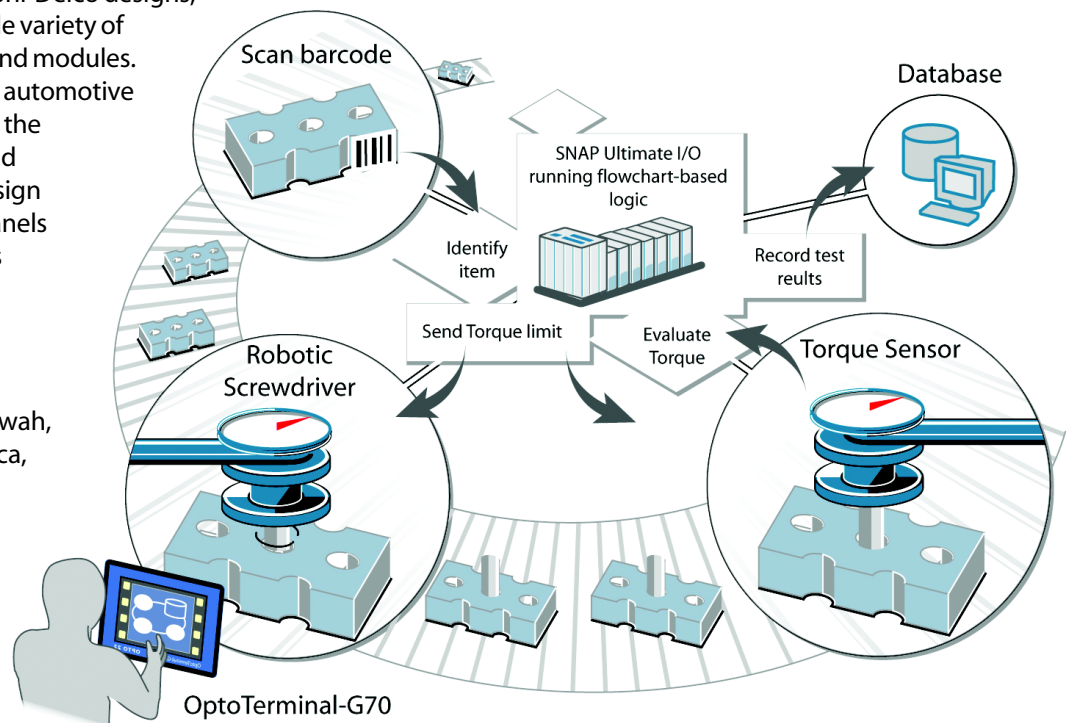# Delphi–Delco

Opto 22 Outfits Automotive Production Line with Ethernet I/O System for Manufacturing Automation and Validation

Delphi, headquartered in Troy, Michigan, is a leading developer of mobile electronics and transportation components and systems technology. Formerly part of General Motors, Delphi has over 190,000 employees and operates a total of 179 manufacturing sites, 53 customer centers and sales offices, and 32 technical centers in more than 40 countries.

Custom Built Robotics

As one the world's largest and most diversified suppliers of automotive parts, Delphi-Delco designs, engineers and manufactures a wide variety of components, integrated systems and modules. The company has pioneered many automotive interior design innovations such as the incorporation of radios and tape and CD players into the dashboard. Design and production of these interior panels and components naturally involves the use of complex and diverse manufacturing systems and equipment. One such system is a robotic screwdriving machine designed for Delphi-Delco by Mahwah, New Jersey-based Janome, America, Inc. Janome, perhaps best known as a manufacturer of sewing machines for both home and industrial use, supplied Delphi Delco with a small, custom built robot equipped with multiple bits for driving screws and assembling various automotive panels and components.

As part of a company initiative called "Lean Manufacturing", Delphi-Delco sought to optimize performance of all of its manufacturing systems and equipment. For instance, one manufacturing procedure involved designating the amount of torque to be applied by the robotic screwdriver to each specific automotive component and then providing verification of the same. This meant that Delphi-Delco needed a way to identify individual components coming down the assembly line so that the screwdriver torque

Delphi-Delco lean manufacturing

could be adjusted appropriately. It also meant that the company would need to measure, capture, and record the actual amount of torque applied and then use all of this data for manufacturing validation purposes. The problem was that the legacy programmable logic controllers (PLCs) that Delphi Delco had installed, though capable of communicating with the robot to specify the required torque, could not capture and deliver the needed data to Janome's enterprise databases. Most PLCs are designed to perform rudimentary logic and then execute control functions based on that. They are not typically used for data acquisition and their communication capabilities beyond the actual piece of equipment being controlled are limited. Thus, Delphi-Delco turned to Opto 22 and its SNAP Ultimate I/O system for automation, remote monitoring, and data acquisition.

Proper Procedures for Critical Requirements

Under the new system, as the individual automotive components reach the robotic screwdriver, a barcode reader scans the barcode of the part. The reader sends an ASCII string identifying the part to the SNAP Ultimate I/O unit via an RS232 serial connection. Using a preprogrammed lookup table within ioControl, SNAP Ultimate I/O's flowchart-based control programming software, the SNAP system confirms that each part is correct and matches it with the corresponding torque. The SNAP system then communicates with a host, which instructs the Janome robot as to the amount of torque to be applied.

Assembly processes are about one thing — ensuring that the proper parts are put together in the proper way. Prior to its implementation of the SNAP system, Delphi-Delco had no way of reading the bar codes on each part to get this whole process started. Knowing that their installed PLCs couldn't do it forced them to read the codes and reprogram the robotic screwdriver's torque manually.

Once the screws are applied, a torque meter is used to measure the actual amount of torque applied. This information is also sent to the SNAP Ultimate unit and then passed on to a host application. This type of validation is critical in the automotive manufacturing industry as they have both self-imposed and regulatory standards that must be adhered to. Without this verification, no parts can leave the factory.

Easy Access, Smooth Processes, Flawless Results

Delphi-Delco is also utilizing Opto 22's OptoTerminal-G70, a small operator interface that managers and other workers on the plant floor use to access data or locally start and stop assembly processes. The OptoTerminal-G70 is mounted right on the Janome robot, giving those on the assembly floor easy access to any process information they might need without having to take time to locate and access a nearby PC.

Thanks to the SNAP Ultimate system, Delphi-Delco's assembly processes are well on their way towards reaching the goals set forth by the Lean Manufacturing initiative. After successful piloting in a lab environment, installation on the actual production line was completed, with flawless results. The intelligence, programmability and connectivity of the SNAP Ultimate I/O system has helped fill a major gap in Delphi-Delco's manufacturing processes.

OptoTerminal-G70 operator interface

About Opto 22

Opto 22 manufactures and develops hardware and software products for applications in industrial automation, remote monitoring, and enterprise data acquisition. Using standard, commercially available Internet, networking, and computer technologies, Opto 22's SNAP systems allow customers to monitor, control, and acquire data from all of the mechanical, electrical, or electronic assets that are key to their business operations. Opto 22's products and services support automation end users, OEMs, and information technology and operations personnel. Founded in 1974 and with over 85 million Opto 22-connected devices deployed worldwide, the company has an established reputation for quality and reliability. Opto 22 products are sold through a worldwide network of distributors, partners, and system integrators. For more information, contact Opto 22 headquarters at 800-321-OPTO or visit our Web site at www.opto22.com.

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