Brake Test Stand
Temperature Monitoring

Temperature digital telemetry for aerospace brake testing
**Application: Brake Test Stand Temperature Monitoring**

**Temperature digital telemetry for aerospace brake testing**

**Industry:** Aerospace

**Product:** AT-7000

**Parameters measured:** Temperature

A large brake manufacturer needed an aircraft wheel testing telemetry system (instead of a slip ring) that was capable of dependably providing 24 channels of thermocouple measurement, as well as providing a rotary union for tire pressure and an optical encoder. Accumetrics’ AT-7000 system was used to provide the telemetry, and was mechanically packaged with the rotary union and encoder to provide a convenient system. The system is able to accurately make the measurements on-shaft, and can dependably transmit them without signal corruption due to noise.

All of the 24 temperature signals are sampled at high speed to allow the system to eliminate high frequency noise that typically detracts from the output temperature accuracy. With un-aliased temperature acquisition, the AT-7000’s Receiver is able to filter out this noise successfully from the desired temperature signals. The digital telemetry techniques used for the AT-7000 provide robust signal transfer, as well as allowing all of the data to be transferred in a single high speed bit stream (thereby eliminating the need for 24 individual tuned transmitters and receivers!). With nothing to wear out, this system has clear advantages over noisy slip rings.
• The picture top left shows the temperature transmitter/rotary union/encoder. The left-most area was bearing mounted to provide a stationary telemetry data and induction power connection, as well as tire air pressure connection and encoder output.
• The top right picture shows an opposite (rotating end) view. The labeling for the thermocouple inputs can be seen, as well as the rotating tire pressure connecting pipe.
• The bottom picture shows the rack mount style Receiver, which decoded the temperature measurements to Ethernet data.

The AT-7000 can measure thermocouples using the TAM (eight channel temperature acquisition module). If desired, the AT-7000 also has RTD modules, torque/strain dynamic acquisition modules, ICP accelerometer modules, and differential voltage (and current shunt) modules.

The AT-7000 can be supplied in either split clamp-on collar or end of shaft mounting. Systems of up to 88 inputs have been supplied (that system measured wheel force with 64 strain gages and 24 thermocouples). Output data can be in the form of analog signals (0 +/- 10V, 4-20mA), or Ethernet.
**What are divisions of PCB Piezotronics?**

PCB Piezotronics, a member of the PCB Group families of companies, has five major divisions, all of which offer targeted sensor technologies. These divisions are supported by an active outside direct sales force of Field Application Engineers, as well as international direct sales offices throughout the world. Individual PCB Piezotronics divisions, locations and their primary product specialties include:


- **Depew, NY, USA** - www.pcb.com/aerospace – Sensors & Instrumentation for aerospace & defense applications, including air and spacecraft testing.

- **Novi, MI, USA** - www.pcb.com/auto – Sensors & Instrumentation for automotive testing, including modal analysis, NVH; component durability, powertrain testing; vehicle dynamics; safety and regulatory testing.

- **Depew, NY, USA** - www.imi-sensors.com – Industrial vibration sensors, bearing fault detectors, mechanical vibration switches, panel meters, cables & accessories for predictive maintenance and equipment protection.

- **Depew, NY & Provo, UT, USA** www.larsondavis.com – Precision microphones, sound level meters, noise dosimeters, audiometric calibration systems.

- **San Clemente, CA, USA** - www.pcb.com/auto – Sensors & Instrumentation for aerospace & defense applications, including air and spacecraft testing.

- **Farmington Hills, MI, USA** - www.pcb.com/LoadAndTorque – Designs and manufactures high quality, precision load cells, wheel force transducers, torque transducers, telemetry systems, and fastener torque-tension test systems.

**PCB® Group Companies:**

- **Cincinnati, OH, USA** - www.modalshop.com – Global leader in dynamic calibration offering a complete line of automated calibration systems and recalibration services to support dynamic vibration, pressure and force sensors in applications such as: national standards, commercial labs, government/military research, consultancies, and industrial/plant floor operations.

- **Rochester, NY, USA** - www.sti-tech.com – Mechanical engineering consulting firm specializing in infinite element analysis, advance analytical techniques, experimentation, technology development, &esign optimization for turbo machinery, industrial machine systems & mechanical structures.