



AeroScout T3-BD

Model: TAG-3500

Bidirectional Tag

User Guide

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Introduction

The AeroScout T3-BD tag is a key component of the AeroScout Visibility System. The T3-BD tag is a small, Wi-Fi, active RFID device that enables the wireless network infrastructure to locate assets not connected to a wireless network. This tag includes full bidirectional Wi-Fi connectivity, enabling it to receive information the network. The tag can be attached to mobile equipment such as vehicles in parking lots, inventory in a manufacturing line, containers, forklifts and medical equipment in hospitals. The tag can also be used to track people - security personnel hospital patients, and many more.



Figure 1. AeroScout T3-BD tag

T3-BD Tag Features

Bidirectional Communication

Other than the standard AeroScout unidirectional beacons transmitted by the tag periodically, the T3-BD tag is capable of performing Wi-Fi bidirectional communication through full network association and authentication.

Over the Air Firmware and Configuration Upgrade

The T3-BD tag is capable of associating with the Wi-Fi network at pre-configured intervals and receives automatically firmware or configuration upgrade. This saves collecting the tags one by one whenever such an upgrade is needed

Acknowledgement

The T3-BD tag is capable of requesting and receiving a system acknowledgement for various events such as a call button press or sending telemetry data. An acknowledgement can result in the activation of various A/V indications on the tag.

Audio Visual Indications

The tag includes 2 LED's in 3 colors, a buzzer and a vibrator. These audio visual indicators can be activated from the network to provide the acknowledgement response in the tag as mentioned in the previous clause.

Flexible Mounting and Usage Options

The tag is supplied with a variety of mounting options. It can be mounted on flat hard surfaces using special holes for screws, adhesive tape or Velcro. It can be mounted on cylindrical forms (such as poles) using tie-wraps. It can be hanged on a pocket using a badge clip, or on the carrier's neck using a band. An optional cradle is also available, enabling the indirect mounting of the tag on various assets.

Call Buttons

T3-BD tags include two call buttons, a large one and a small one, that can be configured to send standard tag messages when the buttons are pressed or released.

The tag can be configured to send different data depending on how the buttons are pressed: different messages can be associated with a long push of the buttons and with short, successive pushes.

Each call button can be configured to serve a different purpose according to the organization's needs.

Optional Tamper-Proof Design

The T3-BD tag is equipped with an optional anti-tampering switch located at the back of the device. When the tag is pressed against a surface and fixed on it, the switch is depressed. The removal of the fixed releases the switch and causes the tag to send a message to the system. Users can interpret the message according to their needs.

Motion Sensing

T3-BD tags are shipped with on-board motion sensors that report when it starts to move and whether it is in motion or not. The motion sensor can be used to define tag behavior when in motion or when it is stationary.

Temperature Sensing

T3-BD tags can optionally be equipped with temperature sensors that can report the temperature measured in the vicinity of the tag or whether it is within a given range (above, below, between).

Long Battery Life

A powerful, replaceable battery provides power for a period of up to 4 years (depending on the tag's transmission interval, operating temperature and number of times a day it associates with the network). The tag periodically provides a report on the battery level so that when the battery level runs low, it can be replaced efficiently with minimum down time. Replacing the battery is simple and done using a special battery compartment removal

tool. The AeroScout T3-BD tag can also be easily deactivated in order to conserve battery power.

Tag Management

The T3-BD tag can be programmed via a wireless interface using the AeroScout Tag Activator. Together with the AeroScout Tag Manager software it allows for easy and efficient tag configuration, activation or deactivation and programming. T3-BD tags are supported by Tag Manager, version 3.0 and above.

Tag Programmability and Storage

The T3-BD tag can store up to 15 messages of 15 bytes each. These messages can either be pre-programmed via the Tag Manager or programmed on the fly by an AeroScout Exciter when a tag is in proximity to it. These messages can also be transmitted in addition to the standard location messages (the tags can be either configured to transmit one of the messages or triggered by an AeroScout Exciter to transmit a specific message).

Telemetry Functionality

The T3-BD tags include a serial interface that enables customized connectivity to host units for data retrieval. The tags can be configured to retrieve data from the host periodically and to send the data together with location messages. Applications for this function may include reading mileage and fuel information from cars or reading temperature from shipping containers (Such implementations require specific integration and additional hardware). Note that any telemetry functionality that does not involve the tag's sensors is a customized solution provided by AeroScout, on customer demand.

Active RFID Functionality

Using the AeroScout Exciter, the tag sends out specific location reports upon arrival at chokepoints or gateways. The tag behavior can also be automatically modified while passing through a chokepoint such as a doorway or gate. This includes activating/deactivating tags or changing the tags' transmission rate to accommodate different usage patterns.

Compatibility and Non-interference

AeroScout tags are 802.11b compatible. The tag's clear channel sensing techniques avoid interference with Wi-Fi networks. The use of the unlicensed 2.4GHz frequency band at low power levels ensures no interference with other wireless equipment, making AeroScout tags safe for use with such sensitive equipment as medical devices in a hospital.

Rugged Performance

AeroScout tags are designed to function in harsh work environments and weather conditions. The tag enclosure is water-resistant (IP-65) and designed to withstand significant physical shocks.

Tag Mounting

The AeroScout T3-BD tag is enclosed in a compact case and offers a variety of mounting options described in this section.

Single Flange

The T3-BD tag may come with a single flange on one of the narrow sides (the “top” side).



Figure 2. AeroScout T3-BD tag with single flange

The flange can be used to hang the tag using a strap (for example, neck band) or a clip (for example, employee badge) or key chain.

Double Flange

The tag enclosure may include two flanges on the two narrow sides of the device.



Figure 3. AeroScout T3-BD tag with two flanges

The flanges can be used to thread two straps through them.

In addition, the holes on the two sides of each flange (four holes in all) can be used to firmly secure the tags on a flat surface, using two or four screws (when using two screws, consider fixing them through the holes on the opposite sides).

No Flange

The T3-BD tag can also be supplied without flanges. The tag can be fixed on a surface by applying adhesive on its back or using Velcro or double-sided tape. It can also be placed into a sleeve.



Figure 4. AeroScout T3-BD tag without flange

Note the following:

- Avoid putting glue on the battery cover or the tamper switch hole.
- Apply 1x1" Velcro or double-sided tape patches as shown in Figure 5.

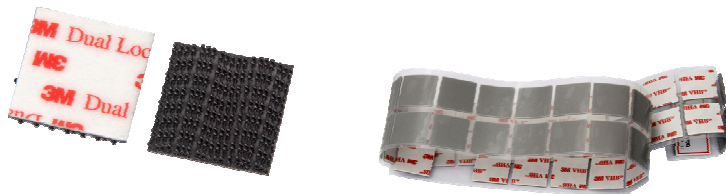


Figure 5. 1x1" Velcro or double-sided tape patches

- However, the tamper switch cannot work if covered by the 1x1" Velcro/double sided tape patches. Therefore, in this case it is recommended to use glue or a thin tape and avoid covering the tamper switch area.

Cradle

The AeroScout T3-BD tag cradle can be used to incorporate the tag in existing equipment. The cradle is fixed on the asset (e.g. a machine) and the tag is snapped into the cradle. With the cradle, tags can be easily removed and replaced without the need to handle screws or adhesives.

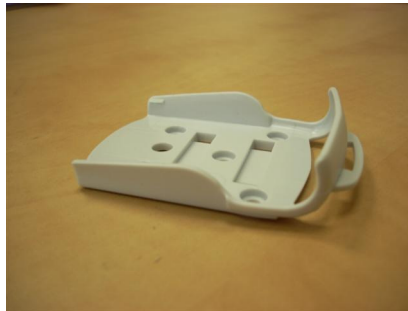


Figure 6. AeroScout T3-BD tag cradle: front view



Figure 7. AeroScout T3-BD tag cradle: back view

To mount a cradle and place a rag in it:

1. Do one of the following:
 - To attach the cradle on a flat surface with (four) screws: Use the four holes on the sides.
 - To attach the cradle on a flat surface with adhesives: Put adhesive material, double sided tape or Velcro on the back side and fix the cradle.
 - To attach the cradle on a non-flat surface (e.g. a pole) with a screw: Use the central hole.
 - To strap the cradle on a non-flat surface (e.g. a pole): Use the rectangular openings on the sides to thread straps.



Figure 8. AeroScout T3-BD tag cradle: side view

2. Snap the tag into the cradle, the tag's front side facing outwards and the upper side up.
3. If you are using a two-flange tag, the possibility exists to fasten to bottom flange to the cradle's flange.

Mounting the Anti-Tampering Device

The optional anti-tampering switch is designed to alert the system (for example by issuing a message) when the tag is removed from its place. The switch is a separate part inserted into a hole at the back of the tag. When the tag is pressed against a surface and fixed on it, the switch is depressed and the mechanism is armed. The removal of the tag releases the switch and causes the tag to send an alert to the AeroScout System Manager.

The anti-tampering device is especially designed for use with objects (and not human beings or animals).

Anti-tampering switches come in two models: long and short. A long switch is needed to press it against a surface through and beyond the cradle. The short switches are supplied with T3-BD tag and the long ones with the cradles.

The mounting procedure should follow configuration. Follow these general steps:

1. Configure the tag, using Tag Manager. See *Tag Manager User Guide*.
2. Activate the anti-tampering mechanism and configure it using Tag Manager.
3. Mount the tag as explained in the following sections.

Option 1 – Tamper Switch Pressed against Surface (without Cradle)

In this case, the tag is fixed on a surface and the tampering switch is pressed against that surface. Use a two-flange tag and the short tampering switch.

1. Insert the short switch into the hole at the tag's back.
2. Firmly secure the two-flange tag on the surface, using four screws, making sure that the switch is pressed against the surface. This is the recommended procedure but you can also apply a thin layer of glue or use double-sided tape.

Option 2 – Tamper Switch Pressed against Surface (with Cradle)

In this case, the tamper switch passes through the cradle's slit and is pressed against the surface on which the cradle is fixed. If the cradle or the tag is removed, the anti-tampering mechanism issues an alert.

1. Remove the tamper adaptor from the cradle (if installed).
2. Fix the cradle.
3. Insert the long switch into the hole at the tag's back.
4. Place the tag in the cradle making sure that the switch is properly pressed against the surface through the cradle's upper slit.

Tag Management

Managing Tags Using AeroScout Tag Manager

The AeroScout T3-BD tag can be configured, programmed and activated via a wireless interface (including anti-tampering device enabling). This is done with the help of the AeroScout Tag Manager version 4.0 (and later) and the AeroScout Tag Activator.

In addition, Tag Manager is used to activate and deactivate tags and to program stored messages on the tags.

The Tag Manager functions can also be activated via APIs that enable easy integration with third-party applications.

Please refer to *AeroScout Tag Manager User Guide*.

Automatic Tag management Through the Wi-Fi Network

The AeroScout T3-BD tag's configuration can be managed automatically through the Wi-Fi network. This is possible due to the tag's bidirectional communication abilities.

This is done by creating a configuration file using the AeroScout Tag Manager and saving it, and then loading it into the AeroScout Bidirectional Tag Controller application. This application can automatically update the configuration to all the tags in the site, through the Wi-Fi network. The actual update will take as much time as the interval set into the tag for periodic network association.

Please refer to *AeroScout Bidirectional Tag Controller User Guide*.

Tag Maintenance

Upgrading the Firmware

The AeroScout T3-BD tag's firmware can be upgraded automatically through the Wi-Fi network. This is possible due to the tag's bidirectional communication abilities.

This is done by using the AeroScout Bidirectional Tag Controller application. This application can automatically upgrade the firmware to all the tags in the site, through the Wi-Fi network. The actual update for each tag will take as much time as the interval set into the tag for periodic network association.

Replacing the Internal Battery

The AeroScout tag uses one 3.0V CR123A battery Lithium Manganese Dioxide (Li/MnO₂) battery, with 1500 mAh capacity. The battery has a diameter of 17mm and length of 34mm. This internal battery can last up to 4 years depending on the configured tag parameters (e.g. the transmission interval rate and the number of associations per day).



Figure 9. T3-BD tag battery choices

To replace a battery:

1. Deactivate the tag with Tag Activator and Tag Manager (recommended).
2. Unscrew the tag compartment screws.
3. Install a new 3.0V lithium battery in the battery compartment.

Make sure that the sealing rubber around the battery compartment has not moved during battery installation. If it did, gently put it back in place using a sharp device.



WARNING: Use only batteries listed in Table 1 or batteries that have been approved by AeroScout. There is a danger of fatal tag damage if the battery is replaced incorrectly or by an incorrect type. Dispose used batteries according to the instructions.

Avertisment: Utilize seulement des piles marquee au Table 1 ou des piles approuvee par Aeroscout. Il y-a un danger Tag fatale si les piles s`ont remplacer incorectement ou par incorrect type. Dispose les piles usage suivre le instructions.

4. Screw the battery cover into place
5. Activate the tag.
6. Dispose of the old lithium battery properly.



WARNING: Local regulations vary. Federal regulations allow up to 100 kg./month of lithium manganese dioxide batteries to be disposed in common landfill. All leads (the terminals) should be taped to prevent short circuit. The user is responsible for safe disposal.

Table 1 lists of the approved battery types for the T3-BD tag:

Manufacturer	Battery Part Number	TAG-3500-XXXXXX-	TAG-3500-XXXXXXE
		-20°C To 60°C	-30°C To 75°C
Panasonic	CR123A	X	
Duracell	Ultra 123 (DL123A)	X	
SANYO	CR123A	X	
SANYO	CR17335HE-R		X
Wuhan	CR17335E	X	
EVE	CR123A		X
Energizer	EL123	X	
Varta	CR 2/3 A		X
Varta	CR123A	X	

Table 1 – T3-BD tag Approved Battery Types

Tag Battery Life

The parameters that affect battery life include the tag transmission interval and the number of transmission channels configured for the tag. The battery life also depends very much on the interval in which the tag associates for bidirectional communication with the network.

Please use the AeroScout Tag Manager in order to evaluate the battery life that is obtained with your setup.

T3-BD Tag Models

Use the following method to determine the correct part number of the tag depending on the required hardware:

TAG-3500-FxTBVAE

Where:

Mark	Meaning
-/F1/F2	Zero/one/two flanges
-/T	Without/with temperature sensor
-/B	Without/with buzzer
-/V	Without/with vibrator
-/A	Without/with tamper proofing
-/E	Extended temperature range (E=-30 to 75) else ("=" = -20 to 60)

Table 2 – Regular T3-BD tag Models

* See table 1 – for batteries temperature classification per Tag model

Tag Accessory Models

Mounting Accessories	Comments	Model
T3-BD tag cradle		TAC-350
Screw kit for cradle or tag	100 pack	TAC-065
Short anti-tampering switch	50 pack	TAC-360
Long anti-tampering switch	50 pack	TAC-361
Tag badge clip	10 pack	TAC-210

Mounting Accessories	Comments	Model
Tag neck strap - white	50 pack	TAC-070
Tag neck strap – with AeroScout logo	50 pack	TAC-071
Velcro attachment kit	50-pack, 1x1" patches	TAC-030
Double-sided tape attachment kit	50-pack, 1x1" patches	TAC-031
Tie wraps for cradle – up to 2" diameter		TAC-060
Tie wraps for cradle – up to 5" diameter		TAC-061
T3-BD tag housing	Empty T3-BD tag housing with AeroScout logo	TGH-305
Tag Management		
Tag Activator (US)	Includes 110/220v to 5v adapter (US)	BWH1000-02-TA
Tag Activator (Europe)	Includes 110/220v to 5v adapter (Europe)	BWH1000-02-TA
AeroScout Tag Manager SW		TGM-2000
Battery		
T3-BD tag battery 25-Pack		TAC-332
T3-BD tag battery 50-Pack		TAC-333

Table 3 – Tag Accessory Models

Tag Specifications

Performance

Outdoor range: Up to 200m (600 feet)

Indoor range: Up to 80m (180 feet)

Physical and Mechanical

- Dimensions: 2.9" x 1.8" x 0.8" (74mm x 47mm x 21mm)
- Weight: 50g

Radio

- Bidirectional 802.11b radio (2.4GHz)
- Low frequency receiver (125kHz)
- Transmission power: up to +19dBm, ~81mW

- Clear channel sensing avoids interference with wireless networks

Accessories

- Motion Sensor
- 2 Call buttons
- 2 LED's (single color + dual color)
- Optional tamper proof switch
- Optional vibrator
- Optional buzzer
- Optional temperature sensor

Environmental Specifications

- Temperature: -30°C to +75°C (-22°F to 167°F)
- Humidity: 0 to 100%, condensing
- The housing is water and dust resistant and includes a rubber lining.
- IP-65

Electrical

- 3.0V Lithium manganese dioxide battery (replaceable)
- Battery life: up to 4 years, depending on usage scenario

Certification

- Radio:
 - FCC Part 15, sub-part C class B, sub-part B
 - EN 300-328, EN 300-330, EN 301-489
 - EN 60601 / IEC 6100 (Healthcare)
 - ARIB (Japan)
- Safety:
 - CE
 - cTUVus (IEC60950-1)

Safety and Warnings

FCC STATEMENT

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:

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

This device complies with Part 15 of the FCC Rules.

Operation is subject to the following two conditions:

- a) This device may not cause harmful interference
- b) This device must accept any interference received, including interference that may cause undesired operation.

FCC Warning

Modifications not expressly approved by the manufacturer could void the user authority to operate the equipment under FCC Rules.

Warranty

Hardware. AeroScout Inc. ("AeroScout"), warrants that commencing from the date of delivery to Customer, and continuing for a period of ninety (90) days the Hardware will be free from defects in material and workmanship under normal use. The date of shipment of a Product by AeroScout is set forth on the packaging material in which the Product is shipped. This limited warranty extends only to the original user of the Product. Customer's sole and exclusive remedy and the entire liability of AeroScout and its suppliers under this limited warranty will be, at AeroScout's or its service center's option, shipment of a replacement within the period or a refund of the purchase price if the Hardware is returned to the party supplying it to Customer, if different than AeroScout, freight and insurance prepaid. AeroScout replacement parts used in Hardware repair may be new or equivalent to new. AeroScout's obligations hereunder are conditioned upon the return of affected articles in accordance with AeroScout's then-current Return Material Authorization (RMA) procedures.

Restrictions. This warranty does not apply if the Product (a) has been altered, except by AeroScout, (b) has not been installed, operated, repaired, or maintained in accordance with instructions supplied by AeroScout, (c) has been subjected to abnormal physical or electrical stress, misuse, negligence, or accident; or (d) is sold for beta, evaluation, testing, or demonstration purposes for which AeroScout does not receive a payment of purchase price or license fee.

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