# NI-9401 Getting Started





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# NI-9401 Pinout



#### Table 1. Signal Descriptions

Signal	Description
СОМ	Common reference connection to isolated ground
DIO	Digital input/output signal connection
NC	No connection

### Ports

The DIO channels are grouped in two ports, one containing channels 0, 1, 2, and 3, and one containing channels 4, 5, 6, and 7. You can independently configure each digital port in software for input or output. Note that all four channels in the port must share the same line direction.

# **Connecting a Serial Peripheral Interface Device**

You can connect a Serial Peripheral Interface (SPI) device to the NI-9401.

Figure 1. Connecting an SPI Device to the NI-9401

0		0
SS		·····
SCLK		DIO3:0
Mosi		Configured
MICO		
MISO	>\DIO4 <br </td <td>DIO7:4 Configured for Input</td>	DIO7:4 Configured for Input
SPI Device		NI-9401

# **Connecting Digital Devices**

You can connect several types of digital devices to the NI-9401.





# **Cable Requirements for EMC Compliance**

Select and install cables for the NI-9401 in accordance with the following requirements:

- Install a clamp-on ferrite bead (782803-01) on the cable that you are connecting to NI-9401.
- The clamp-on ferrite bead must be connected to the cable as close to the module as possible. Placing the ferrite elsewhere on the cable noticeably impairs its effectiveness.

Figure 3. Installing a Ferrite Bead



- 1. Installing a ferrite bead on a 25-pin DSUB cable.
- 2. Installing a ferrite bead on the cable of the terminal block.

## **Overcurrent/Short-Circuit Protection**

The overcurrent protection allows only a specified amount of current through the output channels to protect the NI-9401 from short circuits. If the NI-9401 goes into an overcurrent state, the module sets all the DIO channels to high impedance for approximately 280 ms.

When the channels are in an overcurrent state, the NI-9401 can accept new line direction configuration and output state data but cannot pass valid input data to the software.

## NI-9401 Block Diagram

The eight DIO channels are internally referenced to COM, so you can use any of the nine COM lines as a reference for the external signal.



# **Conformal Coating**

The NI-9401 is available with conformal coating for additional protection in corrosive and condensing environments, including environments with molds and dust.

In addition to the environmental specifications listed in the *NI-9401 Safety, Environmental, and Regulatory Information*, the NI-9401 with conformal coating meets the following specification for the device temperature range. To meet this specification, you must follow the appropriate setup requirements for condensing environments. Refer to *Conformal Coating and NI RIO Products* for more information about conformal coating and the setup requirements for condensing

#### environments.

Operating humidity (IEC 60068-2-30 Test Db)

80 to 100% RH, condensing

#### **Related information:**

<u>Conformal Coating and NI RIO Products</u>