SuperChrono

Quick Start Guide

The SuperChrono is a portable shooting chronograph that gives you reliable velocity readings under any lighting conditions and at any distance, as long as the bullet is travelling at supersonic speed.

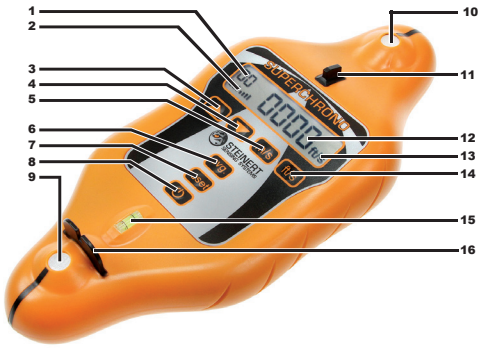
Getting Started

Make sure you have a safe backdrop and that you take all the necessary precautions for handling firearms. Unload your gun and remove the bolt before setting up. Always consider safety first and read the legal disclaimer before use.

Battery Installation

Turn the unit upside-down and locate the screws for the battery door. Unscrew these using the supplied Allen key. Remove the door and insert four AA batteries according to the polarity marks in the battery compartment. Replace the door and tighten the screws, but do not over-tighten them. Turn the unit on.

How to Operate the Keypad

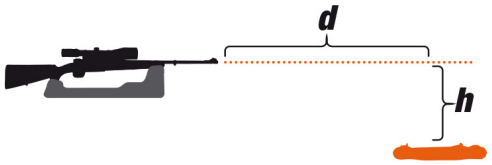


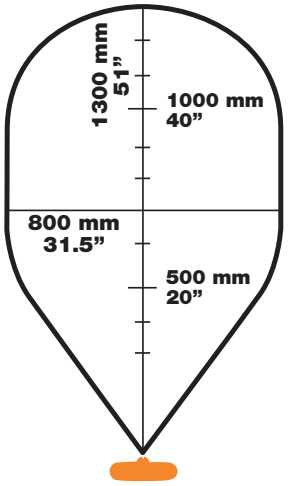
1. Number in shot string
2. Battery level indicator
3. Previous shot in string
4. Next shot in string
5. Show velocity in m/s
6. Average speed of shots in string
7. Clear memory
8. On/off
9. Sensor
10. Sensor
11. Front sight
12. Bullet velocity
13. Current units
14. Show velocity in ft/s
15. Spririt level
16. Back sight

Position the SuperChrono to Detect the Shockwave

The shockwave moves forwards from the muzzle. To make sure the sensors do not end up in the sound shadow, all you have to do is make sure the SuperChrono is further from the muzzle than its height from the ground i.e. that the distance from the muzzle to the back end of the unit is greater than the height from the top of the unit to the gun.

This is shown in the figure below:





Detection Area

The detection area is 51 inches (130 cm) high and 31.5 inches (80 cm) wide. The precision of the device is the same at all points within the detection area.

Setup for Shooting

To get the most precise reading, you have to shoot parallel with or at a very shallow angle to the sensors. If not, the bullet will travel on a path longer than that between the two sensors and the reading will not be correct. This applies to any two-sensor setup, whether it is acoustical, optical, electromagnetic or radar.

Muzzle Velocity

The natural setup for most shooters is to arrange the SuperChrono and the gun to aim at the same target on the range. The figure below illustrates this:

The letter d is used for distance and h for height; d is measured from the SuperChrono to the target and h is the distance between the SuperChrono's sensors and the line from the muzzle to the target.

The longer you make *d* and the shorter *h*, the higher the level of precision you will get.

This is because you get progressively closer to shooting parallel with the sensors.

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Use the table below to set up for 99% precision.

Distance *d*, yards	25	50	75	100	200	300	400
Velocity ft/s	Height *h*, inches						
3300	2	4	5	7	14	21	28
3000	2	4	5	7	14	21	28
2700	2	4	6	8	16	24	32
2400	3	5	8	10	20	30	40
2100	3	6	9	12	24	36	48
1800	4	8	11	15	30	45	51
1500	5	10	15	20	40	51	51
1350	7	14	20	27	51	51	51

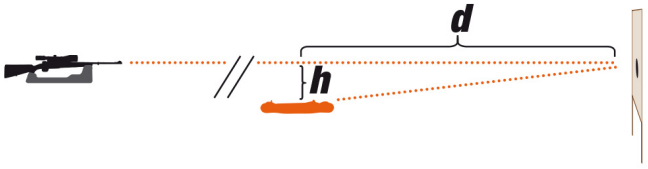
Distance *d*, meters	25	50	75	100	200	300	400
Velocity m/s	Height *h*, cm						
1000	5	10	14	19	38	57	76
900	6	11	17	22	44	66	88
800	6	12	18	24	48	72	96
700	7	15	22	29	58	87	116
600	9	18	26	35	70	105	130
500	12	24	36	48	96	130	130
400	21	43	64	85	130	130	130

To set the SuperChrono up to measure muzzle velocity, follow these instructions:

1. We recommend that you use a rest and bench to make sure you take every shot from the same position.
2. Mount the SuperChrono on a sturdy tripod using the standard 1/4-20 inch thread hole on the bottom of the chronograph.
3. Place the gun in the rest and aim it at the target. Make sure it is unloaded.
4. Place the SuperChrono directly below the path of the bullet.
5. Look up bullet speed and distance in the table to determine h.
6. Adjust the height of the unit to h (10 inches for 2400 ft/s and target distance 100 yards) below the path of the bullet.
7. Place the device at least **10 feet or 3 meters** in front of the muzzle.
8. Aim the chronograph at the target using the sights.
9. Take your shot.

Downrange Velocity

If you want to measure at a downrange distance, the principle is the same and you can use the same table. Note that in this case the height is measured from the unit up to the passing bullet.



Velocity at Target

The setup looks like this:

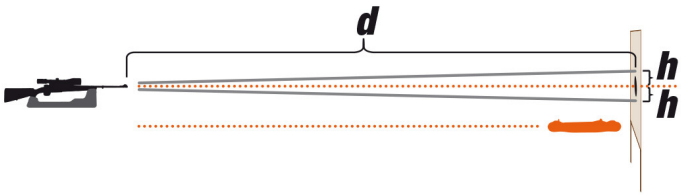
In this case you have to take care in aligning the sensors parallel with the line from the muzzle to the target. The method for doing this is as follows:

1. Position the SuperChrono below the centre of the target, taking note of h2.
2. Align the unit with the line from the muzzle to the target. The sensors on the SuperChrono work either way, so to get a good alignment you can turn it around and aim it at your shooting position.
3. Use the spirit level to attain a horizontal alignment of the sensors and the bullet flight.
4. Shoot h2 above the SuperChrono.

In the figure you can see that there are two imaginary and level lines: the upper, which stretches from muzzle to target, and the lower, which is the sightline for the chronograph. When h1 = h2, you have a parallel setup.

The shorter the distance from the SuperChrono to the target, the more you have to ensure a parallel setup.

A hit zone is indicated in the figure below.



The distance h up or down from a true parallel bullet impact determines your precision. We use the same table as the one above. For a bullet speed of 2400 ft/s and target distance 100 yards, you can shoot 10 inches above or below the line from muzzle and target to get 99% precision or better.

Troubleshooting

We have tested the SuperChrono in all types of weather and have achieved reliable velocity readings even with rain or snow on the sensors. However, if you experience any problems, first check the batteries and make sure you are shooting inside the detection area.The detection area may be reduced for light loads or in rain or snow. Shoot closer to the sensors. If no shot is detected, the round is either traveling at a speed lower than Mach 1.1 or the sensors are in the sound shadow. Position the SuperChrono to detect the shockwave. Unexpected measurements: Position the unit further away from the muzzle, at least 10' or 3m.