METHOD FOR DETECTING A LIQUID SPILL AND MITIGATING THE DAMAGE ON A NOTEBOOK

HP INC
Method for Detecting a Liquid Spill and Mitigating the Damage on a Notebook

Abstract

A method for detection of a liquid spill and mitigating the damage associated with the liquid on a notebook. The disclosed solution can be broken down into three logical main components, spill detection, damage prevention and remediation. When a spill is detected, the logic will notify the user, then shutdown the system and begin to trigger the notebook fans to MAX speed until the spill is no longer detected.

Liquid Detection:

The notebook would contain multiple drip sensors in an around the keyboard, as well as on the motherboard itself. The keyboard here is a focus because it has likely the largest surface on the notebooks and is therefore susceptible to accidental spillage of liquid by the user. The keyboard already has a series of traces to detect each key press, and so leveraging the keyboard design to include dip sensors would be very efficient and low cost. In addition, the keyboard is typically connected to a keyboard controller that is likely running in all system power states, and therefore could conceivably protect the unit in the OFF states as well.

Figure 1: If a spill is detected the notebook will notify the user before shutting down completely.

Damage Prevention:

Once the spill detection is triggered the notebook would try and mitigate potential damage by first notifying the user via a display notification and then shutting off all power to the system. By
removing all power to the system, the system is less likely to have any power shorts or data losses impacted by the liquid spillage.

Figure 2: A simple circuit allows the system to power off, while having independent power source for the spill detection sensor and fan.

Remediation:

The third component is to try and evaporate the liquid in the system. This can be handled by a dedicated circuit so that the entire system is in an OFF state and allows for both the spill detection sensor and fan to be independently and directly powered from the battery. Once triggered, no matter the power state of the system, the fan is paced in MAX speed state and only shuts down there is no longer any spill being detected, and thereby the internal system is dry. Once the system is dry, the user can then again power on the system and work as normal.
Figure 3: A flow chart showing the steps needed for spill detection and damage mitigation.

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