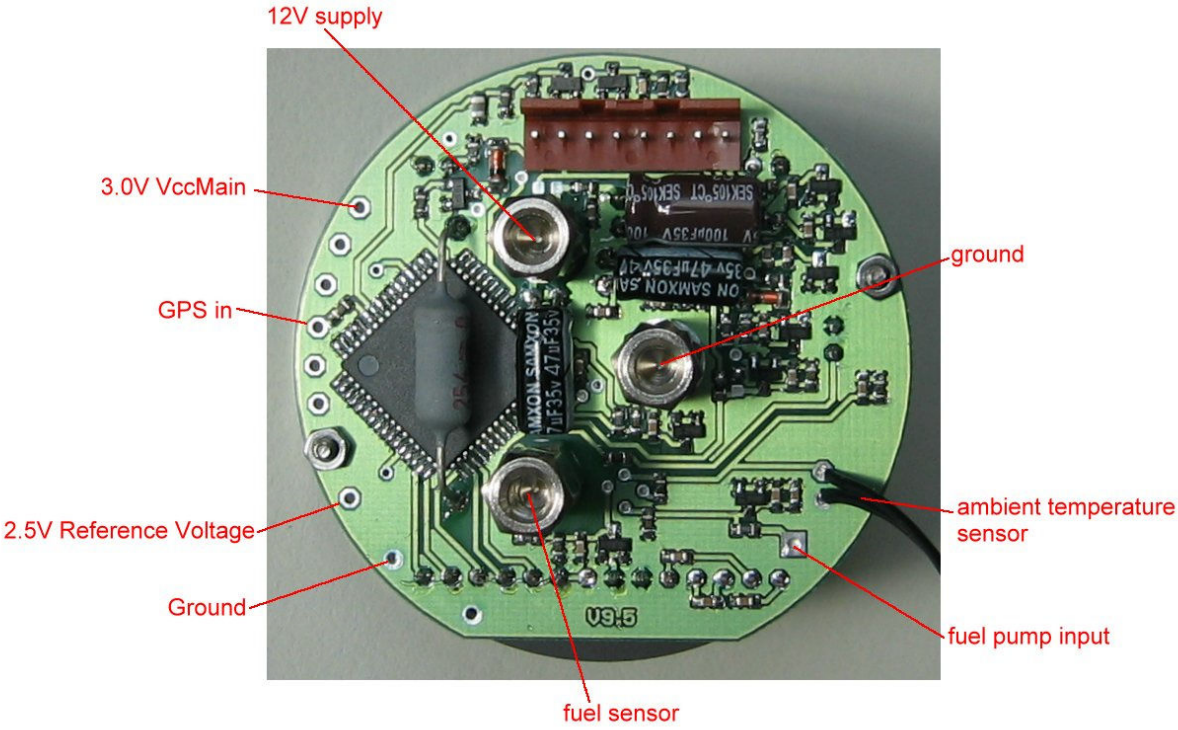
Overview

The Multi Gauge is an on-board computer for Yamaha FZS1000 (= FZ1 Gen1) motorbikes and the like. It also provides the option to connect external “add-ons” to enhance functionality.

Most popular is the addition of a GPS receiver module, the software is already prepared to decode and display the data.

Signal Connections

The following picture shows the positions of the most relevant signals.



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Adding a GPS receiver

The Multi Gauge is capable to process and display a standard GPS-NMEA signal with the following features:

- Data Signals: 3V TTL, normal logic
- Baudrate: 1200 .. 38400 Baud
- Required messages: RMC, GGA
- Supply voltage: 5V
- Update rate: 1Hz! (10Hz modules need to be re-configured before mounting!)

Those features are common for many GPS-modules.

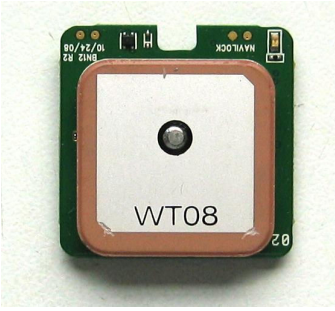
RS-232 type modules are not directly usable due to invers logic and too high amplitudes.

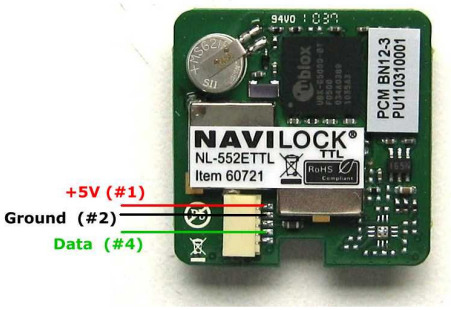
3V supply types can **NOT** be directly supplied by the Multi-Gauge as its 3V rail is not capable to deliver sufficient current! Use the cockpit's 5V and a separate 5V -> 3V converter.

Almost all GPS devices contain a (core) GPS module according to the above characteristics. In addition they have power supply, battery, USB or Bluetooth electronics, depending on application. With the right skills and tools it is possible to tap the respective signals. Using a bare GPS module instead is much easier and save.

GPS receivers also exist as bare modules, quite popular in the R/C or Arduino community. Some examples are "*Navilock NL-552ETTL*" or *OriginGPS ORG1318*. Those modules need no modification as the output is already of 3V TTL type. (Meanwhile the NL-552ETTL is out of production and succeeded by NL-652ETTL)

Navilock NL-552ETTL:



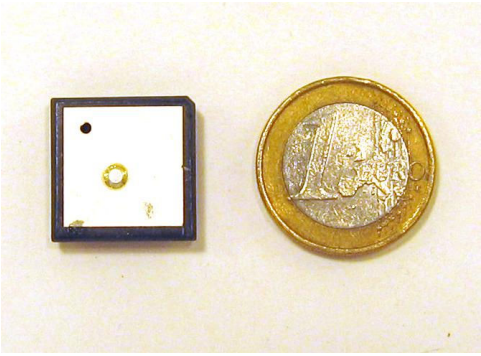


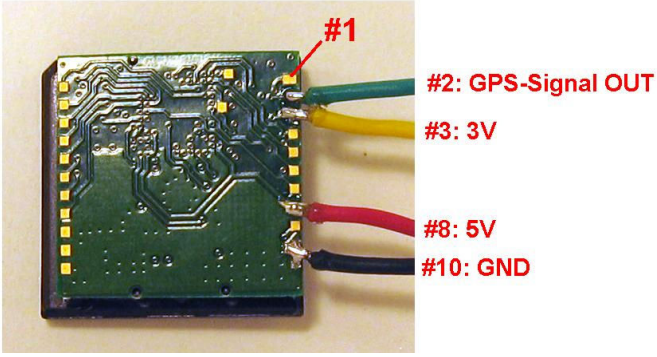
This module is my favorite as it's most simple to connect:

- 5V to ***CL8*** on cockpit.
- Ground to ***GND*** on Multi Gauge.
- Data to ***GPS IN*** on Multi Gauge.

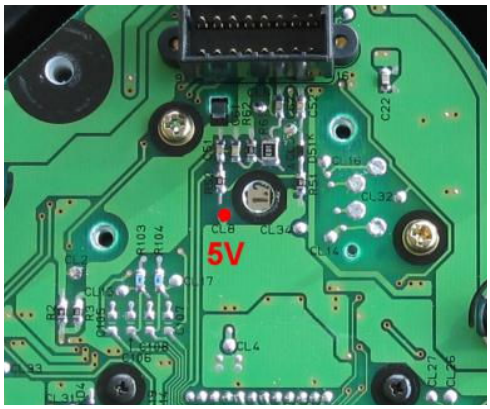
Take care to order exactly this type of module. It also exists in different flavors with USB (extension EUSB) or RS232 output (ERS), those are not usable without modifications!

Example ORG1318:

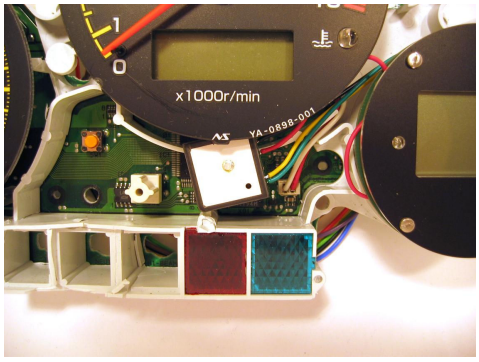




This module is very tiny. It requires an additional low current 3V supply at #3 as reference for the I/O signal level (the Multi Gauge is capable to deliver this small current from ***3.0V VccMain***).
The most simple way to get a clean and stable 5V supply is to tap the existing cockpit supply at ***CL8*** (or somewhere on the according copper plane nearby). This supply is strong enough to also support an additional GPS module.



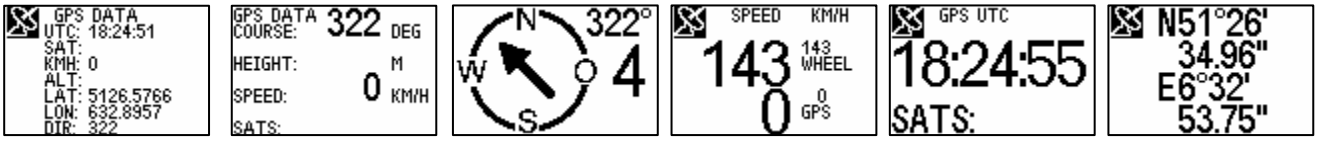
Using one of those tiny modules gives the great advantage to place it inside the cluster. This minimizes cabling and provides protection against ambient conditions. The housing's plastic is transparent for GPS signals and gives ideal receiving conditions. For electrical isolation and precaution against vibrations the module should be wrapped into some air-bubble plastic foil or alike.

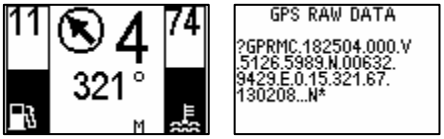


GPS support has to be enabled and set up in software in menu 2. Consult the user guide document for further details if needed. Enable, select baudrate and save. 4800 baud is a widely used standard, otherwise check others by using Plus/Minus. If set correctly the message names will be shown in the upper right corner (e.g VTG). Typically they are updated and altered every second:

The Baudrate can be fine-tuned with Up/Down, to eliminate tolerances. SAVE if finished.

The according Viewmodes will now start to display the GPS content. Depending on signal quality the antenna symbol (upper left corner) will be normal or inversed:





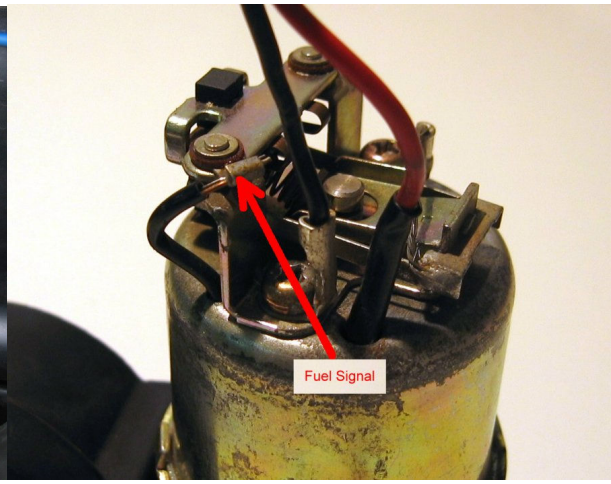
Fuel Pump Connection

The Multi Gauge is capable to count and evaluate the fuel pump's switching pulses. By also taking into account the elapsed distance the gauge calculates the fuel consumption and remaining range.

Due to the simple nature of this signal the achievable accuracy is limited.

On the Multi Gauge board the fuel pump signal has to be connected to the solder point ***Fuel Pump***. No further components are necessary, the signal conditioning and protecting elements are already placed on the board.

A new wire has to be routed (the blue one in the picture). At the fuel pump side the wire has to be connected to the black wire coming out of the pump housing.



The fuel pump signal recognition has to be enabled and configured in menu 2. The number of ***Ticks Per Liter*** can be set and fine tuned individually, if needed:

To preserve all data during ignition-off the odometer-save-function can be enabled:

The results will be displayed in the respective viewmodes: