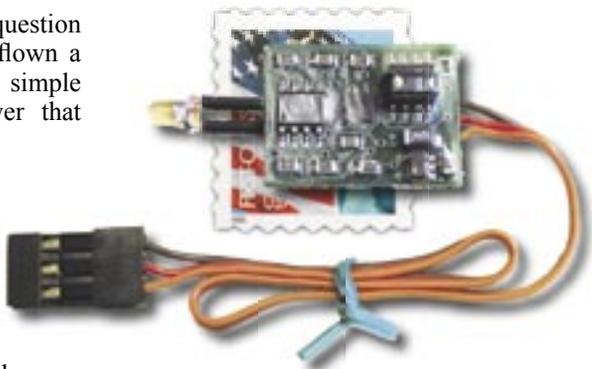


# How High™

## Model Aircraft Altimeter



**How High?** It's a common question for anyone who has ever flown a model aircraft. Now there is a simple and inexpensive way to answer that question with accuracy.

The *How High* altimeter provides peak altitude readings when they are most useful – at the field, right after a flight. A single light-emitting diode (LED) reports altitude data through a series of flashes. Simply waving your finger across the LED activates the altitude report.

The *How High* unit is complete. It does not require the use of a computer, ground-based receiver, or any other equipment. It needs only a 3.2V to 12V power source. Plug it into any available channel on your R/C receiver, or run it off a separate battery. Smaller than a postage stamp and lighter than a dime (2.2g), the *How High* altimeter easily installs into almost any flying model.

Just like the altimeter in a full-scale aircraft, the *How High* altimeter determines altitude by sensing minuscule changes in atmospheric air pressure. It uses a state-of-the-art pressure sensor and proprietary calculation and filtering techniques to provide a level of accuracy previously unavailable in such a low cost, tiny instrument.

### OPERATION

Understanding how the *How High* operates will help you decide where to install the unit – so, we will cover this topic first. Full installation instructions are in the next section.

Using the *How High* is easy:

- 1) Turn the unit on
- 2) Make your flight
- 3) Read the peak altitude

### 1) Power Up

Before your flight, apply power to the unit. If you have it plugged into your R/C receiver, this is as simple as turning on your receiver switch. The LED will light up for about 3 seconds then turn off for another 3 seconds. Start your flight at any time. There is no warm-up or calibration delay.

### 2) Your Flight

As long as power is applied, the LED will output a quick flash about every 2 seconds. This “heartbeat” lets you know the unit is on and all is well. [Note: If your unit is plugged into an R/C channel, and you move that stick or switch on your transmitter to its limit, the LED will output 3 quick flashes. This is normal and is not a sign of a problem.]

Throughout the flight, the *How High* is making high-resolution measurements of the atmospheric pressure and temperature every second.

### WARRANTY

We want you to be happy with your purchase. If you are not satisfied with any product purchased directly from us, return it within 30 days for a full refund of your purchase price. We also provide a one-year replacement warranty on any device that stops working properly - regardless of cause (even crash damage).

Now Available!

The ultimate accessory for your *How High* Altimeter:

## See How™

Display Unit for the *How High*™ Altimeter and the *How Fast*™ Airspeed Instrument

- Eliminates Finger-Waving and Flash Counting
- Ten-flight memory
- No added airborne weight
- Enables In-Flight Capturing of Altitudes or Airspeeds
- Capture up to 9 points per flight – triggered by your R/C transmitter
- Easy post-flight viewing



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## How High™

### Model Aircraft Altimeter

### SPECIFICATIONS

#### Output Method:

Finger-wave activated; Grouped light flashes representing digits

#### Peak Altitude Range:

50 to 7000 ft. (15 to 2150 m)

#### Internal Resolution:

0.46 ft. (0.14 m) @ sea level

#### Report Resolution:

1 ft. (1 m) Above Ground Level

#### Voltage Input:

3.2V min., 12.0V max.

#### Current Input:

1.2 mA typ., 5.9 mA LED on

#### Size (Circuit Board):

.8 x .6 x .16 in. (20 x 15 x 4 mm)

#### Weight:

0.08 oz. (2.2 grams)

## How High™

### Model Aircraft Altimeter

- Reports Peak Altitude
  - No Computer Needed
  - 1 ft. (1 m) Resolution
- Version:  feet,  meters

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### 3) Reporting Peak Altitude

Upon landing, **before turning the unit off**, activate the altitude report. With the LED pointing toward the sun, or the brightest part of the sky, wave your finger back and forth across the LED as shown in Figure 1.



Figure 1

When the unit recognizes your wave, the LED will come on for 4 seconds. At this point, stop waving and start counting! The unit will report the peak altitude by flashing the LED.

For example, an altitude of 423 feet (or meters for metric units) will report as 4 flashes followed by a pause, 2 flashes, another pause, then 3 flashes.

**flash-flash-flash-flash**  
**flash-flash**  
**flash-flash-flash**

Each group of flashes represents one digit. Leading zeros are suppressed, so 89 will report as 8 flashes, pause, 9 flashes. Altitudes as high as 7000 feet (2150 meters) can be reported. A zero is represented by a quick double flash (you will know it when you see it). After the last flash of the altitude report, there is a 4 to 6 second delay before the unit returns to its 2-second heartbeat.

Did you miscount or forget the number? No problem, the peak value is stored in memory. Just wave again and the *How*

*High* will again report the peak altitude of the last flight.

You can now turn the unit off. It will still remember the peak altitude of your last flight. When your next flight exceeds an altitude of about 50 feet (15 meters) above ground, the *How High* will automatically reset. You do not need to turn off power between flights – simply activate the report. If you make a number of flights without activating the report or turning off the power, the unit will report the peak altitude of the combined flights.

**After a flight, activate the altitude report before turning the power off! Otherwise, data for the flight will be lost.**

The *How High* always reports altitude above ground level (AGL). This is the difference between peak altitude and the elevation of the plane when the altitude report is activated.

### INSTALLATION

The *How High* altimeter must be placed in a location that is away from the direct blast of air flowing past the airplane. Direct airflow around the unit will result in inaccuracies in the reported altitude. At the same time, the location must provide for sensing small changes in air pressure with altitude. Fortunately, the fuselage of most model planes is an ideal environment. The unit's light mass and rugged surface-mount construction allow mounting with double-sided foam tape ("servo" tape) or sticky-backed Velcro®.

Simply drill a 1/8" (3mm) hole, so that the LED can protrude through the fuselage. When positioning the unit, keep in mind that the LED will need to point toward a

Figure 2A



Figure 2B



### Tips for Activating the Altitude Report:

- You can practice activating the report at any time (even before installation).
- Come very close to (or lightly touch) the LED as your finger passes over.
- The sensor is looking for a pattern of light and shadow. Make sure the LED is pointed directly at the sun, bright sky, or other light source, and not blocked by your shadow.
- Move your finger completely past the LED on each side by at least an inch (25 mm).
- Don't go too slow. About two "round trip" cycles per second is good. This is the point where your finger will begin to look like a blur.
- Flexing your hand at the wrist gives better results than just moving your finger.
- Indoors, incandescent light sources provide easier activation than fluorescent lights.
- Usually, only 2 or 3 passes are needed. If it is not working, try re-aiming the LED toward the light.

bright area of the sky for report activation. On most planes, it is best to position the unit so that the LED comes through the **TOP** of the fuselage. If you have a small hand-held plane, the fuselage side or bottom could be considered, since you can turn the plane over as needed. You can also place the unit under a hatch, but you will need to open the hatch to activate the report.

Remember to choose a position that will allow you plenty of room to move your finger over the LED. If longer leads are needed, a servo extension can be used.

For flexibility in mounting, the LED can be repositioned by bending. Figure 2A shows the unit as shipped. In Figure 2B the leads of the LED have been bent to a right angle. Bend the leads slowly using your hands (no tools) to prevent damage. Figure 3 shows the unit, with the bent LED, flipped over and mounted to the top of a fuselage with Velcro®. Apply the sticky-backed Velcro® or mounting tape to the side of the device with the white lettering, **NOT** the component side.

There are many alternative mounting methods. With the LED left in the straight position, the unit can be mounted vertically to the fuselage side, or to a bulkhead, with the LED still protruding through the top of the fuselage. If you wish to avoid

using adhesives, you can wrap foam around the unit and wedge or band it into position. When using foam, make sure that the ends (where the wires and LED leads come out) are left open so that air can reach the pressure sensor.

Finally, plug the unit into any unused servo channel on your R/C receiver. Align the brown wire with the black/brown servo wires. If all your channels are in use, you can use a Y-harness to share a channel with an existing servo. For DSC compat-

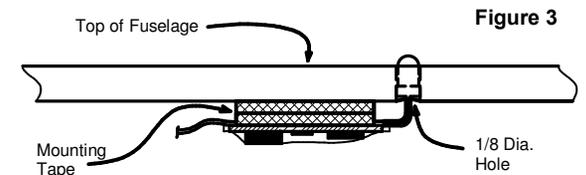


Figure 3

ible receivers, do not use the "DSC" or "DSC/battery" slot.

For free-flight (and other stand-alone applications), you will need to provide a voltage source. The *How High* works across a wide range of voltages (from 3.2V to 12V) so any battery in this range can supply power. This includes common 9V rectangular batteries or even single lithium-polymer cells. Just add an appropriate connector and, if desired, a power switch. Connect the RED wire to the POSITIVE (+) battery terminal. Connect the BROWN and ORANGE wires to the NEGATIVE (-) battery terminal.