

**User Guide:
GSM2228UG001**

Enfora Mini-MT User Guide

Revision 1.03

**Enfora, Inc.
www.enfora.com**

Document Title:	Enfora Mini-MT User Guide
Revision:	1.03
Date:	09/12/2008
Status:	Released
Document Control ID:	GSM2228UG001

General

All efforts have been made to ensure the accuracy of material provided in this document at the time of release. However, the items described in this document are subject to continuous development and improvement. All specifications are subject to change without notice and do not represent a commitment on the part of Enfora, Inc. Enfora, Inc. will not be responsible for any loss or damages incurred related to the use of information contained in this document.

This product is not intended for use in life support appliances, devices or systems where a malfunction of the product can reasonably be expected to result in personal injury. Enfora, Inc. customers using, integrating, and/or selling this product for use in such applications do so at their own risk and agree to fully indemnify Enfora, Inc. for any damages resulting from illegal use or resale.

Copyright

Complying with all applicable copyright laws is the responsibility of the user. Without limiting the rights under copyright, no part of this document may be reproduced, stored in or introduced into a retrieval system, or transmitted in any form or by any means (electronic, mechanical, photocopying, recording or otherwise), or for any purpose, without the express written permission of Enfora, Inc.

Enfora may have patents, patent applications, trademarks, copyrights or other intellectual property rights covering subject matter in this document. Except as expressly provided in any written license agreement from Enfora, the furnishing of this document does not give you any license to these patents, trademarks, copyrights or other intellectual property.

©2008, Enfora, Inc. All rights reserved.

Enfora and the Enfora logo are either registered trademarks or trademarks of Enfora, Inc. in the United States.

Regulatory Compliance

FCC

The modem was tested and certified to meet FCC Parts 15 in a stand-alone configuration, which demonstrated that the GSM2000 Mini-MT complies with Part 15 emission limits. FCC Part 22 & Part 24 is covered by the Enfora Enabler-IIG "modular approval" process for a transmitter. This approach, described by FCC Public Notice DA 00-131407 released June 26, 2000, is intended to afford relief to equipment manufacturers by eliminating the requirement for obtaining a new equipment authorization for the same transmitter when installed in a new device.

In order to use the GSM2000 MINIMT without additional FCC certification approvals, the installation must meet the following conditions:

For the transmitter to meet the MPE categorical exclusion requirements of 2.1091, the ERP must be less than 1.5 watts for personnel separation distance of at least 20 cm (7.9 in). Therefore, the maximum antenna gain cannot exceed +3.3dBi. If greater than 1.5 watts exists, then additional testing and FCC approval is required.

R&TTE -

The GSM2228 Mini-MT modem has been fully tested and complies with all the requirements of EN301 489-1, EN301 489-7 and EN60950-1:2001. Compliance to EN301 511 has been demonstrated by testing on both the GSM2000 and the integrated GSM0108 module.

Disclaimer

The information and instructions contained within this publication comply with all FCC, GCF, PTCRB, R&TTE, IMEI and other applicable codes that are in effect at the time of publication. Enfora disclaims all responsibility for any act or omissions, or for breach of law, code or regulation, including local or state codes, performed by a third party.

Enfora strongly recommends that all installations, hookups, transmissions, etc., be performed by persons who are experienced in the fields of radio frequency technologies. Enfora acknowledges that the installation, setup and transmission guidelines contained within this publication are guidelines, and that each installation may have variables outside of the guidelines contained herein. Said variables must be taken into consideration when installing or using the product, and Enfora shall not be responsible for installations or transmissions that fall outside of the parameters set forth in this publication.

Enfora shall not be liable for consequential or incidental damages, injury to any person or property, anticipated or lost profits, loss of time, or other losses incurred by Customer or any third party in connection with the installation of the Products or Customer's failure to comply with the information and instructions contained herein.

Warranty Information

LIMITED WARRANTY

Enfora warrants to the original purchaser of the product that, for a period of one (1) year from the date of product purchase, the product hardware, when used in conjunction with any associated software (including any firmware and applications such as the modem manager) supplied by Enfora, will be free from defects in material or workmanship under normal operation. Enfora further warrants to such original purchaser that, for a period of ninety (90) days from the date of product purchase, any software associated with the product will perform substantially in accordance with the user documentation provided by Enfora, and any software media provided with the product will be free from defects in material or workmanship under normal operation. Enfora does not warrant that the product hardware or any associated software will meet the purchaser's requirements or that the operation of the product hardware or software will be uninterrupted or error-free. This limited warranty is only for the benefit of the original purchaser and is not transferable.

During the warranty period applicable to the product hardware, Enfora, at its expense and in its sole discretion, will repair or replace the product if it is determined to have a covered hardware defect, provided that the purchaser first notifies Enfora of any such defect, furnishes Enfora with a proof of purchase, requests and obtains a return merchandise authorization (RMA) number from Enfora, and returns the product, shipping charges prepaid, to Enfora under that RMA. If, upon reasonable examination of the returned product, Enfora does not substantiate the defect claimed by purchaser, or determines that the defect is not covered under this limited warranty, Enfora will not be required to repair or replace the product, but may instead reship the product to the purchaser, in which case purchaser shall be responsible for paying Enfora's usual charges for unpacking, testing, and repacking the product for reshipment to purchaser. Purchaser shall bear the risk of loss or damage in transit to any product returned by purchaser to Enfora, or any returned product not found to be defective or covered under this warranty and reshipped by Enfora to purchaser. In the event Enfora repairs or replaces a defective product, the repaired or replacement product will be warranted for the remainder of the original warranty period on the defective product. If Enfora is unable to repair or replace a defective product, the purchaser's exclusive remedy shall be a refund of the original purchase price. Any returned and replaced product, or any product for which Enfora has refunded the original purchase price, becomes the property of Enfora.

During the warranty period applicable to the software or its media, Enfora, at its expense, will replace any defective software or media if purchaser gives written notification of the defect to the technical support department at Enfora during the applicable warranty period. Enfora shall not have any obligation to provide any

software bug fixes, upgrades or new releases except as necessary to correct any covered defect of which purchaser notifies Enfora during the applicable warranty period.

Enfora shall have no obligation under this limited warranty for (a) normal wear and tear, (b) the cost of procurement of substitute products or (c) for any defect that is (i) discovered by purchaser during the warranty period but purchaser does not notify or request an RMA number from Enfora, as required above, until after the end of the warranty period, (ii) caused by any accident, misuse, abuse, improper installation, handling or testing, or unauthorized repair or modification of the product, (iii) caused by use of any software other than any software supplied by Enfora, or by use of the product other than in accordance with its documentation or (iv) the result of electrostatic discharge, electrical surge, fire, flood or similar causes.

ENFORA'S SOLE RESPONSIBILITY AND PURCHASER'S SOLE REMEDY UNDER THIS LIMITED WARRANTY SHALL BE TO REPAIR OR REPLACE THE PRODUCT HARDWARE, SOFTWARE OR SOFTWARE MEDIA (OR IF REPAIR OR REPLACEMENT IS NOT POSSIBLE, OBTAIN A REFUND OF THE PURCHASE PRICE) AS PROVIDED ABOVE. ENFORA EXPRESSLY DISCLAIMS ALL OTHER WARRANTIES OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION THE IMPLIED WARRANTIES OF NON-INFRINGEMENT, MERCHANTABILITY, SATISFACTORY PERFORMANCE AND FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT SHALL ENFORA BE LIABLE FOR ANY INDIRECT, SPECIAL, EXEMPLARY, INCIDENTAL OR CONSEQUENTIAL DAMAGES (INCLUDING WITHOUT LIMITATION LOSS OR INTERRUPTION OF USE, DATA, REVENUES OR PROFITS) RESULTING FROM A BREACH OF THIS WARRANTY OR BASED ON ANY OTHER LEGAL THEORY, EVEN IF ENFORA HAS BEEN ADVISED OF THE POSSIBILITY OR LIKELIHOOD OF SUCH DAMAGES.

Some jurisdictions may require a longer warranty period than specified above and, accordingly, for products sold in those jurisdictions the applicable warranty period shall be extended as required under the law of those jurisdictions. Furthermore, some jurisdictions may not allow the disclaimer of implied warranties or the exclusion or limitation of incidental or consequential damages, so the above disclaimer, limitation or exclusion may not apply to products sold in those jurisdictions. This limited warranty gives the purchaser specific legal rights and the purchaser may have other legal rights which vary from jurisdiction to jurisdiction.

In some instances, the product may also be covered by another limited warranty contained in a separate written agreement between Enfora and the distributor or reseller, if any, from whom purchaser purchased the product. That other limited

warranty may provide, for example, a longer warranty period or a different product return procedure that may also be available to purchaser.

This limited warranty shall be governed by the laws of the State of Texas, United States of America, without regard to conflict of laws principles. This limited warranty shall not be governed in any respect by the United Nations Convention on Contracts for the International Sale of Goods.

Table of Contents

1	INTRODUCTION	1
2	PRODUCT SPECIFICATIONS	2
3	GETTING STARTED	3
4	OVERVIEW OF THE ENFORA MINI-MT	4
4.1	LED INDICATORS	6
4.2	SWITCHES	7
4.2.1	<i>Push To Call (PTC)</i>	7
4.2.2	<i>Set Geo-Fence</i>	7
4.2.3	<i>User-Defined button</i>	7
4.2.4	<i>Volume Buttons</i>	7
4.3	INTERCONNECTIONS	8
4.3.1	<i>USB Connection</i>	8
4.3.2	<i>Headphone Jack</i>	8
4.3.3	<i>Speaker</i>	9
4.3.4	<i>Microphone</i>	9
4.3.5	<i>SIM</i>	10
4.3.6	<i>Battery</i>	10
5	BATTERY REMOVAL / INSERTION / CHARGING	11
5.1	REMOVING THE BATTERY	11
5.2	INSERTING THE BATTERY	11
5.3	CHARGING THE BATTERY	11
6	SIM CARD INSERTION / REMOVAL	13
7	MINI-MT CONFIGURATION	15
7.1	DISPATCH NUMBER	15
7.2	SMS DESTINATION	15
7.3	SET GEO-FENCE	16
7.4	USER-DEFINED BUTTON(S)	16
7.4.1	<i>User-definable Button “⓪”</i>	16
7.4.2	<i>User-definable Button “>”</i>	16
7.5	SETTING THE EMERGENCY CALL NUMBER	16
7.6	DIALING THE EMERGENCY CALL NUMBER	17
8	PC SOFTWARE INSTALLATION	18
8.1	MINI-MT USB COMPOSITE DEVICE – DRIVER	19
8.2	MINI-MT USB TO UART DEVICE – DRIVER INSTALLATION	23
8.3	CONFIGURING THE PC AND VERIFYING COMMUNICATIONS	26
8.3.1	<i>Default Serial Parameters</i>	26
8.3.2	<i>Determine which COM port to use</i>	26
8.4	START HYPERTERMINAL	28
8.5	DEMO CONFIGURATION TO THE ENFORA TEST SERVER	31

8.5.1	<i>Reset the modem to factory defaults</i>	31
8.5.2	<i>Connecting the Mini-MT to the Enfora Test Server</i>	31
8.5.3	<i>Configure the Modem to Access the GPRS network</i>	32
8.5.4	<i>Verify Registration Status</i>	33
8.5.5	<i>Verify GPRS Activation</i>	33
8.5.6	<i>Configure the modem to access the Enfora Server</i>	34
8.5.7	<i>Verifying Server connectivity</i>	36
9	GPS OPERATION AND VERIFICATION	39
9.1	VERIFICATION OF GPS LOCK	39
9.2	VERIFY GPS OPERATION	39
9.2.1	<i>GPS Operation from Enfora Demo Server</i>	40
10	SAFETY INFORMATION FOR WIRELESS DEVICES	41
10.1	RF EXPOSURE.....	41
10.2	SCIENTIFIC EVIDENCE ON RF EXPOSURE	42
11	FCC COMPLIANCE STATEMENT	44
12	PRODUCT SAFETY INSTRUCTIONS	45
	REVISION HISTORY	46

Table of Figures

Figure 1 – Mini-MT Features.....	4
Figure 2 – Mini-MT Front View.....	4
Figure 3 – Mini-MT Side View.....	5
Figure 4 – SIM Door and SIM Lock.....	14
Figure 5 – Open SIM Door.....	14

1 Introduction

This document provides a brief introduction to the Enfora® Mini-MT personal asset tracking device. This guide will provide basic instructions for configuring a Mini-MT for evaluation purposes. Advanced features are described in detail in the following reference documents:

- GSM2228AT001 - Enfora Mini-MT AT Commands
- GSM2228CB001 - Enfora Mini-MT Cook Book

2 Product Specifications

System Requirements		Application Interface	
Interface:	USB	• Host Protocols:	AT Commands, UDP/API, CMUX
L x W x H:	100.33 x 58.92 x 25.4 mm	• Internal Protocols:	PPP, UDP/API, UDP/PAD, CMUX, TCP/PAD
Housing:	Polycarbonate	• API Control/Status:	AT
Weight:	136 g	• Real-Time-Clock (RTC), Event Engine	Scriptable, Friends IP, Wake-Up and Keep Alive, Auto-Activate
TX Power:	Class 4 (2W @850/ 900 MHz) Class 1 (1W @1800/1900 MHz)	• Over the air commands for:	
Special Features		- GPS TX Interval	- GPS Content
- Motion Sensor		- Binary Reporting	- Event Reporting
- Vibrating Alert		- Timed Reporting	- Distance Reporting
		- Geo-Fencing	
Band Operation		SIM Card / Interface / I/O	
850 / 900 / 1800 / 1900 MHz bands		• Internal 3V SIM accessed via battery compartment	
		• Mini USB jack for power and programming	
		• Vehicle power adapter (optional)	
		• 2.5 mm headset jack	
GPRS Packet Data		Environment	
Mode:	Class B, Multislot 10 Certified	Operating:	-20°C to +60°C
Protocol:	GPRS Release 97, SMG 31	Storage:	-40°C to +85°C
Coding Schemes:	CS1 – CS4	Humidity:	Up to 95% non-condensing
Packet Channel:	PBCCH/PCCCH		
GSM Functionality		GPS/A-GPS Functionality	
Voice:	Full Rate, Enhanced full rate and half rate, AMR	• Autonomous and “Enhanced” Autonomous	
CS Data:	Asynchronous, transparent and non transparent up to 9.6 KB	• GPS operations w/ optional Multi-day ephemeris service	
GSM SMS:	PDU, MO/MT Cell broadcast	• Tracking up to 14 satellites	
		• 3GPP A-GPS standards compliant	
		• Supported Protocols	
		- Secure User Plane Location (SUPL)	
		- NMEA	
		• Time to First Fix (Cold Start):	
		- 70 sec @ 10 m avg.	
		• 1 Hz Navigation Fixes	
Certifications		Power	
FCC:	Parts 2,15,22, & 24	Rechargeable Lithium Ion Battery:	
GCF:	Version 3.21.1	Standard	1340mAh
PTCRB:	Version 3.7.1	GSM hibernate	100µA
CE Mark		GSM 1TX/1RX (Avg)	150mA
Industry Canada (CSA0)		GSM1RX (Avg)	75mA
RoHS Compliant			
		Part Number	
		PN – GSM2228	

3 Getting Started

Getting started with the Enfora Mini-MT will require the following:

- Mini-MT (GSM2228)
- USB to mini-USB cable (not supplied) (CAW-6000-0006)
- Activated SIM card (not supplied)
- Personal Computer (not supplied)
 - o Operating Systems: Windows 2000, or XP
 - o USB port
- The USB drivers for the Mini-MT are available on the Enfora website at www.enfora.com. The customer will need to acquire a user id and password from their distributor in order to download the USB drivers.

4 Overview of the Enfora Mini-MT



Figure 1 – Mini-MT Features



Figure 2 – Mini-MT Front View



Figure 3 – Mini-MT Side View

4.1 LED Indicators

There are four LED's used to provide status to the user. See Figure 2 for LED information. The LED functions are defined in the table below.

Power Mode	CALL	ON	GPS	BAT
	<i>Yellow</i>	<i>Yellow</i>	<i>Yellow</i>	<i>Red</i>
Hibernate	OFF	OFF	OFF	Low Battery, less than 20% Slow Blink 250mS/10Sec Low Battery, less than 5% OFF
Active / Battery	Blink when receiving or originating call 500mS/1 Sec Blink for missed call 2 Sec/2 Sec Solid during call	Slow blink 500mS/10Sec	Blink when locked 500mS/2 Sec	Low Battery, less than 20% Slow Blink 250mS/10Sec Low Battery, 5% or less, or turns OFF
Active / Aux	Blink when receiving or originating call 500mS/1 Sec Blink for missed call 2 Sec/2 Sec Solid during call	ON solid	Blink when locked 500mS/2 Sec	Fast Blink, during charge 500mS/2 Sec OFF when charged

NOTE: When upgrading the firmware on the Mini-MT the LED's will blink.

4.2 Switches

4.2.1 Push To Call (PTC)

The Push To Call (PTC) switch allows the user to place a call to a number that has been programmed.

4.2.2 Set Geo-Fence

The switch is used to initiate a geo-fence with a default radius of one-half mile. This radius may be re-defined by the application provider and is retained in non-volatile memory.

4.2.3 User-Defined button

The User-Defined button is a programmable button that can be defined for various functions. Some *examples* of these functions include: generate a call to a number different from the PTC button, generate a geo-fence with different parameters than the geo-fence button, send an SMS of the current location to a cell phone, send the current location to the server, etc.

4.2.4 Volume Buttons

The Mini-MT has two volume buttons for controlling the audio volume level. These buttons are functional whether in a call or not. The '+' button is used for increasing volume and the '-' button is used for decreasing volume.

NOTE: *While you are on an active phone call, the volume buttons will function in both headset and hands-free mode.*

4.3 Interconnections

4.3.1 USB Connection

The USB connector (see Figure 3) is used for charging the battery and for data communication. The unit will charge from a laptop computer, AC to USB power adapter, or vehicle power to USB adapter. (See Figure 3)

Data communications with the Mini-MT is also performed through the USB connector. The USB connection is used to configure or customize the Mini-MT operation. This connection also is used to provide GPS NMEA data to a mapping or user application.

NOTE: *The USB cable needs to support 480 mA.*

4.3.2 Headphone Jack

The headphone jack provides the user with the ability to connect a standard 2.5mm headset (not supplied with the modem) when the speakerphone mode is not desirable. (See Figure 3)

4.3.3 Speaker

An integrated speaker allows the user to make a phone call to the pre-configured dispatch number when in hands-free mode. The user can adjust the volume to a comfortable level using the volume up ('+') or down ('-') buttons.

WARNING



The Mini-MT is intended for use in speaker mode or headset mode only. Do not use the device held up to the head. The audio levels and SAR ratings have not been approved for use in this manner.

4.3.4 Microphone

A built-in sensitive microphone allows the user to communicate with the dispatcher comfortably at up to 3 feet away for hands-free operation.

4.3.5 SIM

A SIM cardholder is located under the battery on the bottom of the Mini-MT. The SIM card is required to enable the voice and data communication capabilities of your Mini-MT device.

4.3.6 Battery

A 1340mA/H Li-Ion battery is supplied with the Mini-MT that will allow operation without USB power. The Mini-MT battery life varies based on configuration and use of the Mini-MT.

The battery must be installed in the Mini-MT in order to configure it.

5 Battery Removal / Insertion / Charging

The Mini-MT is supplied with a 1340mA/H Lithium-Ion rechargeable battery with built-in safety features. The battery should be removed to gain access to the SIM card and for turning the unit off (shipping or travel). The battery is shipped with a red protective cover over the battery terminals and must be removed before use. The following steps provide instructions for how to remove or replace a battery.

NOTE: *The Mini-MT cannot be used without a battery. Running the Mini-MT only on USB power without a battery is not supported.*

5.1 Removing the battery

Access to the battery is through the battery door on the bottom of the Mini-MT. Firmly press the battery cover latch and pull the battery door open. Pull up on the battery using the thumb latch until the battery releases from the retention clips. Slide the battery away from the contacts and remove from the Mini-MT.

NOTE: *The battery is initially provided with a red protective cover over the terminals. Remove the protective cover by peeling off of the battery to expose the terminals. Discard the protective cover after removal.*

5.2 Inserting the battery

While the battery cover is removed, insert the battery into the battery compartment with the contacts aligned with the Mini-MT power contacts. The battery must be inserted into the battery compartment at a 45-degree angle with the contact end first. Ensure the contacts of the battery line up with the contacts in the Mini-MT. Push the battery in towards the contacts and then down firmly until fully seated in the battery compartment. Replace the battery access door ensuring the latch is locked firmly in place.

5.3 Charging the battery

The Mini-MT must be charged for twelve (12) hours prior to initial use.

Charging your Mini-MT battery may be done using a standard USB cable (optional: CAW-6000-0006) connected to your desktop personal computer (PC).

NOTE: *The PC must be turned on or powered up while charging the Mini-MT.*

For charging the Mini-MT battery in a vehicle an optional USB to vehicle accessory power adapter is available (PSA-9000-0002).

NOTE: *Many vehicles do not provide power to the accessory jack when the vehicle ignition is off.*

An alternate method for charging using AC power may be performed with the AC power to USB power adapter (PSA-9000- 0101).

Connect one end of the USB cable to the Mini-MT and the other end to your power source. The Mini-MT ON LED will be on solid and the BAT LED will flash while charging.

When the Mini-MT is fully charged the BAT LED will be off and the ON LED will be on solid while connected to a USB power source.

NOTE: *The USB cable needs to support 480 mA.*

Mini MT Battery Charging Guidelines

Do not use or leave the battery cell in the hot sun or inside a car heated by sunshine for extended periods. This may cause the battery to generate heat, smoke, or flame. It might also cause deterioration of the battery cell's capacity or longevity.



The battery supplier specifies that the charging temperature range is between 0 and 40 degrees centigrade. Charging outside the recommended range may cause excessive heat or serious damage to the battery.

6 SIM Card Insertion / Removal

The SIM, an integral part of any GSM terminal device, is a “smart card” that is programmed with subscriber information. The user information consists of an International Mobile Subscriber Identity (IMSI) number which is registered with the GSM/GPRS service provider and an encryption Ki (pronounced “key”). This information consists of a microprocessor and memory installed on a plastic card. A SIM card can be installed by simply inserting the SIM card in the SIM slot provided inside of the device. The SIM slot is located under the battery and the battery door.

To install the SIM card into the Mini-MT device, follow these steps:

1. Remove the battery cover from the underside of the Mini-MT by pushing the tab in the direction that the arrow is pointing.
2. Remove the battery.
3. Remove the piece of red tape that is covering the battery connectors.
4. You will see the SIM card holder in the Mini-MT.
5. Slide the SIM card holder to the right, and the door will lift up.
6. Slide the SIM card into SIM door. Make sure the notch on the SIM is aligned with the notch in the SIM holder.
7. Close the SIM door.
8. Slide the SIM lock to the left. The SIM card holder **MUST** be locked.
9. Place the battery back in the Mini-MT, making sure the connectors are aligned properly.
10. Replace the battery cover.

Note: *The SIM card is not provided with the Mini-MT device. The SIM must be obtained from the GSM/GPRS service provider and must be provisioned by the operator for data and/or voice. Always take care to protect the SIM. Mini-MT's GSM/GPRS related functionality will not operate without the SIM installed.*



Enfora is not liable for damages to the Mini-MT when inserting a SIM card inside the device.



Figure 4 – SIM Door and SIM Lock



Figure 5 – Open SIM Door

7 Mini-MT Configuration

The Mini-MT must be configured before use. Configuration is performed through AT commands from a PC computer. A terminal program is required to interface to the Mini-MT through the USB cable.

The drivers for the Mini-MT support Windows XP and Windows 2000 operating systems. While Enfora uses HyperTerminal to configure the Mini-MT, the user can use another terminal program.

The Mini-MT drivers must be installed on your computer before proceeding. Refer to *Section 8: PC Software Installation* of this document for driver installation.

7.1 Dispatch Number

The “Dispatch Number” is the phone number the Mini-MT will call when the Push-To-Call (PTC) button is pressed.

To configure the Mini-MT to call phone number “1-214-555-1212” enter the following command:

```
AT$DSPATCH="12145551212" <Enter>
```

After entering the dispatch number enter: AT&W <Enter> to save. This will ensure that if the battery is removed the number will not need to be re-entered.

7.2 SMS Destination

The SMS Destination Address is where the Mini-MT would send an SMS text message. The Mini-MT can store up to five (5) SMS Destination Addresses. The following example shows how to set an SMS Destination Address:

```
AT$SMSDA=1, "19875551212" <Enter>
```

7.3 Set Geo-Fence

There are two user-definable buttons on the Mini-MT. The first button is factory-defined to set a geo-fence. Depressing the Geo-Fence button will place a half-mile radius circular geo-fence around the Mini-MT. When the Mini-MT exits the geo-fence an alert message will be sent via SMS message to the SMS Destination Address defined in the AT\$SMSDA field. (Messages and alerts can also be sent via GPRS packet data. The user has the ability to control the IP and port that the packet data is transmitted to)

The factory default configuration of the Mini-MT will not have any SMS Destination Addresses configured and will not be capable of generating SMS messages for Geo-Fence events.

7.4 User-Defined button(s)

7.4.1 User-definable Button “⊙”

The Mini-MT “⊙” button is user-definable through the event engine. The default state is to configure a ½ mile radius geo-fence at the current location.

7.4.2 User-definable Button “>”

The Mini-MT “>” button is user-definable through the event engine. This button function is not defined from the factory.

7.5 Setting the Emergency Call number

The Mini-MT is capable of dialing an emergency number (AT\$EMERNUM) and a dispatch number (AT\$DSPATCH). The default emergency number in the Mini-MT is “411.” The provider should reconfigure this number to the correct emergency number for the region the Mini-MT will operate in.

To set the emergency number to “911” enter the following text in the terminal window:

```
AT$EMERNUM="911" <enter>
```

```
AT&W <enter>
```

The first command sets the emergency number to 911 and the second command saves the setting.

7.6 Dialing the Emergency Call Number

The Mini-MT will allow emergency communications without a SIM card installed.

Follow these steps to initiate an emergency call:

1. Depress the user-defined button.
2. Hold the user-defined button (>).
3. Press and hold the PTC button.
4. The ON, GPS, and BAT LED's will flash in unison.
5. Momentarily release the user-defined button (>) while still holding the PTC button.
6. Press the user-defined button (>) again.
7. The CALL LED will flash.
8. Release the user-defined (>) and the PTC buttons.

The Mini-MT will establish a call to the number configured in the AT\$EMERNUM command.

8 PC Software Installation

Please contact your local distributor for the USB drivers, or obtain them from the Enfora support website at <http://www.enfora.com>. You will need a login id and password to access the drivers.

The USB drivers are compatible with Windows 2000, and Windows XP operating systems. You only need to connect the Mini-MT to your computer for configuration, and software upgrades.

The following steps describe the USB Driver Installation process.

NOTE: *This is a self-extracting zip file. Save this file to any location on your hard drive. Double-click the file to extract the twenty (20) included files. Make a note of the location of these files on your hard drive. You will need to access these drivers during installation.*

Your first step will be double-clicking on the **PreInstaller.exe** file, which you have just unzipped. Click on **OK** after a successful installation.

Windows will find two separate devices.

- Mini-MT USB to UART Device
- Mini-MT USB Composite Device

You will need to go through two driver installations in order to install both of these devices on your PC. Please follow these steps to install the Mini-MT drivers.

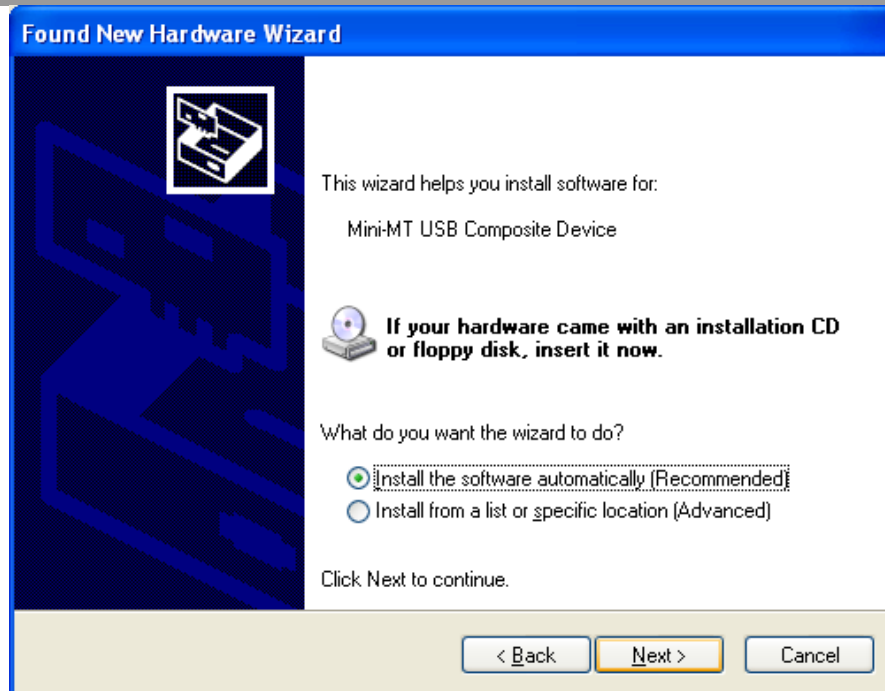
8.1 Mini-MT USB Composite Device – Driver

NOTE: Make sure you run the *PreInstaller.exe* file before connecting the Mini-MT to your computer.

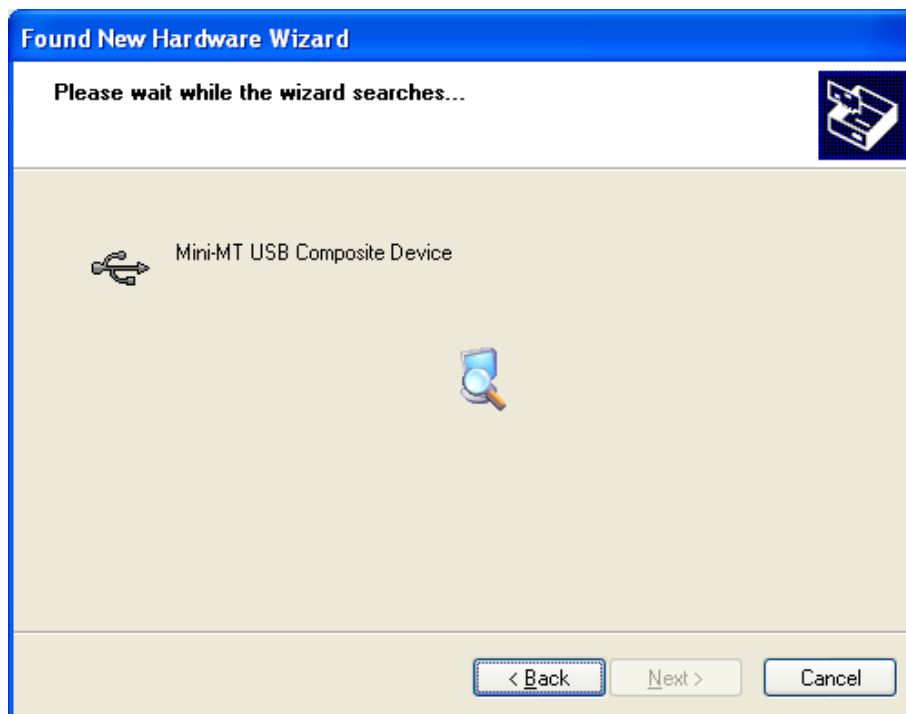
1. Plug the Mini-MT into your USB port.
2. You will see the following screen:



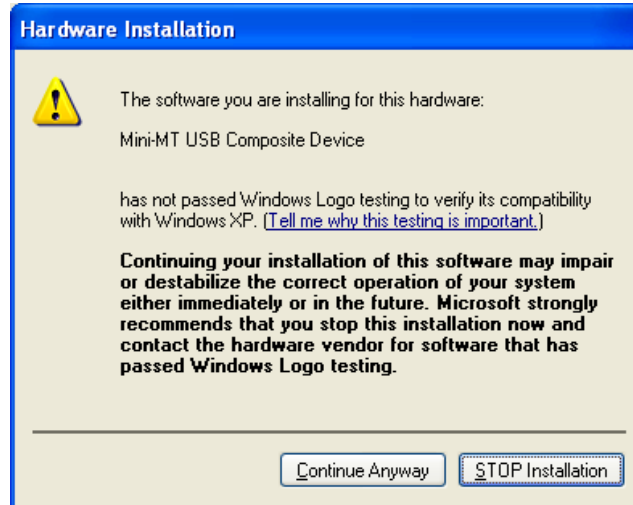
3. Click on the radio button next to, **“No, not this time.”**
4. Click **Next**.
5. You will see the following screen:



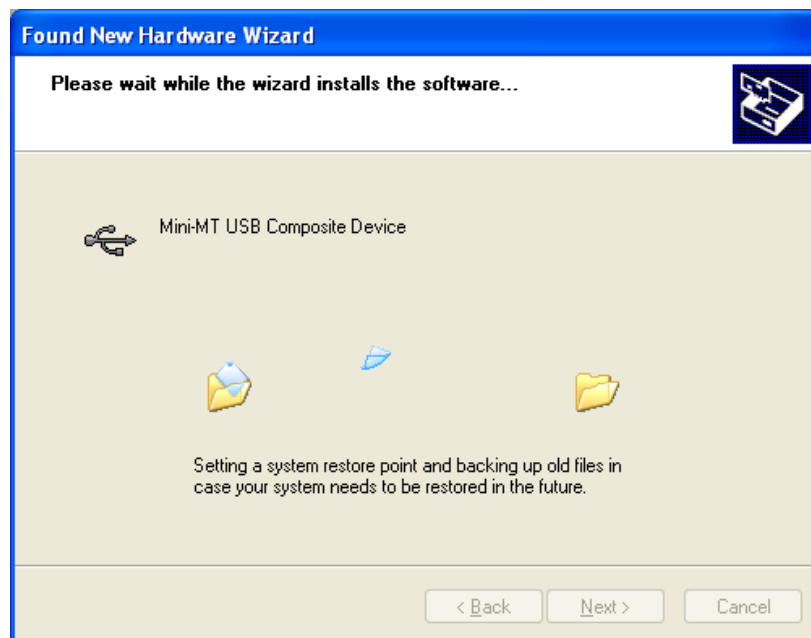
6. Click on the radio button next to, “**Install the software automatically (Recommended).**”
7. Click **Next**. You will see the following screen:



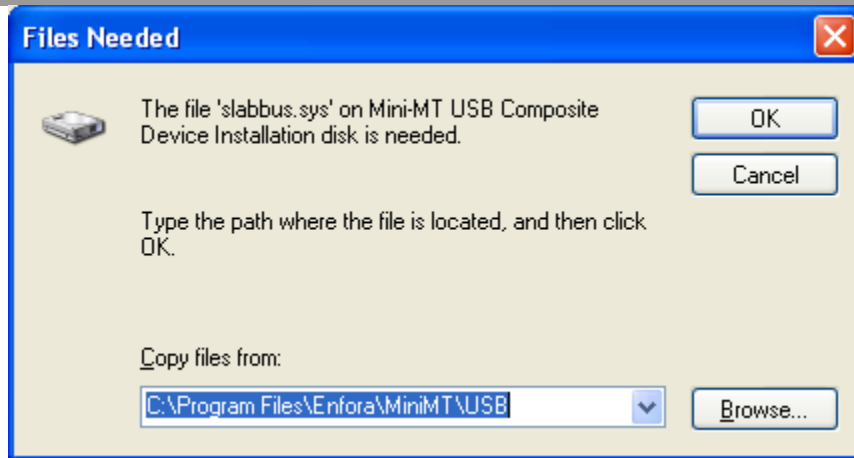
8. The Operating System will detect the drivers for the Mini-MT.
9. You may see the following screen; if you do, follow Step 10, otherwise proceed to Step 11.



10. Click the **Continue Anyway** button.
11. You will see the following screen while the drivers install:



12. You may be prompted to point to the location of the files from this screen:



13. Browse to the correct location of the drivers, and click **OK**.

14. When the drivers have completed installing, you will see the following screen:



15. Click on **Finish**.

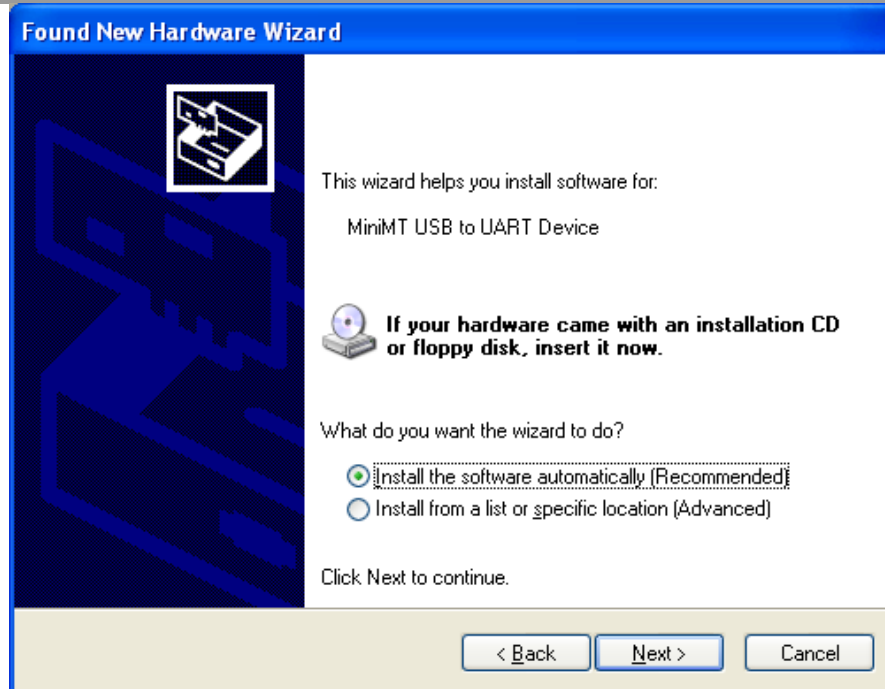
8.2 Mini-MT USB to UART Device – Driver Installation

The installation process for the USB to UART Device should automatically start. The following steps will help guide through the driver installation.

1. You will see the following screen:



2. Click on the radio button next to, “**No, not this time.**”
3. Click **Next**. You will see the following screen:

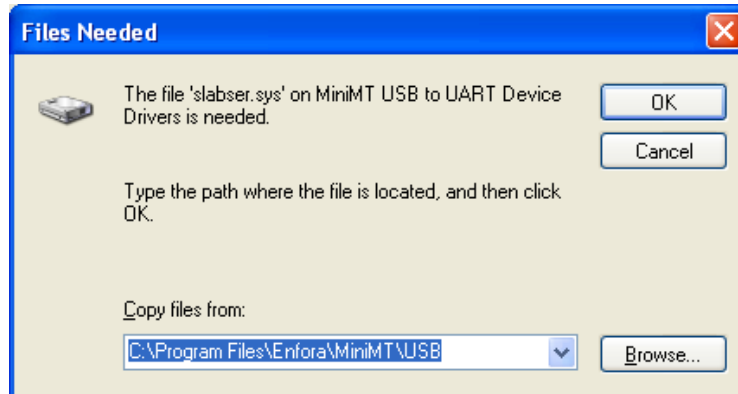


4. Click on the radio button next to, “**Install the software automatically (Recommended).**”
5. Click **Next**. You may see the following screen; if you do, follow Step 6, otherwise proceed to Step 7.



6. Click the **Continue Anyway** button.

NOTE: You may be prompted to search for a specific driver file. If you see the following screen, browse to the location of the Mini-MT driver files.



7. Click **OK**.
8. When the drivers have completed installing, you will see the following screen:



9. Click on **Finish** to complete the installation.

8.3 Configuring the PC and Verifying Communications.

NOTE: The following examples use Windows 2000 and HyperTerminal. Any Terminal program should work, using the parameters in Steps 7.3.1 and 7.3.2.

8.3.1 Default Serial Parameters

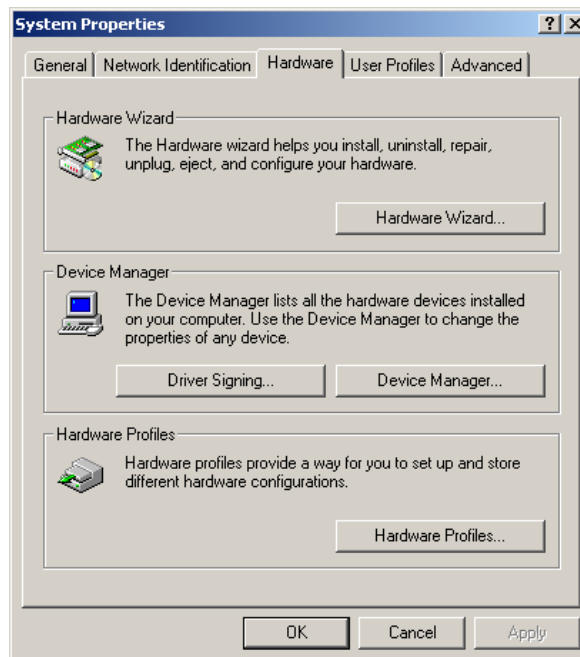
Baud Rate: 115200 baud rate
Data Bits: 8
Stop Bits: 1
Parity: None
Flow Control: None

8.3.2 Determine which COM port to use

On older computers, there is usually a built in COM port. This is normally COM1

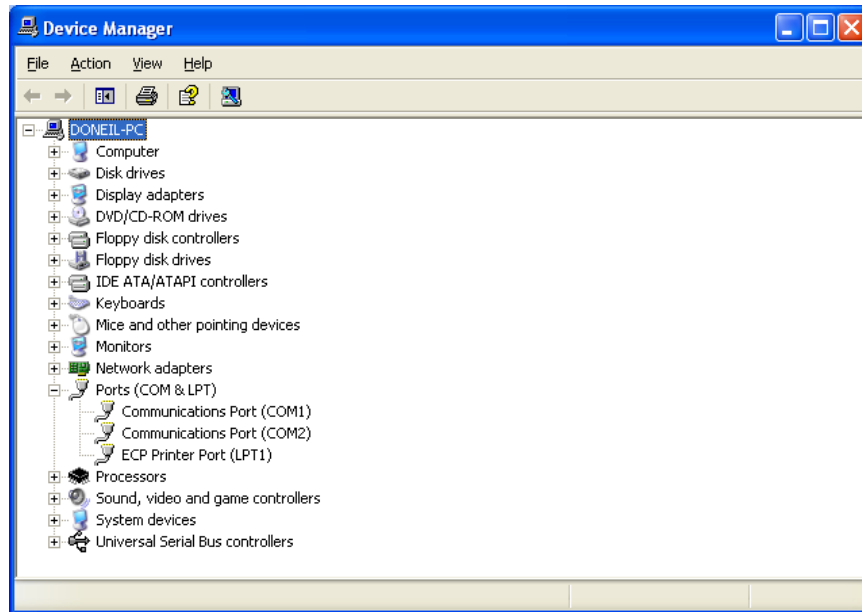
With a USB connection, you will need to determine which COM port it is using.

1. Open up the **System Properties** window. This is done through the **Control Panel > System** or right-click on **My Computer** and select **Properties**. Select the **Hardware Tab**. On Windows 2000 the screen looks like the following:

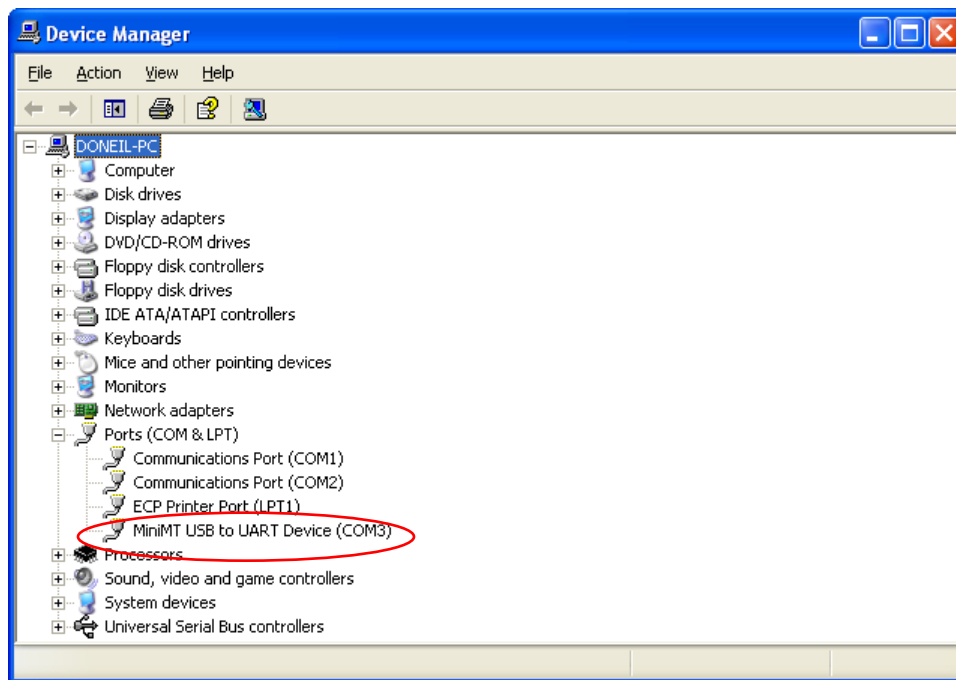


2. Select the **Device Manager** button. Expand the **Ports** section by selecting the '+' sign beside "Ports (COM & LPT)".

Your window should look similar to the following:



3. Plug the Mini-MT into your USB port. The window should change to show Mini-MT USB to UART Device.



Most devices will show the COM port next to the device name. Record this number. In this example, the Mini-MT device is configured to COM3.

NOTE: Make sure there is no “!” or “X” next to the USB device. If you see an “!” or an “X,” the device is not properly installed and will not work.

8.4 Start HyperTerminal

The following configuration steps assume that you are using the Windows XP Operating System.

Follow these steps:

1. Click **Start>Programs>Accessories>Communications>HyperTerminal**

You should see the following screen.



2. Enter a name for the connection. In this example, the name is **Enfora MiniMT**.
3. Click **OK**.

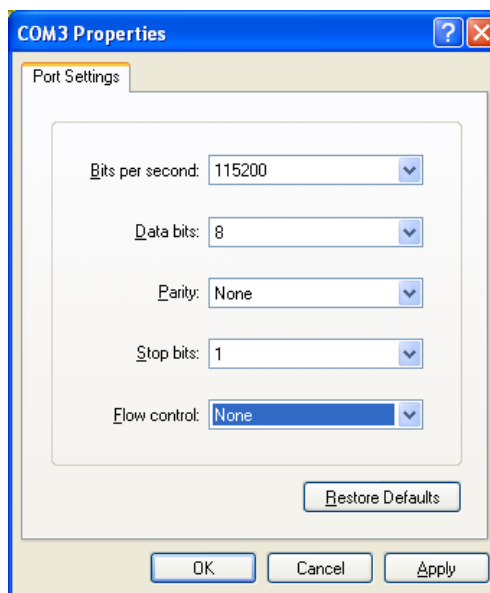
The next window that will appear is the **Connect To** window.



4. Change the **Connect Using** setting to the COM port that was determined in Section 7.3.2, Step 2. For the example we are using **COM3**.
5. Click **OK**.

The next window is the **Port Settings** window.

6. Set the communication port to 115200 bits per second, 8 data bits, no parity, 1 stop bit and no flow control.



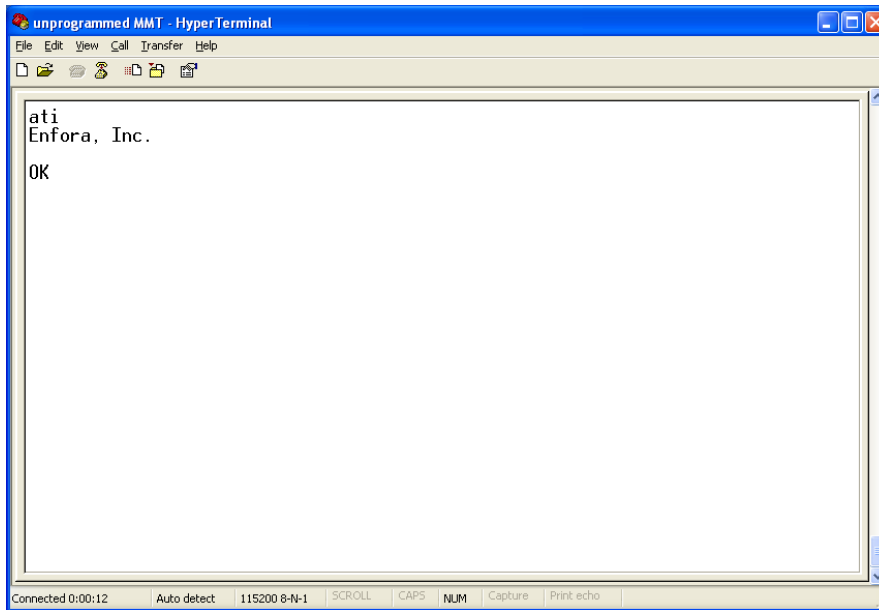
7. Make sure the settings match the example.

8. Click **OK**.

The **Main Program Window** should appear.

9. Type the command **ATI** in the main window and press the **Enter** key.

You should see the following screen with the response from the Mini-MT:



The response “**Enfora, Inc.**” indicates that you are successfully communicating with the Enfora Mini-MT.

8.5 Demo Configuration to the Enfora Test Server

The Mini-MT is capable of communicating with a server. The following steps will guide you through a configuration that will demonstrate the data communication capabilities to the Enfora Test Server. A valid SIM card from your carrier is required that allows GPRS data communications capability.

8.5.1 Reset the modem to factory defaults

To restore the Mini-MT to factory defaults send the following command:

```
AT&F<CR>
```

To save the current configuration to memory send the following command:

```
AT&W<CR>
```

Reset the modem with the following command:

```
AT$RESET<CR>
```

8.5.2 Connecting the Mini-MT to the Enfora Test Server

The following information will be required from the SIM card provider (refer to GSM0000AN019 – Network Configuration Worksheet):

- APN
- Username (if required)
- Password (if required)
- SIM PIN (if required)

The following examples show how to configure the Mini-MT with a Cingular SIM card with the following data:

- APN=isp.cingular
- Username=ISP@CINGULARGPRS.COM
- Password=CINGULAR1
- SIM PIN=1234

8.5.3 Configure the Modem to Access the GPRS network.

De-register the Mini-MT from the network using the following command:

```
AT+CFUN=0 <CR>
```

Set the modem with the proper APN (Access Point Name) using the following command:

```
AT+CGDCONT=1,"IP","APN"<CR>
```

NOTE: Replace the letters "APN" with the APN that was provided to you by your wireless carrier

Example:

```
AT+CGDCONT=1, "IP", "isp.cingular"
```

Set the username and password with the following command:

```
AT%CGPCO=1, "<username>,<password>",0<CR>
```

NOTE: Substitute the correct username and password, if your cellular carrier requires a username and password.

Example:

```
AT%CGPCO=1, "ISP@CINGULARGPRS.COM,CINGULAR1",0<CR>
```

Configure the Mini-MT for auto GPRS registration with the following command:

```
AT$AREG=2<CR>
```

Save the changes to memory with the following command:

```
AT&W<CR>
```

The Mini-MT should be reset to ensure the changes are used. Reset the Mini-MT with the following command:

```
AT$RESET<CR>
```

8.5.4 Verify Registration Status

Verify GSM status by sending the following command:

```
AT+CREG?<CR>
```

If everything is working, you should receive one of two responses:

```
+CREG: 0,1 (GSM registered to home network)  
OR  
+CREG: 0,5 (GSM registered roaming.)
```

Verify GPRS status by sending the following command:

```
AT%CGREG?<CR>
```

If everything is working, you should receive one of two responses:

```
%CGREG: 0,1 (GPRS registered to home network)  
OR  
%CGREG: 0,5 (GPRS registered roaming.)
```

8.5.5 Verify GPRS Activation

Enter the following command to verify that the Mini-MT is activated on the GPRS network:

```
AT$NETIP?<CR>
```

The Mini-MT is activated if it has been assigned an IP address

Example of successful GPRS activation:

```
at$netip?  
$NETIP: "166.217.226.214", "066.102.163.231", "066.209.010.201"
```

NOTE: The above IP addresses will be different for each device and location. Non-zero values indicate a successful GPRS activation.

Example of unsuccessful GPRS activation:

```
at$netip?  
$NETIP: "000.000.000.000", "000.000.000.000", "000.000.000.000"
```

If AT\$NETIP returns all zeros, send the following command:

```
AT$CGEER<CR>
```

There are three common responses:

\$CGEER: no PDP reject cause
(Everything should be working properly)

\$CGEER: requested service option not subscribed
(APN is incorrect or SIM has not been enabled for data mode.)

\$CGEER: user authentication failed
(username and/or password is incorrect.)

8.5.6 Configure the modem to access the Enfora Server.

To configure the modem for server interoperability, several things have to be addressed:

- Most GPRS configurations are **Mobile Originate** only. The mobile modem must initiate a conversation with a remote server before the remote server can talk to the modem.
- IP addresses are dynamically assigned and can change.
- Some IP addresses are NAT and are non-routable.

These issues are addressed with the following configuration commands.

The examples will use the following information:

- Modem ID/name = "MMT_Test"
- Remote Server IP address = apitest.enfora.com
- Remote Server IP port = 1721

Give the modem a unique name with the following command:

```
AT$MDMID="MMT_Test"
```

NOTE: *This command, combined with the wakeup message, will allow the server to associate a Public IP address with a specific modem and create a window of opportunity where the server can send commands to the modem.*

Configure the modem to talk with a specific server with the following command:

```
AT$FRIEND=1,1,"apitest.enfora.com"
```

Set the port number with the following command:

```
AT$UDPAPI=,1721
```

Enable periodic messages (wakeup) to be sent to the server every 60 seconds with the following command:

```
AT$WAKEUP=1,1
```

Configure the Mini-MT for auto GPRS registration with the following command:

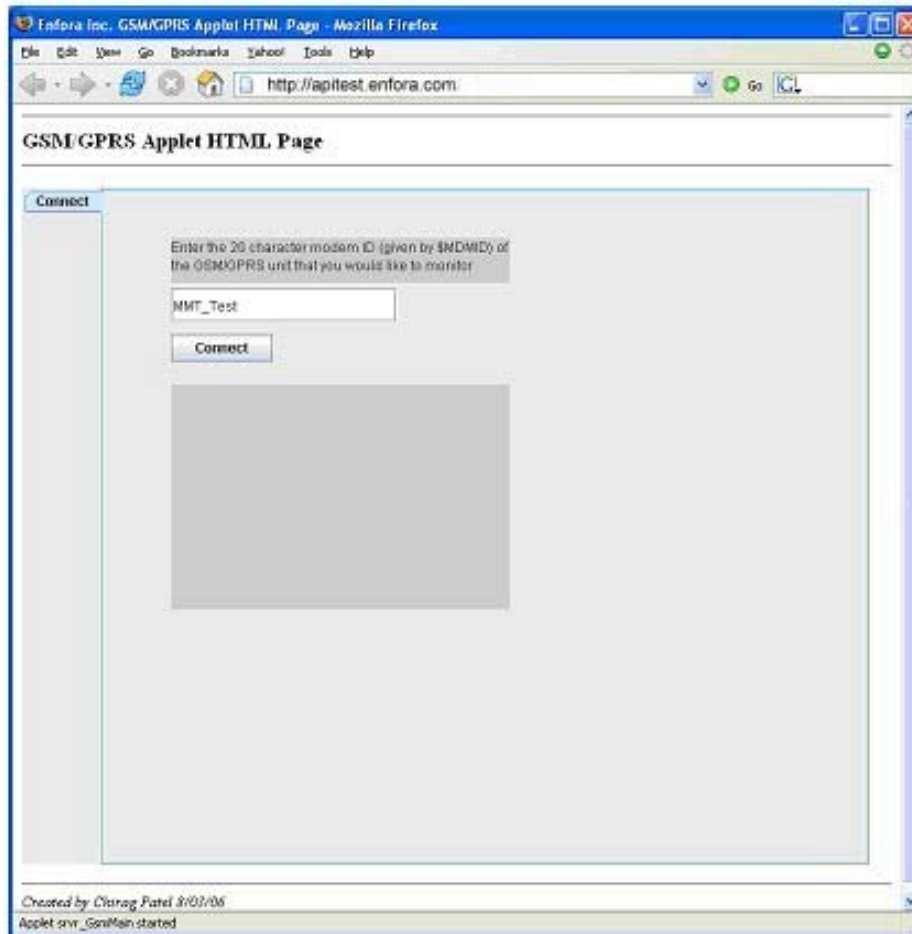
```
AT$AREG=2<CR>
```

8.5.7 Verifying Server connectivity.

For the following tests, Java Runtime must be installed on the computer. (To install Java Runtime, please visit the Java website here:

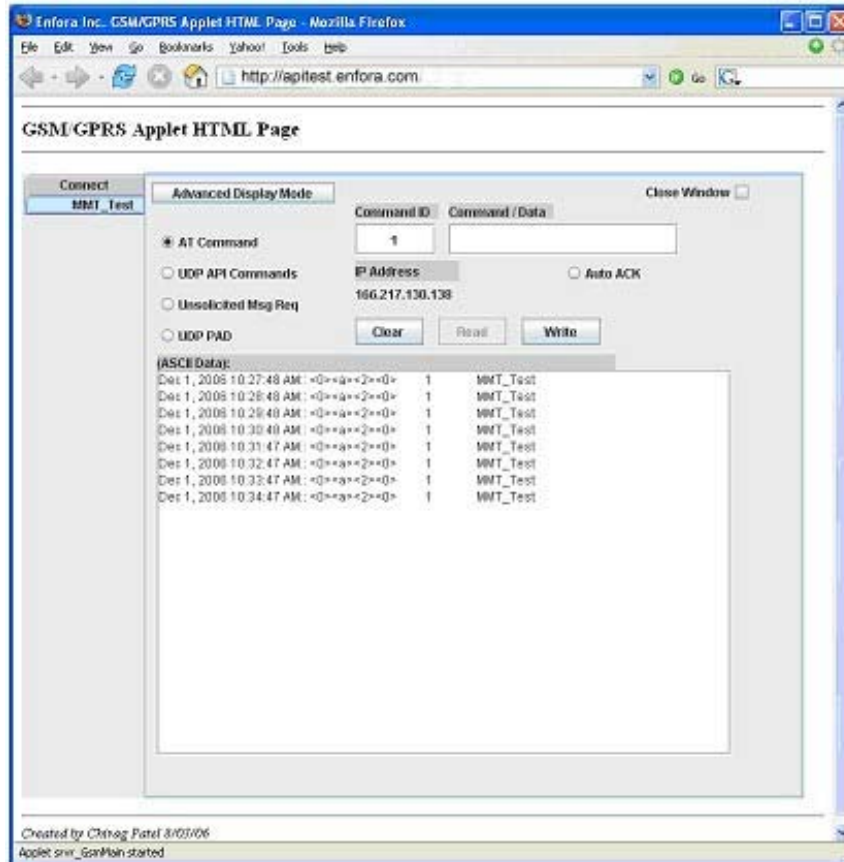
<http://www.java.com/en/download/manual.jsp>)

1. Start Internet Explorer and enter the following URL:
[“http://apitest.enfora.com/udpapp/”](http://apitest.enfora.com/udpapp/)
2. Enter the name used in the Modem ID (MDMID) command in the box.
3. Select **Connect**.



4. Select the tab with the modem name (MMT_Test). Within approximately 60 seconds wakeup messages should be seen in the window.

NOTE: Selecting the **Clear** button will erase the contents of the “(ASCII Data):” window.

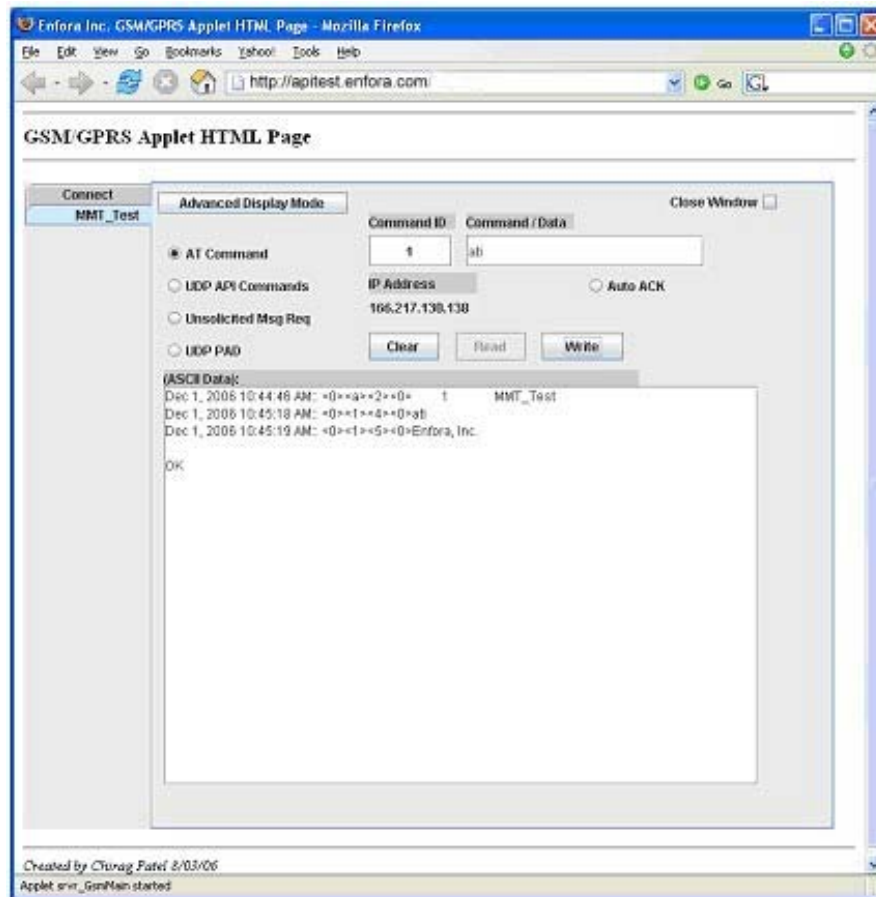


5. Enter the following command in the **Command / Data** text box:

ATI

6. Click on the **Write** button.

7. Verify that you see the following modem response showing **Enfora, Inc.** If so, you have successfully configured the modem to talk with the server.



9 GPS Operation and Verification

The Mini-MT contains an integrated GPS receiver and GPS antenna. For best GPS performance the unit should be placed in an area where it can have direct view of the sky.

9.1 *Verification of GPS Lock*

The Mini-MT will provide an indication of successful GPS Lock within approximately 70 seconds when in view of satellites.

The GPS LED will flash yellow when it is receiving a sufficient number of satellites to provide status. When this occurs, the internal GPS receiver has enough information to track its current position.

9.2 *Verify GPS operation*

The Mini-MT GPS status may be obtained locally through the USB connection or through the GPRS connection to a server. The following steps allow the user to determine GPS operation through a terminal program and also through the Enfora Demonstration web server.

10 Safety Information for Wireless Devices

10.1 RF Exposure



WARNING

Please read this information before using your wireless device.

Your Mini-MT is a radio transmitter and receiver. It is designed and manufactured not to exceed the emissions limits for exposure to radio frequency (RF) energy set by the Federal Communications Commission (FCC) of the U.S. Government. These limits are part of comprehensive guidelines and establish permitted levels of RF energy for the general population. These guidelines are based on the safety standards previously set by the U.S. and international standards bodies. The standards include a substantial safety margin designed to assure the safety of all persons, regardless of age and health.

The exposure standard for wireless RF devices, such as the Mini-MT, employs a unit of measurement known as the Specific Absorption Rate, or SAR. The SAR limit set by the FCC is 1.6W/kg. SAR values at or below that limit are considered safe for the general public.

Before a wireless RF device is made available for sale to the Public, it must be tested and certified to the FCC that it does not exceed the SAR limits established by the FCC. Tests for SAR are conducted using the positions and locations (e.g., at the ear or worn on the body) as required by the FCC for each device model. The Mini-MT has been tested and meets the FCC RF exposure guidelines when used as a speakerphone, with a standard 2.5mm headset, or when worn on the body using an approved belt clip. Other uses may not ensure compliance with FCC RF exposure guidelines.

WARNING



To minimize RF exposure, it is strongly recommended that you use a headset with your Mini-MT or operate it in hands-free mode.

10.2 Scientific evidence on RF exposure

The following information, in large part, is excerpted from, or based on, information provided by the U.S. Food and Drug Administration (FDA) on its website under the heading, “Cell Phone Facts: Consumer Information on Wireless Phones.”

(<http://www.fda.gov/cellphones/qa.html>). The information provided below reflects scientific evidence available through the end of 2004. Please visit the aforementioned FDA website (and the other websites mentioned below) for the latest information.

The available scientific evidence does not show that any health problems are associated with using wireless phones. There is no proof, however, that wireless phones are absolutely safe. Wireless phones emit low levels of RF while being used. They also emit very low levels of RF when in the stand-by mode. Whereas high levels of RF can produce health effects (by heating tissue), exposure to low-level RF that does not produce heating effects causes no known adverse health effects. Many studies of low-level RF exposures have not found any biological effects. Some studies have suggested that some biological effects may occur, but such findings have not been confirmed by additional research. In some cases, other researchers have had difficulty in reproducing those studies, or in determining the reasons for inconsistent results.

The FDA and other U.S. government agencies responsible for public health and safety have worked together and in connection with the World Health Organization (WHO) to monitor developments and identify research needs related to RF biological effects. It is generally agreed that further research is needed to determine what effects actually occur and whether they are dangerous to people. In the meantime, standards-setting organizations and government agencies are continuing to monitor the latest scientific findings to determine whether changes in safety limits are needed to protect human health. In 1996, the WHO established the International EMF Project to review the scientific literature and work towards resolution of health concerns over the use of RF technology. The WHO maintains a Web site that provides extensive information on this project and about RF biological effects and research (www.who.ch/peh-emf).

If there is a risk from using wireless phones—and at this point the scientific evidence does not demonstrate the existence of such a risk—it is probably very small. But if you are concerned about avoiding even potential risks, you can take a few simple steps to minimize your exposure to RF. Since time is a key factor in how much exposure a person receives, reducing the amount of time spent using a wireless phone will reduce RF exposure. If you must conduct extended conversations by wireless phone every day, you could place more distance between your body and the source of the RF, since the exposure level drops off dramatically with distance. For example, you could use a headset and carry the wireless phone away from your body or use a wireless phone connected to a remote antenna.

Some groups sponsored by other national governments have advised that children be discouraged from using wireless phones at all. For example, the government in the United Kingdom distributed leaflets containing such a recommendation in December 2000. They noted that no evidence exists that using a wireless phone causes brain tumors or other ill effects. Their recommendation to limit wireless phone use by children was strictly precautionary, and was not based on scientific evidence that any health hazard exists. More recently, a report published in January 2005 by the British National Radiological Protection Board (NRPB) summarized the results of various studies from 2000 to 2004 on the effects of wireless phone use, and concluded that there is no hard evidence that the health of the public is being harmed by the use of wireless phones, but that uncertainties remain regarding the risks associated with long-term wireless phone use. Therefore, the report suggested that a "precautionary or prudent approach" to reducing RF exposure from wireless phones should be followed until more is known about these potential risks, including the potential increased sensitivity of children to RF.

The report (NRPB-W65) is available for download at the NRPB website (www.nrpb.org). Again, the scientific evidence does not show a danger to users of wireless phones, including children and teenagers. If you want to take steps to lower exposure to RF, the measures described above would apply to children and teenagers using wireless phones. Specifically, reducing the time of wireless phone use and increasing the distance between the user and the RF source will reduce RF exposure.

The FDA scientific staff has reviewed the methodology used by FCC to measure cell phone RF, and has agreed that it is an acceptable approach, given our current understanding of the risks presented by cellular phone RF emissions. RF emissions from cellular phones have not been shown to present a risk of injury to the user when the measured SAR is less than the safety limits set by FCC (SAR of 1.6 w/kg). The FDA will continue to monitor studies and literature reports concerning acute effects of cell phone RF, and concerning chronic effects of long-term exposure to cellular telephone RF (that is, the risks from using a cell phone for many years). If new information leads FDA to believe that a change to FCC's measurement policy may be appropriate, the FDA will contact the FCC, and both agencies will work together to develop a mutually acceptable approach.

11 FCC Compliance Statement

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits pursuant to Part 15 Subpart B, Part 22, and Part 24 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in an appropriate installation. This equipment generates, uses, and can radiate radio frequency energy and, if not used in accordance with instructions, can cause harmful radiation to radio communication. However, there is no guarantee that interference will not occur in a particular installation. If the equipment does cause harmful interference in radio and television reception, which can be determined by turning the equipment on and off, the user is encouraged to try to correct the interference by one or more of the following measures:

- Increase the separation distance between the equipment and the receiver.
- Contact Enfora Technical Support for assistance.



Changes or modifications without the express consent of the manufacturer may void any applicable warranty and the user's authority to operate the equipment.

12 Product Safety Instructions



Please follow all safety instruction outlined below. Failure to follow these instructions may result in serious personal injury and/or property damage.

Always obey all applicable regulations in any area where the Mini-MT may be used. Turn your Mini-MT off by removing the battery in areas where its use is prohibited or where it may cause interference or danger to anyone.

Use of radio equipment is prohibited in hospitals and may interfere with the use of medical equipment. Do not use the Mini-MT in hospitals or near medical equipment. The Health Industry Manufacturers Association recommends that a minimum separation of six inches (6”) be maintained between a handheld wireless device and a pacemaker to avoid potential interference with the pacemaker.

When boarding a plane, follow all instructions of the flight crew on the use of wireless devices. FCC regulations prohibit using your wireless device during any air flight. Turn off your Mini-MT during flight and at all other times as requested by the flight crew by removing the battery.

Do not use the Mini-MT in the vicinity of blasting areas where it might interfere with remote control RF devices used to set off explosives.

Although it is rare, wireless phones can generate sparks. Do not use or store your Mini-MT phone around flammable or explosive gas, liquids, chemicals or any other such materials.

Certain jurisdictions prohibit the use of radio communication equipment while driving to avoid distractions and prevent accidents. Do not use the Mini-MT while driving in those jurisdictions. In those other jurisdictions where using a wireless phone while driving is permitted, use in hands-free mode, avoid using the Mini-MT in heavy traffic or hazardous weather conditions, and do not take notes, look up phone numbers or engage in stressful or emotional conversations or any other activity while driving that might divert your attention from the road.

Revision History

Date	Rev	Author	Description
08/20/07	1.00	S. Ollmann	Initial Release
12/07/07	1.01	D. O'Neil	Removed reference to GPS degradation when the device is connected to a PC via USB. Changed driver download instructions
3/21/08	1.02	D. O'Neil	Added AREG note to page 35 Edtied PTC section
9/12/08	1.03	D. O'Neil	Added battery charging specifications