RFID JOURNAL
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RFID Helps Gem Dealers Track the Diamonds They Buy, Cut and Sell

Topics/Verticals: Asset Tracking, Retail

Two jewelry wholesaler/retailers are using a passive HF system enabling them to read hundreds of tags attached to stacked envelopes in seconds.

By Claire Swedberg

April 25, 2007—Diamond manufacturers are using Magellan's phase jitter modulation (PJM) RFID technology to track their stones by simultaneously capturing the reads of hundreds of RFID tags. Manhattan jewelry wholesaler and retailer Favorite Diamond is employing PJM to track the location of every diamond that enters the store, and as it is processed, displayed or sold. The system, which the company installed two years ago, has allowed it to reduce shrinkage, as well as cut inventory by nearly 50 percent.

Eurostar Diamond, in Antwerp, Belgium, began using the same technology in November to automate the tracking of its diamonds as they pass from its manufacturing site in China to its Antwerp wholesale facility, then on to retail stores or Eurostar sales agents in New York or Shanghai.

Ken Laing

The system includes Magellan's 13.56 MHz passive PJM StackTags labels, which are compliant with the ISO 18000-3 standard, as well as the company's tunnel and desktop readers. Magellan's PJM technology says the company's VP of sales, Ken Laing, is capable of reading stacked tags in seconds. In fact, he claims, the tunnel can read several hundred tags in less than two seconds.

Typically, when gem dealers buy, cut, polish and sell diamonds, the stones are stored individually in envelopes stacked vertically in boxes, often a hundred or more per box. Diamond manufacturers and wholesalers track each stone, recording details about its grade, the number of carats and its type, such as a blue diamond. This is often accomplished by manually entering data about each stone into the database, or by using bar codes that must be scanned individually with a clear line of sight.

Until Favorite Diamond installed the PJM RFID system now in operation, says Eliezer Gruen, IT director at systems integrator Klein Brothers, the company used bar coding as its prominent tracking technology. Klein Brothers provided the PJM system and integration to Favorite Diamond's Microsoft Access back-end system. As diamonds arrived from sellers in Israel or the Netherlands, Favorite Diamond staff members would place each stone in its own envelope, attach a bar-coded label to the envelope, input details about the diamond and scan the bar code. That bar code could then be scanned again at the time of sale, though there was no way to track the stone as it moved around the store to be cut, displayed or placed into a safe or vault.

"The diamonds move faster than you can scan them," Gruen says. "It's simply impossible to scan the bar code every time they move. For that reason, it was not possible to know where things were—you

just couldn't keep track."

As a result, says Gruen, the store had twice as much inventory on site as it needed because staff simply didn't know what they did and did not have in stock. Stones were regularly "lost"—that is, somewhere on the premises but missing from the inventory record—and, thus, inaccessible when needed.

With the PJM system, Gruen explains, Favorite Diamond uses RFID to complement the bar-code system. The jeweler's staff still applies bar codes to each diamond, but now they also attach an RFID tag, using a desktop interrogator to scan the bar code and capture the unique RFID number. The RFID and bar-code readings are transmitted to Favorite Diamond's management system to be linked to details about each stone, keyed in by Favorite Diamond employees.

PJM's StackTag labels are read-write capable, able to hold up to 8,000 bits of data, but Favorite Diamonds does not use them for that purpose. Instead, the diamond company utilizes the ID number only, storing all other data on the back-end system. The company also continues to use bar codes so staff can scan the bar-code number in those sections of the store that lack RFID readers. "They only have about 10 readers," Gruen says, "They don't have one at every station."

The real advantage to the RFID system, says Gruen, comes when boxes of diamonds are being moved. At this time, a box may hold 100 envelopes or more, each containing its own diamond. To scan a bar code for each when the entire box is moved would be impractical. In this case, the staff places the box in the Magellan RFID tunnel reader, which is about the size of a shoebox and can interrogate tags at a rate of 1,000 per second. Magellan provides the readers, RFID labels and application software.

"Now there is no such thing as moving a stone without logging that data," Gruen states. Laing says Favorite Diamond first approached Magellan for this solution in 2000, noting that, "We showed them the prototype in 2002." About a year later, he says, Favorite Diamond began using the system.

Like Favorite Diamond, Eurostar receives rough diamonds from diamond sellers, but ships them to China to be manufactured (cut and polished). In November, bar-code and RFID solutions company Scanology provided the Magellan system and system integration, says Christof Teerlink, Eurostar's sub-manager. Until that point, Eurostar employees in Antwerp would input data about each rough diamond and assign an ID number, which was physically written on the diamond's envelope for use in tracking.

With the implementation of RFID, workers now ship the diamonds directly to the Chinese manufacturer, whose employees input data about each gem, attach an RFID tag to it and interrogate the tag, providing Eurostar with data on its own back-end management system about every stone. When the Chinese manufacturer ships the diamonds back to Antwerp, its uses a Magellan tunnel interrogator to read the tags, alerting Eurostar that the product is on its way.

Eurostar scans the tags again when the product arrives at its warehouse in Antwerp, and once more

when it is shipped either to a retailer or to its own sales agents in New York or Shanghai. The New York sales office, Teerlink says, also uses a Magellan RFID reader to scan the tags when they arrive. The Shanghai sales office does not yet have a tunnel reader, but eventually will. Altogether, Eurostar uses three tunnel readers and three desktops.

"Mainly, it's a matter of time savings," says Teerlink. "I assume we save about eight hours a week in data entry. We're very happy with it."

Richard Reese, Scanology's president, says the Magellan system is the best solution for jewelry dealers because "it's extremely fast." While the tunnel reader can capture hundreds of tags in an instant, he adds, the desktop can capture about 20 at a time.

Magellan accomplishes the stackable tags' read rate by using near-field RFID with an interrogator configured specifically to read stacked tags. This, Laing claims, is the first example of stacked RFID tag reads being used successfully. That may be true, agrees University of Kansas research professor Daniel Deavours, who adds that the special configuration of the RFID reader to those PJM tags would make it possible to capture reads from multiple RFID tags stacked against each other.