Mini MT

User Guide

GSM2428UG001

Version:1.01

13 June, 2011

General

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[Revised: 11/11/2010]

This warranty applies to (a) products sold directly by Enfora, unless a different warranty is specified in a written agreement between Enfora and the purchaser; and (b) products sold to end users through a distributor authorized by Enfora, but only where the authorized distributor does not provide a separate warranty on such products, and Enfora has agreed to provide this warranty to such end users. If you purchased the product from an authorized distributor, please check whether this warranty from Enfora, or a separate warranty from the distributor, applies to your purchase. This warranty does not apply to any (i) accessories or batteries for the products; or (ii) demonstration samples or prototypes of the products. Unless otherwise provided in a written agreement between Enfora and the purchaser, all such accessories, batteries, samples or prototypes are provided by Enfora AS IS without any warranty of any kind.

Enfora warrants to the original purchaser of the product from Enfora or its authorized distributor (as applicable) that, for a period of one (1) year from the date of shipment of the product from Enfora, the product hardware will be substantially free from defects in material or workmanship under normal operation, and the product firmware will perform substantially in accordance with the product documentation provided by Enfora. Enfora does not warrant that (a) the product hardware or firmware will meet the purchaser's requirements; (b) the operation of the product hardware or firmware will be uninterrupted or error-free; or (c) the product, when integrated in, or combined with, other products or software not supplied by Enfora, will continue to perform substantially in accordance with the product documentation. This limited warranty is for the benefit of the original purchaser, and is not transferable.

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purchaser specific legal rights and the purchaser may have other legal rights that vary from jurisdiction to jurisdiction. 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.

Regulatory Compliance

FCC

FCC ID: MIVGSM2428; MODEL NUMBER: GSM2428

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.

RF EXPOSURE

Your device 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 device, 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 device has been tested and meets the FCC RF exposure guidelines when used against the body using the supplied belt clip under normal usage conditions. This device conforms with the RF exposure requirements for portable devices in accordance with FCC Part 2.1093. This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment for portable devices.

Use of non-approved accessories may violate FCC RF exposure guidelines

Canadian Compliance (Industry Canada)

IC ID: 4160a-GSM2428; MODEL NUMBER: GSM2428

This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

The GSM2428 has been designed to comply with safety requirements for exposure to radio waves (SAR). SAR testing has been performed in accordance with RSS-102, with the GSM2428 transmitting at its highest certified power level in all used frequency bands. The highest SAR value for the GSM2428 when tested was 0.477W/Kg. Please follow the instructions included in the user guide for product installation and use.

Ce dispositif est conforme à la norme de l'Industrie Canada exempts de licence RSS. Opération est assujettie à la suite à deux conditions: (1) ce dispositif ne peut pas causer de brouillage, et (2) ce dispositif doit accepter toutes interférence, y compris le brouillage qui peut causer intempestif de fonctionnement du dispositif.

Le GSM2428 a été conçu pour satisfaire aux exigences de sécurité pour l'exposition aux ondes radio (SAR). SAR essais a été réalisée conformément aux flux RSS-102, la transmission de GSM2428 à son plus haut niveau de puissance certifiée dans toutes les bandes de fréquences utilisées. La plus haute valeur SAR pour le GSM2428 lors de l'essai a été 0.477W / Kg. Veuillez suivre les instructions incluses dans le guide de l'utilisateur pour l'installation du produit et l'utilisation.

R&TTE CE

The device modem has been fully tested and complies with all applicable requirements of EN301489-1, EN301489-3, EN301489-7, EN300440-2, EN60950-1, IEC60950-1 and EN62311. Compliance to EN301 511 has been demonstrated by testing on both the device and the integrated module.

ROHS COMPLIANCE

The device complies with the European Union Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment ([RoHS) Directive (2002/95/EC), effective since July 1, 2006.

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.

BATTERY INFORMATION AND SAFETY REQUIREMENTS

NOTE: Failure to comply with all of the following precautions could:

- Cause personal injury or property damage
- Cause abnormal chemical reactions which would make the battery over heat, smoke, distort, leak, or catch on fire
- Destroy internal protections built into the battery
- Shorten battery life
- Reduce battery performance

Precautions

- Read this entire manual and the label on the exterior of the battery.
- Keep the battery away from sources of excessive heat such as fire, stoves, or direct sunlight.
- Keep the battery away from sources of high voltage or static discharge.
- Do not use or store the battery with other batteries or where it could touch metal.
- Do not put the battery into a microwave oven.
- Do not allow the battery to be crushed.
- Keep the battery away from children.
- Do not drop the battery.
- Do not allow anything to touch any of the battery contacts, or to connect two or more of the contacts.
- Do not disassemble, destroy, or attempt reassembly of the battery.
- Do not place or leave the battery in a damp or wet environment.
- Do not allow water to touch the battery.
- Do not wrap the battery with conductive material.

- Properly dispose of the battery.
- Do not incinerate or burn the battery.
- Do not leave or discard the battery where it could get wet or become submerged in water.
- Do not damage the battery.
- Do not weld or solder anything to the battery, the attached wires, or the connector.
- Do not use this battery in any device other than supplied.
- Do not touch a leaking battery. Avoid leaked-out materials. Do not allow it to touch your skin or clothes. If touched, immediately rinse affected areas thoroughly with water. Leaked materials may cause skin irritation. Seek medical attention if irritation persists. If it contacts your eyes, do not rub your eyes. Rinse the eyes thoroughly with water, and see a doctor immediately.
- Use of this battery in other devices could result in unsafe conditions.
- Risk of explosion if battery is replaced by an incorrect type.

Table of Contents

1 Introduction

1.1 Objective

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:

1.2 References

- GSM2428AT001 - Enfora Mini MT AT Commands
- GSM2428CB001 - Enfora Mini MT Cook Book
- GSM2428TG001 - Enfora Mini MT Transition Guide

1.3 Requirements

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

- Mini MT (GSM2428)
- USB to mini-USB cable (sold separately) (CAW-6000-0006)
- Activated SIM card (not supplied)
- Personal Computer (not supplied)
    - Operating Systems: Windows XP or Windows 7 64 Bit
    - USB port
- The USB Driver Setup Utility for the Mini MT is available on the Enfora website at www.enfora.com.

2 Overview

2.1 Product Specifications

Characteristics	
Dimensions (L x W x H)	102 x 60.5 x 25.4 mm
Housing	Polycarbonate
Weight	<120 g
Radio Performance	
Frequency	850/900/1800/1900 MHz
Transmit Power	Class 4 (2W@850/900 MHz) Class 1 (1W@1800/1900 MHz)
Packet Data	
Mode	Class B, Multislot 8
Protocol	GPRS Release 97
Coding Schemes	CS1-CS4
Packet Channel	PBCCH/PCCCH
GSM Functionality	
Voice	AMR, EFR, FR & HR
CS Data	Asynchronous; Transparent and Non-Transparent up to 14.4 kb/sec
GSM SMS	PDU, MO/MT, Cell Broadcast
Over-The-Air Commands	GPS TX internal, binary reporting, timed reporting, maximum speed exceeded, status change reports, GPS content, event reporting, distance reporting, geofencing, FOTA
Interface	
Host Protocols	AT Commands, UDP API, PPP
Internal Protocols	PPP, UDP API, TCP API
API Control/Status	AT Commands, UDP API, TCP API, AT Commands Over SMS

SIM Interface I/O

SIM	Internal 1.8/3.0 V SIM accessed via battery compartment
Interface	Mini USB jack for power and local data access
Audio	2.5 mm headset
Power	AC adapter and optional vehicle power adapter

Environment

Operating	–20ºC to 55ºC (Due to Battery Limitations with Lithium Ion)
Storage	–20ºC to 60ºC
Humidity	Up to 95% non-condensing

Power

Battery	Rechargeable Lithium-Ion 1400 mAh

Certifications

FCC	Parts 2, 15, 22 & 24
GCF	Version 3.39.1
PTCRB	Version 5.6.0
Industry Canada	Yes
CE Mark	Yes
RoHS Compliant	Yes

> Specifications subject to change.

2.2 Description

The Mini MT is a small, ruggedized certified quad-band device optimized for personal asset tracking.

The device has 5 buttons, 4 LEDs, a microphone, speaker, and headphone jack.

The device is intended to be used in either a body worn environment or remotely installed on equipement.

The device ships with a belt clip, see figure 5, when the device is used as a personal tracker the belt clip is the only supported method of carrying the device on the body. It is required that the belt clip side of the device is facing the body, use on the body in other orientations is not supported.

Figure: 1 - Mini MT Overview

Figure: 2 - Mini MT Front View (Showing LEDs)

Figure: 3 - Mini MT Side View (Showing Push to Call Button)

Figure: 4 - Mini MT Side View (Showing USB Port)

2.3 LEDs

There are four LEDs used to provide status to the user. The LED functions are defined in the table below.

	CALL **(Yellow)**	**ON** **(Yellow)**	**GPS** **(Yellow)**	**BAT** **(Red)**
Hibernate	OFF	OFF	OFF	If the battery charge level is <20%, the BAT LED blinks slowly, i.e. every 10 seconds. OFF if the battery charge level is less than 5%
Active /	Blinks on for 500ms, off for 1s, when receiving or	Slow Blink on for 500 ms, off	Blinks on for 500ms, off for 2s, when locked.	If the battery charge level is <20%, the BAT LED blinks

Battery	originating call. Blinks on for 2s, off for 2s for missed call. ON solid during call.	for 10s		slowly i.e. every 10 seconds. OFF if the battery charge level is less than 5%
Active / Aux	Blinks on for 500ms, off for 1s, when receiving or originating call. Blinks on for 2s, off for 2s, for missed call. ON solid during call	ON solid	Blinks on for 500ms, off for 1s, when receiving or originating call. Blinks on for 2s, off for 2s, for missed call. ON solid during call	Blinks on for 500ms, off for 2s during charge.

NOTE: The LEDs will blink when upgrading the firmware on the Mini MT.

2.4 Switches

Push To Call (PTC)

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

Set Geo-Fence Button

The Mini MT "Ø" button is programmable through the event engine. The default state is to configure a ½ mile radius geo-fence at the current location. This radius may be re-defined and is retained in non-volatile memory.

User-Defined Button

The User-Defined button "<" is programmable. 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.

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.

2.5 Interconnections

USB Connection

The USB connector (see Figure 4) 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.

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 is also used to provide GPS NMEA data to a mapping or user application.

> NOTE: The device should only be connected to a USB 1.0, 1.1 or 2.0 port. The USB to Mini-USB cable used must be either USB 1.1 or USB 2.0 compliant.
> The USB cable and vehicle power to USB adapter are both sold separately.

Headphone Jack

The headphone jack provides the user with the ability to connect a standard 2.5mm headset (sold separately) when the speakerphone mode is not desirable.

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.

> The voice operation of the Mini MT is intended for use in Speakerphone or headset modes only. It is not designed for operation against the head and has not been approved for use in this manner.

Two Second Headset Delay

When switching between Headset and Speaker, there is a delay of approximately two seconds.

Microphone

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

SIM

A SIM card holder 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 the Mini MT device.

Battery

A 1400 mAh Li-Ion battery is supplied with the Mini MT. 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 or use the device.

3 Installation

3.1 Opening

The Mini MT may have a belt clip attached. To open the Mini MT the belt clip must first be removed. The following steps provide instructions for how to remove the belt clip and open the Mini MT.

Lift the retainer clasp on the belt clip and slide the belt clip off the Mini MT

Figure: 5 - Removal of Mini MT belt clip

Figure: 6 - Removal of Mini MT belt clip

The battery door clasp can be rigid and resistant to opening, If this is the case, do not use a screw-driver to open as this could cause damage to the device.

If the battery door clasp is too stiff a coin could be used to apply leverage.

Figure: 7 - Opening the Mini MT battery door.

3.2 Battery Installation

The Mini MT is supplied with a 1400 mAh 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.

3.3 Removing the Battery

Access to the battery is through the battery door on the bottom of the Mini MT. 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.

Figure: 8 - Mini MT Battery Cover

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.

3.4 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.

3.5 Charging the Battery

The Mini MT must be fully charged prior to initial use.

Charging your Mini MT battery may be done using a standard USB Mini 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) for purchase.

> 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). Which is available for purchase.

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 be either USB 1.1 or USB 2.0 compliant.

Note: The AC power adapter used to charge the unit must be capable of supplying 5V@500mAh.

Mini MT Battery Charging Guidelines

The battery supplier specifies that the charging temperature range is between 0°C and 45°C. Charging outside the recommended range may cause excessive heat or serious damage to the battery.

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

A fully depleted battery typically takes 5 hours to charge. The actual charging time will depend on multiple factors, including:

- The level of charge remaining in the battery
- The amount of current available from the USB host.
- The ambient temperature

The temperature cut off for charging is 45°C on the high end, 0°C on the low end. The battery will not charge while outside this range.

Once the battery reaches 100% charge, the charging current to the battery will be cut off until such time as the battery may need additional charge. The USB will power the unit so long as the battery is in place.

The charging LED blinks red while charging and turns off when the charging has stopped. The LED will also blink if the battery level is low (i.e. 20%) and the unit is not plugged in to a charger.

3.6 SIM Card Insertion

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 toward the front of the unit.
2. Remove the battery.
3. You will see the SIM card holder in the Mini MT.
4. Slide the SIM card holder to the unlocked position (as shown in the following figure) and the door will lift up.

5. Slide the SIM card into SIM door. Make sure the notch on the SIM is aligned with the notch in the SIM holder.
6. Close the SIM door.
7. Slide the SIM lock to the left. The SIM card holder MUST be locked.
8. Place the battery back in the Mini MT, making sure the connectors are aligned properly.
9. 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.

3.7 USB Driver Installation (Windows XP)

These instructions illustrate how to correctly install the USB drivers in Windows XP using the Enfora Driver Setup Utility.

1. Run the Enfora Driver Setup Utility by double clicking the EnforaDriverSetup executable file.

The Enfora Driver Setup Utility Extraction window will open.

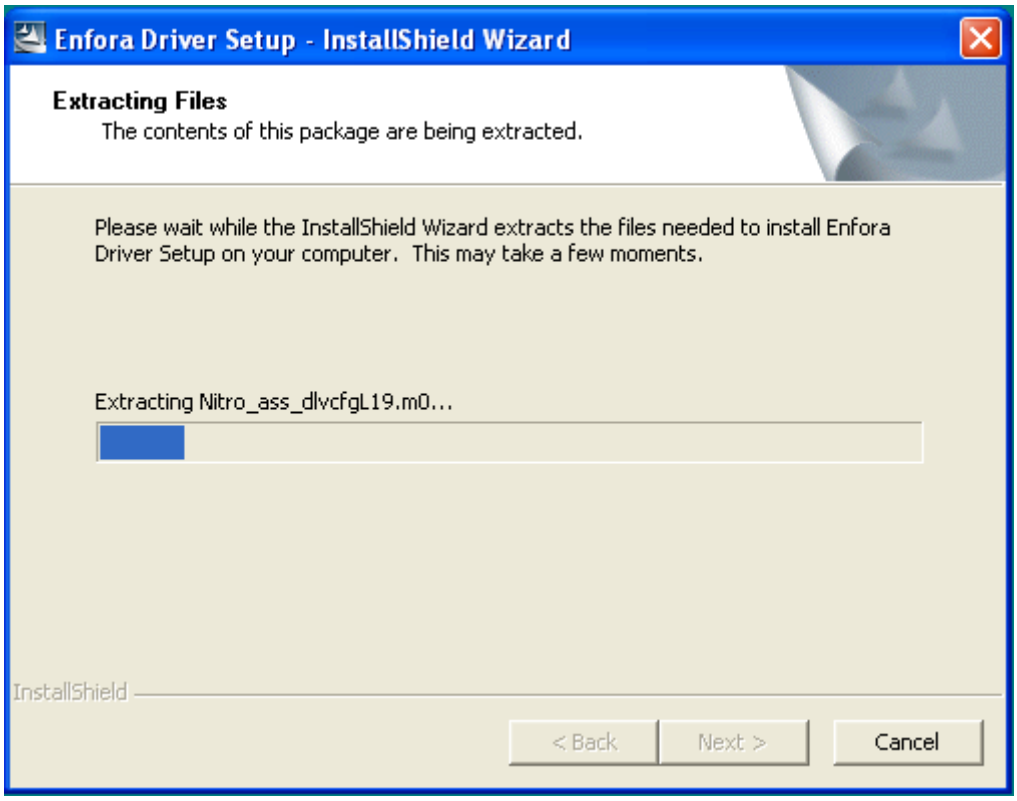


Figure: 9 - Enfora Driver Setup Utility Extraction

Once the contents have been extracted to memory the Welcome Window is displayed.

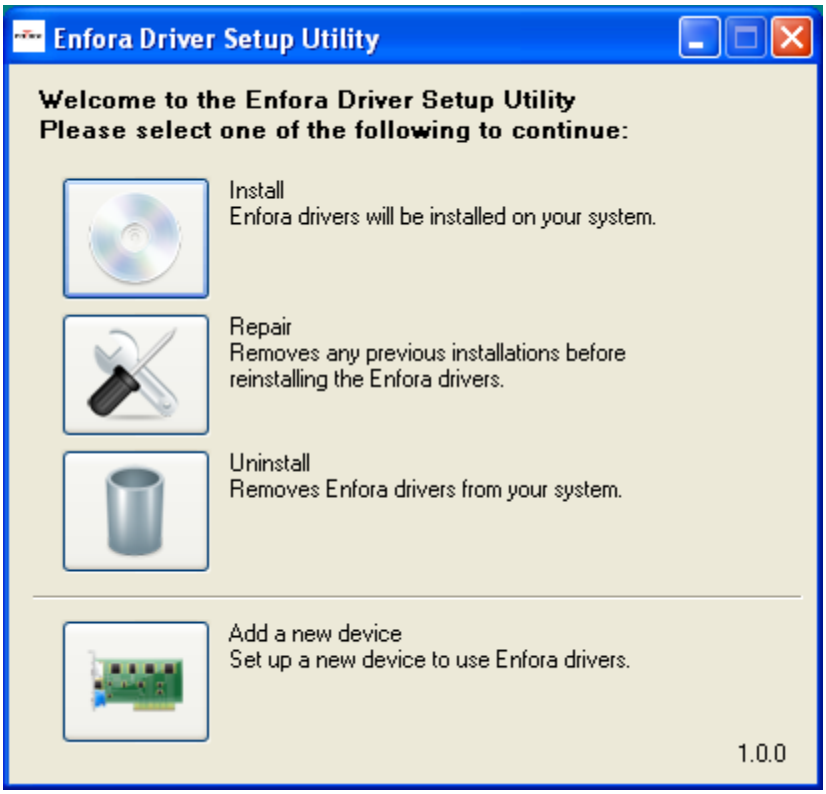


Figure: 10 - Enfora Driver Setup Utility Welcome

2. To install the drivers, select the **Install** button.

The Enfora Driver Setup Utility Prepare System Window will be displayed.

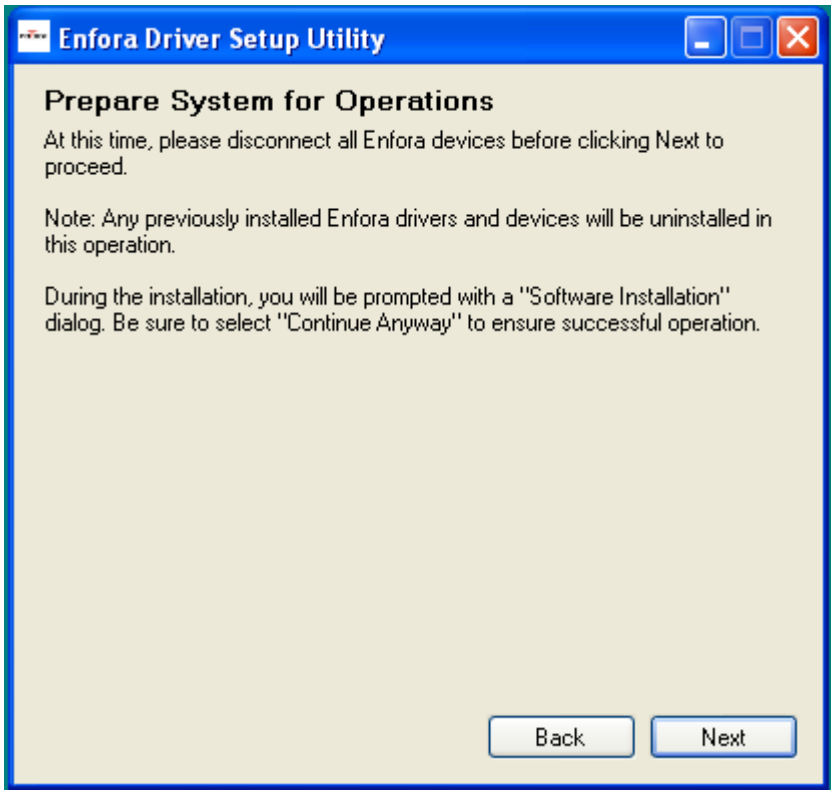


Figure: 11 - Enfora Driver Setup Utility Prepare System Window

3. Select the **Next** button to continue.

The Enfora Driver Setup Utility Installation Window will be displayed while the system installs the drivers.

Be sure to disconnect any Enfora devices. Previous drivers will be removed during this phase.

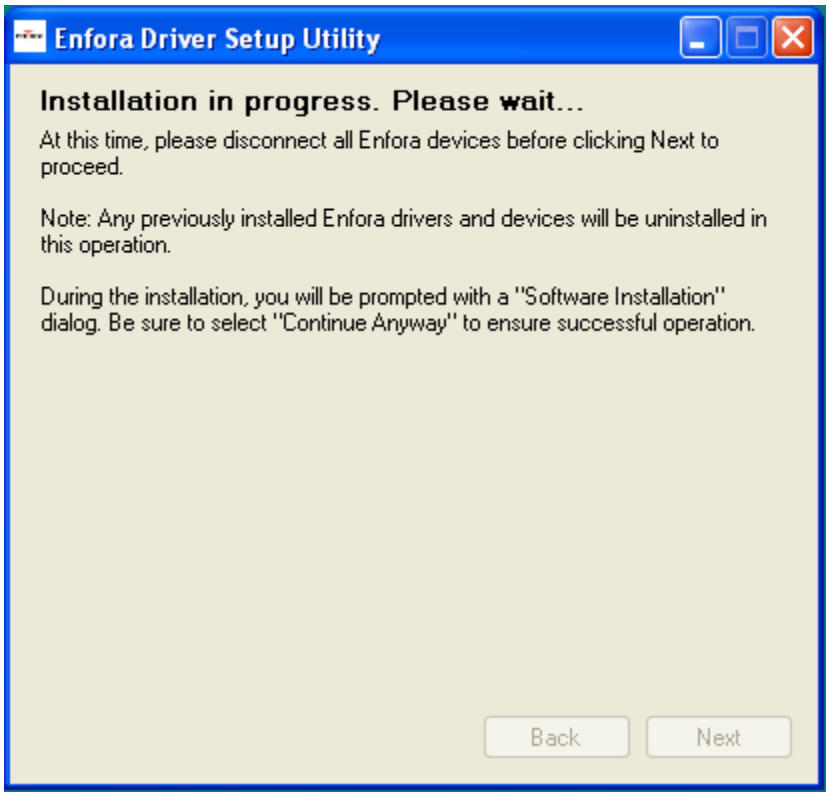


Figure: 12 - Enfora Driver Setup Utility Installation Window

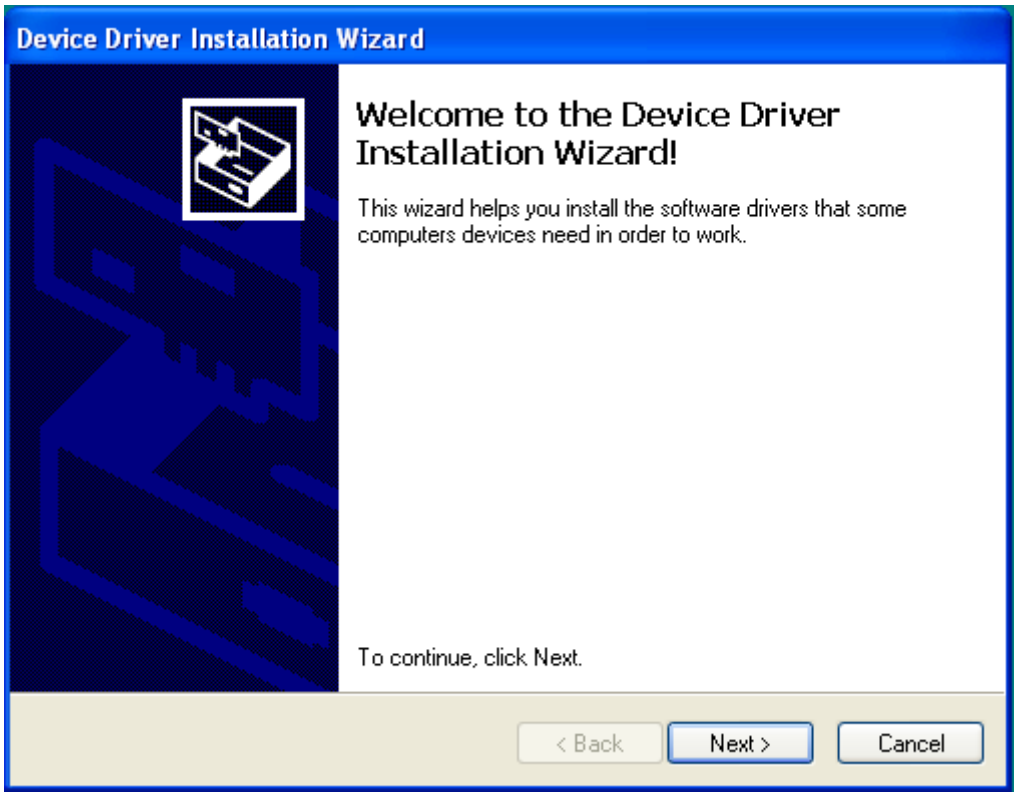


Figure: 13 - Enfora Driver Setup Utility Driver Installation

4. When prompted to install the device driver select the **Next** button.

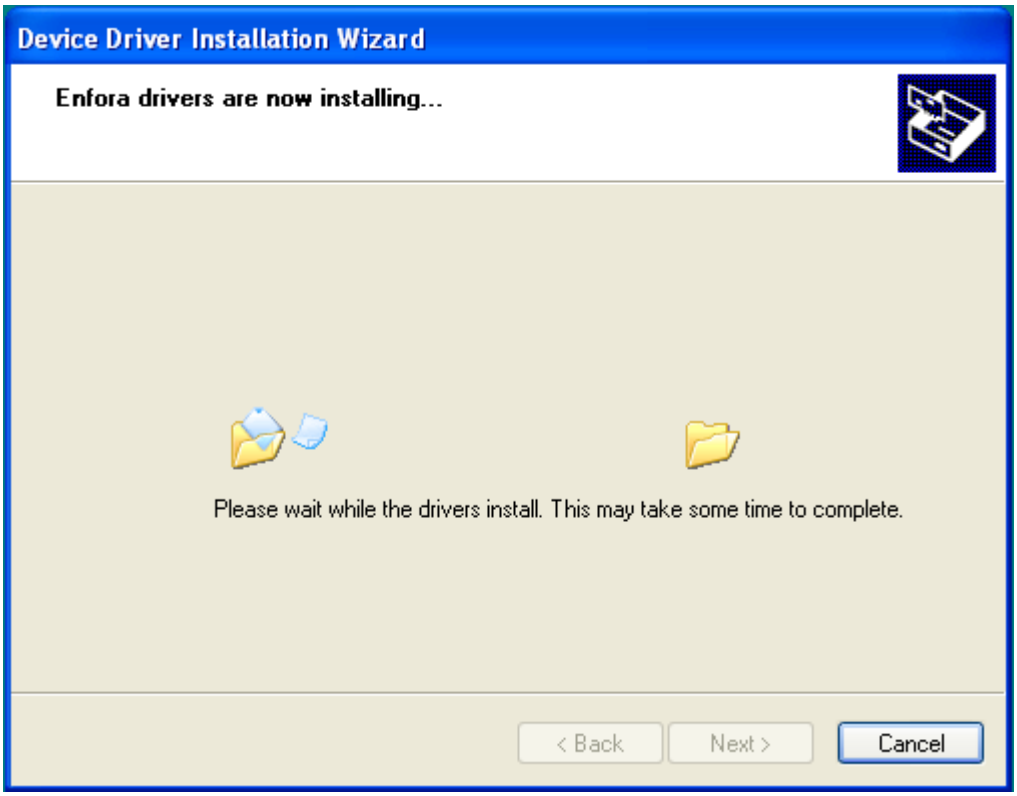


Figure: 14 - Enfora Driver Setup Utility Driver Installation Progress

5. During the driver install phase you may be prompted to Continue or Stop installation due to potential compatibility issues. Select the **Continue Anyway** button.

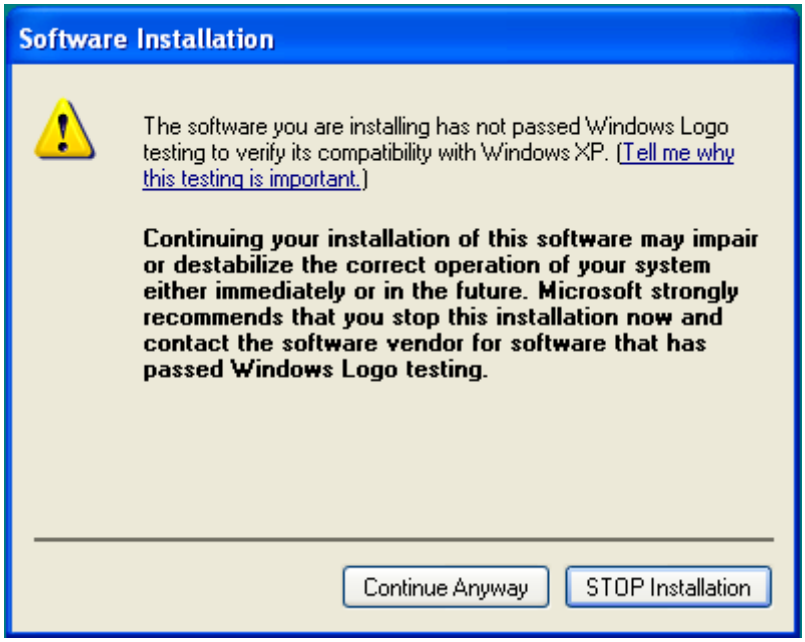


Figure: 15 - Windows Security Window

Upon completion of the installation the Enfora Driver Setup Utility Driver Install Completion Window is displayed.

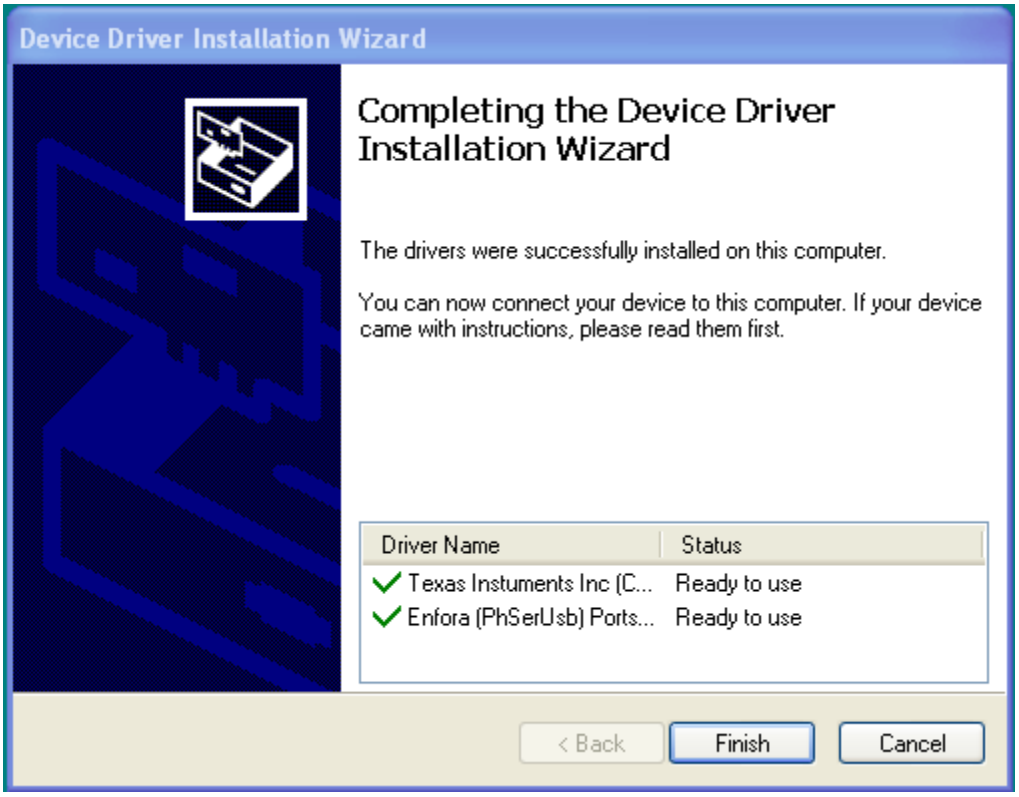


Figure: 16 - Enfora Driver Setup Utility Driver Install Completion Window

6. Select the **Finish** button.

When the installation is complete the list of Attached Devices will be displayed within the Enfora Driver Setup Utility Attached Devices Window

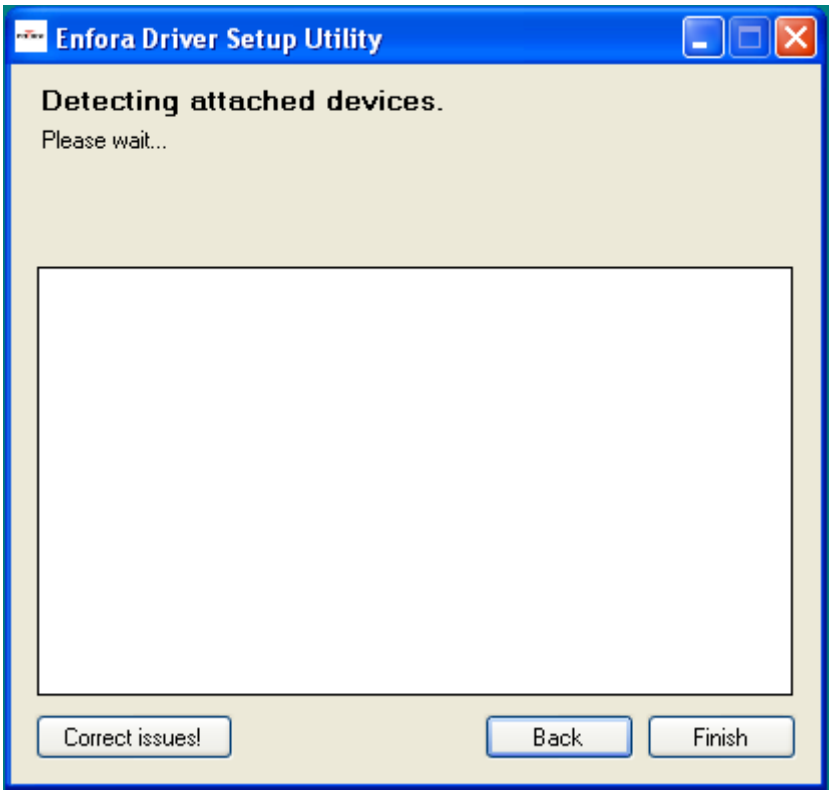


Figure: 17 - Enfora Driver Setup Utility Attached Devices Window

3.8 USB Driver Installation (64 Bit Windows 7)

These instructions illustrate how to correctly install the USB drivers in Windows 7 using the Enfora Driver Setup Utility.

1. Run the Enfora Driver Setup Utility by double clicking the EnforaDriverSetup executable file.

The Enfora Driver Setup Utility Extraction window will open.

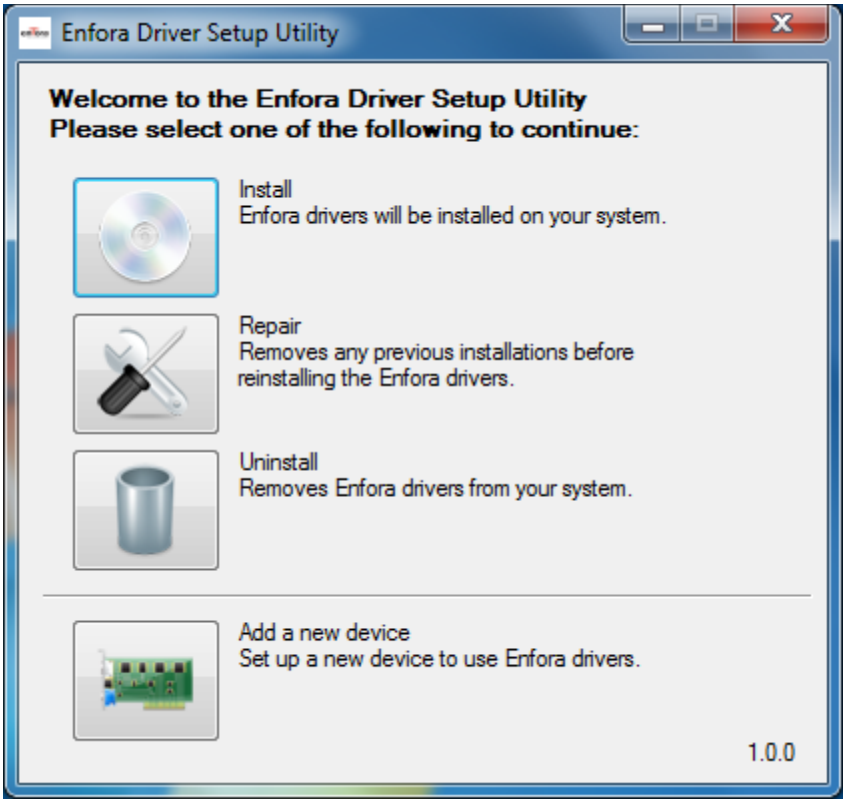


Figure: 18 - Enfora Driver Setup Utility Welcome Window

Once the contents have been extracted to memory the Welcome Window is displayed.

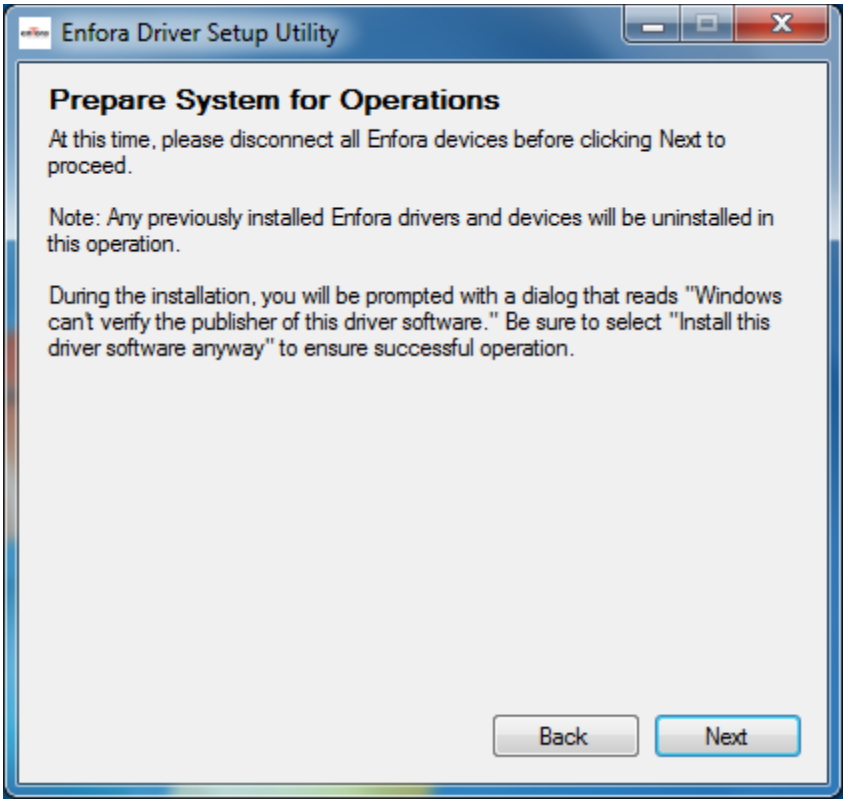


Figure: 19 - Enfora Driver Setup Utility Preparation Window

2. To install the drivers, select the **Install** button.

The Enfora Driver Setup Utility Prepare System Window will be displayed.

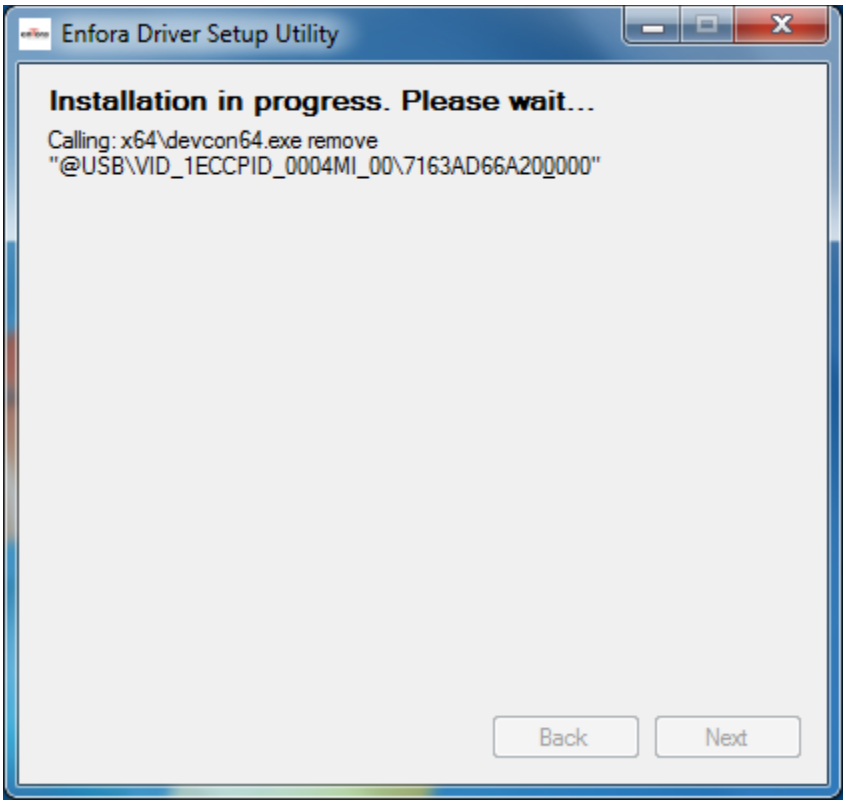


Figure: 20 - Enfora Driver Setup Utility Installation Window

3. Select the **Next** button to continue.

The Enfora Driver Setup Utility Installation Window will be displayed while the system installs the drivers.

Be sure to disconnect any Enfora devices. Previous drivers will be removed during this phase.

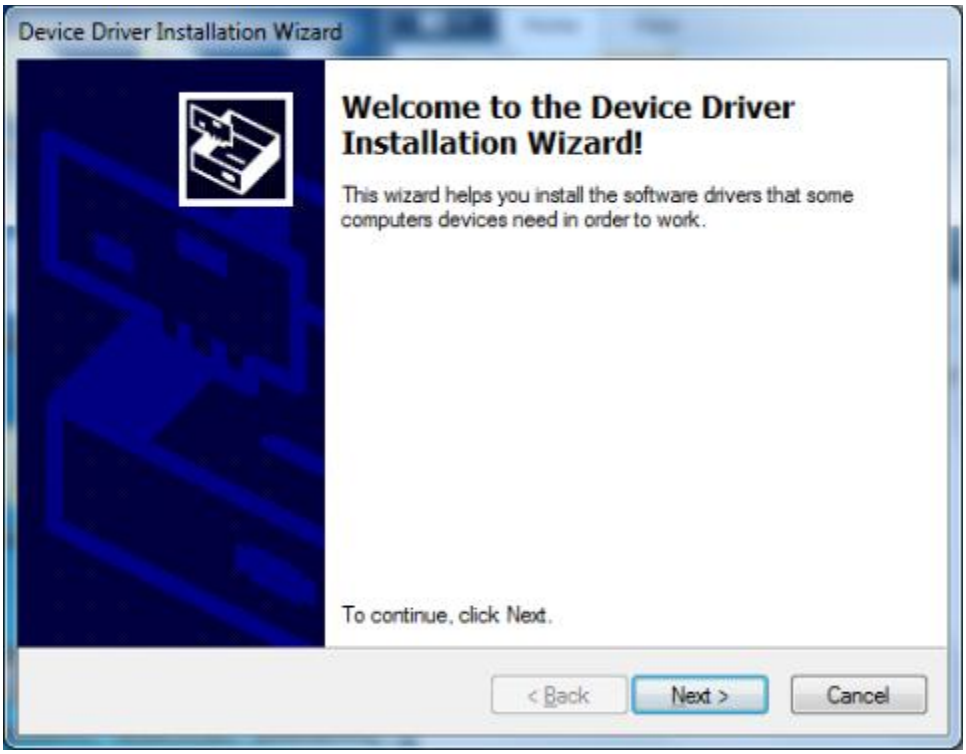


Figure: 21 - Enfora Driver Setup Utility Driver Installation

4. When prompted to install the device driver select the **Next** button.

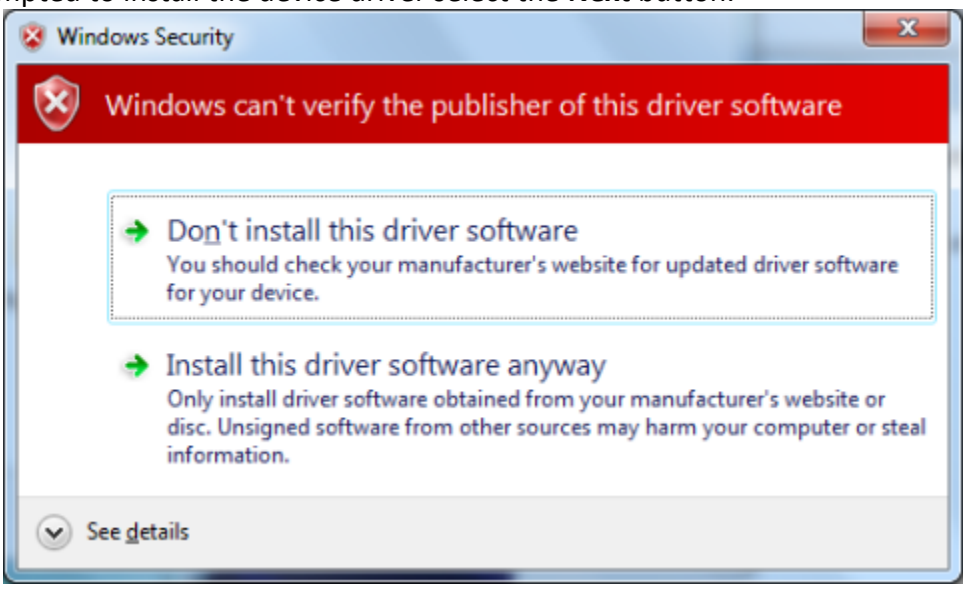


Figure: 22 - Windows Security Window

During the driver install phase you may be prompted to Continue or Stop installation due to potential compatibility issues. Select the **Install this driver software anyway** button.

Figure: 23 - Enfora Driver Setup Utility Driver Install Completion Window

Upon completion of the installation the Enfora Driver Setup Utility Driver Install Completion Window is displayed.

5. If the Status displayes an issue click on the **Correct issues** button
6. At the "OK to apply fix" prompt, click on the **Yes** button.

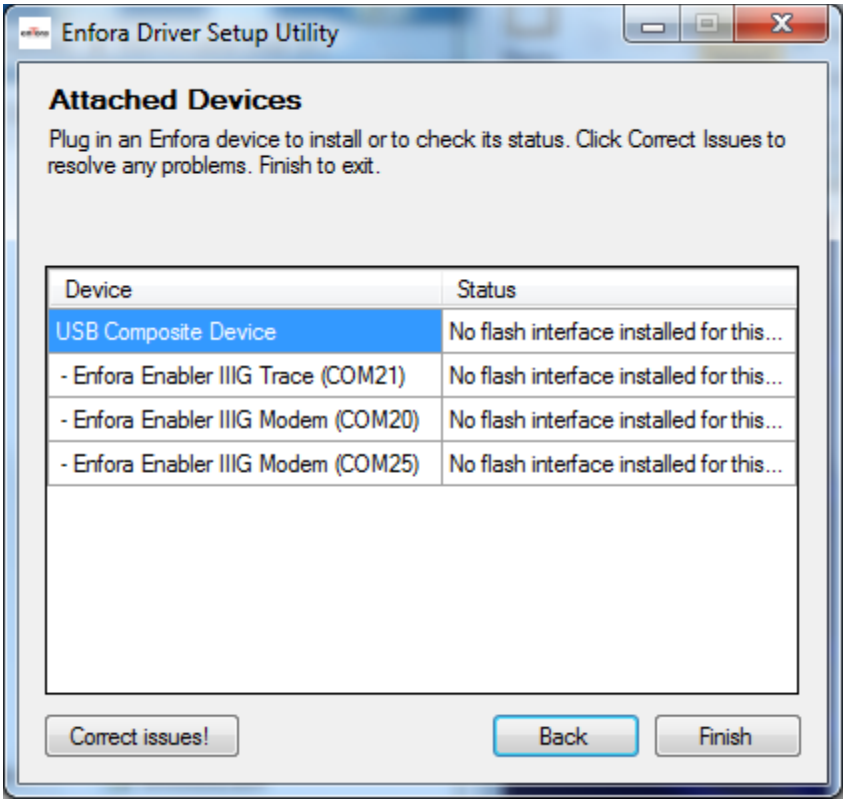


Figure: 24 - Enfora Driver Setup Utility Attached Devices Window

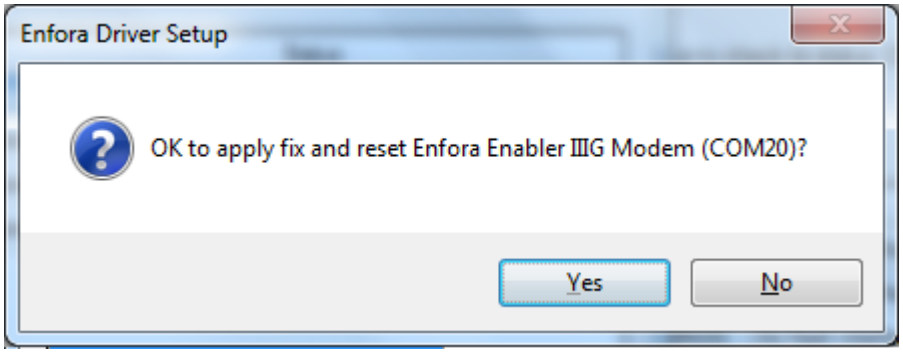


Figure: 25 - Enfora Driver Setup Utility Apply Fix Window

When the installation is complete the list of Attached Devices will be displayed within the Enfora Driver Setup Utility Attached Devices Window.

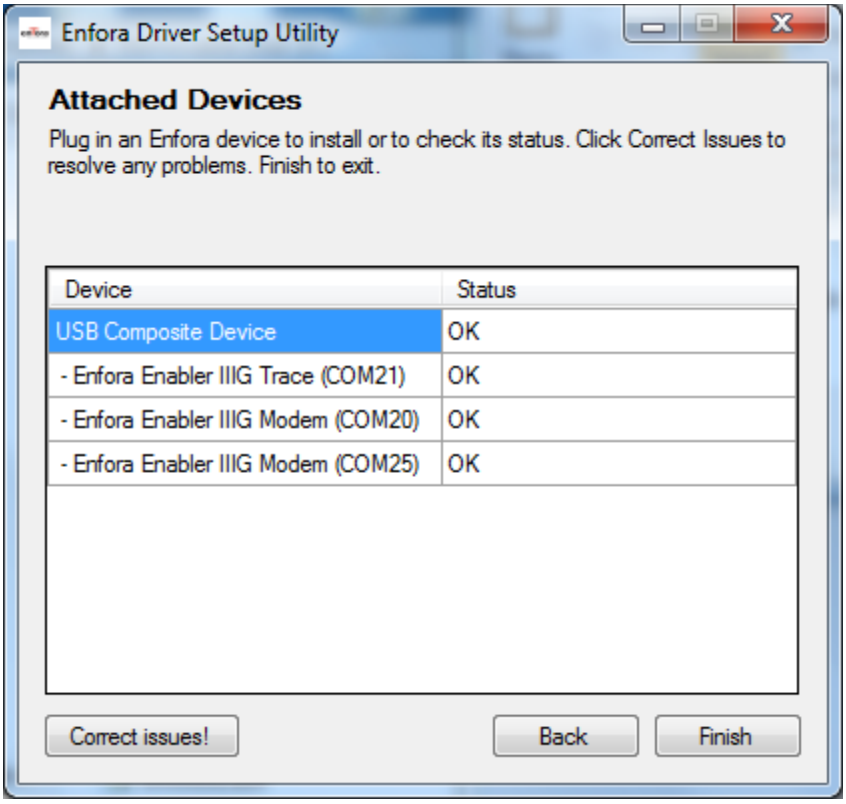


Figure: 26 - Enfora Driver Setup Utility Attached Devices Window

4 Configuration

4.1 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 7 64 Bit 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.

4.2 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.

4.3 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>
```

4.4 Set GeoFence

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.

User Definable Buttons

The Mini MT "0" button is user-definable through the event engine. The default state is to configure a ½ mile radius geo-fence at the current location.

The Mini MT "<" button is user-definable through the event engine. This button function is not defined from the factory.

4.5 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.

4.6 Dialing the Emergency Call Number

Depending on the Mobile Operators network configuration, 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 emergency number configured in the AT$EMERNUM command.

4.7 Configuring the PC

> NOTE: The following examples use Windows XP and HyperTerminal. Any Terminal program should work, using the parameters shown below.

Default Serial Parameters

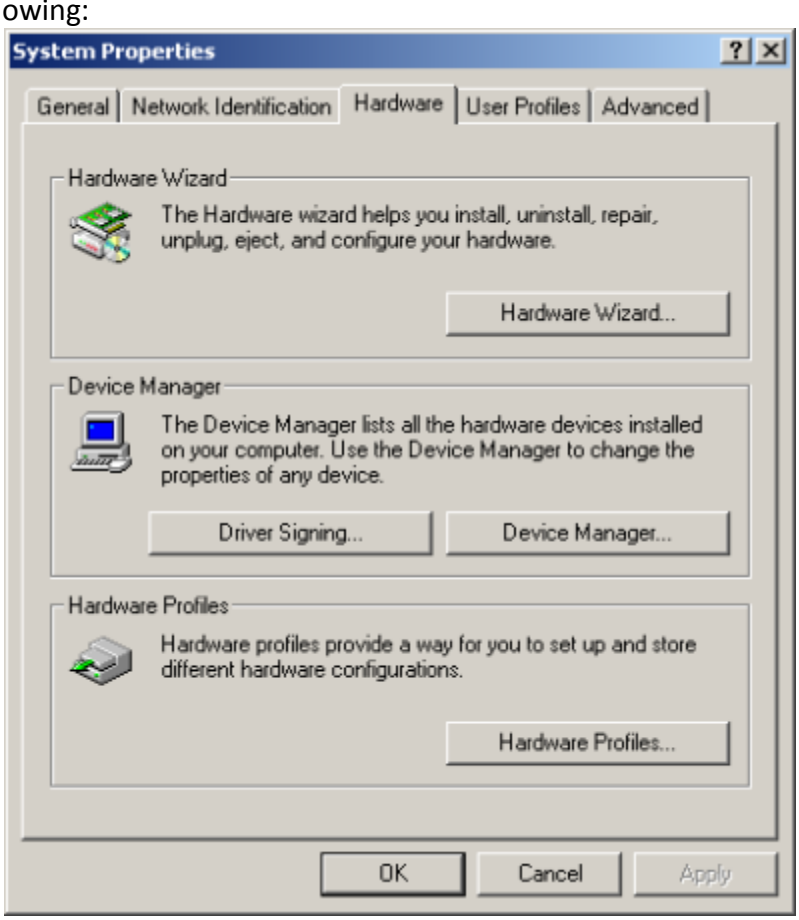
- Baud Rate: 115200 baud rate
- Data Bits: 8
- Stop Bits: 1
- Parity: None
- Flow Control: None

Determine which COM port to use

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

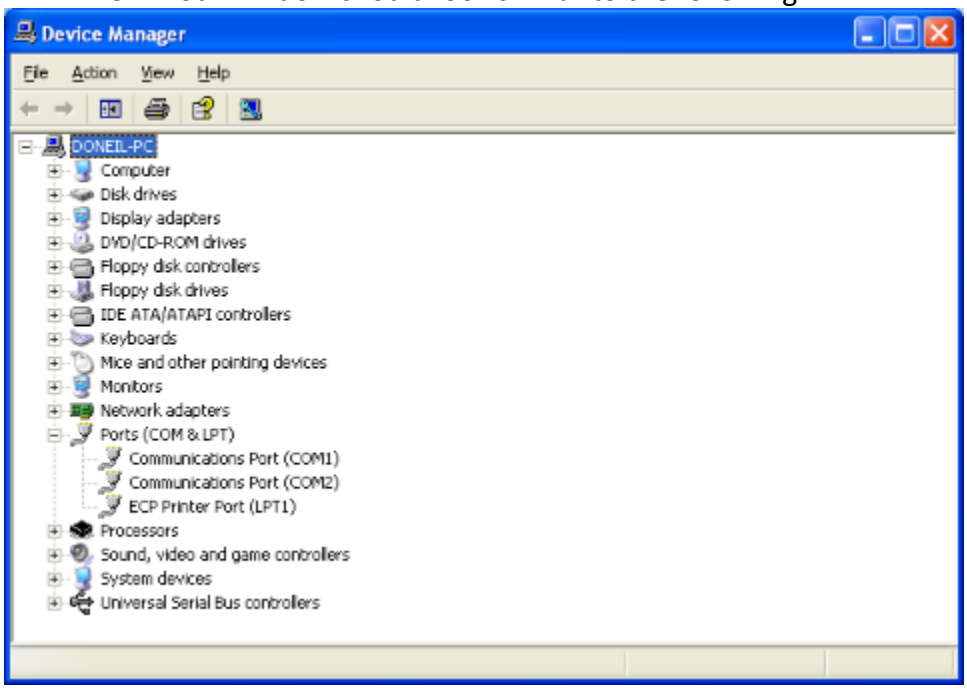
With a USB connection, you will need to determine which COM port it is using.

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 XP the screen looks like the following:



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

3. Your window should look similar to the following:



4. Plug the Mini MT into your USB port. The window should change to show Mini MT USB to UART Device.
5. Most devices will show the COM port next to the device name. Record this number.

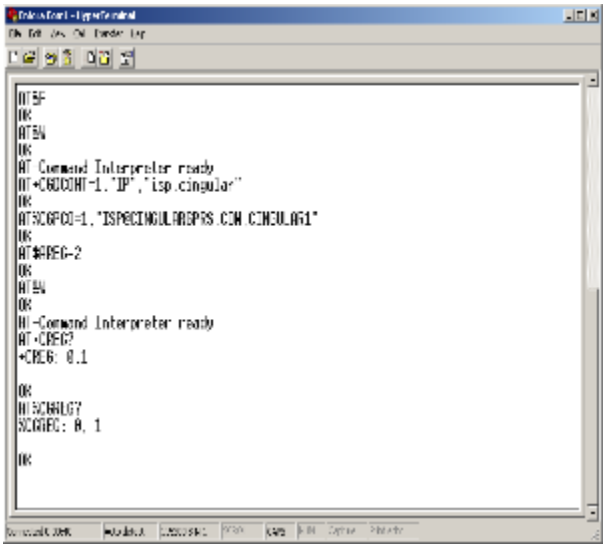
> NOTE: Make sure there is no "!" or "X" next to the USB device. If you see an "!" or an "X," the device is not properly installed and will not work.

Start HyperTerminal

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

Follow these steps:

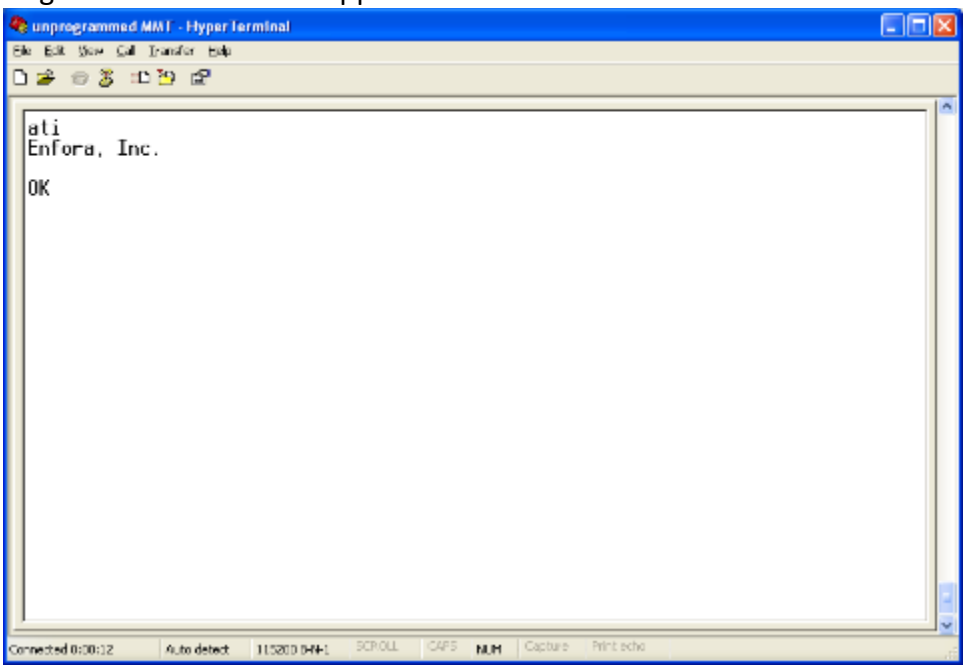
1. Click Start>Programs>Accessories>Communications>HyperTerminal
2. You should see the following screen.



3. Enter a name for the connection. In this example, the name is Enfora MiniMT.
4. Click OK.
5. The next window that will appear is the Connect To window.

6. 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.
7. Click OK.
8. The next window is the Port Settings window.

9. Set the communication port to 115200 bits per second, 8 data bits, no parity, 1 stop bit and no flow control.
10. Make sure the settings match the example.
11. Click OK.
12. The Main Program Window should appear.



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

14. You should see the following screen with the response from the Mini MT:
15. The response “Enfora, Inc.” indicates that you are successfully communicating with the Enfora Mini MT.

4.8 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.

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>
```

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

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>

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.)
```

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.)

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>
```

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/"
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.

5 GPS Operation and Verification

5.1 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.

5.2 Verification of GPS Lock

The Mini MT will provide an indication of successful GPS Lock within approximately 120 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.

5.3 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.

GPS Operation from Enfora Demo Server

The same command can be used in the server application by entering AT$GPSRD=10 in the Command / Data text box, then selecting Write.

> NOTE: The third field is a single character field representing the status of the GPS reading. There are three valid character for this field and are described below:

- A = Valid
- V = Not Valid
- 9 = Enfora Specific response that GPS solution is not valid and the last known GPS location is being substituted.

6 Software Features

Additional Software Features

The Mini MT supports Firmware Over The Air (FOTA) upgrades. Details about FOTA commands can be found in the AT Command Manual.