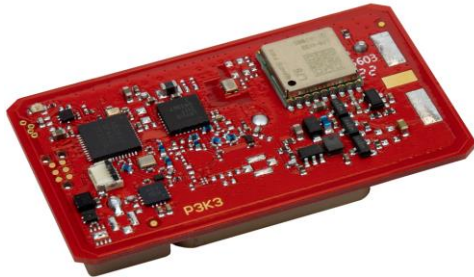


## KCS TraceME TM-4202 / P3K3

LoRa-based asset management module



The TM-4202 / P3K3 is a product line member of KCS' advanced TraceME track and trace modules. It is designed for tracking and tracing a variety of IoT assets, targeting industrial, smart cities, transportation and logistics.

The module is equipped with a non-rechargeable integrated battery. It offers a range of (optional) technologies for localization: GNSS, Wi-Fi sniffing, beacon technology and (where available) LoRa localization.

### Key Features

- LoRa® technology
  - EU-868MHz.
  - Up to 60km line of sight at 25mW and with integrated antenna.
- GNSS coverage, internal antenna
  - Glonass/GPS/Galileo
  - GPS (\*)
- Integrated 2.45GHz. radio for special functions and peripherals. (\*)
  - Long range, over 1 km range, line of sight.
  - BLE 4.0 (\*)
  - Internal antenna
- Wi-Fi sniffing (\*)
- NFC for special functions and peripherals.
- Very small, only 50 x 28.8 x 16mm, with default 2000mAh battery
- Lightweight: 35.4 grams for a fully equipped PCB, incl. battery.
- Standby battery lifespan of more than 10 years.
- Onboard sensors:
  - 3D accelerometer (up to 16g)
- Optional sensors: (\*)
  - Temperature sensor ( $\pm 0.3^{\circ}\text{C}$ )
  - Humidity/Temp sensor ( $\pm 1.8\% \text{RH} / \pm 0.2^{\circ}\text{C}$ )
- 1 LED for user interaction. (\*)
- IP68 rated enclosure (\*)
- Tamper contact (\*)
- Wide operating range:  $-20^{\circ}\text{C} \dots +60^{\circ}\text{C}$   
Extended temperature on request.
- Multiple watchdog levels for maximum stability.
- Event based free configurable module to fit any job.
- Remote configurable to fit any job (both firmware and configuration files can be updated over the air).
- Supports integration into third party networks.

(\*) Optional, please contact sales for more details.

## Applications

- Object protection, more than 10 years of standby on a single lithium battery.
- Indoor and outdoor asset management
- Logistics, bicycle tracking

## Product Summary

The KCS TraceME TM-4202 is a LoRa-based track and trace module targeting for asset localization.

Equipped with GNSS, optional beacon technology (RF and BLE), optional Wi-Fi sniffing and (where available) LoRa localization the TM-4202 provides excellent indoor and outdoor geolocation.

### **GNSS**

Using the GNSS orbit satellite network, the geographical position is determined.

### **Wi-Fi sniffing (\*)**

The module listens to the Wi-Fi access points available in the vicinity of the device, and extracts MAC addresses and signal strength of those access points. Based upon that information, the location can be determined (heatmap or localization service provider).

### **LoRa localization**

The localization functionality in LoRa based networks provides outdoor geolocation accuracy for static devices of typically 50 meters and can be further improved (both indoor and outdoor) up to 1.5 meters by on-site beacon technology (RF and BLE).

### **Beacon technology (\*)**

The module listens to on-site (RF/BLE) beacons. From the beacon location and beacon ID, the position can be determined using triangulation or beacon location.

### **FSK (\*)**

FSK (Frequency Shift Keying) is being used to transmit its own location or to receive information from another FSK beacon. When used for listening to a specific FSK beacon range, the position of the device can be determined measuring the signal strength of 1-way FSK protocol. A special FSK-sniffer with OLED display is available, please contact sales for details.

The TM-4202 contains an optional flexible tamper contact. By using the original enclosure, the tamper contact will stick out of the resin. The enclosure and tamper contact are being glued to the asset. When the enclosure is (fraudly) removed from the protected asset, the tamper contact will be ripped apart, resulting in a tamper alert.

The module can report the total number of rotations, in both directions. When attached for example to a cable-reel the remaining total length of the cable can be calculated.

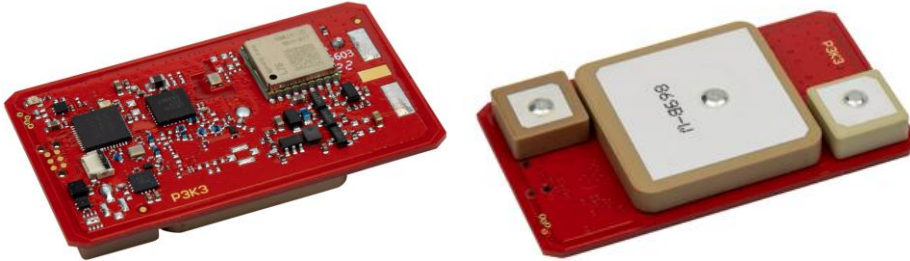
With a minimal size of 50 x 28.8 mm, weight of only 35.4 grams and a battery lifespan of more than 10 years, the module offers endless OEM integration possibilities. The functionality of the module can be remotely (OTA) programmed to fit any job. From basic/general functionality to advanced/low-level application specific detailed functionality.

All of the necessary server-side scripts to process and store data from these units are available for registered distributors and resellers. If you do not want to host data and maps yourself, you can use the hosting services of one of our partner companies.

(\*) Optional, please contact sales for more details.

## Ordering information

- TM-4202L Basic version (LoRa, GNSS, NFC)
- (\*) Optional, please contact sales for more details.



## Enclosure (\*)



The picture above is an example of an available IP68 enclosure.

## Battery



The module is equipped with a non-rechargeable battery.


- |  |                 |
|--|-----------------|
| • Rated voltage                          | 3.0 Volt        |
| • Nominal capacity                       | 2000 mAh        |
| • Typical weight                         | 14 gram         |
| • Operating temperature                  | -20 °C ~ +60 °C |
| • Extended temperature range on request. |                 |
| • Storage temperature                    | -5°C ~ +30 °C   |

## Typical power usage

Depending upon settings, the module can work up to 10 years on a full battery.

## Specifications KCS TraceME TM-4202


### Data communication

LoRa	Semtech LR1110 transceiver
Frequency	EU-868MHz.
Protocol	LoRaWAN 1.0.2 and custom LoRa protocol 
Transmitting power	up to +15 dBm
Sensitivity	-137 dBm

### Beacon functionality (\*)

RF 2.4GHz.	Nordic nRF52810
Frequency	2.45 GHz.
Protocol	BLE 4.0 (*) and proprietary 2.4 GHz. protocol
Transmitting power	up to +20 dBm (with on-board amplifier)
Sensitivity	-96 dBm (BLE)

### Navigation

GPS Receiver	Quectel L76 GNSS (Glonass + GPS + Galileo) module, optional L70 GPS module 	
Frequency	GPS L1 1575.42 MHz. C/A Code, 48 search channels Glonass L1 1598.0625 ~ 1605.375 C/A Code	
Sensitivity	Acquisition	-148 dBm (typical)
	Reacquisition	-160 dBm (typical)
	Tracking	-165 dBm (typical)
Horizontal Position Accuracy	<2.5 m CEP	

### Electrical

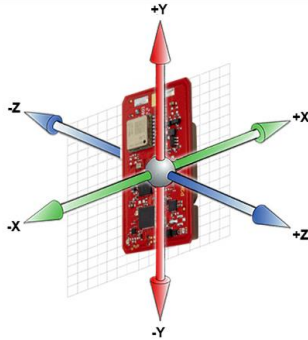
Power supply	Internal non-rechargeable Lithium battery, 2000mAh
Typical power consumption	2.4GHz peak current: 100mA
	LoRa peak current: 50mA
	1uA standby, timer and watchdogs active, no transmissions, NFC active

### Recommended environmental conditions

Operating Temperature	-20°C to +60°C (OEM) Extended temperature on request.
Humidity	10% to 90% (OEM) 100% for IP68 (module fully encapsulated in enclosure)
Altitude	up to 2000 meters

## Onboard sensors

### 3D accelerometer (\*)



The module contains an optional 3D accelerometer (up to 16g), which can be used for a variety of custom specific (M2M) applications. Sensitivity can be changed OTA from a very small vibration up to 16g. Accelerometers are useful for measuring movement, speed, g-forces and vibration of the object. The accelerometer and advanced embedded firmware enables a very low-power battery solution.

### Temperature sensor (\*)

The module contains an optional temperature sensor ( $\pm 0.3^{\circ}\text{C}$ ), which can be used for example to monitor and control any temperature sensitive equipment.

### Humidity/Temp sensor (\*)

The module contains an optional humidity/temp sensor ( $\pm 1.8\% \text{RH}$  and  $\pm 0.2^{\circ}\text{C}$ ). The humidity represents the amount of water vapor held in the air.

### Tamper / Sabotage detection (\*)

The module contains an optional flexible tamper contact. By using the original enclosure, the tamper contact will stick out of the resin. The enclosure and tamper contact are being glued to the asset. When the enclosure is (fraudly) removed from the protected asset, the tamper contact will be ripped apart, resulting in a tamper alert, immediately initiating LoRa and FSK transmissions.

## About KCS BV

KCS BV, founded in The Netherlands in 1984, develops and manufactures electronics in-house for industrial applications, medical purposes, broad-casting solutions, etc.

KCS is ISO 9001:2015 and ISO 14001:2015 certified.



## LoRa Alliance Member™

KCS is a LoRa Alliance member since 2016.

## Support

Visit our support page at: [www.trace.me](http://www.trace.me)

## Sales

Contact us by email: [Trade@trace.me](mailto:Trade@trace.me)

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