![WhereNet logo]

WhereNet
WhereTag II HO
User's Guide
Revision B, January 2003

Model Number: TFF-1015

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WhereNet

FCC Requirements

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This ISM device complies with Canadian ICES-001.
Cet appareil ISM est conforme à la norme NMB-001 du Canada.

Radio Equipment Authorization: FCC ID: NSQTFF-1015-0001
                                      IC: 3586B-TFF1015

FCC RF Exposure Requirements

The internal antenna used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.

Any changes or modifications to WhereNet Corp. equipment not expressly approved by WhereNet Corp. could void the user's authority to operate the equipment.

⚠ **There are no user-serviceable parts inside. Do not attempt to open the unit to change batteries**.

Contents

Introduction

System overview

The WhereNet Real Time Locating System (RTLS) is designed to permit users to determine the position of tagged assets in both indoor and outdoor facilities such as factories and freight yards. The system locates tagged assets by a process involving redundant triangulation. Each tag autonomously emits a 2.4 GHz direct sequence spread spectrum (DSSS) radio signal at predetermined blink rate. Each tag's blink rate is randomized around its predetermined value to minimize the number of collisions between transmissions made by different tags. The signal emitted by the tag is received by a minimum of four Location Antennas. A typical transmission contains a preamble which is used to synchronize the receiver, the tag's serial number which identifies the tag, a status word which monitors various tag functions, data stored in the tag's memory and finally a CRC used to assure that the tag's message is correct as received.

The principal components of WhereNet's RTLS are shown in Figure 1.

WhereTag II HO Device

The WhereTag II HO is the same as the existing WhereTag II with the exception that it has a 200 mW RF power amplifier added to boost the RF ASIC's power output from 2 mW to 60mW. The WhereTag II HO is the first level component of the WhereNet Real Time Locating System (RTLS). It is a low-cost wireless device that attaches to a resource (such as an asset, pallet, container, vehicle, etc.) and periodically broadcasts, via radio, it's unique identification number. WhereNet's RTLS infrastructure detects that signal and precisely locates the tag and it's associated resource.

Powered by a long-life internal battery, the WhereTag II HO's beacon signal can be configured to "blink" from every half second to once an hour. This allows some resources to be tracked second to second while others that are less mobile can be tracked less frequently. At a typical blink rate of four minutes, the tag's battery can last six years.

When excited by a WhereNet WherePort, a WhereTag II HO can alter its blink rate (typically faster) to enable more timely location updates for critical threshold zones such as shipping/receiving docks and other portals.

Each WhereTag II HO has a unique identification number that is transmitted via radio during each blink. When it's battery is running low, the tag alerts the WhereNet RTLS infrastructure so that the tag can be proactively replaced. WhereTag II HOs can be pre-programmed with 12 bytes of supplementary data (such as an asset or serial number) that can be included with each blink. WhereTag II HOs are configured with WhereNet's WhereWand.

The number is also printed as a Code 128 bar code on the tag. The bar code enables seamless integration with existing inventory systems and delivers a cost effective total resource visibility solution that extends beyond the range of the WhereNet Location Antennas.

WhereTags are extremely durable and can be used both indoors and outdoors. The tag's case is resistant to oils, solvents and hydraulic fluids.

WhereNet Location Antenna

This device is an active antenna that mounts remotely and is connected to the Location Processor. Its function is to receive spread spectrum radio signals from the WhereTag II devices. It converts the radio frequency signal to a lower intermediate frequency and transfers those signals to the reader processor cards in the Location Processor.
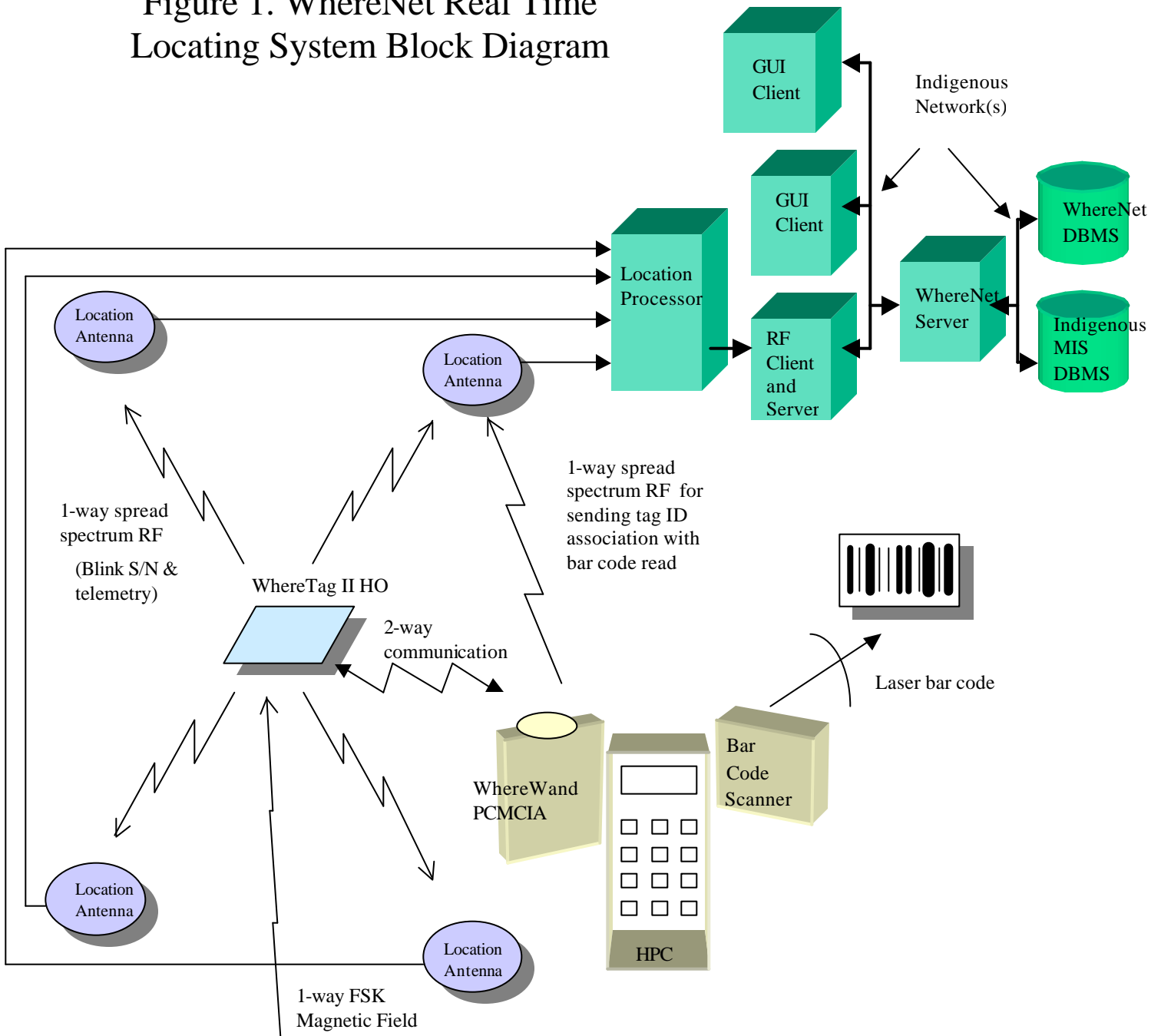
WhereNet Location Processor

The WhereNet Location Processor is a processing unit that receives WhereTag II device signals through a set of WhereNet Location Antenna and calculates location information using sophisticated digital signal processing. The Location Processor is able to track a large number of WhereTag II devices simultaneously to assure location accuracy over a large coverage area. The Location Processor forwards accurate location information, in real-time, to the WhereNet server, where information can be graphically displayed, used for report generation or accessed through the Internet.

WhereNet Hand-Held Communicator or WhereWand

These devices allow the users to reconfigure the blink rate and 12 bytes of memory in a WhereTag II.

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Figure 1. WhereNet Real Time Locating System Block Diagram

GUI Client

GUI Client

Location Processor

RF Client and Server

WhereNet Server

Indigenous Network(s)

WhereNet DBMS

Indigenous MIS DBMS

Location Antenna

Location Antenna

Location Antenna

Location Antenna

1-way spread spectrum RF

(Blink S/N & telemetry)

WhereTag II HO

1-way spread spectrum RF for sending tag ID association with bar code read

2-way communication

Laser bar code

WhereWand PCMCIA

Bar Code Scanner

HPC

1-way FSK Magnetic Field

WherePort

Dimensions:
* Location Antenna – Location Antenna = 1000 ft indoor
* WhereTag II HO – Location Antenna = 1000 ft indoor
* WhereTag II HO - WhereWand = 1-2 ft
* WherePort- WhereTag II HO = 20 ft

Tag Installation and Activation

Tags are shipped with all radio emitters deactivated. Prior to installing a tag on an item to be tracked, the tag must be activated. This is done using the WhereNet's WhereWand. The WhereWand is used to configure and activate the tag, and to confirm that the tag is properly configured and operational. The detailed procedure for tag activation is covered in WhereWand User's Manual.

Tag Mounting Options

Introduction
The WhereTag II device has a variety of ways to be mounted depending on the user's needs. The following mounting methods can be used:

Built-in mounting ears for screws, rivets (ears are removable).
Tie wrap
Poly-lock
Adhesive tape
Vehicle rearview mirror mount
Trailer and ISO container mounts

Specifications (Subject to change without notice)

WhereTag II HO (Model #: TFF-1015-00AA)

CAPABILITIES

Frequency Range ....2.4 to 2.483 GHz
Typical Read Range, Indoors ....300 m (1000 ft)
Typical Read Range, Outdoors ....900 m (3000 ft)
User Configurable Blink Rate ....0.5 sec to 1 hr
WherePort Range ....6 m (20 ft) (With WherePort set for maximum power and optimum orientation.)

TAG MOUNTING OPTONS

Built-in mounting ears for screws, rivets (ears are removable)
Tie wrap
Poly-lock
Adhesive tape
Vehicle rearview mirror mount
Trailer and ISO container mounts

ELECTRICAL

Power...AA 3.6V Lithium Thionyl Chloride cell (The battery is not replaceable.)
Typical Battery Life ....6.5 years (dependent on blink rate and operating temperature)

ENVIRONMENTAL / PHYSICAL

Operating Temperature Range ....-40º C to +65º C (-40º F to +149º F)
Storage Temperature Range ....-40º C to +70º C (-40º F to +158º F)
Durability...1.8 m (6 ft) drop to concrete
Height...2.1 cm (0.9 in)
Length, without mounting tabs.........................6.6 cm (2.6 in)
Length, with mounting tabs...............................10.5 cm (4.1 in)
Width ....4.4 cm (1.7 in)
Weight ....53 g (1.9 oz)
Environmental Sealing......................................IP67 (dust tight, immersible)
Case Material..Molded Plastic (polyester)

REGULATORY APPROVALS

FCC Part 15 Class B, EN 55022 Class B, EN 55024, TUV GS per EN 60590, R&TTE Directive 99/5/EC.