

High accuracy localization module with Ethernet interface for indoor and outdoor positioning for applications in rail & buses

Features

- Seamless positioning from various sensor sources; < 1 m accuracy
- UWB* receiver IEEE 802.15.4-2015;
- GPS/RTK multiband GNSS receiver
- Inertial Measurement Unit (IMU)
- Speed Pulse Signal according to IEC 16844-2
- 100 MBit/s Ethernet, PoE PD class 1
- Alt. power input 9...36V DC (12/24V nom.); ignition
- USB service interface
- Remote update capability of firmware



* requires stationary UWB satlet infrastructure

Introduction

The UWB/RTK precise positioning module *SIO03* is a member of the KYT Sensor family by Ci4Rail and can work as a standalone device as well as in combination with ModuCop MEC0x.

For highly precise positioning in public transport and rail car depots, stations, tunnels etc. or even indoor, a single sensor source is not sufficient. To provide precise localization, *SIO03* combines the technologies UWB (ultra wide band), GNSS/RTK (Real-Time-Kinematik) and additional speed pulse input signal.

Whereas UWB works indoors using a cost sensitive satlet infrastructure, the GNSS/RTK technology provides high precision positioning information without additional infrastructure outdoors. The speed pulse input signal supports identification of distance traveled and movement direction. Specific movement models within an IMU (Inertial Measurement Unit) allow smooth seamless real-time positioning.

The positioning information is transferred to in-vehicle sub-systems via Ethernet interface. The *SIO03* product represents the vehicle component and does not cover stationary equipment like UWB satlets.

Applications

Applications in Rail & Automotive sector requiring high accuracy positioning information, e.g.

- Vehicle asset management
- Depot fleet management
- Track accurate parking position
- ... and further applications where correlation of user data with high precision positioning information increases the data value.

Software

Integrated microcontroller firmware:

- High precision position incl. accuracy and source information at least 1/sec.
- Integration of specific movement models based on IMU
- Eth communication
- Firmware update via USB and Eth
- Remote access to firmware logs

SIO03 is designed to be used in closed networks. Data transfer is not encrypted.

Specifications

Interfaces	SIO3-SIO03-
Communication Interface	100MBit/s Ethernet via M12 D-Coded
Service Interface	USB 2.0 via M12 8p X-Coded*
Positioning Indoor	UWB IEEE 802.15.4-2015
Positioning Outdoor	Multi-band GNSS/RTK GPS/QZSS (L1C/A L2C) GLONASS (L1OF L2OF) Galileo (E1B/C E5b) BeiDou (B1I B2I)
Positioning accuracy	localization values have an accuracy of < 1m for 95% of the reported values
Speed Pulse Signal	acc. to IEC 16844-2 (input high: 4,8V; input low: 2,2V)
Ignition	On State: Input high: 5,2 V (min) or open Standby State (after delay ~3 sec): Input low: 3,6 V (max)
Software Features	
Firmware update	Via USB, Ethernet
Management	Via io4edge protocol, see https://docs.ci4rail.com/edge-solutions/io4edge/
Electrical	
Power Supply	Power-over-Ethernet (PoE PD) class 1 Alt. 12V, 24V (nom.) acc. to ISO 7637-2:2011 via M12 8p X-Coded*
Power Consumption	Operation typ. < 3 W; Standby State < 0,1 W
Mechanics	
Dimensions (w/o mounting accessories)	Length: 110 mm Depth: 98 mm Height: 48 mm
Mounting	Flexible Mounting via integrated mounting holes or vehicle specific mounting adapter Horizontal mounting on vehicle roof with connector in backwards or CAB B direction
Ingress Protection	IP66K
Environmental	
Operating Temperature	-40...+70°C (EN 50155:2021 - OT4)
Storage Temperature	-40...+85°C
Humidity	95% (EN 50155:2021)
Altitude	3000 m max. above sea level (EN 50125-1:2014, class AX)
Shock / Vibration	EN 61373:2010; Cat. 1; Class B
EMC Emission (Rail / Automotive)	EN 50121-3-2:2016; EMV 06 Class S1 / ECE R10 Rev.5
EMC Immunity (Rail / Automotive)	EN 50121-3-2:2016 / ECE R10 Rev.5
El. Safety	EN 50155:2017; EN 50153:2014+A1:2017; EN 50124-1:2017; EN 62368-1:2016; EN ISO 13732-1:2008
Useful Life	20 years (EN 50155:2021, class L4)
Certifications (Rail / Automotive)	CE; EN 50155 / E-Mark ECE R10

* Power, ignition, speed pulse signal and service interface shared on one M12 connector

Order Information and Related Article

Article number	Short	Software configuration	Power Supply	Host Interface	Service Interface	FW Update
S103-SIO03-	UWB/RTK-Positioning Module	ETH/USB	PoE PD Class 1 Alt. 12V, 24V DC (nom.)	100 Mbit/s Ethernet	USB 2.0	✓ Via USB & ETH

Please [contact](#) us for any specific requests.

Product Appearance

