Telic

Solutions Start Here

SBC AVL 4G   **User Manual**

5.12.2023

Release 1.4

Contents

1 General Terms and Conditions

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1.1 General Information

This Installation Manual consists of the following chapters:

Chapter	Description
1	*General Information* provides basic information such as the conventions for the warning levels, applicable related documentations, and contact information.
2	*Safety* addresses the audience for this manual, the indented use of this device and safety-related information important to read before using the device.
3	*Product Description* provides a brief overview about the functions and features of the device as well as the available accessories.
4	*Operation Setup* guides you with detailed step-by-step-procedures through the process of commissioning the device.
5	*Status Indicators* describes the different LED status.
6	*Connect to the Vehicle* provides important instructions about how to install the device within the vehicle.
7	*Configuring the Device* explains how to configure the device for its proper working.
8	*Troubleshooting Hints* provides solutions to issues that may occur during operation setup and active use of the device.

1.2 Contact

Support Hotline

If you need specific technical support, please submit a request at the following link: https://www.telic.de/en/contact.

1.3 Conventions used in this Manual

The following conventions for warning levels are used in this manual:

Warning
Warnings against hazards that may result directly in **serious injuries or death** in case of non-observance.

Caution
Warnings against hazards that may result in **injuries** in case of non-observance.

NOTICE
Warnings against hazards that may result in **material damage** in case of non-observance.

	Indicates that the device can be damaged by electrostatic discharge.

	This note contains helpful suggestions or references to material not covered in the document.

2 Safety

This device has been designed in accordance with state-of-the-art standards, manufactured with utmost care using high-quality materials, and tested. Nevertheless, its use may constitute a risk to persons or cause material damage.
The following safety instructions must be followed to ensure the safety of users and the device.
If these instructions are ignored, Telic will not assume responsibility for any damages that are incurred.

2.1 Audience and Intended Use

The device enables telematics and logistic service providers to track vehicles or other assets with an external power source and is designed for installation inside the vehicle. Any other use is not indented.

2.2 General Safety Information

Caution
➜ Read all enclosed instructions and information. ➜ Observe the warnings included in the documentation. ➜ It must only be used by persons being aware of the risks and dangers involved in operating it.

2.3 Precautions

Caution
Negative consequences on safety and device integrity due to connecting the wrong cable to the unit. ➜ Only use cables which are listed in the Telic accessory list.

NOTICE
The messages of the device are transmitted via the mobile network. Therefore you need a standard 3 Volts or 1.8 Volts SIM card.

2.4 ESD protection

An electrostatic discharge (ESD) is the transfer of charge between two electrically charged objects with different electrical potentials either caused by contact or short circuit. If you are charged, for example due to walking on a carpeted room, you generate static electricity that can damage the PCB.
Therefore, take proper measure for ESD protection, e.g. electrical connection of the body to the ground, to make sure you do not destroy internal electronics.

	Electrostatic discharge (ESD) The internal electronics of the device can be damaged.

	➔ Take proper measures for ESD protection, e.g., electrical connection of the body to ground.

Repair of ESD damages caused by user's negligence will not be covered by Telic's warranty.

2.5 General Battery Handling

The device includes a rechargeable battery. The battery is designed to represent the highest possible degree of safety. It may however present a potential hazard if it is abused electrically or mechanically. This is in most circumstances associated with the generation of excessive heat. In this case the internal pressure may cause the cell case to rupture. For this reason, the following general guidelines should be followed when handling the device's battery:

Caution
Material damage caused by electrical or mechanical abuse. ➔ Do not short-circuit. ➔ Do not over discharge. ➔ Do not incinerate. ➔ Do not expose to temperatures beyond the specified temperature range. ➔ Do not crush or puncture. ➔ Do not open cells, do not disassemble battery packs. ➔ Do not expose contents to water. ➔ Do not connect with false polarity. ➔ Do not weld or solder to the battery's body. ➔ Only authorized official Telic replacement batteries must be used in the devices. ➔ The batteries included with the devices must only be used in the device. ➔ The batteries must never be used in any other device unless specifically authorized by Telic, including but not limited to other Telic products or devices.

2.6 Battery Storage

The following guidelines should be followed when storing the batteries:

- Do not store batteries in rooms with generally high temperature and high humidity levels. Storage temperature range: should be below 35 °C, avoid temperatures above 75 °C.
- Ensure that storage areas are well ventilated.
- Store the batteries in their original packaging materials or in the device itself. This will eliminate unintentional shorting.
- You can store batteries in conductive anti-static bags or foam. Prerequisite: The resistivity of the material exceeds 1 MΩ.

- Batteries should not be placed on or covered with metallic or otherwise conductive material.
- Batteries should be stored away from any flammable material in the storage area. Fire extinguishers for metal fire (class D) are preferred.
- Do not attempt to extinguish fires with small amounts of water, sand, or with carbon dioxide extinguishers.

2.7 Battery Disposal

The disposal or recycling of batteries is regulated by each European country. In each country, the manufacturers, importers and users are responsible for the proper disposal. The European Community (EC) has issued two directives, 91/157/EEC and 93/86/EEC. These directives are implemented by each member country of the EC independently and in a different way. In accordance with these directives, the batteries do not contain dangerous substances. The reaction products are inorganic and do not represent environmental risks once the decomposition process is terminated.

3 Product Description

This chapter provides an overview about the functions and features of the device.

3.1 Identification

On the top side of the device, you will find the type label.
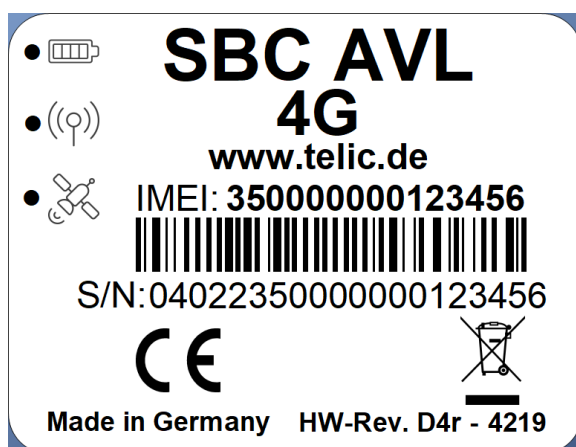
Label	Description
S/N	Serial number
‖‖‖‖‖‖‖‖‖‖‖	Serial number
IMEI	International Mobile Equipment Identity
HW-Rev.	Hardware Revision Number
CE	CE Verification mark
🗑	Disposal in accordance with European Directive 2002/96/CE

Table 1: Identification label

3.2 Technical features

Cellular / GNSS

- LTE Cat M1 / EGPRS
- Receiver type: 72-channel GNSS receiver
- GPS | GLONASS
- GNSS sensitivity: -167 dBm
- Positions acquisition time:
  - Cold 29 sec
  - Hot 1 sec
- Position accuracy: 2.5m CEP50

Software

- Software Download Over The Air (DOTA) or through micro-USB interface
- Device-configuration: TCP/IP, micro-USB, or SMS
- FTP configuration file download
- Event based wake up: time / motion/ input based
- Event-based reporting based on time, duration, distance, course change
- Up to 50 rectangular geofence zones
- Memory capacity for messages: ~20.000 (only positioning data)
- Data transmission modes: TCP/IP or UDP/IP
- RS232 transparent mode & support of local RS232-protocols
- 3-Level Watchdog System
- Driver identification for up to 50 IDs

Hardware Features

- Housing: Small & Compact Design
- Integrated mobile communication and GNSS antennas
- Integrated 3D Accelerometer for Motion detection
- Robust SIM card holder (1.8/3V) for Mini SIM cards
- Status Indicators: 3 LEDs (Mobile communication; GNSS; Battery)
- Approvals: E1; CE

Hardware Interfaces

- Ignition Status (On/Off): 1x
- General Purpose Inputs(digital/analogue): 1x
- Digital Output: 1x (300 mA max)
- 1-Wire: iButton ID key|Temperature Sensor (DS18S20; DS18B20; DS19221)
- RS232: 1x (LVTTL; 3.3V)
- Micro USB: Configure & Trace

Power Management

- External voltage range: 7V -32V

- Battery Capacity: 660 mAh (LiPo)
- Battery Safety compliant with IEC 62133 for extended operating temperature range
- Typical consumption in sleep Mode (external source): ≤ 0,5 mA (@12V)
- Typical consumption in sleep Mode (internal battery): ~ 0,07 mA

Hardware Characteristics
- Dimensions: 74x49x20 mm
- Operating temperature: -30°C to +70°C
- Recharging temperature: 0°C to +45°C
- Weight: 50 g

3.3 Functional Overview

The picture below gives an overview about the main components and its functions available on the PCB after opening the upper lid.
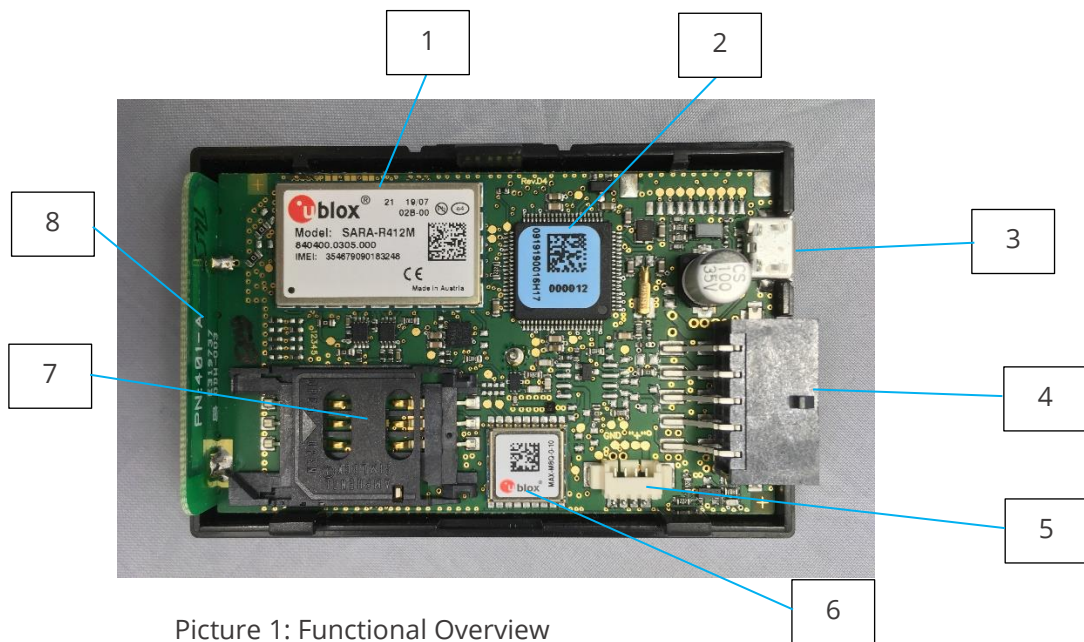
Picture 1: Functional Overview

	Function
1	Mobile Service module LTE Cat.M1 with 2G fallback
2	Microcontroller
3	Micro USB
4	Molex connector
5	Connector for the rechargeable battery; the battery is placed in the device lid
6	GNSS module
7	SIM card holder
8	Mobile Antenna

Table 2: Device components

3.4 Wiring description
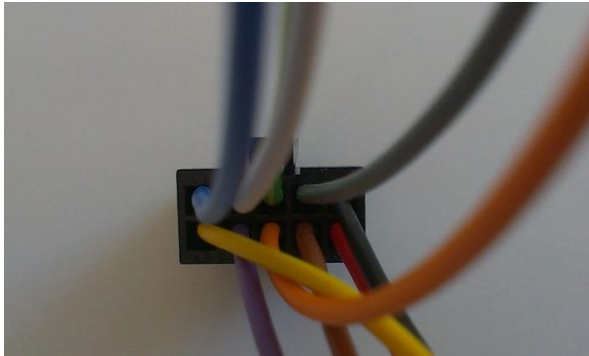
Picture 2: SBC AVL 4G Cable Pin allocation
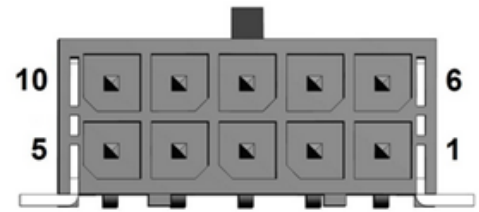
This side up
Picture 3: SBC AVL 4G Connector

Signal	Cable Color	Connection
VCC /DIG IN 3	Red (pin 1)	Required
GND	Black (pin 6)	Required
IGNITION INPUT	Yellow (pin 5)	Recommended
DIG_IN 2 (ANA_IN1)	Violet (pin 4)	Optional
1-wire	Grey (pin 7)	Optional
DIG_OUT1	Orange (pin3)	Optional
RS232 LVTTL RX	White (pin 9)	Optional
RS232 LVTTL TX	Blue (pin 10)	Optional

Table 3: SBC AVL 4G Cable Color description

The following voltage ranges apply:

- +7 V to +32 V for VCC/external power supply / Ignition Input / Dig IN
- 0 V for GND

Please also observe the following wiring diagrams:
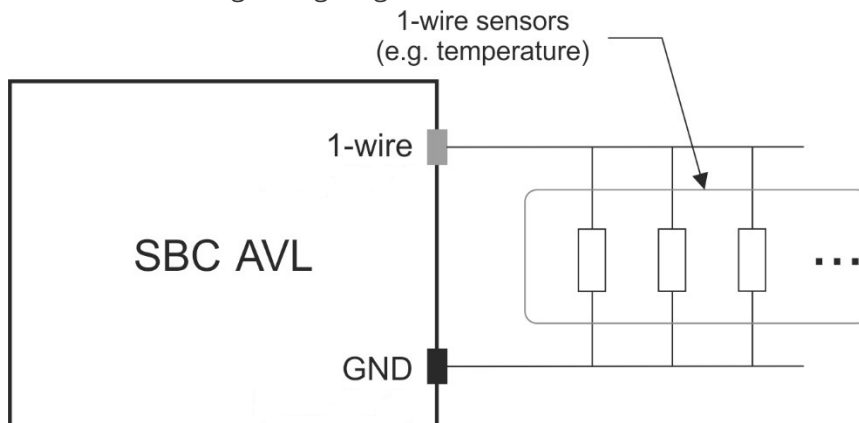
Picture 4: Wiring 1-wire Sensors
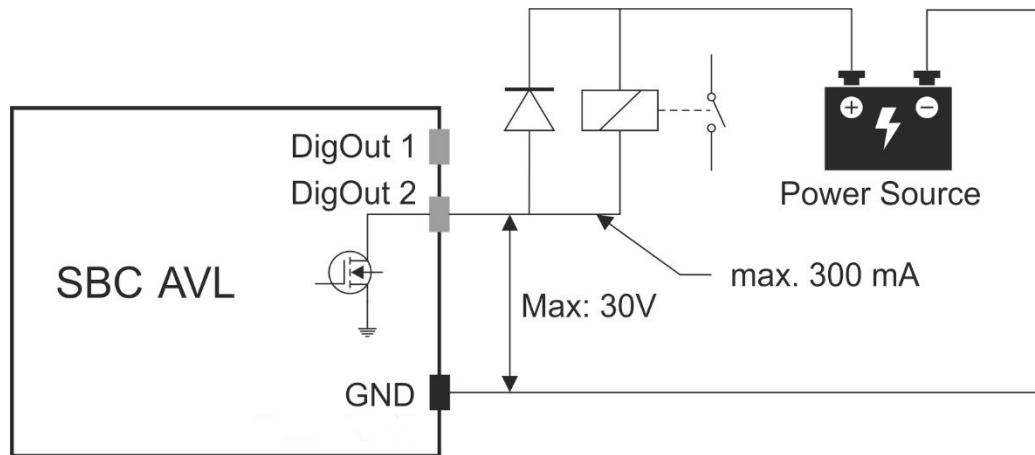
Picture 5: Wiring Digital Output

For the digital output DigOut1, the following applies:
- Max Values: 300mA/+30V
- Low-Side-Switch: if triggered, the pin goes to 0V/GND

Notes:
- If a relay is connected to the digital output, it must have the same common ground as the device
- The voltages on inputs and outputs must be identical.

3.5 Charging your device

The method you can use to charge your device depends on its article number. The article number consists of the first five digits of the serial number.

Identifying Your Article Number
To find your article number, locate the serial number of your device, which is printed on the device's label. The article number is comprised of the first five digits of this serial number.

For devices with article number 04023 and below:
Your device supports two types of charging connectors:
USB connector
Molex connector
You can use either of these methods to charge your device.

For devices with Article number greater than 04023:
Your device is only compatible with the Molex connector for charging. USB charging is not supported for these versions.

3.6 Delivery Content and Accessories

In addition to the SBC AVL 4G, the following accessories can be part of the shipment, if previously ordered.

Accessory Name	Order code	Functionality	Picture
Connection cable SBC AVL 4G	16032	Automotive molex cable for on vehicle installation	
Cigarette lighter charger SBC AVL 4G	17024	Charger cable for connecting the device to the cigarette lighter	
OBD II Power Supply Cable	17023	2-pin OBD-II connector cable for power supply only; Cable length: 1 m	
1-wire Temperature Sensor	90029	1-wire Temperature sensor; Cable length: 7 m; Temperature range: -55 °C to +125 °C; Accuracy: ± 0,5°C (in range -10 °C to +85 °C)	
Cable for RS232 Tracing	16207	Use this cable to charge or to configure the device via the Telic Config-Tool	

Table 4: List of accessories

4 Operating Set up

The operation set-up of the tracking device can be realized in few quick steps.

	Please take proper ESD protection measures (e.g. electrical connection of the body to ground) to make sure you don't destroy internal electronics! Repair of ESD damages caused by user's negligence will not be covered by Telic's warranty. Electrostatic discharge (ESD) is the sudden and momentary electric current that flows between two objects at different electrical potentials normally caused by static electricity.

4.1 Operating the device

Please open the SBC AVL 4G housing by pushing the button shown here:

Picture 6: The button to open the SBC AVL 4G Housing

While keeping the button pushed, remove the top cover with the other hand as shown. The SIM card holder can be found under the top cover.
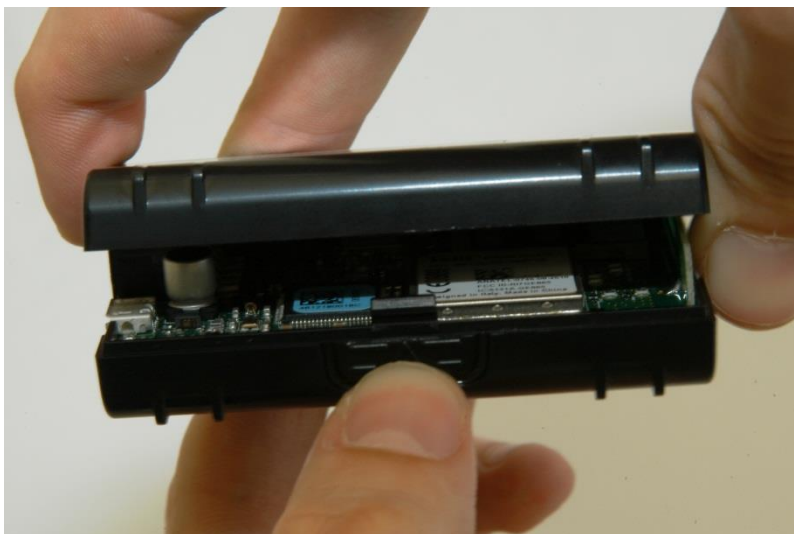
Picture 7: How to open the SBC AVL 4G Housing

4.2 Insert the SIM Card

A working SIM card from a suitable network provider must be properly inserted so that the device operates correctly.

	If the SIM card is not PIN free, it must be ensured that the PIN is set to "0000". To speed up the log-in process into the mobile network, the SIM card should contain no or only a few phone book entries.

	The messages of the SBC AVL 4G are transmitted via the mobile network. Therefore, you need a standard 3 Volts or 1.8 Volts SIM card.

The insertion of the SIM card into the SBC AVL 4G is easy:
- Place the device in front of you as showed in the picture.
- Slide the SIM card cover carefully to left.

Picture 8: How to insert the SIM Card

- Carefully flip the card reader sideways then up. Now insert the SIM card into the SIM card holder so that the cut corner matches with the corresponding marking on the SIM card holder. Do not touch the contacts of the SIM card. If necessary to clean the contacts with a soft cloth.

Picture 9: Where to insert the SIM Card

- When correctly inserted the gold contacts of the SIM card should be facing down.
- Flip the SIM card holder back into its original position and slide the lock back on right till it is locked
- If you cannot close the SIM card holder, you may have inserted the SIM card in the wrong direction

With this step you have finished the SIM card installation.

Now you must connect the rechargeable battery connector to the 4-pins connector on the PCB.

4.3 Close the cover

Please close the SBC AVL 4G housing by pushing the top cover against the downside until there is no more space between the 2 surfaces.
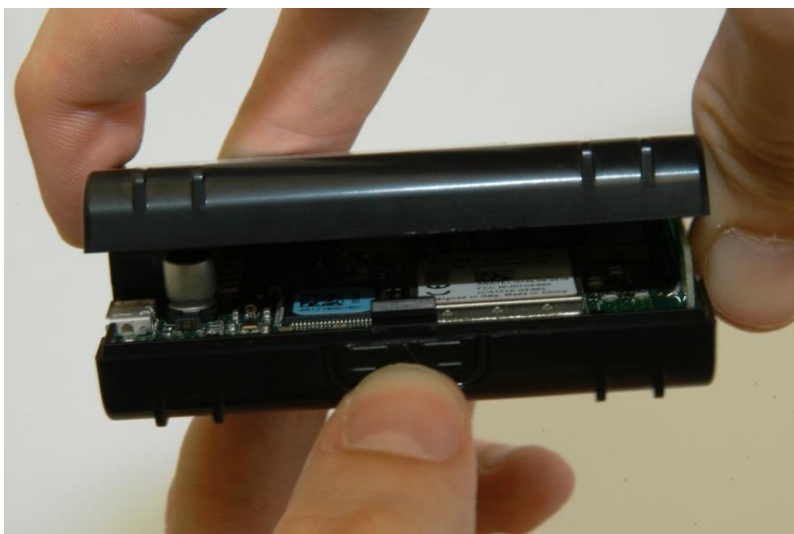
Picture 10: How to close the SBC AVL 4G Housing

5 Status indicators

Left indicator: Power supply status	Middle Indicator: Mobile status	Right Indicator: GNSS status
The left indicator consists of a red one When the LED is off, the device is not powered even in sleep mode.	The orange LED reflects the mobile status and whether the device is switching on. When the LED is off, the mobile module is not active.	This LED blinks green and indicates the status of the GNSS receiver.
Blinking once: Powered (7-32V) and internal battery fully charged. Blinking twice: Low battery voltage On: Internal battery charging.	Permanently on: mobile is active, but no network available / not yet registered. Blinking once: Device is logged into the mobile network, no connection to server. Blinking twice: Device is logged into the mobile network, established TCP/ IP connection to server. A very short flash while the device is in sleep mode means that a movement has been detected.	

Off: GNSS is not switched on.

Blinking once: Position acquisition.

Blinking twice: 2D-Fix (no valid height).

Blinking three times: 3D-Fix (GNSS data is complete).

After starting as well as after a phase without GNSS reception the device only accepts 3D GNSS positions.

This ensures, that 2D positions reports with serious deviations from the real position are not reported to the control center.

After a while, 2D position reports are accepted because the GPS receiver had enough time to evaluate the signal quality of all available satellites.

A very short flash every 2 seconds indicates that the device is in sleep mode.

Table 5: LEDs behaviour

6 Connect to the vehicle

This paragraph describes the procedure to install the device on board of your vehicle and check if the installation has been performed properly.

⚠️	Please take proper ESD protection measures (e.g. electrical connection of the body to ground) to make sure you don't destroy internal electronics! Repair of ESD damages caused by users' negligence will not be covered by Telic's warranty. Electrostatic discharge (ESD) is the sudden and momentary electric current that flows between two objects at different electrical potentials normally caused by static electricity.

6.1 Placing the device into the vehicle

In order to protect your vehicle from theft and vandalism the device should be installed in a location where it and its power supply are well-hidden. Using the cable-cases on box surfaces, please install the device in a suitable, dry location, not in contact to radio and audio frequency interference or hot parts of the vehicle like near the engine. When installing the device, please consider that antennas are integrated, this means it must be installed in a place with a minimum distance of 7 cm to metallic components of the vehicle in each direction. In order to optimize the quality of the signal received, the surface of the internal GNSS antenna must be installed looking at the sky (see the label indication on the device box, this side up).

6.2 Wiring connection

Please connect the Telic SBC AVL 4G with the vehicle according to the following instructions using the connection cable. Please do not connect the connector to the Telic SBC AVL 4G before all wires you intend to use are connected to the vehicle. The power supply has to be available while the ignition is off.
The black wire (pin 6 on Molex connector) must be connected to the GROUND (pin 31 of the vehicle) and the red wire (pin 1 on Molex connector) must be connected to VCC (pin 30 of the vehicle).
The yellow wire (pin 5 on Molex connector) must be connected to ignition (pin 15 of the vehicle). All other wires have to be connected to the related interface, otherwise please ensure that they cannot cause short circuits.
The advantage of constant power supply is that the device is able to connect faster to the Mobile network and it can find faster a new GNSS position after ignition was switched from "OFF" to "ON". This means that for example working time calculations will be more precise. With ignition

off, the power consumption of the Telic SBC AVL 4G is low enough that it does not interfere with proper functionality of the vehicle battery.

If the Telic SBC AVL 4G is configured to use a motion dependent power mode, the device can detect and report that it is moving (e.g. if it is stolen or being transported via a second vehicle) even while ignition is off.

7 Configuring a device

7.1 Basic event types

The SBC AVL 4G's primarily task is to transmit GNSS position data including additional status information via a TCP/IP connection to the telematic server. If a message can't be transmitted, it will be stored in the device to be transmitted later. There is a wide range of events that generate a position message (they are all detailed in our SW specification).

The basic events are listed below:

- **Time event:** the message is generated at the end of a time period of x seconds (x being configurable);
- **Distance event:** the message is generated once a distance of x meters (straight line distance to the previous event) in any direction (x being configurable) has been travelled.
- **Angular course change event:** the message is generated once there is a direction change of a configurable minimum angle in x degrees (x being configured) at a configurable minimum speed of y km/h (y being configured).
- **Periodic Wakeup / Routine Message**: even when the unit is in stand-by mode, the message is generated either every x hours (x being configurable) or at a fixed time (configurable) during the day.

7.2 Power modes

The SBC AVL 4G's can work with several power modes based upon the customer's needs. This allows to save the power consumption as much as possible and to extend the battery runtime.

The available power modes are listed below.

- **Full power mode**
  Microcontroller, mobile service and GNSS modules are always on.
- **Input sleep Mode**
  Microcontroller, mobile service and GNSS modules are turned off two minutes after the selected digital input (e.g. Ignition) is set to low (both time and digital input can be changed in "Expert Settings").

- **Timer Sleep Mode**

  The device enters the sleep mode between the timer events (events generated every x minutes, being x configurable). During sleep mode mobile and GNSS are turned off and microcontroller is in low power mode. An input can be configured to wake up and stay awake until the input goes to low again.

- **Motion Sleep Mode**

  If the motion sensor detects stationary, the device will switch off GNSS and mobile service modules, and µC is switched to low power mode. Changes from "stationary" to "moving" will always wakeup the system. Then it will stay awake as long as the sensor detects movement. GNSS and mobile modules are turned on. If the device detects "stationary" for the stationary detection time period, the device goes into the sleep mode after 60 seconds.
  An input can be configured to wake up and stay awake until the input goes to low again.

- **Endurance Mode**

  Basically, the Endurance Mode is similar to the Timer Sleep mode, combined with the Motion Sleep Mode. As long as the device is moving, it behaves like in Timer Sleep mode. As soon as it falls to stationary it wakes up, sends the stationary event (if configured) and falls back to sleep until the next movement without generating cyclic messages. This sleep-in stationary state can be interrupted by routine or fixed reporting time events.

7.3 Basic configuration

The device can be configured via either serial interface or SMS.
In the first case you will need a simple cable (micro USB – USB connectors) and a serial terminal program (e.g. Realterm).
In the second case, you will need in the device a SIM supporting SMS (M2M SIMs typically don't support them).
Before you insert the SIM-card and activate the device, make sure the PIN is disabled or set to 0000.
Otherwise it can happen that the PIN is entered incorrectly three times, and the SIM falls into the PUK lock.
This would be deactivated again by a mobile phone.
When sending SMS to a device through a mobile phone, the phone number of the latter must be visible (not hidden), otherwise the device won't send its reply to the sender.
Afterwards, you can check the flashing behaviour, Mobile LED should flash once, when the device is logged into the mobile network, and twice when an IP connection to the server is established.
More detailed information can be found in the 5th chapter of this manual.
A lot of parameters can be configured to implement the proper use case.
Besides, the unit has to be configured in order to forward messages (events) to the proper server; in the following paragraphs some scenarios will be illustrated as examples (all the details can be found in the SW specifications, basic and expert type).

Tracking – typical configuration profiles

▪ **Pedestrian & Vehicle Live (1min interval)**

Position messages are generated every 60 seconds when in motion, regardless of speed or changes of driving direction.

This means that a position message is generated and transmitted every 2 km on a freeway or highway (driving with about 120km/h).

As soon as motion is ended (detected by built-in sensor), the device will go to sleep mode.

When going back to motion (detected by the sensor), the device will automatically resume tracking.

A routine event ("I am alive") will be sent once a day.

Then the power mode will be motion-sleep mode (5), and time interval 60 sec.

The following extra messages are generated and sent to the server (value=2 in the 32 bytes sequence detailed below):

▪ Power Supply connected / disconnected

▪ Ignition signal on / off

▪ Digital Input 2 signal on / off

▪ Digital Input 4 signal on / off

▪ Device stopped moving (30 seconds without any sensor motion detection)

▪ Device started moving (according motion sensitivity level 3)

▪ Periodic Wakeup / Routine message (every 24 hours)

Configuration SMS :

0011{6digitsIMEI},,,,60,0,200000700000,50000009,00000000022222220000000022000000,,,,,0,0,0 ,0,24,,,,3,30,,,,30,6

Configuration command through serial line:

CONFIG=,,,,60,0,200000700000,50000009,00000000022222220000000022000000,,,,,0,0,0,0,24,,,,3, 30,,,,30,6

Remark: *the "0011{6digitsIMEI}" of the SMS becomes "CONFIG=" in the serial command; the rest remains unchanged.*

▪ **Vehicle - Medium Resolution - Off by Motion**

Position messages are generated either after 5 km distance or as soon as the driving direction has been changed more than 45 degrees provided that the vehicle is exceeding 20Km/h.

Driving long distances will be covered by one position message every 5 km, driving short distances is managed by generating position messages whenever the driving direction is significantly changed.

As soon as the vehicle has stopped (detected by sensor) the device will go to sleep mode.

When vehicle goes back to move, the device will automatically resume tracking.

Power mode: motion-sleep mode (5)

Distance interval: 5,000 m

Course change: 45 degrees

Minimum Speed: 20 Km/h

In addition, the following extra messages are generated and sent to the server:

▪ Power On

- Ignition signal on / off
- Digital Input 2 signal on / off
- Device stopped moving (1 minute without any sensor motion detection)
- Device started moving (according motion sensitivity level 3)

Configuration SMS:

0011{6digitsIMEI},,,,0,5000,020000700000,50000009,20000200002222000000000022000000,,,,,,0,
0,0,0,24,,,,3,60,,,,45,20

- **Vehicle - Low Resolution Track (10min interval)**

Position messages are generated in 10 minutes time intervals regardless of motion, speed or changes of driving direction.

This profile should be used for long distance tracking applications.

Power mode: timer-sleep mode (4)

Time interval: 600 sec

Configuration SMS:

0011{6digitsIMEI},,,,600,0,200000700000,40000009,00000000000000000000000000000000,,,,,,0,0,
0,0,24,,,,3,60,

- **Vehicle - High Resolution Track - Off by Ignition**

When the ignition is on, position messages are generated and sent either after an 1 km distance has been travelled or as soon as the driving direction has been changed more than 30 degrees; additionally a position message is sent every 5 minutes.

Driving long distances will be covered by one position message every km, driving short distances is managed by generating position messages as soon as the driving direction is changed more than 30 deg.

As soon as the Ignition signal is detected as off, the SBC AVL 4G will enter the sleep mode.

This profile should be used for all kind of tracking applications where a high accurate position track is needed.

Power mode: input sleep mode (1)

Time interval: 300 sec

Distance interval: 1,000 m

Course change: 30 degrees

In addition, the following extra messages are generated and sent to the server:

- Power Supply connected / disconnected
- Ignition signal on / off
- Digital Input 2 signal on / off
- Device stopped moving (1 minute without any sensor motion detection)
- Device started moving (according motion sensitivity level 3)
- at 9:00am and 08:00pm (UTC) an inventory message is sent regardless the ignition state

Configuration SMS:

0011{6digitsIMEI},,,,300,1000,220000700000,10000009,00000200022222220000000022000000,,,,,,
0,540,1200,0,24,,,,3,60,,,,30,6

Connection to the server – configuration

In case you use your own server, the SW integration of Telic's proprietary protocol is mandatory (otherwise received data will be meaningless).

The following configuration command sets some IP parameters in the device, allowing the same to connect the proper server.

00B1{6 digits-IMEI}IP Address,IP Port,APN,USERNAME,PASSWORD,

(SMS command)

Or:

IPCONFIG=IP Address,IP Port,APN,USERNAME,PASSWORD,

(serial command)

APN, USERNAME and PASSWORD must be adapted according to the SIM card (Provider).

In case there is no Username (or Password), you must digit: "".

When you send an SMS, you must wait for an SMS reply by the device (Ack) confirming IP address, port, and APN credentials (*you can disregard the other parameters*).

Example:

IP Address: 78.137.103.86 (this is the IP address of telic.kentaur.cc)

IP Port: 1561

APN: internet.m2m.de   Username: m2m   Password: sim

{IMEI} = last 6 or 15 digits of IMEI – 353322088958773

Final SMS:

00B195877378.137.103.86,1561,internet.m2m.de,m2m,sim,

Reply by the device:

00B495877378.137.103.86,1561,internet.m2m.de,m2m,sim,1,80,60,,,,,0

8 Troubleshooting hints

The device cannot connect to a mobile network

Possible issue source	Troubleshooting
On-board power supply failure or defective internal fuse	You cannot fix this problem yourself. These fuses should protect the device and the periphery and only get damaged by extensive surcharge. You must send the device to Telic or to your supplier.

The device doesn't log into the mobile data network

Possible issue source	Troubleshooting
The Telic SBC AVL 4G isn't in a mobile covered area.	Please check whether there is mobile reception in this area (e.g. using a cell phone) and move if needed to another area.
The SIM card in the SBC AVL 4G is new and has not yet been activated.	Please check, whether the SIM card is already activated. This can be done e.g. by putting the SIM card in your cell phone and checking whether or not your cell phone is able to log into a mobile network.
The SIM card has been locked by the provider.	Please check whether the SIM card is locked. This can be done e.g. by putting the SIM card into your cell phone and checking whether your cell phone is able to log into a mobile network. If it is not the case, then please try to make a phone call. If you are successful, the SIM card is not locked.
The prepaid bonus is exhausted.	Please recharge the SIM card placed in the device.
The prepaid SIM card is no longer valid.	Prepaid SIM cards will lose their validity, if they aren't reloaded on a regular basis (often after 12 or 24 months). In this case usually you must buy a new SIM card.
The PIN code of the card hasn't been deactivated Respectively The PIN on the SIM card is not corresponding to "0000".	Please remove the SIM card from the device and check the PIN code. The PIN code must be deactivated or must be set to "0000". After a triple wrong entry of the PIN, unblocking the SIM card requires the PUK.
The SIM card hasn't been inserted into the SIM card holder in the correct way.	Please check the correct position of the SIM card in the card holder.
The mobile data service is not yet activated.	Please ask your provider whether the mobile data function is already activated for the SIM card in use.

Collection of device's software traces

Collection of device's software traces
In case the device does not work properly, the software traces collection of the device is recommended.

The traces include, in addition to the complete configuration, all the information concerning the various hardware modules of the device and allow to understand the cause of the issue.

Either micro USB or RS232 LV-TTL interface of the device can be used to capture traces.
When traces are collected via micro-USB, the device will never go in stand-by (sleep mode).
When using the RS232 LV-TTL interface, the device will be able to go in stand-by mode (if its power mode entails this).
Then the RS232 LV-TTL interface must be used in case you need to analyse the behaviour of the device when entering/leaving the sleep mode.

The micro USB interface is set by default.
To select the RS232 LV-TTL interface, the following command must be given the device:
XCONFIG=010,,,,,,,,,,,,,,1
(Or 00C1{6 digits IMEI}010,,,,,,,,,,,,,,1)
To go back to the micro-USB interface, the following command must be given:
XCONFIG=010,,,,,,,,,,,,,,0
(Or 01C1{6 digits IMEI}010,,,,,,,,,,,,,,0)

The device will be connected, through either interface, to the USB port of a computer.

If the micro-USB interface of the device is used, a normal USB-micro USB cable will be needed.

In case of connection to the RS232 LV-TTL port of the device, a proper cable (item 16207) will be needed.
Such cable must be cut before the micro-USB connector; you will find then three wires with different colours (black, yellow, orange).
The black wire must be connected to the Pin 6 (Ground), the orange wire to the Pin 9 (LVTTL Rx), and the yellow wire to the Pin 10 (LVTTL Tx) of the Molex connector of the SBC AVL 4G.
To see and capture traces, a serial terminal program for debugging (such as Realterm) will have to be run by the computer.
This software will create a traces file that can be forwarded to Telic's support team for an in-depth analysis.