GS2000 Series

Metal Guard Tour Terminal

REVISIONS

| Rev Number	Date	Note
01	15,Nov, 04	Initial Release

Getting Started

◆ **Update GS2000's Date / Time**

For each new GS2000 terminal, the internal date / time value needs to be calibrated with your local time for the very first time. By doing this, please follow below steps:

1. Connect the communication cable to PC.
2. Power on the GS2000R/U download station and put GS2000 on it; push the GS2000's scan button until the blue LED keeps blinking (This means GS2000 is in On-Line mode).
3. Launch GS2000 Monitor program.
4. On [General Commands] tab, select the connected comport.
5. Click [Sync. Time], then the terminal's date / time will sync and update to your PC.

◆ **Make a Quick Test**

1. Take the GS2000 terminal out of GS2000R/U download station.
2. Push scan button for reading the RFID code.
3. After scan several tags, put the GS2000 on to GS2000R/U download station again and push scan button for going to On-Line mode.
4. On [General Commands] tab, click [Download Data] to download all the terminal's data to PC. (Refer below picture)
5. View the downloading data, confirm each record whether the date / time fields is correct or not. If okay, then you can begin to use the GS2000 terminal to have a patrol route.
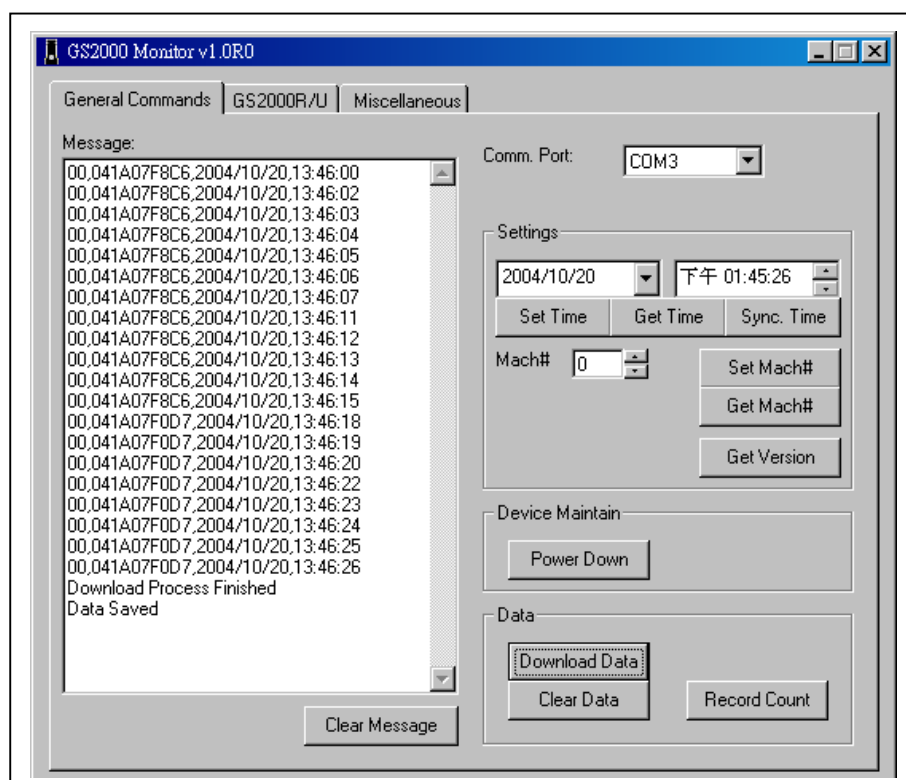
Introduction

The new **GS2000** GuardScan Plus is a more durable Guard Tour Data Collection Terminal, based on RFID technology, it helps you watch over your employees that have had difficulties to track those whose working duties require moving from place to place, such as security guard patrolling, policeman patrolling, remote equipment inspection / maintenance...etc.
The metal housing is the best solution for water-resistant and shockproof. Use our application software "Patrol Manager" you may set up a remarkable Patrol Management System.

Table Contents

Overview on GS2000 Handset
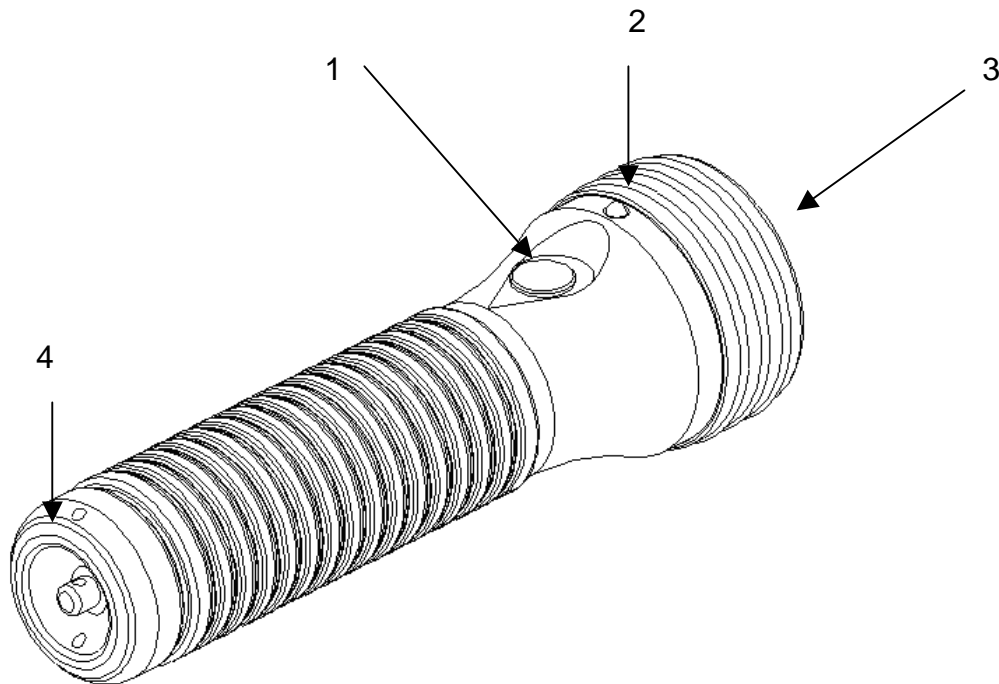
1. Power/Scanning button: continuously press this button and switch the power on to start the data reading.
2. Status indicating LED: served as the GS2000 handset status indication (keep pressing the button is a must)
3. Sensing field: the effective working area of RFID Tag scanning and Data uploading.
4. Battery Lid: the position of changing battery.

REFERENCE OF INDICATION :

STATUS	LIGHT REP	BEEP	SCAN	REAL TIME INCICTOR
Power off	LED off	X	X	O
Scanning	Blue LED on	X	O	O
Scan OK	Blue & Red LED blink	BEEP	X	O
Flash Memory Low	Blue LED flashes once	X	O	X
Flash Memory Full	Blue LED flashes twice	BEEP-BEEP-BEEP	X	O
RTC Abnormal	Blue LED flashes 3 times	BEEP-BEEP-BEEP	X	O
Battery Low	Red LED flashes once	X	O	X
EEPROM Fail	Red LED flashed twice	BEEP-BEEP-BEEP	X	O
FLASH Fail	Red LED flashed 3 times	BEEP-BEEP-BEEP	X	O

PS: Real time indicator means once an operator presses the Power/Scanning button, the said LED will run at once.   On the contrary the operator needs to press and hold the button in 10 seconds to see the LED functioning.

Overview on GS2000 Base Station

1

STATUS
PROMAG
LINK

2   **3**   **4**
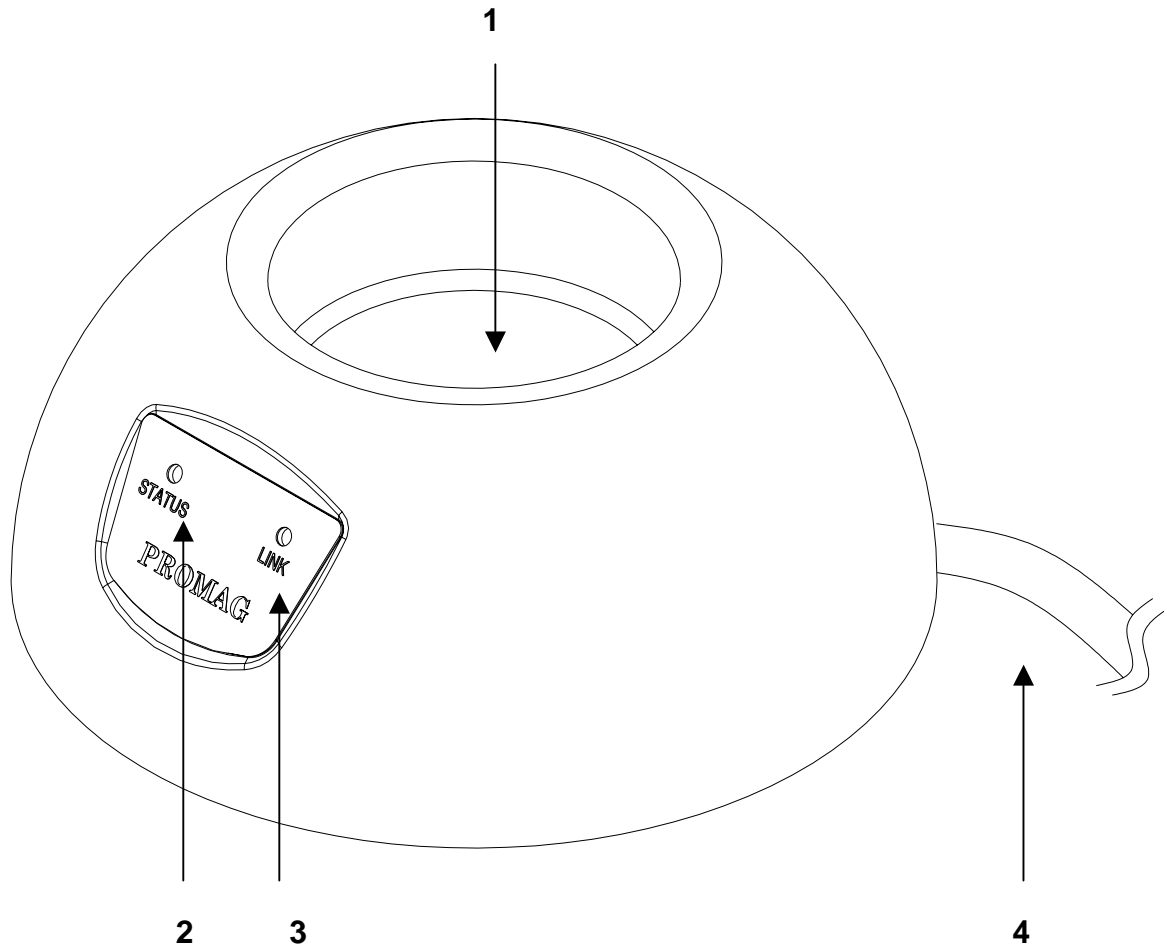
1. IrDA data collection area: the space for accepting GS2000 insert into the base station, by pressing " Power/Scanning " button for 1 second, the GS2000 will enter into the communication mode waiting for accepting commands from PC.
2. Power indicator: while power is up, the Blue LED lasts flashing to indicate the power supply is in good condition.
3. Communication status: the data is transmitting when the Green LED lights up.   The data is in receiving status when the Red LED lights up.
4. Communication port: USB and RS232 interfaces available.

Using the GS2000

The GS2000 is a handheld RFID proximity technology reader that is applied to scan RFID Tags. When the defined RFID tag is scanned, the tag identification code and the date and the time of the scan are recorded exactly in the GS2000 terminal's memory.   The said data is downloaded later into a computer.

Recording Data

Shown illustration 2, holding the GS2000 in the scanning distance at about 40mm, aim the GS2000 head at the RFID tag and press the Scan button till the Blue LED flashes, indicating the tag has been read.   At the same time you will hear one beep meaning successful reading then the Blue and Red LED will blink.   Note: The Blue LED will go off within 10 seconds if the scanning RFID has been read in fail.

illustration 2

illustration 3

40mm

RFID Tag
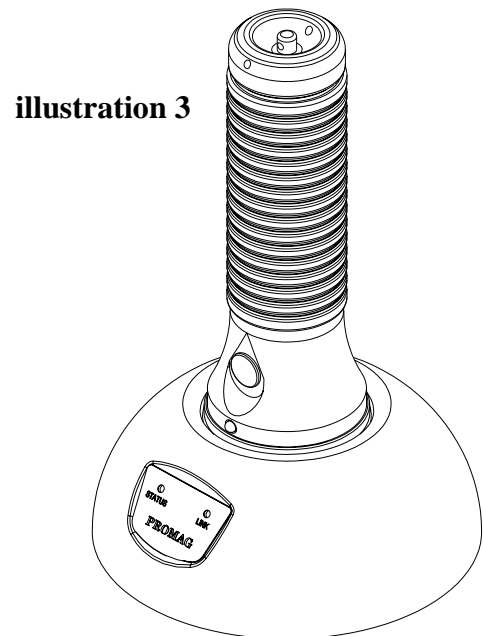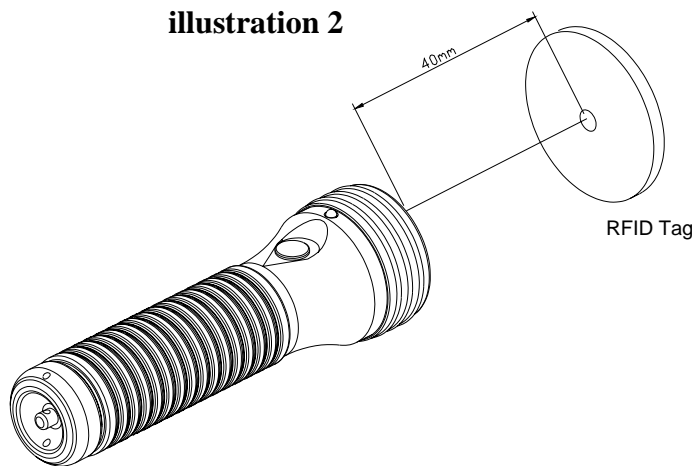
Uploading Data to a PC

Shown as illustration 3, put the GS2000 terminal into the GS2000R/U base station, turning on the "Power/Scanning" button on the GS2000 at about 1 second then let go.   The GS2000 itself will enter into the communication mode.   Note: When the GS2000 is in communication mode, it is not able to scan the RFID tag, reading the data even if you press the Scan button.   We strong recommend you to do the " Power Off" command to conserve the battery after you have completed the work of Data Uploading to the PC.   The handset will switch off automatically after 3 minutes once it is not situated in the communication mode.

illustration 4
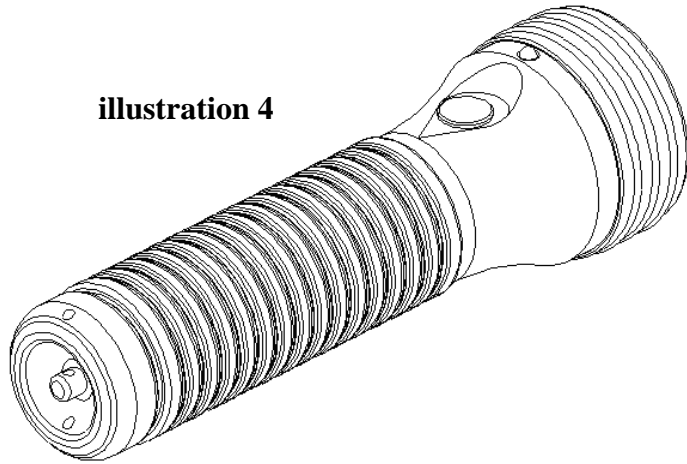
Indication of Battery Low

Shown as illustration 4, when you press the Power/Scanning button on the GS2000 for 10 seconds, the Red LED will start to flash once at every 2 seconds then the light goes off 10 seconds later which means you should change the battery as soon as possible because the handset is about to run out of power.

Memory Full

Also shown as illustration 4, when you press the Power/Scanning button on the GS2000, the RED LED flashes once and the Buzzer keeps three beep-beep-beep; then the Blue LED blinks two times at every 2 seconds and stops 10 seconds later.   The GS2000 is not able to read any RFID Tags. This indicates that the data should be downloaded.

Changing Battery

Please follow the illustration 5 for battery replacement.

illustration 5
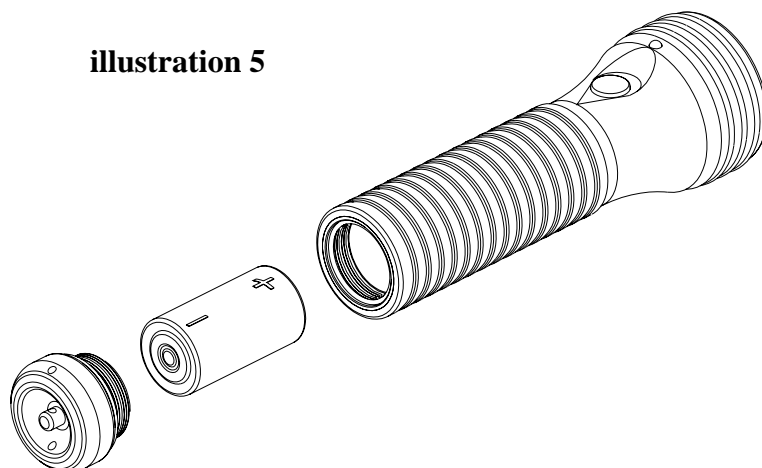
GS2000 Monitor Program

System Requirements:
1. Operating System: Window 98/ME/2000/XP.
2. IE web browser V4.0 or later version is required.

Program Setup:
1. Put Setup CD into CD-ROM Drive.
2. A setup wizard will pop up. Follow the instructions to complete the program setup. (If the CD-ROM auto-run function is disabled, double-click the setup.exe file that is located on the root directory of Setup CD for the program installation)

Launch Program:
1. From [Start] / [Programs] / [GIGA-TMS], click [GS2000 Monitor].
2. A [Password Required] window will pop up, enter correct password (default is 0000), and then go into the GS2000 Monitor program main window.

Hardware connected:
1. Connect GS2000R/U to PC comport (or USB port).
2. Put GS2000 on GS2000R/U download station. Push scan button (about one second) until the blue LED keeps blinking. This means GS2000 is in On-Line mode. Then release the scan button.

Configuration - [General Commands] tab:
1. Set the Comm. Port that GS2000 is connected to (refer to below picture).
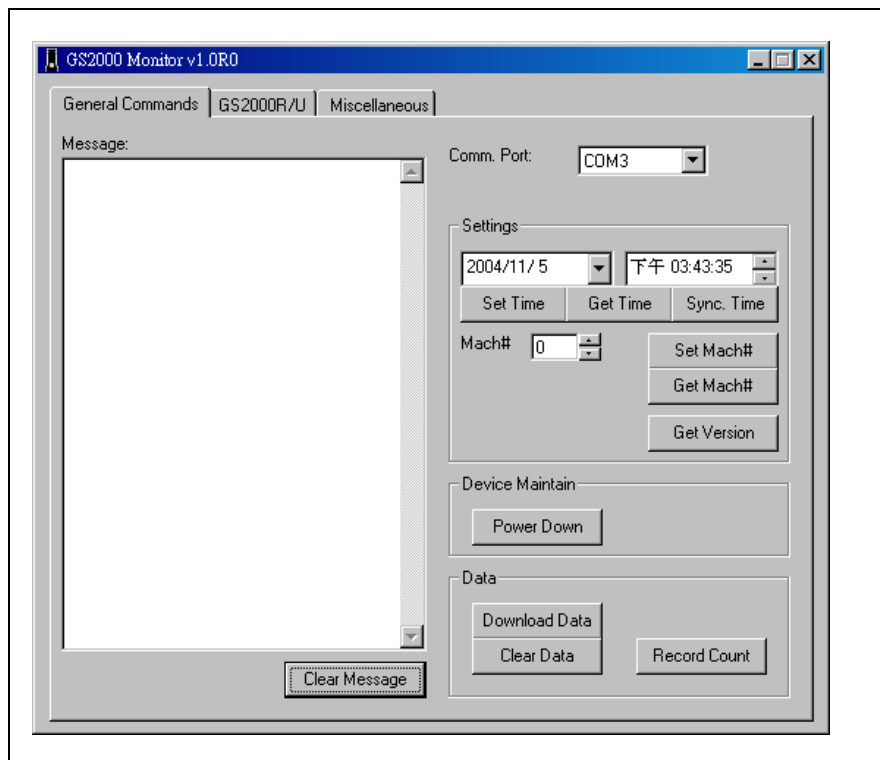
Each command result will show on the Message box.

a. **Set Time:** Update specified date / time settings to GS2000.

b. **Sync. Time:** Using PC's date / time to update to GS2000.

c. **Set Mach#:** Update the specified machine number to GS2000. The value of machine number have to be in the range 0 ~ 255.

d. **Get Time:** Get the GS2000's Time value and show on the Message box.

e. **Get Mach#:** Get the GS2000's machine number and show on the Message box.

f. **Get Version:** Get the GS2000's firmware version and show on the Message box.

g. **Power Down:** Turn off the GS2000.

h. **Record Count:** Get the total number of scanned tag(s) and show the number on the Message box.

i. **Download Data:** Transfer the scanned tag(s) data from GS2000 to PC. The data will be saved to a text file, which the filename can be specified on [Miscellaneous] tab. The downloaded data will show on Message box, the fields definition in each record are showing as below:

[Machine No#], [Tag Code], [Date (year/month/day)], [Time (hour/minute/second)]

j. **Clear Data:** Clear all the data in GS2000 memory.

Configuration - [GS2000R/U] tab:
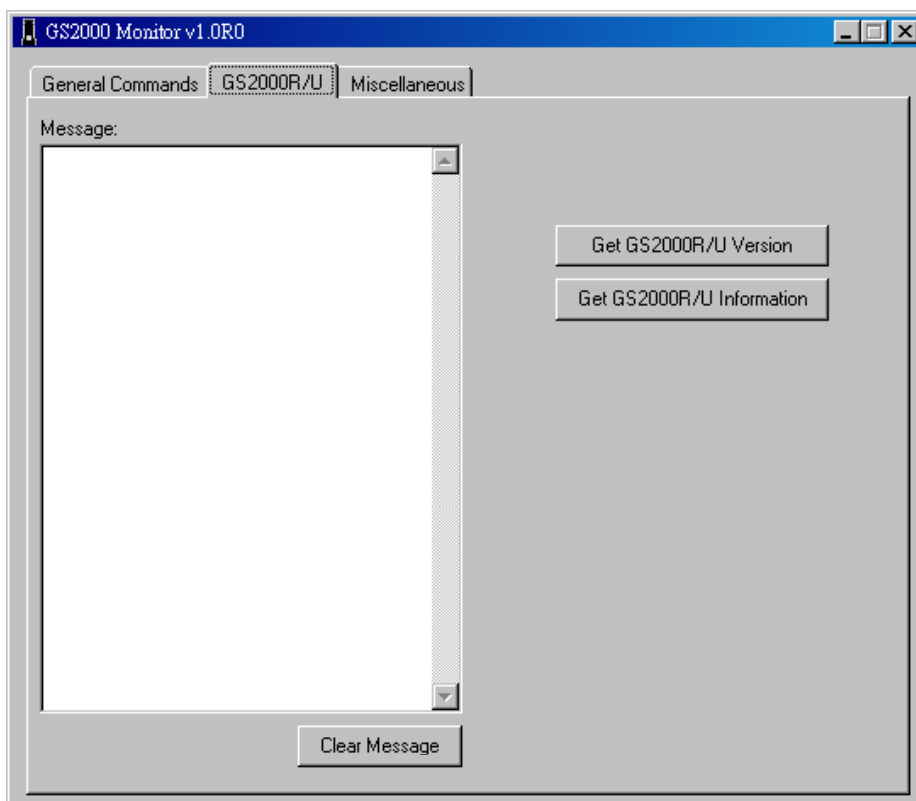
1. Below is the configuration window for GS2000R/U download station.

a. **Get GS2000R/U Version:** Get the firmware version of GS2000R/U download station and show on the Message box.

b. **Get GS2000R/U Information:** Get the GS2000R/U information and show on the Message box.

Configuration - [Miscellaneous] tab:
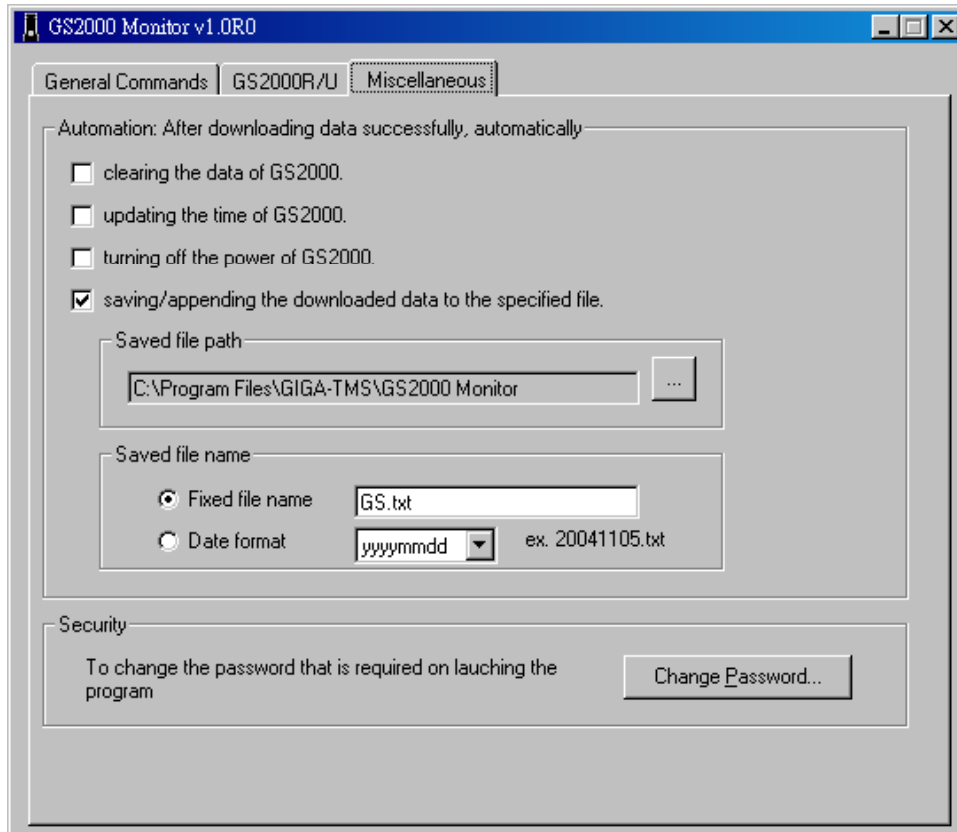
a. **Clearing the data of GS2000:** If this item is selected, then the GS2000's data will be erased after the data is downloaded successfully.
b. **Update the time of GS2000:** If this item is selected, then the GS2000's date / time will be synchronized to PC's date / time after the data is downloaded successfully.
c. **Turning of the power of GS2000:** If this item is selected, then GS2000's power will be turned of after the data is downloaded successfully.
d. **Saving/appending the downloaded data to the specified file:** If this item is selected, then the download data will be saved to the specified file by using append method. This means if the specified file exists, the new data will append on the end of existed data. If not selected, the existed file will be overwritten.
e. **Change Password:** Modify the enter password. It will take effect on next launching.

Note:
a. The GS2000 will automatically turn off its power on its own if there are not any communication between PC and GS2000. This is for power saving purpose.
b. To prevent unwanted person to use GS2000 Monitor program, make sure the program is ended while leaving PC.
c. Before updating date / time or machine number to GS2000, make sure the GS2000's data are all downloaded and cleared.
d. Make sure all the data are downloaded before executing the clear data command.

Communication Protocol

GS2000 communications protocol has been extended to accommodate several new commands. At the same time, backward compatibility is maintained with earlier device version (GS1000A).

Communications between the GS2000 and PC take place in the form of commands sent by PC side and replies from GS2000. 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 GS2000 communications protocol are summarized below:

CONTROL CHARACTER TABLE

ITEM	Hex	Control Key	Function
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 GS2000 addressed and command code.

COMMAND FORMAT

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 GS2000, regardless of its machine number setting. When using machine number other than 00, make sure that it matches current machine number of the GS2000 (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.

DATA FORMAT

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: The GS2000 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 GS2000, and the GS2000 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:

COMMAND INDEX TABLE

Command	ASCII	Description
'S'	53H	Set date/time
'T'	54H	Get date/time
'I'	49H	Download log database data
'D'	44H	Initialize (clear) log database
'M'	4DH	Prepare to recover log database data
'A'	41H	Get total number of records in log database
'P'	50H	Set Machine ID
'Q'	51H	Get Machine ID
'V'	56H	Get firmware version
'Z'	5AH	Invoke Test mode
'O'	4FH	Power down (go into Sleep)
'F'	46H	Login EEPROM Test Mode
'X'	58H	ISP Mode
'N'	4EH	Get GS2000R/U information

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

PC to GS2000	ENQ-M#-'S'
GS2000 to PC	ACK*
PC to GS2000	STX-*date/time*-ETX-BCC
GS2000 to PC	ACK/(NAK)**
PC to GS2000	EOT

Date/time field has the following format: *YYYYMMDDhhmmss*, where:

YYYY- year, *MM*- month, *DD*- date, *hh*- hour, *mm*- minutes, *ss*- seconds.

   *The GS2000 will accept this command regardless of whether there is any data in the log database or not.

   **The GS2000 will accept any date/time data, even if it is invalid (for example, even with the month set to 13).   Use new "T" command to verify if new date and time were actually set.

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

PC to GS2000	ENQ-M#-'T'
GS2000 to PC	STX- *date/time field**- ETX-BCC
PC to GS2000	ACK/(NAK)
GS2000 to PC	EOT

Date/time field has the following format: *YYYYMMDDhhmmss*, where:

YYYY- year, *MM*- month, *DD*- date, *hh*- hour, *mm*- minutes, *ss*- seconds.

Download database data ('I', 49H)

PC to GS2000	ENQ-M#-'I'
GS2000 to PC	STX- *first record data*- ETX-BCC
PC to GS2000	ACK/(NAK)
GS2000 to PC	STX- *next record data*- ETX-BCC
PC to GS2000	ACK/(NAK)
	More records…
	…and acknowledgements
GS2000 to PC	STX- *last record data*- ETX-BCC
PC to GS2000	ACK/(NAK)
GS2000 to PC	EOT

Record data format: *MM,II…I,YYYY/MM/DD,hh:mm:ss*, where

MM- machine number, *II…I*- RFID tag's ID-code, *YYYY*- year, *MM*- month, *DD*-date, *hh*-hour, *mm*- minutes, *ss*- seconds.

Initialize (clear) database ('D', 44H)

PC to GS2000	ENQ-M#-'D'
GS2000 to PC	ACK*
PC to GS2000	EOT

This command reinitializes the log database. All contents are logically deleted, which means that actual record data is not erased, just some database-related housekeeping is initialized. The log database data can still be recovered (if not already written over) using "M" command.

Prepare to recover database data ('M', 4DH)

PC to GS2000	ENQ-M#-'M'
GS2000 to PC	ACK
PC to GS2000	EOT

This command alters log database in such a way that it appears to be 100% full. Subsequent "I" command will download the contents of entire log database memory. This command, therefore, can be used for data recovery purposes.

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

PC to GS2000	ENQ-M#-'A'
GS2000 to PC	STX-*number of records*-ETX-BCC
PC to GS2000	ACK/(NAK)
GS2000 to PC	EOT

Number of records in the log 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'
GS2000 to PC	ACK
PC to GS2000	STX-*new machine number*-ETX-BCC
GS2000 to PC	ACK*
PC to GS2000	EOT

New machine number is a 2-byte Hex string. Therefore, machine number can have a value

in the 00H…FFH range.

Get machine number ('Q', 51H)

PC to GS2000	ENQ-M#-'Q'
GS2000 to PC	STX-*current machine number*-ETX-BCC
PC to GS2000	ACK/(NAK)
GS2000 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 GS2000	ENQ-M#-'V'
GS2000 to PC	STX-*version string*-ETX-BCC
PC to GS2000	ACK/(NAK)
GS2000 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. "GS2000"), *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 GS2000	ENQ-M#-'Z'
GS2000 to PC	**!!! No reply from GS2000 !!!**

This command is used to force the GS2000 into a special Test mode. No reply is issued by the GS2000 upon receiving this command. Details of GS2000 operation in the Test mode are provided in Hardware Testing. Note that Test mode destroys log database memory contents in such a way that the data cannot be recovered even with the "M" command.

Power down ('O', 4FH)

PC to GS2000	ENQ-M#-'O'
GS2000 to PC	ACK

This command puts the GS2000 into the low-power sleep mode. Following this command all communications are suspended. The User must press the Scan button to reawaken the device.

Login EEPROM Test Mode ('F', 46H)

PC to GS2000	ENQ-M#-'F'
GS2000 to PC	ACK

It is used to reset initial value of GS2000 for the manufacture. Not Recommended for user's software.

Go to ISP Mode ('X', 58H)

PC to GS2000	ENQ-M#-'X'
GS2000 to PC	ACK

This command puts the GS2000 into the Firmware Management Mode (FMM) . FMM allows you to quickly upgrade your GS2000's internal firmware and also check validity of currently loaded firmware. Contact your dealer for most recent firmware upgrade files.

The GS2000R/U communications protocol are summarized below:

Note: Communication Baudrate is 9600,8n1

Get firmware version ('V', 56H)

PC to GS2000R/U	ENQ-B-M#-'V'-CR
GS2000R/U to PC	STX-*version string*-ETX-BCC
PC to GS2000R/U	ACK/(NAK)
GS2000R/U to PC	EOT

This command is used to get the firmware's version of the GS2000R/U base station.

Get GS2000 Information ('N', 4EH)

| PC to GS2000R/U	ENQ-B-M#-'N'-CR
GS2000R/U to PC	STX-*information*-ETX-BCC
PC to GS2000R/U	ACK/(NAK)
GS2000R/U to PC	EOT

This command is used to get the name of the GS2000R/U base station.

Firmware Management Mode(FMM)

GS2000 features the Firmware update function in quick and easy way to access.
Please refer to following instructions :

1. Check it up with your local distributor for the latest version ROM-T0567 .
2. Insert theGS2000 handset into the GS2000R/U base station and connect the station to PC comm.
   Port.   Press the "Power/Scanning" button for 1 second to make GS2000 enter into
   communication mode.
3. Being using your "Rom Manager" software by selecting GS2000R/U connection to PC
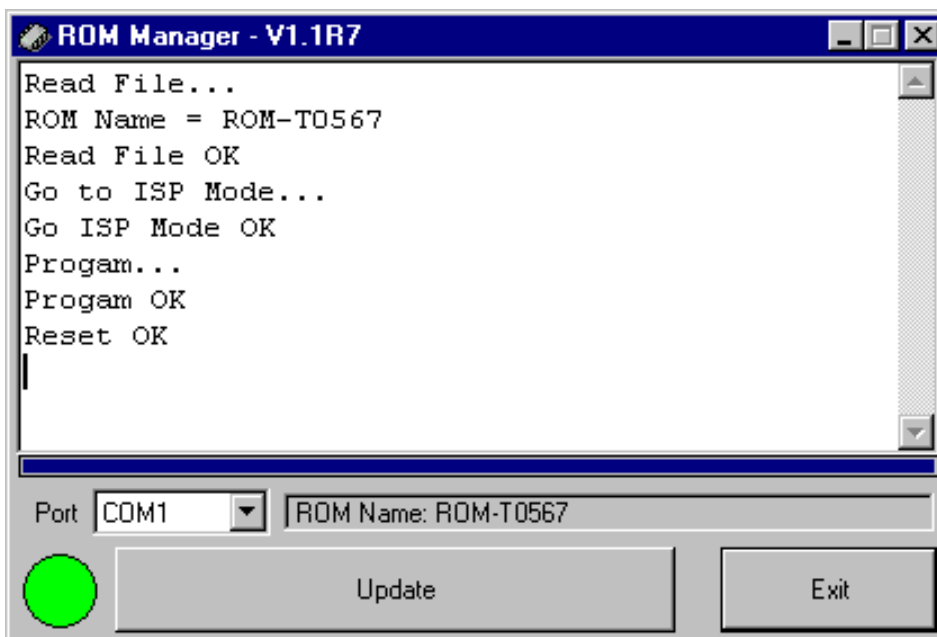   communication port.
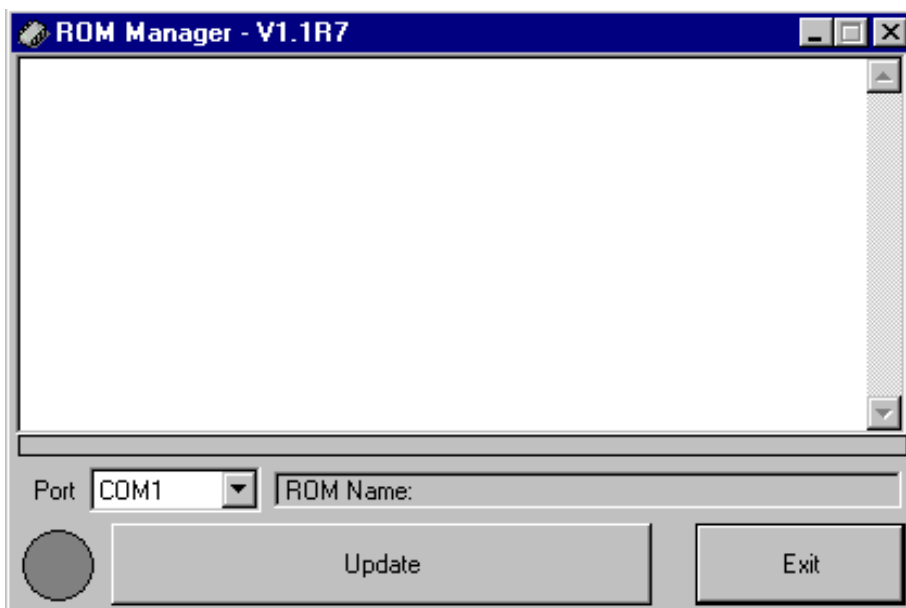
4. Click " Update" button and select the path " ROM-T0567".
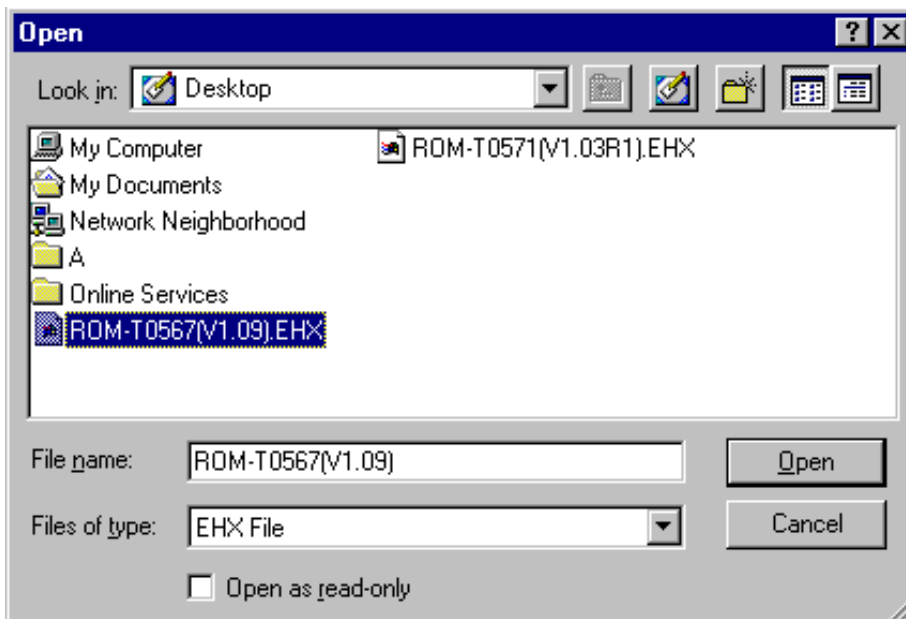
5. Press " Yes" to access the updating.
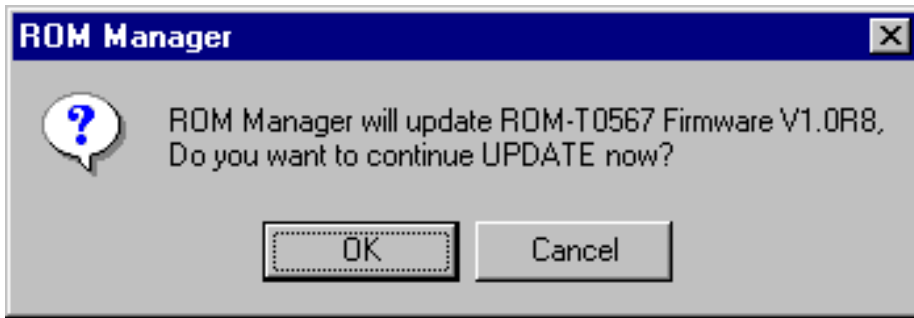
6. The complete of firmware updating window reads as follows

Note: Once you found the firmware is not working well which may indicate that you are not able to follow above procedure to complete the firmware updating.   By avoiding this, you may insert GS2000 into GS2000R/U then connect the whole set to PC comm. port.   Press "Power/Scanning button" at about 10 seconds till the Red LED lights up.   Now GS2000 is in the mode of ISP; you may follow the procedure from 2 to 6 to continue the updating.

Hardware Testing

An additional feature of GS2000 is the ability to do the Hardware test.   Please refer to "Communication section" to start.   Command " Z" is the said command.

Two steps are covered in the work of Hardware testing

Flash memory testing

When you are accessing the flash memory test, the Blue LED will keep blinking in quick motion. Once the work is done one beep will sound and the Blue LED will change to blink normally to indicate the completion of testing. If the Flash memory test runs in failure, you will hear two beeps and the Red LED lights up.   Be sure you have to restart the second times testing in 10 seconds or the Program may tell it is a failure testing.   Same as the previous condition, two beeps will sound and the Red LED will light up.

GS2000 Handset with RFID tags reading test

Then we go for the 2nd step. At this point you will see the Blue and Red LED are in cross flashing when you hold up the GS2000 handset.   Following you need to scan the RFID tags for data reading with 5 times to make sure the hardware is functional.   Every record of data reading, a beep sound can be heard.   Once the successful testing is complete, GS2000 handset will go a long beep and the Blue LED flashes at the same time. The terminal will automatically shut down after 5 seconds.

If the RFID Tags data reading test does not access successfully, two beeps will run and the Red LED lights up; the terminal automatically shuts down after 5 seconds.

Note: the hardware self- test will make GS2000 go back to initial value set up.   The records inside the flash memory are deleted forever which means retrieval is not possible with the command "M".

GS2000 Specification

- Storage Capacity: 14320
- RFID card format: 125KHz, ASK, 64 Bits Manchester Coding
- Reading distance: around 40-50 mm
- Operating time in active (scanning) mode : up to 100,000 reading ((brand new Duracell 1400, LR14, DC 1.5V battery , on line 1 second, off line 1 second covering the time of data uploading to PC)
- Battery specification: DC 1.5 volt, No. 2 battery (brand new Duracell 1400, LR14, DC1.5V battery)
- Communication interface: IrDA
- Protocol: 19200bps, 8 N 1
- Physical dimension: 170 mm * 52 mm
- Weight: 310 grams
- Certificate: CE , FCC , IP66
- Working temperature: - 10 - + 50℃
- Storage temperature: -20~+60℃
- Working humidity: 5-95%

GS2000R/U Specification

- Power: GS2000R – 5V/500mA
          GS2000U – charging from PC
- Available Interfaces: RS232 (GS2000R)
                        USB (GS2000U)
- Protocol: 9600bps, 8N1
- Physical dimension: 4mm * 119 mm
- Weight: 320 grams
- Certificate: CE , FCC
- Working temperature: - 10 - + 50℃
- Storage temperature: -20~+60℃
- Working humidity: 5- 59%