

RACELOGIC

Antenna and Mount Options



Antenna Options

Your choice of antenna is critical to the accuracy of measurement.

Racelogic provide several different antenna options, depending upon the measurement system, the type of vehicle being used and the surrounding conditions.

Why use different antennas?

Standard magnetic “patch” antennas are suitable where they have an unrestricted view of the sky and a good metallic ground plane, such as a car roof.

However, the quality of the signal received can be reduced by reflections from surrounding buildings, trees, and other obstructions. This is known as multipath and can result in increased noise and reduced accuracy.

To protect against multipath reflection and when no suitable ground plane is present, mushroom antennas with ground plane are a good option.

A Dual Antenna Mounting Pole (max. width 2.5 m) ensures the most accurate slip angle measurement.



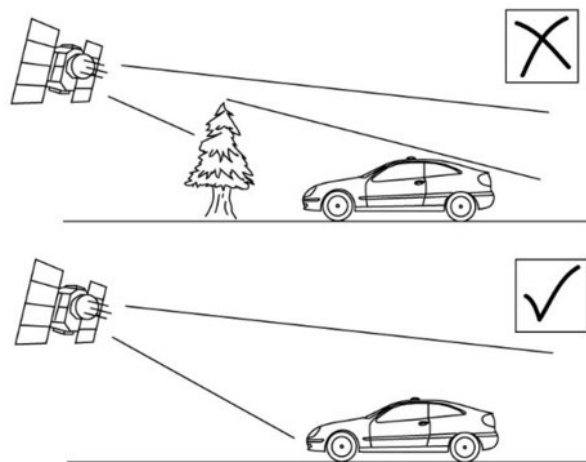
Further effects of noisy GPS signals

- Less accurate general performance results. If the vehicle test is using speed as a start or end condition then the test could be started or stopped at the wrong time, leading to incorrect results
- Less accurate Lateral and Longitudinal acceleration data
- Less accurate Radius of Turn and Centre Line Deviation tests
- Less accurate slip angle tests
- Less accurate vehicle position / driveline

Typical antenna placement

The following should be observed when determining the best place to locate your antenna:

- Car - On the roof away from other antennas and any roof bars
- Car (no roof) - On the highest point of the boot
- Motorbike - At the rear as far away as possible from the rider
- Truck – On or behind the cabin or on top of the trailer
- Other vehicles - Away from metal obstructions and as high as possible



For any GPS antenna, the best signal will be received with the clearest view of the sky.

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Low Profile, Magnetic Antennas with no ground plane

Standard magnetic “patch” antennas are suitable where they have an unrestricted view of the sky and a good metallic ground plane, such as a car roof.



RLACS156 - GPS / GLONASS Antenna

- Comes with a **detachable** 4 m **RG174 antenna cable** (RLCAB071-4).
- This antenna is supplied with all **single and dual antenna VBOX 3i** and **100 Hz Speed Sensor** variants (VBOX 3i RTK up to V4 only).
- It will track GPS and GLONASS satellites with an RTK and GLONASS enabled unit.



RLACS156RTK - GPS / GLONASS Antenna

- Comes with a **detachable** 4 m **RG223 antenna cable** (RLCAB080-4).
- This antenna is supplied with all **VBOX 3i RTK** (V5 onwards) as the RG223 cable maximises the performance in dual antenna and RTK modes.
- It will track GPS and GLONASS satellites with an RTK and GLONASS enabled unit.



RLACS158 - GPS L1 Antenna

- Comes with a **detachable** 4 m RG174 antenna cable (RLCAB071-4).
- This antenna is can be used with all VBOX 3i and 100 Hz Speed Sensor variants.
- It will track **GPS only**.



RLVBACS018 - GPS Antenna

- **Attached** 5 m antenna cable with SMA connector.
- This antenna is supplied **VBOX II, VBOX Micro, Video VBOX Pro, Video VBOX Waterproof** and **5 – 20 Hz Speed sensors**.
- It will track **GPS only**.



RLACS070 - GPS Antenna

- **Attached** 3 m antenna cable with MCX connector.
- This antenna is supplied with **Video VBOX Lite** and can be used with **VBOX Sport** when the internal antenna cannot see satellites e.g. if the vehicle has an athermic windscreen.
- It will track **GPS only**.

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RLACS070R - GPS Antenna

- **Attached** 3 m antenna cable with MCX right angle connector.
- This antenna is supplied with **VBOX Mini, PerformanceBox & DriftBox**.
- It will track **GPS only** and should be used when the internal antenna cannot see satellites e.g., if the vehicle has an athermic windscreen.



RLACS282 – Dual Band GNSS Antenna

- Comes with a **detachable** 4 m **RG223 antenna cable** (RLCAB080-4).
- This antenna is supplied with **VBOX 3i RTK** units from Feb 2022.
- It will track **GPS (L1/L2) and GLONASS (G1/G2)**.



RLACS284 – GPS/GLONASS Antenna

- **Attached** 2 m antenna cable with RG-174 and MCX male connector.
- This antenna is supplied with **VBOX Sport, VBOX LapTimer, VBOX Pit Lane Timer & Performance Box Touch**.
- It will track **GPS and GLONASS**.

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Ground Plane Antennas

Ground plane antennas give best protection against multipath reflection. They are used when a suitable ground plane is not present and are ideal for high accuracy position work, marine and mining applications.



RLACS193 – GPS Antenna with Magnetic Mount

- **Detachable** 3 m antenna cable with SMA connector.
- This antenna can be used with VBOX II units and for multi-antenna set-ups (slip angle test, etc.).
- It will track **GPS only**.



RLVBACS067 – Dual Frequency GNSS Antenna with Mounting Plate

- **Detachable** 3 m RG233 SMA to TNC cable.
- This antenna can be used with any **VBOX 3i**.
- It will track **GPS L1, L2, L5, GLONASS L1, L2, Galileo E1, E5a, E5b, BeiDou B1, B2, and L-Band**.
- This is basically the RLACS320 bundle with Mounting Plate



RLACS320 – Dual Frequency GNSS Antenna

- **Detachable** 3 m RG233 TNC to TNC cable (RLCAB101-3).
- This antenna can be used with an **RTK and GLONASS enabled DGPS Base Station**.
- It will track **GPS L1, L2, L5, GLONASS L1, L2, Galileo E1, E5a, E5b, BeiDou B1, B2, and L-Band**.

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Mounts

Racelogic offer multiple antenna mounting options for all types of vehicle roof materials, antenna separation and IMU mount requirements.



Roof Suction Mount (RLACS223)

This vacuum suction mount allows for a magnetic antenna to be used on vehicles without a metal roof, e.g. vehicles with an aluminium chassis, glass roofs or carbon fibre bodywork.



Roof Mount for Ground Plane Antennas (RLACS159)

This vacuum suction mount allows for a ground plane antenna (e.g. RLVBACS067) to be used on vehicles without a metal roof, e.g. vehicles with an aluminium chassis, glass roofs or carbon fibre bodywork.



Dual Antenna Mounting Pole (RLACS171)

This mounting system is used to extend antenna separation for slip angle and other dynamic tests to up to 2.5 m.



IMU-integrated Antenna Mounts (several options)

Please see the [Inertial Measurement Unit](#) page for all roof mounting options for an IMU/ GPS antenna setup.

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Specifications

Low Profile Magnetic Antenna for VBOX 3i and 100 Hz Speed Sensors

RLACS156 (GPS & GLONASS) / RLACS158 (GPS L1) for Single and Multi-Antenna Setups
RLACS156RTK (GPS & GLONASS) for RTK units

Features

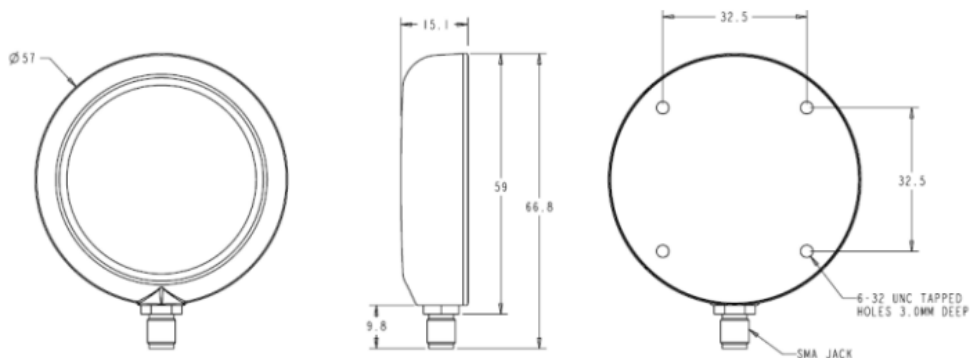
- High rejection SAW filter
- Axial Ratio: 3dB over full bandwidth
- Low noise
- High gain
- Low current
- Wide voltage input range
- IP67 Weather proof housing
- RoHS compliant



Data

	RLACS156	RLACS158	RLACS156RTK
Frequency range	1574 – 1606 MHz and GLONASS / SBAS / GPSL1	1572.5 – 1578 SBAS / GPSL1	1574 – 1606 MHz and GLONASS / SBAS / GPSL1
Gain	28 dB		
LNA Noise	1 dB typ		
VSWR at LNA input plane	<1.5:1		
Supply voltage range	3 to 12 V	3 – 10 V	3 to 12 V
Supply current	10 mA typ		
Cable / Connector	4m RG174 SMA-SMA detachable from antenna (RLCAB071-4)		4 m RG223 SMA-SMA detachable antenna cable (RLCAB080-4).
Operating Temperature	-40°C to +85°C		

Dimensions



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GPS Magnetic Antenna

for VBOX II, VBOX Micro, 5-20Hz Speed Sensors, Video VBOX Pro & Waterproof

RLVBACS018

Features

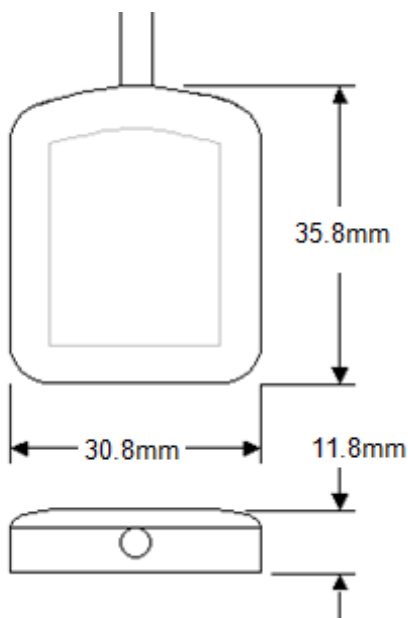
- L1 band RX antenna
- Low noise
- High gain
- Low current
- Compact and lightweight
- Magnetic mounting
- Water resistant housing



Data

Frequency range	1575.42MHz +/- 1.023MHz
Gain	29dB
LNA Noise	1.8dB typical; 2.3dB Max at 85°C
VSWR at LNA input plane	<2.0:1
Supply voltage range	5.0V
Supply current	30mA max
Cable / Connector	5m cable with SMA
Operating Temperature	-40°C to +85°C

Dimensions



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Antenna and Mount Options



Magnetic Antenna with MCX Connector for Video VBOX Lite, VBOX HD and VBOX Sport

RLACS070

Features

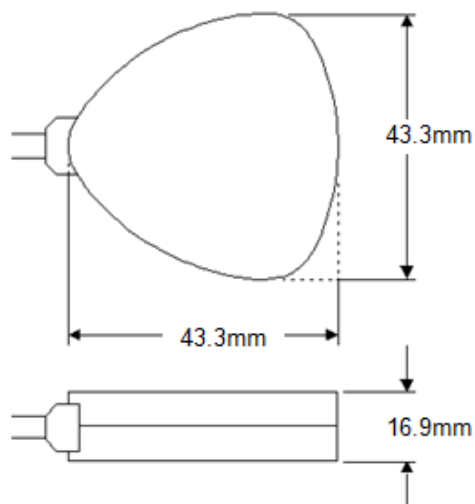
- L1 band RX antenna
- Low noise
- High gain
- Low current
- Compact and lightweight
- Magnetic mounting



Data

Frequency range	1575.42MHz
Gain	26dB @3V ; 28dB @ 5V
LNA Noise	1.15dB
VSWR at LNA input plane	1.2:1
Supply voltage range	3.0 to 5.0V
Supply current	41mA max
Cable / Connector	3m with SMB Female
Operating Temperature	-40°C to +85°C

Dimensions



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Magnetic Antenna with MCX Right Angle Connector for VBOX Mini, VBOX LapTimer, Performance Box and DriftBox

RLACS070-R

Features

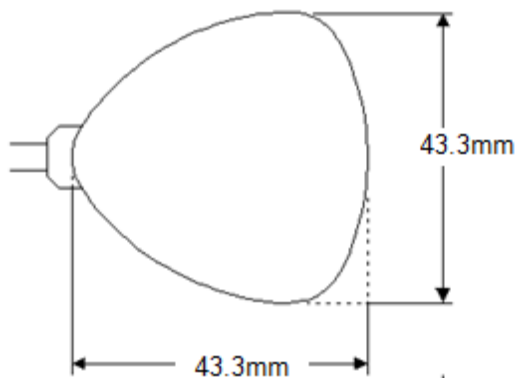
- L1 band RX antenna
- Low noise
- High gain
- Low current
- Compact and lightweight
- Magnetic mounting



Data

Frequency range	1575.42MHz
Gain	26dB @3V ; 28dB @ 5V
LNA Noise	1.15dB
VSWR at LNA input plane	1.2:1
Supply voltage range	3.0 to 5.0V
Supply current	41mA max
Cable / Connector	3m with SMB Female
Operating Temperature	-40°C to +85°C

Dimensions



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GPS Ground Plane Antenna

for VBOX II units, and multi-antenna setups (slip angle test etc.)

RLACS193: With magnetic mount / RLACS194 (legacy): For non-RTK Base Stations

Features

- GPS L1, SBAS, and L-band
- With a metal base
- Low profile
- Improved multi-path mitigation
- Magnetic mounting
- Superior noise rejection



Data

Bandwidth	1525 – 1585 MHz		
Gain	30 dB		
LNA Noise	2.0 dB		
Supply voltage range	3.3 to 12 V DC		
Supply current	24mA		
Cable / Connector	3m TNC to SMA – detachable from antenna	8m TNC to SMA – detachable from antenna	3m TNC to TNC – detachable from antenna
Operating Temperature	-40°C to +70°C		

Mechanical Information

Enclosure:	Aluminium base with ASA plastic cap
Dimensions:	7.0 H x 13.0 D (cm) / 2.9 H x 5.1 D (in)
Weight:	0.38 kg (0.84 lbs)
Mount:	5/8 inch female thread
Enclosure Rating:	IP69K
Shock and Vibration:	EP455

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Antenna and Mount Options



GPS/GLONASS Ground Plane Antenna for RTK Setups

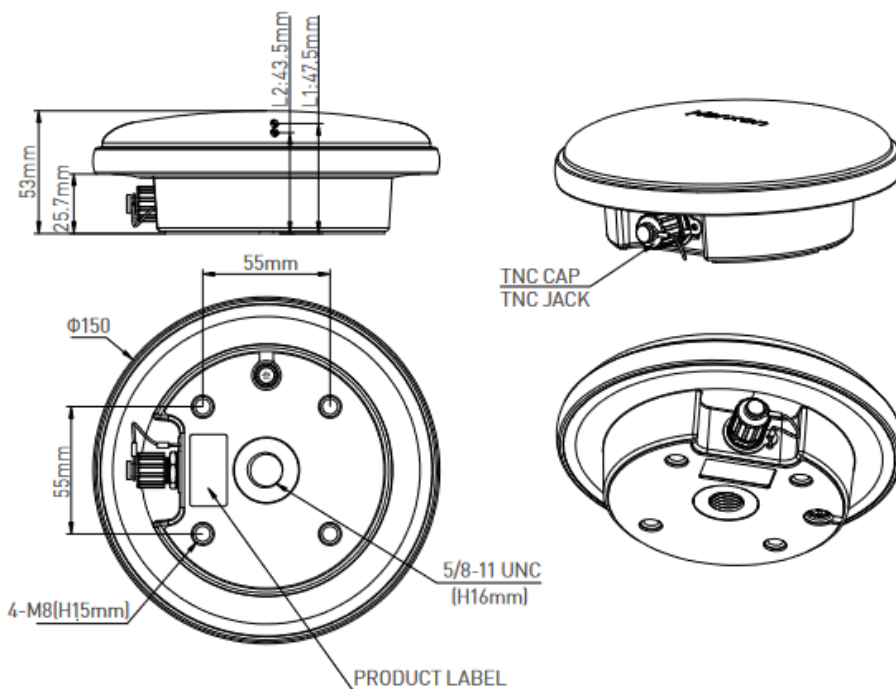
RLVBACS067

For VBOX RTK data loggers

RLACS320

For Base Station, with RG-223 TNC to TNC antenna cable

- Comprehensive GNSS support: GPS, GLONASS, Galileo, BeiDou and QZSS, IRNSS, SBAS as well as L-Band correction services
- Excellent multipath rejection
- Ruggedized enclosure for tough environments
- Suitable for pole, magnetic and tripod mounting



Undeclared Tolerance: $\pm 0.3\text{mm}$

PERFORMANCE

Signal Received

Upper Band	1.525 to 1.615 GHz
Lower Band	1.164 to 1.3GHz GHz
GPS	L1/L2/L5
GLONASS	L1/L2/L3
GALILEO	E1/E5a/E5b/E6
BDS	B1/B2/B3
QZSS	L1/L2/L5/L6
IRNSS	L5
SBAS	L1/L5
L-Band	

Nominal Impedance 50 Ω

Polarization RHCP

Axial Ratio $\leq 3\text{dB}$

Azimuth Coverage 360°(omni-directional)

Output VSWR ≤ 2.0

Peak Gain 5.5dBi

LOW NOISE AMPLIFIER

LNA Gain 40 $\pm 2\text{dB}$

Noise Figure $\leq 2\text{dB}$

Output VSWR ≤ 2.0

Passband Ripple $\pm 2\text{dB}$

Operation Voltage +3.3 to +18VDC

Operation Current $\leq 45\text{mA}$

Differential Propagation Delay $\leq 5\text{ns}$

MECHANICAL

Dimensions $\Phi 150 \times 53\text{mm}$

Connector TNC Female

Weight $\leq 600\text{g}$

Mounting

Pole Mount Coarse threaded 5/8"-11, thread hole depth 10-11mm

Screws Mount 4x M8 screws depth

ENVIRONMENTAL

Temperature

Operating -45°C to +85°C

Storage -55°C to +85°C

Humidity 95% no-condensing

Ingress Protection Rating IP67, IP69K

Vibration 9.8gRMS, 24-2000Hz

Shock 75Gs, 6ms duration, 3 shocks in mutually perpendicular axes

Salt Fog

96h (continuous spray, 5% concentration, 35°C)