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# 14-Bit, 200 kS/s Data Acquisition with PDAs

## NI CF-6004

- Ultraportable DAQ device for CompactFlash
- 4 channels of 14-bit analog input
- Up to 200 kS/s single-channel sampling
- Up to 132 kS/s multichannel (aggregate) sampling
- 4 digital I/O lines (3.3 V)
- Programmable with LabVIEW PDA software

### Operating Systems

- PocketPC/Windows Mobile
- Windows CE<sup>1</sup>

<sup>1</sup>Only on a limited number of devices – visit [ni.com](http://ni.com) for more information.

### Required Software

- LabVIEW PDA for PocketPC

### Driver Software (Included)

- NI-DAQmx Base

**NEW**



Product	Bus	Analog Inputs <sup>1</sup>	Input Resolution (bits)	Max Sampling Rate (kS/s) <sup>2</sup>	Max Input Range (V)	Digital I/O
CF-6004	CompactFlash	4 SE	14	200	±5	4

<sup>1</sup>SE = Single ended <sup>2</sup>Single channel rate. See detailed specifications for multichannel rate.

## Hardware Description

Measuring less than 16 cm<sup>2</sup>, slightly larger than a standard postage stamp, the National Instruments CF-6004 is a tiny, yet powerful platform for handheld measurements. With 14-bit resolution and up to 132 kS/s aggregate sampling on four analog input channels, the NI CF-6004 packs full measurement functionality into a Type II CompactFlash slot, available on many PDAs. The NI CF-6004 is ideal for many portable applications, from consolidation of multiple handheld instruments to custom handheld measurement, analysis, and communication.

## Software Description

The CF-6004 ships with NI-DAQmx Base driver software, a multiplatform driver with a subset of the NI-DAQmx programming interface. Use it to develop customized handheld DAQ applications with the NI LabVIEW PDA module for PocketPC.

## Recommended Accessories

Three connectivity options are available for use with the NI CF-6004. You can use the SH-15-15-B to connect directly to signals or your own custom connector, or you can use the SH-15-15 to connect to one of two connector blocks.

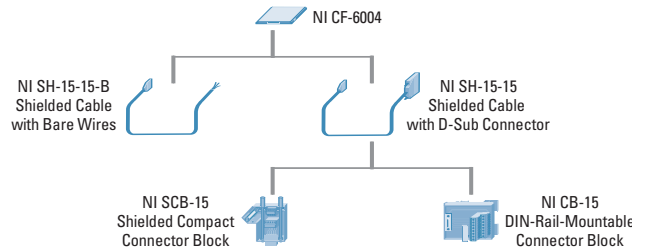


Figure 1. Connectivity Options

## Common Applications

The CF-6004 in a PDA is ideal for a number of applications where economy, small size, and portability are essential, such as:

- Biomedical/wearable computing
- Field monitoring/diagnostics
- Portable data logging and analysis

## Information for OEM Customers

For information on special configurations and pricing, please visit [ni.com/oem](http://ni.com/oem) or contact your local NI sales representative.



# 14-Bit, 200 kS/s Data Acquisition with PDAs

## Ordering Information

NI CF-6004 .....779174-01  
Includes NI-DAQmx Base software

### Accessories

Terminal Blocks  
NI CB-15 .....779198-01  
NI SCB-15 .....779197-01

### Cables

NI SH-15-15 .....191067-0R5  
NI SH-15-15-B .....191070-0R5

## BUY NOW!

For complete product specifications, pricing, and accessory information, call (800) 813-3693 (U.S. only) or go to [ni.com/daq](http://ni.com/daq).

## Specifications

Typical for 25 °C unless otherwise specified.

### Analog Input

Number of channels.....	4 single-ended
ADC type.....	Successive approximation
ADC resolution.....	14 bits
DNL.....	No missing codes
INL.....	±1 LSB
Sampling rate (may be system dependent)	
Single-channel, finite acquisition	
up to 8 kS, raw or calibrated.....	200 kS/s
up to 1 MS, raw data.....	200 kS/s
Multi-channel, finite acquisition	
up to 8 kS total, raw or calibrated.....	132 kS/s, aggregate
up to 1 MS total, raw data.....	132 kS/s, aggregate
Continuous acquisition	
calibrated data, monitoring.....	18 kS/s, typical
calibrated data, graphing.....	1 kS/s, typical
Minimum hardware-timed sample rate.....	195 S/s
Minimum effective software-timed	
sample rate.....	0 S/s
Timing accuracy.....	50 ppm
Timing resolution.....	78.125 ns
Settling time.....	20 ppm at 7.6 µs, 0.1Ω source impedance
Input coupling.....	DC
Input range.....	±5 V
Maximum working voltage.....	±5 V
Input Impedance.....	100 MΩ in parallel with 20 pF
Input bias current.....	75 pA
Crosstalk (at 1 kHz)	
Adjacent channels.....	-104 dB typical
Nonadjacent channels.....	-104 dB typical
Small signal bandwidth	
-3 dB.....	497 kHz
System noise.....	0.75 LSB <sub>rms</sub>
Input FIFO size.....	8,192 samples
Data transfers.....	Programmed I/O
Overvoltage protection.....	±15 V
Input current during overvoltage condition.....	15.3 mA
Accuracy over the operating range.....	±3.1 mV typical ±21 mV maximum

### Digital I/O

Number of channels.....	4 (PFI.<0..3>)
Direction control.....	Each channel individually programmable as input or output
Output driver type.....	Push-pull
Compatibility.....	3.3 V LVCMOS and LVTTL
Power-on state.....	Input (high impedance)
Data transfers.....	Programmed I/O
Absolute maximum voltage range.....	-0.5 V to 4 V

### Digital logic levels

Level	Minimum	Maximum	Units
Input low voltage	-0.3	0.8	V
Input high voltage	2	3.9	V
Input leakage current	-1	1	µA
Output low voltage (I = 2 mA)	–	0.8	V
Output high voltage (I = 2 mA)	2.5	–	V
Input current (0 < Vin < 3.3 V)	-1	1	µA

### Power Available at I/O Connector

Output (10 mA maximum).....	3.3 V typical 2.97 V minimum
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### Physical Characteristics

If you need to clean the module, wipe it with a dry towel.

Dimensions.....	Type II CompactFlash Card
Weight.....	9 g (0.3 oz)
I/O Connectors.....	15-pin

### Bus Interface

CompactFlash

### Power Requirement

+3.3 V from PDA host.....	2 mA idle maximum 50 mA typical (continuous acquisition) 68 mA maximum all outputs loaded
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### Calibration

Recommended warm-up time.....	15 minutes
Calibration interval.....	1 year

### Environment

The CF-6004 device is intended for indoor use only.

### Operating Environment

Ambient temperature.....	0 to 40 °C (Tested in accordance with IEC-60068-2-1 and IEC-60068-2-2.)
Relative humidity.....	10 to 90%, noncondensing (Tested in accordance with IEC-60068-2-56.)

### Storage Environment

Ambient temperature.....	-20 to 70 °C (Tested in accordance with IEC-60068-2-1 and IEC-60068-2-2.)
Relative humidity.....	5 to 90%, noncondensing (Tested in accordance with IEC-60068-2-56.)
Maximum altitude.....	2,000 m (at 25 °C ambient temperature)
Pollution degree.....	2

### Certifications and Compliances

The CF-6004 is designed to meet the requirements of the following standards of safety for electrical equipment for measurement, control, and laboratory use:

- IEC 61010-1, EN 61010-1
- UL 61010-1
- CAN/CSA C22.2 No. 61010-1

Note: For UL and other safety certifications, refer to the product label, or visit [ni.com/certification](http://ni.com/certification), search by model number or product line, and click the appropriate link in the Certification column.

### Voltagess

Connect only voltages that are within the absolute maximum limits of the connection point. See pertinent specification section for appropriate limits.

### Hazardous Locations

The CF-6004 is not certified for use in hazardous locations.

### Electromagnetic Compatibility

Emissions.....	EN 55011 Class A at 10 m FCC Part 15A above 1 GHz
Immunity.....	Industrial levels per EN 61326:1997 + A2:2001, Table 1
EMC/EMI.....	CE, C-Tick, and FCC Part 15 (Class A) Compliant

Note: For EMC compliance, operate this device with shielded cabling.

### CE Compliance

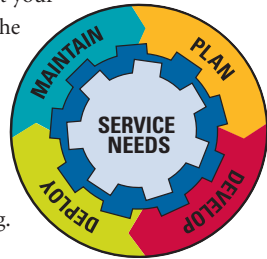
This product meets the essential requirements of applicable European Directives, as amended for CE marking, as follows:

Low-Voltage Directive (safety).....	73/23/EEC
Electromagnetic Compatibility Directive (EMC).....	89/336/EEC

Note: Refer to the Declaration of Conformity (DoC) for this product for any additional regulatory compliance information. To obtain the DoC for this product, visit [ni.com/certification](http://ni.com/certification), search by model number or product line, and click the appropriate link in the Certification column.

# NI Services and Support

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## Training and Certification

NI training is the fastest, most certain route to productivity with our products. NI training can shorten your learning curve, save development time, and reduce maintenance costs over the application life cycle. We schedule instructor-led courses in cities worldwide, or we can hold a course at your facility. We also offer a professional certification program that identifies individuals who have high levels of skill and knowledge on using NI products. Visit [ni.com/training](http://ni.com/training).

## Professional Services

Our Professional Services Team is comprised of NI applications engineers, NI Consulting Services, and a worldwide NI Alliance Partner Program of more than 600 independent consultants and integrators. Services range from start-up assistance to turnkey system integration. Visit [ni.com/alliance](http://ni.com/alliance).



## OEM Support

We offer design-in consulting and product integration assistance if you want to use our products for OEM applications. For information about special pricing and services for OEM customers, visit [ni.com/oem](http://ni.com/oem).

## Local Sales and Technical Support

In offices worldwide, our staff is local to the country, giving you access to engineers who speak your language. NI delivers industry-leading technical support through online knowledge bases, our applications engineers, and access to 14,000 measurement and automation professionals within NI Developer Exchange forums. Find immediate answers to your questions at [ni.com/support](http://ni.com/support).

We also offer service programs that provide automatic upgrades to your application development environment and higher levels of technical support. Visit [ni.com/ssp](http://ni.com/ssp).

## Hardware Services

### NI Factory Installation Services

NI Factory Installation Services (FIS) is the fastest and easiest way to use your PXI or PXI/SCXI combination systems right out of the box. Trained NI technicians install the software and hardware and configure the system to your specifications. NI extends the standard warranty by one year on hardware components (controllers, chassis, modules) purchased with FIS. To use FIS, simply configure your system online with [ni.com/pxiadvisor](http://ni.com/pxiadvisor).

## Calibration Services

NI recognizes the need to maintain properly calibrated devices for high-accuracy measurements. We provide manual calibration procedures, services to recalibrate your products, and automated calibration software specifically designed for use by metrology laboratories. Visit [ni.com/calibration](http://ni.com/calibration).

## Repair and Extended Warranty

NI provides complete repair services for our products. Express repair and advance replacement services are also available. We offer extended warranties to help you meet project life-cycle requirements. Visit [ni.com/services](http://ni.com/services).



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