

AoT-News

Under the Microscope

Support for SME's

Tech-Corner

RFID - The next generation barcodes and smart cards

Speed-Dating à la AoT

with Rolf Schmid

News & Events

World Medtech Forum



25. - 27. September 2012
Halle 4, Stand Nr. C-445
Luzern, Schweiz

»Schneller Entwickeln«



18. Oktober 2012
1. Markt & Technik Symposium
Konferenzzentrum München

electronica 2012



13. - 16. November 2012
Munich Trade Fair Centre
München, Deutschland

Under the Microscope

Support for SME's

Many young entrepreneurs have pioneering, innovative ideas and set-up a company (with or without partners) to implement their idea by giving it a vessel and organising the necessary funding.

Quite often these Start-Up companies lack electronic know-how, as this is not the core business. Art of Technology AG provides support for these companies, either with our full development service or the appropriate individual support services.

Our experience has shown that the young entrepreneurs often want too much too quickly. In particular, the design of the first prototypes with key functions, required to convince prospective financial partners of the feasibility of a project, is an essential step in product development, as very few young entrepreneurs have the financial means to implement a comprehensive, market-ready product at the first attempt.

In most cases, it is very important to plan the "nice-to-have" extras in a later re-design, in order to keep initial costs at an affordable level.

Start-Up companies often overlook, what is NOT necessary for such prototypes. Here, Art of Technology is able to view the overall system from a distance, guiding the customer accordingly.



Art of Technology also offers young entrepreneurs independent system studies, which can be used to help convince potential investors of the feasibility of an idea.

In subsequent stages of a project, start-ups may lack the know-how required to optimise their product for volume production. Again Art of Technology can provide support with designs for manufacturability and testability for

small, large and very large volumes.

Furthermore, we are willing (for projects that convince us) to take limited financial risks, providing support services that are payable after financing has been secured.

Several companies have been able, with the help of Art of Technology, to get a good start to a successful future.

For further information contact [Paul Sphikas](#).

Tech-Corner

RFID - The next generation barcodes and smart cards

Klaus Ruzicka

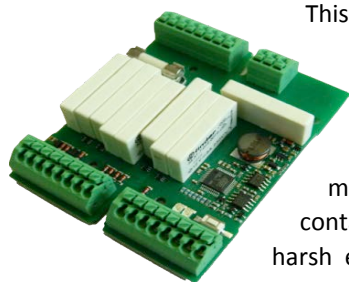
Barcodes¹ on packages or tickets are an indispensable part of our everyday lives. The same applies to smart cards of all kinds - recognisable by the golden contacts that have found widespread use as banking, customer, and key cards.

Both systems have drawbacks that limit their usage. Bar codes have to be held steady under the reader for a short time while being read, there has to be sufficient contrast to the background and the data is not be protected against accidental reading or tampering.



In more demanding applications, the cards are laminated and the antenna is made from a thin wire (for extended range) enabling the chip to save and transfer kilobytes of data (also encrypted²).

The smart cards, which draw the energy required from the radio signal³ of the reader, have a reading range from a few centimetres to several metres, depending on the type and receiver sensitivity.



This applies also to simple electronic tags, which are used (for example) in animals. However, chips and smart cards which have greater storage and security mechanisms, require physical contact, which can be problematic in harsh environments (moisture, dust) or where vandal-proof versions are required.

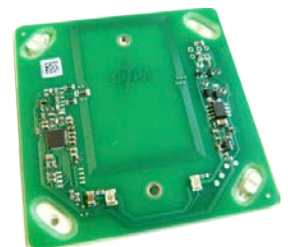
Current generation RFID cards combine the benefits of barcodes, chip and smart cards while avoiding their disadvantages. In it's simplest form, the RFID card - also called "Tag" - comprises a punched metal foil antenna and a chip with an unalterable serial number, sandwiched between two pieces of paper.

Unwanted remote reading is prevented by the security mechanisms, the addition of shielded housings or the use of contact smart cards.

Art of Technology software framework

Art of Technology AG designed and programmed increasingly more pieces of critical hardware-related code for, amongst others, the Atmel ARM7/Cortex-M3 line of processors (see [Newsletter, June 2011](#)) as there was no reliable basis available on the market.

This Art of Technology framework includes all the functions required to address RFID cards in accordance with ISO/IEC 14443 using the PCD⁴ MRFC522 from NXP. The communication between the RFID card and the processor is fully encrypted.



¹ e.g. European Article Number (EAN) oder two-dimensional Codes

² Typically DES, 3DES or AES

³ Typically 13,56 MHz or 125 kHz

⁴ PCD: Proximity Coupling Device (for RFID Card Reader)

AES⁵ is used by default (DES⁶ or triple-DES on request) and we use an Atmel SAM7 (ARM7 core) or a representative of Atmel SAM3 (ARM Cortex M3) series as control processor (using our framework other processors can be easily substituted).

Currently “Mifare plus” cards⁷ are used, being accessed via the T = CL Protocol, with the Mifare DesFire EV1 being used in more demanding applications. The AoT framework also supports Mifare Ultralight cards with the Mifare protocol (triple-DES Cryptography on request) for use in basic systems with small memory requirements (typically 10 bytes).

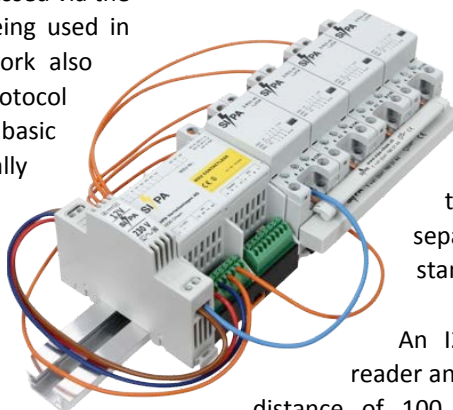
PC Software

Off-the-shelf Readers complete with PC Software in accordance with ISO7816-3 (Security Level 0 and T = 0 Protocol) are available for low-level access and programming of the RFID (smart) cards. The PC software simultaneously controls the card reader and the printer so that the printout and the configuration of the cards are guaranteed to be consistent. To do this, the reader is built into the printer.

Hardware

The Art of Technology RFID system is being used in an electricity meter switch, by SIPA Verteilanlagen AG, to replace an existing contactor-controlled version. The new RFID version can switch one device (in this case a washing machine) between 72 counters; using the copy protected, tamper-proof information about the system and the assigned contactor's stored on the RFID card.

Special cards to read the data-log and Caretaker-cards to unlock the public electricity meter for up to 50 systems are also available. Special attention was given to easy card handling and the exchange of defective cards and the blocking of lost cards.



The system consists of a control unit with 8 + 1 switching outputs and optional extenders, each with an 8 additional outputs in the top hat rail housing which can be installed in the local distribution box, as well as a separate RFID reader to be installed in a standard surface-mount housing.

An I2C bus serves as interface between reader and control processor, which can bridge a distance of 100 m with appropriate line drivers. If necessary, isolation of the two modules or remote supply and communication through a standard 4-wire ring line is possible. Standard 2-layer FR4-PCBs and single-sided SMT provide a cost-effective construction.

Information about the featured product is available directly from SIPA, or contact [Klaus Ruzicka](#) for more information.

⁵ AES: Advanced Encryption Standard

⁶ DES: Data Encryption Standard

⁷ RFID cards also known as PICC: Proximity Integrated Circuit Card

Speed-Dating à la AoT

with Rolf Schmid

What motivates you?

Continuously learning something new to develop myself...personal, professional and in relationships.

How do you spend your free time?

Preferably with my partner, my student fraternity is also very important to me, then Kyudo, cooking and eating, reading, hiking, dancing and diving.

What is Kyudo?

Kyudo is the art of Japanese archery; I practice a westernised form rather than the classic style, using a very modern interpretation of the bow and not the traditional Yumi. Nevertheless, meditation and inner focus are still very important aspects of training.

What attracted you to Kyudo?

Japanese Martial arts has always fascinated me. I used to do Judo, but the traditional sports are no longer possible for me due to back problems.

Which hobby would you never do voluntarily?

Bungee-Jumping.

Are you afraid of heights?

Only inside buildings.

What would you spend a lot of money on?

Travel, a nice apartment, cars.

Are you a bit of a connoisseur?

Yes, very much so.

What would you never spend money on?

Shares on the Stock Exchange

What things do you want to do in Life?

Learn to fly, travel the world.

Which profession would you not want to follow?

Professional Soldier



Age	43
Profession	Managing Director
with AoT	since 1999
Star sign	Taurus





Describe yourself in a few words?

Reserved, sometimes a little shy, demanding but fair

What upsets you?

Dishonest people.

What is your best quality?

I'm a good listener.

What are your strengths at work?

I keep an overview; even if something goes haywire I keep my nerves.

Which Super-strength would you like to have?

Sometimes I would like to be able to read the minds of others.

What sound or noise do you love?

A nice piece of meat sizzling in the pan.

You're invited to a Costume Party; how would you disguise yourself?

As a magician.

If you were an animal, which animal would you be?

A snake - I've got one at home and I find them just fascinating.

