

WITS Installation Guide

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Issue	Change	Author	Date
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1. Safety & Regulatory Statements

1.1 FCC Regulatory 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.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

1.2 FCC Radiation Exposure Statement

This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. The antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.

1.3 Included Approved Devices

This equipment includes a pre-approved Bluetooth module, FCC ID PI403B.

2. Introduction.

This document provides an installation and user guide for the WITS vehicle data logging unit.

2.1 Deliverable Contents

The WITS deliverable package consists of the following hardware items:

- 1 off WITS vehicle data logger unit
- 1 off USB cable, 'A' to 'Mini B'
- 1 off GPS antenna, SMA connector
- 1 off OBD connector cable
- 1 off External WiFi antenna (Optional)

The following software is provided on the included CD:

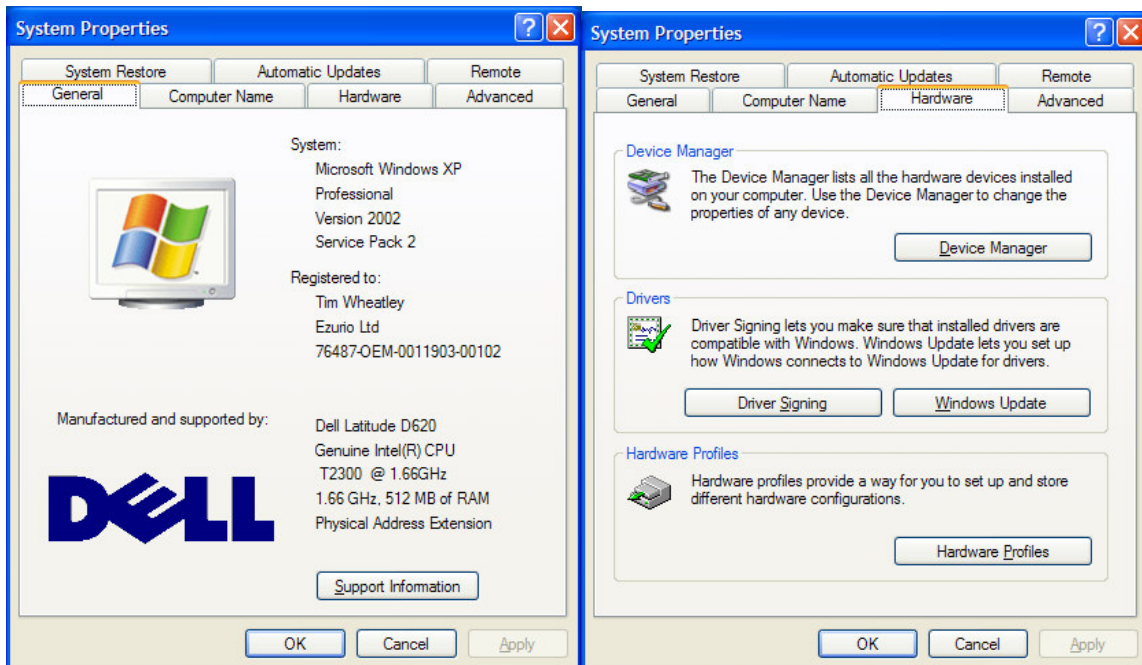
- UwTerminal.exe. This is a terminal emulation program that has a number of Ezurio specific extensions. This program should be used to communicate with the modules for configuration or debug purposes.
- UWLoad.exe. This utility is used to upload new firmware images into the units.
- CDM 2.00.00 x64.zip. Contains the PC driver needed to interface to the prototype units.

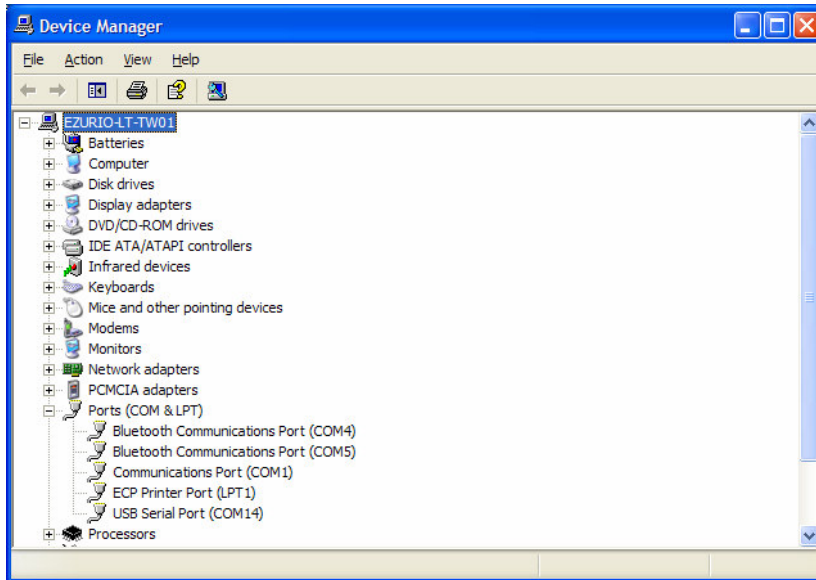
3. Configuring Units Before Use

The WITS unit is supplied with the GPS antenna connected and attached to the unit and will be pre-configured with all of the essential information to allow access to the Ezurio middleware server. All that the installer needs to do is to configure the SSID (and optional WEP key) of the access point that will be used to provide wireless access to the internet.

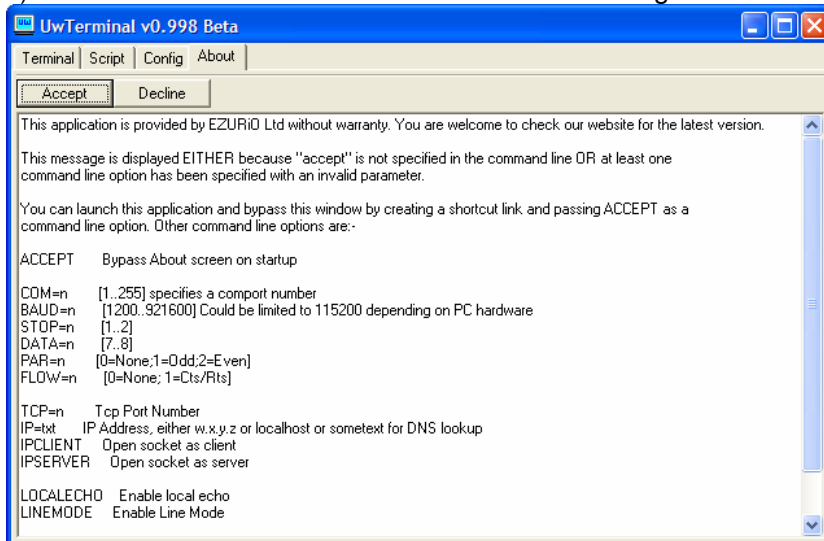
To configure the unit follow these steps:

- i) Load the supplied CD into a PC and copy the UWTerminal.exe and UWLoad.exe utilities to a suitable location.
- ii) Plug the unit into the PC using the USB cable supplied.
- iii) If the PC requests a driver for the hardware, then this is available on the CD. The unit communicates using a virtual COM port.
- iv) Once the driver is installed and the hardware is ready for use, the next step is to identify the COM port needed to communicate with the unit. This can be identified by looking at the system properties by right clicking on the 'My Computer' icon and selecting properties. This will display the system properties screen. Select the 'Hardware' tab and then select 'Device Manager'. In that screen open the 'Ports (COM & LPT)' heading and all of the COM ports available in the PC will be displayed. The unit will show up as a USB Serial Port. In the example below it is COM14.

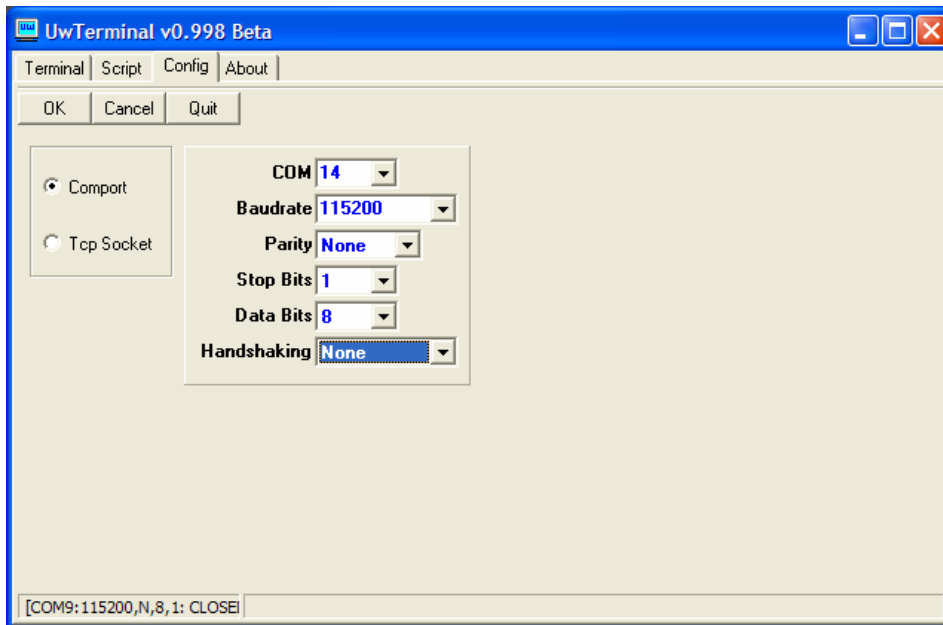




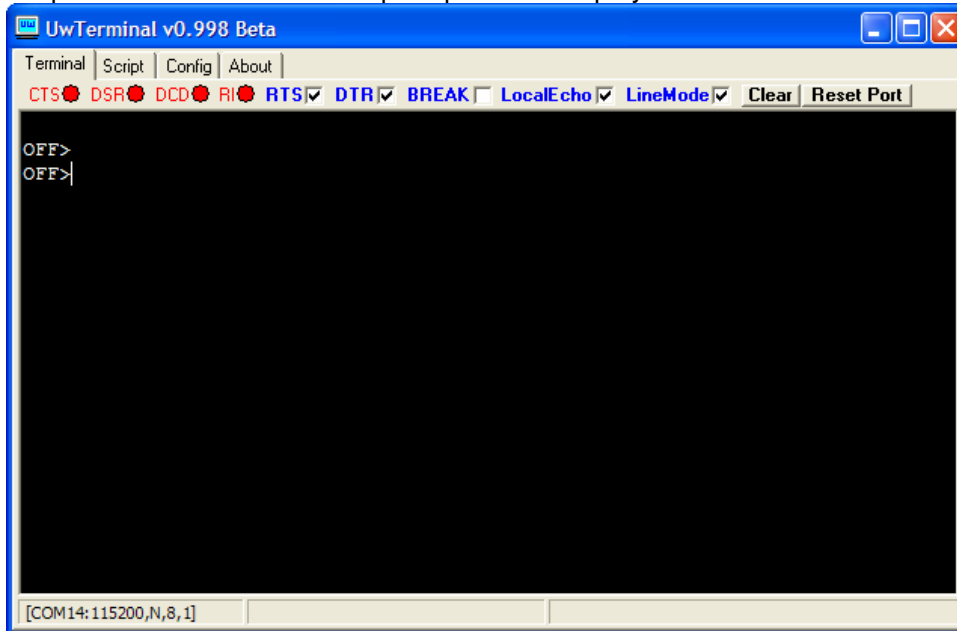
v) Run the UWTerminal.exe executable. The following screen will be displayed:



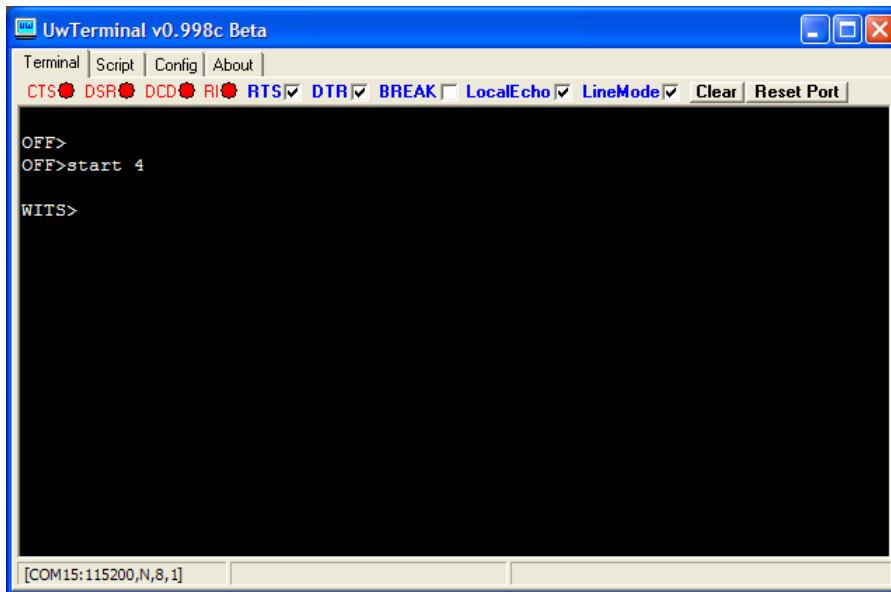
Select Accept and the following screen is displayed:



Select the correct COM port from the COM pull down and press OK. Push the Enter key a couple of times and the OFF> prompt will be displayed:

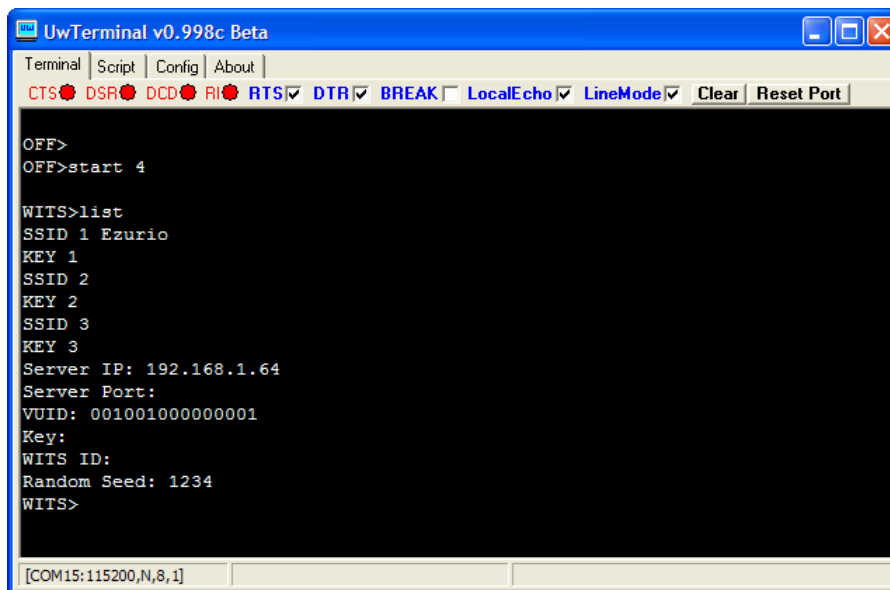


- v) Enter the command 'start 4' (case sensitive) and the prompt will change:



```
UwTerminal v0.998c Beta
Terminal | Script | Config | About
CTS DSR DCD RI RTS DTR BREAK LocalEcho LineMode Clear Reset Port
OFF>
OFF>start 4
WITS>
```

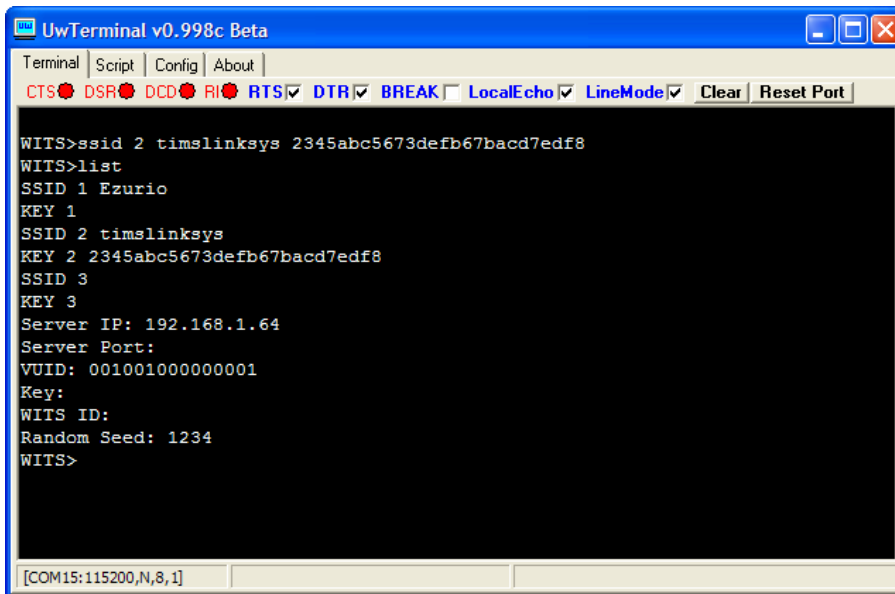
- vi) At the WITS> prompt type the command 'list' and this will display the current non-volatile settings for the unit:



```
UwTerminal v0.998c Beta
Terminal | Script | Config | About
CTS DSR DCD RI RTS DTR BREAK LocalEcho LineMode Clear Reset Port
OFF>
OFF>start 4
WITS>list
SSID 1 Ezurio
KEY 1
SSID 2
KEY 2
SSID 3
KEY 3
Server IP: 192.168.1.64
Server Port:
VUID: 001001000000001
Key:
WITS ID:
Random Seed: 1234
WITS>
```

The server ip, VUID and random seed parameters should not be changed.

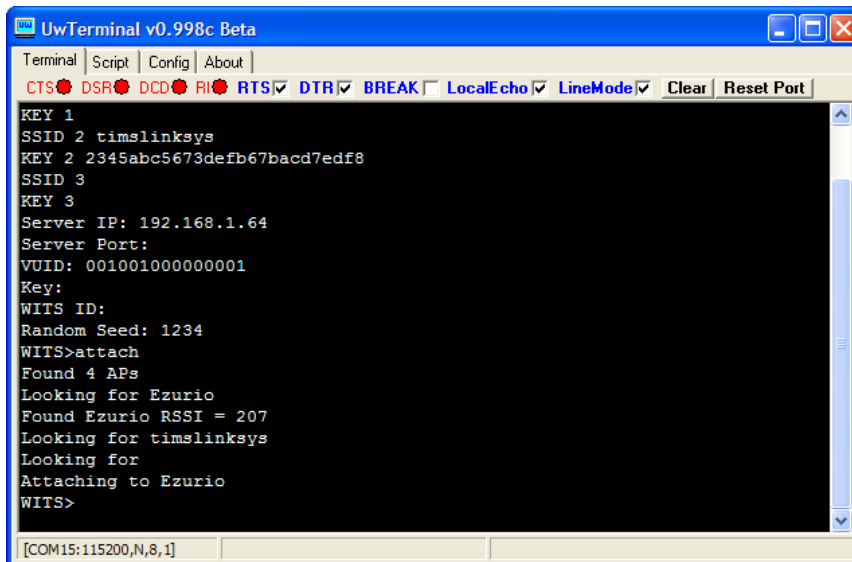
- vii) Up to 3 access points can be programmed into the system. To enter an SSID use the command 'ssid n SSIDName keydigits' where *n* is between 1 and 3 and *SSIDName* is the name of the AP and *keydigits* is the WEP key (if required). The following screen shows an example of the ssid command



```
UwTerminal v0.998c Beta
Terminal | Script | Config | About |
CTS DSR DCD RI RTS DTR BREAK LocalEcho LineMode Clear Reset Port

WITS>ssid 2 timslinksys 2345abc5673defb67bacd7edf8
WITS>list
SSID 1 Ezurio
KEY 1
SSID 2 timslinksys
KEY 2 2345abc5673defb67bacd7edf8
SSID 3
KEY 3
Server IP: 192.168.1.64
Server Port:
VUID: 001001000000001
Key:
WITS ID:
Random Seed: 1234
WITS>
```

To test the SSID settings, the 'attach' command may be used. This scans for available access points in the list and will attach to the access point that has the strongest signal strength. The screen below shows a demonstration of the *attach* command:



```
UwTerminal v0.998c Beta
Terminal | Script | Config | About |
CTS DSR DCD RI RTS DTR BREAK LocalEcho LineMode Clear Reset Port

KEY 1
SSID 2 timslinksys
KEY 2 2345abc5673defb67bacd7edf8
SSID 3
KEY 3
Server IP: 192.168.1.64
Server Port:
VUID: 001001000000001
Key:
WITS ID:
Random Seed: 1234
WITS>attach
Found 4 APs
Looking for Ezurio
Found Ezurio RSSI = 207
Looking for timslinksys
Looking for
Attaching to Ezurio
WITS>
```

Once the access points have been configured and tested, the configuration is complete. To complete the session, type 'quit' and the unit will switch off and be ready for installation in the vehicle.

Once the unit is disconnected from the PC it should be plugged into the vehicle OBD port (this is not essential as the in-built battery should have sufficient capacity to allow logging for a reasonable period) from which it derives power.

4. Logging and Reporting

The WITS unit monitors the state of the vehicle ignition and automatically switches between logging and reporting modes.

4.1 Logging

When the vehicle ignition is switched on the unit will start-up automatically and after a short delay the yellow LED will illuminate and the red LED will flash once per second to indicate logging is in progress.

When the unit is logging, the status of the GPS signal is indicated by the colour of the flashing LED. When the GPS signal is invalid the LED will flash red and when the GPS signal is valid, the LED will flash green. If the LED does not change to green, experiment with another orientation for the unit so that the GPS antenna has a different view of the sky. Our tests show that most locations in a vehicle should give sufficient signal for the GPS to operate – but there may be locations where this is not the case.

4.2 Reporting

When the vehicle ignition is switched off the unit will detect that the journey is complete or interrupted and will shutdown automatically. If the unit determines that logging data should be reported it will automatically start-up after a short delay (5-10 seconds). When the unit successfully connects to the wireless LAN access point, the blue LED will illuminate for the duration of the data upload to the server. If the unit cannot find the access point, or if the report fails for some reason then the red LED will illuminate for 5 seconds and then the unit will switch off. If the report is completed successfully, the green LED will illuminate for 5 seconds before the unit switches off.

4.3 External Wireless LAN Antenna

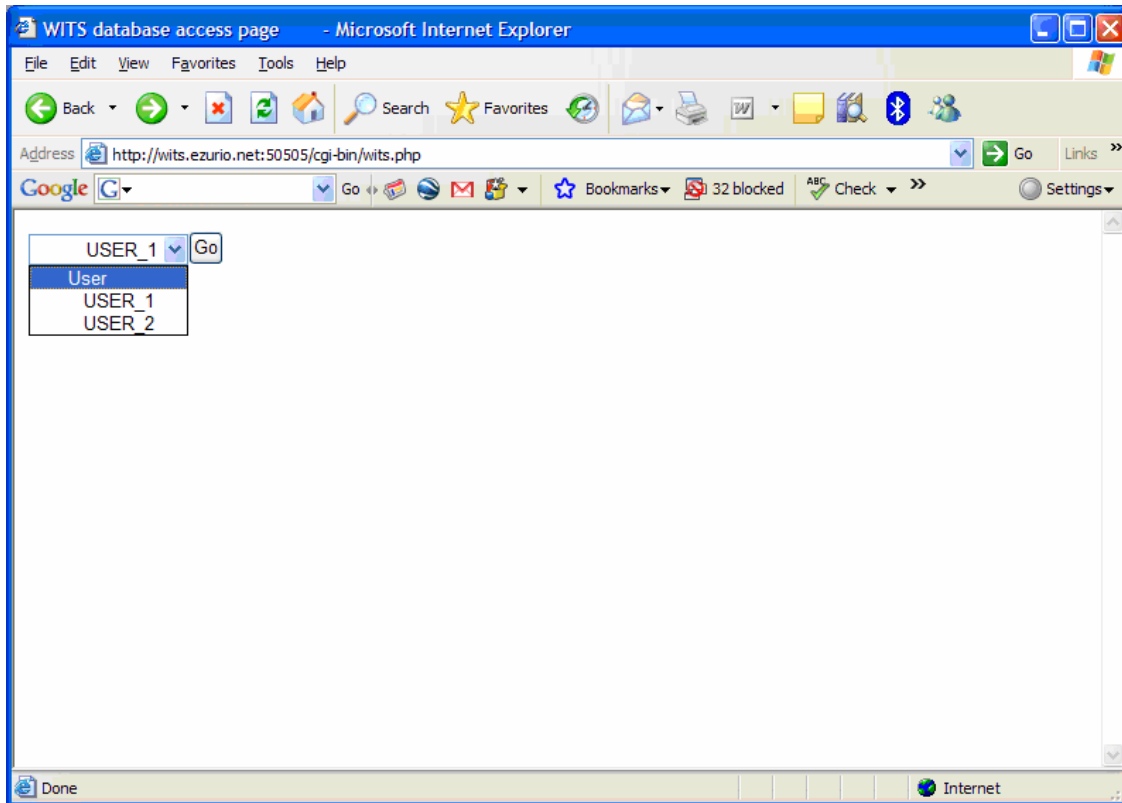
If reporting is unreliable or impossible it may be necessary to use an external antenna to improve the performance of the Wireless LAN. As an option a 3dBi dipole external antenna is available for this product.

Under no circumstances should any antenna other than one supplied by Ezurio Limited expressly for the WITS product be used with this unit. The unit utilises a special reverse SMA connector to prevent use of incorrect antennas.

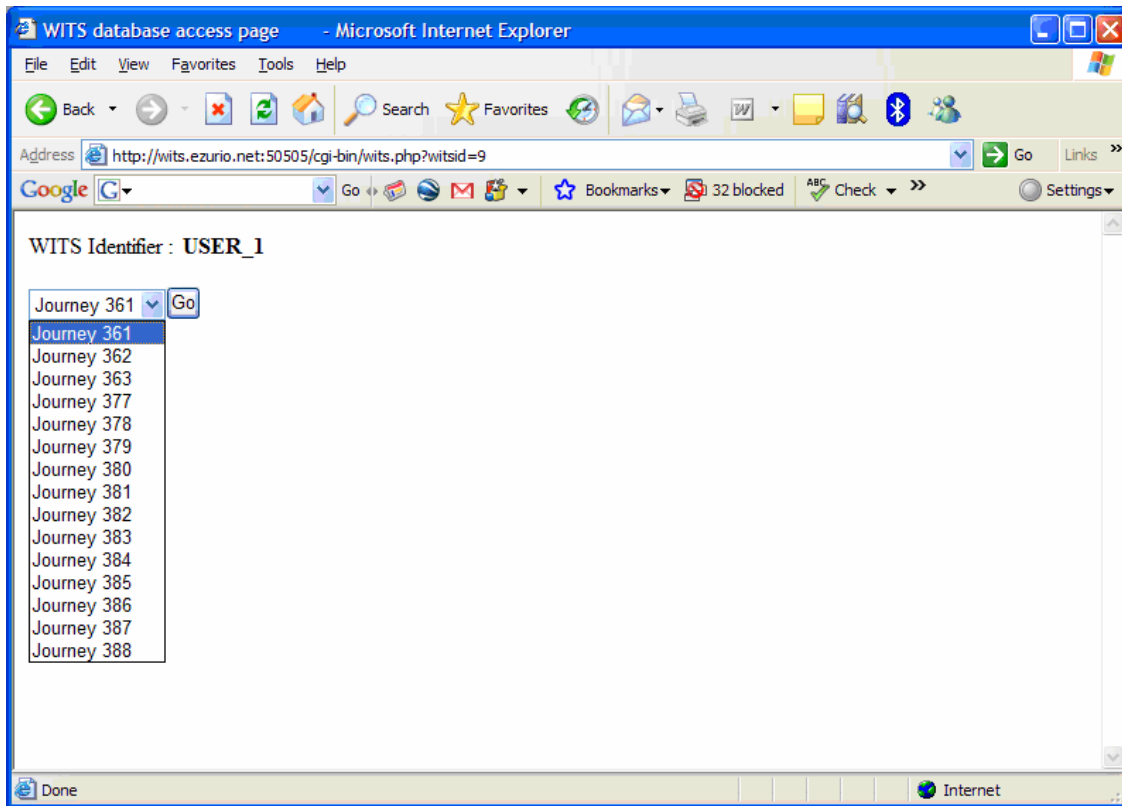
5. Accessing Logged Data

When logged data has been reported back to the middleware, it is ready to be accessed from the database. A simple user interface has been developed to provide access to logged data reports.

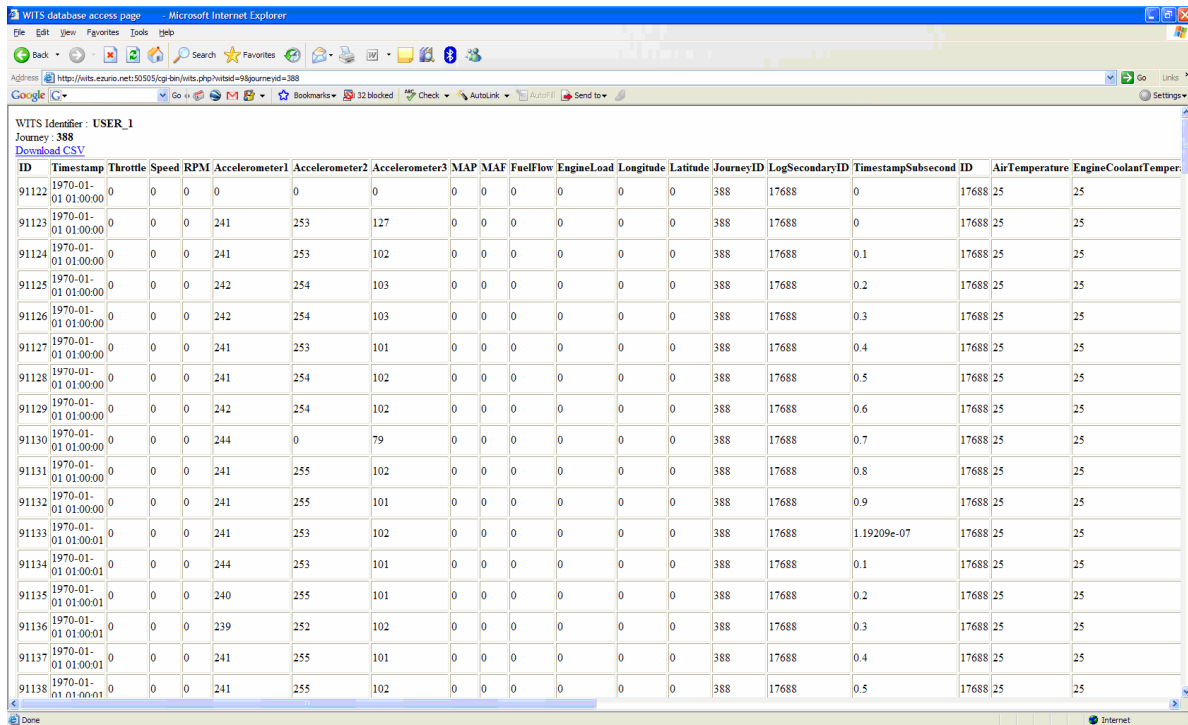
The supplied documentation will indicate the URL of the first page of the user interface, which will look like:



The pull down menu allows access to all registered users of the system. Select the user required and select 'Go'. The following screen is then displayed:



This screen allows the user to select a particular journey to view. A journey is defined as one logging session. Simply select the required journey and the data will be displayed as shown below:



WITS Identifier : USER_1
Journey : 388
[Download CSV](#)

ID	Timestamp	Throttle	Speed	RPM	Accelerometer1	Accelerometer2	Accelerometer3	MAP	MAF	FuelFlow	EngineLoad	Longitude	Latitude	JourneyID	LogSecondaryID	TimestampSubsecond	ID	AirTemperature	EngineCoolantTemper.
91121	1970-01-01 01:00:00	0	0	0	0	0	0	0	0	0	0	0	0	388	17688	0	17688	25	25
91123	1970-01-01 01:00:00	0	0	0	241	253	127	0	0	0	0	0	0	388	17688	0	17688	25	25
91124	1970-01-01 01:00:00	0	0	0	241	253	102	0	0	0	0	0	0	388	17688	0.1	17688	25	25
91125	1970-01-01 01:00:00	0	0	0	242	254	103	0	0	0	0	0	0	388	17688	0.2	17688	25	25
91126	1970-01-01 01:00:00	0	0	0	242	254	103	0	0	0	0	0	0	388	17688	0.3	17688	25	25
91127	1970-01-01 01:00:00	0	0	0	241	253	101	0	0	0	0	0	0	388	17688	0.4	17688	25	25
91128	1970-01-01 01:00:00	0	0	0	241	254	102	0	0	0	0	0	0	388	17688	0.5	17688	25	25
91129	1970-01-01 01:00:00	0	0	0	242	254	102	0	0	0	0	0	0	388	17688	0.6	17688	25	25
91130	1970-01-01 01:00:00	0	0	0	244	0	79	0	0	0	0	0	0	388	17688	0.7	17688	25	25
91131	1970-01-01 01:00:00	0	0	0	241	255	102	0	0	0	0	0	0	388	17688	0.8	17688	25	25
91132	1970-01-01 01:00:00	0	0	0	241	255	101	0	0	0	0	0	0	388	17688	0.9	17688	25	25
91133	1970-01-01 01:00:01	0	0	0	241	253	102	0	0	0	0	0	0	388	17688	1.19209e-07	17688	25	25
91134	1970-01-01 01:00:01	0	0	0	244	253	101	0	0	0	0	0	0	388	17688	0.1	17688	25	25
91135	1970-01-01 01:00:01	0	0	0	240	255	101	0	0	0	0	0	0	388	17688	0.2	17688	25	25
91136	1970-01-01 01:00:01	0	0	0	239	252	102	0	0	0	0	0	0	388	17688	0.3	17688	25	25
91137	1970-01-01 01:00:01	0	0	0	241	255	101	0	0	0	0	0	0	388	17688	0.4	17688	25	25
91138	1970-01-01 01:00:01	0	0	0	241	255	102	0	0	0	0	0	0	388	17688	0.5	17688	25	25

NB Position is only displayed when the GPS signal is valid.

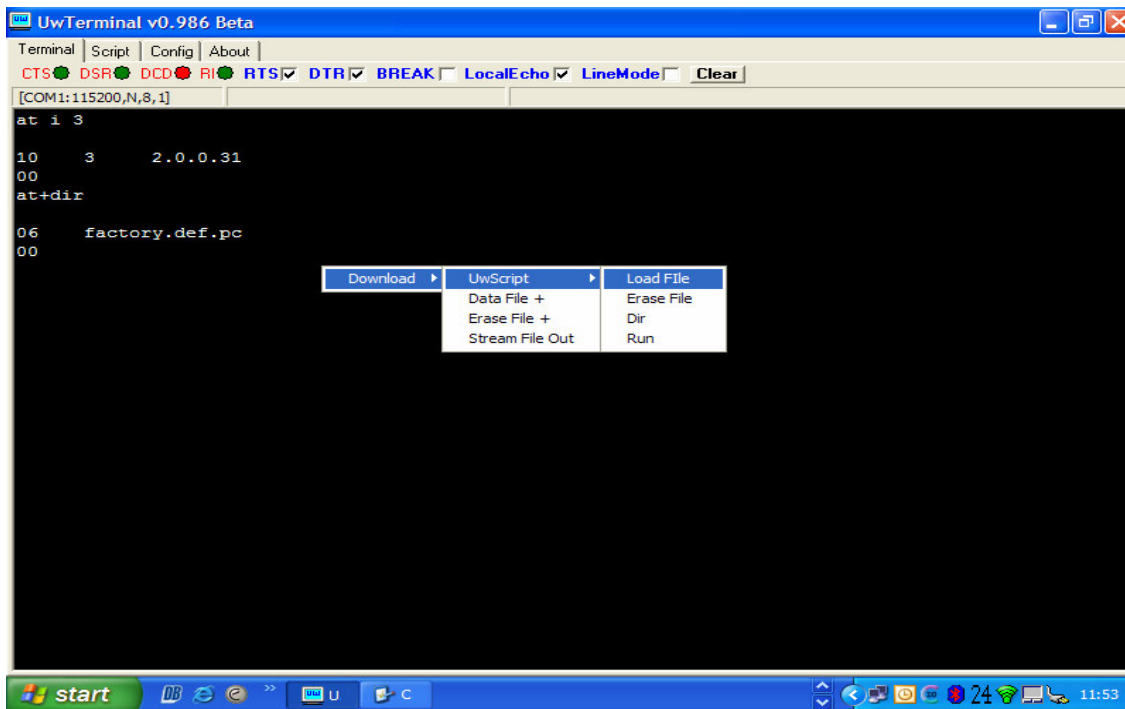
If a CSV file containing the data for the journey is required, then simply select the 'Download CSV' option

6. Updating the Script

The logging operations of the unit are controlled by a script that allows all aspects of the logging process to be flexibly controlled. Normally new control scripts will be downloaded by the middleware when required, however, it may be necessary in certain cases for a new script to be updated manually using the following process:

Firstly, follow the instructions in Section 2 for configuring the unit, but stop before entering the 'Start 4' command. Instead, enter the command 'quit'. This will stop the current script from operating.

To load a user script, right click anywhere in the terminal window and then follow the menu structure, as follows:



The following options are available for script management:

- Load File: Brings up a file selection window to allow the user to select the file to download. When file is selected this is automatically downloaded to the module. If the script is already in the module memory, then it is deleted and the new script will replace it. Using this option is equivalent to using the following interactive commands:

```
at+del "scriptname"
at+cmp "scriptname"
```

- Erase File: Brings up a file selection window. When the script is selected, the module will check if it is memory and, if so, delete it. This is equivalent to the following interactive command:

```
at+del "scriptname"
```


- Dir: Displays the current scripts and data files stored in the module memory. This is equivalent to the following interactive command:
at+dir
- Run: Brings up a file selection window. When the script is selected, the module will check if it is memory and, if so, run it. This is equivalent to the following interactive command:
at+run "scriptname"

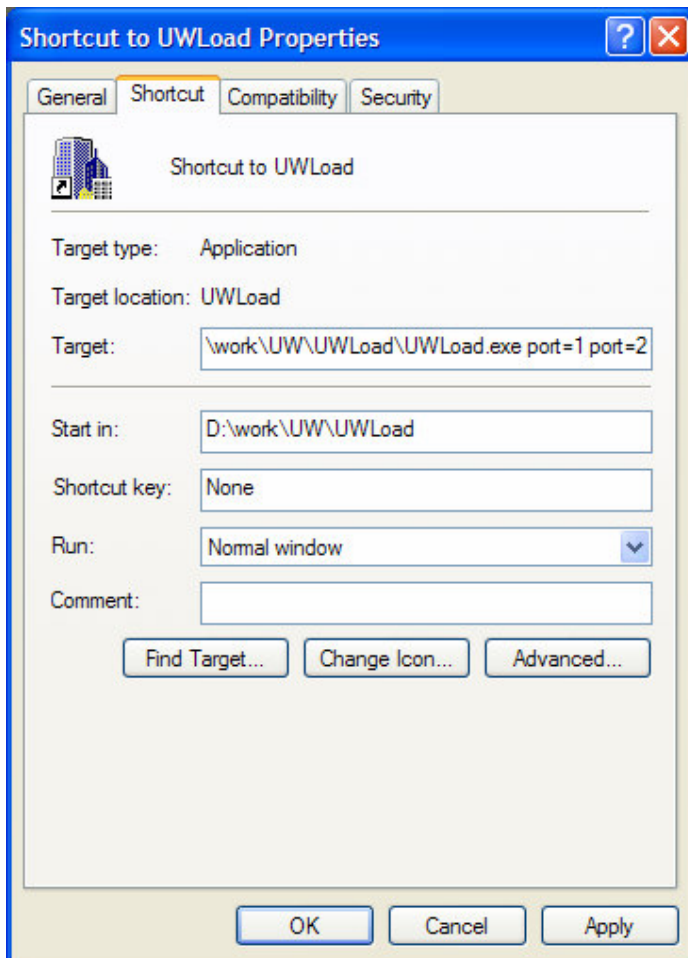
7. Updating Firmware

Normally firmware updates are downloaded automatically by the middleware when required, however, it may be necessary in certain cases for the firmware to be updated manually using the flash loader as follows:

Before running the flash loader, the flash load header should be plugged into the OBD connector and the unit reset .

The flash loader utility is supplied in the zip file UWLoad.zip. Both files in this archive should be unzipped to the same directory.

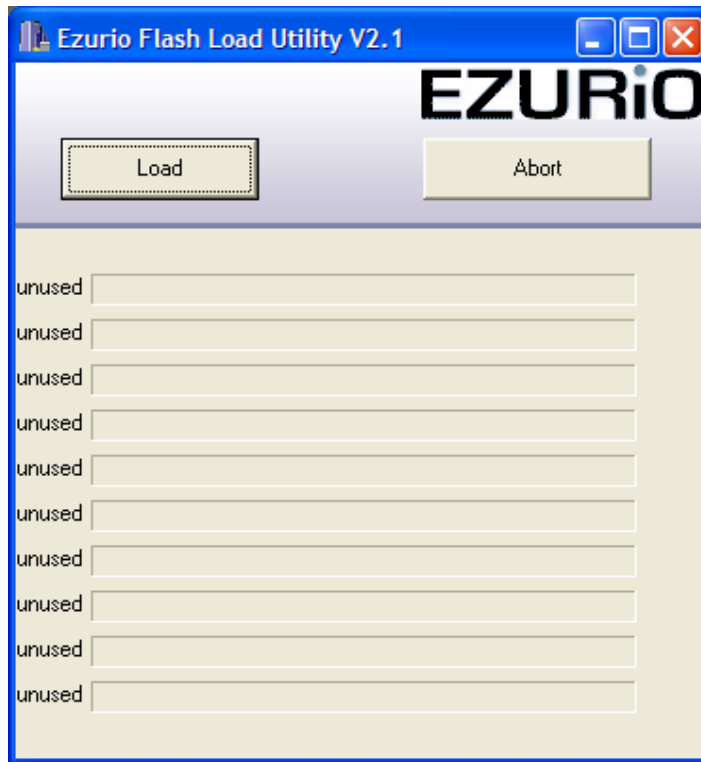
The flash loader can support the parallel programming of up to 10 units and hence up to 10 serial ports can be specified for use with the loader. To specify one or more serial ports, the COM port number is supplied to the flash loader on the command line. This is most easily done by placing a shortcut to the flash loader executable on the desktop and then modifying the command line in the 'properties' window for the shortcut (accessed by right clicking on the shortcut icon). This is shown below for an example where two serial ports are specified.



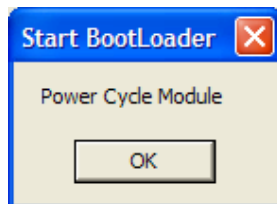
The port numbers refer to the COM numbers assigned to the serial ports.

The 'Start in' file location MUST be the same location as the executable.

Once the port numbers have been specified, run the flash loader utility and the following screen is displayed:

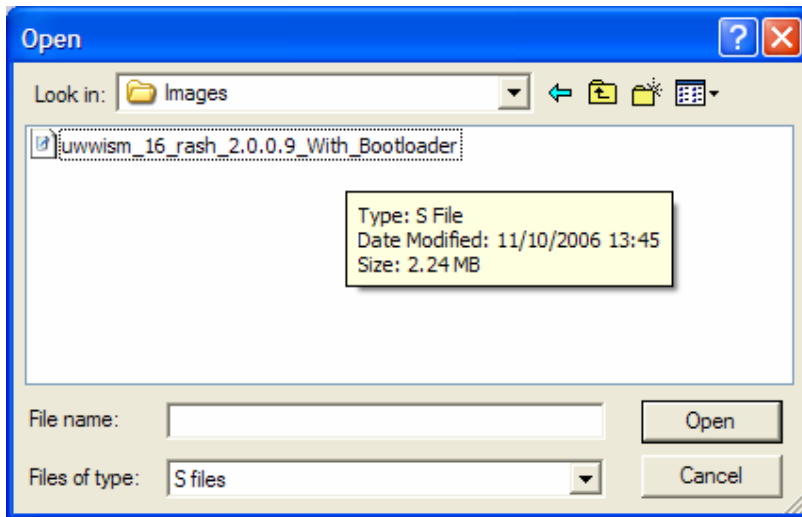


Push the 'Load' button and a window is displayed prompting the user to power cycle the module:



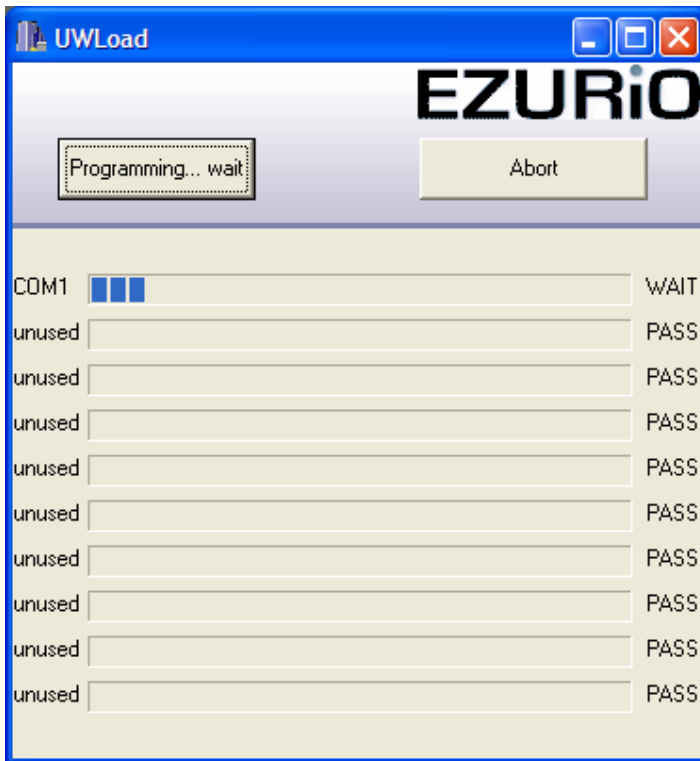
Simply push the OK button.

The user is then prompted to select the firmware image to be downloaded:

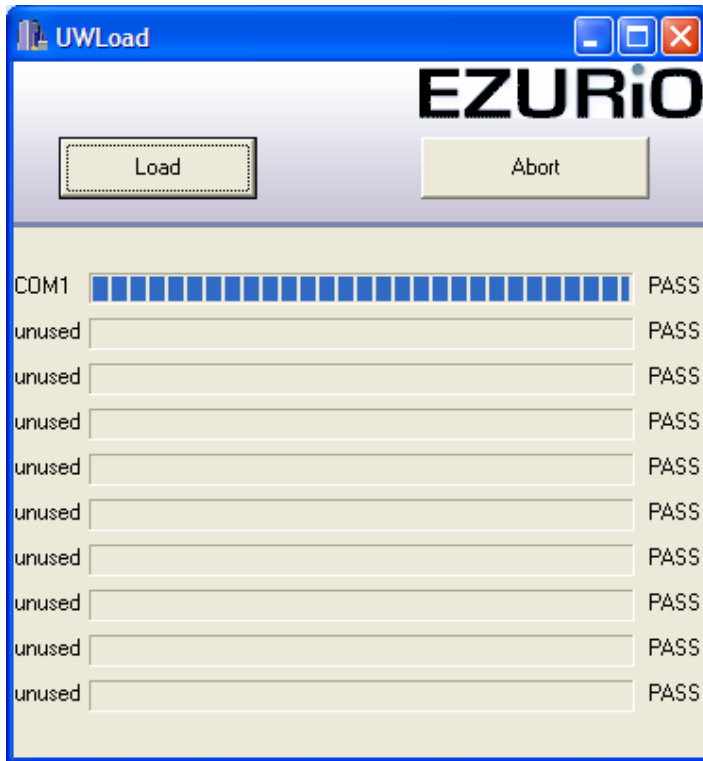


Select the firmware image and press Open. Flash loading will now start. The progress bars for the active serial ports will then be used to indicate flash progress with each of the modules being programmed. It is possible that the flash load will fail at the first attempt (the progress bars will stop moving) – if this happens simply press the abort button and then repeat the above process starting with pressing the Load button.

Flash programming occurs in two stages – the first phase is the erase cycle and the progress bar will indicate the progress through this stage before being erased and then showing the progress through the second, programming, phase. Whilst programming is in progress, the status indicator on the right hand side will show WAIT for all active modules. When programming is complete the status indicator will change to PASS. When all status indicators show pass the programming operation is complete. A typical window during programming is shown below:

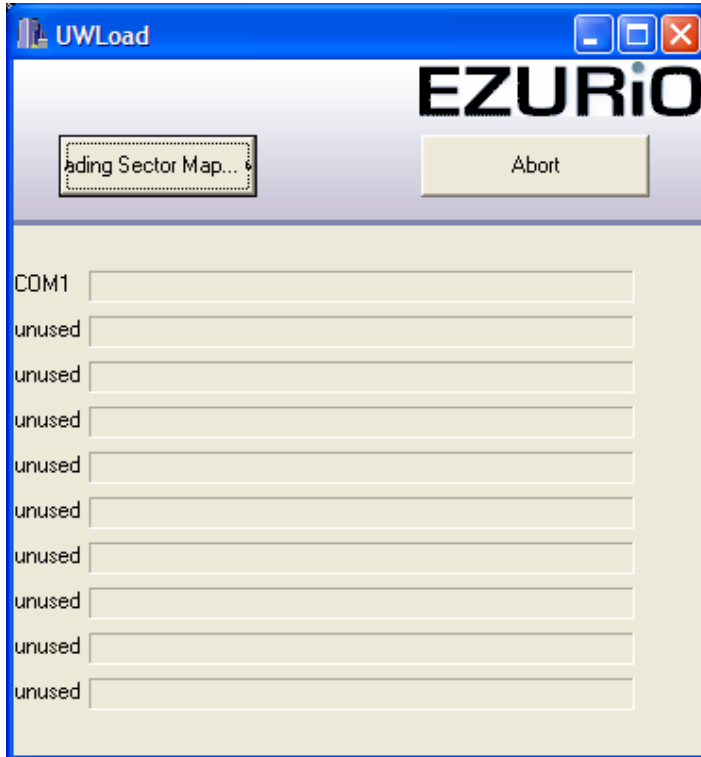


When programming is successfully completed the following window is displayed:



7.1 Fault Finding

If the following screen is displayed:



This indicates that the SectorMap.ini file cannot be found. This file MUST reside in the same location as the flash loader executable.

If the load process stops during the erase cycle, it is likely that the module has not been power cycled or reset when prompted by the program. It is also possible that insufficient time was allowed after module reset for the module to enter flash loading mode. To resolve this, shut down the flash loader, re-start it and repeat the process.