



GlobalTop Technology Inc.

# GPS RF Interference Problem Check Guideline

Revision: A01



Reference layout, design tips, guides, and cautions for GlobalTop GPS modules.

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## Version History

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**Title:** GlobalTop GPS Module Application Notes

**Subtitle:** GPS Module

**Doc Type:** Technical Document

**Doc Id:**

Revision	Date	Editor	Description
A00	2010-12-31	Gavin	First Release



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## Attention

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**Please read carefully before you start:**

- Global Positioning System (GPS) is the property of American Ministry of National Defense, and they held full responsibilities in regard to the preciseness and the maintenance of the entire system. Any changes they have made may have significant impacts on the capabilities and preciseness of GPS.
- If you use GPS receiver inside buildings, tunnels, or besides any huge objects, the GPS signals might be cut-off or disturbed. Please do not assume the receiver has malfunctioned.
- This application note provides the necessary guideline to successfully design a system using GPS modules. For detailed module specification, please refer to the corresponding datasheet of GPS module.
- GPS Module is an electrostatic sensitive device, please don't touch GPS module directly, please follow ESD safety rule when handling.
- For the first time, it is strongly recommended to bring the device, using GPS module, outdoor with under open sky for at least 10 to 15 minutes to ensure 3D position fix and almanac update.



## Technical Support

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If you have any technical problems or cannot find the required information in our documents, please feel free to contact us for technical support. Below is a list of information which you can provide that will be very useful to us in determining source of the problem and the necessary solution:

1. Your company name and website
2. Description about application and system
3. GPS module type
4. GPS firmware version
5. Description of the question or problems encountered, together with pictures or videos files
  - Test setup
  - The problem or issue shown in pictures

**Technical contact information:** [support@gtop-tech.com](mailto:support@gtop-tech.com)

## 1. Introduction

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GlobalTop has a variety of GPS modules designed for many different applications. The modules are classified into two major families: FGPMOSLx and its successor the **Gmm-xx** family, or the FGPMOPAx and its successor the **Gms-xx** family (where x denotes the model number). The major difference between these two families is the inclusion of smart patch antenna. PA / Gms comes with the ceramic antenna, while SL / Gmm does not. These GPS modules provide a complete GPS solution that excels in position, speed, and accuracy performances as well as high in sensitivity and tracking capabilities in urban environment. The GPS module are powered by MediaTek Inc. GPS chipset, the world's leading digital media solution provider and largest fab-less IC Company in Taiwan. GlobalTop's GPS solutions are suitable for assortment of devices, even small-form-factor ones.

## 2. Guideline for RF Interface Debugging

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In order to obtain good GPS performances, there are some rules which require attentions for using GPS module, about the detail, please refer to the "Gtop Module Application Note" document .

The chapter will introduce some guideline about RF interface debugging, Users can follow the guideline to check possible cause or problem in your design.

About RF in band interference, there are still two kinds of interference to interfere GPS signal reception .

### 1. The interference from Air to Patch antenna

Use a simple pickup antenna or EMI pickup antenna to know what signal on the top of the GPS module. For other RF system, because the RF band was clear divide by application, there is no way to interfere the GPS.

The most possible SOURCE are

- a. Clock harmonic generated from baseband processor of other RF system
- b. Clock harmonic generates from other digital processor or clock

Base on #a and #b, if customer can learn where interference from, then place a shield plate on the top of noise source, you can monitor the change status of GPS reception when you try to obstruct the interference signal . The GPS C/N value will be improved. You also know the noise source for design improvement. (Figure 1 )

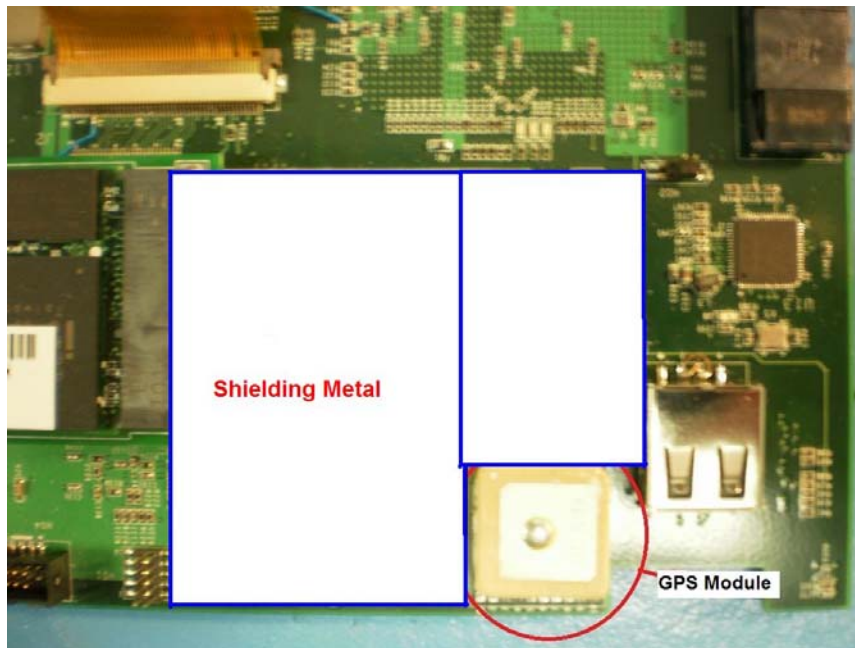


Figure 1:Use shielding plate to find the interference signal source

## 2. Interference from MB through VCC(any DC power line), D+ D- trace or PCB

- a. Using some ferrite bead in Power VCC line to prevent invisible noise
- b. Use common mode choke filter (near GPS module) to isolate GHz noise for USB trace.(because USB trace always rout far and through some Digital process)
- c. Solder module side metal case to other GROUND( such as USB connector housing, or to improve stronger Ground.

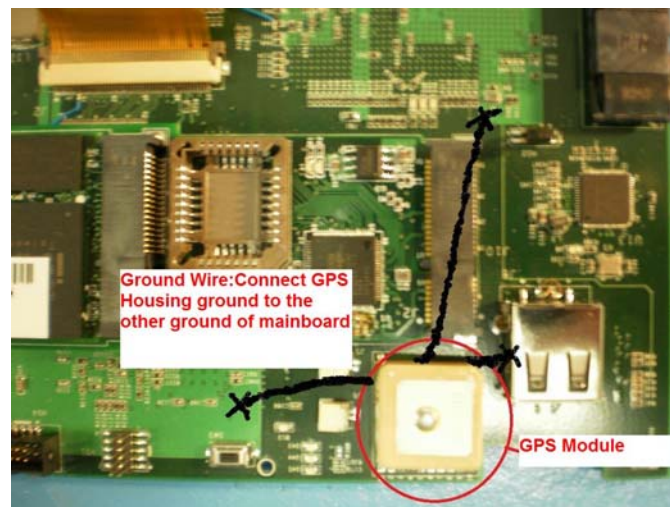


Figure 2 , Solder module side metal case to other GROUND

In general case, the Fig 1 will improve total performance easily if it is difficult to distinguish the noise source. Of course the metal plate, have to connect to GND in electric.