Abstract:

The modern Smartphone design are quite complex. The complexity of design in terms of tight integration of all the functional modules that are collectively responsible for the Smartphone functioning. Due to this tight integration of functional modules, the normal Smartphone users are unable to interpret the entirety of the design. This leads to security issue as the design is not understandable. Furthermore, this complex design has not been much user friendly as it has increased the booting time. The main aim of this project lies in deriving a simple and secured design of Smartphone which provides the precise understandability to the user. As, a result, the user can be aware of hardware and software functioning involved in the functioning of the Smartphone.

The initial design consideration for this project was employing the modular phones as platform. The detailed discussion regarding the modular phones has been included in the later section of the report. Considering the Fairphone 2 (modular phone) as platform for wider secure mobile computing efforts within the mobile telecommunication laboratory and this involved designing and performing the rudimentary functional testing for replacement of main board for Fairphone 2. Basically, the plan was to replace the existing main PCB of the Fairphone 2 with new PCB incorporating an FPGA, small external memory and cellular radio which leads to the interest of creating an FPGA based Smartphone platform. But, in the way of doing so, liaising with the Fairphone 2 manufacturers were necessary and this did not happen as company was unwilling to provide the necessary information. Consequently, the plan had to be terminated.

The other approach to proceed with implementing the proposed design was by considering the process of designing the Smartphone from scratch. Each component that are necessary for the proposed design are selected individually by setting certain criteria to meet the design requirement. The simplicity design concept guarantees understandability and this solves the issue of security. In the way of providing the understandability, 8-bit computer design were reviewed, as these computers are the only rationally trustable computers. The MEGA65 computer design derived within the telecommunication laboratory is the foundation for this project of designing a simple and secured Smartphone, which is coined as, MEGAphone.

After the final selection of the necessary components for the functionality of the MEGAphone, the functional features for the MEGAphone has been framed and the selected components pinouts are considered for deriving the schematic. The integrated schematic design was the main target, due to various design challenges and time constraint, the main functional blocks individual schematics has only been derived. The entire design involves single serial interface approach and this ensures the design simplicity and thereby facilitating the user to easily interpret the design and make informed deduction about its security and other properties.