



## Hazard Warning System

Accidental collisions of double-decker buses with low bridges are a recurring bus operator's nightmare. Passengers' lives are at risk and the operator can be liable to multi-million pound lawsuits.

The Hazard Warning System has been specifically designed to meet the needs of bus operators and to make use of recent improvements in accuracy of the GPS satellite navigation system.

It provides an audio/visual warning of the approach of a bus to a hazard. It is a completely self-contained system, it does not require connection to any other equipment, and operates completely autonomously. It does not require any input or control from the driver eliminating the possibility of erroneous input or accidental disabling of the system. The unit has also been designed to reduce the possibility of accidental or deliberate tampering with the alarm unit and its cables.



- The Hazard database can be configured to include directional information for each hazard. This can be useful for approaching one-way streets or where a low bridge is a hazard from one direction but not from another (e.g. a flyover).
- Hanover completed its first installation of a hazard warning system at Go-Ahead Gateshead in 1999. This system used radio beacons fitted to low bridges with a short range radio transmitter and receivers on the buses. Our new GPS system allows operation over much wider areas without having to rely on external infrastructure.

- The Hazard Warning System contains a built-in database of hazards the operator wishes to avoid.
- A hazard can be overhanging trees, a low bridge, a one way street, roadworks etc.
- There are four phases to the alarm - two warning visual indications from an ultra-bright red LED followed by two audible warnings from a high-power sounder as the bus approaches the hazard.



**NB.** Ultimately, the Hazard Warning System can only provide a warning, it cannot prevent a bus from physically hitting a hazard. The hazard warning system is a significant aid to safety but the ultimate responsibility for the vehicle remains with the driver. The product makes no connection to the basic driving circuits, brakes, steering or lighting.



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