

# 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.

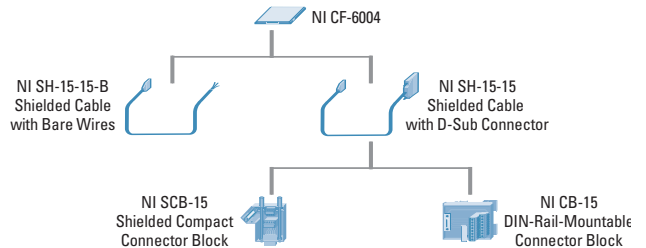


Figure 1. Connectivity Options

## 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 .....  $\pm 1$  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  $\mu$ s, 0.1  $\Omega$  source impedance  
Input coupling ..... DC  
Input range .....  $\pm 5$  V  
Maximum working voltage .....  $\pm 5$  V  
Input Impedance ..... 100 M $\Omega$  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 .....  $\pm 15$  V  
Input current during overvoltage condition ..... 15.3 mA  
Accuracy over the operating range .....  $\pm 3.1$  mV typical  
 $\pm 21$  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 LVTTTL  
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       | $\mu$ A |
| 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       | $\mu$ A |

### Power Available at I/O Connector

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

### 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

### 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.

### Voltages

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

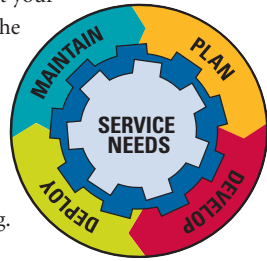
### Electromagnetic Compatibility

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.

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## 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).

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## 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

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