Delphi:

Building engines for a cleaner environment

The Company

Delphi is a leading global supplier of electronics and technologies for automotive, commercial vehicle and other market segments. Delphi Diesel Fuel Injectors are a family of highly versatile mechanical, precision-engineered products.

The Problem

Delphi approached PTP with a requirement for a custom test rig. This was needed for a production line to ensure that a particular type of fuel injector was performing precisely to specification. The following critical requirements were identified at the start of the project:

Speed was of the essence

- There was a need to achieve a specific throughput of a part every 20 seconds
- Extremely fast ‘pick and place’ operations were required – 40 operations in 18.5 seconds
- Parallel processing of components was needed in order to achieve the required throughput

A complex situation

- A wide range of hardware from a number of different manufacturers would need to be integrated as part of the system
- PTP would need to liaise with other contractors to integrate different components of the system
- Extensive project management was required as PTP was asked to project manage all aspects of the project
- Complex sequencing would be required allowing each hardware component to perform its individual task whilst higher level sequencing would be needed to bring all the relevant component parts of the rig back together at the required time

Extensive connectivity

- The rig would need to have 120 digital input channels, 72 digital output channels and multiple analogue channels
- It would also need to make use of TCP and Profibus communications protocols

A wide range of software languages would be required

- It was identified that PTP would need to work in a number of languages ranging from proprietary languages to communicate with the intelligent video camera through to Microsoft .Net C#

The Solution

PTP designed and built a test rig which met Delphi's exact requirements.
The solution included:

- The use of Object Orientated Design Techniques (OOD) which allowed individual component testing thus reducing development and testing time
- A modular design provided a hierarchy of control which allowed an elegantly simple solution to be developed with six independent levels of control
- A simple ASCII based protocol was developed to communicate with the complex 6-axis robot. This style of development meant that PTP could test the communications offsite prior to commissioning
- A robust solution, ideal for an industrial application, based around Beckhoff hardware with software designed to run embedded on this platform. This provided a virtually maintenance free solution which was designed to run 24/7 with minimal downtime
- An extremely flexible multi-tabulated Graphical User Interface (GUI) which was designed to provide a wide range of control options from a standard UI through to individual manual station running

✓ Success

PTP worked with Delphi and the other manufacturers involved in the project to produce a test rig which exceeded Delphi's specifications.

PTP's project management ensured that the test rig was produced and delivered on time and within budget.
The completed test rig delivered significant time and efficiency savings which translated into cost savings for Delphi.
Collaboration with PTP has meant that Delphi can continue to deliver real-world innovations that result in products which comply with the tight European regulations for environmental protection.

Automotive

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How LabVIEW and PXI keep the music playing at 200 mph

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