

## Experiment # 8

### WATER ALERT SYSTEM

#### INTRODUCTION:

A water alert system is no more than a water-level alarm system, which will prevent expensive water damage at home. Also it relieves you from having to mop up the floor when a bathtub overflows. Moreover, if you have problems with water getting into your basement, you can set up the system to notify you the instant that water seeps in. In general, the system can be used to monitor the water level wherever you like to do so.

#### THE CIRCUIT:

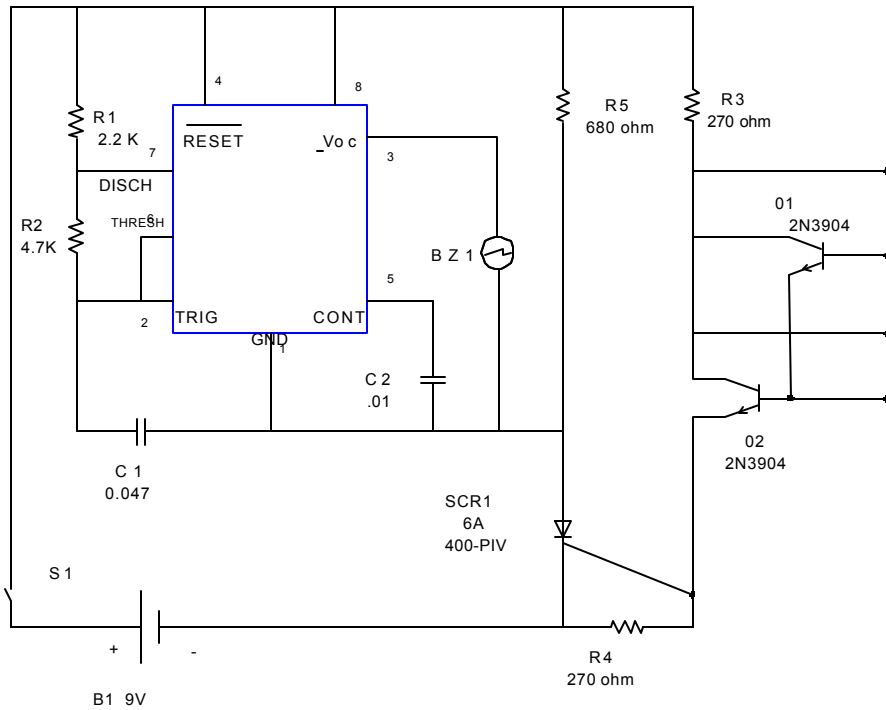
The circuit is shown in Fig. 1. The circuit can be divided into two parts: an annunciator and a water detector. The water detector shown has both a normal-sensitivity input, which is good for most applications, and a high-gain input. The high gain input can be useful for testing fluids with a very high resistivity, such as very pure water. Furthermore, it may be necessary to use the high-gain input if the 2N3904 NPN transistors have a low gain (below 100). The high-gain input overcomes the problems caused by weak transistors by combining Q1 and Q2 to form a Darlington pair. It is always a good idea to test the effectiveness of both inputs to determine what is needed for a particular application. It is always recommended to use separate probe leads when you decide to use the high gain input; do not use twisted leads. If the gap between the input terminals that you use is bridged by fluid, the slight amount of current that flows through it will be greatly amplified. So Q1 will allow plenty of current to flow to the gate of the SCR to turn it on.

When the SCR turns on, it grounds the annunciator circuit, turning it on. Resistor R6 provides enough current to latch the SCR on when it is triggered. The rest of the circuit is the annunciator which is built around the 555 timer. The 555 timer drives the piezoelectric crystal (BZ) at around 2 KHz to produce an alarming sound that can be easily heard from another room.

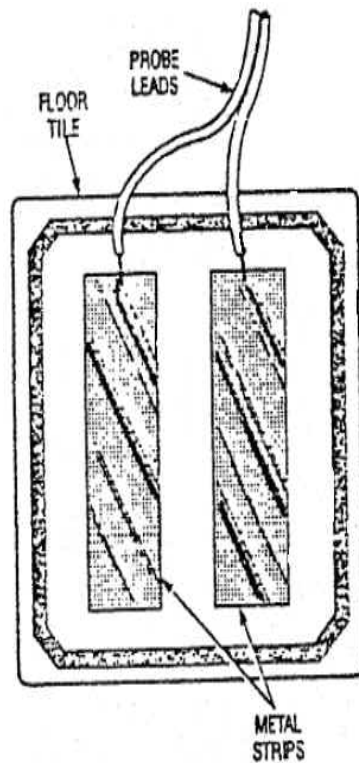
#### EXPERIMENT

Fig. 2 shows a possible construction for the probe which will sense the presence of water. It is made from two metal strips to be mounted to the floor or any surface. In the laboratory we will try to simulate a practical situation say by using a cup of water and immersing the two leads in water to check the operation of the circuit.

**YOU ARE REQUESTED TO BUILD THE CIRCUIT, TO CHECK ITS OPERATION AND TO COMMENT ON YOUR OBSERVATIONS.**



**Fig 1: Water Alert System**



- Parts List
- 2N3904 General Purpose small signal NPN
  - SCR — 6Amp, 400 PIV, silicon controlled rectifier
  - All resistors 1/4 W
  - BZ 1 Piezoelectric instrument

**Fig.2: Probe to Sense the Presence of Water**