Appliance Testing

Applications
Refrigerators
Microwave ovens
Ranges
Dishwashers
Washing machines
Dryers
Mixers/blenders

Departments
Production
Research
Quality

Overview
Household and commercial appliances such as refrigerators, ranges, microwave ovens, dishwashers, washing machines, dryers, mixers, blenders, and toasters must be tested in both design and production phases. Both mechanical and electrical/electronic parts of the appliance must be characterized.

Problem
Consumer demand for energy efficiency, reliability, and ease-of-use has turned appliance manufacturing into a high technology business. These products are complex and are manufactured in high volumes. Manufacturers must be efficient and maintain high standards of quality to remain competitive. This demands a test system that is fast, flexible, highly automated, and useful in both design and production environments.

Solution
Appliance testing requires a combination of electrical, electronic, and mechanical measurements. A VXIbus data acquisition and control system from VXI Technology is an excellent solution for this application. Capable of measuring electrical and electronic parameters directly, the data acquisition system easily interfaces with the control and power functions of an appliance. Transducers convert mechanical parameters such as temperature, pressure, and speed into electronic signals that can be measured and converted by the data acquisition system into meaningful test results. Outputs from the data acquisition system can be used to modify test conditions and automatically exercise every operational mode of the appliance. Test results are stored in the control computer’s data base for subsequent quality control analysis and report generation.
Motor speed

Speeds of fans, motors, compressors, and other moving parts are an important factor in the characterization of an appliance. The speed of these parts can affect appliance efficiency and the lifetime of its parts. Pulse output transducers are typically used to measure rotational speed.

Logic levels

Modern appliances are controlled by microprocessors and digital electronics. Knowing the output and/or input states of the electronics can have an effect on test results. Sometimes the electronic portions of the appliance may cause what looks like a mechanical failure.

Pressure

Some appliances like refrigerators and freezers use pressurized gases or liquids for cooling purposes. For proper operation, these fluids must be under the correct pressurization. In addition, pressure transducers may be used to characterize the pressure inside and outside the appliance during its operation, or they may characterize the pressure exerted by doors, motors, and other moving parts.

Key System Features

- VXIbus open architecture
- Data Acquisition and Control on a single programmable VXIbus card (VT1419A)
- VTI DAC Express or Agilent VEE or NI Labview
- Flexibility with deterministic control
- Wide choice of inputs/outputs
- Built-in control algorithms
- Up to 32 user-written “C” code algorithms
- 65,000 reading FIFO buffer
- 500 reading Current Value Table (CVT)
- All algorithms can write to FIFO/CVT
- Data can be time-stamped

Typical Configuration

<table>
<thead>
<tr>
<th>Data Acquisition System</th>
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<tbody>
<tr>
<td>CT 100-C VXI 6-Slot Card Cage</td>
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<tr>
<td>Firewire VXI Slot 0 Command Module</td>
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<tr>
<td>VT1419A Multifunction Measurement &amp; Control Card</td>
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<tr>
<td>Analog input channels</td>
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<tr>
<td>Strain gage completion channels</td>
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<tr>
<td>Counters channels</td>
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<tr>
<td>Digital input channels</td>
<td>20-60</td>
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