

# Telic Standard BC

## User Manual



**Version 1.2**

**Please check the version number of this document against the two first digits of the used Standard BC software version.**

**September 2009**

## 1 A Word in the Beginning

Thank you for your decision to purchase a remote surveillance module from Telic!

The remote surveillance modules of the Telic tracking product line belong to a highly-esteemed class of devices which are growing in popularity. The crucial factors are the numerous upgrades and performance enhancements which are made possible by using the latest GSM/GPRS technology as well as the price-performance ratio of these devices.

All information in this documentation has been carefully assembled and checked, but it is not to be considered as a guaranteed feature set of the device.

### Brands

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All further names and terms used can be brands or registered brands of their respective owners.

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Oberhaching, 02 September 2009  
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## 2 Hints for this User Manual

This documentation has been written for the users of the remote surveillance module Telic Standard BC.

A significant number of people have been working on this document, in order to provide you the best possible support during the use of the Standard BC.

Nevertheless if you find an error or if you have suggestions with respect to this documentation, please send an email to;

E-Mail: [support@Telic.de](mailto:support@Telic.de)

The intention of this documentation is to help you, with using the various functions of the device in an optimal way. Please go through this user manual carefully.

**The following described operating – and configuration possibilities are partly dependent on the tracking platform used in conjunction with the Standard BC. On enquiry you receive a manual from Telic, about how to configure the important parameters independent from the control centre via SMS (e.g. from a mobile phone).**

In case you are in a hurry and you want to familiarize yourself with the details of this product at a later stage, then please go directly to chapter 15 “Quick start” first.

There you can find all the relevant information to get the device into operation quickly.

## 3 Delivery Content



- Telic Standard BC remote control unit
- Combined GSM/GPS window antenna
- Cable to connect the Telic Standard BC remote control unit to the vehicle
- Mounting material

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## 5 Introduction

### 5.1 What is a remote surveillance module?

A remote surveillance module is the combination of a compact computer system with various interfaces, a GSM modem (mobile phone without a keypad or display), and a GPS receiver used to receive satellite-supported location information.

But, what does GPS mean?

GPS means "Global Positioning System". Originally, this satellite tracking system was developed by the U.S. Military for its own purposes.

A GPS receiver is able to determine its position on the Earth's surface and its height above sea level to within a few meters. To accomplish this amazing feat, 24 satellites at a height of 20,183 km continuously cross our planet in six different patterns. They continuously send location data and time signals using an atomic clock.

GPS receivers simultaneously receive the signals of up to 12 satellites and compare the time of reception with their own built-in clock. Since the satellites operate at different distances from the receiver, the signal delay indicates the distance of the various satellites to the remote surveillance module. Using this difference, the GPS receiver is able to calculate its own position.

In order to transmit three dimensional results - length, height, width - the signals from at least four satellites are necessary.

Through the combination of the above technology, the device can perform surveillance and control tasks and transfer the results to a user via SMS or GPRS – and all this for a price far less than that of a laptop or a PDA with comparable functions.

Remote surveillance modules are available with or without satellite-supported positioning. With the Telic Standard BC unit you have made the choice to use a device with satellite-supported positioning. Therefore, aside from all of the surveillance possibilities of the device, you can also find its precise location and react to any changes in its position.

### 5.2 Operational Range

The Telic standard BC unit is composed of two primary components: a GPS module and a GSM module.

The GPS module receives signals from the GPS satellites which are operated by the U.S. Department of Defense. These signals are available worldwide at every location. However, the precision of the positioning fluctuates. A thorough introduction to GPS can be found in Chapter 5.4, "Precision of the GPS-Position".

The GSM module is responsible for communication. It is a mobileular module working at 850 MHz / 900 MHz / 1800 MHz / 1900 MHz. It functions properly anywhere in the world as long as GSM coverage is available.

Thus, you can use your Telic standard BC device anywhere where you can receive network signals on your mobile phone.

This means for you: You will be able to locate your vehicle pretty much anywhere in the world!

The standard BC is designed for the following operating conditions:

#### **Automated Vehicle Location – AVL**

- Fleet-management
- Leasing
- Taxi / public transport

#### **Security tracking**

- Vehicles
- Precious goods

#### **Asset tracking**

- Containers
- Waggons
- Trailers

### 5.3 What does GPRS mean?

GPS and GPRS are two different things:

- GPS is a set of 24 satellites that send out positioning signals free of charge. These signals can be used to calculate the current position of a vehicle anywhere in the world.

- GPRS is a very cheap TCP/IP connection used to connect the Telic Standard BC unit to the internet. Data exchange using GPRS is much cheaper than data transmission using SMS messages.

In most cases, the billing of the connection of the device to the internet is not based on time but on the basis of data volume. Because the Telic standard BC sends very small amounts of data using the internet, many thousand status and position reports can be sent to the internet for a few Euros in most countries around the world.

If you want to use the GPRS interface of the Telic standard BC unit, the SIM card you are using must be enabled for using the GPRS service. Please contact the provider of your SIM card for information regarding this issue.

## 5.4 Precision of GPS position

The Global Positioning System (GPS) was developed in the early seventies by the U.S. Department of Defense. It is comprised of 24 satellites in various locations around the globe.



Due to the travel patterns of the satellites and their transmission technique, the precision of the data has its limits.

A GPS receiver calculates its position by differentiating the signal from several GPS satellites. The more satellite signals it receives, the greater the precision. With a clear view of the sky, up to 12 satellite signals can be received. In order to receive a valid position, a minimum of three satellite signals are necessary. In an open field this is no problem. If the vehicle is standing still, precision of a meter or less can be achieved.

Unfortunately, we are not always presented with such ideal terrain. In the city, for instance, several problems can present themselves.

For example, shading; This means, one or more satellites are blocked out by high buildings. It is then perhaps the case that signals can only be received from some of the west, north, and south satellites, but all of the east satellites are completely blocked. This is also the case when the vehicle is stationary (or parked) close to a building.

Another source of imprecision is reflections. The signals sent out from the GPS satellites are radio signals which spread out in waves which can possibly be reflected by, for instance, large metal surfaces. Due to this

reflection, the GPS module may not receive the signal directly, but rather reflected from another wall. As a result, the signal propagation delay is changed and a declination results. In areas with high density and high buildings, this can result in miscalculations of tens of meters!

A navigation system attempts to compensate for such problems by taking into account that you are moving, and also by checking to see if the received GPS positions make sense compared to the route being driven (You would not turn and drive into a field 100 meters before an intersection).

A remote surveillance module cannot and should not use such tricks.

## 5.5 What do you need to use the Standard BC?

Having the advantages of the Standard BC in mind the following question comes up: which additional components are necessary for the operation of the device?

To use the functionality of Telic Standard BC, it is essential to operate it together with a tracking service or tracking SW. If you didn't purchase the Standard BC together with a tracking service or SW, please contact your supplier or Telic for further information in order to be sure you are making the best use of the Telic Standard BC's features and options.

### 5.5.1 Power supply

The remote surveillance module needs to be connected to a power source (7 volt - 36 volt direct current). It can be powered by a car battery, a rechargeable battery or a power plug with suitable adapter.

### 5.5.2 Antennas

In order to use the device, a combined antenna or two antennas are needed:

- a GSM quad band (900 MHz / 950 MHz / 1800 MHz / 1900 MHz) antenna to communicate over the mobile network
- an antenna to receive GPS position satellite signals

The antenna included with the Telic Standard BC device is a combined GSM/GPS quad band antenna. This makes mounting the antenna inside the vehicle as easy as possible.

Under certain circumstances, it may be necessary to use special antennas. In such a case, the enclosed antennas may conflict with other devices with the same electrical value.

Other antennas, e.g. roof antennas, and other useful additional devices can be found [www.Telic.de](http://www.Telic.de) or on request [info@telic.de](mailto:info@telic.de).

### 5.5.3 Mobile GSM Network SIM-Card

The messages of the Standard BC are transmitted via the mobile GSM network. Therefore you need a standard 3 Volts or 1.8 Volts SIM card. This can be either a prepaid or a postpaid SIM card.

### 5.5.4 Please give preference to postpaid SIM cards!!

Prepaid SIM cards have the advantage that they don't produce fixed costs, but they have the disadvantage that the credit of the prepaid SIM-card will run out eventually. If a prepaid SIM is used and the credit runs out the Standard BC will not be able to send anymore status messages. To avoid this, we don't recommend using prepaid SIM cards, since the device would be rendered useless in the situation where all the credit on the SIM is depleted.

## 5.6 Operation set-up

The remote surveillance module can be installed using the following six steps:

### 5.6.1 First Step: Open the Device



Please open the SIM card cover by sliding the cover in the direction of the red arrow.

The SIM card cover can be found on top of the device below the three LEDs.

## 5.6.2 Second Step: Insert the SIM card

Before the Standard BC logs into the mobile GSM network, it checks whether the used SIM card is PIN free. If it is PIN free, it will start normal operation.

If the SIM card is not PIN free, it has to be assured, that the PIN is set to "0000" before it has been inserted. The PIN can be changed using a normal GSM mobile phone.

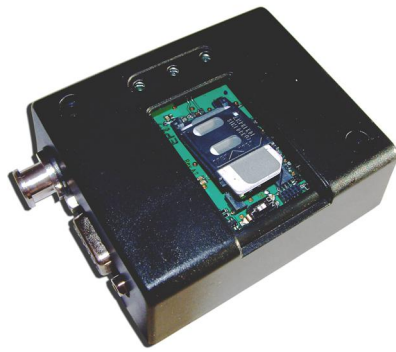
To speed up the log-in into the GSM network, the SIM card should contain only a small number or no phone book entries.

The insertion of the SIM card into the Standard BC is as easy as for your mobile phone:

- Put the device next to you on the desk as follows: the slider of the SIM card cover must point to the ceiling and the three LEDs should be above the SIM card cover.
- Slide the SIM card cover carefully away from yourself towards the direction of the arrow between the two words "OPEN"



Carefully fold the card reader upwards (see picture)



- 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.
- As result, the gold contacts of the SIM card should be facing down
- Fold the SIM card holder back into its original position and slide the lock back towards your body
- If you cannot close the SIM card holder, you probably inserted the SIM card in a wrong direction

With this step you have finished the SIM card installation



### 5.6.3 Third Step: Replace the Cover

Please slide the SIM card cover back into its original position and ensure that the SIM card cover locks audibly.

## 5.6.4 Fourth Step: Connecting the antennas

The device is equipped with connectors for a cellular network antenna (GSM antenna) and a satellite antenna (GPS antenna).

Please connect now the two antennas according to the picture below. You cannot mix the two antennas because they have different connectors.



Connector for GSM-antenna



Connector for the GPS-antenna

## 5.6.5 Fifth Step: Connecting the Unit to the vehicle

Please connect the Telic Standard BC remote control unit to the vehicle according to the following instructions using the connection cable which is included with the device.

Do not connect the white connector to the Telic Standard BC remote control unit before all cables you intent to use are connected to the vehicle.

### 5.6.5.1 Power Supply

Depending on the intended method of operation, you can connect the device to the power supply in two different ways:

#### 5.6.5.1.1 The device must stay active after ignition off

This operating mode has the disadvantage, that the device even consumes power while the ignition is off. This means, that the battery of the vehicle can run out of energy, which means that the vehicle might not be able to start its engine after a number of days without use (depending on the size, age and charging level of the battery).

The advantage of this operating mode is, that the device is able to connect faster to the GSM network and it can find faster a new GPS position after ignition was switched from "OFF" to "ON". This means that working time calculations will be more precise. If the Telic Standard BC remote control unit is configured not to use the power save feature, then the device can detect and report in this mode that it is moving (e.g. if it is stolen or while a construction machine is transported on a truck) even when ignition is off.



To operate the Telic Standard BC remote control unit in this mode, the black wire must be connected to GROUND (pin 31 of the vehicle) and the red wire must be connected to VCC (pin 30 of the vehicle).

The brown wire must be connected to ignition (pin 15 of the vehicle) in this mode.

#### 5.6.5.1.2 The device must be switched off when ignition is switched off

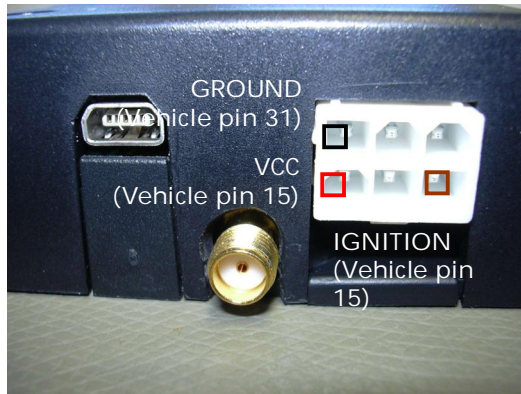
This operating mode has the advantage, that the device does not consume any power while the ignition is off. This means, that the battery of the vehicle cannot run out of energy and this means, that the vehicle will always be able to start its engine even after a few days without operation.

You can configure how long the Standard BC should stay awake. Furthermore you can configure the Input which wakes up the Standard BC again.

The disadvantage of this operating mode is that it takes the device longer to connect to the GSM network and it takes longer to find a new GPS position after ignition was switched from "OFF" to "ON". This means that for example working time calculations will be less precise.

In addition it can happen in this operating mode, that short trips are not registered at all.

If the Telic Standard BC remote control unit is configured not to use the power save feature, then the device can detect and report in this mode that it is moving (e.g. if it is stolen or while a construction machine is transported on a truck) even while ignition is off, but only as long as the internal backup battery can provide enough energy (typically a few hours)



To operate the Telic Standard BC remote control unit in this mode, the black wire must be connected to GROUND (pin 31 of the vehicle) and the red wire and the brown wire must be connected to IGNITION (pin 15 of the vehicle).

Even if you connect the device according to the scheme above, to the cigarette lighter and if the cigarette lighter is switched on and off together with the IGNITION (which is the case in most vehicles) the routes driven by the vehicle will be reported correctly.

#### 5.6.5.1.3 Fuses

The device contains internal fuses to protect it against (e.g. 36 V) high voltage and incorrect wiring to the vehicle.

These fuses cannot be changed by the user. So please pay attention while installing the device.

If you think the fuses are damaged (which should not occur in a 12 volt / 24 volt vehicle), then please get contact your supplier.

## 5.6.5.2 Digital Input 1 (Ignition)



The Digital Input 1 can be connected to any signal which reports "ON" or "OFF". The Input can be used with a voltage up to 36 volts.

The colour of the wire of Digital Input 1 is green.

- Voltages between 0 volt and 1 volt are detected as "low"
- Voltages between 7 and 36 volt are detected as "high"

## 5.6.5.3 Digital Input 2



The Digital Input 2 can be connected to any signal which reports "ON" or "OFF". The Input can be used with a voltage up to 36 volts.

The colour of the wire for Digital Input 2 is brown.

- Voltages between 0 volt and 1 volt are detected as "low"
- Voltages between 7 and 36 volt are detected as "high"

## 5.6.5.4 Digital Input 3 / Power Supply



As well the power supply as the Digital Input 3 can be connected to any signal which reports "ON" or "OFF". The Input can be used with a voltage up to 36 volt.

The colour of the wire for Digital Input 3 is red.

- Voltages between 0 volt and 1 volt are detected as "low"
- Voltages between 7 and 36 volt are detected as "high"

## 5.6.5.5 .Digital Input 4



The Digital Input 4 can be connected to any signal which reports "ON" or "OFF". The Input can be used with a voltage up to 36 volt.

The colour of the wire for Digital Input 4 is white.

- Voltages between 0 volt and 1 volt are detected as "low"
- Voltages between 7 and 36 volt are detected as "high"

## 5.6.5.6 Digital Output



The digital output can be switched with an SMS command or with a GPRS command (have a look at 9.1).

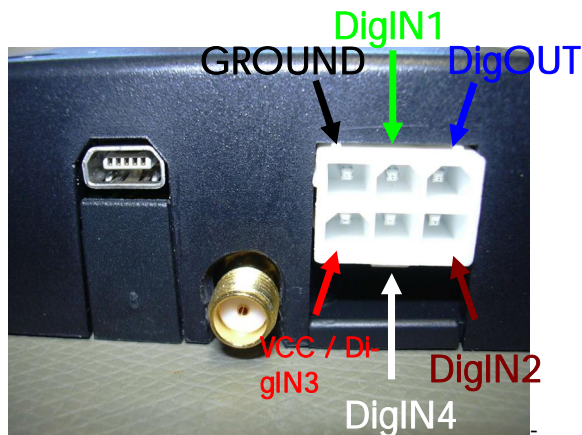
Kommentar [A1]: Korrektes Kapitel benennen!

The voltage provided by the digital output is the same as the devices power supply. A current of max. 400mA can be drawn from the output.

The colour of the wire for the Digital Output is blue.

## 5.6.5.7 Pin out and Colours of the Connector

Connector Description



Please note that the digital output provides VCC if it is activated. You should **never** connect this wire to GROUND. This can destroy the device.

If you do not use some of the wires of the connector, then please ensure, that these wires cannot accidentally come into contact with any metal parts of the vehicle.

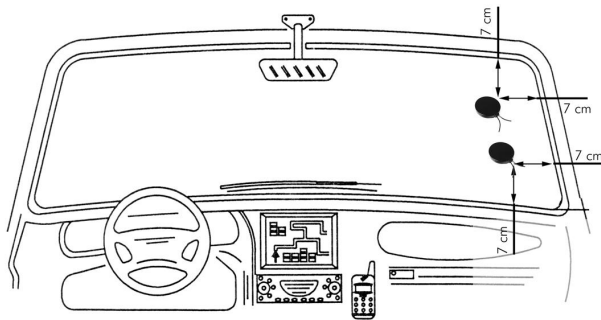
## 5.6.6 Sixth Step: Install the Remote Surveillance Module

In order to protect your vehicle from theft and vandalism, the device should be installed in a location where the device, its antennas and its power supply are well-hidden and where it is easy at the same time to switch the main switch of the device (located below the SIM card holder) on and off.

Using the corresponding two screws and holes in the device, please install the device at a suitable, dry location.

When installing the antennas, please be aware that the antennas must have a free view to the sky (not blocked by metal or liquids) in order to receive good signals.

The antenna should have a minimum distance of 7 cm to metallic components of the vehicle in each direction.



The included combined GSM/GPS antenna is only intended to be mounted inside the vehicle because the antenna cannot withstand a wet environment.

Other types of antennas (e.g. roof antennas) are available. Please contact your supplier of the device for more information.

A perfect place for the combined GSM/GPS window antenna is inside the vehicle, glued to the windshield with the adhesive side of the antenna under the white protection paper. Please clean the window with alcohol or similar and then remove the white paper in order to fix the antenna at the desired place.



If you choose another place for the antenna please ensure, that the side of the antenna with the white paper points towards the sky. This is important because this side of the antenna is the active one.

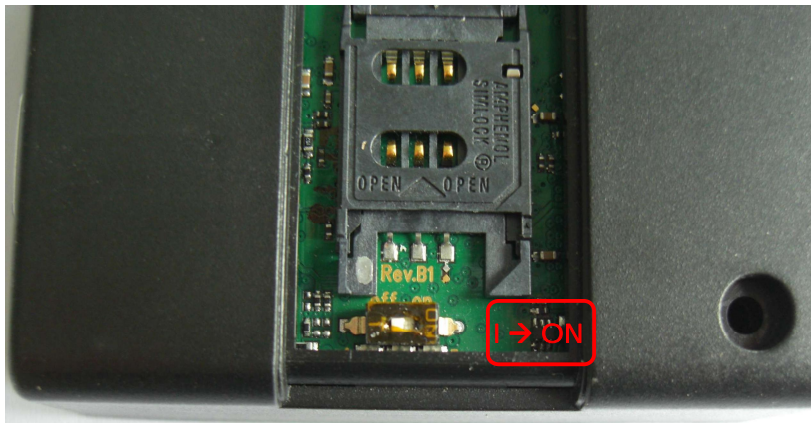
**Attention:**

A buckled, pinched or furled cable can, even if its isolation is not damaged, reduce the quality of the received signal significantly so that the devices functionality may be reduced.

Please also be aware that metallised windshields can strongly block the signals of the GPS satellites causing reception of the GPS position signals to be impossible.

In addition, the antenna should not be mounted behind the OFF position of the windscreen wiper.

### 5.6.7 Switching the device on and off



Normally the device is delivered by Telic with the power switch being switched on.

If the Telic Standard BC remote control unit is switched off, you can switch it on by moving the switch marked with ON/1 with a non metallic tool (e.g. a toothpick) from position "1" into the position marked with "ON". You can find the switch below the cover of the SIM card near to the edge of the device.

If you want to switch the device off, then please move the switch marked with ON/1 with a non metallic tool (e.g. a toothpick) from position "ON" into the position marked with "1".

Tip: The small label "1" of the switch does not mean "ON". "1" only indicates pin 1 of the switch.

## 6 Tracking using a tracking program or tracking server

The Use of the Telic Standard BC remote control unit on a tracking program or a tracking server is recommended for the most efficient use of the Telic Standard BC.

For setting up of the Telic Standard BC remote control unit, the Telic Standard BC has to be configured with the necessary data. For this purpose a configuration- SMS (Short Message) has to be sent to the device, which includes the relevant operating parameters (e.g. the IP address of the server, to which the tracking data has to be sent. Alternatively the configuration parameters can also be setup via the serial interface.

After the configuration of the relevant parameters, status messages will be generated and will be sent via GPRS. Together with the GPS-position and the status of the digital Inputs and Output will be additionally sent. More details for this can be found in chapter 13 "The status message"

## 7 General functionality of Telic Standard BC

The Telic Standard BC's primary task is to communicate GPS position data and additional status information via an existing TCP/IP connection as status messages.

If a message can't be communicated, it is stored in the device and will be sent later. The device can store a minimum of 1000 position messages.

The following events will create a position message:

- The end of a time period of x minutes (x is configurable).
- After a distance of x meters (straight line distance to the previous event) in any direction (x being configurable) has been travelled.
- 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 configurable).
- Changes of the status of the digital Inputs
- Cut off and Connect to the main power supply

After the switching on the Telic Standard BC remote control unit the internal GSM and GPS modules will be powered up.

As soon as the GSM module has successfully logged into the GSM network, all currently available GSM networks are recorded which allow use of GPRS with the SIM card inserted into the device.

Finally a TCP/IP connection to the tracking server will be established.

The selection of the GPRS provider takes approximately 1 minute in addition the login process for the control center software must be completed. This means, that it will take approximately 2-3 minutes after switching the device on until the first status report can be sent to the control centre.

Independent of this delay the first GPS positions will be recorded and will be stored as status reports inside the device until they can be sent to the control centre.

The first identified and valid GPS position will be taken as the reference position for the distance interval calculations. The next distance interval event will be generated if the configured distance has been travelled.

In the case of a direction change being greater than the configured angle while travelling at the configured minimum speed a position message will also be generated.

Activation of a digital input will cause the transmission of a status report. If no actual GPS position is available, the last known GPS position will be transmitted.

Each new status report sets a new reference point for distance calculations.

## 8 The digital Inputs

The Telic Standard BC remote control has 4 digital Inputs you can use as you like.

To detect a signal as “high” (logical 1) a voltage between 7 volts and 36 volts has to be applied. The input will be recognized as “low” (logical 0), if a voltage between 0 volts and 1 volt is applied. If the input is not connected it is recognized by the device as a “low”.

For each change of the digital input a status message including the latest valid GPS position will be sent to the control center

## 9 The digital Output

A change of the digital output can be triggered using a GPRS connection to a Server.

A changing the digital output via SMS (in 7-Bit text format, as is usual in a regular GSM-Mobile network device) is also possible.

### 9.1 Switching the digital Output

The digital output can be switched via GPRS or SMS. The related message is as follows:

00400088661

This SMS sets the digital output.

The message is composed of:

00 – Message-ID (free choice between 00 and 99)

40 – Code setting of the output

008866 – the first 6 numbers of the labelled serial number of the device.

x – Mask for change of the digital output, x: DOUT1

More details are described in the Software Protocol Specification.

## 9.2 Automatic answer of the digital output

If it has to be ensured that the output has been set or reset correctly it is possible to request an acknowledged message from the remote control unit.

This can be done via the Code 41.

Example: 00410088661 to be sent via SMS or GPRS

Reply:

0044008866TSBC0019,1,359563000008668,241006114259,1158  
72,480334,3,0,340,,,,,0,,1,00,223,217

This reply is transmitted according to the "return to sender" principle which means the reply to a request via SMS will be transmitted via SMS, and a reply to a request via GPRS will be transmitted via GPRS.

## 10 The analog Inputs

The analog inputs of the Telic Standard BC remote control unit reflect the actual status of the voltage supply of the Telic Standard BC remote control unit.

Within the transmitted data a numeric value is given between 0 and 255.

### 10.1 Supply-voltage (analog Input 1, VCC)

The value of the analog Input 1 represents the voltage value of the supply voltage. 1 Digit is equivalent to 128mV + Offset 6,0V.

### 10.2 Battery-voltage (analog Input 2)

The value of the analog Input 2 represents the voltage value of the internal battery. 1 Digit is equivalent to 19,8mV.

## 11 The serial Interface

The Telic Standard BC remote control unit provides a serial interface with a female DSUB-9 connector.

This interface can be used for the following purposes:

- Access to external devices such as displays or other input/ output devices

- To read out status information while using the Standard BC (Tracefiles)



Please get into contact with Telic GmbH, to define your operating conditions for the serial interface.

## 12 Other features

### 12.1 Testing the device

After insatalling the device inside the vehicle we strongly recommend verifying the proper installation as follows:

#### 12.1.1 Verification using the LEDs



The device has four LEDs. The blinking patterns of these LEDs can give you valuable information about the proper function of the device:

Assigned indicator	Meaning
--------------------	---------

Assigned indicator	Meaning
<p style="text-align: center;">Right indicator</p>	<p>This LED blinks yellow and indicates the status of the GPS-receiver.</p> <p>off:                    GPS is not switched on</p> <p><b>1 time blinking</b>    position acquisition not possible</p> <p><b>2 times blinking</b>    2D-Fix (no valid height)</p> <p><b>3 times blinking</b>    3D-Fix (GPS data are complete)</p> <p>After start-up as well as after a phase without GPS reception the device only accepts 3D GPS positions. This ensures, that 2D position reports with serious deviations from the real position are not reported to the control centre.</p> <p>After a while, 2D position reports are accepted because the GPS receiver has had enough time to properly evaluate the signal quality of all available GPS satellites.</p>
<p style="text-align: center;">Middle indicator</p>	<p>The middle indicator consists of two LEDs, a green and a red one.</p> <p>The green LED will be permanently on, when the Telic Standard BC has external power supply.</p> <p>The red LED indicates if the internal backup battery is currently charged.</p> <p>Please note: If the LED in the middle is off, this does not mean, that the Telic Standard BC remote control unit has been switched off. Instead, this means, that the device currently does not receive any power from an external power source.</p>

Assigned indicator	Meaning
Left indicator	The green LED reflects the GSM status and also, whether the device is switched on.
	off the GSM module is not switched on
	Permanently on GSM is switched on, but no GSM networks are available.
	Blinking once Device is logged into the GSM network, GPRS available, no connection to the server
Blinking twice Device is logged into GSM network, GPRS is available, TCP/IP connection to the server is established	

### 12.1.2 The test transmission

All devices which are delivered from Telic have been tested by an acceptance inspection.

After you have configured your device and verified that all LEDs are showing the expected blinking patterns we strongly recommend sending a test transmission of a status report as follows:

- Park your vehicle at a place with a good view to the sky.
- Switch the ignition on. It is not necessary that the engine is running.
- Wait minimum 5 minutes
- Switch off the ignition

Now you should see an actual position report in your control centre software. Details regarding your control centre software and functionality are available from your supplier.

### 12.2 Data buffering in case of bad GSM network

In areas of weak or non existing GSM network coverage the device buffers the data meant for transmission in its internal data memory until GSM coverage is available.

This data memory stores the data even if the power supply of the device is temporarily interrupted. The data memory is capable of storing around 1.000 status messages.

If further data needs to be stored, even though the data memory is already entirely used, the oldest data set will be erased and replaced by the newest one.

The data will be sent to the control server as soon as the connection to a mobile phone network can be re-established. The oldest status report will be sent first.

While sending previously recorded status reports, newly generated status reports will be sent immediately which means that sending the older status reports will be interrupted for a short while.

### 12.3 Automatic switch off of the Telic Standard BC

If the external power supply of Telic Standard BC is interrupted (e.g. if the power supply is controlled by the ignition) and if as a result the charge in the internal battery is exhausted, the Standard BC remote control unit switches off automatically.

Even though in this status there is no external Power supply anymore, all relevant operation parameters, the configuration settings as well as the content of the data buffer remain stored.

By reconnecting the external power supply (e.g. Ignition on), the Telic Standard BC is automatically switched on again.

### 12.4 The integrated Watchdogs

The Standard BC has different integrated watchdogs. They automatically check the functions of the device and generate resets as soon as they recognise any malfunction.

A malfunction could occur due to internal problems of the device, problems related to the GSM connection, problems with the GPS reception and many more.

Due to this watchdog it is assured that the Standard BC is able to automatically return to stable operation if necessary.

Control of the watchdogs by the user is not necessary.

If the watchdog has to restart the device it may happen that some of the position messages and respectively events are not logged and as a result are not transmitted to the tracking server.

## 12.5 Assisted GPS (A-GPS)

The ephemeris data (adjustment of the orbit data of satellites) of the GPS system become obsolete within 3 hours. This means that the GPS receiver has to reload them to assist a first position if the last GPS fix (position) is older than 3 hours. To do this as fast and reliable as possible the A-GPS function has to be activated. This function permits the Standard BC track to download the actual ephemeris data via GPRS instead of the conventional (much slower and more unreliable) way direct from the satellites.

## 13 The status message

Status messages are data sets generated as a result of different event types. Status messages will be sent immediately after they occur or out of the database if previously stored.

You can define the way the messages are transmitted to the control centre for every single status message. You can select between transmission via GPRS, transmission via SMS or transmission via GPRS **and** SMS.

Independent of the current configuration all messages are transmitted via SMS if there is no GPRS connection possible (e.g. congestion of the network or a bad GPRS network coverage). In this way it is assured that almost every message is transmitted to the control centre in time.

The event-mask provides the opportunity to enlarge the status message with some more information which is not usually necessary for normal use. You can read out the quality of the GPS-signal, MSC (Message Code: recognition of the country) or MNC (Mobile network code: to identify the network provider). This is meant for security scenarios, to receive more information about location and status of the device.

### 13.1 Content of a status message

Content	Description
Event/Log - Code	Reason for the status message
Event/Log Timestamp	Time at which the event has happened
GPS Timestamp	GPS timestamp at the moment of acquiring longitude and latitude

Content	Description
Longitude	Degrees of longitude in 100μ degrees
Latitude	Degrees of latitude in 100μ degrees
Fix Type	1,2 or 3, depending on the availability of satellites in view having a sufficient signal strength: 1D Fix (no valid data) 2D Fix (no height indication) 3D Fix (position message with height indication)
Speed over ground	Speed in km/h
Course over ground	Direction in degrees
Sats for calculation	Actual number of satellites which are used for calculation
Height	Height above sea level (in m)
Mileage	Distance in km
DigIns	4 digits e.g. 0010, if DigIn3 = High (Ignition on)

### 13.1.1 Event and Log Codes

This code indicates which event has triggered the status message.

Code	Description
1	Start-Up Event will be sent immediately after the switch-on (e.g. via ignition on) Includes the last stored GPS position, usually generated during "ignition off".
6	Direction Change Event Example: - Minimum speed: 6 km/h - Minimum change of direction: 30 degrees

Code	Description
11	Digital Input 1 changed from "low" to "high"
12	Digital Input 1 changed from "high" to "low"
13	Digital Input 2 changed from "low" to "high"
14	Digital Input 2 changed from "high" to "low"
15	Digital Input 3 changed from "low" to "high" (Connected to external power supply)
16	Digital Input 3 changed from "high" to "low" (no external power supply is connected)
17	Digital Input 4 changed from "low" to "high"
18	Digital Input 4 changed from "high" to "low"
30	Incoming Call Event - Standard BC sends an event message when the device is being contacted via voice call.
98	Configurable distance (in a straight line) has been travelled since the last creation of a status message
99	Configurable time period in seconds is elapsed and a related message is created

### 13.1.2 Odometer (in meters)

In the device an Odometer is implemented. The Odometer adds the covered distance and provides this value in meters.

The calculations are made based on GPS information. This can lead to deviations of up to 5% in normal traffic. At low speeds (e.g. parking, traffic jam,...) the deviation can be higher.

All information generated by the mileage counter is analysed by the control centre and can be used e.g. for a driver's log.

It is possible, to initialise the odometer in the device. This is useful when you mount the device into a vehicle that already has an odometer reading more than zero and the user wishes to synchronize the Standard BC odometer with the vehicles.

The odometer is a part of the basic configuration and can be adjusted via SMS or GPRS. Please be aware, that the numeric value has to be put in meters. So a distance of 83213 kms has to be entered as 83213000.

## 13.2 Sending strategies for status messages

### 13.2.1 Distance based status messages

One of the most significant tasks of the device is the tracing of routes. For this purpose distance based status messages are recommended

The device sends the event including GPS position, when it has travelled a distance greater than the configured distance.

Usually the time between messages will get significantly shorter when this feature is used in conjunction with the functionality described in chapter 13.2.2 "Direction change based status messages".

When these two methods are used in combination a typical cross country route will function as follows:

Position messages will happen more often at the beginning of a route (e.g. leaving an industrial or residential area).

On the highway position messages will be relatively seldom, as the route is straight forward.

In the target area (after leaving the highway onwards) the number of position messages will then again increase when entering in industrial or residential areas with frequent direction changes.

### 13.2.2 Direction change based status messages

The device will send a status message with position information when the driving direction has changed compared to the previously generated position by more than x degrees.

In the device an angle is configured, so that significant turning will always be recognized. This function can also be switched off using an event mask or another angle can be configured. Please contact your supplier if changes are required.

### 13.2.3 Status messages for certain events

The Telic Standard BC tracking and tracing module sends status messages for the following events:

Event	Description
Change in state of a digital Input	The Standard BC sends a status message always if a status of any Input has be changed.
Connection and disconnection of the external power supply	The Standard BC sends a status message as soon as the external Power supply be connected or disconnected (e.g. ignition on / off).

#### 13.2.4 The speed filter

The Telic Standard BC has an integrated speed filter for direction dependant status messages (see also chapter 13.2.2 "Direction change based status messages").

This filter prevents the sending of direction dependant status messages when the speed of the vehicle is lower than the configured value.

The advantage of this filter is that for example, if a digger is in action on a building site and is steadily turning around itself these turning movements won't be transmitted to the tracking server. Whereas in the case of transporting the digger to another site, all direction changes will precisely be taken into account so that the real route the digger made can be verified later on.

The higher the speed threshold is configured the later after a turn the direction change will be reported, as the vehicle usually needs a certain time after the direction change, until having achieved the min. speed for the direction dependant position message.

### 13.3 Hints for some special situations

#### 13.3.1 First position of a new route

The first position of a new route is always identical to the last position of the former route. If the device at the end of a route is switched off and is switched on again later at another site, the last position stored in the logbook (of the former route) will show up as the first position of the new route with the respective errors in the odometer reading.

Therefore it is not recommended, to switch off the device during transport from one site to another.

## 13.3.2 Last position of a new route

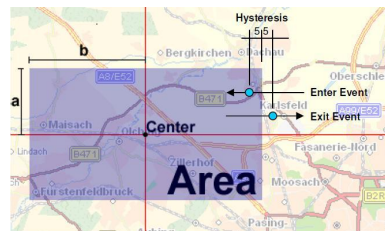
As soon as the ignition is switched off, the actual position is logged in non-volatile memory.

When starting-up the device the last ignition-off position will be read out of the memory and, once the clock is set, will be sent as an ignition-on position event. Nevertheless the clock can be set at the earliest when the GPS data includes a time stamp. So it might occur that the ignition-on position event will be sent delayed, especially when the GPS receiver has to readjust itself after being disconnected from the power supply.

## 14 Geofence

Geofencing (an electronic safety fence) provides the opportunity to set a geographic square around a defined location.

Here you can set different scenarios like “leaving the area” or “entering the area” and transmit an event to the control centre.



With the Standard BC you can monitor 50 geofence areas which can also be combined to create larger areas and build up a complex protection zone.

### 14.1 Position Lock Alarm

With the Position Lock Alarm you can monitor if the device leaves the actual position with a predefined periphery. The actual position is stored automatically if the ignition is turned off. If the Standard BC then leaves the defined square (e.g. a car theft) an alarm event will be generated and transmitted to the control centre.

Applications example:

A construction machine needs to be secured against burglary. The Standard BC has to be connected via car power cable to the ignition of the vehicle. After deactivating the Motor (and ignition) the actual position is stored. If the construction machine is moved (e.g on a trailer) out of the periphery, the Standard BC sends an alarm message.

For this operating condition, the Standard BC has to be always activated.

## 15 Quickstart

### 15.1 Hardware installation

Check activation of the SIM - card including GPRS option

Deactivate the using PIN of the SIM card using a mobile phone, or change it to "0000"

Put the SIM card into the device;

Therefore you have to open the SIM card cover. After inserting the Card, please close the Cover again.

Please pay attention to observe ESD protection measures.

Mount the device stationary in the vehicle

Connect the combined antenna (the antenna should have free view to the sky.

Connect power supply and ignition:

- Red and brown cable at ignition (vehicle pin 15)
- Black cable to GROUND (vehicle pin 31)

Connect the white connector to the device

Switch device with power on switch to "ON" ( found under the SIM card cover).

### 15.2 Quick test

Put the vehicle in an area where the tracking and tracing module has good GPS and GSM reception (free view of the sky in all directions). You can identify a good GPS signal when the GPS LED blinks green three times.

Please make sure you have good GSM reception. This is indicated by a slow once (or twice) blinking of the green LED in the left indicator.

## 16 Request and change of configuration:

The Telic Standard BC gets requests for actual configuration response and configuration changes either via SMS or via a TCP/IP connection per GPRS.

Sending a SMS to the device and having chosen the option with acknowledgement, this acknowledgement will be sent back to the sender of the original SMS.

Please contact your device supplier for help with this issue.

## 16.1 SIM card and provider specific paramters

### 16.1.1 PIN-Code of SIM card

The PIN of the SIM card will be assumed to be "0000". It is Also possible to use SIM cards with the PIN deactivated.

### 16.1.2 GPRS Parameters

The GPRS relevant parameters APN, user name and password have to be configured based on the information from the GSM network provider.

If you use a SIM card from another GSM network provider, you have to set up the new GRPS parameters using the configuration commands or configuration file.

For more information please get in contact with your supplier.

The Standard BC provides the opportunity to use preset SIM- and provider lists for each SIM card.

Please note that APN-Settings in the provider list (if used) have a higher priority than the general default APN setting.

## 16.2 System specific paramters

The device has following default configuration:

Parameter	Default Value
Distance between two waypoints	1500 m
GPS kilometer counter	0 m
GPRS Reconnect delay	60s
Address of Telic M2M-commserver	www.tellic.de

Parameter	Default Value
GPRS IP-Port	5002
Distance between two position events	5000 m
Direction Event	60 degrees and a minimum speed of 6 km/h
Acknowledge Mode	Activated With this configuration the amount of data to be transmitted per status report will be approx. 1/3 higher. On the other side this configuration ensures, that no data will be lost during its transmission from the Telic standard BC remote control unit to the control centre.

## 17 Error handling

There are a number of error sources, which can prevent the proper operation of the Telic Standard BC remote control unit.

This chapter can be used to help you detect and avoid the most common sources of errors and problems.

### Possible malfunctions:

The device shows no signs of life

Possible error source	Trouble shooting
The ON/1 switch is set to 1	<i>–Switch on the ON/1 switch located besides the SIM card by sliding it to ON.</i>
The unit is not connected correctly to your vehicle	<i>Please connect the unit to the vehicle according to the scheme in this manual</i>
On-board power supply failure or defective fuse	<i>you cannot fix this problem yourself. These fuses should protect the device and the periphery and only get damaged by extensive over voltage or current. You have to send the device to Telic</i>

The device cannot connect to a GSM network

Possible error source	Trouble shooting
The Telic Standard BC isn't in a GSM covered area.	<i>Please check whether there is GSM reception in this area (e.g. using a mobile phone) and move to another area.</i>
The GSM antenna is not properly attached or the antenna cable is defective	<i>Check to see if GSM antenna is properly attached and if the cable of the antenna is damaged</i>
The SIM card in the Standard BC is new and has not yet been activated	<i>Please check, whether the SIM card is already activated. This can be done e.g. ,by putting the SIM card into your mobile phone and checking, whether your mobile phone is able to log into a GSM network.</i>
The SIM card has been locked by the provider.	<i>Please check whether the SIM card is locked.</i>

Possible error source	Trouble shooting
	<i>This can be done e.g., by putting the SIM card into your mobile phone and checking, whether your mobile phone is able to log into a GSM network. If this not the case, than please try to make a phone call. If you are successful, the SIM card is definitely not locked.</i>
The prepaid credit is exhausted.	<i>Please recharge the SIM card being in the tracking and tracing module.</i>
The prepaid SIM card is no longer valid .	<i>Prepaid SIM cards will loose their validity, if they aren't recharged on a regular bases (often after 6 or 12 months). In this case usually you have to buy a new SIM card.</i>
The PIN code of the card hasn't been deactivated  or  The PIN on the SIM card is not corresponding to "0000".	<i>Please remove the SIM card from the device and check the PIN code.  The PIN code has to be deactivated respectively has to be at "0000".  After a triple wrong entry of the PIN, deblocking of the SIM card requires the PUK.</i>
The SIM card hasn't been inserted into the SIM card holder in the correct way	<i>Please check the correct position of the SIM card in the card holder.</i>

The device doesn't log into the GPRS network

Possible error source	Trouble shooting
The GPRS service is not yet activated	<i>Please ask your provider, whether the GPRS function is already activated for the used SIM card in use.</i>

The device doesn't receive GPS data

Possible error source	Trouble shooting
The GPS antenna is not connected	<i>Please correct the GPS antenna according to the scheme in this manual</i>
The GPS antenna has no free sight to the sky.	<i>Please be aware, that a GPS antenna needs always clear view of the sky.  In this case, the GPS antenna must be mounted outside the vehicle (e.g. on the roof) or behind the window. In case the glass of all windows is metalized you have to find another position.</i>
Your vehicle is placed in an unsuitable place.	<i>Please consider that a GPS reception is only possible in when free sight between the GPS receiver and the sky is possible.  Please move your vehicle used for the test to a more suitable location (no buildings nearby, outside a garage / factory etc..)</i>

Further hints regarding sources of error are indicated by the 4 LEDs of the 3 indicators, which are easily visible from outside the device.

Details for the meaning of the different colours and blinking signs can be found in chapter 12.1.1. "Verification based on the LED indications".

## 18 Power consumption

If your vehicle isn't used for a couple of days and the device is correctly connected, we recommend disconnecting the Telic Standard BC from the board net (by the ignition signal)

If the ignition is switched off the Standard BC will send a status message to the control centre using the internal LiPolymer battery it is still operable for a defined time. Hence the further operation may not discharge the car battery. By activating the ignition, the Standard BC is switched on again and continues its normal operation. While the power supply is connected, the internal battery is recharged.

## 19 Technical Data

Components	Description
Dimensions	77 mm(B) x 67 mm (L) x 26 mm(H)
Connectors	<ul style="list-style-type: none"> <li>- 1 serial connector, female</li> <li>- 1 FME antenna connector for GSM</li> <li>- 1 SMA antenna connector for GPS</li> <li>- 6 pin Molex I/O connector</li> <li>- Mini-USB - connector used only for production purposes</li> </ul>
LEDs	4 Status - LEDs to indicate the status of GPRS, GPS, On/battery charging
GSM/GPRS Modul	Quadband-GSM-Modul
GPS Modul	50 channel GPS receiver with A-GPS support
Backup battery	660mAh Lithium Polymer, 3,7 V
Operating Temperature	<p>-20°C ~ +60°C</p> <p>For the charging of the internal battery the temperature range should be between 0°C and +45°C to prevent the battery from ageing.</p>
Supply voltage	7V - 36V Direct current
Housing	Black plastic housing
Certificates	<p>ROHS- conformance</p> <p>CE certified - can be mounted with the delivered charging cable into vehicles..</p>

## 20 Accessories

Telic GmbH offers accessories for Standard BC which have been thoroughly tested and approved. Therefore we recommend using only accessories from Telic. Warranty claims can only be accepted if the Standard BC has been used with original Telic accessories.

Please contact your supplier or Telic GmbH for further information on original accessories for the Standard BC; recommended parts are

- Combined GSM/GPS antenna- Part-Nr. 16004-

Cable antenna with adhesive stripes for inside (window)  
ca. 3m cable included



- Connection cable for SBC - Part-Nr. 16007  
Connection cable for vehicle assembly included



- GPS-antenna - Partl-Nr. 16002  
cable antenna with a magnet, ca. 3m Cable



- GSM- antenna with magnet – Part-Nr. 12001- FME –  
connector and 2,5m cable



- GSM-angle antenna - Part-Nr. 12011-  
FME- connector, 90°, Quadband-Version



- GSM-roof screw antenna - Part-Nr. 12006-  
FME-Connector, 3m cable, waterproof



## 21 Document History

Revision	Datum	Changes
Rev 1.0	02.09.2009	first released version

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Deutschland

[www.telic.de](http://www.telic.de)

Note: Specification is subject to change without prior notice. No responsibility is taken for the correctness of this information.