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cRIO-9046

SAFETY, ENVIRONMENTAL, AND REGULATORY INFORMATION

cRIO-9046

1.30 GHz Dual-Core CPU, 2 GB DRAM, 4 GB Storage, Kintex-7 70T FPGA, Extended Temperature, 8-Slot CompactRIO Controller

Read this document and the documents listed in the additional resources section about installation, configuration, and operation of this equipment before you install, configure, operate, or maintain this product. Users are required to familiarize themselves with installation and wiring instructions in addition to requirements of all applicable codes, laws, and standards.

Regulatory Icons



Notice—Take precautions to avoid data loss, loss of signal integrity, degradation of performance, or damage to the model.



Caution—Take precautions to avoid injury. Consult the model documentation for cautionary statements when you see this icon printed on the model. Cautionary statements are localized into French for C-UL certification.



Warning—Take precautions to avoid electrical shock.



Hot Surface—Take precautions to avoid physical burns.



ESD Sensitive—Take precautions to avoid damaging the model with electrostatic discharge.

Safety




Caution Observe all instructions and cautions in the user documentation. Using the model in a manner not specified can damage the model and compromise the built-in safety protection. Return damaged models to NI for repair.



Attention Suivez toutes les instructions et respectez toutes les mises en garde de la documentation utilisateur. L'utilisation d'un modèle de toute autre façon que celle spécifiée risque de l'endommager et de compromettre la protection de sécurité intégrée. Renvoyez les modèles endommagés à NI pour réparation.

Safety Guidelines for Hazardous Locations

The cRIO-9046 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 Gc hazardous locations; and nonhazardous locations only. Follow these guidelines if you are installing the cRIO-9046 in a potentially explosive environment. Not following these guidelines may result in serious injury or death. The cRIO-9046 has been evaluated as Ex nA IIC T4 Gc compliant with the DEMKO 12 ATEX 1202658X directive and is IECEx UL 14.0089X certified. Each device is marked  II 3G and is suitable for use in Zone 2 hazardous locations, in ambient temperatures of $-40\text{ }^{\circ}\text{C} \leq T_a \leq 70\text{ }^{\circ}\text{C}$.

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; Ex nA IIC T4 Gc

Europe (ATEX) and International (IECEx)

Ex nA IIC T4 Gc

Cautions for Hazardous Locations



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



Attention Ne déconnectez les fils d'alimentation, les fils côté E/S et les connecteurs du contrôleur que s'il est hors tension ou que vous savez que l'endroit n'est pas dangereux.




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





Attention Ne retirez les modules que s'ils sont hors tension ou que vous savez que l'endroit n'est pas dangereux.





Caution Substitution of components may impair suitability for use in explosive atmospheres.


 **Attention** Si des composants sont substitués, le système risque de ne plus être conforme pour une utilisation dans une atmosphère explosive.


 **Caution** For use in explosive atmospheres, install the system in an enclosure rated to at least IP54 as defined by IEC/EN 60079-15.

 **Attention** Pour une utilisation dans une atmosphère explosive, installez le système dans une enceinte certifiée au moins IP54 selon la définition de la norme IEC/EN 60079-15.

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

 **Attention** Le système ne doit être utilisé que dans des endroits ne dépassant pas le degré de pollution 2 défini dans la norme IEC/EN 60664-1.

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

 **Attention** La protection contre les phénomènes transitoires doit être fournie à un niveau ne dépassant pas 140 % de la valeur de la tension nominale de crête aux bornes d'alimentation de l'équipement.

Safety Voltages

Connect only voltages that are below these limits.

V1 terminal to C terminal	30 V, maximum
V2 terminal to C terminal	30 V, maximum
Chassis ground to C terminal	30 V, maximum


EMC Guidelines


This product was tested and complies with the regulatory requirements and limits for electromagnetic compatibility (EMC) stated in the product specifications. These requirements and limits provide reasonable protection against harmful interference when the product is operated in the intended operational electromagnetic environment.


This product is intended for use in industrial locations. However, harmful interference may occur in some installations, when the product is connected to a peripheral device or test object, or if the product is used in residential or commercial areas. To minimize interference with radio and television reception and prevent unacceptable performance degradation, install and use this product in strict accordance with the instructions in the product documentation.


Furthermore, any changes or modifications to the product not expressly approved by National Instruments could void your authority to operate it under your local regulatory rules.


EMC Notices


 **Notice** Operate this product only with shielded cables and accessories. Do not use unshielded cables or accessories unless they are installed in a shielded enclosure with properly designed and shielded input/output ports and connected to the product using a shielded cable. If unshielded cables or accessories are not properly installed and shielded, the EMC specifications for the product are no longer guaranteed.


 **Notice** You must use an isolated cable with the RS-485 serial port, such as NI part number 184428-01.


 **Notice** The length of any cable connected to the video and V2 ports must be no longer than 3 m (10 ft). The length of any cable connected to the RS-232 and RS-485 ports must be no longer than 30 m (100 ft). The length of any cable connected to the USB host ports must be no longer than 5 m (16 ft).


 **Notice** Product installation requires either special considerations or user-installed, add-on devices. See the product installation instructions for further information.


 **Notice** Install snap-on, ferrite bead(s) (National Instruments part number 781233-01) in accordance with the product installation instructions.

 **Notice** The performance of this product can be disrupted if subjected to Electrostatic Discharge (ESD) during operation. To prevent damage, industry-standard ESD prevention measures must be employed during installation, maintenance, and operation.

 **Notice** This product may become more sensitive to electromagnetic disturbances in the operational environment when test leads are attached or when connected to a test object.

 **Notice** If you use shielded cabling to connect to a C Series module with a plastic connector, you must attach the cable shield to the chassis grounding terminal using 1.3 mm² (16 AWG) or larger wire. Attach a ring lug to the wire and attach the wire to the chassis grounding terminal. Solder the other end of the wire to the cable shield. Use shorter wire for better EMC performance.

 **Notice** Do not connect V2 to a DC Mains supply or to any supply that requires a connecting cable longer than 3 m (10 ft). A DC Mains supply is a local DC electricity supply network in the infrastructure of a site or building. V1 may be connected to DC Mains.

 **Notice** Do not tighten or loosen the terminal screws on the power connector while the cRIO-9046 is powered on.

Special Conditions for Marine Applications

Some products are approved for marine (shipboard) applications. To verify marine approval certification for a product, visit ni.com/certification and search for the certificate.

! **Note** In order to meet the EMC requirements for marine applications, install the product in a shielded enclosure with shielded and/or filtered power and input/output ports. In addition, take precautions when designing, selecting, and installing measurement probes and cables to ensure that the desired EMC performance is attained.

Power Requirements

📄 Note Some C Series modules have additional power requirements. For more information about C Series module power requirements, refer to the C Series module(s) documentation.

📄 Note Sleep mode for C Series modules is not supported in Real-Time (DAQmx) Mode.

Voltage input range (measured at the cRIO-9046 power connector)

V1	9 V to 30 V
V2	9 V to 30 V
Maximum power consumption	60 W

📄 Note The C terminal of the power connector is functionally isolated from chassis ground to prevent ground loops, but does not meet IEC 61010-1 for safety isolation

📄 Note The maximum power consumption specification is based on a fully populated system running a high-stress application at elevated ambient temperature and with all C Series modules and USB devices consuming the maximum allowed power.

Typical standby power consumption	3.4 W at 24 V DC input
Recommended power supply	100 W, 24 V DC
Typical leakage current from secondary power input (V2) while system is powered from primary power input (V1)	
At 9 V	0.4 mA
At 30 V	1.93 mA

! **Note** Do not connect V2 to a DC Mains supply or to any supply that requires a connecting cable longer than 3 m (10 ft). A DC Mains supply is a local DC electricity supply network in the infrastructure of a site or building. V1 may be connected to DC Mains.

! **Note** Include a switch or circuit breaker in the installation to disconnect the system from DC Mains. The switch or circuit breaker must be suitably rated, accessible, and marked as the disconnecting device for the system.

EMC ratings for inputs as described in IEC 61000

V1	Short lines, long lines, and DC distributed networks
V2	Short lines only
Power input connector	4-position, 3.5 mm pitch, pluggable screw terminal with screw locks, Sauro CTF04BV8-AN000A

Physical Characteristics

Weight (unloaded)	2,250 g (4 lbs, 15 oz)
Dimensions (unloaded)	328.8 mm × 88.1 mm × 121.2 mm (12.94 in. × 3.47 in. × 4.77 in.)
Power connector wiring	
Gauge	0.5 mm ² to 2.1 mm ² (20 AWG to 14 AWG) copper conductor wire
Wire strip length	6 mm (0.24 in.) of insulation stripped from the end
Temperature rating	85 °C
Torque for screw terminals	0.20 N · m to 0.25 N · m (1.8 lb · in. to 2.2 lb · in.)
Wires per screw terminal	One wire per screw terminal
Connector securement	
Securement type	Screw flanges provided
Torque for screw flanges	0.20 N · m to 0.25 N · m (1.8 lb · in. to 2.2 lb · in.)
Insulation rating	300 V, maximum

Maintenance

If you need to clean the cRIO-9046, wipe it with a dry towel.

Environmental

This product was tested in accordance with IEC 60068-2.

Temperature

Operating	-40 °C to 70 °C
Storage	-40 °C to 85 °C
Ingress protection	IP20
Operating humidity	10% RH to 90% RH, noncondensing
Storage humidity	5% RH to 95% RH, noncondensing
Pollution Degree	2
Maximum altitude	5,000 m


Indoor use only.

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 *Minimize Our Environmental Impact* 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 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.

Battery Replacement and Disposal

 **Battery Directive** This device contains a long-life coin cell battery. If you need to replace it, use the Return Material Authorization (RMA) process or contact an authorized National Instruments service representative. For more information about compliance with the EU Battery Directive 2006/66/EC about Batteries and Accumulators and Waste Batteries and Accumulators, visit ni.com/environment/batterydirective.

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)。关于 National Instruments 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.)

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; Ex nA IIC T4 Gc
Europe (ATEX) and International (IECEX)	Ex nA IIC T4 Gc

Shock and Vibration

To meet these specifications, you must mount the cRIO-9046 system directly on a flat, rigid surface as described in the user manual, affix ferrules to the ends of the terminal wires, and use retention accessories for the USB 2.0 host port (NI USB Extender Cable, 152166-xx), USB type-C ports (NI Locking USB Cables, 143556-xx; NI USB Extender Cable, 143555-xx; NI USB Display Adapters, 143557-xx or 143558-xx). All cabling should be strain-relieved near input connectors. Take care to not directionally bias cable connectors within input connectors when applying strain relief.

This product was tested in accordance with IEC 60068-2.


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

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 60079-0:2012, EN 60079-15:2010
- IEC 60079-0: Ed 6, IEC 60079-15; Ed 4
- UL 60079-0; Ed 6, UL 60079-15; Ed 4
- CSA C22.2 No. 60079-0, CSA C22.2 No. 60079-15


 **Note** For UL and other safety certifications, refer to the product label or the [Product Certifications and Declarations](#) section.


Electromagnetic Compatibility

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

- EN 61326-1 (IEC 61326-1): Class A emissions; Industrial 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** In the United States (per FCC 47 CFR), Class A equipment is intended for use in commercial, light-industrial, and heavy-industrial locations. In Europe, Canada, Australia and New Zealand (per CISPR 11) Class A equipment is intended for use only in heavy-industrial locations.

 **Note** Group 1 equipment (per CISPR 11) is any industrial, scientific, or medical equipment that does not intentionally generate radio frequency energy for the treatment of material or inspection/analysis purposes.

 **Notice** For EMC declarations and certifications, and additional information, refer to the [Product Certifications and Declarations](#) section.

CE Compliance

This product meets the essential requirements of applicable European Directives, as follows:

- 2014/35/EU; Low-Voltage Directive (safety)
- 2014/30/EU; Electromagnetic Compatibility Directive (EMC)
- 2014/34/EU; Potentially Explosive Atmospheres (ATEX)

Export Compliance

This product is subject to control under the U.S. Export Administration Regulations (15 CFR Part 730 et. seq.) administered by the U.S. Department of Commerce's Bureau of Industry and Security ("BIS") (www.bis.doc.gov) and other applicable U.S. export control laws and sanctions regulations. This product may also be subject to additional license requirements of other countries' regulations such as the European Union Council Regulations No. 428/2009, the Malaysia Strategic Trade Act, and so forth.

Additionally, this product may also require export licensing before being returned to National Instruments. The issuance of a Return Material Authorization ("RMA") by National Instruments does not constitute export authorization. The user must comply with all applicable export laws prior to exporting or re-exporting this product. See ni.com/legal/export-compliance for more information and to request relevant import classification codes (e.g. HTS), export classification codes (e.g. ECCN), and other import/export data.

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/certification, search by model number or product line, and click the appropriate link in the Certification column.

Additional Resources

Visit ni.com/manuals for more information about the cRIO-9046, including specifications, pinouts, and instructions for connecting, installing, and configuring your system.

Worldwide Support and Services

The NI website is your complete resource for technical support. At ni.com/support, you have access to everything from troubleshooting and application development self-help resources to email and phone assistance from NI Application Engineers.

Visit ni.com/services for information about the services NI offers.

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

A Declaration of Conformity (DoC) is our claim of compliance with the Council of the European Communities using the manufacturer's declaration of conformity. This system affords the user protection for electromagnetic compatibility (EMC) and product safety. You can obtain the DoC for your product by visiting ni.com/certification. If your product supports calibration, you can obtain the calibration certificate for your product at ni.com/calibration.

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