

Electronic Article Surveillance

A Technology Comparison



Sensormatic®

Electronic Article Surveillance - A Technology Comparison

▲Executive Summary

Regardless of where your retail operation is based, shrink is a universal problem. Worldwide retailers recognize that shrink or inventory loss is part of their daily challenge affecting their profitability in different ways – loss resulting from theft by customers and employees to poor inventory management and inefficient operations. The global economy continues to struggle through one of the most chaotic fiscal climates in history, causing many retailers to cut staff in an effort to help manage operating costs. Given current economic conditions, retailers recognize that additional investment in Loss Prevention (LP) is necessary to combat the increasing level of shrink.

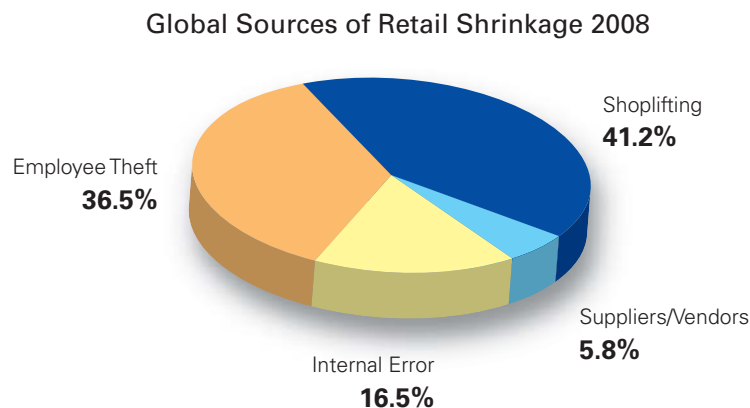
Consequently retailers need to invest in technology solutions that reduce costs, improve productivity, enhance customer satisfaction and create new sources of competitive differentiation. Loss prevention technologies like electronic article surveillance (EAS) have been very effective in delivering a positive return on investment (ROI) for retailer's shrink reduction efforts. According to a recent study by Retail Systems Research (RSR) shrink is increasing as a higher priority among retail executives, supporting their findings that nearly three times the number of top performing retailers use EAS technology as compared to underperformers.

To help frame the discussion is a historical view of EAS technology and its evolution. Also covered is a comparison of radio frequency (RF) to Acousto-magnetic (AM) solutions

As retailers focus on sustainability and growth in the competitive retail space it is imperative that also they consider forward thinking technologies to best support their loss prevention efforts to help weather the economic storm.

▲Retail Shrink is the Same in Any Language

According to the 2008 Global Retail Theft Barometer, worldwide shrink amounted to almost \$105 billion last year which presents a serious threat to retailers' bottom line. Shrinkage accounts for any loss of inventory due to shoplifting, employee theft, administrative error or vendor fraud. Sources of retail shrinkage are: shoplifting (41.2%), employee theft (36.5%), internal error (16.5%) and suppliers/vendors (5.8%). Among the most stolen items include cosmetics and skincare, alcohol, women's wear/apparel, perfume and designer wear.

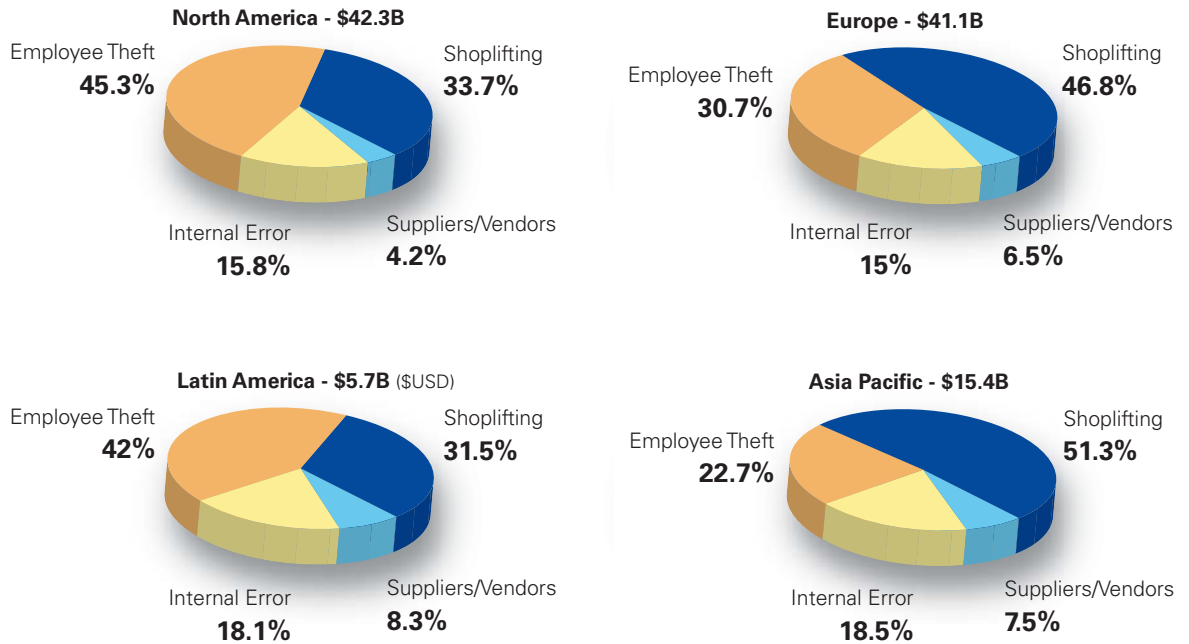


Source: 2008 Global Retail Theft Barometer

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The 2008 Theft Barometer reports shrink figures by country, with Asia Pacific have the largest percentage of theft due to shoplifting: APAC (51.3%), EMEA (46.8%), South Africa (34.4%), North America (33.7%) and Latin America (31.6%). According to the "Current Crime Trend Survey" from Retail Industry Leaders Association (RILA), \$35 million in merchandise is stolen each day in the U.S.

Sources of Shrink by Region



Source: 2008 Global Retail Theft Barometer

Retailers face numerous challenges when combating shrink. One possible dilemma is whether to openly merchandise items to maximize customer convenience and enhance profits versus locating items behind display cases to protect them from theft while inconveniencing the customer. Another possible challenge could be entrusting employees to be the key contact with customers yet wondering if they are stealing from you in the process. The more retailers can improve their operational efficiencies and limit theft; the greater the experience for customers in terms of lower prices and a safer shopping environment with better access to more products conveniently merchandised.

▲ Top Retailers Use EAS Three Times More than Underperforming Retailers

When deploying an effective loss prevention solution, the requirements should include EAS to prevent external theft. With the slowing economy many retailers have cut back on staff and now will be relying on technology to help control theft. A new study from RSR "Loss Prevention and Beyond: Survival of the Fittest," revealed substantial differences between top retail performers – those whose sales growth outpace the three percent industry average – and retailers below that average. Among the findings from retailers with stores around the world:

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- Nearly three times the number of top performing retailers use EAS technology as compared to underperformers.
- While almost half of the top performers use EAS to control shrink, only 17 percent of underperformers use EAS – despite all respondents ranking shoplifting as their second largest source of shrink.

▲ Secure Detection of Protected Product

Detecting the secured product at the exit requires simply that label or hard tag is “seen” by the detection system. This may seem an obvious solution but there are a number of reasons why this may not happen.

The material construction of the packaging or the product itself may stop the EAS tag from being detected. A product with a high metallic content can either “shield” or “de-tune” the EAS tag or label. This is easy to identify in some cases – such as batteries, DVDs or razor blades – but may not be obvious in other cases, such as perfumes where the metallic content can be in the printing on the packaging. Clearly there is little point in protecting a product with an EAS tag if there is little or no chance of it being detected at the exit.

Items used in retailing may also shield the item from detection. A metal shopping cart or basket may shield detection of protected items.

Thieves may take actions to try and “shield” the EAS tag from the detection zone. An obvious theft tactic is the use of aluminum foil lined bags. Dependent on the frequency of the technology used it may be possible to shield an EAS tag simply by placing it in your hand.

More sophisticated criminals have been known also to develop electronic devices known as “Jammers.” Relatively short range items, Jammers generate a signal on the same frequency as the EAS system and effectively blind them from seeing anything else.

Lastly and very importantly EAS detection systems have to be able to operate consistently and to a high standard within the retail environment. EAS systems have to be able to screen out or ignore electronic noise generated by all the other systems utilized by the retailer. “High Noise” environments can adversely effect the detection of a system to the point where there is a large hole in detection. It is not uncommon for thieves to identify these performance gaps. In extreme cases there may very little detection at all – or the EAS system may even be turned off entirely.

▲ A Brief History of EAS

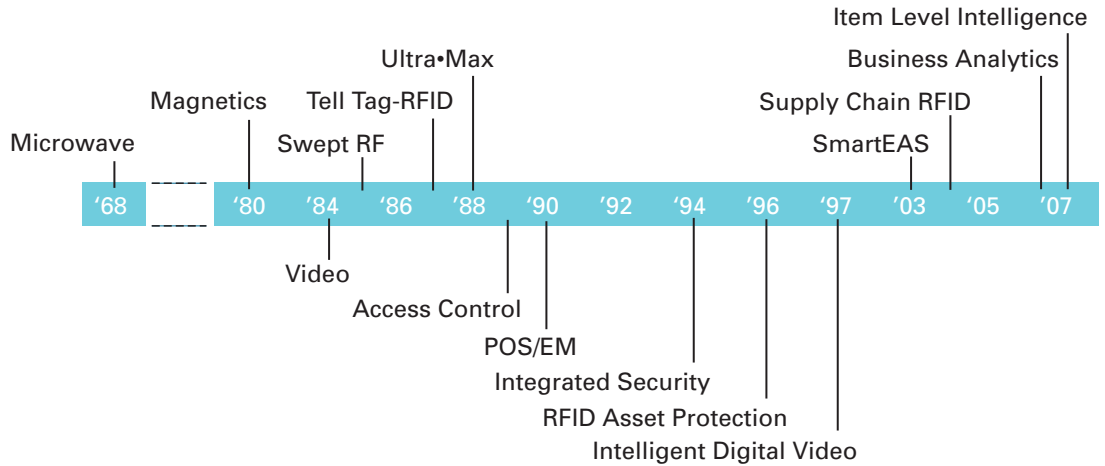
The first EAS system was designed by Arthur Minasy, the founder of “Knogo” in the mid-1960’s, based on Radio Frequency (RF) technology. Very shortly afterwards Ronald G. Assaf, the founder of Sensormatic Electronics Corporation, developed a microwave-based (UHF) EAS system which was primarily targeted at department and apparel stores.

Around the same time, George J Lichtblau developed Swept RF technology and licensed his patents to Checkpoint which created a commercial product by the start of the 1970’s. Electro-Magnetic systems were developed on the basis of the need for a very small label by the mid-70’s and were sold extensively in European super and hypermarket stores.

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By 1986, Sensormatic recognized the need for a single EAS platform that answered many of the retail challenges across many vertical markets. In a joint venture with Allied Signal Corporation, Sensormatic developed the AM technology branded Ultra•Max that came to market in 1988 after Sensormatic bought the exclusive rights to the technology.

Sensormatic Technology Timeline



Evolution of EAS

Multiple Competing Technologies	Ultra•Max® Emerges as Market Leader
<p>Microwave Problems: body & metal shielding, contact deactivation.</p>	
<p>Magnetics Problems: no deactivation & limited width.</p>	<p>500,000 + systems installed</p>
<p>Swept RF Problems: metal shielding, false alarms & limited width.</p>	
<p>Acousto Magnetics (AM) Benefits: wide exits, small labels & tags, works well on metal and liquids.</p>	<p>Billions of inventory items protected</p>

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▲How EAS Systems Work

All EAS systems work in the same basic manner. A transmitter sends a signal at a defined frequency to a receiver. This creates a surveillance area or detection zone. Usually this detection zone is created at an exit of a retail store, or within some stores at the checkout aisle. When an EAS tag or label enters the detection zone it creates a disturbance which is detected by the receiver causing an audible alarm to be activated.

Differences in the EAS technology, critically the frequency of operation, how the tag or label works and the handling of the tag or label response, provide the major differences in performance and value between the systems available on the market.

▲EAS Frequencies

The signals transmitted by EAS systems take the form of Electro-Magnetic waves and the response from the tag or label are set to a defined frequency of the wave. We will call this the frequency of operation of the system.

Frequencies are measured in Hertz (Hz), that is the number of times an event occurs per second, for these wave forms it is the number of complete waves per second. Because the frequencies can be very high other abbreviations are used to save on writing big numbers:

Hz = One per second

KHz = One Thousand per second = 1,000 Hz

MHz = One Million per second = 1,000,000 Hz

GHz = One Thousand Million per second = 1,000,000,000 Hz

EAS systems work on a wide range of frequencies from very low (measured in Hz) to very high (measured in GHz).

A further complication is that some EAS systems have a greater "bandwidth" for detection, meaning that they detect and transmit signals across a wider frequency range. This allows the system to detect tags and labels that are not exactly manufactured to a tight frequency which can result in false alarms.

The frequency of operation and the bandwidth of the EAS system dictate to a large extent the capabilities of the system in terms of detection and accuracy.

The following illustrates technologies developed in order of the frequency at which they operate.

Sensormatic Technology	Frequency	Vertical Market
Microwave (UHF)	868 MHz to 2.45 GHz	All Apparel
Electro-Magnetic (EM)	200 Hz	Video Rental / Food
A-Technology (AT)	39 kHz	High End Apparel Only
Frequency Division (FD)	66 & 132 kHz	Specialty Apparel
Acousto-Magnetic (AM)	58 kHz	All Retail Markets

Checkpoint Technology	Frequency	Vertical Market
Swept Radio Frequency	7.4 to 8.8 MHz	General Merchandise / Variety

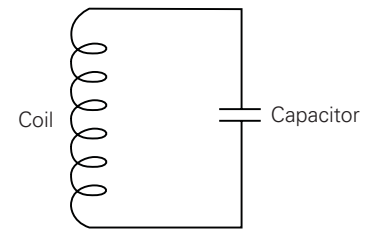
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▲Technology Comparisons

Radio Frequency (8.2MHz) Technology

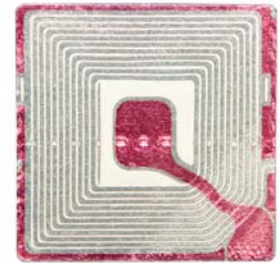
RF systems transmit a signal that varies between 7.4 and 8.8 MHz with a center frequency of 8.2 MHz (often described simply as “the bandwidth”). This range of 1.4 MHz (1,400,000 Hz) is necessary in order for the system to be able to detect RF labels which cannot be manufactured economically to a tighter specification.

The label consists of an induction coil and a capacitor in circuit, each of which store electrical energy. When entering an Electro Magnetic Field a current is induced in the coil which builds charge in the capacitor. When the energy in the coil and capacitor are matched they will “resonate.” By matching the coil and the capacitor correctly a label of a defined resonant frequency can be manufactured. The design of the label requires the circuit to be chemically etched into aluminum foil forming the coil and capacitor and then embedded onto paper.



Resonates at 7.4 - 8.8 MHz

To deactivate the label a device is used that is very similar to the transmitter, except that it creates a stronger field. The higher level of power in the label causes the capacitor to “short,” similar to a fuse in a common appliance except in reverse. The short is created by introducing a weak spot into the capacitor during manufacture, fusing the two together.



(Label not to scale)

The size of the label is important for performance reasons. The standard size of label is 4 x 4 cm label sizes smaller than this have different performance characteristics. The label size also effects deactivation. In order to get enough power into the label, a higher level of field is required to “short” the capacitor, this reduces the deactivation height.

Different hard tags are available; and the circuit within them is exactly the same as the label, with the exception that a copper winding and “proper” capacitor are used. (Picture on the right shows the inside of an RF hard tag). In line with the general rules of EAS, larger hard tags do give improved exit spacing to RF systems; however, at these increased distances RF labels will not be detected.



Due to the frequency used by RF systems, there are strict installation guidelines that should be followed to ensure they are effective in the field. Of particular concern for these systems is electrical noise. Vertical power cables, neon lights, etc, can all very badly affect the performance of the system. Passive noise sources are also a major issue. RF systems cannot be installed near metal doors and even the metal edging around door mats. Typically you will see RF systems installed more than 24” away from the exit to avoid interference.

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▲Acousto-Magnetic (58 KHz) Technology

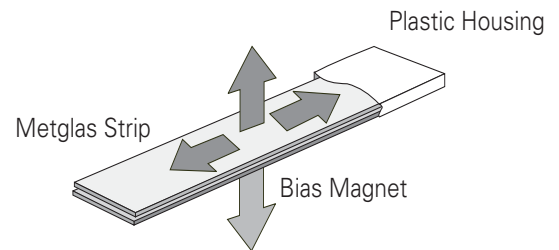
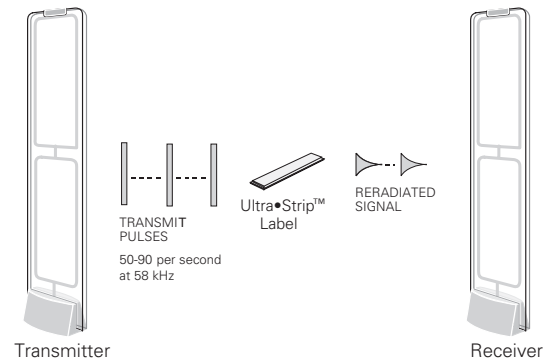
As the latest EAS technology, AM was designed to overcome weaknesses of other existing EAS technologies. AM uses many different technologies to achieve very wide exit detection combined with small tags and labels, consistent performance in the retail environment, greater immunity to false alarms and greater detection performance against shielding.

AM systems create a detection zone by transmitting at 58 kHz. This transmitted signal is not continuous but sent in bursts, or when a tag or label enters the detection zone it is energized by the transmit pulse, when the transmit signal ends the label or tag responds by sending its own 58kHz signal. Like a tuning fork, the signal will “decay” or “ring-down” (reduce in amplitude after the initial response).

When the transmitter is “off” between transmitted pulses, the receiver listens for a signal from the tag. The receiver has a very narrow bandwidth (600 Hz) and also is checking for the characteristic ring-down that a tag or label produces. The received signal is processed by the receiver to ensure that the signal occurs at the right time and at the correct repetition rate, further confirmed a number of times before triggering an audible alarm or alarm activity.

The ability of the system to detect smaller labels and to use a very narrow bandwidth comes from the design of the tag and label. The AM tag or label contains two elements within a three dimensional plastic housing consisting of amorphous resonator material with magnetic properties and a bias magnetic strip. When aligned on top of the magnet, the amorphous material vibrates at a defined frequency. The frequency of the tag is dictated by the length of the strip. AM labels and hard tags are manufactured to a very tight frequency specification as the requirement is only for the material to be cut to the correct length in contrast to other technologies that have to match capacitance and inductance on a printed circuit.

Deactivation of the AM label is carried out by (de-gaussing) the magnet, a process that does not rely on complex design within the label – only on the magnetic properties of the bias magnetic strip. This simple operation shifts the frequency of the label outside the detection window and can be carried out repeatedly, enabling the label to be turned on and off within the supply chain any number of times.



(Label not to scale)

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▲Acousto-Magnetic (58 KHz) Systems

AM EAS systems use one or more pedestals or antennas configured to create a surveillance zone at exits or checkout lanes. Pedestals can provide visible deterrence while concealed systems offer more discreet protection for upscale retail environments.

AM offers the following benefits:






- Industry leading detection rates ... 95% (+) to protect all kinds of goods from theft
- Wide-exit coverage offers greater flexibility for entrance/exit layouts
- Fully visible detection offerings to completely concealed systems
- Effective on products containing liquids or non-ferrous metals to combat shielding
- Variety of applications for both hard goods and soft goods
- Labels may be activated / deactivated an infinite amount of times
- The largest integrated source tagging program in the world by volume
- Wide range of attractive system designs to complement any store décor
- Sophisticated digital technology for optimum system performance
- EAS alarms always mean that a label or tag is present
- Jammer detection & reporting
- Can detect merchandise within foil-lined bags, even metal shopping carts
- Integrated metal detection options
- Integrated Smart EAS functionality such as alarm counts / management, peoplecounting, and system diagnostics

Key advantages of AM over Swept RF technologies include:

- Smallest label
- Highest Pick Rate
- Works on most liquids and metals
- Works in most metal shopping carts
- Protects exits up to sixty (60) feet
- AM alarms mean a tag or label is present

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▲ Comparison of EAS Detection Systems

Sensormatic			Checkpoint	
Specialty Retailers	High-end discreet systems	High Traffic	Specialty Retailers	Discreet systems
				
Ultra•Exit	Digital DoorMax	Ultra•Post	EvolveG10	Liberty PX
Sensormatic has used pulsed signal technology since 1986			Checkpoint made a transition to pulsed RF System in 2001-02	
Wide selection of discreet and concealed detection antennas to address different exit types since 1990			Checkpoint developed technological capabilities for a slim door antenna with Evolve in 2008	
3 ft. to 60 ft. coverage.			3 ft. to 6 ft. coverage between pedestals	
An AM alarm means a tag or label is present			Can false alarm	
Unlimited activation/deactivation			Can only deactivate once	
Can detect merchandise within foil-lined bags, even metal shopping carts			Cannot detect merchandise within foil-lined bags and metal shopping carts	
Effective on products containing liquids or non-ferrous metals to combat body shielding			Physics of RF EAS make the technology prone to shielding by metals and liquids	
Detection rates to over 95% up to 60 feet			Detection rate greater than 80% up to six feet	

▲ Independent EAS Analysis

- In a recent University of Dortmund study for ADT, AM labels were taken through a detection system in 15 reference points and 12 different positions. In most cases, the AM detection rate was 100% (with the lowest being 95.5%).
- The U.S.-based Loss Prevention Research Council (LPRC) conducted the retailer-sanctioned study across 320 stores, and demonstrated that in same-store settings, the AM technology activated 225%, or 2.25 times, more frequently than RF technology.

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▲AM Labels and Hard tags

Other components of an EAS system include labels and hard tag. AM labels are one-quarter the footprint of standard RF labels which better enables retailers and source tagging manufacturers to insert / conceal AM labels into highly pilfered products.



Typical AM Label Size
is 1.78" L x 0.42" W
(1/4 footprint of RF)



Typical RF Label Size
is 1.5" L x 1.5" W

When concealment of labels within the product is not possible, AM labels offer the advantage of not masking consumer brand, dosing and other important product information.



AM topical label application



RF topical label application
(Proximity to metals an issue with RF)



AM source tagging label application
(Inside primary packaging)



RF topical label application

AM labels are popular with both retailers and source tagging manufacturers/distributors, and are available in sheet or roll formats for either manual or automatic, high-speed application. In addition to typical label requirements, AM offers specialty label products for markets such as Food & Drug (the first anti-theft label approved by the U.S. Food & Drug Administration for bottled vitamins, over-the-counter medicines and other food items), books, multimedia, and others.

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The following chart provides a competitive analysis of AM labels versus RF:

AM Labels



Small footprint (1/4 the size of standard RF)

Detects from 3 to 60 feet

Source tagging compatible - Easily integrated inside products due to its size

An AM alarm means a label is present

Not detuned by foils or liquids

Unlimited activation/deactivation

Only activated with specially designed activators

RF Labels



Large footprint. Typical size is 1.5x1.5 inches or about 3-4 times the size of AM labels

Detects up to six feet between pedestals

Source tagging challenges: due to size, challenges when placed near metal or when bent

Can false alarm



















Can be detuned by foils and liquid

Can only deactivate once

Can become live after being deactivated causing unwanted alarms (Lazarus effect)

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▲ Hard Tags

Sensormatic	Checkpoint
<p>SuperTag® III Apparel and general merchandise (High-risk, high-value items; Lanyard option available)</p> 	<p>N/A</p>
<p>SuperTag® (VST) Apparel Source Tagging</p> 	<p>N/A</p>
<p>SuperTag® Ink In-store apparel and accessories</p> 	<p>N/A</p>
<p>SuperTag® III Lanyard General Merchandise</p> 	<p>N/A</p>
<p>Ultra®Tag® AT Apparel</p> 	<p>3G / Mini Hard Tag Apparel, soft goods, delicates, etc.</p> 
<p>Ultra®Tag® Lanyard Apparel, delicates, accessories</p> 	<p>CableLok (alarming CableLok available) Apparel & hard goods merchandise</p> 
<p>Ultra®Tag® MT Wine & Spirits, sporting goods, luggage, power tools</p> 	<p>Bottle- Cap/ Wrap Large or unwieldy merchandise</p> 
<p>UltraInk™ Apparel</p> 	<p>Ink Tag Apparel</p> 
<p>UltraLock® Jewelry, eyewear, swimsuits, strapped apparel and similar garments</p> 	<p>Optical-Tag Eyewear</p> 
<p>Safers High shrink products</p> 	<p>Keepers High shrink products</p> 
<p>Sewn-In Tag Apparel</p> 	<p>Force Tag Apparel</p> 

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▲Key differentiators of Sensormatic branded hard tags

- Utilization of AM resonator technology that delivers high and reliable detection rates
- Visible Source Tag (VST) version available
- Retail hardened and durable to withstand repetitive use
- Specialized locking release mechanism
- Diverse line of tags to meet specific retail requirements
- Safer line is an extension of the standard portfolio of locking mechanisms
- Highly engineered and manufactured to demanding standards of Six Sigma
- Designing EAS hard tags for nearly 40 years
- ID shapes that maximize aesthetics and focus on minimizing attack points or leverage to enhance security
- High impact ABS in most tags compared to standard ABS used in most competitive tags
- Extensive use of internal structures and ultra sonic welding to create a strong housing that is defeat resistant
- SuperTag clamp achieves a minimum of 120 pounds of pull out force resistance and generally is over 140 pounds
- Ultra Tag magnetic clamp achieves well over 120 pounds of pull out force and generally is over 180 pounds
- The bias resonator is the most reliable means of activating an alarm with the most accurate frequency response
- Pins are made of high grade stainless steel, and rolled into shape and then the point is honed like a sewing needle to minimize risk of damage to even the most delicate materials
- The grooves on the pin are designed to minimize impact on the merchandise on insertion and removal, but to securely engage the clamp to achieve superior resistance to pull out.
- Lanyards are all stainless steel multi strand aircraft cable with a nylon coating compared to the vinyl coating used by competitors. The vinyl is much softer and less cut resistant and can be easily damaged in normal use exposing bare wire.
- Magnetic detacher is unique as it is a compound magnet using two magnets, a core and a ring magnet, placed in opposition to one another to focus the magnetic strength in the detacher to the point where it can reliably detach the Ultra Tag. There is no single magnet currently produced that will generate enough magnetic field to reliably release the Ultra Tag AT. There are other detachers that claim to be very high Gauss magnets, but lack the field required at the correct height to reliably detach the UT apparel.

▲Source Tagging

Driven by the demands of the retail community, source tagging is the application of EAS tags and labels by a manufacturer during the manufacturing process. Retailers work in concert with the manufacturers of highly pilfered goods to ensure products are tagged, shelf ready and openly displayed for consumers to conveniently purchase.

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For the retailer, the benefits of source tagging are increased profitability due to product availability and labor savings at the store level with 100% tag compliance. Consequently tag compliance is directly related to shrink reduction. For the manufacturer, the benefit of source tagging is brand protection because the product stays on the shelf.

▲Evolution of Apparel Source Tagging



SuperTag® III



Hang Tag



Sewn In



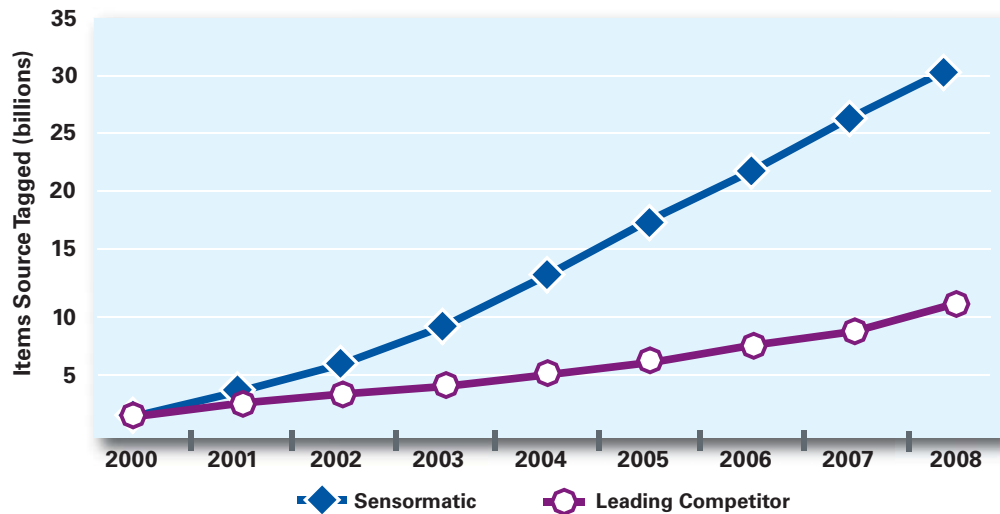
VST

- The latest innovation in source tagging is the Sensormatic Visible Source Tag (VST).
- This technology combines the visual deterrence of a hard tag with the labor savings of being able to implement this solution at the point of manufacture.
- This one time use hard tag is 100% recyclable so it meets the environmental concerns of retailers today.
- Since the beginning of 2007, over one billion apparel products have been protected using the Visible Source Tag.

Both Checkpoint and Sensormatic offer source tagging programs with their respective technologies. AM source tagging has experienced tremendous growth over the years as illustrated by this chart.

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Source protection volume growth in the past years...



To date, Sensormatic has protected over 32 billion items through source tagging or more than three to one versus RF technologies.

Source Tagging provides a positive return on investment for retailers by shifting the application process of labels and disposable hard tags to the supplier who can apply these security devices more efficiently and consistently. Additional benefits for retailers include:

- Reduced in-store labor costs,
- Increased focus on the customer
- Improved merchandising opportunities
- Reduced out of stocks
- Increased speed of products to selling floor to drive increased sales.

▲ Leading Retailers Embrace Sensormatic EAS solutions

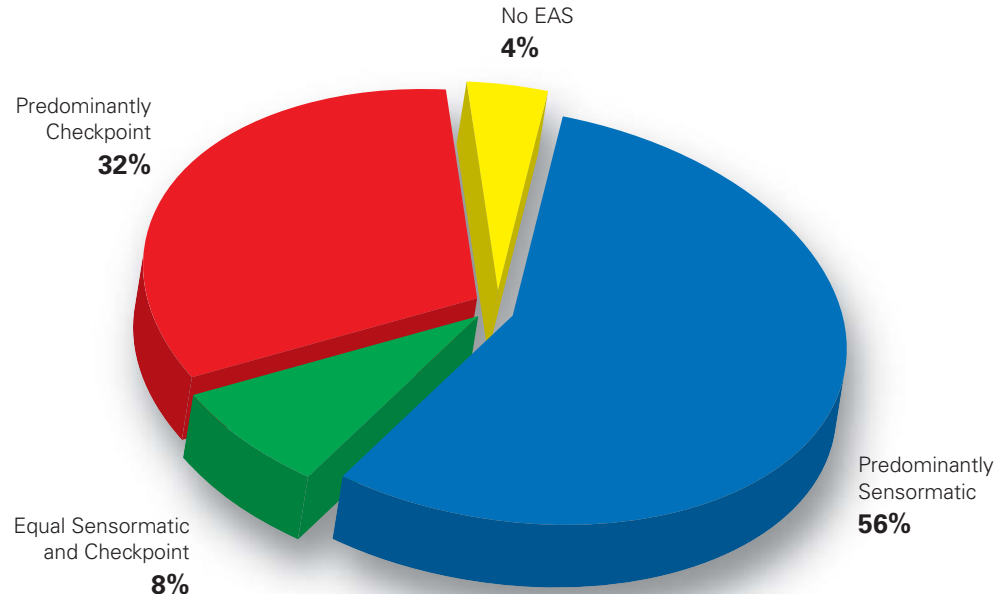
Retailers continue to invest in EAS in the next decade as currently, there is no other proven item-level technology that can provide similar security benefits and return on investment (ROI). Over 84 percent of world's top 200 retailers that use EAS rely on Sensormatic solutions, which include EAS, source-tagging, data analytics and in-store, item-level intelligence applications. Here are some of the leading retailers that embrace EAS Sensormatic EAS solutions.



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▲The top 25 global retailers that utilize EAS solutions

Of the top global 25 retailers, 56% predominantly use Sensormatic EAS and some Checkpoint EAS; 32% predominantly use Checkpoint EAS systems and some Sensormatic EAS systems, and 8% equally use Sensormatic and Checkpoint EAS system, depicted in the following chart.



As the same time retailers are investing in EAS they are looking for integrated, data-driven in-store solutions that can help them measure, manage and, ultimately, improve store operations. Currently retailers are increasing their investments in solutions that don't just reduce shrink, but also provide additional capabilities like remote diagnostics and service, operations applications such as store traffic counting, exception-based reporting with integrated digital CCTV that identifies areas of higher inventory losses (including employee theft), and cashier training issues or improper EAS tagging procedures. Many of these integrated solutions will be based on EAS infrastructures.

▲Real Solutions, Real Benefits, Right Now

The retail market is not homogeneous and customers will require a range of EAS and RFID solution sets. There is no single migration path from EAS to RFID. Rather, we foresee different needs-based scenarios where some retailers can benefit from combined EAS-RFID functionality whereas others may require a sequential approach. Depending on the existing infrastructure, a migration path would consider the following factors:

- Breadth of the RFID implementation
- Price and velocity of items to be tagged
- Cost of EAS versus RFID tags
- Frequency of out-of-stock events
- Ability of retailer's information infrastructure to manage the increasing flow of RFID data.

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In today's changing environment, retailers need to implement more intelligent and integrated technologies into their existing investment to enhance the customer shopping experience and improve product availability. Ongoing retailer challenges that negatively impact retailer profitability are:

- Inventory accuracy
- Labor productivity
- Item location
- Vendor fraud
- Efficient replenishment
- Out-of-Stocks
- Price management
- Internal shrink
- Customer service

For that reason Sensormatic is developing a cost-effective, simple and scalable infrastructure that will integrate multiple sensor technologies, including EAS, item level-RFID, traffic sensors and digital CCTV. Due to their layered technology approach, this platform is capable of delivering customized solutions and unique benefits based on retailers' specific operational needs. For example, some retailers may choose to deploy stand-alone Ultra•Max® AM EAS for security or RFID for inventory visibility, while others will implement a mix of EAS and RFID for security and inventory management.

Customer benefits such as greater product availability, accurate replenishments and effective inventory cycle counting at the retail selling floor have resulted in up to 99 percent sales floor inventory availability and an increase in same store sales of up to 25 percent.

▲Sources Cited:

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- 2 September 2006, AMR Research and EPCGlobal. AMR Research provides comprehensive research and advisory services for supply chain and IT executives. Every day we help companies like yours identify opportunities to improve your operations and get the most out of your enterprise IT investments, <http://www.amrresearch.com/>. EPCglobal leads the development of industry-driven standards for the Electronic Product Code (EPC) to support the use of Radio Frequency Identification (RFID) in today's fast-moving, information rich, trading networks, <http://www.epcglobalinc.org/home>



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