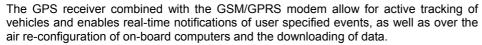# PRODUCT FACT SHEET

## FM300 Communicator

## Overview

The FM300 Communicator offers the same extensive driver and vehicle management as the FM200 *Plus* and has an additional internal GPS receiver and GSM/GPRS modem. The GPS receiver allows the recording of GPS position information.

The GPS receiver combined with the GSM/GPRS modem allow for active tracking of vehicles and enables real-time notifications of user specified events, as well as over the air re-configuration of on-board computers and the downloading of data.

## FEATURES

| ACTIVE TRACKING | |
|---|---|
| Active/ Passive Tracking or Active Trail | Request the vehicle position in real-time or view the route taken after the trip has been downloaded. Active Trail allows hourly updating of the Fleet Manager software with GPS vehicle positions. |
| GPS Data Recording | Various information is recorded with every GPS point, e.g. vehicle and driver ID, date and time, latitude and longitude, altitude, heading, velocity, number of satellite etc. |
| Manage Locations | Add any desired location such as customer, supplier or no- go zones. |
| Route Planning | Plan routes by entering stops, start times and duration of each stop. This can serve as daily job activity sheets for your drivers. |
| Active Events | Receive data messages such as SMS when selected standard or user-defined events occur, e.g. a cargo door opening in a no-go zone, driver arrived at customer location. |
| COMMUNICATIONS | |
| Downloading to / uploading from vehicle | Use the GSM/GPRS Modem to download data to and upload data from the FM300 Communicator. The modem also enables active tracking of the FM300 Communicator by the FM Software. |
| Voice Calls | Incoming voice calls are possible with an optional headset. |
| VEHICLE AND  DRIVER MANAGEMENT | |
| Trip Data Recording | The following data is recorded: date and time, distance traveled, journey duration, vehicle speed, engine speed (RPM), journey departure and arrival time, driver name, driver ID, vehicle ID. |
| Driving Violations | The following standard violations are recorded: over speeding, over revving, green band driving, harsh braking, harsh acceleration, excessive idling and overtime driving. |
| Customised Events | Define customized events, such as driver door opening, no-go zone entered, hazard lights activated and refrigerator temperature exceeded. |
| Second-to-Second (Tacho) Data | The status of inputs such as speed and RPM is recorded every second. This provides valuable in-depth information for accident analysis. |
| Servicing and Licensing | Set reminders for your vehicle's next service or vehicle/driver license expiry. |

# GENERAL INFORMATION

| Ignition input | Used to monitor the ignition switch status. |
|---|---|
| Positive drive output | Used to power external devices. It can supply current up to 500mA. |
| Buzzer output | Signaling device |
| Audio interface | This interface allows the user to make voice calls using a headset, keypad and cable. |
| FM300 Communicator Includes: | • GSM/GPRS Antennae.<br>• GPS Antennae.<br>• Main harness with integrated buzzer (2x frequency input, 3x digital/analogue input).<br>• FM300 code-plug harness including vehicle interface.<br>• Blue driver's plug (driver log-on).<br>• FM on-board computer user manual.<br>• Optional harnesses: I/O harness (2x frequency input, 4x digital/ analogue input), serial harness, voice harness. |

## TECHNICAL DESCRIPTION

| Voltage range | 9VDC – 33 VDC |
|---|---|
| Input Protection | Automotive 24V load dump (160V, 2 Ohm, 400mS); short duration low-energy & high-energy transients). |
| Clock | Real time with independent battery back-up |
| Inputs, events & outputs | Highly configurable inputs, events and output control. |
| Firmware | Re-programmable firmware and configuration over wired and wireless media. |
| 8 analogue inputs | 8 analogue lines measuring voltages in the range of 0 – 38 volts in steps of approximately 0.15 volts. These inputs can be programmed to measure voltages between 0 and 5 volts in increments of approximately 0.02 volts. |
| Frequency measurement | A selected analogue input can measure frequencies of up to 150Hz or low board rate encoded RS232 inputs (up to 75 baud). |
| Frequency inputs | 4 high frequency inputs, one dedicated to measuring engine RPM and another to measuring Vehicle Road Speed. The $3^{rd}$ and $4^{th}$ inputs were originally dedicated to measuring user-defined inputs, especially those from fuel measuring devices i.e. EDM's. The $3^{rd}$ frequency input can be used to input NMEA strings from the GPS receiver. These inputs work to approximately 5KHz (RPM & Speed) and 12KHz(F3 & F4). |
| Relays | The FM300 Communicator features 2 150mA open collector output drivers for driving a relay. One relay can be used to switch off peripheral devices such as GPS. |
| Buzzer and LED | The FM300 Communicator has a buzzer and LED to warn the driver and to provide feedback of the vehicle's status. |
| I²C Bus | Intended for use with code-plugs used to identify drivers, calibrate, diagnose faults, upload firmware and new configurations, and to download logged data and unit specific configuration information. This bus can also be used to drive a simple icon based Fleet Log-Book which displays driving reasons, violations and faults and can allow the driver to make voice calls. |
| TTL level serial port | Intended to be used by devices designed to work on a bus. The bus was specified to be a Multi-Master type to enable other intelligent devices to optionally work as master relieving the FM300 Communicator of processing. |
| Memory | Memory is limited to 1 megabyte of flash and 20Kb's of RAM. 196Kb's of flash memory is dedicated to storing firmware, 128KB for tacho data, 312 KB for event data and the remaining 384KB for buffering data and non-volatile temporary memory space. A FRAM is also present as a non-volatile replacement for RAM. |

## TECHNICAL SPECIFICATIONS

| ENVIRONMENT | |
|---|---|
| **Temperature** | (Storage) -20° to +70°C  - non-battery backup<br>(Operating) -10° to +70° - non-battery backup |
| **Circuit protection** | Conformal coating over the PCB and all components (excluding connectors). |

| SUPPLY | |
|---|---|
| **Current** | (Operating) <42mA at 28V (typical)*<br>(Sleep) <20mA at 28V (typical)*<br>(Operating) <70mA at 12V (typical)*<br>(Sleep) <30mA at 12V (typical)*<br>(Powered down) <2mA at 12V (typical)*<br>(Powered down) <3mA at 28V (typical)*<br>* The signal strength on the GSM affects the current consumption. The firmware running on the FM300 Communicator micro processor affects the current consumption of the unit. |

| RELAY CIRCUIT | |
|---|---|
| **Current Specifications** | 200mA (typical). |
| **Maximum continuous voltage on pin** | 33V |
| **Protection** | Voltages of 36V and higher will be clamped by tranzorb. |

| RS202 PORTS | |
|---|---|
| **Maximum Speed** | 57600 Baud (higher rates possible with hardware flow control) |
| **Protection (transient)** | 15Kv as per human body model |
| **Protection (DC)** | 0V to +12V |
| **I²C BUS** | |
| **Normal operating speed** | ~38Kbits per second |
| **Maximum supply current (CLK)** | <20mA |
| **Protection (transient)** | 15Kv as per human body model |
| **Protection (DC)** | 0V to +12V |

| REAL TIME CLOCK | |
|---|---|
| **Time Loss** | <10 Minutes per year (Typical)/ <5 seconds when a GPS is used (auto synchronization)* |
| **Battery backup life** | >5 Years (typical at -30° to +70°C)<br>*temperature change affects the accuracy of the RTC crystal, it's most accurate at +25°C. |

| GPS | |
|---|---|
| **Channels** | 16 |
| **Update rate** | 1Hz |
| **Accuracy position** | 2.5m CEP |
| **Accuracy DGPS/SBAS** | 2.0m CEP |
| **Start-up time** | <2minutes |
| **GPS operating temperature** | -40°C to 85°C |

| GSM | |
|---|---|
| **GPRS** | Multi-slot class 10 |
| **Triple band** | EGSM900/DSC1800/PSC1900 |

|  | For voice, data, text messages (SMS) and Fax. |
|---|---|
| **Transmit power** | Class 4 (2W) for EGSM900<br>Class 1 (1W) for DSC1800/PCS1900 |
| **Operating temperature** | -20°C to 55°C<br>-25°C to 70°C (limited functionality) |
| **SIM Card** | 3V |

## AUXILLIARY INPUTS/OUTPUTS

| **8 configurable analogue or digital inputs** | The FM300 Communicator analogue or digital inputs can be configured to configured to monitor any device that generated a change in voltage, e.g. seat belts, headlights, refrigeration units, emergency lights, doors, PTO, UDS, trailer coupling etc. |
|---|---|
| **4 auxiliary frequency input** | The FM300 Communicator auxiliary frequency input can be configured to monitor any device that generates a change in frequency e.g. temperature sensor, liquid flow measurement or as a pulse counter e.g. electronic fuel consumption measurement(EDM) *A fourth auxiliary input (F3) is connected to the internal GPS receiver.* |
| **2 Auxiliary relay drive** | This can be used to switch a relay with a current consumption of up to 150 mA. |
| **3 Serial interface (2x RS232 and 1x TTL)** | This can be connected to any TTL or RS232 serial device using the FM Serial cable (e.g. FM Terminal).  *A second RS232 Port (S2) is connected to the internal GSM/GPRS Modem* |