

ELE1EDP: Electronic Engineering Design Project: 2007

FIRE ALARM SPECIFICATIONS

A **prototype** for a **fire alarm system** suitable for a large house or a medium sized office or factory is to be implemented. It shall:

1. utilise a **JLAB board** (which incorporates a JSTAMP embedded processor);
2. be programmed in **Java**;
3. employ specified **peripheral hardware**.

The hardware shall include:

1. **Fire detectors**, one per **zone** of the building, emulated in the prototype by **push button** switches.
2. **Control switches** (as specified below).
3. A **local alarm** in the building, represented by a **buzzer**.
4. A **remote alarm** in a nearby fire station or security service, represented by a **siren**.
5. **LEDs** to indicate the condition of each **zone** and of other aspects of the **system** (q.v. below).

The operational requirements are as follows:

- (a) The system shall have at least **two detector inputs**, called alarm **zones**;
- (b) If any detector registers, even momentarily, the **local alarm** is to sound continuously, and a **telltale LED** for the appropriate zone is to be illuminated;
- (c) The **remote alarm** shall be activated immediately one of the following situations occurs:
 - i. **detectors on more than one zone** have triggered (not necessarily at the same moment), or
 - ii. the **local alarm** has sounded continuously for **8 seconds** without being reset, or
 - iii. the “**call fire brigade**” (**panic**) **button** on the control panel has been pressed;
- (d) Once activated, the alarms must continue to sound, and the indicator lights are to remain illuminated, until the **reset button** is pressed;
- (e) The system shall have a **test mode** in which the *alarms* are *disabled*, but the **indicator LEDs will light up** as per normal operation;
- (f) The system can **enter test mode** *only if* **both alarms are off**.
- (g) If the system is **left in test mode** for longer than **sixteen (16) seconds**, then the **local alarm** will sound a **warning tone** (i.e. bursts of **one second on, one second off**);
- (h) A **status LED** will indicate the current status of the system, which will be one of:
 - i. **on – normal** operation;
 - ii. **off – no power** to system;
 - iii. **flashing – test mode**.

Once a design meeting the above specifications has been produced, students are encouraged to add appropriate enhancements to their system. **Bonus** marks may be awarded for initiative and for innovative designs.