



SC 1000

User Guide

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PREFACE

Purpose

This guide contains product information for the SC 1000. The intended audiences for this guide include field support personnel, product evaluators, and certified third-party personnel. It is particularly intended for personnel who are responsible for system installation and activation.

Notation

Hardware components and hardware labels in this document might not be exactly as shown and are subject to change without notice.

CAUTION: **This safety symbol warns of possible hazards to personnel, equipment, or both. It includes hazards that will or can cause personal injury, property damage, or death if the hazard is not avoided.**

Note: A note indicates information with no potential hazard. A note indicates points of interest or provides supplementary information about a feature or task.

Numbered lists indicate a series of steps required to complete a task or function.

Bulleted lists highlight information where order or sequence is not crucial.

Battery Safety Warnings

CAUTION: **Always follow local disposal guidelines to properly dispose of the Lithium-ion battery and the device.**

CAUTION: **DO NOT throw the internal battery or the device into fire.**

Environmental Protection

Waste electrical products should not be disposed of with household waste. Please recycle where facilities exist. Check with our Local Authority or retailer for recycling advice.

1. PRODUCT OVERVIEW

The SC 1000 (Model Number: SC1000) is a solar-powered, satellite, self-contained tracking solution principally designed for tracking and monitoring globally roaming assets. The SC 1000 interfaces with wireless sensors through Bluetooth Low Energy and integrated internal sensors to monitor the status and condition of the asset.

The SC 1000 is powered through an internal battery that is recharged using an integrated solar panel.



2. SPECIFICATIONS

2.1. Temperature

Parameter	Value
Operating Temperature Range	-30° to +70°C (-22° to +158°F)
Storage Temperature Range	-40° to +80°C (-40° to +176°F)
Battery Charging Temperature Range	-20° to +50°C (-4° to +122°F)

2.2. Power

The SC 1000 is powered through the internal battery that is recharged using an integrated solar panel.

2.3. RF Specifications

2.3.1. IDP RF

Parameter	Value
Rx Operating Frequency	1525-1559 MHz
Modulation	OQPSK
Symbol Rate	3000 symbols/second
Polarization	RHCP
Tx Operating Frequency	1626.5-1660.5 MHz
Modulation	OQPSK
Symbol Rate	900 symbols/second (maximum)
Polarization	RHCP

2.3.2. OGx RF

Parameter	Value
Rx Operating Frequency	1525-1559 MHz
Modulation	OQPSK
Symbol Rate	2000, 8000, 16000 symbols/second
Polarization	RHCP
Tx Operating Frequency	1626.5-1660.5 MHz
Modulation	OQPSK
Symbol Rate	800, 1600, 3200, 6400 12800 symbols/second
Polarization	RHCP

2.3.3. BLE RF Interface

The device includes an internal BLE antenna.

2.3.4. GNSS RF Interface

The GNSS system includes an internal antenna. The GPS provides unassisted cold start in <35 seconds and assisted in <20 seconds. The 3D, aided position accuracy is <10 m CEP.

2.4. Battery

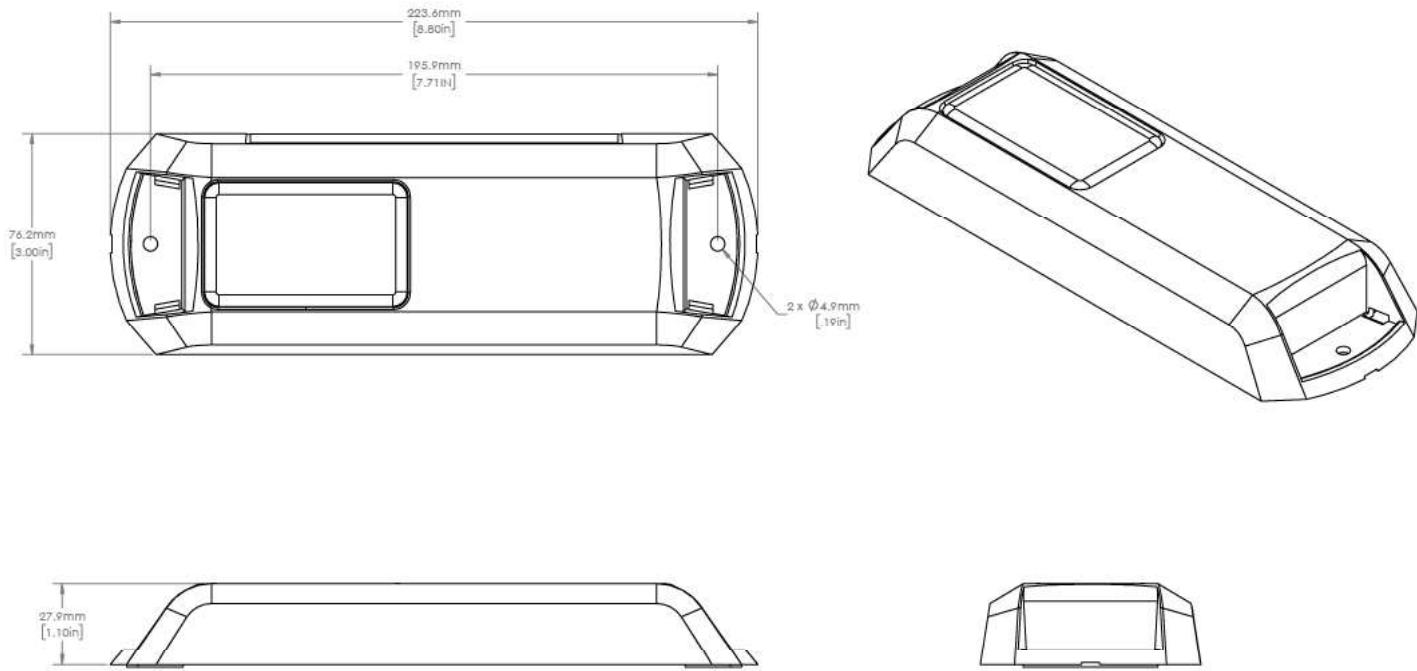
The SC 1000 includes a rechargeable long life, industrial grade 3.6V nominal battery able to supply the current necessary for all operational modes. The battery pack is within the enclosure without causing any interference.

The SC 1000 is charged with an integrated solar panel that provides power to the battery charging system.

PARAMETER	MIN	TYP	MAX	UNITS
Battery				
Capacity	330	-	-	mAh
Voltage (nominal)	-	3.6	-	V
Maximum Current output	2.0	-	-	A
Maximum Charge current	100	-	-	A
Battery Charging				
Solar Open Circuit Voltage	4.84	-	-	V
Solar Power	400	-	-	mW
Charge Current	1	-	90	mA

2.5. Mechanical

The device's mechanical dimensions are shown below.



3. COMPLIANCE

Certifications for the following are pending.

CE Mark (Europe)

- RED 2014/53/EU

Declaration of Conformity

Hereby, ORBCOMM declares that the radio equipment type SC 1000 is in compliance with Directive 2014/53/EU.

The EU DOC (Declaration of Conformity) is either included in the packaging or can be found at the following link: <http://www2.orbcomm.com/eudoc>.

- EN 60079-0: 2018, Explosive atmospheres – Part 0: Equipment – General requirements.
- EN 60079-11, 2012, Explosive Atmospheres Part 11: Equipment protected by intrinsic safety.
- IEC 60529 rev 2.1, Degrees of protection provided by enclosures (IP code), February 2001.

ISED (Canada)

- ISED non-interference disclaimer

This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:

- (1) This device may not cause interference.
- (2) This device must accept any interference, including interference that may cause undesired operation of the device.

This device complies with the Canadian ICES-003 Class B specifications. CAN ICES-003(B) / NMB-003 (B)

- L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempt de licence. L'exploitation est autorisée aux deux conditions suivantes :
 - (1) L'appareil ne doit pas produire de brouillage;
 - (2) L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.
- Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

FCC (United States of America)

FCC Compliance Statement

This device complies with part 15 of the FCC Rules. Operation is subject to the following two 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.

FCC Part 15, Radio Frequency Devices.

FCC OET Bulletin 65 Edition 97-01, Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields, August 1997.

ISED/FCC RF Exposure statement

This equipment complies with FCC and ISED RSS-102 radiation exposure limits set forth for an uncontrolled environment. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter. In order to avoid the possibility of exceeding the FCC and ISED RSS-10 radio frequency exposure limits, this equipment should be installed and operated with minimum distance 20 cm (8 inches) between the antenna and your body during normal operation. Users must follow the specific operating instructions for satisfying RF exposure compliance.

Cet équipement est conforme aux limites d'exposition aux rayonnements FCC et ISED CNR-102 établies pour un environnement non contrôlé. Cet émetteur ne doit pas être installé ou utilisé en conjonction avec une autre antenne ou un autre émetteur. Afin d'éviter la possibilité de dépasser les limites d'exposition aux radiofréquences FCC et ISED, cet équipement doit être installé et utilisé avec une distance minimale de 20cm (8 pouces) entre l'antenne et votre corps pendant le fonctionnement normal. Les utilisateurs doivent suivre les instructions spécifiques d'utilisation pour respecter la conformité à l'exposition aux RF.

Ingress Protection

Device enclosure: IP67 and IP69k

RHoS

Restriction of Hazardous Substances (RoHS)¹

HERO

Hazard of Electromagnetic Radiation to Ordnance

Class I Division 2 (CID2)

IEC 60945

Maritime navigation and radio communication equipment and systems – general requirements

ATEX

Zone 2 – Hazardous Location Standards, II 3 G Ex ic IIB T6 Gc

Country Approval

¹European Union's (EU) Directive 2002/95/EEC "Restriction of Hazardous Substances" (RoHS) in Electronic and Electrical Equipment. For Chinese and European RoHS directives.

4. INSTALLATION INSTRUCTIONS

IMPORTANT

READ ALL INSTRUCTIONS CAREFULLY BEFORE INSTALLING. FAILURE TO DO SO MAY CAUSE PERSONAL INJURY OR DAMAGE TO PRODUCT AND/OR PROPERTY

- Review the product package and contents prior to beginning the installation. Take care when opening the packaging and removing items. If a return is needed, you will want to return the product in its original packaging if possible.
- This instruction guide is provided as a GENERAL installation guide; some assets vary dimensionally and may require additional steps.
- The manufacturer and / or distributors do not accept responsibility for third party charges, labor, and or third part replacement modifications. Some modifications may void the factory warranty.
- Exercise due diligence when installing this product. ORBCOMM does not accept any responsibility for asset damage or personal injury resulting from the installation of this product. Careless installation and operation can result in serious injury or equipment damage.
- All liability for installation and use rests with the owner / operator.
- Always make sure you have a clean, dry, and well-lit work area.
- Always ensure products are secure during disassembly and installation.
- Always take steps to protect yourself when drilling, cutting, and grinding because this may create flying particles that can cause injury.
- Thoroughly inspect the area to be drilled, on both sides of material, prior to modification, and relocate any objects that may become damaged.
- Always route electrical cables carefully. Avoid moving parts, parts that may become hot and rough, or sharp edges.
- Make sure to fully understand the product, its intended use, and operation prior to use.

CAUTION: While ORBCOMM provides mounting hardware to assist with installations, it is the responsibility of the installer to select the proper mounting hardware for the asset's surface material where an ORBCOMM device or accessory will be mounted.

4.1. Mount the SC 1000

4.1.1. Gather the Required Tools and Materials

The following are required for this installation:

- SC 1000 that includes:

0.196" (5 mm) drill bits	Alcohol based cleaner or wipes
0.196" (5 mm) drill stop	Scour pad
3/16" diameter x 3/16" - 1/4" grip range (4.8 mm x 4.8 to 6.4 mm) stainless rivets	
- Cordless drill and cordless rivet gun
- Tape measure
- Smartphone with the ORBCOMM Field Support Tool (FST) mobile app

4.1.2. Wake Up the Device

The SC 1000 ships in a non-transmitting mode. Prior to installation on an asset, you must wake up the device.

Note: Pairing the SC 1000 with an asset is not possible without waking up the SC 1000. Expose the SC 1000 to sunlight at the beginning of the day to ensure it has time to wake up and transmit critical information before you install.

1. Remove the SC 1000 from the packaging.
2. Bring the SC 1000 outside during daylight, with the solar panel facing the sky, for a minimum of 5 minutes.

Note: The SC 1000 solar panel does not charge with typical indoor office lighting.

Note: Generally, the SC 1000 is registered to the appropriate web application (platform) prior to shipping. Once the device wakes up, a message is sent to the web application.

4.1.3. Prepare for the Installation

1. Remove the SC 1000 from the packaging and record the mobile ID (unique alphanumeric serial number). This number is used to register the device.
2. Install the provided 0.196" (5.0 mm) drill bit into the drill.
3. Assemble the provided drill stop, located 3/8" (10 mm) from the end of the drill bit.



4.1.4. Prepare the Mounting Location

1. Determine the mounting location for the SC 1000 following the guidelines below:

CAUTION *Mount the device at least 20 cm (8 in.) away from humans.*

- Mount the device where it has a clear view of the sky/satellite. For a mobile installation, this means that it is preferable to install at the highest point on the asset where it has a clear view of the sky in all directions.
- Mount the device on a flat surface for mobile installations such that the elevation angle does not change with rotation.
- Mount the device so that the device's line-of-sight with the sky is clear of obstructions.
- Fasten the device securely so that it is not loose and does not move easily.
- Mount the device on a solid, stable surface. If necessary, use a mounting bracket (not supplied) or other suitable support.
- Ensure that any paint above the terminal is non-metallic and non-metallic flake if the installation is under fiberglass or composite wind fairings.
- Mount the device on the driver's side of the vehicle, if possible, when there is a possibility of strikes by overhanging tree branches.
- Mount the device on a surface that does not get hotter than the maximum operating temperature (+70°C/158°F). If the surface may get hotter, mount the device with a thermal barrier between it and the mounting surface.

- DO NOT mount the device close to other electrical equipment due to possible radiated and/or conducted electromagnetic interference.
- DO NOT mount the device close to radar or other communications antennas. Use the following guidelines:
 - > 1 m from VHF/UHF antenna
 - > 3 m from loop antenna
 - > 4 m from MF/HF antenna
 - > 5 m from other satellite antennas
 - Not within a radar beam
- DO NOT mount the device where water may build-up or collect.
- DO NOT mount the device close to an exhaust pipe due to the excessive heat and the potential for the exhaust pipe causing satellite blockage.
- DO NOT mount the device close to air horns or any tractor roof hardware (for example, emergency lights) that could interfere with satellite communications.
- DO NOT install the device inside a truck under the roof liner.

2. Mark the location of the corners of the SC 1000 on the asset. This is recommended for accurate prepping the asset surface.

4.1.5. Tape the SC 1000 to the Asset

1. Remove the tape liners from the back of the SC 1000 (two locations).

CAUTION: DO NOT touch the tape.

2. Immediately place the SC 1000 onto the asset, being careful to place it on the previously marked corner locations from an earlier step.
3. Press firmly on the entire top surface of the SC 1000 (7 kg (15 pounds) for 10 seconds) to bond the tape to the asset.

4.1.6. Install the Rivets

CAUTION: DO NOT drill holes in placarded assets that are loaded.

1. Drill through the two (2) holes with the provided 0.196" (5 mm) drill bit.



2. Assemble the two (2) provided rivets through the drilled holes and install them using a rivet gun.

4.1.7. Associate the Device

Use the ORBCOMM Field Support Tool (FST) mobile app to take a picture of the SC 1000, including the asset ID and the SC 1000 serial number label.