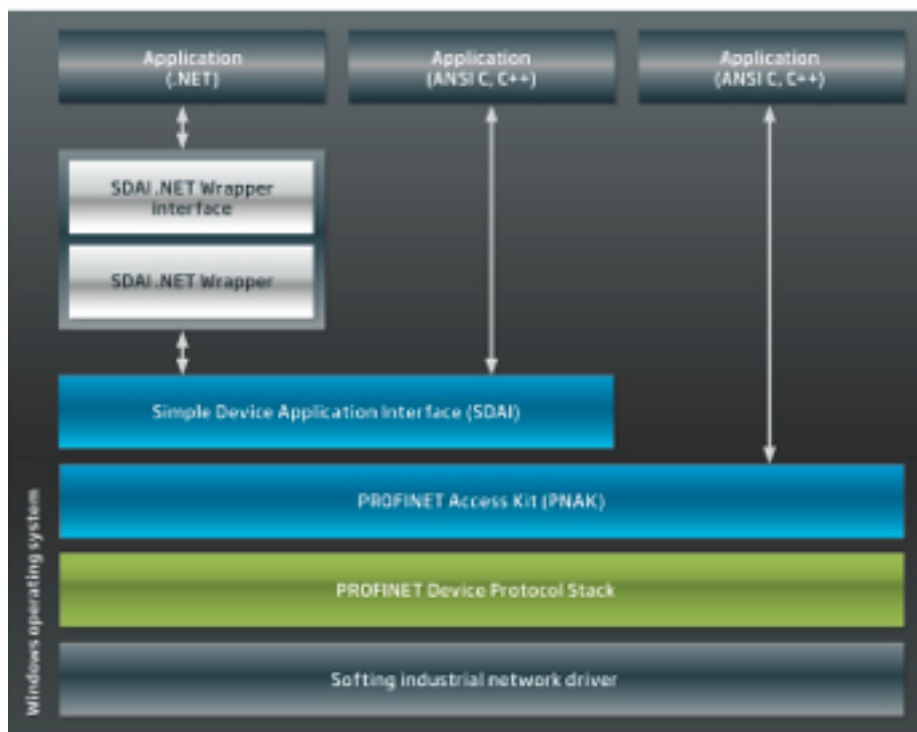


# Fast PROFINET device implementation in Windows

To fill the need for an implemented PROFINET interface in the automotive industry, Unglaube decided to integrate a PROFINET stack into their Data Matrix code reader system. The solution strengthens the company's position in an important market, but also provides an excellent basis for future product innovations.



SOURCE: SOFTING

crankcases by a major German automobile manufacturer in the premium segment.

## PROFINET acceptance

With the increasing acceptance of PROFINET in industrial applications, the automotive industry's call for support of the Industrial Ethernet protocol has been growing louder. To fulfill this demand, Unglaube set out to deal with the PROFINET subject. The challenge: While the SmartCam DMRe2u Currera Data Matrix code reader system provides different connectors, such as RS232, digital I/O or Ethernet, the PROFINET protocol itself is not supported.

For this reason, Unglaube at first combined the reader with an appropriate protocol converter. However, customers did not accept this approach in the long term. Reasons that spoke against it included increased maintenance effort, complicated operation and additional costs. Eventually, the company had only two options left: Either continue to offer the combined reader-protocol converter and risk losing customers to competitors, involving considerable losses in sales; or add a PROFINET interface to the SmartCam DMRe2u Currera Data Matrix code reader and regain a competitive edge for new customer projects. Considering these options, Unglaube of course opted for the PROFINET integration.

## Softing's PROFINET Device Stack

The all-important criterion when looking for a technology partner was the PROFINET stack's executability as a pure software implementation within the Windows operating system of the Data Matrix code reader, without requiring an additional interface board. As the next customer project was soon to be started, the PROFINET interface had to be implemented in only four weeks. And the development costs should be kept to reasonable levels of course. Following an extensive market survey, Unglaube chose the PROFINET Device Protocol Stack from Softing Industrial Automation.

The key factor behind the decision was the fact that Softing's stack provides a flexible and highly portable architecture that is ready-to-use in a Windows environment. Thus, the stack already fulfills the requirements for integration into the Data Matrix code reader, eliminating the need for time-consuming

FULL TRACEABILITY OF ALL COMPONENTS is an essential requirement in the automotive industry today. As a leading provider of barcode and Data Matrix code reader systems, the German company Unglaube in Massenhausen produces high-quality hardware and software solutions for use in industrial applications, in particular in the automotive industry.

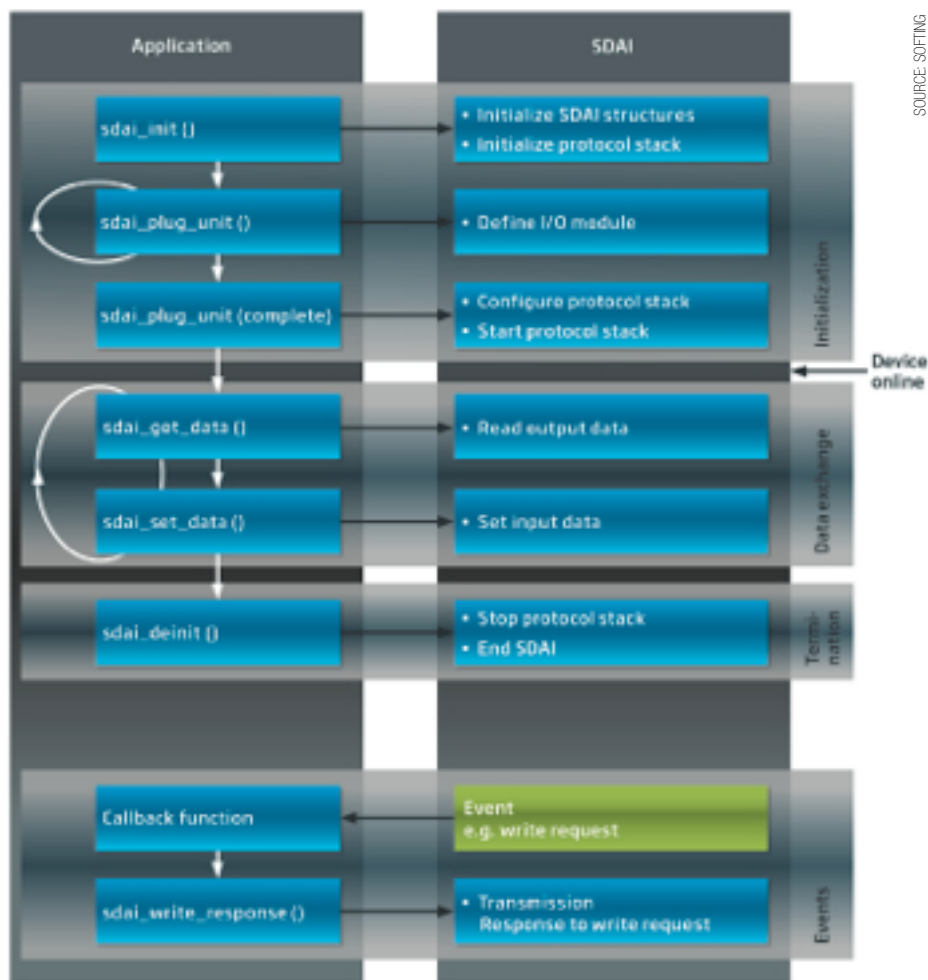
Many automobile manufacturers have been using the Data Matrix code in Direct Part Marking (DPM). The code allows the unique identification of all components and ensures the required 100% traceability. As different methods, such as dot pen or laser marking, are used for affixing the Data Matrix code to the components, the reliable reading of the marking is a major challenge for the reader systems used. In addition, quality differences in the encoding and disturbances from the environment, such as different background types, emulsions or damaged surfaces, impair the recognition performance.

Unglaube's Data Matrix code readers are also used in highly complex applications, for example for the control of entire machining

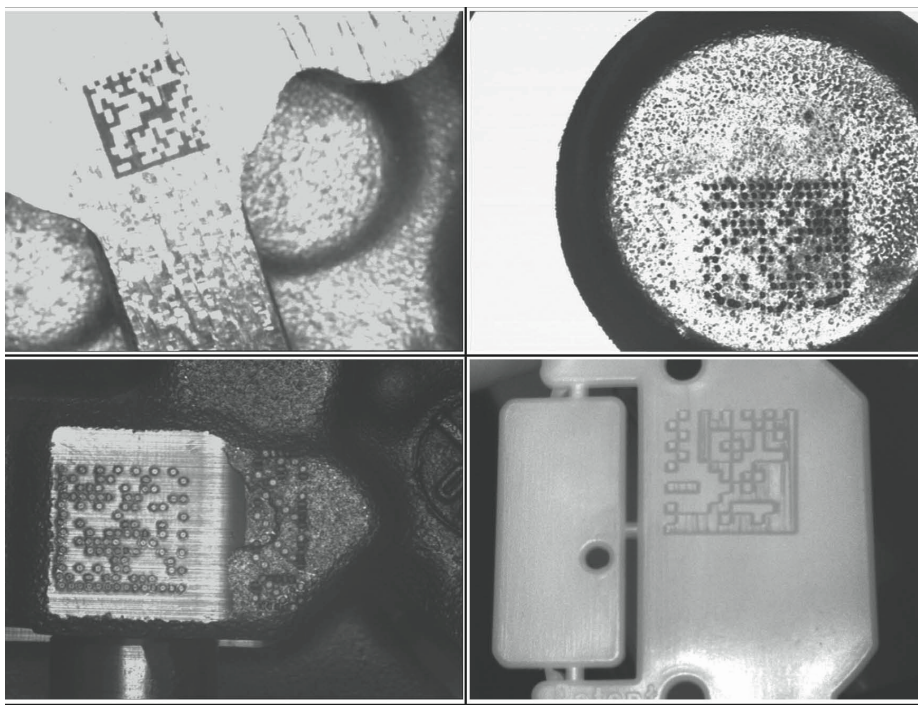
centers. Here a vast variety of different components need to be identified by their Data Matrix code. The higher-level production planning and control system then uses this information to coordinate the next machining steps. When multiple machining centers are interlinked, very high read rates are required to avoid costly standstills.

Based on years of experience with Data Matrix code reader systems, Unglaube knows exactly which solution best suits the individual requirements of their customers. The self-developed reader systems are renowned not only for their high operational safety, but also for their exceptional reliability and long lifetime. Unglaube products are in use today in the automotive industry all over the world.

A key product is the SmartCam DMRe2u Currera Data Matrix code reader, which combines the hardware of an intelligent camera system with the DMRe2u decoder software for dynamic image preprocessing. Known as one of the best Data Matrix code readers in the market, the system is also used in the fully automated manufacture of cylinder heads and



The SDAI interface allows easy implementation of the Industrial Ethernet communication. In addition to functionality for configuration, cyclic data exchange and communication termination, the SDAI also supports the handling of asynchronous events of the protocol stack, such as acyclic read and write access.



Quality differences in the markings on the components and disturbances from the environment are major challenges for the recognition performance of the Data Matrix code reader.

adaptations and porting efforts. Another advantage was that the stack can be used on a per-unit license basis and, therefore, offers a good price-performance ratio. Unglaube's positive experiences with other Softing products and the fact that Softing is located in the area were other points in favor of the PROFINET Device Protocol Stack.

Softing's PROFINET Device Protocol Stack provides different interfaces for integration into a Windows-based application (see Figure 3). Unglaube decided to use the Simple Device Application Interface (SDAI) because this interface is protocol-independent and thus independent from the PROFINET implementation. It is therefore easy to use without requiring detailed PROFINET know-how. The SDAI offers a lean architecture supporting device initialization and actual data exchange, using only a few function calls (see Figure 4). Due to its abstraction from the actual implementation, the SDAI interface can also be used for implementing other Industrial Ethernet protocols in addition to PROFINET by using a standardized application.

### Successful implementation

To speed up the implementation of the PROFINET interface, Unglaube made use of a sample application providing a set of calls for the individual SDAI functions. After briefing by Softing, the application of the SmartCam DMRe2u Currera Data Matrix code reader system was developed on this basis within minimum time. The resulting system then quickly and successfully passed the joint function test. Thanks to the excellent and efficient cooperation between the project teams from Unglaube and Softing, the implementation went very smoothly.

The PROFINET implementation of the reader has already been deployed in automobile manufacturer's plants. In addition, a completely new production based on the PROFINET implementation is currently being realized.

As a result of the PROFINET project, Unglaube can now offer a very simple-to-use solution that meets all customer requirements. External devices causing additional costs are no longer needed. The solution has also strengthened the customer-supplier relationship and increased the product sales. Richard Albrecht, head of development at Unglaube, is very satisfied with the result: "The fast implementation in cooperation with Softing enabled us to retain our customers in this important product segment. The solution also gives us the possibility to provide other Windows-based products with a PROFINET interface. So, we are upbeat about the future, and we are positive that we will remain at the cutting edge with our products in the market."

Technology report by **Softing**.