

GSS-124

Device Specification

1 History

DVers.:	Date	Modified by	Changes	State
01	28.07.2016	PI-FG	Born	Release
02	23.08.2016	PI-FG	Additions and changes to phone book parameters and error codes	Release
03	05.10.2016	PI-JB	Additions and changes to phone book parameters and error codes	Changed
04	09.11.2016	PI-JB	Changes to phone book parameters and error codes	Changed

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3 Legal

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pikkerton GmbH
Kienhorststr. 70
13403 Berlin
Germany

Telephone: +49 (0) 30 3300724 -0
Fax: +49 (0) 30 3300724 -24
Internet: www.pikkerton.de

4 Definition of Symbols



The attention symbol refers to actions, which can cause damage to material or equipment.



The notice indicates necessary conditions for error-free operation. It picks out important details, makes the job easier, and gives tips and advice on the optimal use of hardware and software.

5 Device Configuration

The GSS-124 devices retrieve their settings from the SIM card's phone book. Entries in a SIM card's phone book have unique indices, a telephone number field and a text field. The GSS-124 devices use the phone number fields and text fields only (the entry index is not relevant). A text field of a phone book's entry is limited to max. 16 characters. Device settings which need more characters, will be spread across several phone book entries. **Attention: the entries for error code and counter values (00010, 60040, 60050) are absolutely necessary, the index of the entry does not matter.**

5.1 Phone Book Parameters

Telephone number	Parameter	Description	Type	Constraint	Default Value
00010	Error Code	Error code	-	-	0
Device name and location					
10010	Location [0..15]	device's location char 0 up to 15	ASCII string	ASCII	Home
10011	Location [16..31]	device's location char 16 up to 31			
10020	Name [0..15]	device's name char 0 up to 15	ASCII string	ASCII	GSS-124
10021	Name [16..31]	device's name char 16 up to 31			
GSM settings					
20010	APN [0..15]	APN address char 0 up to 15	IP/URL string	IP/URL syntax	empty
20011	APN [16..31]	APN address char 16 up to 31			
20012	APN [32..47]	APN address char 32 up to 47			
20020	APN User [0..15]	APN user name char 0 up to 15	ASCII string	ASCII	empty
20021	APN User [16..31]	APN user name char 16 up to 31			
20030	APN Password [0..15]	APN user's password char 0 up to 15	ASCII string	ASCII	empty
20031	APN Password [16..31]	APN user's password char 16 up to 31			
20040	Net Search Delay	max. delay between two net registration attempts	unsigned integer (seconds)	1 up to 86400 (max. 1 day)	5

20050	Net Registration Retries	maximum number of net registration attempts	unsigned integer	3 up to 100	10
FTP settings					
30010	FTP Server [0..15]	FTP server address char 0 up to 15	URL/IP string	URL/IP syntax	empty
30011	FTP Server [16..31]	FTP server address char 16 up to 31			
30012	FTP Server [32..47]	FTP server address char 32 up to 47			
30020	FTP User [0..15]	FTP user name char 0 up to 15	ASCII string	ASCII	empty
30021	FTP User [16..31]	FTP user name char 16 up to 31			
30030	FTP Password [0..15]	FTP user's password char 0 up to 15	ASCII string	ASCII	empty
30031	FTP Password [16..31]	FTP user's password char 16 up to 31			
30040	FTP Path [0..15]	FTP upload path char 0 up to 15	ASCII string	ASCII	/
30041	FTP Path [16..31]	FTP upload path char 16 up to 31			
30042	FTP Path [32..47]	FTP upload path char 32 up to 47			
30050	FTP Passive Mode	flag to en-/disable FTP passive connection mode	unsigned integer (0 / 1)	0 - disabled 1 - enabled	1
Device settings					
50010	Time Synchronization	flag to setup RTC time synchronization mode	unsigned integer (0 / 1)	0 - sync local 1 - sync GMT	0
50020	NTP Server IP	IP of NTP server	IP string	IP syntax	131.234.137.63
50030	Watchdog Interval	interval to trigger the HW watchdog to reset the device	unsigned integer (hours)	1 up to 720 (max. 30 days) 0 - disable	24
50040	Transmission Interval (TXT)	interval within data measurement and sending take place	unsigned integer (seconds)	60 up to 2592000 (max. 30 days)	60
50050	MSI Interval	Measurement interval	unsigned integer (seconds)	5 up to 86400	10
50060	Debug Output Enable	flag to en-/disable debug output via UART	unsigned integer (0 / 1)	0 - disabled 1 - enabled	0
50070	Auto Sleep Mode	flag to en-/disable device sleep mode	unsigned integer (0 / 1)	0 - disabled 1 - enabled	1
50080	Sending Retries	maximum number of sending attempts	unsigned integer	3 up to 100	3

50090	Multiple Entries	flag to en-/disable multiple csv entries	unsigned integer (0 / 1)	0 - disabled 1 - enabled	1
DI settings					
60010	Digital In Type	Type of digital input mode	unsigned integer (0 / 1)	0 - Counter 1 - Contact	0
60020	Debounce Time Counter 1	time to debounce pulses on counter 1 input pin	unsigned integer (milliseconds)	20 up to 10000	100
60030	Debounce Time Counter 2	time to debounce pulses on counter 2 input pin	unsigned integer (milliseconds)	20 up to 10000	100
60040	Counter 1 Current / Initial Value	if read, it shows the current count of counter 1, if written, it defines the initial count for counter 1	long unsigned integer	0 up to $2^{32}-1$	0
60050	Counter 2 Current / Initial Value	if read, it shows the current count of counter 2, if written, it defines the initial count for counter 2	long unsigned integer	0 up to $2^{32}-1$	0
AI settings					
70010	Channel 1 lower threshold	Channel 1 lower threshold	double	4.000 -20.000	4.000
70020	Channel 1 upper threshold	Channel 1 upper threshold	double	4.000 -20.000	20.000
70030	Channel 2 lower threshold	Channel 2 lower threshold	double	4.000 -20.000	4.000
70040	Channel 2 upper threshold	Channel 2 upper threshold	double	4.000 -20.000	20.000
70050	Channel 3 lower threshold	Channel 3 lower threshold	double	4.000 -20.000	4.000
70060	Channel 3 upper threshold	Channel 3 upper threshold	double	4.000 -20.000	20.000
70070	Channel 4 lower threshold	Channel 4 lower threshold	double	4.000 -20.000	4.000
70080	Channel 4 upper threshold	Channel 4 upper threshold	double	4.000 -20.000	20.000
70090	Hysteresis	Hysteresis of thresholds	unsigned integer	0 up to 100	0
Modbus settings					
80010	Baud Rate	Modbus baud rate	unsigned integer	110 - 921600	0
80020	Station Address 1	Station address 1	unsigned integer	1 – 247	0
80030	Register Address 1	Register address 1	unsigned integer	1 – 9999	0

80040	Station Address 2	Station address 2	unsigned integer	1 – 247	0
80050	Register Address 2	Register address 2	unsigned integer	1 – 9999	0
80060	Station Address 3	Station address 3	unsigned integer	1 – 247	0
80070	Register Address 3	Register address 3	unsigned integer	1 – 9999	0
80080	Station Address 4	Station address 4	unsigned integer	1 – 247	0
80090	Register Address 4	Register address 4	unsigned integer	1 – 9999	0
80100	Station Address 5	Station address 5	unsigned integer	1 – 247	0
80110	Register Address 5	Register address 5	unsigned integer	1 – 9999	0
80120	Station Address 6	Station address 6	unsigned integer	1 – 247	0
80130	Register Address 6	Register address 6	unsigned integer	1 – 9999	0
80140	Station Address 7	Station address 7	unsigned integer	1 – 247	0
80150	Register Address 7	Register address 7	unsigned integer	1 – 9999	0
80160	Station Address 8	Station address 8	unsigned integer	1 – 247	0
80170	Register Address 8	Register address 8	unsigned integer	1 - 9999	0

5.2 Configuration Hints

1. SIM card PIN 1 has either to be deactivated or to be set to “0000”, otherwise the SIM card cannot be used by GSS-124 devices
2. Attention: the entries for error code and counter values (00010, 60040, 60050) are absolutely necessary, the index of the entry does not matter. Otherwise the GSS-124 device will not start working properly.
3. It is mandatory to setup a valid APN address and a valid FTP server address. Otherwise the GSS-124 device will not start working properly.
4. All phone book text fields which hold device settings are strictly case sensitive
5. If you wish to disable the watchdog functionality, please set option “watchdog interval” to 0 (hours).

6 State and Error Indication

The GSS-124 device owns one yellow LED, which is used for error indication and one green LED, which is used for state indication. Both LEDs can either be blinking (0.5s on/0.5s off), flashing (0.125s on/0.125s off + 0.5s off) several times, or be turned off. The following table shows all LED states currently implemented.

6.1 LED States

State Index	LED Green	LED Yellow	Meaning
0	blinking	off	System is in normal state
1	off	blinking	System is in abnormal/unknown state
2	flashing 1x	off	Waiting for SIM PIN
3	flashing 2x	off	Searching for GSM network
4	flashing 3x	off	FTP Transmission successful
5	flashing 4x	off	not used
6	off	flashing 1x	SIM PIN Error
7	off	flashing 2x	GSM Error/ GSM network registration denied
8	off	flashing 3x	Error during FTP transmission occurred
9	off	flashing 4x	SIM phone book configuration error



If the device indicates any error, you can find detailed information in phone book entry with phone number 00010 (used for error codes).

6.2 Phone Book Error Codes

In addition to the device LEDs, phone book entry with phone number 00010 contains the last device error code. If no error has occurred during latest device operation, this phone book text field holds value '0'. If any error occurred during the latest device operation, it holds one of the values summarized in the following table.

Error Code	LED State Index (see LED state table)	Meaning
0	0 (normal)	no error
-1	9 (SIM CFG error)	Error code entry does not exist
-2	9 (SIM CFG error)	Invalid device name
-3	9 (SIM CFG error)	Invalid APN address
-4	9 (SIM CFG error)	Invalid APN user name
-5	9 (SIM CFG error)	Invalid APN user password
-6	9 (SIM CFG error)	Invalid TXT interval
-7	9 (SIM CFG error)	Invalid debounce time for counter 1
-8	9 (SIM CFG error)	Invalid debounce time for counter 2
-9	9 (SIM CFG error)	Invalid FTP server address
-10	9 (SIM CFG error)	Invalid FTP user name
-11	9 (SIM CFG error)	Invalid FTP user password
-12	9 (SIM CFG error)	Invalid FTP upload path
-13	9 (SIM CFG error)	Invalid FTP transmission mode
-14	9 (SIM CFG error)	Invalid time sync setting
-15	9 (SIM CFG error)	Invalid watchdog interval
-16	9 (SIM CFG error)	Invalid GSM net search delay
-17	9 (SIM CFG error)	Invalid nb. of GSM net registration retries
-18	9 (SIM CFG error)	Counter 1 entry does not exist
-19	9 (SIM CFG error)	Counter 2 entry does not exist
-20	7 (GSM error)	PPP service failed
-21	7 (GSM error)	GSM service failed
-22	8 (FTP error)	FTP service failed
-23	9 (SIM CFG error)	SIM card configuration failed
-24	7 (GSM error)	RTC time setup from GSM failed
-25	7 (GSM error)	PPP setup failed with current apn/user
-26	7 (GSM error)	FTP setup failed with current user/pw
-27	7 (GSM error)	latest transmission attempt failed
-28	9 (SIM CFG error)	Invalid value for msi interval



The error code field contains the code related to the latest device operation. If several errors occur at the same time, only the latest one occurred will be indicated here.

7 Data Transmission and CSV Format

The GSS-124 device transmits its data automatically if its TXT time interval has been reached, or its button has been pressed once (shortly). Every time a data transmission has been triggered manually (by button press), the device restarts waiting for complete time of TXT interval, until the next transmission will be retriggered.

If all required device settings have been setup (APN access/FTP access etc.), the device uploads a CSV file to the FTP server set. The name of the file is composed by a time stamp and the device's name with following syntax:

YYMMDD_HHMMSS_NAME.csv

If e.g. a measurement occurs on July the 26th, in year 2016 @ 10:30 am and 00 seconds, with device "GSS-Test" in city "Berlin", the resulting CSV file name will be:

160726_103000_GSS-Test.csv

In counter mode, the content of each CSV file consists of the counter values of pulse counter 1 and 2 and the values of each analog channel in one line. The values are separated by comma (PC1=xxxxx,PC2=xxxxx,AI1=xxxxx,AI2=xxxxx,AI3=xxxxx,AI4=xxxxx). In contact mode, the content of each CSV file consists of the contact states of contact 1 and 2 and the values of each analog channel (CONTACT1=state,CONTACT2=state,AI1=xxxxx,AI2=xxxxx,AI3=xxxxx,AI4=xxxxx). Each line is terminated by line feed.

If a CSV file e.g. holds following line: "PC1=10,PC2=33,AI1=4.000,AI2=9.150,AI3=12.500,AI4=0.000\n", this means that pulse counter 1 has a value of 10, pulse counter 2 has a value of 33, analog channel 1 has a value of 4.0 mA, analog channel 2 has a value of 9.15 mA, analog channel 3 has a value of 12.5 mA, analog channel 4 has a value of 0.0 mA (hint: line feed '\n' is not visible in standard file editor tools).

If Modbus is additionally switched on, the csv file is extended by eight entries of the register values.

8 Button functionality

The button of the GSS-124 has an advanced functionality that depends on the number of key strokes. The table below shows an overview of the functions.

Key strokes	Function
1x	Sending current sensor data via FTP (csv file)
2x	Sending current configuration data via FTP (text file)

9 Configurable intervals of GSS-124

The GSS-124 has two different internal intervals. Both intervals are configurable via SIM-Card.

MSI –Measurement Interval

The MSI is the length of the pause between two measurements. Measurements usually mean less power consumption than sending wireless messages. Therefore, it is advisable to send a message only if it is really necessary.

TXT – Transmit Interval

The TXT is the interval between two packets with service / readings.

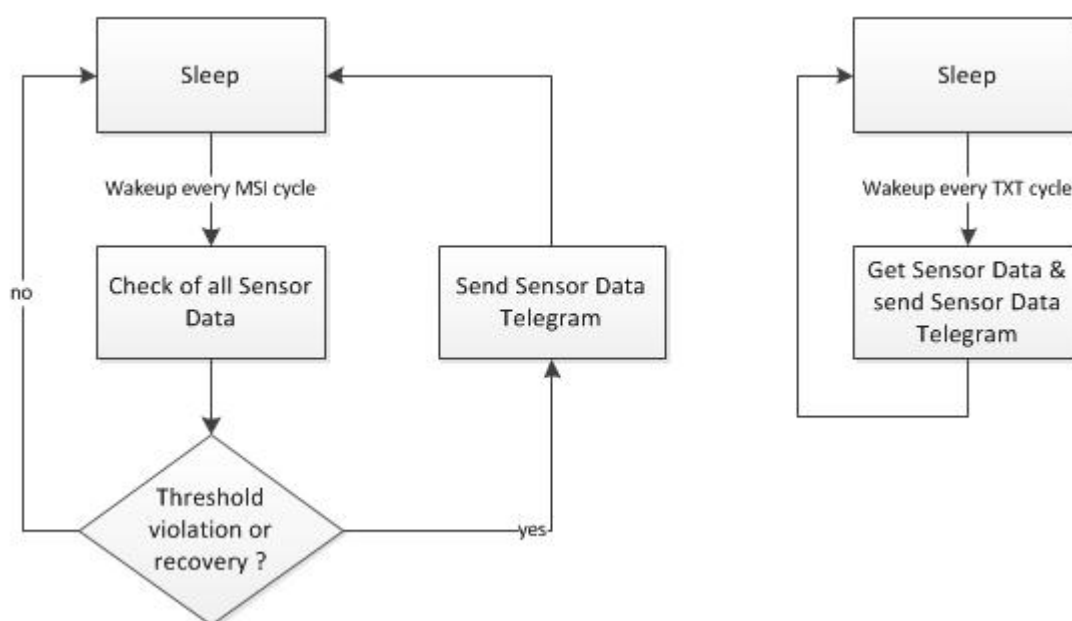


Figure 1 MSI and TXT-Interval Overview

10 GSM net registration / sending retries

For the log-in in the GSM network and sending sensor data, it is necessary to setup an amount of attempts. The amount of attempts is dependent on the link quality, GSM network status and the FTP server connection. In normal ambient values from 7 to 15 are sufficiently. In buildings and away from any GSM radio stations the repetitions must be increased accordingly. The default value is 3 repetitions.

11 Threshold and hysteresis of analog channels

Every analog channel has its own lower and upper threshold, which can be set via the corresponding SIM card parameters. If the measured value exceeds the lower threshold or exceeds the measured value the upper threshold, a message will be send. This message contain the current value, not a reference of the values which have exceeded the threshold. If the measured value again the range between the thresholds values a message will also be sent.

To avoid constant back and forth tilt to the threshold limits, a hysteresis can be set. One hysteresis for all channels is available. The hysteresis in percent indicates how much has to be exceeded or fallen below the threshold value to be within the normal range.