Integrator for Industry 4.0

Thanks to its integrated middleware, Turck's robust DCC module connects RFID solutions directly into ERP, MES and other data systems without any additional detours

"Industry 4.0" or the "Industrial Internet of Things" are currently hot topics in the automation sector. These approaches and visions share the fact that industrial production in the future will enable customized mass production through increasing flexibility and maximum automation right through to the automatic control of production processes.

Identification solutions such as RFID represent a key technology on the way towards mass customization. Only through the unique identification of workpiece carriers or workpieces is it possible to create a large number of different product variants in a single production line. For example, it is possible for different configurations to be stored for this purpose directly on the tag on the workpiece. RFID is ideal for the identification tasks of modern production and logistics as not only the recording of process parameters but also the writing of data to tags or bulk reads – the simultaneous reading of multiple tags – are possible.

Intelligent solutions
As very few systems are designed from scratch and newly implemented as part of the evolution of customized mass production, it must be possible to

QUICK READ

A new RFID module allows Turck to connect the production world with the IT world and thus prepares the way for Industry 4.0. The TBEN-L-DCC RFID interface is mounted directly in the production environment. Besides four RFID read/write heads in the HF or UHF frequency band, up to eight additional sensors or actuators can be connected. The key feature: Thanks to its integrated middleware, the Device Control Center processes the RFID signals directly in the module and transfers them conditioned and filtered directly to production or corporate management systems.

integrate intelligent sensors and identification technology later in existing production systems. Three things are indispensable for this upgrade: the identification solutions must be easy to implement. The user does not want to write for each application a separate program for preparing the RFID data for its corporate networks and performing the relevant actions. RFID solutions therefore have to be simpler and require less programming than today. Secondly, the interfaces of the industrial hardware for the corporate IT networks and their languages must be opened. And thirdly, IT technology is required, which is suitable for use in industrial systems and the appropriate protection types.

With its latest TBEN-L-DCC – Device Control Center – RFID module, Turck is precisely meeting these requirements. The DCC module enables RFID applications to be retrofitted compactly and quickly in production plants at a later time without any real programming required. Based on the robust TBEN-L module platform with IP67 protection, it offers another eight freely definable digital inputs/outputs as well as
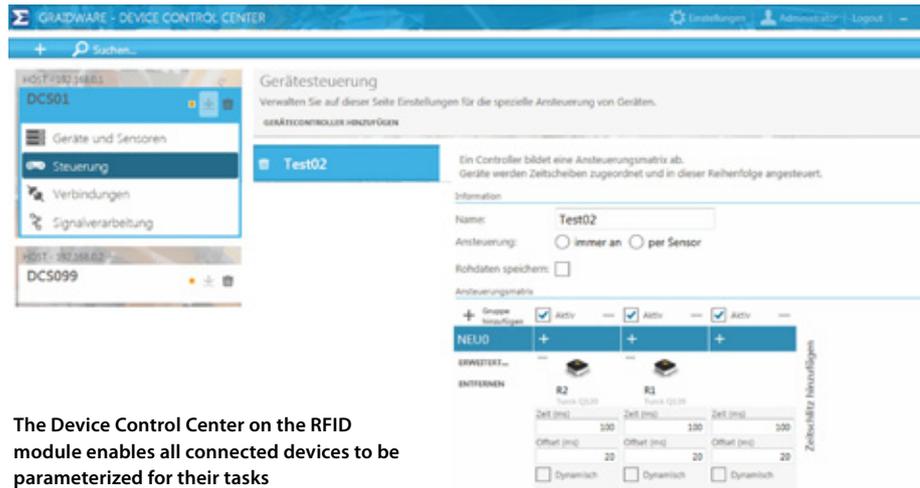
The Device Control Center on the RFID module enables all connected devices to be parameterized for their tasks

connection options for four RFID read/write heads in HF or UHF technology. Communication with higher-level ERP or MES systems is implemented via Ethernet TCP/IP. The smooth running of the module is ensured with an ARM Cortex A8 controller with Windows Embedded Compact 2013 and a 800 MHz frequency, 4 GByte NAND Flash memory and 512 MByte DDR3-RAM.

This level of performance enables the standard tasks of a middleware – from data pre-processing and filtering right through to the multiplex operation of several read/write heads – to be performed directly on the module. Without any knowledge of programming you can use the software of the DCC to set the parameters and identification tasks of the connected devices as well as preselect the data. The actions of the connected sensors and actuators are also set up in the DCC, for example, in order to define trigger signals.

Simple data transfer
The data transfer is implemented via standard interfaces such as web services, CSV file storage or Windows Eventlog files. This enables the processed data to be forwarded directly to ERP and MES systems or Cloud servers. If the functionality of the TBEN-L-DCC is not enough, it is also possible to communicate directly with the Graidware middleware of Turck system partner Sigma Chemnitz. Graidware is a high-performance middleware which not only manages devices, roles and users, and logs key performance indicators (KPI), but also enables the collection, processing and saving of signals, the plausibility checking of data, the evaluation, statistics and visualization as well as the data exchange with third-party systems such as SAP or other ERP systems.

Cheaper than IPC solutions
Users can implement simple RFID applications directly in the field with the TBEN-L-DCC. This eliminates the need to install a separate industrial PC for preprocessing data. Besides the costs saved for the IPCs, this also saves the mounting and wiring effort involved with a control cabinet solution – particularly when additional actuators or sensors have to be connected via interface converters and GPIOs. Thanks to its internal switch,

Industry 4.0 Enabler: Turck DCC RFID module brings together the IT and production world
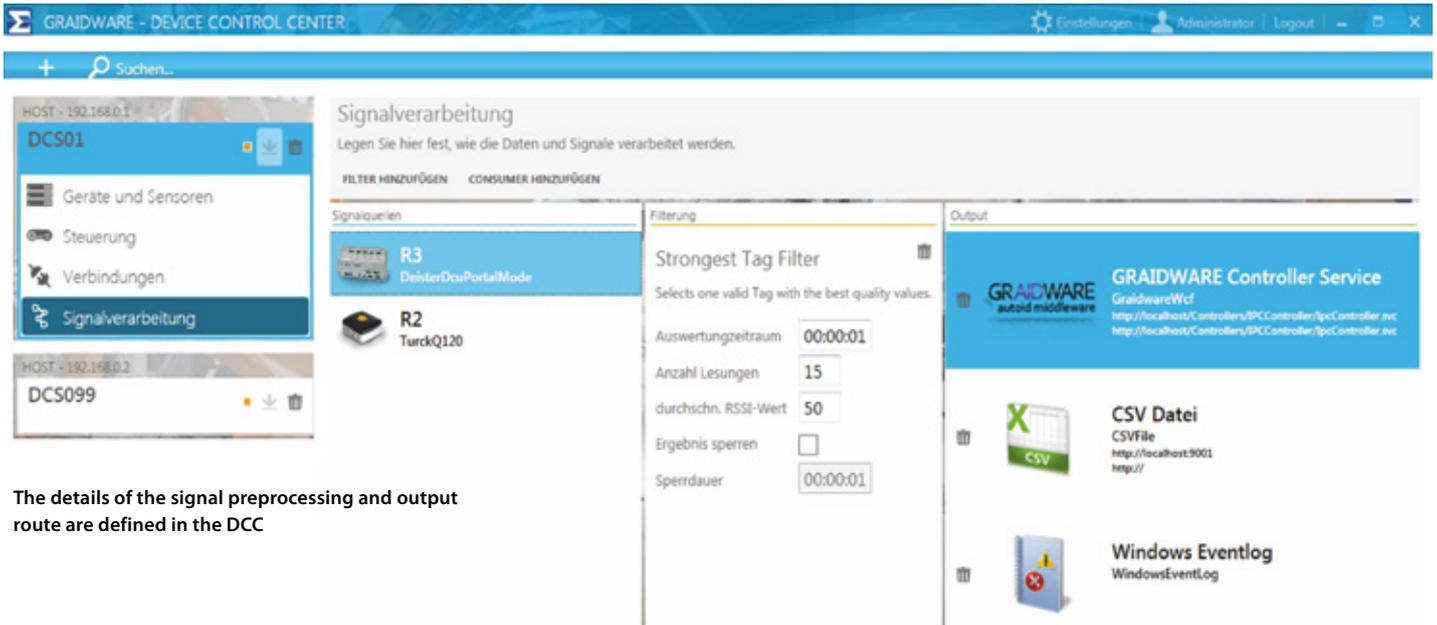
The details of the signal preprocessing and output route are defined in the DCC

several TBEN-L modules can be wired directly in series in a linear topology via the TCP/IP interface. This keeps the wiring requirement down to a minimum.

The compact size and robust design of the device are particularly useful for installations in existing plants. Particularly with retrofits, the space provided in existing control cabinets is not always enough for the additional I/O and IT technology involved, even though designers wish to avoid installing additional cabinets.

Applications in industry and logistics

The easily configured multiplex operation and the possibility to also connect UHF read/write heads make the Turck DCC modules particularly suitable for applications in logistics, such as for gate control with several UHF read/write heads in multiplex operation. In logistics applications, data is also transferred directly to databases and ERP systems more frequently than in production, where the data is mostly processed first by machine controls.

The USB connection is used as a memory interface or for transferring data or software to the device

The modules are also highly suitable for use on fork lift trucks due to their high degree of protection and small size. Additional protective enclosures are unnecessary. Even wireless data communication can be implemented via external Wifi or LTE modules. The possibility to connect actuators and sensors via the module brings additional benefits: the ejection of NIO parts on a production section, for example, can be easily implemented.

Outlook

The merging of IT and industrial hardware required for Industry 4.0 has been efficiently implemented in the TBEN-L-DCC. The module is open for communication with IT systems and is at the same time robust enough for use in the harshest environments. Proprietary solutions for connecting RFID technology to databases, ERP and MES systems have become unnecessary.

This also offers a key to Industry 4.0. The connection of decision making systems with the production level must be simple. Programming services are expensive and therefore present an obstacle in establishing an intelligent production process. Turck's TBEN-L-DCC considerably reduces this hurdle. The TBEN-L-DCC will be available in the third quarter of 2016 with Windows Embedded 2013. Further versions based on alternative operating systems are scheduled to follow.

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