Dual-Screen Tablet, Multi-purpose Device

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Abstract:- A dual-display device is designed and described in this paper. The device sports multiple features and combines an E-Ink display (secondary) with a regular IPS LCD display (primary) along with a hand-jack, a flip-cover and an auto switch mode. This paper describes the functionalities, features and the design in detail.

Keywords:- E-ink display, Dual-display, hand-jack, flip-cover, tablet.

I.   INTRODUCTION

Smartphones and tablets have completely revolutionized the twenty first century. With new features and benefits erupting every few months, and the price of gadgets reducing daily, they have made their way into hands of millions of people across the globe who depend on these gadgets for various tasks in their day to day life.

With tablets getting more powerful in terms of computing power and memory storage capacity. The size proportionally getting sleeker and lighter, new features are required which would benefit the people even more. Thus, keeping the various needs and requirements of students and working professionals in mind, a new feature was thought of to be implemented specifically in a tablet.

Therefore, we have designed a "dual-screen" Tablet pc which packs two screens into one cohesive package. A primary full colour LCD Display which enables the user to perform the usual tasks like viewing multimedia, playing games or managing various applications is provided while the secondary black and white display doubles up and switches the tablet into "reading mode".

The device sports two individual displays connected to a single motherboard. The main goal of the dual-display device is to provide each display for a different purpose as per the requirement of the user. The tablet requires two displays: a primary display for multimedia and applications and a secondary e-ink display for reading purposes.

Our device also consists of a hand-jack, which can be clasped onto the user's hand. This allows the user to freely read and move as the tablet gets attached and is thus prevented from falling. When not required, the hand-jack is fitted into the side and top rim of the tablet.

Flip-cover is the third feature of the tablet. This cover is used to cover the non-functioning screen. The cover helps to activate the sensors and it helps the tablet realise as to which screen is not in use.
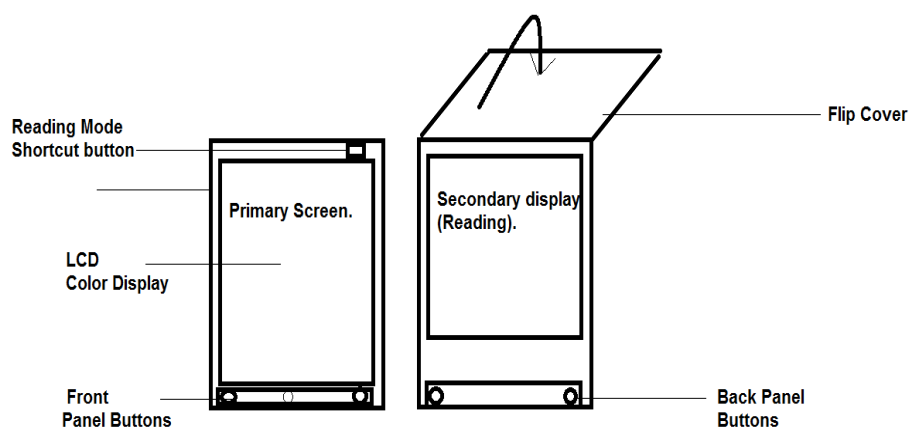
The figure above portrays the tablet from a front view: the following labels are highlighted:

- Primary Display: The multimedia based screen wherein the user will run various applications. This screen is mainly an LCD screen. It has good graphics and can be used for day to day activities of the tablet user.

- Secondary Display: Reading screen to be used for E-books and other reading material. The screen is similar to ones present in E-book readers.

A list of the features is described as follows:
- Reading Mode: A secondary (E-Ink-Reader) display meant for reading purposes which consumes less power as well as less strain on the eye.
- Primary Mode: Basic tablet features like viewing multi-media and operating a variety of applications and games.
- Flip cover: A Magnetic flip cover to protect the screen which is not in use.
- Hand-Jack: Special grip lever situated at the side rim of the tablet which allows a user to insert his/her palm and lock the tablet making it easier to read as well as providing a better grip.
- Expandable Memory: The tablet can support a memory expansion of up to 32 GB via micro SD cards.
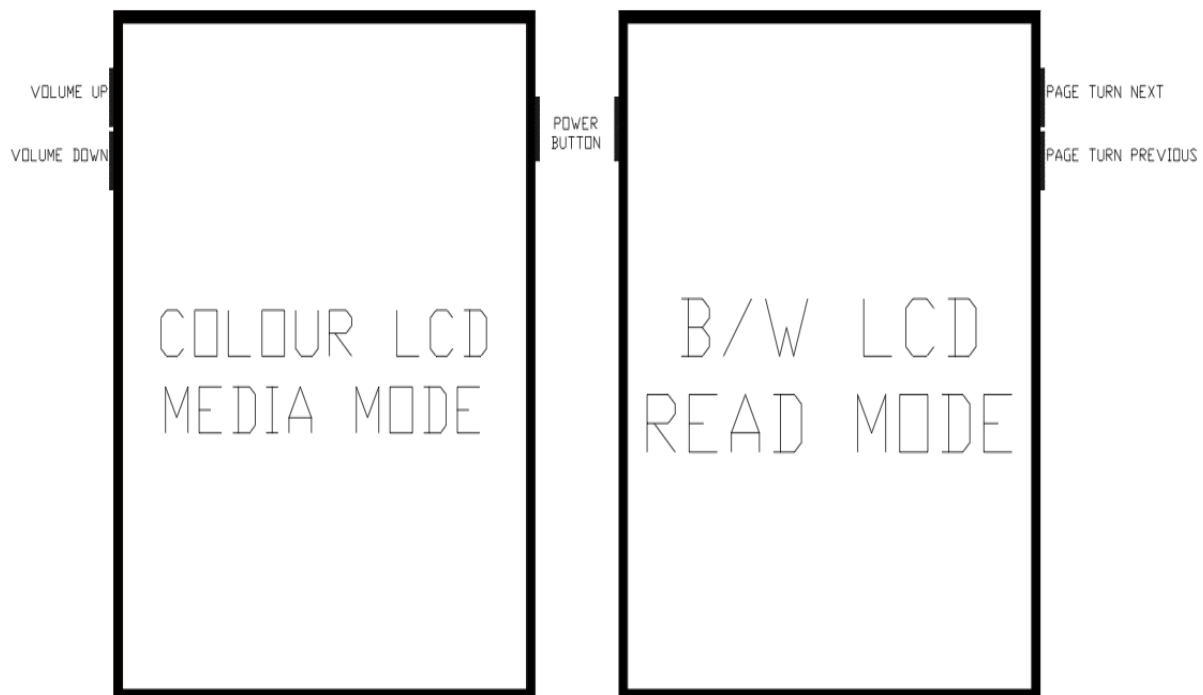
II. MATERIALS AND METHODS

Beaglebone black (BeagleBoard, Texas, USA) was used as the central processing unit (CPU), an LCD was our primary display and the secondary display was an e-book reader screen. Using the beaglebone we could mirror the display out, onto both the screens.

The display is split into parts, with the help of the beaglebone black. The different ports of the beaglebone are used to split the display and to mirror it onto the other display screen. To know, which screen the user is currently using, we customised the flip cover. The flip cover works with the help of the sensors. The sensors detect if a particular screen is being used or not. Depending on the position of the flip cover, it switches off one screen and switches the other on. A toggle switch is an alternative to the flip cover. The toggle switch helps the user to manually switch the display. So if the user wants to read documents then he can use the toggle switch to move onto the e-book Reader screen. Incase the user wants to play games or watch movies, then he can switch over to to the LED screen.

The basic designs of the device were made using Solid works Pro design tool.

III. RESULTS

The following designs were devised using Solid works:

Fig.1: Front and Back view of the device.

POWER
BUTTON

VOLUME UP/PAGE TURN NEXT

VOLUME DOWN/PAGE TURN PREVIOUS

HANDJACK

MAGNETIC FLIP COVER ON COLOUR LCD

HANDJACK   POWER
                  BUTTON

B/W LCD IN USE

COLOUR LCD IN USE

HANDJACK   POWER
                  BUTTON

MAGNETIC FLIP COVER ON B/W LCD

Fig.2: Side views of the device.

POWER
BUTTON

COLOUR LCD IN USE
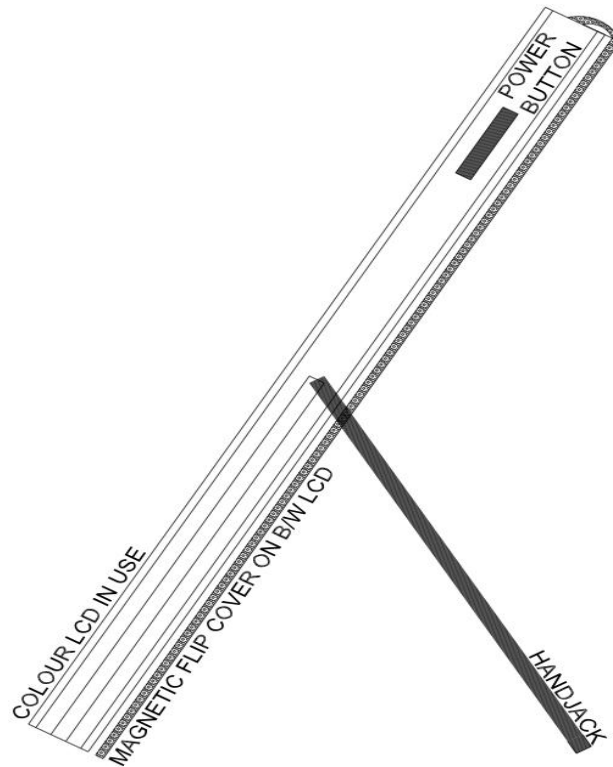
MAGNETIC FLIP COVER ON B/W LCD

HANDJACK

Fig.3: Side view with hand-jack.

IV.   CONCLUSIONS

The future potential of the device is tremendous. Since such a product is not yet available in the market, this device could be welcomed by the people as something different in comparison with the existing products and designs!

Also, as more and more people start using the E-Reading platform, we are hopeful that our product will help more people get accustomed to this mechanism!

Our tablet is overall very beneficial as-

- It saves on the power consumption(e-book reader consumes negligible power)
- Does not cause excessive strain on the eyes, when reading documents etc
- Hand jack gives the user the freedom to be on the move and yet use the tablet.

All these and more, make our tablet a unique product. We would further implement some more functionalities as its future scope.