

**Ordering Information**

For user manuals and dimensional drawings, visit the product page resources tab on ni.com.

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## CompactDAQ Controllers

### cDAQ-913x



- Intel processor with options for dual-core or quad-core Atom, Core i7, or Celeron
- Up to 32 GB onboard nonvolatile storage and SDHC storage
- More than 60 hot-swappable I/O modules with integrated signal conditioning
- USB, Gigabit Ethernet, serial, MXI-Express, and CAN/LIN for connectivity
- Ultra-rugged options with -40 °C to 70 °C operating temperatures
- Measure in minutes with NI-DAQmx software and automatic code generation using the DAQ Assistant
- 4 general-purpose 32-bit counter/timers built into the chassis (access through digital module)

### Overview

High-performance cDAQ-913x controllers include Intel processing and up to 32 GB nonvolatile storage in a rugged enclosure for advanced data-logging and embedded monitoring applications. You have the option to use a Microsoft Windows Embedded Standard 7 (WES7) or a real-time OS. Choose WES7 on a cDAQ-913x to take advantage of the extensive Windows ecosystem of software and display capabilities made possible by LabVIEW software. LabVIEW Real-Time, which is recommended for long-term reliability, uses a local display with the NI Linux Real-Time OS (on the cDAQ-9132/9133/9134/9135/9136/9137 controllers). A high-performance cDAQ-913x controller also offers a wide array of standard connectivity and expansion options, including USB, Ethernet, serial, MXI-Express, CAN/LIN, trigger input, and Mini DisplayPort or VGA display output. Check the product and driver documentation for OS-specific expansion capabilities. Combine a cDAQ-913x with up to eight NI C Series I/O modules for a custom analog input, analog output, digital I/O, counter/timer, and CAN measurement and logging system. Modules are available for a variety of sensor measurements including thermocouples, resistance temperature detectors (RTDs), strain gages, load and pressure transducers, torque cells, accelerometers, flow meters, and microphones. CompactDAQ systems combine sensor measurements with voltage, current, and digital signals to create custom, mixed-measurement systems within a single system. The cDAQ-913x controllers have four 32-bit general-purpose counter/timers built in. You can access these counters through an installed, hardware-timed digital module such as the NI 9401 or NI 9402 for applications that involve quadrature encoders, PWM, event counting, pulse train generation, and period or frequency measurement.

[Back to Top](#)

### Comparison Tables

Model	I/O Module Slots	Processor	Operating Temp	Storage	Built-in Connectivity
cDAQ-9132	4	1.33 GHz Dual-Core Atom	-20 °C to 55 °C	16 GB and Removable SDHC	2 USB, 2 GigE, Trigger, RS232
cDAQ-9133	8	1.33 GHz Dual-Core Atom	-20 °C to 55 °C	16 GB and Removable SDHC	2 USB, 2 GigE, Trigger, RS232
cDAQ-9134	4	1.33 GHz Dual-Core Atom	-40 °C to 70 °C	32 GB and Removable SDHC	2 USB, 2 GigE, Trigger, RS232, CAN/LIN
cDAQ-9135	8	1.33 GHz Dual-Core Atom	-40 °C to 70 °C	32 GB and Removable SDHC	2 USB, 2 GigE, Trigger, RS232, CAN/LIN
cDAQ-9136	4	1.91 GHz Quad-Core Atom	-20 °C to 55 °C	32 GB and Removable SDHC	
cDAQ-9137	8	1.91 GHz Quad-Core Atom	-20 °C to 55 °C	32 GB and Removable SDHC	
cDAQ-9138	8	1.06 GHz Celeron	0 °C to 55 °C	32 GB Onboard	4 USB, 2 GigE, RS232, RS485, MXI-Express
cDAQ-9139	8	1.33 GHz Core i7	0 °C to 55 °C	32 GB Onboard	4 USB, 2 GigE, RS232, RS485, MXI-Express

[Back to Top](#)

### Application and Technology

## Multicore Processing

CompactDAQ controllers feature an Intel processor for intense processing tasks. With multicore processors, you can execute independent tasks, or threads, simultaneously to drastically reduce the time required to perform operations. LabVIEW makes it easy to develop an application that takes advantage of this multicore technology by automatically dividing each operation into multiple threads. The complex task of thread management within the processor is transparently built into graphical



programming.

Figure 1. cDAQ-9135 System

### Embedded OSs

Both Windows Embedded Standard 7 (WES7) and LabVIEW Real-Time have features and properties that make them a good choice for tasks requiring extended operation. WES7 also gives you the ability to use the extensive Windows software ecosystem and the LabVIEW for Windows platform. Additionally, you can use the built-in VGA or Mini DisplayPort output to implement your user interface, which reduces system costs and maintenance requirements by eliminating the need for a dedicated user interface computer. LabVIEW Real-Time components have been reduced to the minimum number required, which decreases the probability of system failure due to crashes and other unforeseen problems. LabVIEW Real-Time also has features such as the Reliance file system and watchdog timers that further ensure application reliability over an extended period of time.

### Rugged Design to Deploy Anywhere

CompactDAQ controllers have been built to fully integrate DAQ, signal conditioning, multicore processing, and data storage in a single, rugged mechanical enclosure that helps reduce integration cost and complexity. Some controllers are designed to operate in temperatures from  $-40^{\circ}\text{C}$  to  $70^{\circ}\text{C}$  and survive up to 50 g of shock and 5 g of vibration. These controllers are also certified for Class 1, Div 2 environments, so you can put them close to the measurements you need and reduce sensor wiring.

### Mix Analog, Digital, and Sensor Measurements in the Same System

Many devices can measure temperature, voltage, or bridge-based sensors, but CompactDAQ can integrate all of these measurements and more into a single device. You have more than 60 C Series modules to choose from for different measurements including thermocouples, voltage, RTDs, current, resistance, strain, digital (TTL and other), accelerometers, microphones, and CAN. Channel counts on the individual modules range from one to 32 channels to accommodate a wide range of system requirements. C Series modules combine signal conditioning, connectivity, and DAQ in a small module for each specific measurement type. You can insert these modules in any of the C Series chassis to create a variety of systems. With CompactDAQ, you have one modular system, and, if you run into any problems with the measurements or equipment, you can contact award-winning NI support engineers for all your instrumentation needs.



Figure 2. C Series I/O Modules

### Multiple Timing Engines to Acquire From Different Modules at Different Rates

With CompactDAQ controllers, you can install a thermocouple module next to an accelerometer measurement module and acquire from both simultaneously at different rates. Each controller has multiple analog input timing engines, which means you can group all of your analog input modules in up to three sets of modules. These sets, known as tasks, can all run at different rates because each one has its own timing engine in the chassis backplane. This alleviates the need to decimate or parse lower speed data from the higher speed data.



Figure 3. Run analog input modules at different rates with multiple AI timing engines.

#### Four 32-Bit General-Purpose Counters Built In

CompactDAQ controllers have four 32-bit counters built in. You access these counters through an installed hardware-timed digital I/O module (sold separately) such as the NI 9401 or NI 9402. Once you have installed the digital module, you can create a counter task in software for operations such as quadrature encoder, period and frequency measurement, or finite pulse train and PWM generation.

#### I/O Expansion

CompactDAQ controllers provide up to eight slots of integrated C Series I/O capacity that you can increase with various C Series I/O expansion options. The CompactDAQ platform includes chassis that can stream directly to CompactDAQ controllers with USB, Ethernet (Windows only), and wireless options. With these expansion methods, you can incorporate any combination of over 60 measurement-specific C Series I/O modules. With this wide selection of measurement modules, you can tailor your system to meet your specific application requirements.

#### Solid-State Data Storage

CompactDAQ controllers include a solid-state drive (SSD) that uses solid-state memory to store nonvolatile data. Because these drives do not have any moving parts, they offer a significantly reduced risk of mechanical failure, resulting in improved system reliability. They can also withstand extreme shock, high altitude and vibration, and other harsh operation environments. In addition to better tolerance for harsh operating environments and increased reliability, SSDs deliver shorter application load times and overall test-time savings due to faster file I/O.

#### Flexible Software Options

NI ships CompactDAQ and every other NI DAQ device with a driver kit that includes the following:

- Measurement & Automation Explorer (MAX)—This configuration utility is for quick measurement debugging or system diagnostic test via the device self-test.
- NI-DAQmx—Driver and API for all NI DAQ devices. This installer includes interfaces to LabVIEW, ANSI C/C++, C#, Visual Basic .NET, and hundreds of example programs for LabVIEW and text-based languages.
- SignalExpress LE—With configuration-based data logging, you can get up and running out of the box without programming. Using SignalExpress LE, you can acquire data from the hardware, build a custom user interface, and log data to Technical Data Management Streaming (TDMS) files or to Microsoft Excel for graphing and post-processing. SignalExpress is available for purchase and includes analysis and processing blocks for use within the data-logging environment.

Windows-based CompactDAQ controllers also are shipped with the latest LabVIEW Evaluation version and applicable hardware drivers preinstalled, so you can get to your first measurements faster than ever before.

[Back to Top](#)

## Ordering Information

For a complete list of accessories, visit the product page on ni.com.

Products	Part Number	Recommended Accessories	Part Number
<b>Accessories</b>			
Panel Mounting Kit (9132/34 Only)	157253-01	No accessories required.	
NI 9977 C Series Filler Module for Empty Slot	196917-01	No accessories required.	
NI PS-15 Power Supply, 24 VDC, 5A, 100-120/200-240 VAC Input	781093-01	No accessories required.	
DIN Rail Mounting Kit (9138/39 Only)	781989-01	No accessories required.	
Panel Mounting Kit (9138/39 Only)	781919-01	No accessories required.	
CAN Transceiver Cable, HS/FD (9134 Only)	783699-01	No accessories required.	
CAN Transceiver Cable, LIN (9134 Only)	783702-01	No accessories required.	
Desktop Mounting Kit (9138/39 Only)	781988-01	No accessories required.	
DIN Rail Mounting Kit (9132/34 Only)	157254-01	No accessories required.	
<b>CompactDAQ Controller</b>			
NI cDAQ-9138, Celeron, Windows	782323-01	No accessories required.	
NI cDAQ-9139, Core i7, Windows	782325-01	No accessories required.	
NI cDAQ-9139, Core i7, Real-Time	782326-01	No accessories required.	
NI cDAQ-9132, Atom, Windows	783338-01	No accessories required.	
NI cDAQ-9132, Atom, Real-Time	783339-01	No accessories required.	
NI cDAQ-9134, Atom, Windows	783340-01	No accessories required.	
NI cDAQ-9134, Atom, Real-Time	783341-01	No accessories required.	
NI cDAQ-9138, Celeron, Real-Time	782324-01	No accessories required.	

[Back to Top](#)

## Support and Services

### System Assurance Programs

NI system assurance programs are designed to make it even easier for you to own an NI system. These programs include configuration and deployment services for your NI PXI, CompactRIO, or Compact FieldPoint system. The NI Basic System Assurance Program provides a simple integration test and ensures that your system is delivered completely assembled in one box. When you configure your system with the NI Standard System Assurance Program, you can select from available NI system driver sets and application development environments to create customized, reorderable software configurations. Your system arrives fully assembled and tested in one box with your software preinstalled.

When you order your system with the standard program, you also receive system-specific documentation including a bill of materials, an integration test report, a recommended maintenance plan, and frequently asked question documents. Finally, the standard program reduces the total cost of owning an NI system by providing three years of warranty coverage and calibration service. Use the online product advisors at [ni.com/advisor](http://ni.com/advisor) to find a system assurance program to meet your needs.

## Calibration

NI measurement hardware is calibrated to ensure measurement accuracy and verify that the device meets its published specifications. To ensure the ongoing accuracy of your measurement hardware, NI offers basic or detailed recalibration service that provides ongoing ISO 9001 audit compliance and confidence in your measurements. To learn more about NI calibration services or to locate a qualified service center near you, contact your local sales office or visit [ni.com/calibration](http://ni.com/calibration).

## Technical Support

Get answers to your technical questions using the following National Instruments resources.

- **Support** - Visit [ni.com/support](http://ni.com/support) to access the NI KnowledgeBase, example programs, and tutorials or to contact our applications engineers who are located in NI sales offices around the world and speak the local language.
- **Discussion Forums** - Visit [forums.ni.com](http://forums.ni.com) for a diverse set of discussion boards on topics you care about.
- **Online Community** - Visit [community.ni.com](http://community.ni.com) to find, contribute, or collaborate on customer-contributed technical content with users like you.

## Repair

While you may never need your hardware repaired, NI understands that unexpected events may lead to necessary repairs. NI offers repair services performed by highly trained technicians who quickly return your device with the guarantee that it will perform to factory specifications. For more information, visit [ni.com/repair](http://ni.com/repair).

## Training and Certifications

The NI training and certification program delivers the fastest, most certain route to increased proficiency and productivity using NI software and hardware. Training builds the skills to more efficiently develop robust, maintainable applications, while certification validates your knowledge and ability.

- **Classroom training in cities worldwide** - the most comprehensive hands-on training taught by engineers.
- **On-site training at your facility** - an excellent option to train multiple employees at the same time.
- **Online instructor-led training** - lower-cost, remote training if classroom or on-site courses are not possible.
- **Course kits** - lowest-cost, self-paced training that you can use as reference guides.
- **Training memberships** and training credits - to buy now and schedule training later.

Visit [ni.com/training](http://ni.com/training) for more information.

## Extended Warranty

NI offers options for extending the standard product warranty to meet the life-cycle requirements of your project. In addition, because NI understands that your requirements may change, the extended warranty is flexible in length and easily renewed. For more information, visit [ni.com/warranty](http://ni.com/warranty).

## OEM

NI offers design-in consulting and product integration assistance if you need NI products for OEM applications. For information about special pricing and services for OEM customers, visit [ni.com/oem](http://ni.com/oem).

## Alliance

Our Professional Services Team is comprised of NI applications engineers, NI Consulting Services, and a worldwide National Instruments Alliance Partner program of more than 700 independent consultants and integrators. Services range from start-up assistance to turnkey system integration. Visit [ni.com/alliance](http://ni.com/alliance).

[Back to Top](#)

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