KCS TraceME TM-3201 / P3D2
LTE-M / NB-IoT / LoRa / RF-module

KCS' TraceME TM-3201/P3D2 is designed for tracking and tracing a variety of IoT assets, targeting industrial, transportation and logistics.

The rugged compact IP68 enclosure, global connectivity by cellular networks, excellent positioning performance and low power consumption makes the TM-3201 the best choice for a wide range of M2M/IoT applications, such as container tracking and asset management.

Key Features

- Excellent national telecom coverage
    - LTE Cat M1 / NB-2 / EGPRS
    - Nano SIM socket
    - SIM-on-chip   (*)
- GNSS coverage
- Wi-Fi sniffing   (*)
- LoRa® technology, EU-868MHz   (*)
- Sigfox, RC1, class 0u – Europe and Middle East   (under development)
- 2.45GHz. radio for special functions and peripherals.   (*)
    - Short range, up to 30m
- NFC for special functions and peripherals.
- Optional sensors: (*)
    - 3D accelerometer   (up to 16g)
    - Humidity/Temp sensor (±1.8%RH/±0.2°C)
    - Tamper contact
- Wireless power charging   (*)
- Solar power charging   (*)

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

- Position storage in memory:
    - up to 4,000 log entries
    - up to 60,000 log entries   (*)
- Compact size, 52.2 x 40.0mm
- Lightweight: 12 grams for a fully equipped PCB, (excl. battery)
- Rugged and IP68 rated enclosure (138 x 72 x 22mm)
- Standby battery lifespan up to 10 years.
- 3 LED for user interaction
- Operating range: -20˚C … +70˚C (depending on options)
- Magnetic installation   (*)
- Remote configurable to fit any job (both firmware and configuration files can be updated/patched over the air).
- Supports integration into third party networks.

Applications

- Container tracking.
- Remote control and diagnostics.

Product Summary

The KCS TraceME TM-3201 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-3201 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 module can be equipped with different optional features: LTE Cat-M1 / NB-IoT modem, GNSS, NFC, Sigfox, LoRa including Wi-Fi positioning, Bluetooth Smart (BLE) and proprietary RF, acceleration-, temperature/humidity sensor and optional external I2C sensor interfacing. The module can be fully customized dependent of the application.

The module provides reliable, optimized connectivity and coverage for the next generation 4G LTE Cat-M1 and NB-IoT networks and offers seamless fall back to 2G networks. In areas without network coverage, position-data and events are stored in memory (default up to 4,000 positions, optional up to 60,000 positions). As soon as communication is restored, all information can be transmitted.

The TM-3201 contains an light sensor for tamper functionality. When the enclosure is (fraudly) removed from the protected asset, the module will send a tamper notification.

The optional magnet installation saves labor cost.
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.

Ordering information

The KCS TraceME TM-3201 can be equipped with different optional technologies for traceability. It can be fully customized dependent of the application. Please contact sales for more details.

Enclosure

IP68

- Dimensions: 138 x 72 x 22mm.
- IP grade: IP68
- Installation: Screws / magnet (*)

Battery
Depending on the application, different battery types and capacities might be required, which can be provided separately. By default, the module is equipped with a non-rechargeable battery.

- Rated voltage   3.6 Volt
- Nominal capacity   8000 mAh, 5500mAh/3000mAh on request.
- Typical weight   79 gram

(*) The module can also be used with rechargeable LiPo battery including wireless and solar charging functionality. Please contact sales for more details.

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

Specifications KCS TraceME TM-3201

Data communication (*)

Modem	Quectel BG95-M3 LTE Cat M1 / NB-2, GSM Module, all global certifications and R&TTE directives.	
Frequency bands	GSM/GPRS: 850/900/1800/1900 MHz LTE:　B1-5, 8, 12, 13, 14 (Cat M1) 18, 19, 20, 25, 26, 27 (Cat M1), 28	

LoRa	Semtech LR1110 transceiver	
Frequency	EU-868 MHz.	
Protocol	LoRaWAN 1.0.2 and custom LoRa protocol	
Protocol	Sigfox (under development)	
Transmitting power	up to +15 dBm	
Sensitivity	-141 dBm　(LoRa, RxBoosted BWL=125kHz, SF=12) -94 dBm　　(Wi-Fi 802.11 b, DSSS)	

Beacon functionality (*)

RF 2.4GHz.	Nordic nRF52832	
Frequency	2.45 GHz.	
Protocol	BLE 4.0 (*) and proprietary 2.4 GHz. protocol	
Transmitting power	up to +4 dBm	
Sensitivity	-96 dBm (BLE)	

Navigation

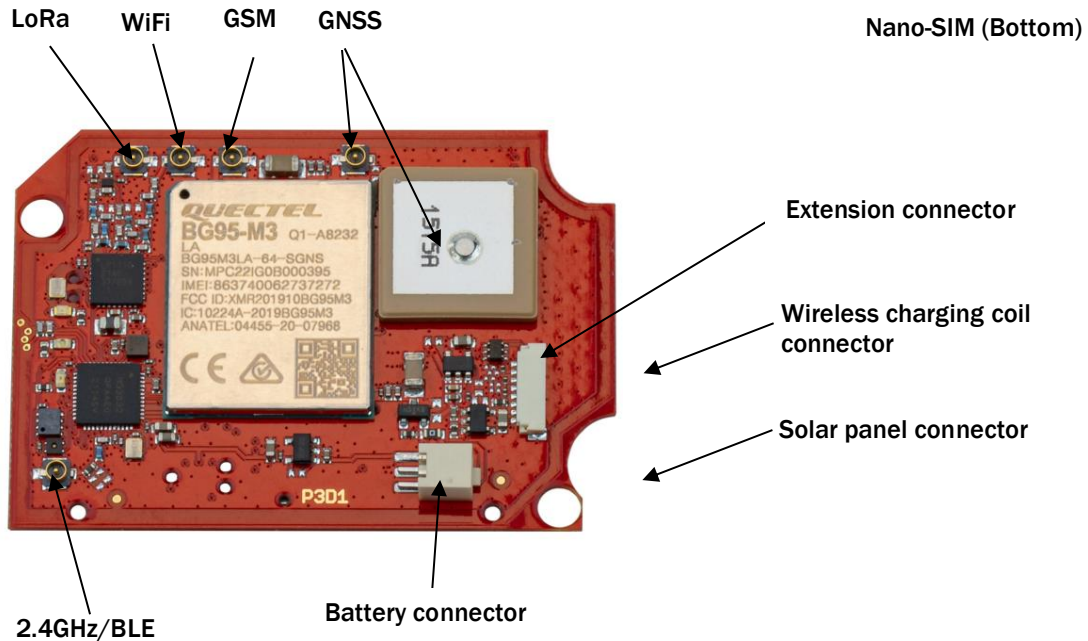| GPS Receiver	Quectel L76 GNSS (Glonass + GPS + Galileo) module	
Frequency	GPS L1 1575.42 MHz. C/A Code, 48 search channels Glonass L1 1598.0625 ~ 1605.375 C/A Code	
Sensitivity	Acquisition	-148 dBm (typical)
	Reacquisition	-160 dBm (typical)
	Tracking	-165 dBm (typical)
Horizontal Position Accuracy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

Electrical

Power supply	Internal non-rechargeable Lithium battery, 8000mAh
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 +70°C (depending on options)

External Connections

LoRa   WiFi   GSM   GNSS

Nano-SIM (Bottom)

Extension connector

Wireless charging coil connector

Solar panel connector

2.4GHz/BLE

Battery connector

Battery connector

Pin	Description
1	3.6V Non-rechargeable battery (+) connection
2	Ground

Connector manufacturer: Molex
Description: 1.50mm pitch Pico-SPOX pcb header, 2 circuits
Partnumber PCB connector: 874380243
Mates with cable connector: 874390200
Partnumber crimp serie: 87421

Extension connector

Pin	Signal	Type	Description
1	VCC	VCC	Internal use only.
2	PWR-OUT	O	+3.0VDC power output for external I2C sensors
3	Serial IN	I	Serial input or digital input (2..31V for active high) ~ 50k pulldown
4	Serial OUT	O	Serial or digital output, open collector (max 31V/10mA/100mW)
5	I/O-1	I/O	Digital I/O (0…+3V)
6	SCL	O	I2C clock
7	SDA	O	I2C data
8	GND	GND	GND for charge and I/O

Connector manufacturer: JST
Partnumber PCB connector: SM08B-SURS-TF(LF)(SN)
Partnumber cable connector: 08SUR-32S
Partnumber crimp contact: SSUH-003T-P0.15

Wireless charging coil connector

 TBD

This connector is for internal use only. Do not use.
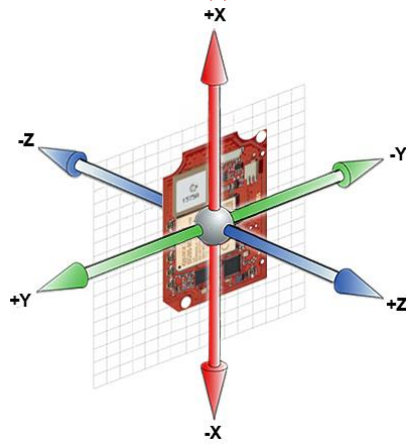
Solar panel connector

 TBD

This connector is for internal use only. Do not use.

Onboard sensors

3D accelerometer (*)

The module contains a 3D accelerometer (up to 16g), which can be used for a variety of custom specific (M2M) applications. 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.

Humidity/Temp sensor (*)

The module contains an optional humidity/temp sensor (±1.8%RH and ±0.2°C). The humidity represents the amount of water vapor held in the air.

Tamper / Sabotage detection (*)

The module contains an optional tamper contact. By using the original enclosure, the internal light sensor acts as an tamper contact. 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.

KCS is a LoRa Alliance member since 2016.

Support

Visit our support page at: www.trace.me

Sales

Contact us by email: Trade@trace.me

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