



The High-Performance Alternative

## **Embedded Controller [definition and description]**

An Embedded Controller is simply a device that performs Embedded control. The embedded market is a part of the overall DAQ market. The main differentiating feature of an embedded controller is that all system operation is not controlled by external PC. In fact the CPU running the system is actually built into the I/O system itself. While a typical, slaved data acquisition system is hosted by some type of general purpose Personal Computer complete with mouse, monitor and other human interface devices (HID), an Embedded Controller's processor is usually dedicated to controlling the I/O system and often does not provide any direct human interface.

Differences between an embedded controller and a standard PC are easily observed. However, the differences in software are equally noticeable. While most PCs operating systems for your desktop and laptop computer are large (in terms of RAM and hard drive space needed), operating systems developed for embedded systems are likely to be smaller and have been developed without all of the built-in GUIs as well as much of office equipment peripheral support.

Linux and Windows CE and Linux are much more likely to be the operating system under the hood of an embedded controller. Also, it is much more likely that one of these systems is running a real-time operations system such as QNX, RTX or RTAI Linux as a substantial percentage of these applications have either timing critical or high throughput requirements.

It is not uncommon for an embedded controller to run independent of any supervisory or otherwise outside controller. However, there is usually some link to the outside world. This may be limited to providing a simple status such as "I have no error conditions to report at this time", or it may such a tight connection that it allows an external computer take complete control while the interface between the two computers is alive. Typically, it will be in the middle where an external computer tracks system status, provides some control of key factors (e.g. temperature set point or target RPM), and/or offers the interface between the system and a human controller in charge of overall system operation.

Embedded controllers are often the heart of an industrial control system or a process control application. They may also be at the center of a portable data acquisition system or remote controller that allows an application to keep running even if its umbilical link to the outside world is cut.

