



# Supply Chain Technology

## RFID Monthly

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**Reik Read**

rread@rwbaird.com

414.298.1030

**Robb Timme**

rtimme@rwbaird.com

414.298.1762

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# Key RFID Developments

**Survey Suggests Traditional Data Capture Market Seeing RFID Opportunity.** We recently surveyed 92 automated data capture resellers in North America regarding industry trends and found some good activity in the RFID space. Roughly 33% of these resellers suggest RFID is becoming either “somewhat important” or “important” to their business. Further, resellers indicated that passive/BAP technology is the No. 1 technology category they expect to offer in the next 24 months; active came in at No. 2.

**Increased Federal Focus on Pharma Pedigree.** U.S. House Representatives Stephen Buyer (R-IN) and Jim Matheson (D-UT) introduced H.R. 5839, “Safeguarding America’s Pharmaceuticals Act” on April 17. The bill essentially seeks to require the Secretary of Health and Human Services to establish regulations to promote a standardized national drug identification and tracking system. The bill seeks to amend section 503 of the Federal Food, Drug and Cosmetic Act in ensuring safety of wholesale prescription drugs in terms of minimum required data elements for pedigree tracking, and it requires a report on technological evaluation in addition to standards development on a faster basis than required in the Food and Drug Administration Amendments Act of 2007 (FDAAA). The act would also supersede individual state pedigree laws.

**Increased Aerospace Activity.** Airbus recently offered some incremental insight into its RFID uses. The Aerospace giant, which has been piloting since 2006, discussed the success of past pilots, including providing some supporting metrics, and indicated that some rollouts have begun. The company is also beginning pilots with more complex operations and expects to begin expanding RFID throughout 2008. Airbus indicated that RFID, while just a tool, will be a key enabler in achieving some significant operational improvements.

**RFID Challenges.** Given the early stages of RFID, many challenges exist to adoption. Given comments from industry players, we see three that have particular focus: 1) ability to share data across a common platform among trading partners as data sharing will be the key value driver (this includes also restricting proprietary data); 2) Privacy and regulation, which as we discussed in previous editions can significantly dampen prospects if not properly addressed; 3) International standardization given the increasingly complex global supply chain.

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# RFID Hardware News and Comment

## Tags & Readers

UPM Raflatac unveiled three new Gen 2 tags based on Impinj's Monza chip inlays. The tags are designed for both near-field and far-field applications. The Button tag is a half-inch diameter tag intended for short-range difficult RF environments such as pharmaceutical vial tracking. The PaperClip tag (11mm x 20mm) is anticipated to be used in pharmaceutical, industrial and media tracking applications. The Satellite tag (36mm x 22mm) is designed for short or medium-range garment tagging and pharma tracking applications.

Avery Dennison announced that its RFID design and manufacturing facilities have been certified as ISO 9001:2000 compliant.

NXP unveiled a new HF RFID tag intended for library and other document archiving applications. The ICODE SLI-SY has a password protection feature and is compatible with ISO 15693 and 18000-3 standards. The chip also functions with Electronic Article Surveillance (EAS) systems, and according to NXP, is guaranteed to hold data for 40 years. We expect increased standards and product development focus on combination RFID/EAS tags. In the March edition, we discussed seeing increased interest from several retailers on such products.

Texas Instruments introduced a new "ultra-thin" contactless payment module designed for payment cards such as Mastercard's PayPass. According to the company, the module is 26% thinner than existing contactless modules, which enables card makers to use thicker print stock layers while maintaining card thickness standards. Thicker print stock is more durable and improves the yield efficiency of the payment card manufacturing process.

Vivotech unveiled its kiosk contactless payment module. Designed as a bolt-on addition to current parking meter, transit ticketing, self check-in and other types of kiosks, the module accepts payment from contactless payment cards and NFC equipped phones and does not

require the existing kiosk hardware to be recertified to accept these types of payments.

KSW Microtec, a smart card component supplier, unveiled a polycarbonate UHF inlay designed for security and ID card applications. According to the company, the polycarbonate substrate enables the inlay to be laminated into polycarbonate ID cards more easily and with lower risk of delamination than traditional PET inlays.

KSW Microtec also announced that it has created an RFID inlay designed for magnetic tape tracking and storage applications. The inlay is based on NXP's UCODE G2X chip and is designed to last ten years as part of an identification label.

Sokymat Automotive unveiled glass encapsulated low frequency (120kHz-140kHz) RFID tags intended for waste management, laundry, industrial automation and animal identification applications. The tags are available with different processing chips, including the EM4305 from EM Marin. The glass casing is designed to protect the tag in harsh environments. Sokymat Automotive also announced that it plans to release a new tag for laundry applications, the S-Tag 10mm 13.56MHz Laundry Tag this year.

Reva reported that its Tag Acquisition Processor (TAP) is compatible with Oracle's E-Business Suite enterprise resource planning software. The TAP provides data collected from various RFID readers in a structure that can be processed by Oracle's software.

Sirit announced the availability of enhanced firmware for its INfinity 510 UHF RFID reader. The reader is now meets regulatory compliance in 18 regions including Australia, China, Israel, South Africa and Taiwan. Acquisition algorithms were also updated and increased EPC Gen 2 functionality with NXP UCODE G2XM and G2XL chipped tags was added. Support for EM Microelectronic's EM4222 chip set and enhancements for Texas Instruments' EPC Gen 2 chip was also put into the firmware.

# RFID Hardware News and Comment

Feig Electronic announced the availability of firmware updates making its OBID i-scan HF LR2000 readers compliant with EPC HF Gen2 protocol. All new LR2000 readers shipped after April have the firmware installed. According to Feig, the update also enhances the anti-collision capability of the reader. Feig plans updates for its other readers after the EPC certifies the HF Gen 2 standard.

Feig also introduced a new UHF RFID reader, the ID ISC.MRU200i. The reader can operate using both near-field and far-field techniques simultaneously and is intended for apparel or pharmaceutical industry applications. We expect to see increased development of multi-capability readers. In 2009/2010, we anticipate increased development of multi-frequency readers as the new HF standards are approved.

Innovision Research & Technology announced that its integrated circuit chip is being used in Axxess International's Dot RFID tag. The UHF Gen 2 compatible chip works with various external sensors and in RFID systems with frequency ranges of 126KHz-960MHz.

As part of its new IT Asset Management (ITAM) solution for tracking IT assets, RF Code unveiled three new active RFID tags: the M130 Thin Tag for laptop and desktop PCs, the M140 Badge Tag for personnel and the M150 Temperature Tag for temperature sensitive equipment. The tags work in conjunction with the RF Code's Zone Manager software to track assets, create audit reports and meet compliance requirements (e.g., Sarbanes-Oxley).

Thin Battery Technologies recently announced the availability of its line of printed battery products for applications such as battery assisted passive RFID tags, RFID sensor tags, RTLS solutions and smart cards. Thin Battery's products are powered by carbon-zinc chemistry and are thinner than coin or button-cell batteries.

## Systems and Solutions

Xterprise announced that its Clarity CCI (cold chain integrity) solution is now widely available. The system is designed to monitor conditions during the transport of items such as pharmaceuticals, engineered materials, beverages and food (e.g., produce), and volatile compounds. The solution consists of sensors that monitor temperature, humidity, and movement integrated with active RFID tags from Tyco. The tags communicate on customers' existing WiFi networks and can store sensor data until reaching a suitable hotspot. Xterprise can also incorporate passive Gen 2 UHF tags in the same form factor, enabling customers to leverage their existing Gen 2 systems. We believe this will be a meaningful area of development given comments we have received from food companies that see great value in sensor-generated information. We also believe such cold chain solutions can help with the continued lack of food chain track and trace visibility for recalls.

In a related announcement, Xterprise reported that its Clarity Re-usable Transport Item (RTI) solution is now available for beer keg tracking applications. Xterprise cited a Beer Institute report indicating that 300,000 beer kegs, with a value of \$50 million, are misplaced annually. The Clarity RTI solution uses the IP68 Ironside rugged UHF Gen 2 RFID tag from Confidex.

NXP, in conjunction with Siemens, is developing an open-road tolling system that combines GPS, GPRS cellular and NFC technology. Cars would receive GPS positioning data and use it to calculate distance and time traveled. This would be sent via GPRS communications to a government agency that would calculate tolls. The system car would also include an NFC tag equipped sticker attached to the car's windshield, which would receive signals from the onboard system, verifying proper operation. Government monitoring personnel (e.g., police) would be equipped with scanners to check that the system is working correctly. We expect this solution will have the greatest opportunity in international markets.

# RFID Hardware News and Comment

Routeware, a provider of waste industry hardware and software, announced a new waste collection verification system based on Texas Instruments' LF RFID technology. The system uses tags attached to trash containers and readers mounted on trucks to record trash

collection events. Data is communicated to a central system in real-time by the trucks' on-board computers. The system can also monitor garbage trucks while they are in the yard or at dumping facilities. We are seeing increased interest in using RFID for waste management including monitoring discarded retail packaging, environmental sorting and recycle management.

SPEDE Technologies, a provider of wireless solutions for inventory tracking, unveiled its RFID Crane Locator system for inventory management. The system consists of wireless laser range finders located on top of an overhead crane and an RFID reader mounted in the hook of the crane. The range finders locate where the crane places an item while the RFID reader identifies the tagged item. The information is sent wireless to the crane cab, where it is processed and interfaced with the company's inventory control system. The solution is intended for steel processing facilities and warehouses.

MIKOH introduced its Smart & Secure Healthcare solution for the healthcare industry. The solution is designed for chain of custody and anti-tampering applications; the RFID tag is incorporated into a seal and ceases to function if the seal has been altered. The solution can also be used in patient wristbands for identification and to ensure administration of correct medication.

# RFID Software and Service News

Lowry Computer Products announced two products designed to work with Microsoft's BizTalk Server to manage RFID data. AssetTracker Pro is an asset tracking software solution intended to help customers meet Sarbanes-Oxley reporting and control requirements. TagSmart Pro is designed for Wal-Mart compliance and DoD UID requirements. According to Lowry, the software provides solutions based on Microsoft's .NET framework and integrates with Microsoft's other business products.

Sato announced that its iTRAK software suite for asset tracking applications can be integrated with Microsoft's BizTalk Server 2006 R2 software. Sato indicated that future versions of its iTRAK software would utilize BizTalk's capabilities in Electronic Data Interchange and AS2 data exchange protocols.

Software developer TrenStar received a patent for its RFID Asset Management Process. The company indicated that its process is unique in the method used for analyzing and passing asset movement data to users.

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## Industry Commentary

We recently surveyed 92 traditional automated data capture resellers in North America regarding industry trends and found some good activity in the RFID space. Roughly 33% of these resellers suggest RFID is becoming either “somewhat important” or “important” to their business. When asked what data capture technologies they expected to offer in the next 24 months, passive/BAP RFID came in with the No. 1 response, with active coming in at No. 2. These beat out traditional industry stalwarts scanning, printing and mobile computing. Key applications for all automated data capture technologies include inventory management, warehouse management and asset tracking. Our conversations with resellers suggest that RFID opportunities come along only sparingly at this point, but the closed loop versions offer strong profitability.

We continue to be surprised by the amount of negative RFID coverage oriented towards Wal-Mart. In our view, the story of RFID today is the relative successes achieved in the last two years, not the ongoing challenges in moving the retail supply chain forward. In the passive space, we have seen the development of equipment that works better than expectations, lower prices and the development of clear market and product segmentation. Pilots have moved well beyond supply chain, and are generating that all important financial return on investment in a wide number of industries, including manufacturing, transportation and logistics, healthcare, agriculture, etc. Long-term opportunities have been identified in apparel, Pharma and entertainment. In the battery-assisted passive space, we are seeing uses in returnables and asset tracking. Product segmentation is occurring. In the active area, improved Wi-Fi capabilities have lead to several different approaches that are allowing hospitals to cost effectively implement the technology. Automotive manufacturing and intermodal transportation are effectively using active RFID to improve operations.

In each of these areas, we have seen incremental investment from both the private financial markets as well as public companies, including Avery Dennison, Motorola/Symbol, Honeywell, Sirit and Zebra. While the market is still emerging, we view the activity as positive. In our view, we believe news coverage of RFID will begin to tilt more favorably as the potential benefits of RFID get realized closer to the end consumer, particularly in applications such as contactless payment, combination RFID/EAS, in store apparel, DVDs and baggage sortation.

As for Wal-Mart, we agree that things didn't go as planned given implementation schedules fall short of expectations, but this is not new. The important historical consideration is that Wal-Mart provided a catalyst for RFID, including fostering the development of standards, increased investment in the technology and essentially requiring end users to address and, therefore, learn about the technology. All of today's strong pilot activity might yet be years away if Wal-Mart had not provided its initial mandate.

A final industry comment. Given the early stages of RFID, there exist many challenges, but as we take inventory from the industry, we see three key concerns rise to the top: 1) ability to share data across a common platform among trading partners, and the ability to generate standards that allows public data to be properly shared and proprietary data to remain private; 2) Privacy and regulation, which could lessen the capability of the technology if enacted in a restrictive way; 3) International standardization. Given trade is truly global, we need a wide number of countries implementing the technology in a way that enables effective communication. Failure to achieve such standardization will diminish the value of the technology. Recall, China viewed Gen 2 as proprietary until it was adopted by ISO, and China originates roughly 70% of U.S. consumer goods. U.S. consumer product companies would see substantially greater value with China using Gen 2 technology.

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## Standards, Industry Policy, and Government

ISO published in late April ISO/IEC TR 24729-2, or “radio frequency identification for item management -- Implementation guidelines -- Part 2: Recycling and RFID tags.” This standard highlights the use of RFID as a tool in providing aid in the recycling process for household appliances and electronics. ISO notes that such recycling processes have been successfully demonstrated in Korea and Japan, and represent a key consideration for not “killing” tags. The original guidelines in this standard were developed by the RFID Experts Group within AIM Global. Also incorporated into ISO/IEC TR 24729 are parts 1, 3, 4. Part 1 provides guidance on the use of RFID enabled labels and packaging in the supply chain. This guidance includes transponder and media selection, placement, attachment on key conveyances, and techniques to minimize electrostatic discharge and transponder damage. Part 3 includes Implementation and operation of UHF Interrogator systems in logistics applications, and Part 4 provides guidelines on tag data security.

On May 1, the department of Army issued an updated request for proposal (RFP) for passive RFID hardware, software and services. The Army is looking for 5,894 fixed 902MHz-928MHz readers (1,263 in year one, 2,395 in year two and 2,236 in year three), and 2,199 mobile readers, also at 902MHz-928MHz (437 in year one, 590 in year two and 1,172 in year three). In addition, the Army will require 646 902MHz-928MHz printers (142 in year one, 259 in year two and 245 in year three), and roughly 53,000 General Purpose Tags. Thus far, sixteen vendors have indicated interest in bidding for the program. We estimate the total value of this order at roughly \$18M-\$23M over a three-year period, and while we do not view this as a large request, we are encouraged to see greater adoption in the DoD. In addition to the Army, recall that the Navy is rolling out 167 sites over five years. We believe such activity helps to validate the value of RFID and continues to get a greater number of consumer and aerospace suppliers focused on implementing the technology.

The U.S. Department of Agriculture (USDA) announced that it has shipped 28,000 RFID ear tags to California in conjunction with its National Animal Identification System (NAIS) “840” program. The NAIS 840 program is designed to electronically track livestock using a 15-digit code, and increases the capability of animal disease investigations, including bovine TB. The USDA has a goal of being able to trace any animal, its location(s) and associations within 48 hours. The tags are compliant with ISO 11784 and ISO 11785, are designed for attachment at the ear and operate at 134KHz. The USDA has five approved manufacturers, Allflex, Digital Angel, Global Animal Management/Geissler Technology, Y-Text Corporation and Leader Products. One tag variant is injectable and largely designed for horses; this is produced by Digital Angel. The USDA is also seeking to award to small business a blanket purchase agreement for 24,000 RFID ear tags annually for the tracking of sheep and goats.

U.S. House Representatives Stephen Buyer (R-IN) and Jim Matheson (D-UT) introduced H.R. 5839, “Safeguarding America’s Pharmaceuticals Act” on April 17. The bill essentially seeks to require the Secretary of Health and Human Services (HHS) to establish regulations to promote a standardized national drug identification and tracking system. Such proposed regulations to establish this system would be due no later than March 31, 2010 and final regulations would be due one year following the establishment of proposed regulations. This legislation seeks to amend section 503 of the Federal Food, Drug and Cosmetic Act (21 U.S.C. 353) in ensuring safety of wholesale prescription drugs in terms of minimum required data elements for pedigree tracking, and it requires a report on technological evaluation in addition to standards development on a faster basis than required in the Food and Drug Administration Amendments Act of 2007 (FDAAA). In addition, the act would supersede individual state pedigree laws.

While there is significant detail in the bill, the general purpose is to establish a pedigree, which can be conducted either through paper or electronic format that includes the drug names, the drug’s National Drug Code number, its strength, the container size, number of

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containers, the drug's lot control number, and the business name and address of all participants involved in a transaction of the drug, including the date of each transaction, beginning with either the authorized distributor of record (ADR-as defined by the Prescription Drug Marketing Act of 1988) or manufacturer as applicable.

The bill requires the Secretary of HHS to provide the Committee on Energy and Commerce in the House, and the Committee on Health, Education, Labor and Pensions in the Senate a feasibility and efficiency analysis on the use of certain technologies, including "barcodes, Radio-Frequency Identification Tags, nanotechnology, or other promising...technology..." This report would be due eighteen months following enactment of the act. The act also requires the Secretary of HHS to develop before March 27, 2010 a standard numerical identifier as required by Section 505D(b)(2) of the Federal Food, Drug and Cosmetic act (this section was created by the FDAAA, Section 913). That identifier would be required to be electronically readable and would access an electronic database that is interoperable among all supply chain participants. The Secretary also has responsibility for establishing standards for this database that would not only share necessary information, but also protect proprietary information for each supply chain member. Drugs defined to be "at risk" for counterfeit, will be required to carry this numerical identifier within 18 months after date of notice in the Federal Register.

In our view, this legislation may also help to clear up the delays associated with the implementation of the Prescription Drug Marketing Act of 1998 (PDMA), which first established drug pedigree requirements. The PDMA was largely paper based and has had a series of implementation delays, the most recent court oriented. Recall, in 2006, the Federal District Court in Eastern New York prevented implementation of the pedigree standard after wholesalers not meeting the definition of ADRs, indicated that ADRs would not provide them with pedigree information sufficient to meet the standard. The FDA appealed in April 2007 indicating that ADRs are required to furnish this information. Pending a decision, the FDA indicated it will not initiate enforcement actions.

The New Hampshire Senate Committee on Commerce, Labor and Consumer Protection referred HB686 for further study on a 6-0 vote on May 1. Recall, the New Hampshire house passed the bill on March 18 by at 209 to 121 margin. The measure sought to define several RFID-related terms, provide notice for consumers of tagged items, restrict use with respect to state readers and prohibit implanting devices in people. According to the bill Sponsor, Rep. Neal Kurk, the bill went beyond the recommendations of the government sponsored RFID Commission which has representation from industry, government, and privacy areas. For example, the bill sought a definition of "track," where the RFID commission acknowledged it is still working through arriving at a consensus definition. In our view, this bill seems a bit premature as it would be difficult to properly regulate a tracking technology if the definition of "track" is in question. We agree that such debate is positive, but we remain of the opinion that legislators should not seek to overly regulate the technology, but instead should strive to curb bad behavior. Further, based on testimony, we also believe that the unique labeling requirements being proposed by New Hampshire might be challenged in court under the commerce clause in the U.S. Constitution. There is such precedent in Bioganic Safety Brands vs. Don Ament, where a Colorado Federal court essentially indicated that unique state labeling requirements would place an undo burden on interstate commerce. For these reasons, we believe the New Hampshire Senate voted to further study the legislation. We expect constructive debate will follow.

Covidien reported that the FDA approved its RFID-enabled contrast media syringe system. The system consists of an RFID tag on a pre-filled syringe of contrast media injected into patients during CT scans, and an RFID reader on the power injector. The system is designed to increase safety by alerting medical personnel if the contents of the syringe are past the expiration date and by preventing injection of previously used syringes, which can lead to potentially fatal air injections or air embolisms.

## Implementation Analysis

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Airbus recently offered some incremental insight into its various uses of RFID and how it expects to use it as a tool to attain broader business objectives. The main challenge Airbus faces is increasing complexity of its supply chain. The company has eighteen assembly sites worldwide and plans to double production in the next several years. This is exacerbated by more complex product as the new A380 requires roughly 6x-8x more parts than that of the A320 product. The company believes RFID is one key enabler that will improve visibility, and thus allow Airbus better ability to measure, evaluate and change business processes. By 2010, Airbus intends to improve EBIT by 2B euros and cash flow by 5B euros through its "Programme 8" improvement initiative, which involves significant changes in its current business processes.

Airbus has been actively piloting RFID since 2006, and used the benefits of early projects, which automate data management, to fund continued development and piloting. Such pilots represented the first of three phases of pilot programs. Phase I and II are considered by Airbus to be in Non-Flyable visibility category, which represents production components. Nearly all programs to date have had a ROI payback of less than one year. Phase III will be flyable visibility, which handles in service operations, including maintenance, cargo, luggage and catering. Two phase I pilots were completed in 2006, which offered a quick payback, minimal disruption and focused on low complexity processes. Airbus sought to understand the costs, abilities and benefits associated with using RFID to improve visibility. The first pilot in Phase I covered tracking of products from two key suppliers, who added RFID tags to shipping labels to their shipments to enable greater receipt and goods movement automation at the Airbus third-party logistic provider in Toulouse. In this pilot, the increased automation reduced the time needed for manual key entry and lowered waiting/processing times, which allowed for a 75% reduction in physical handling time.

The second Phase I pilot covered receipt, storage and delivery to the assembly line of part containers at the Airbus A380 final manufacturing facility in Hamburg. The pilot tested 750 large containers that house parts and subassemblies for in-facility transport. Delivery to the line is particularly critical as there six assembly areas, each having four floors

and two directions (left and right), for a possible 48 delivery locations. Each of the containers looks similar and had been tracked through a paper based system; incorrect deliveries slow production and create a substantial need for "search labor." In this pilot, Airbus saw a substantial increase in first time delivery and was able to reduce the number of containers needed by 8%. This operation has been expanded to full deployment on four of the six assembly docks using 3,000 containers. Two additional docks are currently being deployed. This facility currently has 40 operational readers and will use a total of 80 readers once complete. This pilot is now also being deployed in two other sites beyond A380.

In Phase II, Airbus is currently conducting five pilots in internal transport, configuration management, manufacture tracking and tool asset tracking. These processes are slightly more complex and represent processes deeper within the Airbus production system. With configuration management, Airbus today tracks all part installations manually, including the capture of serial numbers and location of each part deployed. The company plans to improve automation using RFID and has completed a pre-pilot phase. In Transportation, Airbus tracks the shipment of large subassemblies across multiple geographies on a manual basis, and is again using RFID to automate the tracking capabilities. The pilot improved visibility on the transportation and storage of these subassemblies. As a result of the successful pilot, it is now being deployed at Airbus' Hamburg facility. In manufacturing, Airbus is using RFID to track the 10-12 work orders associated with each part which allows workers to automatically confirm what processes have been performed on a particular part and allows workers to find a particular part much more rapidly. These processes are historically done manually or in some instances with bar coding. Finally, with tooling, Airbus is using RFID to automate the check-out/check-in process, enable better location for missing tools and to manage the scheduling for tool calibration.

Phase III, which is for flyable operations, is in the detailed planning stages to determine if processes using RFID can add more value than existing capabilities. Airbus has announced that a live in-service pilot will begin by the end of June and will likely last until August or September.

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IBM and Oat Systems will provide the platform and application software for this project. IBM's WebSphere Premises Service leverages a service-oriented architecture to provide business process rules. In addition, IBM's Tivoli products will support infrastructure monitoring. Oat Systems will provide applications, including its foundation suite, asset-tracking and work in process monitoring solution. Odin Technologies has been providing system integration, including hardware testing.

## Passive/BAP RFID Applications

Zebra reported that Wilson Sporting Goods has implemented a compliance-driven UHF Gen 2 RFID system using Zebra's R110Xi printers. The installation includes four Zebra printers, which are used to encode labels that are subsequently applied by hand to cases and pallets of finished goods.

Intellex announced that it has partnered with Minds Inc., a provider of automation and information technologies for the road construction industry, to create an RFID-based solution for tracking hot-mix asphalt (HMA) trucks and material. Certain steps in building roads using HMA are time critical. The ability to track product weight, loading time, departure and arrival information and paving location on an automated basis using RFID is expected to substantially improve the overall HMA deployment capability resulting in better yields and higher quality. Today, these processes are done with a paper-based system, which often creates unwanted lag times.

UPM Raflatac reported that it is supplying its DogBone UHF Gen 2 passive RFID tags as part of an asset tracking solution for Assistor, an automobile logistics company. The solution, developed by Digia, consists of RFID tags attached to cars as they are unloaded from a cargo ship and handheld readers used to locate the cars during subsequent storage and other processing functions. Assistor upgraded its asset tracking system to RFID from a barcode system due to the better performance of RFID in adverse weather such as rain or snow.

BlueBean announced that it has implemented an RFID inventory tracking system for GE Aviation. The system, which uses Alien RFID readers and antennas, tracks shipments of inventory from GE's plant in Erlanger, KY to its plant in Durham, NC, and tracks inventory kits within the Durham facility.

Tracient Technologies reported that Airfield, a systems integrator in Luxemburg, is using its Explore-R and Padl-R handheld RFID readers in its field equipment inventory solution. Using the readers, workers scan tagged equipment in the field such as pipes, electrical boxes and cables and vineyard plants. The data is transmitted via Bluetooth connection to a smart phone, where it is input to business process software. Data, such as location or servicing event information, can be written back to the tags. The solution has been trialed by Faynot, a French land survey equipment manufacturer.

## Active News and Comment

AeroScout announced that Viracon, a manufacturer of architectural glass, will use AeroScout's asset tracking solution to monitor work in process at three of Viracon's U.S. production facilities after completion of a successful pilot program begun in fall 2007. As part of the installation, AeroScout's T2EB RFID tags will be installed on 5,000 glass carriers which transport in-process glass between cutting, tempering and lamination areas. The tags communicate over a Cisco Wi-Fi network and AeroScout's MobileView software displays the carriers' location. The data is also supplied to Viracon's inventory management system. According to Viracon, the system has reduced the time required to locate a specific piece of work from several minutes to less than one minute, and in some cases eliminated lost carriers. These benefits have reduced reproduction and scrap. Viracon expects to roll out this solution to its three locations by the end of 2008. In total Viracon's facilities cover more than 1.6M square feet, and produce over 35M square feet of glass each year.

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AeroScout announced that The Wrigley Company, producer of gum and other confections, has implemented AeroScout's active RFID system to track pallets at its Poznan, Poland manufacturing facility. The solution also uses Cisco's Unified Wireless Network and Wireless Location Technology.

Hi-G-Tek, a provider of RFID solutions for fuel distribution asset tracking and control, announced that Emco Wheaton, a manufacturer of petroleum tank truck equipment, is using Hi-G-Tek's Pro-Active RFID technology in its Sealed Cargo System (SCS) and other RFID-based products. The SCS is designed to monitor tanker truck compartment valves and access doors while the truck is in transit.

Axcess International reported that the U.S. Army is implementing a full rollout of an ordnance tracking system using Axcess' Dot technology at a weapons storage facility. The rollout comes after a pilot program begun last year and includes perimeter security and inventory applications.

In other ordnance tracking news, Savi announced that it has won a U.S. Army Joint Munitions Command contract for the installation of the Munitions Total Management Systems-Field Module (MTMS-FM) automated information system. The MTMS-FM is business process management software that incorporates data from various sources, including real-time data from barcode scanners and RFID readers.

In a development that we believe shows the continuing penetration of RFID asset tracking applications in healthcare, Randy Regimbal, Director of Network Services at Mayo Clinic indicated that he anticipates that RFID will be used to track equipment at the clinic. Mayo recently installed a Cisco Unified Wireless Network at its three campuses, and we anticipate that the clinic will leverage this installation in future RFID implementations.

Bentonville International Group (BIG) announced that the U.S. Geological Survey (USGS) is using the company's BIGViz PAK active/passive RFID solution to track and study the Mojave Desert Tortoise. BIGViz PAK is a mobile RFID data collection unit that was created for wildlife tracking applications.

## Knowledge Base / Education

RFID4U is offering three free courses for end users and industry players to learn more about RFID and its potential applications. These courses include RFID Basics, a RFID and UID Compliance Course for DoD applications and a practice exam to evaluate CompTIA certification readiness. Beyond these free offerings, *RFID4U* offers eleven titles in e-Learning and fourteen titles in instructor facilitated online classes, and provides CompTIA certification. To learn more, or to sign up for the complementary offerings, visit the *RFID4U* website at [www.rfid4u.com](http://www.rfid4u.com) or learning portal [www.teamrfid.com](http://www.teamrfid.com)

## Partnerships

I.D. Systems announced that Zetes, a European automatic identification systems integrator with 700 employees in 12 countries, will add I.D. Systems asset tracking systems to its lineup. We anticipate that Zetes will promote I.D. Systems' Wireless Asset Net as a tracking solution for Zetes' customers, many of whom operate forklift fleets at their warehouses.

## Corporate News

Francisco Partners, a private equity fund, reported that it is selling Metrologic to Honeywell for \$720 million. Metrologic will become part of Honeywell Security, a segment of Honeywell's Automation and Control Solutions division. Recall that Honeywell also acquired Hand Held Products in December 2007.

# RFID Briefs

3M announced that it is selling its HighJump Software business to Battery Ventures, a private equity firm with a technology focus. Recall that HighJump focuses on supply chain solutions; we believe this move demonstrates that 3M is concentrating its on offing RFID as part of its offerings in its core medical, office/library, transportation and safety and security business units.

VeriChip reported first-quarter revenue of \$8.6M, or growth of 21%. EPS came in at a loss of \$0.30 versus a loss of \$0.47 last year. VeriChip also announced that it is selling its Xmark subsidiary, a provider of infant security and adult patient wander systems, to The Stanley Works, a maker of tools and access control systems for \$45 million in cash, or for about 1.5x revenue. This segment had mid-single-digits operating profitability before corporate sales and marketing allocations. We expect the Xmark unit will be integrated with Stanley's Senior Technologies unit. We believe Stanley will compete most directly with RF Technologies, Visonic and Accutech. Given Stanley's comments that annual revenue exceeded \$30M, we also believe Stanley will acquire a portion of the industrial business. Industrial segment largely consists of vibration monitoring equipment, and the Tool Hound asset management solution. The company announced plans to sell its Tool Hound business previously. These segments have limited growth opportunity and are modestly profitable before corporate sales and marketing allocations.

VeriChip will receive \$37M in cash and plans to pay down its \$15.6M in outstanding debt, and issue a one-time dividend in excess of \$15M to shareholders with the proceeds. Verichip also announced that it is looking to sell its VeriMed Health Link business, and possibly the entire company, after completing the sale of Xmark. VeriMed is an implantable business generating minimal revenue and substantial operating losses and, thus using significant amounts of cash. We estimate the company could generate only a minimal amount in selling the remaining operations.

Scott R. Silverman has also agreed to step down as chairman and

CEO of VeriChip. Digital Angel CEO Joseph Grillo will take over as chairman at VeriChip. Recall, Digital Angel owns 48% of VeriChip's stock. We believe a key catalyst for these changes is Digital Angel's desire to focus on its core animal and emergency identification platforms. We view this as a continued maturing of the industry, where players are increasingly focusing on core opportunities, and larger players are entering/expanding their market presence through acquisition.

VeriChip also announced that it is renaming its patient identification system to "Health Link" as part of a direct-to-consumer marketing campaign in South Florida. Recall that VeriChip's system uses an RFID tag which stores a 16-digit identification number and is implanted in a patient's upper arm. If a patient is unable to provide information to emergency response personnel, the medics can scan the tag and have access to the patient's records through an online database. VeriChip also entered into a marketing agreement with HearUSA, a provider of hearing care; customers will be able to enroll in the Health Link program at HearUSA's eight HEARx locations in the Palm Beach area.

I.D. Systems reported that it acquired PowerKey, a supplier of industrial vehicle monitoring systems, from International Electronics for \$500,000. With the acquisition, I.D. Systems gains ties to current PowerKey customers such as Caterpillar, Owens Corning, Visteon and Whirlpool, in addition to PowerKey's network of forklift dealers. I.D. Systems also introduced PowerKeyPlus, an entry-level vehicle monitoring system that customers can later upgrade to the company's Wireless Asset Net RFID-based asset tracking system.

InnerWireless, a provider of wireless networking and PanGo asset tracking solutions, announced that it is receiving \$9.5 million in venture debt financing from Silicon Valley Bank. InnerWireless has previously received \$62 million in venture funding since 1998. The company will use the additional funds to expand operations, particularly in the healthcare and hospitality verticals.

# RFID Briefs

PowerID, a maker of battery-assisted passive RFID hardware, announced that it has opened a European sales office outside Amsterdam. Additionally, the company appointed Fred de Haas as Director of Sales, Europe. Mr. de Haas has significant Electronic Article Surveillance product experience. He worked previously at Checkpoint Systems as Business Development Director, Apparel in Europe and at Sensormatic.

Zebra Technologies announced that its CFO, Randy Whitchurch, is retiring. Zebra has appointed Mike Smiley as the new CFO. Mr. Smiley was most recently the General Manager for Tellabs' Denmark A/S division. Recall that Zebra's CEO, Anders Gustafsson also came to Zebra from Tellabs and most recently Spirent.

Lowry Computer Products announced that Tim Cook has been appointed as Vice President of Sales and Marketing. Mr. Cook was previously Vice President of Sales at Zebra and has also worked at Paxar as a sales executive.

Feig Electronics appointed Klaus Schoeke as National Sales Director for the U.S. region. Mr. Schoeke has experience in industrial automation and integration and is an engineer trained in HF and RFID technology.

Intermec reported revenue of \$217 million for the first quarter of 2008, up from \$179 million last year on strong sales of its CN3 mobile computer. Operating income for the quarter was \$12.2 million, versus a loss of \$5.0 million in first quarter 2007. RFID remains a small but rapidly growing component of revenue. EPS came in at \$0.13 versus a loss of \$0.07 last year.

Zebra's first-quarter revenues were \$246 million, up 18% over the first quarter of 2007, driven in part by recent acquisitions of WhereNet, Navis, proveo and Multispectral Solutions. Revenue from these businesses, which collectively form Zebra's Enterprise Solutions Group

(ESG), was \$21.5 million, versus \$6.7 million in the first quarter of 2007. ESG operating loss was \$7.1 million, down from \$3.6 million last year. In total, Zebra reported EPS of \$0.42 versus \$0.39 last year.

SAP reported 1Q08 revenue of 2.46 billion euros, which represents a 14% increase versus last year. Currency provided a 6% headwind. In the important software category, revenue came in at 622 million euros, or an 11% increase. SAP's investments in the SAP ByDesign mid-market solution negatively impacted profitability. SAP generated earnings per share of 0.21 euros, down from 0.26 euros last year, or a drop of 19%.

Checkpoint Systems reported first-quarter revenue of \$210 million, up 22% from the first quarter of 2007, with currency benefits and recent acquisitions each accounting for 9% of the growth. Operating income (excluding restructuring charges) in the quarter was \$8.7 million, up from \$6.5 million last year.

Sirit reported first-quarter revenues of \$4.3 million, down from \$5.5 million in the first quarter last year due to lower transponder sales and effects of currency translation. Operating loss was about \$1.4 million, versus a loss of approximately \$0.8 million last year.

I.D. Systems announced first-quarter revenue of \$4.3 million, down from \$4.6 million last year. Loss from operations was \$2.9 million for the quarter in 2008, down from a loss of \$2.3 million in the first quarter of 2007. The higher loss was due to increased marketing personnel headcount in preparation for growth.

Digital Angel reported revenue of \$22.4 million in the first quarter, up from \$15.3 million last year, on 14% growth in its animal identification segment and 112% growth in its emergency identification segment driven by the acquisition of its McMurdo commercial beacon business (contributed 86% to segment growth). The company reported an EBITDA loss of \$0.4 million, excluding one-time charges, up from a loss of \$4.1 million last year.

# RFID Briefs

WJ Communications reported first-quarter revenues of \$10.3 million, down from \$10.8 million in the first quarter of 2007. Excluding one-time charges, EBITDA was a loss of \$354,000, up from a loss of \$2.5 million last year. Recall that the acquisition of WJ Communications by TriQuint Semiconductor is anticipated to close on May 22, after approval at a scheduled shareholder meeting. The acquisition price is \$1.00 per share, for a total of \$72 million, which represents a 22% premium to the \$0.82/share average price for WJ during the week before the acquisition was announced (March 10).

Access International reported first-quarter revenue of \$176,000, down from \$1.023 million in the first quarter 2007 due to timing of orders and a large order in 2007. Management indicated that the booking rate for the second quarter is at a run rate of approximately \$500,000. Loss from operations in the first quarter was \$1.5 million, up from a loss of \$1.8 million in the first quarter of 2007 on reduced marketing and R&D expenses.

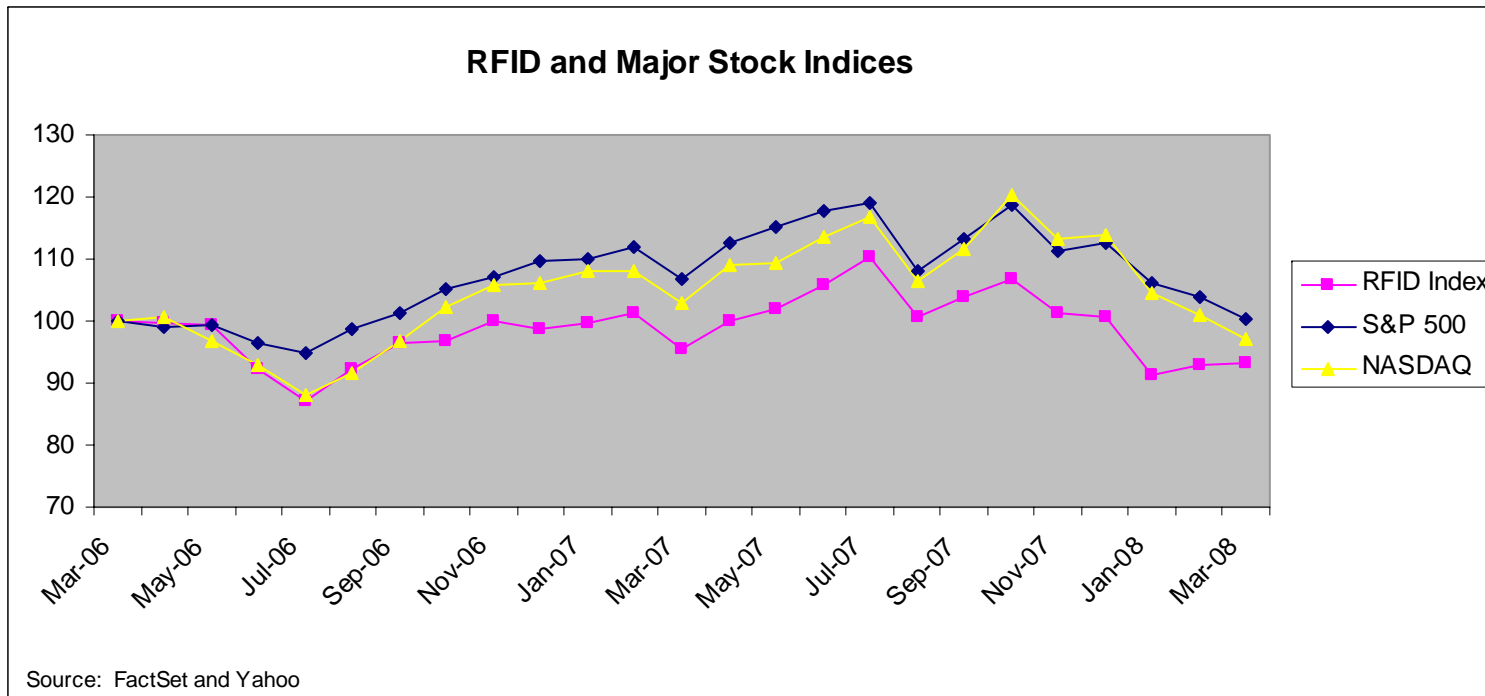
## Upcoming Events

RFID Journal's "RFID In Fashion" show will be held August 13-14 at The Fashion Institute of Technology in New York. The event provides an overview on using RFID to improve the supply chain for apparel, footwear and accessories, including inventory tracking, on-shelf availability and shipping accuracy. The event also explores using RFID to improve the customer in store experience to generate incremental revenue as well as theft deterrence. To learn more, visit <http://www.rfidjournalevents.com/fashion/>.

## RFID Monthly

To receive RFID Monthly, please send us an e-mail at [read@rwbaird.com](mailto:read@rwbaird.com). There is no charge for the publication.

# RFID Stock Index and Comment



On May 15, Baird's RFID Index was up 6.6% versus April 15. The index underperformed both the S&P 500 (+6.7%) and the NASDAQ (+10.8%). Of companies under Baird Supply Chain Technology coverage, Zebra (+13.9%) outperformed all three indices on first-quarter results and second-quarter guidance above expectations. Intermec (+9.4%) reported higher-than-expected revenues and guidance for second quarter was roughly in line with expectations and NCR (+9.4%) had better-than-expected results; both companies outperformed the RFID Index and S&P 500, but underperformed the NASDAQ. ScanSource (+5.0%) and Avery Dennison (+1.3%) underperformed all three indices. Stocks that outperformed the indices included Infineon (+46.8%), Atmel (+34.9%), Axxess (+29.7%), and ST Microelectronics (+23.6%). Big movers that underperformed the indices included Sirit (-23.3%), Sun Microsystems (-9.3%), and ID Systems (-7.7%).

# RFID Stock Index Table

Company Name	Ticker	3/12/08 Price	% change		52 week	
			vs. Last Month	vs. Last Year	High	Low
3M	MMM	\$ 78.42	-1.22%	3.20%	\$ 97.00	\$ 72.05
Accenture	ACN	33.83	-3.48%	-3.34%	44.03	31.91
Atmel	ATML	3.42	-4.74%	-34.48%	6.08	2.83
Avery Dennison	AVY	47.12	-6.77%	-26.68%	68.78	44.06
Axcess	AXSI	1.16	-17.14%	-15.64%	1.96	0.91
Brady Corporation	BRC	31.79	5.97%	0.98%	44.46	28.00
Cisco	CSCO	25.14	6.37%	-2.60%	34.24	21.77
Digital Angel	DIGA	0.76	15.29%	-61.03%	1.64	0.41
IBM	IBM	117.07	9.45%	25.28%	121.46	92.10
ID Systems	IDSY	6.25	-18.19%	-47.92%	14.85	5.94
Infineon	IFX	7.26	-12.95%	-50.61%	18.74	7.15
Intel	INTC	21.12	1.37%	10.34%	27.99	18.05
Intermec	IN	23.01	0.74%	8.33%	30.16	17.53
Motorola	MOT	10.01	-14.30%	-45.36%	19.68	9.43
NCR Corporation	NCR	22.20	-1.94%	-2.41%	29.01	15.07
Omron Corporation	OMRNF.PK	21.00	-16.00%	-4.55%	26.50	21.00
Philips	PHG	39.50	3.11%	7.05%	45.90	34.91
SAP	SAP	49.05	1.07%	8.54%	59.86	43.00
ScanSource	SCSC	34.23	-2.95%	31.05%	39.50	22.61
Sirit	SI.TO	0.27	50.00%	1.89%	0.41	0.18
STMicroelectronics	STM	10.84	-8.52%	-42.80%	20.84	10.66
Sun Microsystems	SUNW	16.96	0.36%	172.67%	26.04	14.20
Texas Instruments	TXN	28.38	-7.16%	-10.10%	39.63	27.67
UPM Rafsec	UPM	17.54	5.98%	-32.23%	26.69	16.35
Verichip	CHIP	2.77	20.43%	NA	10.62	1.76
WJ Communications	WJCI	0.97	59.02%	-39.38%	2.00	0.40
Zebra Technologies	ZBRA	33.49	9.88%	-10.93%	42.50	27.50
RFID Index		683.56	0.27%	-2.33%	808.89	669.63
S&P 500		1308.77	-3.37%	-6.00%	1576.09	1270.05
NASDAQ		2243.87	-3.93%	-5.67%	2861.51	2168.67

Source: FactSet

# Table of Key RFID Providers

Company Name	Ticker	Semi-Conductors	Inlays/Tags	Readers	Printers / Encoders	Networking	Software	Integration / Services
3M Company	MMM		X	X			X	X
AbeTech	Private							X
Accenture	ACN							X
Acscis	Private					X	X	
Aeroscout	Private	X	X			X	X	
Alien	Private	X	X			X		
Ambient ID	Private						X	
Applied Wireless	Private		X					
AssetPulse	Private					X	X	
Atmel	ATML	X						
Avery Dennison	AVY		X					
Access	AXSI	X	X			X		
Bentonville Int'l Group	Private					X	X	
Brady Corp	BRC	X		X				
BlueStar	Private						X	
Blue Vector	Private				X	X	X	
Checkpoint Systems Inc.	CKP	X	X			X		
CIM Bar Code	Private						X	
Cisco	CSCO				X			
Computer Sciences Corp.	CSC						X	
Confidex	Private	X						
Danaher (Accu-Sort)	DHR						X	
Datalogic	DAL	X	X					
Dover (Datamax)	DOV			X				
Digital Angel	DOC	X	X					
Domino-ISG	Private						X	
Ekahau	Private	X	X		X	X	X	
EM Microelectronic Marin	UHR.DE	X						
Feig Electronic	Private	X	X					
Fluensee	Private					X	X	
Globe Ranger	Private					X		
Goliath Solutions	Private	X	X					
Hewlett-Packard	HPQ						X	
ASSA-ABLOY (HID)	ASSA	X	X					
HK Systems	Private						X	
IBM	IBM					X	X	
ID Systems	IDSY	X	X			X		
Identec Solutions	Private	X	X			X	X	
Impinj Inc.	Private	X	X					
Infineon	IFX	X						
Intel Corporation	INTC				X		X	
Intellex	Private	X	X	X				
Intermec	IN	X	X	X			X	
IPICO	RFD.TSX	X	X	X				
Lexmark	LXK			X				
Lowry Computer	Private	X		X		X	X	
Kennedy Group	Private	X		X		X	X	
Magellan Technology	Private	X	X			X		
Manhattan Associates	MANH					X	X	
MARKEM	Private	X					X	
MIKOH	MIK.ASX	X					X	
Miles Technologies	Private						X	
Moore Wallace	RRD	X						
Motorola (Symbol)	MOT		X				X	

Company Name	Ticker	Semi-Conductors	Straps / Inlays / Tags	Readers	Printers / Encoders	Networking	Software	Integration / Services
Nashua	NSHA	X						
NCR Corporation	NCR						X	X
OATSystems, Inc.	Private						X	
Odin	Private							X
Omron Corporation	OMRNF.PK	X	X					
Oracle	ORCL				X	X	X	
Panatrack, Inc.	Private					X	X	
NXP	NXP	X						
Power ID	Private	X	X					X
PLITEK	Private	X						
Precision Dynamics	Private	X	X					
Printronix	Private			X				
Provia Software Inc.	Private					X		
Red Prairie	Private					X	X	
Reva Systems	Private				X			
RF Code	Private	X	X			X		
RF Technologies	Private	X	X					
Rfid, Inc.	Private	X	X					
RFID Global Solution	Private					X	X	
RFTechnologies	Private	X	X			X	X	
RSI ID Technologies	Private	X				X	X	
Rush Tracking Systems	Private						X	
SAP	SAP					X	X	
Sato	Japan	X		X				
SAVR Communications	Private	X						
Lockheed (Savi)	LMT	X	X		X	X	X	
ScanSource Inc.	SCSC						X	
Siemens	SI				X		X	
SimplyRFID	Private					X	X	
Sirit	SI.TSX		X					
SkyeTek	Private		X					
Sovereign Tracking Sys.	Private	X	X			X	X	
STMmicroelectronics	STM	X	X					
Sun Microsystems	SUNW					X	X	
System Concepts, Inc.	Private					X	X	
Tagsys	Private	X	X	X		X	X	
Texas Instruments	TXN	X	X					
ThingMagic	Private			X				
Toppan Printing	7911	X	X	X				
Toshiba TEC	Japan	X	X					
Roper (TransCore)	ROP	X	X					X
TrenStar Inc.	Private					X	X	
Tyco (Sensomatic)	TYC	X	X				X	
UPM Raflatac	UPM	X						
Venture	Private							X
Verichip	CHIP	X	X					
Verisign	VRSN				X	X	X	
Vue Technology	Private					X	X	
Wavetrend	Private	X	X			X	X	
WJ Communications	WJCI			X				
Xterprise	Private					X	X	
Zebra Technologies	ZBRA	X	X	X		X	X	

Source: Company Websites

# Comparable RFID Valuation

**COMPARABLE RFID VALUATION**  
**Analysis of Selected Ratios and Current Market Multiples**  
*(in millions, except per share amounts)*

Ticker	Company <sup>(1)</sup>	Fiscal Year End	Latest Quarter	Shares <sup>(2)</sup>	Price Per Share 3/12/2008	Market Value of Equity	Debt <sup>(3)</sup>	Enterprise Value	Book Value	52 Week Price	
										Low	High
<b><u>Wireless Infrastructure:</u></b>											
RIMM	Research In Motion Ltd.	2/28/2008	2/28/2008	557.6	\$101.39	\$56,536.4	7.5	\$55,290.5	3057.0185	\$42.93	\$137.01
GRMN	Garmin	12/31/2008	12/31/2007	217.0	\$58.82	12,762.8	0.0	12,017.5	1985.6595	\$52.11	\$125.68
ELMG	EMS Technology (LXE)	12/31/2008	12/31/2007	15.3	\$25.00	383.2	13.7	265.0	224.36735	\$18.00	\$33.23
NVTL	Novatel Wireless Inc.	12/31/2008	12/31/2007	29.7	\$9.98	296.8	0.4	171.3	167.56495	\$9.98	\$29.14
IDSY	ID Systems Inc.	12/31/2008	12/31/2007	11.3	\$6.25	70.6	0.0	42.4	77.422803	\$5.94	\$14.85
<b><u>IT Solutions/Software:</u></b>											
ACN	Accenture Ltd.	8/31/2008	2/28/2008	595.9	\$33.83	\$20,160.0	8.5	\$18,305.2	2063.3324	\$31.91	\$44.03
IBM	International Business Machines Corp.	12/31/2008	12/31/2007	1385.2	\$117.07	162,169.3	35,274.0	181,297.3	20654.518	\$92.10	\$121.46
MANH	Manhattan Associates Inc.	12/31/2008	12/31/2007	27.6	\$22.02	608.0	0.0	485.7	219.14573	\$21.31	\$31.63
SAP	SAP AG	12/31/2008	12/31/2007	1218.3	\$49.05	59,756.9	34.5	54,701.4	7995.0518	\$43.00	\$59.86
SUNW	Sun Microsystems Inc.	6/30/2008	12/31/2007	883.5	\$16.96	14,984.2	1,274.0	11,273.3	6636.162	\$14.20	\$26.04
UIS	Unisys Corp.	12/31/2008	12/31/2007	353.9	\$4.31	1,525.3	1,262.7	1,957.8	13.087834	\$3.04	\$9.70
VRSN	Verisign	12/31/2008	12/31/2007	222.8	\$34.00	7,576.9	1,265.3	7,518.9	1601.3648	\$23.78	\$41.96
<b><u>Data Capture:</u></b>											
ZBRA	Zebra Technologies Corp.	12/31/2008	12/31/2007	68.8	\$33.49	\$2,305.1	0.0	\$2,138.8	939.04611	\$27.50	\$42.50
IN	Intermec, Inc.	12/31/2008	12/31/2007	60.3	\$23.01	1,387.9	100.0	1,238.1	425.5295	\$17.53	\$30.16
AVY	Avery Dennison	12/31/2008	12/31/2007	98.4	\$47.12	4,636.0	2,255.8	6,820.3	1899.6119	\$44.06	\$68.78
BRC	Brady Corp.	7/31/2008	10/31/2007	54.1	\$31.79	1,720.6	500.0	2,036.4	891.01225	\$28.00	\$44.46
CKP	Checkpoint Systems Inc.	12/31/2008	12/31/2007	39.3	\$26.05	1,023.2	16.5	907.2	505.4997	\$19.02	\$30.50
<b><u>Components/Semi-Conductors:</u></b>											
IFX	Infineon Technologies AG	9/30/2008	12/31/2007	749.7	\$7.26	\$5,443.0	2,732.2	\$6,804.0	6987.2164	\$7.15	\$18.74
PHG	Koninklijke Philips Electronics NV	12/31/2008	12/31/2007	1090.7	\$39.50	43,082.9	5,194.3	35,533.2	30344.112	\$34.91	\$45.90
STM	STMicroelectronics NV	12/31/2008	12/31/2007	897.4	\$10.84	9,727.8	2,220.0	9,157.4	8896.0283	\$10.66	\$20.84
WJCI	WJ Communications	12/31/2008	12/31/2007	67.3	\$0.97	65.3	0.0	41.4	23.035341	\$0.40	\$2.00
CHIP	Verichip	12/31/2008	12/31/2007	3.5	\$2.77	9.7	14.4	35.3	10.926395	\$1.76	\$10.62
TXN	Texas Instruments Inc.	12/31/2008	12/31/2007	1343.2	\$28.38	38,120.3	0.0	35,196.3	10698.944	\$27.67	\$39.63
<b><u>Networking/Telecom</u></b>											
INTC	Intel Corporation	12/31/2008	12/31/2007	5818.0	\$21.12	\$122,876.2	2,122.0	\$109,635.2	40768.861	\$18.05	\$27.99
MOT	Motorola Inc.	12/31/2008	12/31/2007	2263.1	\$10.01	22,653.6	4,323.0	18,370.6	14904.381	\$9.43	\$19.68
CSCO	Cisco Systems Inc.	7/31/2008	1/31/2008	6100.0	\$25.14	153,354.0	6,851.0	134,450.5	33972.248	\$21.77	\$34.24
NOK	Nokia Oyj	12/31/2008	12/31/2007	3965.7	\$32.10	127,299.9	1,860.4	108,152.5	20451.059	\$20.94	\$42.22
QCOM	Qualcomm Inc.	9/30/2008	12/31/2007	1646.0	\$39.75	65,428.5	283.0	57,684.8	15835.001	\$35.17	\$47.72
ERIC	LM Ericsson	12/31/2008	12/31/2007	1588.1	\$20.07	31,873.7	4,215.1	27,175.6	18490.138	\$19.48	\$43.41

(1) Information Provided by Factset.

(2) Excludes options

(3) Net debt equals total debt (including capital leases) plus preferred stock at book value plus minority interest minus cash and short term investments

(4) Book value equals total shareholders' equity less preferred stock at book value

\*\* Incomplete metrics as a result of recent IPO

# Comparable RFID Valuation

## COMPARABLE RFID VALUATION

### Analysis of Selected Ratios and Current Market Multiples

(in millions, except per share amounts)

Ticker	Company <sup>(1)</sup>	Latest Twelve Month Results					Latest Twelve Month Margins					* Cap	
		Net Sales	Gross Profit <sup>(2)</sup>	EBITDA	EBIT	Net Income <sup>(3)</sup>	Gross Profit <sup>(2)</sup>	EBITDA	EBIT	Net Income <sup>(3)</sup>	Debt to:		EBIT to:
											Total Cap.	EBITDA	Int
<b>Wireless Infrastructure:</b>													
RIMM	Research In Motion Ltd.	\$5,057.1	\$2,510.9	\$1,643.9	\$1,482.8	\$631.6	49.7%	32.5%	29.3%	12.5%	0%	0.5%	NA
GRMN	Garmin	\$3,180.3	\$1,463.3	\$1,042.3	\$978.3	\$855.0	46.0%	32.8%	30.8%	26.9%	0%	0.0%	23,860.3
ELMG	EMS Technology (LXE)	\$287.9	\$29.5	\$6.4	\$6.4	\$15.8	10.2%	2.2%	2.2%	5.5%	5%	43.4%	11.8
NVTL	Novatel Wireless Inc.	\$429.9	\$138.8	\$5.9	-\$2.1	\$0.4	32.3%	1.4%	-0.5%	0.1%	0%	0.6%	#N/A
IDSY	ID Systems Inc.	\$17.1	\$8.2	-\$6.8	-\$7.3	-\$1.6	47.7%	-39.7%	-42.9%	-9.5%	0%	NA	(733.1)
<b>IT Solutions/Software:</b>													
ACN	Accenture Ltd.	\$22,388.4	\$6,314.3	\$2,989.1	\$2,805.2	\$1,243.1	28.2%	13.4%	12.5%	5.6%	0%	0.3%	110.8
IBM	International Business Machines Corp.	\$98,786.0	\$36,530.0	\$21,065.0	\$15,863.0	\$10,418.0	37.0%	21.3%	16.1%	10.5%	45%	177.2%	15.6
MANH	Manhattan Associates Inc.	\$337.4	\$176.4	\$61.3	\$47.7	\$19.3	52.3%	18.2%	14.1%	5.7%	0%	0.0%	90.8
SAP	SAP AG	\$14,960.8	\$10,020.6	\$4,554.7	\$4,175.0	\$2,469.7	67.0%	30.4%	27.9%	16.5%	0%	0.8%	NA
SUNW	Sun Microsystems Inc.	\$13,952.0	\$6,587.0	\$1,850.0	\$1,049.0	\$473.0	47.2%	13.3%	7.5%	3.4%	15%	68.9%	NA
UIS	Unisys Corp.	\$5,652.5	\$1,322.7	\$563.1	\$182.6	-\$79.1	23.4%	10.0%	3.2%	-1.4%	74%	424.2%	2.4
VRSN	Verisign	\$1,496.3	\$783.7	\$349.0	\$117.4	-\$144.7	52.4%	23.3%	7.8%	-9.7%	45%	363.5%	NA
<b>Data Capture:</b>													
ZBRA	Zebra Technologies Corp.	\$868.3	\$406.0	\$200.1	\$173.2	\$69.6	46.8%	23.0%	19.9%	8.0%	0%	0.0%	687.3
IN	Intermec, Inc.	\$849.2	\$361.0	\$46.1	\$34.4	\$35.0	42.5%	5.4%	4.1%	4.1%	19%	216.9%	0.0
AVY	Avery Dennison	\$6,307.8	\$1,722.4	\$817.5	\$582.9	\$303.5	27.3%	13.0%	9.2%	4.8%	37%	275.9%	5.5
BRC	Brady Corp.	\$1,453.4	\$705.4	\$260.5	\$203.0	\$109.4	48.5%	17.9%	14.0%	7.5%	35%	202.2%	7.7
CKP	Checkpoint Systems Inc.	\$834.2	\$346.0	\$77.4	\$77.4	\$35.0	41.5%	9.3%	9.3%	4.2%	2%	17.5%	33.0
<b>Components/Semi-Conductors:</b>													
IFX	Infineon Technologies AG	\$10,451.6	\$1,370.2	\$639.3	-\$1,191.2	-\$473.5	13.1%	6.1%	-11.4%	-4.5%	22%	427.3%	(28.1)
PHG	Koninklijke Philips Electronics NV	\$39,125.8	\$13,443.5	\$3,047.2	\$2,302.9	\$6,718.8	34.4%	7.8%	5.9%	17.2%	5%	115.6%	#N/A
STM	STMicroelectronics NV	\$10,001.0	\$3,544.0	\$2,214.0	\$801.0	\$782.0	35.4%	22.1%	8.0%	7.8%	17%	99.8%	18.2
WJCI	WJ Communications	\$43.9	\$24.1	-\$8.0	-\$8.0	-\$8.4	54.9%	-18.2%	-18.2%	-19.1%	0%	NA	(102.7)
CHIP	Verichip	\$23.7	\$15.5	-\$9.1	-\$10.9	-\$6.7	65.4%	-38.3%	-46.1%	-28.4%	38%	NA**	(6.4)
TXN	Texas Instruments Inc.	\$13,835.0	\$7,331.0	\$4,776.0	\$3,706.0	\$2,641.0	53.0%	34.5%	26.8%	19.1%	0%	0.0%	3,706.0
<b>Networking/Telecom</b>													
INTC	Intel Corporation	\$38,334.0	\$20,001.0	\$14,608.0	\$9,810.0	\$6,976.0	52.2%	38.1%	25.6%	18.2%	4%	14.5%	324.0
MOT	Motorola Inc.	\$36,622.0	\$9,964.0	\$1,874.0	\$971.0	-\$105.0	27.2%	5.1%	2.7%	-0.3%	21%	230.3%	16.6
CSCO	Cisco Systems Inc.	\$37,684.0	\$23,789.0	\$12,264.0	\$10,663.0	\$7,333.0	63.1%	32.5%	28.3%	19.5%	17%	55.9%	28.4
NOK	Nokia Oyj	\$74,560.0	\$26,585.7	\$11,681.0	\$10,101.7	\$5,682.6	35.7%	15.7%	13.5%	7.6%	1%	15.9%	0.1
QCOM	Qualcomm Inc.	\$9,292.0	\$6,462.0	\$4,159.0	\$3,759.0	\$3,303.0	69.5%	44.8%	40.5%	35.5%	1%	6.8%	234.9
ERIC	LM Ericsson	\$29,082.5	\$8,730.0	\$5,021.7	\$5,021.7	\$3,841.1	30.0%	17.3%	17.3%	13.2%	10%	63.5%	19.1
Mean							42.7%	13.6%	8.9%	6.1%	13.9%		
Median							45.8%	14.5%	9.4%	5.6%	4.8%		
High							69.5%	44.8%	40.5%	35.5%	74.3%		
Low							10.2%	-39.7%	-46.1%	-28.4%	0.0%		

(1) Information Provided by FactSet.

(2) Before depreciation and amortization.

(3) Represents income from continuing operations before extraordinary items.

\* Numbers not available as systems are still in the process of being updated following earnings reports.

\*\* Incomplete metrics as a result of recent IPO

# Comparable RFID Valuation

## COMPARABLE RFID VALUATION

### Analysis of Selected Ratios and Current Market Multiples

(in millions, except per share amounts)

Ticker	Company <sup>(1)</sup>	LTM		Cal. Year Ended 2006		Cal. Year Ended 2007		Growth Rate <sup>(2)</sup>	PEG Ratio	Price to:				Book Value	Dividend Yield
		EPS	P/E	EPS <sup>(2)</sup>	P/E	EPS <sup>(2)</sup>	P/E			Net Sales	EBITDA	EBIT	Net Inc		
<b><u>Wireless Infrastructure:</u></b>															
RIMM	Research In Motion Ltd.	\$1.87	54.3x	\$0.97	104.3x	\$2.05	49.5x	34.5%	1.4	22.5	34.4x	38.1x	89.5x	18.5	0.0%
GRMN	Garmin	\$3.89	15.1	\$2.35	25.0	\$3.80	15.5	19.7%	0.8	8.7	12.2	13.0	14.9	6.4	1.3%
ELMG	EMS Technology (LXE)	\$1.24	20.2	\$0.81	30.9	\$1.24	20.2	NA	NA	13.0	59.9	59.9	24.2	1.7	0.0%
NVTL	Novatel Wireless Inc.	\$1.21	8.2	\$0.01	998.0	\$1.19	8.4	19.2%	0.4	2.1	50.3	(141.4)	670.1	1.8	0.0%
IDSY	ID Systems Inc.	-\$0.65	(9.6)	\$0.11	56.8	-\$0.36	(17.4)	17.0%	(1.0)	8.7	(10.4)	(9.6)	-43.7	0.9	0.0%
<b><u>IT Solutions/Software:</u></b>															
ACN	Accenture Ltd.	\$2.11	16.0x	\$1.73	19.6x	\$2.11	16.0x	13.9%	1.2	3.2x	6.7x	7.2x	16.2	9.8	0.0%
IBM	International Business Machines Corp.	\$7.24	16.2	\$6.06	19.3	\$7.13	16.4	10.8%	1.5	4.4	7.7	10.2x	15.6	7.9	0.9%
MANH	Manhattan Associates Inc.	\$1.13	19.5	\$1.08	20.4	\$1.30	16.9	15.0%	1.1	3.4	9.9	12.8	31.5	2.8	0.0%
SAP	SAP AG	\$2.33	21.1	\$2.01	24.4	\$2.19	22.4	14.0%	1.6	6.0	13.1	14.3	24.2	7.5	0.7%
SUNW	Sun Microsystems Inc.	\$0.87	19.5	-\$0.08	(212.0)	\$0.82	20.6	8.3%	2.5	2.3	8.1	14.3	31.7	2.3	0.0%
UIS	Unisys Corp.	-\$0.23	(18.7)	-\$0.81	(5.3)	-\$0.23	(18.7)	8.3%	(2.2)	1.2	2.7	8.4	-19.3	116.5	0.0%
VRSN	Verisign	-\$0.68	(50.0)	\$0.96	35.4	\$1.02	33.3	18.8%	1.8	9.7	21.7	64.5	-52.4	4.7	0.0%
<b><u>Data Capture:</u></b>															
ZBRA	Zebra Technologies Corp.	\$1.60	20.9x	\$1.56	21.5x	\$1.65	20.3x	15.5%	1.3	5.7x	11.5x	13.3x	33.1	2.5	0.0%
IN	Intermec, Inc.	\$0.40	57.5	\$0.38	60.6	\$0.40	57.5	18.6%	3.1	3.8	30.1	40.3	39.7	3.3	0.0%
AVY	Avery Dennison	\$3.07	15.3	\$3.78	12.5	\$3.91	12.1	10.5%	1.1	2.7	5.7	8.0	15.3	2.4	2.5%
BRC	Brady Corp.	\$2.15	14.8	\$2.04	15.6	\$2.15	14.8	9.7%	1.5	2.4	6.6	8.5	15.7	1.9	2.0%
CKP	Checkpoint Systems Inc.	\$1.43	18.2	\$1.00	26.1	\$1.39	18.7	17.0%	1.1	3.0	13.2	13.2	29.2	2.0	0.0%
<b><u>Components/Semi-Conductors:</u></b>															
IFX	Infineon Technologies AG	-\$1.62	-4.5x	-\$0.51	-14.3x	-\$1.02	-7.1x	8.0%	(0.9)	4.0x	8.5x	-4.6x	-11.5	0.8	0.0%
PHG	Koninklijke Philips Electronics NV	\$6.15	6.4	\$1.09	36.2	\$5.21	7.6	24.7%	0.3	3.2	14.1	18.7	6.4	1.4	1.7%
STM	STMicroelectronics NV	-\$0.54	(20.1)	\$0.83	13.1	\$0.77	14.1	13.5%	1.0	2.7	4.4	12.1	12.4	1.1	0.7%
WJCI	WJ Communications	-\$0.11	(8.8)	-\$0.13	(7.5)	-\$0.10	(9.7)	NA	NA	2.7	(8.2)	(8.2)	-7.8	2.8	0.0%
CHIP	Verichip	-\$1.29	(2.1)	-\$1.21	(2.3)	-\$1.36	(2.0)	NA	NA	0.6	(1.1)	(0.9)	-1.4	0.9	0.0%
TXN	Texas Instruments Inc.	\$1.83	15.5	\$1.69	16.8	\$1.83	15.5	16.2%	1.0	5.2	8.0	10.3	14.4	3.6	0.4%
<b><u>Networking/Telecom</u></b>															
INTC	Intel Corporation	\$1.18	17.9x	\$0.86	24.6x	\$1.18	17.9x	14.9%	1.2	6.1x	8.4x	12.5	17.6	3.0	0.7%
MOT	Motorola Inc.	-\$0.04	(250.3)	\$1.19	8.4	\$0.24	41.7	9.6%	4.3	2.3	12.1	23.3	-215.7	1.5	1.1%
CSCO	Cisco Systems Inc.	\$1.29	19.5	\$1.20	21.0	\$1.42	17.6	13.4%	1.3	6.4	12.5	14.4	20.9	4.5	0.0%
NOK	Nokia Oyj	\$2.67	12.0	\$1.27	25.3	\$2.01	16.0	12.5%	1.3	4.8	10.9	12.6	22.4	6.2	2.7%
QCOM	Qualcomm Inc.	\$2.03	19.6	\$1.73	22.9	\$2.03	19.6	19.7%	1.0	10.1	15.7	17.4	19.8	4.1	0.6%
ERIC	LM Ericsson	\$2.12	9.5	\$2.24	9.0	\$2.03	9.9	11.6%	0.9	3.7	6.3	6.3	8.3	1.7	0.0%
Mean			1.6x		48.5x		15.4x	15.2%	1.1x	5.3x	12.9x	10.0x	28.3	8.0	0.5%
Median			15.4		21.0		16.0	14.5%	1.2	3.8	9.9	12.6	15.7	2.8	0.0%
High			57.5		998.0		57.5	34.5%	4.3	22.5	59.9	64.5	670.1	116.5	2.7%
Low			(250.3)		(212.0)		(18.7)	8.0%	(2.2)	0.6	(10.4)	(141.4)	(215.7)	0.8	0.0%

(1) Information Provided by FactSet.

(2) Based on mean Multex estimates. EPS estimates are calendarized for comparison purposes.

(3) Cal. Year Ended 2004 P/E divided my Multex's estimated mean five year growth rate.

\* Numbers not available as systems are still in the process of being updated following earnings reports.

\*\* Incomplete metrics as a result of recent IPO

# Glossary of RFID Terms

**Active RFID Tag** – The tag has an internal power source (i.e., a battery), which allows for significantly longer read ranges. Primarily used to track large, high-value assets such as intermodal shipping containers. Active tags are significantly larger and more expensive (\$25-\$250 per unit) than passive tags.

**Air Interface** – The communication protocol between the tag and reader. Passive tags at UHF are standardized around the Generation 2 protocol; HF is seeking a similar standard. Some active tags are increasingly communicating with standardized Wi-Fi networks (IEEE 802.11x), however, active continues to see several proprietary air interface protocols.

**Antenna** – Attached to chips on tags and an integral part of a reader; antennas are devices that send and receive radio frequency (electromagnetic) energy.

**Anti-Collision** – A component of the air-interface protocol that prevents tag data from multiple tags in the read area from interfering (colliding) with each other. Also prevents multiple readers in close proximity from interfering with each other. This is a key component to the Generation 2 standard.

**Battery Assisted Passive (also semi-passive)** – Passive tags that offer a small battery to boost signal strength, or improve tag sensor capability. The battery generally goes into sleep mode until required. Referred to as Class 3 products; a standard is expected in early 2008.

**Class 0** – Class 0 refers to a proprietary air interface protocol for passive UHF tags. Class 0 is read only, while a subsequent protocol, Class 0 Plus, offers read/write capability. This protocol is largely obsolete with Gen 2.

**Class 1** – Class 1 refers to a proprietary air interface protocol for passive UHF tags. Class 1 offers read/write capability. Class This protocol is largely obsolete with Gen 2.

**Closed Loop Solution** – Set of readers and tags intended for a particular application having specific, well defined start and end point. Generally seen in tracking work in process or reverse logistics operations.

**DoD Mandate** – A mandate to all 43,000+ DoD suppliers, announced in June of 2003, to employ RFID. The DoD issued a timetable specifying when RFID will be required (by products into specified DoD depots). The timetable has been somewhat fluid given DoD budget dollars are focused on existing operations in Iraq and Afghanistan.

**Dual Di-Pole** – A tag that essentially has two antennas, reducing the sensitivity to orientation and increasing read capability.

**Electronic Product Codes (EPC)** – The code that resides on an RFID tag that is unique to each product. The code contains manufacturer and product

information as well as an individualized serial number. EPCs are maintained by EPCglobal.

**Encode and Apply** – A step up from “Slap and Ship,” where labels are encoded and applied on a more automated basis. Slightly more capital intensive, but more operationally efficient than slap and ship.

**Encoder** – Device that transmits and writes data on to an RFID tag. Used extensively in printers and label applicators for product shipments. Encoders are generally RFID reader modules developed for a printing or other encoding application.

**Environmental Factors** – Typically discussed with respect to UHF products, which can be affected by many factors including the presence of metal, liquids, significant reader activity, other RF “noise,” etc. These factors require process controls in terms of tag and reader placement. Readers also need proper adjustment for a given environment.

**EPC Global** – The body responsible for RFID standards creation; formed originally as a joint venture between the Uniform Code Council (UCC) and the Electronic Article Numbering Association (EAN). EPC Global is responsible for RFID standards development and for promoting vertical RFID solution development.

**EPC Network** – Developed by the Auto-ID center, this Internet-based system allows supply chain participants to retrieve data associated with an EPC through the Internet. The network remains in an emerging phase, and is administered by EPC Global.

**Fluidic Self Assembly (FSA)** – A proprietary process developed to rapidly attach chips to straps. The process uses a fluid bath to place small chips on a substrate for strap attachment. This process continues to be developed.

**Generation 2** – The RFID air interface standard for supply chain shipments using UHF. The Gen 2 standard was approved in December 2004 by EPC Global, and has since received international approval by ISO as 18000-6C. EPCglobal is working to create a similar standard for HF.

**High Frequency (HF) RFID** – RFID products that use the 13.56MHz band, which is not regulated by any government. This frequency generally allows read ranges of 4-8 feet, and is not affected by environmental factors such as liquid due to magnetic coupling. The existing ISO 15963 standard is different from the Gen 2 protocol. We expect a new EPC-based standard by the end of 2007. HF has historically been used in contactless payment and item level tracking applications.

# Glossary of RFID Terms

**Hybrid (semi-active) RFID Tag** – Tag that incorporates a smaller internal power supply, which is triggered by reader action. After interrogation, the tag resumes a passive stance.

**ISO** – International Organization for Standardization is a network of the national standards institutes of 148 countries, on the basis of one member per country, with a Central Secretariat in Geneva, Switzerland, that coordinates the system. ISO is not government affiliated. EPC Global is an ISO member and has received ISO approval for the Generation 2 standard.

**Kill Command** – A code within the RFID tag that once activated will permanently disable the tag. Intended to limit consumer tracking after purchase for privacy protection.

**Low Frequency (LF) RFID** – RFID products that use the 125Kz band. Products that use this frequency are generally smaller and cheaper as read ranges are short, typically less than 12 inches. Security access and control and contactless payment are typical applications.

**Mandate Requirements** – Primarily refers to an edict put in place by retailers, most notably Metro, Wal-Mart and the DoD, requiring that certain types of shipments (mostly deliveries at the case and pallet level) use RFID for tracking purposes. The Metro mandate is the only one that imposes a charge for non-compliance.

**Metro Mandate** – German based retailer that is piloting Gen 2 based RFID at 229 German based stores. Suppliers are required to tag all pallets by October 1, 2007 or face a charge of approximately 2 euros per pallet. Case level tagging is expected in 2008. Metro, the worlds 5<sup>th</sup> largest retailer, operates roughly 2,400 stores in Europe and Asia.

**Middleware** – A specific class of software that offers several levels of functionality. Middleware acts as a data filter, eliminating duplicate reads so that the host system maintains accurate records and is not inundated with excessive data. Middleware also ensures that the RFID data formatting “maps up” with the host system data structure.

**Optional User Memory** – Additional bits memory available on a tag that can be used by any member of the supply chain as they see fit (i.e., routing information). Intended to allow for increased tracking efficiency.

**Parallel Integrated Chip Assembly (PICA)** – A proprietary process developed by Symbol (Motorola) to rapidly assemble chips to tags. The process uses small punches to extract a chip from the wafer and attach the chip to the tag antenna using a single motion. The process remains in test stages, and

Motorola no longer produces tags.

**Passive RFID Tag** – A tag that receives its power supply from the reader upon interrogation. Used primarily in supply chain applications, these tags tend to be small in size and relatively inexpensive compared to active tags.

**Pilots** – Testing done by companies seeking RFID solutions, primarily for supply chain applications. Consumer product companies under mandate requirements are seeking ways to increase the value add to themselves in addition to meeting mandate compliance, which requires evaluation of equipment and internal business processes.

**Portal** – A door or other point in a facility surrounded by fixed RFID readers to identify and track the flow of product. Dock doors are a typical example.

**Reader** – Also known as an interrogator. Typically a network-based device and antenna configuration, which reads the information contained on an RFID tag. In passive operations, the reader supplies the tag with power. Readers can be fixed position for dock door or other portal applications, or embedded into mobile computing devices for in store or exception reporting requirements.

**Rollout** – When pilots provide sufficient evidence of a strong return on investment, companies are expected to deploy (rollout) the technology into greater parts of their internal operations or external supply chain partners. This process is expected to result in significant growth for the RFID industry.

**Slap and Ship** – Refers to placing an RFID tagged bar code label on products immediately before shipment. The process is typically done on an exception basis for products requiring compliance labeling. Slap and Ship is not labor efficient and allows virtually no incremental value add to the supplier; however, the up-front capital investment is small.

**Strap** – Component of a tag or inlay that connects the microchip to the antenna. The purpose of the strap is largely to make the manufacturing process of antenna attachment easier and faster.

**Tag** – Also referred to as transponder or transponder tag, which is typically affixed to an item for tracking purposes. Composed of a semi-conductor chip and antenna held together in a substrate. Each tag has a manufacturer installed unique identification number as well as additional few bits to many kilobits of incremental memory. Passive tags receive energy from the reader, while active tags have an internal power supply.

# Glossary of RFID Terms

**UID** – Unique Identification is a DoD based numbering scheme to identify a broad range of high-value assets. RFID is not necessarily required, but is preferred in many UID applications. UID applications typically require more than 256 bits of memory.

**Ultra High Frequency (UHF) RFID** – RFID products that use the 868MHz to 950MHz frequency band, which is regulated by governments. This frequency allows read ranges of 8-30 feet (2x-4x of HF), but can be heavily affected by environmental factors, including liquids and metals.

**Wal-Mart Mandate** – Wal-Mart mandated that its top 600 suppliers ship products with Gen 2 RFID tags identifying each pallet and case to up to 1,400 stores by the end of 2007. As part of this program, Wal-Mart continues to conduct pilots to determine ROI.

**Write Once Read Many (WORM)** – Used to describe an RFID tag that allows only one set of data to be written on to it. Typically used in applications where security is a concern.

# Appendix – Important Disclosures and Analyst Certification

## Appendix – Important Disclosures and Analyst Certification

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**Investment Ratings: Outperform (O)** - Expected to outperform on a total return, risk-adjusted basis the broader U.S. equity market over the next 12 months. **Neutral (N)** - Expected to perform in line with the broader U.S. equity market over the next 12 months. **Underperform (U)** - Expected to underperform on a total return, risk-adjusted basis the broader U.S. equity market over the next 12 months.

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# Appendix – Important Disclosures and Analyst Certification

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# Baird's RFID Contacts

## Research

Reik W. Read  
rread@rwbaird.com  
414.298.1030

Robb Timme  
rtimme@rwbaird.com  
414.298.1762

## Investment Banking

John Moriarty  
jmoriarty@rwbaird.com  
650.424.9311

Mike Avila  
mavila@rwbaird.com  
650.424.9312

Tom Lange  
tlange@rwbaird.com  
813.273.8248

Tre Mischka  
tmischka@rwbaird.com  
813.273.8208

Michael Bruns  
mbruns@rwbaird.com  
312.609.5486

Ben Brown  
bbrown@rwbaird.com  
414.298.7013

**Robert W. Baird & Co.**  
www.rwbaird.com

800.RW.BAIRD

## Equity Capital Markets and Private Equity Office Locations

### U.S. Offices

#### Atlanta

3282 Northside Parkway  
Suite 225  
Atlanta, GA 30327  
888.792.9478

#### Boston

One Post Office Square  
36<sup>th</sup> Floor, Suite 3620  
Boston, MA 02109  
888.661.5431

#### Chicago

227 West Monroe Street  
Suite 2100  
Chicago, IL 60606  
800.799.5770

#### Madison

510 Charmany Drive  
Suite 275  
Madison, WI 53719  
608.441.2900

#### Milwaukee

777 East Wisconsin Avenue  
Milwaukee, WI 53202  
888.224.7326

#### Nashville

2525 West End Avenue  
Suite 1000  
Nashville, TN 37203  
888.454.4981

#### Palo Alto

1001 Page Mill Road  
Building 1, Suite 210  
Palo Alto, CA 94304  
650.424.9301

#### Philadelphia

175 Strafford Avenue  
Wayne, PA 19087  
610.975.0929

#### San Francisco

One Market Street, Spears Tower  
Suite 3667  
San Francisco, CA 94105  
888.224.7326

#### Stamford

263 Tresser Boulevard  
Suite 910  
Stamford, CT 06901  
888.224.7326

#### Tampa

401 East Jackson Street  
Suite 2900  
Tampa, FL 33602  
888.238.2672

#### Washington, D.C.

Pinnacle Tower North  
1751 Pinnacle Drive  
Suite 1100  
McLean, VA 22102  
888.853.2753

### International Locations\*

#### Beijing

Unit 1006, Quanshitiandi Tower A  
Jia No.50-1, Wangjing Xilu  
Chaoyang District,  
Beijing 100102 China  
011.86.10.6479.5151

#### Frankfurt

Baird GmbH  
Kirchnerstrasse 6-8  
60311 Frankfurt  
Germany  
011.49.69.13.01.49.10

#### Hamburg

Haus am Hafen  
Steinhöft 5-7  
20459 Hamburg  
Germany  
011.49.40.37.48.02.10

#### Hong Kong

18 Harbour Road  
Central Plaza  
Suite 3202  
Wanchai, Hong Kong  
011.852.2827.8822

#### London

Mint House  
77 Mansell Street  
London E1 8AF  
UK  
011.44.207.488.1212

#### Shanghai

Room 603, Citigroup Tower  
No.33 Huayuan Shiqiao Road  
Pudong Shanghai 200120 China  
011.86.21.5887.8238

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