

## KCS TraceME TM-187 / R9A11 GPS / LTE-M / NB-IoT module



The TM-187 / R9A11 is a high-end product line member of KCS' advanced TraceME track and trace modules. The TM-187 is targeted for remotely tracing and controlling vehicles, vessels and other powered equipment and machinery.

The TM-187 is equipped with an intelligent RF-location based positioning solution, which provides locating the vehicle or object quickly and accurate in scenarios where traditional GPS systems are insufficient. It offers multiple connectivity options and server connections.

### Key Features

- National telecom & worldwide satellite (GNSS) coverage
  - Quad-band GSM/GPRS
  - UMTS/HSPA (\*)
  - LTE-M / NB-IoT (\*)
  - GPS (\*)
  - Glonass/GPS/Galileo
- Micro SIM socket
- Low power consumption, down to 100uA.
- Robust aluminum enclosure 90 x 67 x 20mm.
- 4 LEDs for user interaction.
- Excellent Glonass/GPS/Galileo accuracy, external antenna.
- Integrated 2.45GHz. radio for special functions and peripherals.
  - Long range, over 1 km range, line of sight
- LoRa technology
  - 868MHz. / 915MHz. (\*)
- Onboard sensors:
  - 3D accelerometer up to 16g.
- Wide operating temperature range: -25°C ... +85°C (without LiPo battery)
- Multiple watchdog levels for maximum stability.
- 6 to 31VDC power supply
- 6 to 35VDC power supply (\*)
- 5V / 1A power supply for peripherals
- Versatile interfacing:
  - Digital and analog
  - Bluetooth LE
  - 4x Serial (3V / RS232)
  - CAN bus / OBD-II (\*)
  - RS485 (\*)
  - iButton™ / 1-Wire™
  - Cameras
  - LCD Display + keyboard
  - Digital tachograph
  - Passive / active RFID
  - Garmin FMI™
- Event based free configurable module to fit any job; 300+ different events and 4,000+ geozones.
- Remote maintenance. Both firmware and configuration files can be updated over the air.
- 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
- Public transport / Railway industry
- Logistics, M2M
- Security and surveillance
- Remote control and diagnostics
- Anti-theft

### Product Summary

Equipped with a state-of-the-art GPS receiver, the TM-187 / R9A11 module provides reliable and accurate navigational data and can be equipped with a 2G, 3G or LTE-M/NB-IoT modem.

The module provides reliable, optimized connectivity and coverage for the next generation LTE-M 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 (up to 120,000 positions). As soon as communication is restored, all information can be transmitted.

The TM-187 / R9A11 module is equipped with external power and battery connection and contains full I/O-connectivity offering easy integration into many applications.

The module is equipped with different technologies for traceability (2G/3G/LTE-M/NB-IoT modem, GPS/Glonass, LoRa, Bluetooth Smart (BLE) and proprietary RF), which can all be combined dependent of the application and local mobile network coverage. This functionality results in an intelligent location based positioning solution (LBS) for indoor and outdoor anti-theft applications. A sophisticated 'listen before talk' algorithm makes it practically impossible to locate the module which secures the valuable vehicle or object.

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

The KCS TraceME TM-187 / R9A11 can be equipped with different optional technologies for traceability. It can be fully customized dependent of the application. Please contact sales for more details.


## Specifications KCS TraceME TM-187

### Data communication

GPRS Modem	Quectel M95 QUAD band, optional UG95(-A or -E) UMTS/HSPA Module, optional UG96 UMTS/HSPA Module, optional BG95 NB-IoT Module, optional BG96 LTE-M / NB-IoT Module, all global certifications and R&TTE directives.	
Frequency bands	GSM/GPRS: 850/900/1800/1900 MHz UMTS: 800/850/900/1900/2100 MHz LTE: B1-5, 8, 12, 13,18, 19, 20, 25, 28	


LoRa	Semtech SX1272 transceiver	
Frequency	868/915 MHz. (*)	
Protocol	LoRaWAN 1.0.2 and custom LoRa protocol	
Transmitting power	up to +20 dBm	
Sensitivity	-137 dBm	

### RF Communication

RF 2.4GHz.	Nordic nRF51822	
Frequency	2.45 GHz.	
Protocol	BLE 4.0 and custom 2.4 GHz. protocol	
Transmitting power	up to +20 dBm (with on-board amplifier)	
Sensitivity	-93 dBm (BLE)	

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

### 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		

### Operating Temperature Conditions

With Primary Lithium Cell or without LiPo battery	-25°C ... +85°C (discharging only)
With rechargeable LiPo Cell (**)	-20°C ... +60°C (discharging) 0°C ... +45°C (charging)

(\*\*) Extended temperature range LiPo batteries available on request.

### Electrical

Power supply	External +6...+31VDC
Charging Current (LiPolymer)	450 mA. Observing 0...+45 °C safety range for LiPolymer.
Typical Power Consumption	20 mA, GPS full power tracking, open GPRS session
	6 mA, using AlwaysLocate™
	100mA BLE transmissions
	100 uA, GPS/GPRS/sensors power down, 4 inputs and 1 timer active

## External Connections

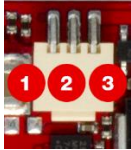
### External antenna connectors



LoRa	External LoRa antenna
RF	External 2.45GHz. antenna
GPS	External GPS antenna
GSM	External GSM/GPRS antenna

(\*) Please contact sales for more details.

### Battery connector



Pin	Description
1	Temperature sensor
2	Ground
3	3.4 - 4.5V Battery (+) connection

## External Connections

Front view Power and I/O-connectors



Pin	Signal	Type	Description
1	GND for VCC	GND	Ground for VCC
2	VCC	VCC	+6...+31VDC or VCC Charge input
3	GND for I/O	GND	Ground for I/O
4	Digital/Analog_In5	I	Digital/Analog Input 5 (0..31V)
5	TXD1_3V	O	3 Volt serial transmit port 1
6	RXD1_3V	I	3 Volt serial receive port 1, hardware pulse counter
7	TXD2_RS232	O	RS232 serial transmit port 2
8	TXD2_3V	O	3 Volt serial transmit port 2
9	GND for I/O	GND	Ground for I/O
10	I/O1 or RXD4_3V or One-Wire™ or	I/O	I/O1 (3 Volt) - or RXD4 (e.g. Camera1) - or One-Wire™
11	ADC6 I/O2 or TXD4_3V or One-Wire™	O	- or analog input (ADC6) range +0.0...+2.5Volt I/O2 (3 Volt) TXD4 (e.g. Camera1) Note: Connect pins 10-11 for One-Wire™ operation
12	Digital_Out1	O	Open Collector max. 31V /160 mA, protected via Polyswitch fuse
13	Digital_Out2	O	Open Collector max. 31V /160 mA, protected via Polyswitch fuse
14	GND for I/O	GND	Ground for I/O
15	Digital_Out3	O	Open Collector max. 31V /160 mA, protected via Polyswitch fuse
16	Digital_Out4	O	Open Collector max. 31V /160 mA, protected via Polyswitch fuse
17	TXD3_RS232	O	RS232 serial transmit port 3
18	TXD3_3V	O	3 Volt serial transmit output 3
19	RXD3_RS232	I	RS232 receive input 3
20	RXD2_RS232	I	RS232 receive input 2
21	VCC_3V3	VCC	External Supply 3.3V switchable by module
22	N/C	-	Reserved
23	N/C	-	Reserved
24	Digital/Analog_In1	I	Digital/Analog Input 1 (0..31V)
25	Digital/Analog_In2	I	Digital/Analog Input 2 (0..31V)
26	N/C	-	Reserved
27	Digital/Analog_In3	I	Digital/Analog Input 3 (0..31V)
28	Digital/Analog_In4	I	Digital/Analog Input 4 (0..31V)
<b>TM-187L</b>			
E	CAN_H / RS485-A	I/O	CANH or RS485-A
F	CAN_L / RS485-B	I/O	CANL or RS485-B
G	GND for CAN / RS485	GND	Ground for CAN / RS-485

## 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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