elaman
GERMAN SECURITY SOLUTIONS

**Tracking Device GSM-GPS Module
GSM-A7**

Micro User Manual

GSM-GPS Module

GSM-A7
User's manual

Content

1. Description

The GSM-A7/Box is a GSM audio transmitter with integrated GPS module, motion detector and switched output.

The configuration and working parameters are controlled via SMS. It is possible to control the following parameters:
- Sensitivity of microphone input (8 steps)
- Working interval of the GPS receiver
- Output switch
- Motion detector

The status of the device and network information can be transmitted via SMS.

The GSM-A7 is available in two versions:
- The **GSM-A7/Box** is covered in a small sized robust waterproof aluminium box. Two magnets on the upper side allow of quick and easy installation. The device is equipped with an internal Lithium Ion accumulator and a charging unit.
- The **GSM-A7/Board** is designed for concealed installation. It is covered in a shrinking film and powered by an external battery.

2. Getting started

2.1. SIM card

An unlocked SIM card (3 V type) is required for operation of the GSM-A7. Save the phone number of SMS centre and a valid PIN on this SIM card by means of any mobile phone.

2.1.1. Phone number of SMS centre

Save the phone number of the SMS centre on SIM card according to the instructions given in the manual for the respective mobile phone.

2.1.2. PIN

For operation of the GSM-A7, you will need a SIM card with the PIN "0000". Save this PIN on the SIM card according to the instructions given in the manual for the respective mobile phone.

Alternatively, you can use a SIM card whose PIN check is switched off.

2.2. GSM-A7/Box

1. Insert SIM card into device:
   remove cover of the GSM-A7/Box, put SIM card into holder, reattach cover.
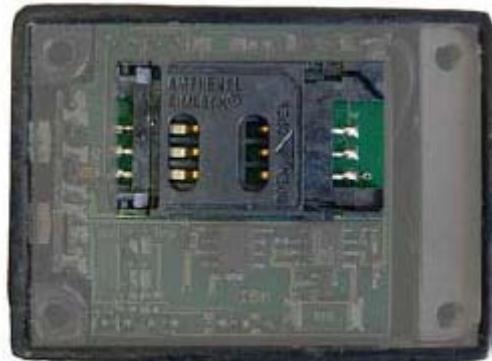
Fig. 1: SIM card holder

2. Charge the accumulator:
    remove switch-off-plug and connect battery charger to power supply socket [1].
    Charger LED [4] glows red while charging and will turn green when charging process is
    finished. GSM-A7/Box will be inactive during charging process.

    Alternatively, you may employ an external power source for the GSM A7/Box:
    a. Connect a power source of 10 – 24 V DC to power supply socket [1] by
        means of the power supply cable "12 V". A red status LED will be glowing for
        10 seconds after power supply is switched on.
        When using an external power source of 10 - 24 V DC, the internal
        accumulator will be recharged whereby charger LED [4] will be switched off.
    b. Connect a power source of 3.3 – 4.5 V DC to power supply socket [1] by
        means of the power supply cable "4 V".
        When using an external power source of 3.3 – 4.5 V DC, the internal
        accumulator will be switched off.

        CAUTION: Power supply input of 3.3 – 4.5 V has no inverse-polarity
        protection!

3. Connect GSM aerial, GPS aerial and microphone to corresponding sockets.

2.3. GSM-A7/Board

1. Insert SIM card into device (see 8.2 GSM-A7/Board)

2. Connect the external power supply (red – plus).

2.4. Initialization

Initialization will start after the switch-off-plug has been removed.
GSM-A7 will be logged in to GSM network during initialization phase. At the same time red and green status LED's will flash simultaneously.

After successful log-in to GSM network, red and green status LED's will flash alternately for 5 seconds.

In case there is no GSM signal available where the GSM-A7 is located, both status LED's will go out after 2 minutes and the GSM-A7 will either be put into stand-by mode (movement sensor is activated) or its initialization will start anew.

3. Operation of the GSM-A7

The GSM-A7/Box will be switched on by removing the switch-off-plug.

The GSM-A7/Board will be switched on by connecting the external power supply.

3.1. Stand-by mode

In this mode, the movement sensor must be active (see Fehler! Verweisquelle konnte nicht gefunden werden. Table of functions). If the movement sensor has not recognized any activity for a changeable delay time, the GSM-A7 will be put into the energy-saving stand-by mode, i.e. the GSM modem and GPS receiver will be switched off but the sensor will be monitored permanently.

3.2. Audio monitoring

Use any telephone and dial the phone number of the GSM-A7's SIM card. In doing so, the connection will be established automatically and the audio information will be transmitted within the receiving range of an active microphone.

> **Note**
> GSM-A7 is answering the call depending on the ROAM list
> (see 6.1 Control commands)

3.3. Termination of audio monitoring

The GSM-A7 will be reset to stand-by mode after termination of audio monitoring. This will also occur when the movement sensor has not recognized any activity for the configured delay time.

3.4. Switching off

Connect the switch-off plug to the power supply socket [1] to switch off the GSM-A7/Box.

The GSM-A7/Board will be switched off by disconnecting the power supply.

4. GPS Data

4.1. GPS-Data via SMS

If the GPS receiver is switched on the position data will be transmitted via SMS with a changeable format. The first fix will be transmitted one minute after switching on. All following fixes will be transmitted corresponding to the configured interval.

To ensure an intelligent power management the PowerSave mode can be used. In this mode the GPS receiver will be switched off after transmitting the fix and switched on one minute before transmitting the following fix.

4.2. GPS-Data via Online-Modus

When data connection to GSM-A7 is established, a GPS receiver will be activated whose tracking data will then be transmitted at an interval of 1 second (preset data protocol 1 or 2).

5. Software "IBH-GPS Viewer"

The software "IBH-GPS Viewer" is used to assess the quality of the GPS data. To do this the software has to be installed to a PC with USB connector and the GSM-A7 has to be connected to the PC (via connector [3]).

5.1. Installation of the USB driver

Connect the delivered USB data cable to an USB port of the PC. Insert the CD-ROM "IBH-GPS Viewer" in the drive. Open the hardware assistant to install the *USB Serial Converter*. Select the device driver from the CD (folder USB_98_ME\USB or USB_2000_XP\USB).

After successful installation the *USB Serial Converter* please install the *USB Serial Port* by the same way.

Note the number of the installed COM-Port to open a connection in the software "IBH-GPS Viewer". This number you can find in the hardware assistant (*COM and LPT*).

5.2. Installation of the software "IBH-GPS Viewer"

Start the file "IBH-Impex.exe" on the CD by double clicking to install the software "IBH-GPS Viewer".

5.3. Establishing connection to GPS receiver

Connect the USB data cable to socket [3] of the GSM-A7/Box. Pay attention to the colour-marked connections when connecting the data cable to the GSM-A7/Board.

Switch on the GSM-A7 and start "IBH – GPS Viewer" programme thereafter. Select "Options" from the "Settings" menu and adjust the COM port of the corresponding USB slot. Set the baud rate to 38400 bps.

If the settings are correct, a green indicator on the screen's bottom left will be flashing every second to signal the cyclic reception of NMEA data.
You may also activate a pop-up window showing the content of data records by selecting "data window" from the "Options" menu.

5.4. Verwenden der Software

Apart from bare tracking data (length, width, depth), the software displays data which serve to evaluate the positional accuracy (DOP). Position of satellites located above the receiving position is dispalyed in a circle diagram. Satellites are shown as small circles. The different numeric figures found in each circle indicate the number of the satellite. The colour of the circles indicate the read-out-status of the satellite signal: green satellites – used for position finding; blue satellites – currently read out; red satellites – known but not found yet.

Level display of satellites shows signal strength based on bandwidth. A satellite signal of max. 55dB-Hz can be received on earth. The GPS receiver used is capable of receiving signals which are below 15dB-Hz and reading them out.

The software can be used to improve the positioning of the GPS aerial. A different position under or within the vehicle may, for example, be sufficient to receive stronger signals of some satellites.

Moreover, start-up and the time-to-first-fix value can be easily evaluated:
Calculated switching-on/off of the GSM-A7, which means that the GPS receiver is activated at the same time, enables hot starts (switched off no longer than 2 hours) and warm starts (switched off longer than 2 hours). The necessary time of acquisition is diplayed in the "Fix Time" column.

6. Controlling the GSM-A7

Configuration and control of the GSM-A7 occur via text message (SMS). If desired, preset parameters can be retrieved.

Capitals or minuscule can be used for spelling. Space characters can also be used but they are not required.

6.1. Control commands

ID
The identification number can be configured individually by the user.
The ID my contain 11 alpha-numeric characters. If ID is used for the UKSP protocol, you should use the following format:
{Country}.{State(County/Province)}.{Authority}.{GPS receiver number}

Value range:	Country:	00 - 15
	State (County/Province)	00 - 31
	Authority:	00 - 63
	Receiver number:	00 - 63

Example: 05.07.14.33

GPS
The GPS command is used to switch on/off the GPS receiver. Additionally with this command are controlled the following functions:
- Test mode
  In this mode the position data will not be transmitted via SMS. The data output is happens only via connector [3].

- PS (PowerSave)
  In this mode the GPS receiver will be switched off after transmitting the fix and switched on one minute before transmitting the following fix.
- Interval
  The interval command controls the period of transmission the position data (setting range: 1 – 255 minutes).
- Data protocol
  It is possible to select one of three different protocols.

Sensor

The sensor command is used to switch on/off the internal movement sensor and for configuration of the delay time of this sensor.

Output

The output command switches the output contact to ground. In the mode "Automatic" the contact will be switched automatically during loss the GSM network.

Gain

The gain command is used to change the sensitivity of the microphone.

USER

The USER command is used to program up to two call numbers. This numbers are the destinations to transmit the SMS with position data.

LOWBAT

The LOWBAT command is used to program a call number. If the battery voltage goes lower than 3.3 V a message will be sent to LOWBAT.

ALARM

The ALARM command is used to program a call number. The working condition (GSM-A7 on/off) will be signalized to this number.

Roam

The Roam command is used to program up to five mobile country codes (MCC). The automatically establishment of the connection will be realized only for the programmed MCC.

If no MCC is programmed all calls will be accepted.

Timer
The TIMER command is used to program a start time and a delay time.
The time base is UTC.

6.2.   Table of functions

Command	Function	SMS	Alternative	Values
ID	Set ID	ID xx.xx.xx.xx	IDxx.xx.xx.xx	x: 0 … 9
GPS	Switch off	GPS Off	GPS 0	
	Switch on	GPS On	GPS 1	
	Test modus	GPS Test	GPS 2	
	Switch off PS	GPSPS Off	GPSPS 0	
	Switch on PS	GPSPS On	GPSPS 1	
	Interval	GPSINT x	GPSINTx	x: 1…255 min.
	Select protocol	Prot x	Protx	
Sensor	Switch off	Sensor Off	Sensor 0	
	Switch on	Sensor On	Sensor 1	
	also:			
	Switch off	BW Off	BW 0	
	Switch on	BW On	BW 1	
	Delay time	SDelay x	SDelayx	x: 1…255 min.
Output	Switch off	Output Off	Output 0	
	Switch on	Output On	Output 1	
	Automatic	Output Auto	Output 2	
Gain	Sensitivity	Gain x	Gainx	x: 0 … 7
		also:	*also*:	
		Mic x	Micx	
USER	Set call number	USERy x	USERyx	y: 1, 2
	Delete call number	USERy 0	USERy0	x: call number
LOWBAT	Set call number	LOWBAT x	LOWBATx	x: call number
	Delete call number	LOWBAT 0	LOWBAT0	
ALARM	Set call number	ALARM x	ALARM x	x: call number
	Delete call number	ALARM 0	ALARM 0	
Roam	Switch off roaming	Roam Off	Roam 0	1 – 5:
	Store roaming list	Roam Mcc1,…,Mcc5		MCC 3-digit
Timer	Set start time (UTC)	Timer hh:mm	Timerhh:mm	h: hour
				m: minute
	Delete Timer	Timer 0	Timer0	
	Delay time	TDelay x	TDelay x	x: 1…255 min.

*) Protocol 0: IBH, Protocol 1: UKSP, Protocol 2: specified by user

6.3. Configuration of the GSM-A7

The configuration of the GSM-A7 can be realized with the config command for any functions simultaneously.

Configuration string:

Type	Value	Note	Semicolon
ID	xx.xx.xx.xx		1
Gps	0, 1, 2	0 - GPS off 1 - GPS on 2 - GPS Test	2
Gpsps	0, 1	0 - Powersave off 1 - Powersave on	3
Gpsint	1 … 255	Interval (minutes)	4
Logint	1 … 255	(not implemented yet)	5
Prot	0, 1, 2	0 – IBH 1 – UKSP 2 – specified by user	6
Sensor	0, 1	0 – motion detector off 1 – motion detector on	7
SDelay	1 … 255	Delay time (minutes)	8
Output	0, 1, 2	0 – off 1 – switched 2 – switched whilst loss GSM connection	9
Gain	0 … 7	Sensitivity of the microphone (0 low)	10
User1	0, call number	0 - delete	11
User2	0, call number	0 - delete	12
LowBat	0, call number	0 - delete	13
Alarm	0, call number	0 - delete	14
Roam	0, MCC1, …, MCC5 (max)	0 - delete	15
Timer	0, hh:mm	0 - delete	16
TDelay	1 … 255	Dealy time (minutes)	17

Syntax:
config id;gps;gpsps;gpsint;logint;prot;sensor;sdelay;output;gain;user1;user2;lowbat;alarm;
mcc1,…,mcc5;timer;tdelay;

Please note:
1. Use the values as shown in the table above for the configuration string.
2. Complete each value with a semicolon. If one value is left out within the string, the semicolon has nevertheless to be put in.

Example:
config 13;1;0;2;10;1;1;10;0;3;017212345678;;017212345678;;262;;;

6.4. Retrieval of programmed state

Add rx to the text message entry to retrieve the status signal from the GSM-A7 (see also 6.5.1 Configuration settingsgs).

6.5. Status retrieval

You can retrieve configuration settings and GSM parameters via text message (SMS) by means of status retrieval.

6.5.1. Configuration settings

Retrieval of configuration settings occurs via text message (SMS):

Stat

Reply	
ID:	
*Gps:	ON/ OFF/ TEST, PS(PS ON, PS OFF), INT(1..255), Prot(IBH, UKSP, CUST)
*Sens:	ON/ OFF, SDELAY(1 ... 255)
*Out:	ON/ OFF/ AUTO
*Gain:	0 ... 7
*Bat:	x.x V
*USER1:	GPS_Number1
*Roam:	MCC1,...,MCC5/ ALL
*Timer:	hh:mm, TDELAY(1 ... 255)

Number

Reply	
ID:	
*USER1:	Destination 1 for position data
*USER2:	Destination 2 for position data
*LOWBAT:	Destination for "LOW BAT!" message
*ALARM:	Destination for message with working conditions

6.5.2. GSM parameters

Retrieval of GSM parameters occurs via text message (SMS):

Cell

Reply	
ID:	
*MCC :	Mobile Country Code of the main base station
*MNC :	Mobile Network Code of the main base station
*LAC :	Local Area Code of the main base station
*CI :	Cell-ID of the main base station
*RxLev:	relative input level of the main base station
*N1-N6:	ID and relative input level of the adjacent stations

6.5.3. Tracking data

Retrieval of tracking data occurs via text message (SMS):

Pos

GSM-A7 will send a formatted tracking text message (SMS) as reply.

If GPS receiver is switched off on reception of POS command, it will be switched on automatically by this command.

If GPS receiver cannot evaluate any position, an error message will be sent after 5 minutes as text message (SMS).

7. Technical data

GSM-A7

Closed circuit current	app. 200 µA (motion detector on, GSM and GPS off)
	app. 4 µA (switched off)
Charging current	app. 300 mA (external 12 V charging unit)
Current consumption (max.)	2 A (external 4 V power supply, internal battery off)
Internal battery (GSM-A7/Box only)	1000 mAh, Lithium-Ion, rechargeable
Operating time (with internal battery)	>12 h
	(operating conditions: PS ON, interval 2 min., max. output power, BW OFF)
GSM module	Wavecom Quadband GSM modem
Current consumption (max.)	2 A
Idle Mode	app. 15 mA
GPS module	Falcom SiRF III
Current consumption	app. 60 mA
GPS antenna	MK-76
Current consumption @ 2,85 V	app. 20 mA

Model No:	550 100 0015 (GSM-A7/Box)
	550 100 0018 (GSM-A7/Board)

8. Appendix

8.1. GSM-A7/Box

8.1.1. Connectors and LED's

connector [1] (Power supply)

connector [2] (Microphone)

connector [3] (Switching output/ GPS-Data)

LED [4] (Charging control)

connector [6] (GPS-antenna)

connector [5] (GSM-antenna)

8.1.2. Sockets

8.1.2.1. Socket [1] (5-binder)

|	
1	6-30 V Charging unit and external power supply, 500 mA
2	GND – charging display, shortcut to GND – charging unit
3	Switching input, shortcut to GND to switch internal battery
4	Input - external power supply 3.3 V – 4.5 V
5	GND

8.1.2.2. Socket [2] (3-binder)

1	Microphone input +
2	Microphone input -
3	Shield

8.1.2.3. Socket [3] (4-binder)

1	GND
2	Output – external power supply for supply of external devices
3	Switching output - GND, non-floating, max. 2 A
4	Data output

8.2. GSM-A7/Board

8.2.1. Sockets and LEDs
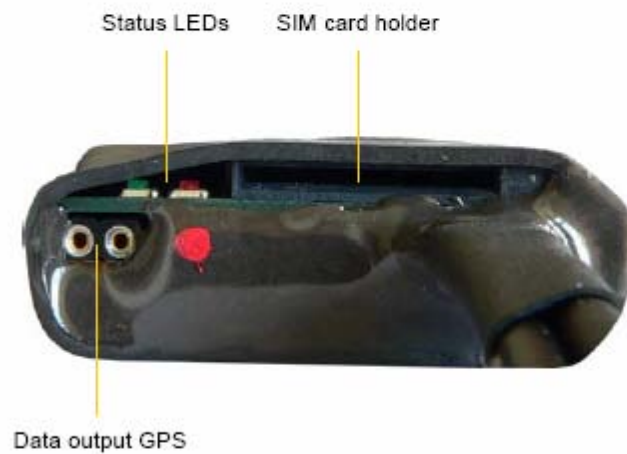
9. Support

9.1. Guarantee

It applies a legal guarantee period of 24 months for material and faulty manufacturing.
There is no further, explicit or tacit guarantee possible.
The manufacturer is not responsible for sequence damages.
The warranty claim expires if repairs or interventions are done by persons who were not authorized by the manufacturer.
Errors which occurred due to an inappropriate use of the device, incorrect maintains or the use of accessories or special accessories not advised by the manufacturer do not fall under guarantee.

It is in no case allowed to open the device.

Any installation procedures for the programs presuppose an in itself conflict-free operating system.
Problem solutions for it require either an intensive detail knowledge of the used system or its compromise less reconstruction.
The manufacturer does not take over any guarantee for that the programs or systems used by the user will furnish the striven utility.
Should any warranty return take place, it has before to be agreed by the manufacturer. Otherwise, it will not be handled.
The manufacturer does not take over any transport damages or transport insurances.
Any unfranked letter or parcel will not be accepted. If there is no error of the product found, a handling charge will be raised.

If you would like further Information about ELAMAN,
or would like to discuss a specific requirement or project, please contact us at: