

## Real-Time Control System Acts as Closed-Loop Motor Controller

### *ADwin Systems Enable Nanosecond-Speed Control*

Automotive data acquisition applications often use closed-loop control systems for ECU testing, engine prototype development, fuel injection, and more. These data monitoring applications can greatly benefit from modern control systems.

Designed expressly for real-time control of automotive applications, ADwin systems control processes fully independently. With nanosecond control and sampling, ADwin can simultaneously log multiple parameters and then incorporate this data as feedback to control the process.



#### **Unique ADwin Features:**

- Ideal for logging or alarming events in continually-running loops
- Extremely low-latency operation from inputs to outputs
- Vast computational abilities and speed
- Integrates seamlessly with Simulink
- Fast compiling times measured in seconds!
- Stand-alone operation prevents OS lockups and crashes
- Sample rate of 100kHz aggregate, to 1.25 MHz per channel
- Response times of 1 usecond or less
- Counter/timer channels and Event input

### Automotive Control Capabilities

Closed-loop systems incorporate one or more feedback paths to auto-correct errors and to self-regulate processes. Desired setpoints can be engine temperature, RPM, speed, etc.

ADwin measures, monitors and controls the entire process:

- ✓ **ADwin measures** data from many different sensor types (ECUs, thermocouples, position sensors etc.)
- ✓ **ADwin monitors** the process in real time by recording samples at extremely high speeds and high throughput.
- ✓ **ADwin controls** the closed-loop system by monitoring its output (motor temperature, etc.) and using it as feedback by comparing it to the setpoints and then self-correcting any error during the next input.

The ADwin processor enables complex calculations such as state-space differential equations. ADwin also offers an optional (10/100MBIT/S) for high-speed communication and data transmission to the PC.

## Multi-Feedback Control

ADwin is a cost-effective solution for multi-input and output applications. ADwin also provides all the necessary layers of control for closed-loop systems with multiple feedback paths. Every setpoint and alarm condition is stored in internal memory.

For high-input applications, the [ADwin Pro-II data acquisition and control system](#) is available in a variety of robust housing, including a desk system for labs. The system's PRO-II T11 processor module has extremely short response times so control processes run reliably with cycle frequencies far above 1 MHz. ADwin can also adjust the gain to increase or decrease the amount of feedback to the controller.

For example, using voltage variations via the input, ADwin can control a motor within a closed-loop application in order to maintain one or more specific parameters (engine temperature, speed, etc.) in different conditions.

Likewise, an ADwin's Event input can be used with an encoder to accurately monitor or detect a certain measurement value such as Temperature, Speed, RPM, and more.

## Flexible Communications and Modules

ADwin offers a variety of communications options including:

- Ethernet
- USB

- CAN-bus
- Profibus
- INTERBUS

ADwin's versatile modules are the foundation for many different real-time applications. Data acquisition cards include processor modules, analog I/O cards, and high-speed CAN bus interfaces for vehicular communication.

The ADwin software environment can be used under Windows (2000/XP/Vista/Win7) and Linux, or as a stand-alone data acquisition system. ADwin has an interface library for all of the most common GUI and development packages including Visual Basic, Visual C/C++, LabVIEW/LabWindows, TestPoint and others.

Meanwhile the ADbasic control language allows users to program mathematical operations and functions which are executed immediately after each sampling step. For test engineering applications, the ADwin's fast compiling time--measured in seconds--makes programming much simpler.

## The Data Logger Experts

At **CAS DataLoggers** we provide ADwin systems for automotive test stand and other CANbus applications. We specialize in systems integration, custom programming, application development and more.

Our customer Wade Torres explains the benefits of ADwin in his automotive R&D application: "Your hardware is good for low-latency applications such as closed-loop feedback control. ADwin has a 100kHz sample rate, but we were impressed to find that the hardware can run that fast on a sample-by-sample basis. Lots of hardware can sample at 100kHz, but usually it's only buffered in chunks of samples, which is useless for controls applications. The I/O latency of our systems is less than 10 micro-seconds."

To learn more about [ADwin Data Acquisition and Control systems](#), or to find the ideal solution for your application-specific needs, contact a **CAS DataLoggers Application Specialist** at (800) 956-4437 or visit our website at [www.DataLoggerInc.com](http://www.DataLoggerInc.com).