GPS Dome Model T

Installation Manual

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Introduction

This guide details a generic instruction for the installation and operation of the GPS DOME Model T. This guide has been written for static application although GPS DOME model T may be used in a range of applications.

Overview

GPS DOME Model T (see Figure 1) is a compact, light-weight GPS anti-jamming module, designed to prevent loss of position fix and time in the presence of certain types of jammers and spoofers. The unit may be installed on a range of installations that rely on GPS and includes all elements required to connect to the GPS receiver.

Two active GPS antennas are connected to the SMA RF connectors; the primary and auxiliary antenna inputs. The RF Output provides connection to the input of the GPS Receiver.

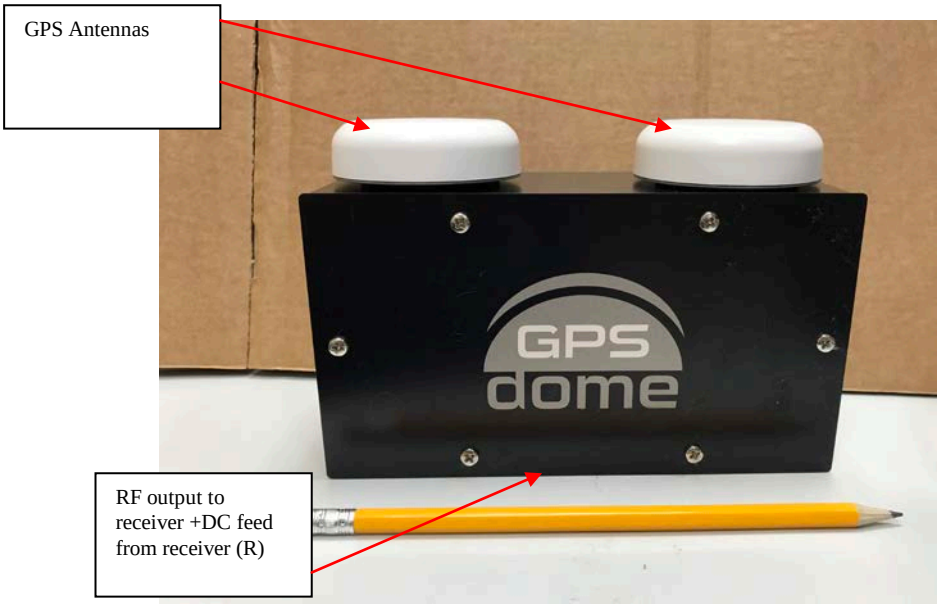


Figure 1: GPS Dome – General view

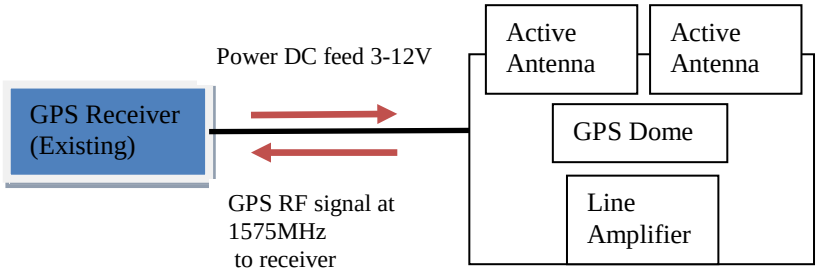
Cautions

(1) **The GPS DOME module should be mounted on a 3/4" pole where possible and secured using the pole connecting hole.**
(2) **To prevent damage to any cable assemblies used in this installation, ensure that cables are not bent, deformed or snagged to cause damage to the internal wiring or the connector ends.**
(3) **This product is a high-tech electronics module; we recommend installation is undertaken by a professional.**
(4) During installation ensure there is NO power applied to the module. Make sure the GPS receiver is not powered.

Installation

GPS Receiver System with GPS Dome

The GPS DOME model T is integrated into the static GPS receiver as shown in Figure 2.
The GPS DOME module is enabled/disabled automatically by the GPS receiver. It operates independently with a GPS Receiver and without the need for an external controller.



Figur 2: GPS Receiver with GPS DOME Model ZTIntegrated

TNC Cables Connectors

To prevent the risk of moisture ingress, it is recommended that a cable with high quality sealed (IP-67) TNC connectors is used to connect between the GPS DOME Model T and the GPS receiver unit. The cable must be of a high RF specification, and a good double shielded cable is recommended, such as Times Microwave LMR-100A-PVC. Single shielded coaxial cable is not suitable.

Installation Procedure

Before commencing the installation procedure read the **CAUTIONS** detailed on page 3. The following instructions are provided to install the GPS DOME Model T system:
NOTES:

(1) Installation and methods used to secure the GPS DOME Model T system may vary depending on the place of installation and cable's availability.
(2) Use general purpose tools to carry out this installation procedure unless specific tools are called up in text.
(3) The GPS DOME Model T is composed of elements that are IP67 certified as long as the recommended TNC connector is tightened to the correct torque and the cable is sealed using the correct sealant.

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Step 1. With reference to Figure 3, carry out the following:

a) Open the front panel of the Model T

b) Mount the unit on top of the 3/4" pipe using 2 nuts and a spring nut. Make sure the RF cable is coming through the pipe to the unit.

c) Connect the cable to the line amplifier (if the unit does not have a line amplifier, add a TNC-SMA adapter ang connect it to the GPS Dome module).

d) Allowing for ease of cable connection, Close the front cover using the 6 scews.

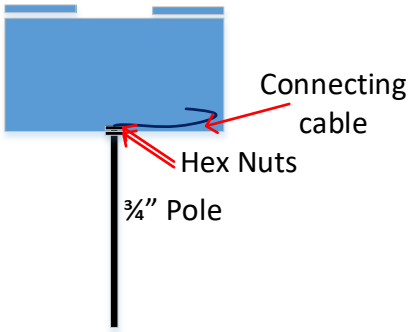

Figure 3: GPS Dome Model T Mechanical Interface

To prevent damage to any cable assemblies used in this installation, ensure that cables are not bent, deformed or snagged to cause damage to the internal wiring or the connector ends.

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Tips:
There are large variations in the performance of GPS receivers supplied by different manufacturers. GPS DOME adds an anti-jam capability to all receivers, but the overall anti-jam performance of the combined system will depend on performance characteristics of the receiver.
GPS DOME reduces jamming signals that enter the receiver through the antenna port. However, a poorly-designed receiver can also absorb the jamming signal through the body of the receiver itself. A good receiver will have EMC shielding to prevent leakage of RF radiation through its sides; if this is not the case, and a better receiver can't be used, install the receiver in a shielded case.

General Operation

The GPS DOME module operates without manual intervention.
Two LEDs located on the GPS DOME module, provide the following indications:

- LED 1 - When the module is powered ON and operating correctly; a green LED is illuminated.
- LED 2 – When the presence of a jamming event is detected; a red LED is illuminated.

If the GPS DOME system fails to operate correctly refer to Troubleshooting on page 12.

Maintenance

GPS DOME does not contain any user-serviceable parts and contains no moving parts. With reference to the CAUTIONS on page 3, no maintenance is required apart from examining all the cable assemblies for secure connection, damage and corrosion.

Troubleshooting

Nothing is working and my GPS receiver does not acquire lock

Complete the following steps, in order:

- Make sure the receiver provides enough DC power to the GPS Dome Model T (3-12VDC with 0.8W power). If not' connect an appropriate Bias Tee unit (like Minicircuits ZFBT-282-1.5A+) and connect it to an external DC power supply.
- Check that there are no obstructions (e.g. buildings, trees or tunnels) around or above the installation; move to another location as necessary.
- Isolate any internal jamming sources; switch off all other electronic devices.

- Check all cable connections for damage, excessive bending and are correctly secured.
- Check that the antennas are connected to GPS DOME '**P**' and '**A**' connectors, and that the SMA connectors are tightened.
- Check that the GPS DOME '**R**' connector is connected to the GPS receiver, and that the SMA connectors are tightened at both ends.

Jammer Rejection Performance is Poor

There are many factors that determine how well GPS DOME performs, including:

- Being in an environment where signals are blocked.
- The properties of the jamming source (power, waveform, direction).
- The type of GPS receiver being used.
- The GPS DOME installation may be incorrect.
- The distance between GPS DOME and any jamming sources (the bigger the better).
- The propagation environment (open field, in-vehicle, urban, etc.).

Help and Support

The GPS DOME help and support contact details is as follows:
Phone: +972 (0)4 770 7700
Email: info@gpsdome.com

Specifications

Table 2 details the Environmental & Electrical Specifications. All specifications are at nominal supply (3 - 12V) and temperature (+25°C) unless otherwise stated.

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Table 2: Environmental & Electrical Specifications

Item	Parameter	Description/notes	Value			Units
			Min.	Typ.	Max	
Physical Operational Environmental						
1	Temperature range		-40	25	+85	°C
Default System Configuration						
RF Specification						
2	Protected frequency	GPS L1		1575.42		MHz
Power Supply Specification						
3	Supply Voltage	Receiver DC line	+3		+12	Volt
4	Supply Consumption	Including antennas		0.8		Watt