

## Using the Advanced Lightgates

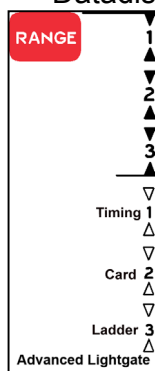
These teachers notes are designed to show:

- How to setup the Advanced Lightgates remotely, and using Datadisc Pt or Timing software (Datadisc or Logbook Timing).
- How to investigate the velocity of a car down a ramp both remotely and with Datadisc and a *Logbook* datalogger.

### Setting up the Advanced Lightgate

Before the using the Advanced Lightgate familiarise yourself with its design and operation:

- ✓ The lightgate is a reflective IR device, and has an IR transmitter adjacent to an IR sensor, which will detect IR reflected from a surface placed in front of it.
- ✓ The maximum distance between the lightgate and the reflecting surface depends upon the how good the surface is at reflecting IR.
- ✓ White is best and works up to 12cm, matt black is worst and works up to 5cm away.
- ✓ The Advanced Lightgate has three ranges, which can be set by pressing the 'RANGE' button on the body of the lightgate (see below-left). The range is shown by an LED on the lightgate body, next to the range numbers. These LEDs are powered when the lightgate is connected to a Logger which is metering, or to a computer with timing software running.
- ✓ **Range 1** is for using the lightgate as a digital 'Off-On' sensor. This range should be used in conjunction with timing software, either Datadisc Timing or Logbook Timing, or indeed with Datadisc Pt, for the advanced user.



- Note On range 1 the lightgates operate like any standard timing lightgate. For details of how to use lightgates in this mode see Teacher Notes 'g by freefall'. The Advanced Lightgates are not suitable for use remotely with a Logbook, on Range 1.
- ✓ **Range 2** is for using the Advanced Lightgate with a 'credit-card'-sized card. The lightgate will report the velocity, in m/s, of such a card as it pass the lightgate.
- ✓ **Range 3** is for using the Advanced Lightgate with a ScienceScope Timing Ladder. The Advanced Lightgate will report a series of velocities as the Ladder passes through the lightgate.

### Remote use of the Advanced Lightgate

- ✓ On Range 2, with the Advanced lightgates reporting velocity for a 'credit-card' sized card, the values of velocity can be seen on the meter screen of a Logbook. With 2 or more Advanced Lightgates plugged into a Logbook, the changing velocity of a trolley can be seen on Logbook meter screen, without connecting to a computer. The velocities can be logged and the results viewed later in Datadisc. The lightgate will output the velocity it has calculated for 2 seconds after the event.
- ✓ On Range 3, with the Advanced lightgates reporting velocity for a ScienceScope Timing Ladder, the values of velocity for the ladder can be recorded remotely, and the data can then be viewed in Datadisc and will show the acceleration of the ladder as it passes down past an Advanced Lightgate.

#### Equipment List:

- A *Logbook* SE,XD,ML,UL,WL a connection to the computer, a PC computer with **Datadisc** software installed.
- A *Logbook* Advanced Lightgate