STANLEY

T22 and T23 Asset Tag

User Guide

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AeroScout Industrial

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Overview

The T22/T23 Bi-directional Asset Tag is a component of AeroScout Industrial's suite of enterprise visibility solutions for location-based applications. The T22/T23 Tag adds further flexibility and scalability to track assets across a wide variety of applications.

Once deployed, the tag uses its bi-directional functionality to receive firmware and configuration updates from MobileView. This removes the need to manually collect, update and re-deploy tags in the field.

Figure 1: T22/T23 Asset Tag

T23 tag version comprises, in addition to the T22 capabilities described above, an UWB radio to support UWB-based positioning. UWB-based positioning is significantly more precise than Wi-Fi-based positioning and well suited for indoors applications where a location accuracy of less than 1m is required.

T22/T23 Tag Features

Beaconing and Bi-directional Communication

The T22/T23 Tag utilizes lightweight beaconing communication (for standard messages) and bi-directional Wi-Fi communication with full network association and authentication (for FW and configuration upgrades). This unique combination provides a flexible and scalable solution for advanced applications. The tag can operate with up to four different network SSIDs in a secure or non-secure mode and is able to store up to two network IPs. The tag also supports both static IP configuration and DHCP.

T23 tag version comprises, in addition to the T22 capabilities described above, an UWB radio to support UWB-based positioning. UWB-based positioning is significantly more precise than Wi-Fi-based positioning and well suited for indoors applications where a location accuracy of less than 1m is required.

Long Battery Life

The tag has a user replaceable battery that provides up to 12 years battery life. The tag is able to report its battery level to MobileView. The T22/T23 Tag also has a motion sensor to conserve battery life when the tag is not in motion.

In addition, to prevent battery drainage and extend battery life, tags leave the factory in **Dormant** state. This prevents them from being activated inadvertently. Dormant tags react only to the Tag Activator's Exit Dormant command, after which they can be configured and activated.

Note

Battery life depends on tag configuration, usage profile, and environment conditions.

For deployment specific battery life expectancy, consult with your AeroScout Industrial sales representative.

Egress Point Detection

When combined with AeroScout Exciters, the T22/T23 Tag provides instant notification when a tagged asset passes through an egress point, such as a gate, doorway or other tightly defined area. Additionally the tag's behavior can be automatically modified while passing through an egress point, such as activating / deactivating the tag, or changing the tag's transmission rates to accommodate different usage scenarios.

Rugged Performance

The T22/T23 Tag enclosure is designed for durability against significant impacts and is water and dust resistant. For information regarding chemical resistance, see Appendix A: Chemicals Compatibility.

Visual Indication

The T22/T23 Tags include a dual-color LED which enables visual indication of tag operation.

Tag Management

T22/T23 Tags are easily configured and activated wirelessly via the Tag Manager BD application and a Tag Activator device. The tags can then be reprogrammed using bi-directional communication via MobileView.

Mounting the Tag

The main way to mount the T22/T23 is by using four M4 screws in the proper holes.

The T22/T23 can also be mounted using tie wraps, either vertically or horizontally via the accompanying slots on each opposite side. See the following picture:

Figure 2: T22/T23 Mounting

Reusing T2EB mounting holes

When replacing a T2EB, the T22/T23 adapter plate can be used to avoid additional mounting holes in the asset.

To mount the tag:

1. Mount the adapter plate to the existing T2EB mounting holes
2. Screw the tag to the adapter plate using the screws provided with the adapter plate.

Figure 3: T22/T23 Adapter plate

Mounting with an Adapter Plate

The adapter plate also allows you to fix the tag on surfaces where it cannot be attached using straps or screws, such as metal cages.

To mount the tag:

1. Place the tag on one side of the cage and the adapter plate on the opposite side.
2. Attach the tag to the adapter plate using screws or tie wraps while the cage bars are placed in between them.

Tag Management

T22/T23 Bi-directional Asset Tags firmware contains up to 10 pre-defined sets of parameters. Each parameter set is called a static configuration and has a unique number. Static configurations cannot be edited. Only one (1) configuration can be selected and used for the tag at any given time.

Configuring and Updating Tags

T22/T23 Tags **must** be initially configured using the TMBD application before use (Tag Manager Bi-directional application). The TMBD application allows you to activate and configure the tags according to your sites infrastructure.

Once the tags have been initially configured using the TMBD application, future configurations can then be done via MobileView.

For more details on configuring and updating the tags, see the Tag Manager BD User Guide.

Updating Tag Firmware and Configuration

MobileView supports the option to update the T22/T23 Tag configuration and firmware over the air (wirelessly). A group of tags or tags associated to a specific category can be configured simultaneously.

For more details see the MobileView Administration Guide.

Tag LED Indications

T22/T23 Tags include a dual-color LED (red and green) for visual indications. These indications are described in the table below.

Action		Indication Description
Low Battery		Alternating red and green short blinks every minute
LF reception		1 quick green flash
Message transmission		1 quick red flash

(periodic or triggered)		
Bi-directional session	Start	1 short red blink
	End	1 Short red blink followed by 2 quick red flashes

Tag Maintenance

Tag Battery Life

The T22/T23 Tag uses a battery pack consisting of two 3.6V Lithium batteries. The battery can last up to 12 years depending on the configured tag parameters (e.g. the transmission interval rate).


Note

The tag's battery life is significantly reduced if used in extremely low temperatures (below -20 °C, -4°F).

Approved Batteries

Only an approved AeroScout Battery pack must be used (Able ER14505M*2-45-24-2C).

Replacing the Battery Pack

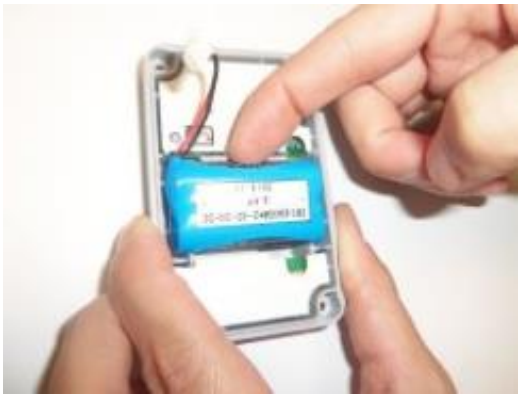
To replace a battery pack:

1. Using a Torx screwdriver, remove the tag casing by unscrewing the four M3 Torx case screws.

2. Gently pull the tag casing apart from the main body.

3. Disconnect the wires from the back panel.

4. Remove the disconnected battery pack from the battery holder.



5. Place a new battery pack in the battery holder, and connect the wires.

6. Close and re-screw the panel to the tag casing.

Note

For accurate battery prediction, make sure new batteries are used.

In order to have an accurate battery prediction in MobileView the tag battery counters mechanism needs to be reset after every battery change.

The counters can be reset either through the Tag Manager BD, MobileView or the MTA application. For more information see the relevant system documentation.

WARNING: Risk of explosion if battery is replaced by an incorrect type! Dispose of used batteries according to the instructions!

ATTENTION: Risqué explosion si la pile est remplacée par un type incorrect! Se débarrasser des piles usagées selon les instructions!

T22 Tag Models

Model	Description
IND-T22	Rugged T22 indoor bi-directional Wi-Fi Tag with low frequency (LF) receiver. Includes a 2*AA 3.6V Lithium battery pack, motion sensor, and industrial housing with two mounting flanges.
IND-T22W	Rugged T22 indoor bi-directional Wi-Fi Tag with low frequency (LF) receiver. Includes a 2*AA 3.6V Lithium battery pack, motion sensor, and industrial housing with no flanges.
IND-T22T	Rugged T22 indoor bi-directional Wi-Fi Tag with low frequency (LF) receiver. Includes a 2*AA 3.6V Lithium battery pack, motion sensor, and industrial housing with two mounting flanges and tamper switch.

T23 Tag Models

Model	Description
IND-T23	Rugged T23 indoor bi-directional Wi-Fi/UWB Tag with low frequency (LF) receiver. Includes a 2*AA 3.6V Lithium battery pack, motion sensor, and industrial housing with two mounting flanges.
IND-T23W	Rugged T23 indoor bi-directional Wi-Fi/UWB Tag with low frequency (LF) receiver. Includes a 2*AA 3.6V Lithium battery pack, motion sensor, and industrial housing with no flanges.
IND-T23T	Rugged T23 indoor bi-directional Wi-Fi/UWB Tag with low frequency (LF) receiver. Includes a 2*AA 3.6V Lithium battery pack, motion sensor, and industrial housing with two mounting flanges and tamper switch.

Tag Accessories

Accessory	Description
AC-TM-0150	T22/ T23 to T2EB adapter plate, used to mount a T22 or T23 tag on existing T2EB mounting holes (50 units)
AC-TM-0250	T22W/ T23W back plates with a hook, used to hang the tag in temporary deployments (50 units)
AC-TM-0350	Transparent ID card back plate, used to attach an ID card to the back of a T22W/ T23W (50 units)
AC-TB-0250	2*AA 3.6V Lithium battery pack for T22/ T23 tags (50 units)
HWM-1000-US (US) HWM-1000-E (Europe) HWM-1000-UK (UK) HWM-1000-J (Japan)	Hardware Manager Kit for configuration of Tags and Exciters. Includes the following products: 1. Tag Activator with power adapter 2. Ultrasound and LF Exciter Detector (EXD-1000) 3. Exciter Configuration Cables Kit (EXM-1000) 4. EX4100 Ultrasound Exciter Configuration Cable (CON-4100) Software installation file is available for download on the Knowledge Base. A CD with the file is also available and can be shipped with the hardware per demand.

Specifications

Tag Specifications

Range

- **Indoor range:** Up to 80m (260 feet)

Physical and Mechanical

- **Dimensions:** 127mm x 62mm x 26mm (L x W x H)
- **Weight:** ~140 grams

Radio

Wi-Fi: 802.11 radio (2.4 GHz); g compliant

- Transmission power: up to +19dBm (~81mW)
- Patented clear channel sensing avoids interference with wireless networks

Security protocol: WPA2 security with AES encryption

Low frequency receiver for chokepoint detection (125 kHz)

UWB (T23 only):

- UWB Channel Number: 2
  - Centre Frequency (MHz) - 3993.6
  - Band - 3774-4243.2 MHz
  - Bandwidth - 499.2 MHz
- UWB Channel Number: 5
  - Centre Frequency (MHz) – 6489.6
  - Band - 6240-6739.2 MHz
  - Bandwidth - 499.2 MHz

Environmental Specifications

- Operating Temperature: -30°C (-22°F) - 75°C (167°F)
- Relative Humidity: 90-95% at the temperature of 50°C (122° F)
- Ingress Protection Rating: IP-67
- Tested in accordance to MIL-STD 801F (temperature, humidity, drop, vibration, shock, ingress, rain/ icing, ESD and chemical resistance)

Electrical

2-Battery Pack (replaceable) of 3.6 lithium 4000-milliamp per hours batteries

Programmability

- Tag configurations
- Transmission channels
- IP Address

Certification

EMC Certifications:

- US standard: FCC part 15 sub part B
- European standard: ETSI 300.328, 300.330, ETSI 301.489

Safety Certifications:

- US – cTUVus: UL 60950-1; -22
- Europe – CE mark: EN 60950-1; -22

Radio Certification:

- US Standard FCC part 15 sub-part C section 15.247
- T23 only- UWB for US: FCC part 15 sub-part F (UWB)
- Europe: EN302.065 version 1.2.1

1. ***FCC 15.517 (f):*** *This equipment may only be operated indoors. Operation outdoors is in violation of 47 U.S.C. 301 and could subject the operator to serious legal penalties.*

2. ***FCC 15.247(i):*** *The transmitter must not be co-located or operated in conjunction with any other antenna or transmitter. This equipment complies with the FCC RF radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20cm between the radiator and any part of your body.*

Appendix A: Chemicals Compatibility

The following table summarizes the Tag's resistance to various chemical compounds.

Use this key:

- R - Resistant
- LR - Limited Resistance (gradual attack over time may occur)
- N - Not Resistant (rapid attack or attack over short time period will occur)

Chemical	**Compatibility**
Acetic acid, conc.	N
Acetone	R
Ammonia, 10% aqueous	R
Amyl acetate	R
Aniline	L
Antifreeze (glycol)	L
Benzene	R
Benzyl alcohol	N
Bromine	N
Butane	R
Butanol	R
Carbon tetrachloride	R
Caustic potash 50%	R
Chlorine	N
Chlorine dioxide	N
Chlorobenzene	R
Chloroform	N

Chemical	Compatibility
Citric acid, conc.	L
Copper sulfate 10% aqueous	R
Cresol	N
Crude oil	R
Diesel fuel	R
Diethyl ether	R
Engine Oil	R
Ethanol	R
Ethylene oxide	R
Fats (lipids)	R
Fluorine	N
Formaldehyde	N
Formic acid, 10% aqueous	N
Formic acid, conc.	N
Freon liquid F12	R
Freon liquid F22	N
Glycerin	R
Heptane	R
Hydraulic oil	R
Hydrochloride acid 1%	N
Hydrochloride acid, conc.	N
Hydrogen peroxide 2%	N
Hydrogen peroxide 10%	N
Hydrogen peroxide 30%	N

Chemical	Compatibility
Hydrogen sulphide <5%gaseous	R
Iodine tincture, alcoholic	N
Isooctane	R
Isopropanol	R
Kerosene	R
Lactic acid, aqueous	L
Magnesium chloride, 10% aqueous	R
Methane	R
Methanol	R
Methylene chloride	L
Methyl ethyl ketone	R
Mineral oil	R
Nitric acid, conc.	N
Nitrobenzene	L
Oleum	N
Oxalic acid, 10% aqueous	L
Ozone	N
Perchloroethylene	R
Petrol	R
Petroleum ether	R
Phenol	N
Phosphoric acid, 10% aqueous	N
Potash (potassium carbonate) sat.	R
Potassium permanganate 5%	N
Propane	R
Pyridine	R

Chemical	Compatibility
Resorcinol	N
Salicylic acid	R
Sea water	R
Silicone oil	R
Soap suds	R
Soda, sat. (sodium carbonate)	R
Sodium chloride, saturated	R
Sodium hypochlorite, 5% aqueous	N
Sulphur	R
Sulphur dioxide <5%gaseous	L
Sulphuric acid 1%	N
Sulphuric acid, conc.	N
Styrene	R
Tartaric acid aqueous	L
Tetralin	R
Toluene	R
Transformer oil	R
Trichloroethane	L
Trichloroethylene	L
Turpentine	R
Urea, 20% aqueous	R
Uric acid, aqueous	L
Vinegar	L
Water	R

Chemical	Compatibility
Xylol	R
Zinc chloride, 50% aqueous	L

FCC Compliance Statement

This device 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 residential installations. 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 and television reception.

However, there is no guarantee that interference will not occur in a particular installation. If this device does cause such interference, which can be verified by turning the device off and on, the user is encouraged to eliminate the interference by one or more of the following measures:

- Re-orient or re-locate the receiving antenna.
- Increase the distance between the device and the receiver.
- Connect the device to an outlet on a circuit different from the one that supplies power to the receiver.
- Consult the dealer or an experienced radio/TV technician.

WARNING! Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This device complies with FCC Rules Part 15 and with Industry Canada licence-exempt RSS standard(s). Operation is subject to two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference that may be received or that may cause undesired operation.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :(1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

About AeroScout

AeroScout is the market leader in Unified Asset Visibility solutions. Clients improve operational efficiency and quality using AeroScout products that leverage standard Wi-Fi networks to track and manage the location, condition and status of mobile assets and people. AeroScout's global customer base consists of leading hospital, manufacturing and logistics organizations, including many of the Fortune 500. The company originally invented the first Wi-Fi-based Active RFID tag, and today is widely recognized as leading the market in number of deployments and tags shipped. Headquartered in the U.S.A, AeroScout has offices in Europe, Asia, the Middle East, Latin America and Australia. For more information, please visit www.aeroscoutindustrial.com.

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