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Sparkfun SF-GPS-13740

SF-GPS-13740 Sensor GPS IC GP-20U7 User Manual

Model: SF-GPS-13740 | Brand: Sparkfun

INTRODUCTION

This manual provides detailed instructions for the setup, operation, and maintenance of the Sparkfun SF-GPS-13740 Sensor GPS IC GP-20U7. Please read this manual thoroughly before using the device to ensure proper functionality and longevity.



Figure 1: Sparkfun SF-GPS-13740 Sensor GPS IC GP-20U7 module. This image shows the compact GPS module with its integrated GP-20U7 chip, connected to three wires (red, black, white) ending in a white connector. The module itself is green with a silver component labeled "GP-20U7 S/N: 106080455".

PRODUCT OVERVIEW

The SF-GPS-13740 is a compact GPS module designed for integration into various electronic projects requiring precise location data. It features the GP-20U7 GPS IC, known for its reliable performance and low power consumption. This module is ideal for applications such as navigation, tracking, and time synchronization.

Key Features:

- Integrated GP-20U7 GPS IC
- Compact form factor
- Low power consumption
- Reliable satellite acquisition

- Easy integration with microcontrollers

SPECIFICATIONS

Attribute	Value
Model Number	SF-GPS-13740
GPS IC	GP-20U7
Dimensions (Package)	8 x 4 x 2 cm
Weight (Package)	10 g
Manufacturer	SPARKFUN ELECTRONICS INC.

SETUP AND INSTALLATION

Proper setup is crucial for the optimal performance of your SF-GPS-13740 module. Follow these steps carefully:

1. **Power Connection:** Connect the red wire to your power supply's positive terminal (typically 3.3V to 5V DC) and the black wire to ground (GND). Ensure the voltage is within the module's operating range to prevent damage.
2. **Data Connection:** The white wire is typically for data transmission (e.g., UART TX or RX, depending on the specific pinout). Refer to the module's datasheet for exact pin assignments and connect it to your microcontroller's serial communication pins.
3. **Antenna Placement:** For best GPS signal reception, ensure the module has a clear, unobstructed view of the sky. Avoid placing it near large metal objects or other electronic components that might interfere with the signal.
4. **Software Configuration:** Integrate the appropriate GPS library or code into your microcontroller project. Most GPS modules communicate using NMEA 0183 protocol.

Note: Always consult the official Sparkfun datasheet for the SF-GPS-13740 for detailed pinouts and electrical characteristics specific to your module revision.

OPERATING INSTRUCTIONS

Once the SF-GPS-13740 module is correctly wired and powered, it will begin searching for GPS satellites. The time to first fix (TTFF) can vary depending on environmental conditions and whether the module has a hot, warm, or cold start.

Acquiring GPS Data:

- **Power On:** Apply power to the module. An indicator LED (if present) may blink to show activity.
- **Satellite Acquisition:** The module will automatically scan for available GPS satellites. This process can take from a few seconds (hot start) to several minutes (cold start).
- **Data Output:** Once a sufficient number of satellites are acquired, the module will start outputting NMEA sentences via its serial interface. These sentences contain various data points such as latitude, longitude, altitude, speed, time, and satellite fix status.
- **Parsing Data:** Your microcontroller or processing unit will need to parse these NMEA sentences to extract the desired information. Libraries are available for most programming environments (e.g., Arduino, Python) to simplify this process.

Common NMEA Sentences:

- \$GPGGA: Global Positioning System Fix Data (Time, Position, and Fix related data).
- \$GPRMC: Recommended Minimum Specific GPS/Transit Data (Time, Date, Position, Course, Speed).
- \$GPGSV: GPS Satellites in View (Number of satellites, PRN, Elevation, Azimuth, SNR).

MAINTENANCE

The SF-GPS-13740 module is designed for low maintenance. However, following these guidelines can help ensure its longevity and reliable performance:

- **Environmental Protection:** Protect the module from extreme temperatures, humidity, dust, and direct water exposure. If used outdoors, enclose it in a weather-resistant casing.
- **Connection Integrity:** Periodically check all wire connections to ensure they are secure and free from corrosion or damage.
- **Firmware Updates:** While not typically user-updatable for this type of module, check Sparkfun's official product page for any relevant firmware updates or application notes that might improve performance.
- **Cleaning:** If necessary, gently clean the module with a soft, dry, anti-static cloth. Avoid using liquids or abrasive cleaners.

TROUBLESHOOTING

If you encounter issues with your SF-GPS-13740 module, refer to the following common problems and solutions:

Problem	Possible Cause	Solution
No GPS Fix / No Data Output	<ul style="list-style-type: none">◦ Insufficient power supply◦ Incorrect wiring◦ Poor satellite visibility◦ Incorrect serial communication settings (baud rate, etc.)	<ul style="list-style-type: none">◦ Verify power supply voltage and current.◦ Double-check all connections against the datasheet.◦ Move the module to an open area with clear sky view.◦ Ensure your microcontroller's serial port settings match the module's default (e.g., 9600 baud).
Inaccurate Position Data	<ul style="list-style-type: none">◦ Limited number of satellites acquired◦ Multipath interference◦ Poor antenna placement	<ul style="list-style-type: none">◦ Wait for more satellites to be acquired (check HDOP/VDOP values in NMEA data).◦ Relocate the module away from reflective surfaces.◦ Optimize antenna orientation and clear line of sight.
Module Not Responding	<ul style="list-style-type: none">◦ Power issue◦ Hardware damage	<ul style="list-style-type: none">◦ Check power connections and voltage.◦ Inspect the module for visible damage. If damaged, replacement may be necessary.

SUPPORT AND RESOURCES

For further assistance, technical documentation, and community support, please refer to the official Sparkfun resources:

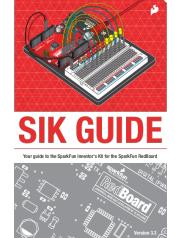
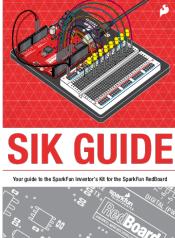
- **Product Page:** Visit the Sparkfun website for the SF-GPS-13740 product page for the latest datasheets, hookup guides, and example code.

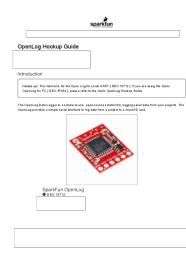
- **Forums:** Engage with the Sparkfun community forums for project ideas, troubleshooting tips, and peer support.
- **Contact Support:** If you require direct technical support, please contact Sparkfun customer service through their official channels.

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Related Documents - SF-GPS-13740

	<p>SparkFun Inventor's Kit SIK Guide: Your Introduction to Electronics and Physical Computing</p> <p>Explore the world of electronics with the SparkFun Inventor's Kit (SIK) for the SparkFun RedBoard. This comprehensive guide provides step-by-step instructions for 16 circuits, teaching programming, physical computing, and DIY electronics for beginners and educators.</p>
	<p>SparkFun Inventor's Kit SIK Guide: Learn Electronics with RedBoard</p> <p>Explore 16 hands-on circuits with the SparkFun Inventor's Kit for the RedBoard. This guide provides step-by-step instructions for beginners to learn electronics, programming, and physical computing using Arduino.</p>
	<p>SparkFun Inventor's Kit SIK Guide: Learn Electronics with RedBoard</p> <p>A comprehensive guide to the SparkFun Inventor's Kit for the SparkFun RedBoard, covering 15 circuits to teach embedded electronics, programming, and physical computing. Ideal for beginners.</p>
	<p>Getting Started with SparkFun Blynk Board and Blynk App</p> <p>A step-by-step guide to setting up the SparkFun Blynk Board with the Blynk mobile application, covering project creation, hardware selection, and Wi-Fi connection.</p>

	<p>SparkFun OpenLog Hookup Guide: Serial Data Logging with Microcontrollers</p> <p>A comprehensive guide to setting up and using the SparkFun OpenLog, an open-source serial data logger. Learn how to connect it to microcontrollers like Arduino, configure firmware, and utilize its command set for data logging projects.</p>
	<p>SparkFun Tinker Kit Circuit Guide: Your Introduction to Electronics and Programming</p> <p>Discover the SparkFun Tinker Kit, an educational electronics toolkit. This guide offers 11 circuits with the RedBoard Qwiic, teaching programming, robotics, and physical computing for beginners.</p>