GS1000A

Patrol Tour Terminal

M95-5021A

GS1000 IMPORTANT NOTICE

In order to assure the Date/Time you set into GS1000 unit is correct , you must follow the procedures as below to check .This means after you use GS Monitor software to Set Time into GS1000 unit every time , you must check if the Date/Time you set into the unit is correct .

1. Set-Time is done from the Computer .
2. Disconnect the GS1000 unit from the Computer .
3. Take GS1000 unit to read some tags .
4. Connect GS1000 unit with the Computer and get LOGIN again with the GS Monitor software .
5. Click "UPLOAD" to upload the data from GS1000 unit to the Computer The Display window should show the data with the format as below :

Rec#	Mach#	ID-CODE	Date	Time
Rec number	Machine ID#	Tag's code	YYYY/MM/DD	HH:mm:ss

6. Check the above Date YYYY/MM/DD and Time HH:mm:ss to see if they are correct .
7. You can start using GS1000 unit only after you have assured the Date/Time on the GS1000 unit is correct .

Important Notice! New Features of GS1000A

This Manual refers to a new improved version of GS1000 terminal. Notable improvements/additions include:

- Bigger data memory increases record capacity to 14320 records
- New database memory design dramatically improves reliability
- Extended communications protocol features several new commands
- Improved buzzer and LED signaling provides better visual clues into device operation and status
- Finally, internal device firmware can now be upgraded via Serial port.

Attention! New Firmware Management mode (FMM)

The GS1000A has two different modes of operation. Normal mode provides regular device functionality and is largely compatible with the original GS1000 operation (see Section 1 for details).

New Firmware Management mode (FMM) is provided for internal firmware checkup and upgrades (Section 4).

The Normal mode is entered by switching the GS1000A on while *not* pressing the Scan button. Switching the GS1000A on while holding the Scan Button down forces the unit into the FMM. The mode of operation cannot be exited other than by switching the GS1000A off and powering it on again.

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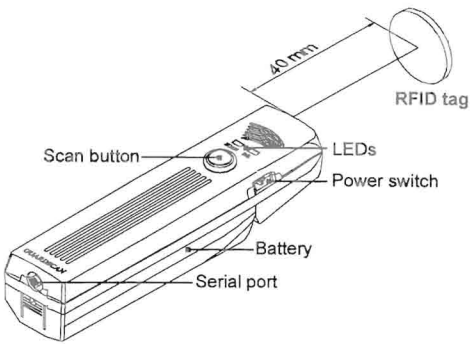
Revision: 1.0-a (10/04/2000)

1. Using the GS1000A



Switching the GS1000A on and off

To switch the GS1000A on for normal operation, slide the Power switch located on the side of the unit while *not* pressing the Scan button. Switching the GS1000A on while keeping the Scan button pressed forces the device into a special Firmware Management mode (FMM, see Section 4 for details).

When powered up, the GS1000A switches both Scan and B/L LEDs on and performs a firmware check. Upon successful test completion, the unit enters a Normal mode of operation[1]. What happens next depends on whether Serial cable is plugged into the GS1000A or not.

If the cable is not plugged, then the GS1000A will beep and blink Scan LED twice, then go into standby. Device consumes minimal power in this state and will typically last 3-5 weeks on a single battery charge.

If the cable is plugged, then the GS1000A will beep and its Scan LED will start blinking steadily- the unit is ready for communications with PC. Note that GS1000A will only detect "live" cable, i.e. the one that is connected to the working PC.

[1] In an unlikely event of test failure, the unit will quickly blink both LEDs for 2 seconds and seize operation. In this case you may need to use the Firmware Management mode to check firmware validity and/or download new firmware. See Section 4 for details.

Scanning (reading) RFID Tags

RFID tags can only be read if the GS1000A is in the Normal mode of operation and "live" serial cable is not plugged into the unit. To read a tag, position the GS1000A in front of the tag as shown on the picture on page 3, then press and hold the Scan button- Scan LED will be switched on. One long beep will be generated upon successful read and the database record will be added to the GS1000A memory.

If no tag is read within 10 seconds from the moment the Scan button is pressed, the scanning is disabled automatically.

Low memory status

When there is less than 10% of empty memory space left, the GS1000 is indicating this by blinking Scan LED once at 2 second intervals. To conserve battery power, the GS1000A only indicates this for about 10 seconds after you release the Scan button or after each successful read or read timeout.

Memory full status

The GS1000A will allow you to read the RFID Tag even when its database memory is full. Upon successful read, a long beep will be generated and the B/L LED will be switched on for 1 second thus indicating that new record has not been added. In addition, the GS1000A indicates memory full condition by blinking Scan LED twice at 2 second intervals. To conserve battery power, the GS1000A only indicates this for about 10 seconds after you release the Scan button or after each successful read or read timeout.

Battery low status

GS1000A indicates low battery condition by blinking B/L LED once at 2 second intervals. Upon detecting battery low condition, all tasks in progress (scanning, PC communications, etc.) are terminated immediately. Pressing the Scan button will not resume normal GS1000A operation.

Allowing the battery level to fall even further may result in erroneous GS1000A operation! If the unit starts blinking its LEDs and beeping constantly then this means that the battery level is so low that the GS1000A cannot even start up. In this case, switch the GS1000A off and recharge the battery immediately! Failure to do so may affect battery performance and destroy the database data in the GS1000A internal memory.

PC Communications

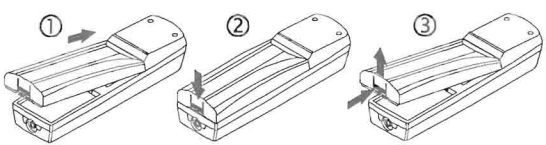
To establish communications with PC, switch the GS1000A off, plug the cable into the GS1000A's Serial port and switch the GS1000A back on again. Make sure that the cable is "live" i.e. that it is connected to the PC and that PC is on, otherwise GS1000A will not be able to detect the cable. Upon cable detection, the GS1000A will generate a beep and start blinking its Scan LED.

Always turn the GS1000A off before plugging or unplugging the Serial cable! Failure to do so may disrupt the GS1000A database data and possibly result in a permanent damage to the device.

Communications mode timeouts automatically in case there is no communications activity for more than 3 minutes. In this case, the GS1000A will beep and blink its B/L LED once, then go into standby. PC software can also put the GS1000A into standby at any time. Device can only be reawakened by pressing the Scan button.

Handling battery

To install the battery, insert its "sharper" end into the recess on the GS1000A body (1), then push down and snap into position (2). To remove the battery, push the spring holder and pull the battery away from the unit (3).



The battery should be charged only with a specified charger. **Note that the battery reaches its full capacity after 3-5 charge/discharge cycles.** Observe recommendations below to achieve the best battery performance:

- Completely recharge the battery before the first use or after having kept the battery in storage for a long period of time (over 3 months)
- Do not over-discharge the battery. Once the GS1000A signals that the battery is low, recharge the battery as soon as possible
- Do not charge the battery too often
- Keep the battery away from direct sunlight and heat sources

2. Communications protocol

GS1000A communications protocol has been extended to accommodate several new commands. At the same time, backward compatibility is maintained with earlier device version (GS1000).

Communications between the GS1000A and PC take place in the form of commands sent by PC side and replies from GS1000A. Commands and replies are packets of data using ASCII control characters to mark beginning and end of packets, acknowledge the data, request data retransmission and so on.

Control characters used by the GS1000A communications protocol are summarized below:

STX	02H	^B	Marks the beginning of data packet
ETX	03H	^C	Marks the end of data packet
EOT	04H	^D	Indicates the end of data exchange
ENQ	05H	^E	Marks the beginning of command packet
ACK	06H	^F	Acknowledges reception of data
NAK	15H	^U	Requests data retransmission
ETB	17H	^W	Signals that command or data was not accepted

There are two different packet types: command packets and data packets.

Command packets start with ENQ character and contain a machine number of the GS1000A addressed and command code.

ENQ	machine number	command code
1 character	2 characters	1 character

Machine number is supplied as a two-character Hex string and can be in the 00H...FFH range (for example, machine number of 4AH is represented by '4A' ASCII string). 00H is a so-called universal machine number, it will work with any GS1000A, regardless of its machine number setting. When using machine number other than 00, make sure that it matches current machine number of the GS1000A (set by "P" command). Using universal machine number of 00 will work well in all situations.

Command code consists of a single character. See below for complete description of all available commands.

Data packets start with the STX character and end with ETX character. ETX

character is followed by the BCC byte.

STX						ETX	BCC
1 ch.	Data characters					1 ch.	1 ch.

BCC byte is a result of consecutive XOR operations on all data packet bytes excluding STX, ETX and BCC byte itself. It is important to realize that BCC byte can contain *any* value from 00H to FFH *and this also includes control character codes*! When designing PC software, be sure to distinguish between BCC byte and control characters.

In many cases, reception of data must be acknowledged by the receiving side. This is done by sending the ACK character. In case the receiving side does not accept the data (for whatever reason), the NAK character may be sent to request retransmission. Transmitting side shall make no more than 2 retransmissions (i.e. send the same data no more than 3 times). All retransmit requests in excess of 2 times should be ignored.

Note: following the functionality of the original GS1000, the GS1000A treats all characters other than ACK as NAK. This means, that when requesting retransmission, the PC can send any character other than ACK to the GS1000A, and the GS1000A will interpret this as NAK. At the same time, you are advised to use the NAK character for retransmission requests.

Summarized below are all supported commands:

Modified	'S'	53H	Set date/time
New	'T'	54H	Get date/time
	'I'	49H	Download database data
Modified	'D'	44H	Initialize (clear) database
New	'M'	4DH	Prepare to recover database data
	'A'	41H	Get total number of records in the database
Modified	'P'	50H	Set Machine number
New	'Q'	51H	Get Machine number
New	'V'	56H	Get firmware version
New	'Z'	5AH	Invoke Test mode
	'O'	4FH	Power down (go into Sleep)

Set Date/Time ('S', 53H)

PC to GS1000A	ENQ-M#-'S'
GS1000A to PC	ACK*
PC to GS1000A	STX-*date/time*-ETX-BCC
GS1000A to PC	ACK/(NAK)**
PC to GS1000A	EOT

Date/time field has the following format: *YYYYMMDDhhmmss*, where: *YYYY*- year, *MM*- month, *DD*- date, *hh*- hour, *mm*- minutes, *ss*- seconds.

*This command is slightly modified from its original version. Original GS1000 rejected the command in case the database had some data. New GS1000A will accept this command regardless of whether there is any data in the database or not.

**To maintain compatibility with the original GS1000, the GS1000A will accept any date/time data, even if it is invalid (for example, even with the month set to 13). The only situation when the GS1000A will return NAK at this point is when BCC check fails. Invalid date/time will not be written into the GS1000A's clock, however. Use new "T" command to verify if new date and time were actually set.

Get date/time ('T', 54H)

PC to GS1000A	ENQ-M#-'T'
GS1000A to PC	STX- *date/time field**- ETX-BCC
PC to GS1000A	ACK/(NAK)
GS1000A to PC	EOT

Date/time field has the following format: *YYYYMMDDhhmmss*, where: *YYYY*- year, *MM*- month, *DD*- date, *hh*- hour, *mm*- minutes, *ss*- seconds.

*To maintain compatibility with the original GS1000, the GS1000A will not explicitly report any clock-related error conditions. Instead, if the date and/or time within GS1000A's clock are not valid (for whatever reason), default date and/or time value will be returned. Default date is 1999/01/01, default time is 00:00:00.

Get total number of records in the database ('A', 41H)

PC to GS1000A	ENQ-M#-'A'
GS1000A to PC	STX-*number of records*-ETX-BCC
PC to GS1000A	ACK/(NAK)
GS1000A to PC	EOT

Number of records in the database is returned as a 6-digit decimal string. Leading zeroes are appended to keep the string size constant.

Set machine number ('P', 50H)

C	ENQ-M#-'P'
GS1000A to PC	ACK
PC to GS1000A	STX-*new machine number*-ETX-BCC
GS1000A to PC	ACK*
PC to GS1000A	EOT

New machine number is a 2-byte Hex string. Therefore, machine number can have a value in the 00H...FFH range. Unlike previous GS1000 version, this also includes 0 (original GS1000 rejected 0). GS1000A also allows the machine number to be changed at any time (old GS1000 would only permit this in case there is no data in the database).

Get machine number ('Q', 51H)

PC to GS1000A	ENQ-M#-'Q'
GS1000A to PC	STX-*current machine number*-ETX-BCC
PC to GS1000A	ACK/(NAK)
GS1000A to PC	EOT

Current machine number is a 2-byte Hex string. Therefore, machine number returned can be in the 00H...FFH range.

Get firmware version ('V', 56H)

PC to GS1000A	ENQ-M#-'V'
GS1000A to PC	STX-*version string*-ETX-BCC
PC to GS1000A	ACK/(NAK)
GS1000A to PC	EOT

Version string can have a variable length but will never exceed 61 character. Although it is technically possible to have a version string with any kind of ASCII data in it, we commit to the following format:

V*x.xx pp...p nn...n*, where V*x.xx*- version number (i.e. "V1.25"), *pp...p*- product model number (i.e. "GS1000A"), *nn...n*- note (i.e. "rev. 01/01/2000").

Version number, product model number and note fields are separated by space characters. Version number and product model number are guaranteed to contain no space characters. Note field can contain any characters including spaces.

Invoke Test mode ('Z', 5AH)

PC to GS1000A	ENQ-M#-'Z'
GS1000A to PC	**!!! No reply from GS1000A !!!**

This command is used to force the GS1000A into a special Test mode. No reply is issued by the GS1000A upon receiving this command. Details of GS1000A operation in the Test mode are provided in Section 5. Note that Test mode destroys database memory contents in such a way that the data cannot be recovered even with the "M" command.

Power down ('O', 4FH)

PC to GS1000A	ENQ-M#-'O'
GS1000A to PC	ACK

This command puts the GS1000A into the low-power sleep mode. Following this command all communications are suspended. The User must press the Scan button to reawaken the device.

3. Using Demo software (GS Monitor)

The GS1000A is supplied with a simple demo program called **GS Monitor**. The program allows you to setup the machine as well as download the database data from the GS1000A into the PC. In addition, the **GS Monitor** features a **Terminal** view that protocols all communications between the PC and GS1000A. Thus, this software can serve as a great starting point for designing your own GS1000A PC software.

System requirements

The GS1000A runs under Windows-95/98. An Internet Explorer 4.0 or later *must* be present on the system in order for the GS1000A to run correctly.

Installation

Install the GS Monitor onto your PC by running an installation file. The installation is straightforward and has no differences from a standard installation process for other Windows programs. Installation program will create new **GSMonitor** icon in the **Start/Programs** menu.

Connecting the GS1000A to the PC

- Switch the GS1000A off
- Plug the Serial cable into the GS1000A, make sure the cable is also attached securely to the PC's serial port. **Always switch the GS1000A off before plugging the cable into it. Failure to do so may result in GS1000A internal database data disruption and permanent damage to the device**
- Switch the GS1000A on while *not* pressing the Scan button. The unit will turn both Scan and L/B LEDs on first (self-check, see Section 1), then beep once and start blinking its Scan LED. This means that the GS1000A has detected the cable. Communications between the PC and GS1000A is possible from this moment on. Communications between the PC and GS1000A is only possible while Scan LED is blinking. If the Scan LED is not blinking, then this means that the GS1000A is not in the communications mode. The GS1000A can only detect "live" cable, i.e. the one that is connected to the powered PC. If, when you switch the GS1000A on with the cable plugged in, the unit does not enter communications mode (start blinking its Scan

LED constantly) then this means that the cable is not properly attached to the PC, that PC is not powered or that PC's serial port is malfunctioning

- If no communications between the PC and GS1000A occurs for about 3 minutes, the GS1000A powers itself down automatically- the unit beeps and blinks B/L LED once, then goes into standby. Press the Scan button once to re-awaken the unit.

Running the GS Monitor

- Make sure that the GS1000A is in the communications mode (Scan LED is blinking constantly)
- Launch **GS Monitor**
- When **GS Monitor** window opens, click on the **LOGIN** button- the **Input login password** dialog will appear
- **GS Monitor** has two modes of operation- normal and extended. Extended mode allows you to issue "special" commands- **Recover data**, **Invoke test mode** and **Power down**. All other commands are equally accessible in the normal mode as well
- Input "regular" password (default after installation is "0000" (four "zeroes") to log on for regular mode or "GIGA" (case-sensitive!) for extended mode. Click **OK** when done
- If the password you have entered is correct, then all buttons in the **GS Monitor** window will become active. Plus, additional **Special functions** window will appear in the extended mode
- Select an appropriate COM port from **COM Ports** frame.

The **GS Monitor** window features a number of command buttons, a **Data** table that displays GS1000A data after downloading and a **Terminal** view which protocols all communications between the PC and GS1000A.

GS Monitor allows you to change the default password of "0000". Press **Set password** button to set a new password. Note, that login password for extended mode ("GIGA") is fixed and cannot be changed.

Click **Upload** button to download the GS1000A data. This action first invokes "A" command to check the number of records in the GS1000A internal memory, then "I" command to perform actual download. The data, if any, will be downloaded and displayed in the **Data** table. **Rec#** field is the record number, **Mach#** is a machine number of a particular GS1000A, **ID-code** is the ID-code

of RFID tag scanned. Finally, **Date** and **Time** fields display the date and time of record creation.

Click **Save to file** button to save the uploaded data into a file. The data is saved in a "raw" text file format and can be viewed using simple text editor like **Notepad**. Each record occupies one line of text and has the following format:

MM,Ii…I,YYYY/MM/DD,hh:mm:ss, where *MM* is machine number, *Ii…I*- ID-code of the RFID tag, *YYYY*- year, *MM*- month, *DD*- date, *hh*- hour, *mm*- minutes, *ss*- seconds.

Click **Erase** button to delete the data from the GS1000A internal memory (invokes "D" command). Make sure that you don't need the data any more before deleting it.

Machine number of the GS1000A can be set at any time by clicking on the **Set Machine #** button (invokes "P" command). Machine number is a 2-digit hexadecimal number which means that it can contain digits from '0' to '9' and characters from 'A' to 'F'. "00", "23", "5A", "B9", "EC" and "FF" are all examples of correct Machine numbers. You can read machine number back by clicking on the **Get Machine #** button (invokes "Q" command). Machine number will appear in the reply from GS1000A, in the **Terminal** view:

PC:<ENQ>00Q	Q-command issued by PC
GS:<STX>15<ETX>02	Reply from GS1000A contains Machine number (15)

Clicking **Set time/date** button sets GS1000A internal clock from the PC clock ("S" command is invoked). GS1000A current date and time can be checked by pressing **Get time/date** button ("T" command). The data will appear in the reply from GS1000A, in the **Terminal** view:

PC:<ENQ>00T	S-command issued by PC
GS:<STX>20000407114120<ETX>06	Reply from GS1000A contains date and time (2000/04/07 11:41:20)

Clicking **Version** button produces GS1000A internal firmware version string ("V" command is used). The data appears in the reply from GS1000A, in the **Terminal** view:

PC:<ENQ>00V	S-command issued by PC

GS:<STX>V2.00 GS1000A<ETX>6A	Reply from GS1000A contains version string ("V2.00 GS1000A")

Special functions window has **Recover data**, **Invoke test mode** and **Power down** buttons.

Recover data command allows you to download entire database data, regardless of the actual amount of data contained in the database. This is done by first invoking "M" command to make the GS1000A database "pretend" that its database is 100% filled with data. Then, regular "I" command is executed to download the data. Finally, "D" command initializes the database.

Invoke test mode command forces the GS1000A into a special test mode. Test mode is described in details in Section 5. Note that Test mode destroys database data in such a way that it cannot be recovered even using **Recover data** command.

Power down command suspends all communications between the GS1000A and the PC and puts GS1000A into standby. Press Scan button to reawaken the device and resume communications.

4. Firmware Management mode

The GS1000A features new Firmware Management mode (FMM). FMM allows you to quickly upgrade your GS1000A's internal firmware and also check validity of currently loaded firmware. Contact your dealer for most recent firmware upgrade files.

FMM is entered by switching the GS1000A on while holding the Scan button pressed. FMM itself has 2 sub-modes of operation: FMM/download mode and FMM/check mode.

If the GS1000A is switched on with the Scan button pressed and Serial cable plugged, then FMM/download mode is entered (Serial cable must be "live", i.e. it must be connected to the powered PC). If the GS1000A is switched on with the Scan button pressed but without Serial cable, then FMM/check mode is entered.

Downloading new firmware:

To upgrade the firmware, you will need a new firmware file and a terminal software for PC capable of transferring files using Xmodem protocol (Checksum version).

All GS1000A firmware files have a fixed size of exactly 64K (65536 bytes) and a ".gsf" name extension (although latter is not technically necessary).

The list of popular and widely available terminal programs includes **HyperTerminal** for Windows, **QModem**, and **Term95**. Procedure below assumes the use of **HyperTerminal** which is included into standard Windows-95/98 package.

To upgrade the GS1000A's internal firmware:

- Switch the GS1000A off
- Plug the Serial cable into the GS1000A. Make sure that the other side of the cable is connected to the PC
- Launch **HyperTerminal** and configure it as follows:
  - When **Connection Description** dialog opens, type any string (1 character minimum) and press **OK**
  - When **Connect to** dialog opens, select an appropriate COM port from the **Connect Using** drop-down box (for example, "**Direct to COM1**")

- When **COMx Properties** dialog appears, set communications parameters as follows: **Bits per second:** 19200, **Data bits:** 8, **Parity:** None, **Stop bits:** 1, **Flow control:** None
- The HyperTerminal's main window will appear

- Choose **Transfer→Send file** from the **Main** menu- the **Send file** dialog will appear
- In the **Send file** dialog, select the **.gsf* file you want to download and choose **Xmodem** protocol from the **Protocol** drop-down box
- The **Xmodem file send for** dialog will be displayed
- Press and hold the Scan button, then switch the GS1000A on. The unit should first turn both Scan and B/L LEDs on and beep, then start downloading data. If, instead of blinking both LEDs and beeping, the GS1000A starts blinking its B/L LED and beeping infrequently, then this means that battery level is too low
- When receiving file, the GS1000A will blink its Scan LED (Scan LED is on while GS1000A is receiving or expecting to receive a block of data from the PC; Scan LED is off while GS1000A is programming the data received into its internal memory)
- Once the downloading is finished, the GS1000A will execute one long beep and blink its Scan LED
- You may start using the newly downloaded firmware after switching the unit off and back on again.

A number of errors may occur during downloading. All errors are indicated by B/L LED/buzzer patterns starting with "long blink/beep" followed by a number of short blinks/beeps corresponding to the nature of error:

- One long blink/beep: timeout while waiting for the data from PC. This can happen if you activate FMM/download mode prior to starting the upload process on the PC side. Remember, you must always start the file transfer on the PC first, then switch the GS1000A on (with Scan button pressed and the cable plugged)
- One long + one short blink/beep: communications error. This error is normally caused by incorrect communications parameters setup on the PC side. Make sure that you have selected 19200-8-N-1, Xmodem
- One long + two short blinks/beeps: the file is too long (exceeds 64K).

This error means that you are downloading some wrong file. GS1000A firmware files are always 64K in size

- One long + three short blinks/beeps: internal program memory failure. This error indicates some hardware malfunction. Please, send the unit for repair.

Checking existing firmware

To check currently downloaded application firmware for being valid:

- Switch the GS1000A off
- Make sure that the cable is not plugged in
- Press and hold the Scan button, then switch the GS1000A on. The unit should switch its Scan LED on
- Memory checkup takes about 5 seconds to complete. Upon test completion, the GS1000A will either beep (OK status) or generate 1 long and 4 short B/L LED blinks and beeps (program memory verification failure). The latter means that the data found in the unit's program memory is not a valid program code. In this case, obtain new GS1000A application program file and download it again.

The only error condition that may occur during program verification is "internal program memory failure". This is indicated by one long and three short beeps and B/L LED blinks. This error indicates some hardware malfunction (*not memory content* error).

5. Test mode

The GS1000A provides a hardware Test mode that can be invoked by issuing a "Z" command (see Section 2).

Warning! Hardware test initializes the database and also *destroys* its contents (not just deletes it logically) so the data cannot be recovered even using the "M" command!

Once entered, the Test mode can not be exited other than by switching the GS1000A off.

The Test mode is comprised of two phases. Phase 1 performs SRAM, RTC and FLASH tests. Phase 1 begins immediately upon entering the Test mode. Scan LED is blinking constantly while tests are being performed.

Upon successful test completion the GS1000A will beep and blink its Scan LED once. Error conditions (test failures) are indicated by generating one long beep and B/L LED blink followed by a number of short beeps/blinks:

- 1 long + 1 short beep/blink- SRAM test failure
- 1 long + 2 short beeps/blinks- RTC test failure
- 1 long + 3 short beeps/blinks- FLASH test failure

Database gets initialized during Phase 1. Also, RTC's time and date are reset (to 1999/01/01 00:00:00) *in case they were invalid*. The RTC data is not changed if it appears to be correct.

Phase 2 is intended for RFID reader checkup. Pressing the Scan Button activates the reader. Scan and B/L LEDs are blinking alternatively while scanning is in progress. The GS1000A beeps when good read is achieved. However, the database record *is not* created. The database, therefore, remains "clean" after the initialization performed in Phase 1.

6. Specifications

RFID reading range, standard ISO card-sized tag	4 cm
Database capacity	14320 records
Operating time in standby mode, 1350mA/h battery	App. 4 weeks*
Operating time in active (scanning) mode, 1350mA/h battery	App.9hours (av. 30,000 scans)*
Physical dimensions, including 1350mA/h battery	165(L) x 47(W) x 40(H) mm
Operating temperature range	-10-55 C°
Operating humidity	5-95%

*Actual User experience with the time GS1000A can last on a single battery charge depends on how much time GS1000A spends in standby and in active (scanning) mode. One second of scanning is approximately equivalent to 2 minutes of standby.