WhereTag IV Module

User Guide

Part Numbers:

26048, 26391, 26683, 27937, 28171, and 28177

User Guide for WhereTag IV Module   D1587 Rev B

Typographical Conventions

Warnings call attention to a procedure or practice that could result in personal injury if not correctly performed. Do not proceed until you fully understand and meet the required conditions.

WARNING

Cautions call attention to an operation procedure or practice that could damage the product if not correctly performed. Do not proceed until understanding and meeting these required conditions.

CAUTION

Notes provide information that can be helpful in understanding the operation of the product.

Note

REGULATORY COMPLIANCE INFORMATION

The following regulatory agency information is for WhereTag IV Module, which includes part numbers 26048, 26391, 26683m 27937, 28171 and 27177.

RF Notice

Any changes or modifications to Zebra Enterprise Solutions (ZES) equipment not expressly approved by ZES could void the user's authority to operate the equipment.

FCC Compliance Statement

This device complies with Part 15 rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference; (2) this device must accept any interference which may cause undesired operation.

FCC ID: XWX-TFF2005

This equipment has been tested and found to comply with the limits for both Class A and Class B devices, pursuant to Part 15 of the FCC Rules & Regulations.

Canadian DOC Compliance Statement

This Class B digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

IC: 8701A-TFF2005

Labeling

If the FCC and IC identification number is not visible when the module is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module. This exterior label can use the wording such as "Contains FCC ID: XWX-TFF2005" and "Contains IC: 8701A-TFF2005". Any similar wording that expresses the same meaning may be used.

The WhereTag IV Module will be only installed in devices produced by Zebra Enterprise Solutions Corp..

Document Revision History

Revision	Change	Change Description	Date	Initials
01		Draft	7/3/10	HH
A	ECO C02150	Initial Release	7/20/10	HH
B	ECO pending	Add new variant P/Ns 27937, 28171 and 28177	7/2/12	HH

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1 INTRODUCTION

1.1 System overview

The ZES 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 ZES's RTLS are shown in Figure 1.

1.2 WhereTag IV Module

The WhereTag IV Module is a compact battery powered radio frequency device which is used in WhereTag IV, WhereCall III+ and WhereCall IV tag products. These tag products are key components of the ZES Real Time Locating System (RTLS). The tags can be attached to assets of many kinds, such as forklifts, containers, ULDs, hospital and test equipment as well as trailers and container chassis's. It is used to manage those assets by allowing them to be identified and located by the system.

The WhereTag IV Module "blinks" an RF transmission at pre-programmed rates ranging from 1 second to 5 days between blinks. The ZES RTLS infrastructure receives these blinks and use sophisticated Differential Time of Arrival, (DTOA), algorithms to determine the location of the tag. Accuracy of this determined location can be as low as 2 meters and is nominally within 3 meters in most installations. The WhereTag IV Module complies with the ISO 24730-2 RTLS standard. It

operates in the globally accepted 2.4GHz frequency band and transmits spread spectrum signals in accordance with the standard. The use of direct sequence spread spectrum technology provides extremely long range; in excess of 1,000 meter locate range outdoors, and 120 meter locate range indoors. The WhereTag IV Module also incorporates an 802.11b/g transceiver for data communication and/or positioning by standard or location-enabling 802.11 access points. The combination of low average power consumption and good engineering allow the WhereTag IV Module to operate for long periods of time without any maintenance. Battery life can be as long as 6 years when connected to an AA lithium battery. A magnetic receiver is also built into the WhereTag IV Module. The module can receive low frequency magnetic signals from an exciter called a WherePort. The WherePort transmissions can be read at distances ranging from 1 to 8 meters. Each WhereTag IV Module has a unique identification number that is transmitted via radio during each blink. WhereTag IV Modules are configured with ZES's WhereWand.

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Figure 1   ZES Real Time Locating System Block Diagram
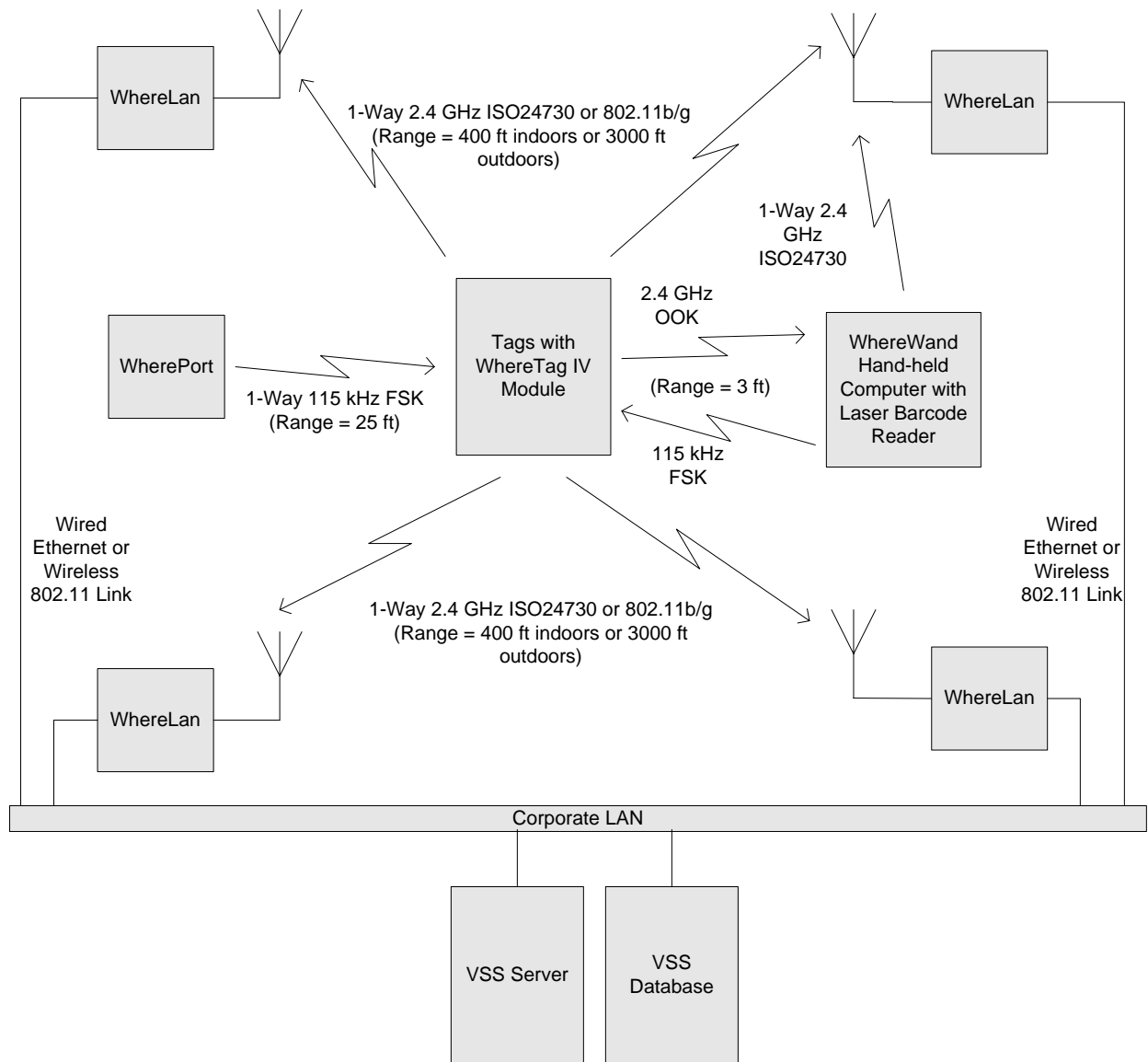
1.3 WhereLan Location Sensor (LOS) and Location Access Point (LAP)

The Location Sensor and Locating Access Point receive the tag transmissions and forwards the information to the ZES Visibility Server Software which performs locations calculations, database functions and systems management. The Location Sensors and Locating Access Points communicate with each other and the Visibility Server Software via standard wired Ethernet cables or an 802.11b-compliant wireless LAN. Utilizing sophisticated DSP technology, the LOS and LAP

are able to track large populations of WhereTags simultaneously. They can be installed in a grid configuration to provide ubiquitous coverage over large areas comprised of many cells. The Locating Access Point combines multiple functions: an RTLS Location Sensor and a Wi-Fi certified access point for wireless LAN clients and applications

1.4   WherePort III and WherePort IV

WherePort III and WherePort IV are proximity communication devices that are used to trigger a WhereTag IV Module to transmit an alternate "blink" pattern. When a tag passes though the WherePort's field, the tag can initiate a pre-programmed and (typically) faster blink rate to allow more location points as a tagged asset passes through a critical threshold, such as a shipping/receiving dock door or from one zone to another. When the tag is sending WherePort-initiated blinks, the tag includes the identification number of the WherePort.

1.5   WhereWand II Programmer

The WhereWand II Handheld Programmer consists of a handheld computer connected to a palm-size box radio frequency device. The WhereWand is capable of two-way wireless communication with tag devices. The WhereWand is also capable of wired communication with WherePort devices. The third capability of the WhereWand is wireless communications with the WhereLan. The WhereWand communicates with tag devices by sending magnetic FSK data to the tag and receiving on-off keyed / frequency shift keyed (OOK/FSK) RF data from the tag. Communication with the tag allow the user to set tag configuration parameters such as DSSS blink intervals and tag responses to such stimuli as WherePorts and/or switch/telemetry inputs. It also allows the user to read back configuration and other data from the tag.

1.6   Visibility Server Software (VSS)

ZES's Visibility Server Software (VSS) is an integrated software package that provides all the tools required to effectively manage assets and resources as well as the ZES Real-Time Locating System (RTLS). Visibility provides all core software components to allow efficient

resource management. Key among those software components is WhereSoft Locate, which is a distributed Windows Service. When WhereSoft Locate is combined with Visibility and any of the many applications available from ZES, it is possible to locate assets, know their status, and react to any number of user configurable alert conditions. Visibility also provides the tools required to control and monitor the Real-Time Location System (RTLS). It includes configuration tools, diagnostics, system alerts, an interface manager and installation tools.

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2   SPECIFICATIONS (SUBJECT TO CHANGE WITHOUT NOTICE)

2.1   WhereTag IV Module

CAPABILITIES

Frequency Range .... 2.4 to 2.483 GHz

Typical Locate Range, Indoors .... 100 m (325 ft)

Typical Locate Range, Outdoors........ 1,000 m (3200 ft)

Typical Read Range, Indoors............. 200 m (650 ft)

Typical Read Range, Outdoors.......... 1,750 m (5700 ft)

User Configurable Blink Rate............. 1 sec to 5 days

WherePort Range .... 8 m (24 ft) (With WherePort set for maximum power and optimum orientation.)

ELECTRICAL

Power................................. ……………AA 3.6V Lithium Thionyl Chloride

ENVIRONMENTAL / PHYSICAL

Operating Temperature Range .... -30º C to +70º C (-22º F to +158º F)

Storage Temperature Range .... -30º C to +70º C (-22º F to +158º F)

Dimensions (Including a AA battery and plastic housing):

Height .... 2.1 cm (0.9 in)

Length... 6.6 cm (2.6 in)

Width... 4.4 cm (1.7 in)

Weight... 50 g (1.7 oz)

REGULATORY APPROVALS

North America

FCC Part 15 Class B, Part 15.247

Industry Canada ICES-003, RSS-210, RSS-GEN

ANSI INCITS 371.1-2003

Europe

CE, R&TTE Directive 99/5/EC: EN 300328, EN 301489-1/-17, EN 60950-1

Worldwide

ISO/IEC 24730-2 Compliant

Cisco CCX Compliant

802.11b/g Client Mode