

Round Solutions GPS usage application note

Introduction

Choosing the right GPS receiver it's not an easy decision. There are three main aspects which influences the decision making:

- Application needs
(performance like TTFF, battery running time, internal vs. external antennas, etc)
- Forecast of production volume
(high volume → SMT/BGA, low volume → connector version)
- Budget size for developing
(less budget → less complex design)

The following remarks try to give some ideas which considerations should be made using exemplary application cases. The focus will be here more on the required feature set than on the commercial issues. The following table will give a quick overview which modules and which application cases fits well together.



	Telit GM862GPS	Telit GE863GPS	AarLogic C01/3	AarLogic C05/3	AarLogic C10/3	AarLogic GPS 3M	AarLogic GPS 3T	AarLogic GPS 3L
(1) Asset tracking	+	+	+	+	+	+	++	++
(2) People tracking	-	o	-	-	-	++	++	++
(3) Animal tracking	-	o	-	-	-	++	++	++
(4) Car/Truck tracking	+	+	+	++	+	+	+	+
(5) Bus tracking	o	o	o	o	o	++	o	o
(6) Marine tracking	o	o	o	o	o	++	o	o
(7) Student project	++	-	+	++	+	-	o	+
(8) Container tracking	+	+	+	+	o	++	++	++

Explanation: ++ ideal application
+ requirements well met
o limitations in application
- not recommended

1 Asset tracking

1.1 Description:

Tracking of small to medium sized devices like medical equipment, notebooks, expensive tools etc.

1.2 Device Requirements:

Small to medium enclosure size, rechargeable & non rechargeable battery, indoor capability of the GPS receiver, embedded antennas, concurrent usage of cellular communication (GSM, GPRS) and GPS → SAW filters needed

→ *small design with low power consumption, high complexity of design due internal cellular and GPS antennas.*

1.3 Remarks:

The choice of the receiver model depends very much on the quantity. For smaller quantities (<250) the integration of modules with connector (like GM862-GPS, AarLogic GPS 3L, AarLogic C05/3) is less complex than SMT/BGA versions.

AarLogic GPS 3M and 3L are designed for usage together with cellular communication systems.

Combined GSM/GPS modules by Telit don't provide LNA and SAW filter, therefore the SAW filter has to be placed at the active antenna. Please take care that irradiation of GSM signals at the connection between GPS antenna and GSM/GPS module must be avoided.

2 People tracking

2.1 Description:

Personal handheld tracking & navigation devices and mobile phone with GPS functionality.

2.2 Device Requirements:

Very small size, powered by rechargeable battery, long battery life, thus very low power consumption, low weight, small embedded antennas, display & keypad, processing power for GUI

→ *small design with very low power consumption, high complexity of design due internal cellular and GPS antennas.*

2.3 Remarks:

In most cases small form factor and lowest energy consumption are the key requirements for personal tracking/navigation devices.

Smallest form factors can be reached using the GE863-GPS or one of the AarLogic GPS family (3M, 3T, 3L) together with the GE864. The most flexible solution is a combination of a separate GSM, GPS module and μ -controller (for example AarLogic GPS 3M + GE864) because:

- the GPS antenna can be freely chosen (active or passive, size, position) and

- both modules can be switched off separately for lowest energy consumption

The usage of the combined GPS modules GPS 3T and GPS 3L reduces complexity of the design because the GPS antenna & receiver part comes "ready to go". The usage of the GE863-GPS provides easy communication between GSM and GPS part but need some extra attention if internal/embedded antennas are used.

For premium/high performance application scenarios A-GPS capability can be useful to reduce the TTFF (TTFF taxes end customers patience)

3 Animal tracking

3.1 Description:

Tracking of animals or pets, for example locating run away pets.

3.2 Device Requirements:

Very small size, powered by rechargeable battery, long battery life → thus very low power consumption, low weight, small embedded antennas, protection against dust & water.

→ *small design with very low power consumption, high complexity of design due internal cellular and GPS antennas.*

3.3 Remarks:

Same as for people tracking on page 2

4 Car/Truck tracking

4.1 Description:

Tracking, navigation & fleet management systems for cars. Internal as well as external antenna are appropriate.

4.2 Device Requirements:

DC/DC voltage converter reducing the 12 or 24V car, for Europe "e approval" (European guideline 72/245/EWG)

4.3 Remarks:

The choice of the right GPS receiver depends mostly on the specified customer requirements (antenna, energy consumption, etc.). The AarLogic C05/3 can help reducing development complexity because it already comes with a integrated DC/DC voltage converter.

5 Bus tracking

5.1 Description:

Tracking, navigation & fleet management systems for buses.

5.2 Device Requirements:

External antenna with long cable (>5m)

5.3 Remarks:

Long cables from the GPS receiver to the external antennas causes a loss of signal due to the loss of the cable and the linear loss of supply voltage to the antenna. This loss can be compensated by increasing the supply voltage of the external antenna. This can be reached by manual control of the antenna supply voltage. The GPS 3M module can handle external controlled supply voltage for active antennas.

6 Marine tracking

6.1 Device Requirements:

External antenna,

6.2 Remarks:

If the GPS antenna will be mounted on a mast the same consideration as for bus tracking applies due to the long cable between GPS antenna and receiver

7 Student/Research projects

7.1 Description:

Scientific project, feasibility studies

7.2 Device Requirements:

Fast setup → "Plug and play", simple connection of antennas, simple mounting of the module

7.3 Remarks:

The GM862-GPS is well suited for small projects, because the module can easily be changed due to its molex connector. The AarLogic C05/3 makes the start up easier because it comes with an integrated DC/DC converter. For quick test no soldering is needed.

8 Container tracking

8.1 Description:

Tracking of containers

8.2 Device Requirements:

Very long battery life ,protection against dust&water

8.3 Remarks:

Due autonomous operation without external power supply, low power consumption is one of the most important design characteristics. Therefore independently controlled GPS & communication parts are a must.