

1. INTRODUCTION

The G200 is designed as a top of the range tracking device that is capable of being installed in a vehicle, or can be carried in a portable configuration.

The design allows the device to operate off the cellular network and fall back to Iridium SBD (optional feature) when out of coverage.

It includes a high-power Bluetooth Smart module to allow the G200 to communicate with mobile devices (smartphones and tablets) and other Bluetooth Smart sensors.

The G200 has a range of other inputs and outputs (see below).

The G200 will be designed to use the new “Flexi” housing which can accommodate the PCB and the 7.4V backup battery.



2. G200 HARDWARE FEATURES

Hardware Features	
Housing	The G200 will use the new “Flexi1” housing. It is made of sturdy UV resistant plastic and is IP67 rated. Dimensions: 155 x 130mm x 40mm (excluding mounting tabs)
Vehicle Aux power	A minimum 2 metre harness with “cigarette lighter” or “Vehicle Auxiliary” style 12 Volt plug to enable the tracking device to be powered and charged from the vehicle will be provisioned with each G200.
Satellite Communications Antenna	An Iridium antenna with 1.2 metre cable length and SMA connector will be provisioned with each G200 where Iridium is required.
Internal Connectors	Screw terminal connectors on the PCB make for flexibility in installations
Automotive spec power supply	9V to 36V input voltage Reverse polarity protection TVS protected for spikes PTC self-resetting fuse
Operating Temperature	-20°C to +65°C

	Below 0°C the internal backup battery's ability to deliver sufficient power to operate the modems is reduced. Below 0°C and above +45°C the internal backup battery will not be charged as a safety precaution due to dangers associated with charging batteries at extreme temperatures.
High sensitivity GPS	UBLOX MAX8 GPS module Supports concurrent GLONASS and other GNSS systems 72 channel high sensitivity receiver -167dBm industry leading tracking performance Battery backed up for optimal hot-start performance AssistNow Offline aiding data for extremely fast time-to-first-fix and performance in urban canyon environments
Internal GPS Patch Antenna	Having the GPS antenna inside the housing makes for very simple and quick installation. Position performance is still very good.
Low noise GPS amplifier	GPS signals are boosted by a special low-noise amplifier (LNA)
3 axis accelerometer	Allow the G200 to detect movement to conserve battery when not required. Harsh driving events and roll-over detection. (same functionality as the existing G100 device)
3G Modem (NextG)	The Telstra approved Telit HE910-EUD 3G modem will be used.
SIM Card Holder	Micro-SIM holder
Internal / External 3G antenna options	The G200 will have a UFL connector for the 3G antenna and will come as standard with a flexible internal antenna. As an "after-market" option an external 3G antenna can be used if needed.
Iridium SBD	The G200 will cater for an optional Iridium 9603 modem to be fitted. This will allow the device to communicate on the Iridium satellite SBD network. The 9603 has a UFL connector for an external antenna.
Bluetooth Smart (BLE)	The G200 will contain a Bluetooth Smart module for communications to mobile devices and sensors. The Silicon Labs BGM111 module will be used, which has up to +8dBm output power and an integrated antenna.
Backup battery	A 7.4V 2-cell LiPo battery pack will allow the operation of the entire device including the Iridium modem. Battery charger / controller. Capacity minimum of 2400 mAh.
RTC	Real-time clock for timing operations
4 x Digital Inputs	1 x Ignition line 3 x digital inputs with configurable pull-up / pull-down Numerous configuration options including switches, duress/panic alerts, pulse counting
External power detect	Digital input to microcontroller to detect when external power is present or not
2 x Analogue Inputs	0 – 5V sensing

2 x Digital Outputs	2 x switched ground digital outputs, easily wired up to switch external lights, relays, buzzers etc
On PCB temperature sensor	The PCB temperature (internal to the box) is measured and sent up as part of the tracking data
Switched 3.3V	Provide power to I2C and other sensors
I2C sensor interface	
Switched 5V	Provide power to card readers and other external sensors
TTL / Wiegand / i-button Interface	Interface to card readers and other devices
RS232	Interface to RS232 devices
Internal Buzzer	Audible alert without requiring the installation of an external buzzer.
Diagnostic LED	The LED (red) on the PCB assists with diagnostics
Flash memory	<p>64 Mbit flash memory, sufficient to store over 50,000 records.</p> <p>A flash partition will be allocated to allow the Bluetooth application to store some vehicle metadata, for example the vehicle registration number.</p> <p>Normally the data will be sent to the server immediately but if the device is out of range then there is sufficient space to ensure that no data is lost – for many weeks of driving!</p> <p>The flash memory is also used to store parameters, GPS aiding data, accident data, and other valuable information that needs to be stored.</p>

3. CONNECTORS

The G200 will contain a combination of PCB plug terminals and terminal strips for wiring.

PWR	
GND	
IGN (DI0)	
DI1	
DI2	
DI3	
GND	
AI0	
AI1	
DO0	
DO1	
GND	

3V3	
I2C SCL	
I2C SDA	
GND	
5V	
DATA0	
DATA1	
GND	
RS232 TX	
RS232 RX	

4. MICRO-CONTROLLER

UARTS

- GPS
- 3G MODEM
- IRIDIUM
- Bluetooth
- RS232
- Driver ID Card Reader

SPI

- Flash

I2C

- Accelerometer
- External sensors

A2D

- External voltage
- Battery voltage
- PCB temp sensor (MCP9701)
- AI0, AI1

ENCRYPTION MODULE

- Hardware accelerated AES-256 encrypt / decrypt enabling both cellular and Iridium data to be encrypted

5. FIRMWARE FEATURES

The G200 firmware will provide the same functionality as the existing G100 device.

Notable additions are the G200 security requirements (including key management) and the addition of the Bluetooth Smart module, both of which require further specification, costing and development work and are outside of the firmware specification for the 'standard' G100 equivalent functionality.

Firmware	
Concurrent GPS and GLONASS	Supports position tracking using both the American GPS satellites and the Russian GLONASS system concurrently . This results in fast and accurate tracking with double the number of satellites available for use.
GPS SBAS support	Allows for more accurate GPS position in Australia with new augmented data.
AssistNow Offline	Offline GPS assist data allows the GPS to predict which satellites are in orbit above it and to dramatically reduce the time-to-first-fix of the GPS, and the overall performance of the GPS, especially in 'urban canyon' or forested environments.
Auto-APN	Standard
Text Message Setup	The G200 can also be sent text messages to setup the APN, server and other details
Flexible Logging Parameters	The G200 trip logging is flexible and can be configured to log based on a variety of parameters including: <ul style="list-style-type: none"> • Elapsed time • Distance travelled • Change in heading • Change in speed • On Stationary • etc
Accident Data	The device will keep a second-by-second "black-box" recording of valuable GPS and accelerometer data for a two hour window. This data can be automatically uploaded to the server when an accident is detected, or it can be requested manually.
Driver Identification	Optional via Digital Matter RFID card reader