OriginGPS
mini+mighty

SPIDER'S ANTENNAS (ORG9805)

ACTIVE ANTENNA

Datasheet

OriginGPS.com

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1. SCOPE

This document describes the features and specifications of Spider's Antennas ORG9805 Antenna.

2. DISCLAIMER

All trademarks are properties of their respective owners.
Performance characteristics listed in this document do not constitute a warranty or guarantee of product performance. OriginGPS assumes no liability or responsibility for any claims or damages arising out of the use of this document, or from the use of integrated circuits based on this document.
OriginGPS assumes no liability or responsibility for unintentional inaccuracies or omissions in this document.
OriginGPS reserves the right to make changes in its products, specifications and other information at any time without notice.
OriginGPS reserves the right to conduct, from time to time, and at its sole discretion, firmware upgrades. As long as those FW improvements have no material change on end customers, PCN may not be issued.
OriginGPS navigation products are not recommended to use in life saving or life sustaining applications.

3. SAFETY INFORMATION

Improper handling and use can cause permanent damage to the product.

4. ESD SENSITIVITY

This product is ESD sensitive device and must be handled with care.

5. CONTACT INFORMATION

Support - info@origingps.com or Online Form
Marketing and sales - marketing@origingps.com
Web – www.origingps.com

6. RELATED DOCUMENTATION

№	DOCUMENT NAME
1	Micro Spider – ORG4475 Evaluation Kit Datasheet
2	Micro Spider – ORG4475 Product Change Notification
3	Spider and Hornet - Software User Manual for CSR® based receivers
4	Spider and Hornet - NMEA Protocol Reference Manual for CSR® based receivers
5	Spider and Hornet - One Socket Protocol Reference Manual for CSR® based receivers
6	Spider and Hornet - Host Interface Application Note
7	Spider and Hornet - Low Power Modes Application Note
8	Spider and Hornet - Jammer Detector and Remover Application Note
9	Spider and Hornet - Client Generated Extended Ephemeris Application Note
10	Spider and Hornet - Server Generated Extended Ephemeris Application Note
11	Spider and Hornet - Ephemeris Push Application Note

TABLE 1 – RELATED DOCUMENTATION

7. REVISION HISTORY

REVISION	DATE	CHANGE DESCRIPTION
A00	November 9, 2011	First release
2.0	January 14, 2015	Format update, content update according to PCN
3.0	June 21, 2015	Updated Electrical Characteristics (GLONASS support)

TABLE 2 – REVISION HISTORY

8. GLOSSARY

A-GNSS **A**ssisted **GNSS**
BPF **B**and **P**ass **F**ilter
CE European Community conformity mark
CGEE™ **C**lient **G**enerated **E**xtended **E**phemeris
CMOS **C**omplementary **M**etal-**O**xide **S**emiconductor
COMPASS PRC GNSS (same as **BDS** **B**ei**D**ou-2 Navigation Satellite **S**ystem)
EGNOS **E**uropean **G**eostationary **N**avigation **O**verlay **S**ervice
EMC **E**lectro-**M**agnetic **C**ompatibility
ESD **E**lectro-**S**tatic **D**ischarge
EVB **E**valuation **B**oard
EVK **E**valuation **K**it
FCC **F**ederal **C**ommunications **C**ommission
GALILEO EU GNSS
GLONASS **Glo**bal **Na**vigation **S**atellite **S**ystem
GNSS **G**lobal **N**avigation **S**atellite **S**ystem
GPS **G**lobal **P**ositioning **S**ystem
I²C **I**nter-**I**ntegrated **C**ircuit
IC **I**ntegrated **C**ircuit
ISO **I**nternational **O**rganization for **S**tandardization
LDO **L**ow **Dropo**ut regulator
LGA **L**and **G**rid **A**rray
LNA **L**ow **N**oise **A**mplifier
MSAS **M**ulti-functional **S**atellite **A**ugmentation **S**ystem
MSL **M**oisture **S**ensitivity **L**evel
NFZ™ **N**oise-**F**ree **Z**ones **S**ystem
NMEA **N**ational **M**arine **E**lectronics **A**ssociation
MEMS **M**icro**E**lectro**M**echanical **S**ystems
PCB **P**rinted **C**ircuit **B**oard
PPS **P**ulse **P**er **S**econd
QZSS **Q**uasi-**Z**enith **S**atellite **S**ystem
REACH **R**egistration, **E**valuation, **A**uthorisation and Restriction of **Ch**emical substances
RF **R**adio **F**requiency
RHCP **R**ight-**H**and **C**ircular **P**olarized
RoHS **R**estriction of **H**azardous **S**ubstances directive
ROM **R**ead-**O**nly **M**emory
RTC **R**eal-**T**ime **C**lock
SAW **S**urface **A**coustic **W**ave
SBAS **S**atellite-**B**ased **A**ugmentation **S**ystems
SGEE™ **S**erver **G**enerated **E**xtended **E**phemeris
SIP **S**ystem **I**n **P**ackage
SMD **S**urface **M**ounted **D**evice

SMT **S**urface-**M**ount **T**echnology
SOC **S**ystem **O**n **C**hip
SPI **S**erial **P**eripheral **I**nterface
TCXO **T**emperature-**C**ompensated Crystal **O**scillator
TTFF **T**ime **T**o **F**irst **F**ix
TTL **T**ransistor-**T**ransistor **L**ogic
UART **U**niversal **A**synchronous **R**eceiver/**T**ransmitter
WAAS **W**ide **A**rea **A**ugmentation **S**ystem

9. ABOUT SPIDER FAMILY

OriginGPS GNSS receiver modules have been designed to address markets where size, weight, stand-alone operation, highest level of integration, power consumption and design flexibility - all are very important.

OriginGPS' Spider family breaks size barrier, offering the industry's smallest fully-integrated, highly-sensitive GPS and GNSS modules.

Spider family features OriginGPS' proprietary NFZ™ technology for high sensitivity and noise immunity even under marginal signal condition, commonly found in urban canyons, under dense foliage or when the receiver's position in space rapidly changes.

Spider family enables the shortest TTM (Time-To-Market) with minimal design risks.

Just connect an antenna and power supply on a 2-layer PCB.

10. ABOUT SPIDER'S ANTENNAS

L1 Ceramic Patch Antennas – For ultimate compatibility and best-in-class performance use our Spider's modules together with Spider's Antennas.

11. ABOUT ORIGINGPS

OriginGPS is a world leading designer, manufacturer and supplier of miniature positioning modules, antenna modules and antenna solutions.

OriginGPS modules introduce unparalleled sensitivity and noise immunity by incorporating Noise Free Zone system (NFZ™) proprietary technology for faster position fix and navigation stability even under challenging satellite signal conditions.

Founded in 2006, OriginGPS is specializing in development of unique technologies that miniaturize RF modules, thereby addressing the market need for smaller wireless solutions.

12. DESCRIPTION

The ORG9805 External Active Antenna incorporates high-efficiency ceramic patch antenna element, high out-of-band rejection band-pass Surface Acoustic Wave (SAW) filter, low Noise Figure and high gain Low Noise Amplifier (LNA), enclosed in plastic case, with coaxial cable terminated by standard SMA-type plug.
The ORG9805 Active Antenna with highest GPS-band performance and notch filtering for out-of band signals provides exceptional sensitivity, high selectivity and noise immunity.
The ORG9805 Active Antenna is built of highest quality materials and components.
The ORG9805 Active Antenna is the perfect match to the OriginGPS GPS receiver modules.

13. FEATURES

- Antenna element with high efficiency for excellent coverage of GPS satellites
- SAW filter for rejection of out-of-band signals
- LNA with low Noise Figure and high gain for high sensitivity
- Plastic case with magnetic base
- RG-174 flexible coaxial cable of 5m length
- SMA-type gold plated plug

14. BENEFITS

- High performance
- Compact size
- Easy integration

15. BLOCK DIAGRAM

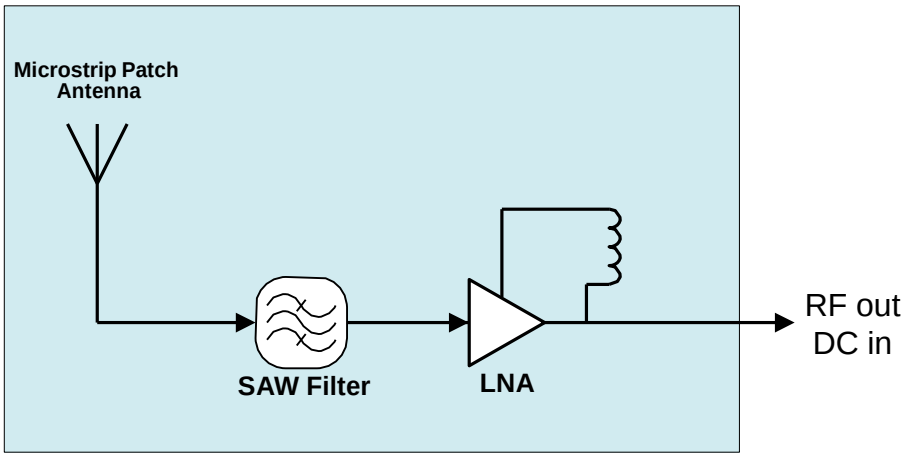

FIGURE 1 – ORG9805 BLOCK DIAGRAM

16. Typical Application Circuit

16.1. ORG447X series

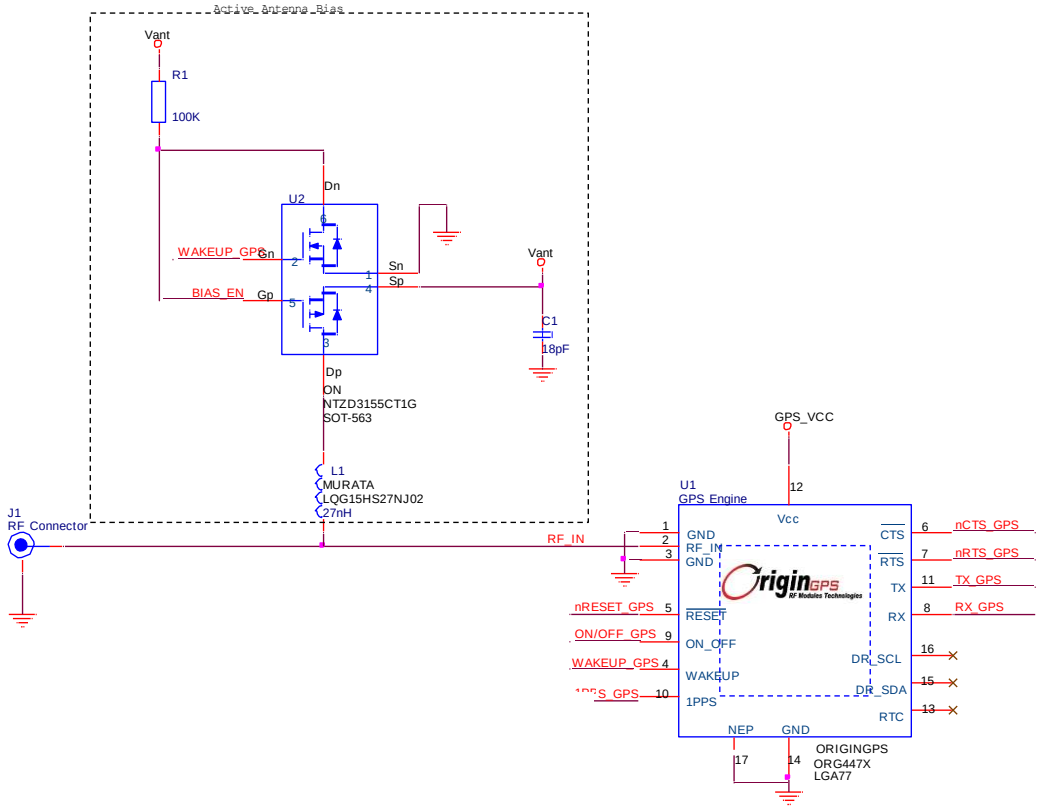

FIGURE 2 – ORG447X SERIES CIRCUIT

16.2. ORG1408

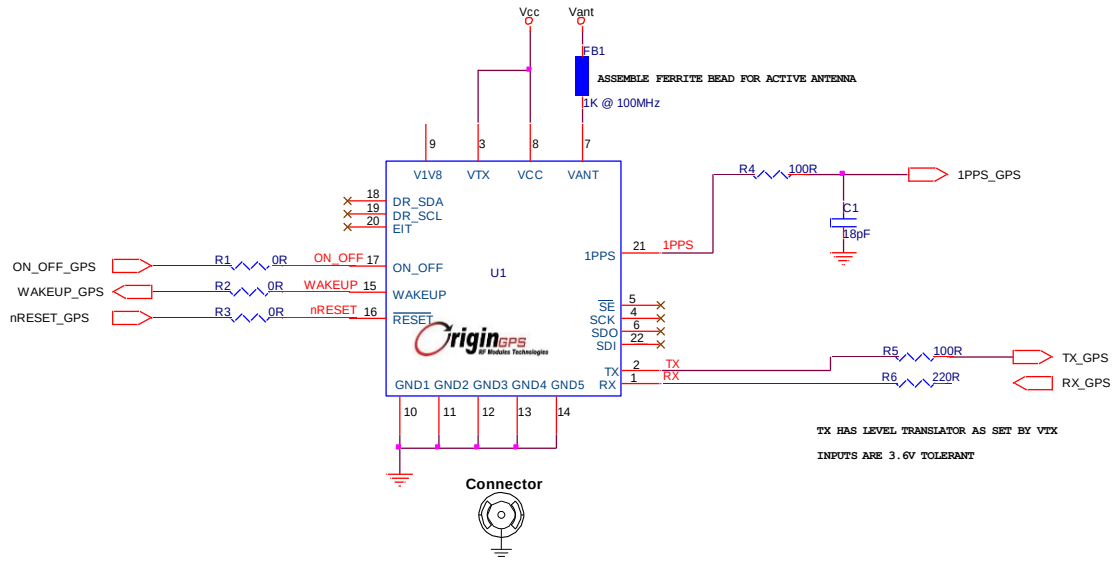

FIGURE 3 – ORG1408 CIRCUIT

17. Electrical Specifications

17.1. Characteristic Data

Parameter	Value	Unit	Notes
Frequency Range	1575.42 ± 5 1610 ± 8	MHz	
VSWR	1.5:1		
BW	10 for GPS 20 for GLONASS	MHz	
Peak Gain	5 (min)	dBic	On 70mm x 70mm Ground Plane
Polarization	R.H.C.P		
impedance	50	Ω	
LNA freq. range	1595± 25	MHz	
LNA Gain	30 (typ)	dB	without cable loss
LNA Noise Figure	1.5 (max)	dB	
LNA DC Voltage	3 - 5	V	supplied via coaxial cable
LNA DC Current	11.5 (typ)	mA	@3.0V
LNA Output VSWR	2.0 (typ)		@output
LNA Impedance	50	Ω	@output
Cable Insertion Loss	1.2 (typ)	dB/m	RF cable RG174

TABLE 3 – ELECTRICAL SPECIFICATIONS

17.1.1. LNA Characteristic

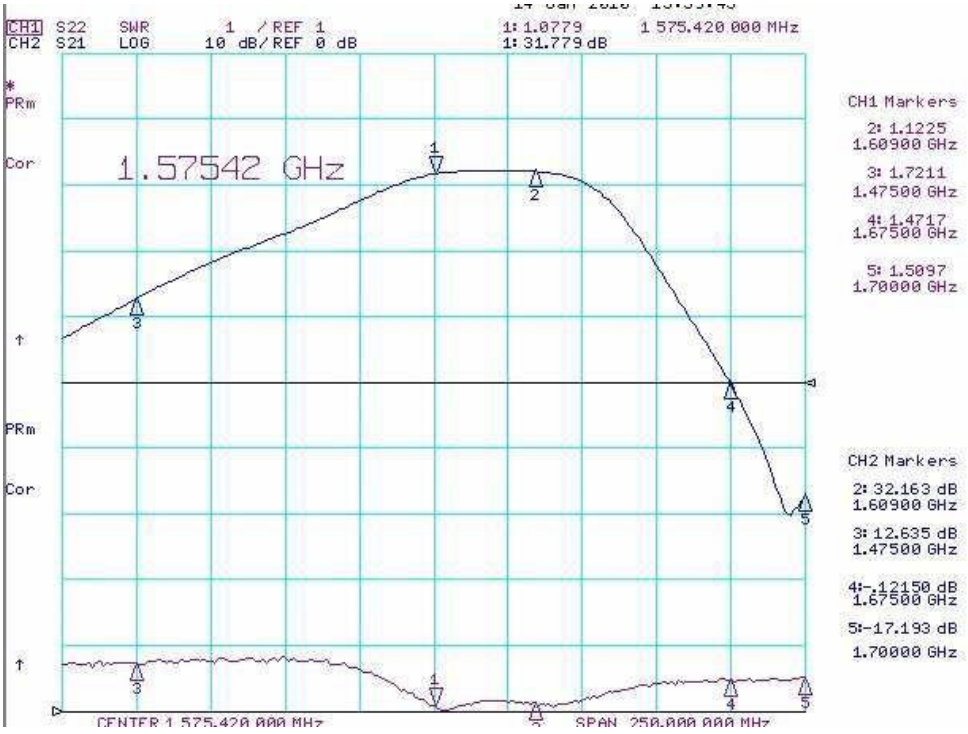

FIGURE 4 – LNA

18. Mechanical Specifications

Parameter	Value	Unit	Notes
Size (L x W x T)	48.6 x 39.2 x 15.2	mm	tolerance: ± 0.5mm
Weight	106 (approx.)	g	including cable
Housing	PC		
Color	Black		
Mounting	Magnetic base		
Orientation	Horizontal surface		
Cable Type	RG-174		diameter: 2.7 ± 0.1mm
Cable Length	5	m	
Connector Type	SMA Plug		Gold plated

TABLE 4 – MECHANICAL DATA

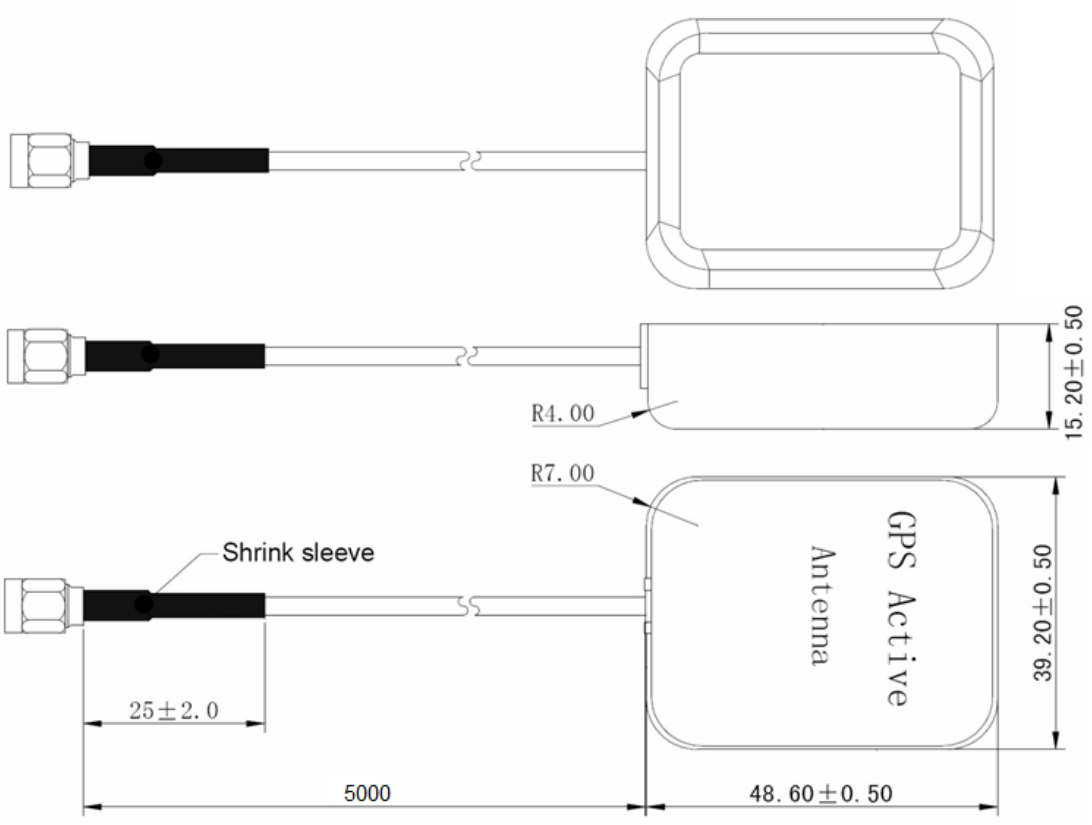

FIGURE 5 – MECHANICAL DATA

19. Environmental Specifications

Parameter	Value	Notes
Operating Temperature	-40°C to +85°C	
Storage Temperature	-40°C to +85°C	
Humidity	5% ~ 95% RH	@ operating temp.
Weatherproof	IP66	dustproof and waterproof

TABLE 5 – ENVIRONMENTAL DATA

20. Compliance

The ORG9805 External Active Antennas are manufactured and handled to comply with and according to Pb-Free/RoHS Directive 2002/95/EC on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

The ORG9805 Active Antennas are manufactured in ISO 9001:2000 accredited facilities.
The ORG9805 Active Antennas are manufactured in ISO 14001:2004 accred
The ORG9805 Active Antennas comply with the following EMC standards:

- EU CE EN55022:06+A1(07), Class B
- US FCC 47CFR Part 15:09, Subpart B, Class B

21. Reliability

Parameter	Description	Pass Criteria
Drop Test	Place antenna on set 1.5m height Drop 5 times	1. No visible damage 2. Electrical perf. is satisfying
Vibration Test	Sine sweep 5 – 55 – 5 Hz, 1 octave/min Amplitude = 1.5mm, Acceleration = 2g Crossover freq. = 18Hz Hold time = 2hr.	1. No visible damage 2. Electrical perf. is satisfying
Humidity	60°C, 95% RH, 96hr.	1. No visible damage 2. Electrical perf. is satisfying
Thermal Shock	+80°C (30 min) → 5 min → -40°C (30 min) 10 cycles	1. No visible damage 2. Electrical perf. is satisfying
High Temperature Resistance	+85°C, 96hr.	1. No visible damage 2. Electrical perf. is satisfying
Low Temperature Resistance	- 40°C, 96hr.	1. No visible damage 2. Electrical perf. is satisfying

TABLE 6 – RELIABILITY DATA

22. Safety Information

Improper handling or use can cause permanent damage to the device.
There is also the possible risk of personal injury from mechanical trauma or shocking hazard.

23. Disposal Information

The product should not be treated as household waste.
For more detailed information about recycling electronic components, please contact your local waste management authority.

24. Product Labeling

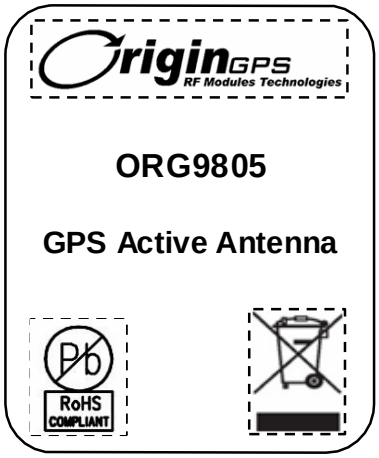

FIGURE 6 – LABELING INFORMATION