Project title: **Interactive reading application**

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2. *Abstract:*

Using XMC4500 Relax Kit and the HMI OLED V1 , the application we wrote is meant to help the user read an article or any other simple document. At this point, it is capable to read it from the code written on XMC microcontroller, but with the help of a wireless connection, it can be easily made to read anything online. Also, the application can display a GIF.

3. *Introduction, project aims and objectives*:

The hardware components we had access to are useful in developing almost any kind of applications, from blinky led to others much more complicated, such as controllers of a smart home or portable devices. We thought about trying to write code to help people read articles without the need of a gadget. The objectives were to use the display (HMI OLED V1) to show some text, writing code on the XMC4500 Relax Kit microcontroller.

4. *System overview*:

The system is completely made from the XMC4500 Relax Kit microcontroller (ARM® Cortex™-M4F based) connected with the HMI OLED V1 to use its display (Passive Matrix OLED Display, size: 1.54", 160x128 pixel). Using DAVE 3 tool, we wrote code on the Relax Kit microcontroller to show on the display, at a maximum possible size, given the reduced dimensions of the component, some text or a GIF.

5. *Schematics and components*:

The scheme of the connection is as in the following table:

HMI OLED V1	XMC4500 Relax Kit
Pin 1	GND
Pin 24	P3.1
Pin 31	P0.9
Pin 32	P0.1
Pin 34	P0.0
Pin 36	P0.10
Pin 42	RST#
Pin 43	VDD 5

6. *Software*:

The software consists of C code, written on DAVE 3, which is meant to set font, size and color of the text and to show it on the connected display. In order to achieve that, it is necessary to import the GUI library. As well as that, we made an array of strings, for this example, containing a few lines with the maximum number of characters which can be displayed on a single row of the OLED .

To configure text parameters, we used code lines such as:

GUI_SetFont(&GUI_Font10_1); // set font to the dimension of 10

GUI_SetColor(GUI_RED); // set red color for the displayed text

GUI_DispStringAt("Overview XMC4500 Relax Kit", 5, 18); // show text at the described

//position

There are many other fonts and colors to be used, this is just an example, which will write red text, at (5,18). In order to start the reading, the user needs to press button 1, then if he wants to see the next page, he will use button 2. He can also go back to the previous page, pressing button 1. At the end of the article, one GIF will be displayed.

In order to show the GIFs, we converted the graphics to hexadecimal and saved it inside the code. The function used to show the loading GIF is as it follows:

```
void showGIF(const char * pFile, int FileSize, int X, int Y) {

        GUI_GIF_IMAGE_INFO ImageInfo = {0}; // Info struct of one GIF image of the GIF file

        GUI_GIF_INFO  GifInfo  = {0};           // Info structure of GIF file

        int  i, j;

        GUI_GIF_GetInfo(pFile, FileSize, &GifInfo);    // Get GIF info structure

        for (i = 0; i < 2; i++) {                              // Show the complete GIF 2 times

           for (j = 0; j < (GifInfo.NumImages -1); j++) {

            GUI_GIF_DrawSub(pFile, FileSize, X, Y, j);   // Draw sub image

            GUI_GIF_GetImageInfo(pFile, FileSize, &ImageInfo, j); // Get sub image information

              GUI_Delay(ImageInfo.Delay ? ImageInfo.Delay * 10 : 100); // Use the Delay member

                                              // of the ImageInfo structure for waiting a while

           }

        }
}
```

7. *Project results & applications* :

This kind of application can be used on multiple ways, such as: book reader (take as an example Kindle from Amazon), mobile internet browser, train station display with information for travelers, mall display (with advertising or guides), free internet browsing in a café and so on.

8. *References*:

1. **www.embedac.ro,**
2. **www.infineon.com,**
3. **www.segger.com**