

The German retailer uses RFID to display information about each garment presented in its store windows, enabling a consumer to buy that exact item on the spot, via a vending machine.

By Rhea Wessel

Feb. 3, 2009—Serendipity, creativity and years of patience are the basis for a clever application that utilizes radio frequency identification to operate a 24-hour automated fashion show in store windows. The system, employed by a retail store in an industrial park in northern Germany, displays information regarding each garment, thereby allowing shoppers to use their mobile phones to reserve the clothes they see, then purchase those outfits via a vending machine.

Erwin Krause owns [Krause Outlet](#), a warehouse and store that sells off-season men's and women's brand-name fashions that it buys from retailers eager to reduce inventory. The store often has individual items rather than full sets of all sizes and colors of a particular garment. Before Krause implemented RFID, customers had to wait for up to two weeks before purchasing items displayed in one of its windows. A clerk would manually write down the shopper's name and telephone number, then call when that item was taken out of the window and became available for purchase. Krause realized decades ago that this was hurting sales, however, and dreamed of a system that would enable him to have clothing constantly on display in the store window, even if items were selling quickly.



Krause Outlet

As luck would have it, Krause's neighbor, Wilhelm Stock, was an expert in automation technology for a large energy company. Together, Krause and Stock began to design a way for Krause's dream to become reality. The two contacted [Duerkopp Fördertechnik](#), a company in Bielefeld that manufactures automated hanging racks, to discuss a system. Stock then set up a small firm to consult with Krause's store on building a system.

Krause and Stock began implementing the idea in 2005, when Krause's company moved into a new

building in an industrial zone in Düren, a village near Cologne. The system became fully operational in late 2008.

When window-shopping at Krause Outlet, a customer may find himself lingering longer than expected. Instead of the usual mannequin or folded items, the patron will see articles of clothing moving by on a 56-meter-long (184-foot-long) automated hanging rack. The high-end, brand-name items are spaced approximately 2.4 meters (8 feet) apart on the rack.

As each piece of apparel—a [Hugo Boss](#) jacket or coat, for instance—reaches the window, the automated rack stops and turns that item around 180 degrees, and a nearby RFID interrogator reads the passive high-frequency (HF) tag attached to the garment. The tag's unique ID number is linked to data regarding the item, as well as its picture, enabling related information and the picture to pop up on a computer screen in the store window. Customers can read about the item's size, brand and original price, along with Krause Outlet's price and a code that can be used to reserve the item for purchase.

If a customer wants to buy the garment or put it on hold, he can call a special automated hotline and punch in a four-digit code to designate the desired item.

The computer system then instructs the automated hanging rack to remove the garment from circulation and place it on hold, or to dispense it to the customer immediately. The system automatically replaces the garment on the circular hanging rack with others ready and waiting on the sidelines. An item placed on hold moves along the circular route of the hanging rack until reaching the juncture for reserved items. At this point, the garment's RFID tag is read once more in order to identify it, and the automated system moves the article of clothing to a storage area for items that have been reserved. The customer then has two business days to return and purchase that garment.

Krause Outlet Takes Window-Shopping to the Ultimate Level

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When a garment reaches the store window, an interrogator reads the item's RFID tag, prompting product information to appear on a computer screen.

If a person would rather take the item home immediately, he can do so by buying it through the automated system, a sort of vending machine for clothes. After reserving the garment, the patron uses his bank card to unlock a secure door that leads to a lobby in which Krause has set up a touch-screen machine similar to an ATM. The shopper puts the bank card into the machine, follows the instructions to call up information on the reserved item and makes the purchase.

Once a garment has been paid for, the computer system instructs the hanging rack to move it to the delivery door inside the lobby. A reader identifies the item via its RFID tag and moves it into position behind two glass doors. The inner glass door opens, the automated hanging rack moves the garment into the delivery position and the inner door closes. A few seconds later, the outer door separating the customer from the item slides opens, and the shopper can then take his purchase.

At present, there is no designated area for a shopper to try on the item, and any returns must be made in person during regular business hours. If customers return their RFID tags to the store, they receive a 50-cent refund per tag.

Customers who purchase items online also utilize the RFID system. Krause has designed its Internet site so that it, too, runs a 24-hour fashion show. As photographs of garments move across the screen, patrons can click on them and discover the four-digit code of each item. By calling the automated system, a customer can then place a particular item on hold.

As with reservations phoned in by customers standing in front of the store window, orders placed by Internet users result in instructions from the computer system to the hanging rack. The rack is instructed as to which item to take out of circulation, then reads the tags on all items that pass by the interrogator and automatically sorts out those that have been reserved.

Tags used in the application are 13.56 MHz, with a proprietary air-interface protocol. The system's designers chose these tags because EPC Gen 2 tags were not yet considered the industry standard at the time the system was developed. Krause uses about 2,000 tags, which are made by [X-Ident Technology](#). Readers and antennas were provided by [Feig Electronic](#). The tags are the size of a credit card, and are attached to clothing in the same way other hangtags are attached with a plastic thread. For garments such as shirts and jackets, tags are always placed near the brand label at the back of the

collar. For pants, the tags are always located near the brand label on the back of the waistband. Interrogators are able to read the tags even at short range, since the tags are always in the same place on each garment.



After a customer pays for an item, an RFID-enabled conveyor system delivers it directly to the purchaser.

At the point of tagging, the RFID tag's unique ID number is linked in the store's database to the bar-coded ID number printed on the label attached to the item.

If Krause ultimately expands the application to all 50,000 items in his warehouse—which he is currently considering doing—he says he would endeavor to switch over to EPC Gen 2 tags, since that is the standard for the retail and textiles industry.

What's more, Krause is considering setting up the automated hanging rack system to automatically photograph each item. At present, employees must manually photograph garments intended for placement in the store window when they are RFID-tagged.

Krause says his decision to invest in radio frequency identification was "right on the money," given the potential of RFID compared with bar-coding. He has yet to experience high sales with his 24-hour store in the industrial zone, but feels he would do so if he implemented such a system in a large city.

[Click here](#) to watch a video about the application.

Krause has filed for a patent for the system.

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