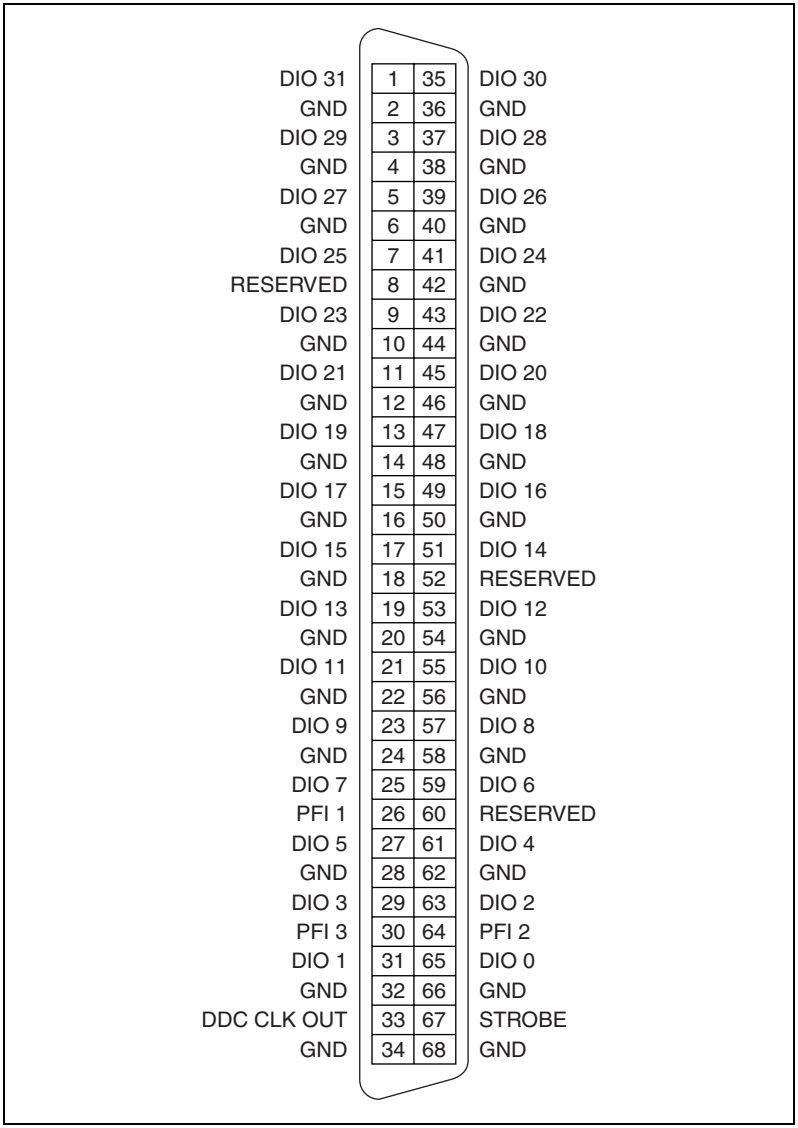


Figure 3. DDC Connector Pinout

Note Refer to the *NI Digital Waveform Generator/Analyzer Help* at **Program Files»National Instruments»NI-HSDIO»Documentation»NI Digital Waveform Generator/Analyzer Help** for information about the number of available DIO channels on your device. DIO <20..31> may not apply to your device.

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Table 1. DDC Connector Pinout Descriptions

DDC Pin	Signal Description
DIO <0..31>	Bidirectional digital data channels 0 though 31.
STROBE	External Sample clock source for pattern acquisition.
DDC CLK OUT	Exported Sample clock signal.
PFI <1..3>	Programmable function interface channels 1 through 3.
GND	Ground reference for signals.
RESERVED	These channels are reserved for system use. Do not connect signals to these channels.

Note For additional shielding, you can connect the shield ground connector on the NI SMB-2163 to earth/hard ground. This terminal is connected to the shielded enclosure ground. The shield ground lug is shown in Figure 1.

leaning the Accessory

Disconnect all cables to the NI SMB-2163 before cleaning. To remove light dust, use a soft, nonmetallic brush. To remove other contaminants, use alcohol wipes. The unit must be completely dry and free from contaminants before returning to service.

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Specifications

Digital I/O

DIO channels..... 32, single-ended

Control I/O channels ..... 5, single-ended

Typical propagation delay
through NI SMB-2163 ..... 1.2 ns

Typical channel-to-channel skew..... ±35 ps

Typical trace
characteristic impedance ..... 50 Ω

Power

Maximum voltage rating..... 5.5 V

Physical

Dimensions..... 30.5 cm × 4.5 cm × 26.5 cm
(12.0 in. × 1.77 in. × 10.43 in.)

I/O connectors ..... One 68-pin DDC connector,
37 SMB jack connectors,
one banana-style connector

CE Compliance

Refer to the regulatory statement for this product for additional compliance information. To obtain this information for this product, visit `ni.com/hardref.nsf`, search by model number or product line, and click the appropriate link in the Certification column.

Caution When connected to other test objects, this product may cause radio interference. In a residential environment, the user may be required to take adequate measures to reduce the radio interference.

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nvironmental Management

National Instruments is committed to designing and manufacturing products in an environmentally responsible manner. NI recognizes that eliminating certain hazardous substances from our products is beneficial not only to the environment but also to NI customers.

For additional environmental information, refer to the *NI and the Environment* Web page at `ni.com/environment`. This page contains the environmental regulations and directives with which NI complies, as well as other environmental information not included in this document.

Waste Electrical and Electronic Equipment (WEEE)



EU Customers At the end of their life cycle, all products *must* be sent to a WEEE recycling center. For more information about WEEE recycling centers and National Instruments WEEE initiatives, visit `ni.com/environment/weee.htm`.

电子信息产品污染控制管理办法 （中国 RoHS）



中国客户 National Instruments 符合中国电子信息产品中限制使用某些有害物质指令 (RoHS)。
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(For information about China RoHS compliance, go to `ni.com/environment/rohs_china`.)

echnical Support Resources

l Web Support

National Instruments Web support is your first stop for help in solving installation, configuration, and application problems and questions. Online problem-solving and diagnostic resources include frequently asked questions, knowledge bases, product-specific troubleshooting wizards, manuals, drivers, software updates, and more. Web support is available through the Technical Support section of `ni.com`.

Worldwide Support

National Instruments corporate headquarters is located at 11500 North Mopac Expressway, Austin, Texas, 78759-3504. National Instruments also has offices located around the world to help address your support needs. You can access our branch office Web sites from the Worldwide Offices section of `ni.com`. Branch office Web sites provide up-to-date contact information, support phone numbers, email addresses, and current events.

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Czech Republic 420 224 235 774, Denmark 45 45 76 26 00,
Finland 358 (0) 9 725 72511, France 01 57 66 24 24,
Germany 49 89 7413130, India 91 80 41190000, Israel 972 3 6393737,
Italy 39 02 41309277, Japan 0120-527196, Korea 82 02 3451 3400,
Lebanon 961 (0) 1 33 28 28, Malaysia 1800 887710,
Mexico 01 800 010 0793, Netherlands 31 (0) 348 433 466,
New Zealand 0800 553 322, Norway 47 (0) 66 90 76 60,
Poland 48 22 3390150, Portugal 351 210 311 210, Russia 7 495 783 6851,
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