Graphical LCD and memory stick based tilt operated Textbook reading system

The project aims in designing a Graphical LCD based tilt operated text book with large storage capacity. Currently, most students purchase their books on campus, where new and used copies are available, at the end of the semester; students can sell their books back to the school. For decades, this has been the routine. More recently, however, the words "e-textbook" has created a buzz around campus. E-textbooks have been available for some time now, and are currently purchased for use on a laptop or desktop for about half the price of the print book version. Electronic textbooks are an excellent alternative to print books since with them, a student can search for a specific word or topic, copy/paste text into their coursework, comment within the textbook, and enjoy a lighter backpack. Students may copy and paste parts of the textbook into a word-processing application for safekeeping. Additionally, students must choose if they'd like to download the book and view it on one computer, or access it online from any computer--they can't choose both. Students can take notes on their laptop or Net book in class, while referencing the textbook in another window.

We developed a basic e-textbook reader that consists of MMC/SD memory card that consists of some text material. This text can be read by the microcontroller and displays on graphical LCD for reading purpose. The text into the MMC/SD card can be copied from the computer. Any text files of any size can be copied on to the memory card. Microcontroller reads the contents of the file and displays on graphical display. It also provides the facility to navigate the book forward and backward.

In this project, a MEMS accelerometer sensor is used to move upwards or downwards. MEMS accelerometer sensor is a transducer which is capable of detecting the tilt. By using this we can control the upward or downward movement of pages in the GLCD screen.

Features:

1. Touch screen based Graphical interface.
2. Memory provided for storage.
3. Low power consumption.
4. Reliable for student needs.

The project focuses on the following areas:

1. Characteristics of Touch sensor.
2. MEMS accelerometer sensor.
3. MMC card interfacing with controller.
4. SPI protocol implementation.
5. Embedded C programming.
6. PCB design.

The major building blocks of this system are:

1. Regulated Power Supply.
2. Microcontroller.
3. MMC/SD with driver.
4. Graphical LCD with driver.
5. Buzzer with driver.
6. LED Indicators.
7. MEMS accelerometer sensor
8. Crystal oscillator.

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Software's used:

1.   PIC-C compiler for Embedded C programming.

2.   PIC kit 2 programmer for dumping code into Micro controller.

3.   Express SCH for Circuit design.

4.   Proteus for hardware simulation.

Regulated Power Supply:

5v DC

```
Step down   →   Rectifier   →   Filters   →   Regulator   →
transformer
```
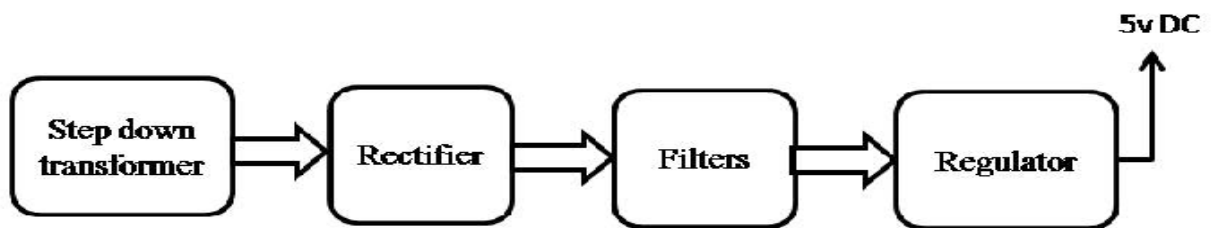
Block diagram:

Graphical LCD and memory stick(MMC/SD card) based tilt operated text book reading system

```
                    ┌──────────────────────────┐
                    │ Regulated power supply   │
                    └──────────────────────────┘
                                 │
┌──────────────┐   ┌─────┐   ┌────────────┐   ┌──────────────┐   ┌──────────┐
│ MEMS         │→  │ ADC │→  │            │→  │ Graphical    │→  │ Graphical│
│ Accelerometer│   └─────┘   │            │   │ LCD driver   │   │ LCD      │
└──────────────┘            │            │   └──────────────┘   └──────────┘
                            │   Micro    │
┌────────┐  ┌──────────┐    │ controller │   ┌──────────┐   ┌──────────┐
│ Buzzer │← │ Buzzer   │←   │            │⇄  │ MMC      │⇄ │ MMC/SD   │
└────────┘  │ driver   │    │            │   │ driver   │   │ card     │
            └──────────┘    │            │   └──────────┘   └──────────┘
                            │            │
┌─────────────────────┐     │            │   ┌──────────────┐
│ Crystal Oscillator  │→    │            │→  │ LED indicator│
└─────────────────────┘     └────────────┘   └──────────────┘
```

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