

## Smart real-time vehicle tracking system

**Data brief**

### Features

- Real-time vehicle tracking through GPS/GSM/GPRS. Vehicle location coordinates acquired using a Telit GPS module and sent over GPRS to web server-based fleet tracking application
- The vehicle states are defined as parked, in-journey, off journey and break
- Vehicle location and status tracking on web-based GUI application using APIs by third-party map provider OpenStreetMap
- Graphical display of information including vehicle status, location coordinates, speed, distance covered, GPS strength, GSM signal strength, time and date
- Car lift alarm for anti-theft feature (sensed using MEMS)
- Black box functionality: in case of vehicle crash (detected using MEMS), vehicle status and location parameters are stored in the microSD card and a text message is sent to the admin "Mobile Number" informing of the alarming situation. The text message is sent only when the vehicle is in-journey state; in all other cases alarm notification is on the web-based GUI
- Tamper and panic detection with alarm
- Detailed web-based "fleet management system" for tracking and management of vehicle location and status. Currently supports 10 vehicles. Flexibility to add/modify/remove vehicles and drivers from the menu. Configuration of parameters as frame-rate, emergency number and over-speed value are also supported.
- Buzzer on vehicle unit for alarm indication
- On-board user switch controls various functions
- RoHS compliant

## Description

The STEVAL-IEG001V2 implements a smart vehicle tracking system reference design based on GPS/GSM/GPRS. The system is built around the Cortex-M3 STM32F20x microcontroller series.

Today, tracking and navigation systems for vehicles are extensively used all over the world by public transportation units, fleet owners as well as by individuals, and are an essential component of vehicle telematics systems.

The system consists of a vehicle unit (installed inside the vehicle) and remote web server application where the vehicle status and movement data can be viewed in an intuitive way on the map.

The vehicle unit is built around Cortex-M3 STM32 microcontroller, Telit GPS (SL869) module and SAGEM GSM/GPRS module.

The vehicle unit gathers GPS information such as location coordinates, time, date, speed, in-journey distance traveled and satellites fixed and sends the data over GPRS to the web server application. This web application displays the current location and status information of the vehicle in OpenStreetMaps. The same information is displayed locally on the graphical LCD display.

This unit features the following MEMS sensors: LIS331DLH 3-axis accelerometer and yaw/pitch/roll gyroscope L3GD20. This unit also serves as theft detection unit and senses car lift using MEMS.

In case of vehicle crash (detected using MEMS), the vehicle status and location parameters are logged within the microSD card and the same information is sent to the admin by text message, thereby implementing black box functionality.

# 1 Schematic diagrams

Figure 1.  $\mu$ SD connections

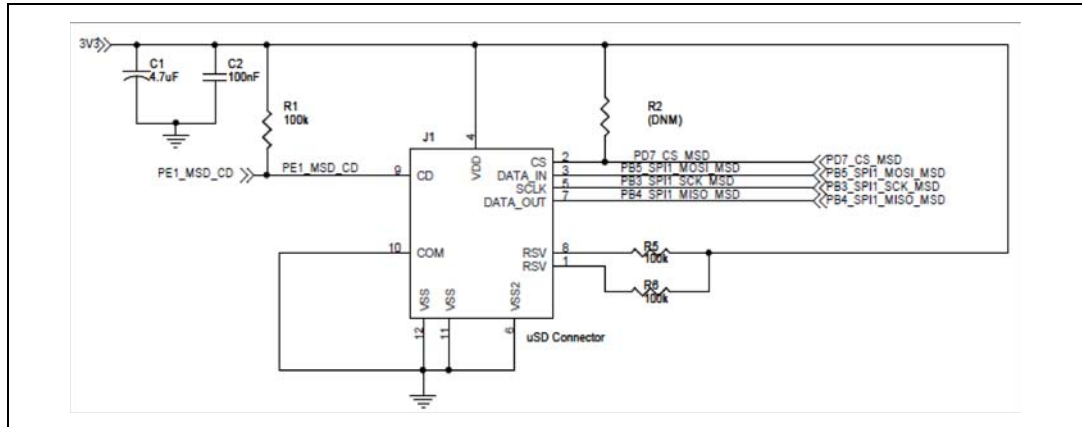


Figure 2. IrDA transceiver

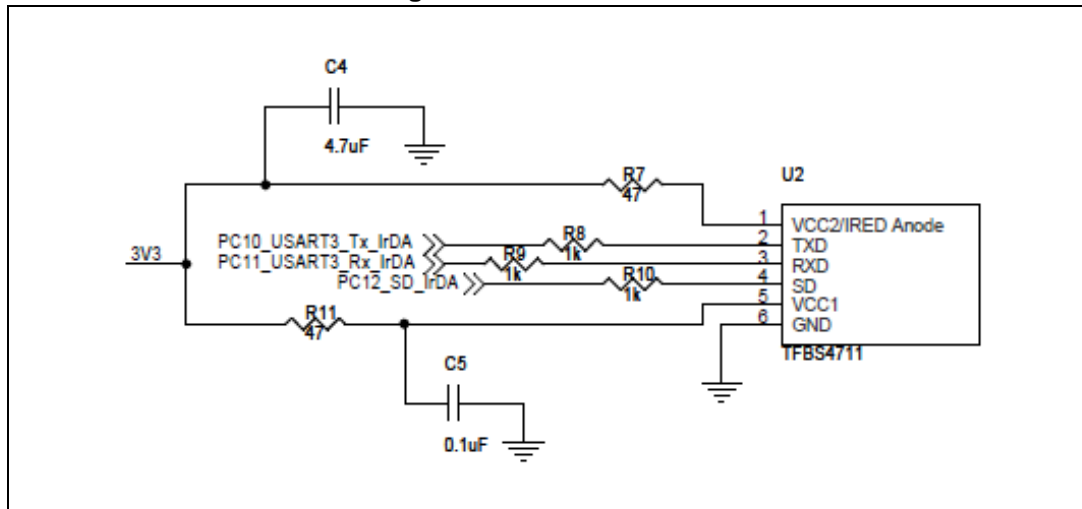


Figure 3. EEPROM section

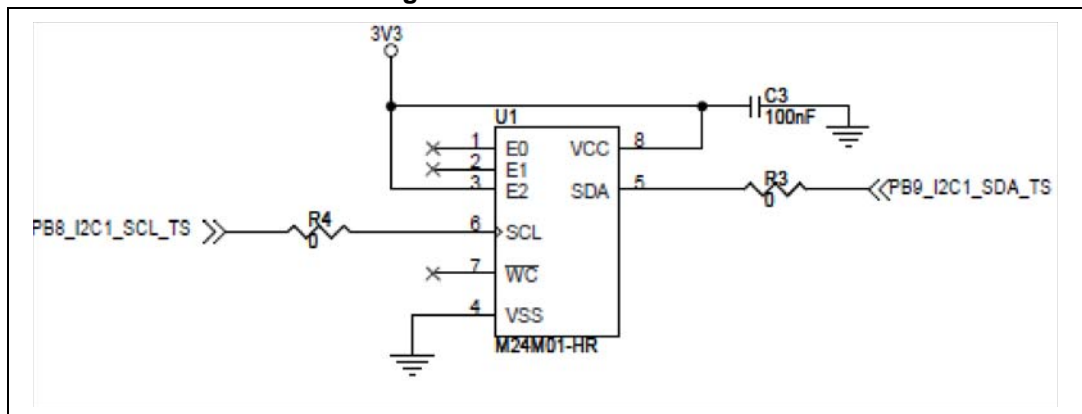


Figure 4. LCD connector on VTS motherboard

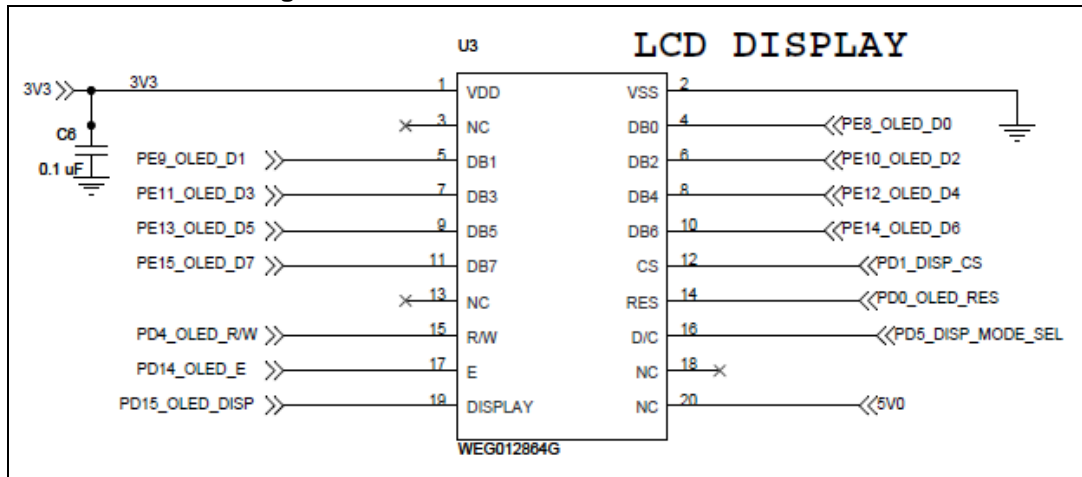


Figure 5. Graphical LCD daughter card

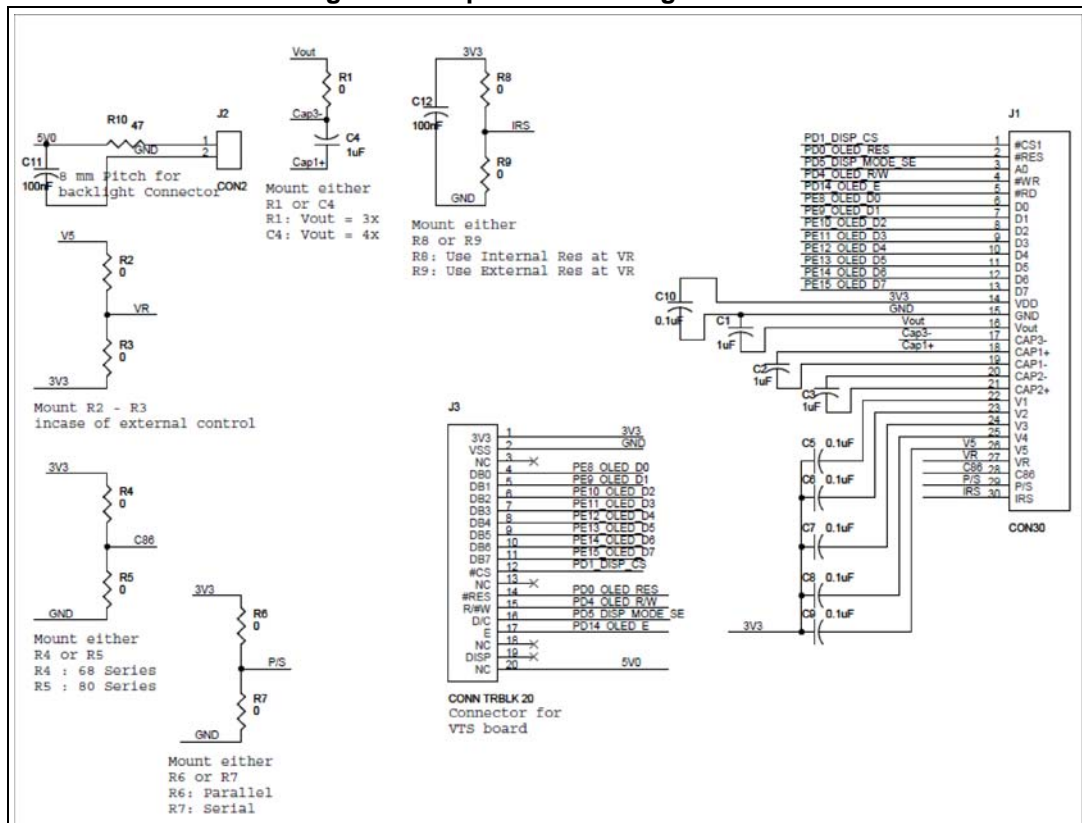


Figure 6. GPS module interface

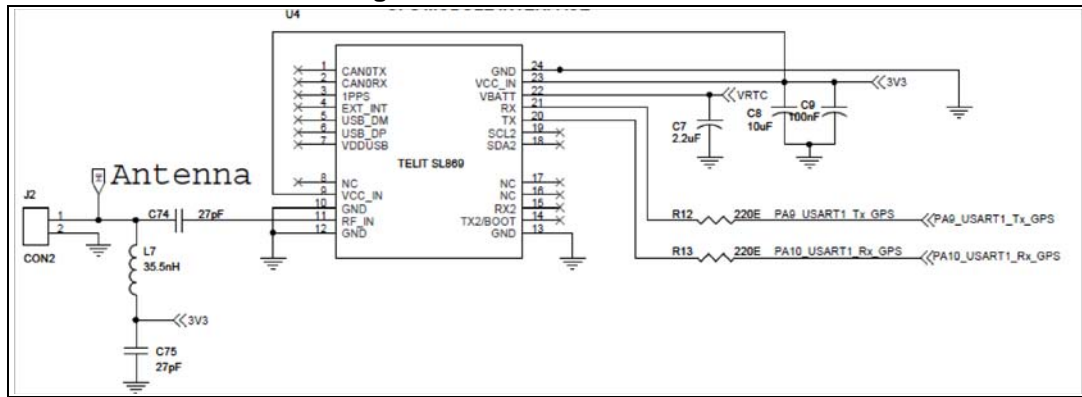


Figure 7. GSM

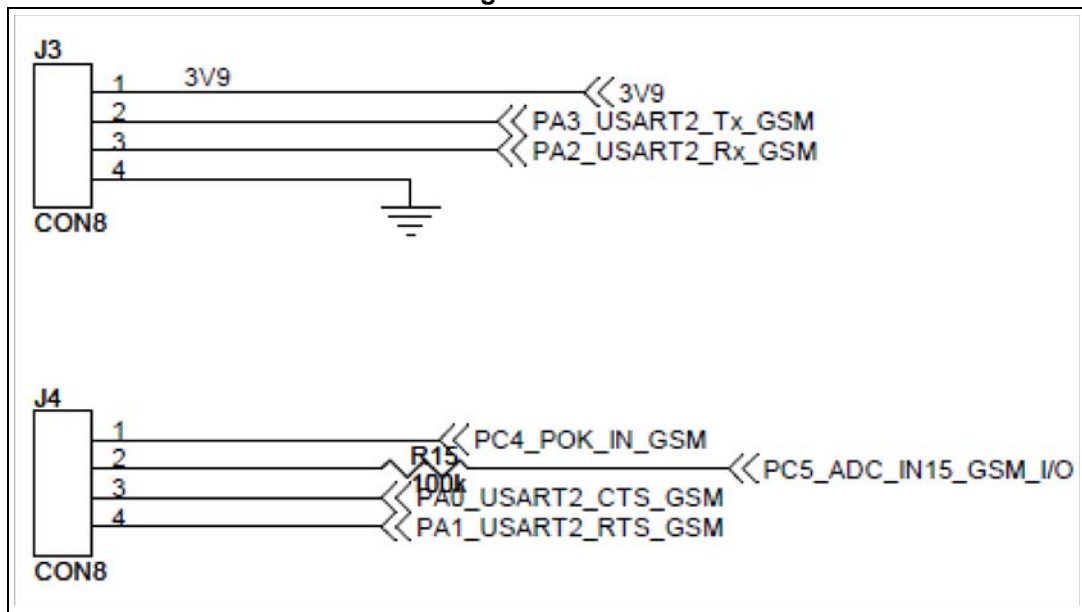


Figure 8. GSM module interface

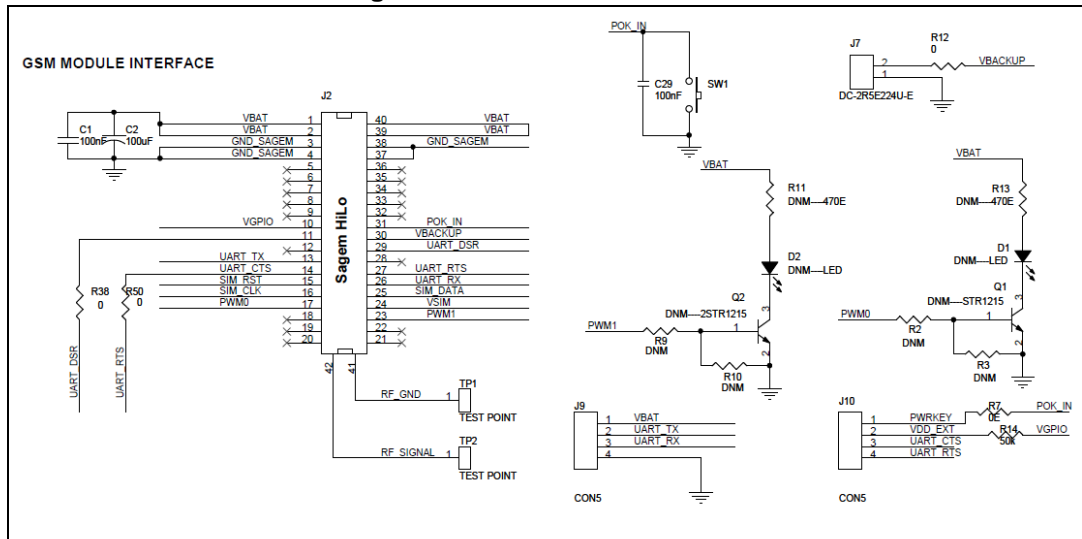


Figure 9. SIM card section

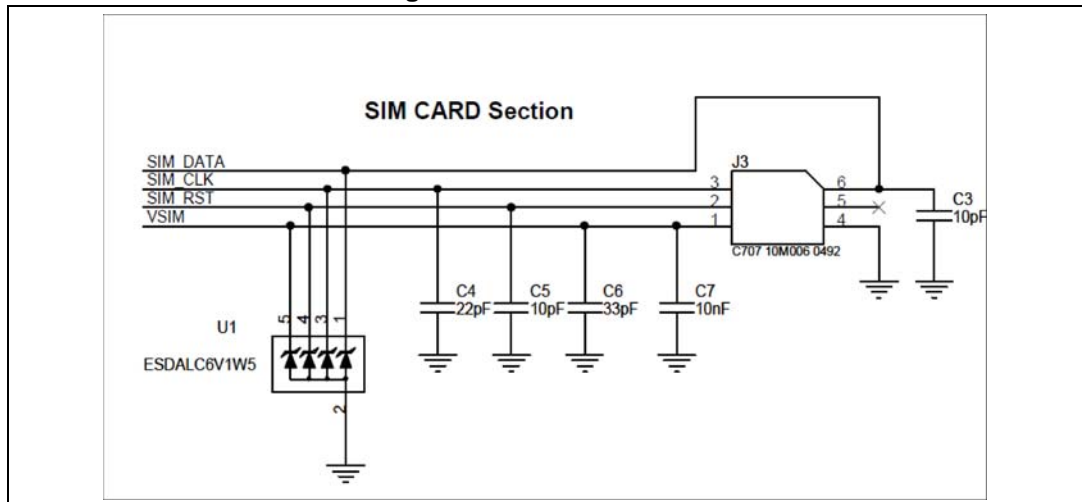


Figure 10. Compatibility between STM32F10x and STM32F20x

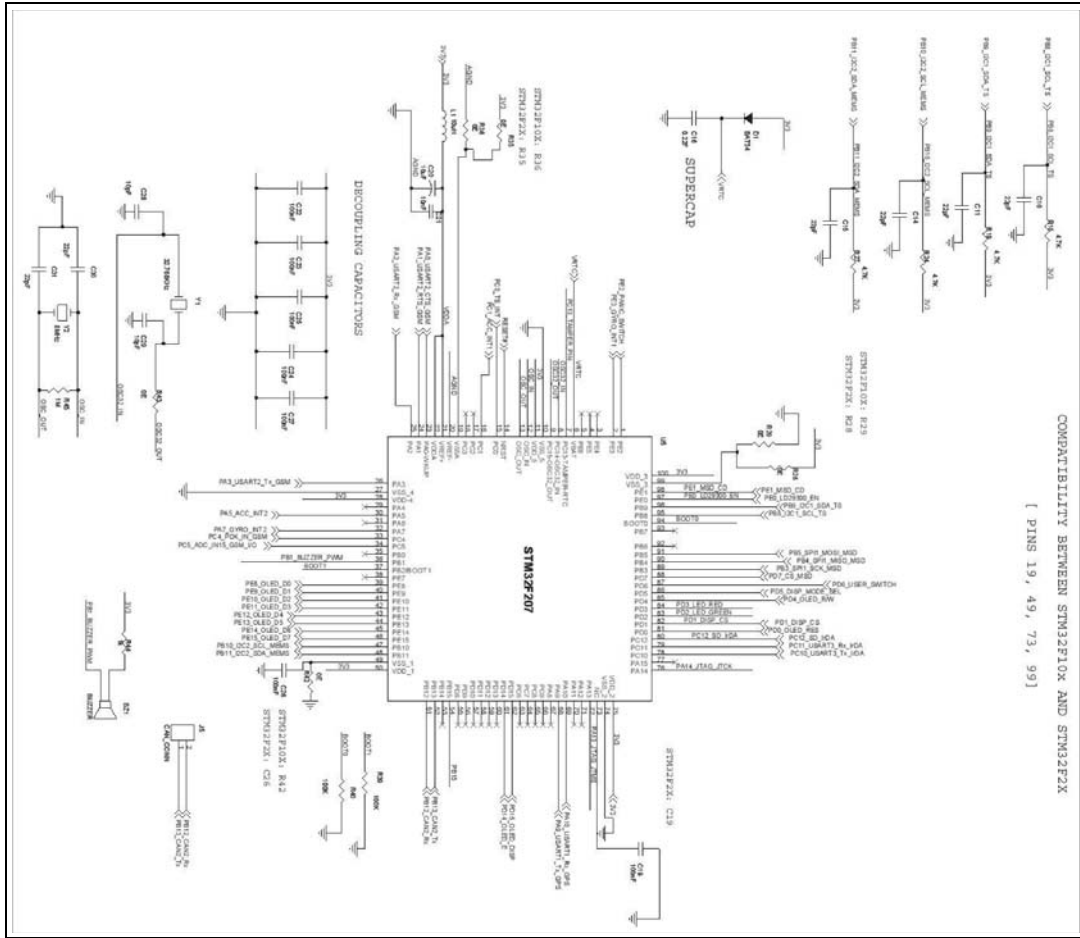


Figure 11. Switch section

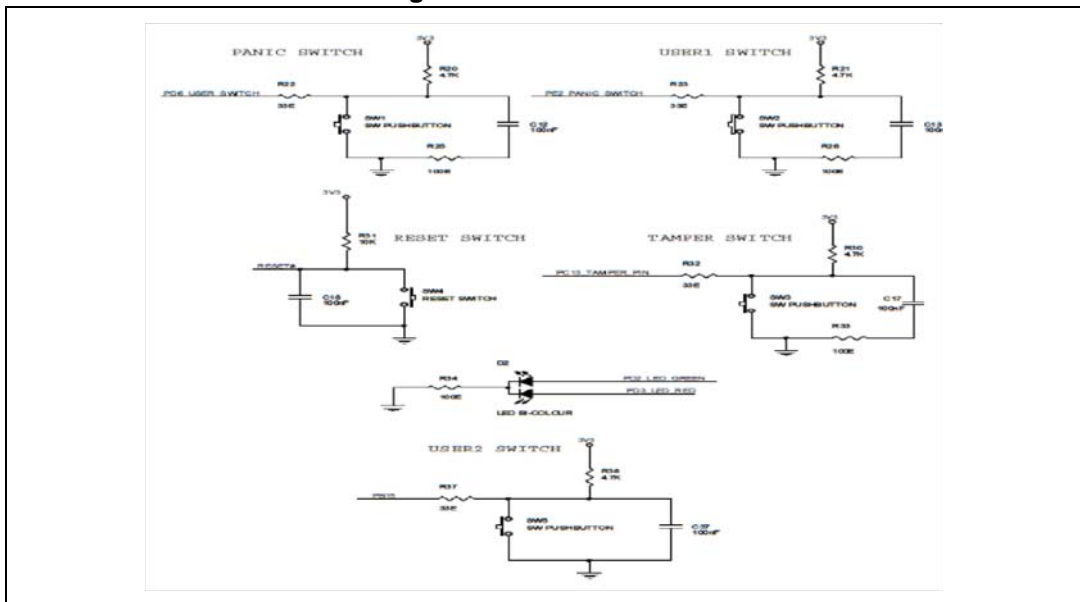


Figure 12. SWD section

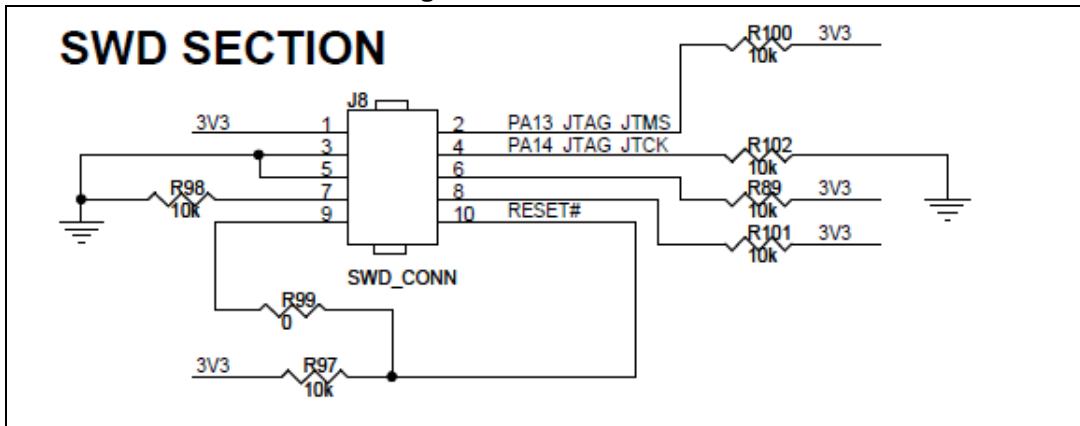


Figure 13. 5 V regulator

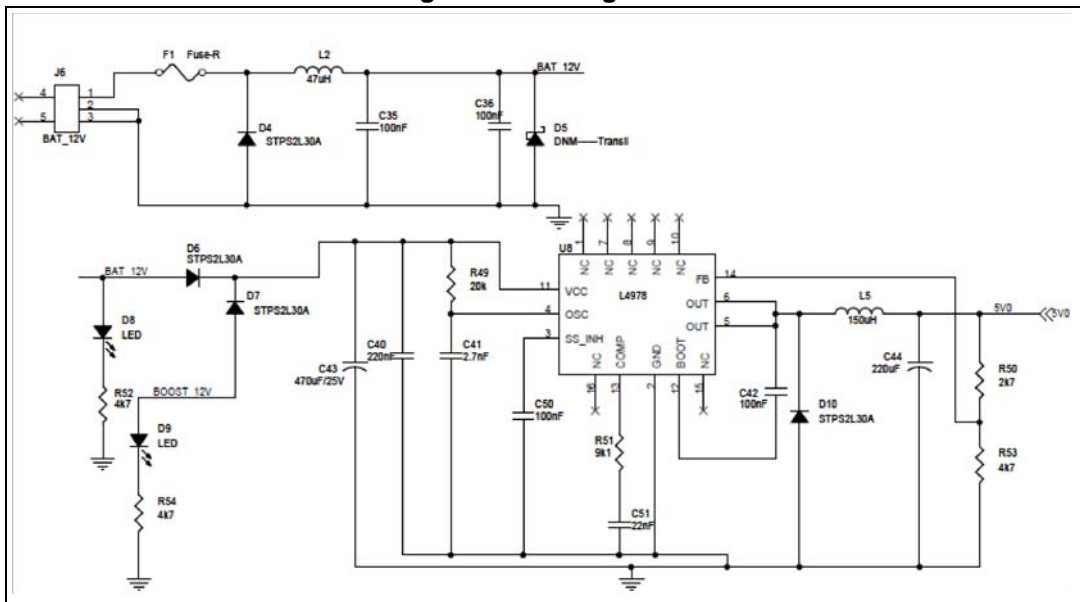


Figure 14. L6924D battery charger

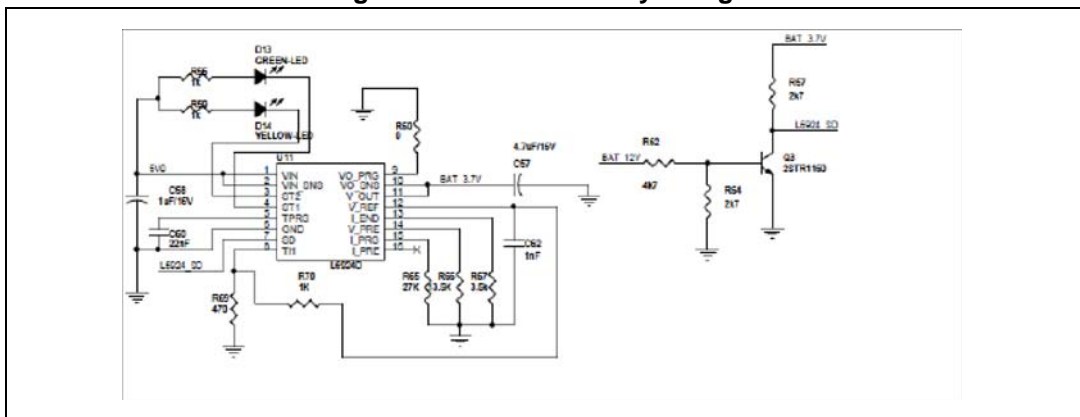




Figure 15. Voltage regulators

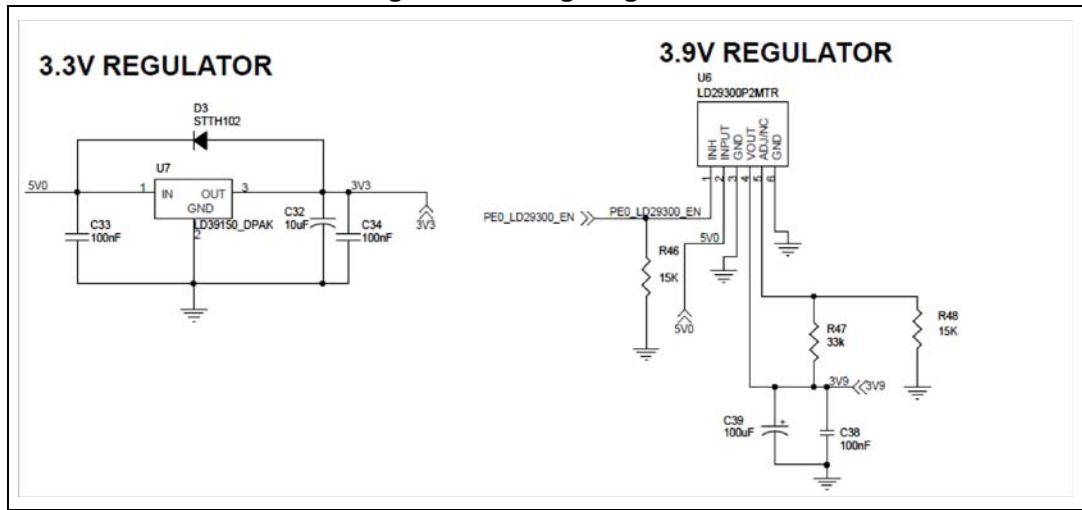


Figure 16. Gyroscope section

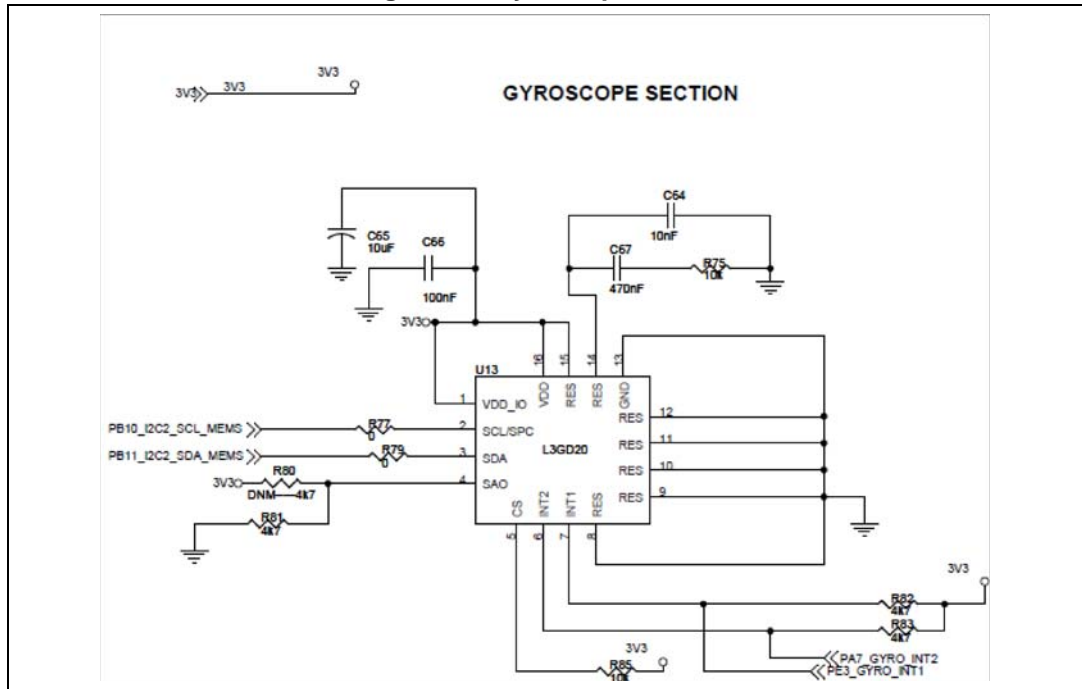


Figure 17. Temperature sensor

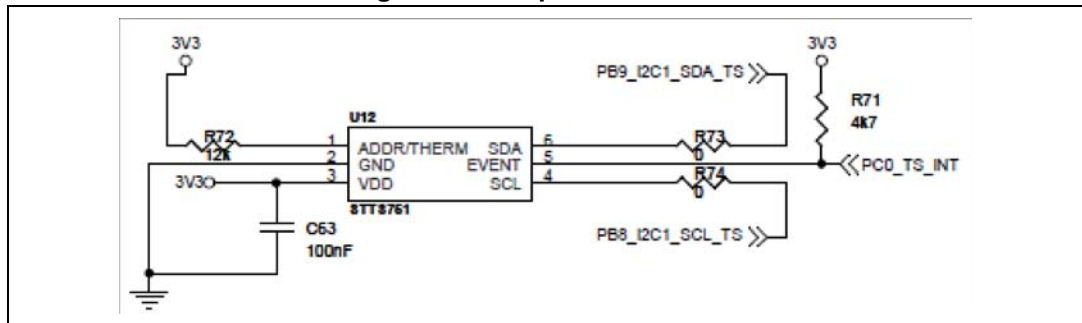
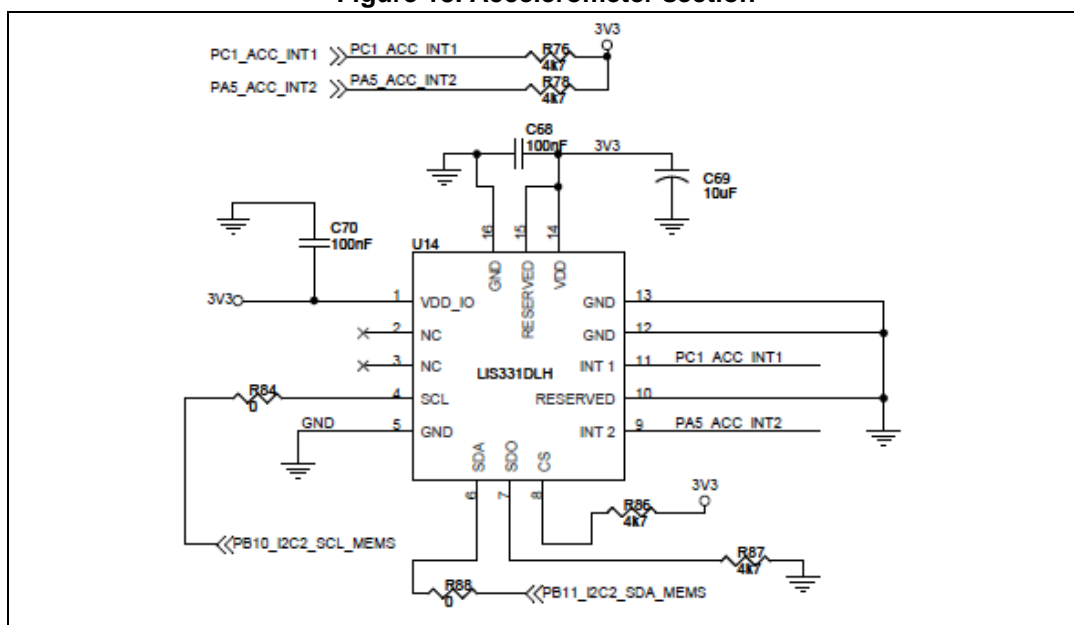


Figure 18. Accelerometer section



## 2 Revision history

Table 1. Document revision history

Date	Revision	Changes
19-Jun-2014	1	Initial release.

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