CASE STUDY

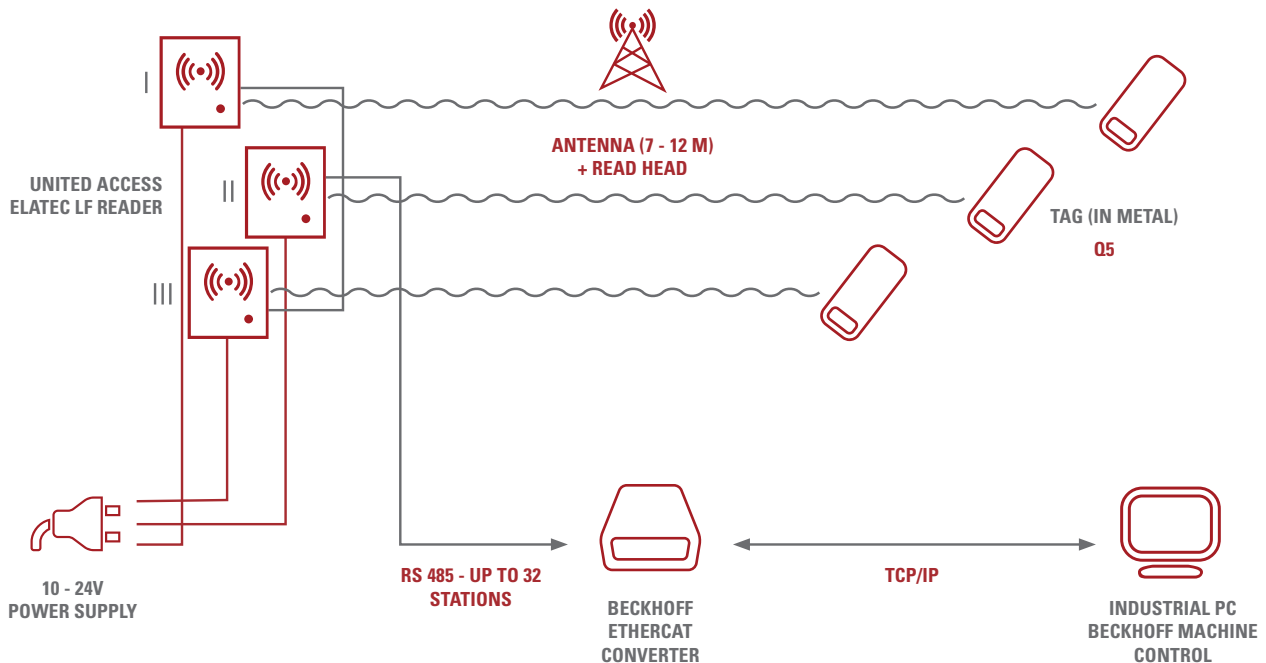## A CUSTOM SOLUTION FOR RFID-BASED MACHINE SETUP

Machine
Authentication

A European precision steel product manufacturer needed a robust reader for an RFID-assisted production system that would stand up to the rigors of the factory floor. United Access Ltd. collaborated with ELATEC to jointly develop a highly customized solution for precision steel processing equipment.

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CHALLENGE: COMPLEX REQUIREMENTS AND A CHALLENGING INDUSTRIAL ENVIRONMENT

The client company produces high-precision, cold-rolled strip steel products. They rely on RFID authentication of parts and devices to call up the correct parameters on machine controls. High-precision machining devices are measured at a calibration station, and the individual parameters are stored on a low-frequency (LF) RFID tag on the tool. In production, these data are read dynamically, and the parameters of the machine control system are individually adapted to the tool. The RFID-based machine setup system enables a high degree of workforce automation and reliable tracking of work equipment, enhancing productivity and quality control.

To hold up to the rigors of the factory floor, the reader needed to be able to withstand high temperatures and exposure to aggressive solvents and lubricants. Highly customized software, hardware and communication protocols were required to integrate the reader with machine controls. Read range and reliability were also challenging in an environment full of metal, requiring a customized antenna of several meters.

UNITED ACCESS ELATEC LF READER

ANTENNA (7 - 12 M) + READ HEAD

TAG (IN METAL) Q5

10 - 24V POWER SUPPLY

RS 485 - UP TO 32 STATIONS

BECKHOFF ETHERCAT CONVERTER

TCP/IP

INDUSTRIAL PC BECKHOFF MACHINE CONTROL

REQUIREMENTS

The reader needed to reliably read LF (125 kHz) tags in a harsh industrial environment. It required a custom, extra-long antenna and a robust housing to withstand exposure to solvents and lubricants. It also needed to integrate with an industrial computer running Beckhoff control software using an RS485 protocol.
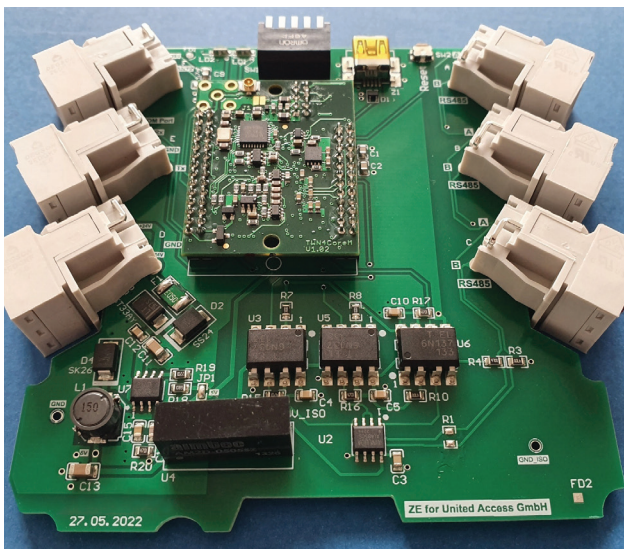
UNITED ACCESS LTD: A PERFECT INTEGRATION OF HARDWARE AND SOFTWARE

United Access Ltd., a long-time partner of ELATEC, is an Austrian systems integrator specializing in custom RFID and smart card solutions for physical and logical access control.

They create custom solutions that combine hardware and software for perfect alignment to customer needs.

For this client, they customized an ELATEC reader with a specialized housing, communication protocol, firmware and antenna design for use in harsh industrial environments.

ELATEC TWN4 MULTITECH NANO M

An update to the unit used in this application, the TWN4 MultiTech Nano M is compact multitechnology (LF/HF) reader designed for OEM board integration. Miniature size (31 x 17.8 x 2.7 mm) and low power consumption. Components mounted to one side for easy placement on the main circuit board. Supports wireless (re) configuration.

SOLUTION

ELATEC worked with United Access Ltd., an Austrian system integrator specializing in RFID solutions, to develop a customized reader suitable for an industrial environment. The solution was built around an ELATEC LF OEM reader that supports virtually any 125 kHz transponder technology (since replaced by the TWN4 MultiTech Nano M). United Access Ltd. developed the customized hardware, software and antenna to support the client's needs.

The result is a robust industrial reader suitable for use in even the harshest environments. The reader is encased in a sturdy housing that supports RS485, RS232 or USB interfaces. The reader is designed for DIN rail mounting. In this use case up to seven readers can be combined with different station IDs to a single industrial computer via TCP/IP-RS485 converter. The command interface is highly customizable for different applications. In general, up to 32 readers can be combined in a series using jumpers to assign station IDs, allowing easy centralized control of several machine stations.

United Access developed and implemented a customized communication protocol in collaboration with the plant manufacturer to ensure seamless integration with the industrial computer and Beckhoff machine control software. The solution also required custom reader firmware. LF RFID provides a reliable signal even in metallic environments. The ELATEC reader module supports a wide variety of LF tags, including EM, Q5, ATA and Hitag. A custom external antenna (7-12 m. long) enables reliable reads and extended read range even surrounded by metal components and machines.

The resulting solution enables accurate reads of LF tags on tools and devices for production automation. Precise measurement data is written to and stored on the LF tag at the measuring station. When the tag is read, the parameters are sent by the machine controls, enabling machine settings to be set dynamically based on precise measurements. This improves efficiency and quality control by eliminating the need to manually enter machine parameters. With robust design and seamless integration, the custom industrial reader supports smart factory solutions in any environment.

Want to know more about RFID for factory automation? Talk to our application experts.

BENEFITS

+ Compact design and low power use for OEM board integration

+ Powerful software development kit for custom firmware

+ Support contactless or remote configuration and updates