



Internet**Home**Alliance

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**Asset Management (RFID)**  
Focus Group Report

February 20, 2006

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## Background & Methodology

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# Background

Avery Dennison is known as a pioneer in developing RFID labeling technology for business inventory management. With consumer awareness of the technology rising, Avery Dennison is now interested in RFID tagging solutions for the home.

Recently conducted quantitative research has allowed Avery Dennison to estimate the level of consumer interest in using RFID technology, as well as profile likely adopters. Qualitative insight into the nature of potential consumer response among the most likely adopters was needed to further the development of these home-oriented solutions. With Alliance support and backing, Avery Dennison was primary project sponsor of this qualitative exploration.

The primary objectives of the research effort were to:

- Explore consumer reactions to the general idea of using an RFID tagging solution in the home.
- Investigate the usefulness of various applications of RFID tags, including: a locator tool to help find items around the home; connecting the tags to databases and/or the Internet (e.g., to access warranty information); and using tags as a monitoring mechanism, e.g. monitoring valuables, pets or children.
- Uncover any other unmet needs within the home (but outside the scope of the proposed applications) that might pose opportunities for Alliance members to develop other RFID technology solutions.
- Prioritize where RFID tagging solutions are most needed in the home help guide future RFID R&D endeavors.
- Understand how consumers talk about RFID to provide insight to future messaging efforts.

# Methodology

Eight small-group (triad) interviews were conducted during the week of January 16 in Chicago and Los Angeles. Two groups in each city were with 21-34 year-old heads of households, and two were with heads of households with five or more people in them. (In some cases, there was some crossover in age or number of household members, but the majority of the 21-34 year-olds lived only with a spouse, significant other or roommate. The majority of the 5+ households were comprised of two parents with three or more children under the age of 18.)

## Respondents in all groups were required to:

- Be technology decision-makers for their household.
- Be self-identified early technology adopters.
- Have general interest in RFID for the home (rate '5' to '7' on a 7 point scale).
- Have broadband Internet and/or WiFi network at home.
- Have annual household income of \$50,000 or more.

## Other group details include:

- An even mix of males and females was recruited in each city.
- According to the Whirlpool segmentation scheme, over half of the participants fit the profile of Home Enthusiasts, and were represented in all but one group. Super Moms were the second most common segment represented in the groups.
- Participants were paid for their participation.

## Executive Summary

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# Executive Summary

**First impressions of the Household Item Locating Kit are mixed. (See the concept description on pages 30 and 31 of this report.)**

- On the positive side, it's perceived as a simple, easy to use time-saver that can help people get organized.
- On the down side, it's regarded as more of a "cool tool" than a necessity, and concept specifics (limited to 30 tags, cumbersome to set up) generate some skepticism.

**The Household Item Locating Kit is more appealing to households with five or more people than it is to younger, smaller households.**

- Households with five or more people tend to lose things more often, and have more possessions and bigger houses.
- Younger, smaller households have limited space, fewer possessions, and fewer people in the household to lose things.

**If the reader covered only a 10-foot radius, consumers are unlikely to try the product. Tagged items would be located all over the house, not just limited to one room or area of the house.**

**The most compelling use for the Household Item Locating Kit is as a locator. The presence-based application is second most useful, but not as a standalone product because on-screen notification is a very limited security measure. The information-based function will be useful once manufacturers store information on RFID tags direct from the factory, but have little appeal if data have to be manually entered.**

**Keys, wallets, cell phones and remotes are the most desirable items to tag with the Household Item Locating Kit.**

- These items are more likely to be lost and most critical to find.
- They tend to cause the most frustration because they tend to turn up missing as people are running out the door.

## Executive Summary

Most say they would prefer to integrate the Household Item Locating Kit with their current computer system and network, in order to make use of existing equipment rather than having to go out and buy expensive new equipment. The idea of printing out labels on a new, special printer is also not attractive.

Integrating the system with a touch-screen display or wireless device is appealing because: these devices are perceived as easier to use; they're more convenient than having to boot up a computer; and they would allow for remote connectivity.

A product enhancement requested by many consumers is an audible locator, much like a pager for a cordless phone.

When consumers discussed what their 'smart home' of the future would look like, with ubiquitous embedded RFID chips, they struggled to come up with applications beyond the location-, proximity- and information-based applications explored in relation to the Household Item Locating Kit. This indicates that the concept of a truly automated 'smart home' is still beyond the realm of imagination for most.

When a product like the Household Item Locating Kit comes out on the market, most say they would be willing to try it, just for fun. It wouldn't initially be an essential tool, but as one participant said, "It could become like the cell phone...you can't live without it."

Consumers most commonly envision finding a product like this at an electronics store, such as Best Buy, Fry's or Circuit City, either next to the wireless routers, computer peripherals, or in the software section. Some can see buying it at a store such as Wal Mart or Target, in the home appliance or security section, or at a gadget store, like Sky Mall or Sharper Image.



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# Conclusions and Recommendations

For the most part, the future home notion of having RFID chips embedded in items all over the home is still a far-reaching, futuristic concept. Consumers understand the context and applicability, but are not yet convinced it is something they need. The advantages of time-savings and convenience are appealing, but are not compelling enough to prompt consumers to investigate potential, current solutions.

It is likely that early technology adopters would want to try the Household Item Locating Kit after it was introduced to the market, but it will initially be perceived as a 'cool toy' rather than an essential tool. Most will probably wait until the advent of embedded RFID chips, and for a certain application that they, personally, find essential.

The market for a product like the Household Item Locating Kit is viable....

- If the cost can be kept down to a price consumers consider reasonable;
- If setup is as simple and quick as possible; and
- If the range of the antennas is not limited to ten feet (ideally it would extend to the entire house perimeter) and the footprint of the antennas is small.

**Recommendations for developing a successful Household Item Locating Kit-type solution for the consumer market:**

- Focus on the location-based application—it is the most compelling, standalone function, and easily carries over to the enterprise (i.e., keeping track of common office supplies such as staplers, calculators, tape dispensers, etc.)
- Consider eliminating the requirement to print item names on labels—allow users to type in label names next to a unique tag identifier. This reduces the amount of time and effort for the user to set it up and allows labels to be smaller, and applicable to small items, such as jewelry and glasses.
- Ensure the diagramming process is simple and user-friendly (certainly requiring no measurement of the home).

**Introduce the product in consumer technology stores such as Fry's or Best Buy.**



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# Current Home Organizing Habits

Keys, wallets, cell phones and remotes are by far the most often-mentioned items that go missing around the home.

In general, people consider themselves to be fairly well organized when it comes to these essential daily-life items. Many have a “place” for their keys, wallets and phones. Said one participant, “I put my keys for work... my wallet... change... money... on the kitchen counter by the coffeemaker. I know I’m going to be there sooner or later and this way it’s all together.”

Those in larger households with more people in the home tend to lose items most often. They say it’s much more difficult to track items because so many hands have touched them. It’s a different story for younger, smaller households who generally know where everything is kept.

When an item turns up missing, current methods for finding it are less than desirable.

- Many enlist the help of others: “I first yell to the wife, ‘Do you know where it’s at?’ She says, ‘No, you had it last.’ Then I start looking for it.”
- Some use an audible aid: “I have a pager for my cordless phone. Or, if I lose my cell phone, I call it from my home phone.”

When asked how they feel when searching for a lost item, people use terms like “frustrated,” “annoyed,” “mad,” and “worried.”

- “It’s a waste of my time! And I always seem to lose it when I’m walking out the door and already late.”
- “You want to kill your kids when they can’t find their MP3 or iPod... you just want to strangle them. You spend all that money and then it gets lost.”
- “It’s a marital stressor when you think the other person is to blame.”
- “It’s been two days and I *still* can’t find the remote! My wife is like, ‘You used it last,’ and I’m like, ‘No, the kids used it last!’”

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# Reaction to the Household Item Locating Kit\*

## Basic Likes, Dislikes and Questions

Groups were read a description of the Household Item Locating Kit and shown an animated illustration to demonstrate its use. Participants were asked to write down their first impressions, and then they discussed them as a group.

First impressions of the kit were:

### Pros

- + Sounds simple, easy and convenient
- + Good for finding small items around the home
- + A time-saver
- + An organizational tool
- + Good for a big house with lots of clutter
- + Good for elders (those with memory problems) or disabled

### Questions

- ? How difficult would the home diagram be to set up?
- ? How much would it cost?
- ? Can you purchase additional tags?
- ? How would it work in multi-level homes?
- ? What would the range of the reader be?
- ? Does the signal interfere with a wireless modem?
- ? Any health risks with radio waves?
- ? How could I be protected from outside hackers?
- ? Could it be used on kids and pets?

### Cons

- A novelty/"cool tool" rather than necessity
- Sounds time-consuming to set up (especially the home diagram)
- 30 tags is not enough to tag every possibility or *too many* for tagging just basic items
- Encourages too much reliance on technology
- Promotes laziness
- Missing a sound indicator (e.g., cordless phone pager)
- Limited to use inside the home (many items are lost outside the home)

(\*Details of the Household Item Locating Kit description are outlined on [pages 30 and 31](#) of this report.)

# Reaction to the Household Item Locating Kit

## Who It's For

In general, the 21-34 year old cohort tended to think the concept was for someone else, but members of larger families felt it addressed their needs.

- “It’s for messy people who have really big houses.”
- “It’s definitely for me. I’ve got so much going on my head and I have so much to keep track of. The kids are always losing things, and asking me to find them. I just need a break sometimes.”
- “A well-organized person wouldn’t need it because they have a place for everything. It’s for someone who loses things.”
- “It’s for someone like my dad who always has the latest gadgets. He’d tag his remotes. All 60 of them.”

✔ For:



- Middle to older-aged people with families
- Those who have larger homes
- People who have large households with active kids
- Consumers with a lot of “stuff”
- Those who are moderately organized

✘ Not for:



- Young, Gen X professionals
- People who have small homes with limited space
- Those with small households with no active kids
- Minimalists
- Those who are overly organized or overly messy

vs.

# Reaction to the Household Item Locating Kit

## What Would be Tagged

Locating lost items is by far the most promising application for RFID tags.

Participants were pressed to come up with as many applications as possible for locating items with the Household Item Locating Kit tags (see full list on [page 35](#) of this presentation). Not surprisingly, keys, remotes and wallets/purses were mentioned in all the groups. Cell phones, jewelry, cordless phones and shoes were brought up almost as frequently.

When asked which of the lost items were most important, the majority voted for keys, remotes and cell phones.

Consumers indicate that tagging small, important, frequently used items are the best use for the RFID tags.

- Losing these items causes the most “pain:” “It’s so frustrating to lose my keys! I can’t go anywhere without them!”
- They’re typically lost when consumers don’t have time to search for them, e.g., running out the door: “Seems like I can never find my wallet when I am running late.”

Only a handful expressed enthusiasm about using the kit to locate infrequently used items, such as Christmas presents or sports equipment. Said one participant, “I usually have an idea where I stored them and I’m not in a big rush if I do have to look for them.”



# Reaction to the Household Item Locating Kit Presence-based (Security) Applications

Groups were read a description of the presence-based (security) application and shown an animated illustration to demonstrate its use after exploring the merits and brainstorming uses for the location function. (The detailed presence-based description is on [page 32](#) of this report.)

**This application appeals to some consumers, and not to others.**

- Those who do find the security aspect of the Household Item Locating Kit compelling see it as a clever way of tagging larger items around their home that might be stolen—mostly TV, stereo equipment and small electronic devices, such as digital cameras and iPods. Tagging pets and children *within* the home is not particularly compelling, but several mention that keeping track of them *outside* the home would be helpful. As one parent explained, “I don’t ever wonder where my son is when he’s at home, but I worry about him coming home from school safely.”
- Those who don’t like the security application either believe they have nothing of value, or they already have a security system in place that makes them feel sufficiently secure.

Simply having a notification pop up on screen is a big drawback because it presumes someone is sitting in front of their computer. Several mention that the function would be more valuable if a remote alert was issued, e.g., to a cell phone. “Although I don’t know what I could do about it, at least I’d know if someone was messing with my things,” said one participant.

Without the locating function of the Household Item Locating Kit, the presence-based application does not appear to be strong enough to carry the kit on its own.

# Reaction to the Household Item Locating Kit Information-based Applications

After discussing the presence-based applications, participants were read a description of information-based applications and shown an animated illustration. (For details, see [page 33](#) of this report.)

Overall, the capabilities of this application are promising, but consumers indicate it won't be compelling until manufacturers automatically link information on the chip.

- For now, if information had to be linked to the tag manually (during the tag setup) most consumers would consider this function is nearly worthless. The time and effort involved in set-up would not be considered worthwhile. Said one participant, "I can't imagine taking the time to sit down and enter in a whole bunch of information."
- It's a different story when consumers start thinking about the future when products come already labeled with "smart" tags. Most talk enthusiastically about the notion that information about their product warranties and manuals can be stored on a tiny chip, rather than taking up shelf-space. Said one participant, "I still have a whole bunch of manuals for products I don't own anymore."

**Some were less than enthusiastic about the information-based applications.**

- Young, self-sufficient, tech-savvy Gen Xers who feel confident that they could find better information in a Google search, just about as fast: "I'm sure I would find more useful information on my own."
- Those who balk at increased reliance on technology: "I already feel like I can't live without my cell phone. Don't tie me to my computer, too."
- Those who worry about memory loss and aging: "At least it gives my brain a little workout to look for information. Spoon feeding might make me lazy."

# Reaction to the Household Item Locating Kit

## Where and How Often Tagged Items Would Be Found

When it comes to where tagged items would commonly reside in the home, no one room stands out as a primary focus for the Household Item Locating Kit—consumers see applications for it in various places around the home.

- **Family room.** Most likely home to remote controls and DVDs/CDs.
- **Kitchen.** Primarily for groceries (grocery management and inventory). Not much interest in finding utensils, pots and pans or kitchen equipment.
- **Bathroom.** Only medicines and medicine expiration dates were mentioned.
- **Master bedroom.** Jewelry, wallets/purses, bedroom TV remote control, glasses.
- **Kid's bedroom.** Toys, clothes, shoes, GameBoys, iPods, school books, remote controls, cordless phone. This is where lost items are often “found” by parents.
- **Office.** Not only computer-related items such as digital cameras, iPods and the like, but also files/important papers and planners.
- **Front entry.** Keys, wallet, purse are often stored here for ease of access when coming/going.
- **Garage.** Tools, sports equipment.

Those who expressed the most interest in the concept envision using the Household Item Locating Kit frequently—either multiple times a day or week. It would be considered a backup for their current system. One participant elaborated, “I would first try to find the lost item on my own. After a brief look around, I’d go to my computer and look it up.”

## Reaction to the Household Item Locating Kit Installation and Setup of Home Diagram and Reader

Most estimate the setup will take anywhere between 30 minutes and two hours—reasonable, given the time-savings they would enjoy by being able to look up lost items rather than searching for them. However, for those with marginal interest in the concept to begin with, even a 30 minute set up time is virtually a deal-killer. “I just wouldn’t do it,” stated one participant.

The primary concerns and questions about the Household Item Locating Kit center around setting up the home layout diagram.

- Will it be difficult to use the software? “I know how to use Visio, but it’s pretty difficult to learn. I can’t imagine my wife using that.”
- Will it be time consuming to set up? “I think it would take hours to figure out all of my rooms and dimensions.”
- Will it require measurements? “Would I have to go around and measure each room? Ugh.”
- How accurate will the diagram be? “My remote control usually falls under the seat cushions. Simply knowing that it’s in the corner of my living room where my couch is isn’t enough.”

Most anticipate putting their reader in a central location such as their living room or kitchen.

- Almost all mention the desire for the footprint to be as small as possible and not interfere with home décor: “I imagine it would be about the size of my router...I’d try to hide it behind a piece of furniture.”
- Those with kids said they’d need to put it out of reach of small hands: “Probably somewhere up on a counter.”

The current antenna range of 10 feet is unacceptable to most. When presented with the reality that RFID antennas currently have a range of ten feet (instead of being sufficient to cover an entire household), most said that they would be unlikely to buy the kit. Said one participant, “To be worthwhile, it would have to span the whole house. My keys, for example, are never in the same room.”

# Reaction to the Household Item Locating Kit Installation and Setup of Tags

Generally, consumers say that setting up the tags sounds easy and quick.

Some say they would print out all their tags in one sitting. Others anticipate that they would discover uses over time, and therefore print them out separately. Regardless, most prefer to print the tags using existing equipment.

- “I’d probably tag the essential items—keys, wallet, phone—and try it out for awhile. I’m sure I’d think of additional items as I lose them.”
- “I would make a list of 30 items and print them out, just to get it over with.”

**A special individual-tag printer is not necessary.**

- When asked if the kit needed to include a special printer or “labelmaker” type of device to allow labels to be printed one at a time, most didn’t like the idea: “I’d have to put an RFID tag on the labelmaker so I wouldn’t lose it. It would just be one additional thing for me to lose!”
- Some question the need to actually print the name of the item on the tag: “Why can’t each tag just have a unique number that you enter in your computer?”

# Reaction to the Household Item Locating Kit Interface and Integration with Existing Systems

Most are comfortable with integrating the Household Item Locating Kit with their existing computer and network. It seems to be a logical extension of the network due to the wireless router. Particularly when considering the information-access function, the need for Internet connectivity makes sense.

Many say the need for storing the database of tagged items on a home PC makes sense, but the computer interface is a bit awkward.

- Consumers aren't in front of their computers all day and therefore, would not get alerts in a timely manner.
- Many either have screen savers, turn off their monitors, or don't keep their computers on all the time: "If I had to power up my computer to search for a lost item, that would take longer than just walking through the house."

A touch-screen interface would represent an improvement over the PC interface for many—provided the cost is reasonable.

- It is up all the time.
- Easier for kids to use.
- Most assume that it would be in a more central location (e.g., the kitchen) than the computer, which is in the home office.

Many suggest that having some type of audible alert (either on a PC or touch screen) would help enhance the usefulness of the system.

- That's what they're used to with the paging function of their cordless phones.
- If a mobile interface (e.g., a PDA) was used with sound, they could play "hot and cold" until they find the exact location of an item in a room, as opposed to just pinpointing an area of the home on screen.

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# Future of RFID in the Home

Going beyond the notion of having to tag items around the home with special RFID labels, a description of a “home of the future” was read, and examples of ubiquitous RFID chip applications in the kitchen were read. (For details, see [page 34](#) of this report.)

**Most react positively to having their home automated to some degree when RFID chips come embedded in labels and products by the manufacturer.**

- It will help them manage aspects of their home they don't care to worry about, like food inventory management: “I really need to know when I am running low on a food item. With a big family, we tend to worry more about running out of milk than the expiration date!”
- It will be a time saver: “If it makes my day run smoother, I'm all for technology moving us ahead!”

**Particularly those in younger, smaller households express a bit more skepticism about the notion of embedded RFID chips.**

- They reinforce that too much reliance on technology results in laziness: “It's important to practice doing things on your own. If you got so reliant on RFID tags telling you everything, what would happen if the power went out?”

**When consumers were then invited to discuss what their ‘smart home’ of the future, with ubiquitous embedded RFID chips, might look like, they struggled to imagine applications. A few drew on scenarios they'd seen in sci-fi movies, but for the most part they did not expand greatly on how they envisioned using the Household Item Locating Kit. This indicates that the concept of a truly automated ‘smart home’ is still beyond the realm of imagination for most.**

**Beyond the kitchen examples, some suggested ‘smart home’ ideas include:**

- Maintenance reminders around the home (e.g., change furnace filter).
- Clothing outfit coordinator.
- System or appliance failure indicators (automatically calls for maintenance).
- Medical alert and maintenance—keep track of vaccinations, household medications, refills.



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# Adoption and Purchase of an RFID Solution

## When?

A good many early technology adopters would be willing to invest in the Household Item Locating Kit as described, at a price they would consider reasonable, “just to play with it.” They don’t anticipate that this early system would be an essential tool, but rather a “cool new toy.”

Consumers say that RFID tags in the home will only become an *indispensable* tool once RFID chips are embedded, with information attached, from the manufacturer, and all they need is to set up a reader. Others say that the true value of RFID chips will be when they can find items *outside* their home, such as kids, pets or valuables, such as jewelry.

## Where?

Most envision buying the Household Item Locating Kit at a place where they buy other technology products—Best Buy, Fry’s, Buy.com, Circuit City. Others think of more general consumer outlets like Wal Mart, Target, Sears or Home Depot. A couple of groups mentioned QVC, Sharper Image or Sky Mall—outlets known for their cool technology toys.

In a store, most say they’d expect to find the kit either in the technology section, next to computers and peripherals, in the home appliance or security section, or with software.

## Who?

Those who think of routers mention Cisco, E-Link, others think of Internet Service providers—SBC, Verizon and Cingular, to name a few. Microsoft and Whirlpool were also mentioned.

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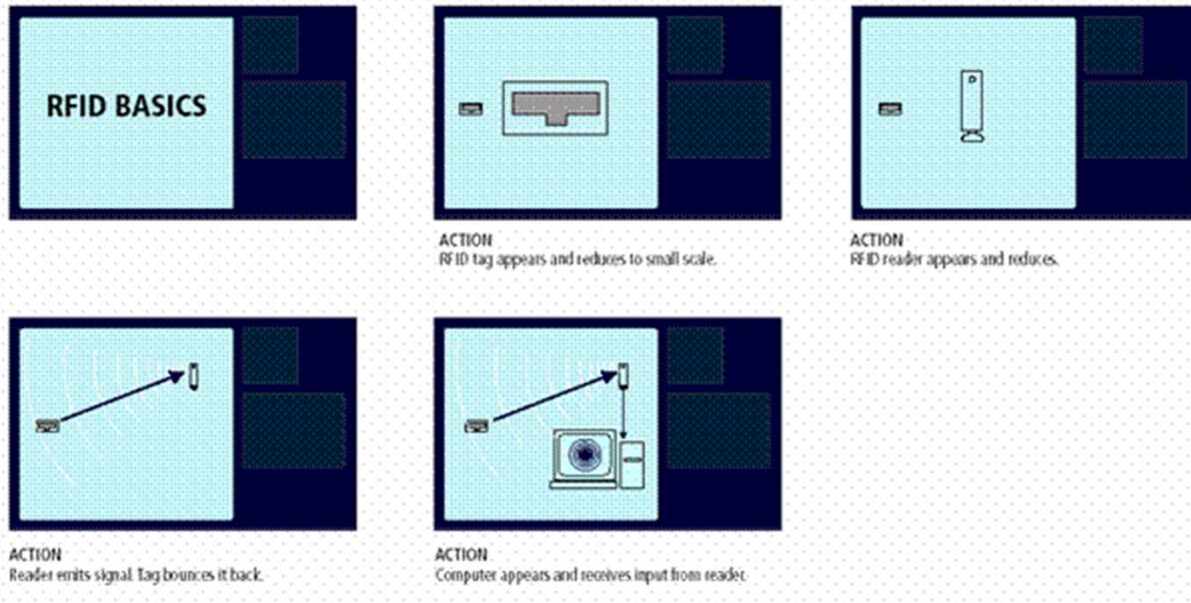
# Discussion Flow

- 1 Introduction to RFID.** The group first reviewed a definition of RFID, and were then shown an animated illustration of the technology. A brief discussion then ensued to explore existing applications for the technology.
- 2 Household Item Locating Kit Introduced.** Participants read a description of the Household Item Locating Kit and subsequently saw an animated illustration of how it would be used. A detailed discussion followed to uncover likes/dislikes and questions about the concept.
- 3 Ideation of RFID household uses.** Participants were asked to list items they would likely tag with the Household Item Locating Kit. They were then asked to place common location of items up on a home layout diagram. Discussion explored significance of items, rooms and envisioned set up and use of the kit.
- 4 Exploration of presence-based application of the Household Item Locating Kit.** A third animated illustration was shown to demonstrate the use of RFID in tagging valuable items, such as a valuable painting, for security purposes. Reaction to the concept and anticipated uses were investigated.
- 5 Exploration of information-based application of the Household Item Locating Kit.** Groups were shown an animated illustration of information linked to the RFID tag via the Internet. Possible information access uses explored, such as product manuals, warranties, expiration dates, etc.
- 6 “Futuristic Concept” presentation.** A fifth, final, animated illustration was presented, showing uses for embedded RFID chips in a kitchen. Uses included finding a stored blender, a grocery expiration alert, food allergy alert. Participants were asked to brainstorm other uses for embedded RFID chips in their own “home of the future.”

# Introduction to RFID

Radio Frequency Identification or RFID is a generic term for a technology which can transmit small amounts of information about an object wirelessly, using radio waves. RFID systems enable users to identify, locate and access information about items within defined areas.

It works like this: An RFID tag bearing a micro chip and tiny antenna receives and reflects signals back to a reader (one or more transmitting antennas). The reader communicates this data to an attached computer or similarly enabled user interface, which in turn retrieves the information and communicates it to the user.



# Household Item Locating Kit

Every household has items that are routinely misplaced. Keys, remote controls, and checkbooks are often lost in the shuffle of daily life. The Household Item Locating Kit simplifies finding these essential items—providing individuals with access to digital tracking systems usually reserved for industry.

The Household Item Locating Kit uses Radio Frequency Identification (RFID) to help users locate and store information about items in and around their home. The user places RFID tags on objects they'd like to track (e.g. house keys, remote controls, etc...). When an item cannot be easily found, the user simply queries the system through their PC to receive the object's location.

Please assume for the purposes of this evaluation that the system could be integrated into a wireless home network. Please also assume that information would be encrypted to prevent security issues at a level that would allay any security concerns you may have.

## Basic Setup and Requirements

### The Household Item Locating Kit consists of:

- CD-ROM with easy to use installation software
- A set of 30 RFID tagging labels
- An antenna.

### The Household Item Locating Kit must initially be set up by the user. Setup consists of:

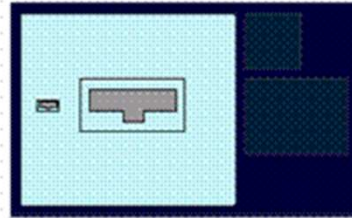
- Installing software on a home computer or laptop.
- Printing out item names on labels and then putting those labels on corresponding items around the home. For example, when “keys” is printed on a label, the computer will automatically register the name “keys” and link that name to the RFID tag. Once the tag is attached to the keys, the RFID tag will be tracked by the computer as “keys.”
- Setting up a radio antenna in your home to allow the tagged items to communicate with the computer. If necessary, say: radio antennas work in a limited area, so whatever you tag would need to be in a “readable zone” to be detected. It is likely that you would have to set up multiple antennas around your home to relay information back to your computer, but for the purposes of our discussion today, let's not worry about range limitations.

### Requirements:

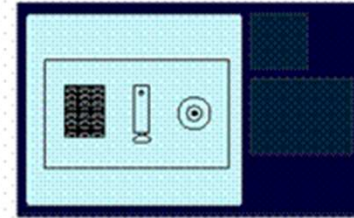
- A home computer or laptop.
- Broadband (high speed) Internet access and a WiFi network

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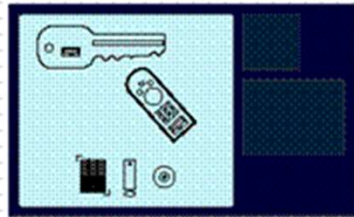
# Household Item Locating Kit



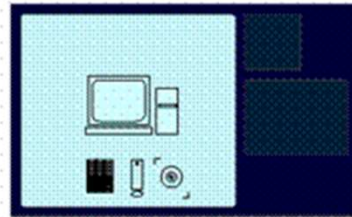
**ACTION**  
RFID tag appears and reduces to small scale.



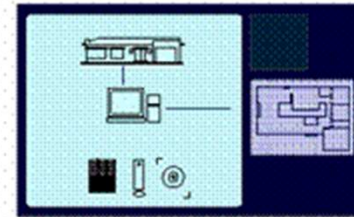
**ACTION**  
RFID tag multiplies into sheet of tags.  
Additional kit elements appear.



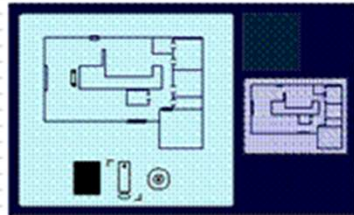
**ACTION**  
Keys and remote control appear.  
Tag sheet is highlighted. RFID tags are placed on each item.



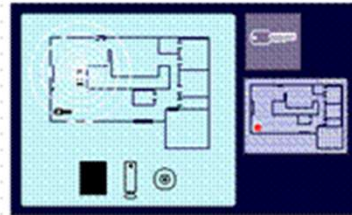
**ACTION**  
Computer appears.  
Software CD is highlighted.



**ACTION**  
House appears.  
Translated house diagram appears.



**ACTION**  
House diagram appears.  
Reader is highlighted. Moves to position inside house.



**ACTION**  
Key appears in search window. Key appears on screen.  
Reader sends out waves. Red location indicator pulses on screen.

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# Presence-based Applications

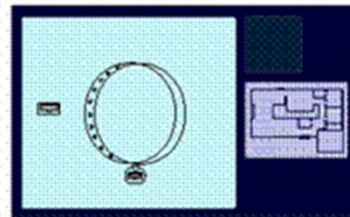
Through the use of RFID tags, the Household Item Locating Kit is not just limited to locating lost or misplaced items. Because the item is “connected” to a PC via the RFID tag, it can also track whether an item is where it belongs or not.

In connection with the computer, RFID tags would monitor movement outside of pre-set zones and generate proximity alerts.

Other potential RFID presence-based applications could include:

- Sending an alert if an indoor pet gets out.
- Sending an alert if a child leaves a room or play area.

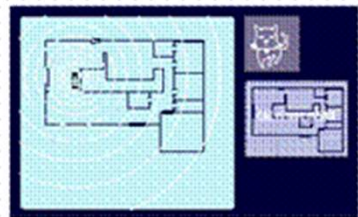
(Please note that animated illustration showed an example of a tag placed on a valuable painting, rather than a cat, as shown in the storyboards below.)



ACTION  
Reduced tag appears.  
Pet collar appears. RFID tag is placed on it.



ACTION  
Collar reduces.  
Cat appears with collar around neck.  
Cat moves off screen.



ACTION  
House diagram appears.  
Cat appears in search window.  
Reader sends out waves.  
Message appears indicating cat is not inside.

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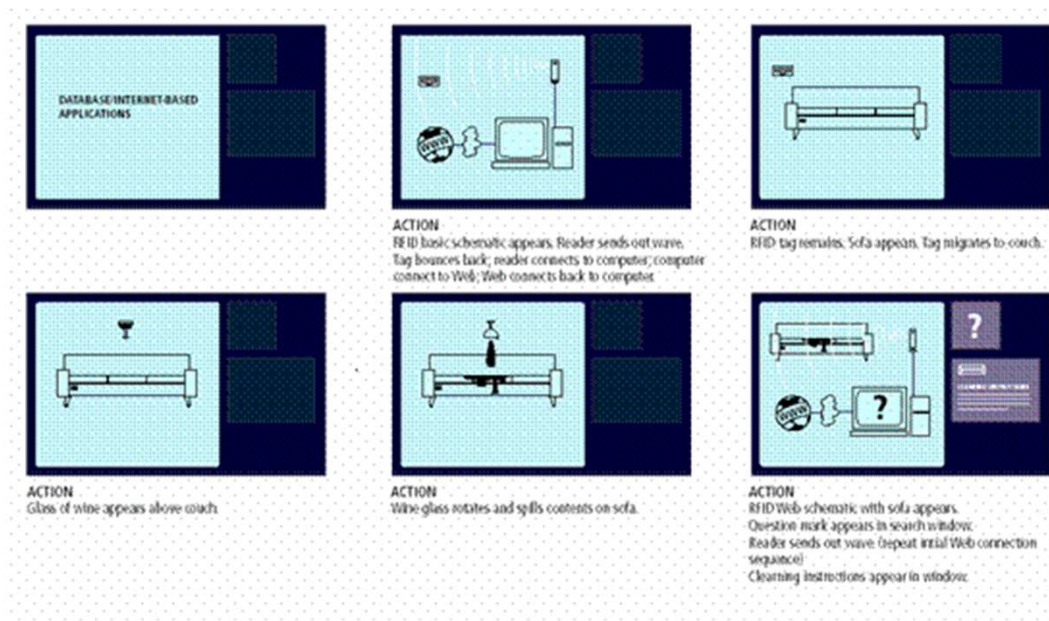


# Information-based Applications

The RFID tag can also access information about an item. For example, if you bought a new refrigerator and wanted to keep track of when you bought it or the warranty information, you could do so electronically rather than having to keep track of warranty papers or receipts in a file.

Other potential RFID Information-based applications could include:

- Accessing product warranty information.
- Accessing product manuals/repair information
- Identifying product model/pedigree (for updates and safety recall information)
- Access prescription instructions & check expiration dates
- In the home office, integrate with enterprise level RFID systems
- Check food expiration dates and provide menu options based upon available groceries
- View a list of valuables in the household and how much they cost, for insurance purposes
- Identify missing components to complete household systems (i.e., answer the question: “do I already have one of these?”)



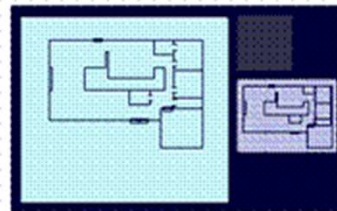
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# Kitchen of the Future

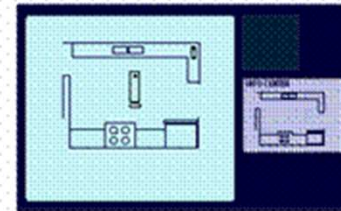
Now I'd like you to look way out into the future, at a time when RFID chips can easily and cheaply be embedded in anything you buy for your home. In the future, it will be possible to do so much more with RFID. To give you an example, let me describe what the kitchen of the future might look like.

Few would argue that the kitchen is one of the busiest rooms in the home. If you could buy kitchen tools, foods and appliances with embedded RFID chips, you could more efficiently manage your kitchen, such as:

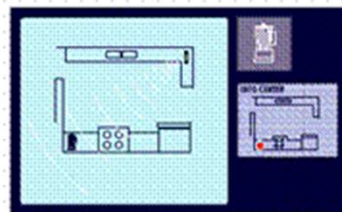
- Walk into your kitchen and have a notification waiting for you on the touch screen or information center (e.g., warning: your milk will expire in 2 days). Reorder the food online via a click of a button.
- Receive alerts about foods as they enter your kitchen that family members are allergic to (e.g., a food product that contains peanuts.)
- Pull recipes up on your computer based on foods that are already in your kitchen. Keep track of recipes you've tried, even pull up other user reviews of those recipes.



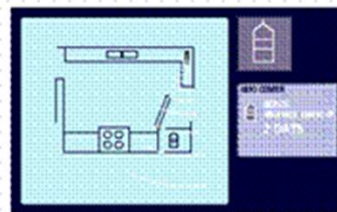
**ACTION**  
Home diagram appears.



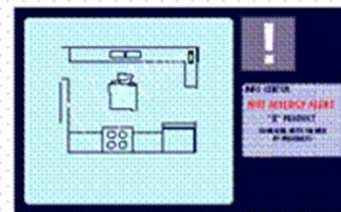
**ACTION**  
Home diagram enlarges to reveal kitchen diagram.  
Kitchen schematic appears in window.



**ACTION**  
Blender appears in search window.  
Reader sends out wave. Blender bounces it back.  
Info center shows pulsing red indicator.



**ACTION**  
Refrigerator door opens.  
Reader sends out wave. Milk bounces it back.  
Milk appears in search window.  
Info center provides notice.



**ACTION**  
Grocery bag appears in kitchen.  
Product begins to remove itself from bag.  
Reader sends out wave. Product bounces it back.  
Alert appears in search window and info center.

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# Items Most Likely Tagged with Household Item Locating Kit

Following is a comprehensive list of items, generated by each group, of items they say they would likely want to tag with the Home Item Locating Kit.

Type of Application	Number of groups who mentioned	Item
Locator	8	Keys
Locator	8	Remote
Locator	8	Wallet/purse
Locator	7	Cell phone
Locator	7	Jewelry, wedding ring, earrings
Locator	6	Shoes
Locator	6	Cordless phone
Locator	4	Books (library books, school books, magazines, kids' notebooks)
Locator	4	Camera
Locator	4	Checkbook
Information	4	Manuals (appliances, electronics)
Locator, Information	4	Medicine, prescriptions, Advil
Locator	4	Tools
Security	4	TV
Security, Information	3	Car (security, problems, recall)
Locator	3	CD Rom
Locator, Information	3	Clothing (location, care of product)
Locator	3	Eyeglasses
Locator	3	Files/records
Security, Locator	3	iPod
Security, Locator	3	Kids
Locator	3	Sports equipment
Locator	3	Toys
Information	3	Warranty
Locator	2	ATM card
Locator	2	Calendar/planner
Locator	2	Dog items (collar, leash)
Locator, Information	2	Groceries
Locator	2	Hamster
Locator	2	ID
Security, Locator	2	Pets
Security, Locator	2	PDA
Security	2	Stereo

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(List continued on next page.)



# Most Likely Items Tagged with Home Item Locating Kit (continued)

Type of Application	Single mentions	Type of Application	Other single mentions
Information	Alert for product recall (baby)	Security	Packages in lobby of apt. building
Security, Locator	Baby	Locator	Paint brushes
Locator	Belt	Security	Painting
Locator	Blanket	Security, Locator	Passports
Locator	Bottle opener	Security, Locator	People
Security, Locator	Briefcase	Information	Poisons
Locator	Cassette recorder	Information	Reminders (new filters, etc.)
Security, Locator	Cat	Locator	Roller skates
Locator	Cigarettes	Locator	Screwdriver
Locator	Coat	Security	Silverware/spoons
Security	Computers	Locator	Slippers
Locator	Credit card	Locator	Smaller items (general)
Locator	Darts	Locator	Socks
Security, Locator	DVD equipment	Locator	Summer clothes
Locator	DVD case	Locator	Sunglasses
Security, Locator	Elderly	Locator	Tape measure
Security, Locator	Electronics	Locator	Tissues
Locator	Sunglasses	Locator	Train card
Information	Fridge - soon to expire foods	Locator	Watch
Information	Furnace reminder		
Security, Locator	Gameboy		
Locator	Garage door opener		
Locator	Hats		
Locator	Hidden christmas present/stored presents		
Information	Home entertainment equip. manuals		
Locator	Junk food		
Security	Keep out of certain rooms		
Locator	Kid stuff		
Security, Locator	Laptop/computer		
Locator	Lighter		
Information	Maintenance (scheduled) of furnace, fridge, dryer, cars		
Locator	Pacifier		
Locator	Office stuff (stapler, tape)		

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