Time-of-Flight Accessory

ME-6810A

About the product

The Time-of-Flight Accessory is built for use with PASCO projectile launchers and photogates. It consists of a piezoelectric speaker circuit mounted on a plastic plate. When a solid object hits the plate, the speaker circuit generates a photogate-like signal. The cable sends the signal to a timer or an interface. When the projectile launcher launches a ball, a photogate mounted on the front of the launcher sends a signal to start the timing. When the ball hits the Time-of-Flight Accessory, it sends a signal to stop the timing.

Required Items

- Projectile launcher
  Use either the Projectile Launcher (ME-6800) or the Mini Launcher (ME-6825B).
- Photogate system
  The Time-of-Flight Accessory needs to connect to a photogate system. Use one of the following configurations:
  - Wireless Smart Gate (PS-3225) with SPARKvue or PASCO Capstone
  - Smart Gate (PS-2180) with a PASPort interface, and SPARKvue or PASCO Capstone
  - 2×Photogate Heads (ME-9204) with a digital interface, and SPARKvue or PASCO Capstone
  - Smart Timer Photogate System (ME-8932)
- Photogate Mounting Bracket (ME-6821A)
  Use to mount photogates or a Smart Gate to the projectile launcher.

Smart Timer setup

Use this setup when using a Smart Timer to measure the time of flight.

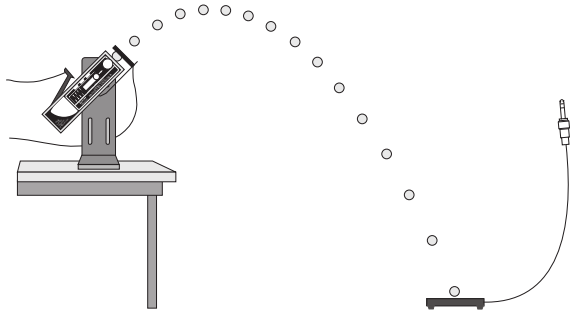

Figure 1. Time of flight setup using one photogate.

1. Attach the Photogate Mounting Bracket onto the projectile launcher.
2. Attach a Photogate Head to the bracket at the front of the launcher.
3. Connect the Photogate Head to channel 1 of the Smart Timer and the Time-of-Flight Accessory to channel 2.
4. Mount the launcher to a table and put the Time-of-Flight Accessory on the floor (**Figure 1**).
5. Set the Smart Timer measurement (button 1) to **Time** the mode (button 2) to **Two Gates**.
6. Press button 3 to activate the Smart Timer then launch the projectile.

Software timer setup

Use this setup when using software to measure the initial velocity and time of flight.

Set up the equipment

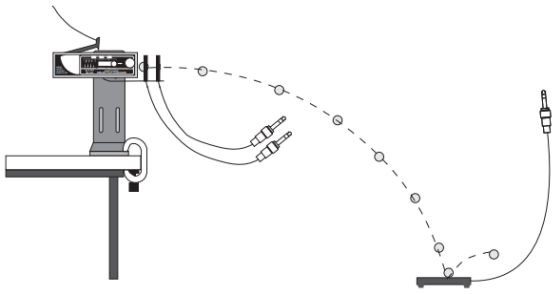

Figure 2. Time of flight setup using two photogates.

1. Attach the Photogate Mounting Bracket onto the projectile launcher.
2. Attach a Smart Gate or two Photogate Heads to the bracket in front of the launcher.
3. Assemble one of the following setups based on the equipment you have:
   - Connect the Time-of-Flight Accessory to the auxiliary port on the Wireless Smart Gate.
   - Connect the Smart Gate to a PASPort interface. Connect the Time-of-Flight Accessory to the auxiliary port on the Smart Gate.
   - Connect two Photogate Heads and the Time-of-Flight Accessory to the digital ports on an interface.
4. Mount the launcher to a table and put the Time-of-Flight Accessory on the floor (**Figure 2**).
5. Connect the Wireless Smart Gate or interface to SPARKvue or Capstone.
6. (Capstone only) Set up the timing devices in **Hardware Setup** based on the equipment you have:
   - Wireless Smart Gate and Smart Gate: Click port **3** then select **Time of Flight Accessory**.
   - Photogate Heads with an interface: Click port **1** then select **Photogate**, click port **2** then select **Photogate**, and click port **3** then select **Time of Flight Accessory**.

Set up the timer

Use either the PASCO Capstone or SPARKvue instructions.

PASCO Capstone

Click **Timer Setup** in the **Tools** palette to access the timer.

1. Select **Pre-Configured Timer**.
2. Select two photogates and the Time of Flight Accessory.
3. Select **Time of Flight** from the list.
4. Select the measurements you want to be visible.
5. Enter the **Photogate Spacing**. This is equal to the distance between the photogate beams (**Figure 3**). Capstone enters the value automatically when using a Smart Gate.
6. Give the timer a custom name or use the default name.

Click **Record** then launch the projectile. The timer starts when the projectile goes through the photogates and stops when it hits the Time-of-Flight Accessory.

SPARKvue

1. Click configure sensor .
2. Click **Smart Gate and Auxiliary Port** or **Two Photogates and Device**, select **Time of Flight**, then click **OK**.
3. Enter the **Photogate Spacing**. This is equal to the distance between the photogate beams (**Figure 3**). SPARKvue enters the value automatically when using a Smart Gate.
4. Select the measurements you want to display.
5. Select a template to display the selected measurements.

Click Start then launch the projectile. The timer starts when the projectile goes through the photogates and stops when it hits the Time-of-Flight Accessory.

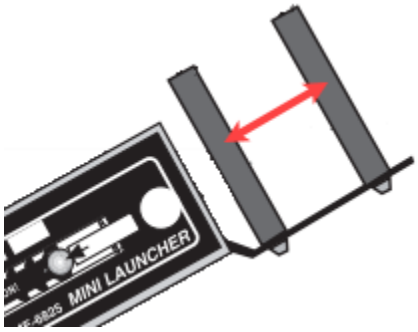

Figure 3. How to measure the photogate spacing.

Additional resources

Product information

Visit the product web page at **pasco.com/product/ME-6810A** for additional information including:

- Specifications
- Buying Guide
- Experiments
- Documents

Experiments

Print-ready experiment worksheets are available to download from the PASCO website. Go to **pasco.com/freelabs** and enter **ME-6810A** in the **Part No.** field.

Software help

Additional information on how to use the Time-of-Flight Accessory with SPARKvue and Capstone can be found in the SPARKvue and PASCO Capstone Help. The help can be accessed within the software or online.

SPARKvue

Software: Click then select **Help**.

Online: **pasco.com/help/sparkvue**

PASCO Capstone

Software: In the menu bar, click **Help** then select **PASCO Capstone Help**.

Online: **pasco.com/help/capstone**

Technical Support

Need more help? Our knowledgeable and friendly Technical Support staff is ready to provide assistance with this or any other PASCO product.

Phone (USA)	1-800-772-8700 (Option 4)
Phone (International)	+1 916 462 8384
Online	**pasco.com/support**

Regulatory information

Warranty, Copyright, and Trademarks

Limited Warranty

For a description of the product warranty, see the Warranty and Returns page at **www.pasco.com/legal**.

Copyright

Trademarks

Product end of life disposal instructions

This electronic product is subject to disposal and recycling regulations that vary by country and region. It is your responsibility to recycle your electronic equipment per your local environmental laws and regulations to ensure that it will be recycled in a manner that protects human health and the environment. To find out where you can drop off your waste equipment for recycling, please contact your local waste recycle or disposal service, or the place where you purchased the product.

The European Union WEEE (Waste Electronic and Electrical Equipment) symbol on the product or its packaging indicates that this product must not be disposed of in a standard waste container.