

Severn Board

User Manual

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Product and Regulatory Information

Disclaimer and Warnings

Read this user manual before attempting to install the device. Failure to observe recommendations included in this manual may be dangerous or cause a violation of the law. LAIER will not be held responsible for any loss or damage resulting from not following the instructions of this user manual.

The product must not be dismantled or modified in any way, unless specified by LAIER. The safety of this product is only guaranteed when it is used in accordance with its purpose.

The product must not be installed close to a heat source or in damp conditions.

When the board is open, do not carry out any operations other than the ones set out in this document.

Risk of explosion if the battery is replaced by an incorrect type. The battery should be removed from the device if it is not to be used for an extended period. Otherwise, the battery might leak and damage the device. Never leave a discharged battery in the battery compartment.

Maintenance should only be carried out by qualified personnel.

All rights to this manual are the exclusive property of LAIER. All rights reserved. LAIER makes no warranties based on the accuracy or completeness of the contents of this user manual and reserves the right to make changes to specifications and product descriptions at any time without notice.



The Severn Board produces non-ionising radiation, please keep your distance if this might cause you harm.



There is a risk of explosion if the battery is replaced by an incorrect type. Contact LAIER for more information about the battery needed.

Disposal

The product, including board and sensors, must not be disposed with household waste or industrial waste. Please contact LAIER to replace the product if you have subscribed to the HaaS. If you haven't, please take it to a collection point designated for the recycling of electrical and electronic appliances. The board contains a battery, which must be disposed of separately.



Technical Support

Our website contains a lot of useful information. If you have any technical problems, contact LAIER at info@laiier.io, where your issue will be processed as soon as possible.

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.

Note: 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 to an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

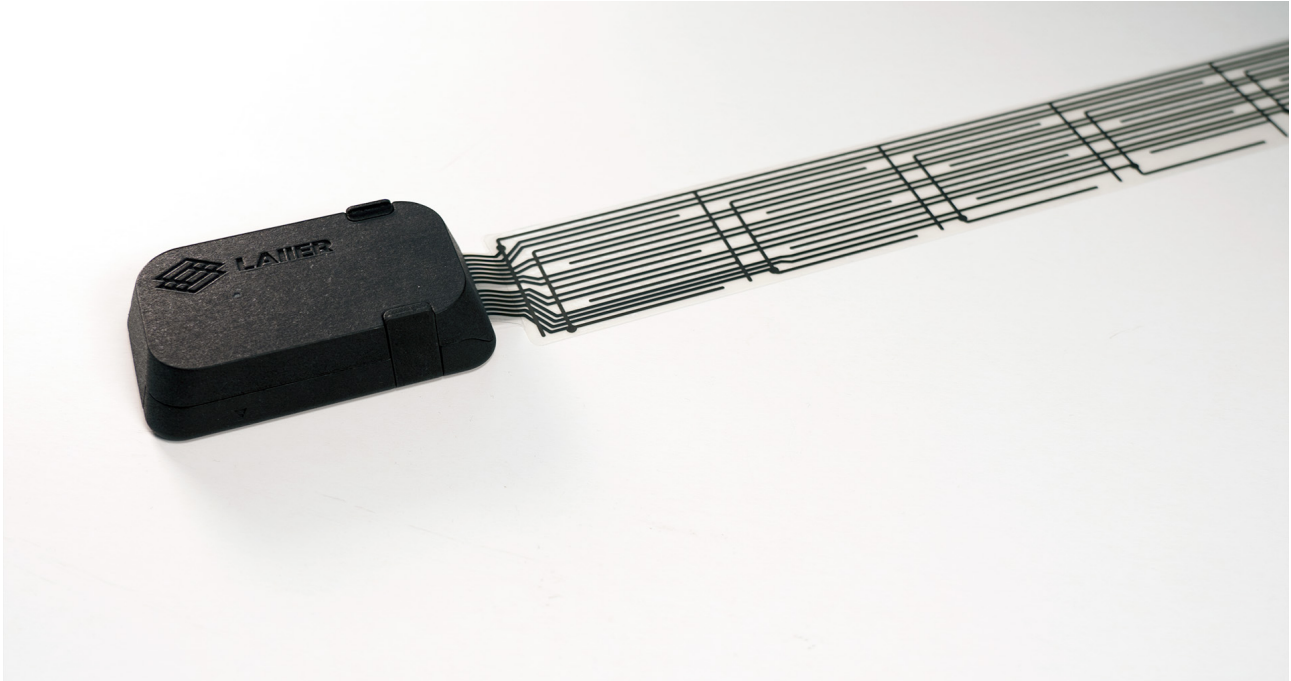
Changes or modifications not expressly approved by LAIIER could void the user's authority to operate the equipment.

ISED Compliance Statement

This device complies with ISED Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'ISDE 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'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Introduction



The Severn Board, combined with Severn Sensors, forms LAIER's Severn WLD solution: a water leak detecting sensor. This solution is able to detect small amounts of liquid, wirelessly transmitting this data to the LAIER Cloud™ via LoRaWAN.

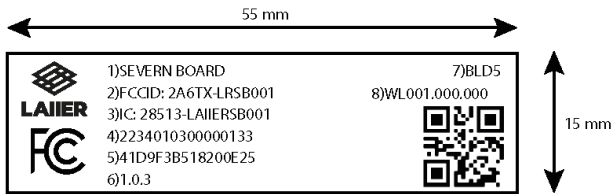
The Severn Board is powered with a single AA battery. Once the battery is inserted, the unit is controlled using a magnet that triggers a magnet sensor and the board's status is indicated using an on-board RGB LED. At power-on, the device connects to a LoRaWAN network via OTAA authentication and then is stepped through signal strength indication and self-test using a magnet swipe gesture to advance each stage. Once self-test is passed the unit enters a low-power state, waking once every minute to measure a number of resistances on the Severn Sensor. LoRaWAN messages are sent to determine signal strength and to communicate the self-test result to the gateway. If the resistances on the printed sensor breach particular thresholds, a LoRaWAN message is sent. If a given period has elapsed with no LoRaWAN messages having been sent, a message is sent to indicate that the unit is still operating. Swiping the magnet across the unit when it is running puts it back into self-test mode. After the self-test ran, another LoRaWAN message is sent, allowing the end user to check that the unit is operating correctly if required.

Specifications

Board Dimensions	95 × 58 × 24mm
Board Weight	82g
Operating Temperature Range	-30°C to 60°C
Operating Humidity Range	< 90%RH
Sensitivity	Maximum resolution of 0.1ml of water
Activation Method	Magnet
Wireless Communication Protocol	LoRaWAN
LoRaWAN Regions	US and Europe
LoRaWAN Version	1.0.3
Read Range	Up to 10km
Antenna Type	Built-in antenna
Available Frequency	US915, AU915, EU868 (configured before shipment)
Battery Type	AA Li-SOCl ₂ cell
Operating Voltage	3.6V
Peak Current Drawn	105mA
Active Battery Lifetime	18 months
Housing	Nylon, splash-proof, not currently IP rated
Mounting	Self-adhesive
Sensor Connector	FFC

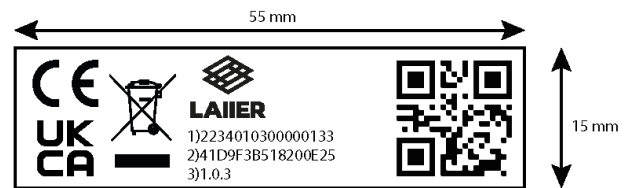
Label Description

US/Canada



- 1) PRODUCT MARKETING NAME (PMN)
- 2) FCCID
- 3) IC
- 4) SERIAL NUMBER
- 5) DEV EUI
- 6) LORAWAN VERSION
- 7) Hardware Version Identification Number (HVIN)
- 8) Firmware Version Identification Number (FVIN)

Europe



- 1) SERIAL NUMBER
- 2) DEV EUI
- 3) LORAWAN VERSION

Installation

1. First, open the board by unlatching the two levers on the side.



2. On the side of the board you will find an FFC connector. Lift up the latch of the connector up and slide in a Severn Sensor, with the contacts facing upwards, inside the FFC connector. Once inside, close the FFC connector again by pushing down the latch. Give a small tug to the sensor, it should be securely attached and not come loose. If it does, open the FFC connector and try to move the sensor further in.

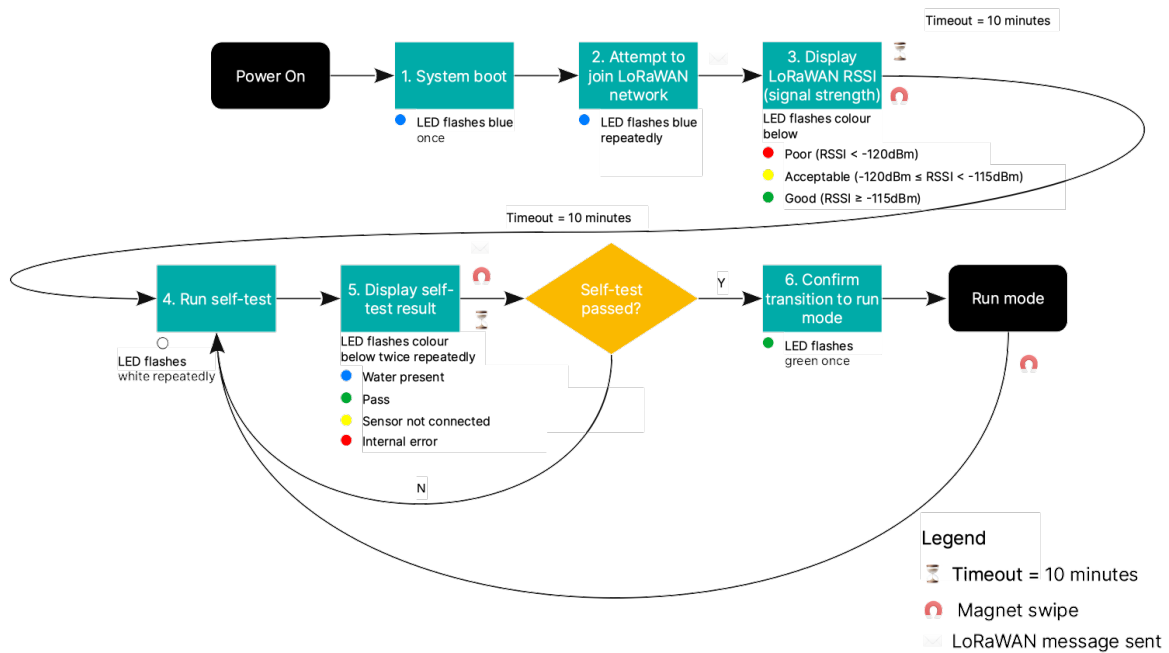


3. To power the board, remove the battery safety pull tab between the Li-SOCl₂ cell battery and the battery holder inside the board. The board's LED should light up in blue.
4. Place the top of the enclosure back and close the board again.



You can now attach the Severn Board and Severn Sensor to the surface that you want to monitor for leaks. Simply peel away the protective layer of the 3M adhesive from the sensor and the board and stick them down. Make sure to clean the surface you want to attach the sensor too from any debris and dirt, as the sensor won't adhere well otherwise; we recommend cleaning the surface with an IPA.

Board Behaviour at Start-Up and Self-Test



1. Upon powering the board, the board's LED will flash blue for one second.
2. It will then attempt to connect to the LoRaWAN network, with the LED now flashing blue continuously.
3. Once the board has successfully joined the LoRaWAN network, the LED will flash red, yellow or green, depending on the strength of the network.
4. To activate the board into running self-tests, you now have to swipe with a magnet on the side of the board. Alternatively, you can also wait 10 minutes, at which point the board will enter the self-test mode automatically.

5. During the self test, the LED turns white. Once it has ran the self-test, the LED will display one of the following results, with the result also being sent as a message to the LoRaWAN network:

Blue	Water is present on the sensor
Green	Board has passed the self test
Yellow	Sensor isn't connected correctly
Red	Internal error

7. If the LED flashes yellow, check that the Severn Sensor is correctly attached to the board. You don't need to remove the battery, you can simply open the FCC connector switch and take the sensor out and push it in again. If the LED flashes red, please contact us at info@laiier.io.

6. To then set the board into run mode you either swipe the magnet again on the side of the board, or wait 10 minutes. The LED flashes green for a second and then the board is set to run mode.

When the board is set into run mode, it will check the status of the sensor every minute. Each sensor is split into 12 electrodes and if no water is present, then the board sends a message every hour to state that everything is okay.

If the board detects that three adjacent sensor electrodes report a change past a pre-defined threshold within a one minute period, then it classifies this as a leak occurring. This message is sent every 10 minutes until the leak has been fixed and the board reset.

Document Information

Title	Severn Board User Manual
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Version History

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V1.0	Creation	2022 October 14
V1.1	Updated legal section	2022 October 24



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