

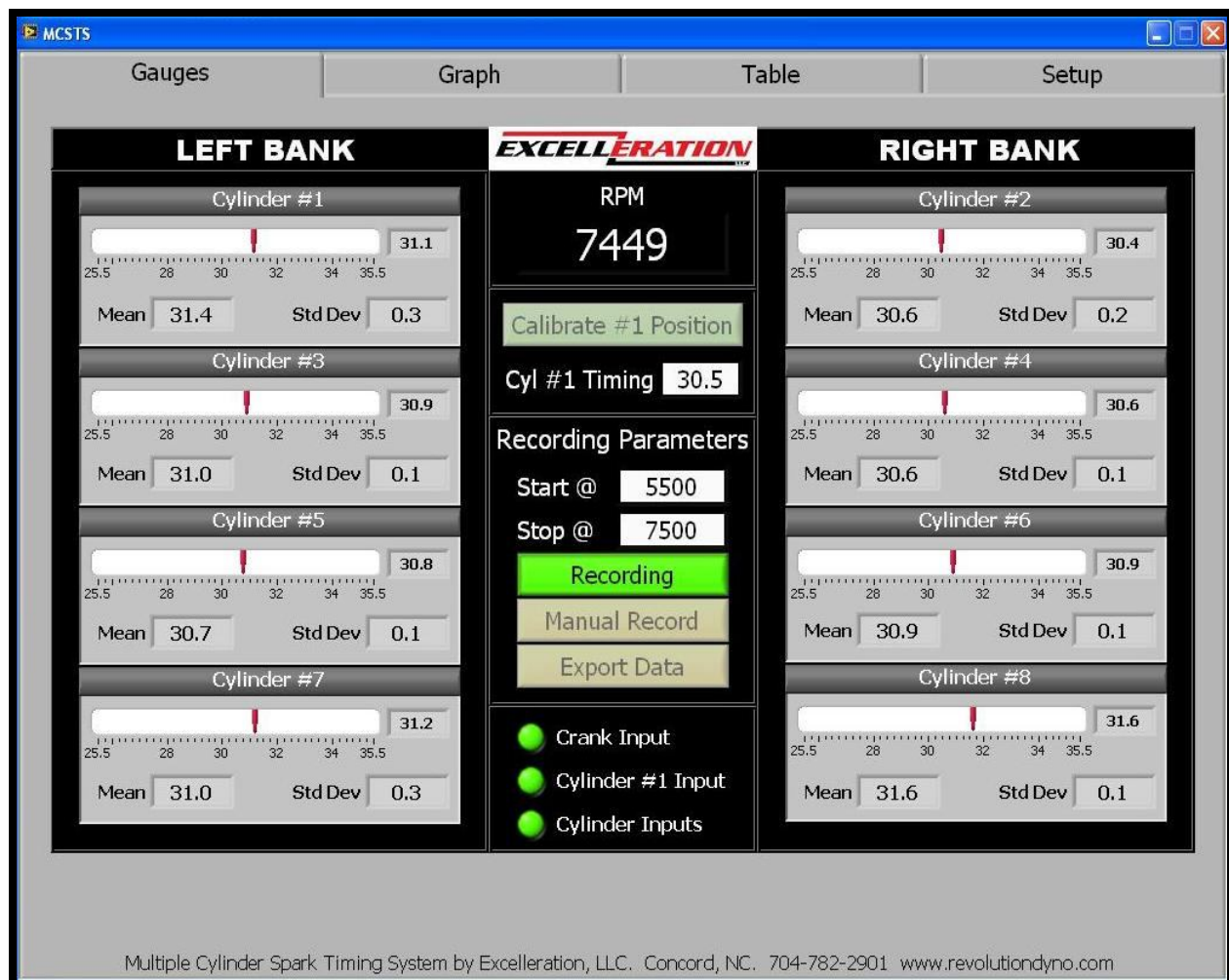
# EXCITE



## Inductive Test Equipment

by **EXCELLERATION**

The **EXCITE Inductive Test Equipment** system, developed by Excelleration, LLC, provides engine builders and researchers with a tool that records the individual timing events of each cylinder with relation to the crankshaft position. The system can assist the engine builder in setting and monitoring the spark event for each cylinder while the engine is under load.



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## Timing System Features

- National Instruments Hardware / LabView Developed Proprietary Software Interface
- Stand-Alone Enclosure Packaging for Easy Addition to Existing Test Cell
- $\pm 0.01$  Degree Timing Resolution (80 MHz Internal Clock Speed)
- Analog Voltage Signal Output to Existing Data Acquisition System
- Connects to a PC via a LAN cable and port

<b>System Specifications</b>	Power Supply	Internal Regulated Power Supply
		5V, -12V, 12V, 24V
	Enclosure	NEMA 23 Enclosure
		Dimensions: 14"Height x 12" Wide x 6" Depth
	Display Interface	Specific Software on PC via LAN Cable
		LED's for each input signal
Hardware	National Instruments Chassis	
	National Instruments Expansion Cards	
<b>Input Signals</b>	Crankshaft Position	Optical Disk Sensor
		VRS Four Magnet Option
		Crank Trigger Signal
	Spark Pulse Events	Inductive Pickup on Coil and Plug Wires Variable Signal Conditioning
<b>Output Signals</b>	Computer Interface	LAN Cable from National Instruments to PC
	Analog Output	0-5 volt Analog Signal Card Slots to Existing Data Acq.
<b>System Expansion</b>	Card Slot	National Instrument Chassis Slots for System Expansion

Each spark pulse is detected using an inductive spark plug wire pickup located on the ignition coil wire. One specific cylinder is referenced during each pulse sequence by a second inductive pickup. Offered as an option, an inductive pickup can be used on each spark plug wire rather than the one on the coil wire and the one on a reference cylinder (usually cylinder #1).

The **EXCITE Inductive Test Equipment** system measures the actual timing event of each cylinder to  $\pm 0.01^\circ$  resolution. This is accomplished by using an 80 MHz internal clock and an

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optical sensor positioned on the crankshaft. Other methods of referencing crank position are available. One method includes the addition of four magnets (for an 8-cylinder, 4-stroke engine) placed at the “preferred” timing position on the front of the crankshaft. The actual crank position is interpolated from the signal generated during the crankshaft revolution. This option requires adequate physical space on the front of the engine for the pulse generator as well as proper positioning of the sensor. Another crankshaft position reference can be gathered from a production engine position sensor (crank trigger wheel) if that signal generator pre-exists.

## Input Signal Sources

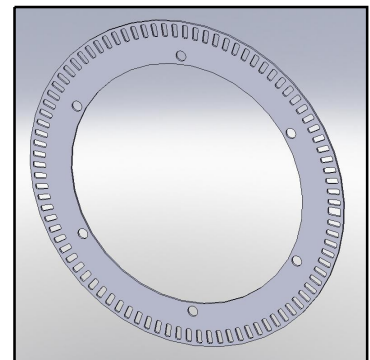
### **Crankshaft Position**

- Optical Disk – Slotted Disk fastened to rear of crankshaft, 90-180 PPR (preferred)
- Magnetic – Variable Reluctance Sensor Detecting Magnetic Field or Ring-gear Teeth

### **Spark Pulse Event(s)**

- Voltage Event – Inductive Sensor from Coil Wire and/or Spark Plug Wire(s)

The optical disk crankshaft position sensor placed at the rear of the engine crankshaft has an inertia value of 0.00212 lb-ft-sec<sup>2</sup>. Using the optical disk, the crankshaft position is referenced every 4 degrees (with one pulse per revolution providing an index pulse). The index pulse is used to monitor unforeseen signal losses. If any crankshaft position signals are missed during one crank rotation the software is designed to recognize the missed signal and the crankshaft position is reinitialized upon the next index pulse.



## System Specific Software

- Timing Indicator Bar for Each Cylinder (Absolute or Relative Value Display Option)
- Mean and Standard Deviation Value During Each Sweep
- User Defined Engine RPM Values for Auto Recording Parameters
- Graphing and Table Display of Results
- Data Export Option to .csv file format

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