

Real-Time Dynamometer Start-Up Kit

Real-Time Dynamometer Start-Up Kit

Features

Low-cost real-time control monitoring
Easily modified software architecture
Graphical speed and torque profile editor
Accurate measurement capability for engine test, control, and simulation
PID control loops operating on independent hardware
Intuitive operator interface
Signal conditioning for RPM, torque, temperature, and inputs for pressure signals

Benefits

Open source code based on LabVIEW™ Real-Time graphical programming environment
Interfaces to a wide variety of dynamometer systems
Maintained and scaled using standard PC-based technology
Includes a ready-to-run Real-Time Dynamometer Example Program you can download from the Web



Download Your FREE Real-Time Dynamometer Example Program

ni.com/svix

Overview

The National Instruments Real-Time Dynamometer Start-Up Kit is designed for engine and electric motor testing applications. The kit can simultaneously perform real-time control of torque or speed and real-time monitoring of RPM, temperature, emissions, and pressure. You can connect to many types of signals, including voltage, frequency, thermocouples, thermistors, RTDs, and strain-gauge bridges.

The Real-Time Dynamometer Start-Up Kit uses existing PC technology, data acquisition, and real-time control to simplify configuration and lower system cost. We built the kit around the Real-Time Dynamometer Example Program. You can download the example program FREE from the National Instruments Web site at ni.com/svix. With the open source code architecture, you can modify the kit for individual applications and connect to other I/O devices. The kit uses the LabVIEW Real-Time graphical development system to log data and generate reports in word-processing, spreadsheet, and database programs.

Applications

The Real-Time Dynamometer Start-Up Kit delivers monitoring and control for:

- Automotive engine testing
- Real-time dynamometer control
- Electric motor testing
- Brake testing
- Other speed and torque control applications

Real-Time Performance

The Real-Time Dynamometer Start-Up Kit uses LabVIEW Real-Time with an RT Series DAQ board to reliably and deterministically run the dynamometer control loop. With LabVIEW Real-Time, you can create real-time programs with easy-to-use graphical programming. The LabVIEW Real-Time code is downloaded to the dedicated processor of the RT Series DAQ board, which runs a real-time operating system. With this combination of hardware and software, you get a guaranteed loop rate to run the control loop in the dynamometer application. To ensure reliable operations for real-time control, embedded LabVIEW Real-Time applications continue to run even if the host PC crashes or if you perform a soft reboot.

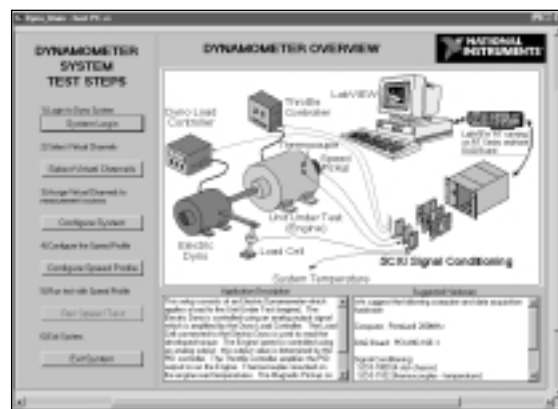


Figure 1. Real-Time Dynamometer Example Program Configuration Screen

Real-Time Dynamometer Start-Up Kit

Real-Time Dynamometer Kit Components

The kit consists of the following hardware and software components.

Hardware

- SCXI™ signal conditioning
- PXI™
- RT Series data acquisition

Software

- LabVIEW Real-Time
- Real-Time Dynamometer Example Program*

*Real-Time Dynamometer Example Program requires LabVIEW Real-Time graphical programming software.

RT Series Data Acquisition

The kit includes a real-time multifunction data acquisition board with analog, digital, and counter/timer input and output. We recommend the PXI-7030/6040E, a high-end, intelligent, multifunction I/O board. The PXI-7030/6040E features:

- 486 /133 MHz embedded processor
- 8 MB of DRAM
- Analog inputs – 16 single-ended, 8 differential channels
- Sampling rate – 250 kS/s, 12-bit resolution
- Analog output – 2 channels
- Digital I/O – 8 TTL lines
- Counter/timers – 2 up/down, 24-bit resolution

SCXI

You can select from a variety of signal conditioning modules that offer a range of sensor connectivity, excitation, and isolation for pressure, temperature, and RPM transducers. The table below includes signal conditioning modules appropriate for real-time dynamometer applications.

PXI Controller, I/O, and Conditioning

The Real-Time Dynamometer Kit is based on a rugged Compact/PCI-based PC and chassis. We recommend the following PXI hardware for use with the Dynamometer Kit.

PXI-1011 – Chassis for PXI/CompactPCI and SCXI modules.

Integrates a high-performance 4-slot PXI backplane with an 8-slot SCXI backplane to offer a complete solution for demanding I/O applications.

PXI-8156B – High-performance system controller compatible with the PXI-1011 chassis. The PXI-8156B:

- Controls up to 3 single-slot PXI modules in the PXI-1011
- Includes a 333 MHz AMD-K6-2 CPU with Windows NT operating system
- Requires a minimum of 64 MB of RAM for use with Windows NT

Module	Description	Application	Features
SCXI-1121	Signal conditioning module	Connects to strain gauge to measure torque	<ul style="list-style-type: none"> • 250 V_{rms} working isolation per channel • 4 isolated input channels and excitation
SCXI-1102	Thermocouple amplifier/multiplexer	Temperature monitoring	<ul style="list-style-type: none"> • 32 channels • 2 Hz lowpass noise filters and gain amplifiers • Programmable instrumentation amplifier
SCXI-1126	Signal conditioning module	Measures RPM	<ul style="list-style-type: none"> • 8 isolated frequency input channels • Programmable frequency ranges from 250 Hz to 128 kHz • Signal input levels up to +/-250 V
SCXI-1180	Feedthrough panel	Extends unconditioned I/O signals from DAQ board to SCXI chassis	<ul style="list-style-type: none"> • Cables directly to breakout connector or SCXI cable assembly
SCXI-1302	Front-mounting terminal block	For use with SCXI-1180	<ul style="list-style-type: none"> • 50 screw terminals
SCXI-1303	Front-mounting terminal block	High-accuracy thermocouple measurements for use with SCXI-1102	<ul style="list-style-type: none"> • Includes isothermal construction and circuitry for open thermocouple detection and automatic signal ground referencing
SCXI-1321	Front-mounting terminal block	For use with strain gauges and the SCXI-1121	<ul style="list-style-type: none"> • Capable of offset nulling and shunt calibration
SCXI-1327	Front-mounting terminal block	Extends the input range of the SCXI-1121 to 250 V _{rms} . Extends the threshold level of the SCXI-1126 up to 250 V	<ul style="list-style-type: none"> • Extended voltage input range • Includes an onboard temperature sensor for cold-junction compensation with thermocouples

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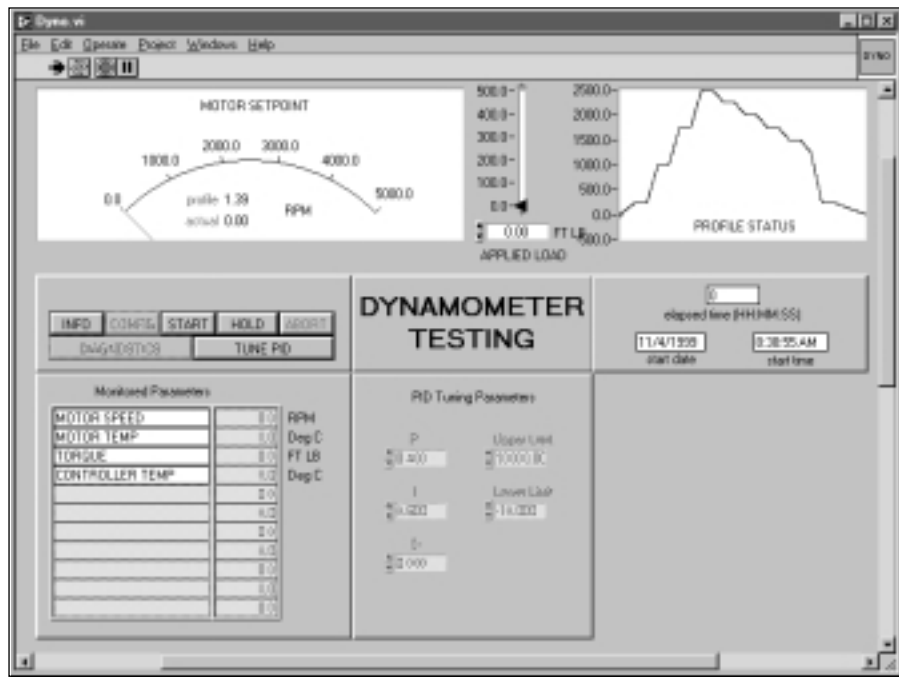


Figure 2. Real-Time Dynamometer Example Program Front Panel

LabVIEW Real-Time

The LabVIEW Real-Time flexible graphical environment for high-performance systems combines easy-to-use graphical development with the flexibility of a powerful programming language. With a whole suite of debugging tools available, you can easily add to the existing Real-Time Dynamometer Example Program. The Real-Time Dynamometer Start-Up Kit uses LabVIEW Real-Time to provide real-time operation and maintains flexibility for modification if necessary.

Real-Time Dynamometer Example Program

The Real-Time Dynamometer Example Program is a ready-to-run program that performs monitor and control functions and includes panels for a simple dynamometer test station. To run the Real-Time Dynamometer Example Program requires LabVIEW Real-Time. You can download the program from the National Instruments Web site at ni.com/svix

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

Real-Time Dynamometer Example Program features include:

- Web-based, downloadable
- Real-time control
- Source code
- Profile editor
- User log-on
- Diagnostic screen
- PID tuning screen
- Data logging to standard word processing, database, and spreadsheet applications

Real-Time Dynamometer Start-Up Kit

Ordering Information

LabVIEW Real-Time

LabVIEW Real-Time Full Development System for
Windows 2000/NT/9x777840-03

LabVIEW Real-Time

LabVIEW Real-Time Professional Development System
for Windows 2000/NT/9x777848-03

* Real-Time Dynamometer Example Program requires
LabVIEW Real-Time.

PXI Industrial Computer with SCXI chassis

PXI-1011777965-01
PXI-8156B777884-32
64 MB SRAM777885-64

Data Acquisition

PXI-7030/6040E777837-01

SCXI Signal Conditioning

SCXI-1121776572-21
SCXI-1180776572-80
SCXI-1102776572-02
SCXI-1126776572-26
SCXI-1321777687-21
SCXI-1302777687-02
SCXI-1303777687-03
SCXI-1327777687-27

For other configurations, please contact National Instruments.

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