



NIDays





New Hardware Technologies for DAQ Applications

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Session Objectives

- Introduce the three major NI DAQ platforms
- Present future trends in the Data Acquisition industry
- Discuss new technologies NI is applying to different applications to build products that help you take advantage of these trends

NI DAQ Hardware Platforms

DAQ Devices



PCI/e, USB, Ethernet,
and Wireless single-
purpose devices

CompactDAQ



Medium-channel-
count, sensor-specific,
modular I/O with
rugged options

PXI DAQ



High-channel-count,
best performance,
modular I/O

LabVIEW

NI-DAQmx

Industry Trends in Data Acquisition

Performance



Simplification



Distribution



Industry Trends in Data Acquisition

Performance



With higher performance, you can take more data and perform more analysis at a lower price, which ultimately means better decisions.
Improved ADCs, Intel Atom Processors, USB 3.0, Gen 3 PCI Express

Simplification



Distribution



Industry Trends in Data Acquisition

Performance



Simplification



No one wants a DAQ system; they want data and decisions. The simpler the system, the easier and faster it is to get to your decision.

Mobile Interfaces, Wireless Communication

Distribution



Industry Trends in Data Acquisition

Performance



Simplification



Distribution



Distributed systems can offload processing from the main system and reduce wiring, which leads to lower costs and better measurements.
Intel Atom Processors, Wireless Access, TSN

DAQ Devices

CompactDAQ

PXI DAQ

Performance



Simplification



Distribution



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PXI DAQ

Performance



Improved ADCs

USB 3.0

Gen 3 PCIe

Simplification



Mobile Interfaces

System Calibration

Distribution



Wireless Access

Atom Processors

DAQ Devices

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Gen 3 PCIe

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Wireless Access

Atom Processors



Low-Cost Single Devices

Quality measurements and outputs at a competitive price point suitable for academic and laboratory applications

Improved Low-Cost
ADCs



Laboratory and
Academia Applications



USB-
6000/6001/6002/6003





USB-6000/6001/6002/6003

USB-6000 (£95)

- 8 AI @ 12 bits
- 10 kS/s
- 4 DIO

USB-6002 (£179)

- 8 AI @ 16 bits
- 50 kS/s
- 13 DIO
- 2 AO

USB-6001 (£129)

- 8 AI @ 14 bits
- 20 kS/s
- 13 DIO
- 2 AO

USB-6003 (£299)

- 8 AI @ 16 bits
- 100 kS/s
- 13 DIO
- 2 AO



Prototyping Tidal Steam Turbines



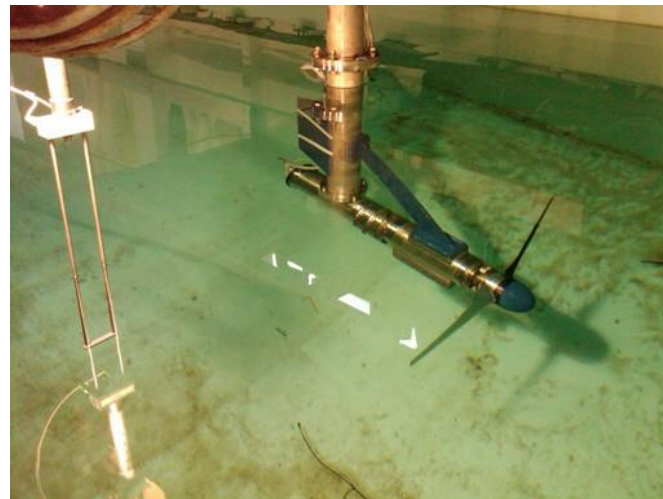
Customer Challenge

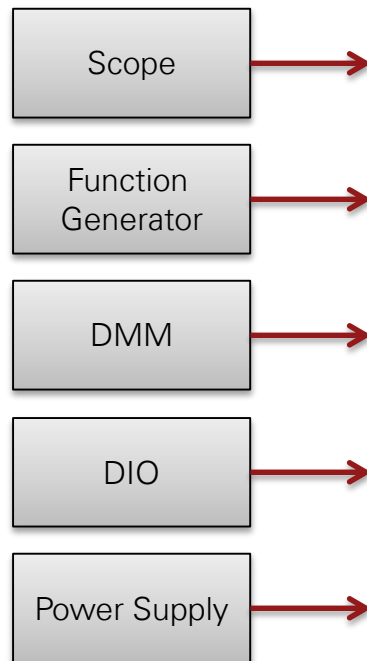
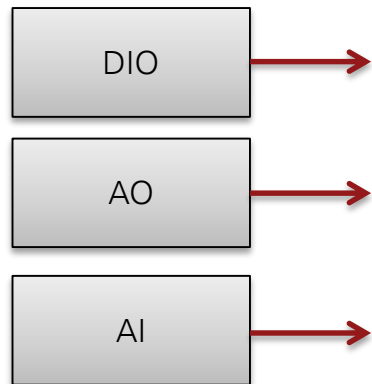
Synchronizing real-time strain-gauge data with a digital shaft encoder to characterize tidal stream turbine loading in dynamic ocean conditions.

Solution

Using NI LabVIEW software and an NI multifunction DAQ device to acquire analog and digital counter data and provide a user interface for real-time load and acceleration visualization.

UNIVERSITY OF
Southampton







Interactive Single Devices

Combine five common benchtop instruments into one device with an intuitive software interface for the PC or iPad to simplify and streamline how you take benchtop measurements.

Wi-Fi Communication



Mobile Interface



Benchtop Test and Validation



VirtualBench

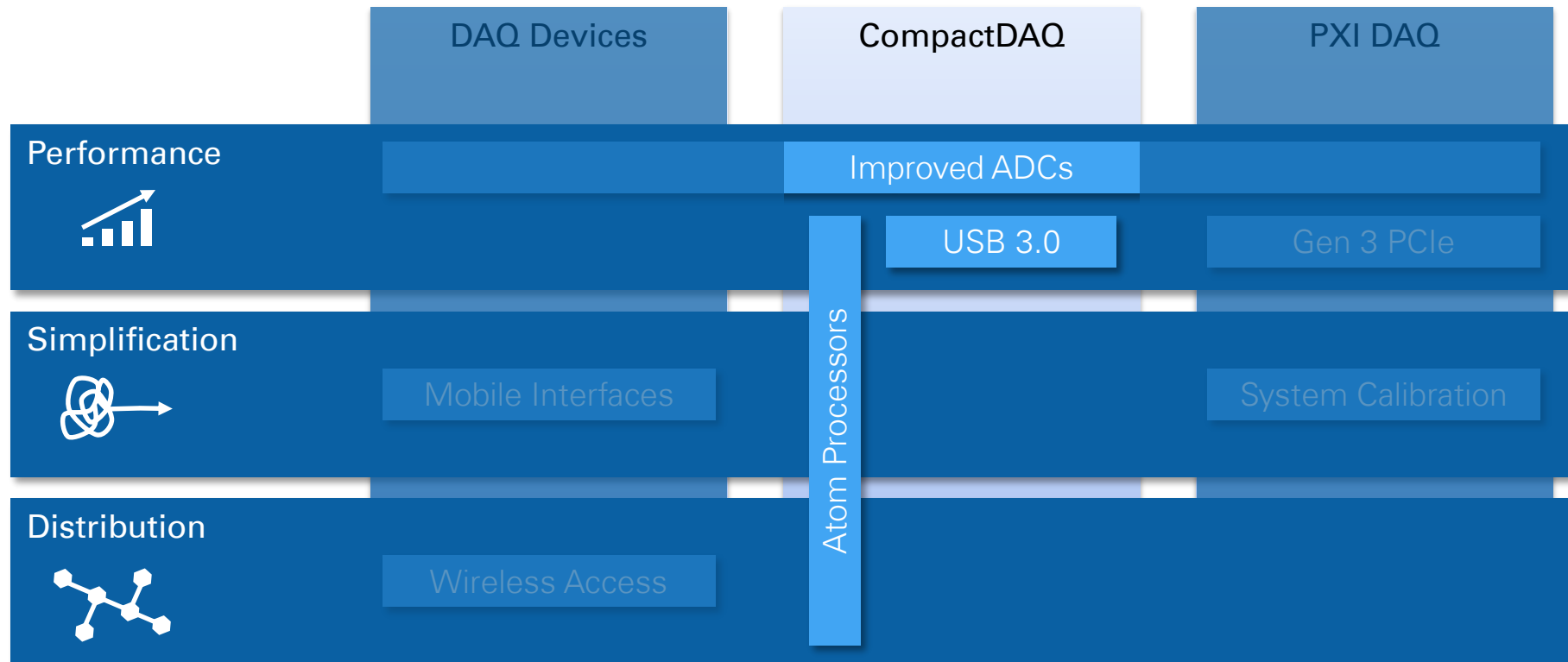


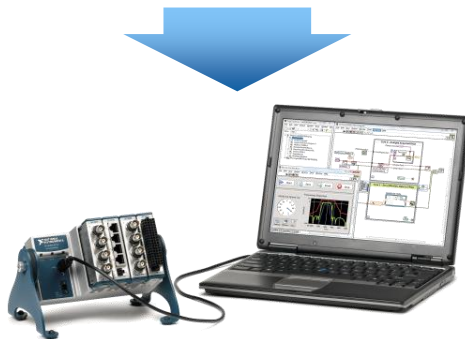
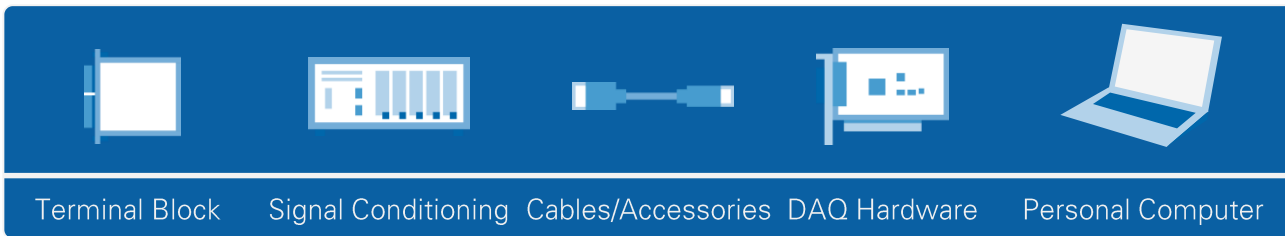
Analog Devices Field and Applications Engineers



"I can't tell you how many times I've toted around a huge oscilloscope. This thing is small enough to fit in your backpack. I'm holding on instrumentation purchases for my FAE's until this thing is available."

- Field Applications Engineer Manager, Analog Devices







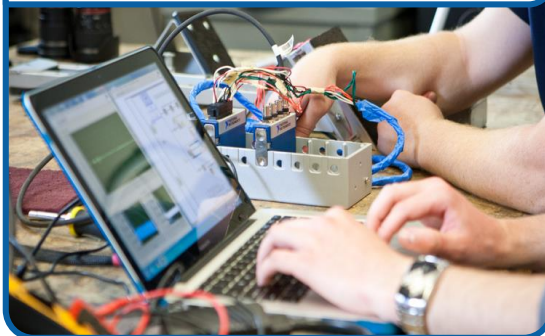
Higher Bandwidth

More streaming bandwidth from the chassis to the PC means you can take more channels of data at faster speeds, and with the larger 14-slot chassis, you can fit more measurements in a single chassis to truly take advantage of the increased bandwidth.

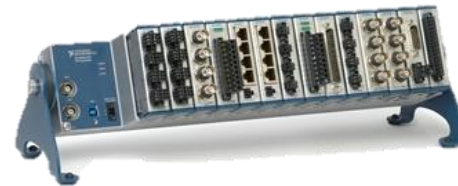
USB 3.0



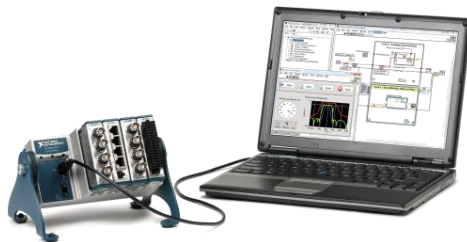
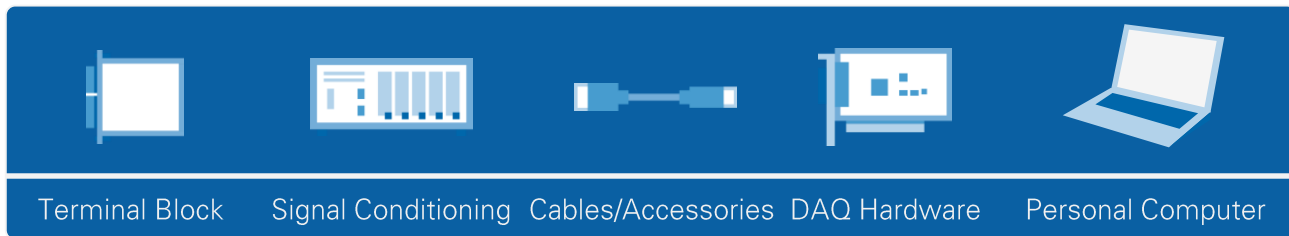
High Performance Benchtop Measurement



CompactDAQ 9179



- 14 Slot USB 3.0 Chassis

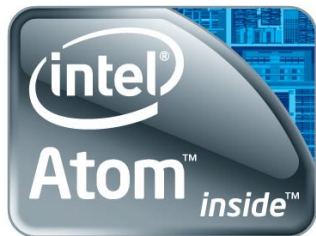


Higher Performance Processing

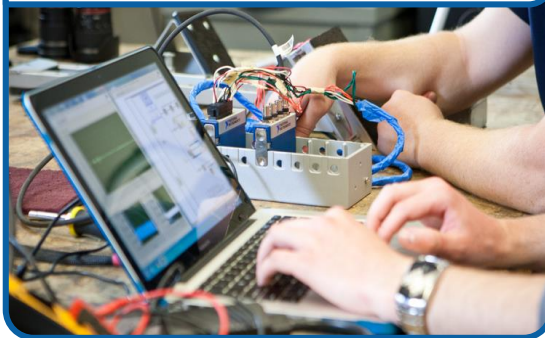


Quad-core processors allow for more processing, analysis, and streaming to disk speed in a completely integrated form factor to reduce points of failure and increase measurement accuracy.

Quad-Core Atom Processors



High-Performance Benchtop Measurement



cDAQ-9136 cDAQ-9137



CompactDAQ Controller Family



	Base		Rugged		Performance	
OS	Windows	RT	Windows	RT	Windows	RT
Processor	Dual-Core	Dual-Core	Dual-Core	Dual-Core	Quad-Core	Quad-Core
RAM	2GB	2GB	2GB	2GB	2GB	2GB
Storage	16GB	16GB	32GB	32GB	32GB	32GB
XNET	None	None	1 Port	1 Port	None	None
Extended Temp.	No	No	Yes	Yes	No	No
4 slots	cDAQ-9132		cDAQ-9134		cDAQ-9136	
8 slots	cDAQ-9133		cDAQ-9135		cDAQ-9137	

- All include 2 USB host, 1 USB device port, RS232, display, SMB, and SD slot





C Series Modules

Lower the cost of generating audio signals while also getting lower noise floors and higher dynamic range.

Improved DACs and Analog Circuitry



Shaker Control



MEMS Testing



NI 9260



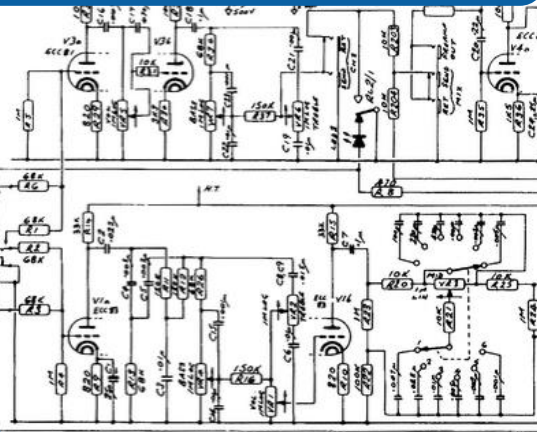
- 2 AO ch @ 24 bits
- 51.2 kS/s/ch
- 110 dB dynamic range



C Series Modules

Add more counter measurements to your C Series DAQ applications.

Redesigned Counter ASIC



Vehicle Monitoring



Process Control



NI 9361



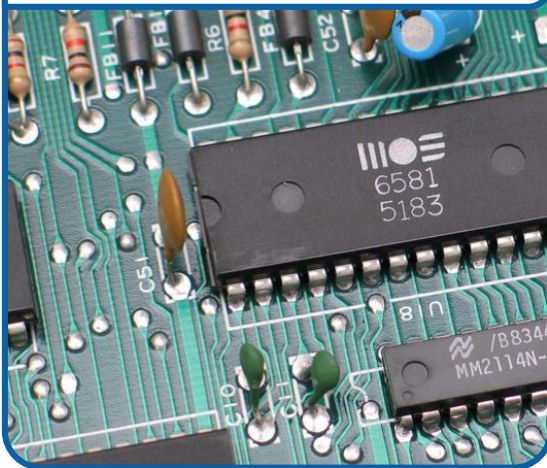
- 8 counter input channels
- 0-100% duty cycles
- 0-5 V diff or 0-24 V SE



C Series Modules

Create a universal test system that can quickly adapt to different measurement needs without having the change hardware.

Improved Analog Circuitry Design



Vehicle Monitoring



High Mix Measurements



NI 9218



- 2 Universal Input Channels
- 24 bits @ 51.2 kS/s/ch
- Voltage, current, bridge, accel, amplified sensor



New I/O Options for C Series

- NI 9209 – High-Density Industrial Voltage
- NI 9212 – Ch-Ch Isolated Thermocouples
- NI 9218 – Universal I/O with LEMO
- NI 9216 – 8-Channel PT100 RTDs
- NI 9226 – 8-Channel PT1000 RTDs
- NI 9224 – 8 Ch-Ch Isolated ± 10 V
- NI 9230 – Low-Speed IEPE
- NI 9238 – Ch-Ch Isolated ± 500 mV
- NI 9246/7 – High-Current Analog Input
- NI 9260 – 24-bit Audio Analog Output
- NI 9361 – Counter Input Module
- NI 9437 – 24 to 250 VDC Sinking Digital
- NI 9344 – User Switch/LEDs
- NI 9997 – 2 Ch, 11 A Busbars

DAQ Devices

CompactDAQ

PXI DAQ

Performance



Improved ADCs

USB 3.0

Gen 3 PCIe

Simplification



Mobile Interfaces

System Calibration

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Wireless Access

Atom Processors



High Throughput PXI

The highest streaming performance chassis on the market means you can acquire more data than ever before.

PCI Express Gen 3



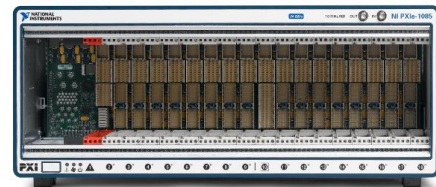
Automated Test



High-Performance Test



PXIe-1085



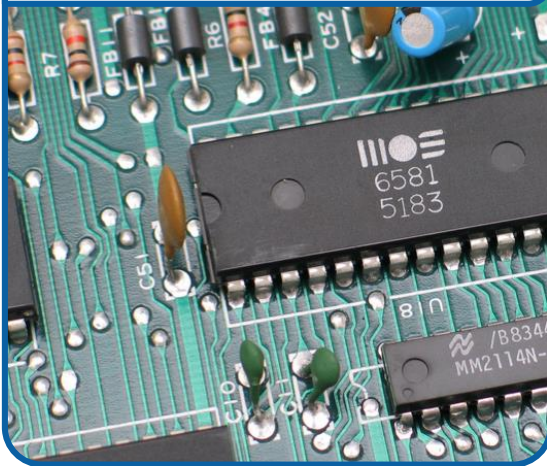
- 16 hybrid slots
- 8 GB/s per slot
- 24 GB/s total bandwidth
- 925 W total power



High-Density Devices

Increased channel density and speed means more data and better decisions all in a smaller footprint.

Analog Circuitry Improvements



Structural Mil/Aero Test



Production Test



High-Density AI



- 80, 144, or 208 AI channels
- 3.86 MS/s scan rate
- Optional AO and DIO



High-Density Devices

Increased channel density and speed means controlling and simulating more points with less cost, for more refined control and testing.

Improved DACs



Sensor Simulation



Machine Control



High-Density AO



- 32 or 64 AO Channels
- 300 kS/s/ch Update Rate
- 10 mA Current Drive



PXI DSA

With a low noise floor and multiple timing engines you can use each board for multiple test stations.

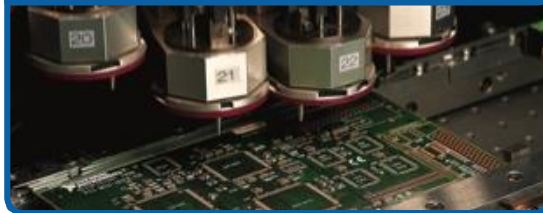
Improved ADCs, DACs,
and Analog Circuitry



Chip Validation



Audio Test



24 bit AI/AO



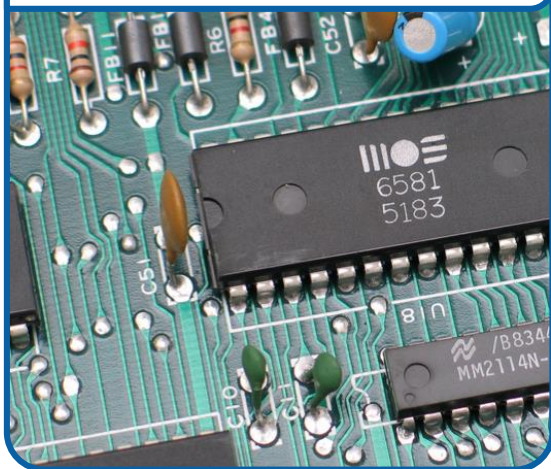
- 4 channels
- 100 mA output power
- -119 dB dynamic range



Signal Conditioned DAQ Devices

Universal bridge and voltage modules, paired with the in-situ calibration accessory, reduce your application and test setup time.

Analog Circuitry Improvements



Test Cells



Structural Test



Universal Input with In-Situ Calibration



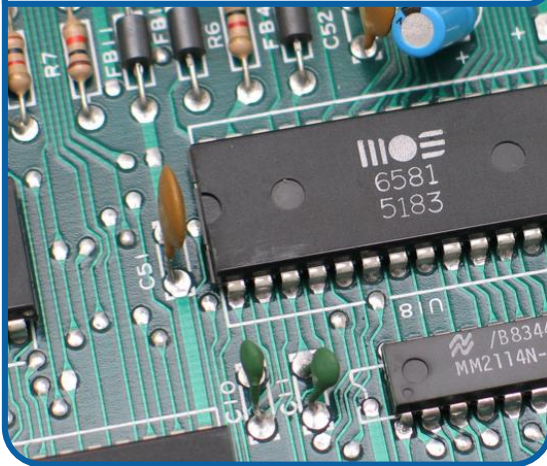
- 8 Bridge & Voltage Channels
- 24-bits @ 25.6 kS/s/ch
- Per Ch Wide Bandwidth AO



Signal Conditioned DAQ Devices

Filtered analog inputs increase your measurement quality and hardware timed single point measurement mode lets you use these modules in real-time control loops.

Analog Circuitry Improvements



Wind Tunnels



Automotive Test



Filtered AI



- 32 Filtered Input Channels
- 24 bits @ 5 or 51.2 kS/s/ch
- ± 10 V or ± 42 V



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