

# Frequency Detector Start-Up Kit

## Frequency Detector Start-Up Kit

### Benefits

Open source code based on LabVIEW™ graphical development environment  
Data recorder with automatic recording based on user-selected signal conditions  
Upgradeable using standard PC-based technology  
Frequency detector example program included (downloadable from the Web)

### Features

Real-time display, detection, and storage of frequency waveforms  
FFT-based peak detection algorithm automatically detects prominent sound or vibration frequency  
Recorder can start logging on user-selected conditions (triggers) including:  
Frequency (above, in range, or below)  
Amplitude (above, in range, or below)

Easily modified software architecture  
Low-cost automated data recording  
Portable components for use on the bench top or with a laptop computer  
Accurate measurement capability  
Intuitive graphical interface  
Signal conditioning for microphone inputs



**DOWNLOAD THE FREQUENCY DETECTOR  
EXAMPLE PROGRAM**

[ni.com/automotive/autovi\\_exchange.htm](http://ni.com/automotive/autovi_exchange.htm)

## Overview

We designed the National Instruments Frequency Detector Start-Up Kit for real-time detection and storage of frequency waveforms. Using your PC and a microphone that are purchased separately, you can detect frequencies and store them directly on your hard drive.

The kit uses existing PC technology and common data acquisition hardware to simplify configuration and lower cost. We built the kit around the frequency detector example program, an example application that you can download from the National Instruments Web site at [ni.com/automotive/autovi\\_exchange.htm](http://ni.com/automotive/autovi_exchange.htm)

The program is part of a set of unsupported examples that are intended as starting points for a wide variety of applications. With the open source code architecture, you can customize the example for individual applications and connect to other I/O devices. The kit requires the LabVIEW graphical development environment, which is sold separately.

## Application

Mechanical and electronic designers and testers find the Frequency Detector Start-Up Kit useful for recording and analyzing sounds or vibrations. The kit is a data logger that can automatically start recording based on signal conditions that the user selects. It does so by monitoring the prominent frequencies and amplitudes of the signal during acquisition. Conditions that you can set include prominent frequency/amplitude above, below, or in range. When it detects at least one of these

conditions, it logs the data to disk for a duration of time that you specify. After collection, you can review and play back the data through the PC sound card, using an included data review utility.

## Frequency Detector Start-Up Kit Components

We list the recommended configuration for the Frequency Detector Start-Up Kit below. These components are sold separately.

### Hardware

- Data acquisition
- Signal conditioning
- Microphone\*

\*You must purchase the microphone (and an appropriate cable) separately. Exact specifications for these components depend on your configuration requirements.

### Software

- Frequency detector example program\*
- LabVIEW 5.1.1 (or higher), full or professional edition
- NI-DAQ™ driver software, version 6.7 (or higher)

\*The frequency detector example program is free and downloadable from the National Instruments Web site. Examination and modification of the source code for this example program requires LabVIEW.

# Frequency Detector Start-Up Kit

## Data Acquisition

The recommended configuration includes high-performance data acquisition hardware with analog, digital, and counter/timer I/O. Choice of an exact configuration varies depending on your needs. Please contact National Instruments for other configuration suggestions.

Application	Portable Use	Benchtop Use	Benchtop and Rack Use
Computer	Laptop PC	Desktop PC	PXI <sup>®</sup> -based computer
Recommended DAQ hardware	The DAQCard <sup>®</sup> -AI-16XE-50 is a PCMCIA card that features: <ul style="list-style-type: none"> <li>Analog inputs – 16 single ended, 8 differential channels</li> <li>Sampling rate – 200 kS/s, 16-bit resolution</li> <li>Digital I/O – 8 TTL lines</li> <li>Counter/timers – 2 up/down, 24-bit resolution</li> <li>The PR68-68F cable is recommended for this use.</li> </ul>	The PCI-6034E is a PCIbus card that features: <ul style="list-style-type: none"> <li>Analog inputs – 16 single ended, 8 differential channels</li> <li>Sampling rate – 200 kS/s, 16-bit resolution</li> <li>Digital I/O – 8 TTL lines</li> <li>Counter/timers – 2 up/down, 24 bit resolution</li> <li>The SH-68-68EP is recommended for this use.</li> </ul>	The PXI-6052E is a PXI board that features: <ul style="list-style-type: none"> <li>Analog inputs – 16 single ended, differential channels</li> <li>Sampling rate – 333 kS/s, 16-bit resolution</li> <li>Digital I/O – 8 TTL lines</li> <li>Counter/timers – 2 up/down, 24-bit resolution</li> <li>Analog outputs – 2 channels, 16-bit</li> <li>The SH-68-68EP is recommended for this use.</li> </ul>

## Signal Conditioning

Signal conditioning components for the Frequency Detector Start-Up Kit come from a family of products that offer a range of sensor connectivity, excitation, and isolation for pressure, temperature, and amplification. The kit is based on the SC-2345, a portable, modular signal conditioning chassis that integrates signal conditioning, connectivity, controls, and indicators in a shielded chassis. The table below lists suggested signal conditioning modules for the Frequency Detector Start-Up Kit.

Module	Description	Application	Features
SCC-AI05	Dual-channel isolated analog input module	Amplification, isolation, and filtering for microphone input	<ul style="list-style-type: none"> <li>Both channels have 10 kHz lowpass noise filters and gain amplifiers</li> </ul>
SC-2345	Carrier for SCC modules and panelette connectors	Base for signal conditioning and connectivity	<ul style="list-style-type: none"> <li>Laptop carrier</li> <li>Up to 16 channels of signal conditioning</li> <li>Modular connectivity</li> </ul>
BNC Panelette Connector*	Dual BNC panelette connector	Provides BNC connector for microphone input	<ul style="list-style-type: none"> <li>2 BNC connectors occupy a single SC-2345 slot</li> </ul>
Blank Connector panelette	Blank panelette to cover unused	Closes unused areas of SC-2345	<ul style="list-style-type: none"> <li>Black metal filler panels</li> </ul>

\*The BNC connector is one of several options for microphone connection. Other options include SMB, banana jack, and D-sub connectors. An exact choice will depend on the particulars of your microphone.

# Frequency Detector Start-Up Kit

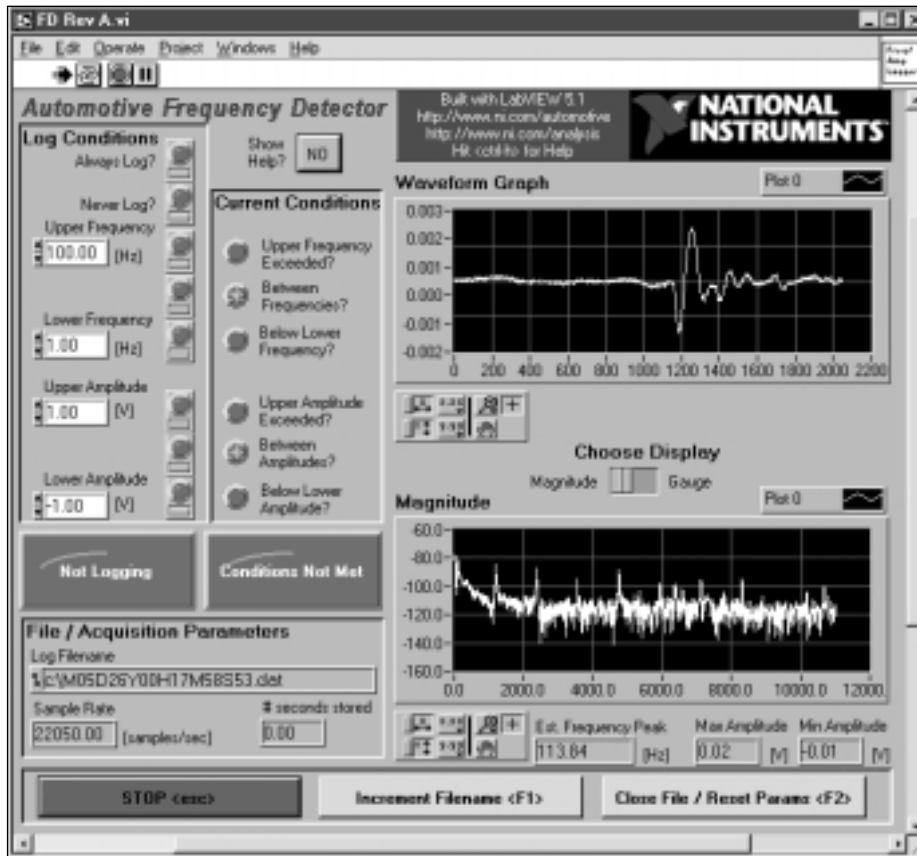


Figure 1. Frequency Detector Example Program Front Panel

## Frequency Detector Example Program LabVIEW

The frequency detector example program differentiates between audio frequencies. You can download the source code and executables (Windows platforms) for the code from the National Instruments Web site at [ni.com/automotive/autovi\\_exchange.htm](http://ni.com/automotive/autovi_exchange.htm) In order to customize the source code, you must have the LabVIEW full or professional edition.

Frequency Detector Program features:

- Web-based and downloadable program
- Commented LabVIEW source code
- Automated or continuous monitoring, detection, and logging of audio frequencies and amplitudes
- Continuous spectrum or prominent frequency displays
- Data review utility
- Audio review capabilities through a standard PC sound card

We built the frequency detector example program with LabVIEW, a flexible graphical environment for development of high-performance PC-based systems for measurement and automation. LabVIEW combines easy-to-use graphical application development with the flexibility of a powerful programming language.

## NI-DAQ

NI-DAQ driver software integrates all National Instruments DAQ products. NI-DAQ capabilities include DAQ I/O, remote measurements, buffer and data management, and resource management. You can download NI-DAQ for free, from our Web site at [ni.com/softlib.nsf](http://ni.com/softlib.nsf)

# Frequency Detector Start-Up Kit

## Technical Support

National Instruments strives to provide you with quality technical assistance worldwide. To provide you with immediate answers and solutions 24 hours a day, 365 days a year, we maintain an extensive online technical support system. Web support is available at no cost to all of our registered users, and can be found in the technical support section of our Web site at [ni.com/support](http://ni.com/support)

To handle questions that cannot be answered by an automated system, National Instruments provides no-cost standard technical support via e-mail and phone for all registered users on all products. In the Americas, phone support is available on non-holiday weekdays from 7:00 a.m. to 7:00 p.m. central time. For technical support outside of the Americas, please contact your local National Instruments office.

National Instruments sponsors a wide variety of group activities, such as user group meetings at trade shows and at large industrial sites. Our users also receive our quarterly *Instrumentation Newsletter*™ and *AutomationView*™ newsletters to get the latest information on new products, product updates, application tips, and current events. In addition, sign up for *NI News*, our electronic news service at [ni.com/news](http://ni.com/news)

## Warranty

All National Instruments data acquisition, computer-based instrument, VXIbus, and MXI™bus products are covered by a one-year warranty. GPIB hardware products are covered by a two-year warranty from the date of shipment. The warranty covers board failures, components, cables, connectors, and switches, but does not cover faults caused by misuse. You may return a failed assembly to National Instruments for repair during the warranty period. Extended warranties are available for an additional charge.

Information furnished by National Instruments is believed to be accurate and reliable. National Instruments reserves the right to change product specifications without notice.

## Seminars/Training

Free and fee-paid seminars are presented several times a year in cities around the world. Comprehensive, fee-paid training courses are available at National Instruments offices or at customer sites. For training schedules, and to register online, please visit our Web site at [ni.com/custed](http://ni.com/custed)

## Ordering Information

### LabVIEW Full Development System\*

Windows 2000/NT/9x.....776670-03

### LabVIEW Professional Development System\*

Windows 2000/NT/9x .....776678-03

\*To use the frequency detector program source code, you must have LabVIEW (FDS or PDS).

### Data Acquisition

For portable use:

DAQCard-AI-16XE-50 ..... 777231-01

PR68-68F ribbon cable..... 183646-0R1

For desktop use with a PCI-based computer:

PCI-6034E.....778075-01

SH68-68EP ..... 184749-01

For bench-top and rack use with a PXI-based computer:

PXI-6052E.....777962-01

SH68-68EP ..... 184749-01

### SCC Signal Conditioning

SCC-AI05..... 777459-24

SC-2345.....777722-01

BNC panelette .....184737-01

Blank panelette (X8).....184483-01

For other configurations, please contact National Instruments or visit the National Instruments Web site at

[ni.com/automotive/autovi\\_exchange.htm](http://ni.com/automotive/autovi_exchange.htm)



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