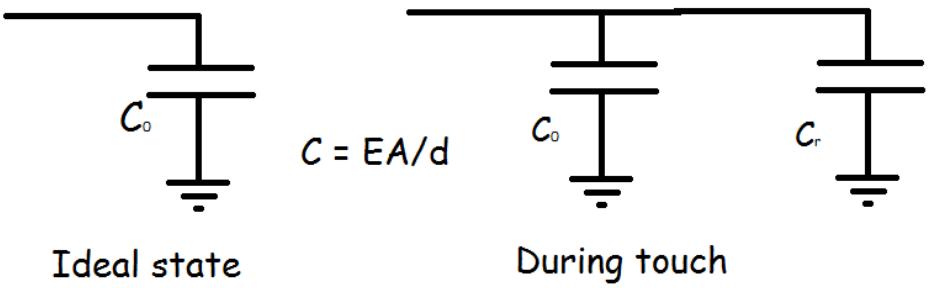
FLEXIBLE CAPACITIVE TOUCH SENSOR

OBJECTIVE

Nowadays, touch sensors are slowly replacing button interface. But still, because of its cost and its fragile nature, touch sensors are not preferred in many day to day appliances like TV remote or ASCII keyboard in laptops. The objective of this project is to create a low-cost, easy to manufacture, but rugged touch sensor that can be implemented almost anywhere.

DESIGN

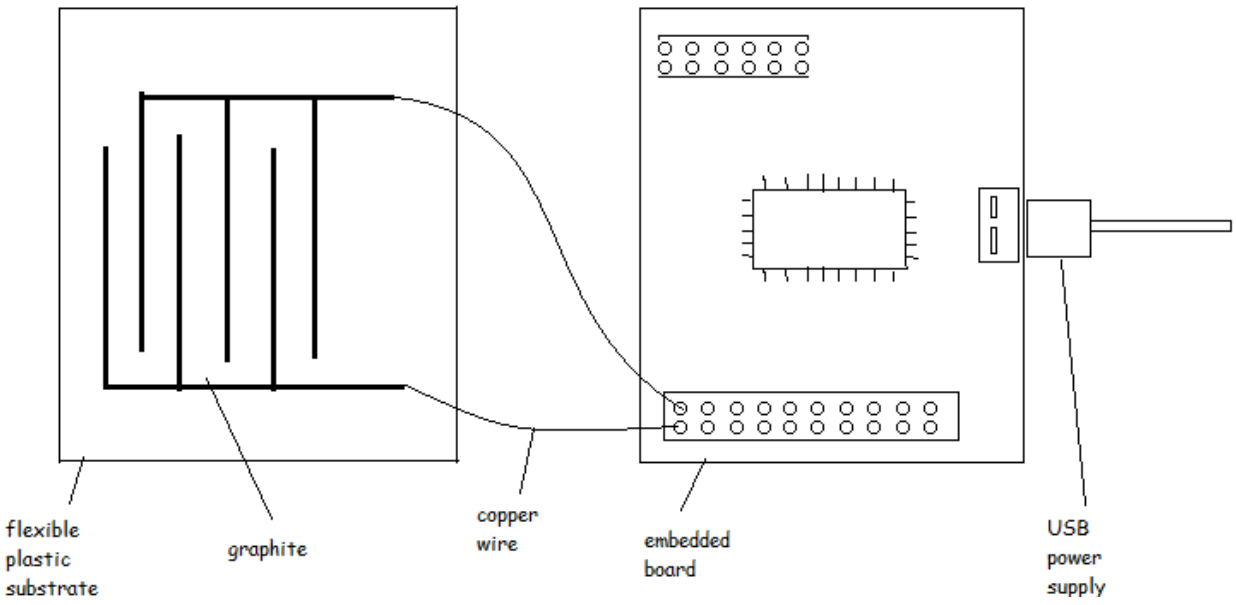
Our concept is to create a flexible capacitive touch sensor, using graphite and plastic sheet. Graphite is first grinded and made into a powder. The substrate is a plastic sheet, onto which, liquid glue is applied. The graphite powder is applied in the shape of grills/fins with 1 mm gap between the grills. This forms a capacitor. When the human finger touches the capacitor, there is a minute(in femto Farad) change in capacitance.



This capacitor is connected with a tiny SMT chip (“SAM D20 J18” in our implementation) in which, the program will run to check/sense the change in capacitance. This, in turn, will report to the user through LED (our implementation). This concept may be extended to the communication of the chip to any other adjacent device (like smartphone or PDA) via Bluetooth, or communication to cloud (IOT).

IMPLEMENTATION

The chip used in our project is Atmel SAM D20 J18 and the evaluation kit (embedded board) used is SAM D20 XPLAINED PRO. The power source for the board is through USB from a laptop/computer. The wires used for connecting the board and the capacitor is ordinary low-resistive copper wires. The conductor used is graphite powder and the substrate is plastic sheet.



SUMMARY OF THE PROJECT

The demo of the implementation will be shown. The requirement for the demo is a USB power supply from a PC or from an ordinary 5A socket, a mobile phone's charger adapter can be used as a USB power supply.

CONCLUSION

Since graphite is used in the form of powder and the substrate (plastic sheet) is flexible, the whole capacitive sensor is flexible and it has high tensile strength. It has many advantages:

- Very cost-effective.
- Flexible.
- Simple to construct.

It can be used in variety of applications:

- Can be embedded into the cloth.
- Can be used as a wrist band.
- Bendable ASCII touch keyboard (in roll-able computers).

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