



Fleet Manager GPS Functionality

Introduction

The purpose of this document is to describe how to connect a Global Positioning System (GPS) receiver to the FM200 unit, how to configure the unit to record GPS data, and how to analyse the data using the Fleet Manager 2002 application software and GPS Log Viewer Extensions. Please consult the "Fleet Manager GPS Log Viewer for MapPoint", "Fleet Manager GPS Log Viewer for XMap" and "Fleet Manager GPS Log Viewer" documents for more information on functionality specific to each Extension. For information on Geo-fencing (defining events based on geographic zones), please refer to the "How to do Geo-fencing with the FM200" document.

Hardware

A standard off-the-shelf GPS receiver can be connected to the FM200 unit via the third frequency (F3) input. Please see "Appendix A – FM200 GPS Interface" for more information and a list of recommended GPS devices and requirements.

Device Drivers

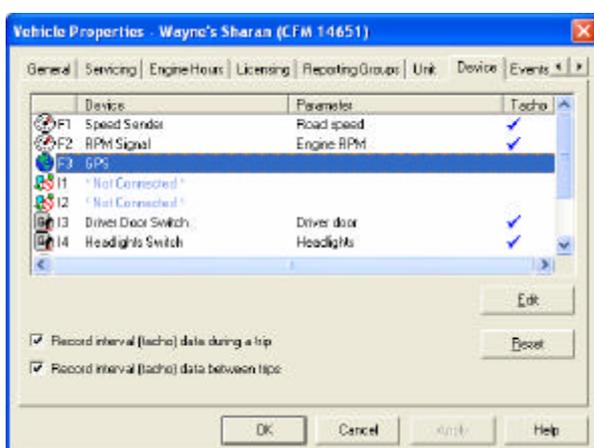
A set of firmware device drivers must be transferred to the FM200 unit using a standard 256kb code-plug, via GSM or DECT. These device drivers enable the FM200 unit to read and record GPS data from the GPS receiver.

The FM Dealer software utility should be used to initialise a code-plug with the required device drivers.

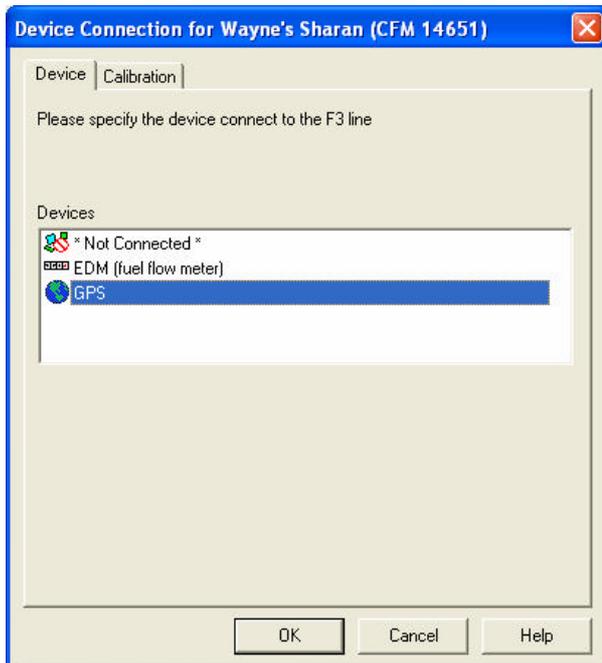
Configuration

The Fleet Manager Client application allows the user to specify how and when the FM200 unit records data from the GPS receiver.

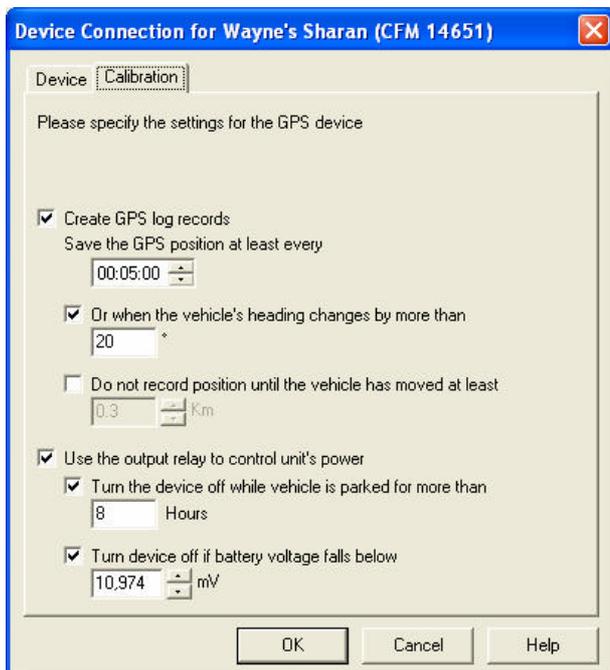
The Device tab of the Vehicle Properties dialog is used to specify that a GPS receiver is connected to the F3 input of the FM200 unit.



Double clicking on the F3 entry in the list box displays the Device Connection dialog.



Drop down the combo box and select the GPS device. Click on the Calibration tab.

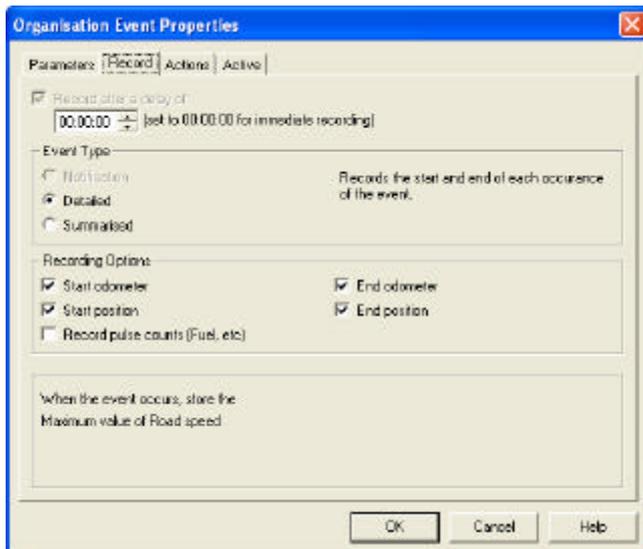


The relay output of the FM200 unit can be used to control the supply of power to the GPS receiver. You can specify a value in hours after which the FM200 unit will switch the GPS receiver off. This is useful to prevent the GPS receiver from draining the vehicle's battery when the vehicle is parked.

The FM200 unit can be configured to record GPS data under any or all of the following conditions:

1. At the start and end of every sub-trip - this is done automatically.
2. Regularly at a pre-defined time interval or under certain pre-defined conditions. These parameters ensure that important data is recorded without utilising resources in the FM200 unit unnecessarily:

- a) Setting the heading change parameter to 10 degrees for example will result in 9 GPS logs recorded in the unit when the vehicle makes a 90-degree turn.
 - b) Setting the minimum distance to 0.1 km will cause the unit to ignore all GPS logs within the first 100 meters of a sub-trip. This is useful to prevent GPS logs from being recorded inside depots, or when idling at the start of a trip.
3. At the start and/or end of the occurrence of any FM200 event - this is specified in the Vehicle Event Properties dialog and can be seen below.



Analysis of GPS Data

The GPS data recorded by the FM200 units is downloaded into the Fleet Manager software by any of the standard downloading techniques available. The data is stored in the Fleet Manager SQL Server database and is made available to third party applications via the standard Fleet Manager Extension Interface.

The following data is stored with every GPS record in the database:

- ? **Vehicle ID**
- ? **Driver ID**
- ? **Date and time**
- ? **Latitude**
- ? **Longitude**
- ? **Altitude**
- ? **Heading**
- ? **Number of satellites**
- ? **HDOP (Horizontal Dilution Of Precision)**
- ? **Age of reading**
- ? **Distance travelled since last reading**

Three GPS Extensions are available for the analysis of GPS data.

1. Microsoft MapPoint 2002 Extension: "GPS Log Viewer for MapPoint" – intended for Fleet Manager users in the United States and Europe.

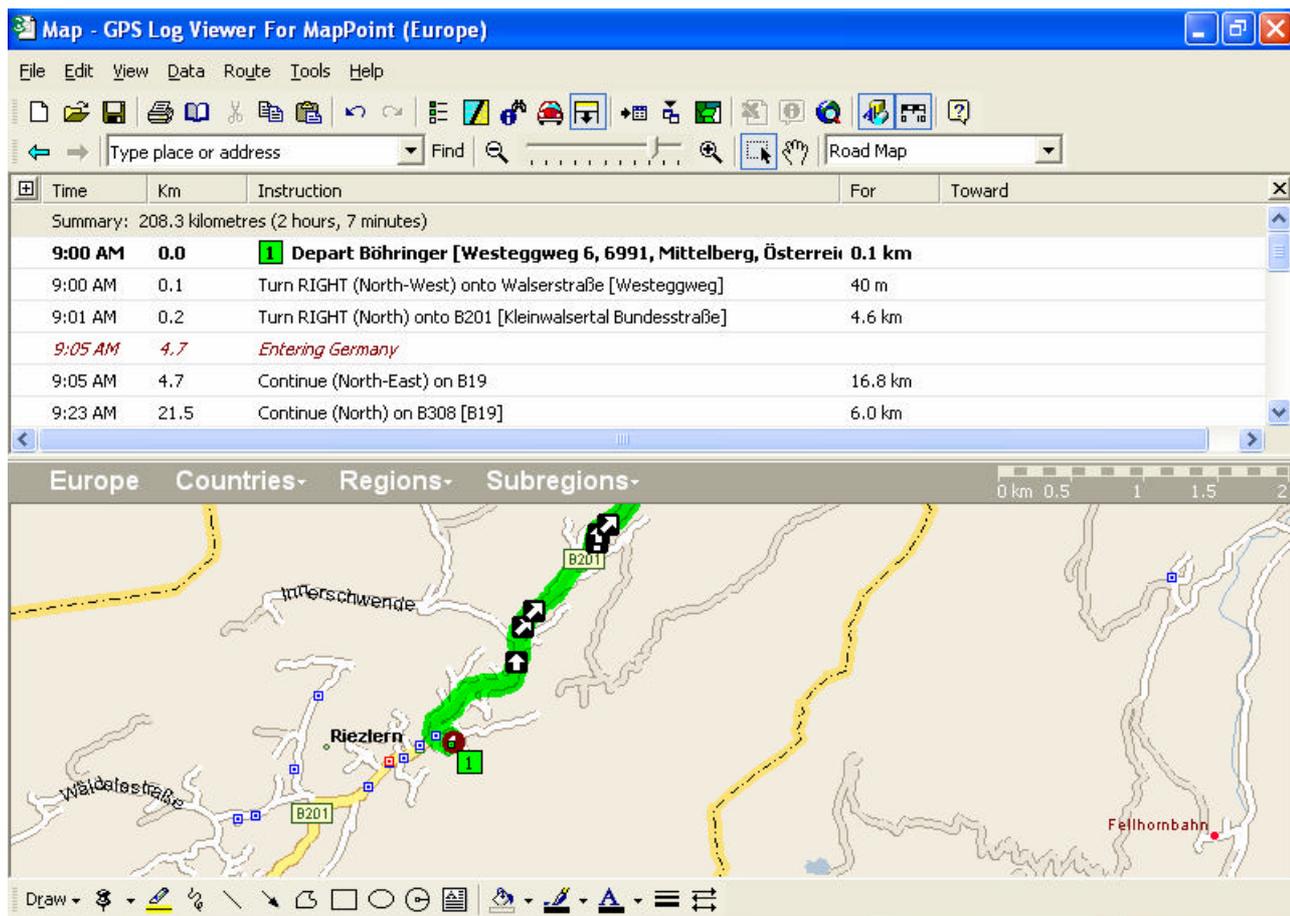
2. Delorme XMap Extension: "GPS Log Viewer for XMap" – intended for Fleet Manager users in the United States.
3. Fleet Manager GPS Log Viewer Extension: "GPS Log Viewer" – intended for Fleet Manager users in other countries, subject to the availability of suitable maps and data.

Each of these Extensions enables you to analyse the GPS data visually by plotting selected GPS records on a map. Although each provides its own unique functionality, the manner in which the Extensions are used from within the Fleet Manager application is more or less the same. Their unique functionality is described "Fleet Manager GPS Log Viewer for MapPoint", "Fleet Manager GPS Log Viewer for XMap" and "Fleet Manager GPS Log Viewer" documents.

Microsoft MapPoint 2002 Extension

Microsoft's new MapPoint 2002 GIS software (Europe and USA versions available) includes functionality for defining points of interest, displaying route points, planning and optimising routes, printing driving directions and much more.

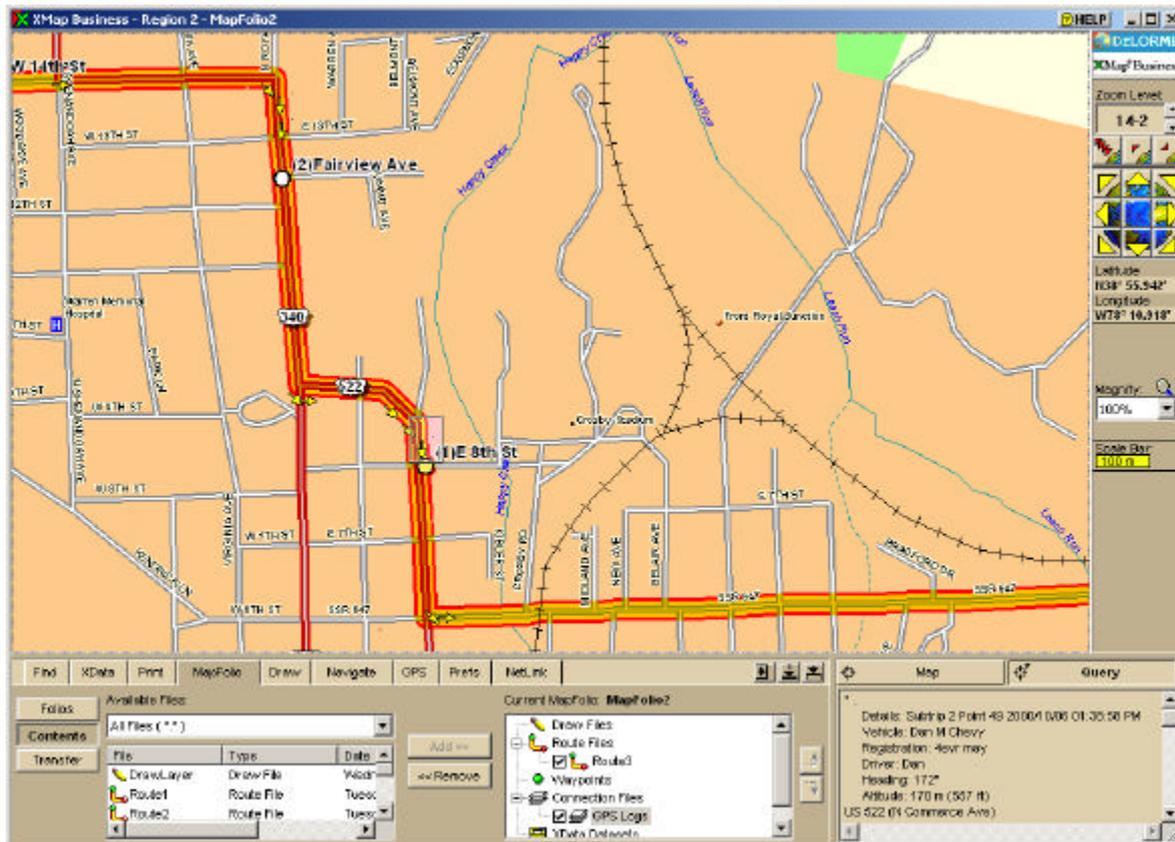
The figure below shows a trip displayed using symbols (customisable per event), as well as the Route Planner's suggested route with driving directions.



Delorme XMap Extension

Delorme's XMap Business GIS software (USA only) includes a powerful route planner (for preferred (highway), scenic and shortest route). Driving directions can be printed out and much more. XMap Business retails for around 100 US dollars.

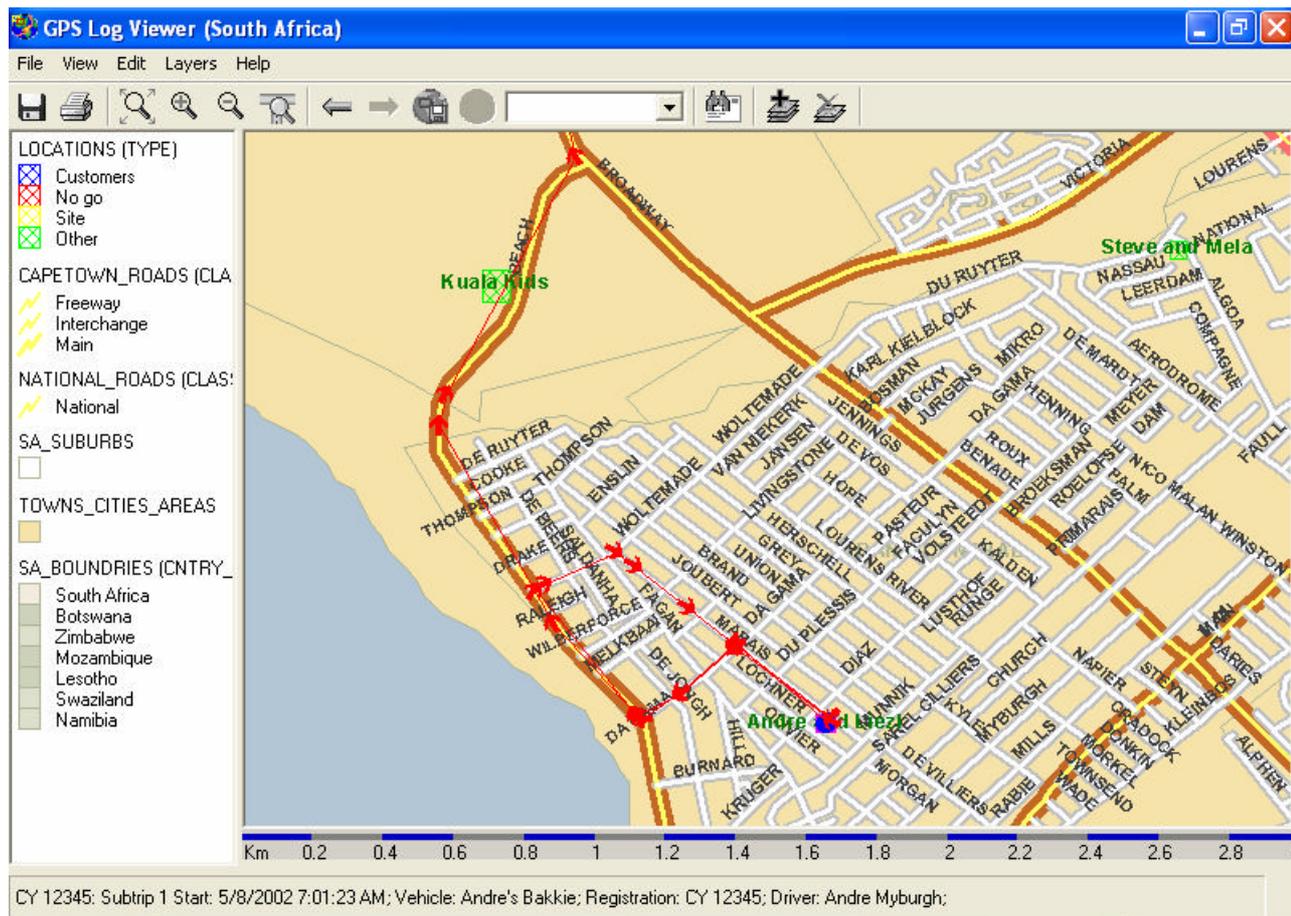
The figure below shows a trip displayed using symbols, as well as the Route Planner's suggested route.



Fleet Manager GPS Log Viewer Extension

The Fleet Manager GPS Log Viewer Extension is intended for customers outside of Europe and the USA (i.e. not covered by MapPoint or XMap), or those wishing to use their own maps for viewing GPS data. A variety of map formats are supported, including .BMP, .JPG, .DWG, .SHP and .VPF. Street address searches are possible, and many other features for viewing trip data on street level maps.

The figure below shows a trip displayed on a street map (vector data in .SHP format) using symbols.



Appendix A – FM200 GPS Interface

Description

The interface harness consists of two connector cables:

- ? A FM200 connector cable, and
- ? A GPS connector cable (optional)

The FM200 connector cable should be wired to the FM200 (Fig. 1) and terminates in a male DB9 connector. The GPS connector cable is optional and is only needed if the GPS module does not already come with a female DB9 connector. It can be wired to a GPS module and terminates in a female DB9 connector (as shown in Fig. 1).

Minimum GPS Requirements

Any GPS module chosen to work with the FM200 should conform to the following specification level to assure proper functioning.

A GPS module should:

- ? Output NMEA 0183 serial data @ 4800 baud, one stop bit.
- ? Output a voltage swing of at least ? 5 Volts.
- ? Accept 12V or 24V power.

Note: The FM200 will auto-detect the polarity of the GPS output signal. (TTL or V.24)

Recommended GPS modules

The following GPS modules have been verified to work with the FM200.

- GARMIN GPS 35/36 TracPak
- TRIMBLE Lassen SK-8
- GARMIN GPS III

Diagram

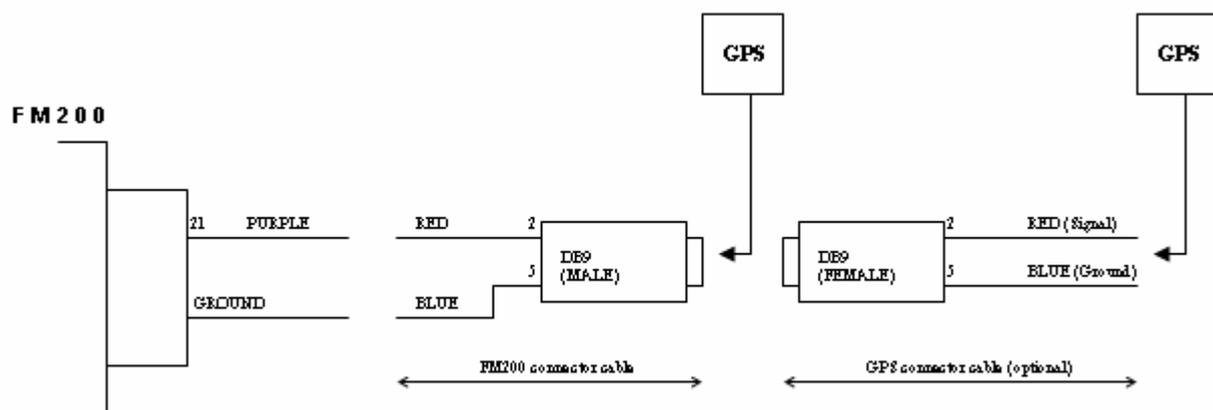


Fig. 1