NI-9866 Getting Started

2022-07-06

Contents

Overview

This document explains how to connect to the NI-9866.

Note Before you begin, read the **NI-9866 Safety, Environmental, and Regulatory Information** document on ni.com/manuals and complete the software and hardware installation procedures in your chassis documentation.

Note The guidelines in this document are specific to the NI-9866. The other components in the system might not meet the same safety ratings. Refer to the documentation for each component in the system to determine the safety and EMC ratings for the entire system.

Safety Guidelines

Caution Observe all instructions and cautions in the user documentation. Using the product in a manner not specified can damage the product and compromise the built-in safety protection.

Attention Suivez toutes les instructions et respectez toutes les mises en garde de la documentation d'utilisation. L'utilisation du produit de toute autre façon que celle spécifiée risque de l'endommager et de compromettre la protection de sécurité intégrée.

Safety Guidelines for Hazardous Locations

The NI-9866 is suitable for use in Class I, Division 2, Groups A, B, C, D, T4 hazardous locations; Class I, Zone 2, AEx nA IIC T4 Gc and Ex nA IIC T4 hazardous locations; and nonhazardous locations only. Follow these guidelines if you are installing the NI-9866 in a potentially explosive environment. Not following these guidelines may result in serious injury or death.

Caution Do not disconnect I/O-side wires or connectors unless power has been switched off or the area is known to be nonhazardous.

Caution Do not remove modules unless power has been switched off or the area is known to be nonhazardous.

Caution Substitution of components may impair suitability for Class I, Division 2, or Zone 2.

Caution The system must be installed in an enclosure certified for the intended hazardous (classified) location, having a tool secured cover/door, where a minimum protection of at least IP54 is provided.

Special Conditions for Hazardous Locations Use in Europe and Internationally

The NI-9866 has been evaluated as Ex nA IIC T4 Gc equipment under DEMKO 07ATEX 0626664X and is IECEx UL 14.0089X certified. Each NI-9866 is marked ⟨Ex⟩ II 3G and is suitable for use in Zone 2 hazardous locations, in ambient temperatures of -40 °C ≤ Ta ≤ 70 °C. If you are using the NI-9866 in Gas Group IIC hazardous locations, you must use the device in an NI chassis that has been evaluated as Ex nC IIC T4, Ex IIC T4, Ex nA IIC T4, or Ex nL IIC T4 equipment.

Caution Transient protection shall be provided that is set at a level not exceeding 140% of the peak rated voltage value of 85 V at the supply terminals to the equipment.

Caution The system shall only be used in an area of not more than Pollution Degree 2, as defined in IEC/EN 60664-1.

Caution The system shall be mounted in an ATEX/IECEx-certified enclosure with a minimum ingress protection rating of at least IP54 as defined in IEC/EN 60079-15.

Caution The enclosure must have a door or cover accessible only by the use of a tool.

Wiring the NI 9866

The NI-9866 has one 9-pin male D-Sub connector that provides connections to a LIN bus.

The port has two common pins (COM) that are internally connected to the module's isolated reference and serve as the reference ground for LIN signal. You can connect the LIN bus reference ground to one or both COM pins. The port also has an optional shield pin, SHLD, that you can connect to a shielded LIN cable. Connecting SHLD may improve signal integrity and EMC performance in a noisy environment.

Caution You must use a UL listed ITE power supply marked LPS with the NI-9866.

The NI-9866 requires an external power supply of +8 to +18 V to operate. Supply power to the NI-9866 V_{SUP} pin from the LIN bus.

Note Power on V_{SUP} is required for LIN operation.

The NI-9866 pinout is listed in Table 1.

Connector	Pin	Signal Name
	1	No Connection (NC)
	2	NC
	3	COM
	4	NC
	5	SHLD
	6	COM

Connector	Pin	Signal Name
	7	LIN
	8	NC
	9	V_{SUP}

Table 1. Pin Assignments for the NI-9866

Cabling Requirements for the NI 9866

This section deals with cabling specifications, termination resistors, cable lengths, and the number of LIN nodes that can exist in a system.

Cable Specifications

LIN cables should meet the physical medium requirement of a bus RC time constant of 5 µs. For detailed formulas for calculating this value, refer to the **Line Characteristics** section of the LIN specification. Belden cable (3084A) and other unterminated CAN/Serial quality cables meet these requirements and should be suitable for most applications.

Cable Lengths

The maximum allowable cable length is 40 m, per the LIN specification.

Number of LIN Devices

The maximum number of devices on a LIN bus is 16, per the LIN specification.

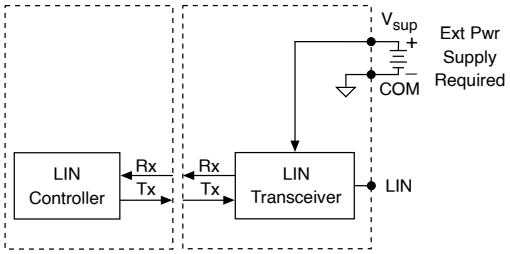
Termination Resistors

LIN cables require no termination, as nodes are terminated at the transceiver. Slave nodes typically are pulled up from the LIN bus to VBat with a 30 kΩ resistance and a serial diode. This termination usually is integrated into the transceiver package. The master node requires a 1 kΩ resistor and serial diode between the LIN bus and VBat. On NI-XNET LIN products, master termination is software selectable; you can enable it in the API with the NI-XNET Session Interface:LIN:Termination property.

NI 9866 Hardware Overview

The NI-9866 has one full-featured LIN port that is isolated from the other modules in the system. The port has a LIN controller that is fully compliant with the LIN 1.3/2.0/2.1/2.2 Specification. The port also has an NXP TJA1028 LIN transceiver that is fully compatible with the LIN 1.3/2.0/2.1/2.2 and SAE J2602 standard and supports baud rates up to 20 kbps.

Figure 1. NI-9866 Hardware Overview



NI-9866 Specifications

The following specifications are typical for the range -40 °C to 70 °C unless otherwise noted.

LIN Characteristics

Transceiver	NXP TJA1028
Max baud rate	20 kbps
LIN bus lines voltage	-40 to +40 VDC
Supply voltage range (V_{SUP})	+8 to +18 VDC normal operation, -0.3 to +40 V absolute limits
MTBF	Contact NI for Bellcore MTBF or MIL-HDBK-217F specifications

Power Requirements

Power consumption from chassis	1 W maximum (active mode)
Thermal dissipation (at 70 °C)	1.25 W maximum (active mode)

Physical Characteristics

Dimensions	Visit ni.com/dimensions and search by module number.
Weight	Approx. 144 g (5.0 oz)

Safety Voltages

Connect only the voltages that are within these limits:

Supply voltage range (Vsup)	+8 V DC to +18 V DC

Maximum voltage

Port-to-COM	-40 V DC to +40 V DC maximum, Measurement Category I

Isolation

Port-to-earth ground

Withstand	1,000 V RMS, verified by a 5 s dielectric withstand test
Continuous	60 V DC, Measurement Category I

Safety Compliance and Hazardous Locations Standards

This product is designed to meet the requirements of the following electrical equipment safety standards for measurement, control, and laboratory use:

- IEC 61010-1, EN 61010-1
- UL 61010-1, CSA C22.2 No. 61010-1
- EN 60079-0, EN 60079-7
- IEC 60079-0, IEC 60079-7
- UL 60079-0, UL 60079-7
- CSA C22.2 No. 60079-0, CSA C22.2 No. 60079-7

Note For safety certifications, refer to the product label or the Product Certifications and Declarations section.

Hazardous Locations

U.S. (UL)	Class I, Division 2, Groups A, B, C, D, T4; Class I, Zone 2, AEx nA IIC T4 Gc
Canada (C-UL)	Class I, Division 2, Groups A, B, C, D, T4; Class I, Zone 2, Ex nA IIC T4
Europe (DEMKO)	Ex nA IIC T4 Gc

Environmental

Refer to the manual for the chassis you are using for more information about meeting these specifications.

Operating temperature (IEC 60068-2-1, IEC 60068-2-2)	-40 °C to 70 °C
Storage temperature (IEC 60068-2-1, IEC 60068-2-2)	-40 °C to 85 °C
Ingress protection	IP40
Operating humidity (IEC 60068-2-30)	10% RH to 90% RH, noncondensing
Storage humidity (IEC 60068-2-30)	5% RH to 95% RH, noncondensing
Pollution Degree	2
Maximum altitude	2,000 m

Indoor use only.

Shock and Vibration

To meet these specifications, you must panel mount the system.

Operating vibration	
Random	5 g RMS, 10 Hz to 500 Hz
Sinusoidal	5 g, 10 Hz to 500 Hz

Operating shock	30 g, 11 ms half sine; 50 g, 3 ms half sine; 18 shocks at 6 orientations

Electromagnetic Compatibility

This product meets the requirements of the following EMC standards for electrical equipment for measurement, control, and laboratory use:

- EN 61326 (IEC 61326): Class A emissions; Basic immunity
- EN 55011 (CISPR 11): Group 1, Class A emissions
- AS/NZS CISPR 11: Group 1, Class A emissions
- FCC 47 CFR Part 15B: Class A emissions
- ICES-001: Class A emissions

Note For the standards applied to assess the EMC of this product, refer to the **Online Product Certification** section.

Note For EMC compliance, operate this product according to the documentation.

CE Compliance CE

- 2014/34/EU; Potentially Explosive Atmospheres (ATEX)

Product Certifications and Declarations

Refer to the product Declaration of Conformity (DoC) for additional regulatory compliance information. To obtain product certifications and the DoC for NI products, visit ni.com/product-certifications, search by model number, and click the appropriate link.

Environmental Management

NI is committed to designing and manufacturing products in an environmentally responsible manner. NI recognizes that eliminating certain hazardous substances from our products is beneficial to the environment and to NI customers.

For additional environmental information, refer to the **Engineering a Healthy Planet** 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.

EU and UK Customers

- Waste Electrical and Electronic Equipment (WEEE)—At the end of the product life cycle, all NI products must be disposed of according to local laws and regulations. For more information about how to recycle NI products in your region, visit ni.com/environment/weee.

电子信息产品污染控制管理办法（中国 RoHS）

- 中国 RoHS— NI 符合中国电子信息产品中限制使用某些有害物质指令 (RoHS)。关于 NI 中国 RoHS 合规性信息，请登录 ni.com/environment/rohs_china。(For information about China RoHS compliance, go to ni.com/environment/rohs_china.)

NI Services

Visit ni.com/support to find support resources including documentation, downloads, and troubleshooting and application development self-help such as tutorials and examples.

Visit ni.com/services to learn about NI service offerings such as calibration options, repair, and replacement.

Visit ni.com/register to register your NI product. Product registration facilitates technical support and ensures that you receive important information updates from NI.

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