NI-9871 Getting Started

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NI-9871 Hardware Overview

The NI-9871 has four independent RS485/RS422 ports that are isolated from the other modules in the system. Each port is fully compatible with the ANSI/EIA/TIA-485 standard.

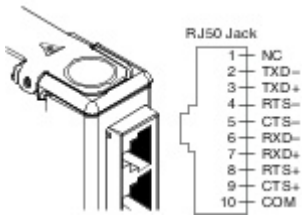
Sleep Mode (CompactRIO Only)

You can enable sleep mode for the CompactRIO system in software. In sleep mode, the system consumes less power and may dissipate less heat. Typically, when a system is in sleep mode, you cannot communicate with the modules. Refer to the ***Specifications*** for more information about power consumption and thermal dissipation.

NI-9871 Pinout

The NI-9871 has four RJ-50 receptacles that provide connections for four RS485/RS422 devices.

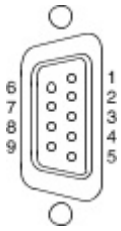
Table 1. RS485/RS422 Port Pinout

	RJ-50 Pin	Signal Name*
	1	No Connect
	2	TXD-
	3	TXD+
	4	RTS-
	5	CTS-
	6	RXD-
	7	RXD+
	8	RTS+

	RJ-50 Pin	Signal Name*
	9	CTS+
	10	GND
*These signals are shared by all four RJ-50 connectors on the NI-9871.		

The cables included with your kit convert the RJ-50 pinout to the standard NI pinout on a DB-9 male connector, as shown in Table 2.

Table 2. Pin Assignments for RS485/RS422 DB-9 Male Connector

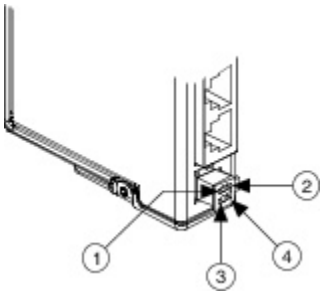
Connector	RJ-50 Pin	Signal Name
	1	GND
	2	CTS+
	3	RTS+
	4	RXD+
	5	RXD-
	6	CTS-
	7	RTS-
	8	TXD+
	9	TXD-

Wiring the NI-9871

You must connect an external power supply to the NI-9871. This power supply provides the power for the RS485/RS422 transceivers on the module. You can use the included female four-position pigtail to connect to an external voltage source. Figure 1 lists the connections between an external voltage source (of +8 V to +28 V) and the NI-9871.

Caution To ensure the specified EMC performance, do not connect the power input to a DC mains supply or to any supply requiring a connecting cable longer than 30 m (100 ft). A DC mains supply is a local DC electricity supply network in the infrastructure of a certain site or building.

Figure 1. Four-Position External Power Connector



1. V sup
2. V sup
3. COM
4. COM

Figure 2 shows the method of power connection to the NI-9871 module. Attach an isolated power supply to the V_{SUP} and COM terminals using the included pigtail.

Figure 2. Powering the NI-9871 from an Isolated Power Source

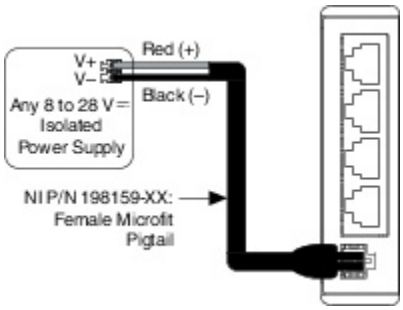
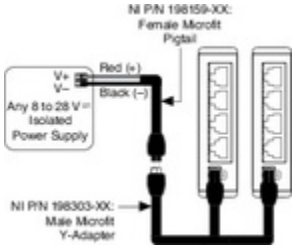


Figure 3 shows how to use the optional Y-adapter (available at ni.com/serial) to connect power to more than one module using the same power source. One Y-adapter is needed for each additional module. Ensure that the power supply can handle maximum power requirements for all modules connected.

Caution Make all connections before applying power.

Figure 3. Powering Multiple Modules from a Single Power Supply



RS485 Bus Topology and Termination

Refer to Figure 4 and Figure 5 for an overview of 4-wire and 2-wire RS485 bus topologies and termination.

Figure 4. 4-Wire Full-Duplex Multidrop Network Using Terminating Resistors

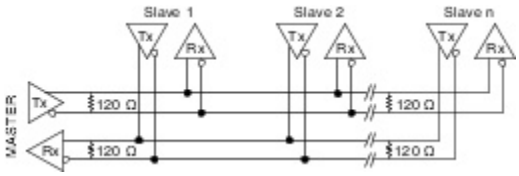
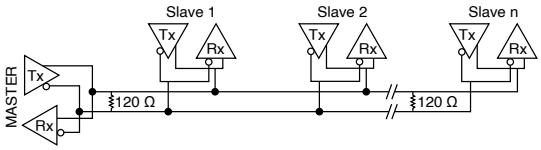


Figure 5. 2-Wire Multidrop Network Using Terminating Resistors



The driver directly supports 4-wire full-duplex operation on peer-to-peer RS-485 networks. Multidrop RS-485 networks require additional software development.

RS485 terminators are available at ni.com/serial.

RS485 Transceiver Control

Refer to Table 3 for a listing of TX and RX enable conditions for the different RS485 transceiver control modes.

Table 3. Transceiver Control Pin Conditions

Enable	4-Wire	2-Wire		
		DTR/Echo	DTR/No Echo	Auto
TX	On	DTR	DTR	TX
RX	On	On	DTR#	TX#

Conformal Coating

The NI-9871 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-9871 Safety, Environmental, and Regulatory Information***, the NI-9871 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:

- Conformal Coating and NI RIO Products