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| **E-Paper Display Unit – Android Interface Definition** |
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| KL  11-1-2015 |

Document history

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# Introduction

This project is to create a simple E-paper display system which consists of an e-paper display unit embedded in a mobile phone cover case that can be attached to an Android mobile device via Bluetooth for leisure reading.

# Functional requirements

The e-paper display unit shall be able to display an ebook content on an e-paper display (dimension 4.3”).

The content of the book shall be transmitted from an Android mobile phone application.

The Android phone application shall provide a simple user interface to read an epub format book.

The e-paper display unit shall be paired with the Android phone via Bluetooth connection.

The system shall provide a mechanism for scrolling backward/forward a single page (i.e. using physical button on the e-paper display unit or volume up/down on the Android phone).

The e-paper display unit shall be embedded into a flip case/cover case for an Android phone.

The e-paper display unit shall operate using an independent source of power (i.e. coin cell, Li-ion battery).

The first prototype shall be designed to accommodate the requirement in this document.

Optional requirement:

It shall have the ability to accommodate the expansion for future development outlined in section 6.

# Technical requirements

## E-paper display unit (EDU) functions

The EDU shall:

* Use Bluetooth Low Energy v4.1 protocol.
* Have and on/off button.
* Have two buttons for next/previous page control.
* Have the ability to pair with an Android mobile phone via Bluetooth connection.
* Display epub-format ebook from a reader Android application.
* Embedded in a flip/cover case.
* Operate while the mobile device screen is locked.
* Battery-operate for at least 8 hours.
* Able to display text in English.
* Have Bluetooth connection indication in the form of an LED.

## Android EDU Application functions

The Android EDU application shall:

* Capable of processing ebooks in epub format:
  + List books stored in internal storage of the phone.
  + User can select and open a book.
  + Bookmarking facility.
* Handshaking with e-paper display unit.
* Listen to button commands while the Android phone is in locked state.

# User stories

While Alice is in her living room, she takes out her EDU that has been embedded into her phone case. She wants to read a novel in epub format that is stored on her Android mobile phone. She opens the EDU app and browses for the novel.

Then Alice switch on her EDU, it started blinking blue to indicate that the Bluetooth connection is active. Using the Android mobile phone, the EDU is paired and recognised by the application. Now the Bluetooth indicator on the EDU blinks once every five seconds to indicate a stable connection has been established.

Alice then starts reading the book from the start (or from a bookmarked page) using a ‘start reading’ button. The current page is then displayed on the EDU. Alice can now lock her mobile phone and continue reading. She can go forward/backward one page at a time using the buttons on the EDU.

When Alice finishes reading, she can unlock her mobile phone and server the Bluetooth connection. The EDU can now be switched off.

# Constrains

Due to the prototyping nature of the project, the e-paper reader system shall be constrained to process and display epub format only. Minimum control shall be accommodated until further development.

For the first prototype, the goal is simply display text on the EDU. No persistent memory unit (SD card or external flash IC) is supported.

# Further development

EDU:

Have the ability to display bitmap image.

Able to display Chinese text.

Android app:

Have the ability to process more ebook format: pdf,