

## UNIT-IV

### **Security and antitheft devices**

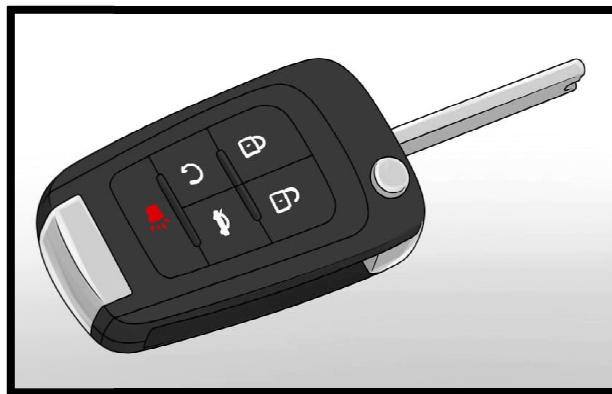
Every 50 seconds a car is stolen somewhere in the world. Although more than half of the million plus cars stolen every year whether they are luxury or sports cars, any vehicle can become a part of these statistics. However, there are some steps that can be taken to slow down thieves or even warn them off.

There are three basic types of antitheft devices available; locking devices, disabling devices, alarm systems. Many of the devices are available as OE from the manufacturers; others are after-market installed. Like other electrical systems, computers control antitheft devices. The sensors and relays can be checked with a digital multimeter and a jumper wire.

### **Locks**

A variety of locks are available that are designed to deny entry to the engine, passenger, and trunk compartments of the car as well as to prevent a thief from driving the car away. These locking systems include door and trunk locks, keyless entry systems, fuel tanks, light delay systems, and locking steering wheels. With locking steering wheels, when the ignition key is off, the steering wheel cannot be turned. A rack and sector are usually used to slide a steel pin into mesh with a slotted disc. Since the disc is splined to the steering shaft, the steering wheel does not turn.

### **Remote keyless system**



**Fig.6.1. Remote keyless system**

A smart entry system is an electronic lock that controls access to a building or vehicle without using a traditional mechanical key. The term keyless entry system originally meant a lock controlled by a keypad located at or near the driver's door, which required entering a predetermined (or self-programmed) numeric code.

The term remote keyless system (RKS), also called keyless entry or remote central locking, refers to a lock that uses an electronic remote control as a key which is activated by a handheld device or automatically by proximity.

Widely used in automobiles, an RKS performs the functions of a standard car key without physical contact. When within a few yards of the car, pressing a button on the remote can lock or unlock the doors, and may perform other functions. A remote keyless system can include both a remote keyless entry system (RKE), which unlocks the doors, and a remote keyless ignition system (RKI), which starts the engine.

### **Anti-Theft System**

An anti-theft system is any device or method used to prevent or detect the unauthorized appropriation of items considered valuable. Theft is one of the most common and oldest criminal behaviors. From the invention of the first lock and key to the introduction of RFID tags and biometric identification, anti-theft systems have evolved to match the introduction of new inventions to society and the resulting theft by others.

Anti-theft Under normal circumstances, theft is prevented simply through the application and social acceptance of property law. The best anti-theft device ownership is often indicated by means of visual marking (license plates, name tags). When clear owner identification is not possible and when there is a lack of social observance, people may be inclined to take possession of items to their own benefit at the expense of the original owner. Motive and opportunity are two enabling factors for theft. Given that motives for theft are varied and complex and are generally speaking not within the control of the victim, most methods of theft prevention rely on reducing opportunities for theft.

## Alarm Systems

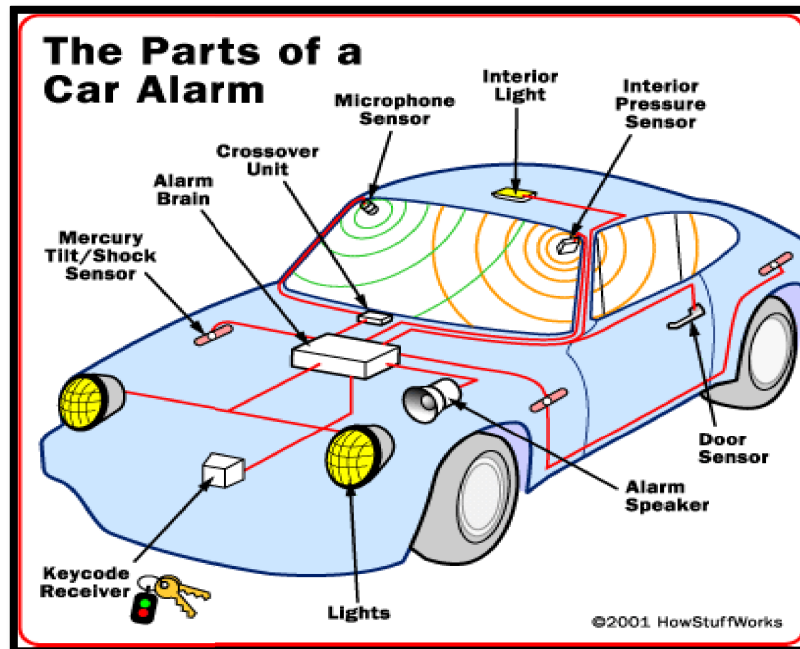


Fig.6.2. Alarm Systems

A car alarm is an electronic device installed in a vehicle in an attempt to discourage theft of the vehicle itself, its contents, or both. Car alarms work by emitting high-volume sound (often a vehicle-mounted siren, klaxon, pre-recorded verbal warning, the vehicle's own horn, or a combination of these) when the conditions necessary for triggering it are met. Such alarms may also cause the vehicle's headlights to flash, may notify the car's owner of the incident via a paging system, and may interrupt one or more electrical circuits necessary for the car to start. Although inexpensive to acquire and install, the effectiveness of such devices in deterring vehicle burglary or theft when their only effect is to emit sound appears to be negligible.

### Anti-theft alarm system

The motorcycle and car owners consider their possessions valuable. To prevent cars and motorcycles from being stolen, manufacturers use different methods. An 'Anti-theft alarm system' or Car Alarm is a type of device or method which prevents unauthorized access to a motorcycle or car. Hence, the manufacturers fit such a device to prevent it from being used by an unauthorized person. To facilitate this, they install various devices in cars.

Alarm system or Car Alarm work?

The Anti-theft alarm system works with the help of sensors installed in and around the vehicle. An impact or the movements inside the car activates the sensors. This, in turn, triggers the Anti-theft alarm system and sounds the alarm. The alarm goes off and alerts the owner/people. Even, the change in the vehicle's position can alert the tilt sensor and activates the anti-theft alarm system.

### Proximity Sensors

A proximity sensor is a sensor that is used to detect presence of nearby objects without coming into contact with the said object e.g. most cars have sensors that will let you know when you are about to hit an object like a curb or a wall. Therefore they are used to sense when your car gets too close to an object.

Using echo-times from sound waves that bounce off nearby objects, the sensors can identify how far away the vehicle is from said object, and alert the driver the closer the vehicle gets. Electromagnetic sensors create an electromagnetic field around the bumper, and offer an alert whenever objects enter it.

### Global Positioning System

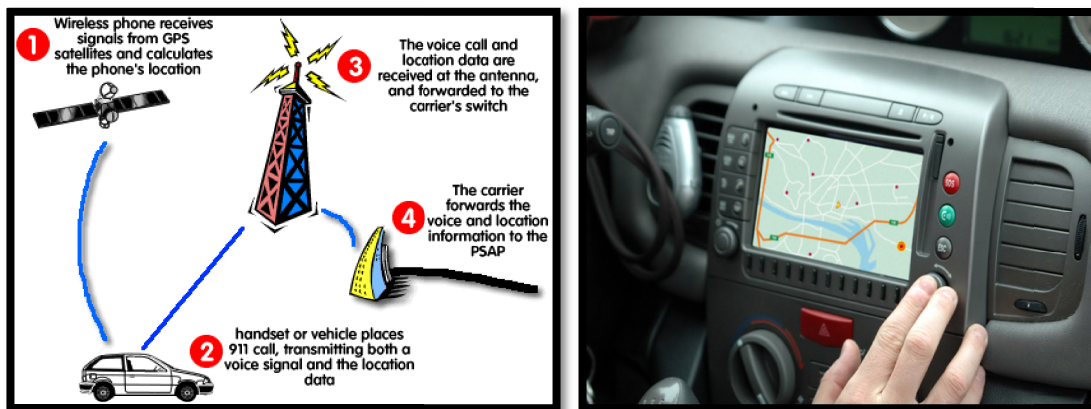


Fig.6.3 Global Positioning System

A GPS navigation device, GPS receiver, or simply GPS is a device that is capable of receiving information from GPS satellites and then to calculate the device's geographical position. Using suitable software, the device may display the position on a map, and it may offer directions. The Global Positioning System (GPS) is a global navigation satellite system (GNSS) made up of a network of a minimum of 24, but currently 30, satellites placed into orbit by the U.S. Department of Defense.

## **Automotive navigation system**

Using the GPS information and subject to the sophistication of installed GPS software, a GPS device used as an automobile navigation system may be used in a number of contexts, including:

- Maps, including street maps, displayed in human-readable format via text or in a graphical format,
- Turn-by-turn navigation directions to a human in charge of a vehicle or vessel via text or speech,
- Directions fed directly to an autonomous vehicle such as a robotic probe,
- Traffic congestion maps (depicting either historical or real-time data) and suggested alternative directions,
- Information on nearby amenities such as restaurants, fueling stations, and tourist attractions.

## **GPS devices may be able to indicate:**

- The roads or paths available,
- Traffic congestion and alternative routes,
- Roads or paths that might be taken to get to the destination,
- If some roads are busy (now or historically) the best route to take,
- The location of food, banks, hotels, fuel, airports or other places of interests,
- The shortest route between the two locations,
- The different options to drive on highway or back roads.