



ActiveWave RFID

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ActiveWave

Benefits

Benefits of Active Wave Systems



- ◆ **Total Asset Visibility:**
People and assets can be identified and monitored throughout a facility. Inventory in a warehouse can be determined without manual counting or movement of goods.
- ◆ **Real-Time Tracking:**
Tagged items can be located quickly from the Host.
- ◆ **Sorting, Storage, and Order Picking:**
Stationary inventory items can be found quickly for retrieval.
- ◆ **Reconciliation:**
All stock can be verified automatically against records – when received, stored, and shipped.
- ◆ **Invoice Transactions in Real-Time:**
Accurate invoices can be generated automatically and transmitted to customers as soon as items are shipped.

Benefits of Active Wave Systems



- ◆ **Less Equipment Required:**
Greater read range means less equipment is required to provide full coverage. ActiveWave tags can be read up to 85 meters (279 feet) away!
- ◆ **Periodic Updates of Inventory:**
Inventory in a warehouse can be verified at user-specified intervals – weekly, daily, hourly, etc.
 - ◆ Alerts can be issued for items found missing.
 - ◆ Loss can be investigated as soon as alert occurs.
- ◆ **Greater Tag Data Storage:**
Tags can store a record of the container/pallet contents for verification and system input at the receiving location.
ActiveWave tags can hold up to 256 Kbits of user-defined data!

Comparison of Tags



	ActiveWave tags	Passive tags
Reusable on other items	√	√
Rewritable data	√	√
Additional memory for user	√	√
Stores up to 256 Kbits of data	√	
Externally powered (tag must be in field to work)		√
Low power consumption with removable battery	√	
Read range less than 3 meters		√
Read range 1 to 85 meters	√	
Periodic beacons	√	
Real-time tamper alarms	√	
Real-time temperature monitoring	√	

Comparison of Tags



◆ Re-usability

All ActiveWave tags and most other RFID tags (active and passive) are designed to be re-usable. This means that the same tag can be used on different items. For example, if a tag is used to track an asset in a hospital, and the asset is replaced, then the same tag can simply be attached to the new asset and reconfigured by the user.

◆ Data Storage

Data stored in all ActiveWave tags and most other RFID tags are rewritable by the user. In addition, some tags have additional memory space for the user to add information specific to the item tagged (e.g., person's name, product's expiration date, good's sale date). ActiveWave tags allow up to 256 Kbits of data.

Comparison of Tags



◆ Power Source

A tag's power source is the characteristic distinction between 'active' and 'passive'. Passive tags rely on an external RF field for power. Active tags use a small internal battery. ActiveWave tags are designed for low-power consumption and use removable batteries.

◆ Read Range

Power source has a direct impact on performance. Active tags have much greater read range and reliability. Passive tags have a maximum read range of 3 meters. ActiveWave tags can be read up to 85 meters away.

Comparison of Tags



◆ **Asynchronous Features**

Using an internal battery allows ActiveWave to have several important features not offered by other active tags:

- 1. Periodic beacons – All ActiveWave tags can be configured to periodically transmit data at user-defined intervals, from a few seconds to several days. This provides an extra level of security when monitoring important items.**
- 2. Real-time tamper alarms – As soon as an ActiveWave tag is removed from its holder, or if its band is cut (for WristbandTags), then the tag immediately transmits an alarm to the system. The tag can also be configured to remember if it were ever tampered in the past instead of reporting immediately.**

Comparison of Tags



◆ Asynchronous Features (continued)

- 3. Real-time temperature monitoring – ActiveWave tags can be configured with upper and lower temperature limits. If the temperature of whatever the tag is attached to (person, asset) goes beyond those limits, then the tag will immediately transmit an alarm to the system. This feature allows our WristbandTags to monitor patients' locations with current body temperatures in real-time. If the patient develops a fever, or the patient's body temperature falls abnormally low, the system will automatically alert a nurse with the patient's location. If the patient tries to remove the tag, the tag will send a tamper alarm to the system.**

System Features



◆ **Dual Frequency**

The ActiveWave RFID system uses 433 MHz and 916 MHz (868 MHz for Europe) simultaneously in a full-duplex environment. This design allows for much faster and more reliable communication between devices.

◆ **Adjustable Read Range**

ActiveWave Reader and Field Generators (devices used to wake up and communicate to tags) have adjustable read range settings that can be easily configured by the user via software. This feature allows two things:

- 1. Easier installation – devices can be adjusted on the fly to cover only specific boundaries.**
- 2. Zoning – by adjusting the read ranges on a tag's three closest devices, the system can locate that tag.**



ActiveWave Products

ActiveWave Products



- ◆ **Tag – access, asset, inventory**
 - Transmits periodically or when RF field is sensed.
 - Placed on people, animals, equipment, inventory items, etc.
- ◆ **Reader – fixed, portable**
 - Transmits and receives RF information from tags and passes this data to the Host.
- ◆ **Field Generator – standard, smart**
 - Produces 433 MHz RF field to wake up tags.
- ◆ **Software – Programming Station, Tracker, API**
 - Used to configure ActiveWave devices, process tag information, and communicate with RFID system operator.
- ◆ **Host**
 - Computer that manages RFID activities, receives Reader data, and runs software applications.

Access & Asset Tags



◆ **Used to track people and assets.**

Tag performs three major functions:

- 1. Wakes up and transmits when it senses a field from an ActiveWave RF Field Generator (at doorways or any other monitored area). Has anti-collision capability, enabling the Reader to receive information from multiple tags that are transmitting at the same time.**
- 2. If the tag is tampered with or separated from the attached item, it transmits an alarm message.**
- 3. If the battery is low, it transmits a low battery notification message.**

Access & Asset Tags



***Market: Access Control, Asset/Inventory Tracking
Bi-Directional Access/Asset Tags with automatic wake-up
capability***

<i>Multi-Tag Read Capability</i>	<i>Yes</i>
<i>Configurable</i>	<i>Yes</i>
<i>User Memory</i>	<i>0 to 256 Kbits</i>
<i>Operating Frequency</i>	<i>916 MHz, 868 MHz</i>
<i>Wake UP Frequency</i>	<i>433 MHz</i>
<i>Field-initiated Wake-up Range</i>	<i>1 to 33 meters</i>
<i>Tag Read Range</i>	<i>1 to 85 meters</i>
<i>Power Source</i>	<i>3 Volt lithium battery</i>
<i>Operating Temperature</i>	<i>-35°C to +70°C (-31°F to 158°F)</i>
<i>Dimensions*</i>	<i>85.4mm x 54.1mm x 3.0mm</i>

**** Tags available in different sizes based on applications.***

Inventory Tags



- ◆ **Used to track containers, pallets, boxes, equipment, automobiles, and other assets and valuables.**

Tag performs five major functions:

- 1. Wakes up and transmits ID and data at specified time intervals. Transmit interval can be set to match customer requirements.**
- 2. Wakes up and transmits when it senses field from ActiveWave RF Field Generators.**
- 3. Has anti-collision capability, enabling Reader to receive information from multiple tags that are transmitting at the same time.**
- 4. If the tag is tampered with or separated from the attached item, it transmits an alarm message.**
- 5. If the battery is low, it transmits a low battery notification message.**

Inventory Tags



Market: Inventory/Tracking

Bi-Directional Inventory Tag with automatic wake-up capability

<i>Multi-Tag Read Capability</i>	<i>Yes</i>
<i>Configurable</i>	<i>Yes</i>
<i>User Memory</i>	<i>0 to 256 Kbits</i>
<i>Operating Frequency</i>	<i>916 MHz, 868 MHz</i>
<i>Wake UP Frequency</i>	<i>433 MHz</i>
<i>Field-initiated Wake-up Range</i>	<i>1 to 33 meters</i>
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<i>Dimensions*</i>	<i>85.4mm x 54.1mm x 3.0mm</i>

**** Tags available in different sizes based on applications.***

Fixed Readers



Several different sizes of fixed Readers are available to fit all application needs.

Market: Access Control, Asset/Inventory Tracking

Devices: Standard, Small, and Medium Readers and Universal Programming Station.

Read Range

1 to 85 meters

Configurable

Yes

Operating Frequency

433 MHz and 916 MHz

Power Supply

+12 Volts

Dimensions

***From 152 x 176 x 54 mm
to 108 x 65 x 28 mm***

Portable Readers



activeWAVE

ActiveWave makes PC-Card (PCMCIA) Readers and customized Reader modules to fit existing handheld scanners.

Market: Access Control, Asset/Inventory Tracking

Devices: Handheld, PDA, and all general purpose portable wireless communications devices.

<i>Read Range</i>	<i>1 to 85 meters</i>
<i>Configurable</i>	<i>Yes</i>
<i>Operating Frequency</i>	<i>433 MHz and 916 MHz</i>
<i>Power Supply</i>	<i>+3 or +5 Volts</i>
<i>Dimensions</i>	<i>PC-Card and custom*</i>

**** The size of the module can be changed based on applications.***

Field Generators



Field Generators are used to locally call tags periodically or when movement is detected.

Market: Access Control, Asset/Inventory Tracking

Devices: Standard and Smart Field Generators.

<i>Read Range</i>	<i>1 to 33 meters</i>
<i>Configurable</i>	<i>Yes</i>
<i>Operating Frequency</i>	
- <i>Standard</i>	<i>433 MHz</i>
- <i>Smart</i>	<i>433 MHz and 916 MHz</i>
<i>Power Supply</i>	<i>+12 Volts</i>
<i>Dimensions</i>	<i>67 x 108 x 28 mm</i>

Software



- ◆ **Programming Station – used to reset, enable, disable, query, call, and configure tags, Readers, and Field Generators.**
- ◆ **Tracker – monitors and displays all ActiveWave system activity. Reports alarms and informs operator what action to take. Stores all transactions on the host or in a central database accessible via the LAN, WAN, WLAN, or Internet.**
- ◆ **API – used by customers who want to write their own software applications that interface to the ActiveWave system. Documentation and example application code written in Visual C++, Visual Basic, and C# are available to show how to interface to the API.**

ActiveWave Applications

Primary Applications



◆ Hospital Resource Tracking

ActiveWave RFID systems can be used to track patients, doctors, and expensive equipment in hospitals in real-time. RFID tags can be attached to the ID bracelets of all patients, or just patients requiring special attention, so their location can be tracked continuously. ActiveWave tags have an optional temperature sensor to monitor patients' body temperatures, and optional tamper switches to alarm if the tags are removed without authorization.

An instant assessment of critical equipment and personnel locations is also possible through RFID technology. These applications can be combined with ActiveWave access control to allow only authorized personnel to access critical areas of the hospital.

Primary Applications



◆ **Container and Pallet Tracking**

ActiveWave RFID active tags can be programmed with contents and assigned locations and then placed on containers and pallets that are stored in a warehouse. Additional information can be collected and added to the RFID tags as the pallets move through the warehouse. The ActiveWave tracking system can identify unscheduled movement, so managers and security can be alerted to possible theft.

The ActiveWave system can also reduce theft and other forms of inventory shrinkage by immediately alerting the operator when a product is moved from its assigned area. And we can reduce the time and cost for counting stock as it enters a warehouse by collecting the data automatically and virtually eliminating the need for manual intervention.

Primary Applications



◆ **Hands-Free Inventory Control**

Although many companies are now using sophisticated Warehouse Management Systems integrated with Supply Chain Systems, Enterprise Systems, and Electronic Data Interchange (EDI), the movement and tracking of goods through the manufacturing and supply chain process is still a complex procedure which is difficult to manage. In many instances, the goods being distributed to the retailer must go through one or more third party distribution processes, before they reach their final destination.

With ActiveWave's RFID solution, inventory can be updated in real-time without product movement, scanning, or human involvement. Our fully automated system allows inventory status to be determined, and shipping & receiving documents to be generated automatically. The system can also trigger automatic orders for products that are low in inventory.

Primary Applications



◆ Hands-Free Access Control

ActiveWave's RFID technology provides a hands-free access control solution with many advantages over traditional access control badges and systems. Our unique technology allows the user to enjoy complete hands-free access control. Our access badge can be read at a distance that eliminates the need to handle the badge or walk very close to the reader. This freedom is particularly important to handicapped workers, when carrying packages, and during inclement weather.

The ActiveWave access control system can report any unauthorized access and issue an alert to the security manager. In addition, it can be used to trigger cameras and video recorders in order to capture unauthorized or authorized access in real-time.

Primary Applications



◆ **Parking Lot Access Control**

ActiveWave's RFID technology can provide independent, automated systems for parking lot security and access control. Our technology provides businesses and communities with hands-free control to ensure only authorized vehicles have entry. The system can also provide access data for administering periodic access charges or parking fees.

◆ **Car Inventory Tracking**

ActiveWave RFID systems can manage inventory of automobiles in new and used car dealerships and in rental car lots. Our technology can track the location of each car in the lot at any time. In addition, our advanced RFID technology can automatically check cars into and out of the lot in real-time.

Primary Applications



◆ Airport Security

ActiveWave RFID access control and personnel tracking/locating systems can help to ensure the security of restricted areas in airports, such as flight lines, baggage handling areas, customs, employee lounges, and other sensitive areas. These techniques could also be applied at maritime ports, railway stations, and passenger bus terminals.

Our systems can track employees and passengers in real-time. Unlike other access control systems, ActiveWave solutions are completely hands-free so they have minimal interference with the busy work schedules and flow of employees and passengers. Read on for more examples of how ActiveWave technology can be used.

Primary Applications



◆ Manufacturing Line

Manufacturers can track and record in-process assembly information into the RFID tag as an item progresses down the line. For example, as features are added to a personal computer assembly, they could be recorded on the tag. In this case, the tag would keep a current "inventory" of the PC's contents. The tag information can later be read to produce a shipping list and invoice. The tag can also remain with the item for later use by field personnel during installation and maintenance.

ActiveWave RFID solutions are ideal for manufacturers who build several products on a single production line, or manufacture complex or customized products. Assembly line personnel can use an RFID reader to verify which processes have been completed, to determine which inspections or tests are required, and to automatically update the central production database. Instead of manually creating data entry sheets which could introduce errors into the system, production planners and inventory control personnel can use ActiveWave RFID tags, an RFID reader, and a PC to automatically update the customer database and finished goods inventory.

Primary Applications



◆ **Fleet Tracking**

With ActiveWave's RFID technology, commercial, government, and private fleets can have hands-free access to their maintenance depot. Our technology also allows these fleets to efficiently collect, track, and report operations and maintenance data for all of their vehicles in the depot. ActiveWave's hands-free technology can also enable gate access, authorize fueling, and automate weighing operations, while allowing all associated record-keeping to be automated.