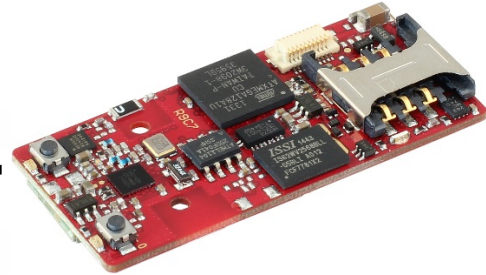
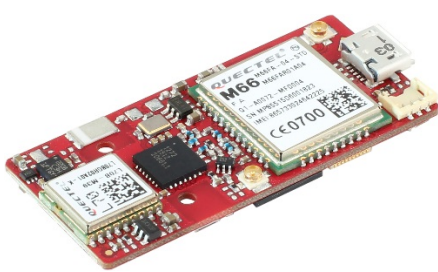


## KCS TraceME TM-202 / R9C7 GPS / GPRS / RF module / OEM-version



The TM-202 / R9C7 is a high-end product line member of KCS' advanced TraceME track and trace modules. The TM-202 is targeted for remotely tracking and tracing a variety of objects, even livestock, and for personal use.

The TM-202 offers excellent quad-band GSM/GPRS coverage, long range RF coverage and is equipped with a low-power GPS receiver. The module is equipped with multiple on-board sensors, low-level I/O-connectivity and a solar (\*) rechargeable integrated battery. It offers accurate location based position data to be connected to any existing worldwide server application.

### Key Features

- National telecom & worldwide satellite coverage
  - Quad-band GSM/GPRS
  - GPS
  - Glonass/GPS (\*)
- Very small, only 46 x 21 x 6.5mm
- Lightweight: 6.4 grams for a fully equipped PCB
- Micro SIM socket
- SIM on chip (\*)
- Standby battery lifespan of more than 10 years.
- OEM version
- Excellent GSM accuracy, external antenna.
- Excellent GPS accuracy, internal antenna.
- Integrated 2.45GHz. radio for special functions and peripherals.
  - Short range, up to 30m (\*)
  - Long range, over 1 km range, line of sight
- LoRa® technology, up to 10km, line of sight
- Excellent indoor and outdoor performance with accuracy up to 1.5m
- 3 LEDs (Red/Green/Yellow) and 2 switches for user interaction.
- Onboard sensors:
  - Temperature sensor ( $\pm 0.5^{\circ}\text{C}$ )
  - 3D accelerometer up to 16g.
  - Humidity sensor (\*)
- Wide operating range:  $-20^{\circ}\text{C} \dots +85^{\circ}\text{C}$
- Multiple watchdog levels for maximum stability.
- Solar cell powered (\*)
- Versatile interfacing:
  - Digital and analog I/O
  - Serial, 3V
  - iButton™ / 1-Wire™
- Event based free configurable module to fit any job; 300+ different events, up to 4,000 geozones.
- Remote maintenance. Both firmware and configuration files can be updated over the air.
- Audio with microphone and embedded class AB speaker amplifier. (\*)
- Runs local user scripts via .src files.
- User definable SMS commands.
- Supports integration into third party networks.

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

## Applications

- Vehicle and boat tracking
- Object protection, up to 10 years of standby on a single lithium battery.
- Logistics, M2M
- Animal tracking, asset monitoring
- Security and surveillance
- Remote control and diagnostics
- Anti-theft

## Product Summary

Equipped with a state-of-the-art GPS receiver, the KCS TraceME TM-202 / R9C7 module provides reliable and accurate navigational data.

All communication is handled effectively by a GSM/GPRS modem (QUAD band version) through GPRS or SMS. Data communication can also be done by LoRa which eliminates traditional telecom costs. In areas without network coverage, position-data and events are stored in memory (up to 120,000 positions). As soon as communication is restored, all information can be transmitted.

The full version module (TM-202F) is equipped with different technologies for traceability (e.g. GPS/Glonass, GPRS/SMS, LoRa, Bluetooth LE, ANT/ANT+ and proprietary RF), which can all be combined dependent of the application and local mobile network coverage. User specific low-budget basic versions are available on request.

The combined LoRa and 2.4GHz. RF technologies offers tracing of the module over a wide area up to 10km. The rough tracing from 10km down to 300 meters is done by LoRa, while the short-range tracing is done by the proprietary RF-technique, which offers excellent indoor and outdoor tracing with an accuracy up to 1.5 meters.

An intelligent 'Listen before talk' algorithm makes it practically impossible to locate the module which secures the valuable vehicle or asset. It enables stolen object recovery and thereby offers insurance premium reduction possibilities.

Multiple on-board sensors (temperature, humidity (\*) and acceleration) as well as LEDs, I/O-functionality, pushbuttons and two-way audio enable the integration of TraceME into a variety of custom specific (M2M) applications. With a minimal size of 46 x 21 mm, weight of only 6.4 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 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-202SF Full version (Long-range RF, optional Solar-charger)
- TM-202L Basic version (TM-202F without: audio)
- (\*) Optional, please contact sales for more details

## Specifications KCS TraceME TM-202

### Data communication

GPRS Modem	Quectel M66 QUAD band, global certifications and R&TTE directives.
Power saving	Typical power consumption in sleep mode: 1.3mA @ GSM, DRX = 5 1.2 mA @ GSM, DRX = 9
Frequency bands	<ul style="list-style-type: none"> <li>• Quad-band GSM850, GSM900, DCS1800, PCS1900</li> <li>• Frequency bands can be set by AT command</li> <li>• Compliant with GSM Phase 2/2+</li> </ul>
GSM Class	Small MS
Transmitting power	<ul style="list-style-type: none"> <li>• Class 4 (2 W) at GSM850 and GSM900</li> <li>• Class 1 (1 W) at DCS1800 and PCS1900</li> </ul>
GPRS connectivity	<ul style="list-style-type: none"> <li>• GPRS multi-slot class 1~12 (configurable)</li> <li>• GPRS mobile station class B</li> </ul>

### Data communication

LoRa	Semtech SX1272 transceiver
Frequency	868/915 MHz
Protocol	LoRaWAN 1.0 and custom LoRa protocol
Transmitting power	up to +20 dBm
Sensitivity	-137 dBm

### Navigation

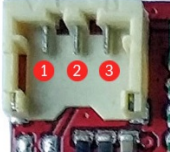
GPS Receiver	Quectel L70 GPS module, optional L76 GNSS (Glonass + GPS) module	
Frequency	GPS L1 1575.42 MHz. C/A Code, 48 search channels Glonass L1 1598.0625 ~ 1605.375 C/A Code	
Sensitivity	Acquisition	-148 dBm (typical)
	Reacquisition	-160 dBm (typical)
	Tracking	-165 dBm (typical)
Horizontal Position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

### Electrical

Power supply	Internal Lithium primary cell
	Optional external +5VDC $\pm 10\%$ (micro USB-connector)
Charging Current (LiPolymer)	450 mA. Observing 0...+45 °C safety range for LiPolymer.
Typical power consumption	30 mA, GPS full power tracking, open GPRS session
	6 mA, using AlwaysLocate™
	100 mA BLE/LoRa transmissions
	7 uA, GPS/GPRS/sensors power down, 4 inputs and 1 timer active

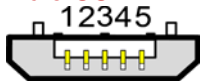
## External Connections

### Power connector



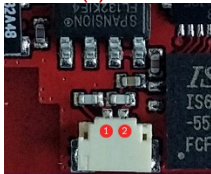
Pin	Description
1	3.4 - 4.5V Battery (+) connection
2	Ground
3	Temperature sensor / Optional: Solar cell 5V

### Micro-USB



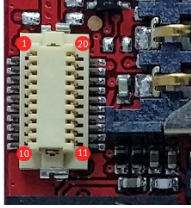
Pin	Signal	Type	Description
1	USB VCC	VCC	+4.5 ... +5.5 VDC Charge input, max 600mA
2	Serial IN	I	Serial input or digital input (2..31V for active high) ~ 50k pulldown
3	Serial OUT	O	Serial or digital output, open collector (max 31V/10mA/100mW)
4	Optional (*)	I/O	Optional: Analog input or digital I/O
5	GND	GND	GND for charge and I/O

### Audio (\*)



Pin	Signal	Type	Description
1	N	Speaker output	Class AB, max 800mW, negative speaker output
2	P	Speaker output	Class AB, max 800mW, positive speaker output

## 20 pins extension header



Pin	Description	Description	Pin
1	3.4 - 4.5V Board Voltage (direct battery connection, not switched); max 300mA	3.4 - 4.5V Board Voltage (switched)	20
2	general IO / TxD 4 open collector , max 30V @ 5mA	3.4 - 4.5V Board Voltage (switched)	19
3	general IO / RxD 4 , logic 0 if 0-0.4 V, logic 1 if 2..30V	Battery temperature sensor	18
4	Red LED	Analog IN 1 (0..1V or 0..30mV, firmware dependant)	17
5	Ground	Ground	16
6	general IO / TxD 5 (2V8 level)	Ground	15
7	general IO / RxD 5 (2V8 level)	4.5 - 5.5V input (parallel to USB power)	14
8	Ground	4.5 - 5.5V input (parallel to USB power)	13
9	Ground	Ground	12
10	Serial programming, PDI-data Do not connect	Serial programming, PDI-clock Do not connect	11

## External antennas (\*\*)



Pin	Description
1	GPRS-antenna
2	LoRa-antenna

(\*\*) Please contact sales for more details.

## 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.

## 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)

## Final notes & certification

We certify that Kolff Computer Supplies BV, Dordrecht, The Netherlands does not make any hardware or IMEI modifications to the QUECTEL devices as used in the TraceME track & trace device. All software modifications are restricted to official firmware upgrades as provided by Quectel Wireless Solutions Co., Ltd..

KCS is ISO 9001:2008 and ISO 14001 certified since 1999.

### WARNING:

- The device should be turned off in vicinity of petrol pumps, chemical, flammable or hazardous environments where ignition of flammable atmospheres is possible.
- The GSM unit and antenna shall be operated at a distance greater than 20 cm from the human body.
- The device is to be operated in accordance with the user instructions or manufactured recommendations.

## Disclaimer

KCS BV reserves the right to make changes without further notice to any products herein to improve reliability, function or design. KCS BV does not assume any liability arising out of the application or use of any product or circuit described herein; neither does it convey any license under its patent rights, nor the rights of others.

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