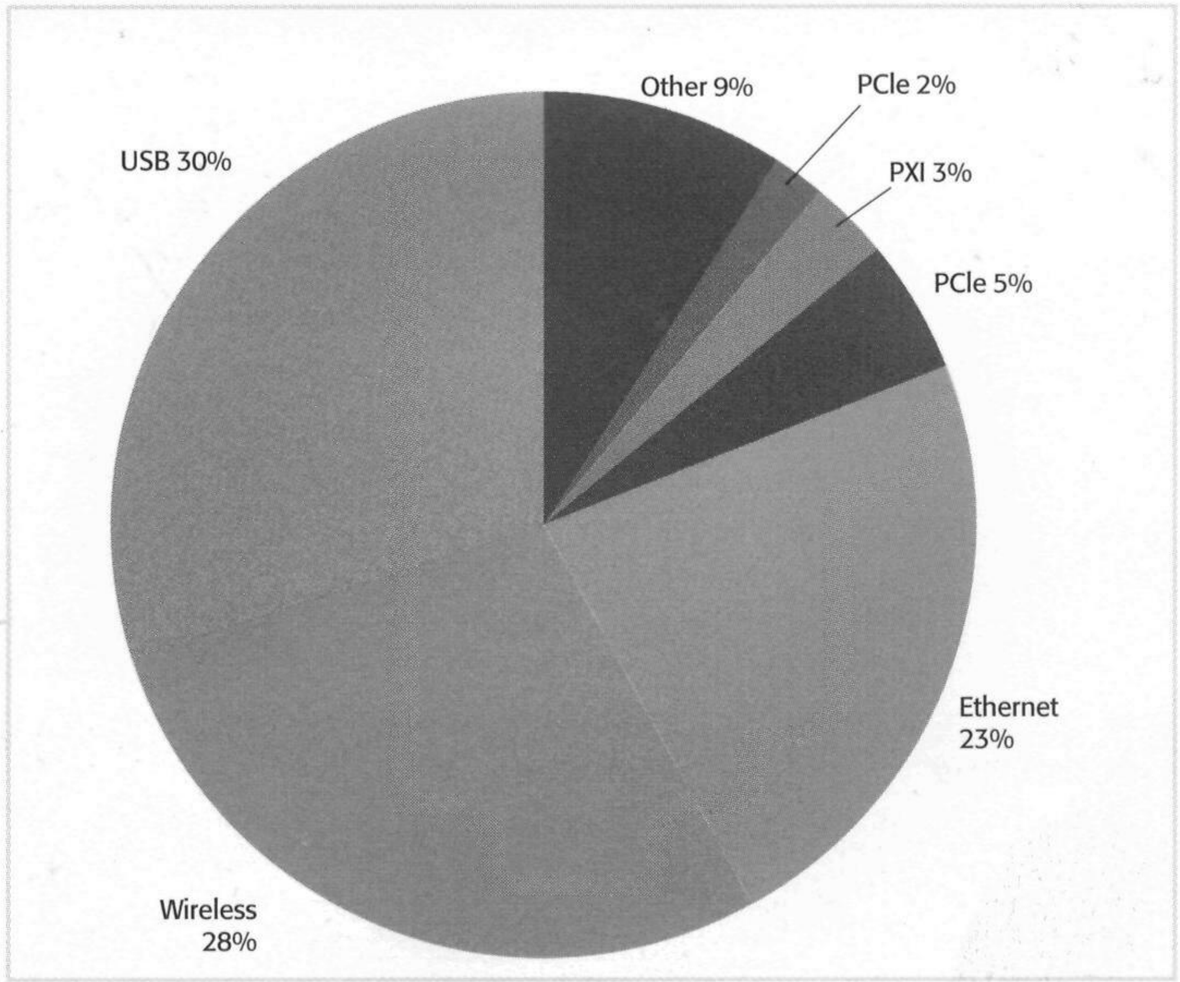

Fig 1: Which computer bus

catch the next bus

Technologies that are popular in the PC industry usually end up making their way to the factory floor. This was certainly the case with Ethernet, and engineers are currently evaluating USB, says **Ian Bell**.

A DECADE ago, the introduction of Ethernet on the factory floor was met with considerable scepticism. Engineers raised questions about its communication reliability, connector performance, and hardware sustainability under harsh industrial environments. Ethernet evolved to overcome these concerns and engineers are now successfully using it in a variety of industrial applications from mining to offshore drilling.

Ethernet has seen major success because it is readily available on commercial devices such as industrial PCs.

Now, with the explosive growth and adoption of USB in the PC industry, engineers are evaluating its viability in industrial environments. USB has been widely adopted as the standard bus for PC peripherals because it offers ease of use; high data throughput; and, with an estimated two billion ports around the world, it is one of the fastest-growing bus technologies in the computer industry.

As depicted in Fig 1, a survey performed by *Sensors* magazine showed that most customers would choose USB for their next data acquisition system rather than any other bus.

USB owes this rapid adoption to its unique mix of ease of use and performance, which makes it attractive for more demanding industrial applications, such as data acquisition. Because of this, USB, like Ethernet, is finding its place on the factory floor.

THE NEED FOR USB

The typical factory floor is a mix of sensors, actuators, relays, motors, wires and controllers working together as an interdependent system.

Running an efficient plant involves promptly troubleshooting malfunctions and constantly evaluating plant efficiency by monitoring machine vibrations, capturing digital events, and trending temperature and pressure data. Along with 24V digital signal levels, 4 to 20mA analogue signal levels, and galvanic isolation for safety, industrial applications require a measurement system with high-speed, accurate analogue input; fast data logging; and analysis capabilities. They also need a permanently installed efficiency monitoring system and a portable diagnostic system for troubleshooting.

Programmable logic controllers (PLCs) traditionally used for plant control do not offer the high-speed I/O required for diagnosis and monitoring tasks. In contrast, a USB-based measurement system with industrial I/O levels and high data throughput can make demanding measurements, including dynamic machine condition monitoring.

USB can be used for short-term diagnostic systems that require quick and easy setup. You can also permanently install USB data acquisition systems where industrial PCs or human-machine interfaces (HMIs) with USB ports are available.

Since its release in 1996, USB has become the standard bus for connecting to computer peripherals, and today, it is readily available on industrial PCs, single-board computers, and touch panel HMIs. USB also offers a unique mix of ease of use, high performance and reliability.

EASE OF USE

One of the major benefits of USB is its plug-and-play ease of use, ▶