





# Table of Contents

*(Use the links below to navigate. To return, click on any RFID logo in upper left corner.)*

<a href="#">Key RFID Developments.....</a>	<a href="#">1</a>
<a href="#">RFID Hardware News and Comment .....</a>	<a href="#">2</a>
<a href="#">RFID Software News and Comment.....</a>	<a href="#">5</a>
<a href="#">RFID Service News .....</a>	<a href="#">6</a>
<a href="#">RFID Briefs .....</a>	<a href="#">7</a>
<a href="#">Public Company Profile.....</a>	<a href="#">10</a>
<a href="#">Private Company Profile.....</a>	<a href="#">11</a>
<a href="#">Table of Key RFID Providers .....</a>	<a href="#">12</a>
<a href="#">Comparable RFID Valuation .....</a>	<a href="#">13</a>
<a href="#">Baird's RFID Team .....</a>	<a href="#">18</a>

*(Please refer to “Appendix – Important Disclosures on page 16.)*



# Key RFID Developments

- **EPC Global US Conference Demonstrated Good Momentum in RFID.** The event had a very strong showing with over 1,700 attendees, which exceeded expectations of 1,000. The tone during the conference was very good, with demonstrations of significant pilot activity, both mandate and non-mandate related (yes, some companies are actually looking at ROI). Conference attendees suggested to us that the resulting idea sharing and learning will lead to increased development activity. We also see increased investment from the venture community, which will provide the resources for increased development. Baird and AIM Global hosted an Executive RFID Forum the day preceding the EPC Global event, which demonstrated equally positive momentum and idea sharing from industry executives.
- **Generation 2 Standards Progress.** EPC Global's Hardware Action Group voted on October 1 to advance the UHF Gen 2 specification to "candidate status," the final stage before ratification by the EPC Global Board of Governors. The key remaining steps are prototype testing and resolution of outstanding intellectual property (IP) claims. Intermec is the only HAG company asserting IP, asking for royalties based on 14 patents. EPC Global expects the Gen 2 standard to be completed before the end of the year.
- **New Hardware Development Appears to be Accelerating.** We are seeing strong new development efforts in all hardware categories, but two have emerged recently as key areas of focus. First is acceleration of multi-protocol readers given that Class 0 and Class 1 are currently accepted by the mandates. The second area of development is in the print/encode and apply segment, which focuses on rapid encoding and automated application of smart tags for cases on high-speed conveyor operations. This development appears to be in response to many suppliers that want to move quickly beyond labor intensive "slap and ship."
- **End-Users' Primary Near-Term Concern Is Product Availability.** We have heard repeatedly from several end user contacts that they are concerned with product availability, including readers, encoders and tags. We have found that modest production problems and capacity limitations in a rising demand environment remain the key issues. We expect increased development will focus on process improvement in addition to new products. Several chip and tag companies have been or are in the process of boosting tag capacity. We expect improving yields will also help.
- **Interoperability Testing Underway for Class 0 and Class 1.** MET Laboratories completed a round of interoperable testing for EPC Global in August. The testing highlights which readers and encoders have acceptable interoperability with various tags. Interoperability was determined by products passing a series of mandatory tests; optional tests were available to demonstrate additional functionality. We have provided a summary of results at the end of the "RFID Hardware News and Comment Section."



## RFID Hardware News and Comment

Hardware development appears to be accelerating based on three observations. First, we see increasing amounts of financing entering the RFID space, including both venture money and strategic funding. Second, our discussions with providers and users at EPC Global's US conference and our RFID Executive Forum suggest increased new product evaluation. Third, the number of new product announcements seems to be on the rise, particularly with respect to multi-protocol offerings – each month we profile new product announcements, with this issue representing the largest grouping yet. We are also seeing significant development around automated print/encode and apply systems to improve the efficiency associated with case labeling at conveyor speeds. We expect development and new product announcements will further accelerate following the establishment of Gen 2.

Zebra is expected to introduce its first multi-protocol printer/encoder product in the next several weeks, which we view as an important near-term product set given the current lack of standards. We also expect NCR will begin to resell Zebra products in the near future.

Several EPC Global participants were complimentary of Printronix's multi-protocol printer currently available as it has strong tag verification capabilities in addition to working with various protocols. The Printronix product uses an AWID reader. ADT also announced in September that it is reselling Printronix products as part of the Sensormatic RFID Launch Package for retail and manufacturing supply chain applications.

NCR appears to be accelerating its Systemedia business further into RFID. The company will be converting labels using a wide variety of tags (Class 0 and Class 1) and reselling printer encoders - NCR currently offers Printronix and is expected to offer Zebra shortly.

Intermec announced in September the introduction of a multi-protocol version of its PM4i printer/encoder product, which is intended for manufacturing, warehousing and logistic operations. The PM4i is Class 0, Class 1 and ISO capable, and is upgradeable to Generation 2. The PM4i

also has multi-frequency capability, allowing it to be used in various geographic regions. Intermec also announced the EasyCoder PX series, used for heavy-duty bar code applications (i.e., harsh environments), is also RFID upgradeable in the field.

In addition, Intermec introduced its IF5 RFID reader, which has a software upgradeable air interface for migration to Generation 2. The IF5 provides intelligence on the reader, allowing execution of tasks, such as data filtering, at the point of collection. The intent of the design is to reduce the number of needed servers. According to Intermec, the IF5 is fully compliant with both low-power and high-power European standards (set up by the European Telecommunications Standards Institute).

Paxar announced availability of the Monarch 9855 RFID printer / encoder, which offers Class 1 smart labels in feed lengths as short as one inch. The flexibility of the product allows end users to print and encode multiple label sizes, depending on the product application.

WJ Communications announced that it has received its first volume production orders for their new MPR 5000 and MPR 6000 reader cards, which are Class 0 and Class 1 based – and upgradeable to “future standards” (which we take to mean Generation 2). The cards are Type II PCMCIA compatible and intended for use in printers, handheld and fixed positioned products. WJ anticipates the revenue opportunity will be \$500,000-\$1M, with shipments beginning in 4Q04.

Tyco's ADT Security Services division announced the availability of a next-generation RFID reader. According to ADT, the Sensormatic Agile 2 Reader, which is based on an Intel network processor and ThingMagic's Mercury4 platform, can support up to 16 RFID antennas.

Lowry Computer Products will invest \$2 million in RFID to develop the company's Encode & Apply automated labeling system (encodes EPS smart labels and applies them to cases and pallets), RFID inlay insertion equipment for the company's label conversion facility, and construction of an RFID center at its corporate facility in Brighton, Michigan.



## RFID Hardware News and Comment

Quadrel Labeling Systems has introduced several RFID print/encode and apply products for automated application on cases and pallets. ADT (Sensormatic) announced that it will resell the Quadrel T, which was designed to apply up to 100 labels per minute.

UPM Rafsec unveiled three new lines of UHF tags at the Frontline Solutions 2004 Conference – EPC Class 1 96-bit, Class 0+ 256-bit and UCode EPC 1.19 256-bit. The company recently doubled the RFID tag and label production capacity of its plant in Finland.

Alien Technology announced the release of its third-generation EPC Class 1 tags, named “Lepton” The tags have 96-bits of user-programmable memory, and Alien believes that the tags deliver up to 40% more read range than previous models. The tags are targeted for pharmaceuticals, baggage tags, retail hang tags, and other applications.

Alien also announced the addition of three new executives: John Payne as Chief Operating Officer, Keith McDonald as Senior VP of Sales and Marketing, and Raj Bridgelall as VP of Research and Development. Payne was most recently at Magis Networks, a wireless home entertainment chipset company. McDonald joins Alien from electronics manufacturing services company Solectron. Bridgelall was Chief Technologist at Symbol Technologies.

Impinj announced that it is now offering Zuma chipsets in volume quantity for RFID applications. Zuma offers 144 bits of lockable user memory. Further, Impinj believes that Zuma offers “high speed” tag writing, which lends itself particularly well to print and apply applications.

Sirit Technologies acquired an order from the Transportation Corridor Agencies in Southern California for approximately Cdn\$12 million. The order is for the company’s Automatic Vehicle Identification (toll collection and integration) segment.

TAGSYS announced the completion of \$9M in its third round of funding in September, with total funding reaching \$30M. Add Partners, AXA Private Equity, ENDEAVOUR, Saffron Hill Ventures and Joint Investment Fund for Young Enterprises have provided funding to TAGSYS. The funding will go towards expanding U.S. and Asian operations, development of Generation 2 UHF offerings and increased penetration of the pharma market.

TrenStar announced in September that it raised \$30 million in its second institutional round of financing. Half of the funding was from Trencor Limited and The Carlyle Group, while the other half was in the form of Senior Notes from Technology Investment Capital Corp. Last September TrenStar raised \$34 million, which the company used to design and implement asset tracking and management solutions.

MET Laboratories completed a round of interoperable testing for EPC Global in August. The testing highlights which readers and encoders have acceptable interoperability with various tags. Interoperability was determined by products passing a series of mandatory tests; optional tests were available to demonstrate additional functionality. The complete results are summarized in the table on the next page.



# RFID Hardware News and Comment

## EPC Global Interoperability Test Results:

Class 0 Readers	Class 1 Readers	Printer/Encoders
<b>Reader: Matrics AR400</b> Tag: Matrics X2020	<b>Reader: Alien ALR-9780</b> Tag: ASK 001 Tag: Rafsec Tag: ST Micro XRA00	<b>Printer/Encoder: Datamax DMX-I-4210</b> Tag: Alien Omega Squiggle
<b>Reader: Samsys MP 9320-0</b> Tag: Matrics X1020 Tag: Matrics X2020	<b>Reader: Alien ALR-9640</b> Tag: Alien Omega Squiggle Tag: ST Micro XRA00	<b>Printer/Encoder: Datamax DMX-A-4212</b> Tag: Alien Omega Squiggle
	<b>Reader: Samsys MP 9320-1</b> Tag: Alien Omega Squiggle Tag: ASK 001 Tag: ST Micro XRA00	<b>Printer/Encoder: Paxar 9855</b> Tag: Alien Omega Squiggle
		<b>Printer/Encoder: Printronix SL5000e</b> Tag: Alien Omega Squiggle Tag: Matrics X1020
		<b>Printer/Encoder: Printronix/ FOX IV TECH SLPA 7000e</b> Tag: Alien Omega Squiggle Tag: Matrics X1020
		<b>Printer/Encoder: Sato America CL408e</b> Tag: Alien Omega Squiggle
		<b>Printer/Encoder: Sato America M-8485Se</b> Tag: Alien Omega Squiggle
		<b>Printer/Encoder: Zebra R110 XiIII Plus</b> Tag: Matrics X1020 Tag: Matrics X2020
		<b>Printer/Encoder: Zebra R110PAX3</b> Tag: Alien Omega Squiggle
		<b>Printer/Encoder: Zebra R4M PLUS</b> Tag: Alien Omega Squiggle

Source: EPC Global



## RFID Software News and Comment

Baird's RFID Forum in Baltimore reaffirmed that RFID has limited near-term software potential and, thus, remains more of a services-oriented revenue opportunity. Discussions with supply chain vendors and consultants continue to conclude that new software license revenue opportunities related to RFID will not likely emerge until mid-2005 at the earliest. Basic compliance with mandates from WMT and the DOD remain the driving force behind most activity, and significant advancements in RFID-enabled applications are likely to be slow moving until industry standards are established.

Manhattan Associates announced the release of its EPC Manager solution (stand alone solution that operates independent of other applications and can be implemented in conjunction with existing third party, custom or legacy supply chain systems), which alleviates one of the key marketplace concerns related to meeting RFID compliance mandates without having to replace existing supply chain systems.

RedPrairie announced a partnership with Weber Marking Systems Partner to create the industry's first EPC compliant in-line print engine-applicator solution, which is designed to automate and improve the efficiency of production line applications and slap and ship compliance applications. RedPrairie also announced a partnership with Avery Dennison and RF Code that creates a complete solution offering for global asset and inventory visibility and security, integrating RedPrairie's software and optimization tools with active RFID reader technology from RF Code and the active RFID Secure Strap from Avery Dennison for container security.

ODIN Technologies introduced a new software package called Trifecta, which enables companies to test the radio frequency properties of a product in order to determine the best tag and tag placement for the product. The offering is limited to 902MHz to 928MHz. The package includes a server, a reader, tags, and a 21-step process.



## RFID Service News

HP, Oat Systems and BearingPoint (BE) announced a collaborative RFID solution for the retail industry targeting lower inventory carrying costs and improved stocking conditions. HP will spend \$150M over the next five years on the initiative. HP will contribute the infrastructure, including servers and storage as well as service resources (allocating 350 consulting and integration employees). BE will provide RFID assessments for clients as well as system integration support.

As part of HP's initiative, the company will partner with Oat Systems to offer RFID/IS (industrial strength), a single platform based, RFID solution that enables businesses to capture RFID data and track the movement of goods across an extended supply chain while providing centralized control of an expanding RFID network. The scalable, enterprise-wide foundation combines an RFID framework, systems management and consulting and integration services in a single offering that is targeted towards automotive, consumer packaged goods, pharmaceutical, consumer electronics, retail and high-tech verticals.

IBM announced plans to invest \$250 million and 1,000 workers in a new RFID-focused business unit focused on driving widespread adoption of passive radio tags by helping businesses realize the multitude of benefits offered by sensor networks (e.g., setting up computer systems that use sensor data to quickly identify supply shortages and automatically adjust delivery schedules).

IBM announced that it will offer a new line of RFID consulting services to manufacturers by leveraging its own internal RFID tests. The services for industrial companies (automotive, aerospace and defense, manufacturing, chemicals and petroleum, forest and paper, and electronics) include consulting, internal pilot, trading partner pilot, and full rollout of systems. Planned services for mid-market clients include: a solutions development workshop, site survey, pilot, and testing services.

Unisys is growing its RFID business with a new offering called the Global Visible Commerce Solutions, which is designed to assist companies to collect, filter, and analyze data from RFID tags, cellular devices, and bar codes, in order to track goods across the supply chain. Unisys has managed the U.S. Department of Defense's RFID-based in-transit visibility network for 10 years, in addition to working on over 20 RFID deployments.



## RFID Briefs

Baird partnered with AIM Global to host a forum designed for industry executives on September 28. The event featured a presentation by AMR and three panel discussion groups of end users, software vendors, and service providers. We had over 100 industry executives in attendance. Our event preceded the EPC Global US Conference that took place September 28-30, and featured several keynote speeches, vendor and user presentations and exhibits, and educational forums. Both events took place in Baltimore. While our attendance at these events yielded no significant changes in industry status, we saw several incremental positives that suggest building momentum in the RFID market.

First, the EPC Global event had a very strong showing, with over 1,700 attendees. Our EPC contacts indicated to us that the optimistic expectation had been 1,000 attendees. Further, the tone of the conference was positive as users and RFID providers appeared enthusiastic regarding progress within the industry. We held discussions with a number of end users and providers and concluded that they found the events very worthwhile - while none suggested that the industry has moved in any significant direction, nearly all agreed that development efforts and new pilots are moving forward with increased urgency.

Second, the Gen 2 standards process continues to move forward as the HAG voted to make the "Chicago Protocol" a "Candidate" standard. With that complete, the final prototype testing and IP issues remain. Prototyping has been ongoing during the past several months. The next stage of prototyping will allow the HAG to generate additional data to confirm their findings with the goal being rapid approval once presented to the EPC Global Board of Governors.

Our EPC contacts have told us to expect Gen 2 to be approved by "Fall." Once the Gen 2 standard is approved, EPC Global intends to bring the standard to ISO to receive international certification.

We anecdotally surveyed several vendors, and most were not aware of this level of detail. Many told us they expect the standard to be set in the next "one to three weeks."

Third, we heard considerable discussion regarding increased pilot activity. A number of conference participants provided illustrations of a wide variety of pilots (both EPC and non-EPC), with a significant amount of information sharing. Conference attendees suggested to us that the resulting idea generation and learning is strong, which suggests to us strong development activity.

### **Additional EPC Global Conference Take-Aways**

We also discovered that several end users are pursuing non-mandated closed loop pilots that are using UHF - these closed loop pilots tend to be more oriented towards generating an ROI, not complying with a mandate. Therefore, we view these pilots as large industry positives as they will generate incremental development and learning.

While momentum is building, the lack of standards and weak understanding of ROI are clearly factors that are causing most end users to pursue minimal investment and a "slap and ship" approach. However, we heard several vendors suggest new product introductions of combination bar code printers/RFID encoders that will allow automated print and apply on the assembly line if desired. We view this as a key product offering.



# RFID Briefs

One particular area of strength for RFID is in Pharma, which appears to be gaining momentum. Several times during the two days, we heard that opportunity in tagging of pharmaceuticals and other life sciences is strong with significant development activity. CVS and Rite-Aid have undergone pilots at the item level using 13.56MHz. This appears to be the first strong attempt by a sector to pilot at this level.

## Standards Update

EPCglobal's Hardware Action Group voted on October 1 to advance the UHF Gen 2 specification to "candidate status," the final stage before ratification by the EPCglobal Board of Governors, which includes representatives from end users such as Gillette, Procter & Gamble, and the Department of Defense. The next step is to produce prototype tags and readers based on the specification in order to show that the specification is valid.

From an IP perspective, the HAG is currently working within the EPC process to confirm the validity of Intermec's patent claims. This is a collaborative process with Intermec, where the EPC Global patent council and Intermec's patent council share information and confirm the existence of the patent, determine the scope of the patent and confirm that no "prior art" supersedes the patents. Each of Intermec's 14 patents must undergo this rigorous process. Once complete, and if EPC agrees that Intermec has patent position, EPC will enter into negotiations on behalf of its other members with Intermec to determine royalty rates.

EPCglobal has added a new group to address issues revolving around the development and deployment of RFID within the pharmaceutical industry, called the Healthcare & Life Sciences Business Action Group. Over the past six months, 16 pharmaceutical companies and a leading patient services provider have joined EPCglobal. This is consistent with our comment above that Pharma is gaining momentum.

The Automotive Industry Action Group (AIAG) announced it has revised its B-11 tire and wheel label and RFID standard to conform to EPC protocol. AIAG made the revision in an effort to provide a tag solution that will service both the automotive and retail industries. AIAG noted that the standard is not limited to tires and could be applied to any vehicle part.

## Industry Studies

Frontline Solutions, together with Wavelink, conducted a survey of the recent Frontline Solutions Conference & Expo attendees in Chicago. Almost 80% of the 135 respondents said they intend to pilot or implement an RFID solution. Of those, 63% expect to begin in the next 24 months. Cost was cited most often as the primary concern surrounding RFID. Lack of standards and the infancy of the market, as well as integration issues and lack of expertise, were also concerns.

Accenture managed a trial in coordination with EPCglobal's Healthcare & Life Sciences Business Action Group as well as the FDA's Anti-Counterfeiting Task Force to study the application of RFID technologies across the pharmaceutical supply chain. The study was based on shipping, tracking, and tracing approximately 13,500 packages of pharmaceuticals within the supply chain (did not involve testing at the consumer level). The study results indicated that RFID can help to satisfy regulatory and retailer requirements, increase consumer safety, enhance order accuracy, and improve efficiency of recalls and returns. Matrics supplied the tags, readers and antennas and Manhattan Associates provided the middleware for the study.

We expect Pharma distribution will leverage UHF, with item level tracking using 13.56MHz.



# RFID Briefs

## DoD Update

Given the significant focus on Wal-Mart's rollout plans, we wanted to briefly profile the DoD's supplier implementation plan for the DoD's 43,000 vendors. Beginning in January of 2005, suppliers with new contracts (or existing contracts expiring by September) will be required to tag products with passive Class 0 or Class 1 tags into two defense distribution depots, one in Susquehanna, PA and one in San Joaquin, CA.

Supplies covered in this segment include cases and pallets of clothing, packaged operational rations, individual equipment (helmets, boots, etc.), weapon system repair parts and components and personal items (similar to Wal-Mart items).

By January of 2006, the DoD extends its case and pallet requirements to include subsistence and comfort items, packaged petroleum, oils, lubricants, preservatives, chemicals, additives, construction and barrier material, ammunition of all types, pharmaceuticals and medical materials and major end items at 32 additional distribution depots within the United States.

By January of 2007, the DoD plans to extend the requirement to all unit packages for unique identification for items for all commodities shipped into the DoD.

One of our industry contacts indicated that the DoD increased its RFID contract with Savi Technology to \$207 million from \$90 million for active tagging. The DoD has experienced an increased need for active tagging of containers given current operations in Iraq. Savi is the sole supplier to the DoD for active tagging.

## Other Industry News

Roper Industries, a diversified industrial company, announced it will acquire TransCore, a provider of RFID and transportation technology and services, for \$600 million. TransCore designs, develops, installs and maintains products and service solutions for security, toll collection, and traffic monitoring applications.

ScanSource announced the introduction of RFID Edge, an initiative aimed to educate resellers in order to improve the selling of RFID solutions. ScanSource will provide resellers with access to RFID solutions, including handheld and fixed readers, thermal label printers/encoders, RFID tags and smart labels, and access to application software and middleware partners, for applications such as the supply chain, healthcare, pharmaceutical, and asset tracking.

Senator Byron Dorgan from North Dakota has spoken publicly on the need for the federal government to get involved in dispelling concerns revolving around issues of consumer privacy and RFID. Recall, California's legislature has already considered this issue, tabling it for further study at a later date.



# Public Company Profile

## NCR Corporation (NCR – NYSE)

NCR Corporation is a leading provider of retail and financial automation solutions, data warehousing and global services. NCR also provides check imaging equipment and various types of printable media. Key retail equipment includes point-of-sale (POS) terminals, laser scanners, self-checkout, and electronic shelf labels. Financial equipment is primarily centered on automated teller machines (ATMs). These solutions enable NCR's customers to gain operational efficiency, provide better customer service and increase their customer intelligence.

### INVESTMENT SUMMARY

**Market Leader.** NCR has the No. 1 worldwide position for financial self-service with approximately 36% of the automated teller machine (ATM) market. In retail, NCR occupies the No. 2 overall market position. NCR has over 600 data warehousing customers, with leading names such as Sears, 3M and AT&T. Recent Gartner Group surveys indicate that NCR continues to gain market share and improve its offerings versus key competitors.

**Strong Knowledge Base in Retail and Financial Markets.** NCR has been in the retail market for over 100 years and in the ATM market for over 30 years. As a result, the company has been able to acquire significant market and technical knowledge. NCR has over 3,000 patents worldwide.

**Improving Fundamentals.** NCR is benefiting from positive trends in the data warehousing and ATM businesses. Together these units represent roughly 55% of revenue and are the highest margin segments at the company. Furthermore, we believe that management's incremental restructuring actions on NCR's unprofitable customer service segment could generate incremental savings of \$50M-\$70M in the next 18-24 months.

**RFID Offerings.** NCR offers RFID solutions through its Systemedia division, which manufactures printer consumables. The company converts labels using a wide variety of tags (Class 0 and Class 1) and resells printer encoders – NCR currently offers Printronix and is expected to shortly offer Zebra. The company has been placing increased emphasis on RFID opportunities.

**Price Target.** In light of the continued restructuring underway at NCR, we are electing to value the company based on a discounted value approach. Based on our assumptions, which include 4% average revenue growth over the next ten years, with EBIT growth of 16% (EBIT margin of 9.5% at the end of ten years – management expects long-term EBIT margin to be between 7%-10%), we derive a price target of \$52.

### STATISTICAL PROFILE

Price (10/13/04):	\$52.22	Dividend:	\$0.00
52-Wk. Range:	\$53 - 32	Yield:	0.0%
<b>Rating:</b>			<b>Neutral</b>
<b>Suitability Rating:</b>			<b>Higher Risk</b>

FY: December	2003	2004E	2005E
EPS	\$0.84	\$1.45	\$2.05
P/E Ratio	62.2	36.0	25.5

Projected 3-Year EPS Growth Rate: .....	10%
Book Value (6/30/04): .....	\$20.20
Market Capitalization (millions): .....	\$1,256
Debt/Total Capitalization (6/30/04): .....	13.8%
Return on Equity (6/30/04): .....	7.7%
Return on Invested Capital (6/30/04): .....	19.2%
Institutional Ownership: .....	85.2%
Insider Ownership: .....	0.6%
Shares Outstanding (millions): .....	94.2
Average Daily Trading Volume: .....	665,090
Headquarters: .....	Dayton, Ohio

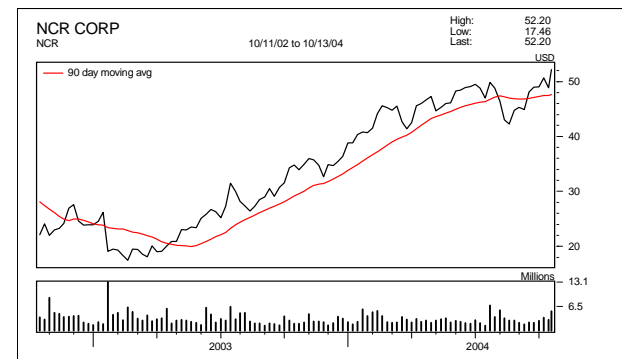


Chart Courtesy of FactSet Research Systems





# Private Company Profile

## TAGSYS

<b>Corporate Headquarters:</b>	Philadelphia, Pennsylvania	<b>CEO:</b>	Frederic Coustere
<b>Employees:</b>	50+	<b>President:</b>	John Jordan

### COMPANY OVERVIEW

TAGSYS was founded in August 2001 as a management-led buy-out of the Gemplus Tag Division. TAGSYS, with annual revenue of approximately \$15 million, is a global producer of RFID systems targeted at item tracking, with applications focused on libraries, textile rental services, pharma and supply chain.

### COMPANY HIGHLIGHTS

**Broad Product Portfolio.** TAGSYS is a leading designer of complete RFID systems, including silicon design, chips, tags, reading stations, and implementation services. The company primarily focuses on creating easy-to-install systems for individual item applications. TAGSYS partners with a large number of resellers who combine software with the TAGSYS system to create an RFID solution.

**New Library Product.** TAGSYS recently introduced a new chip offering at 13.56MHz for the library market. The new product combines ISO 18000 reader talk first capability for strong tracking with anti-theft tag talk first capability for attractive security capability. TAGSYS has indicated that the new product is generating significant customer interest, with several larger deals imminent.

**Pharma an Expanding Opportunity.** TAGSYS's historical focus with item level tracking at 13.56MHz appears to be an opportunity in the pharma market. Based on our visit to the EPC Global U.S. conference, we expect that the pharma market will rapidly move to item-level tagging as pharma manufacturers and distributors, the FDA, hospitals and pharmacies all view RFID as a key tool in reducing improving safety and logistics efficiency. We expect TAGSYS's small tag form factors will also be an advantage.

**Expanding Focus.** Historically TAGSYS's products have been within the 13.56 MHz frequency and largely supporting ISO protocols. The company utilizes these systems for libraries and textile rental applications. TAGSYS is currently developing EPC-compliant UHF products in order to capitalize on the recent Wal-Mart initiative to tag individual Class 2 pharmaceuticals.

**Production Up for Expected Ramp.** TAGSYS has recently increased its tag production capacity by 300% to reach annual capability of 60M tags. The flip chip process is capable of delivering 13.56MHz and UHF products. Given the expanding opportunities in library and pharma, TAGSYS expects such increases in volume will be leveraged quickly.



# Table of Key RFID Providers

Company Name	Ticker	Semi-Conductors	Tags	Readers	Printers / Encoders	Software	Integration/ Services
Accenture	ACN						X
Alien	Private		X	X		X	
Applied Wireless	Private			X			
Atmel	ATML	X					
Avery Dennison	AVY		X				X
Axcess	AXSI		X	X		X	
Brady Corp	BRC		X		X		
BT Auto-ID	Private					X	
CapGemni	CGEMY.PK						X
Checkpoint	CKP		X	X		X	
Datalogic	DAL		X	X			
Dynasys	Private			X			X
Fargo Electronics	FRGO				X		
Globe Ranger	Private					X	
Hewlett-Packard	HPQ						X
HID	Private		X	X			
IBM	IBM					X	X
Identec Solutions	Private		X	X		X	X
ID Systems	IDSY		X	X		X	
Impinj	Private	X					
Infineon	IFX	X					
Manhattan	MANH					X	X
Matrics	Private		X	X		X	
Omron	OMRNF.PK		X	X			
Parlex	PRLX		X				
Philips	PHG	X					
Printronix	PTNX				X		
Provia	Private					X	
R4 Global Services	Private						X
Rafsec	Private						
Red Prairie	Private					X	X
RF Code	Private		X	X		X	
Rfid, Inc.	Private		X	X			
SamSys	SMY.V			X	X		
SAP	SAP					X	X
Savi	Private		X	X		X	
Sun	SUNW					X	X
STMicroelectronics	STM	X					
Symbol	SBL			X			X
Tagsys	Private	X	X	X			
Texas Instruments	TXN	X	X				
ThingMagic	Private			X			
TrenStar	Private					X	X
Unisys	UIS						X
Unova	UNA		X	X	X		X
Zebra Technologies	ZBRA				X		





# 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 10/13/2004	Market Value of Equity	Net Debt <sup>(3)</sup>	Enterprise Value	Book Value	52 Week Price	
										Low	High
<b><u>Wireless Infrastructure:</u></b>											
RIMM	Research In Motion Ltd.	2/28/2004	5/29/2004	157.9	77.92	12,299.7	(866.2)	11,433.5	1,777.7	13.8	72.1
GRMN	Garmin	12/31/2003	6/26/2004	108.2	45.89	4,963.5	(305.3)	4,658.2	843.9	28.1	59.5
SLNK	SpectraLink	12/31/2003	6/30/2004	19.2	10.90	209.2	(53.0)	156.2	71.0	8.6	26.3
ELMG	EMS Technology (LXE)	12/31/2003	7/3/2004	11.1	17.53	194.9	41.5	236.4	123.5	14.0	26.3
NVTL	Novatel Wireless Inc.	12/31/2003	6/30/2004	27.7	22.39	620.2	(71.5)	548.7	85.5	4.0	28.6
SBL	Symbol Technologies Inc.	12/31/2003	6/30/2004	239.4	13.26	3,173.8	(35.8)	3,138.0	982.4	11.3	19.4
IDSY	ID Systems Inc.	12/31/2003	6/30/2004	7.2	14.71	105.9	(2.2)	103.7	11.0	5.8	16.2
<b><u>IT Solutions/Software:</u></b>											
ACN	Accenture Ltd.	8/31/2003	5/31/2004	926.1	23.93	22,161.6	(3,780.0)	18,381.6	1,852.0	21.0	28.1
IBM	International Business Machines Corp.	12/31/2003	6/30/2004	1699.4	84.98	144,415.0	13,733.0	158,148.0	28,830.0	81.9	100.4
MANH	Manhattan Associates Inc.	12/31/2003	6/30/2004	30.2	21.98	663.8	(179.4)	484.4	244.9	22.5	33.9
MANU	Manugistics	2/28/2004	5/31/2004	82.0	2.36	193.5	51.5	244.9	209.0	2.2	9.1
SAP	SAP AG	12/31/2003	6/30/2004	1261.7	39.42	49,736.2	(3,492.7)	46,243.5	4,814.0	30.3	45.8
SUNW	Sun Microsystems Inc.	6/30/2004	6/30/2004	3286.9	4.02	13,213.3	(2,169.0)	11,044.3	6,450.0	3.1	5.9
UIS	Unisys Corp.	12/31/2003	6/30/2004	333.3	10.82	3,606.3	419.5	4,025.8	1,492.8	9.9	16.9
VRSN	Verisign	12/31/2003	6/30/2004	240.3	20.84	5,007.6	(326.3)	4,681.4	1,627.7	17.8	21.1
<b><u>Data Capture:</u></b>											
ZBRA	Zebra Technologies Corp.	12/31/2003	7/3/2004	71.7	57.62	4,129.6	(8.8)	4,120.8	726.4	33.0	60.0
UNA	UNOVA Inc.	12/31/2003	6/30/2004	60.5	14.41	871.8	17.4	889.2	452.8	13.6	26.6
AVY	Avery Dennison	12/31/2003	6/30/2004	99.6	62.14	6,187.3	1,230.5	7,417.8	1,377.6	48.3	65.7
PXR	Paxar	12/31/2003	6/30/2004	10.6	22.17	236.0	98.0	334.0	400.7	11.5	20.0
BRC	Brady Corp.	7/31/2004	7/31/2004	23.6	48.00	1,132.8	(79.8)	1,053.0	379.1	31.7	46.7
CKP	Checkpoint Systems Inc.	12/28/2003	6/27/2004	37.6	15.93	599.0	36.4	635.4	327.6	14.3	22.5
FRGO	Fargo Electronics Inc.	12/31/2003	6/30/2004	12.5	10.68	133.5	(17.5)	116.0	45.8	7.9	17.1
PTNX	Printronix Inc.	3/26/2004	6/25/2004	5.8	17.61	102.1	(38.3)	63.8	76.5	11.8	20.7
<b><u>Components/Semi-Conductors:</u></b>											
IFX	Infineon Technologies AG	9/30/2003	6/30/2004	747.6	10.33	7,722.7	(437.2)	7,285.5	7,275.1	10.1	16.1
PHG	Koninklijke Philips Electronics NV	12/31/2003	6/30/2004	1316.1	22.66	29,822.8	4,077.2	33,900.0	16,179.7	21.9	33.4
STM	STMicroelectronics NV	12/31/2003	6/26/2004	901.0	17.33	15,614.3	67.0	15,681.3	8,037.0	17.7	29.9
WJCI	WJ Communications	12/31/2003	6/27/2004	57.7	1.97	113.7	(66.9)	46.8	50.5	1.4	7.5
TXN	Texas Instruments Inc.	12/31/2003	6/30/2004	1731.1	21.73	37,616.8	(3,144.0)	34,472.8	12,438.0	17.9	34.0
<b><u>Networking/Telecom</u></b>											
INTC	Intel Corporation	12/31/2003	6/30/2004	6487.0	20.99	136,162.1	(15,858.0)	120,304.1	38,593.0	22.5	34.6
MOT	Motorola Inc.	12/31/2003	7/3/2004	2338.7	18.40	43,032.1	(1,756.0)	41,276.1	13,124.0	9.1	20.9
CSCO	Cisco Systems Inc.	7/31/2004	7/31/2004	6998.0	18.86	131,982.3	(8,869.0)	123,113.3	25,981.0	17.4	29.4
NOK	Nokia Oyj	12/31/2003	6/30/2004	4700.3	13.98	65,709.7	(14,098.0)	51,611.7	16,911.6	11.3	23.5
QCOM	Qualcomm Inc.	9/30/2003	6/30/2004	1596.7	41.55	66,343.1	(5,503.1)	60,840.0	9,141.3	20.3	39.0
ERICY	LM Ericsson	12/31/2003	6/30/2004	1613.2	31.90	51,461.9	(8,718.8)	42,743.1	8,333.3	13.7	32.3

(1) Information Provided by Capital IQ and 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





# 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					Debt to:		EBIT to:
		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>	Total Cap.	EBITDA	Int	
<b><u>Wireless Infrastructure:</u></b>														
RIMM	Research In Motion Ltd.	759.8	333.2	171.6	139.8	154.1	43.9%	22.6%	18.4%	20.3%	0%	\$0.04	N/M	
GRMN	Garmin	653.7	367.2	254.7	228.4	180.9	56.2%	39.0%	34.9%	27.7%	0%	0.0	830.8	
SLNK	SpectraLink	77.7	47.9	15.8	14.3	8.2	61.7%	20.3%	18.4%	10.5%	0%	0.0	N/M	
ELMG	EMS Technology (LXE)	263.0	92.5	23.3	14.7	10.2	35.2%	8.9%	5.6%	3.9%	11%	0.7	6.4	
NVTL	Novatel Wireless Inc.	57.9	17.1	7.3	3.7	0.1	29.5%	12.6%	6.4%	0.2%	0%	0.1	N/M	
SBL	Symbol Technologies Inc.	1,622.6	745.3	170.6	115.4	77.8	45.9%	10.5%	7.1%	4.8%	10%	0.6	11.1	
IDSY	ID Systems Inc.	9.1	4.5	(0.4)	(0.7)	(1.2)	49.5%	-4.8%	-7.2%	-13.2%	6%	N/M	5.8	
<b><u>IT Solutions/Software:</u></b>														
ACN	Accenture Ltd.	14,769.4	4,546.0	2,030.0	1,759.0	1,188.0	30.8%	13.7%	11.9%	8.0%	2%	0.0	N/M	
IBM	International Business Machines Corp.	92,838.0	34,321.0	16,422.0	11,704.0	7,613.0	37.0%	17.7%	12.6%	8.2%	38%	1.5	N/M	
MANH	Manhattan Associates Inc.	206.9	123.9	49.2	38.7	26.8	59.9%	23.8%	18.7%	12.9%	0%	0.0	N/M	
MANU	Manugistics	229.0	129.4	47.3	8.2	(5.7)	56.5%	20.6%	3.6%	-2.5%	45%	3.8	N/M	
SAP	SAP AG	9,104.7	5,893.5	2,682.5	2,405.3	1,356.8	64.7%	29.5%	26.4%	14.9%	0%	N/M	N/M	
SUNW	Sun Microsystems Inc.	11,185.0	4,516.0	(13.0)	(723.0)	(787.0)	40.4%	-0.1%	-6.5%	-7.0%	19%	N/M	N/M	
UIS	Unisys Corp.	5,938.3	1,694.4	749.9	386.6	258.7	28.5%	12.6%	6.5%	4.4%	43%	1.4	5.8	
VRSN	Verisign	1,004.9	596.4	310.8	204.8	152.4	59.4%	30.9%	20.4%	15.2%	11%	0.0	N/M	
<b><u>Data Capture:</u></b>														
ZBRA	Zebra Technologies Corp.	598.9	307.2	165.0	153.1	105.0	51.3%	27.5%	25.6%	17.5%	0%	0.0	N/M	
UNA	UNOVA Inc.	1,180.8	390.8	76.0	55.1	22.8	33.1%	6.4%	4.7%	1.9%	19%	1.4	4.2	
AVY	Avery Dennison	5,005.9	1,485.3	616.7	430.8	242.8	29.7%	12.3%	8.6%	4.9%	40%	2.2	7.3	
PXR	Paxar	768.2	316.0	66.1	66.1	14.6	41.1%	8.6%	8.6%	1.9%	34%	5.0	388.2	
BRC	Brady Corp.	630.4	325.1	85.1	65.8	21.4	51.6%	13.5%	10.4%	3.4%	0%	N/M	N/M	
CKP	Checkpoint Systems Inc.	761.0	331.9	59.1	59.1	29.9	43.6%	7.8%	7.8%	3.9%	17%	1.6	6.4	
FRGO	Fargo Electronics Inc.	66.6	26.3	11.3	10.4	7.1	39.5%	17.0%	15.6%	10.6%	0%	0.0	N/M	
PTNX	Printronix Inc.	127.8	54.6	7.7	1.0	0.6	42.7%	6.0%	0.8%	0.5%	16%	0.0	N/M	
<b><u>Components/Semi-Conductors:</u></b>														
IFX	Infineon Technologies AG	8,027.8	2,455.9	1,784.6	79.0	(506.8)	30.6%	22.2%	1.0%	-6.3%	29%	1.6	2.6	
PHG	Koninklijke Philips Electronics NV	37,643.6	11,940.7	4,372.4	1,834.1	893.1	31.7%	11.6%	4.9%	2.4%	25%	2.1	4.7	
STM	STMicroelectronics NV	8,118.4	2,922.4	2,324.6	629.6	253.0	36.0%	28.6%	7.8%	3.1%	27%	1.4	13.5	
WJCI	WJ Communications	28.9	11.1	(19.7)	(19.7)	(12.6)	38.3%	-68.1%	-68.1%	-43.6%	0%	N/M	N/M	
TXN	Texas Instruments Inc.	11,480.0	5,093.0	3,534.0	2,012.0	1,198.0	44.4%	30.8%	17.5%	10.4%	3%	0.3	N/M	
<b><u>Networking/Telecom</u></b>														
INTC	Intel Corporation	32,714.0	19,757.0	15,462.0	10,660.0	5,641.0	60.4%	47.3%	32.6%	17.2%	2%	0.1	140.5	
MOT	Motorola Inc.	32,113.0	12,236.0	3,341.0	1,759.0	893.0	38.1%	10.4%	5.5%	2.8%	36%	2.0	2.8	
CSCO	Cisco Systems Inc.	22,045.0	15,126.0	8,240.0	6,797.0	5,337.0	68.6%	37.4%	30.8%	24.2%	0%	N/M	N/M	
NOK	Nokia Oyj	37,794.8	15,929.2	8,484.8	7,124.9	4,524.8	42.1%	22.4%	18.9%	12.0%	0%	0.1	219.2	
QCOM	Qualcomm Inc.	4,671.6	3,257.4	2,353.6	2,186.1	827.4	69.7%	50.4%	46.8%	17.7%	2%	N/M	58.7	
ERICY	LM Ericsson	17,035.4	6,236.5	2,637.0	1,857.0	961.3	36.6%	15.5%	10.9%	5.6%	0%	0.4	2.5	
Mean							44.9%	16.6%	10.8%	5.8%	12.8%			
Median							42.4%	16.3%	9.5%	4.8%	4.4%			
High							69.7%	50.4%	46.8%	27.7%	45.1%			
Low							28.5%	-68.1%	-68.1%	-43.6%	0.0%			

(1) Information Provided by Capital IQ and FactSet.

(2) Before depreciation and amortization.

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





# 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 2004		Cal. Year Ended 2005		Growth Rate <sup>(2)</sup>	PEG Ratio <sup>(3)</sup>	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.	0.62	125.7	1.57	49.7	2.07	37.6	17.4%	1.9x	36.9x	71.7x	88.0x	79.8x	6.9	0.0%
GRMN	Garmin	1.66	27.6	1.83	25.1	2.09	21.9	12.1%	1.8	13.5	19.5	21.7	27.4	5.9	1.3%
SLNK	SpectraLink	0.46	23.7	0.47	23.4	0.61	17.9	21.5%	0.8	4.4	13.2	14.6	25.6	2.9	4.5%
ELMG	EMS Technology (LXE)	0.68	25.8	0.76	23.1	1.03	17.1	12.5%	1.4	2.1	8.4	13.3	19.2	1.6	0.0%
NVTL	Novatel Wireless Inc.	-0.44	N/M	0.40	56.7	0.73	30.8	40.0%	0.8	36.3	85.1	166.2	N/M	7.3	0.0%
SBL	Symbol Technologies Inc.	0.27	49.1	0.44	30.2	0.68	19.6	15.5%	1.3	4.3	18.6	27.5	40.8	3.2	0.2%
IDSY	ID Systems Inc.	-0.11	N/M	0.05	294.2	0.24	61.3	40.0%	1.5	23.6	N/M	N/M	N/M	9.6	0.0%
<b><u>IT Solutions/Software:</u></b>															
ACN	Accenture Ltd.	1.17	20.5	1.27	18.8	1.46	16.4	13.8%	1.2	4.9	10.9	12.6	18.7	12.0	0.0%
IBM	International Business Machines Corp.	4.67	18.2	4.97	17.1	5.51	15.4	9.9%	1.6	4.2	8.8	12.3	19.0	5.0	0.9%
MANH	Manhattan Associates Inc.	0.76	28.9	0.94	23.4	1.11	19.8	20.3%	1.0	5.4	13.5	17.1	24.8	2.7	0.0%
MANU	Manugistics	-1.21	N/M	-0.09	N/M	0.04	54.8	20.2%	2.7	1.5	4.1	23.6	N/M	0.9	0.0%
SAP	SAP AG	1.15	34.3	1.33	29.7	1.52	26.0	14.0%	1.9	8.4	18.5	20.7	36.7	10.3	0.7%
SUNW	Sun Microsystems Inc.	-0.12	N/M	-0.12	N/M	0.04	99.6	12.2%	8.2	2.9	N/M	N/M	N/M	2.0	0.0%
UIS	Unisys Corp.	0.65	16.6	0.50	21.6	0.73	14.9	10.8%	1.4	2.1	4.8	9.3	13.9	2.4	0.0%
VRSN	Verisign	-0.13	N/M	0.62	33.4	0.79	26.5	13.7%	1.9	8.4	16.1	24.4	32.9	3.1	0.0%
<b><u>Data Capture:</u></b>															
ZBRA	Zebra Technologies Corp.	2.18	26.4	2.48	23.2	2.87	20.0	15.3%	1.3	13.4	25.0	27.0	39.3	5.7	0.0%
UNA	UNOVA Inc.	0.27	53.4	0.46	31.1	0.82	17.6	13.5%	1.3	2.2	11.5	15.8	38.2	1.9	0.0%
AVY	Avery Dennison	2.25	27.6	2.99	20.8	3.33	18.7	11.5%	1.6	4.2	10.0	14.4	25.5	4.5	2.5%
PXR	Paxar	0.77	28.8	1.12	19.9	1.25	17.8	N/A	N/A	0.7	3.6	3.6	16.2	0.6	0.0%
BRC	Brady Corp.	1.54	31.2	2.23	21.6	2.51	19.1	16.7%	1.1	3.5	13.3	17.2	52.9	3.0	2.0%
CKP	Checkpoint Systems Inc.	0.78	20.4	0.98	16.2	1.15	13.8	10.5%	1.3	1.8	10.1	10.1	20.0	1.8	0.0%
FRGO	Fargo Electronics Inc.	0.57	18.7	0.58	18.6	0.70	15.3	18.0%	0.8	5.1	11.8	12.9	18.8	2.9	0.0%
PTNX	Printronix Inc.	0.15	117.4	0.51	34.7	1.14	15.4	N/A	N/A	1.9	13.3	102.1	161.6	1.3	0.0%
<b><u>Components/Semi-Conductors:</u></b>															
IFX	Infineon Technologies AG	-0.03	N/M	0.49	21.1	N/A	N/A	8.0%	N/A	3.1	4.3	97.8	N/M	1.1	0.0%
PHG	Koninklijke Philips Electronics NV	1.27	17.8	2.39	9.5	2.34	9.7	12.5%	0.8	2.5	6.8	16.3	33.4	1.8	1.7%
STM	STMicroelectronics NV	0.34	51.0	0.74	23.3	1.20	14.4	14.8%	1.0	5.3	6.7	24.8	61.7	1.9	0.7%
WJCI	WJ Communications	-0.22	N/M	-0.13	N/M	1.25	1.6	27.5%	0.1	10.3	N/M	N/M	N/M	2.3	0.0%
TXN	Texas Instruments Inc.	1.00	21.7	1.02	21.3	1.33	16.4	19.4%	0.8	7.4	10.6	18.7	31.4	3.0	0.4%
<b><u>Networking/Telecom</u></b>															
INTC	Intel Corporation	1.11	18.9	1.19	17.7	1.37	15.3	17.3%	0.9	6.9	8.8	12.8	24.1	3.5	0.7%
MOT	Motorola Inc.	0.41	44.9	0.80	22.9	0.93	19.7	13.6%	1.4	3.5	12.9	24.5	48.2	3.3	1.1%
CSCO	Cisco Systems Inc.	0.64	29.5	0.79	23.8	0.90	20.8	16.1%	1.3	8.7	16.0	19.4	24.7	5.1	0.0%
NOK	Nokia Oyj	0.93	15.0	0.70	20.1	0.81	17.3	10.8%	1.6	4.1	7.7	9.2	14.5	3.9	2.7%
QCOM	Qualcomm Inc.	1.95	21.3	2.22	18.7	2.44	17.0	20.1%	0.8	20.4	28.2	30.3	80.2	7.3	0.6%
ERICY	LM Ericsson	-0.39	N/M	1.54	20.7	1.72	18.5	12.0%	1.5	8.3	19.5	27.7	53.5	6.2	0.0%
Mean			35.2		33.3		23.3	16.6%	1.5	8.0	16.6	30.2	38.7	4.0	0.6%
Median			27.0		22.9		17.9	14.4%	1.3	4.6	11.8	18.7	29.4	3.1	0.0%
High			125.7		294.2		99.6	40.0%	8.2	36.9	85.1	166.2	161.6	12.0	4.5%
Low			15.0		9.5		1.6	8.0%	0.1	0.7	3.6	3.6	13.9	0.6	0.0%

(1) Information Provided by Capital IQ.

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

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



## “Appendix – Important Disclosures”

Robert W. Baird & Co. and/or its affiliates expect to receive or intend to seek investment banking related compensation from the company or companies mentioned in this report within the next three months.

**Baird prohibits analysts from owning stock in companies they cover.**

**ADDITIONAL INFORMATION ON COMPANIES MENTIONED HEREIN IS AVAILABLE UPON REQUEST**

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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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