

Installation Guide

Savi ST-694 GlobalTag



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Documentation for Savi ST-694 GlobalTag

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Savi GlobalTag ST-694

Description

The Savi GlobalTag ST-694 is a data-rich active RFID tag equipped with a satellite modem and a GPS receiver. This tag is suited for various applications including tracking shipping containers, vehicles, and other high-value assets throughout a supply chain. The GlobalTag can track assets with or without active RFID infrastructure.

Figure 1: Top view



Figure 2: Bottom view



Figure 3: Mounting bracket view



Features

- Extends active RFID networks with GPS and satellite to enable true global tracking solutions
- 128 Kbytes of programmable database memory enables tag to support multiple applications
- RFID 433 MHz communications with 400-foot (122m) omnidirectional line-of-sight range
- Replaceable battery with a typical life of three years, assuming one satellite reporting per day
- Supports innovative low-frequency technology for more precise locating capabilities
- FCC, HERO, RoHS (Directive 2002/95/EC) certified

Activating and Initializing the Tag

Before you can initialize the tag, you must wake it up by inserting the battery.

1. Remove the battery from its wrapping.
2. Insert the battery by lowering the tab end into the tag battery compartment and then lowering the connector end. The battery should fit snugly in position.

When a battery is inserted into a tag, the tag emits 2 short beeps one second apart to indicate adequate battery voltage or 3 short beeps if a fresh battery is required.

3. Secure the battery with the two provided 6-32 screws.

Note: When the tag is not in use, removing the battery and store it at room temperature (50-80 °F or 10-27 °C).

After you activate the tag, you can initialize it for immediate use. Refer to the *Savi SmartChain Mobile User Guide* or the *Savi SmartChain Workstation User Guide* for initialization information.

Hibernating the Tag

You can hibernate the tag to conserve the battery. To place the tag in hibernation mode using SmartChain Mobile:

1. Remove the mobile device (also known as a handheld interrogator) from the cradle and login to SmartChain Mobile.
2. Make sure the mobile device is disconnected from the external power supply.



3. From the Main menu, tap **Tags & Devices** > **Hibernate Tags**.
4. Tap **Add**.
5. Tap **Collect** to begin active tag collection.
6. Select a tag from the list and tap **OK**.

You can select multiple tags.

7. To add tags to the collection, tap **Add** and repeat steps 4 and 5.
8. When you finish adding tags, tap **Hibernate**.
9. Tap:
 - **New Hibernate Tags** to disable UHF reception for other tags.
 - **Return to Main Menu** to go back to the Main menu.

For more information, see the *Savi SmartChain Mobile User Guide*.

Initializing Satellite Communication

Once you activate the RFID, you can initialize satellite communication.

1. Start Savi SmartChain Mobile on the mobile device.
2. From the Main menu, tap **Tag Commands**.
3. Enter or scan the RFID Tag ID in the space provided and tap **Read Tag**.
4. Tap the **GPS Reporting** tab.
5. Tap the Standard Positional Reporting desired and tap **Next**.
6. Tap **Write Tag**.

Refer to the *Savi SmartChain Mobile User Guide* or the *Savi SmartChain WorkStation User Guide* for initialization information.

Placing the Tag for Best Performance

Savi Technology recommends that you mount the tag on a flat horizontal surface, with a clear view of the sky. The tag may also be mounted vertically on the side of a container. For best performance, place the tag as high as possible, safe from impact, and away from obstructions on the asset. For satellite reporting, a clear view of the sky is required.

During transit, ensure that tags mounted on multiple containers are not obstructed by other containers. If the container is loaded onto a vehicle for transport, avoid placing the tag on the side of a container that faces the vehicle cab or any other obstruction.

Mount the tag by adhering the tag and supplied plastic mounting sleeve with pressure sensitive tape (PST) to the inside or outside of a Class VIII container or plastic, cardboard, or wood container or box. Secure the tag to the mounting sleeve using the three provided 8-24 screws.

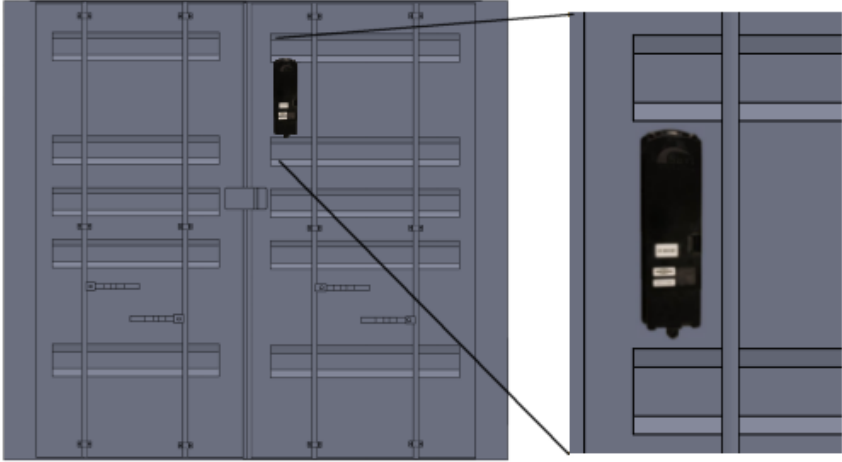
Typical mounting locations include on the hood of a vehicle or on the outside of the container on a flat surface.

For best performance, make sure the tag is:

- Mounted with clear view of the sky
- Mounted on a metal surface
- Mounted horizontally whenever possible, otherwise vertically
- Not mounted behind or between metal objects
- Secured to the Optional Mounting Bracket to provide the minimum clearance to the asset (.575 inch or 1.5 cm)

Savi ST-TAG NUMBER Installation Guide

The next figure shows an example of a tag mounted on an ISO container according to the performance guidelines.



Note: Make sure you clean the surface of the container or other asset before attaching the tag.

The tag has 400-foot (122m) read/write range to Savi SR-650 Fixed Readers. For the most consistent communications with the tag, the readers must be mounted:

- To have an unobstructed line-of-sight to the tag
- At 20 feet (6m) or higher

Caution: Tags mounted close to the ground may have less range.

Follow the instructions in the *Savi SR-650 Fixed Reader Installation Guide* to locate and position the Savi Fixed Reader for best performance.

Mounting the Tag

When mounting the tag, use the plastic mounting sleeve. You can choose among several methods for mounting the sleeve, including using pressure sensitive tape (PST).

Mounting the tag directly onto the asset limits access to the battery and should be avoided.

Whichever mounting method you select, the goal is to prevent accidental loss of the tag by sudden impact, vibration, or shock during transport. The fastener you choose often depends on the material from which the asset or container is constructed and your personal preference.

You can also use the following alternative fastening methods:

- Tie-wraps
- Twine
- Screws
- Rivets

Caution: Use these and other alternative methods at your own risk.

If it is not possible or practical to use screws, use PST to attach the tag. For ease of installation, the tag comes with PST on the back of the plastic mounting sleeve.

Note: Ideal tape application temperature range is 70°F to 100°F (21°C to 38°C). After application, the bond reaches maximum strength after 3 days.

PST mounting kits are also available for separate purchase.

Once a mounting sleeve is fastened to an asset, you can leave it on the asset even after the tag is removed so the sleeve is available for future use with other compatible tags. Prior to re-use, visually inspect the

PST-mounted sleeve to make sure it is attached securely. If necessary, reinstall the sleeve using new PST.

Conserving the Battery

The tag's battery can be depleted by excessive accessing through overpolling. Minimizing a tag's exposure to unintentional reader signals can help extend battery life.

Avoid Overpolling

The most common cause of early battery depletion is overpolling. Overpolling can occur when the tag is left idle within range of an RF reader such as in a warehouse, shipping yard, or near a gate where fast UHF polling is used.

Use Hibernation Mode

You can protect unused tags from unintentional polling by placing them in Hibernation mode. See “Hibernating the Tag” on page 7.

Replacing the Battery

The tag is equipped with non-volatile memory, which means stored data is not lost when you replace the battery.

1. Unscrew the two 6-32 screws from the battery cover.
2. Remove the discharged battery from its compartment.

For more information, see “Activating and Initializing the Tag” on page 6.

Note: The lithium battery can be harmful to the environment. Follow current procedures for safely disposing of lithium batteries. The battery cannot be reused or recharged.

3. Install a fresh 6V lithium battery into the tag housing by first lowering the tab end in then lowering the connector end.

The battery should fit snugly.

When a battery is inserted into a tag, the tag emits 2 short beeps one second apart to indicate adequate battery voltage or 3 short beeps if a fresh battery is required.

4. After the beep, secure the battery with the two provided 6-32 screws.

Contacting Savi Global Support Services

For additional product information, including firmware updates, contact Savi Global Support Services.

- Go to www.savi.com and click SAVI SUPPORT.
- Send an email to help@savi.com.
- Call 1-888-994-7284 (North America only) or 1-650-316-4760 between 5 a.m. and 5 p.m. Pacific time.

When you contact Savi Global Support Services by telephone or email, have the following information available:

- Contact information (company name, your name, email, and phone number)
- Problem description
- Product name/ model
- Product/software version
- Serial number or license information

Specifications

Specifications

Versions	ST-694-001: active RFID system satellite uplink and GPS tag
Environmental	Temperature: -32°C to +70°C operating; -40°C to +85°C storage Humidity: 95% non-condensing Vibration and shock: MIL-STD-810F Weatherproofing: IP64 Manufacturing: RoHS Directive 2002/95/EC Color: black
L-band transmitter	Frequency: 1.615 GHz Protocol: Direct Sequence Spread Spectrum Simplex Packet size: 9 bytes
GPS receiver	Integrated GPS receiver
UHF receiver/transmitter	Frequency: 433.92 MHz at 0.6 mW peak EIRP, FSK Modulated Communication range (unobstructed): 400 ft. (122m) operating read/write range (outdoors, non-obstructed) to Savi SR-650 Fixed Reader Protocols: <ul style="list-style-type: none">• EBCS Commands (22-bit tag identification supported)• Savi EchoPoint Air Protocol 2.1 (32-bit tag identification supported)
LF receiver	Frequency: 123 kHz Communication range: Up to 12 ft. (3.6m) from SP-651-211 Long Range Signpost Protocol: EchoPoint Protocol
Power	Battery type: lithium, non-rechargeable Battery life: Approximately 3 years, assuming 1 satellite reporting per day

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Digital storage	User memory: 128 Kbytes on-board non-volatile memory Wired interface: USB 2.0
Accessories	Mounting: Mounting bracket STA-694-032
Regulatory approval	Radio Type Approval: FCC Part 15 and Part 25, ETSI, EN 300 220 (433.92 MHz) EMC and Immunity: ETSI, EN 301 489, EN 61000-4-2 Ordnance: HERO Certified, ARDEC rating of 1 in. (2.5 cm)

ST-694-001 ISO Container Door Tag with GPS/Satellite Modem U.S. Regulatory Approvals Compliance Notice

Federal Communications Commission (FCC) Notice

The Federal Communications Commission has established technical standards regarding radio frequency energy emitted by computer devices. This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference with radio/TV reception. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.



Warning: Changes or modifications to this equipment that are not expressly approved by Savi Technology could void the warranty and the authority to operate this equipment.

Savi Technology is not responsible for radio/TV interference caused by using unauthorized cable or by making unauthorized changes to this equipment.

Federal Communications Commission (FCC) Label Statement

This device complies with Part 15 of the FCC Rules. Operation is subject to the following conditions:

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

The label statement corresponds to the following devices:

Device	Model	FCC ID
Radio Tag	Savi SensorTag ST-694-001 ST-694-001 ISO Container Door Tag with GPS/Satellite Modem	KL7-694T-V1

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Savi SensorTag ST-694-001 ISO Container Door Tag with GPS/Satellite Modem

International Regulatory Approvals Compliance Notice

Declaration of Conformity

Hereby, Savi Technology, Inc., 351 E. Evelyn Avenue, Mountain View, CA 94041-1530 declares that the Savi SensorTag ST-694-001 ISO Container Door Tag with GPS/Satellite Modem are in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC.



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Industry Canada Notice:

IC: 2404A-694T

This Class A digital apparatus complies with Canadian ICES-003
Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

Warning

This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Operation is subject to the following 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.

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International Compliance

Czech	<i>Savi Technology, Inc.</i> tímto prohlašuje, že tento Savi SensorTag ST-694-001 ISO Container Door Tag with GPS/Satellite Modem je ve shodě se základními požadavky a dalšími příslušnými ustanoveními směrnice 1999/5/ES.
Danish	Undertegnede <i>Savi Technology, Inc.</i> erklærer herved, at følgende udstyr Savi SensorTag ST-694-001 ISO Container Door Tag with GPS/Satellite Modem overholder de væsentlige krav og øvrige relevante krav i direktiv 1999/5/EF.
German	Hiermit erklart <i>Savi Technology, Inc.</i> , dass sich das Gerät Savi SensorTag ST-694-001 ISO Container Door Tag with GPS/Satellite Modem in Übereinstimmung mit den grundlegenden Anforderungen und den übrigen einschlägigen Bestimmungen der Richtlinie 1999/5/EG befindet.
Estonian	Käesolevaga kinnitab <i>Savi Technology, Inc.</i> seadme Savi SensorTag ST-694-001 ISO Container Door Tag with GPS/Satellite Modem vastavust direktiivi 1999/5/EÜ põhinõuetele ja nimetatud direktiivist tulenevatele teistele asjakohastele sätetele.
English	Hereby, <i>Savi Technology, Inc.</i> , declares that this Savi SensorTag ST-694-001 ISO Container Door Tag with GPS/Satellite Modem is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC.
Spanish	Por medio de la presente <i>Savi Technology, Inc.</i> declara que el Savi SensorTag ST-694-001 ISO Container Door Tag with GPS/Satellite Modem cumple con los requisitos esenciales y cualesquiera otras disposiciones aplicables o exigibles de la Directiva 1999/5/CE.
Greek	ΜΕ ΤΗΝ ΠΑΡΟΥΣΑ <i>Savi Technology, Inc.</i> ΔΗΛΩΝΕΙ ΟΤΙ Savi SensorTag ST-694-001 ISO Container Door Tag with GPS/Satellite Modem ΣΥΜΜΟΡΦΩΝΕΤΑΙ ΠΡΟΣ ΤΙΣ ΟΥΣΙΩΔΕΙΣ ΑΠΑΙΤΗΣΕΙΣ ΚΑΙ ΤΙΣ ΛΟΙΠΕΣ ΣΧΕΤΙΚΕΣ ΔΙΑΤΑΞΕΙΣ ΤΗΣ ΟΔΗΓΙΑΣ 1999/5/ΕΚ.
French	Par la présente <i>Savi Technology, Inc.</i> déclare que l'appareil Savi SensorTag ST-694-001 ISO Container Door Tag with GPS/Satellite Modem est conforme aux exigences essentielles et aux autres dispositions pertinentes de la directive 1999/5/CE.
Italian	Con la presente <i>Savi Technology, Inc.</i> dichiara che questo Savi SensorTag ST-694-001 ISO Container Door Tag with GPS/Satellite Modem è conforme ai requisiti essenziali ed alle altre disposizioni pertinenti stabilite dalla direttiva 1999/5/CE.
Latvian	Ar šo <i>Savi Technology, Inc.</i> deklarē, ka Savi SensorTag ST-694-001 ISO Container Door Tag with GPS/Satellite Modem atbilst Direktīvas 1999/5/EK būtiskajām prasībām un citiem ar to saistītajiem noteikumiem.
Lithuanian	Šiuo <i>Savi Technology, Inc.</i> deklaruoją, kad šis Savi SensorTag ST-694-001 ISO Container Door Tag with GPS/Satellite Modem atitinka esminius reikalavimus ir kitas 1999/5/EB Direktyvos nuostatas.
Dutch	Hierbij verklaart <i>Savi Technology, Inc.</i> dat het toestel Savi SensorTag ST-694-001 ISO Container Door Tag with GPS/Satellite Modem in overeenstemming is met de essentiële eisen en de andere relevante bepalingen van richtlijn 1999/5/EG.
Maltese	Hawnhekk, <i>Savi Technology, Inc.</i> , jiddikjara li dan Savi SensorTag ST-694-001 ISO Container Door Tag with GPS/Satellite Modem jikkonforma mal-htigijiet essenzjali u ma provvedimenti oħrajn rilevanti li hemm fid-Dirrettiva 1999/5/EC.
Hungarian	Alulírott, <i>Savi Technology, Inc.</i> nyilatkozom, hogy a Savi SensorTag ST-694-001 ISO Container Door Tag with GPS/Satellite Modem megfelel a vonatkozó alapvető követelményeknek és az 1999/5/EC irányelv egyéb előírásainak
Polish	Niniejszym <i>Savi Technology, Inc.</i> oświadcza, że Savi SensorTag ST-694-001 ISO Container Door Tag with GPS/Satellite Modem jest zgodny z zasadniczymi wymogami oraz pozostałymi stosownymi postanowieniami Dyrektywy 1999/5/EC.

Portuguese	<i>Savi Technology, Inc.</i> declara que este Savi SensorTag ST-694-001 ISO Container Door Tag with GPS/Satellite Modem está conforme com os requisitos essenciais e outras disposições da Directiva 1999/5/CE.
Slovenian	<i>Savi Technology, Inc.</i> izjavlja, da je ta Savi SensorTag ST-694-001 ISO Container Door Tag with GPS/Satellite Modem v skladu z bistvenimi zahtevami in ostalimi relevantnimi določili direktive 1999/5/ES.
Slovak	<i>Savi Technology, Inc.</i> týmto vyhlasuje, že Savi SensorTag ST-694-001 ISO Container Door Tag with GPS/Satellite Modem spĺňa základné požiadavky a všetky príslušné ustanovenia Smernice 1999/5/ES.
Finnish	<i>Savi Technology, Inc.</i> vakuuttaa täten että Savi SensorTag ST-694-001 ISO Container Door Tag with GPS/Satellite Modem tyyppinen laite on direktiivin 1999/5/EY oleellisten vaatimusten ja sitä koskevien direktiivin muiden ehtojen mukainen.
Swedish	Härmed intygar <i>Savi Technology, Inc.</i> att denna Savi SensorTag ST-694-001 ISO Container Door Tag with GPS/Satellite Modem står i överensstämmelse med de väsentliga egenskapskrav och övriga relevanta bestämmelser som framgår av direktiv 1999/5/EG.
Icelandic	Hér með lýsir <i>Savi Technology, Inc.</i> yfir því að Savi SensorTag ST-694-001 ISO Container Door Tag with GPS/Satellite Modem er í samræmi við grunnkröfur og aðrar kröfur, sem gerðar eru í tilskipun 1999/5/EC.
Norwegian	<i>Savi Technology, Inc.</i> erklærer herved at utstyret Savi SensorTag ST-694-001 ISO Container Door Tag with GPS/Satellite Modem er i samsvar med de grunnleggende krav og øvrige relevante krav i direktiv 1999/5/EF.