

# AK Tag Business Kit

## User's Guide

Revision 1.2



July 2006

---

# Publishing Information

---

## Disclaimer and Limitation of Liability

All information herein is either public information or is the property of and owned solely by TAGSYS who shall have and keep the sole right to file patent applications or any other kind of intellectual property protection in connection with such information.

Nothing herein shall be construed as implying or granting to you any rights, by license, grant or otherwise, under any intellectual and/or industrial property rights of or concerning any of TAGSYS' information.

This document can be used for informational, non-commercial, internal and personal use only provided that:

- the copyright notice below, the confidentiality and proprietary legend and this full warning notice appear in all copies.
- this document shall not be posted on any network computer or broadcast in any media and no modification of any part of this document shall be made.

Use for any other purpose is expressly prohibited and may result in severe civil and criminal liabilities.

The information contained in this document is provided "AS IS" without any warranty of any kind. Unless otherwise expressly agreed in writing, TAGSYS makes no warranty as to the value or accuracy of information contained herein. The document could include technical inaccuracies or typographical errors. Changes are periodically added to the information herein. Furthermore, TAGSYS reserves the right to make any change or improvement in the specifications data, information, and the like described herein, at any time.

Therefore TAGSYS assumes no liability and is not responsible for customer applications or product or software which include TAGSYS products.

TAGSYS HEREBY DISCLAIMS ALL WARRANTIES AND CONDITIONS WITH REGARD TO THE INFORMATION CONTAINED HEREIN, INCLUDING ALL IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, TITLE AND NON-INFRINGEMENT. IN NO EVENT SHALL TAGSYS BE LIABLE, WHETHER IN CONTRACT, TORT OR OTHERWISE, FOR ANY INDIRECT, SPECIAL OR CONSEQUENTIAL DAMAGES OR ANY DAMAGES WHATSOEVER INCLUDING BUT NOT LIMITED TO DAMAGES RESULTING FROM LOSS OF USE, DATA, PROFITS, REVENUES, OR CUSTOMERS, ARISING OUT OF OR IN CONNECTION WITH THE USE OR PERFORMANCE OF INFORMATION CONTAINED IN THIS DOCUMENT.

TAGSYS does not and shall not warrant that this product/system/equipment will be resistant to all possible attacks, and shall not incur, and disclaims, any liability in this respect. Even if each product is compliant with current security standards in force on the date of their design, security mechanisms' resistance necessarily evolves according to the state-of-the-art in security and notably under the emergence of new attacks. Under no circumstances shall TAGSYS be held liable for any third party actions, and in particular in case of any successful attack against systems or equipment incorporating TAGSYS products.

TAGSYS disclaims any liability with respect to security for direct, indirect, incidental or consequential damages that result from any use of its products. It is further stressed that independent testing and verification by the person using the product is particularly encouraged, especially in any application in which defective, incorrect, or insecure functioning could result in damage to persons or property, denial of service, or loss of privacy.

© 2000-2006 TAGSYS. All rights reserved.

Microsoft, Visual C++, Windows, and Windows NT are either registered trademarks or trademarks of Microsoft Corporation in the U.S.A. and/or other countries.

I-Code is a registered trademark of Philips.

Tag-It is a registered trademark of Texas Instruments.

Printed in France.

TAGSYS – 180 Chemin de St Lambert, 13821 LA PENNE SUR HUVEAUNE, France.

Tel: +33 (0)4.91.27.57.00 / Fax: +33 (0)4.91.27.57.01

## Table of Contents

<b>PUBLISHING INFORMATION</b>	<b>2</b>
DISCLAIMER AND LIMITATION OF LIABILITY	2
<b>1 FOR YOUR SAFETY</b>	<b>4</b>
1.1 GENERAL USE	4
1.2 CARE AND MAINTENANCE	4
1.3 IMPORTANT SAFETY INFORMATION	5
1.3.1 OPERATING ENVIRONMENT	5
<b>2 CERTIFICATION</b>	<b>6</b>
2.1 OCCUPATIONAL HEALTH	6
2.2 REGULATORY NOTICES	6
2.2.1 IN USA (FCC DIRECTIVE)	7
<b>3 OVERVIEW</b>	<b>8</b>
3.1 INTRODUCTION	8
3.2 KEY FEATURES	8
3.3 MAIN BENEFITS	8
3.4 AK TAG BUSINESS KIT	9
<b>4 TECHNOLOGY AND PERFORMANCES</b>	<b>13</b>
4.1 BRIEF DESCRIPTION OF THE ADAPTIVE KERNEL TAG TECHNOLOGY	13
4.2 AK TAG READ/WRITE PERFORMANCES	13
4.3 TAG ENCODING	13
<b>5 GETTING STARTED</b>	<b>15</b>
5.1 HOW TO INSTALL THE SIRIT/TAGSYS READER	15
5.2 HOW TO INSTALL THE DEMONSTRATION SOFTWARE	16
5.3 HOW TO READ A TAG	16
5.4 HOW TO ENCODE A TAG	17
5.5 HOW TO SET READER PARAMETERS	17
5.6 HOW TO GET SIRIT/TAGSYS READER INFORMATION	18
5.7 IF YOU NEED ASSISTANCE	19

# 1 For Your Safety

---

## 1.1 General Use

The SIRIT/TAGSYS Reader is designed to be reliable and to provide years of trouble-free service. Please observe the following general tips:

- Take care not to scratch the device. Keep the device clean. When working with the device, use only TAGSYS-approved accessories.
- This device is not waterproof and should not be exposed to rain or moisture. Under extreme conditions, water may enter the circuitry.
- Protect the device from extreme temperatures. For example, do not place the device in a windowed area where the sun may cause extreme temperatures, and keep it away from heaters and other heat sources.
- Do not store or use the device in any location that is extremely dusty, damp, or wet.
- Use a soft, damp cloth to clean the device. If the surface of the device becomes soiled, clean it with a soft cloth moistened with a diluted window-cleaning solution.

## 1.2 Care and Maintenance

This device is a product of superior design and should be handled with care. The suggestions below will further increase the lifetime of this device.

- Keep the device and all parts and accessories out of the reach of small children.
- Keep the device dry. Precipitation, humidity and liquids contain minerals that will corrode electronic circuits.
- Do not use or store the device in dusty, dirty areas. Its moving parts can be damaged.
- Do not store in hot areas. High temperatures can shorten the life of electronic devices, damage batteries and warp or melt certain plastics.
- Do not store in cold areas. When the device warms up (to its normal temperature), moisture can form inside the device, which may damage electronic circuit boards.
- Do not attempt to open the device. Non-professional handling of the device may damage it.
- Handle the device with care. Shocks may break internal circuit boards.
- Do not clean the device with harsh chemicals, cleaning solvents or strong detergents. Gently wipe the device with a soft cloth slightly dampened in a mild soap-and-water solution.
- Do not paint the device. Paint may clog the device's moving parts and prevent proper operation. Paint with metallic contents may limit device performances.
- If the device or any accessory are not working properly, take it to your nearest qualified TAGSYS representative.

## **1.3 Important Safety Information**

### **1.3.1 Operating Environment**

When connecting the device or any accessory to another device, read its user's guide for detailed safety instructions. Do not connect incompatible products.

As with all RF equipment, users are advised that the equipment should only be used in its normal operating position.

## 2 Certification

---

### 2.1 Occupational Health

#### **FCC Radiation Exposure Statement:**

This equipment complies with FCC's RF radiation exposure limits set forth for an uncontrolled environment under the following conditions;

1. This equipment should be installed and operated such that; a minimum separation distance of 20cm is maintained between the radiator (antenna) & user's/nearby people's body at all times.
2. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

### 2.2 Regulatory Notices

An RFID system typically composed of an RF emission device such as the SIRIT/TAGSYS Reader connected to an antenna is subject to national regulations that may differ by country.

The SIRIT/TAGSYS Reader meets the FCC parts 15 regulatory limit of 1W conducted power at the antenna terminal.



#### **CAUTION:**

It is the responsibility of the CIT (Certified Integrators by TAGSYS) to install the SIRIT/TAGSYS Reader as described in this User's Guide or in TAGSYS Documentation.

If a SIRIT/TAGSYS Reader is further integrated in a different product, it is the responsibility of the manufacturer of this complementary product to obtain the required approvals for this product.

---

## 2.2.1 In USA (FCC Directive)

### **SIRIT/TAGSYS Reader**

*WARNING TO USERS IN THE UNITED STATES*

FEDERAL COMMUNICATIONS COMMISSION (FCC) RADIO

INTERFERENCE STATEMENT 47 CFR Section 15.105(b)

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and if not installed and used in accordance with the instructions may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different to that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

#### **NO UNAUTHORIZED MODIFICATIONS**

47 CFR Section 15.21

**CAUTION:** This equipment may not be modified, altered, or changed in any way without signed written permission from TAGSYS SA. Unauthorized modification may void the equipment authorization from the FCC and will void the TAGSYS warranty.

#### **ANTENNA REQUIREMENT**

47 CFR Section 15.203

**CAUTION:** This equipment must be professionally installed. The installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded. Non-professional installation or installation of the equipment with an improper antenna may void the equipment authorization from the FCC and will void the TAGSYS warranty.

The SIRIT/TAGSYS Reader with its integral circular antenna has been designed to comply with FCC 47 CFR Part 15 Rules.

Operation is subject to the following two conditions: (1) The system devices may not cause harmful interference, and (2) The library system devices must accept any interference received, including interference that may cause undesired operation.

## 3 Overview

### 3.1 Introduction

Welcome to the TAGSYS RFID Adaptive Kernel (AK) family of tags.

The AK Tag Business Kit is a low-cost evaluation kit designed for people and companies that wish to know more about TAGSYS' *The Package Is The Tag™*, an integrated packaging approach featuring world's first adaptive EPC Gen 2 family of tags for item-level RFID, the AK Tag.

It provides a step-by-step guide for the following procedures:

- Installation of the AK Tag Business Kit
- Configuring and using the product within your system

This document does not assume any previous knowledge of Radio Frequency Identification (RFID) technology.

### 3.2 Key Features

- AK Tag Business Kit includes a set of AK tag modules and a high-performance SIRIT/TAGSYS table-top reading station, ideal for long and mid-range applications where reading distances can exceed 4m (13feet).
- The AK Tag Business Kit also includes several item-level RFID-enabled packages where the AK tags are affixed.

### 3.3 Main Benefits

- The AK tag module is low cost, universal and is the world smallest UHF tag converted into the package. When placed near a secondary adaptive antenna also incorporated within the package, it results in a completely customized, secure and highly cost-effective RFID solution, fully adaptable to the customers' packaging shapes, sizes and material.
- The AK Tag Business Kit with its AK Tag Explorer demonstration software gives you the opportunity to test the capabilities of the TAGSYS RFID AK tag modules and adaptive antenna

Figure 1: The Adaptive Kernel Tag





### 3.4 AK Tag Business Kit

Figure 2: AK Tag Business Kit



The items listed in Table 1 are included in the AK Tag Business Kit.

**Table 1: AK Tag Business Kit Contents**

Quantity	Description
1	Getting Started manual
1	Product flyer
1	Data sheet
<b>1</b>	<b><i>Plastic suit case that contains:</i></b>
1	Reading station (SIRIT/TAGSYS reader and antenna)
1	Power pack
1	Serial connector cable
1	AK Tag Module Booster
1	CD-ROM including Getting Started manual, Product flyer, Data sheet and the AK Tag Explorer demonstration software
<b>1</b>	<b><i>White cardboard box that contains:</i></b>
4	Items equipped with AK tags: <ol style="list-style-type: none"> <li>1. A standard courier envelope</li> <li>2. A standard luggage label</li> <li>3. A fashion price tag</li> <li>4. A box</li> </ol>
1	Roll of 50 AK Tag modules

Figure 3: A standard courier envelope



Figure 4: A standard luggage label



**Figure 5: A fashion price tag**



**Figure 6: A box**



# 4 Technology and Performances

## 4.1 Brief Description of the Adaptive Kernel Tag Technology

The Adaptive Kernel Tag approach consists of two components:

- A low cost, universal and world smallest UHF “Kernel” module converted into the package
- An adaptive antenna, which is customized and intrinsically incorporated within the package of the item to be RFID-enabled, and also placed in close proximity to the Kernel Tag

A reader sends a radio signal at a specific UHF frequency range via an antenna linked to a reader. This radio signal activates the AK tag which sends its data to the reader. The reader decodes the AK tag data and sends this decoded data to a host PC for processing. This radio signal is also used to write data to the AK tag.

- Alone the AK Tag module can be read/write at a distance up to 30cm(12 inches) according to the antenna reader characteristics
- AK Tag module associated to the adaptive antenna can be read/write at a distance up to 4m (13 feet) depending on the item where they are affixed and the size of the secondary antenna.

## 4.2 AK Tag Read/Write Performances

The AK Tag concept is universal. The Kernel tag can therefore be used for a multitude of items, all different in size, shape and material. The performance of the Kernel tag can be adapted to its environment: the geographic region of tag operation or the read range requirements for the object, by the use of a secondary Adaptive antenna.

The table below shows read/write performances of items equipped with the AK Tag.

These performances have been measured with the 1 Watt SIRIT/TAGSYS Reader.

Items	Read/Write distance performances
A standard courier envelope	≤ 3.5m (11.50ft)
A standard luggage label	≤ 4.0m (13.00ft)
A fashion price tag	≤ 1.5m (4.90ft)
A box	≤ 4.0m (9.80ft)

## 4.3 Tag Encoding

Due to its small size the AK Tag Module requires a small UHF antenna to be correctly encoded.

If you do not own a small UHF antenna we recommend you the AK Tag Module Booster to facilitate the encoding using a standard UHF antenna reader.

1. Place the AK Tag Module Booster on the SIRIT/TAGSYS reader
2. Place the AK Tag Module on the AK Tag Module Booster as shown Figure 7
3. Proceed to encoding operation

Figure 7: AK Tag Module Booster



# 5 Getting Started

## 5.1 How to Install the SIRIT/TAGSYS Reader

1. Plug the power pack to the SIRIT/TAGSYS reader.
2. Connect the serial connector to the PC serial port.

Now the installation is complete and ready for read/write operations.

**Figure 8: Hardware connections**



**Figure 9: SIRIT/TAGSYS reader**







## 5.4 How to Encode a Tag

- o To write data into a tag, click **Write**, enter the identifier to write and click **Write Tag**



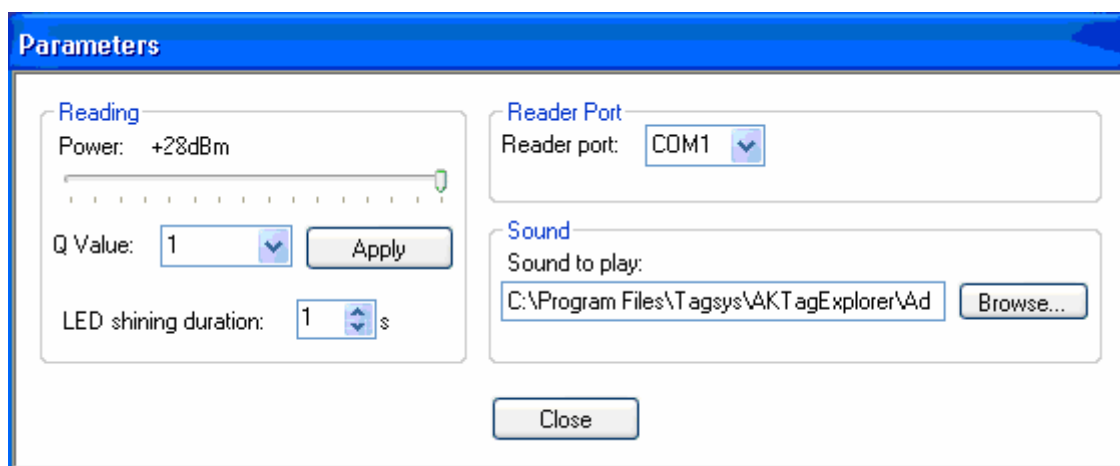
## 5.5 How to set Reader Parameters

- o To adjust the power, use the **horizontal cursor** (+15dBm<Power< +28dBm = 630mW)
- o Q Value is an anti-collision parameter which defines the number of time slots during the reading process (number of time slot = 2<sup>Q</sup>).

Select the Q value and click **Apply**

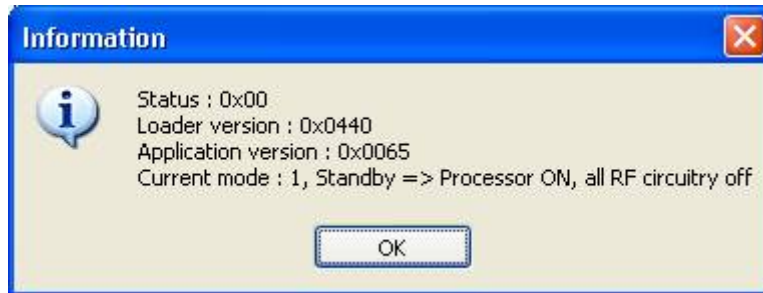
(For further information please refer to the EPC Class 1 Gen 2 protocol specification)

- o Select Reader Port according to the PC serial port you chose in § 3.1



## 5.6 How to Get SIRIT/TAGSYS Reader Information

- To get information about the SIRIT/TAGSYS reader, click **Version**



## 5.7 If you need assistance

Please contact your nearest TAGSYS sales representative:

Country	TEL	E-mail
USA Toll Free	+1 267 895 1750 +1 877 550-RFID	<a href="mailto:dottie.otoole@tagsysrfid.com">dottie.otoole@tagsysrfid.com</a>
ASIA PACIFIC	+852 2526 7984	<a href="mailto:son.lai@tagsysrfid.com">son.lai@tagsysrfid.com</a>
EUROPE	+33 (0) 4 91 27 57 07	<a href="mailto:emmanuelle.vella@tagsysrfid.com">emmanuelle.vella@tagsysrfid.com</a>



[www.tagsysrfid.com](http://www.tagsysrfid.com)