



# Application Software

**Product Code: L-SW500**

## Description: TagTrac

Active RFID Access Control, Personnel, Asset and Smart Building System Version 1.5.5

### System Architecture

TagTrac's system architecture is a multi-tiered multi-threaded distributed network designed for use over LAN/WAN/GAN to manage buildings, their assets and their staff. The system architecture consists of four tiers that make up the distributed system. The Database Server (DBS) provides the system with rules to follow and information on which to act. The database server requires a backend database engine or RDBMS to run, and supporting a wide variety of database engines from MS SQL to Oracle on a native level, as well as ODBC for any drivers the system does not cater for, we can connect to almost any database.



The Floor Server (FS) is the systems real-world interface, and will connect to the DBS via TCP/IP ensuring a truly distributed architecture. Using a delta protocol that is encrypted and compressed, the nominal bandwidth requirement of the system will ensure smooth operation even over poor communications infrastructure. Floor Servers will integrate into real-world devices such as Readers/ReaderNets, Biometrics, Digital I/O devices, real time video etc. giving the system the ability to monitor, verify and control access as well as building functions such as geysers, lights, etc.

The Console (CS) is a monitoring station for the system. Also TCP/IP based one could conceivably dial into the system from home and perform actions as well as draw reports and monitor system activity. This distributed monitoring feature means that control of security, for example, could be either centralized or decentralized giving total control to the end user.

In combination one could run Floor Servers at various different locations throughout the globe, run a centralized DB Server at a head office, and monitor from anywhere in the world. On the other hand, one could run the entire system off one computer very localized. How distributed the system is therefore very flexible and can be moulded to suit user requirements as oppose to users changing their business and practices to suit the system.

The FS systems are set up, maintained and monitored from the DBS allowing central control of the entire system whether local or global. This level of control means that only one skilled operator is required at one location on the globe for system maintenance.

### The Database Server (DBS)

The DBS is designed to facilitate high data throughput, handling well over a million transactions per minute (Dependant on operating platform and RDBMS). The DBS is a multi-threaded Win32 application designed and optimised for performance as well as usability. The interface is designed for administrative ease and rule-set construction to allow administrators to maintain the system with ease and speed.

Due to the multi-threaded nature of the DBS multiple components of the system can run simultaneously ensuring that all requests are tended to. For example a communications thread will read information from the FS, decode it and place it into a master message queue; a message controller thread will determine which part of the system that message is destined for and pass it to the relevant waiting thread (such as the Logic Matrix).

The DBS's Logic Matrix is the central processor of the system. It contains a global system image and is aware of all tags, DI/Os, etc. The Logic Matrix will make a decision dependant on the type of input, the states of other inputs and the location of tags, etc., it will also update any CSs that are monitoring the present item or zone.



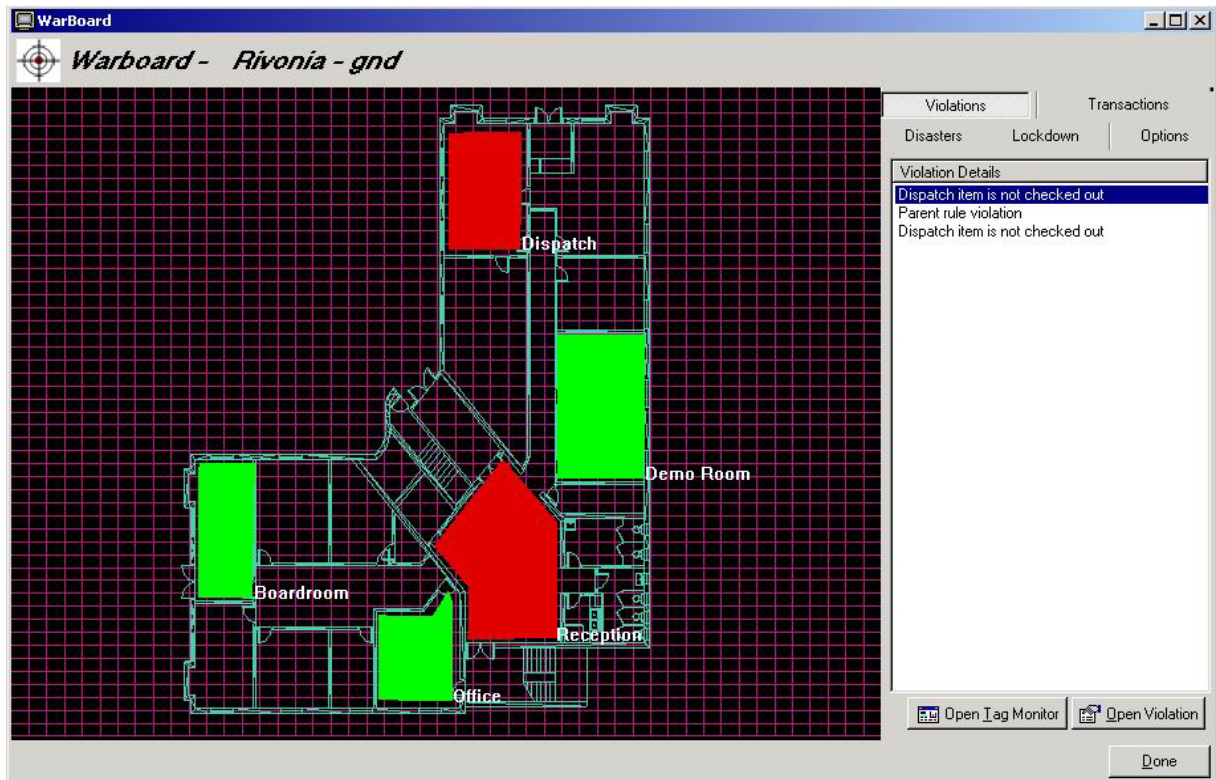
Using an event based system to monitor tagged items ranging from staff to assets and visitors, and the ability to create custom data containers or Ownership Types to cater to items that are not available on install, we are confident that any item of any description can be tagged and monitored.

Also utilizing an event such as "First Tag On Floor" and "First Tag In Building" one can perform building management such as – When the first tag enters the building, activate the lights and turn the geysers on.

By integrating the system into an existing alarm system and using a ReaderNet, it is also possible to perform intruder detection functions i.e. If a passive is activated in a zone and there are no tags in that zone, the person in that zone must be an intruder.

Capable of sustaining thousands of incoming connections from FSs and CSs the system is capable of monitoring and maintaining thousands of sites. Using TCP/IP as the communications protocol, the remote systems can be on the same machine, on the same LAN, on the same WAN or on over the Internet.

Rules and maintenance range from parenting or parent rules, zone control, access control to state control and movement limitations. The ability of the system to seamlessly link these rules and rule sets together ensures that almost any scenario can be dealt with.



## The Floor Server (FS)

The Floor Server's primary function is to monitor the "real world" and update the DBS of events that have occurred via the communications infrastructure in place. The Floor Server is multi-threaded and will control any hardware from Biometric IO to ReaderNets to PLCs.

Separating local logic from communications means that the various components operate independently of one another (similarly to the DBS) having separate threads for control over differing aspects of the system. This is once again done to ensure rapid local system response to high volumes of transactions.

FS configuration and maintenance is controlled by the DBS so no local administration of the system is required.

The FS will build an image in it's memory of the location and state of all it's various I/Os to perform delta transmission. This means that only relevant meaningful data will be sent from the FS to the DBS and not redundant information. By doing so, bandwidth requirements become nominal and henceforth infrastructure costs go down significantly.

Communications between a FS and its DBS are encrypted using the TEA encryption algorithm. This encryption is 128-bit and to date we are unaware of it ever being cracked. The communication is compressed and sent to the DBS.

## The Console (CS)

The Console is a window into the system that is updated via the systems DBS. The CS will create watches on the DBS to ensure that only relevant, delta, information is passed to the CS. CS can therefore be run in a low bandwidth environment.

The CS is designed for ease of use for any skill level from security guard to system administrator, and for rapid response to violation events.

With the ability to monitor anything from a global war board to a single tag the CS will cater to most of the needs of clients in the marketplace.

The CS will also provide the ability to draw reports on the system remotely.

The CS also connects to its DBS via TCP/IP.

## Advantages of the system

This distributed structure means several things from cost cutting to faster response to events on a global scale. The multi-threaded nature of the system also introduces a high level of fault tolerance, as should one thread become jammed or fail, the other system threads and objects will continue running.

The system is capable of controlling various types of hardware ranging from access control hardware, to RF readers, to biometrics, etc. ensuring that all client applications are tended to. The seamless integration of various types of hardware into the system and the systems ability to easily create complex transactions based on the various types of connected hardware will allow users to monitor and control assets, people, and anything else of value, as well as automate buildings and their responses to events with both ease and speed.

Catering for disasters and events of this nature gives us an advantage over our competitors as the system can go into "Disaster Mode" in the event of some form of disaster. Disaster Mode allows mass egress from the building in the event of a disaster and enables one to perform other functions such as displaying the last known location of personnel in the building for the purposes of high duress rescues.

Utilizing the OpenGL™ graphics system, developed by Silicon Graphics Incorporated, floor plans and information are transformed into multi-dimensional models displaying information from the DBS in real time in a meaningful format. Floor plans are imported in the popular "Windows Meta File" or WMF format, which AutoCAD™ and other popular graphics packages can export to for TagTrac to utilize.

Allowing for grouping, scheduling and binding allows the end user to control when, where, how, and who may do what, which is understandably no small task.

Being designed as an enterprise level management system which can handle any entity from the largest global corporation to the smallest one-room office, TagTrac is both robust and flexible giving the end user more than a simple access control or asset management system.

## Features:

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### 1. Distributed system-

The system can run anywhere from one computer on its own, controlling and monitoring everything, to a global network of thousands of systems connected to produce an environment of control.

### 2. Database Interconnectivity-

The ability to connect to various database engines or RDBMS ranging from small systems such as MS Access to large and powerful systems like Oracle and MS SQL. This allows us to suite client requirements ensuring that the back-end database engine does not become a bottleneck in the system.

### 3. Custom Data Containers / Ownership Typing -

Creating custom data containers with the ability to assign data in various formats to tags and system objects ensures that meaningful data for each client can be entered into the system as oppose to fixed fields created by programmers.

### 4. Device Independence -

Hardware devices of various descriptions can be used by the system. This list is constantly growing to ensure that we keep up to date with the latest hardware on the market, and also to ensure that we are not dependant on any particular hardware vendor.

### 5. Biometrics -

Integration into biometrics to confirm the identity of a tag holder as well as to run transactions sets us apart from almost all of our competitors. Devices such as fingerprint and retinal scanners for identity confirmation or active IR scanners to scan for multiple sources of body heat mean that we are certainly one step ahead of the curve.

### 6. Action Admin Present Rule Sets -

With the need for supervision in restricted zones, etc. the need to move beyond a system that does the simple parenting of two or more tags has become apparent. The Admin present rule sets can raise violations or lock events if a zone administrator is not present in that zone.

### 7. Combining Active RF Technology With Access Control -

Most of today's systems either perform access control with passive technology or monitoring with active technology. TagTrac is the first package that gives you the benefits of both types of technology and others simultaneously.

### 8. Off-Site Monitoring-

Is the ability to monitor and control the system from anywhere on the globe, including the comfort of your home.

### 9. High Speed Delta Communications -

The ability for the system to use a delta-only encrypted and compressed protocol for both speed and privacy.

### 10. Smart Building Management and Disaster Control -

Automation of buildings and management of disasters is important in the enterprise and giving users this flexibility certainly sets us apart from the pack.

## Hardware and Software Specifications:

Recommended Software	Minimum Software
<b>Database Server</b> NOS = Windows 2000 Server DBMS = MSSQL 2000	<b>Database Server</b> NOS = Windows 2000 Server DBMS = MSQL 7
<b>Floor Server</b> OS = Windows 2000 Professional or XP Professional	<b>Floor Server</b> OS = XP Professional
<b>Console</b> OS = Windows 2000 Professional or XP Professional	<b>Console</b> OS = XP Professional

The hardware recommendations are based on a small to medium sized installation. For more precise hardware requirements contact Wavetrend Technologies.

Recommended Hardware	Minimum Hardware
<p><b>Database Server</b> Graphics Card – GForce2 MX 32mb P4 512mb RAM 80gig hard drive 10/100 network card</p> <p><b>Floor Server</b> P4 256mb RAM 40gig hard drive 10/100 network card</p> <p>Wavetrend LXR201 RS485 Reader</p> <p><b>Application specific hardware</b> ( I/O Card – Nudaq 7225, 7230 and 7250 Syclon I/O Panel Eagle Technologies PCI I/O Card     Biometrics – Precise Biometrics 100     Video – video for windows     Video – Videum Capture Card     Multi-port – Precision RS232 8 port )</p> <p><b>Console</b> Graphics Card – GForce2 MX 32mb P4 256mb RAM 40gig hard drive 10/100 network card</p>	<p><b>Database Server</b> Graphics Card – Riva TNT2</p> <p><b>Floor Server</b> Wavetrend LRX200 RS485 Reader</p> <p><b>Console</b> Graphics Card – Riva TNT2</p>

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